

Passera per a bicicletes i vianants a Can Sant Joan a Sant Cugat del Vallés



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Relació de documents i volums

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Annex 11

Estructures i murs (part 1)

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APÈNDIX 1 – BASES DE CàLCUL

APÈNDIX 2 – TAULER MIXT

APÈNDIX 3 – GELOSIES METÀL·LIQUES

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01. Bases de càlcul

El càlcul de les estructures i l'anàlisi dels resultats se ha dut a terme en base als criteris generals de la Resistència dels Materials, Elasticitat i Plasticitat.

El procés de dimensionament i verificació de l'estructura atén, a nivell estructural i seccional, al mètode dels estats límits.

Estats Límits de Servei (ELS): Sota les combinacions més desfavorables d'accions, amb el seu valor característic i amb característiques no minorades dels materials, es verifica el comportament de l'estructura, no sobrepassant uns valors límits admissibles de deformacions, tensions, desplaçaments i vibracions, prescrits en les instruccions, normatives i codis descrits a continuació.

Estats Límits Últims (ELU): Sota les combinacions més desfavorables d'accions ponderades, els valors de càlcul de les sol·licitacions seccionals pèssimes no deuen superar la resposta última seccional, considerant aquesta com la resistència minorada dels materials.

L'anàlisi de les estructures s'ha realitzat amb diferents models d'elements finits. La utilització de cada model es troba degudament justificada per la seva contrastació pràctica.

Addicionalment, s'efectuen càlculs manuals per al dimensionament i verificació de les estructures o parts de les mateixes. Al llarg de les diferents parts del present Annex de Càlcul, es desenvolupen amb major detall les hipòtesi, criteris i simplificacions adoptades.

02. Instruccions i normatives considerades

Per al desenvolupament d'aquest Annex s'han considerat les següents recomanacions i normatives:

02. 01. Accions

- Instrucción sobre las acciones a considerar en el proyecto de puentes de carretera IAP11
- EC8 – Proyecto de estructuras sismorresistentes UNE-EN 1998-1:2018 Regles generals, accions sísmiques i regles per edificació i UNE-EN 1998-2:2018 Ponts

02. 02. Estructures de formigó armat

- Código Estructural, RD 470/2021 de 29 de juny de 2021.
- EC2 – Projecte d'estructures de formigó UNE-EN 1992-1-1:2013 Regles generals i regles per edificació i UNE-EN 1992-2:2013 Ponts de formigó

02. 03. Estructures metàl·liques i mixtes

- Código Estructural, RD 470/2021 de 29 de juny de 2021.
- EC3 – Projecte d'estructures d'acer UNE-EN 1993-1-1:2013 Regles generals i regles per edificació i UNE-EN 1993-2:2013 Ponts
- EC4 – Projecte d'estructures mixtes d'acer i formigó UNE-EN 1994-1-1:2013 Regles generals i regles per edificació i UNE-EN 1994-2:2013 Ponts

02. 04. Fonamentacions

- EC7 – Projecte geotècnic UNE-EN 1997-1:2016 Regles generals

D'acord a la Ordre Circular 1/2019 de 25 de març sobre “Aplicación de los Eurocódigos a los proyectos de carreteras”, el projecte de ponts de la xarxa de carreteres de l'Estat ha de complir amb els Eurocodis, juntament amb els Annexes Nacionals. Igualment, l'Article 3 del Código Estructural assenyala els Eurocodis estructurals, juntament amb els Annexes Nacionals, com un mitjà per a demostrar el compliment de les exigències del Código Estructural.

D'altra banda, el RD 470/2021 de 29 de juny pel que s'aprova el Código Estructural indica a la seva disposició addicional segona que quan es projecta amb els Eurocodis s'han de complir també les prescripcions recollides al CE relatives a materials, durabilitat, execució, control de qualitat i manteniment de l'estructura.

03. Descripció de l'estructura

La solució estructural proposada consisteix en un tauler continu de planta corba amb un radi de 220 metres, sostingut per dues gelosies metàl·liques de gran cantell, amb una altura variable entre 1,50 i 3,45 metres respecte al paviment. Aquestes gelosies, lleugerament inclinades, defineixen una estructura de 193 metres de longitud total.

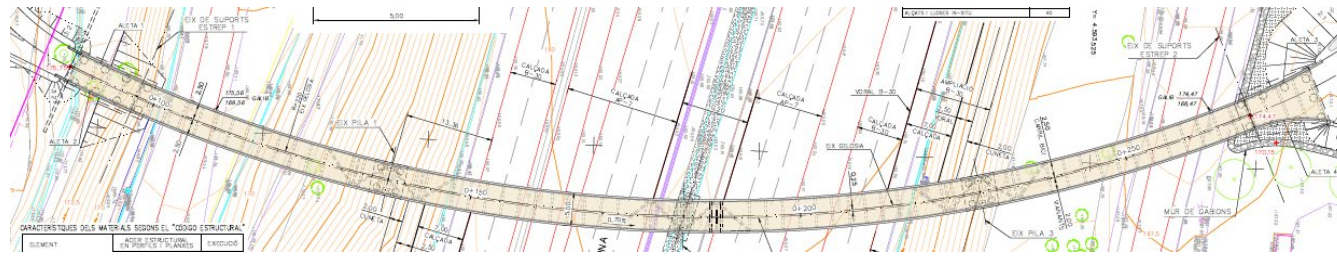


Figura 3.1 Planta

La passarel·la presenta una seqüència de llums de 10,00 + 40,00 + 2x45,00 + 42,40 + 10,60 metres. Aquesta configuració respon a un conjunt de quatre vànols principals sobre tres piles, més dos vànols de compensació encastats als estreps. Es tracta d'una estructura oberta en forma d'artesa, amb gelosies de cantell variable, amb una relació h/L que oscil·la entre 1/15 i 1/30. Aquesta variació permet una transició progressiva en alçada, d'acord a una lògica estructural i constructiva que optimitza el comportament resistent del conjunt. Alhora, aquesta configuració serveix de suport per a un sistema secundari d'enllumenat integrat a l'estructura.

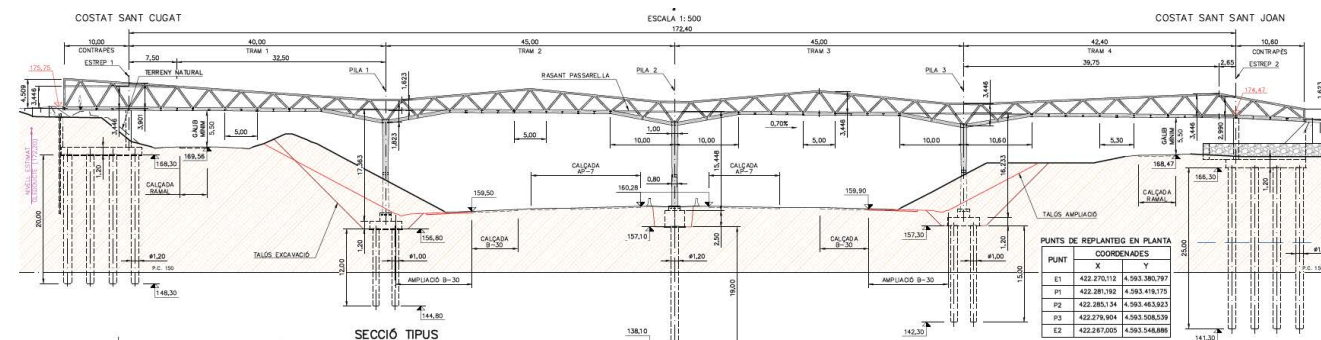


Figura 3.2 Alçat longitudinal

Les barres de les gelosies són de secció tubular, formades per xapes d'acer soldades, amb unions rígides resoltes mitjançant nusos soldats. En tots els casos, s'utilitza acer d'alta resistència a la corrosió tipus Corten.

La secció transversal del tauler presenta un ample lliure de 4,5 metres, distribuïts en 2,5 metres per al carril bici i 2 metres per al pas de vianants, que inclou una franja podotàctil de 40 centímetres.

La proposta correspon a una estructura integral, sense juntes ni aparells de recolzament ni en piles ni en estreps. La rigidesa horitzontal s'aconsegueix gràcies al propi tauler i a la seva geometria en planta corba, que actua com un arc estructural.

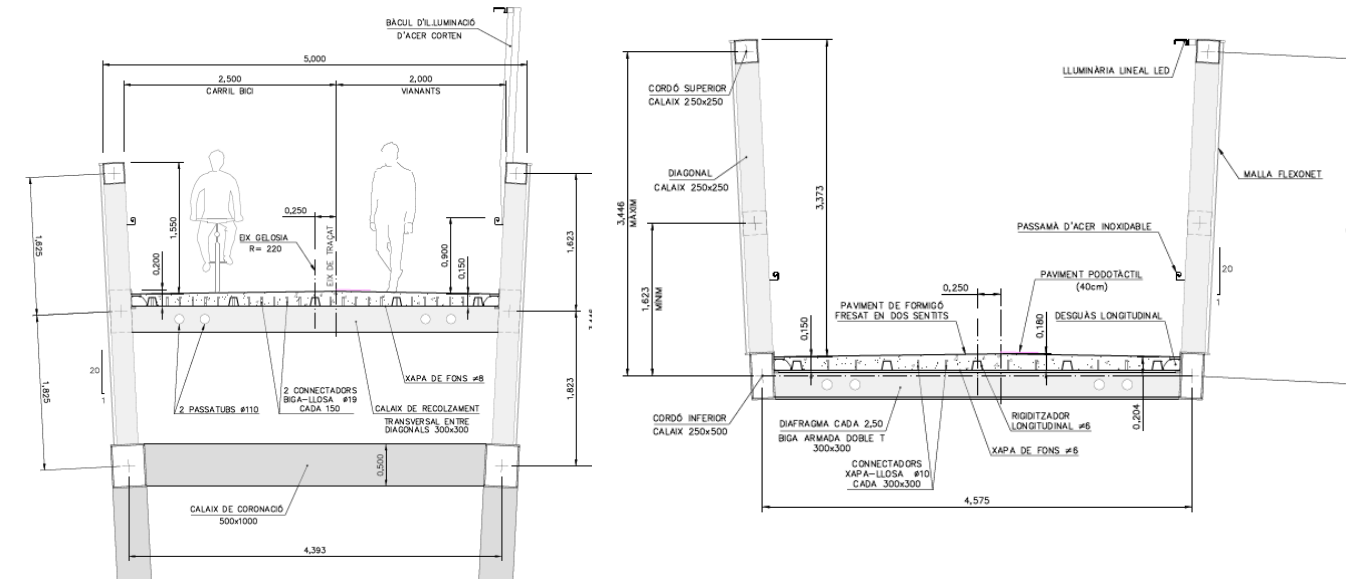


Figura 3.3 Seccions transversals per pila (esquerra) i centre de tram (dreta)

El tauler està format per una llosa de formigó sobre forjat col·laborant, recolzada sobre bigues transversals cada 2,50 metres. En planta, el tauler es comporta com un arc encastat als estreps, amb una llum de 168 metres i una relació fletxa/llum de 1/10 (fletxa màxima $f = 16,5$ metres). Aquesta llosa actua com a ànima d'una biga horitzontal, unint els cordons inferiors de les gelosies, que es comporten com les ales d'aquesta biga, amb un cantell total $h = 4,8$ metres ($h/L = 1/35$).

Els estreps, de formigó armat, estan dissenyats per formar vànols ocults de compensació del tauler, encastant les gelosies verticals i aportant la reacció necessària per tancar l'arc horitzontal del tauler.

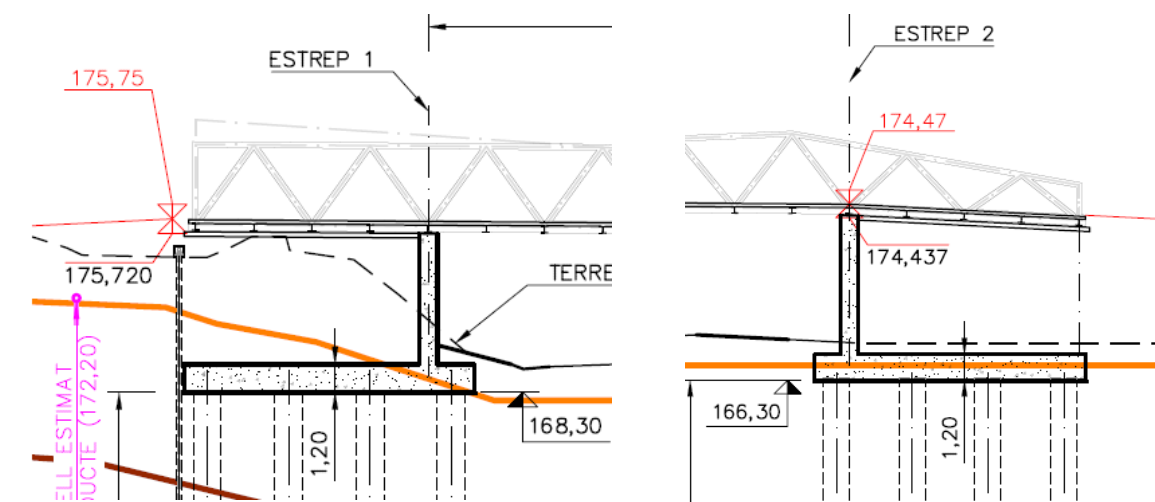


Figura 3.4 Estreps integrals de formigó armat

Les piles són metàl·liques, formades per dos tubs inclinats que suporten cadascuna de les gelosies. Les fonamentacions es resolen mitjançant pilots de 100 i 120 centímetres de diàmetre.

03. 01. Procés constructiu

La seqüència constructiva prevista és la següent:

- Adequacions de l'entorn i moviment de terres
- Execució de pilons i fonamentacions en piles i estreps
- Execució d'alçats d'estreps i piles
- Col·locació per trams de gelosia metàl·lica
- Formigonat de la llosa entre bigues
- Execució de paviments, col·locació de baranes i acabats

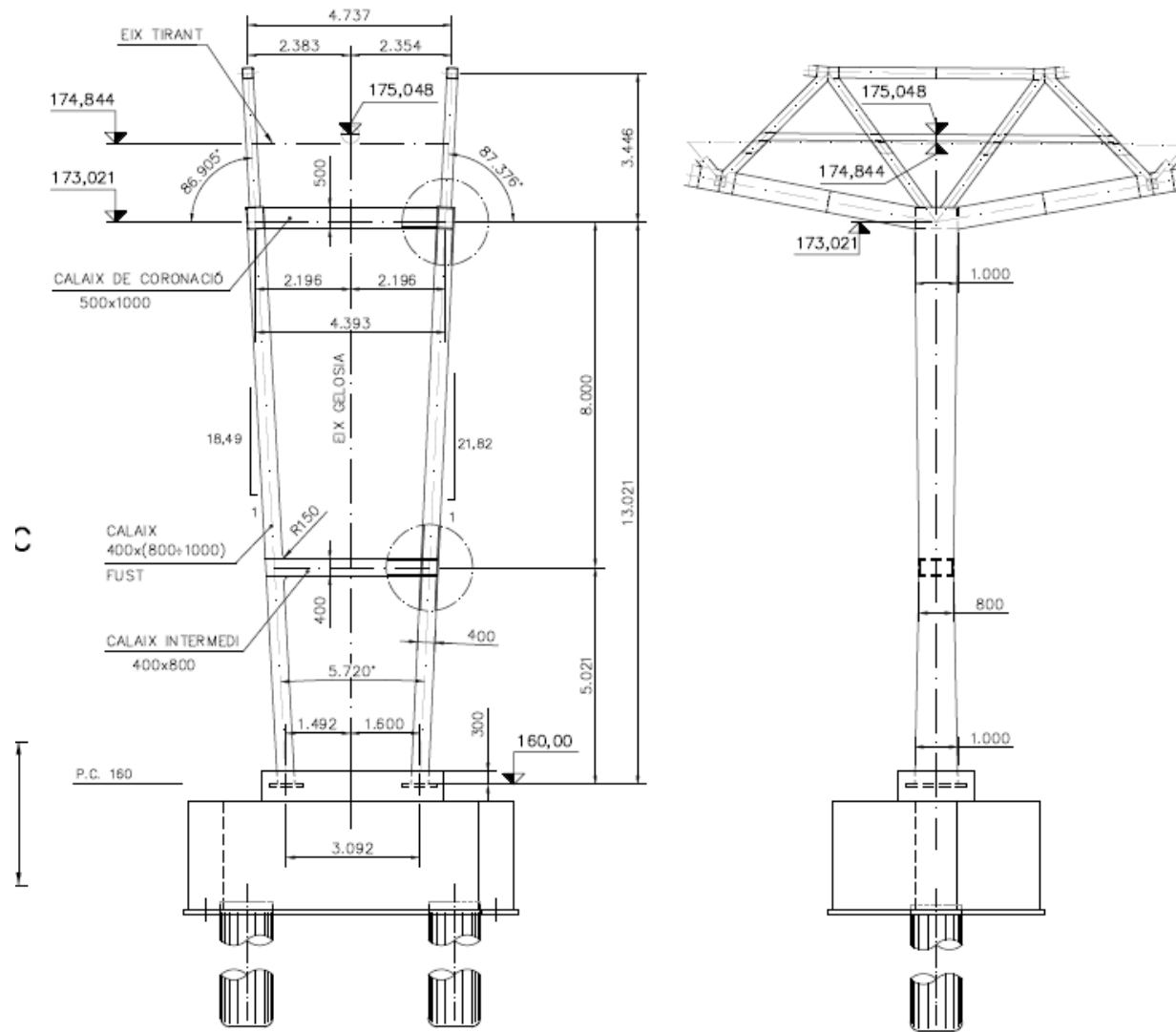


Figura 3.5 Piles metàl·liques (Pila 2)

04. Materials

04. 01. Formigons

04. 01. 01 Formigó en pilons HA-30/L/20/XC2+XA1

- Resistència característica a compressió a 28 dies, $f_{ck} = 30$ MPa.
- Resistència característica a tracció a 28 dies, $f_{ctk} = 2,03$ MPa.
- Mòdul de deformació secant a 28 dies, $E_{c28} = 32837$ MPa.
- Pes específic $\gamma_H = 25 \frac{kN}{m^3}$
- Coeficient de minoració ELU, $\gamma_c = 1.5$

04. 01. 02 Formigó en fonaments HA-30/F/20/XC2

- Resistència característica a compressió a 28 dies, $f_{ck} = 30$ MPa.
- Resistència característica a tracció a 28 dies, $f_{ctk} = 2,03$ MPa.
- Mòdul de deformació secant a 28 dies, $E_{c28} = 32837$ MPa.
- Pes específic $\gamma_H = 25 \frac{kN}{m^3}$
- Coeficient de minoració ELU, $\gamma_c = 1.5$

04. 01. 03 Formigó en alçats d'estreps i murs HA-30/F/20/XC4

- Resistència característica a compressió a 28 dies, $f_{ck} = 30$ MPa.
- Resistència característica a tracció a 28 dies, $f_{ctk} = 2,03$ MPa.
- Mòdul de deformació secant a 28 dies, $E_{c28} = 32837$ MPa.
- Pes específic $\gamma_H = 25 \frac{kN}{m^3}$
- Coeficient de minoració ELU, $\gamma_c = 1.5$

04. 01. 04 Formigó en lloses in situ HA-30/F/20/XC4

- Resistència característica a compressió a 28 dies, $f_{ck} = 30$ MPa.
- Resistència característica a tracció a 28 dies, $f_{ctk} = 2,03$ MPa.
- Mòdul de deformació secant a 28 dies, $E_{c28} = 32837$ MPa.
- Pes específic $\gamma_H = 25 \frac{kN}{m^3}$
- Coeficient de minoració ELU, $\gamma_c = 1.5$

04. 02. Acer per a armadures

04. 02. 01 Acer per a l'armadura passiva B-500-SD

- Límit Elàstic característic, $f_{yk} = 500$ MPa
- Mòdul de elasticitat $E_s = 200000$ MPa
- Pes específic $\gamma_A = 78.5 \frac{kN}{m^3}$
- Coeficient de minoració ELU, $\gamma_s = 1.15$

04. 02. 02 Acer per a barres pretensades MK Y1050

- Límit Elàstic característic, $f_{yk} = 950$ MPa
- Tensió de ruptura, $f_u = 1050$ MPa
- Mòdul de elasticitat $E_s = 205000$ MPa
- Pes específic $\gamma_A = 78.5 \frac{kN}{m^3}$
- Coeficient de minoració ELU, $\gamma_s = 1.15$

04. 03. Acer estructural

04. 03. 01 Acer en perfils laminats i xapes S355J2W $t < 40\text{mm}$

- Límit Elàstic característic, $f_a = 355 \text{ MPa}$
- Mòdul de elasticitat $E_a = 210000 \text{ MPa}$
- Pes específic $\gamma_A = 78.5 \frac{\text{kN}}{\text{m}^3}$
- Coeficients de minoració ELU, $\gamma_{M0} = 1.05$ $\gamma_{M1} = 1.10$ $\gamma_{M2} = 1.25$

04. 03. 02 Acer en perfils laminats i xapes S355J2W $t \geq 40\text{mm}$

- Límit Elàstic característic, $f_a = 335 \text{ MPa}$
- Mòdul de elasticitat $E_a = 210000 \text{ MPa}$
- Pes específic $\gamma_A = 78.5 \frac{\text{kN}}{\text{m}^3}$
- Coeficients de minoració ELU, $\gamma_{M0} = 1.05$ $\gamma_{M1} = 1.10$ $\gamma_{M2} = 1.25$
- Grau Z25 (UNE-EN 10164) en la direcció perpendicular a la superfície.

05. Accions

05. 01. Valors característics

De manera general, es consideren les següents accions. Els valors i l'aplicació detallada de les accions als models es desenvolupen als annexes a la present memòria.

05. 01. 01 Accions permanents

Pes propi (G1):

- Degudes al pes de les seccions segons geometria i materials.

Càrregues mortes (G2):

- Degudes al pes dels elements no estructurals que graviten sobre l'estructura

05. 01. 02 Accions permanents de valor no constant

Reològiques, degudes a la retracció (G*3) i la fluència (G*4):

La retracció i fluència del formigó del tauler es considera directament pel programa de càlcul, que realitza un anàlisi no lineal evolutiu en el temps que considera la reologia dels materials. Per determinar el valor d'aquesta acció, els paràmetres que es consideren són:

- HR= 70 %
- t-ts=10 000 dies

05. 01. 03 Accions variables

Sobrecàrregues d'us (Qi):

- Sobrecàrrega uniformement repartida de 5 kN/m2 en zones peatonals, segons IAP-11
- Càrrega horitzontal de valor igual al 10% del total de la sobrecàrrega vertical, segons IAP11.

Sobrecàrregues climàtiques tèrmiques (Qj):

- Es considera l'acció del vent amb una empenta lateral, vertical i longitudinal d'acord a l'especificat a la IAP11.
- Deformacions tèrmiques. La variació màxima de temperatura es considera aplicant variacions tèrmiques respecte a la temperatura de muntatge. Es consideren una variació uniforme de temperatura l'estructura actuant simultàniament amb uns gradients tèrmics.

05. 02. Valors representatius

És el valor d'una acció emprat per a verificar els Estats Límit abans d'aplicar els coeficients de majoració.

El principal valor representatiu de les accions és el seu valor característic. Per a les accions variables es consideren, addicionalment, altres valors representatius, segons s'especifica en aquest apartat.

05. 02. 01 Accions permanents

Per a les accions permanents es considerarà un únic valor representatiu, coincident amb el valor característic. En el cas paviments es prendran dos valors representatius, $G_{k.sup}$ i $G_{k.inf}$, considerant el gruix teòric i un increment del 50% dels mateixos.

05. 02. 02 Accions variables

Per a les accions variables, excepte el tren de fatiga, a més del seu valor característic es consideraran els següents valors representatius, segons la combinació de que es tracti:

- El valor de combinació $\psi_{0,Q}$ serà el valor emprat quan l'acció actuï amb alguna altre acció variable, per a tenir en compte la petita probabilitat que actuïn de maner simultània els valors més desfavorables de diverses accions independents.
- El valor freqüent $\psi_{1,Q}$ serà el valor de l'acció que es veurà superat durant un període de curta duració respecte la vida útil del pont. Correspon a un període de retorn d'una setmana i s'utilitzarà en les comprovacions dels estat límit en situació accidental i dels estats límit de servei reversibles.
- El valor quasi-permanent $\psi_{2,Q}$ serà el valor de l'acció tal que es veurà sobrepassat durant gran part de la vida útil del pont i s'utilitzarà per a comprovacions accidentals i dels estat límit de servei reversibles, a més de en l'avaluació dels efectes diferits.

S'han adoptat els factors de simultaneïtat de la IAP-11, recollits a la Taula 5.1.

05. 02. 03 Accions accidentals

Per a les accions accidentals es considerarà un únic valor representatiu, coincident amb el valor nominal de l'acció.

Taula 5.1 Factors de simultaneïtat segons IAP-11

ACCIÓ			ψ_0	ψ_1	ψ_2
Sobrecarga de uso	gr 1, Cargas verticales	Vehículos pesados	0,75	0,75	0
		Sobrecarga uniforme	0,4	0,4	0 / 0,2 ⁽¹⁾
		Carga en aceras	0,4	0,4	0
	gr 2, Fuerzas horizontales		0	0	0
	gr 3, Peatones		0	0	0
	gr 4, Aglomeraciones		0	0	0
	Sobrecarga de uso en pasarelas		0,4	0,4	0
Viento	F_{wk}	En situación persistente	0,6	0,2	0
		En construcción	0,8	0	0
		En pasarelas	0,3	0,2	0
Acción térmica	T_k		0,6	0,6	0,5
Nieve	Q_{Snt}	En construcción	0,8	0	0
Acción del agua	W_k	Empuje hidrostático	1,0	1,0	1,0
		Empuje hidrodinámico	1,0	1,0	1,0
Sobrecargas de construcción	Q_c		1,0	0	1,0

(1) El factor de simultaneidad ψ_2 correspondiente a la sobrecarga uniforme se tomará igual a 0, salvo en el caso de la combinación de acciones en situación sísmica (apartado 6.3.1.3), para la cual se tomará igual a 0,2.

Taula 5.2 Coeficients parcials per a les accions segons IAP-11 (ELU resistència)

ACCIÓ		EFECTO	
		FAVORABLE	DESFAVORABLE
Permanente de valor constante (G)	Peso propio	1,0	1,35
	Carga muerta	1,0	1,35
Permanente de valor no constante (G*)	Pretensado P_1	1,0	1,0 / 1,2 ⁽¹⁾ / 1,3 ⁽²⁾
	Pretensado P_2	1,0	1,35
	Otras presolicitaciones	1,0	1,0
	Reológicas	1,0	1,35
	Empuje del terreno	1,0	1,5
	Asientos	0	1,2 / 1,35 ⁽³⁾
	Rozamiento de apoyos deslizantes	1,0	1,35
Variable (Q)	Sobrecarga de uso	0	1,35
	Sobrecarga de uso en terraplenes	0	1,5
	Acciones climáticas	0	1,5
	Empuje hidrostático	0	1,5
	Empuje hidrodinámico	0	1,5
	Sobrecargas de construcción	0	1,35

05. 03. Valors de càlcul

Aquest és el valor que s'obté aplicant al valor representatiu de les accions un coeficient parcial de seguretat γ_f .

05. 03. 01 Comprovacions en ELU

Es consideren com coeficients parcials de seguretat en situacions persistents o transitòries els indicats a la Taula 5.2. En situació accidental es consideren directament els valors de càlcul definits per a les accions. En situació sísmica es considerarà com a valor de càlcul de l'acció definit a la normativa pertinent.

05. 03. 02 Comprovacions en ELS

S'han adoptat els valors de la IAP-11, recollits a la Taula 5.3.

Taula 5.3 Coeficients parcials per a les accions segons IAP-11 (ELS)

ACCIÓN			ψ_0	ψ_1	ψ_2
Sobrecarga de uso	gr 1, Cargas verticales	Vehículos pesados	0,75	0,75	0
		Sobrecarga uniforme	0,4	0,4	0 / 0,2 ⁽¹⁾
		Carga en aceras	0,4	0,4	0
	gr 2, Fuerzas horizontales		0	0	0
	gr 3, Peatones		0	0	0
	gr 4, Aglomeraciones		0	0	0
	Sobrecarga de uso en pasarelas		0,4	0,4	0
Viento	F_{wk}	En situación persistente	0,6	0,2	0
		En construcción	0,8	0	0
		En pasarelas	0,3	0,2	0
Acción térmica	T_k		0,6	0,6	0,5
Nieve	Q_{Skt}	En construcción	0,8	0	0
Acción del agua	W_k	Empuje hidrostático	1,0	1,0	1,0
		Empuje hidrodinámico	1,0	1,0	1,0
Sobrecargas de construcción	Q_c		1,0	0	1,0

(1) El factor de simultaneidad ψ_2 correspondiente a la sobrecarga uniforme se tomará igual a 0, salvo en el caso de la combinación de acciones en situación sísmica (apartado 6.3.1.3), para la cual se tomará igual a 0,2.

05. 04. Combinació d'accions

Per als diferents estats límits es formen combinacions d'accions compatibles en les que actuen les accions permanents, una acció variable dominant i el la resta concomitants (qualsevol acció variable pot ser dominant).

05. 04. 01 Comprovacions ELU

Es consideren grups de combinacions de càrregues variables, a més de las accions permanents. La variable dominant s'aplica amb el seu valor característic i les concomitants amb el seu valor de combinació ψ_0 (una combinació per cada acció variable que es consideri dominant).

- Situacions permanents o transitòries

$$\sum_{j \geq 1} \gamma_{G,j} G_{k,j} + \sum_{j \geq 1} \gamma_{G^*,j} G_{k,j}^* + \gamma_P P_k + \gamma_{Q,1} Q_{k,1} + \sum_{i > 1} \gamma_{Q,i} \psi_{0,i} Q_{k,i}$$

- Situacions accidentals

$$\sum_{j \geq 1} \gamma_{G,j} G_{k,j} + \sum_{j \geq 1} \gamma_{G^*,j} G_{k,j}^* + \gamma_P P_k + \gamma_A A_k + \gamma_{Q,1} \psi_{1,1} Q_{k,1} + \sum_{i > 1} \gamma_{Q,i} \psi_{2,i} Q_{k,i}$$

- Situacions sísmiques

$$\sum_{j \geq 1} \gamma_{G,j} G_{k,j} + \sum_{j \geq 1} \gamma_{G^*,j} G_{k,j}^* + \gamma_P P_k + \gamma_A A_{E,k} + \sum_{i \geq 1} \gamma_{Q,i} \psi_{2,i} Q_{k,i}$$

05. 04. 02 Comprovacions ELS

Es consideren els següents grups de combinacions de càrregues variables, a més de las acciones permanents.

- Combinació poc probable o característica. La variable dominant s'aplica amb el seu valor característic i les concomitants amb el seu valor de combinació ψ_0 (una combinació per cada acció variable que es consideri dominant)

$$\sum_{j \geq 1} \gamma_{G,j} G_{k,j} + \sum_{j \geq 1} \gamma_{G^*,j} G_{k,j}^* + \gamma_{Q,1} Q_{k,1} + \sum_{i > 1} \gamma_{Q,i} \psi_{0,i} Q_{k,i}$$

- Combinació freqüent. La variable dominant s'aplica amb el seu valor freqüent ψ_1 i les concomitants amb el seu valor quasi permanent ψ_2 (una combinació per cada acció variable que es consideri dominant)

$$\sum_{j \geq 1} \gamma_{G,j} G_{k,j} + \sum_{j \geq 1} \gamma_{G^*,j} G_{k,j}^* + \gamma_P P_k + \gamma_{Q,1} \psi_{1,1} Q_{k,1} + \sum_{i > 1} \gamma_{Q,i} \psi_{2,i} Q_{k,i}$$

- Combinació quasi permanent. Totes les variables s'apliquen amb el valor quasi permanent ψ_2 .

$$\sum_{j \geq 1} \gamma_{G,j} G_{k,j} + \sum_{j \geq 1} \gamma_{G^*,j} G_{k,j}^* + \sum_{i > 1} \gamma_{Q,i} \psi_{2,i} Q_{k,i}$$

06. Programes informàtics

Els models d'elements finits per a l'anàlisi i disseny de l'estructura s'han implementat al programa de càlcul Midas Civil 2025 v1.1, tant pel que fa al model global com als diferents models locals. Cada element es representa per la seva secció transversal real. Els elements lineals s'han modelitzat amb barres 1D tipus biga, mentre que per a les lloses i murs s'han utilitzat elements 2D tipus shell. El programa efectua en el post procés una integració de les seccions conformades per barres i llosa per a obtenir els esforços en seccions compostes.

Per a l'anàlisi seccional sota els esforços obtinguts al model s'ha utilitzat el programa de dimensionament de seccions Fagus v.9, de CUBUS. Es té en compte el procés evolutiu del pont, en el qual la secció transversal de les bigues ha de resistir el seu pes propi i el pes corresponent al formigonat de la llosa. Amb posterioritat, els esforços sobre l'estructura actuen sobre la secció completa bigues + llosa.

Addicionalment, s'efectuen càlculs manuals i en fulles de càlcul per al dimensionament i verificació de les estructures o parts de les mateixes.

07. Models de càlcul

S'han elaborat models globals d'Elements Finites (EF) per a l'anàlisi estàtica i dinàmica, en els quals s'han representat tots els elements que integren l'estructura: bigues metàl·liques, llosa, piles i estreps.

Les fonamentacions s'han analitzat mitjançant models locals, emprats tant per determinar la seva matriu de rigidesa —que s'ha incorporat al model global— com per dimensionar els elements de fonamentació a partir de les reaccions obtingudes en aquest.

07. 01. Models globals

07. 01. 01 Anàlisi estàtics

S'ha desenvolupat un model matemàtic global del pont que idealitza la geometria, les accions i els suports per reproduir-ne el comportament estructural. En aquest anàlisi s'han utilitzat elements finits de tipus barra per als elements lineals i de tipus làmina per als elements superficials. S'han modelitzat l'estructura de la passarel·la, les piles i els estreps, caracteritzant-los pel seu material i la secció transversal representativa, així com la rigidesa de les fonamentacions de piles i estreps.

Per tal de tenir en compte la flexibilitat de les fonamentacions sobre pilons de les piles i estreps, s'han introduït a les seves bases condicions de contorn de tipus general, caracteritzades per una matriu de rigidesa equivalent al grup de pilons embeguts en el terreny. Aquesta matriu permet l'acoblament dels diferents graus de llibertat. Per obtenir-la, s'ha realitzat un model d'anàlisi local de cadascun dels elements.

A continuació s'adjunten imatges del model realitzat:

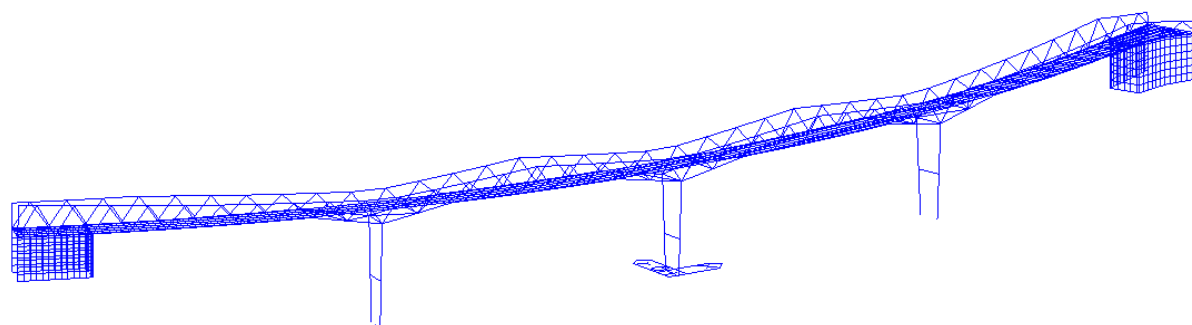


Figura 6.1 Model global de càlcul

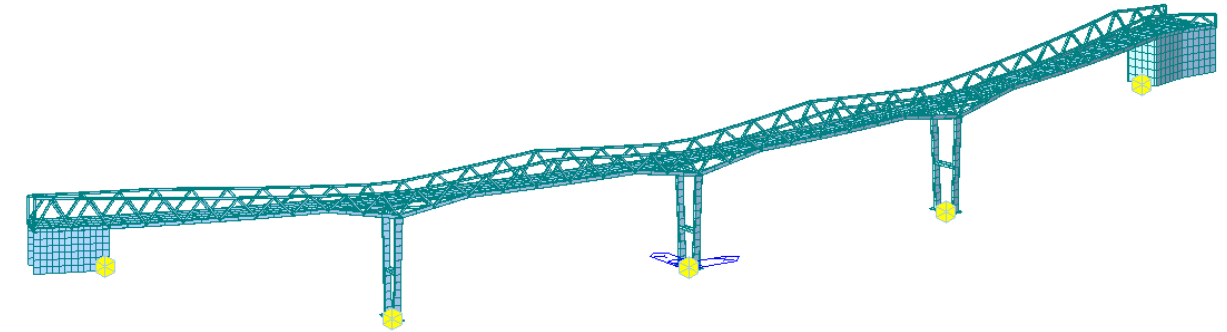


Figura 6.2 Condicions de contorn (matrius de rigidesa de les fonamentacions)

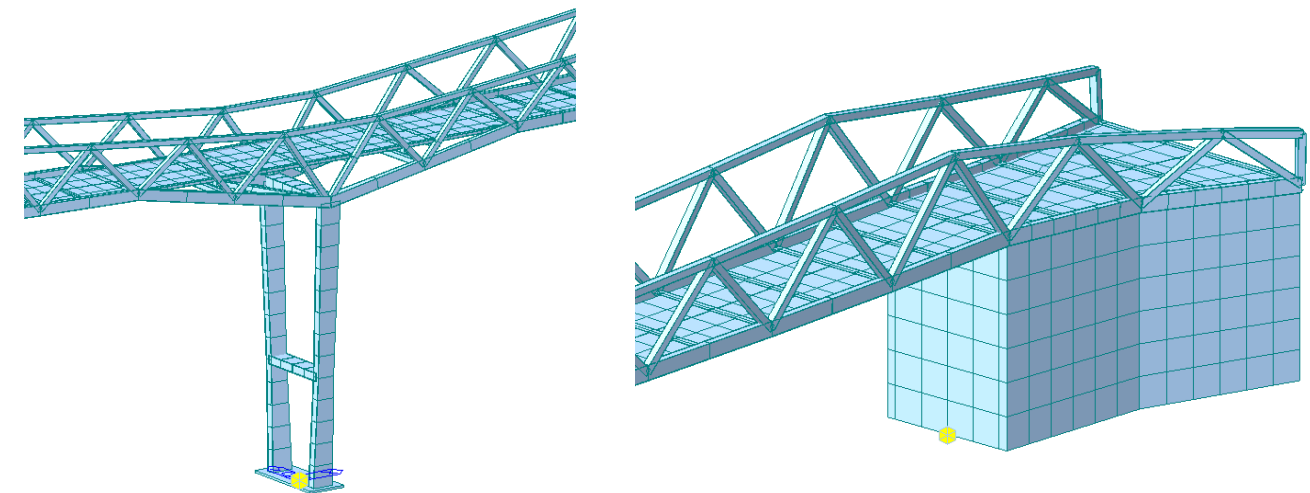


Figura 6.3 Detall de piles i estreps

07. 01. 02 Anàlisi dinàmica

S'ha desenvolupat un model global del pont en el qual s'han idealitzat la geometria de l'estructura, la distribució de masses i les condicions de suport, mitjançant un model matemàtic capaç de reproduir fidelment el seu comportament dinàmic.

Per a aquest anàlisi, s'han emprat elements finits de tipus barra per als elements lineals i de tipus làmina per als elements bidimensionals. El model inclou l'estructura de la passarel·la, la llosa que configura el tauler, les piles i els estreps, tots ells definits pel seu material, secció transversal representativa. Com a condicions de contorn es consideren les rigideses de les fonamentacions.

Aquest model s'ha utilitzat per determinar les freqüències pròpies i els modes de vibració de la passarel·la, així com per avaluar-ne el comportament dinàmic d'acord amb la guia tècnica Footbridges. Assessment of vibrational behaviour of footbridges under pedestrian loading (Sétra, 2006), amb l'objectiu de determinar les acceleracions màximes induïdes pel pas de vianants i garantir el nivell de confort requerit per als usuaris.

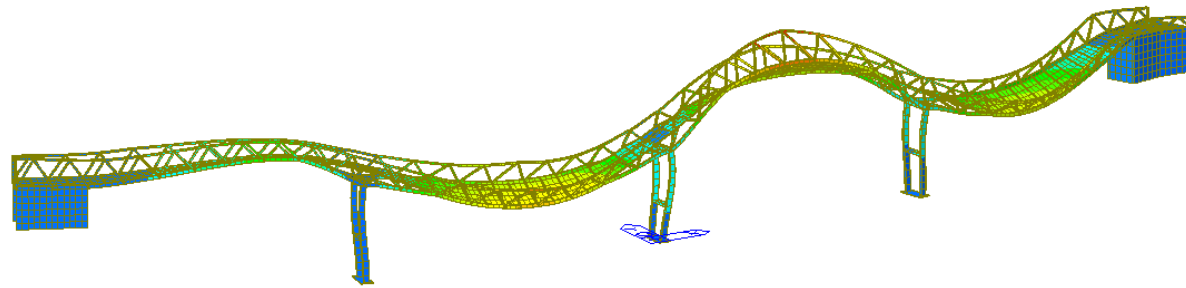


Figura 6.4 Model dinàmic (Mode 3 - $f = 2,81$ Hz)

07. 02. Models locals. Piles

S'han desenvolupat models 3D d'elements finits per analitzar el comportament dels grups de pilons corresponents a les piles 1, 2 i 3. Els pilons s'han modelitzat mitjançant elements de tipus barra, connectats de manera rígida a un node situat a la cara superior de la fonamentació, que és el punt d'aplicació de les càrregues provinents del model estructural global. La geometria dels encepers també s'ha inclòs als models, exclusivament per tenir en compte el seu pes propi.

Els paràmetres geotècnics utilitzats són els coeficients de balast horitzontal indicats a l'annex geotècnic, els quals permeten caracteritzar la rigidesa del terreny en funció de la profunditat. A cada node s'han assignat condicions de contorn mitjançant molles elàstiques en les direccions X i Y, mentre que el desplaçament vertical (direcció Z) s'ha restringit al peu dels pilons.

Per determinar la rigidesa global de cada conjunt de fonamentació, s'han utilitzat models equivalents, als quals s'han aplicat desplaçaments unitaris en el punt de càrrega, mantenint les mateixes condicions de contorn.

07. 02. 01 Piles 1 i 3

Les fonamentacions de les piles 1 i 3 estan formades per encepers quadrats de $5,00 \times 5,00$ m i 1,30 m de cantell, sobre els quals se situen plints de $4,20 \times 1,80$ m i 1,20 m d'alçada, assolint un cantell total de 2,50 m. Cada grup de pilons està format per 4 unitats (2x2) de 1,00 m de diàmetre, separades 3,00 m en direccions longitudinal i transversal.

Els pilons s'han discretitzat en trams d'1 m mitjançant elements de tipus barra, amb una longitud total de 12,00 m per a la pila 1 i de 15,00 m per a la pila 3.

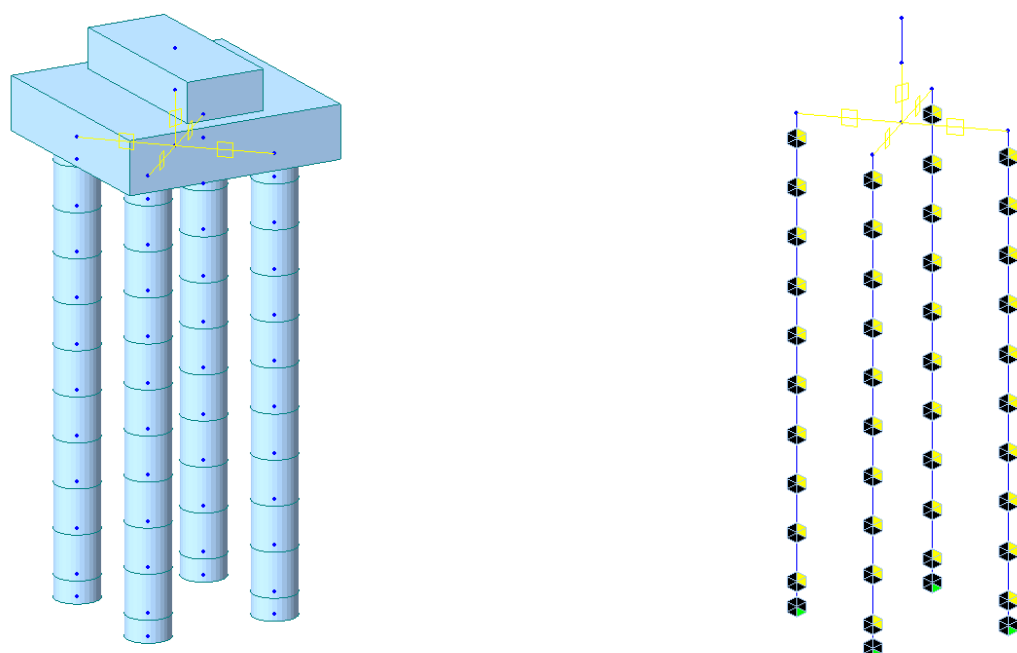


Figura 6.5 Model local de la fonamentació de pila 1

07. 02. 02 Pila 2

La fonamentació està formada per un encep rectangular de $7,00 \times 3,00$ m i 2,50 m de cantell, sobre el qual se situa un plint de $4,20 \times 1,80$ m i 0,70 m d'alçada, assolint un cantell total de 3,20 m. El grup de fonamentació està compost per 2 pilons de 1,20 m de diàmetre, separats 5,00 m.

Per evitar l'afectació d'un prisma de serveis que discorre longitudinalment sota l'autopista inferior, s'ha disposat l'encep alineat amb l'eix de l'autopista. No obstant això, la configuració de la passarel·la requereix una pila orientada segons l'eix de la pròpia passarel·la, generant un desfasament entre l'alineació de la pila i la de la fonamentació.

A conseqüència d'això, el plint es disposa seguint l'orientació de la pila superior, resultant esbiaixat aproximadament 16° respecte a l'encep, que segueix l'alineació inferior. Aquesta particularitat s'ha tingut en compte explícitament en el model d'anàlisi.

Cada piló, de 19,00 m de longitud, s'ha discretitzat en trams d'1 m mitjançant elements de tipus barra.

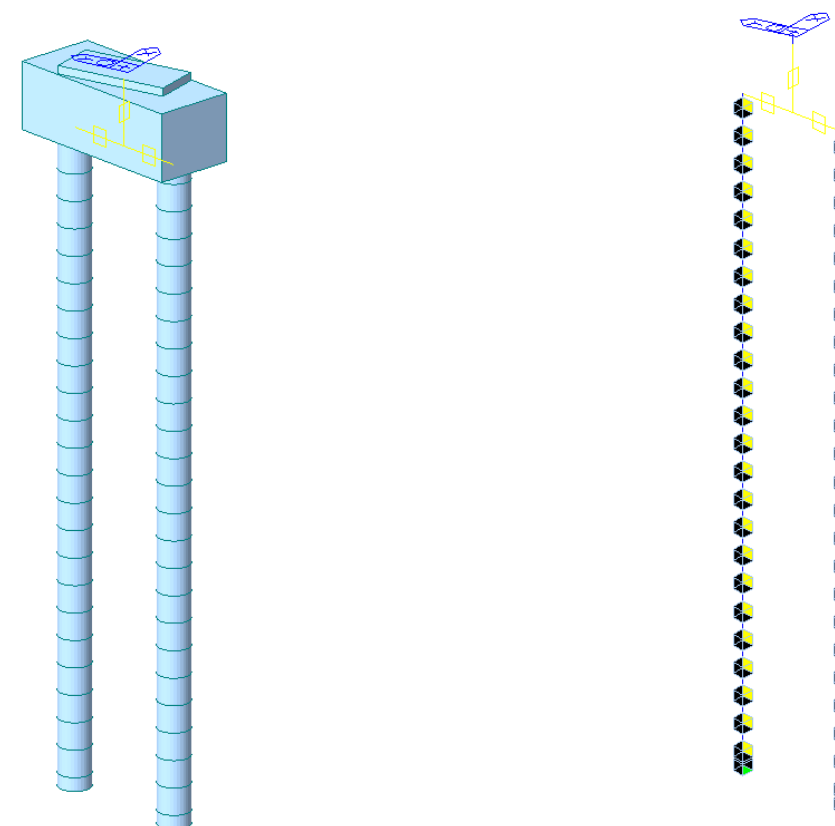


Figura 6.6 Model local de la fonamentació de pila 2

07. 03. Models locals. Estreps

S'han desenvolupat models 3D d'elements finits per analitzar el comportament dels grups de pilons associats als estreps 1 i 2. Les lloses dels encep s'han modelitzat mitjançant elements de tipus placa (2D), mentre que els pilons s'han representat amb elements de tipus barra (1D), connectats a l'encep segons la disposició geomètrica real de la fonamentació.

Les càrregues provinents del model estructural global s'apliquen a la base dels murs frontals i de les aletes dels estreps. Per fer-ho, s'ha definit un node a l'eix del mur frontal, situat al nivell de connexió entre aquest i la llosa. Aquest node és comú als models global i local, i en ambdós casos es troba rígidament unit a la base dels murs de l'estrep. En el model global, és el punt on s'apliquen les condicions de rigidesa de la fonamentació; en el model local, és el punt d'aplicació de les càrregues transmeses pel model estructural.

A més de les reaccions derivades del model global, el model local incorpora el pes propi de la llosa de fonamentació i el pes del reblert de terres dins la caixa dels estreps.

Els paràmetres geotècnics emprats són els coeficients de balast horitzontal indicats a l'annex geotècnic, que permeten caracteritzar la rigidesa del terreny en funció de la profunditat. A cada node del model s'han assignat condicions de contorn mitjançant molles elàstiques en les direccions X i Y, mentre que el desplaçament vertical (direcció Z) ha estat impedit al peu dels pilons.

Per determinar la rigidesa global de cada fonamentació, s'han utilitzat models equivalents als quals s'han aplicat desplaçaments unitaris en el punt de càrrega, mantenint les mateixes condicions de contorn.

07. 03. 01 Estrep 1

La llosa de fonamentació de l'estrep 1 té unes dimensions de 6,00 x 12,50 m i un cantell de 1,20 m. El sistema de fonamentació està format per un total de 8 pilons de 1,20 m de diàmetre, disposats en dues alineacions de 4 pilons cadascuna, alineades amb els alçats de les aletes de l'estrep.

Els pilons, amb una longitud de 20,00 m, s'han discretitzat en segments d'1 m mitjançant elements de tipus barra.

07. 03. 02 Estrep 2

La llosa de fonamentació de l'estrep 2 té un cantell de 1,20 m i una geometria trapezoidal en planta, amb un ample variable entre 6,50 i 9,10 m i una longitud de 12,50 m. La fonamentació es compon de 9 pilons de 1,20 m de diàmetre, disposats en dues alineacions de 4 pilons cadascuna, alineades amb els alçats de les aletes de l'estrep, i un piló addicional situat al punt mig entre els dos pilons més posteriors.

Els pilons, amb una longitud de 25,00 m, s'han discretitzat en trams d'1 m mitjançant elements de tipus barra.

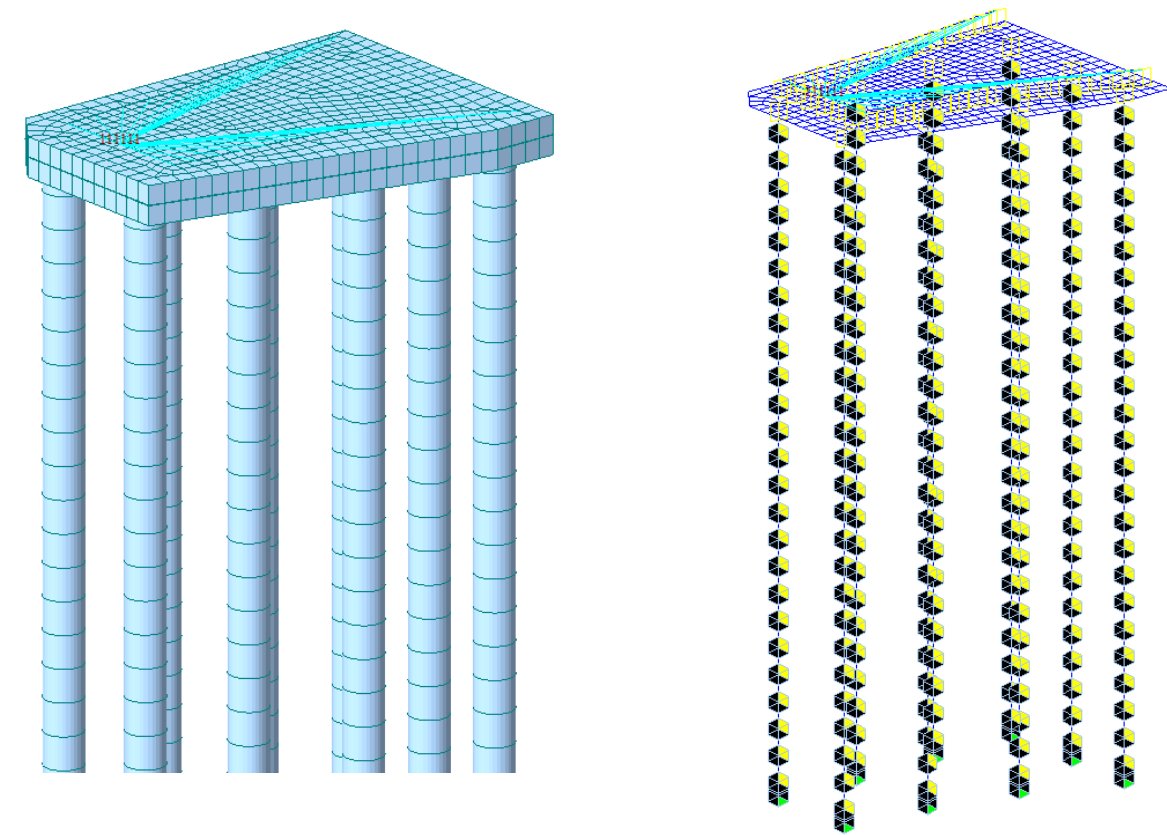


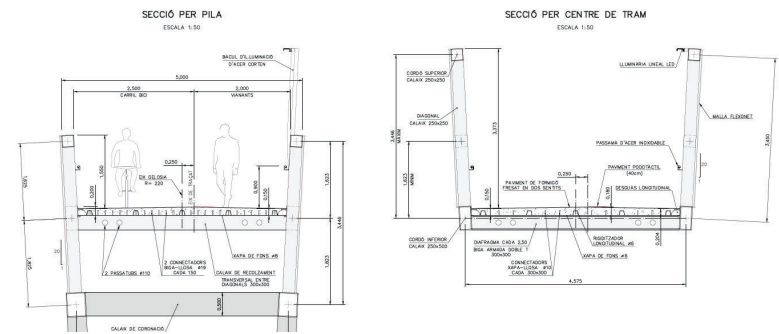
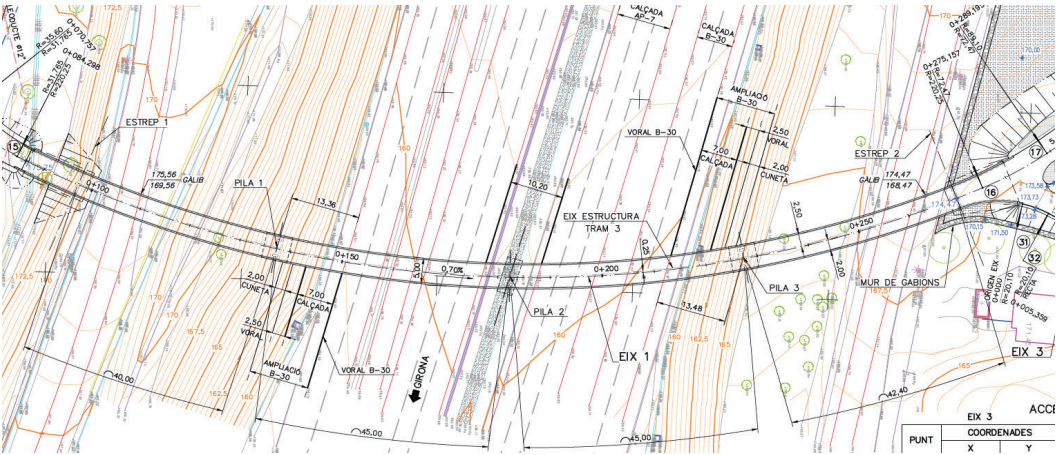
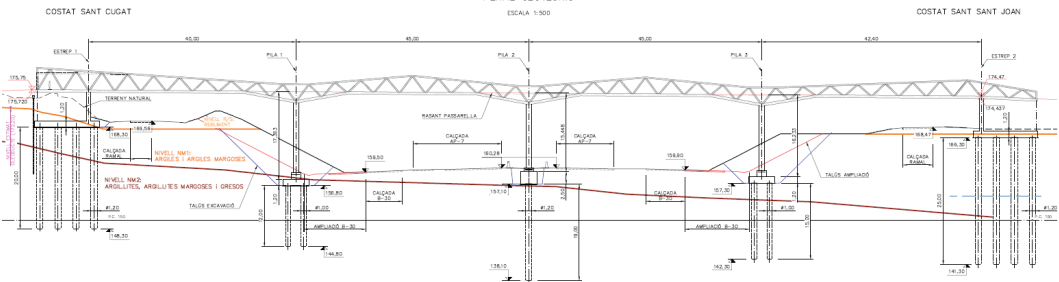
Figura 6.7 Model local de la fonamentació de l'estrep 2

APÈNDIX 1 - BASES DE CÀLCUL

1.1 ACCIONS

INIGIA_Functions

PASSAREL·LA CAN SANT JOAN



Esquema longitudinal

$$L_1 := 10 \text{ m} \quad L_2 := 40 \text{ m} \quad L_3 := 45 \text{ m} \quad L_4 := 45 \text{ m} \quad L_5 := 42.40 \text{ m} \quad L_6 := 10.60 \text{ m}$$

$$n := \text{length}(L) = 6$$

$$l_{culata} := 0 \text{ m}$$

$$L_{tot} := \sum_{i=1}^n L_i + 2 \cdot l_{culata} = 193 \text{ m} \quad \text{longitud total del puente}$$

Esquema transversal

$$b_{Fw} := 4.50 \text{ m} \quad \text{ancho útil zonas de uso peatonal (aceras, rampas y escaleras)}$$

ACCIONES

Acciones a considerar

De acuerdo con la instrucción IAP-11 "Instrucción de acciones a considerar en el proyecto de puentes de carretera", del Ministerio de Fomento, las acciones a considerar en la estructura son:

Acciones permanentes (G):

- Peso propio
- Cargas muertas

Acciones permanentes de valor no constante (G*):

- Presolicitaciones (proceso constructivo)
- Pretensado
- Acciones reológicas
 - Fluencia
 - Retracción
- Acciones debidas al terreno
 - Sobre elementos de la estructura
 - Movimientos que afectan a las cimentaciones

Acciones variables (Q):

- Sobrecargas de uso
- Acciones climáticas
 - Viento
 - Nieve
- Acciones térmicas

Acciones accidentales (A):

- Acciones sísmicas

VALORES CARACTERÍSTICOS DE LAS ACCIONES

El valor característico de una acción es su principal valor representativo. Puede venir determinado por un valor medio, un valor nominal o, en los casos en que se fija mediante criterios estadísticos, por un valor correspondiente a una determinada probabilidad de no ser superado durante un período de referencia, que tiene en cuenta la vida útil de la estructura y la duración de la acción.

Se han seguido los criterios especificados en la instrucción IAP-11.

3.1 ACCIONES PERMANENTES DE VALOR CONSTANTE

3.1.1 PESO PROPIO

Correspondiente a los pesos de los elementos estructurales, de acuerdo a la geometria de las secciones transversales

$\gamma_H := 25 \frac{\text{kN}}{\text{m}^3}$

Elementos de hormigón

$\gamma_A := 78.5 \frac{\text{kN}}{\text{m}^3}$

Elementos de acero

☐—APLICACIÓN PESO PROPIO AL MODELO

La losa es un forjado de hormigón sobre prelasas metálicas, con un canto total de 15 cm

$h_{losa} := 0.15 \text{ m}$

canto total hormigón

$pp_{losa} := h_{losa} \cdot \gamma_H = 3.75 \frac{\text{kN}}{\text{m}^2}$

$pp_{prelosa} := 0.55 \frac{\text{kN}}{\text{m}^2}$

peso total de las prelasas

MODELO GLOBAL 3D

$s_0 := 2.5 \text{ m}$

separación tipo entre vigas transversales

$s_1 := 4.25 \text{ m}$

vano 1 - ábaco sobre pilas

$s_2 := 1.65 \text{ m}$

vano 2 - ábaco sobre pilas

$s_3 := 2.80 \text{ m}$

vano 3 - ábaco sobre pilas

$s_4 := 2.65 \text{ m}$

vano 4 - ábaco sobre pilas

Cargas sobre vigas transversales del tablero

$pp_{prelosa.0} := pp_{prelosa} \cdot s_0 = 1.38 \frac{\text{kN}}{\text{m}}$

$pp_{losa.0} := pp_{losa} \cdot s_0 = 9.38 \frac{\text{kN}}{\text{m}}$

$pp_{prelosa.01} := pp_{prelosa} \cdot \left(\frac{s_0 + s_1}{2}\right) = 1.86 \frac{\text{kN}}{\text{m}}$

$pp_{losa.01} := pp_{losa} \cdot \left(\frac{s_0 + s_1}{2}\right) = 12.66 \frac{\text{kN}}{\text{m}}$

$pp_{prelosa.12} := pp_{prelosa} \cdot \left(\frac{s_1 + s_2}{2}\right) = 1.62 \frac{\text{kN}}{\text{m}}$

$pp_{losa.12} := pp_{losa} \cdot \left(\frac{s_1 + s_2}{2}\right) = 11.06 \frac{\text{kN}}{\text{m}}$

$pp_{prelosa.23} := pp_{prelosa} \cdot \left(\frac{s_2 + s_3}{2}\right) = 1.22 \frac{\text{kN}}{\text{m}}$

$pp_{losa.23} := pp_{losa} \cdot \left(\frac{s_2 + s_3}{2}\right) = 8.34 \frac{\text{kN}}{\text{m}}$

$pp_{prelosa.34} := pp_{prelosa} \cdot \left(\frac{s_3 + s_4}{2}\right) = 1.5 \frac{\text{kN}}{\text{m}}$

$pp_{losa.34} := pp_{losa} \cdot \left(\frac{s_3 + s_4}{2}\right) = 10.22 \frac{\text{kN}}{\text{m}}$

3.1.2 CARGAS MUERTAS

Debidas al peso de los elementos no estructurales que gravitan sobre la estructura

[...]

3.2 ACCIONES PERMANENTES DE VALOR NO CONSTANTE

3.2.1 PRESOLICITACIONES

3.2.1.1 Pretensado

[...]

3.2.1.2 Otras presolicitaciones

La simulación del proceso constructivo en el modelo introducirá diferentes presolicitaciones sobre la estructura. Se tienen también en cuenta las redistribuciones de éstas debido a la variación de propiedades de los materials en el tiempo (reologia, relajación,...)

3.2.2 ACCIONES REOLÓGICAS

El valor característico de las acciones reológicas se obtiene a partir de los valores característicos de las deformaciones provocadas por la retracción y la fluencia de los hormigones que conforman la estructura.

Los coeficientes de fluencia y retracción se han calculado para:

- Espesores eficaces de cada sección - automático según geometrias transversales.
- Humedad relativa del 70%
- Calendario de construcción
- ...

3.2.3 EMPUJE DEL TERRENO

El empuje del terreno sobre elementos de la estructura (muros, aletas, etc.) se determinará en función de las características del terreno y otras consideraciones geotécnicas

Empuje sobre elementos verticales

$$\gamma_t := 19 \frac{\text{kN}}{\text{m}^3} \quad \text{peso específico del terreno}$$

$$\phi_t := 30 \text{ deg} \quad \text{ángulo de rozamiento interno del terreno}$$

$$\alpha := 90 \text{ deg} \quad \text{ángulo del trasdós con la horizontal}$$

$$\delta_a := 0 = 0 \text{ deg} \quad \text{ángulo de rozamiento tierras-muro (activo)}$$

$$i_a := 0 \quad \text{pendiente del talud en el trasdós}$$

Coeficiente de empuje activo horizontal

$$k_{a,h} := \frac{(\sin(\alpha + \phi_t))^2}{(\sin(\alpha))^2 \cdot \left(1 + \sqrt{\frac{\sin(\phi_t + \delta_a) \cdot \sin(\phi_t - i_a)}{\sin(\alpha - \delta_a) \cdot \sin(\alpha + i_a)}}\right)^2} = 0.33$$

Coeficiente de empuje activo vertical

$$k_{a,v} := k_{a,h} \cdot \cot(\alpha - \delta_a) = 0$$

Coeficiente de empuje al reposo horizontal

$$k_0 := 1 - \sin(\phi_t) = 0.5$$

4 ACCIONES VARIABLES

4.1 SOBRECARGAS DE USO

4.1.7 EMPUJES SOBRE BARANDILLAS

Las fuerzas transmitidas por la barandilla al tablero dependerán de la clase de carga de la barandilla proyectada, según la EN 1317 – 6. En puentes y pasarelas, se adoptará una clase de carga tal que la fuerza horizontal perpendicular al elemento superior de la barandilla sea como mínimo **1.5 kN/m**

Esta fuerza horizontal se considerará actuando simultáneamente con la sobrecarga uniforme definida en el apartado 4.1.2.2

4.1.8 SOBRECARGA DE USO EN PASARELAS

Para la determinación de los efectos estáticos de la sobrecarga de uso debida al tráfico de peatones, se considerará la acción simultánea de las cargas siguientes:

a) una carga vertical uniformemente distribuida de valor igual a $q_{fk} := 5 \frac{\text{kN}}{\text{m}}$

b) una fuerza horizontal longitudinal $q_{fl,k} := 10 \% \cdot q_{fk} = 0.5 \text{ kPa}$ actuando en el eje del tablero al nivel de la superficie del pavimento

A efectos de las comprobaciones locales, se considerará una carga vertical puntual

$Q_{fk} := 10 \text{ kN}$ actuando en una superficie cuadrada de 0.10m de lado

—APLICACIÓN DE SOBRECARGAS DE USO AL MODELO

MODELO GLOBAL 3D

$s_0 = 2.5 \text{ m}$ separación tipo entre vigas transversales

$s_1 = 4.25 \text{ m}$ vano 1 - ábaco sobre pilas

$s_2 = 1.65 \text{ m}$ vano 2 - ábaco sobre pilas

$s_3 = 2.8 \text{ m}$ vano 3 - ábaco sobre pilas

$s_4 = 2.65 \text{ m}$ vano 4 - ábaco sobre pilas

Cargas sobre vigas transversales del tablero

$SC_{vert.0} := q_{fk} \cdot s_0 = 12.5 \frac{\text{kN}}{\text{m}}$

$SC_{vert.01} := q_{fk} \cdot \left(\frac{s_0 + s_1}{2} \right) = 16.88 \frac{\text{kN}}{\text{m}}$

$SC_{vert.12} := q_{fk} \cdot \left(\frac{s_1 + s_2}{2} \right) = 14.75 \frac{\text{kN}}{\text{m}}$

$SC_{vert.23} := q_{fk} \cdot \left(\frac{s_2 + s_3}{2} \right) = 11.12 \frac{\text{kN}}{\text{m}}$

$SC_{vert.34} := q_{fk} \cdot \left(\frac{s_3 + s_4}{2} \right) = 13.62 \frac{\text{kN}}{\text{m}}$

Cargas sobre cordones longitudinales del tablero

$SC_{arr.fr} := \frac{q_{fl.k} \cdot b_{Fw}}{2} = 1.125 \frac{\text{kN}}{\text{m}}$

4.2 VIENTO

Salvo en estructuras muy flexibles, susceptibles de fenómenos vibratorios que requieren estudios especiales, el efecto del viento puede asimilarse a una carga estática.

4.2.1 VELOCIDAD BÁSICA DEL VIENTO

La velocidad básica fundamental del viento es la velocidad media a lo largo de un periodo de 10 minutos, con un periodo de retorno T de 50 años, medida con independencia de la dirección del viento y la época del año en una zona plana y desprotegida frente al viento, equivalente a un entorno de puente II, a una altura de 10m sobre el suelo.

A falta de estudios precisos relativos a dirección y estacionalidad, la velocidad básica del viento para un periodo de 50 años puede considerarse igual a la velocidad básica fundamental, obtenida según el mapa de isotacas de la Figura 4.2-a



FIGURA 4.2-a MAPA DE ISOTACAS PARA LA OBTENCIÓN DE LA VELOCIDAD BÁSICA FUNDAMENTAL DEL VIENTO $v_{b,0}$
(Coincide con el mapa correspondiente del Código Técnico de la Edificación)

$v_{b.0} := 29 \frac{\text{m}}{\text{s}}$ zona C

$v_{b.50} := v_{b.0} = 29 \frac{\text{m}}{\text{s}}$ velocidad máxima para T=50 años

Para un periodo diferente de 50 años la velocidad básica será:

$K := 0.2$ parámetro probabilístico - IAP11

$n := 0.5$ parámetro probabilístico - IAP11

$c_{prob}(T) := \left(\frac{1 - K \cdot \ln \left(- \ln \left(1 - \frac{1}{T} \right) \right)}{1 - K \cdot \ln \left(- \ln (0.98) \right)} \right)^n$ $c_{prob}(100) = 1.04$

Para situaciones transitorias, se tomarán los periodos de retorno indicados en la tabla 4.2-a, salvo que se justifiquen adecuadamente otros valores

TABLA 4.2-a PERIODOS DE RETORNO PARA SITUACIONES TRANSITORIAS

DURACIÓN DE LA SITUACIÓN	PERIODO DE RETORNO, T [AÑOS]
≤ 3 días	2
> 3 días y ≤ 3 meses	5
> 3 meses y ≤ 1 año	10
> 1 año	50

Para situaciones **persistentes**, a falta de estudios específicos, se considerará un **periodo de retorno de 100 años**

velocidad básica - situación persistente

$$v_b := c_{prob}(100) \cdot v_{b.0} = 30.1 \frac{m}{s}$$

4.2.2 VELOCIDAD MEDIA DEL VIENTO

La velocidad media del viento a una altura z sobre el terreno dependerá de la rugosidad del terreno, de la topografía y de la velocidad básica del viento. Se determinará según la expresión siguiente:

$$c_0 := 1 \quad \text{factor de topografia, que se tomará habitualmente igual 1,0}$$

Categoría de terreno II

Áreas con vegetación baja, como hierba o césped y obstáculos aislados (árboles, edificios) con separación de al menos 20 veces la altura del obstáculo



TABLA 4.2-b COEFICIENTES k_r , z_0 , Y z_{min} SEGÚN EL TIPO DE ENTORNO

TIPO DE ENTORNO	k_r	z_0 [m]	z_{min} [m]
0	0,156	0,003	1
I	0,170	0,01	1
II	0,190	0,05	2
III	0,216	0,30	5
IV	0,235	1,00	10

$$z_{min} := 2 \text{ m} \quad \text{altura mínima, según tabla 4.2-b}$$

$$z_0 := 0.05 \text{ m} \quad \text{longitud de rugosidad, según tabla 4.2-b}$$

$$k_r := 0.19 \quad \text{factor de terreno, según tabla 4.2-b}$$

factor de rugosidad

$$c_r(z) := \text{if } z \geq z_{min} \quad k_r \cdot \ln\left(\frac{z}{z_0}\right) \\ \text{else} \quad k_r \cdot \ln\left(\frac{z_{min}}{z_0}\right)$$

$$v_m(z) := c_r(z) \cdot c_0 \cdot v_b \quad \text{velocidad media del viento}$$

4.2.3 EMPUJE DEL VIENTO

El empuje producido por el viento se calculará por separado para cada elemento del puente, teniendo en cuenta la posible modificación del área expuesta debido a otras acciones actuantes sobre la estructura (nieve, sobrecargas de uso, etc.), así como las posibles situaciones transitorias en que los elementos puedan presentar diferentes superficies de exposición respecto las definitivas (cajón abierto frente a cerrado, elementos auxiliares de construcción, etc.)

$$\rho := 1.25 \frac{\text{kg}}{\text{m}^3} \quad \text{masa específica del aire}$$

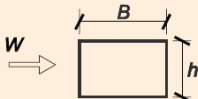

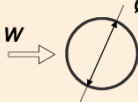
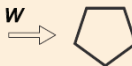
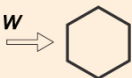
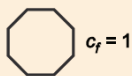




$$p_{w,b} := \frac{1}{2} \cdot \rho \cdot v_b^2 = 0.57 \text{ kPa} \quad \text{presión a la velocidad básica del viento}$$

$$k_1 := 1 \quad \text{factor de turbulencia, se tomará igual a 1,0}$$

coeficiente de exposición

$$c_e(z) := \text{if } z \geq z_{min} \quad k_r^2 \cdot c_0^2 \cdot \left(\ln \left(\frac{z}{z_0} \right) \right)^2 + 7 \cdot k_1 \cdot c_0 \cdot \ln \left(\frac{z}{z_0} \right) \\ \text{else} \quad k_r^2 \cdot c_0^2 \cdot \left(\ln \left(\frac{z_{min}}{z_0} \right) \right)^2 + 7 \cdot k_1 \cdot c_0 \cdot \ln \left(\frac{z_{min}}{z_0} \right)$$

Coeficiente de fuerza (Figura 4.2.b)

	$\frac{B}{h}$	$\leq 0,2$	0,4	0,6	0,7	1,0	2,0	5,0	$\geq 10,0$
	c_f	2,0	2,2	2,35	2,4	2,1	1,65	1,0	0,9
 $c_f = 1,4$	<div><div><div><div>sección circular con superficie lisa y tal que:</div><div>$\varnothing v_b(T) \sqrt{c_e(z)} > 6 \text{ m}^2/\text{s}$</div><div>$c_f = 0,7$</div></div><div><div>sección circular con superficie rugosa^(*), o lisa tal que:</div><div>$\varnothing v_b(T) \sqrt{c_e(z)} < 6 \text{ m}^2/\text{s}$</div><div>$c_f = 1,2$</div></div></div></div>								
 $c_f = 1,8$	 $c_f = 1,6$		 $c_f = 1,45$		 $c_f = 1,3$				
 $c_f = 1,6$	 $c_f = 2,2$			 $c_f = 2,0$					

*) Se tomará siempre superficie rugosa excepto si la rugosidad superficial equivalente resulta menor de $\phi \cdot 10^{-6} \text{ m}$

Efecto de la sobrecargas

El efecto de la sobrecarga equivale a un área expuesta de 2m en el caso de puentes de carretera y 1,25m en el caso de pasarelas. Dichas alturas se medirán desde la superficie de pavimento y se tendrán en cuenta para el cálculo tanto del coeficiente de arrastre, como del área expuesta.

Siempre que el viento actúe simultáneamente con las sobrecargas de uso, el valor resultante de la fuerza equivalente del viento se combinará con el resto afectado por los correspondientes factores de simultaneidad ψ (apartado 6.1) y deberá aplicarse sobre la longitud ocupada por vehículos más desfavorable, independientemente de la zona de aplicación de las acciones verticales debidas a la propia sobrecarga de uso.

Ocultamiento

Cuando sea necesario considerar el efecto del ocultamiento sobre cualquier elemento no expuesto directamente a la acción del viento (por quedar detrás de la sombra o proyección de otro situado inmediatamente a barlovento de éste), el coeficiente de fuerza del elemento oculto se multiplicará por el coeficiente de ocultamiento η definido en la Tabla 4.2-c.

TABLA 4.2-c COEFICIENTE DE OCULTAMIENTO η

ESPACIAMIENTO RELATIVO s_r	RELACIÓN DE SOLIDEZ λ					
	0,1	0,2	0,3	0,4	0,5	$\geq 0,6$
0,5	0,75	0,40	0,31	0,22	0,13	0,06
1	1,00	0,82	0,64	0,46	0,28	0,10
2	1,00	0,84	0,68	0,52	0,36	0,20
3	1,00	0,86	0,72	0,59	0,45	0,31
4	1,00	0,89	0,78	0,68	0,57	0,46
5	1,00	1,00	0,92	0,85	0,77	0,69
6	1,00	1,00	1,00	1,00	1,00	1,00

λ es la relación de solidez del elemento de barlovento más próximo (área sólida expuesta dividida por el área total de una superficie perpendicular a la dirección del viento que contuviera al elemento)

$$s_r := \frac{s}{h_p} \quad \text{es el espaciamiento relativo entre el elemento de barlovento y el de sotavento}$$

4.2.4 DIRECCIÓN DEL VIENTO

Para evaluar la acción del viento sobre la estructura se considerará su actuación en dos direcciones:

- Perpendicular al eje del tablero: dirección transversal (X). Esta componente podrá ir acompañada de una componente asociada en dirección vertical (Z)
- Paralela al eje del tablero: dirección longitudinal (Y)

En general se considerará que la acción en las direcciones transversal y longitudinal no es concomitante. La componente vertical del viento, dirección Z, se considerará concomitante sólo con la dirección transversal del viento.

VIENTO TRANSVERSAL

EMPUJE TRANSVERSAL (SOBRE EL TABLERO)

(Tableros de tipo celosía)

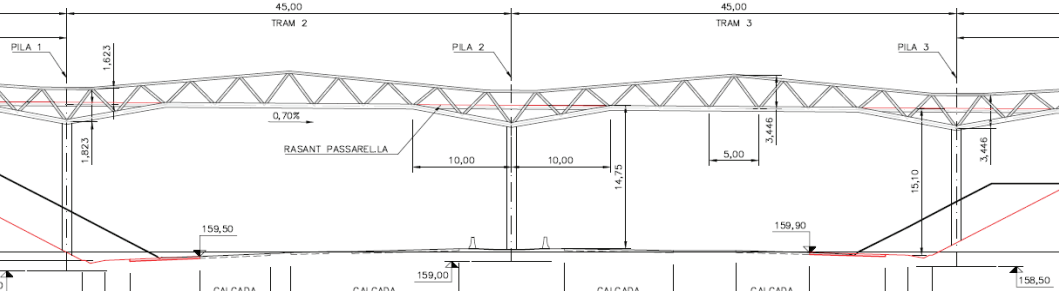
Se entenderá que el área de referencia es el producto de la longitud del tramo de puente considerado por la altura equivalente

$B := 5.00 \text{ m}$

ancho total del tablero

$z_{\text{tablero}} := 15 \text{ m}$

altura de referencia del tablero



EC1-4 §8.3.1

(4) Las áreas de referencia $A_{ref,x}$ para las combinaciones de carga sin aplicar carga de tráfico se deberían basar en el valor apropiado de d_{tot} , como se define en la figura 8.5 y la tabla 8.1:

- b) En tableros con vigas de celosía, la suma de
- 1) el área transversal de una cornisa, acera o vía con balasto;
 - 2) aquellos elementos sólidos de todas las vigas principales de celosía con proyección normal en alzado situadas por encima o por debajo del área descrita en el punto 1);
 - 3) el área transversal de las barreras rígidas o barreras antirruído, si procede, sobre el área descrita en el punto 1), o en ausencia de estos equipamientos, 0,30 m para cada parapeto o barrera abiertos.

Sin embargo, el área total de referencia no debería superar aquella formada por una viga de alma llena del mismo canto total, incluyendo todas las partes proyectadas.

$c_{f,x} := 1.8$

coeficiente de fuerza
IAP-11 4.2.5.1.1 b) Tableros tipo celosía

MODELO GLOBAL 3D

$b_{Cinf.0} := 0.50 \text{ m}$

canto del cordón inferior (vacío)

$b_{Cinf.sc} := 1.70 \text{ m}$

canto aparente del cordón inferior (con sc)

$b_{Csup} := 0.25 \text{ m}$

canto del cordón superior

$b_{Diagonal} := 0.25 \text{ m}$

canto de las diagonales

$b_{borde.0} := 0.15 \text{ m}$

canto de la viga de borde en pilas (vacío)

$b_{borde.sc} := 1.40 \text{ m}$

canto aparente de la viga de borde en pilas (con sc)

$F_{w.x.Cinf.0} := p_{w.b} \cdot c_e \left(z_{tablero} \right) \cdot c_{f.x} \cdot b_{Cinf.0} = 1.33 \frac{\text{kN}}{\text{m}}$

fuerza transversal sobre CORDÓN INFERIOR (vacío)

$$\frac{F_{w.x.Cinf.0}}{2} = 0.67 \frac{\text{kN}}{\text{m}}$$

$F_{w.x.Cinf.sc} := p_{w.b} \cdot c_e \left(z_{tablero} \right) \cdot c_{f.x} \cdot b_{Cinf.sc} = 4.54 \frac{\text{kN}}{\text{m}}$

fuerza transversal sobre CORDÓN INFERIOR (con sc)

$$\frac{F_{w.x.Cinf.sc}}{2} = 2.27 \frac{\text{kN}}{\text{m}}$$

$F_{w.x.borde.0} := p_{w.b} \cdot c_e \left(z_{tablero} \right) \cdot c_{f.x} \cdot b_{borde.0} = 0.4 \frac{\text{kN}}{\text{m}}$

fuerza transversal sobre VIGA BORDE (vacío)

$$\frac{F_{w.x.borde.0}}{2} = 0.2 \frac{\text{kN}}{\text{m}}$$

$F_{w.x.borde.sc} := p_{w.b} \cdot c_e \left(z_{tablero} \right) \cdot c_{f.x} \cdot b_{borde.sc} = 3.74 \frac{\text{kN}}{\text{m}}$

fuerza transversal sobre VIGA BORDE (con sc)

$$\frac{F_{w.x.borde.sc}}{2} = 1.87 \frac{\text{kN}}{\text{m}}$$

$F_{w.x.Csup} := p_{w.b} \cdot c_e \left(z_{tablero} \right) \cdot c_{f.x} \cdot b_{Csup} = 0.67 \frac{\text{kN}}{\text{m}}$

fuerza transversal sobre CORDÓN SUPERIOR

$F_{w.x.Diagonal} := p_{w.b} \cdot c_e \left(z_{tablero} \right) \cdot c_{f.x} \cdot b_{Diagonal} = 0.67 \frac{\text{kN}}{\text{m}}$

fuerza transversal sobre DIAGONAL

EMPUJE VERTICAL (SOBRE EL TABLERO)

Se considera un empuje vertical (Z) sobre el tablero actuando en el sentido más desfavorable (ascendente o descendente):

$c_{f.z} := 0.90$

coeficiente de fuerza en la dirección vertical (se tomará igual a 0,90)

$p_{w.z} := p_{w.b} \cdot c_e \left(z_{tablero} \right) \cdot c_{f.z} = 1.33 \frac{\text{kN}}{\text{m}^2}$

presión vertical sobre el tablero (ascendente o descendente)

$F_{w.z} := p_{w.b} \cdot c_e \left(z_{tablero} \right) \cdot c_{f.z} \cdot B = 6.67 \frac{\text{kN}}{\text{m}}$

fuerza vertical sobre el tablero (ascendente o descendente)

Momento de vuelco sobre el tablero

En tableros de tipo celosía, la media ponderada de las alturas de los centros de gravedad de las diferentes áreas que compongan el primer frente máximo adoptado en el cálculo del área expuesta a la componente horizontal del viento, incluyendo en su caso, el área correspondiente a la sobrecarga de uso

[...]

El empuje vertical está aplicado a una distancia del borde de barlovento igual a un cuarto de la anchura del tablero

$$e_{w,z} := \frac{B}{4} = 1.25 \text{ m}$$

excentricidad del viento vertical respecto al eje del tablero

$$M_{w,z,sc} := F_{w,z} \cdot e_{w,z} = 8.34 \text{ m} \frac{\text{kN}}{\text{m}}$$

momento de vuelco por viento vertical

Aplicamos excentricidad como una fuerza $2 \cdot p_{w,z} = 2.67 \text{ kPa}$ en un ancho igual a la mitad del tablero del lado de la resultante de viento vertical $\frac{B}{2} = 2.5 \text{ m}$

MODELO GLOBAL 3D

$$s_0 = 2.5 \text{ m}$$

separación tipo entre vigas transversales

$$s_1 = 4.25 \text{ m}$$

vano 1 - ábaco sobre pilas

$$s_2 = 1.65 \text{ m}$$

vano 2 - ábaco sobre pilas

$$s_3 = 2.8 \text{ m}$$

vano 3 - ábaco sobre pilas

$$s_4 = 2.65 \text{ m}$$

vano 4 - ábaco sobre pilas

Cargas verticales de viento sobre vigas transversales de $\frac{1}{2}$ tablero

$$SC_{viento,vert.0} := 2 \cdot p_{w,z} \cdot s_0 = 6.67 \frac{\text{kN}}{\text{m}}$$

$$SC_{viento,vert.01} := 2 \cdot p_{w,z} \cdot \left(\frac{s_0 + s_1}{2} \right) = 9.01 \frac{\text{kN}}{\text{m}}$$

$$SC_{viento,vert.12} := 2 \cdot p_{w,z} \cdot \left(\frac{s_1 + s_2}{2} \right) = 7.87 \frac{\text{kN}}{\text{m}}$$

$$SC_{viento,vert.23} := 2 \cdot p_{w,z} \cdot \left(\frac{s_2 + s_3}{2} \right) = 5.94 \frac{\text{kN}}{\text{m}}$$

$$SC_{viento,vert.34} := 2 \cdot p_{w,z} \cdot \left(\frac{s_3 + s_4}{2} \right) = 7.27 \frac{\text{kN}}{\text{m}}$$

VIENTO LONGITUDINAL

EMPUJE LONGITUDINAL (SOBRE EL TABLERO)

Se considerará un empuje horizontal paralelo al eje del puente (Y) sobre los elementos de desarrollo longitudinal (tablero, pretilos y barandillas).

Este empuje longitudinal será una fracción (25% para elementos sólidos y 50% para elementos con huecos) del empuje transversal producido por el viento (X), multiplicado por un coeficiente reductor calculado como sigue:

$\alpha := 0.52$

Tabla 4.2-d (Entorno II)

Longitud integral de turbulencia

$L_{w,Long}(z) := \text{if } z < z_{min}$

$300\text{ m} \cdot \left(\frac{z_{min}}{200\text{ m}}\right)^\alpha$

else

$\text{if } (z_{min} \leq z) \wedge (z \leq 200\text{ m})$

$300\text{ m} \cdot \left(\frac{z}{200\text{ m}}\right)^\alpha$

else

$\text{if } z > 200\text{ m}$

300 m

else

"error"

$L_{tot} = 193\text{ m}$

longitud total del puente

$\Phi(z) := 0.23 + 0.182 \cdot \ln\left(\frac{L_{tot}}{L_{w,Long}(z)}\right)$

$c_{red.w.long}(z) := 1 - \left(\frac{7}{c_0 \cdot \ln\left(\frac{z}{z_0}\right) + 7}\right) \cdot \Phi(z)$

$c_{red.w.long}(z_{tablero}) = 0.78$

TABLA 4.2-d COEFICIENTE α SEGÚN EL TIPO DE ENTORNO

TIPO DE ENTORNO	α
0	0,38
I	0,44
II	0,52
III	0,61
IV	0,67

$F_{w.long.Cinf.0} := 50\% \cdot F_{w.x.Cinf.0} \cdot c_{red.w.long}(z_{tablero}) = 0.52 \frac{\text{kN}}{\text{m}}$

fuerza longitudinal sobre

CORDÓN INFERIOR (vacío)

$\frac{F_{w.long.Cinf.0}}{2} = 0.26 \frac{\text{kN}}{\text{m}}$

$F_{w.long.Cinf.sc} := 50\% \cdot F_{w.x.Cinf.sc} \cdot c_{red.w.long}(z_{tablero}) = 1.78 \frac{\text{kN}}{\text{m}}$

fuerza longitudinal sobre

CORDÓN INFERIOR (con SC)

$\frac{F_{w.long.Cinf.sc}}{2} = 0.89 \frac{\text{kN}}{\text{m}}$

$F_{w.long.borde.0} := 50\% \cdot F_{w.x.borde.0} \cdot c_{red.w.long}(z_{tablero}) = 0.16 \frac{\text{kN}}{\text{m}}$

fuerza longitudinal sobre

VIGA BORDE (vacío)

$\frac{F_{w.long.borde.0}}{2} = 0.08 \frac{\text{kN}}{\text{m}}$

$F_{w.long.borde.sc} := 50\% \cdot F_{w.x.borde.sc} \cdot c_{red.w.long}(z_{tablero}) = 1.46 \frac{\text{kN}}{\text{m}}$

fuerza longitudinal sobre

VIGA BORDE (con SC)

$\frac{F_{w.long.borde.sc}}{2} = 0.73 \frac{\text{kN}}{\text{m}}$

$F_{w.long.Csup} := 50\% \cdot F_{w.x.Csup} \cdot c_{red.w.long}(z_{tablero}) = 0.26 \frac{\text{kN}}{\text{m}}$

fuerza longitudinal sobre

CORDÓN SUPERIOR

$F_{w.long.Diagonal} := 50\% \cdot F_{w.x.Diagonal} \cdot c_{red.w.long}(z_{tablero}) = 0.26 \frac{\text{kN}}{\text{m}}$

fuerza longitudinal sobre

DIAGONAL

EMPUJE TRANSVERSAL (SOBRE PILAS)

$b_{pila} := 1.00 \text{ m}$

$h_{pila} := 0.40 \text{ m}$

$c_{f.x.Pila} := 2.2$ Figura 4.2-b

$\frac{h_{pila}}{b_{pila}} = 0.4$

	$\frac{B}{h}$	$\leq 0,2$	0,4	0,6	0,7	1,0	2,0	5,0	$\geq 10,0$
	c_f	2,0	2,2	2,35	2,4	2,1	1,65	1,0	0,9

$\eta_{t.Pila} := 0.46$ coeficiente ocultamiento transversal en fuste de pilas
Tabla 4.2-c sr=4/1=4 - solidez $\lambda=1$

TABLA 4.2-c COEFICIENTE DE OCULTAMIENTO η

ESPACIAMIENTO RELATIVO s_r	RELACIÓN DE SOLIDEZ λ					
	0,1	0,2	0,3	0,4	0,5	$\geq 0,6$
0,5	0,75	0,40	0,31	0,22	0,13	0,06
1	1,00	0,82	0,64	0,46	0,28	0,10
2	1,00	0,84	0,68	0,52	0,36	0,20
3	1,00	0,86	0,72	0,59	0,45	0,31
4	1,00	0,89	0,78	0,68	0,57	0,46
5	1,00	1,00	0,92	0,85	0,77	0,69
6	1,00	1,00	1,00	1,00	1,00	1,00

$F_{w.x.Pila} := p_{w.b} \cdot c_e(z_{tablero}) \cdot c_{f.x.Pila} \cdot b_{pila} = 3.26 \frac{\text{kN}}{\text{m}}$

$F_{w.x.Pila.sotavento} := \eta_{t.Pila} \cdot F_{w.x.Pila} = 1.5 \frac{\text{kN}}{\text{m}}$

EMPUJE LONGITUDINAL (SOBRE PILAS)

$b_{pila} = 1 \text{ m}$

$h_{pila} = 0.4 \text{ m}$

$h_{travesia.inf} := 0.4 \text{ m}$

$h_{travesia.sup} := 0.5 \text{ m}$

$\frac{b_{pila}}{h_{pila}} = 2.5$

$c_{f.Long.Pila} := 2.2$ Figura 4.2-b

$c_{f.Long.TraviesasPila} := 1.65$ Figura 4.2-b

	$\frac{B}{h}$	$\leq 0,2$	0,4	0,6	0,7	1,0	2,0	5,0	$\geq 10,0$
	c_f	2,0	2,2	2,35	2,4	2,1	1,65	1,0	0,9

$F_{w.Long.Pila} := p_{w.b} \cdot c_e(z_{tablero}) \cdot c_{f.Long.Pila} \cdot h_{pila} = 1.3 \frac{\text{kN}}{\text{m}}$

$F_{w.Long.Pila.TravesiaSup} := p_{w.b} \cdot c_e(z_{tablero}) \cdot c_{f.Long.TraviesasPila} \cdot h_{travesia.sup} = 1.2 \frac{\text{kN}}{\text{m}}$

$F_{w.Long.Pila.TravesiaInf} := p_{w.b} \cdot c_e(5 \text{ m}) \cdot c_{f.Long.TraviesasPila} \cdot h_{travesia.inf} = 0.7 \frac{\text{kN}}{\text{m}}$

4.3 ACCIÓN TÉRMICA

A efectos de aplicación de la Instrucción IAP11, para evaluar el efecto de la acción térmica se consideran los siguientes tipos de tablero:

- Tipo 1 - Tableros de acero con sección transversal cajón, viga armada o celosía
- Tipo 2 - Tableros mixtos hormigón-acero conectados para trabajar solidariamente
- Tipo 3 - Tableros de hormigón armado o pretensado

4.3.1 ACCIÓN TÉRMICA EN TABLEROS

4.3.1.1 Componente uniforme de la temperatura del tablero

Se parte del valor de la temperatura del aire a la sombra en el lugar del emplazamiento del puente. Para un periodo de retorno T=50 años la temperatura máxima Tmax se indica en la Figura 4.3-a

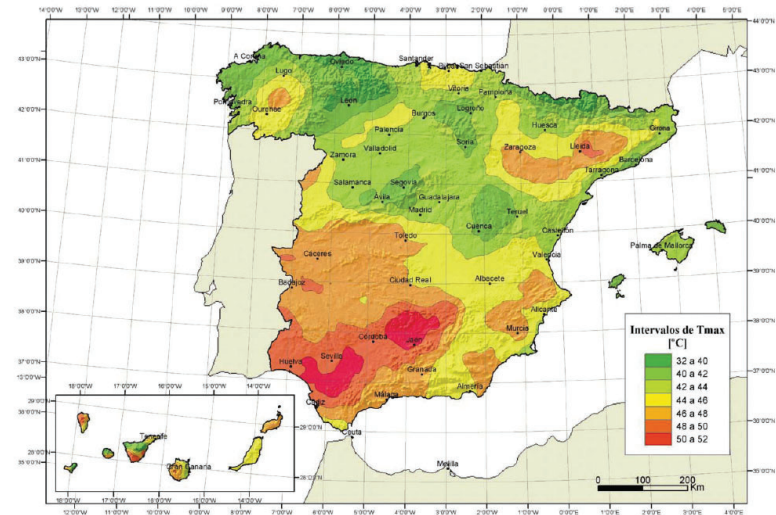


FIGURA 4.3-a ISOTERMAS DE LA TEMPERATURA MÁXIMA ANUAL DEL AIRE, T_{max} [°C]
(Coincide con el mapa correspondiente del Código Técnico de la Edificación)

$T_{max.50} := 42$ temperatura máxima del aire a la sombra (T=50 años)
SANT CUGAT

Como valor característico de la temperatura mínima del aire a la sombra Tmin se tomará el que se deduce de la tabla 4.3-a (T=50 años) en función de la altitud del emplazamiento y la zona climática invernal (Figura 4.3-c)

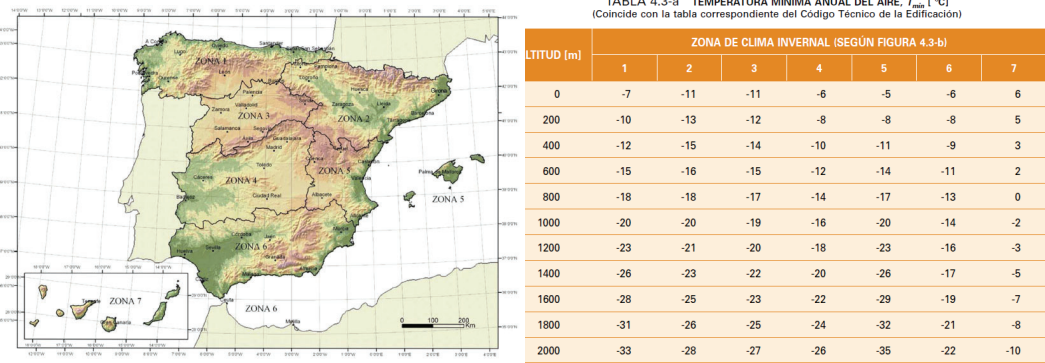


FIGURA 4.3-b ZONAS CLIMÁTICAS DE INVIERNO
(Coincide con el mapa correspondiente del Código Técnico de la Edificación)

$T_{min.50} := -13$ temperatura mínima del aire a la sombra (T=50 años)
SANT CUGAT: ZONA 2 - 200 msnm

Para un periodo diferente de 50 años se deben ajustar los valores

Para situaciones persistentes se considerará un periodo de retorno de 100 años

$p := \frac{1}{100} = 0.01$ probabilidad anual de excedencia
(inverso del periodo de retorno)

$k_1 := 0.781$

$k_2 := 0.056$

$k_3 := 0.393$

$k_4 := -0.156$

$T_{max.100} := T_{max.50} \cdot (k_1 - k_2 \cdot \ln(-\ln(1-p))) = 44$

$T_{min.100} := T_{min.50} \cdot (k_3 + k_4 \cdot \ln(-\ln(1-p))) = -14$

La componente uniforme de la temperatura del tablero, también denominada temperatura efectiva (temperatura media de la sección transversal), tendrá un valor mínimo y un valor máximo que se determinaran a partir de la temperatura del aire y de los diferenciales de la Tabla 4.3-b:

TABLA 4.3-b VALORES DE $\Delta T_{e,min}$ Y $\Delta T_{e,max}$ PARA EL CÁLCULO DE LA COMPONENTE UNIFORME DE TEMPERATURA

TIPO DE TABLERO	$\Delta T_{e,min}$ [°C]	$\Delta T_{e,max}$ [°C]
Tipo 1: Tablero de acero	-3	+16
Tipo 2: Tablero mixto	+4	+4
Tipo 3: Tablero de hormigón	+8	+2

Tipo 1 Tablero de acero $\Delta T_{e,min.acero} := -3$

Tipo 2 Tablero mixto $\Delta T_{e,min.mixto} := +4$

Tipo 3 Tablero de hormigón $\Delta T_{e,min.hormigon} := +8$

Tipo 1 Tablero de acero $\Delta T_{e,max.acero} := +16$

Tipo 2 Tablero mixto $\Delta T_{e,max.mixto} := +4$

Tipo 3 Tablero de hormigón $\Delta T_{e,max.hormigon} := +2$

$T_{e,min.acero} := T_{min.100} + \Delta T_{e,min.acero} = -17.4$ temperatura efectiva mínima

$T_{e,max.acero} := T_{max.100} + \Delta T_{e,max.acero} = 59.6$ temperatura efectiva máxima

$T_{e,min.mixto} := T_{min.100} + \Delta T_{e,min.mixto} = -10.4$ temperatura efectiva mínima

$T_{e,max.mixto} := T_{max.100} + \Delta T_{e,max.mixto} = 47.6$ temperatura efectiva máxima

$T_{e,min.hormigon} := T_{min.100} + \Delta T_{e,min.hormigon} = -6.4$ temperatura efectiva mínima

$T_{e,max.hormigon} := T_{max.100} + \Delta T_{e,max.hormigon} = 45.6$ temperatura efectiva máxima

Rango de la componente uniforme de temperatura

$\Delta T_{N.acero} := T_{e.max.acero} - T_{e.min.acero} = 77.1$

$\Delta T_{N.mixto} := T_{e.max.mixto} - T_{e.min.mixto} = 58.1$

$T_0 := 15$ Temperatura media del tablero en el momento en que se coacciona su movimiento

$\Delta T_{N.d.acero} := T_0 - T_{e.min.acero} = 32$ valor característico de la máxima variación uniforme de CONTRACCIÓN (decremento temp.)

$\Delta T_{N.i.acero} := T_{e.max.acero} - T_0 = 45$ valor característico de la máxima variación uniforme de EXPANSIÓN (incremento temp.)

$\Delta T_{N.d.mixto} := T_0 - T_{e.min.mixto} = 25$ valor característico de la máxima variación uniforme de CONTRACCIÓN (decremento temp.)

$\Delta T_{N.i.mixto} := T_{e.max.mixto} - T_0 = 33$ valor característico de la máxima variación uniforme de EXPANSIÓN (incremento temp.)

$\Delta T_{N.d.hormigon} := T_0 - T_{e.min.hormigon} = 21$ valor característico de la máxima variación uniforme de CONTRACCIÓN (decremento temp.)

$\Delta T_{N.i.hormigon} := T_{e.max.hormigon} - T_0 = 31$ valor característico de la máxima variación uniforme de EXPANSIÓN (incremento temp.)

Rango de la componente uniforme de temperatura para el dimensionamiento de juntas

El dimensionamiento de los aparatos de apoyo y de las juntas de dilatación se realizará considerando como máxima variación de contracción y dilatación del puente los valores siguientes:

$\Delta T_{N.d.neop} := \Delta T_{N.d.acero} + 15 = 47$ valor característico de la máxima variación uniforme de CONTRACCIÓN (decremento temp.) para el dimensionamiento de neoprenos y juntas

$\frac{\Delta T_{N.d.neop}}{\Delta T_{N.d.acero}} = 1.46$

$\Delta T_{N.i.neop} := \Delta T_{N.i.acero} + 15 = 60$ valor característico de la máxima variación uniforme de EXPANSIÓN (incremento temp.) para el dimensionamiento de neoprenos y juntas

$\frac{\Delta T_{N.i.neop}}{\Delta T_{N.i.acero}} = 1.34$

4.3.1.2 Componente de la diferencia de temperatura

Gradiente vertical - Puentes de acero (Tipo 1) y puentes de hormigón (Tipo 3)

A lo largo de un periodo de tiempo determinado, el calentamiento y enfriamiento de la cara superior del tablero da lugar a una variación de temperatura en la altura de la sección transversal que tendrá un valor de máximo calentamiento (cara superior más caliente) y un valor de máximo enfriamiento (cara superior más fría)

El efecto de la diferencia vertical de temperatura se debe considerar mediante el empleo de una componente lineal equivalente de la diferencia de temperatura $\Delta T_{M.heat}$ y $\Delta T_{M.cool}$. Estos valores son diferencias de temperatura entre las fibras superior e inferior del tablero.

$\Delta T_{M.heat.1} := 18$ Calentamiento - ganancia de calor de la sección cara superior

$\Delta T_{M.cool.1} := 13$ Enfriamiento - pérdida de calor de la cara superior

Gradiente vertical - Tableros Tipo 1 y Tipo 3

TABLA 4.3-d COMPONENTE LINEAL DE LA DIFERENCIA VERTICAL DE TEMPERATURA PARA TABLEROS TIPO 1 Y TIPO 3

TIPO DE TABLERO	FIBRA SUPERIOR MÁS CALIENTE	FIBRA SUPERIOR MÁS FRÍA
	$\Delta T_{M.heat} [^{\circ}C]$	$\Delta T_{M.cool} [^{\circ}C]$
Tipo 1: Tablero de acero	18	13
Tipo 3: Tablero de hormigón		
— Sección cajón	10	5
— Sección de vigas	15	8
— Sección losa	15	8

TABLA 4.3-e COEFICIENTE k_{sur} DE INFLUENCIA DEL TIPO Y ESPESOR DE PAVIMENTO

ESPESOR DEL PAVIMENTO	TABLERO TIPO 1		TABLERO TIPO 3	
	FIBRA SUPERIOR MÁS CALIENTE	FIBRA SUPERIOR MÁS FRÍA	FIBRA SUPERIOR MÁS CALIENTE	FIBRA SUPERIOR MÁS FRÍA
	k_{sur}	k_{sur}	k_{sur}	k_{sur}
Sin impermeabilización ni pavimento	0,7	0,9	0,8	1,1
Con impermeabilización y sin pavimento ⁽¹⁾	1,6	0,6	1,5	1,0
50 mm	1,0	1,0	1,0	1,0
100 mm	0,7	1,2	0,7	1,0
150 mm	0,7	1,2	0,5	1,0

⁽¹⁾ Estos valores representan valores límite superiores para superficies de color oscuro.

$k_{sur.heat.1} := 0.7$

$\Delta T_{M.heat.1} := k_{sur.heat.1} \cdot \Delta T_{M.heat.1} = 12.6$ Calentamiento - Cordón superior más caliente

$k_{sur.cool.1} := 0.9$

$\Delta T_{M.cool.3} := k_{sur.cool.1} \cdot \Delta T_{M.cool.1} = 11.7$ Enfriamiento - Cordón superior más frío

4.3.1.3 Simultaneidad de la componente uniforme y gradiente de temperatura

Ambas componentes se combinarán de acuerdo a las expresiones siguientes:

$$\Delta T \cdot \text{grad} + 0.35 \Delta T \cdot \text{unif}$$
$$0.75 \Delta T \cdot \text{grad} + \Delta T \cdot \text{unif}$$

Estas expresiones dan lugar a ocho posibles formas de considerar la concomitancia de las distintas componentes de la acción térmica, de las que se elegirán las que den lugar a los efectos más desfavorables

4.4 NIEVE

La sobrecarga de nieve sobre un terreno horizontal en la zona climática II en una región situada a 125 msnm (SANT CUGAT) es $s_k := 0.5 \text{ kPa}$

Valor característico de la sobrecarga de nieve sobre tableros de puentes $q_n := 0.8 \cdot s_k = 0.4 \text{ kPa}$

Se considerará actuando una sobrecarga de nieve en todas aquellas superficies del tablero sobre las que no cabe considerar la actuación de la sobrecarga de uso

TABLA 4.4-a SOBRECARGA DE NIEVE EN UN TERRENO HORIZONTAL. s_k [kN/m²]
(Coincide con la tabla correspondiente del Código Técnico de la Edificación)

ZONA DE CLIMA INVERNAL (SEGÚN FIGURA 4.3-b)							
ALTITUD [M]	1	2	3	4	5	6	7
0	0,3	0,4	0,2	0,2	0,2	0,2	0,2
200	0,5	0,5	0,2	0,2	0,3	0,2	0,2
400	0,6	0,6	0,2	0,3	0,4	0,2	0,2
500	0,7	0,7	0,3	0,4	0,4	0,3	0,2
600	0,9	0,9	0,3	0,5	0,5	0,4	0,2
700	1,0	1,0	0,4	0,6	0,6	0,5	0,2
800	1,2	1,1	0,5	0,8	0,7	0,7	0,2
900	1,4	1,3	0,6	1,0	0,8	0,9	0,2
1000	1,7	1,5	0,7	1,2	0,9	1,2	0,2
1200	2,3	2,0	1,1	1,9	1,3	2,0	0,2
1400	3,2	2,6	1,7	3,0	1,8	3,3	0,2
1600	4,3	3,5	2,6	4,6	2,5	5,5	0,2
1800	-	4,6	4,0	-	-	9,3	0,2
2200	-	8,0	-	-	-	-	-

INIGIA_Functions

PASSAREL·LA CAN SANT JOAN (AMB, SANT CUGAT)

ACCIONES SÍSMICAS

$$g_e = 9.81 \frac{\text{m}}{\text{s}^2}$$

$$a_{gR} := 0.09 \quad g_e = 0.88 \frac{\text{m}}{\text{s}^2}$$

Aceleración máxima para suelo tipo A
Sant Cugat 41,5°N - 2,10°E (ANEXO NACIONAL EC-8:2018)

$$K := 1$$

$$\gamma_I := 1$$

factor de importancia: Normal

$$a_g := \gamma_I \cdot \frac{a_{gR}}{g_e} = 0.09$$

$$\xi := 5 \%$$

amortiguamiento

ESTUDIO GEOTÉCNICO

Informe geotècnic d'uns terrenys situats a Can
Sant Joan (Sant Cugat del Vallès, Barcelona)

Exp. C25X0215

194/24

TERRENO MEDIO: TIPO C

$$v_{s,30} := 336 \frac{\text{m}}{\text{s}}$$

según informe geotécnico

Tabla AN.1 (Tabla 3.1) - Tipos de terreno

Tipo de terreno medio	$v_{s,30}$ (m/s)	Descripción
A	> 800	Roca compacta o suelo cementado aflorante o con una capa de suelo superficial de espesor menor de 5 m.
B	360 - 800	En las decenas de metros más superficiales, predominio de suelos granulares densos o suelos cohesivos duros o presencia de capas delgadas de suelos granulares sueltos o cohesivos blandos.
C	180 - 360	En las decenas de metros más superficiales, predominio de suelos granulares de compacidad media o suelos cohesivos de consistencia firme o muy firme o presencia de capas de bastante espesor de suelos granulares sueltos o cohesivos blandos.
D	< 180	En las decenas de metros más superficiales, predominio de capas de gran espesor de suelos granulares sueltos o cohesivos blandos.
S1	< 100	Suelos consistiendo, o conteniendo, una capa de al menos 10 m de espesor, de arcillas o limos blandos, de alta plasticidad (IP > 40) y con alto contenido de humedad.
S2		Suelos formados por arenas licuables o arcillas susceptibles, u otro perfil de suelos no contenido en los tipos A-D o S1.

El terreno se clasifica en función de su capacidad de amplificar el movimiento sísmico que se produzca en la roca, lo que depende del espesor de los suelos superficiales y de la velocidad media de propagación de las ondas sísmicas transversales. El terreno puede ser homogéneo o estar formado por varias capas de los siguientes tipos (de I a IV):

- Capa de terreno tipo I: Roca compacta o suelo cementado, con velocidad de propagación de las ondas elásticas transversales $v_s > 800$ m/s.
- Capa de terreno tipo II: Roca muy alterada o muy fracturada, suelos granulares densos o suelos cohesivos duros, con velocidad de propagación de las ondas elásticas transversales $800 \text{ m/s} \geq v_s > 360$ m/s.
- Capa de terreno tipo III: Suelo granular de compacidad media o suelo cohesivo de consistencia firme a muy firme, con velocidad de propagación de las ondas elásticas transversales $360 \text{ m/s} \geq v_s > 180$ m/s.
- Capa de terreno tipo IV: Suelo granular suelto o suelo cohesivo blando, con velocidad de propagación de las ondas elásticas transversales $v_s \leq 180$ m/s.

Las capas de terreno tipo I suelen poseer velocidad de las ondas elásticas longitudinales $v_p > 2\,000$ m/s.

Las capas de terreno tipo II suelen poseer velocidad de las ondas elásticas longitudinales $v_p > 1\,000$ m/s, los granulares, golpeo en los ensayos SPT $N_{1,60} > 40$ y resistencia en punta del penetrómetro estático $q_p > 15$ MPa, y los cohesivos resistencia a compresión simple $q_u > 500$ kPa.

Las capas de terreno tipo III suelen poseer, los granulares, golpeo en los ensayos SPT $40 \geq N_{1,60} > 15$ y resistencia en punta del penetrómetro estático $15 \text{ MPa} \geq q_p > 6 \text{ MPa}$, y los cohesivos resistencia a compresión simple $500 \text{ kPa} \geq q_u > 150 \text{ kPa}$.

Las capas de terreno tipo IV suelen poseer parámetros $N_{1,60}$, q_p , q_u menores que los indicados para los demás tipos.

En cada terreno real (de A a D), formado por N capas de terrenos de diferente tipo, se determina la velocidad media de las ondas elásticas transversales $v_{s,30}$ como establece el apartado 3.1.2(3).

ESPECTRO DE RESPUESTA ELÁSTICO HORIZONTAL

$$\eta := \sqrt{\frac{10\%}{5\% + \xi}} = 1$$

espectro horizontal de aceleraciones

$$S_e(S; T_B; T_C; T_D; T) := \text{if } (0 \leq T) \wedge (T \leq T_B) \\ a_g \cdot S \cdot \left(1 + \frac{T}{T_B} \cdot (\eta \cdot 2.5 - 1) \right) \\ \text{else} \\ \text{if } (T_B \leq T) \wedge (T \leq T_C) \\ a_g \cdot S \cdot \eta \cdot 2.5 \\ \text{else} \\ \text{if } (T_C \leq T) \wedge (T \leq T_D) \\ a_g \cdot S \cdot \eta \cdot 2.5 \cdot \left(\frac{T_C}{T} \right) \\ \text{else} \\ \text{if } (T_D \leq T) \wedge (T \leq 4 \text{ s}) \\ a_g \cdot S \cdot \eta \cdot 2.5 \cdot \left(\frac{T_C \cdot T_D}{T^2} \right) \\ \text{else} \\ 0$$

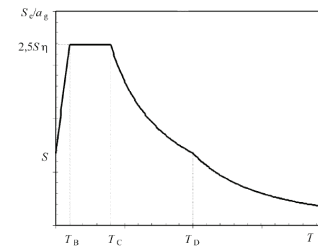


Figura 3.1 - Forma del espectro de respuesta elástica

Si no se tiene en cuenta la geología profunda, se recomienda el uso de dos tipos de espectro: tipo 1 y tipo 2. Si los terremotos que más contribuyen a la peligrosidad sísmica tienen una magnitud de ondas superficiales no mayor que 5,5, se recomienda el espectro tipo 2.

Guía para el proyecto sísmico de puentes de carretera (Mitma, pp.131)

El espectro tipo 1 quiere representar los sismos de magnitud media a grande mientras que el espectro tipo 2 quiere representar los sismos de magnitud inferior a 5,5 que se generan a poca distancia (sismo de campo cercano), con una meseta de mayor amplitud pero menos extensa en términos de periodos. El coeficiente de suelo es menor para el sismo de tipo 1 debido a que la no linealidad del suelo generada por los movimientos producidos por sismos de magnitud moderada a grande es más acusada. De esta forma, el sismo tipo 2 tiene una meseta más reducida, pero valores de aceleración espectral mayores.

Los valores que definen S, T_B, T_C y T_D son parámetros nacionales, y, claramente, deben serlo puesto que están relacionados con las condiciones locales y el nivel de seguridad que es una competencia de los Estados. El Anejo nacional define la peligrosidad sísmica de forma detallada a nivel de cada punto del terreno nacional en una malla de puntos separados 0.1 grados en coordenadas geodésicas de longitud y latitud.

No obstante, con el criterio de magnitud M.s inferior a 5,5 parece que sería viable limitar el uso del espectro tipo 2 a partes muy concretas del Sur de España.

ESPECTRO ELÁSTICO HORIZONTAL - ANEXO NACIONAL ESPAÑOL

$$C := \left(\frac{800 \frac{\text{m}}{\text{s}}}{v_{s,30}} \right)^{0.465} = 1.5$$

$$S_{AN} := C = 1.5 \quad \text{verifica} \left(a_g \leq 0.1 \right) = \text{"OK"}$$

$$T_{C,AN} := \frac{K \cdot C}{4} \text{ s} = 0.37 \text{ s}$$

$$T_{B,AN} := \frac{T_{C,AN}}{5} = 0.07 \text{ s}$$

$$T_{D,AN} := 2 \text{ s}$$

Tabla AN.2 (Tabla 3.2) - Valores de los parámetros que describen el espectro elástico de respuesta horizontal

Suelo tipo	S		T _B (s)	T _C (s)	T _D (s)
A	1		$\frac{T_c}{5}$	$\frac{K}{4}$	2,0
B	$a_g \leq 0,1 g:$	$S = C$	$\frac{T_c}{5}$	$\frac{KC}{4}$	2,0
C	$0,1 g < a_g \leq 0,4 g:$	$S = C + 3,33 \left(\frac{a_g}{g} - 0,1 \right) (1,0 - C)$			
	$a_g > 0,4 g:$	$S = 1$			
D	$a_g \leq 0,1 g:$	$S = 2$	$\frac{T_c}{5}$	$\frac{K}{2}$	2,0
	$0,1 g < a_g \leq 0,4 g:$	$S = 2,33 - 3,33 \frac{a_g}{g}$			
	$a_g > 0,4 g:$	$S = 1$			

donde $C = (800/v_{s,30})^{0.465}$ (con $v_{s,30}$ en m/s) y K se establece en el apartado 3.2.1(2).

ESPECTRO ELÁSTICO HORIZONTAL - ARTICULADO EC-8:2018

$$S_1 := 1.15 \quad T_{B,1} := 0.20 \text{ s} \quad T_{C,1} := 0.6 \text{ s} \quad T_{D,1} := 2.0 \text{ s}$$

Tabla 3.2 – Valores de los parámetros que describen el espectro de respuesta elástica tipo 1 recomendado

Tipo de terreno	S	T _B (s)	T _C (s)	T _D (s)
A	1,0	0,15	0,4	2,0
B	1,2	0,15	0,5	2,0
C	1,15	0,20	0,6	2,0
D	1,35	0,20	0,8	2,0
E	1,4	0,15	0,5	2,0

$$S_2 := 1.5 \quad T_{B,2} := 0.10 \text{ s} \quad T_{C,2} := 0.25 \text{ s} \quad T_{D,2} := 1.2 \text{ s}$$

Tabla 3.3 – Valores de los parámetros que describen el espectro de respuesta elástica tipo 2 recomendado

Tipo de terreno	S	T _B (s)	T _C (s)	T _D (s)
A	1,0	0,05	0,25	1,2
B	1,35	0,05	0,25	1,2
C	1,5	0,10	0,25	1,2
D	1,8	0,10	0,30	1,2
E	1,6	0,05	0,25	1,2

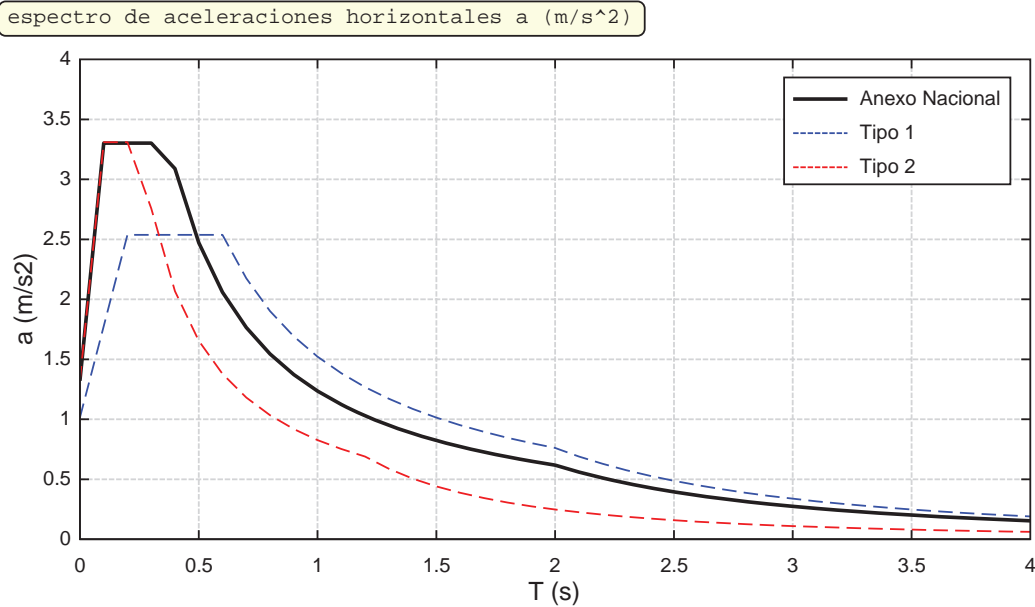
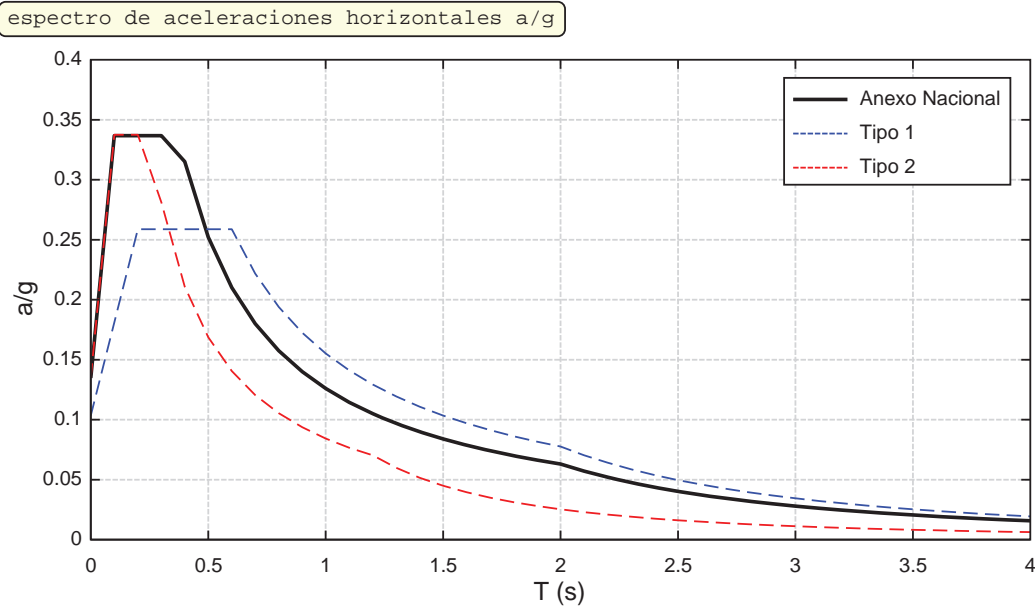
ESPECTROS DE RESPUESTA ELÁSTICA HORIZONTAL

$$T_{var} := \left[0 ; 0.1 \text{ s} \dots (4 \text{ s}) \right]$$

$$S_{e,AN} := S_e \left(S_{AN} ; T_{B,AN} ; T_{C,AN} ; T_{D,AN} ; T_{var} \right)$$

$$S_{e,Tipo1} := S_e \left(S_1 ; T_{B,1} ; T_{C,1} ; T_{D,1} ; T_{var} \right)$$

$$S_{e,Tipo2} := S_e \left(S_2 ; T_{B,2} ; T_{C,2} ; T_{D,2} ; T_{var} \right)$$



1.2 GEOTÈCNIA

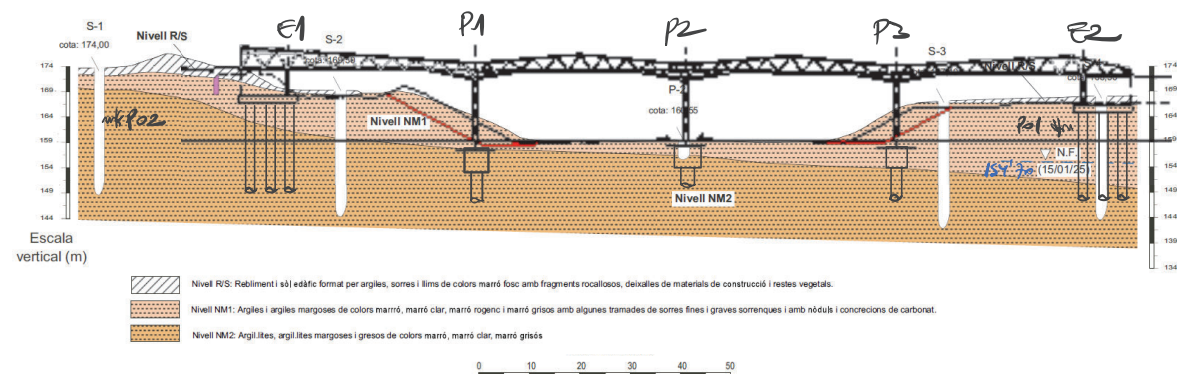
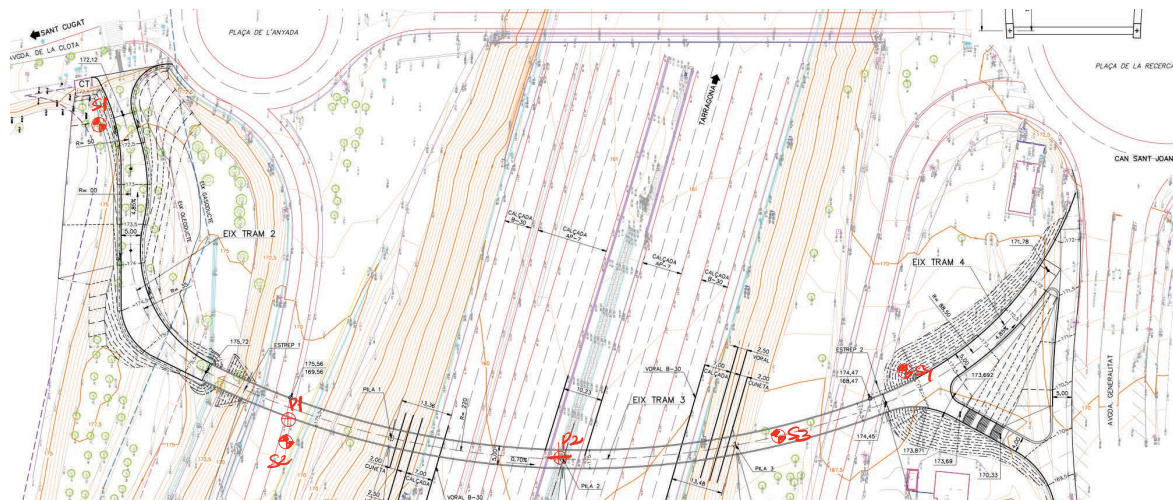
Informe geotècnic d'uns terrenys situats a Can Sant Joan (Sant Cugat del Vallès, Barcelona)

Exp. C25X0215
194/24



Sol.licitant de l'estudi
AMB-Àrea Metropolitana de Barcelona

Obra motiu de l'estudi
Construcció d'una passera per a bicicletes i vianants sobre la B-30 i AP-7



Taula 3.1
Quadre resum dels diferents nivells de materials reconeguts
(veure també talls geològics-annex 7.5)

Denominació	Composició	Fondària del límit superior de la capa (m)	Potència (m)
Nivell R/S	Rebliment i sòl edàfic format per argiles, sorres i llims de colors marró fosc amb fragments rocallosos, deixalles de materials de construcció i restes vegetals	0,00	0,20 a 1,80
Nivell NM1	Argiles, argiles margoses i argiles llimoses de colors marró, marró clar, marró rogenc i marró grisos amb algunes tramades de sorres fines i graves sorrenques i amb nòduls i concrecions de carbonat	0,20 a 1,80	1,40 a 16,70
Nivell NM2	Argil.lites, argil.lites margoses i gresos de colors marró, marró clar, marró grisós	3,20 a 17,90	0,05 a 17,77 (reconeguda)

Aprofitament en TERRAPLONS

Nivell R/S → No esplanada
aprofitada en reserbs no-estructurals
"sense comprimit"

Nivell NM1 → "si marginal", no esplanada

AGRESSIVITAT AL FORMIGÓ

- Aigües freàtiques **AGRESSIVITAT DÈBIL** (V)
- Sòls → NO agressius.

AMBIENT **XC2 + XA1**

ANÀLISI DE L'AIGUA				GRAU D'AGRESSIVITAT		
ASSAIG	NORMA	UNITATS	RESULTAT	DÈBIL	MITJANA	FORTA
pH	UNE 83952:08	u. pH / °C	7,65 / 19,24	6,5-5,5	5,5-4,5	< 4,5
Magnesi	UNE 83955:08	mg Mg ²⁺ /L	35	300-1000	1000-3000	> 3000
Amoni	UNE 83954:08	mg NH ₄ ⁺ /L	<1	15-30	30-60	> 60
Sulfats	UNE 83956:08	mg SO ₄ ²⁻ /L	58	200-600	600-3000	> 3000
CO ₂ agressiu	UNE-EN 13577:08	mg CO ₂ /L	23,3	15-40	40-100	> 100
Residu sec	UNE 83957:08	mg/L	500	75-150	50-75	< 50

QUALIFICACIÓ
Segons RD470/2021 taula 27.1.b, l'aigua analitzada és d'agressivitat dèbil per al formigó.

(V) En la memòria s'indica un atac dèbil per sulfats:

Pel que fa a l'aigua s'ha fet una anàlisi d'una mostra presa en el sondatge S-4 i d'acord amb el RD 470/2021 aquesta es considera d'agressivitat dèbil per al formigó degut a la concentració excessiva de sulfats.

tot i que els resultats de l'anàlisi no reflexen presència de sulfats.
En tot cas, l'atac dèbil per CO₂ i/o sulfats requereixen les mateixes mesures preventives (XC↓, contingut ciment ↑).

CARACTERITZACIÓ GEOTÈCNICA

Nivell R/S

Rebliment i sòl edàfic format per argiles, sorres i llims de colors marró fosc amb fragments rocallosos, deixalles de materials de construcció i restes vegetals.

Es tracta de materials cohesius de consistència molt tova a rígida i de materials granulars de compactat molt solta a mitjanament densa (veure taula següent):

Valors N ₃₀ obtinguts en el nivell R/S a partir de l'assaig DPSH i la correlació de Dahlberg (1974)	
Penetració dinàmica	valors N ₃₀
P-1	8-22 (mitjana de 16,03)
P-2	1-14 (mitjana de 6,01)

Classificació USCS (Unified Soil Classification System): CL, SC, SP-SC, ML, ML-CL

Nivell NM1

Argiles, argiles margoses i argiles llimoses de colors marró, marró clar, marró rogenc i marró grisós amb algunes tramades de sorres fines i grava sorrenques i amb nòduls i concrecions de carbonat.

Aquest nivell el formen materials cohesius de consistència rígida a dura i per alguns materials granulars de compacitat mitjanament densa a molt densa. Així ho reflecteixen els resultats de les proves de penetració SPT i DPSH efectuades (veure taules següents).

Valors N_{30} obtinguts en el nivell NM1 a partir de l'assaig DPSH i la correlació de Dahlberg (1974)

Penetració dinàmica	valors N_{30}
P-1	12-17 (mitjana de 14,10)-1,40-6,00 m 20-Rebuig (mitjana de 24,89)-6,00-9,75 m
P-2	16-Rebuig (mitjana de 24,42)

Valors N_{30} obtinguts en els materials del nivell NM1

Sondatge	valors N_{30}	Sondatge	valors N_{30}
S-1	14 (deduït de MI), 37, Rebuig, Rebuig (deduït de MI)	S-3	26 (deduït de MI), 22, 20, 20 (deduït de MI), 13, 18 (deduït de MI), 21, 44 (deduït de MI), ,
S-2	17 (deduït de MI), 23, 20 (deduït de MI), Rebuig, 17 (deduït de MI), 16, 30	S-4	15 (deduït de MI), 24, 29, 21 (deduït de MI), 18, 10 (deduït de MI), 16, 10 (deduït de MI), 25, 53, Rebuig (deduït de MI), 65, 72

Prova	Fondària	Pressió fluència Kg/cm ²	Pressió límit/Pressió límit Menard Kg/cm ²	Mòdul pressiomètric Inicial/recàrrega Kg/cm ²
S-4 P01	6,20-6,70	8,90	26,30/23,30	425,70/839,40

(7) Expansivitat

Cal esmentar que els materials del nivell NM1 són de plasticitat baixa a alta i dels mateixos es disposa de pressions d'inflament de 0,30 a 1,97 kg/cm²-mitjana de 0,91 kg/cm² i inflaments del 0,11 a 1,92% amb un confinament de 0,10 kg/cm². L'expansibilitat d'aquests sediments, encara que força variable, fa que s'hagin de tenir en compte les indicacions següents:

- Treballar de forma permanent a pressions superiors a la d'inflament, però no més grans que les resistències del terreny indicades
- Encastar la fonamentació un mínim d'1,00 m en el nivell NM1
- Prendre mesures per evitar que l'aigua, sigui quin sigui el seu origen, pugui assolir la zona activa de la fonamentació (construcció d'una vorera perimetral a l'edificació de la màxima amplada possible, la qual pot ser quelcom soterrada i acabada amb una pantalla, que faciliti la sortida controlada de l'escorrentia) i del paviment en el seu cas.
- No comptabilitzar el fust dels elements profunds o especials en el tram corresponent als dos-tres metres superiors del terreny.

Nivell NM2

Argil.lites, argil.lites margoses i gresos de colors marró, marró clar, marró grisós

En aquesta unitat els materials són de natura predominantment rocallosa i majorment han estat perforats amb aigua. En alguns trams, però, el material no ha estat molt resistent i s'ha hagut de perforar en sec.

En aquesta unitat totes les proves de penetració han assolit la condició de rebuig, tal es pot veure a les taules següents:

Valors N_{30} obtinguts en el nivell NM2 a partir de l'assaig DPSH i la correlació de Dahlberg (1974)

Penetració dinàmica	valors N_{30}
P-1	Rebuig
P-2	Rebuig

Valors N_{30} obtinguts en els materials del nivell NM1

Sondatge	valors N_{30}	Sondatge	valors N_{30}
S-1	Rebuig	S-3	Rebuig, rebuig
S-2	Rebuig (deduït de MI), Rebuig, Rebuig (deduït de MI), Rebuig, Rebuig, Rebuig (deduït de MI)	S-4	Rebuig

Prova	Fondària	Pressió fluència Kg/cm ²	Pressió límit/Pressió límit Menard Kg/cm ²	Mòdul pressiomètric Inicial/recàrrega Kg/cm ²
S-1 P01	8,50-9,00 m	14,10	72,60/65,00	2420

Valors de l'Índex RQD

Sondatges	Valor RQD
S-1 (7,23-25,00 m)	81% (interval 61-93)
S-2 (11,50-25 m)	55% (interval 0-91)-destacar tram de 18 a 20,05 m amb valor proper al 0%
S-3 (13,80-25,00 m)	71% (interval de 0 a 100)-hi ha trams decimètrics amb valor 0
S-4	78% (interval de 0 al 84)

El material rocallós pròpiament dit presenta una resistència que es pot catalogar com molt tova (10 a 50 kg/cm²) d'acord amb el criteri de de la ISRM (Societat Internacional de Mecànica de Roques). Així ho indiquen les determinacions fetes al laboratori a partir de testimonis de roca.

Propietat/paràmetre	mostra MP-1.2 11,00-11,40 m	mostra MP-1.4 17,40-17,65 m	mostra MP-1.5 18,70-19,05 m	mostra MP-3.1 14,20-14,40 m
Resistència a la compressió uniaxial MPa	2,61	2,77	4,13	2,66
Densitat aparent g/cm ³	2,39	2,39	2,35	2,45
Propietat/paràmetre	mostra MP-3.3 18,60-18,90 m	mostra MP-3.5 22,40-22,80 m	mostra MP-3.6 24,70-25,00 m	mostra MP-4.1 18,90-19,20 m
Resistència a la compressió uniaxial MPa	3,10	2,81	3,82	3,26
Densitat aparent g/cm ³	2,28	2,34	2,28	2,26
Propietat/paràmetre	mostra MP-4.3 22,80-23,15 m			
Resistència a la compressió uniaxial MPa	3,87			
Densitat aparent g/cm ³	2,27			

RESUM CARACTERÍSTIQUES GEOTÈCNIAQUES

Taula 3.3
Quadre resum de les característiques geotècniques dels materials reconeguts

Nivell	Densitat aparent (g/cm³)	Índex plastic. Ip (%)	Humitat natural (%)	Classifica. U.S.C.S.	N ₃₀ SPT	N ₃₀ DPSH	Resist. compres. simple (kg/cm²)	Cohesió c curt plaç (kg/cm²)	Angle ϕ curt plaç graus	Cohesió c llarg plaç (kg/cm²)	Angle ϕ llarg plaç graus
Nivell R/S	1,85-2,10			CL, SC, ML, ML-CL		1-22 (mitjanes de 6,01 i 16,03)	-	0,017-0,38	15-21	0,0035-0,077	23-29
Nivell NM1	1,63-2,17 (mitjana de 2,03)	NP-8-37	9,30-19,20	CL, CH, SM	10-Rebuig	12-Rebuig (mitjanes de 14,10 a 24,89)	0,26-5,91 (mitjana de 2,87)	0,098-2,24	7-10	0,020-0,57	23-28
Nivell NM2	2,26-2,45 (mitjana de 2,33)	NP-15-21	16-25	-Material alterat/poc cimentat-CL, CH, SC, SM Material compacte	Rebuig	Rebuig	26,10-41,30	1,89-3,79	9-10	0,37-1,04	20-27

FONAMENTACIÓ

ENUNCIAT - ENRC 2

EW-05

Nivell NM1-Fonamentació directa

Qd CURT PLAÇ

Amplada del fonament B (m)	Encast en el terreny (m)	Càrrega vertical d'esfondrament (q _n) kg/cm²
-	1,20	4,48 (terreny horitzontal) 3,18 (terreny inclinat)

Qd LLARG PLAÇ

Amplada del fonament B (m)	Encast en el terreny (m)	Càrrega vertical d'esfondrament (q _n) kg/cm²
-	-	9,45 (terreny horitzontal) 3,40 (terreny inclinat)

*La contribució del segon i tercer terme de l'expressió és molt reduïda i no s'ha tingut en compte

Qd = Qd / γR = 1,85

Situació de curt plaç

Amplada del fonament B (m)	Encast en el terreny (m)	Resistències verticals unitàries Rd-acció d'esfondrament kg/cm²
-	1,20	2,42 (terreny horitzontal) 1,71 (terreny inclinat)

RECOMANACIONS PER EXPANSIÓ NIVELL NM1:

- No treballar a pressions inferiors a pressió d'inflament $\geq 30-197 \text{ kg/cm}^2$ (màxim 291 kg/cm^2)
- encastament fonaments $> 1 \text{ m}$
- MESURAR per evitar que l'aigua cedeixi fonaments.

Nivell NM2-Fonamentació profunda

Q1. opció 1. MÈTODE ANALÍTIC (MHR-GULMB)

Nivell	Resistència unitària d'esfondrament per fust kg/cm ²	Resistència unitària d'esfondrament per punta kg/cm ²
NM1	0,45	-
NM2	0,90	25,57

Q1. opció 2. MÈTODE PRESSIOMÈTRIC

Nivell	Resistència unitària d'esfondrament per fust kg/cm ²	Resistència unitària d'esfondrament per punta kg/cm ²
NM1	0,70	-
NM2	0,70	62,32

El valor resultant per al fust és de 0,256 i 0,78 kg/cm² pe als nivells NM1 i NM2 però el mètode limita el resultat a 0,70 kg/cm²

Q1. opció 3. PILONS ENCASTRATS EN Roca

Nivell	Resistència unitària d'esfondrament per fust kg/cm ²	Resistència unitària d'esfondrament per punta kg/cm ²
NM2	0,72	14,52

(*)
informe gest.
recomana no
considerar
els primers 3m de fust
en NM1 per expansivitat

Q1. promig 1/2/3.

Nivell	Resistència unitària d'esfondrament per fust kg/cm ²	Resistència unitària d'esfondrament per punta kg/cm ²
NM1	0,57 (*)	-
NM2	0,77	34,13

COEFICIENTS PARCIAIS RESISTÈNCIA (CR)
Tabla A.8 - Coeficientes parciales γ_R aplicables a las resistencias, en el cálculo de pilotes de barrena continua (CFA) (Conjunto R2)

Resistencia	Símbolo	Valor	
		Estructuras de edificación	Otras estructuras
Punta	γ_b	1,55 ¹⁾	1,45 ¹⁾
Fuste (pilotes a compresión)	γ_s	1,55 ¹⁾	1,15 ¹⁾
Total/combinada (pilotes a compresión)	γ_t	1,40 ²⁾	1,30 ²⁾
Fuste (pilotes a tracción) ³⁾	γ_{st}	1,80 ⁴⁾	1,15 ⁴⁾

1) Aplicable junto con el coeficiente de modelo definido en el punto 7.6.2.3(8).

2) Aplicable, según los casos, junto con el coeficiente de modelo definido en el punto 7.6.2.3(8) o con los coeficientes de correlación (ζ) definidos en las tablas A.9, A.10 y A.11.

3) Se entiende que este coeficiente se aplica a la resistencia por fuste en pilotes a tracción (de acuerdo a la práctica habitual, esta resistencia es menor que la resistencia por fuste a compresión).

4) Aplicable junto con el coeficiente de modelo definido en el punto 7.6.3.3(6).

(*) $\gamma_{model} = 1,4$

$$\gamma = \gamma_R \cdot \gamma_{model}$$

(*)

(*) INFORME RESISTÈNCIA
APLICACIÓ INCORRECTA D'AQUESTS COEFICIENTS

ES: assentaments

Nivell NM1-Fonamentació directa

tipus: fonamentació 3x3 m²
seu de 1'00 m en NM1

Càrrega aplicada (kg/cm ²) (*)	Assentament orientatiu (cm)
2,42	1,93 (3,00 x 3,00 m) S-1
2,42	3,16 (3,00 x 3,00 m) S-2
2,42	3,68 (3,00 x 3,00 m) S-3
2,42	4,66 (3,00 x 3,00 m) S-4
2,42	4,66 (3,00 x 3,00 m) P-2

UNE EN 1997-1
assentament absolut < 5cm
distorsió < 4/500

Si es tenen en compte les distàncies entre aquest punts de reconeixement i la diferència d'assentaments les distorsions són inferior a 1:500

(*) 2'42 kg/cm² és la resistència de disseny en EU,
a comptar amb accions EU - majorades.
la càrrega en ES quasi permanent és inferior.

Nivell NM2-Fonamentació profunda

assentament $\triangleq 25$ mm (1 m) per a la càrrega
màxima d'esfondrament.

EFECTES SÍSMICS

Terreny tipus C segons UNE-EN-1998-1

Tipo de terreno	Descripción del perfil estratigráfico	Parámetros		
		$V_{s,30}$ (m/s)	N_{SPT} (golpes/30 cm)	c_u (kPa)
A	Roca u otra formación geológica similar a roca, incluyendo como máximo 5 m del material más débil en la superficie	> 800	-	-
B	Depósitos de arena muy densa, grava o arcilla muy rígida, de al menos algunas decenas de metros de espesor, caracterizados por un aumento gradual de las propiedades mecánicas con la profundidad	360 - 800	> 50	> 250
C	Depósitos profundos de arena densa o de densidad de media a densa, grava o arcilla dura con espesor de algunas decenas a muchos centenares de metros	180 - 360	15 - 50	70 - 250
D	Depósitos de suelos sueltos a medios no cohesionados (con o sin algunas capas blandas cohesivas), o principalmente suelos cohesivos de rigidez débil a firme	< 180	< 15	< 70
E	Un perfil de suelo constituido por una capa aluvial con valores de v_s de tipo C o D y espesor variable entre 5 m y 20 m, que yace sobre un material más rígido con $v_s > 800$ m/s			
S_1	Depósitos que contienen una capa de al menos 10 m de espesor, de arcillas/aluviones blandos con alto índice de plasticidad (IP > 40) y alto contenido en agua	< 100 indicativo		10 - 20
S_2	Depósitos de suelos licuefactables, de arcillas sensibles o cualquier otro perfil de suelo no incluido en los tipos A - E o S_1			

Velocitat de propagació mitjana de les ones transversals en els primers 30 m del terreny és la següent:

$$V_{s,30} = 336 \text{ m/s}$$

Acceleració màxima del sòl $-a_{gR}$ referenciada per a un terreny tipus A (roca) i per a l'emplaçament amb coordenades d'acord amb l'Annex Nacional UNE-EN 1998-1.

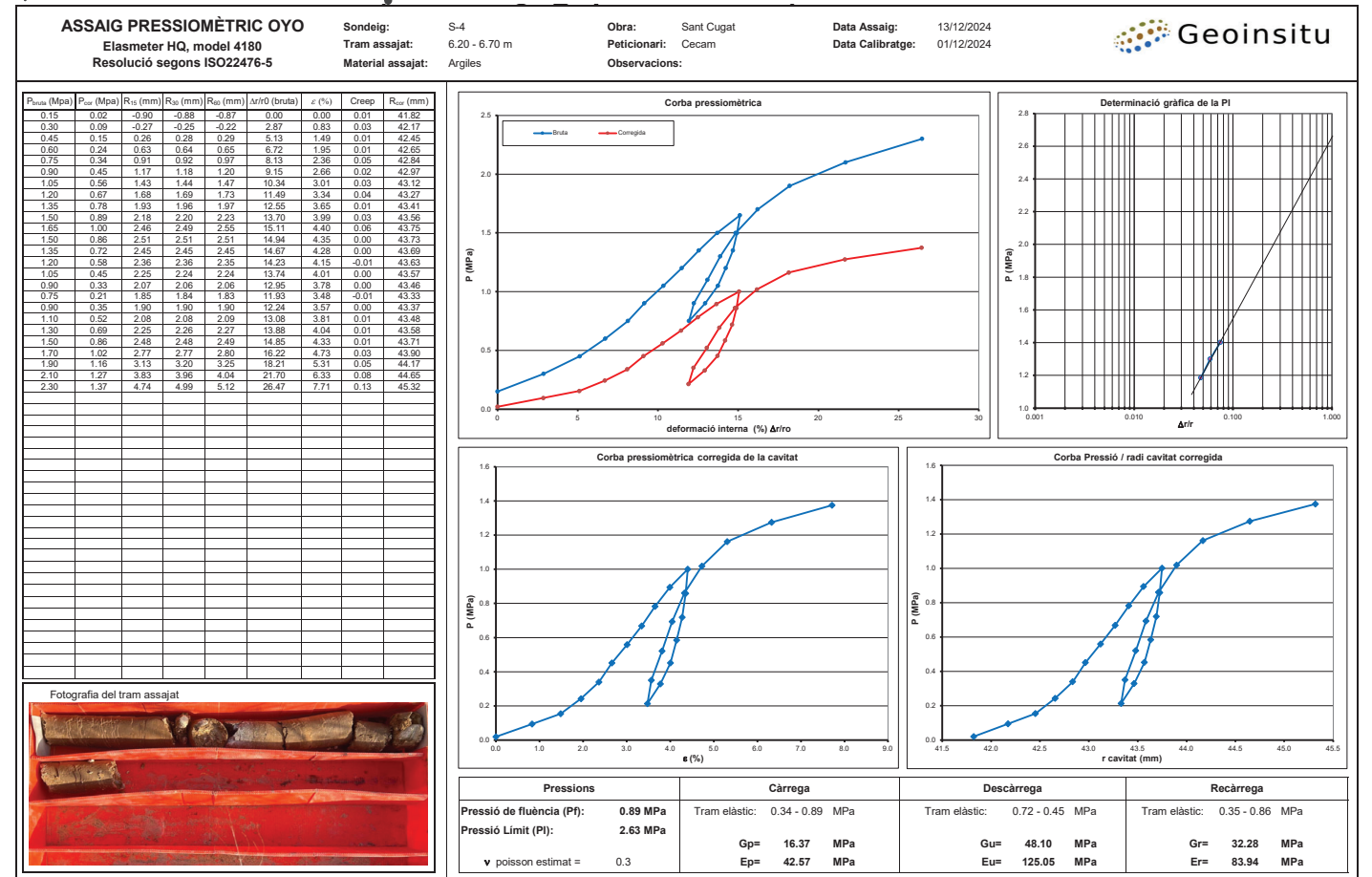
Longitud: 2,067-2,068 graus Oest

Latitud: 41,88-41,90 graus Est

$$a_{gR} = 0,082g \text{ (gravetat)}$$
$$\text{Coeficient de contribució } K = 1$$

error en les coordenades de longitud i latitud \rightarrow $41^{\circ}5'N - 2^{\circ}1'E$
 $a_{gR} = 0,09g$
 $K = 1$

PRESSIONMÈTRE B1-Sudeig SY - Terreny NM1



PRESSIOMÈTRE R2-Sondeig S1 - Terreny NM2

ASSAIG PRESSIOMÈTRIC OYO

Elasmeter HQ, model 4180

Resolució segons ISO22476-5

Sondeig:

EG 194/24-S1

Obra:

Sant Cugat

Data Assaig:

14/01/2025

Tram assajat:

8.50 - 9.00 m

Peticionari:

Cecam

Data Calibratge:

02/01/2025

Material assajat:

Argil·lita

Observacions:

Geoinsitu

P _{max} (Mpa)	P _{0.5} (Mpa)	R _{0.5} (mm)	R _{0.2} (mm)	R _{0.1} (mm)	Δu/0 (bruta)	ε (%)	C _{crep}	R _{0.5} (mm)
0.30	0.00	-0.12	-0.02	0.06	0.00	0.00	0.08	40.15
0.60	0.00	2.25	2.28	2.31	9.55	3.26	0.03	41.50
1.20	0.57	2.44	2.45	2.47	10.23	3.48	0.02	41.59
1.50	0.85	2.55	2.56	2.56	10.61	3.61	0.00	41.65
1.80	1.13	2.65	2.65	2.68	11.12	3.78	0.03	41.72
2.10	1.41	2.76	2.77	2.77	11.50	3.90	0.00	41.78
2.40	1.69	2.92	2.92	2.93	12.18	4.13	0.01	41.88
2.10	1.40	2.90	2.90	2.90	12.05	4.09	0.00	41.86
1.80	1.12	2.82	2.81	2.81	11.67	3.96	0.00	41.80
1.50	0.84	2.69	2.69	2.66	11.12	3.75	-0.01	41.72
1.20	0.56	2.58	2.58	2.57	10.65	3.62	-0.01	41.66
0.90	0.27	2.49	2.49	2.49	10.31	3.51	0.00	41.61
1.10	0.47	2.52	2.52	2.52	10.44	3.55	0.00	41.63
1.30	0.65	2.57	2.57	2.56	10.70	3.64	0.01	41.66
1.50	0.84	2.64	2.64	2.64	10.95	3.72	0.00	41.70
1.70	1.03	2.72	2.72	2.72	11.29	3.84	0.00	41.75
1.90	1.22	2.78	2.78	2.78	11.54	3.92	0.00	41.79
2.10	1.40	2.86	2.86	2.86	11.88	4.03	0.00	41.83
2.30	1.59	2.93	2.93	2.94	12.22	4.15	0.01	41.88
2.50	1.78	3.02	3.02	3.03	12.61	4.28	0.01	41.94
2.70	1.96	3.12	3.13	3.14	13.07	4.43	0.01	42.01
2.90	2.14	3.25	3.28	3.29	13.71	4.65	0.01	42.10
3.10	2.32	3.40	3.42	3.44	14.35	4.86	0.02	42.20
3.30	2.49	3.57	3.59	3.62	15.11	5.12	0.03	42.31
3.50	2.67	3.75	3.77	3.80	15.87	5.37	0.03	42.43
3.90	3.02	4.17	4.20	4.27	17.87	6.04	0.07	42.73
4.30	3.35	4.70	4.76	4.90	20.54	6.94	0.12	43.14
4.70	3.69	5.36	5.49	5.64	23.68	7.98	0.15	43.63
5.10	4.01	6.30	6.53	6.77	28.48	9.55	0.24	44.39

Fotografia del tram assajat

Corba pressiomètrica

Determinació gràfica de la PI

Corba pressiomètrica corregida de la cavitat

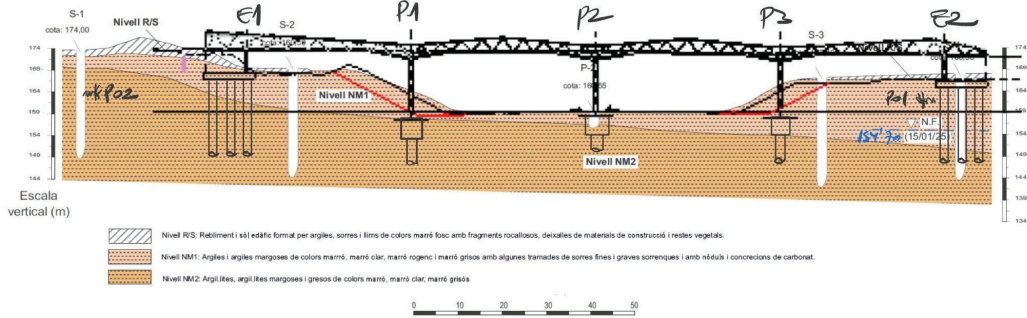
Corba Pressió / radi cavitat corregida

Pressions	Càrrega	Descàrrega	Recàrrega
Pressió de fluència (Pf): 1.41 MPa	Tram elàstic: 0 - 1.41 MPa	Tram elàstic: 1.4 - 0.84 MPa	Tram elàstic: 0.47 - 1.4 MPa
Pressió Límit (PI): 7.26 MPa	Gp= 105.28 MPa	Gu= 86.25 MPa	Gr= 93.10 MPa
ν poisson estimat = 0.3	Ep= 273.72 MPa	Eu= 224.26 MPa	Er= 242.06 MPa

+

INIGIA_Functions

MÓDULO DE BALASTO HORIZONTAL EN PILOTES



$\Delta L := 1 \text{ m}$

Longitud del tramo de pilote (EF)

Nivel NM1 - ARGILES, ARGILES MARGOSES I ARGILES LLIMOSES

Argiles llimoses de 0 a 14m

$E_{p.NM1} := 42.57 \text{ MPa} = 425.7 \frac{\text{kgf}}{\text{cm}^2}$

Módulo presiométrico Ep
Argiles NM1

$K_{h.NM1} := 1.5 \cdot E_{p.NM1} \cdot \Delta L = 63855 \frac{\text{kN}}{\text{m}}$

Coeficiente de balasto horizontal
NM1

Nivel NM2 - ARGIL·LITES

Argil·lites de 14m fins al peu del piló

$E_{p.NM2} := 242 \text{ MPa} = 2420 \frac{\text{kgf}}{\text{cm}^2}$

Módulo presiométrico Ep
Argil·lites NM2

$K_{h.NM2} := 1.5 \cdot E_{p.NM2} \cdot \Delta L = 363000 \frac{\text{kN}}{\text{m}}$

Coeficiente de balasto horizontal
NM2

COEFICIENTS PARCIALES ACCIONES

Tabla A.3a – Coeficientes parciales γ_F aplicables a las acciones o γ_E aplicables a los efectos de las acciones, en situaciones persistentes y transitorias, en la comprobación de los estados límite último tipo STR/GEO, excepto el estado límite último de estabilidad global (Conjunto A1)

Tipo de estructura	Tabla de referencia
Estructuras de edificación	Tabla AN.3 (tabla A1.2(B)) “Valor de cálculo de las acciones (STR/GEO) (Conjunto B)”, del anexo nacional de la Norma UNE-EN 1990
Puentes de carretera y de ferrocarril y pasarelas	Tabla AN.9 (tabla A2.4(B)) “Valor de cálculo de las acciones (STR/GEO) (Conjunto B)”, del anexo nacional de la Norma UNE-EN 1990

EC7:2016

Tabla AN.9 [tabla A2.4(B)] – Valor de cálculo de las acciones (STR/GEO) (Conjunto B)

Situación persistente o transitoria	Acciones permanentes		Pretensado	Acción variable dominante	Acciones variables concomitantes	
	Desfavorable	Favorable			Principal (en su caso)	Otras
(Ec. 6.10)	$\gamma_{G1, sup} \cdot G_{k1, sup}$	$\gamma_{G1, inf} \cdot G_{k1, inf}$	$\gamma_p \cdot P$	$\gamma_{Q1} \cdot Q_{k1}$		$\gamma_{Q2} \cdot \psi_{0i1} \cdot Q_{ki}$

Acción		Efecto	
		Favorable	Desfavorable
Permanente (G) γ_G	Peso propio	$\gamma_{G, inf} = 1$	$\gamma_{G, sup} = 1,35$
	Carga muerta	$\gamma_{G, inf} = 1$	$\gamma_{G, sup} = 1,35$
	Otras presolicitaciones	1	1
	Reológicas	1 ¹⁾ 2)	1,35 ¹⁾ 2)
	Rozamiento de apoyos deslizantes	1	1,35
	Empuje del terreno	1	1,35
	Empuje hidrostático del agua intersticial ³⁾	$\gamma_{G, inf} = 1$	$\gamma_{G, sup} = 1,35$
	Asientos	$\gamma_{G, inf} = 0$	$\gamma_{G, sup} = 1,20 / 1,351) 2) 4)$
Pretensado (P) γ_P	Pretensado P_1	$\gamma_P = 1$	$\gamma_P = 1 / 1,205) / 1,306)$
	Pretensado P_2	$\gamma_P = 1$	$\gamma_P = 1,35$
Variable (Q) γ_Q	Sobrecarga de uso en puentes de carretera y pasarelas	0	1,35
	Sobrecarga de uso en puentes de ferrocarril	0	1,45 ⁷⁾
	Sobrecarga de uso en rellenos de trasdós de muros o estribos ⁸⁾	0	1,50
	Sobrecargas de construcción	0	1,35
	Acciones climáticas	0	1,50 ¹⁾ 2)
	Empuje hidrostático del agua libre	0	1,35
	Empuje hidrodinámico del agua	0	1,50

EC0:2019

COEFICIENTS PARCIALES RESISTENCIAS

Y, por lo tanto, el valor de la resistencia a compresión del terreno ELU-GEO se puede obtener como:

$$R_{c;d} = \frac{R_{b;k}}{\gamma_b \cdot \gamma_{R;d}} + \frac{R_{s;k}}{\gamma_s \cdot \gamma_{R;d}} \quad (7)$$

Criterios cálculo pilotes Mitma

Tabla A.8 – Coeficientes parciales γ_R aplicables a las resistencias, en el cálculo de pilotes de barrena continua (CFA) (Conjunto R2)

Resistencia	Símbolo	Valor	
		Estructuras de edificación	Otras estructuras
Punta	γ_b	1,55 ¹⁾	1,45 ¹⁾
Fuste (pilotes a compresión)	γ_s	1,55 ¹⁾	1,15 ¹⁾
Total/combinada (pilotes a compresión)	γ_t	1,40 ²⁾	1,30 ²⁾
Fuste (pilotes a tracción) ³⁾	$\gamma_{s,t}$	1,80 ⁴⁾	1,15 ⁴⁾
1) Aplicable junto con el coeficiente de modelo definido en el punto 7.6.2.3(8).			
2) Aplicable, según los casos, junto con el coeficiente de modelo definido en el punto 7.6.2.3(8) o con los coeficientes de correlación (ζ) definidos en las tablas A.9, A.10 y A.11.			
3) Se entiende que este coeficiente se aplica a la resistencia por fuste en pilotes a tracción (de acuerdo a la práctica habitual, esta resistencia es menor que la resistencia por fuste a compresión).			
4) Aplicable junto con el coeficiente de modelo definido en el punto 7.6.3.3(6).			

7.6.2.3 Resistencia última a compresión obtenida a partir de los resultados de los ensayos de campo

(8) Los valores característicos pueden calcularse mediante:

$$R_{b,k} = A_b \cdot q_{b,k} \quad \text{y} \quad R_{s,k} = \sum_1 A_{s,i} \times q_{s,i,k} \quad (7.9)$$

donde $q_{b,k}$ y $q_{s,i,k}$ son los valores característicos de las resistencias por punta y el rozamiento por fuste en diferentes estratos, obtenidos a partir de mediciones de los valores de los parámetros del terreno.

NOTA Si se aplica este procedimiento alternativo, puede ser necesario corregir los valores de los coeficientes parciales γ_b y γ_s recomendados en el anexo A mediante un coeficiente de modelo mayor que 1,0. El valor del coeficiente de modelo puede establecerse en el anexo nacional.

7.6.2.3(8): Valor del coeficiente de modelo $\gamma_{R;d}$ para la corrección de los coeficientes parciales γ_b y γ_s

El valor del coeficiente de modelo ($\gamma_{R;d}$) para la corrección de los coeficientes γ_b y γ_s , en caso de aplicar el procedimiento de cálculo establecido en el punto 7.6.2.3(8), debe ser 1,40.

COEFICIENTS PARCIAIS PARCIALS (EC-2)

2.4.2.4 Coeficientes parciales de seguridad para los materiales

(1) Se deberían usar coeficientes parciales de seguridad para los materiales, γ_c y γ_s , para los estados límite últimos.

Tabla AN/1 (Tabla 2.1N) – Coeficientes parciales para la ponderación de los materiales en la comprobación de los Estados Límite Últimos

Situaciones de proyecto	γ_c , hormigón	γ_s , para armadura pasiva	γ_s , para armadura activa
Persistente o transitoria	1,5	1,15	1,15
Accidental	1,3	1,0	1,0

2.4.2.5 Coeficientes parciales de seguridad para los materiales para cimentaciones

(1) Los valores de cálculo de las propiedades de resistencia del suelo se deberían calcular conforme a la Norma EN 1997.

(2) El coeficiente parcial de seguridad para el hormigón γ_c dado en el punto (1) del apartado 2.4.2.4 se debería multiplicar por un coeficiente k_f para el cálculo de la resistencia de pilotes hormigonados *in situ* sin encamisado permanente.

2.4.2.5 (2) Coeficiente que multiplica al coeficiente parcial de ponderación del hormigón en la comprobación de pilotes hormigonados in situ sin encamisado permanente

Se adopta el valor recomendado del coeficiente k_f que multiplica al coeficiente parcial de ponderación del hormigón γ_c en la comprobación de pilotes hormigonados in situ sin encamisado permanente, $k_f = 1,25$.

$$f_{cd} = \frac{\alpha_{cc}}{\gamma_c \cdot k_f} f_{ck}$$

COEFICIENT PARCIAL PARCIALS EN PILONS:

$$\gamma_c \times k_f = 1,50 \times 1,25 = 1,875 \text{ (EC-pilons)}$$

2.3.4.2 Requisitos adicionales para hormigonado de pilotes «in situ»

(1)P Se deben tener en cuenta en el proyecto las incertidumbres relacionadas con la sección transversal de hormigonado de pilotes *in situ* y los procedimientos de hormigonado.

(2) En ausencia de otras disposiciones, el diámetro a emplear en los cálculos del proyecto de pilotes hormigonados *in situ* sin encamisado permanente debería ser:

- si $d_{nom} < 400$ mm $d = d_{nom} - 20$ mm
- si $400 \leq d_{nom} \leq 1\,000$ mm $d = 0,95 \cdot d_{nom}$
- si $d_{nom} > 1\,000$ mm $d = d_{nom} - 50$ mm

donde d_{nom} es el diámetro nominal de los pilotes.

1.3 CLASSE D'EXECUCIÓ DE L'ESTRUCTURA METÀL·LICA

CLASES DE EJECUCIÓN

SEGÚN IS 1370-2 (Código Estructural 991.2)

NIVEL DE RIESGO → **CC2** elementos con fallo

Compromete la seguridad de personas, pero no del público en general.

(así mismo a obras Anexo A EN 1991-1-7:2006 edificios < 15 plantas)

CATEGORÍA DE USO → **SC2** estructuras

estructuras con acciones de fije o vibraciones por efecto del viento, peso de personas,...

CATEGORÍA DE EJECUCIÓN → **PC2** componentes

en estructuras de acero grado S235 o superior, soldaduras en acero de elementos principales.

CLASE DE EJECUCIÓN → **CC3**

Tabla 6.2.3

Determinación de la clase de ejecución

Nivel de riesgo		CC1		CC2		CC3	
Categoría de uso		SC1	SC2	SC1	SC2	SC1	SC2
Categoría de ejecución	PC1	1	2	2	3	3	3
	PC2	2	2	2	3	3	4

APÈNDIX 2 – TAULER MIXT

2.1 BIGUES TRANSVERSALS MIXTES

AMPLE EFICAÇ

EC4-1-1 § 5.4.1.2

$b_0 := 0 \text{ mm}$

$L := 4 \text{ m}$

$b_1 := \frac{2.50 \text{ m}}{2} = 1.25 \text{ m}$

$b_2 := \frac{2.50 \text{ m}}{2} = 1.25 \text{ m}$

$b_{e1} := \text{Min} \left(b_1 ; \frac{L}{8} \right) = 0.5 \text{ m}$

$b_{e2} := \text{Min} \left(b_2 ; \frac{L}{8} \right) = 0.5 \text{ m}$

$b_{eff} := b_0 + b_{e1} + b_{e2} = 1 \text{ m}$

ancho eficaz en el centro del vano para ELS y ELU

$\beta_1 := \text{Min} \left(0.55 + 0.025 \cdot \frac{L}{b_{e1}} ; 1 \right) = 0.75$

$\beta_2 := \text{Min} \left(0.55 + 0.025 \cdot \frac{L}{b_{e2}} ; 1 \right) = 0.75$

$b_{eff.apoyo} := b_0 + \beta_1 \cdot b_{e1} + \beta_2 \cdot b_{e2} = 0.8 \text{ m}$

ancho eficaz sobre un apoyo extremo
ELS y ELU

$\beta_1 \cdot b_{e1} = 0.38 \text{ m}$

$b_0 = 0$

$\beta_2 \cdot b_{e2} = 0.38 \text{ m}$

ELU FLEXIÓ

MATERIALES

HORMIGÓN

$f_{ck} := 30 \text{ MPa}$

$\gamma_c = 1.5$

$f_{cd} = 20 \text{ MPa}$

ACERO

$f_a := 355 \text{ MPa}$

$\gamma_{M0} = 1.05$

$f_{ad} := \frac{f_a}{\gamma_{M0}} = 338.1 \text{ MPa}$

SECCIÓN TRANSVERSAL

VIGA ACERO (DOBLE-T SIMÉTRICA)

$h := 300 \text{ mm}$

$b := 300 \text{ mm}$

$t_f := 15 \text{ mm}$

$t_w := 10 \text{ mm}$

$h_i := h - 2 \cdot t_f = 0.27 \text{ m}$

$A := b \cdot h - h_i \cdot (b - t_w) = 117 \text{ cm}^2$

$I_y := \frac{1}{12} \cdot b \cdot h^3 - \frac{1}{12} \cdot (b - t_w) \cdot h_i^3 = 19932.75 \text{ cm}^4$

$I_z := 2 \cdot \frac{1}{12} \cdot t_f \cdot b^3 + \frac{1}{12} \cdot h_i \cdot t_w^3 = 6752.25 \text{ cm}^4$

$i_y := \sqrt{\frac{I_y}{A}} = 13.05 \text{ cm}$

$i_z := \sqrt{\frac{I_z}{A}} = 7.6 \text{ cm}$

$W_{el,y} := \frac{I_y}{\frac{h}{2}} = 1328.85 \text{ cm}^3$

$y_s := \frac{(b \cdot t_f) \cdot \left(\frac{h - t_f}{2}\right) + \left(\frac{h_i}{2} \cdot t_w\right) \cdot \left(\frac{h_i}{4}\right)}{b \cdot t_f + \frac{h_i}{2} \cdot t_w} = 0.1252 \text{ m}$

$S := \frac{A}{2} \cdot y_s = 732.375 \text{ cm}^3$

$2 \cdot y_s = 250.38 \text{ mm}$

$pp := A \cdot 7850 \frac{\text{kgf}}{\text{m}^3} = 0.92 \frac{\text{kN}}{\text{m}}$

LOSA HORMIGÓN (SECCIÓN CON LOSA SUPERIOR)

$b_{eff} := 1.00 \text{ m}$

$h_L := 150 \text{ mm}$

$h_{L.0} := 0 \text{ mm}$

$h_T := h_L + h_{L.0} + h = 450 \text{ mm}$

CONEXIÓN

$P_{1.Rd} := 81.7 \text{ kN}$

$n_p := 2$

$s_p := 150 \text{ mm}$

$L_p := 2 \text{ m}$

Valor plástico de la fuerza de compresión en el hormigón

$N_{c.f} := b_{eff} \cdot h_L \cdot (0.85 \cdot f_{cd}) = 2550 \text{ kN}$

Valor conectado de la fuerza de compresión en el ala (conexión parcial)

$N_c := P_{1.Rd} \cdot n_p \cdot \frac{L_p}{s_p} = 2179 \text{ kN}$

$\eta := \text{Min} \left(\frac{N_c}{N_{c.f}} ; 1 \right) = 0.85$ Grado de conexión

MOMENTO POSITIVO

6.2 Resistencia de las secciones transversales de vigas

Clasificación de sección (Mínimo Clase 2)

$\varepsilon := \sqrt{\frac{235 \text{ MPa}}{f_y}} = 0.81$

$c := \frac{b - t_w}{2} = 145 \text{ mm}$

$\text{verifica} \left(\frac{c}{t_f} \leq 10 \cdot \varepsilon \right) = \text{"NO VERIFICA"}$ Ala volada en compresión - Clase 3
Conectada a hormigón -> Clase 2 $\frac{c}{t_f} = 9.67 \quad 10 \cdot \varepsilon = 8.1$

$\text{verifica} \left(\frac{h_i}{t_w} \leq 83 \cdot \varepsilon \right) = \text{"OK"}$ Alma en flexión - Clase 2 $\frac{h_i}{t_w} = 27 \quad 83 \cdot \varepsilon = 67.5$

$\text{verifica} \left(\frac{h_i}{t_w} \leq 38 \cdot \varepsilon \right) = \text{"OK"}$ FLEXIÓN COMPUESTA
Alma en compresión - Clase 2 $\frac{h_i}{t_w} = 27 \quad 38 \cdot \varepsilon = 30.9$

6.2.1.2 Momento plástico resistente de una sección mixta

$$N_{c.f} := b_{eff} \cdot h_L \cdot (0.85 \cdot f_{cd}) = 2550 \text{ kN}$$

$$N_{pl.a} := A \cdot f_{ad} = 3956 \text{ kN}$$

$$verifica(N_{c.f} < N_{pl.a}) = \text{"OK"}$$

La fibra neutra plástica se sitúa en el acero

La sección completa de hormigón no agota a tracción el perfil. Se establece un par entre hormigón y acero con $N_{c.f} = 2550 \text{ kN}$ y al perfil le queda capacidad para desarrollar un momento adicional M_a .

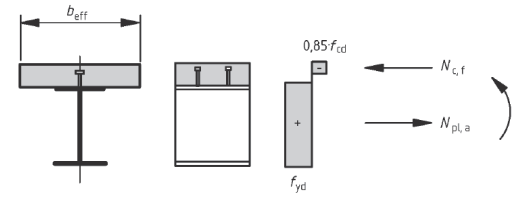
Si la fibra neutra plástica se sitúa dentro del ala del perfil metálico

$$y_p := \frac{A \cdot f_{ad} - 0.85 \cdot f_{cd} \cdot b_{eff} \cdot h_L}{2 \cdot b \cdot f_{ad}} = 6.93 \text{ mm}$$

$$verifica(y_p < t_f) = \text{"OK"} \quad \text{fibra neutra dentro del espesor del ala 't.f'}$$

"Vigas mixtas de edificación" (Argüelles, 2014) - Ec.4.8

$$M_{pl.Rd} := A \cdot f_{ad} \cdot \left(\frac{h}{2} + \frac{h_L}{2} + h_{L.0} \right) - b \cdot y_p \cdot f_{ad} \cdot (y_p + h_L + 2 \cdot h_{L.0}) = 780 \text{ m kN}$$

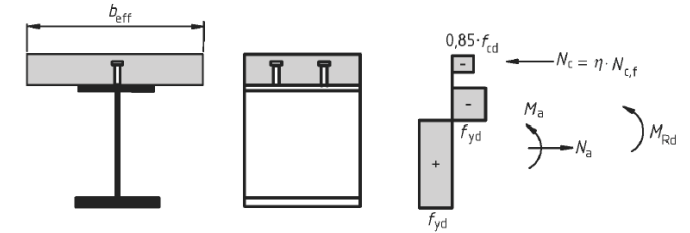


6.2.1.3 Momento plástico resistente de secciones con conexión parcial en edificación

Valor conectado de la fuerza de compresión en el ala (conexión parcial)

$$N_c := P_{1.Rd} \cdot n_p \cdot \frac{L_p}{S_p} = 2179 \text{ kN}$$

$$\eta := \text{Min} \left(\frac{N_c}{N_{c.f}} ; 1 \right) = 0.85 \quad \text{Grado de conexión}$$



$$N_{parcial} := \eta \cdot N_{c.f} = 2179 \text{ kN}$$

Figura 6.4 – Distribución plástica de tensiones en flexión positiva con conexión parcial

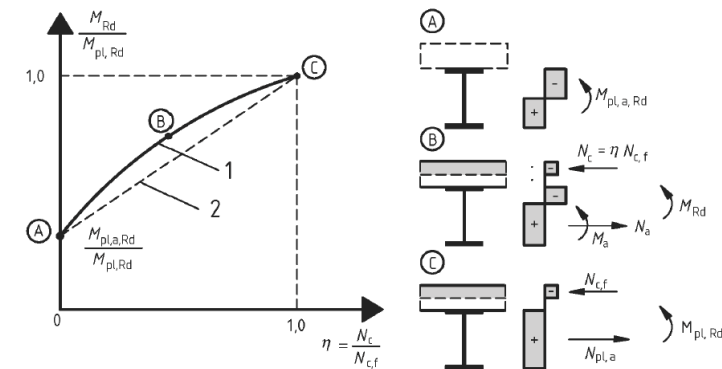
La fuerza de compresión conectada con el hormigón no agota a tracción el perfil. Se establece un par entre hormigón y acero con $N_{parcial} = 2179 \text{ kN}$ y al perfil le queda capacidad para desarrollar un momento adicional M_a .

Resistencia plástica a flexión positiva de la sección de ACERO sola

$$M_{pl.a.Rd} := 2 \cdot S \cdot f_{ad} = 495 \text{ m kN}$$

$$M_{Rd} := M_{pl.a.Rd} + (M_{pl.Rd} - M_{pl.a.Rd}) \cdot \eta = 738 \text{ m kN}$$

Momento plástico resistente con conexión parcial (cálculo APROXIMADO por interpolación lineal)



- 1 Teoría plástica
- 2 Método simplificado

Figura 6.5 – Relación entre M_{Rd} y N_c (para los conectadores dúctiles)

Momento plástico con conexión parcial (Cálculo exacto)
Vigas Mixtas de Edificación (Argüelles, 2014) §4.3.2

$$x_{parcial} := \frac{N_{parcial}}{b_{eff} \cdot (0.85 \cdot f_{cd})} = 128.2 \text{ mm}$$

$$N_{parcial} = 2178.7 \text{ kN}$$

$$x_{parcial} = 128.2 \text{ mm}$$

$$verifica(x_{parcial} \leq h_L) = \text{"OK"}$$

la fibra neutra de la losa de hormigón es inferior a su espesor

$$M_{Rd.Nc} := N_{parcial} \cdot \left(h_T - \frac{h}{2} - \frac{x_{parcial}}{2} \right) = 514 \text{ m kN}$$

Momento resistido por el par de fuerzas Nparcial entre losa y perfil metálico

$$verifica(N_{parcial} \leq N_{pl.a}) = \text{"OK"}$$

el axil conectado Nparcial no agota el perfil metálico a tracción, queda una parte del perfil de acero que puede incrementar el momento

$$verifica(h_i \cdot t_w \cdot f_{ad} \leq N_{parcial}) = \text{"OK"}$$

el axil Nparcial plastifica completamente el alma del perfil

...y una parte t.f.pl. del espesor de las alas

$$t_{f.pl} := \frac{N_{parcial} - h_i \cdot t_w \cdot f_{ad}}{2 \cdot b \cdot f_{ad}} = 6.24 \text{ mm}$$

$$verifica(t_{f.pl} < t_f) = \text{"OK"}$$

espesor de alas del perfil metálico no afectado por el par losa-perfil

$$t_{f.a} := t_f - t_{f.pl} = 8.76 \text{ mm}$$

Momento desarrollado por la parte no plastificada de las alas del perfil metálico

$$M_{Rd.Ma.f} := b \cdot t_{f.a} \cdot f_{ad} \cdot (h - t_{f.a}) = 259 \text{ m kN}$$

$$M_{Rd.Ma} := M_{Rd.Ma.f} = 259 \text{ m kN}$$

Momento plástico desarrollado por la parte no plastificada del perfil metálico

$$M_{Rd.parcial} := M_{Rd.Nc} + M_{Rd.Ma} = 773 \text{ m kN}$$

Momento plástico resistente con conexión parcial (Cálculo exacto)

ELU TALLANT

RESISTENCIA A CORTANTE

EN 1993.1.1 - 6.2.6

SOLICITACIONES

$V_{Sd} := 75 \text{ kN}$

MATERIALES

ACERO

$E_a = 2.1 \cdot 10^5 \text{ MPa}$

$f_{yw} := 355 \text{ MPa}$

$\gamma_{M0} = 1.05$

$\eta := 1.2$

factor de endurecimiento por deformación

$\varepsilon := \sqrt{\frac{235 \text{ MPa}}{f_{yw}}} = 0.81$

$h := 300 \text{ mm}$

canto

$b := 300 \text{ mm}$

ancho del ala

$t_w := 10 \text{ mm}$

espesor del alma

$t_f := 20 \text{ mm}$

espesor del ala

$h_w := h - 2 \cdot t_f = 260 \text{ mm}$

$A := 2 \cdot b \cdot t_f + h_w \cdot t_w = 146 \text{ cm}^2$

$A_v := \eta \cdot h_w \cdot t_w = 31.2 \text{ cm}^2$

Secciones de vigas armadas soldadas en I, en H y en cajón con carga paralela al alma

eq.6.18 - EC3-1-1

$V_{pl.Rd} := \frac{A_v \cdot \left(\frac{f_{yw}}{\sqrt{3}}\right)}{\gamma_{M0}} = 609 \text{ kN}$

$verifica \left(\frac{h_w}{t_w} \leq 72 \cdot \frac{\varepsilon}{\eta}\right) = \text{"OK"}$

no abolla a cortante

INTERACCIÓN

En aquellos casos en que η_3 sea menor o igual que 0,5, no es necesario reducir la resistencia de cálculo de la sección a flexión y a esfuerzo axil para tener en cuenta el efecto del esfuerzo cortante.

$\eta_3 := \frac{V_{Sd}}{V_{pl.Rd}} = 0.12$

$Interacción := \text{if } \frac{V_{Sd}}{V_{pl.Rd}} \leq 0.5$

"no"

else

"si"

$Interacción = \text{"no"}$

Si por el contrario η_3 es mayor que 0,5, la combinación de efectos de flexión y cortante se realiza mediante una disminución de la capacidad a flexión y axil para tener en cuenta el efecto del esfuerzo cortante

Para secciones en **Clase 1 o 2**, la interacción se realiza considerando una reducción del valor de cálculo de la resistencia del acero en el área de cortante

$\rho_w := \left(2 \cdot \frac{V_{Sd}}{V_{pl.Rd}} - 1\right)^2 = 0.57$

$(1 - \rho_w) = 0.43$

$f_{yw.r} := (1 - \rho_w) \cdot f_{yw} = 153 \text{ MPa}$

límite elástico reducido en el alma por interacción σ - τ

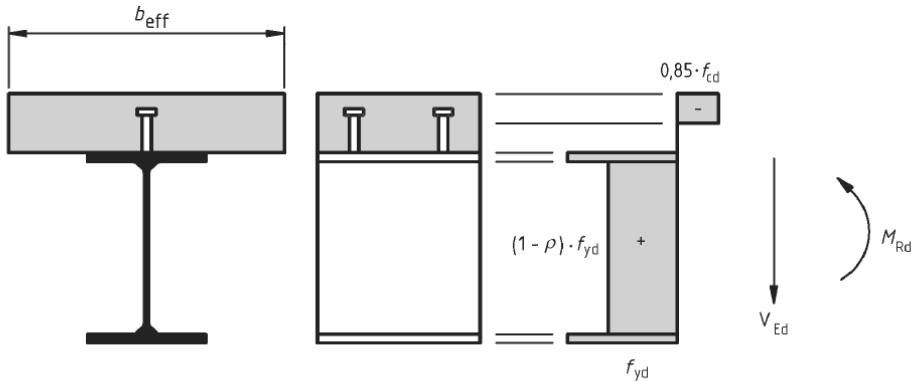


Figura 6.7 – Distribución plástica de tensiones modificada por el efecto del cortante

Clasificación de la sección transversal

ALMA EN COMPRESIÓN

$$c_w := h - 2 \cdot t_f = 260 \text{ mm}$$

$$t_w = 10 \text{ mm} \quad \frac{c_w}{t_w} = 26$$

$$\text{verifica} \left(\frac{c_w}{t_w} \leq 42 \cdot \varepsilon \right) = \text{"OK"} \quad \text{Clase 3}$$

$$\text{verifica} \left(\frac{c_w}{t_w} \leq 38 \cdot \varepsilon \right) = \text{"OK"} \quad \text{Clase 2}$$

$$\text{verifica} \left(\frac{c_w}{t_w} \leq 33 \cdot \varepsilon \right) = \text{"OK"} \quad \text{Clase 1}$$

ALA VOLADA EN COMPRESIÓN

$$c_f := \frac{b - t_w}{2} = 145 \text{ mm}$$

$$t_f = 20 \text{ mm} \quad \frac{c_f}{t_f} = 7.2$$

$$\text{verifica} \left(\frac{c_f}{t_f} \leq 14 \cdot \varepsilon \right) = \text{"OK"} \quad \text{Clase 3}$$

$$\text{verifica} \left(\frac{c_f}{t_f} \leq 10 \cdot \varepsilon \right) = \text{"OK"} \quad \text{Clase 2}$$

$$\text{verifica} \left(\frac{c_f}{t_f} \leq 9 \cdot \varepsilon \right) = \text{"OK"} \quad \text{Clase 1}$$

PERNS CONNECTORS

CONEXIÓN - EC 4-1-1 §6.6

6.6.3 Pernos conectadores con cabeza en losas macizas y el hormigón envolvente

$$f_{ck} := 30 \text{ MPa}$$

$$f_{cm} := f_{ck} + 8 \text{ MPa}$$

$$E_{cm} := 22 \cdot \left(\frac{f_{cm}}{10 \text{ MPa}}\right)^{0.3} \text{ GPa} = 32.8 \text{ GPa}$$

$$f_u := 450 \text{ MPa}$$

$$\gamma_V := 1.25$$

$$d := 19 \text{ mm}$$

$$h_{sc} := 125 \text{ mm}$$

$$\alpha := \text{Min}\left(0.2 \cdot \left(\frac{h_{sc}}{d} + 1\right); 1\right) = 1$$

$$P_{Rd.1} := \frac{0.8 \cdot f_u \cdot \pi \cdot \frac{d^2}{4}}{\gamma_V} = 81.66 \text{ kN}$$

$$P_{Rd.2} := \frac{0.29 \cdot \alpha \cdot d^2 \cdot \sqrt{f_{ck} \cdot E_{cm}}}{\gamma_V} = 83.13 \text{ kN}$$

$$P_{Rd} := \text{Min}\left(P_{Rd.1}; P_{Rd.2}\right) = 81.7 \text{ kN}$$

ARMADURES CONNEXIÓ

INIGIA_EC2

EC4-1 §6.6.6 Rasante en losas de hormigón

La armadura transversal de la losa debe dimensionarse en ELU, de forma que se evite el fallo prematuro por esfuerzo rasante o por hendimiento longitudinal.

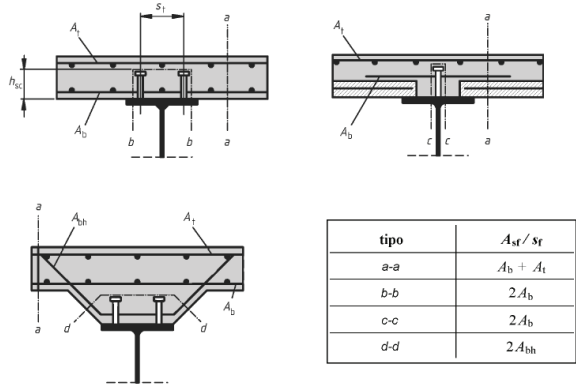


Figura 6.15 – Superfícies de rotura potencial típiques

$h_p := 125\text{ mm}$

$h_L := 150\text{ mm}$

$A_{bb} := 2 \cdot h_p + (150\text{ mm}) = 0.4\frac{\text{m}^2}{\text{m}}$

$A_{aa} := 2 \cdot h_L = 0.3\frac{\text{m}^2}{\text{m}}$

$P_{Rd} := 81.7\text{ kN}$

$n_p := 2$

$s_p := 150\text{ mm}$

$R_{Sd} := \frac{P_{Rd} \cdot n_p}{s_p} = 1089\frac{\text{kN}}{\text{m}}$

$v_{Sd.bb} := \frac{R_{Sd}}{A_{bb}} = 2.72\text{ MPa}$

$v_{Sd.aa} := \frac{R_{Sd}}{A_{aa}} = 3.6\text{ MPa}$

EC2 §6.2.4 Resistencia a rasante

$\theta_f := 45\text{ deg}$

$f_{yd} = 434.8\text{ MPa}$

$A_{sf.aa} := v_{Sd.aa} \cdot \frac{h_L}{\cot(\theta_f) \cdot f_{yd}} = 12.53\frac{\text{cm}^2}{\text{m}}$

eq 6.21
armadura transversal necesaria por rasante

$A_{sf.bb} := v_{Sd.bb} \cdot \frac{h_L}{\cot(\theta_f) \cdot f_{yd}} = 9.4\frac{\text{cm}^2}{\text{m}}$

eq 6.21
armadura transversal por unidad de longitud

(5) En el caso de una combinación de rasante entre el ala y el alma y flexión transversal, el área de acero debería ser mayor que la obtenida de la ecuación (6.21) o la mitad que la obtenida de la ecuación (6.21) además de aquella requerida por flexión transversal

Agotamiento de las bielas comprimidas

$\frac{2 \cdot \phi 12}{150\text{ mm}} = 15.1\frac{\text{cm}^2}{\text{m}}$

$f_{ck} := 30\text{ MPa}$

$f_{cd} = 20\text{ MPa}$

$v := 0.6 \cdot \left(1 - \frac{f_{ck}}{250\text{ MPa}}\right) = 0.53$

$v_{Rd,max} := v \cdot f_{cd} \cdot \sin(\theta_f) \cdot \cos(\theta_f) = 5.3\text{ MPa}$

2.2 LLOSA DE FORMIGÓ



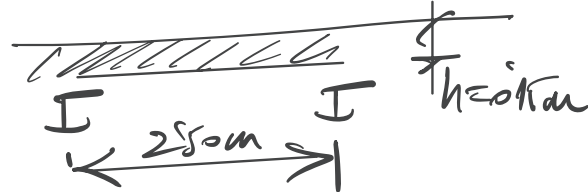
BSB

ESTRUCTURES
D'EDIFICACIÓ I PONTS S.L.

PROJECTE DE PASSERA PER A BICICLETES I VIANANTS
A CAN SANT JOAN A SANT CUGAT DEL VALLÈS

LOSA COL·LABORANT

HAIRCOL 59.



Perfil de Forjado Colaborante(4.205,59)
HAIRCOL 59 FC

APLICACIÓN

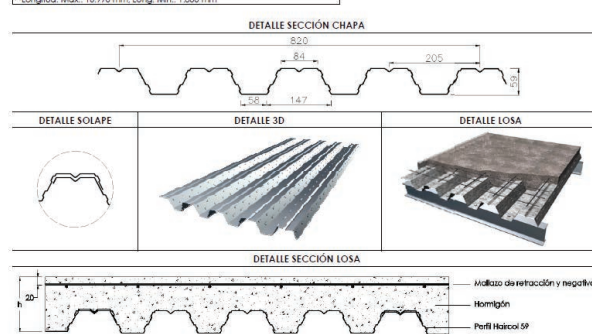
Chapa metálica de acero autoportante destinada al encofrado inferior de una losa de hormigón en fase de fraguado y actuando de armadura de positivos en fase de servicio.

PROPIEDADES MATERIA PRIMA (Acero)

CONCEPTO	REF. NORMA	Espesor (mm)		
		0,75	1,00	1,20
Tolerancias dimensionales	EN 10143			
Acero	EN 10346			
Recubrimiento orgánico	EN 10149			

CARACTERÍSTICAS GEOMÉTRICAS

CONCEPTO	VALOR	UDS.
Profundidad del perfil	59	mm
Paso de onda	205	mm
Anchura útil	420	mm
Longitud	A medida	mm



TABLAS DE UTILIZACIÓN

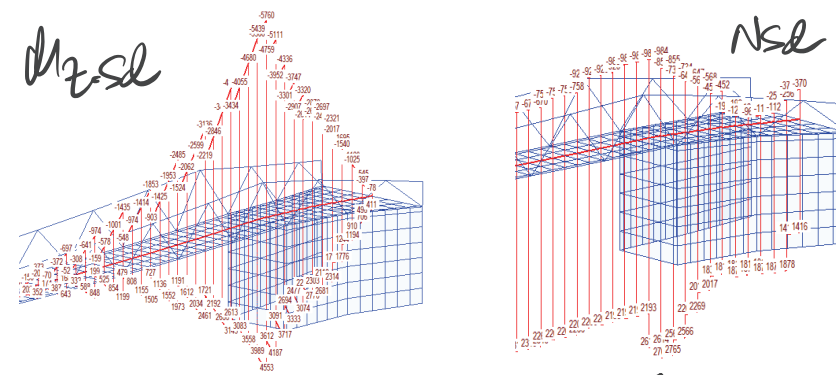
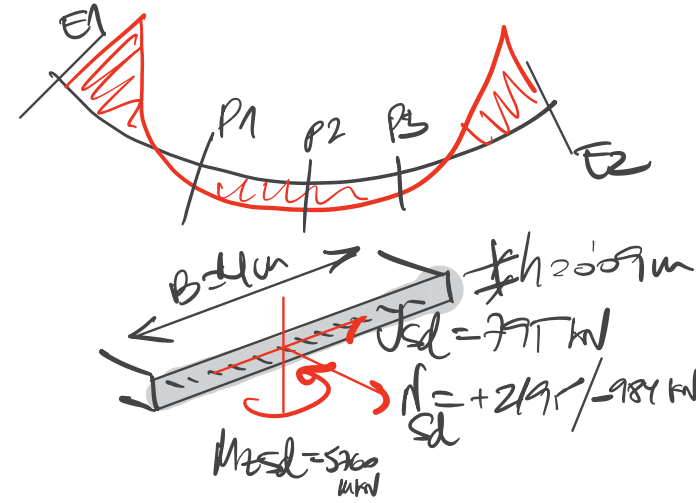
Sobrecarga máxima admisible (daN/m²)

Luz (m)	h (cm)															
	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2,20	1164	1294	1424	1555	1687	1819	1951	2084	2217	2350	2483	2617	2751	2886	3020	3155
2,40	980	1089	1199	1310	1421	1532	1643	1755	1867	1979	2092	2204	2317	2430	2543	2656
2,60	836	930	1024	1119	1214	1309	1403	1500	1595	1692	1789	1886	1983	2080	2177	2274
2,80	723	804	885	966	1047	1128	1209	1290	1371	1452	1533	1614	1695	1776	1857	1938
3,00	631	701	769	838	907	976	1045	1114	1183	1252	1321	1390	1459	1528	1597	1666
3,20	544	603	661	719	777	835	893	951	1009	1067	1125	1183	1241	1299	1357	1415
3,40	466	513	560	607	654	701	748	795	842	889	936	983	1030	1077	1124	1171
3,60	398	435	472	509	546	583	620	657	694	731	768	805	842	879	916	953
3,80	329	365	401	437	473	509	545	581	617	653	689	725	761	797	833	869
4,00	259	295	331	367	403	439	475	511	547	583	619	655	691	727	763	799

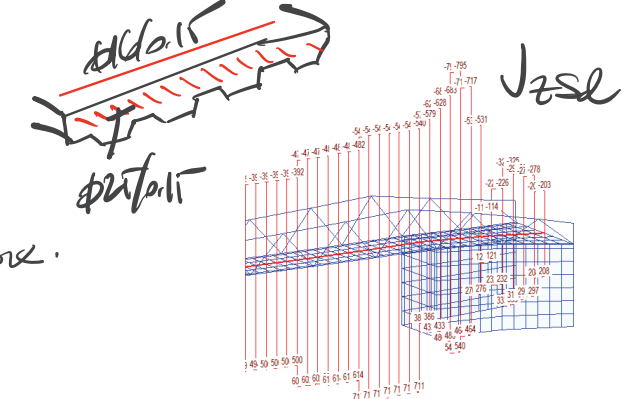
Sobrecarga máxima admisible (daN/m²)

Luz (m)	h (cm)															
	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2,40	1011	1162	1314	1465	1616	1767	1919	2070	2221	2372	2524	2675	2826	2977	3129	3280
2,60	820	950	1080	1210	1340	1470	1600	1730	1860	1990	2120	2250	2380	2510	2640	2770
2,80	727	847	967	1087	1207	1327	1447	1567	1687	1807	1927	2047	2167	2287	2407	2527
3,00	634	744	854	964	1074	1184	1294	1404	1514	1624	1734	1844	1954	2064	2174	2284
3,20	541	641	741	841	941	1041	1141	1241	1341	1441	1541	1641	1741	1841	1941	2041
3,40	448	548	648	748	848	948	1048	1148	1248	1348	1448	1548	1648	1748	1848	1948
3,60	355	455	555	655	755	855	955	1055	1155	1255	1355	1455	1555	1655	1755	1855
3,80	262	362	462	562	662	762	862	962	1062	1162	1262	1362	1462	1562	1662	1762
4,00	169	269	369	469	569	669	769	869	969	1069	1169	1269	1369	1469	1569	1669
4,20	116	216	316	416	516	616	716	816	916	1016	1116	1216	1316	1416	1516	1616
4,40	83	183	283	383	483	583	683	783	883	983	1083	1183	1283	1383	1483	1583
4,60	50	150	250	350	450	550	650	750	850	950	1050	1150	1250	1350	1450	1550
4,80	17	117	217	317	417	517	617	717	817	917	1017	1117	1217	1317	1417	1517
5,00	10	110	210	310	410	510	610	710	810	910	1010	1110	1210	1310	1410	1510

EFFETS MC HORIZONTAL



$M_{z,sl} = 2191 / -989 \text{ kN}$
 $M_{z,sl} = 5760 \text{ kN}$
 $V_{z,sl} = 77 \text{ kN}$
 $2ff(Cu, N) = 594 \text{ ok.}$



Car' permanente

$N_{ep} = 1415 \text{ kN}$
 $M_{ep} = 2011 \text{ kN}$
 $S_{ep} =$

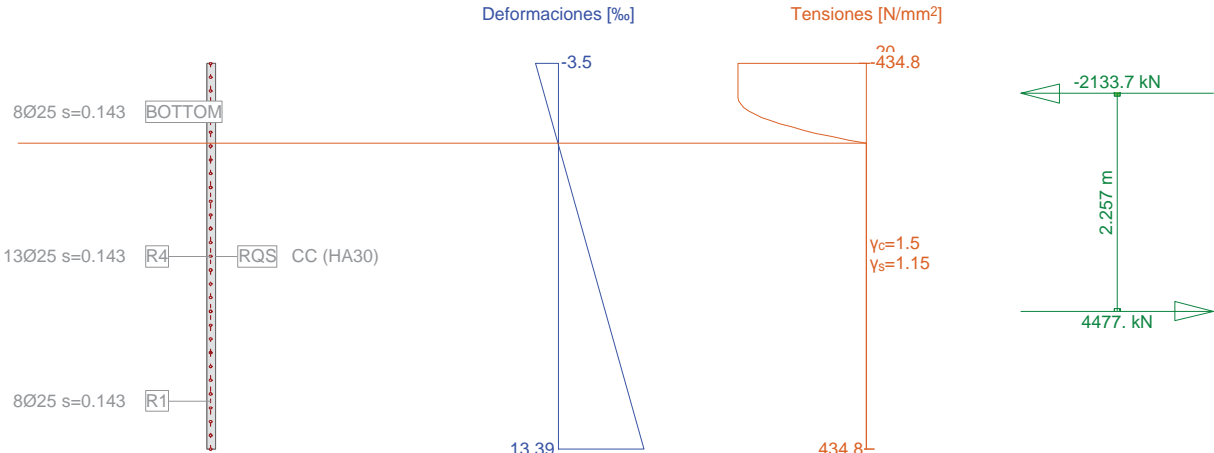
Sección transversal LOSA90X400 (HA30;B500S): Contorno, Armaduras



Escala 1 :19.1

Sección transversal LOSA90X400 (HA30;B500S): Eficiencia Nx=2195.0;My=5760.0; eff(M,N)=0.94 OK

Escala 1 :73.9



Cálc. capacidad última Sección (Losa): LOSA90X400

Esfuerzos / Factores de eficiencia: eff(M,N)=0.94 OK

No.	AP	P	Flexión y esfuerzo normal				eff(M,N) [-]	Esfuerzos de corte y torsión			eff(V,T) [-]	Sección completa eff(M,N,V,T) [-]
			N [kN]	M _y [kNm]	M _z [kNm]			V _y [kN]	V _z [kN]	T [kNm]		
1	!ELU		2195.0	5760.0	-		0.94					

- : Cálculo a flexión simple según eje y !!

Parámetros de análisis !ELU Código: Codigo Estructural 2021

ID	Diagrama σ-ε				Límites de deformación			σ _s [N/mm²]	Factores de la resistencia					Otros valores		
	c	s	p	M	ε _{c2} [‰]	ε _{cu3} [‰]	ε _{ud} [‰]		α _{cc} [-]	γ _c [-]	γ _s [-]	γ _p [-]	γ _M [-]	θ [-]	φ [-]	
!ELU	2/0	1	1	1	-2.	-3.5	20.		1.	1.5	1.15	1.15	1.05	45.	0.	

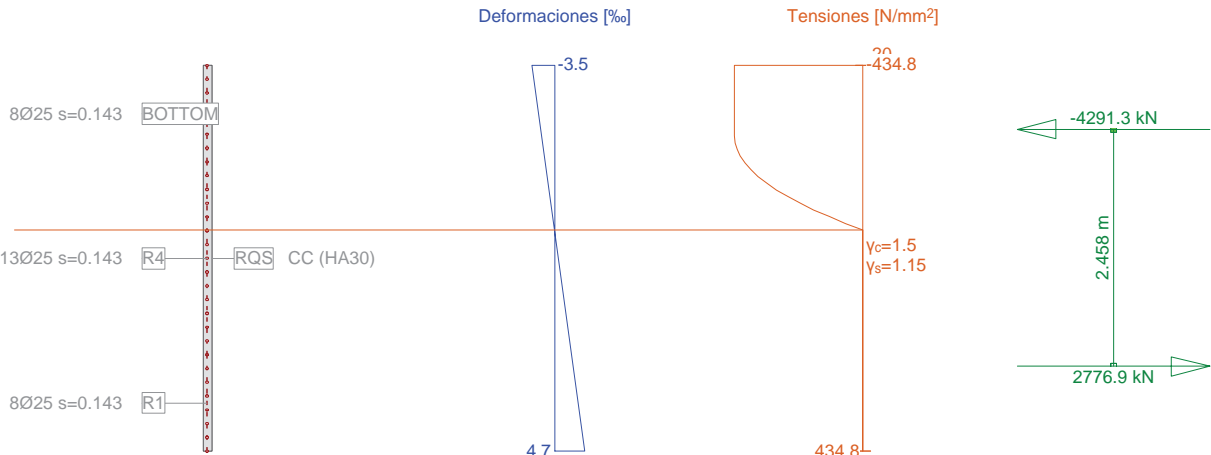
Deformaciones y tensiones extremas

Nombre	Clase	y _q [m]	z _q [m]	ε [‰]	σ _d [N/mm²]	γ [-]
RQS	HA30	0.	2.	-3.5	-20.	1.50
RQS	HA30	0.	-2.	13.39	0.	1.50
BOTTOM	B500S	-0.05	2.	-3.5	-434.8	1.15
R1	B500S	-0.05	-2.	13.39	434.8	1.15

Estado Último "!ELU"

Esfuerzos			Deformación y curvatura			Valores rigidez		
N [kN]	M _y [kNm]	M _z [kNm]	ε _x [‰]	χ _y [km⁻¹]	χ _z [km⁻¹]	N/ε _x [kN]	M _y /χ _y [kNm²]	M _z /χ _z [kNm²]
2343.3	6149.6	17.8	4.94	4.22	0	473961.78	1456500.5	* 480.36

Sección transversal LOSA90X400 (HA30;B500S): Eficiencia Nx=-985.0;My=5760.0; eff(M,N)=0.65 OK Escala 1 :73.9



Cálc. capacidad última Sección (Losa): LOSA90X400

Esfuerzos / Factores de eficiencia: eff(M,N)=0.65 OK

No.	AP	P	Flexión y esfuerzo normal			eff(M,N) [-]	Esfuerzos de corte y torsión			eff(V,T) [-]	Sección completa eff(M,N,V,T) [-]
			N [kN]	M _y [kNm]	M _z [kNm]		V _y [kN]	V _z [kN]	T [kNm]		
1	!ELU		-985.0	5760.0	-	0.65					

- : Cálculo a flexión simple según eje y !!

Parámetros de análisis !ELU Código: Codigo Estructural 2021

ID	Diagrama σ-ε				Límites de deformación			σ _s [N/mm²]	Factores de la resistencia					Otros valores			
	c	s	p	M	ε _{c2} [‰]	ε _{cu3} [‰]	ε _{ud} [‰]		α _{cc} [-]	γ _c [-]	γ _s [-]	γ _p [-]	γ _M [-]	θ [-]	φ [-]		
!ELU	2/0	1	1	1	-2.	-3.5	20.		1.	1.5	1.15	1.15	1.05	45.	0.		

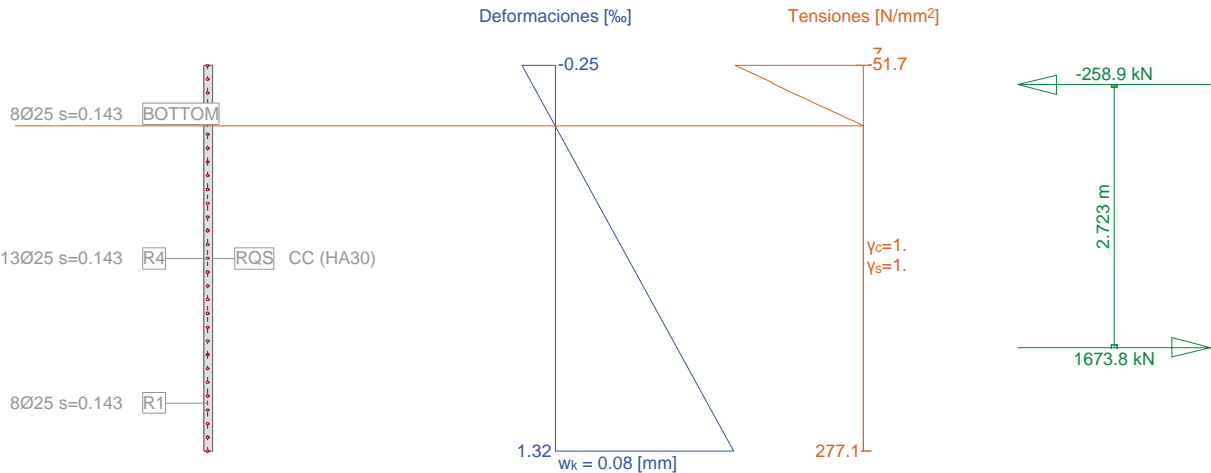
Deformaciones y tensiones extremas

Nombre	Clase	y _q [m]	z _q [m]	ε [‰]	σ _d [N/mm²]	γ [-]
RQS	HA30	0.	2.	-3.5	-20.	1.50
RQS	HA30	0.	-2.	4.7	0.	1.50
BOTTOM	B500S	-0.05	2.	-3.5	-434.8	1.15
R1	B500S	-0.05	-2.	4.7	434.8	1.15

Estado Último " !ELU "

Esfuerzos			Deformación y curvatura			Valores rigidez		
N [kN]	M _y [kNm]	M _z [kNm]	ε _x [‰]	χ _y [km ⁻¹]	χ _z [km ⁻¹]	N/ε _x [kN]	M _y /χ _y [kNm²]	M _z /χ _z [kNm²]
-1514.4	8851.5	4.9	0.60	2.05	0	2527219.72	4318715.	* 953.39

Sección transversal LOSA90X400 (HA30;B500S): Análisis de tensiones dadas las fuerzas Nx=1415.0;My=2011.0; Escala 1 :73.9



Verif. estado de tens. Sección (Losa): LOSA90X400

Esfuerzos

No.	AP	P	Flexión y esfuerzo normal			Esfuerzos de corte y torsión			Observaciones -
			N [kN]	M _y [kNm]	M _z [kNm]	V _y [kN]	V _z [kN]	T [kNm]	
1	!ELS		1415.0	2011.0	-				

- : Cálculo a flexión simple según eje y !!

Parámetros de análisis !ELS Código: Codigo Estructural 2021

ID	Diagrama σ-ε				Límites de deformación			σ _s [N/mm²]	Factores de la resistencia					Otros valores			
	c	s	p	M	ε _{c2} [‰]	ε _{cu3} [‰]	ε _{ud} [‰]		α _{cc} [-]	γ _c [-]	γ _s [-]	γ _p [-]	γ _M [-]	θ [-]	φ [-]		
!ELS	1/0	1	1	1				200.	1.	1.	1.	1.	1.	45.	0.		

Deformaciones y tensiones extremas

Nombre	Clase	y _q [m]	z _q [m]	ε [‰]	σ _d [N/mm²]	γ [-]
RQS	HA30	0.	2.	-0.25	-7.	1.00
RQS	HA30	0.	-2.	1.32	0.	1.00
BOTTOM	B500S	-0.05	2.	-0.25	-51.7	1.00
R1	B500S	-0.05	-2.	1.32	277.1	1.00

Tensiones y deformaciones en último paso de la iteración

Esfuerzos			Deformación y curvatura			Valores rigidez		
N [kN]	M _y [kNm]	M _z [kNm]	ε _x [‰]	χ _y [km ⁻¹]	χ _z [km ⁻¹]	N/ε _x [kN]	M _y /χ _y [kNm²]	M _z /χ _z [kNm²]
1414.9	2011.	8.1	0.54	0.39	0	2635968.41	5136861.6	* 1223.16

Verificación de las fisuras

Texto	Valor	Texto	Valor
Principios básicos	EN 1992-1-1 7.3		
Sección			
h	4. m	zona compresión (no fisurado)	1.062 m
d	2.923 m	h-d	1.077 m
Recubrimiento c	-0.013 m	h _{c,eff}	0.979 m
A _{c,eff} (zona de tracción)	88145 mm²	= Min[2.5 (h-d); (h-x)/3; h/2]	
Hormigón		Parámetros adicionales	
E _c	29 kN/mm²	Duración aplicación carga k _t	0.4
α _e (E _s /E _c)	7.349	Factor de adherencia k _l	0.8
Coef. de fluencia φ	0.	Distribución de deformación	0.5
f _{ctm}	2.9 N/mm²	k ₃	3.4
f _{ct,eff}	2.9 N/mm²	k ₄	0.425
Armadura		Resultados	
E _s	210 kN/mm²	Momento	2011. kNm



Texto	Valor	Texto	Valor
A _s (zona de tracción)	3436 mm ²	Tensión en la armadura σ _s	277.1 N/mm ²
Diámetro Ø _{eq}	25 mm	ε _{sm} -ε _{cm} (7.9)	1.137 o/oo
ρ _{eff}	3.898 o/o	Separación de fisuras s _{r,max}	0.067 m
		Ancho de fisuras w _k (7.8)	0.08 mm

INIGIA_Functions

EC2-1-1:2013

SOLICITACIONES

$V_{Ed} := 795 \text{ kN}$

$M_{Ed} := 5760 \text{ m kN}$

$N_{Ed} := 2195 \text{ kN}$

CAPÍTULO 3 - MATERIALES

§ 3.1 HORMIGÓN

$f_{ck} := 30 \text{ MPa}$

$f_{ctm} = 2.9 \text{ MPa}$

$E_c = 32837 \text{ MPa}$

$\gamma_c = 1.5$

$\alpha_{cc} = 1$

$f_{cd} = 20 \text{ MPa}$

$f_{ctd} = 1.35 \text{ MPa}$

§ 3.2 ACERO PARA ARMADURAS PASIVAS

$f_y = 500 \text{ MPa}$

$\gamma_s = 1.15$

$f_{yd} = 434.8 \text{ MPa}$

ELU CORTANTE - Art.6.2 EC2-1-1-2013

$h := 4.00 \text{ m}$ canto

$b := 0.09 \text{ m}$ ancho

$A_c := b \cdot h = 0.36 \text{ m}^2$ área de la sección transversal de hormigón

$r_l := 50 \text{ mm}$ recubrimiento mecánico de las armaduras longitudinales

$d := h - r_l = 3.95 \text{ m}$ canto útil $\frac{d}{h} = 0.99$

$b_w := b = 0.09 \text{ m}$ menor anchura de la sección en la zona de tracción y compresión

$z := 0.9 \cdot d = 3.555 \text{ m}$ brazo mecánico correspondiente al momento flector normalmente se puede usar el valor aproximado 0.9d

$A_{sl} := 14 \cdot \phi 25 = 68.72 \text{ cm}^2$ área de armadura de tracción la cual se extiende una longitud $\geq (l_{bd} + d)$ de la sección considerada

$A_{s'} := 14 \cdot \phi 25 = 68.72 \text{ cm}^2$ área de armadura de compresión

$A_p := 0$ armadura activa adherente

$P_{Ed} := 0$ pretensado con valor de cálculo

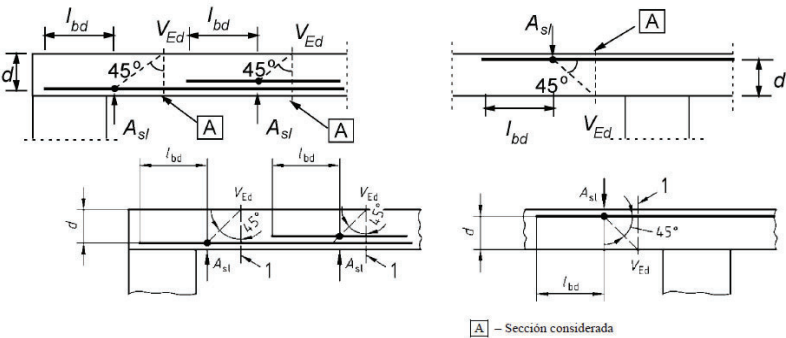


Figura 6.3 – Definición de A_d en la ecuación (6.2)

$A_{sw} := 1 \cdot \phi 16 = 2.01 \text{ cm}^2$

$\alpha := 90 \text{ deg}$ ángulo entre armadura de cortante y eje de la viga

$s := 250 \text{ mm}$

$f_{ywd} := f_{yd} = 434.8 \text{ MPa}$ se adopta f_{yd} y reducción de v_l según §6.2.3

$\frac{A_{sw}}{s} = 8 \frac{\text{cm}^2}{\text{m}}$

EC2 - 1 - 1 - 2013

§ 6.2.2 Elementos que no requieren armadura de cortante

$$k := \text{Min} \left(1 + \sqrt{\frac{200 \text{ mm}}{d}} ; 2 \right) = 1.23$$

$$\rho_1 := \text{Min} \left(\frac{A_{s1} + A_p}{b_w \cdot d} ; 0.02 \right) = 0.0193$$

$$\sigma_{cp} := \text{Min} \left(\frac{N_{Ed}}{A_c} ; 0.2 \cdot f_{cd} \right) = 4 \text{ MPa}$$

$$C_{Rd,c} := \frac{0.18}{\gamma_c} \quad \text{Anejo nacional}$$

$$k_1 := 0.15 \quad \text{Anejo nacional}$$

$$v_{min} := \frac{0.075}{\gamma_c} \cdot k^{\frac{3}{2}} \cdot \text{Min} \left(\frac{f_{ck}}{\text{MPa}} ; 60 \right)^{\frac{1}{2}} \quad \text{MPa} = 0.37 \text{ MPa} \quad \text{Anejo nacional}$$

$$V_{Rd,c} := \left(C_{Rd,c} \cdot k \cdot \left(100 \cdot \rho_1 \cdot \frac{f_{ck}}{\text{MPa}} \right)^{\frac{1}{3}} + k_1 \cdot \frac{\sigma_{cp}}{\text{MPa}} \right) \cdot \frac{b_w}{\text{mm}} \cdot \frac{d}{\text{mm}} \cdot 1 \text{ N} = 415.6 \text{ kN}$$

$$V_{Rd,c,min} := (v_{min} + k_1 \cdot \sigma_{cp}) \cdot b_w \cdot d = 345.3 \text{ kN}$$

Resistencia a cortante sin armadura

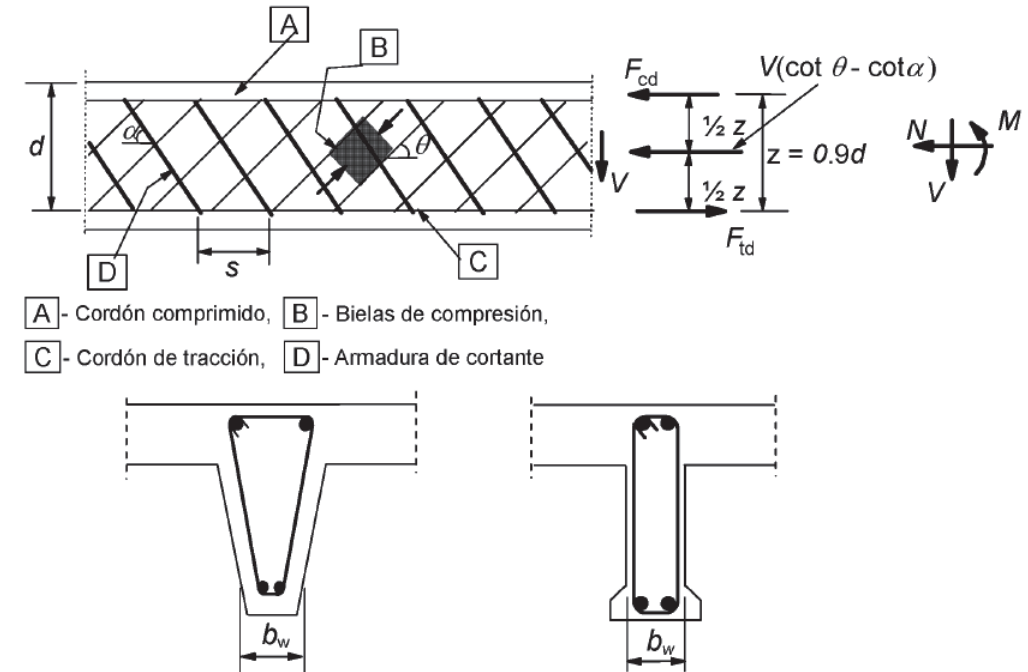
$$V_{Rd,c} := \text{Max} \left(V_{Rd,c} ; V_{Rd,c,min} \right) = 416 \text{ kN}$$

$$\text{verifica} (V_{Ed} \leq V_{Rd,c}) = \text{"NO VERIFICA"}$$

EC2 - 1 - 1 - 2013

§ 6.2.3 Elementos que requieren armadura de cortante

El cálculo de elementos con armadura de cortante se basa en un modelo de celosía plana.



Los valores límite para el ángulo θ de las bielas inclinadas en el alma son los indicados en el Anejo nacional ($0.5 < \cot \theta < 2$)

$$\theta := 45 \text{ deg} \quad \text{ángulo entre la biela comprimida y eje de la viga}$$

Agotamiento por compresión oblicua en el alma

$$\sigma'_{cp} := \frac{N_{Ed}}{A_c} = 6.1 \text{ MPa}$$

tensión media de compresión (positiva) debida a la fuerza axil de cálculo, como promedio en la sección de hormigón teniendo en cuenta la armadura

coeficiente estadio tensional cordón comprimido

$$\alpha_{cw}(\sigma'_{cp}) := \text{if } \left(0 \leq \sigma'_{cp} \right) \wedge \left(\sigma'_{cp} \leq 0.25 \cdot f_{cd} \right)$$

$$1 + \frac{\sigma'_{cp}}{f_{cd}}$$

$$\text{else}$$

$$\text{if } \left(0.25 \cdot f_{cd} < \sigma'_{cp} \right) \wedge \left(\sigma'_{cp} \leq 0.50 \cdot f_{cd} \right)$$

$$1.25$$

$$\text{else}$$

$$2.5 \cdot \left(1 - \frac{\sigma'_{cp}}{f_{cd}} \right)$$

$$\alpha_{cw} := \alpha_{cw}(\sigma'_{cp}) = 1.25$$

$$\nu_1 := \text{if } f_{yd} > 0.8 \cdot f_y$$

$$0.6 \cdot \left(1 - \frac{f_{ck}}{250 \text{ MPa}} \right)$$

$$\text{else}$$

$$\text{if } \left(f_{yd} \leq 0.8 \cdot f_y \right) \wedge \left(f_{ck} \leq 60 \text{ MPa} \right)$$

$$0.6$$

$$\text{else}$$

$$\text{if } \left(f_{yd} \leq 0.8 \cdot f_y \right) \wedge \left(f_{ck} > 60 \text{ MPa} \right)$$

$$0.9 - \frac{f_{ck}}{200 \text{ MPa}}$$

$$\text{else}$$

$$\text{"error"}$$

$$V_{Rd,max} := \alpha_{cw} \cdot b_w \cdot z \cdot \nu_1 \cdot f_{cd} \cdot \frac{\cot(\theta) + \cot(\alpha)}{1 + (\cot(\theta))^2} = 2112 \text{ kN}$$

$$\text{verifica}(V_{Ed} \leq V_{Rd,max}) = \text{"OK"}$$

θ = 45 deg

α = 90 deg

$$A_{sw,max} := \frac{\frac{1}{2} \cdot \alpha_{cw} \cdot \nu_1 \cdot f_{cd}}{\sin(\alpha)} \cdot \frac{b_w}{f_{ywd}} = 13.7 \frac{\text{cm}^2}{\text{m}}$$

Agotamiento por tracción en el alma

$$V_{Rd,s} := \frac{A_{sw}}{s} \cdot z \cdot f_{ywd} \cdot (\cot(\theta) + \cot(\alpha)) \cdot \sin(\alpha) = 1243 \text{ kN}$$

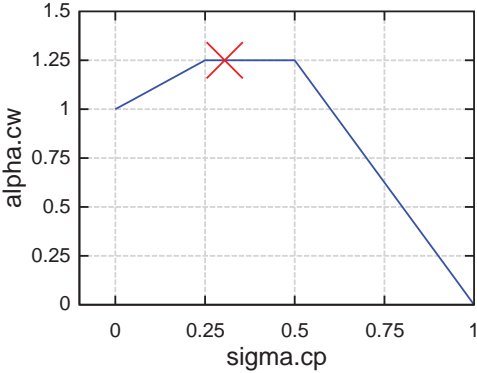
$$\text{verifica}(V_{Ed} \leq V_{Rd,s}) = \text{"OK"}$$

Agotamiento por cortante (con armadura de cortante)

$$V_{Rd} := \text{Min}(V_{Rd,s}; V_{Rd,max}) = 1243 \text{ kN}$$

ESFUERZO CORTANTE ÚLTIMO

$$\text{verifica}(V_{Ed} \leq V_{Rd}) = \text{"OK"}$$



EC2 - 1 - 1 - 2013

§9.2.2 Armadura de cortante

La armadura de cortante debería formar un ángulo entre 45° y 90° respecto al eje longitudinal del elemento estructural

$\text{verifica}((45 \text{ deg} \leq \alpha) \wedge (\alpha \leq 90 \text{ deg})) = \text{"OK"}$

La armadura de cortante puede ser una combinación de:

- cercos o estribos envolviendo la armadura longitudinal de tracción y la zona de compresión
- barras levantadas
- una combinación de ambas recomendaciones

Se deberían disponer al menos 0.33 de la armadura de cortante en forma de cercos (Anejo Nacional)

$$\rho_w := \frac{A_{sw}}{s \cdot b_w \cdot \sin(\alpha)} = 0.0089 \quad \text{cuantía dispuesta de armadura de cortante}$$

$$\rho_{w.min} := \frac{f_{ctm}}{7.5 \cdot f_y} = 0.0008 \quad \text{cuantía mínima de armadura de cortante (Anejo nacional)}$$

$$A_{sw.min} := \rho_{w.min} \cdot b_w \cdot \sin(\alpha) = 0.7 \frac{\text{cm}^2}{\text{m}} \quad \text{armadura mínima de cortante}$$

$\text{verifica}(\rho_w \geq \rho_{w.min}) = \text{"OK"}$

separación longitudinal máxima entre armaduras de cortante

$$s_{l.max} := \begin{cases} \text{if } V_{Rd} \leq \frac{1}{5} \cdot V_{Rd.max} & = 0.45 \text{ m} \\ \quad \text{Min}(0.75 \cdot d \cdot (1 + \cot(\alpha)); 600 \text{ mm}) \\ \text{else} \\ \quad \text{if } \left(\frac{1}{5} \cdot V_{Rd.max} < V_{Rd} \right) \wedge \left(V_{Rd} \leq \frac{2}{3} \cdot V_{Rd.max} \right) \\ \quad \quad \text{Min}(0.60 \cdot d \cdot (1 + \cot(\alpha)); 450 \text{ mm}) \\ \text{else} \\ \quad \quad \text{Min}(0.30 \cdot d \cdot (1 + \cot(\alpha)); 300 \text{ mm}) \end{cases}$$

$\text{verifica}(s \leq s_{l.max}) = \text{"OK"}$

Esfuerzo de tracción adicional debido al cortante

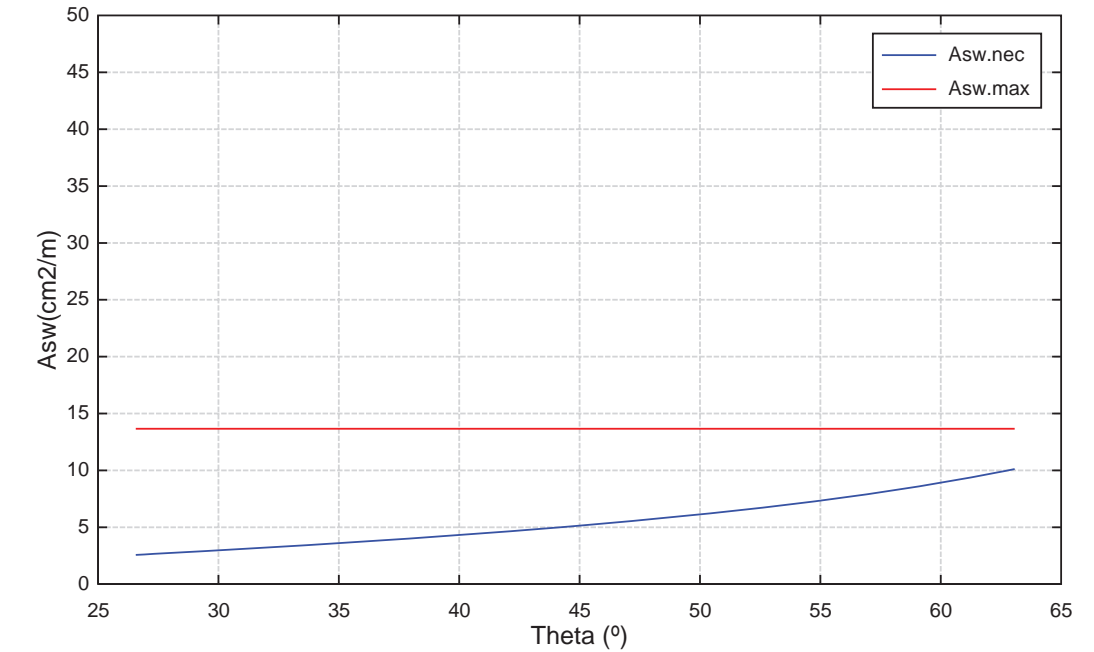
$$\Delta F_{td} := 0.5 \cdot V_{Ed} \cdot (\cot(\theta) - \cot(\alpha)) = 398 \text{ kN}$$

$$s_d := \frac{z}{2} \cdot (\cot(\theta) - \cot(\alpha)) = 1.78 \text{ m} \quad \text{decalaje de la ley de momentos}$$

$$\frac{s_d}{d} = 0.45 \quad \text{decalaje de la ley de momentos (relativo al canto útil)}$$

Dimensionamiento - Armadura de cortante - θ variable

GRÁFICO $A_{sw.nec}$ - θ



$\theta = 45 \text{ deg}$

$$A_{sw.nec.\theta}(\theta) = 5.1 \frac{\text{cm}^2}{\text{m}}$$

$$z = 3.56 \text{ m}$$

$$A_{sw.nec.\theta}(\text{acot}(2)) = 2.6 \frac{\text{cm}^2}{\text{m}} \quad \text{Armadura de cortante necesaria para } \cot\theta=2 \text{ } (\theta=26.6^\circ)$$

$$A_{sw.nec.\theta}(45 \text{ deg}) = 5.1 \frac{\text{cm}^2}{\text{m}} \quad \text{armadura de cortante necesaria para } \cot\theta=1 \text{ } (\theta=45^\circ)$$

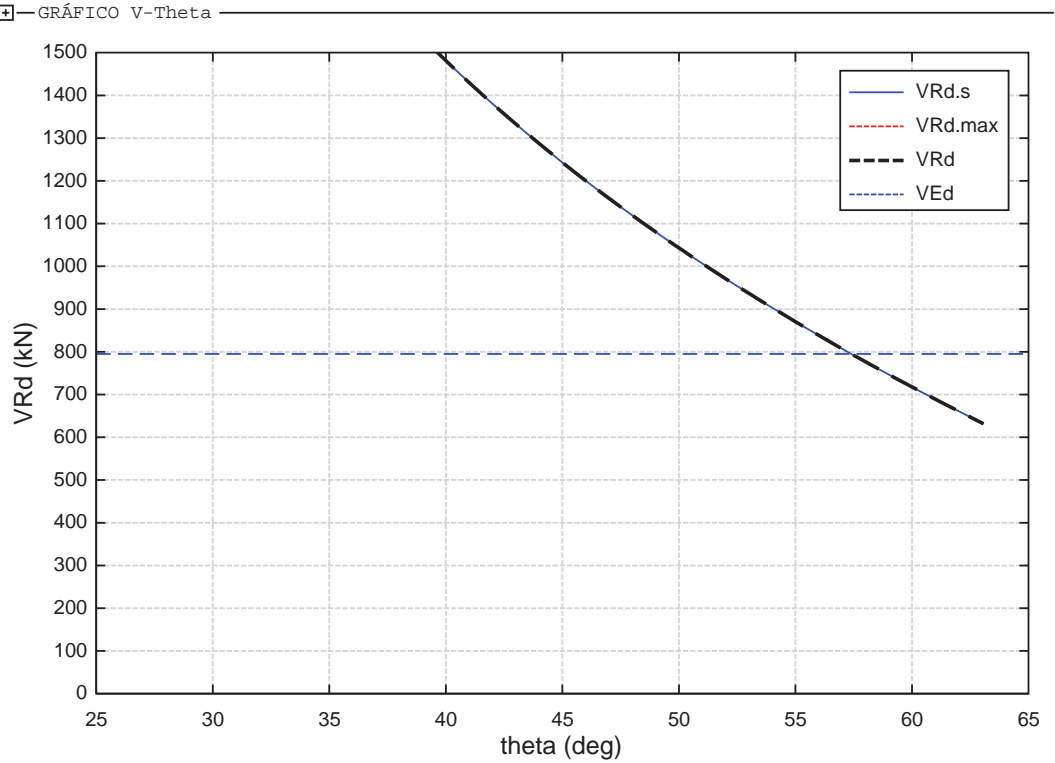
$$A_{sw.max} = 13.66 \frac{\text{cm}^2}{\text{m}}$$

Agotamiento a cortante - θ variable

$$V_{Rd.s.\theta}(\theta) := \frac{A_{sw}}{S} \cdot z \cdot f_{ywd} \cdot (\cot(\theta) + \cot(\alpha)) \cdot \sin(\alpha)$$

$$V_{Rd.max.\theta}(\theta) := \frac{\alpha_{cw} \cdot b_w \cdot z \cdot v_1 \cdot f_{cd}}{\cot(\theta) + \tan(\theta)}$$

$$V_{Rd.\theta}(\theta) := \text{Min}\left(V_{Rd.s.\theta}(\theta); V_{Rd.max.\theta}(\theta)\right)$$



$\theta := 40 \text{ deg}$

$V_{Rd.\theta}(\theta) = 1481 \text{ kN}$

$V_{Rd.max.\theta}(\theta) = 2080 \text{ kN}$

$V_{Rd.s.\theta}(\theta) = 1481 \text{ kN}$

$V_{Ed} = 795 \text{ kN}$

$s_d := \frac{z}{2} \cdot (\cot(\theta) - \cot(\alpha)) = 2.12 \text{ m}$ decalaje de la ley de momentos

$\frac{s_d}{d} = 0.54$ decalaje de la ley de momentos (relativo al canto útil)

APÈNDIX 3 – GELOSIES METÀL·LIQUES

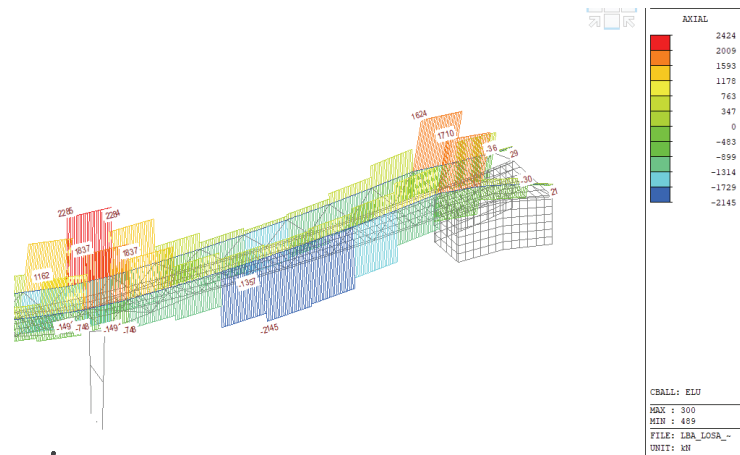
3.1 ANÀLISIS LINEALS DE BIFURCACIÓ (LBA)

LINEAR BUCKLING ANALYSIS

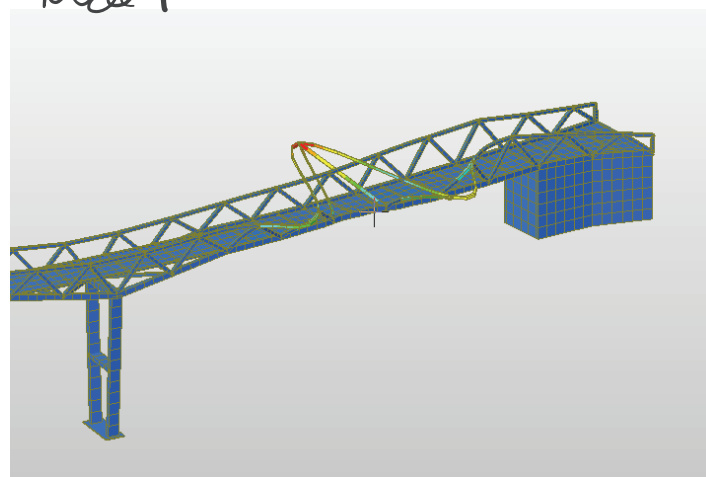
Endre Superior

Veroy

$N_{comp} = 2166 \text{ kN}$ ← Hipòtesis EU 09
per manutencions
Temperatures (dormir) i
SC (concalitate)



Model 1



$\alpha_{cr} = 5.67$

$N_{cr,i} = 12281 \text{ kN}$
 $L_{cr,i} = 4'3 \text{ m}$
 $\lambda_{cr,i} = 43'9$

INIGIA_Functions

LINEAR BUCKLING ANALYSIS Valores considerados en el modelo LBA

$$A_c := 1.1424 \cdot 10^{-2} \text{ m}^2 = 114.2 \text{ cm}^2$$

$$I_c := 1.081244 \cdot 10^{-4} \text{ m}^4 = 10812.4 \text{ cm}^4$$

$$i_c := \sqrt{\frac{I_c}{A_c}} = 0.0973 \text{ m}$$

$$N_{LB} := 2166 \text{ kN}$$

$$E_{LB} := 210000 \text{ MPa}$$

$$I_{LB} := I_c = 10812.44 \text{ cm}^4$$

$$A_{LB} := A_c = 114.24 \text{ cm}^2$$

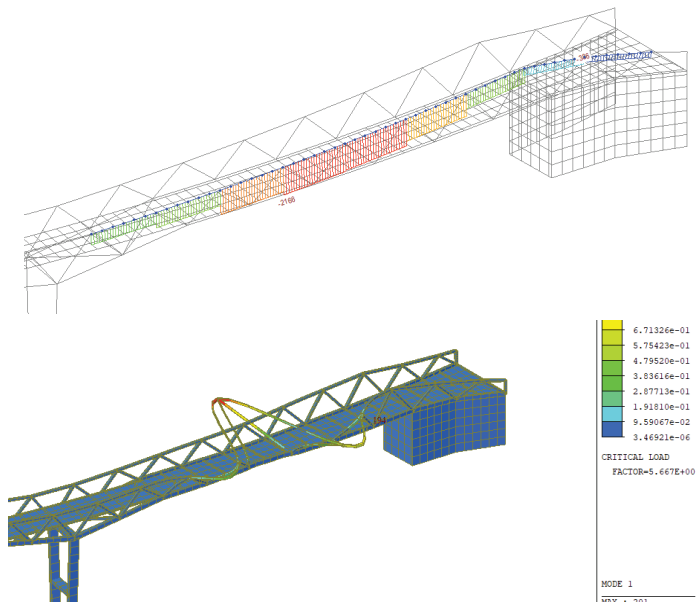
$$\alpha_{cr} := 5.67$$

$$i_{LB} := \sqrt{\frac{I_{LB}}{A_{LB}}} = 0.097 \text{ m}$$

$$N_{cr,i} := \alpha_{cr} \cdot N_{LB} = 12281 \text{ kN}$$

$$L_{cr,i} := \sqrt{\frac{\pi^2 \cdot E_{LB} \cdot I_{LB}}{N_{cr,i}}} = 4.3 \text{ m}$$

$$\lambda_{cr,i} := \frac{L_{cr,i}}{i_{LB}} = 43.9$$

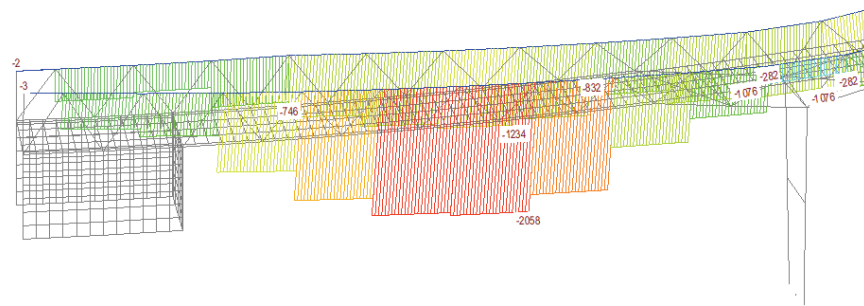


LINEAR BUCKLING ANALYSIS

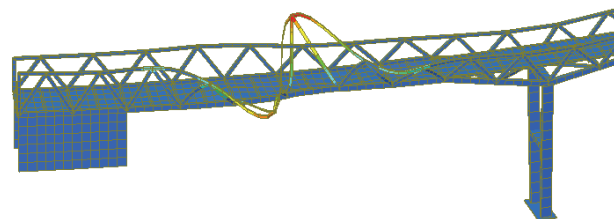
Endre Superior

Ueno 1

$N_{comp} := -2058 \text{ kN}$ ← Hipòtesis EU 09
 PERMANENTS
 Temperature (dominante)
 SC (concalitate)



Node 2



$$\alpha_{cr} = 5.68$$

$$\begin{aligned}
 N_{cr,i} &= 11689 \text{ kN} \\
 L_{cr,i} &= 4.4 \text{ m} \\
 \lambda_{cr,i} &= 45
 \end{aligned}$$

INIGIA_Functions

LINEAR BUCKLING ANALYSIS

Valores considerados en el modelo LBA

$$A_c := 1.1424 \cdot 10^{-2} \text{ m}^2 = 114.2 \text{ cm}^2$$

$$I_c := 1.081244 \cdot 10^{-4} \text{ m}^4 = 10812.4 \text{ cm}^4$$

$$i_c := \sqrt{\frac{I_c}{A_c}} = 0.0973 \text{ m}$$

$$N_{LB} := 2058 \text{ kN}$$

$$E_{LB} := 210000 \text{ MPa}$$

$$I_{LB} := I_c = 0.0001 \text{ m}^4$$

$$A_{LB} := A_c = 0.0114 \text{ m}^2$$

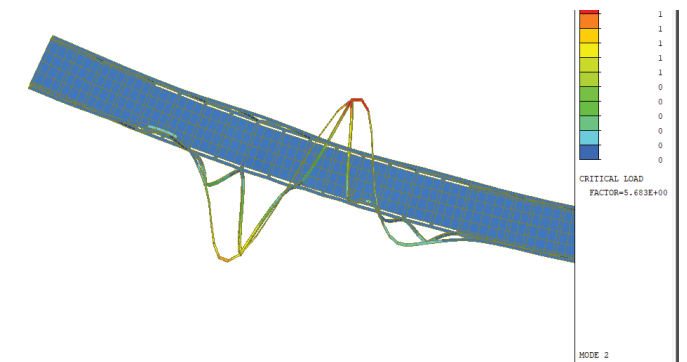
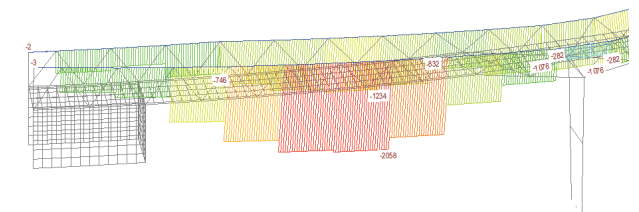
$$\alpha_{cr} := 5.68$$

$$i_{LB} := \sqrt{\frac{I_{LB}}{A_{LB}}} = 0.097 \text{ m}$$

$$N_{cr,i} := \alpha_{cr} \cdot N_{LB} = 11689 \text{ kN}$$

$$L_{cr,i} := \sqrt{\frac{\pi^2 \cdot E_{LB} \cdot I_{LB}}{N_{cr,i}}} = 4.4 \text{ m}$$

$$\lambda_{cr,i} := \frac{L_{cr,i}}{i_{LB}} = 45$$

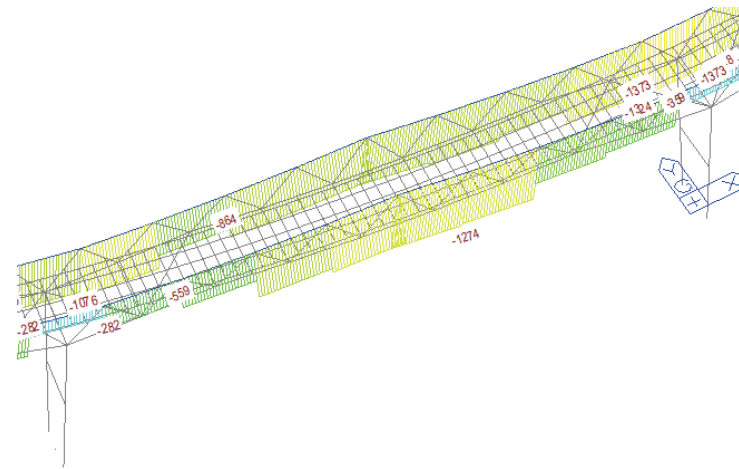


LINEAR BUCKLING ANALYSIS

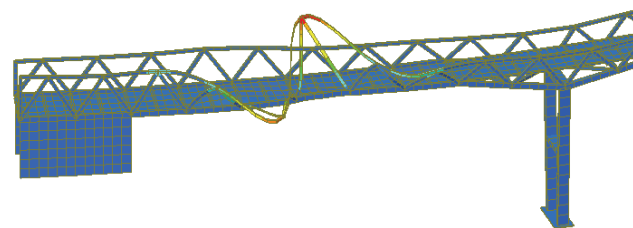
Endre Superior

Ueno 2

$N_{comp} = -1274 \text{ kN}$ ← Hipòtesis EW 09
 PERMANENTS
 Temperature (dominante)
 SC (concalitate)



Mode 9



$$\alpha_{cr} = 8.17$$

$$\begin{aligned}
 N_{cr.i} &= 10409 \text{ kN} \\
 L_{cr.i} &= 4.6 \text{ m} \\
 \lambda_{cr.i} &= 47.7
 \end{aligned}$$

INIGIA_Functions

LINEAR BUCKLING ANALYSIS

Valores considerados en el modelo LBA

$$A_c := 1.1424 \cdot 10^{-2} \text{ m}^2$$

$$I_c := 1.081244 \cdot 10^{-4} \text{ m}^4$$

$$i_c := \sqrt{\frac{I_c}{A_c}} = 0.0973 \text{ m}$$

$$N_{LB} := 1274 \text{ kN}$$

$$E_{LB} := 210000 \text{ MPa}$$

$$I_{LB} := I_c = 0.0001 \text{ m}^4$$

$$A_{LB} := A_c = 0.0114 \text{ m}^2$$

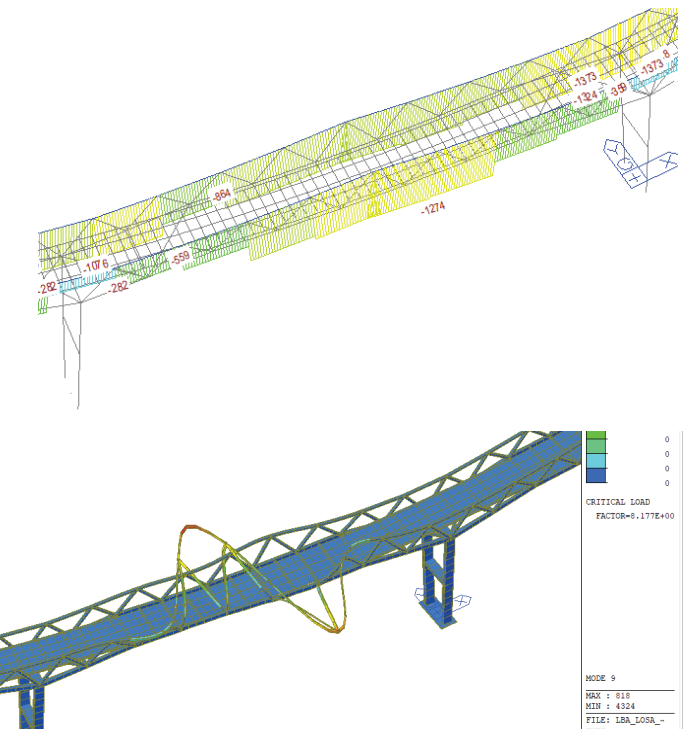
$$\alpha_{cr} := 8.17$$

$$i_{LB} := \sqrt{\frac{I_{LB}}{A_{LB}}} = 0.097 \text{ m}$$

$$N_{cr.i} := \alpha_{cr} \cdot N_{LB} = 10409 \text{ kN}$$

$$L_{cr.i} := \sqrt{\frac{\pi^2 \cdot E_{LB} \cdot I_{LB}}{N_{cr.i}}} = 4.6 \text{ m}$$

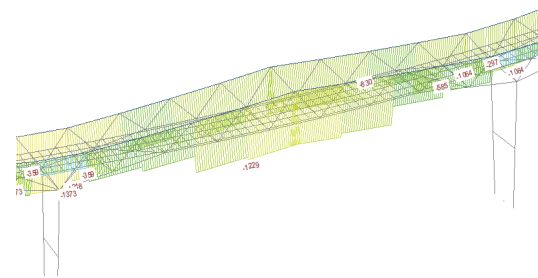
$$\lambda_{cr.i} := \frac{L_{cr.i}}{i_{LB}} = 47.7$$



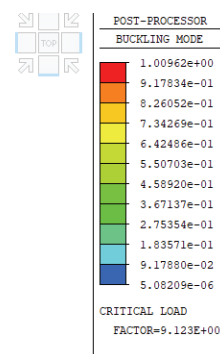
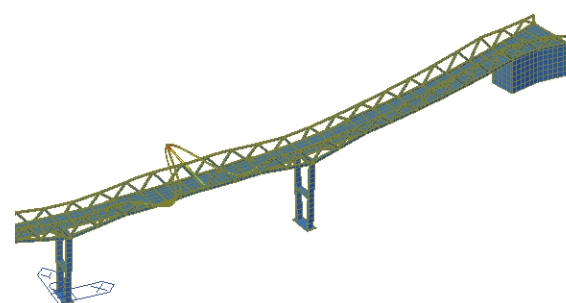
LINEAR BUCKLING ANALYSIS

Endre Superior

Vers 3
 $N_{comp} := -1229 \text{ kN}$ ← Hipòtesis EW 09
 PERMANENTS
 Temperature (dormiente)
 SC (concreta)



Mode 11



$$\alpha_{cr} = 8.45$$

$$N_{cr,i} = 10385 \text{ kN}$$

$$L_{cr,i} = 4.6 \text{ m}$$

$$\lambda_{cr,i} = 47.7$$

INIGIA_Functions

LINEAR BUCKLING ANALYSIS

Valores considerados en el modelo LBA

$$A_c := 1.1424 \cdot 10^{-2} \text{ m}^2$$

$$I_c := 1.081244 \cdot 10^{-4} \text{ m}^4$$

$$i_c := \sqrt{\frac{I_c}{A_c}} = 0.0973 \text{ m}$$

$$N_{LB} := 1229 \text{ kN}$$

$$E_{LB} := 210000 \text{ MPa}$$

$$I_{LB} := I_c = 0.0001 \text{ m}^4$$

$$A_{LB} := A_c = 0.0114 \text{ m}^2$$

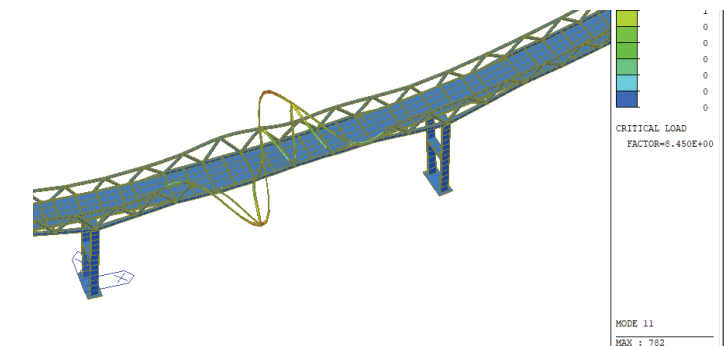
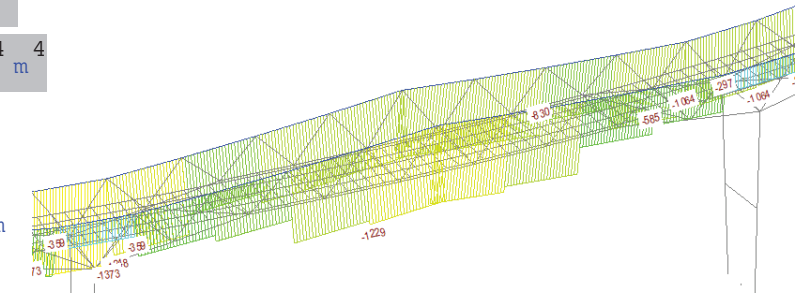
$$\alpha_{cr} := 8.45$$

$$i_{LB} := \sqrt{\frac{I_{LB}}{A_{LB}}} = 0.097 \text{ m}$$

$$N_{cr,i} := \alpha_{cr} \cdot N_{LB} = 10385 \text{ kN}$$

$$L_{cr,i} := \sqrt{\frac{\pi^2 \cdot E_{LB} \cdot I_{LB}}{N_{cr,i}}} = 4.6 \text{ m}$$

$$\lambda_{cr,i} := \frac{L_{cr,i}}{i_{LB}} = 47.7$$



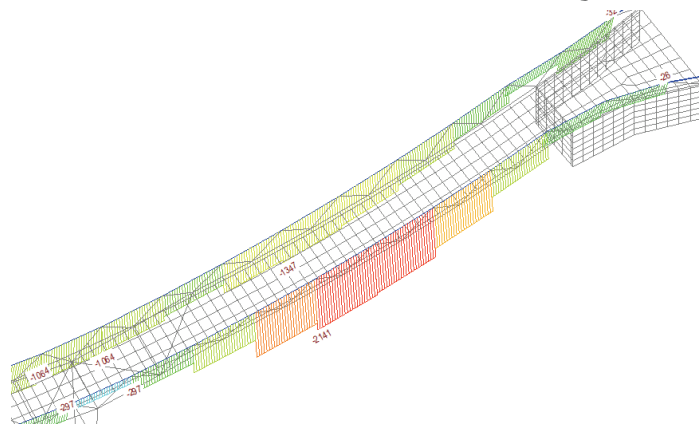
LINEAR BUCKLING ANALYSIS

Endre Superior

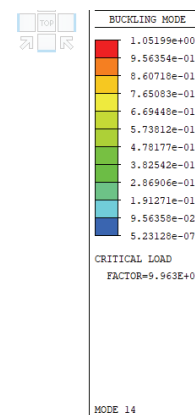
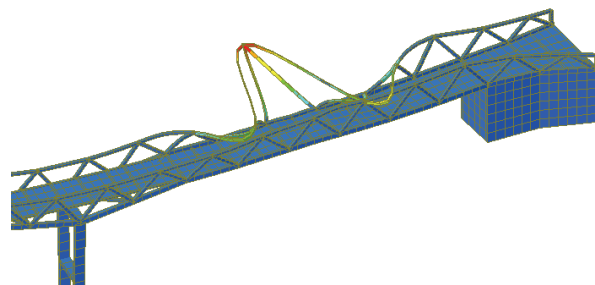
Veru Y

$N_{comp} := -1347 \text{ kN}$

Hipòtesis EW 09
 per manutencions
 Temperature (dormiente)
 SC (concalitate)



Mode 14



$\alpha_{cr} = 9.03$

$N_{cr,i} = 12163 \text{ kN}$

$L_{cr,i} = 4.3 \text{ m}$

$\lambda_{cr,i} = 44.1$

INIGIA_Functions

LINEAR BUCKLING ANALYSIS

Valores considerados en el modelo LBA

$$A_c := 1.1424 \cdot 10^{-2} \text{ m}^2$$

$$I_c := 1.081244 \cdot 10^{-4} \text{ m}^4$$

$$i_c := \sqrt{\frac{I_c}{A_c}} = 0.0973 \text{ m}$$

$$N_{LB} := 1347 \text{ kN}$$

$$E_{LB} := 210000 \text{ MPa}$$

$$I_{LB} := I_c = 0.0001 \text{ m}^4$$

$$A_{LB} := A_c = 0.0114 \text{ m}^2$$

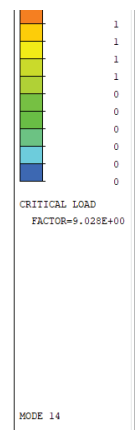
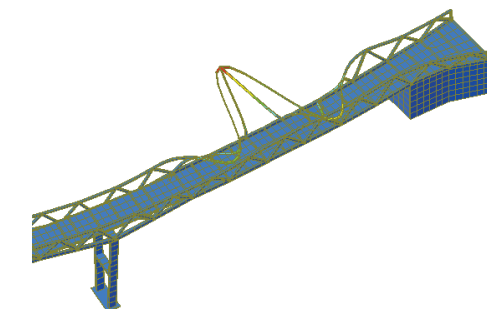
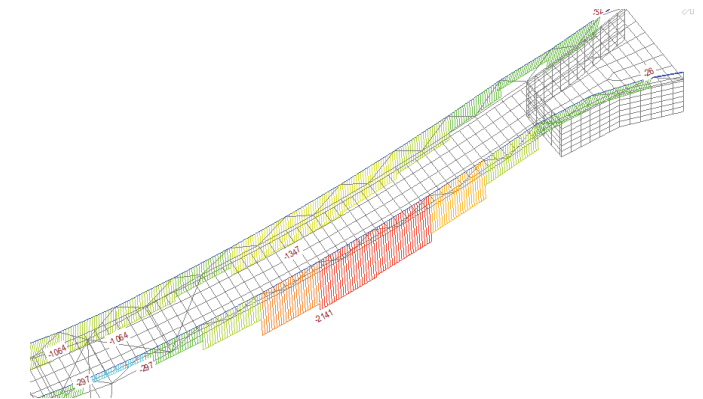
$$\alpha_{cr} := 9.03$$

$$i_{LB} := \sqrt{\frac{I_{LB}}{A_{LB}}} = 0.097 \text{ m}$$

$$N_{cr,i} := \alpha_{cr} \cdot N_{LB} = 12163 \text{ kN}$$

$$L_{cr,i} := \sqrt{\frac{\pi^2 \cdot E_{LB} \cdot I_{LB}}{N_{cr,i}}} = 4.3 \text{ m}$$

$$\lambda_{cr,i} := \frac{L_{cr,i}}{i_{LB}} = 44.1$$



ANÀLISIS ESTRUCTURAL (FASE METÀLICA)

HIPÒTESIS DE càLCUL:

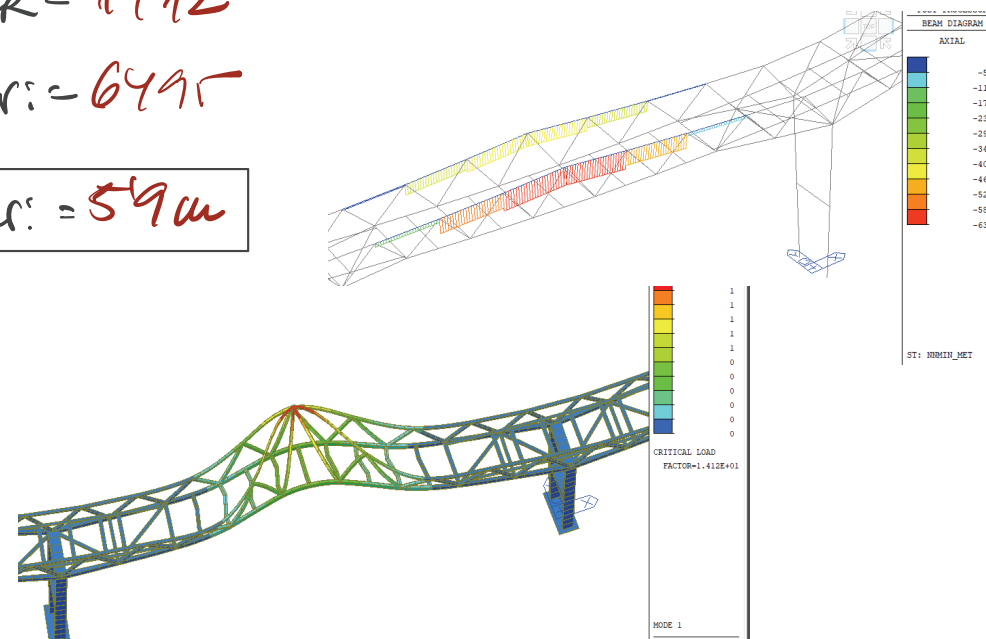
$\gamma_{G \times}$
 PES PROPIA ESTRUCTURA METÀLICA + PES GSA
 (FONDEJAMENTS)
 $\gamma_{Q \times}$
 + 1 kN/m² S. CONSTRUCCIÓ.

$N_{Ed} = 460 \text{ kN}$ en vano 2

$\alpha_{cr} = 14.12$

$N_{cr.i} = 6495$

$L_{cr.i} = 5.9 \text{ m}$



PERO el enduramiento de la bsa el
 cribado de los orden superiores es menor, pero
 también lo son los GSA. $\rightarrow \alpha_{cr} \approx 14$ (con factor
 de 2 orden)

INIGIA_Functions

LINEAR BUCKLING ANALYSIS

Valores considerados en el modelo LBA

$$A_c := 1.1424 \cdot 10^{-2} \text{ m}^2 = 114.2 \text{ cm}^2$$

$$I_c := 1.081244 \cdot 10^{-4} \text{ m}^4 = 10812.4 \text{ cm}^4$$

$$i_c := \sqrt{\frac{I_c}{A_c}} = 0.0973 \text{ m}$$

$$N_{LB} := 460 \text{ kN}$$

$$E_{LB} := 210000 \text{ MPa}$$

$$I_{LB} := I_c = 0.0001 \text{ m}^4$$

$$A_{LB} := A_c = 0.0114 \text{ m}^2$$

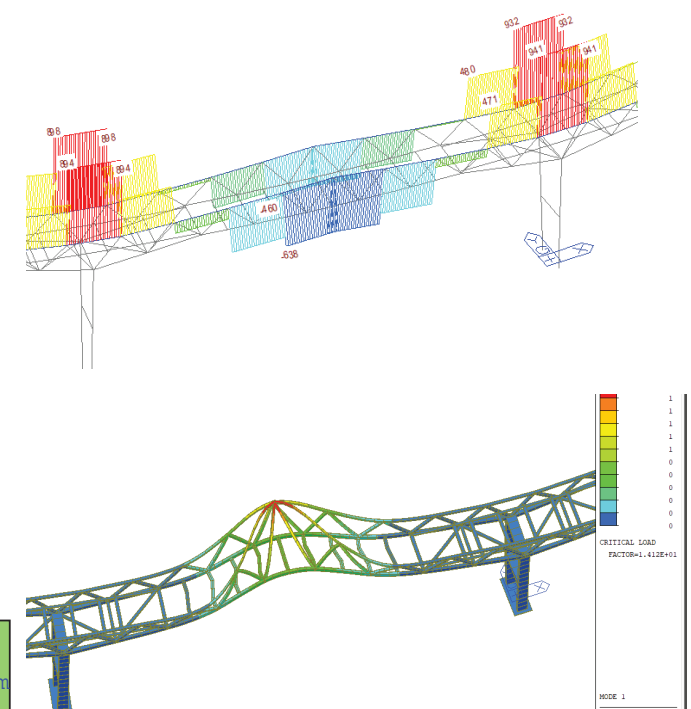
$$\alpha_{cr} := 14.12$$

$$i_{LB} := \sqrt{\frac{I_{LB}}{A_{LB}}} = 0.097 \text{ m}$$

$$N_{cr.i} := \alpha_{cr} \cdot N_{LB} = 6495 \text{ kN}$$

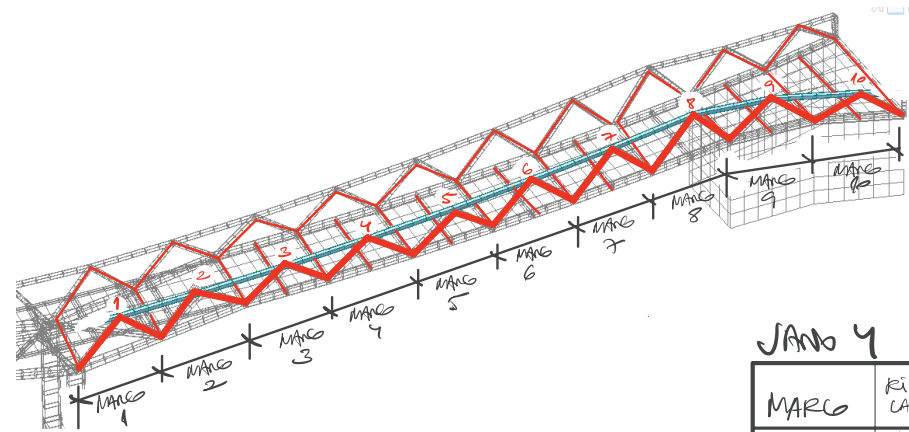
$$L_{cr.i} := \sqrt{\frac{\pi^2 \cdot E_{LB} \cdot I_{LB}}{N_{cr.i}}} = 5.9 \text{ m}$$

$$\lambda_{cr.i} := \frac{L_{cr.i}}{i_{LB}} = 60.4$$



CÁLCULO ANÁLITICO SIMPLIFICADO

UNE-EN 1993-2 - ANEJO D



EN 1993-2 - PARTE 2 Table D.3

2		
	Ejemplo de puentes celosía sin montantes	Pórtico en doble U de puentes en celosía sin montantes
2a		
	Modelizado	Modelizado: cordón inferior del pórtico en U solo con rigidez a flexión EI_d , cordones inferiores adyacentes con rigidez a torsión GI_T

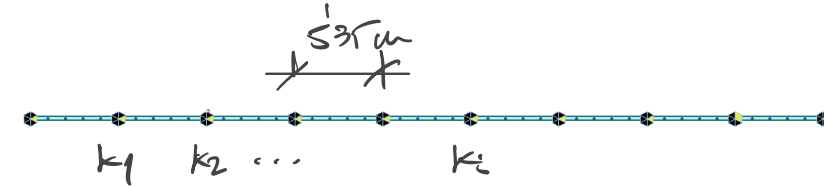
Las longitudes d_t , d_r , a , b , u y b_d pueden reducirse en el caso de extremos rígidos.
 u_t y u_r pueden reducirse en caso de que el extremo sea rígido a torsión.
 EI_{dt} , EI_{dr} , EI_d = rigidez a flexión de las diagonales y de los cordones inferiores en la flexión fuera de su plano
 EI_{qt} , EI_{qr} = rigidez a flexión de la viga transversal
 GI_{Tt} , GI_{Tr} = rigidez a torsión de St. Venant de los cordones adyacentes

Como aproximación, la carga de puentes del
cable superior sobre lecho elástico uniforme
correspondiente a una rigidez promedio de los muros
 $k = 1500 \text{ kN/m} \rightarrow N_{cr,0} \approx 5000 \text{ kN}$

JARNO 4

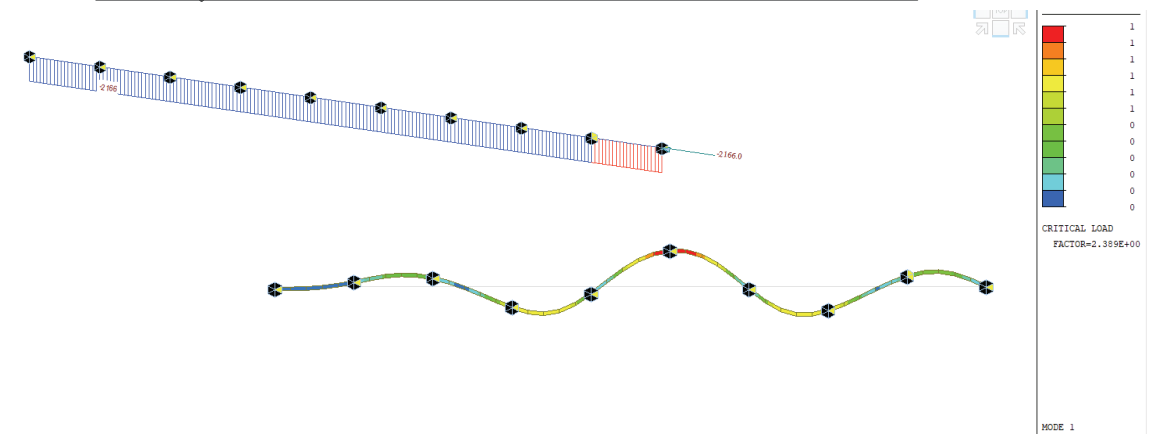
MARCO	RIGIDEZ LATERAL (kN/m)
1	3498
2	2712
3	1779
4	1584
5	1481
6	1321
7	2215
8	1530
9	2175
10	2663

Modelo simplificado:
Viga sobre apoyos elásticos discretos



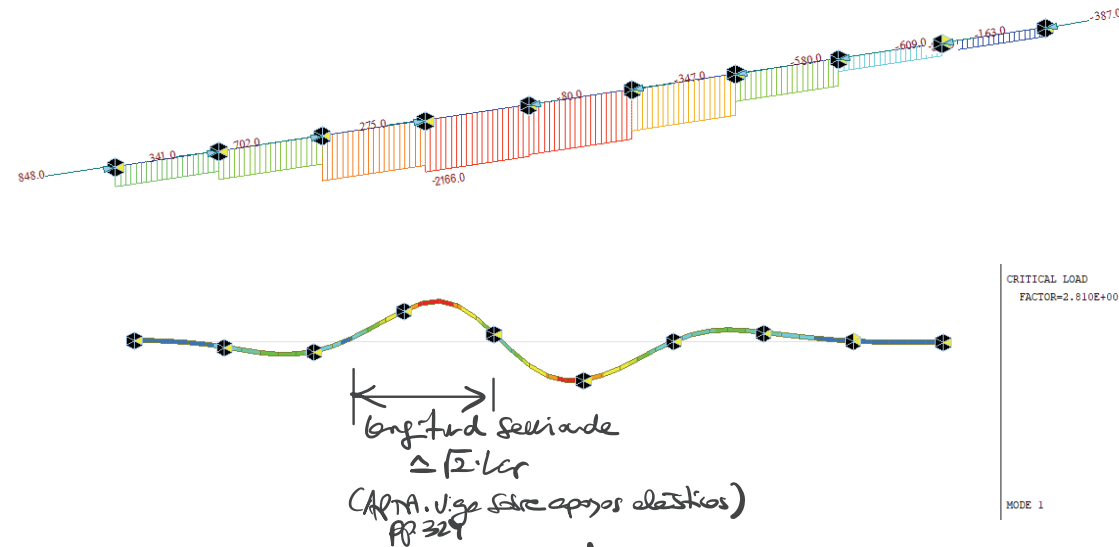
Considerando un eje uniforme resulta
un factor $\alpha_{cr1} = 2.39$ y una carga crítica

$$N_{cr1} = \alpha_{cr1} N_1 = 2.39 \times 2166 \text{ kN} = 5177 \text{ kN}$$



Considerando una ley **no-uniforme** de ejes
en el cable superior acorde a la ley de ejes
sobre el modelo 3D, el coeficiente se incrementa
hasta $\alpha_{cr2} = 2.81$ y la carga crítica:

$$N_{cr2} = \alpha_{cr2} N = 2.81 \times 2166 \text{ kN} = 6086 \text{ kN}$$



Del lado de la seguridad, tenemos este valor simplificado para la comprobación de los efectos de segundo orden del cordón superior, la longitud de pandeo asociada a KF_2 es

$$L_{cr,i} = 64m \approx 1'15 \times L \text{ para el cordón sup.}$$

Las cargas críticas obtenidas del análisis Lineal de Bifurcación sobre el modelo 3D, son netamente superiores ($\times 2$) reflejando efectos beneficiosos no contemplados en el modelo simplificado (mayor rigidez a flexión y torsión de las diagonales, vigas transversales y cordón inf.)

3.2 MARCS D'ARRIOSTRAMENT

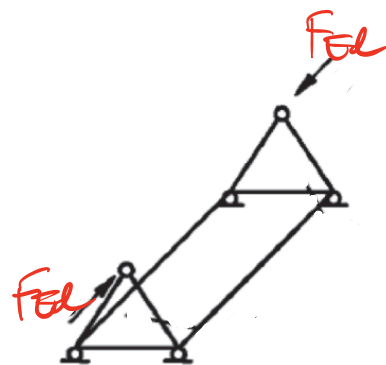
Cargas sobre marcos de arriostramiento

Los marcos intermedios que cumplen el papel de arriostramiento del cordón se ven sometidos a unas esfuerzos laterales asociados a las cargas de compresión del cordón.

según EC3-2 §6.3.4.2(5)

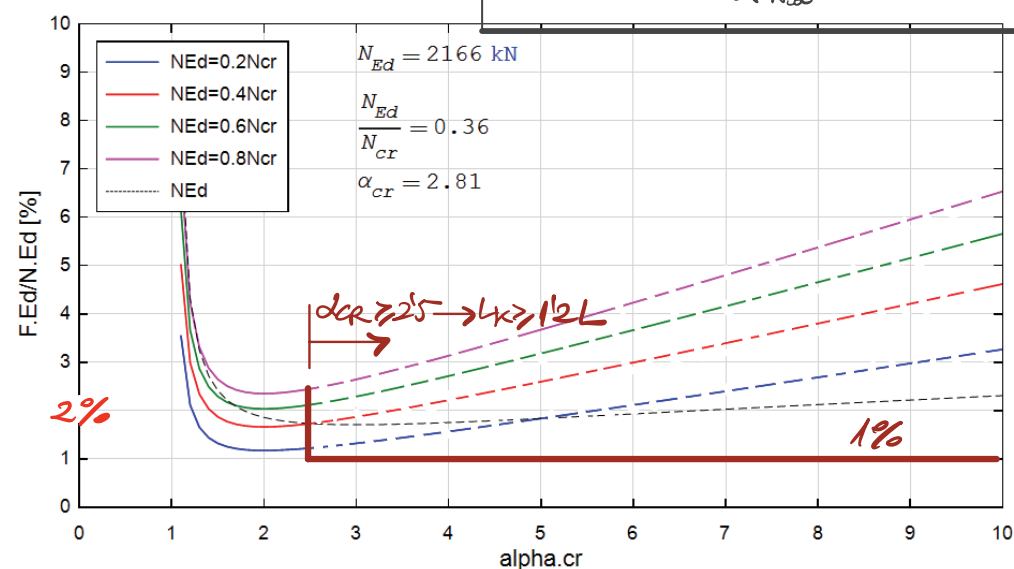
$$F_{Ed} = \frac{N_{Ed}}{100} \quad \text{si } l_k \leq 1,2 l$$

$$F_{Ed} = \frac{l}{l_k} \frac{N_{Ed}}{80} \frac{1}{1 - \frac{N_{Ed}}{N_{cr}}} \quad \text{si } l_k > 1,2 l$$



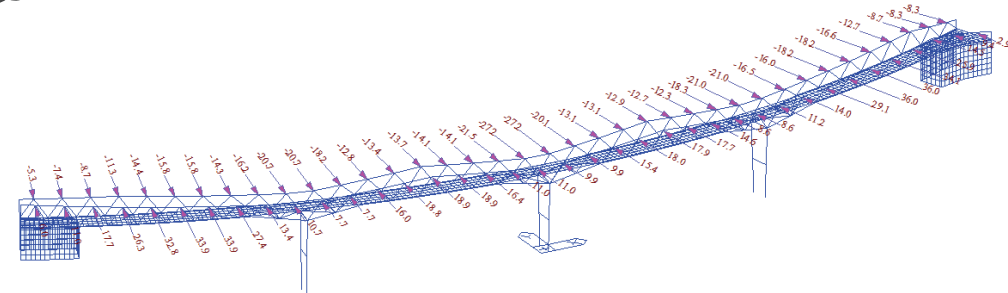
que tomando en consideración que $l_k = \pi \sqrt{\frac{EI}{N_{cr}}}$ puede reescribirse como:

$$F_{Ed} = N_{Ed} \cdot \left[\frac{L}{\pi \sqrt{\frac{EI}{\alpha_{cr} N_{Ed}}}} \cdot \frac{1}{80} \cdot \frac{1}{1 - \alpha_{cr}} \right] \quad \text{si } l_k > 1,2 L$$



el coeficiente $\alpha_{cr} = 2.81$ queda en el rango $l_k < 1.2 L$ y según EC-3-2 corresponde a una flecha $1/100$.

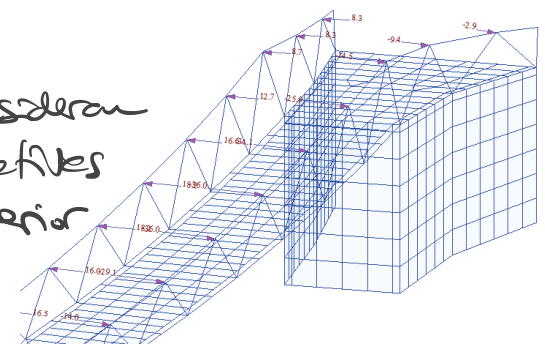
Aún así, del lado de la seguridad aplicamos una fuerza proporcional a N_{Ed} en cada marco de acuerdo a la ecuación (6) lo cual dará fuerzas transversales del 1% al 2% de N_{Ed} en los marcos.



Las fuerzas se consideran en dos sentidos alternativos (pueden hacia el interior o exterior). Se

aplican sobre todo los

marcos de arriostramiento como por diseño y se consideran en la verificación de los elementos únicamente cuando resultan desfavorables.



Brazo mecánico
entre cordones superior-inferior

$h := 1.8 \text{ m}$

DIAGONAL: longitud

$d_r := 3.2 \text{ m}$

DIAGONAL: espesor

$t_d := 10 \text{ mm}$

EN 1993_2 ANEJO D

LONGITUDES DE PANDEO - CELOSÍAS CON CORDONES EXENTOS (§D.2.4)

MATERIAL

$E := 210000 \text{ MPa}$

$\nu := 0.3$

$G := \frac{E}{2 \cdot (1 + \nu)} = 80769 \text{ MPa}$

CARACTERÍSTICAS GEOMÉTRICAS DE LA CELOSÍA

VIGA TRANSVERSAL: longitud entre cordones inferiores

$b_q := 4.57 \text{ m}$

DIAGONAL: longitud

$d_l := d_r$

$d_r = 3.2 \text{ m}$

Brazo mecánico
entre cordones superior-inferior

$h = 1.8 \text{ m}$

separación entre nudos inferiores

$a := \frac{u}{2}$

$b := \frac{u}{2}$

$u := 5.35 \text{ m}$

longitud del cordón inferior derecho (Right)

$u_r := \frac{u}{2} = 2.68 \text{ m}$

longitud del cordón inferior izquierdo (Left)

$u_l := \frac{u}{2} = 2.68 \text{ m}$

CARACTERÍSTICAS MECÁNICAS DE LAS BARRAS

CORDÓN INFERIOR: Inercia a torsión

$I_{Tr} := I_{Tl}$

$I_{Tl} := 5.412625 \cdot 10^{-4} \text{ m}^4$

CORDÓN INFERIOR: Inercia a flexión horizontal

$I_u := 2.33995 \cdot 10^{-4} \text{ m}^4$

VIGA TRANSVERSAL: Inercia a flexión vertical
situación permanente -> I.mixta
construcción metálica -> I.metálica

$I_{qr} := I_{ql}$

$I_{ql} := 6.384 \cdot 10^{-4} \text{ m}^4$

DIAGONAL (CUADRADA)

$b_d := 250 \text{ mm}$

$t_d = 10 \text{ mm}$

$b_{d,i} := b_d - 2 \cdot t_d$

$I_{d,e} := \frac{1}{12} \cdot b_d^4 \quad I_{d,i} := \frac{1}{12} \cdot b_{d,i}^4 \quad I_d := I_{d,e} - I_{d,i} = 9.232 \cdot 10^{-5} \text{ m}^4$

DIAGONAL: rigidez a flexión
fuera del plano de la celosía

$I_{dr} := I_{dl}$

$I_{dl} := I_d = 9232 \text{ cm}^4$

$n_l := \frac{2}{b_q} \cdot I_{ql} + \frac{G \cdot I_{Tl}}{E \cdot u_l} = 357.21 \text{ cm}^3$

$n_r := \frac{2}{b_q} \cdot I_{qr} + \frac{G \cdot I_{Tr}}{E \cdot u_r} = 357.21 \text{ cm}^3$

$A := \frac{h^2 \cdot I_u}{n_l} + \frac{d_l^3 \cdot I_u}{3 \cdot I_{dl}} + \frac{a^2 \cdot u}{3} = 42.57 \text{ m}^3$

$B := \frac{h^2 \cdot I_u}{n_r} + \frac{d_r^3 \cdot I_u}{3 \cdot I_{dr}} + \frac{b^2 \cdot u}{3} = 42.57 \text{ m}^3$

$D := \frac{1}{6} \cdot a \cdot b \cdot u = 6.38 \text{ m}^3$

rigidez equivalente de los apoyos elásticos laterales sobre el cordón superior

$C := \frac{A + B - 2 \cdot D}{A \cdot B - D^2} \cdot E \cdot I_u = 2008 \frac{\text{kN}}{\text{m}}$

CÁLCULO ANALÍTICO (VIGA SOBRE FUNDACIÓN ELÁSTICA - AXIL CONSTANTE)

$I_{CordonSup} := 1.081244 \cdot 10^{-4} \text{ m}^4$

$L_{CordonSup} := 5.35 \text{ m}$

$C := 2150 \frac{\text{kN}}{\text{m}}$

$P_{cr.i} := \frac{\pi^2 \cdot E \cdot I_{CordonSup}}{L_{CordonSup}^2} = 7830 \text{ kN}$

$\beta := \frac{C}{L_{CordonSup}} = 402 \frac{\text{kN}}{\text{m}}$

$L_e := 2.22 \cdot \sqrt[4]{\frac{E \cdot I_{CordonSup}}{\beta}} = 6.09 \text{ m}$

$\pi \cdot \sqrt[4]{\frac{E \cdot I_{CordonSup}}{\beta}} = 8.61 \text{ m}$

$N_{cr.e} := \frac{\pi^2 \cdot E \cdot I_{CordonSup}}{L_e^2} = 6049 \text{ kN}$

$k_{nec} := \frac{4 \cdot P_{cr.i}}{L_{CordonSup}} = 5854 \frac{\text{kN}}{\text{m}}$

Rigidez mínima del soporte lateral de arriostramiento para considerarlo rígido a efectos de pandeo lateral
(EN 1993-2 §6.3.4.2(6))

APTA §10.4
Si se pretende que el pilar de rigidez EI pueda alcanzar su carga crítica intraslacional, la rigidez del muelle ha de ser suficiente para garantizar que antes no se produce un fallo traslacional

FUERZA TRANSVERSAL SOBRE LOS MARCOS DE ARRIOSTRAMIENTO
UNE-EN 1993_2:2013 §6.3.4.2(5)
APTA 10.4

$L := 5.35 \text{ m}$

$N_{Ed} := 2166 \text{ kN}$

$E := 210000 \text{ MPa}$

$I := 1.081244 \cdot 10^{-4} \text{ m}^4$

$\alpha_{cr} := 2.81$

$L_k := \pi \cdot \sqrt{\frac{E \cdot I}{\alpha_{cr} \cdot N_{Ed}}} = 6.1 \text{ m}$

$N_{cr} := \alpha_{cr} \cdot N_{Ed} = 6086 \text{ kN}$

$\frac{L_k}{L} = 1.13$

Fuerza sobre el marco de arriostramiento para L.k>1.2L

$F_{Ed} := \frac{L}{L_k} \cdot \frac{N_{Ed}}{80} \cdot \frac{1}{1 - \frac{N_{Ed}}{N_{cr}}} = 37.1 \text{ kN}$

para L.k<1.2L
FEd=NEd/100

$\frac{N_{Ed}}{100} = 22 \text{ kN}$

$\alpha_{cr.1.2L} := \frac{\pi^2 \cdot E \cdot I}{(1.2 \cdot L)^2 \cdot N_{Ed}} = 2.51$

Fuerza transversal en los arriostramientos:
función de las características mecánicas y geométricas de la barra (E, I, L)
y de la relación entre carga de diseño N.Ed y coeficiente crítico α.cr

$F_{Ed.t} := N_{Ed} \cdot \frac{L}{\sqrt{\frac{\pi^2 \cdot E \cdot I}{\alpha_{cr} \cdot N_{Ed}}}} \cdot \frac{1}{80} \cdot \frac{1}{1 - \frac{1}{\alpha_{cr}}}$

$E = 2.1 \cdot 10^5 \text{ MPa}$

$I = 10812.44 \text{ cm}^4$

$\alpha_{cr} = 2.81$

$N_{Ed} = 2166 \text{ kN}$

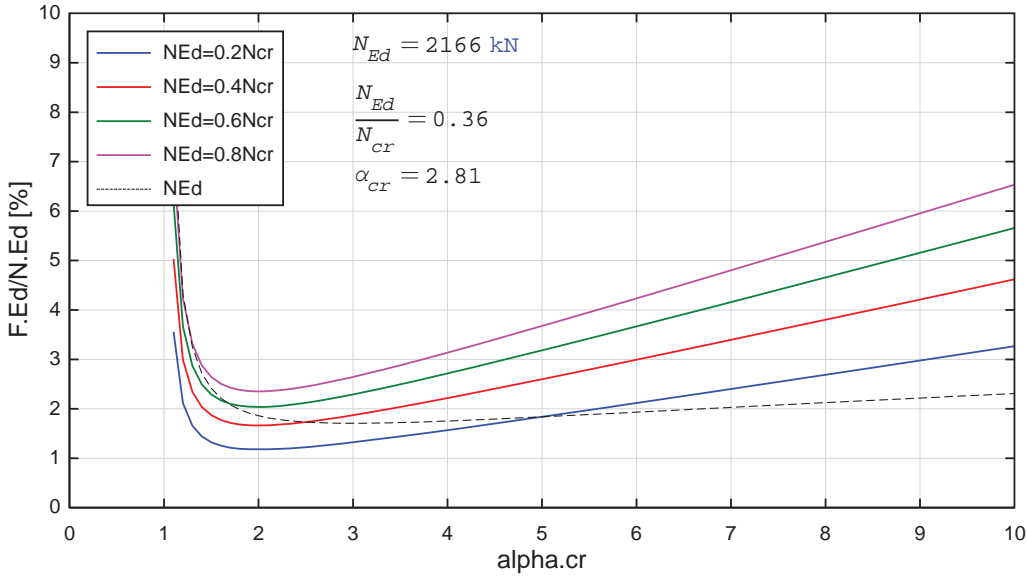
$F_{Ed.t} = 37.1 \text{ kN}$

$\frac{F_{Ed.t}}{N_{Ed}} = 1.71 \%$

$$F_{Ed.perc}\left(\alpha_{cr};N_{Ed}\right):=1\cdot\frac{L}{\pi\cdot\sqrt{\frac{E\cdot I}{\alpha_{cr}\cdot N_{Ed}}}}\cdot\frac{1}{80}\cdot\frac{1}{1-\frac{1}{\alpha_{cr}}}$$

$$F'_{Ed.perc}\left(\alpha_{cr};N_{Ed}\right):=\text{if } \alpha_{cr}\leq\alpha_{cr.1.2L}\quad\frac{1\cdot\frac{L}{\pi\cdot\sqrt{\frac{E\cdot I}{\alpha_{cr}\cdot N_{Ed}}}}\cdot\frac{1}{80}\cdot\frac{1}{1-\frac{1}{\alpha_{cr}}}}{\text{else } 0.01}$$

GRAPH



$$F_{Ed.perc}\left(5.67;2166\text{ kN}\right)2166\text{ kN}=41.17\text{ kN}$$

$$F_{Ed.perc}\left(2.81;2166\text{ kN}\right)=1.71\%$$

$$F_{Ed.perc}\left(2.81;\frac{2166\text{ kN}}{2}\right)=1.21\%$$

L	5.35	m
Lk		m
alpha_cr	2.81	
E	210000000	kPa
I	0.00010812	m4

ENTRADA: ESFUERZOS DE COMPRESIÓN DE DISEÑO (ELU) EN EL CORDÓN SUPERIOR								SALIDA: F. TRANSVERSAL ARRIOSTRADOS HACIA INTERIOR	
Elem	Load	Part	Axial (kN)	Shear-y (kN)	Shear-z (kN)	Torsion (kN-m)	Moment-y (kN-m)	Moment-z (kN-m)	F_arriost_i
10002	ELU(min)	I[116]	-596.12	-2.36	-3.27	-3.44	-5.15	-4.94	-5.35
10002	ELU(min)	J[114]	-596.15	-2.64	1.65	-3.44	-6.89	-8.88	-5.35
10003	ELU(min)	I[114]	-742.64	-3.53	-4.27	-1.61	-7.08	-13.68	-7.44
10003	ELU(min)	J[112]	-742.67	-3.92	0.73	-1.61	-10.97	-5.56	-7.44
10004	ELU(min)	I[112]	-823.23	-6.38	-4.94	0.26	-8.33	-15.92	-8.68
10004	ELU(min)	J[110]	-823.26	-6.08	0.39	0.26	-2.66	0.31	-8.68
10005	ELU(min)	I[110]	-978.69	-5.6	-4.43	-0.3	-5.57	-12.58	-11.26
10005	ELU(min)	J[108]	-979.1	-5	0.85	-0.3	-2.27	1.06	-11.26
10006	ELU(min)	I[108]	-1155.9	-3.39	-3.99	-0.88	-2.76	-2.48	-14.45
10006	ELU(min)	J[106]	-1156.3	-3.46	1.24	-0.88	-2.29	-0.22	-14.46
10007	ELU(min)	I[106]	-1228.88	-2.41	-3.39	-2.23	-2.11	-1.06	-15.84
10007	ELU(min)	J[104]	-1229.28	-2.46	1.75	-2.23	-2.94	-2.06	-15.85
10008	ELU(min)	I[104]	-1145.68	-2	-2.91	-5.16	-1.81	-0.29	-14.26
10008	ELU(min)	J[102]	-1146.08	-2.08	2.09	-5.16	-5.48	-5.4	-14.26
10009	ELU(min)	I[102]	-848.99	-1.51	-3.72	-6.79	-6.99	0.45	-9.09
10009	ELU(min)	J[100]	-849.39	-2.12	1.19	-6.79	-6.42	-9.7	-9.10
10010	ELU(min)	I[100]	-1247.73	-1.95	-6.35	-4.25	-11.09	-1.84	-16.20
10010	ELU(min)	J[98]	-1248.03	-2.48	-1.39	-4.25	-15.6	-6.98	-16.21
10011	ELU(min)	I[98]	-1468.91	-2.61	-6.36	-1.28	-14.72	-3.03	-20.70
10011	ELU(min)	J[167]	-1468.95	-2.5	-1.12	-1.28	-16.81	-2.64	-20.70
10012	ELU(min)	I[167]	-1347.56	-3.88	-6.53	-1.46	-15.22	-7.9	-18.19
10012	ELU(min)	J[165]	-1347.19	-2.92	-1.04	-1.46	-5.53	-2	-18.18
10013	ELU(min)	I[165]	-856.3	-5.29	-5.19	-0.36	-6.29	-11.16	-9.21
10013	ELU(min)	J[163]	-855.8	-4.07	0.14	-0.36	-8.29	0.61	-9.20
10014	ELU(min)	I[163]	-1067.95	-4.56	-3.9	-0.35	-6.07	-6.57	-12.83
10014	ELU(min)	J[161]	-1067.45	-3.7	1.32	-0.35	-4.33	-0.95	-12.82
10015	ELU(min)	I[161]	-1102.24	-3.33	-2.81	-0.67	-3.82	-2.34	-13.45
10015	ELU(min)	J[159]	-1101.74	-2.74	2.21	-0.67	-6.61	-2.03	-13.44
10016	ELU(min)	I[159]	-1113.81	-2.02	-3.8	-2.34	-6.92	-1.11	-13.67
10016	ELU(min)	J[157]	-1114.39	-2.67	1.39	-2.34	-3.37	-2.93	-13.68
10017	ELU(min)	I[157]	-1137.51	-1.58	-2.94	-5.39	-4.69	0.15	-14.10
10017	ELU(min)	J[155]	-1138.09	-2.46	2.06	-5.39	-4.68	-6.52	-14.12
10018	ELU(min)	I[155]	-1015.07	-1.28	-3.59	-6.96	-7.29	0.58	-11.89
10018	ELU(min)	J[153]	-1015.65	-2.46	1.3	-6.96	-6.58	-10.76	-11.90
10019	ELU(min)	I[153]	-1507	-1.65	-5.13	-5.55	-6.55	-1.58	-21.51
10019	ELU(min)	J[152]	-1507.43	-2.53	-0.34	-5.55	-17.24	-8.8	-21.52
10020	ELU(min)	I[152]	-1762.33	-2.46	-3.3	-0.32	-14.34	-3.57	-27.20
10020	ELU(min)	J[148]	-1762.36	-2.49	1.77	-0.32	-14.68	-3.75	-27.20
10021	ELU(min)	I[148]	-1440.33	-3.91	-7.14	-0.25	-16.85	-8.34	-20.10
10021	ELU(min)	J[146]	-1439.96	-3.16	-1.72	-0.25	-8.02	-1.69	-20.09
10022	ELU(min)	I[146]	-941.07	-5.12	-5.18	-0.04	-6.82	-10.45	-10.61
10022	ELU(min)	J[144]	-940.57	-3.94	0.15	-0.04	-7.75	0.45	-10.60
10023	ELU(min)	I[144]	-1080.88	-4.42	-3.94	-0.07	-5.31	-6.32	-13.06
10023	ELU(min)	J[142]	-1080.38	-3.61	1.28	-0.07	-4.58	0.02	-13.06
10024	ELU(min)	I[142]	-1071.41	-3.33	-2.85	-0.08	-3.78	-2.51	-12.89
10024	ELU(min)	J[140]	-1070.91	-2.74	2.18	-0.08	-6.76	-1.33	-12.88
10025	ELU(min)	I[140]	-1060.22	-1.99	-3.71	-3.21	-6.75	-1.78	-12.69
10025	ELU(min)	J[138]	-1060.8	-2.6	1.48	-3.21	-3.79	-2.67	-12.70
10026	ELU(min)	I[138]	-1034.9	-1.48	-2.76	-6.52	-4.53	-0.75	-12.24
10026	ELU(min)	J[136]	-1035.48	-2.34	2.23	-6.52	-6	-6.83	-12.25
10027	ELU(min)	I[136]	-829.23	-1.22	-3.74	-7.84	-8.4	0.33	-8.78
10027	ELU(min)	J[134]	-829.82	-2.34	1.17	-7.84	-6.47	-11.19	-8.79
10028	ELU(min)	I[134]	-1352.23	-1.87	-4.61	-5.6	-6.36	-2.23	-18.28
10028	ELU(min)	J[132]	-1352.66	-2.83	0.19	-5.6	-14.53	-7.72	-18.29
10029	ELU(min)	I[132]	-1482.56	-2.62	-5.65	-1.39	-18.35	-3.04	-20.99
10029	ELU(min)	J[205]	-1482.59	-2.67	-0.38	-1.39	-12.94	-3.15	-20.99
10030	ELU(min)	I[205]	-1261.64	-3.73	-6.49	-0.52	-15.24	-7.37	-16.48
10030	ELU(min)	J[206]	-1261.46	-3.29	-0.88	-0.52	-9.61	-2.09	-16.47
10031	ELU(min)	I[206]	-889.87	-5.08	-5.3	0.28	-6.75	-10.53	-9.76
10031	ELU(min)	J[207]	-889.62	-4.43	0.33	0.28	-7.35	0.49	-9.76
10032	ELU(min)	I[207]	-1237.84	-4.36	-4.24	0.14	-5.71	-6.15	-16.01
10032	ELU(min)	J[208]	-1237.59	-4.26	1.29	0.14	-1.83	-0.08	-16.01
10033	ELU(min)	I[208]	-1349.82	-3.15	-3.43	-1.51	-3.24	-2.28	-18.23
10033	ELU(min)	J[209]	-1349.58	-3.05	1.96	-1.51	-1.96	-0.91	-18.23
10034	ELU(min)	I[209]	-1266.67	-2.43	-3.21	-5.11	-2.6	-0.16	-16.57
10034	ELU(min)	J[210]	-1266.42	-2.52	2.12	-5.11	-2.51	-2.48	-16.57
10035	ELU(min)	I[210]	-1062.9	-1.1	-3.28	-8.8	-2.74	2.32	-12.74
10035	ELU(min)	J[211]	-1062.66	-2.07	1.99	-8.8	-5.52	-13.45	-12.74
10036	ELU(min)	I[211]	-824.87	-0.47	-3.12	-9.34	-2.69	1.17	-8.71
10036	ELU(min)	J[212]	-824.69	-1.47	2.21	-9.34	-5.66	-21.74	-8.71
10037	ELU(min)	I[212]	-762.91	-2.65	-3.42	-3.62	-8.79	-10.65	-7.75
10037	ELU(min)	J[221]	-763.7	-3.3	1.92	-3.62	-10.99	-8.81	-7.76
10038	ELU(min)	I[221]	-800.81	-5.44	-4.39	-4.53	-6.59	-12.04	-8.33
10038	ELU(min)	J[222]	-801.6	-5.01	1.14	-4.53	-5.14	-7.88	-8.34



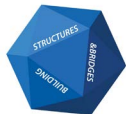
L	5.35	m
Lk		m
alpha_cr	2.81	
E	210000000	kPa
I	0.000108124	m4

ENTRADA: ESFUERZOS DE COMPRESIÓN DE DISEÑO (ELU) EN EL CORDÓN SUPERIOR

Elem	Load	Part	Axial (kN)	Shear-y (kN)	Shear-z (kN)	Torsion (kN-m)	Moment-y (kN	Moment-z (kN-m)
10002	ELU(min)	I[116]	-596.12	-2.36	-3.27	-3.44	-5.15	-4.94
10002	ELU(min)	J[114]	-596.15	-2.64	1.65	-3.44	-6.89	-8.88
10003	ELU(min)	I[114]	-742.64	-3.53	-4.27	-1.61	-7.08	-13.68
10003	ELU(min)	J[112]	-742.67	-3.92	0.73	-1.61	-10.97	-5.56
10004	ELU(min)	I[112]	-823.23	-6.38	-4.94	0.26	-8.33	-15.92
10004	ELU(min)	J[110]	-823.26	-6.08	0.39	0.26	-2.66	0.31
10005	ELU(min)	I[110]	-978.69	-5.6	-4.43	-0.3	-5.57	-12.58
10005	ELU(min)	J[108]	-979.1	-5	0.85	-0.3	-2.27	1.06
10006	ELU(min)	I[108]	-1155.9	-3.39	-3.99	-0.88	-2.76	-2.48
10006	ELU(min)	J[106]	-1156.3	-3.46	1.24	-0.88	-2.29	-0.22
10007	ELU(min)	I[106]	-1228.88	-2.41	-3.39	-2.23	-2.11	-1.06
10007	ELU(min)	J[104]	-1229.28	-2.46	1.75	-2.23	-2.94	-2.06
10008	ELU(min)	I[104]	-1145.68	-2	-2.91	-5.16	-1.81	-0.29
10008	ELU(min)	J[102]	-1146.08	-2.08	2.09	-5.16	-5.48	-5.4
10009	ELU(min)	I[102]	-848.99	-1.51	-3.72	-6.79	-6.99	0.45
10009	ELU(min)	J[100]	-849.39	-2.12	1.19	-6.79	-6.42	-9.7
10010	ELU(min)	I[100]	-1247.73	-1.95	-6.35	-4.25	-11.09	-1.84
10010	ELU(min)	J[98]	-1248.03	-2.48	-1.39	-4.25	-15.6	-6.98
10011	ELU(min)	I[98]	-1468.91	-2.61	-6.36	-1.28	-14.72	-3.03
10011	ELU(min)	J[167]	-1468.95	-2.5	-1.12	-1.28	-16.81	-2.64
10012	ELU(min)	I[167]	-1347.56	-3.88	-6.53	-1.46	-15.22	-7.9
10012	ELU(min)	J[165]	-1347.19	-2.92	-1.04	-1.46	-5.53	-2
10013	ELU(min)	I[165]	-856.3	-5.29	-5.19	-0.36	-6.29	-11.16
10013	ELU(min)	J[163]	-855.8	-4.07	0.14	-0.36	-8.29	0.61
10014	ELU(min)	I[163]	-1067.95	-4.56	-3.9	-0.35	-6.07	-6.57
10014	ELU(min)	J[161]	-1067.45	-3.7	1.32	-0.35	-4.33	-0.95
10015	ELU(min)	I[161]	-1102.24	-3.33	-2.81	-0.67	-3.82	-2.34
10015	ELU(min)	J[159]	-1101.74	-2.74	2.21	-0.67	-6.61	-2.03
10016	ELU(min)	I[159]	-1113.81	-2.02	-3.8	-2.34	-6.92	-1.11
10016	ELU(min)	J[157]	-1114.39	-2.67	1.39	-2.34	-3.37	-2.93
10017	ELU(min)	I[157]	-1137.51	-1.58	-2.94	-5.39	-4.69	0.15
10017	ELU(min)	J[155]	-1138.09	-2.46	2.06	-5.39	-4.68	-6.52
10018	ELU(min)	I[155]	-1015.07	-1.28	-3.59	-6.96	-7.29	0.58
10018	ELU(min)	J[153]	-1015.65	-2.46	1.3	-6.96	-6.58	-10.76
10019	ELU(min)	I[153]	-1507	-1.65	-5.13	-5.55	-6.55	-1.58
10019	ELU(min)	J[152]	-1507.43	-2.53	-0.34	-5.55	-17.24	-8.8
10020	ELU(min)	I[152]	-1762.33	-2.46	-3.3	-0.32	-14.34	-3.57
10020	ELU(min)	J[48]	-1762.36	-2.49	1.77	-0.32	-14.68	-3.75
10021	ELU(min)	I[48]	-1440.33	-3.91	-7.14	-0.25	-16.85	-8.34
10021	ELU(min)	J[46]	-1439.96	-3.16	-1.72	-0.25	-8.02	-1.69
10022	ELU(min)	I[46]	-941.07	-5.12	-5.18	-0.04	-6.82	-10.45
10022	ELU(min)	J[44]	-940.57	-3.94	0.15	-0.04	-7.75	0.45
10023	ELU(min)	I[44]	-1080.88	-4.42	-3.94	-0.07	-5.31	-6.32
10023	ELU(min)	J[42]	-1080.38	-3.61	1.28	-0.07	-4.58	0.02
10024	ELU(min)	I[42]	-1071.41	-3.33	-2.85	-0.08	-3.78	-2.51
10024	ELU(min)	J[40]	-1070.91	-2.74	2.18	-0.08	-6.76	-1.33
10025	ELU(min)	I[40]	-1060.22	-1.99	-3.71	-3.21	-6.75	-1.78
10025	ELU(min)	J[38]	-1060.8	-2.6	1.48	-3.21	-3.79	-2.67
10026	ELU(min)	I[38]	-1034.9	-1.48	-2.76	-6.52	-4.53	-0.75
10026	ELU(min)	J[36]	-1035.48	-2.34	2.23	-6.52	-6	-6.83
10027	ELU(min)	I[36]	-829.23	-1.22	-3.74	-7.84	-8.4	0.33
10027	ELU(min)	J[34]	-829.82	-2.34	1.17	-7.84	-6.47	-11.19
10028	ELU(min)	I[34]	-1352.23	-1.87	-4.61	-5.6	-6.36	-2.23
10028	ELU(min)	J[32]	-1352.66	-2.83	0.19	-5.6	-14.53	-7.72
10029	ELU(min)	I[32]	-1482.56	-2.62	-5.65	-1.39	-18.35	-3.04
10029	ELU(min)	J[205]	-1482.59	-2.67	-0.38	-1.39	-12.94	-3.15
10030	ELU(min)	I[205]	-1261.64	-3.73	-6.49	-0.52	-15.24	-7.37
10030	ELU(min)	J[206]	-1261.46	-3.29	-0.88	-0.52	-9.61	-2.09
10031	ELU(min)	I[206]	-889.87	-5.08	-5.3	0.28	-6.75	-10.53
10031	ELU(min)	J[207]	-889.62	-4.43	0.33	0.28	-7.35	0.49
10032	ELU(min)	I[207]	-1237.84	-4.36	-4.24	0.14	-5.71	-6.15
10032	ELU(min)	J[208]	-1237.59	-4.26	1.29	0.14	-1.83	-0.08
10033	ELU(min)	I[208]	-1349.82	-3.15	-3.43	-1.51	-3.24	-2.28
10033	ELU(min)	J[209]	-1349.58	-3.05	1.96	-1.51	-1.96	-0.91
10034	ELU(min)	I[209]	-1266.67	-2.43	-3.21	-5.11	-2.6	-0.16
10034	ELU(min)	J[210]	-1266.42	-2.52	2.12	-5.11	-2.51	-2.48
10035	ELU(min)	I[210]	-1062.9	-1.1	-3.28	-8.8	-2.74	2.32
10035	ELU(min)	J[211]	-1062.66	-2.07	1.99	-8.8	-5.52	-13.45
10036	ELU(min)	I[211]	-824.87	-0.47	-3.12	-9.34	-2.69	1.17
10036	ELU(min)	J[212]	-824.69	-1.47	2.21	-9.34	-5.66	-21.74
10037	ELU(min)	I[212]	-762.91	-2.65	-3.42	-3.62	-8.79	-10.65
10037	ELU(min)	J[221]	-763.7	-3.3	1.92	-3.62	-10.99	-8.81
10038	ELU(min)	I[221]	-800.81	-5.44	-4.39	-4.53	-6.59	-12.04
10038	ELU(min)	J[222]	-801.6	-5.01	1.14	-4.53	-5.14	-7.88

SALIDA: F_ TRANSVERSAL ARRIOSTRADOS HACIA EXTERIOR

F_arriost_e	
5.35	*USE-STLD,Ft_pandeo_e*BEAMLOAD10002,BEAM,CONLOAD,LY,NO,NO,LY,,,0,5.35,0,0,0,0,0,,NO,0,0,NO,
5.35	
7.44	*USE-STLD,Ft_pandeo_e*BEAMLOAD10003,BEAM,CONLOAD,LY,NO,NO,LY,,,0,7.44,0,0,0,0,0,,NO,0,0,NO,
7.44	
8.68	*USE-STLD,Ft_pandeo_e*BEAMLOAD10004,BEAM,CONLOAD,LY,NO,NO,LY,,,0,8.68,0,0,0,0,0,,NO,0,0,NO,
8.68	
11.26	*USE-STLD,Ft_pandeo_e*BEAMLOAD10005,BEAM,CONLOAD,LY,NO,NO,LY,,,0,11.26,0,0,0,0,0,,NO,0,0,NO,
11.26	
14.45	*USE-STLD,Ft_pandeo_e*BEAMLOAD10006,BEAM,CONLOAD,LY,NO,NO,LY,,,0,14.45,0,0,0,0,0,,NO,0,0,NO,
14.46	
15.84	*USE-STLD,Ft_pandeo_e*BEAMLOAD10007,BEAM,CONLOAD,LY,NO,NO,LY,,,0,15.84,0,0,0,0,0,,NO,0,0,NO,
15.85	*USE-STLD,Ft_pandeo_e*BEAMLOAD10007,BEAM,CONLOAD,LY,NO,NO,LY,,,1,15.85,0,0,0,0,0,,NO,0,0,NO,
14.26	
14.26	*USE-STLD,Ft_pandeo_e*BEAMLOAD10008,BEAM,CONLOAD,LY,NO,NO,LY,,,1,14.26,0,0,0,0,0,,NO,0,0,NO,
9.09	
9.10	
16.20	*USE-STLD,Ft_pandeo_e*BEAMLOAD10010,BEAM,CONLOAD,LY,NO,NO,LY,,,0,16.2,0,0,0,0,0,,NO,0,0,NO,
16.21	
20.70	*USE-STLD,Ft_pandeo_e*BEAMLOAD10011,BEAM,CONLOAD,LY,NO,NO,LY,,,0,20.7,0,0,0,0,0,,NO,0,0,NO,
20.70	*USE-STLD,Ft_pandeo_e*BEAMLOAD10011,BEAM,CONLOAD,LY,NO,NO,LY,,,1,20.7,0,0,0,0,0,,NO,0,0,NO,
18.19	
18.18	*USE-STLD,Ft_pandeo_e*BEAMLOAD10012,BEAM,CONLOAD,LY,NO,NO,LY,,,1,18.18,0,0,0,0,0,,NO,0,0,NO,
9.21	
9.20	
12.83	*USE-STLD,Ft_pandeo_e*BEAMLOAD10014,BEAM,CONLOAD,LY,NO,NO,LY,,,0,12.83,0,0,0,0,0,,NO,0,0,NO,
12.82	
13.45	*USE-STLD,Ft_pandeo_e*BEAMLOAD10015,BEAM,CONLOAD,LY,NO,NO,LY,,,0,13.45,0,0,0,0,0,,NO,0,0,NO,
13.44	
13.67	*USE-STLD,Ft_pandeo_e*BEAMLOAD10016,BEAM,CONLOAD,LY,NO,NO,LY,,,0,13.67,0,0,0,0,0,,NO,0,0,NO,
13.68	
14.10	*USE-STLD,Ft_pandeo_e*BEAMLOAD10017,BEAM,CONLOAD,LY,NO,NO,LY,,,0,14.1,0,0,0,0,0,,NO,0,0,NO,
14.12	*USE-STLD,Ft_pandeo_e*BEAMLOAD10017,BEAM,CONLOAD,LY,NO,NO,LY,,,1,14.12,0,0,0,0,0,,NO,0,0,NO,
11.89	
11.90	
21.51	*USE-STLD,Ft_pandeo_e*BEAMLOAD10019,BEAM,CONLOAD,LY,NO,NO,LY,,,0,21.51,0,0,0,0,0,,NO,0,0,NO,
21.52	
27.20	*USE-STLD,Ft_pandeo_e*BEAMLOAD10020,BEAM,CONLOAD,LY,NO,NO,LY,,,0,27.2,0,0,0,0,0,,NO,0,0,NO,
27.20	*USE-STLD,Ft_pandeo_e*BEAMLOAD10020,BEAM,CONLOAD,LY,NO,NO,LY,,,1,27.2,0,0,0,0,0,,NO,0,0,NO,
20.10	
20.09	*USE-STLD,Ft_pandeo_e*BEAMLOAD10021,BEAM,CONLOAD,LY,NO,NO,LY,,,1,20.09,0,0,0,0,0,,NO,0,0,NO,
10.61	
10.60	
13.06	*USE-STLD,Ft_pandeo_e*BEAMLOAD10023,BEAM,CONLOAD,LY,NO,NO,LY,,,0,13.06,0,0,0,0,0,,NO,0,0,NO,
13.06	*USE-STLD,Ft_pandeo_e*BEAMLOAD10023,BEAM,CONLOAD,LY,NO,NO,LY,,,1,13.06,0,0,0,0,0,,NO,0,0,NO,
12.89	
12.88	*USE-STLD,Ft_pandeo_e*BEAMLOAD10024,BEAM,CONLOAD,LY,NO,NO,LY,,,1,12.88,0,0,0,0,0,,NO,0,0,NO,
12.69	
12.70	*USE-STLD,Ft_pandeo_e*BEAMLOAD10025,BEAM,CONLOAD,LY,NO,NO,LY,,,1,12.7,0,0,0,0,0,,NO,0,0,NO,
12.24	
12.25	*USE-STLD,Ft_pandeo_e*BEAMLOAD10026,BEAM,CONLOAD,LY,NO,NO,LY,,,1,12.25,0,0,0,0,0,,NO,0,0,NO,
8.78	
8.79	
18.28	*USE-STLD,Ft_pandeo_e*BEAMLOAD10028,BEAM,CONLOAD,LY,NO,NO,LY,,,0,18.28,0,0,0,0,0,,NO,0,0,NO,
18.29	
20.99	*USE-STLD,Ft_pandeo_e*BEAMLOAD10029,BEAM,CONLOAD,LY,NO,NO,LY,,,0,20.99,0,0,0,0,0,,NO,0,0,NO,
20.99	*USE-STLD,Ft_pandeo_e*BEAMLOAD10029,BEAM,CONLOAD,LY,NO,NO,LY,,,1,20.99,0,0,0,0,0,,NO,0,0,NO,
16.48	
16.47	*USE-STLD,Ft_pandeo_e*BEAMLOAD10030,BEAM,CONLOAD,LY,NO,NO,LY,,,1,16.47,0,0,0,0,0,,NO,0,0,NO,
9.76	
9.76	
16.01	*USE-STLD,Ft_pandeo_e*BEAMLOAD10032,BEAM,CONLOAD,LY,NO,NO,LY,,,0,16.01,0,0,0,0,0,,NO,0,0,NO,
16.01	
18.23	*USE-STLD,Ft_pandeo_e*BEAMLOAD10033,BEAM,CONLOAD,LY,NO,NO,LY,,,0,18.23,0,0,0,0,0,,NO,0,0,NO,
18.23	*USE-STLD,Ft_pandeo_e*BEAMLOAD10033,BEAM,CONLOAD,LY,NO,NO,LY,,,1,18.23,0,0,0,0,0,,NO,0,0,NO,
16.57	
16.57	*USE-STLD,Ft_pandeo_e*BEAMLOAD10034,BEAM,CONLOAD,LY,NO,NO,LY,,,1,16.57,0,0,0,0,0,,NO,0,0,NO,
12.74	
12.74	*USE-STLD,Ft_pandeo_e*BEAMLOAD10035,BEAM,CONLOAD,LY,NO,NO,LY,,,1,12.74,0,0,0,0,0,,NO,0,0,NO,
8.71	
8.71	*USE-STLD,Ft_pandeo_e*BEAMLOAD10036,BEAM,CONLOAD,LY,NO,NO,LY,,,1,8.71,0,0,0,0,0,,NO,0,0,NO,
7.75	
7.76	
8.33	*USE-STLD,Ft_pandeo_e*BEAMLOAD10038,BEAM,CONLOAD,LY,NO,NO,LY,,,0,8.33,0,0,0,0,0,,NO,0,0,NO,
8.34	*USE-STLD,Ft_pandeo_e*BEAMLOAD10038,BEAM,CONLOAD,LY,NO,NO,LY,,,1,8.34,0,0,0,0,0,,NO,0,0,NO,



BSB

ESTRUCTURES
D'EDIFICACIÓ I PONTS S.L.


L	5.35	m
Lk		m
alpha_cr	2.81	
E	210000000	kPa
I	0.000108124	m4

ENTRADA: ESFUERZOS DE COMPRESIÓN DE DISEÑO (ELU) EN EL CORDÓN SUPERIOR

Elem	Load	Part	Axial (kN)	Shear-y (kN)	Shear-z (kN)	Torsion (kN-m)	Moment-y (kN	Moment-z (kN-m)
20002	ELU(min)	I[78]	-643.63	-2.41	-4.11	-4.32	-7.2	-6.24
20002	ELU(min)	J[80]	-643.92	-3.05	0.87	-4.32	-9.24	-9.22
20003	ELU(min)	I[80]	-964.86	-2.51	-3.1	-4.09	-6.14	-8.89
20003	ELU(min)	J[82]	-965.16	-2.52	1.94	-4.09	-10.41	-4.98
20004	ELU(min)	I[82]	-1322.94	-4.46	-5.4	-2.24	-10.86	-14.18
20004	ELU(min)	J[84]	-1323.23	-4.36	0.11	-2.24	-1.22	-2.74
20005	ELU(min)	I[84]	-1721	-6.56	-5.17	-1.62	-7.94	-18.19
20005	ELU(min)	J[86]	-1721.4	-6.56	0.31	-1.62	-1.02	-2.53
20006	ELU(min)	I[86]	-1994.57	-3.29	-4.34	-0.46	-3.2	-2.5
20006	ELU(min)	J[88]	-1994.97	-3.79	1.05	-0.46	-0.74	0.44
20007	ELU(min)	I[88]	-2040.09	-2.17	-3.34	-1.82	-1.35	-0.72
20007	ELU(min)	J[90]	-2040.49	-2.7	1.91	-1.82	-0.92	-2.73
20008	ELU(min)	I[90]	-1771.22	-1.41	-2.69	-5.49	-0.77	-0.3
20008	ELU(min)	J[92]	-1771.62	-2.56	2.38	-5.49	-3.55	-6.41
20009	ELU(min)	I[92]	-1099.89	-1.08	-2.7	-6.44	-2.45	-2.02
20009	ELU(min)	J[120]	-1100.29	-2.68	2.25	-6.44	-8.62	-10.93
20010	ELU(min)	I[120]	-943.61	-2.03	-3.85	-4.14	-5.67	-1.47
20010	ELU(min)	J[95]	-943.91	-2.9	1.13	-4.14	-13.69	-6.15
20011	ELU(min)	I[95]	-699.7	-2.6	-5.73	-0.41	-15.19	-3.34
20011	ELU(min)	J[135]	-699.73	-2.57	-0.54	-0.41	-17.97	-3.12
20012	ELU(min)	I[135]	-761.12	-3.56	-6.55	-1.69	-14.52	-6.39
20012	ELU(min)	J[137]	-760.75	-2.75	-1.06	-1.69	-9.15	-1.4
20013	ELU(min)	I[137]	-755.13	-5.08	-5.43	-1.55	-7.17	-11.28
20013	ELU(min)	J[139]	-754.63	-4.23	0.08	-1.55	-3.89	-0.6
20014	ELU(min)	I[139]	-1236.31	-4.78	-4.46	-0.92	-4.63	-7.96
20014	ELU(min)	J[141]	-1235.81	-4.09	0.93	-0.92	-1.43	-1.46
20015	ELU(min)	I[141]	-1378.76	-3.55	-2.86	-0.49	-1.39	-2.94
20015	ELU(min)	J[143]	-1378.27	-3.01	2.27	-0.49	-3.42	-2.1
20016	ELU(min)	I[143]	-1384.12	-1.8	-3.91	-2.78	-3.84	-1.23
20016	ELU(min)	J[145]	-1384.7	-2.81	1.4	-2.78	-1.09	-3.39
20017	ELU(min)	I[145]	-1257.22	-1.07	-2.76	-6.18	-1.52	-0.96
20017	ELU(min)	J[147]	-1257.8	-2.99	2.28	-6.18	-3.85	-8.08
20018	ELU(min)	I[147]	-858.42	-0.92	-3.11	-7.03	-3.8	0.39
20018	ELU(min)	J[149]	-859	-3.03	1.84	-7.03	-7.49	-10.63
20019	ELU(min)	I[149]	-962.84	-1.65	-4.64	-5.01	-7.26	-1.3
20019	ELU(min)	J[151]	-963.28	-2.83	0.29	-5.01	-14.71	-6.58
20020	ELU(min)	I[151]	-796.87	-2.53	-3.45	-0.26	-13.26	-3.93
20020	ELU(min)	J[14]	-796.9	-2.56	1.78	-0.26	-13.73	-4.01
20021	ELU(min)	I[14]	-900.06	-3.63	-6.25	-0.85	-14.65	-6.39
20021	ELU(min)	J[16]	-899.69	-3.06	-0.75	-0.85	-8.4	-1.41
20022	ELU(min)	I[16]	-793.67	-4.81	-5.42	-1.38	-7.44	-10.1
20022	ELU(min)	J[18]	-793.17	-4	0.07	-1.38	-4.33	0.45
20023	ELU(min)	I[18]	-1208.5	-4.67	-4.54	-0.99	-4.54	-7.7
20023	ELU(min)	J[360]	-1208	-3.97	0.87	-0.99	-1.47	-1.21
20024	ELU(min)	I[360]	-1336.13	-3.52	-2.93	-0.38	-1.06	-2.97
20024	ELU(min)	J[22]	-1335.63	-2.99	2.22	-0.38	-3.75	-1.57
20025	ELU(min)	I[22]	-1324.31	-1.77	-3.78	-3.46	-3.66	-1.75
20025	ELU(min)	J[24]	-1324.89	-2.75	1.52	-3.46	-1.37	-3.29
20026	ELU(min)	I[24]	-1165.66	-1.01	-2.67	-6.98	-1.42	-1.17
20026	ELU(min)	J[26]	-1166.24	-2.83	2.37	-6.98	-4.51	-8.27
20027	ELU(min)	I[26]	-715.2	-0.84	-2.81	-7.77	-3.99	-0.61
20027	ELU(min)	J[28]	-715.79	-2.88	2.13	-7.77	-7.88	-11.03
20028	ELU(min)	I[28]	-818.09	-1.89	-5.09	-5.35	-8.94	-1.6
20028	ELU(min)	J[361]	-818.52	-3.05	-0.13	-5.35	-15.32	-6.27
20029	ELU(min)	I[361]	-750.45	-2.58	-5.95	-0.69	-16.74	-3.26
20029	ELU(min)	J[197]	-750.48	-2.63	-0.57	-0.69	-16.56	-3.69
20030	ELU(min)	I[197]	-974.91	-3.47	-5.55	-0.7	-13.01	-6.25
20030	ELU(min)	J[198]	-974.73	-2.93	0.13	-0.7	-7.83	-1.87
20031	ELU(min)	I[198]	-1132.17	-5.13	-5.44	-0.5	-8.99	-12.29
20031	ELU(min)	J[199]	-1131.92	-4.7	0.38	-0.5	-2.72	-0.89
20032	ELU(min)	I[199]	-1844.35	-4.72	-4.68	-0.21	-3.43	-8.18
20032	ELU(min)	J[200]	-1844.1	-4.53	1.04	-0.21	-0.71	1.18
20033	ELU(min)	I[200]	-2123.8	-3.49	-3.29	-0.21	-1	-3.36
20033	ELU(min)	J[201]	-2123.56	-3.13	2.24	-0.21	-1.22	0.03
20034	ELU(min)	I[201]	-2049.04	-2.28	-2.89	-5.36	-0.83	-1.67
20034	ELU(min)	J[202]	-2048.79	-2.48	2.52	-5.36	-3.05	-3.02
20035	ELU(min)	I[202]	-1706.13	-2.06	-2.67	-11.65	-1.23	-9.15
20035	ELU(min)	J[203]	-1705.89	-3.02	2.62	-11.65	-7.79	-18.85
20036	ELU(min)	I[203]	-1158.97	-18.26	-3.86	-14.64	-2.2	-44.66
20036	ELU(min)	J[204]	-1158.79	-18.26	1.59	-14.64	-10.97	-39.77
20037	ELU(min)	I[204]	-869.08	-0.94	-3.9	-7.18	-9.92	-5.02
20037	ELU(min)	J[219]	-869.87	-3.41	1.59	-7.18	-13.58	-26.13
20038	ELU(min)	I[219]	-397.27	-7.81	-4.6	-15.41	-12.63	-21.72
20038	ELU(min)	J[220]	-398.34	-7.81	0.71	-15.41	-5.76	-38.38

SALIDA: F_ TRANSVERSAL ARRIOSTRADOS HACIA INTERIOR

F_arriost_i
6.00
*USE-STLD,Ft_pandeo_i*BEAMLOAD20002,BEAM,CONLOAD,LY,NO,NO,LY,,,0,6,0,0,0,0,0,,NO,0,0,NO,
6.01
*USE-STLD,Ft_pandeo_i*BEAMLOAD20003,BEAM,CONLOAD,LY,NO,NO,LY,,,0,11.02,0,0,0,0,0,0,,NO,0,0,NO,
11.02
*USE-STLD,Ft_pandeo_i*BEAMLOAD20004,BEAM,CONLOAD,LY,NO,NO,LY,,,0,17.69,0,0,0,0,0,0,,NO,0,0,NO,
17.69
*USE-STLD,Ft_pandeo_i*BEAMLOAD20005,BEAM,CONLOAD,LY,NO,NO,LY,,,0,26.25,0,0,0,0,0,0,,NO,0,0,NO,
26.25
*USE-STLD,Ft_pandeo_i*BEAMLOAD20006,BEAM,CONLOAD,LY,NO,NO,LY,,,0,32.75,0,0,0,0,0,0,,NO,0,0,NO,
32.75
*USE-STLD,Ft_pandeo_i*BEAMLOAD20007,BEAM,CONLOAD,LY,NO,NO,LY,,,0,33.88,0,0,0,0,0,0,,NO,0,0,NO,
32.76
*USE-STLD,Ft_pandeo_i*BEAMLOAD20007,BEAM,CONLOAD,LY,NO,NO,LY,,,1,33.89,0,0,0,0,0,0,,NO,0,0,NO,
33.88
*USE-STLD,Ft_pandeo_i*BEAMLOAD20008,BEAM,CONLOAD,LY,NO,NO,LY,,,1,27.41,0,0,0,0,0,0,,NO,0,0,NO,
27.41
*USE-STLD,Ft_pandeo_i*BEAMLOAD20009,BEAM,CONLOAD,LY,NO,NO,LY,,,1,13.42,0,0,0,0,0,0,,NO,0,0,NO,
13.41
*USE-STLD,Ft_pandeo_i*BEAMLOAD20010,BEAM,CONLOAD,LY,NO,NO,LY,,,1,10.66,0,0,0,0,0,0,,NO,0,0,NO,
13.42
*USE-STLD,Ft_pandeo_i*BEAMLOAD20010,BEAM,CONLOAD,LY,NO,NO,LY,,,1,10.66,0,0,0,0,0,0,,NO,0,0,NO,
10.66
*USE-STLD,Ft_pandeo_i*BEAMLOAD20012,BEAM,CONLOAD,LY,NO,NO,LY,,,0,7.72,0,0,0,0,0,0,,NO,0,0,NO,
10.66
*USE-STLD,Ft_pandeo_i*BEAMLOAD20012,BEAM,CONLOAD,LY,NO,NO,LY,,,1,7.71,0,0,0,0,0,0,,NO,0,0,NO,
7.71
*USE-STLD,Ft_pandeo_i*BEAMLOAD20014,BEAM,CONLOAD,LY,NO,NO,LY,,,0,15.98,0,0,0,0,0,0,,NO,0,0,NO,
7.63
*USE-STLD,Ft_pandeo_i*BEAMLOAD20014,BEAM,CONLOAD,LY,NO,NO,LY,,,0,15.98,0,0,0,0,0,0,,NO,0,0,NO,
15.98
*USE-STLD,Ft_pandeo_i*BEAMLOAD20015,BEAM,CONLOAD,LY,NO,NO,LY,,,0,18.82,0,0,0,0,0,0,,NO,0,0,NO,
15.97
*USE-STLD,Ft_pandeo_i*BEAMLOAD20016,BEAM,CONLOAD,LY,NO,NO,LY,,,0,18.93,0,0,0,0,0,0,,NO,0,0,NO,
18.82
*USE-STLD,Ft_pandeo_i*BEAMLOAD20016,BEAM,CONLOAD,LY,NO,NO,LY,,,1,18.94,0,0,0,0,0,0,,NO,0,0,NO,
18.81
*USE-STLD,Ft_pandeo_i*BEAMLOAD20016,BEAM,CONLOAD,LY,NO,NO,LY,,,0,18.93,0,0,0,0,0,0,,NO,0,0,NO,
18.93
*USE-STLD,Ft_pandeo_i*BEAMLOAD20017,BEAM,CONLOAD,LY,NO,NO,LY,,,1,16.4,0,0,0,0,0,0,,NO,0,0,NO,
18.94
*USE-STLD,Ft_pandeo_i*BEAMLOAD20017,BEAM,CONLOAD,LY,NO,NO,LY,,,1,16.4,0,0,0,0,0,0,,NO,0,0,NO,
16.39
*USE-STLD,Ft_pandeo_i*BEAMLOAD20019,BEAM,CONLOAD,LY,NO,NO,LY,,,0,10.98,0,0,0,0,0,0,,NO,0,0,NO,
16.40
*USE-STLD,Ft_pandeo_i*BEAMLOAD20019,BEAM,CONLOAD,LY,NO,NO,LY,,,1,10.99,0,0,0,0,0,0,,NO,0,0,NO,
9.25
*USE-STLD,Ft_pandeo_i*BEAMLOAD20021,BEAM,CONLOAD,LY,NO,NO,LY,,,0,9.93,0,0,0,0,0,0,,NO,0,0,NO,
9.26
*USE-STLD,Ft_pandeo_i*BEAMLOAD20021,BEAM,CONLOAD,LY,NO,NO,LY,,,1,9.92,0,0,0,0,0,0,,NO,0,0,NO,
10.98
*USE-STLD,Ft_pandeo_i*BEAMLOAD20023,BEAM,CONLOAD,LY,NO,NO,LY,,,0,15.45,0,0,0,0,0,0,,NO,0,0,NO,
10.99
*USE-STLD,Ft_pandeo_i*BEAMLOAD20024,BEAM,CONLOAD,LY,NO,NO,LY,,,0,17.96,0,0,0,0,0,0,,NO,0,0,NO,
8.27
*USE-STLD,Ft_pandeo_i*BEAMLOAD20024,BEAM,CONLOAD,LY,NO,NO,LY,,,1,17.95,0,0,0,0,0,0,,NO,0,0,NO,
8.27
*USE-STLD,Ft_pandeo_i*BEAMLOAD20025,BEAM,CONLOAD,LY,NO,NO,LY,,,1,17.73,0,0,0,0,0,0,,NO,0,0,NO,
14.63
*USE-STLD,Ft_pandeo_i*BEAMLOAD20026,BEAM,CONLOAD,LY,NO,NO,LY,,,1,14.64,0,0,0,0,0,0,,NO,0,0,NO,
14.64
*USE-STLD,Ft_pandeo_i*BEAMLOAD20028,BEAM,CONLOAD,LY,NO,NO,LY,,,0,8.6,0,0,0,0,0,0,,NO,0,0,NO,
7.03
*USE-STLD,Ft_pandeo_i*BEAMLOAD20028,BEAM,CONLOAD,LY,NO,NO,LY,,,1,8.61,0,0,0,0,0,0,,NO,0,0,NO,
7.04
*USE-STLD,Ft_pandeo_i*BEAMLOAD20030,BEAM,CONLOAD,LY,NO,NO,LY,,,0,11.19,0,0,0,0,0,0,,NO,0,0,NO,
8.60
*USE-STLD,Ft_pandeo_i*BEAMLOAD20031,BEAM,CONLOAD,LY,NO,NO,LY,,,0,14.01,0,0,0,0,0,0,,NO,0,0,NO,
8.61
*USE-STLD,Ft_pandeo_i*BEAMLOAD20032,BEAM,CONLOAD,LY,NO,NO,LY,,,0,29.12,0,0,0,0,0,0,,NO,0,0,NO,
7.56
*USE-STLD,Ft_pandeo_i*BEAMLOAD20033,BEAM,CONLOAD,LY,NO,NO,LY,,,0,35.98,0,0,0,0,0,0,,NO,0,0,NO,
11.19
*USE-STLD,Ft_pandeo_i*BEAMLOAD20033,BEAM,CONLOAD,LY,NO,NO,LY,,,1,35.98,0,0,0,0,0,0,,NO,0,0,NO,
11.19
*USE-STLD,Ft_pandeo_i*BEAMLOAD20034,BEAM,CONLOAD,LY,NO,NO,LY,,,1,34.09,0,0,0,0,0,0,,NO,0,0,NO,
14.00
*USE-STLD,Ft_pandeo_i*BEAMLOAD20035,BEAM,CONLOAD,LY,NO,NO,LY,,,1,25.9,0,0,0,0,0,0,,NO,0,0,NO,
29.12
*USE-STLD,Ft_pandeo_i*BEAMLOAD20036,BEAM,CONLOAD,LY,NO,NO,LY,,,1,14.5,0,0,0,0,0,0,,NO,0,0,NO,
29.11
*USE-STLD,Ft_pandeo_i*BEAMLOAD20037,BEAM,CONLOAD,LY,NO,NO,LY,,,1,9.43,0,0,0,0,0,0,,NO,0,0,NO,
35.98
*USE-STLD,Ft_pandeo_i*BEAMLOAD20038,BEAM,CONLOAD,LY,NO,NO,LY,,,1,2.92,0,0,0,0,0,0,,NO,0,0,NO,
34.10
*USE-STLD,Ft_pandeo_i*BEAMLOAD20038,BEAM,CONLOAD,LY,NO,NO,LY,,,1,2.92,0,0,0,0,0,0,,NO,0,0,NO,
34.09
*USE-STLD,Ft_pandeo_i*BEAMLOAD20038,BEAM,CONLOAD,LY,NO,NO,LY,,,1,2.92,0,0,0,0,0,0,,NO,0,0,NO,
25.91
*USE-STLD,Ft_pandeo_i*BEAMLOAD20038,BEAM,CONLOAD,LY,NO,NO,LY,,,1,2.92,0,0,0,0,0,0,,NO,0,0,NO,
14.51
*USE-STLD,Ft_pandeo_i*BEAMLOAD20038,BEAM,CONLOAD,LY,NO,NO,LY,,,1,2.92,0,0,0,0,0,0,,NO,0,0,NO,
14.50
*USE-STLD,Ft_pandeo_i*BEAMLOAD20038,BEAM,CONLOAD,LY,NO,NO,LY,,,1,2.92,0,0,0,0,0,0,,NO,0,0,NO,
9.42
*USE-STLD,Ft_pandeo_i*BEAMLOAD20038,BEAM,CONLOAD,LY,NO,NO,LY,,,1,2.92,0,0,0,0,0,0,,NO,0,0,NO,
9.43
*USE-STLD,Ft_pandeo_i*BEAMLOAD20038,BEAM,CONLOAD,LY,NO,NO,LY,,,1,2.92,0,0,0,0,0,0,,NO,0,0,NO,
2.91
*USE-STLD,Ft_pandeo_i*BEAMLOAD20038,BEAM,CONLOAD,LY,NO,NO,LY,,,1,2.92,0,0,0,0,0,0,,NO,0,0,NO,
2.92
*USE-STLD,Ft_pandeo_i*BEAMLOAD20038,BEAM,CONLOAD,LY,NO,NO,LY,,,1,2.92,0,0,0,0,0,0,,NO,0,0,NO,



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ENTRADA: ESFUERZOS DE COMPRESIÓN DE DISEÑO (ELU) EN EL CORDÓN SUPERIOR										SALIDA: F. TRANSVERSAL ARRIOSTRADOS HACIA EXTERIOR	
Elem	Load	Part	Axial (kN)	Shear-y (kN)	Shear-z (kN)	Torsion (kN-m)	Moment-y (kN	Moment-z (kN-m)	F_arriost_e		
20002	ELU(min)	I[78]	-643.63	-2.41	-4.11	-4.32	-7.2	-6.24	-6.00	*USE-STLD,Ft_pandeo_e*BEAMLOAD20002,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-6,0,0,0,0,0,,NO,0,0,NO,	
20002	ELU(min)	J[80]	-643.92	-3.05	0.87	-4.32	-9.24	-9.22	-6.01		
20003	ELU(min)	I[80]	-964.86	-2.51	-3.1	-4.09	-6.14	-8.89	-11.02	*USE-STLD,Ft_pandeo_e*BEAMLOAD20003,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-11.02,0,0,0,0,0,0,,NO,0,0,NO,	
20003	ELU(min)	J[82]	-965.16	-2.52	1.94	-4.09	-10.41	-4.98	-11.02		
20004	ELU(min)	I[82]	-1322.94	-4.46	-5.4	-2.24	-10.86	-14.18	-17.69	*USE-STLD,Ft_pandeo_e*BEAMLOAD20004,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-17.69,0,0,0,0,0,0,,NO,0,0,NO,	
20004	ELU(min)	J[84]	-1323.23	-4.36	0.11	-2.24	-1.22	-2.74	-17.70		
20005	ELU(min)	I[84]	-1721	-6.56	-5.17	-1.62	-7.94	-18.19	-26.25	*USE-STLD,Ft_pandeo_e*BEAMLOAD20005,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-26.25,0,0,0,0,0,0,,NO,0,0,NO,	
20005	ELU(min)	J[86]	-1721.4	-6.56	0.31	-1.62	-1.02	-2.53	-26.26		
20006	ELU(min)	I[86]	-1994.57	-3.29	-4.34	-0.46	-3.2	-2.5	-32.75	*USE-STLD,Ft_pandeo_e*BEAMLOAD20006,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-32.75,0,0,0,0,0,0,,NO,0,0,NO,	
20006	ELU(min)	J[88]	-1994.97	-3.79	1.05	-0.46	-0.74	0.44	-32.76		
20007	ELU(min)	I[88]	-2040.09	-2.17	-3.34	-1.82	-1.35	-0.72	-33.88	*USE-STLD,Ft_pandeo_e*BEAMLOAD20007,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-33.88,0,0,0,0,0,0,,NO,0,0,NO,	
20007	ELU(min)	J[90]	-2040.49	-2.7	1.91	-1.82	-0.92	-2.73	-33.89	*USE-STLD,Ft_pandeo_e*BEAMLOAD20007,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-33.89,0,0,0,0,0,0,,NO,0,0,NO,	
20008	ELU(min)	I[90]	-1771.22	-1.41	-2.69	-5.49	-0.77	-0.3	-27.41		
20008	ELU(min)	J[92]	-1771.62	-2.56	2.38	-5.49	-3.55	-6.41	-27.41	*USE-STLD,Ft_pandeo_e*BEAMLOAD20008,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-27.41,0,0,0,0,0,0,,NO,0,0,NO,	
20009	ELU(min)	I[92]	-1099.89	-1.08	-2.7	-6.44	-2.45	-2.02	-13.41		
20009	ELU(min)	J[120]	-1100.29	-2.68	2.25	-6.44	-8.62	-10.93	-13.42	*USE-STLD,Ft_pandeo_e*BEAMLOAD20009,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-13.42,0,0,0,0,0,0,,NO,0,0,NO,	
20010	ELU(min)	I[120]	-943.61	-2.03	-3.85	-4.14	-5.67	-1.47	-10.66		
20010	ELU(min)	J[95]	-943.91	-2.9	1.13	-4.14	-13.69	-6.15	-10.66	*USE-STLD,Ft_pandeo_e*BEAMLOAD20010,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-10.66,0,0,0,0,0,0,,NO,0,0,NO,	
20011	ELU(min)	I[95]	-699.7	-2.6	-5.73	-0.41	-15.19	-3.34	-6.80		
20011	ELU(min)	J[135]	-699.73	-2.57	-0.54	-0.41	-17.97	-3.12	-6.80		
20012	ELU(min)	I[135]	-761.12	-3.56	-6.55	-1.69	-14.52	-6.39	-7.72	*USE-STLD,Ft_pandeo_e*BEAMLOAD20012,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-7.72,0,0,0,0,0,0,,NO,0,0,NO,	
20012	ELU(min)	J[137]	-760.75	-2.75	-1.06	-1.69	-9.15	-1.4	-7.71	*USE-STLD,Ft_pandeo_e*BEAMLOAD20012,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-7.71,0,0,0,0,0,0,,NO,0,0,NO,	
20013	ELU(min)	I[137]	-755.13	-5.08	-5.43	-1.55	-7.17	-11.28	-7.63		
20013	ELU(min)	J[139]	-754.63	-4.23	0.08	-1.55	-3.89	-0.6	-7.62		
20014	ELU(min)	I[139]	-1236.31	-4.78	-4.46	-0.92	-4.63	-7.96	-15.98	*USE-STLD,Ft_pandeo_e*BEAMLOAD20014,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-15.98,0,0,0,0,0,0,,NO,0,0,NO,	
20014	ELU(min)	J[141]	-1235.81	-4.09	0.93	-0.92	-1.43	-1.46	-15.97		
20015	ELU(min)	I[141]	-1378.76	-3.55	-2.86	-0.49	-1.39	-2.94	-18.82	*USE-STLD,Ft_pandeo_e*BEAMLOAD20015,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-18.82,0,0,0,0,0,0,,NO,0,0,NO,	
20015	ELU(min)	J[143]	-1378.27	-3.01	2.27	-0.49	-3.42	-2.1	-18.81		
20016	ELU(min)	I[143]	-1384.12	-1.8	-3.91	-2.78	-3.84	-1.23	-18.93	*USE-STLD,Ft_pandeo_e*BEAMLOAD20016,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-18.93,0,0,0,0,0,0,,NO,0,0,NO,	
20016	ELU(min)	J[145]	-1384.7	-2.81	1.4	-2.78	-1.09	-3.39	-18.94	*USE-STLD,Ft_pandeo_e*BEAMLOAD20016,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-18.94,0,0,0,0,0,0,,NO,0,0,NO,	
20017	ELU(min)	I[145]	-1257.22	-1.07	-2.76	-6.18	-1.52	-0.96	-16.39		
20017	ELU(min)	J[147]	-1257.8	-2.99	2.28	-6.18	-3.85	-8.08	-16.40	*USE-STLD,Ft_pandeo_e*BEAMLOAD20017,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-16.4,0,0,0,0,0,0,,NO,0,0,NO,	
20018	ELU(min)	I[147]	-858.42	-0.92	-3.11	-7.03	-3.8	0.39	-9.25		
20018	ELU(min)	J[149]	-859	-3.03	1.84	-7.03	-7.49	-10.63	-9.26		
20019	ELU(min)	I[149]	-962.84	-1.65	-4.64	-5.01	-7.26	-1.3	-10.98	*USE-STLD,Ft_pandeo_e*BEAMLOAD20019,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-10.98,0,0,0,0,0,0,,NO,0,0,NO,	
20019	ELU(min)	J[151]	-963.28	-2.83	0.29	-5.01	-14.71	-6.58	-10.99	*USE-STLD,Ft_pandeo_e*BEAMLOAD20019,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-10.99,0,0,0,0,0,0,,NO,0,0,NO,	
20020	ELU(min)	I[151]	-796.87	-2.53	-3.45	-0.26	-13.26	-3.93	-8.27		
20020	ELU(min)	J[14]	-796.9	-2.56	1.78	-0.26	-13.73	-4.01	-8.27		
20021	ELU(min)	I[14]	-900.06	-3.63	-6.25	-0.85	-14.65	-6.39	-9.93	*USE-STLD,Ft_pandeo_e*BEAMLOAD20021,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-9.93,0,0,0,0,0,0,,NO,0,0,NO,	
20021	ELU(min)	J[16]	-899.69	-3.06	-0.75	-0.85	-8.4	-1.41	-9.92	*USE-STLD,Ft_pandeo_e*BEAMLOAD20021,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-9.92,0,0,0,0,0,0,,NO,0,0,NO,	
20022	ELU(min)	I[16]	-793.67	-4.81	-5.42	-1.38	-7.44	-10.1	-8.22		
20022	ELU(min)	J[18]	-793.17	-4	0.07	-1.38	-4.33	0.45	-8.21		
20023	ELU(min)	I[18]	-1208.5	-4.67	-4.54	-0.99	-4.54	-7.7	-15.45	*USE-STLD,Ft_pandeo_e*BEAMLOAD20023,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-15.45,0,0,0,0,0,0,,NO,0,0,NO,	
20023	ELU(min)	J[360]	-1208	-3.97	0.87	-0.99	-1.47	-1.21	-15.44		
20024	ELU(min)	I[360]	-1336.13	-3.52	-2.93	-0.38	-1.06	-2.97	-17.96	*USE-STLD,Ft_pandeo_e*BEAMLOAD20024,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-17.96,0,0,0,0,0,0,,NO,0,0,NO,	
20024	ELU(min)	J[22]	-1335.63	-2.99	2.22	-0.38	-3.75	-1.57	-17.95	*USE-STLD,Ft_pandeo_e*BEAMLOAD20024,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-17.95,0,0,0,0,0,0,,NO,0,0,NO,	
20025	ELU(min)	I[22]	-1324.31	-1.77	-3.78	-3.46	-3.66	-1.75	-17.72		
20025	ELU(min)	J[24]	-1324.89	-2.75	1.52	-3.46	-1.37	-3.29	-17.73	*USE-STLD,Ft_pandeo_e*BEAMLOAD20025,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-17.73,0,0,0,0,0,0,,NO,0,0,NO,	
20026	ELU(min)	I[24]	-1165.66	-1.01	-2.67	-6.98	-1.42	-1.17	-14.63		
20026	ELU(min)	J[26]	-1166.24	-2.83	2.37	-6.98	-4.51	-8.27	-14.64	*USE-STLD,Ft_pandeo_e*BEAMLOAD20026,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-14.64,0,0,0,0,0,0,,NO,0,0,NO,	
20027	ELU(min)	I[26]	-715.2	-0.84	-2.81	-7.77	-3.99	-0.61	-7.03		
20027	ELU(min)	J[28]	-715.79	-2.88	2.13	-7.77	-7.88	-11.03	-7.04		
20028	ELU(min)	I[28]	-818.09	-1.89	-5.09	-5.35	-8.94	-1.6	-8.60	*USE-STLD,Ft_pandeo_e*BEAMLOAD20028,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-8.6,0,0,0,0,0,0,,NO,0,0,NO,	
20028	ELU(min)	J[361]	-818.52	-3.05	-0.13	-5.35	-15.32	-6.27	-8.61	*USE-STLD,Ft_pandeo_e*BEAMLOAD20028,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-8.61,0,0,0,0,0,0,,NO,0,0,NO,	
20029	ELU(min)	I[361]	-750.45	-2.58	-5.95	-0.69	-16.74	-3.26	-7.56		
20029	ELU(min)	J[197]	-750.48	-2.63	-0.57	-0.69	-16.56	-3.69	-7.56		
20030	ELU(min)	I[197]	-974.91	-3.47	-5.55	-0.7	-13.01	-6.25	-11.19	*USE-STLD,Ft_pandeo_e*BEAMLOAD20030,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-11.19,0,0,0,0,0,0,,NO,0,0,NO,	
20030	ELU(min)	J[198]	-974.73	-2.93	0.13	-0.7	-7.83	-1.87	-11.19		
20031	ELU(min)	I[198]	-1132.17	-5.13	-5.44	-0.5	-8.99	-12.29	-14.01	*USE-STLD,Ft_pandeo_e*BEAMLOAD20031,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-14.01,0,0,0,0,0,0,,NO,0,0,NO,	
20031	ELU(min)	J[199]	-1131.92	-4.7	0.38	-0.5	-2.72	-0.89	-14.00		
20032	ELU(min)	I[199]	-1844.35	-4.72	-4.68	-0.21	-3.43	-8.18	-29.12	*USE-STLD,Ft_pandeo_e*BEAMLOAD20032,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-29.12,0,0,0,0,0,0,,NO,0,0,NO,	
20032	ELU(min)	J[200]	-1844.1	-4.53	1.04	-0.21	-0.71	1.18	-29.11		
20033	ELU(min)	I[200]	-2123.8	-3.49	-3.29	-0.21	-1	-3.36	-35.98	*USE-STLD,Ft_pandeo_e*BEAMLOAD20033,BEAM,CONLOAD,LY,NO,NO,LY,,,0,-35.98,0,0,0,0,0,0,,NO,0,0,NO,	
20033	ELU(min)	J[201]	-2123.56	-3.13	2.24	-0.21	-1.22	0.03	-35.98	*USE-STLD,Ft_pandeo_e*BEAMLOAD20033,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-35.98,0,0,0,0,0,0,,NO,0,0,NO,	
20034	ELU(min)	I[201]	-2049.04	-2.28	-2.89	-5.36	-0.83	-1.67	-34.10		
20034	ELU(min)	J[202]	-2048.79	-2.48	2.52	-5.36	-3.05	-3.02	-34.09	*USE-STLD,Ft_pandeo_e*BEAMLOAD20034,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-34.09,0,0,0,0,0,0,,NO,0,0,NO,	
20035	ELU(min)	I[202]	-1706.13	-2.06	-2.67	-11.65	-1.23	-9.15	-25.91		
20035	ELU(min)	J[203]	-1705.89	-3.02	2.62	-11.65	-7.79	-18.85	-25.90	*USE-STLD,Ft_pandeo_e*BEAMLOAD20035,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-25.9,0,0,0,0,0,0,,NO,0,0,NO,	
20036	ELU(min)	I[203]	-1158.97	-18.26	-3.86	-14.64	-2.2	-44.66	-14.51		
20036	ELU(min)	J[204]	-1158.79	-18.26	1.59	-14.64	-10.97	-39.77	-14.50	*USE-STLD,Ft_pandeo_e*BEAMLOAD20036,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-14.5,0,0,0,0,0,0,,NO,0,0,NO,	
20037	ELU(min)	I[204]	-869.08	-0.94	-3.9	-7.18	-9.92	-5.02	-9.42		
20037	ELU(min)	J[219]	-869.87	-3.41	1.59	-7.18	-13.58	-26.13	-9.43	*USE-STLD,Ft_pandeo_e*BEAMLOAD20037,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-9.43,0,0,0,0,0,0,,NO,0,0,NO,	
20038	ELU(min)	I[219]	-397.27	-7.81	-4.6	-15.41	-12.63	-21.72	-2.91		
20038	ELU(min)	J[220]	-398.34	-7.81	0.71	-15.41	-5.76	-38.38	-2.92	*USE-STLD,Ft_pandeo_e*BEAMLOAD20038,BEAM,CONLOAD,LY,NO,NO,LY,,,1,-2.92,0,0,0,0,0,0,,NO,0,0,NO,	

3.3 COMPROVACIONS GLOBALS DE BARRES

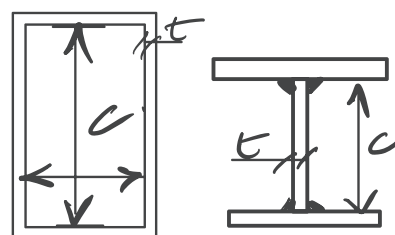
CLASIFICACIÓN SECCIONES

EC3-1.1:213 §5.5

Elementos de carga comprimidos intrínsecos:

Clase 3 $\rightarrow C/t \leq 42 \varepsilon = 42 \times \sqrt{\frac{235}{355}} = 34.2$
 Compression

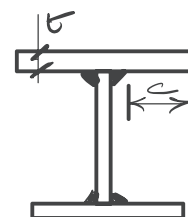
$t \geq \frac{C}{34.2}$	C	$t_{Clase 3}$
	200	$\geq 6 \text{ mm}$
	250	$\geq 8 \text{ mm}$
	300	$\geq 10 \text{ mm}$
	400	$\geq 12 \text{ mm}$
	500	$\geq 15 \text{ mm}$



Alas voladas

Clase 3 $\rightarrow C/t \leq 14 \varepsilon = 11.4$
 Compression

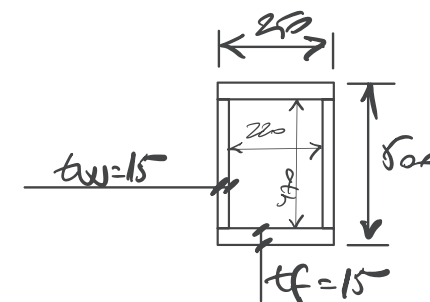
$t \geq \frac{C}{11.4}$	C	$t_{Clase 3}$
	100	$\geq 12 \text{ mm}$
	150	$\geq 15 \text{ mm}$
	200	$\geq 20 \text{ mm}$
	300	$\geq 30 \text{ mm}$



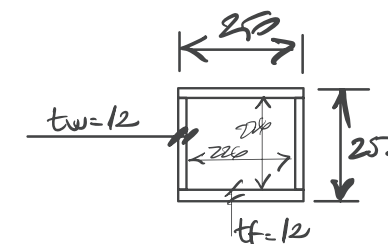
GRUPO ESTRUCTURAL §8.3.2

(a) por dureabilidad hay que considerar espesores de cálculo reducidos por corrosión (-1 mm/carga)

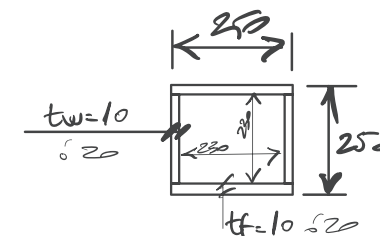
GRAN INFILTR



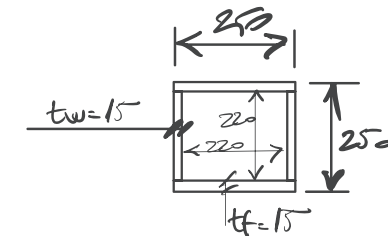
GRAN SUPERIOR



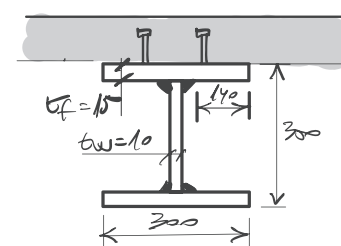
DIAGONALES (ALZADOS)



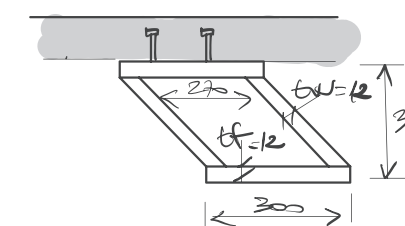
BARRA DEBILITADA (ABAG)



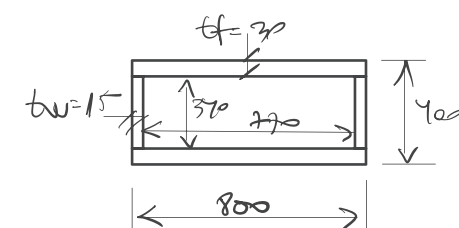
VIGAS TRANSVERSALES (TABLERO MIXTO)



VIGAS ABAG (TABLERO MIXTO)

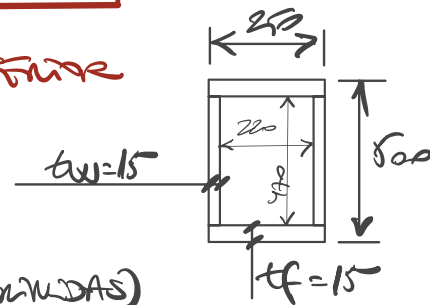


PILAS DE ACERO METÁLICO



BARRAS CEGSTA

GRAN INFRA



diner (compresió)

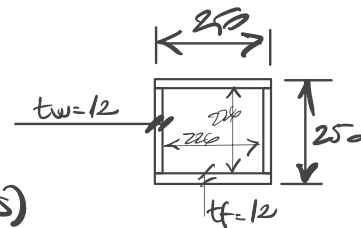
$$\frac{470}{15-1^{(4)}} = 33'6 \leftarrow \angle 42E \text{ Clase 3}$$

des (compresió)

$$\frac{220}{15-1^{(4)}} = 15'7 \leftarrow \angle 33E \text{ Clase 1}$$

Clase 3

GRAN SUPER



diner (compresió)

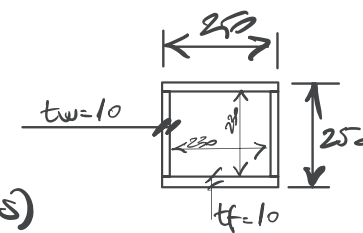
$$\frac{220}{12-1^{(4)}} = 20'5 \leftarrow \angle 33E \text{ Clase 1}$$

des (compresió)

$$\frac{220}{12-1^{(4)}} = 20'5 \leftarrow \angle 33E \text{ Clase 1}$$

Clase 1

DIAGONALES CALZADOS



diner (compresió)

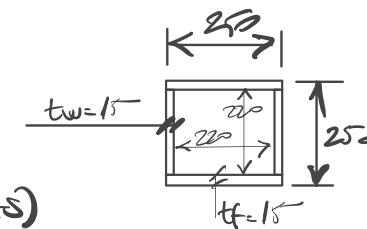
$$\frac{230}{10-1^{(4)}} = 25'6 \leftarrow \angle 33E \text{ Clase 1}$$

des (compresió)

$$\frac{230}{10-1^{(4)}} = 25'6 \leftarrow \angle 33E \text{ Clase 1}$$

Clase 1

JIGAS ABAC (TRANSVERSALS/DIAGONALS)



diner (compresió)

$$\frac{220}{15-1^{(4)}} = 15'7 \leftarrow \angle 33E \text{ Clase 1}$$

des (compresió)

$$\frac{220}{15-1^{(4)}} = 15'7 \leftarrow \angle 33E \text{ Clase 1}$$

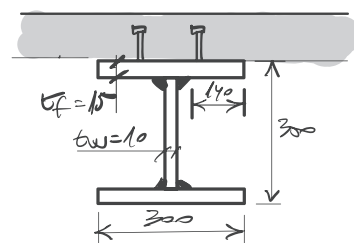
Clase 1

VIGAS TRANSVERSALS (TABULA MIXTA)

altes (comp.)

$$\frac{140}{15 - 2 \times 10} = 10,8 < 14 \text{ E}$$

Clase 3



com el de comprimita correctada al horitzontal se produeix una oïra que permet augmentar la classificació a classe 1 (cumplint les condicions segons 6.6.5.5) EC4.

altes (fuer.)

$$\frac{270}{10 - 2 \times 10} = 27,0 < 72 \text{ E}$$

Clase 1

Clase 1 ^(mixta)

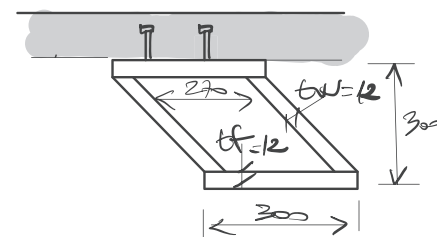
com) COMPRESSA CORRECTADA AL HORIZONTAL.

VIGAS ABAB (TABULA MIXTA)

altes (comp.)

$$\frac{270}{12 - 10} = 24,5 < 33 \text{ E}$$

Clase 1



altes (fuer.)

$$\frac{270}{12 - 10} = 24,5 < 72 \text{ E}$$

Clase 1

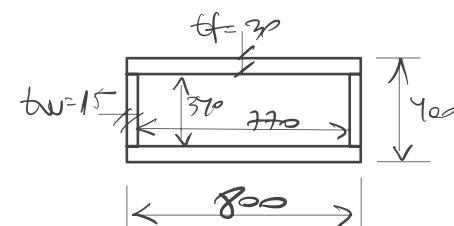
Clase 1

PICAS: PISTE METÀL·LICO

ALAS (COMP.)

$$\frac{770}{30 - 10} = 26,3 < 33 \text{ E}$$

Clase 1



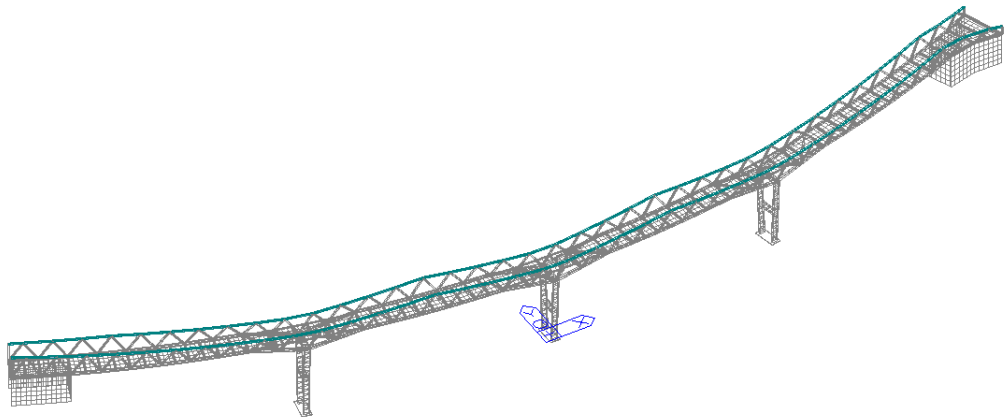
altes (comp.)

$$\frac{370}{15 - 10} = 27,3 < 33 \text{ E}$$

Clase 1

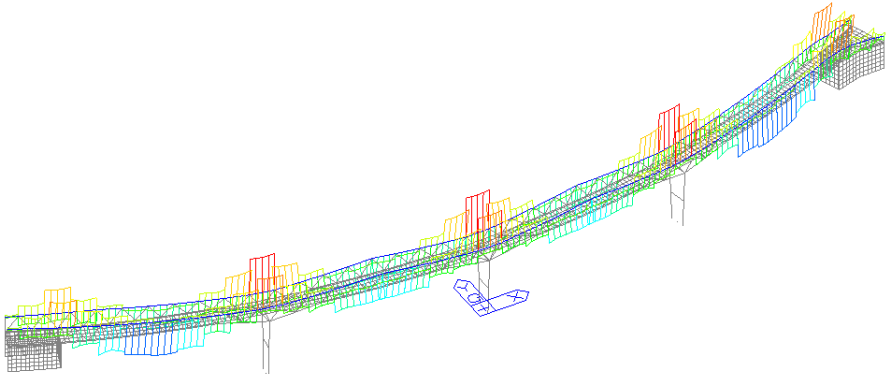
Clase 1

CORDÓ SUPERIOR



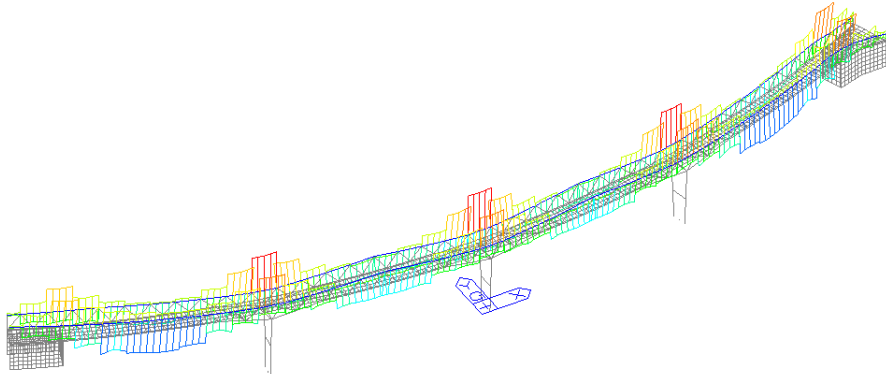
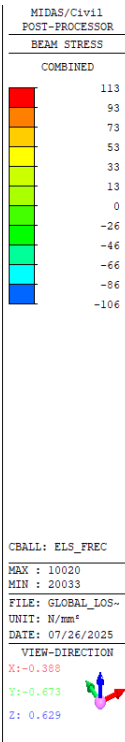
1

100_CordonSup



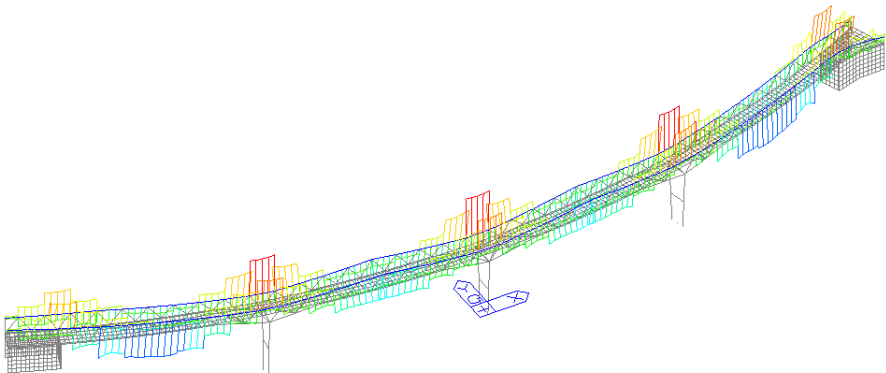
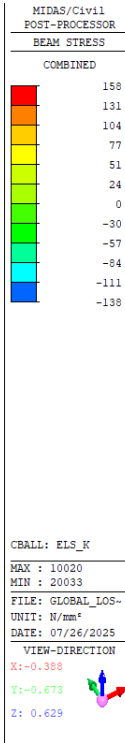
3

102_CordonSup_SigmaELSfrec



2

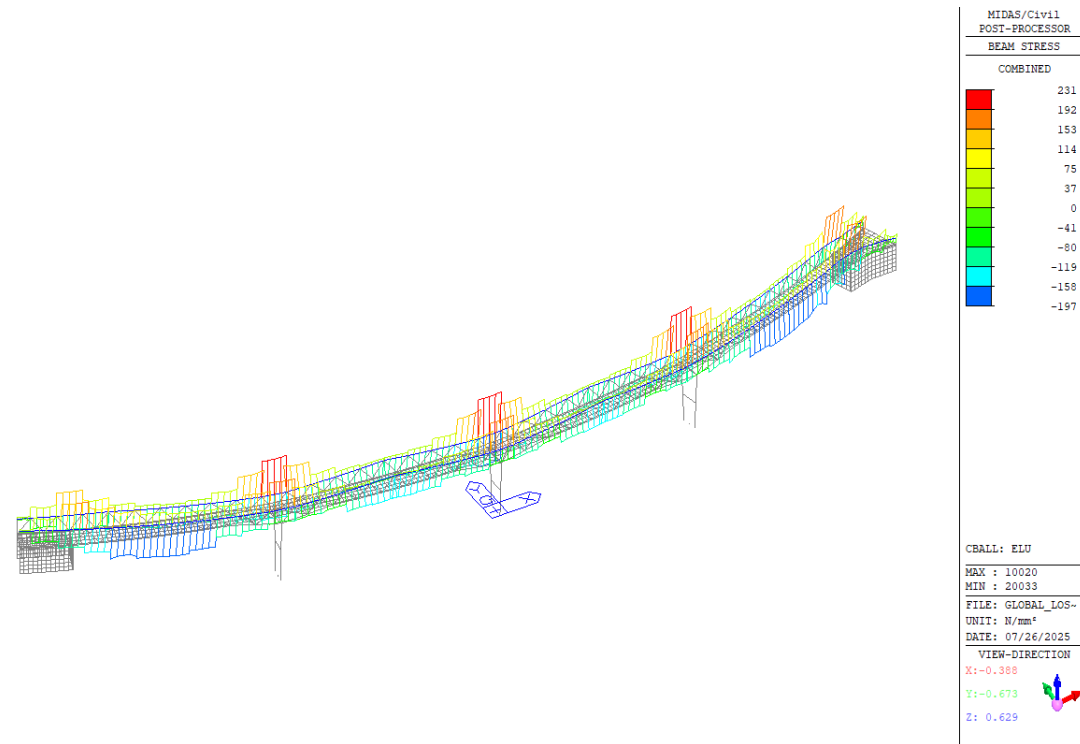
101_CordonSup_SigmaELSk



4

103_CordonSup_SigmaELScp





5 104_CordonSup_SigmaELU

■ MEMBER NAME : Brace 20033 cordonSUP (ID : 10)

1. Member Information

1) Design Code

EN 1993-2: 2006 (NA:Recommended)

2) Material

$f_y = 355.000\text{MPa}$, $E_s = 210,000.000\text{MPa}$

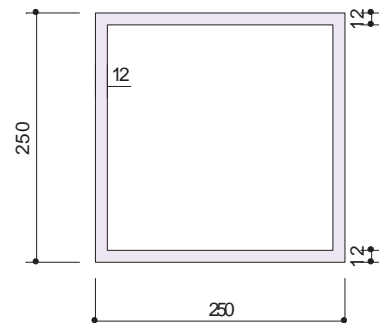
3) Length

$L = 5.362\text{m}$

4) Partial factors

$\gamma_{M0} = 1.050$ $\gamma_{M1} = 1.100$ $\gamma_{M2} = 1.250$

5) Section Properties



A	11,424,000mm ²	I _y	108,124,352.000mm ⁴	I _z	108,124,352.000mm ⁴	I _{yz}	0.000mm ⁴
C _y	125.000mm	C _z	125.000mm	i _y	97.287mm	i _z	97.287mm
W _{el,y}	864,994.816mm ³	W _{el,z}	864,994.816mm ³	W _{pl,y}	1,020,456.000mm ³	W _{pl,z}	1,020,456.000mm ³
I _t	161,775,264.000mm ⁴	I _w	0.000mm ⁶				

2. Check Axial Resistance (Middle, 0.50R)

Axial	LCB	ELU_09-FX	
	N _{Ed} / N _{Rd}	2,151.480kN / 2,393.580kN = 0.899	OK

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ_1 (MPa)	σ_2 (MPa)	ϵ	λ_{lim1-2}	λ_{lim2-3}	λ_{lim3-4}	Class
internal top-flange	18.833	194.838	192.763	0.814	26.849	30.917	34.313	Class 1
internal bottom-flange	18.833	183.897	181.822	0.814	26.849	30.917	34.323	Class 1
left web	18.833	192.127	182.237	0.814	26.849	30.917	34.868	Class 1
right web	18.833	194.423	184.532	0.814	26.849	30.917	34.858	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$$\epsilon = \sqrt{235 / f_y}$$

2) Check slenderness ratio of compressive member

$$\frac{KL}{i} = 62.701 < 200.000 \rightarrow O.K$$

3) Calculate design resistance of cross section

$$N_{c,Rd} = \frac{A f_y}{\gamma_{M0}} = 3,862.400\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

4) Calculate design resistance for flexural buckling (y-y axis)

Non-dimensional slenderness

$$K_y = 1.000$$

$$N_{cr,y} = \frac{\pi^2 E I_y}{(K_y L_y)^2} = 9,726.578\text{kN}$$

$$\lambda_b = \sqrt{\frac{A f_y}{N_{cr,y}}} = 0.646 \quad \text{EN 1993-1-1:2005, 6.3.1.3 (1)}$$

Design resistance for flexural buckling

$$\alpha = 0.490 \text{ (Buckling curve: c)} \quad \text{EN 1993-1-1:2005, Table 6.1}$$

$$\phi = 0.5 [1 + \alpha (\alpha_b - 0.2) + \lambda_b^2] = 0.818$$

$$\chi = \text{iError!} = 0.758 \quad \text{EN 1993-1-1:2005, 6.3.1.2 (1)}$$

$$N_{b,y,Rd} = \frac{\chi A F_y}{\gamma_{M1}} = 2,794.501\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

5) Calculate design resistance for flexural buckling (z-z axis)

Non-dimensional slenderness

$$K_z = 1.000$$

$$N_{cr,z} = \frac{\pi^2 E I_z}{(K_z L_z)^2} = 6,022.584\text{kN}$$

$$\lambda_b = \sqrt{\frac{A f_y}{N_{cr,z}}} = 0.821 \quad \text{EN 1993-1-1:2005, 6.3.1.3 (1)}$$

Design resistance for flexural buckling

$$\alpha = 0.490 \text{ (Buckling curve: c)} \quad \text{EN 1993-1-1:2005, Table 6.1}$$

$$\phi = 0.5 [1 + \alpha (\lambda_b - 0.2) + \lambda_b^2] = 0.989$$

$$\chi = \text{iError!} = 0.649 \quad \text{EN 1993-1-1:2005, 6.3.1.2 (1)}$$

$$N_{b,z,Rd} = \frac{\chi A F_y}{\gamma_{M1}} = 2,393.580\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

6) Calculate design resistance for torsional buckling

Non-dimensional slenderness

$$G = \frac{E}{2 (1 + \nu)} = 80,769.231\text{MPa} \quad \text{EN 1993-1-1:2005, 3.2.6}$$

$y_o = 0.000\text{mm}$, $z_o = 0.000\text{mm}$ (Shear center from centroid)

$$a = \sqrt{y_o^2 + z_o^2} = 0.000\text{mm}$$

$$i_s = \sqrt{i_y^2 + i_z^2 + a^2} = 137.584\text{mm}$$

$$N_{cr,T} = \frac{1}{i_s^2} \left(\frac{\pi^2 E I_z a^2}{L_T^2} + \frac{\pi^2 E I_w}{L_T^2} + G I_T \right) = 690,275.954\text{kN}$$

$$\beta = 1 - (y_o / i_s)^2 = 1.000$$

$$N_{cr,TF} = \frac{N_{cr,y}}{2\beta} \left(1 + \frac{N_{cr,T}}{N_{cr,y}} - \sqrt{\left(1 - \frac{N_{cr,T}}{N_{cr,y}} \right)^2 + 4 \left(\frac{y_o}{i_s} \right)^2 \frac{N_{cr,T}}{N_{cr,y}}} \right) = 9,726.578\text{kN} \quad \text{EN 1993-1-3:2006, 6.2.3 (7)}$$

$$N_{cr} = \min (N_{cr,T} , N_{cr,TF}) = 9,726.578\text{kN}$$

$$\lambda_b = \sqrt{\frac{A f_y}{N_{cr}}} = 0.646 \quad \text{EN 1993-1-1:2005, 6.3.1.3 (1)}$$

Design resistance for Torsion and torsional-flexural buckling

$$\alpha = 0.490 \text{ (Buckling curve: c)} \quad \text{EN 1993-1-1:2005, Table 6.1}$$

$$\phi = 0.5 [1 + \alpha (\lambda_b - 0.2) + \lambda_b^2] = 0.818$$

$$\chi = \text{iError!} = 0.758 \quad \text{EN 1993-1-1:2005, 6.3.1.2 (1)}$$

$$N_{b,Rd,TF} = \frac{\chi A F_y}{\gamma_{M1}} = 2,794.501\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

7) Design resistance of a compression member

$$N_{Rd} = \min (N_{c,Rd} , N_{b,y,Rd} , N_{b,z,Rd} , N_{b,Rd,TF}) = 2,393.580\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.3}$$

3. Check design resistance for shear about major axis (Sector J, 1.00L)

Shear	LCB	ELU_09+FZ	
	V _{z,Ed} / V _{c,z,Rd}	3.373kN / 1,270.514kN = 0.003	OK

* ELU_09+FZ : ELU Temp dominante SC concomitante

1) Calculate design plastic shear resistance

$$A_{vz} = \eta \sum h_w t_w = 6,508.800\text{mm}^2 \quad \text{EN 1993-1-1:2005, 6.2.6 (3)}$$

$$V_{pl,z,Rd} = \frac{A_{vz} (f_y / \sqrt{3})}{\gamma_{M0}} = 1,270.514\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.6 (2)}$$

2) Determine whether to consider shear buckling

EN 1993-1-5:2006, 5.1 (2)

$$\eta = 1.200$$

$$\epsilon = \sqrt{\frac{235}{f_y}} = 0.814$$

$$\frac{h_w}{t} = 18.833 \leq \frac{72}{\eta} \epsilon = 48.817 \text{ (Unstiffened)}$$

∴ No need to check shear buckling

3) Calculate design shear resistance

$V_{c,z,Rd} = V_{pl,z,Rd} = 1,270.514kN$

4. Check design resistance for shear about minor axis (Sector I, 0.00R)

Shear	LCB	ELU_04-MZ	OK
	$V_{y,Ed} / V_{c,y,Rd}$	$4.189kN / 1,171.196kN = 0.004$	

* ELU_04-MZ : ELU Viento Transv-sin-sc dominante

1) Calculate design plastic shear resistance

$A_{vy} = A - 2h_w t_w = 6,000.000mm^2$ EN 1993-1-1:2005, 6.2.6 (3)

$V_{pl,y,Rd} = \frac{A_{vy} \left(f_y / \sqrt{3} \right)}{\gamma_{M0}} = 1,171.196kN$ EN 1993-1-1:2005, 6.2.6 (2)

2) Determine whether to consider shear buckling

EN 1993-1-5:2006, 5.1 (2)

$\eta = 1.200$

$\epsilon = \sqrt{\frac{235}{f_y}} = 0.814$

$\frac{h_w}{t} = 18.833 \leq \frac{72}{\eta} \quad \epsilon = 48.817 \text{ (Unstiffened)}$

∴ No need to check shear buckling

3) Calculate design shear resistance

$V_{c,y,Rd} = V_{pl,y,Rd} = 1,171.196kN$

5. Check design resistance for bending about major axis (Middle, 0.50R)

Moment	LCB	ELU_09-FX	OK
	$M_{y,Ed} / M_{c,y,Rd}$	$5.582kN \cdot m / 345.011kN \cdot m = 0.016$	
	Sectional class	Class 2 ≤ Class 1, 2, 3, or 4 (DCL)	

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ_1 (MPa)	σ_2 (MPa)	ϵ	λ_{lim1-2}	λ_{lim2-3}	λ_{lim3-4}	Class
internal top-flange	18.833	194.838	192.763	0.814	26.849	30.917	34.313	Class 1
internal bottom-flange	18.833	183.897	181.822	0.814	26.849	30.917	34.323	Class 1
left web	18.833	192.127	182.237	0.814	26.849	30.917	34.868	Class 1
right web	18.833	194.423	184.532	0.814	26.849	30.917	34.858	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$\epsilon = \sqrt{235 / f_y}$

2) Calculate design resistance of cross section

$M_{c,y,Rd} = M_{pl,y,Rd} = \frac{W_{pl,y} f_y}{\gamma_{M0}} = 345.011kN \cdot m$ EN 1993-1-1:2005, 6.2.5 (2)

6. Check design resistance for bending about minor axis (Middle, 0.50R)

Moment	LCB	ELU_09-FX	OK
	$M_{z,Ed} / M_{c,z,Rd}$	$1.171kN \cdot m / 345.011kN \cdot m = 0.003$	
	Sectional class	Class 2 ≤ Class 1, 2, 3, or 4 (DCL)	

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ_1 (MPa)	σ_2 (MPa)	ϵ	λ_{lim1-2}	λ_{lim2-3}	λ_{lim3-4}	Class
internal top-flange	18.833	194.838	192.763	0.814	26.849	30.917	34.313	Class 1
internal bottom-flange	18.833	183.897	181.822	0.814	26.849	30.917	34.323	Class 1
left web	18.833	192.127	182.237	0.814	26.849	30.917	34.868	Class 1
right web	18.833	194.423	184.532	0.814	26.849	30.917	34.858	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$\epsilon = \sqrt{235 / f_y}$

2) Calculate design resistance of cross section

$M_{c,z,Rd} = M_{pl,z,Rd} = \frac{W_{pl,z} f_y}{\gamma_{M0}} = 345.011kN \cdot m$ EN 1993-1-1:2005, 6.2.5 (2)

7. Check design resistance for lateral-torsional buckling (Middle, 0.50R)

Moment	LCB	ELU_09-FX	OK
	$M_{y,Ed} / M_{b,Rd}$	$0.000kN \cdot m / 0.000kN \cdot m = 0.000$	

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Calculate design resistance for lateral-torsional buckling

Asymmetric section about minor axis or not supported section

∴ Cannot check LTB

8. Check Interaction ratios (Middle, 0.50R)

Interaction	LCB	ELU_09-FX	OK
	R_{max}	0.577	

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Applied forces for interaction ratio

$N_{Ed} = -2,151.480kN$

$M_{y,Ed} = 5.582kN \cdot m$, $M_{z,Ed} = 1.171kN \cdot m$

$V_{y,Ed} = 0.0784kN$, $V_{z,Ed} = 0.0769kN$

$T_{Ed} = -1.470kN \cdot m$

2) Reduced moment resistance for high shear about major axis

$M_{c,y,Rd} = \frac{W_{pl,y} f_y}{\gamma_{M0}} = 345.011kN \cdot m$ EN 1993-1-1:2005, 6.2.5 (2)

$V_{z,Ed} < 0.5 V_{pl,z,Rd} = 187,930.152kN$ EN 1993-1-1:2005, 6.2.8 (4)

$M_{y,Rd} = M_{c,y,Rd} = 345.011kN \cdot m$ EN 1993-1-1:2005, 6.2.8 (5)

3) Reduced moment resistance for high shear about minor axis

$M_{c,z,Rd} = \frac{W_{pl,z} f_y}{\gamma_{M0}} = 345.011kN \cdot m$ EN 1993-1-1:2005, 6.2.8 (4)

$V_{y,Ed} < 0.5 V_{pl,y,Rd} = 585.598kN$ EN 1993-1-1:2005, 6.2.8 (4)

$M_{z,Rd} = M_{c,z,Rd} = 345.011kN \cdot m$ EN 1993-1-1:2005, 6.2.8 (5)

4) Calculate interaction ratio of bending and axial force

$R_{max1} = \frac{N_{Ed}}{A f_y / \gamma_{M0}} + \frac{M_{y,Ed}}{M_{y,Rd}} + \frac{M_{z,Ed}}{M_{z,Rd}} = 0.577$ EN 1993-1-1:2005, 6.2.8 (5)
EN 1993-1-1:2005, 6.2.1 (7)

5) Calculate interaction ratio of a Class 1 and 2 cross-section (Bending and Compression)

$N_{pl,Rd} = \frac{A f_y}{\gamma_{M0}} = 3,862.400kN$ EN 1993-1-1:2005, 6.2.4 (2)

$M_{pl,y,Rd} = 345.011kN \cdot m$ EN 1993-1-1:2005, 6.2.5 (2)

$M_{pl,z,Rd} = 345.011kN \cdot m$

$n = N_{Ed} / N_{pl,Rd} = 0.557$ EN 1993-1-1:2005, 6.2.9.1 (5)

$a_y = \min((A - b t_{f1} - b t_{f2}) / A , 0.5) = 0.475$

$a_z = \min((A - 2 b t_w) / A , 0.5) = 0.475$

$N_{Ed,y,lim} = \min(0.25 M_{pl,Rd} , \frac{h_w t_w f_y}{\gamma_{M0}}) = 916.914kN$

$N_{Ed,z,lim} = \frac{2 h_w t_w f_y}{\gamma_{M0}} = 1,833.829kN$

$N_{Ed} > N_{Ed,y,lim} ;$ EN 1993-1-1:2005, 6.2.9.1 (4)

$M_{N,y,Rd} = \min(M_{pl,y,Rd} (1 - n) / (1 - 0.5 a_y) , M_{pl,y,Rd}) = 200.404kN \cdot m$ EN 1993-1-1:2005, 6.2.9.1 (5)

$N_{Ed} > N_{Ed,y,lim} ;$ EN 1993-1-1:2005, 6.2.9.1 (4)

$M_{N,z,Rd} = \min(M_{pl,z,Rd} (1 - n) / (1 - 0.5 a_z) , M_{pl,z,Rd}) = 200.404kN \cdot m$ EN 1993-1-1:2005, 6.2.9.1 (5)

$\alpha = \beta = \min(\frac{1.66}{1 - 1.13 n^2} , 6.0) = 2.556$ EN 1993-1-1:2005, 6.2.9.1 (6)

$R_{max2} = [(\frac{M_{y,Ed}}{M_{N,y,Rd}})^\alpha + [(\frac{M_{z,Ed}}{M_{N,z,Rd}})^\beta] = 0.000108$ EN 1993-1-1:2005, 6.2.9.1 (6)

6) Calculate maximum interaction ratio

$R_{max} = \max(R_{max1} , R_{max2}) = 0.577$

9. Check Deflection (Sector J, 1.00L)

Deflection	LCB	ELS_cp_01-MZ	OK
	$\delta_{max} / \delta_{allow}$	$0.000mm / 21.448mm = 0.000$	

* ELS_cp_01-MZ : ELS casi-permanente



1) Calculate allowable deflection

$$L = 5,361.928\text{mm}$$

$$\delta_{\text{allow}} = \frac{L}{250} = 21.448\text{mm}$$

2) Calculate maximum deflection

Maximum deflection position 0.000mm from i-end.


Deflection Amplification Factor (DAF) = 1.000

$$\delta = 0.000\text{mm}$$

$$\delta_{\text{max}} = \delta * \text{DAF} = 0.000\text{mm}$$

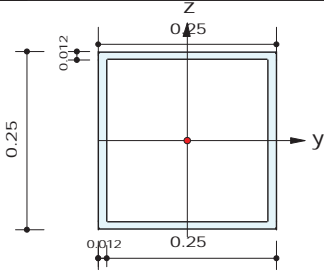
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Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10002
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 4.94411



2. Member Forces

Axial Force	Fxx = -649.07 (LCB: 60+MY, POS:J)
Bending Moments	My = -1.6933, Mz = 2.32362
End Moments	Myi = 2.90101, Myj = -1.6933 (for Lb) Myi = 2.90101, Myj = -1.6933 (for Ly) Mzi = 6.15253, Mzj = 2.32362 (for Lz)
Shear Forces	Fyy = 4.76883 (LCB: 55-MZ, POS:J) Fzz = 4.92497 (LCB: 54-MY, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 649.07/2393.58 = 0.271 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 1.693/345.011 = 0.005 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.324/345.011 = 0.007 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.180 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.004 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.004 < 1.000$ O.K

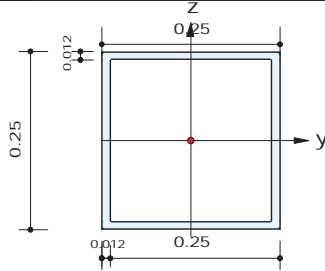
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Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10003
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 4.94411



2. Member Forces

Axial Force	Fxx = 1470.20 (LCB: 54-MY, POS:J)
Bending Moments	My = -12.071, Mz = 0.05213
End Moments	Myi = -6.4631, Myj = -12.071 (for Lb) Myi = -6.4631, Myj = -12.071 (for Ly) Mzi = -14.706, Mzj = 0.05213 (for Lz)
Shear Forces	Fyy = -4.5537 (LCB: 55-FY, POS:J) Fzz = 5.04180 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t,Rd} = 1470.20/3862.40 = 0.381 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 12.071/345.011 = 0.035 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.052/345.011 = 0.000 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.416 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.004 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.004 < 1.000$ O.K

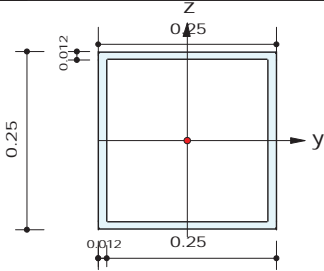
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10004
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 4.94411



2. Member Forces

Axial Force	Fxx = -867.58 (LCB: 60-FX, POS:I)
Bending Moments	My = 0.58573, Mz = -8.5170
End Moments	Myi = 0.58573, Myj = -2.3255 (for Lb) Myi = 0.58573, Myj = -2.3255 (for Ly) Mzi = -8.5170, Mzj = 3.08111 (for Lz)
Shear Forces	Fyy = -7.5257 (LCB: 55-FY, POS:I) Fzz = -4.9690 (LCB: 54-MY, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 867.58/2393.58 = 0.362 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 0.586/345.011 = 0.002 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.517/345.011 = 0.025 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.251 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.006 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.004 < 1.000$ O.K

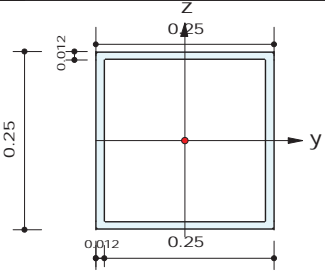
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10005
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 4.95578



2. Member Forces

Axial Force	Fxx = -993.49 (LCB: 60-FX, POS:I)
Bending Moments	My = -2.5293, Mz = -8.0801
End Moments	Myi = -2.5293, Myj = -1.2964 (for Lb) Myi = -2.5293, Myj = -1.2964 (for Ly) Mzi = -8.0801, Mzj = 6.58361 (for Lz)
Shear Forces	Fyy = -7.4446 (LCB: 55-FY, POS:I) Fzz = -4.4608 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

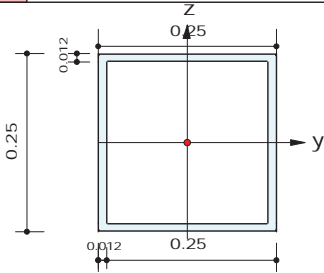
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 993.49/2393.58 = 0.415 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 2.529/345.011 = 0.007 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.080/345.011 = 0.023 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.288 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.006 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.004 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10006
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.95612



2. Member Forces

Axial Force Fxx = -1155.3 (LCB: 60-FX, POS:J)
Bending Moments My = -1.3304, Mz = 5.16871
End Moments Myi = -1.9323, Myj = -1.3304 (for Lb)
Myi = -1.9323, Myj = -1.3304 (for Ly)
Mzi = -1.5254, Mzj = 5.16871 (for Lz)
Shear Forces Fyy = -3.5825 (LCB: 55-FY, POS:J)
Fzz = -4.0330 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1155.33/2393.58 = 0.483 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 1.330/345.011 = 0.004 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 5.169/345.011 = 0.015 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.318 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.003 < 1.000 \dots\dots\dots O.K$$

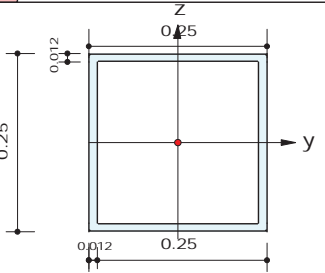
$$V_{Edz}/V_{z_Rd} = 0.003 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10007
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.95647



2. Member Forces

Axial Force Fxx = -1223.9 (LCB: 60-FX, POS:J)
Bending Moments My = -2.1862, Mz = 3.10007
End Moments Myi = -1.4395, Myj = -2.1862 (for Lb)
Myi = -1.4395, Myj = -2.1862 (for Ly)
Mzi = 1.52399, Mzj = 3.10007 (for Lz)
Shear Forces Fyy = 3.31283 (LCB: 55-MX, POS:J)
Fzz = -3.4146 (LCB: 60-MX, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1223.86/2393.58 = 0.511 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 2.186/345.011 = 0.006 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 3.100/345.011 = 0.009 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.332 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.003 < 1.000 \dots\dots\dots O.K$$

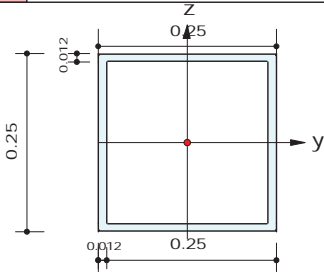
$$V_{Edz}/V_{z_Rd} = 0.003 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10008
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.95681



2. Member Forces

Axial Force Fxx = -1150.8 (LCB: 60-FX, POS:J)
Bending Moments My = -4.9794, Mz = -0.0820
End Moments Myi = -0.7219, Myj = -4.9794 (for Lb)
Myi = -0.7219, Myj = -4.9794 (for Ly)
Mzi = 4.21868, Mzj = -0.0820 (for Lz)
Shear Forces Fyy = 4.68735 (LCB: 55-MZ, POS:J)
Fzz = 4.14307 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1150.83/2393.58 = 0.481 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 4.979/345.011 = 0.014 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 0.082/345.011 = 0.000 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}] \\ R.BiM &= (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.313 < 1.000 \dots\dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

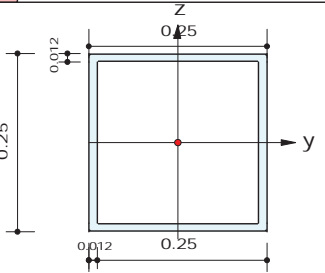
$$V_{Edz}/V_{z,Rd} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10009
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.95716



2. Member Forces

Axial Force Fxx = -880.50 (LCB: 60-FX, POS:I)
Bending Moments My = -6.1939, Mz = 2.99418
End Moments Myi = -6.1939, Myj = -3.2936 (for Lb)
Myi = -6.1939, Myj = -3.2936 (for Ly)
Mzi = 2.99418, Mzj = -2.9465 (for Lz)
Shear Forces Fyy = 5.25870 (LCB: 55-MZ, POS:J)
Fzz = 5.15708 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 880.50/2393.58 = 0.368 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 6.194/345.011 = 0.018 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 2.994/345.011 = 0.009 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}] \\ R.BiM &= (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.255 < 1.000 \dots\dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

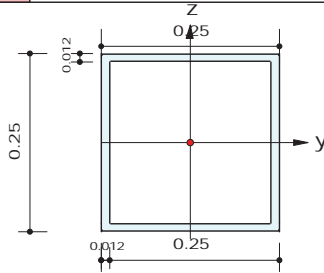
$$V_{Edz}/V_{z,Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10010
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.95750



2. Member Forces

Axial Force Fxx = -1290.4 (LCB: 60+MY, POS:1/2)
Bending Moments My = 1.77387, Mz = -0.7724
End Moments Myi = 5.86507, Myj = 7.99266 (for Lb)
Myi = 5.86507, Myj = 7.99266 (for Ly)
Mzi = 0.79335, Mzj = -3.6142 (for Lz)
Shear Forces Fyy = 3.83700 (LCB: 55-MZ, POS:J)
Fzz = 7.18789 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1290.40/2393.58 = 0.539 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 1.774/345.011 = 0.005 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 0.772/345.011 = 0.002 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.341 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.003 < 1.000 \dots\dots\dots O.K$$

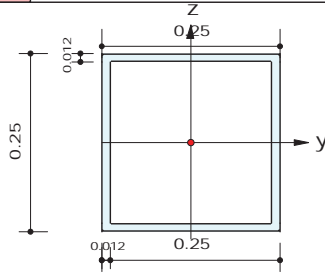
$$V_{Edz}/V_{z_Rd} = 0.006 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10011
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.94619



2. Member Forces

Axial Force Fxx = -1508.3 (LCB: 60-FX, POS:J)
Bending Moments My = 5.33914, Mz = 0.80506
End Moments Myi = -5.1660, Myj = 5.33914 (for Lb)
Myi = -5.1660, Myj = 5.33914 (for Ly)
Mzi = -0.3111, Mzj = 0.80506 (for Lz)
Shear Forces Fyy = -2.6385 (LCB: 55-MY, POS:I)
Fzz = -6.8687 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1508.29/2393.58 = 0.630 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 5.339/345.011 = 0.015 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 0.805/345.011 = 0.002 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.408 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.002 < 1.000 \dots\dots\dots O.K$$

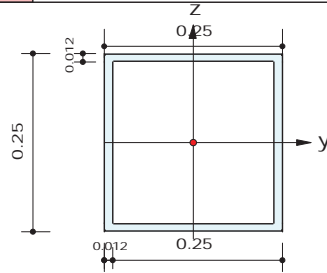
$$V_{Edz}/V_{z_Rd} = 0.005 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10012
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.96372



2. Member Forces

Axial Force Fxx = -1391.2 (LCB: 60-FX, POS:I)
Bending Moments My = 3.17788, Mz = -2.6644
End Moments Myi = 3.17788, Myj = -5.0591 (for Lb)
Myi = 3.17788, Myj = -5.0591 (for Ly)
Mzi = -2.6644, Mzj = -0.0959 (for Lz)
Shear Forces Fyy = -4.5779 (LCB: 55-MZ, POS:I)
Fzz = -6.5985 (LCB: 54-MY, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1391.20/2393.58 = 0.581 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 3.178/345.011 = 0.009 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 2.664/345.011 = 0.008 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta$$

$$R.byN = N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$


$$R_{max} = \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.377 < 1.000 \dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

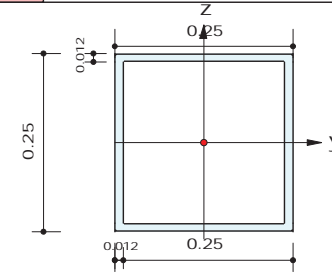
$$V_{Edz}/V_{z,Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10013
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.96320



2. Member Forces

Axial Force Fxx = -904.03 (LCB: 60-FX, POS:J)
Bending Moments My = -7.3422, Mz = 4.47135
End Moments Myi = -4.4540, Myj = -7.3422 (for Lb)
Myi = -4.4540, Myj = -7.3422 (for Ly)
Mzi = -6.2342, Mzj = 4.47135 (for Lz)
Shear Forces Fyy = -5.3007 (LCB: 55-MY, POS:I)
Fzz = -5.2452 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 904.03/2393.58 = 0.378 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 7.342/345.011 = 0.021 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 4.471/345.011 = 0.013 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta$$

$$R.byN = N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$

$$R_{max} = \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.268 < 1.000 \dots\dots \text{O.K}$$


Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z,Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

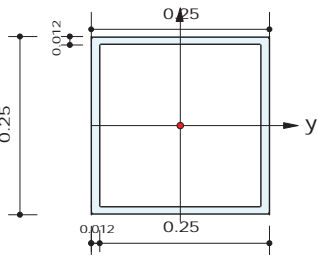
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10014
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 4.96268



2. Member Forces

Axial Force	Fxx = -1103.4 (LCB: 60-FX, POS:J)
Bending Moments	My = -3.2181, Mz = 8.08135
End Moments	Myi = -5.6183, Myj = -3.2181 (for Lb) Myi = -5.6183, Myj = -3.2181 (for Ly) Mzi = -2.8717, Mzj = 8.08135 (for Lz)
Shear Forces	Fyy = -5.0878 (LCB: 55-FY, POS:I) Fzz = -3.9051 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1103.45/2393.58 = 0.461 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 3.218/345.011 = 0.009 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.081/345.011 = 0.023 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.318 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.004 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.003 < 1.000$ O.K

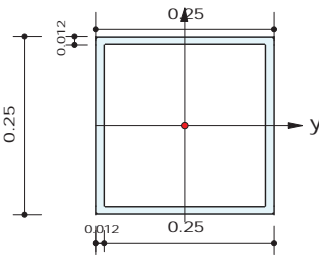
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10015
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 4.96217



2. Member Forces

Axial Force	Fxx = -1133.1 (LCB: 54-FX, POS:J)
Bending Moments	My = -4.2249, Mz = 5.30523
End Moments	Myi = -0.3691, Myj = -4.2249 (for Lb) Myi = -0.3691, Myj = -4.2249 (for Ly) Mzi = 1.67037, Mzj = 5.30523 (for Lz)
Shear Forces	Fyy = -3.7476 (LCB: 55-FY, POS:I) Fzz = 3.73632 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

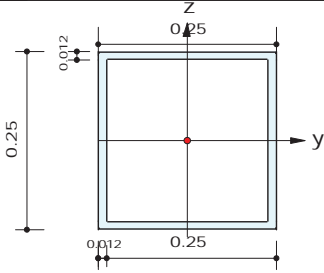
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1133.13/2393.58 = 0.473 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 4.225/345.011 = 0.012 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 5.305/345.011 = 0.015 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.321 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.003 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.003 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10016
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.96859



2. Member Forces

Axial Force Fxx = -1145.8 (LCB: 54-FZ, POS:I)
Bending Moments My = -4.4695, Mz = 4.79859
End Moments Myi = -4.4695, Myj = 0.05367 (for Lb)
Myi = -4.4695, Myj = 0.05367 (for Ly)
Mzi = 4.79859, Mzj = 2.04042 (for Lz)
Shear Forces Fyy = 3.58456 (LCB: 55-MX, POS:J)
Fzz = -3.8320 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729


3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

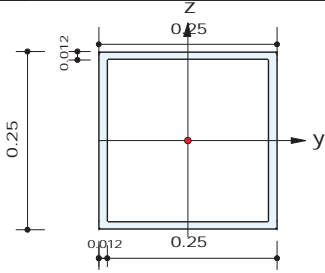
Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1145.76/2393.58 = 0.479 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 4.469/345.011 = 0.013 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 4.799/345.011 = 0.014 < 1.000$ O.K
Combined Resistance
 $R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$
 $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$
 $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$
 $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$
 $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$
 $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$
 $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$
 $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.324 < 1.000$.. O.K
Shear Resistance
 $V_{Edy}/V_{y_Rd} = 0.003 < 1.000$ O.K
 $V_{Edz}/V_{z_Rd} = 0.003 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10017
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.96910



2. Member Forces

Axial Force Fxx = -1177.3 (LCB: 60-FX, POS:I)
Bending Moments My = -3.6051, Mz = 5.94580
End Moments Myi = -3.6051, Myj = -4.2128 (for Lb)
Myi = -3.6051, Myj = -4.2128 (for Ly)
Mzi = 5.94580, Mzj = -0.7169 (for Lz)
Shear Forces Fyy = 4.82587 (LCB: 55-MX, POS:J)
Fzz = 3.94322 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729


3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

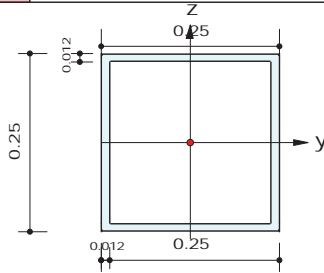
Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1177.34/2393.58 = 0.492 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 3.605/345.011 = 0.010 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 5.946/345.011 = 0.017 < 1.000$ O.K
Combined Resistance
 $R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$
 $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$
 $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$
 $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$
 $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$
 $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$
 $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$
 $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.333 < 1.000$.. O.K
Shear Resistance
 $V_{Edy}/V_{y_Rd} = 0.004 < 1.000$ O.K
 $V_{Edz}/V_{z_Rd} = 0.003 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10018
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.96962



2. Member Forces

Axial Force Fxx = -1069.2 (LCB: 60-FX, POS:I)
Bending Moments My = -6.3939, Mz = 4.39561
End Moments Myi = -6.3939, Myj = -4.0659 (for Lb)
Myi = -6.3939, Myj = -4.0659 (for Ly)
Mzi = 4.39561, Mzj = -2.8832 (for Lz)
Shear Forces Fyy = 5.45691 (LCB: 55-MZ, POS:J)
Fzz = 5.23327 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1069.16/2393.58 = 0.447 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 6.394/345.011 = 0.019 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 4.396/345.011 = 0.013 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}] \\ R.BiM &= (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.308 < 1.000 \dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

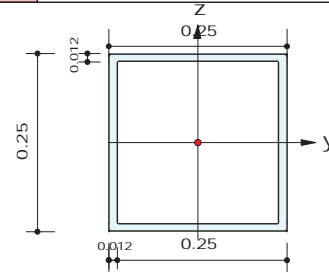
$$V_{Edz}/V_{z,Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10019
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.97013



2. Member Forces

Axial Force Fxx = -1562.0 (LCB: 60-FX, POS:J)
Bending Moments My = 5.92241, Mz = -3.6904
End Moments Myi = -5.4597, Myj = 5.92241 (for Lb)
Myi = -5.4597, Myj = 5.92241 (for Ly)
Mzi = 1.93743, Mzj = -3.6904 (for Lz)
Shear Forces Fyy = 4.64063 (LCB: 55+FY, POS:J)
Fzz = 7.42201 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1562.01/2393.58 = 0.653 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 5.922/345.011 = 0.017 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 3.690/345.011 = 0.011 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}] \\ R.BiM &= (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.432 < 1.000 \dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

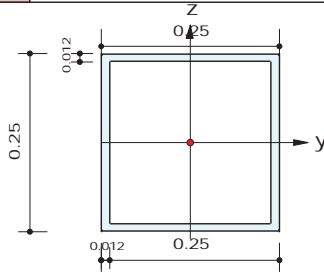
$$V_{Edz}/V_{z,Rd} = 0.006 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10020
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.94619



2. Member Forces

Axial Force Fxx = -1808.6 (LCB: 60-FX, POS:1/2)
Bending Moments My = 5.47394, Mz = -2.1632
End Moments Myi = 4.07580, Myj = 1.49352 (for Lb)
Myi = 4.07580, Myj = 1.49352 (for Ly)
Mzi = -2.0131, Mzj = -2.3134 (for Lz)
Shear Forces Fyy = 2.53669 (LCB: 55+FZ, POS:J)
Fzz = 3.70211 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1808.58/2393.58 = 0.756 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 5.474/345.011 = 0.016 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 2.163/345.011 = 0.006 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.490 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.002 < 1.000 \dots\dots\dots O.K$$

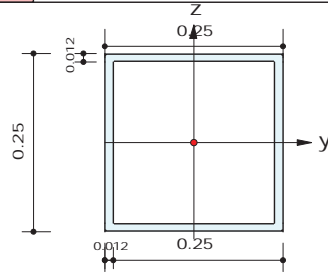
$$V_{Edz}/V_{z_Rd} = 0.003 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10021
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.96372



2. Member Forces

Axial Force Fxx = -1494.6 (LCB: 60-FX, POS:I)
Bending Moments My = 6.23699, Mz = -3.8556
End Moments Myi = 6.23699, Myj = -6.6398 (for Lb)
Myi = 6.23699, Myj = -6.6398 (for Ly)
Mzi = -3.8556, Mzj = 2.05274 (for Lz)
Shear Forces Fyy = -4.3248 (LCB: 55-FY, POS:I)
Fzz = -7.3023 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1494.61/2393.58 = 0.624 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 6.237/345.011 = 0.018 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 3.856/345.011 = 0.011 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.416 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.004 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.006 < 1.000 \dots\dots\dots O.K$$

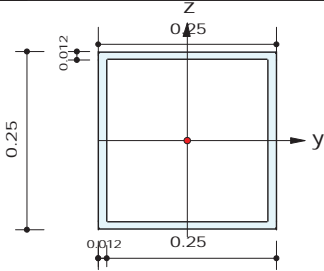
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10022
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 4.96320



2. Member Forces

Axial Force	Fxx = -993.95 (LCB: 60-FX, POS:J)
Bending Moments	My = -6.8477, Mz = 4.27268
End Moments	Myi = -4.3547, Myj = -6.8477 (for Lb) Myi = -4.3547, Myj = -6.8477 (for Ly) Mzi = -2.8124, Mzj = 4.27268 (for Lz)
Shear Forces	Fyy = -5.3565 (LCB: 55-MZ, POS:I) Fzz = -5.2169 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 993.95/2393.58 = 0.415 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 6.848/345.011 = 0.020 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 4.273/345.011 = 0.012 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.290 < 1.000 \dots\dots\dots O.K$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.005 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.004 < 1.000 \dots\dots\dots O.K$$

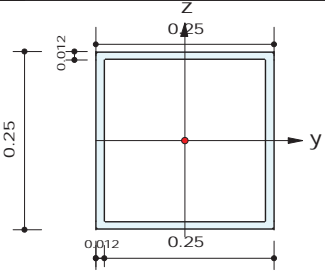
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10023
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 4.96268



2. Member Forces

Axial Force	Fxx = -1117.9 (LCB: 60-FX, POS:J)
Bending Moments	My = -3.4947, Mz = 5.91693
End Moments	Myi = -4.8713, Myj = -3.4947 (for Lb) Myi = -4.8713, Myj = -3.4947 (for Ly) Mzi = -0.8739, Mzj = 5.91693 (for Lz)
Shear Forces	Fyy = -4.7307 (LCB: 55-FZ, POS:I) Fzz = -3.9810 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1117.86/2393.58 = 0.467 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 3.495/345.011 = 0.010 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 5.917/345.011 = 0.017 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.317 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.004 < 1.000 \dots\dots\dots O.K$$

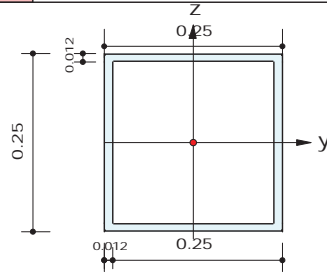
$$V_{Edz}/V_{z_Rd} = 0.003 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10024
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.96217



2. Member Forces

Axial Force Fxx = -1098.8 (LCB: 54-FX, POS:J)
Bending Moments My = -4.3351, Mz = 4.57377
End Moments Myi = -0.3992, Myj = -4.3351 (for Lb)
Myi = -0.3992, Myj = -4.3351 (for Ly)
Mzi = 2.14421, Mzj = 4.57377 (for Lz)
Shear Forces Fyy = -3.5614 (LCB: 55-FY, POS:I)
Fzz = 3.72985 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1098.84/2393.58 = 0.459 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 4.335/345.011 = 0.013 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 4.574/345.011 = 0.013 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta$$

$$R.byN = N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$


$$R_{max} = \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.310 < 1.000 \dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

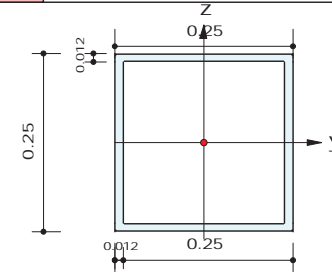
$$V_{Edz}/V_{z,Rd} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10025
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.96859



2. Member Forces

Axial Force Fxx = -1086.5 (LCB: 54-FX, POS:I)
Bending Moments My = -4.2870, Mz = 5.24019
End Moments Myi = -4.2870, Myj = -0.4833 (for Lb)
Myi = -4.2870, Myj = -0.4833 (for Ly)
Mzi = 5.24019, Mzj = 1.39202 (for Lz)
Shear Forces Fyy = 3.75005 (LCB: 55-MX, POS:J)
Fzz = -3.7187 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1086.50/2393.58 = 0.454 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 4.287/345.011 = 0.012 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 5.240/345.011 = 0.015 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta$$

$$R.byN = N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$


$$R_{max} = \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.309 < 1.000 \dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

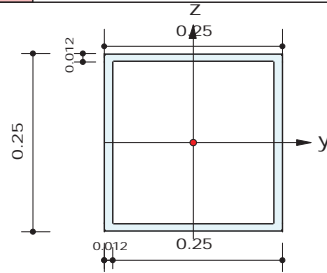
$$V_{Edz}/V_{z,Rd} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10026
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.96910



2. Member Forces

Axial Force Fxx = -1063.3 (LCB: 60-FX, POS:I)
Bending Moments My = -3.4161, Mz = 7.89056
End Moments Myi = -3.4161, Myj = -5.6558 (for Lb)
Myi = -3.4161, Myj = -5.6558 (for Ly)
Mzi = 7.89056, Mzj = -2.9962 (for Lz)
Shear Forces Fyy = 5.03615 (LCB: 55-MX, POS:J)
Fzz = 3.96861 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1063.34/2393.58 = 0.444 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 3.416/345.011 = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 7.891/345.011 = 0.023 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta$$

$$R.byN = N_{Ed}/(A \cdot f_y/\gamma M_0), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma M_1)$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma M_1) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma M_1)$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma M_1)$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma M_1) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma M_1)$$


$$R_{max} = \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.308 < 1.000 \dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

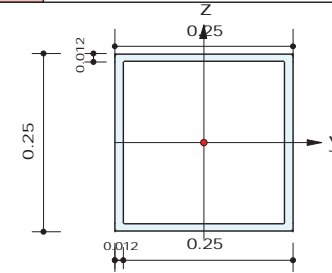
$$V_{Edz}/V_{z,Rd} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10027
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.96962



2. Member Forces

Axial Force Fxx = -865.64 (LCB: 60-FX, POS:I)
Bending Moments My = -7.5217, Mz = 4.27324
End Moments Myi = -7.5217, Myj = -4.4284 (for Lb)
Myi = -7.5217, Myj = -4.4284 (for Ly)
Mzi = 4.27324, Mzj = -6.5577 (for Lz)
Shear Forces Fyy = 5.34802 (LCB: 55+FY, POS:J)
Fzz = 5.24328 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 865.64/2393.58 = 0.362 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 7.522/345.011 = 0.022 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 4.273/345.011 = 0.012 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta$$

$$R.byN = N_{Ed}/(A \cdot f_y/\gamma M_0), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma M_1)$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma M_1) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma M_1)$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma M_1)$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma M_1) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma M_1)$$

$$R_{max} = \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.258 < 1.000 \dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z,Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

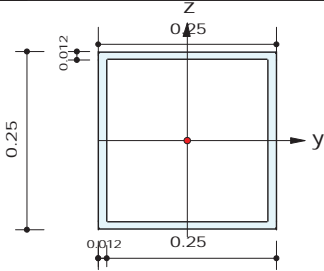
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10028
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 4.97013



2. Member Forces

Axial Force Fxx = -1381.6 (LCB: 60-FX, POS:J)
Bending Moments My = 4.33520, Mz = -2.6289
End Moments Myi = -5.8355, Myj = 4.33520 (for Lb)
Myi = -5.8355, Myj = 4.33520 (for Ly)
Mzi = -0.3963, Mzj = -2.6289 (for Lz)
Shear Forces Fyy = 4.51323 (LCB: 55-MZ, POS:J)
Fzz = 6.26123 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 1381.61/2393.58 = 0.577 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 4.335/345.011 = 0.013 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 2.629/345.011 = 0.008 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.378 < 1.000 \dots\dots\dots \text{O.K}$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

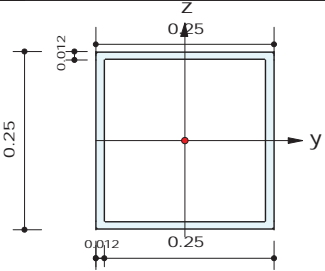
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10029
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.09456



2. Member Forces

Axial Force Fxx = 2308.53 (LCB: 60+FX, POS:I)
Bending Moments My = -16.427, Mz = -0.6868
End Moments Myi = -16.427, Myj = -8.7205 (for Lb)
Myi = -16.427, Myj = -8.7205 (for Ly)
Mzi = -0.6868, Mzj = -0.4230 (for Lz)
Shear Forces Fyy = -2.6939 (LCB: 55-FY, POS:J)
Fzz = 6.43288 (LCB: 60-MX, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/N_{t_Rd} = 2308.53/3862.40 = 0.598 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 16.427/345.011 = 0.048 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 0.687/345.011 = 0.002 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.647 < 1.000 \dots\dots\dots \text{O.K}$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.002 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

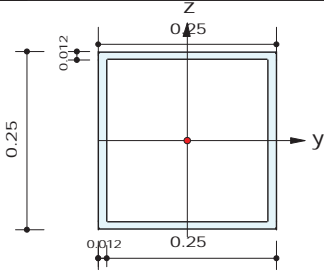
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10030
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.24672



2. Member Forces

Axial Force	Fxx = -1296.3 (LCB: 60-FX, POS:J)
Bending Moments	My = -7.2522, Mz = 0.60937
End Moments	Myi = 4.67014, Myj = -7.2522 (for Lb) Myi = 4.67014, Myj = -7.2522 (for Ly) Mzi = -2.0580, Mzj = 0.60937 (for Lz)
Shear Forces	Fyy = -3.8831 (LCB: 55-MZ, POS:I) Fzz = -6.9243 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1296.29/2393.58 = 0.542 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 7.252/345.011 = 0.021 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.609/345.011 = 0.002 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.358 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.003 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.005 < 1.000$ O.K

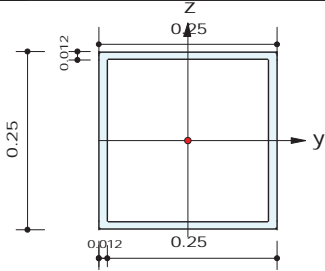
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10031
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.24643



2. Member Forces

Axial Force	Fxx = -922.84 (LCB: 60-FX, POS:J)
Bending Moments	My = -6.2040, Mz = 2.99392
End Moments	Myi = -3.6690, Myj = -6.2040 (for Lb) Myi = -3.6690, Myj = -6.2040 (for Ly) Mzi = -2.7561, Mzj = 2.99392 (for Lz)
Shear Forces	Fyy = -5.5718 (LCB: 55-MZ, POS:I) Fzz = -5.2946 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 922.84/2393.58 = 0.386 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 6.204/345.011 = 0.018 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.994/345.011 = 0.009 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.266 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.005 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.004 < 1.000$ O.K

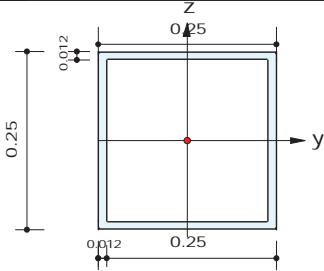
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10032
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.24614



2. Member Forces

Axial Force	Fxx = -1239.1 (LCB: 60-FX, POS:I)
Bending Moments	My = -5.0586, Mz = -0.2302
End Moments	Myi = -5.0586, Myj = -0.5760 (for Lb) Myi = -5.0586, Myj = -0.5760 (for Ly) Mzi = -0.2302, Mzj = 4.60290 (for Lz)
Shear Forces	Fyy = -4.8389 (LCB: 55-MZ, POS:I) Fzz = -4.2807 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1239.11/2393.58 = 0.518 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 5.059/345.011 = 0.015 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.230/345.011 = 0.001 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.336 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.004 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.003 < 1.000$ O.K

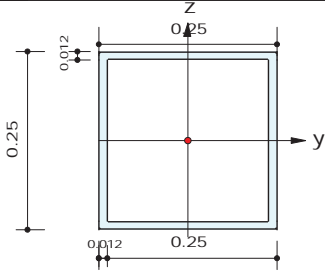
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10033
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.24585



2. Member Forces

Axial Force	Fxx = -1347.0 (LCB: 54-FX, POS:1/2)
Bending Moments	My = 4.39172, Mz = 2.91238
End Moments	Myi = 0.18901, Myj = 0.43300 (for Lb) Myi = 0.18901, Myj = 0.43300 (for Ly) Mzi = 2.80899, Mzj = 3.01577 (for Lz)
Shear Forces	Fyy = -3.3407 (LCB: 55-FY, POS:I) Fzz = 3.54996 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1347.04/2393.58 = 0.563 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 4.392/345.011 = 0.013 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.912/345.011 = 0.008 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.370 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.003 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.003 < 1.000$ O.K

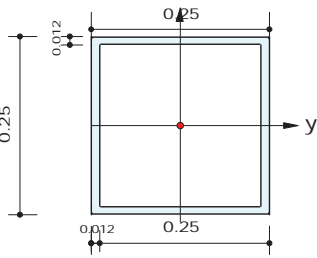
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10034
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.24555



2. Member Forces

Axial Force	Fxx = -1254.0 (LCB: 60-FX, POS:I)	Depth	0.25000	Web Thick	0.01200
Bending Moments	My = -1.5614, Mz = 5.21147	Flg Width	0.25000	Top F Thick	0.01200
End Moments	Myi = -1.5614, Myj = -1.6108 (for Lb) Myi = -1.5614, Myj = -1.6108 (for Ly) Mzi = 5.21147, Mzj = -1.7330 (for Lz)	Web Center	0.23800	Bot.F Thick	0.01200
Shear Forces	Fyy = 3.81224 (LCB: 55+MZ, POS:I) Fzz = 4.01327 (LCB: 54+FZ, POS:J)	Area	0.01142	Asz	0.00600
		Qyb	0.02126	Qzb	0.02126
		Iyy	0.00011	Izz	0.00011
		Ybar	0.12500	Zbar	0.12500
		Wely	0.00086	Welz	0.00086
		ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1254.02/2393.58 = 0.524 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 1.561/345.011 = 0.005 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 5.211/345.011 = 0.015 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.344 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.003 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.003 < 1.000$ O.K

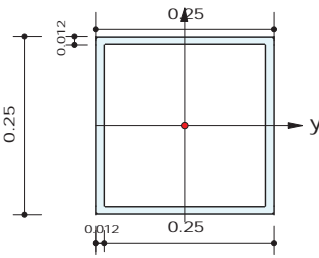
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10035
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.24526



2. Member Forces

Axial Force	Fxx = -1063.4 (LCB: 60-FX, POS:J)	Depth	0.25000	Web Thick	0.01200
Bending Moments	My = -2.0275, Mz = -7.9728	Flg Width	0.25000	Top F Thick	0.01200
End Moments	Myi = -1.8257, Myj = -2.0275 (for Lb) Myi = -1.8257, Myj = -2.0275 (for Ly) Mzi = 5.09864, Mzj = -7.9728 (for Lz)	Web Center	0.23800	Bot.F Thick	0.01200
Shear Forces	Fyy = 7.84270 (LCB: 55+FY, POS:J) Fzz = 4.53633 (LCB: 54+FZ, POS:J)	Area	0.01142	Asz	0.00600
		Qyb	0.02126	Qzb	0.02126
		Iyy	0.00011	Izz	0.00011
		Ybar	0.12500	Zbar	0.12500
		Wely	0.00086	Welz	0.00086
		ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths	Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1063.43/2393.58 = 0.444 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 2.028/345.011 = 0.006 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 7.973/345.011 = 0.023 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.304 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.007 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.004 < 1.000$ O.K

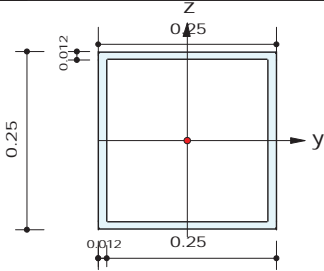
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10036
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.24497



2. Member Forces

Axial Force	Fxx = -850.51 (LCB: 60-FX, POS:J)
Bending Moments	My = -1.3355, Mz = -3.7930
End Moments	Myi = -1.4239, Myj = -1.3355 (for Lb) Myi = -1.4239, Myj = -1.3355 (for Ly) Mzi = -0.9229, Mzj = -3.7930 (for Lz)
Shear Forces	Fyy = 9.48636 (LCB: 52-MZ, POS:J) Fzz = 3.87090 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 850.51/2393.58 = 0.355 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 1.336/345.011 = 0.004 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 3.793/345.011 = 0.011 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.235 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.008 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.003 < 1.000$ O.K

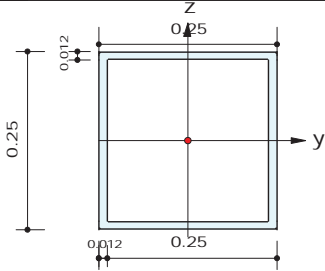
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10037
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.31493



2. Member Forces

Axial Force	Fxx = 1689.32 (LCB: 54+FX, POS:J)
Bending Moments	My = -9.4684, Mz = -5.8520
End Moments	Myi = -9.6624, Myj = -9.4684 (for Lb) Myi = -9.6624, Myj = -9.4684 (for Ly) Mzi = -1.3738, Mzj = -5.8520 (for Lz)
Shear Forces	Fyy = -3.6510 (LCB: 55-FY, POS:J) Fzz = 4.33788 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729


3. Design Parameters

Unbraced Lengths	Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

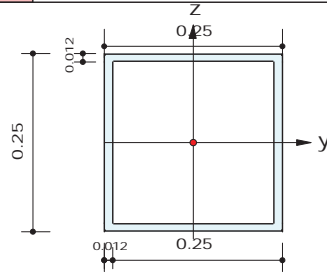
Axial Resistance	$N_{Ed}/N_{t,Rd} = 1689.32/3862.40 = 0.437 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 9.468/345.011 = 0.027 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 5.852/345.011 = 0.017 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.482 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.003 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.003 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10038
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.31314



2. Member Forces

Axial Force Fxx = -854.04 (LCB: 60-FX, POS:J)
Bending Moments My = -3.4567, Mz = -7.7377
End Moments Myi = -4.2492, Myj = -3.4567 (for Lb)
Myi = -4.2492, Myj = -3.4567 (for Ly)
Mzi = 5.04371, Mzj = -7.7377 (for Lz)
Shear Forces Fyy = -5.4423 (LCB: 55-MZ, POS:I)
Fzz = -4.4784 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 854.04/2393.58 = 0.357 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 3.457/345.011 = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 7.738/345.011 = 0.022 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$
$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$
$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$
$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$
$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$
$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.254 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

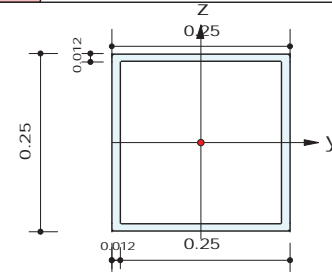
$$V_{Edz}/V_{z_Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10039
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 2.65836



2. Member Forces

Axial Force Fxx = -30.055 (LCB: 60-FX, POS:J)
Bending Moments My = -16.638, Mz = -3.2986
End Moments Myi = 0.35202, Myj = -16.638 (for Lb)
Myi = 0.35202, Myj = -16.638 (for Ly)
Mzi = 4.75311, Mzj = -3.2986 (for Lz)
Shear Forces Fyy = 6.13094 (LCB: 60-MZ, POS:J)
Fzz = -10.936 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 30.05/3862.40 = 0.008 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 16.638/345.011 = 0.048 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 3.299/345.011 = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$
$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$
$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$
$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$
$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$
$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.066 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.009 < 1.000 \dots\dots\dots \text{O.K}$$

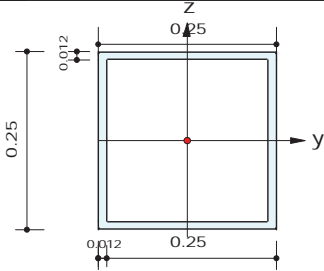
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20001
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 2.53492



2. Member Forces

Axial Force	Fxx = 2.03738 (LCB: 60-MZ, POS:J)
Bending Moments	My = -4.8330, Mz = -4.4505
End Moments	Myi = -5.7401, Myj = -4.8330 (for Lb) Myi = -5.7401, Myj = -4.8330 (for Ly) Mzi = -1.7443, Mzj = -4.4505 (for Lz)
Shear Forces	Fyy = -3.1468 (LCB: 55-FY, POS:J) Fzz = 6.56794 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 2.04/3862.40 = 0.001 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 4.833/345.011 = 0.014 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 4.451/345.011 = 0.013 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.027 < 1.000 O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.003 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.005 < 1.000$ O.K

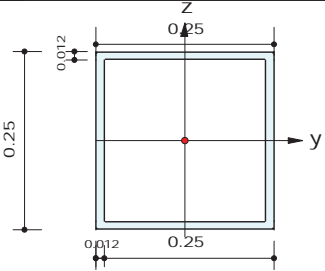
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20002
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.06802



2. Member Forces

Axial Force	Fxx = -718.68 (LCB: 60-FX, POS:I)
Bending Moments	My = -7.5742, Mz = -3.1631
End Moments	Myi = -7.5742, Myj = 0.87072 (for Lb) Myi = -7.5742, Myj = 0.87072 (for Ly) Mzi = -3.1631, Mzj = 4.51057 (for Lz)
Shear Forces	Fyy = 5.14128 (LCB: 55-MZ, POS:J) Fzz = 5.98985 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 718.68/2393.58 = 0.300 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 7.574/345.011 = 0.022 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 3.163/345.011 = 0.009 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.217 < 1.000 .. O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.004 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.005 < 1.000$ O.K

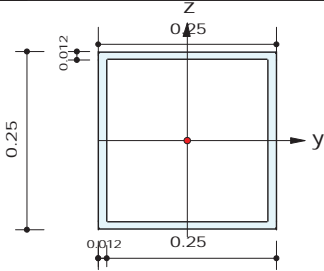
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20003
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.06767



2. Member Forces

Axial Force	Fxx = 1727.14 (LCB: 60+FX, POS:J)
Bending Moments	My = -9.5823, Mz = 1.38767
End Moments	Myi = -1.4187, Myj = -9.5823 (for Lb) Myi = -1.4187, Myj = -9.5823 (for Ly) Mzi = -0.9334, Mzj = 1.38767 (for Lz)
Shear Forces	Fyy = 5.85018 (LCB: 55+FY, POS:J) Fzz = 4.87726 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 1727.14/3862.40 = 0.447 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 9.582/345.011 = 0.028 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.388/345.011 = 0.004 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.479 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.005 < 1.000 O.K V_Edz/Vz_Rd = 0.004 < 1.000 O.K

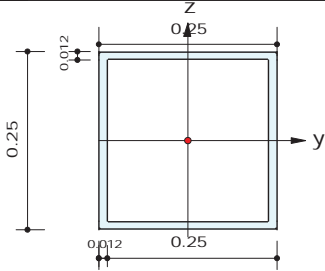
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20004
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.06733



2. Member Forces

Axial Force	Fxx = -1468.0 (LCB: 60-FX, POS:J)
Bending Moments	My = -0.4514, Mz = -8.3158
End Moments	Myi = -6.2443, Myj = -0.4514 (for Lb) Myi = -6.2443, Myj = -0.4514 (for Ly) Mzi = -1.8632, Mzj = -8.3158 (for Lz)
Shear Forces	Fyy = -7.9634 (LCB: 55-MZ, POS:I) Fzz = -5.5977 (LCB: 54-MY, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1468.00/2393.58 = 0.613 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 0.451/345.011 = 0.001 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.316/345.011 = 0.024 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.405 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.007 < 1.000 O.K V_Edz/Vz_Rd = 0.004 < 1.000 O.K

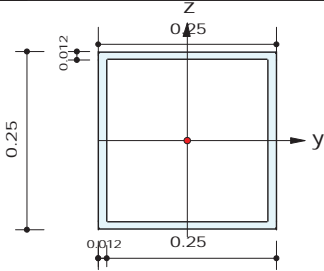
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20005
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.06698



2. Member Forces

Axial Force	Fxx = -1831.5 (LCB: 60-FX, POS:I)
Bending Moments	My = -6.6490, Mz = -8.6066
End Moments	Myi = -6.6490, Myj = 1.48979 (for Lb) Myi = -6.6490, Myj = 1.48979 (for Ly) Mzi = -8.6066, Mzj = 1.48460 (for Lz)
Shear Forces	Fyy = -11.066 (LCB: 60-MZ, POS:1/4) Fzz = -5.4213 (LCB: 54-MZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Qyb	0.02126	Qzb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1831.50/2393.58 = 0.765 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 6.649/345.011 = 0.019 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.607/345.011 = 0.025 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.518 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.009 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.004 < 1.000$ O.K

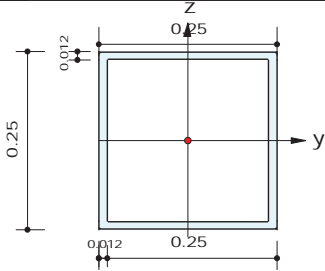
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20006
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.06664



2. Member Forces

Axial Force	Fxx = -2081.7 (LCB: 60-FX, POS:3/4)
Bending Moments	My = 4.05053, Mz = 1.23669
End Moments	Myi = -2.5766, Myj = 2.45848 (for Lb) Myi = -2.5766, Myj = 2.45848 (for Ly) Mzi = -2.6121, Mzj = 2.51964 (for Lz)
Shear Forces	Fyy = -3.9611 (LCB: 55-FY, POS:J) Fzz = -4.3865 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Qyb	0.02126	Qzb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

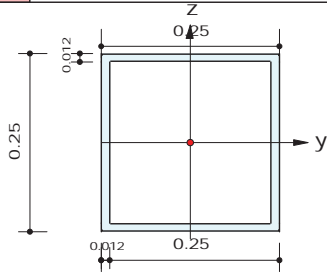
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2081.65/2393.58 = 0.870 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 4.051/345.011 = 0.012 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.237/345.011 = 0.004 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.554 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.003 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.003 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20007
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.06629



2. Member Forces

Axial Force Fxx = -2113.2 (LCB: 60-FX, POS:1/2)
Bending Moments My = 4.79569, Mz = 0.70315
End Moments Myi = 0.76913, Myj = 1.22113 (for Lb)
Myi = 0.76913, Myj = 1.22113 (for Ly)
Mzi = 1.24078, Mzj = 0.16552 (for Lz)
Shear Forces Fyy = 3.98093 (LCB: 55-MX, POS:J)
Fzz = -3.3493 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 2113.24/2393.58 = 0.883 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 4.796/345.011 = 0.014 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 0.703/345.011 = 0.002 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}] \\ R.BiM &= (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.563 < 1.000 \dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

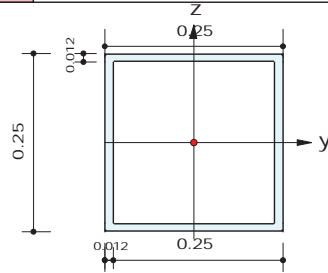
$$V_{Edz}/V_{z,Rd} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20008
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.06595



2. Member Forces

Axial Force Fxx = -1844.4 (LCB: 60-FX, POS:1/4)
Bending Moments My = 4.58372, Mz = 1.09107
End Moments Myi = 3.08572, Myj = -2.3224 (for Lb)
Myi = 3.08572, Myj = -2.3224 (for Ly)
Mzi = 1.83072, Mzj = -1.1279 (for Lz)
Shear Forces Fyy = 6.38046 (LCB: 55-MZ, POS:J)
Fzz = 4.52606 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1844.37/2393.58 = 0.771 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 4.584/345.011 = 0.013 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 1.091/345.011 = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}] \\ R.BiM &= (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.494 < 1.000 \dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

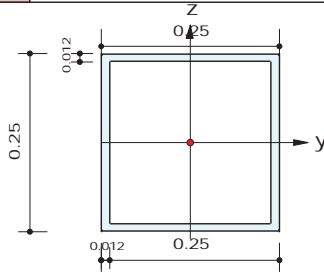
$$V_{Edz}/V_{z,Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20009
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.06560



2. Member Forces

Axial Force Fxx = -1186.6 (LCB: 60-FX, POS:J)
Bending Moments My = -7.3938, Mz = -1.7512
End Moments Myi = -0.1390, Myj = -7.3938 (for Lb)
Myi = -0.1390, Myj = -7.3938 (for Ly)
Mzi = 1.75891, Mzj = -1.7512 (for Lz)
Shear Forces Fyy = 7.77582 (LCB: 55-MZ, POS:J)
Fzz = 5.29707 (LCB: 52-MY, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1186.57/2393.58 = 0.496 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 7.394/345.011 = 0.021 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 1.751/345.011 = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$
$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$
$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$
$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.334 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.007 < 1.000 \dots\dots\dots \text{O.K}$$

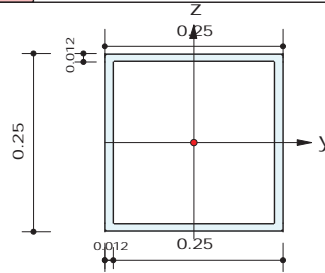
$$V_{Edz}/V_{z_Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20010
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.06526



2. Member Forces

Axial Force Fxx = -1025.9 (LCB: 60-FX, POS:J)
Bending Moments My = -8.9240, Mz = -1.1864
End Moments Myi = 2.53998, Myj = -8.9240 (for Lb)
Myi = 2.53998, Myj = -8.9240 (for Ly)
Mzi = 1.45770, Mzj = -1.1864 (for Lz)
Shear Forces Fyy = 4.13889 (LCB: 55-MZ, POS:J)
Fzz = 6.41949 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1025.93/2393.58 = 0.429 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 8.924/345.011 = 0.026 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 1.186/345.011 = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$
$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$
$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$
$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.295 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

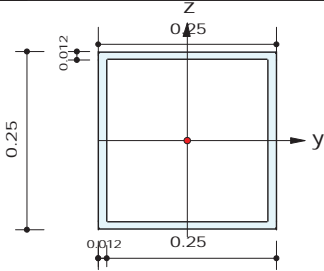
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20011
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.05384



2. Member Forces

Axial Force	Fxx = 1749.61 (LCB: 54+FX, POS:I)
Bending Moments	My = -16.050, Mz = -1.0734
End Moments	Myi = -16.050, Myj = -8.2701 (for Lb) Myi = -16.050, Myj = -8.2701 (for Ly) Mzi = -1.0734, Mzj = -1.8349 (for Lz)
Shear Forces	Fyy = -2.8163 (LCB: 55-FY, POS:I) Fzz = 7.08867 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 1749.61/3862.40 = 0.453 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 16.050/345.011 = 0.047 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.073/345.011 = 0.003 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.503 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.002 < 1.000 O.K V_Edz/Vz_Rd = 0.006 < 1.000 O.K

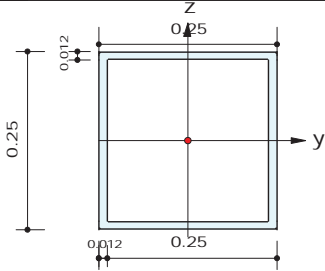
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20012
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.07151



2. Member Forces

Axial Force	Fxx = -815.52 (LCB: 60-FX, POS:J)
Bending Moments	My = -8.3158, Mz = 1.46559
End Moments	Myi = 4.34108, Myj = -8.3158 (for Lb) Myi = 4.34108, Myj = -8.3158 (for Ly) Mzi = -1.6876, Mzj = 1.46559 (for Lz)
Shear Forces	Fyy = -3.9199 (LCB: 55-MZ, POS:I) Fzz = -6.6838 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 815.52/2393.58 = 0.341 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 8.316/345.011 = 0.024 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.466/345.011 = 0.004 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.239 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.003 < 1.000 O.K V_Edz/Vz_Rd = 0.005 < 1.000 O.K

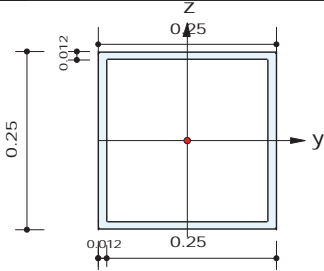
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20013
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.07203



2. Member Forces

Axial Force	Fxx = -816.95 (LCB: 60-FX, POS:I)
Bending Moments	My = -4.9775, Mz = -2.1757
End Moments	Myi = -4.9775, Myj = 0.01740 (for Lb) Myi = -4.9775, Myj = 0.01740 (for Ly) Mzi = -2.1757, Mzj = 1.46447 (for Lz)
Shear Forces	Fyy = -7.1995 (LCB: 55-MZ, POS:I) Fzz = -5.5270 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 816.95/2393.58 = 0.341 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 4.977/345.011 = 0.014 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 2.176/345.011 = 0.006 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.232 < 1.000 \dots\dots\dots \text{O.K}$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.006 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

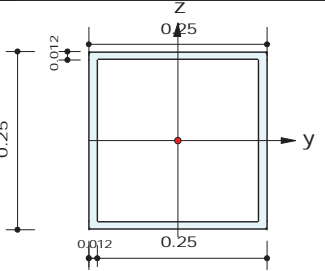
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20014
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.07254



2. Member Forces

Axial Force	Fxx = -1280.8 (LCB: 54-FX, POS:J)
Bending Moments	My = 3.91910, Mz = 3.92703
End Moments	Myi = -1.9901, Myj = 3.91910 (for Lb) Myi = -1.9901, Myj = 3.91910 (for Ly) Mzi = -3.7288, Mzj = 3.92703 (for Lz)
Shear Forces	Fyy = -6.2023 (LCB: 55-FY, POS:I) Fzz = -4.5507 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1280.84/2393.58 = 0.535 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 3.919/345.011 = 0.011 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 3.927/345.011 = 0.011 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.354 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

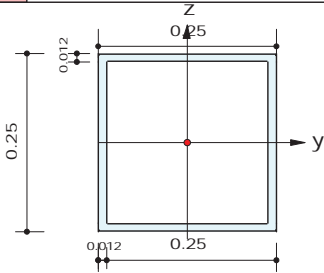
$$V_{Edz}/V_{z_Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20015
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.07306



2. Member Forces

Axial Force Fxx = -1410.9 (LCB: 54-FX, POS:1/2)
Bending Moments My = 4.39511, Mz = 1.33140
End Moments Myi = 2.85718, Myj = -1.6792 (for Lb)
Myi = 2.85718, Myj = -1.6792 (for Ly)
Mzi = -0.1010, Mzj = 2.76382 (for Lz)
Shear Forces Fyy = -4.1975 (LCB: 55-FY, POS:I)
Fzz = 3.91996 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1410.93/2393.58 = 0.589 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 4.395/345.011 = 0.013 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 1.331/345.011 = 0.004 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.382 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.004 < 1.000 \dots\dots\dots O.K$$

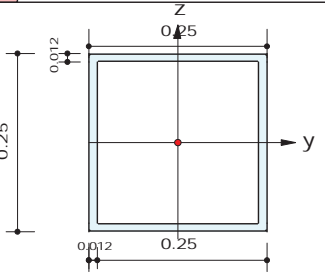
$$V_{Edz}/V_{z_Rd} = 0.003 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20016
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.07934



2. Member Forces

Axial Force Fxx = -1413.9 (LCB: 54-FX, POS:1/2)
Bending Moments My = 4.43972, Mz = 1.32497
End Moments Myi = -1.8151, Myj = 3.07289 (for Lb)
Myi = -1.8151, Myj = 3.07289 (for Ly)
Mzi = 2.61273, Mzj = 0.03721 (for Lz)
Shear Forces Fyy = 4.19220 (LCB: 55-MX, POS:J)
Fzz = -3.9642 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1413.89/2393.58 = 0.591 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 4.440/345.011 = 0.013 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 1.325/345.011 = 0.004 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.383 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.004 < 1.000 \dots\dots\dots O.K$$

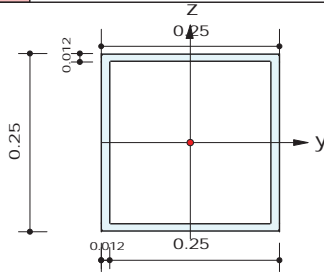
$$V_{Edz}/V_{z_Rd} = 0.003 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20017
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.07883



2. Member Forces

Axial Force Fxx = -1287.5 (LCB: 54-FX, POS:I)
Bending Moments My = 3.83636, Mz = 3.43229
End Moments Myi = 3.83636, Myj = -1.8731 (for Lb)
Myi = 3.83636, Myj = -1.8731 (for Ly)
Mzi = 3.43229, Mzj = -3.3512 (for Lz)
Shear Forces Fyy = 6.12356 (LCB: 55-MX, POS:J)
Fzz = 4.51864 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729


3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

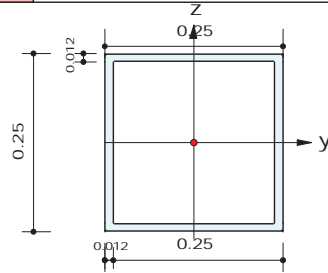
Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1287.53/2393.58 = 0.538 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 3.836/345.011 = 0.011 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 3.432/345.011 = 0.010 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rc.LT1 = N_Ed/(xy*A*fy/γM1)
Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1)
Rc.LT2 = N_Ed/(xz*A*fy/γM1)
Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1)
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.354 < 1.000 .. O.K
Shear Resistance
 $V_{Edy}/V_{y_Rd} = 0.005 < 1.000$ O.K
 $V_{Edz}/V_{z_Rd} = 0.004 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20018
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.07831



2. Member Forces

Axial Force Fxx = -874.16 (LCB: 60-FX, POS:I)
Bending Moments My = -1.8095, Mz = 2.68402
End Moments Myi = -1.8095, Myj = -3.5710 (for Lb)
Myi = -1.8095, Myj = -3.5710 (for Ly)
Mzi = 2.68402, Mzj = -0.7074 (for Lz)
Shear Forces Fyy = 6.67692 (LCB: 55+FY, POS:J)
Fzz = 5.42272 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729


3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

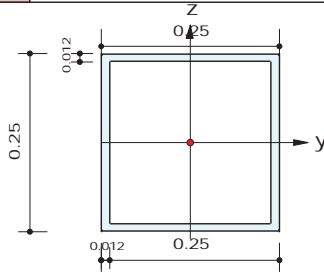
Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 874.16/2393.58 = 0.365 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 1.809/345.011 = 0.005 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 2.684/345.011 = 0.008 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rc.LT1 = N_Ed/(xy*A*fy/γM1)
Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1)
Rc.LT2 = N_Ed/(xz*A*fy/γM1)
Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1)
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.239 < 1.000 .. O.K
Shear Resistance
 $V_{Edy}/V_{y_Rd} = 0.006 < 1.000$ O.K
 $V_{Edz}/V_{z_Rd} = 0.004 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20019
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.07780



2. Member Forces

Axial Force	Fxx = -937.02 (LCB: 60-FX, POS:I)
Bending Moments	My = -5.5396, Mz = 3.37975
End Moments	Myi = -5.5396, Myj = 2.37593 (for Lb) Myi = -5.5396, Myj = 2.37593 (for Ly) Mzi = 3.37975, Mzj = -2.0642 (for Lz)
Shear Forces	Fyy = 4.19025 (LCB: 55-MZ, POS:J) Fzz = 6.25572 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

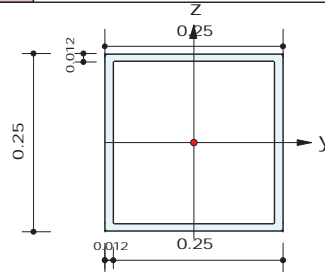
Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 937.02/2393.58 = 0.391 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 5.540/345.011 = 0.016 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 3.380/345.011 = 0.010 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.268 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.004 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.005 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20020
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.05384



2. Member Forces

Axial Force	Fxx = 1768.75 (LCB: 54+FX, POS:I)
Bending Moments	My = -12.774, Mz = -2.0565
End Moments	Myi = -12.774, Myj = -12.395 (for Lb) Myi = -12.774, Myj = -12.395 (for Ly) Mzi = -2.0565, Mzj = -2.3942 (for Lz)
Shear Forces	Fyy = 2.64741 (LCB: 55-MY, POS:J) Fzz = 3.50765 (LCB: 56+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t,Rd} = 1768.75/3862.40 = 0.458 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 12.774/345.011 = 0.037 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.057/345.011 = 0.006 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.501 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.002 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.003 < 1.000$ O.K

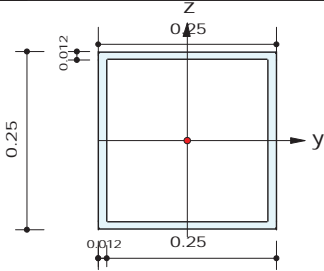
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20021
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.07151



2. Member Forces

Axial Force	Fxx = -876.26 (LCB: 60-FX, POS:J)
Bending Moments	My = -6.4706, Mz = 3.18674
End Moments	Myi = 2.35170, Myj = -6.4706 (for Lb) Myi = 2.35170, Myj = -6.4706 (for Ly) Mzi = -1.9399, Mzj = 3.18674 (for Lz)
Shear Forces	Fyy = -4.0672 (LCB: 55-MZ, POS:I) Fzz = -6.2452 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 876.26/2393.58 = 0.366 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 6.471/345.011 = 0.019 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 3.187/345.011 = 0.009 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.255 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.003 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.005 < 1.000$ O.K

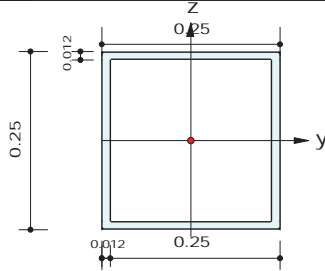
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20022
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.07203



2. Member Forces

Axial Force	Fxx = -833.23 (LCB: 60-FX, POS:I)
Bending Moments	My = -4.3073, Mz = -1.6258
End Moments	Myi = -4.3073, Myj = -0.0511 (for Lb) Myi = -4.3073, Myj = -0.0511 (for Ly) Mzi = -1.6258, Mzj = 2.05708 (for Lz)
Shear Forces	Fyy = -6.4687 (LCB: 55-MY, POS:I) Fzz = -5.4003 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

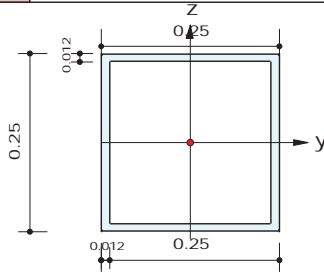
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 833.23/2393.58 = 0.348 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 4.307/345.011 = 0.012 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.626/345.011 = 0.005 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.233 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.006 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.004 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20023
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.07254



2. Member Forces

Axial Force Fxx = -1245.0 (LCB: 54-FX, POS:J)
Bending Moments My = 3.75058, Mz = 3.32351
End Moments Myi = -2.2298, Myj = 3.75058 (for Lb)
Myi = -2.2298, Myj = 3.75058 (for Ly)
Mzi = -3.2604, Mzj = 3.32351 (for Lz)
Shear Forces Fyy = -5.9394 (LCB: 55-FZ, POS:I)
Fzz = -4.5993 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1245.04/2393.58 = 0.520 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 3.751/345.011 = 0.011 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 3.324/345.011 = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}] \\ R.BiM &= (M_{Edy}/M_{ny_Rd})^\alpha + (M_{Edz}/M_{nz_Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.343 < 1.000 \dots\dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

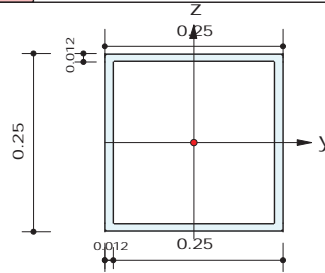
$$V_{Edz}/V_{z_Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20024
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.07306



2. Member Forces

Axial Force Fxx = -1368.7 (LCB: 54-FX, POS:1/2)
Bending Moments My = 4.27160, Mz = 1.32748
End Moments Myi = 2.75107, Myj = -1.8201 (for Lb)
Myi = 2.75107, Myj = -1.8201 (for Ly)
Mzi = 0.12342, Mzj = 2.53153 (for Lz)
Shear Forces Fyy = -4.0568 (LCB: 55-FY, POS:I)
Fzz = 3.91061 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1368.70/2393.58 = 0.572 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 4.272/345.011 = 0.012 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 1.327/345.011 = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}] \\ R.BiM &= (M_{Edy}/M_{ny_Rd})^\alpha + (M_{Edz}/M_{nz_Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.371 < 1.000 \dots\dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

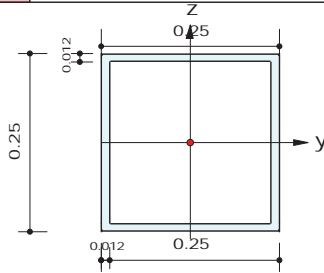
$$V_{Edz}/V_{z_Rd} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20025
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.07934



2. Member Forces

Axial Force Fxx = -1362.3 (LCB: 54-FZ, POS:1/2)
Bending Moments My = 4.22989, Mz = 1.29946
End Moments Myi = -1.7540, Myj = 2.53985 (for Lb)
Myi = -1.7540, Myj = 2.53985 (for Ly)
Mzi = 2.83504, Mzj = -0.1366 (for Lz)
Shear Forces Fyy = 4.24093 (LCB: 55+FY, POS:J)
Fzz = -3.8567 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1362.25/2393.58 = 0.569 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 4.230/345.011 = 0.012 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 1.299/345.011 = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}] \\ R.BiM &= (M_{Edy}/M_{ny_Rd})^\alpha + (M_{Edz}/M_{nz_Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.369 < 1.000 \dots\dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

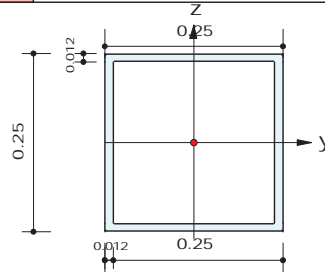
$$V_{Edz}/V_{z_Rd} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20026
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.07883



2. Member Forces

Axial Force Fxx = -1218.4 (LCB: 54-FX, POS:I)
Bending Moments My = 3.67456, Mz = 4.05392
End Moments Myi = 3.67456, Myj = -2.3392 (for Lb)
Myi = 3.67456, Myj = -2.3392 (for Ly)
Mzi = 4.05392, Mzj = -3.8330 (for Lz)
Shear Forces Fyy = 6.16925 (LCB: 55-MX, POS:J)
Fzz = 4.56118 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1218.35/2393.58 = 0.509 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 3.675/345.011 = 0.011 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 4.054/345.011 = 0.012 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}] \\ R.BiM &= (M_{Edy}/M_{ny_Rd})^\alpha + (M_{Edz}/M_{nz_Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.338 < 1.000 \dots\dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

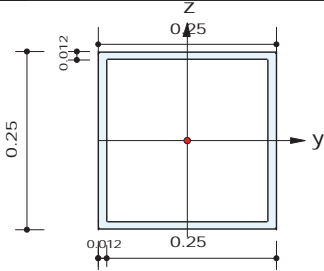
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20027
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.07831



2. Member Forces

Axial Force	Fxx = -780.13 (LCB: 60-FX, POS:J)
Bending Moments	My = -5.2175, Mz = -3.0766
End Moments	Myi = -0.2644, Myj = -5.2175 (for Lb) Myi = -0.2644, Myj = -5.2175 (for Ly) Mzi = 2.09246, Mzj = -3.0766 (for Lz)
Shear Forces	Fyy = 6.65964 (LCB: 55+FY, POS:J) Fzz = 5.58050 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 780.13/2393.58 = 0.326 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 5.218/345.011 = 0.015 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 3.077/345.011 = 0.009 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.226 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.006 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.004 < 1.000$ O.K

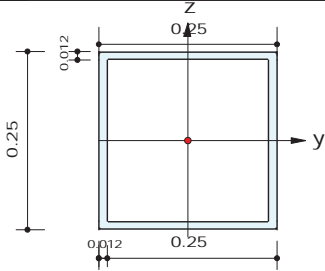
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20028
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.07780



2. Member Forces

Axial Force	Fxx = 1233.08 (LCB: 60+FX, POS:J)
Bending Moments	My = -16.086, Mz = -2.2532
End Moments	Myi = 2.75154, Myj = -16.086 (for Lb) Myi = 2.75154, Myj = -16.086 (for Ly) Mzi = -1.2837, Mzj = -2.2532 (for Lz)
Shear Forces	Fyy = 3.87346 (LCB: 55-MZ, POS:J) Fzz = 6.74153 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

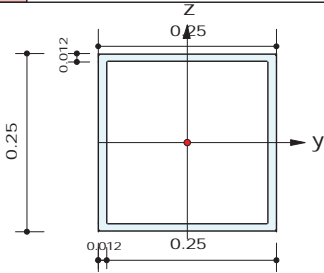
Axial Resistance	$N_{Ed}/N_{t,Rd} = 1233.08/3862.40 = 0.319 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 16.086/345.011 = 0.047 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.253/345.011 = 0.007 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.372 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.003 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.005 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20029
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.20545



2. Member Forces

Axial Force Fxx = 1921.90 (LCB: 54+FX, POS:J)
Bending Moments My = -18.012, Mz = -1.3577
End Moments Myi = -8.6330, Myj = -18.012 (for Lb)
Myi = -8.6330, Myj = -18.012 (for Ly)
Mzi = -1.5832, Mzj = -1.3577 (for Lz)
Shear Forces Fyy = 2.96111 (LCB: 55-MX, POS:J)
Fzz = -6.6173 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

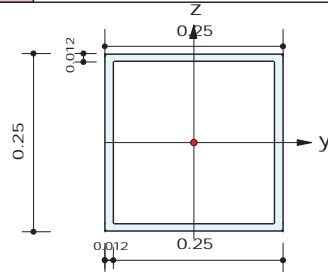
Axial Resistance
 $N_{Ed}/N_{tRd} = 1921.90/3862.40 = 0.498 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 18.012/345.011 = 0.052 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 1.358/345.011 = 0.004 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.554 < 1.000 O.K
Shear Resistance
V_Edy/Vy_Rd = 0.003 < 1.000 O.K
V_Edz/Vz_Rd = 0.005 < 1.000 O.K

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20030
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.36105



2. Member Forces

Axial Force Fxx = -1070.7 (LCB: 60-FX, POS:I)
Bending Moments My = -9.2079, Mz = -1.2108
End Moments Myi = -9.2079, Myj = 2.88453 (for Lb)
Myi = -9.2079, Myj = 2.88453 (for Ly)
Mzi = -1.2108, Mzj = 1.60512 (for Lz)
Shear Forces Fyy = -4.2103 (LCB: 55-MZ, POS:I)
Fzz = -6.2096 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729


3. Design Parameters

Unbraced Lengths Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

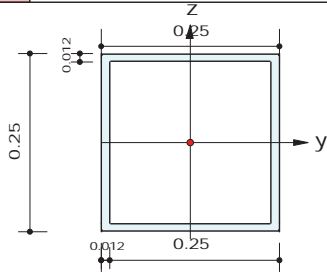
Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1070.74/2393.58 = 0.447 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 9.208/345.011 = 0.027 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 1.211/345.011 = 0.004 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rc.LT1 = N_Ed/(χy*A*fy/γM1)
Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1)
Rc.LT2 = N_Ed/(χz*A*fy/γM1)
Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1)
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.307 < 1.000 .. O.K
Shear Resistance
V_Edy/Vy_Rd = 0.004 < 1.000 O.K
V_Edz/Vz_Rd = 0.005 < 1.000 O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20031
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.36134



2. Member Forces

Axial Force Fxx = -1218.4 (LCB: 60-FX, POS:I)
Bending Moments My = -7.3148, Mz = -1.7214
End Moments Myi = -7.3148, Myj = -0.3726 (for Lb)
Myi = -7.3148, Myj = -0.3726 (for Ly)
Mzi = -1.7214, Mzj = 2.13244 (for Lz)
Shear Forces Fyy = -8.2596 (LCB: 55-MZ, POS:I)
Fzz = -5.5132 (LCB: 52-MY, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1218.44/2393.58 = 0.509 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 7.315/345.011 = 0.021 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 1.721/345.011 = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}] \\ R.BiM &= (M_{Edy}/M_{ny_Rd})^\alpha + (M_{Edz}/M_{nz_Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.342 < 1.000 \dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.007 < 1.000 \dots\dots\dots \text{O.K}$$

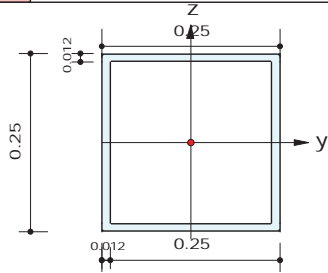
$$V_{Edz}/V_{z_Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20032
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.36164



2. Member Forces

Axial Force Fxx = -1892.5 (LCB: 60-FX, POS:3/4)
Bending Moments My = 5.17423, Mz = 1.40487
End Moments Myi = -2.0096, Myj = 3.30585 (for Lb)
Myi = -2.0096, Myj = 3.30585 (for Ly)
Mzi = -0.6107, Mzj = 2.07672 (for Lz)
Shear Forces Fyy = -6.7275 (LCB: 55-MZ, POS:I)
Fzz = -4.8243 (LCB: 54-MZ, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1892.51/2393.58 = 0.791 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 5.174/345.011 = 0.015 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 1.405/345.011 = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}] \\ R.BiM &= (M_{Edy}/M_{ny_Rd})^\alpha + (M_{Edz}/M_{nz_Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.509 < 1.000 \dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.006 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

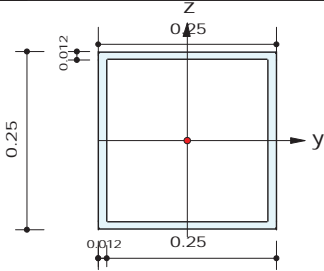
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20033
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.36193



2. Member Forces

Axial Force	Fxx = -2151.5 (LCB: 60-FX, POS:1/2)
Bending Moments	My = 5.58243, Mz = 1.17123
End Moments	Myi = 1.52511, Myj = 1.11285 (for Lb) Myi = 1.52511, Myj = 1.11285 (for Ly) Mzi = 1.38146, Mzj = 0.96100 (for Lz)
Shear Forces	Fyy = -4.1894 (LCB: 55-MZ, POS:I) Fzz = 3.37343 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths	Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2151.48/2393.58 = 0.899 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 5.582/345.011 = 0.016 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.171/345.011 = 0.003 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.577 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.004 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.003 < 1.000$ O.K

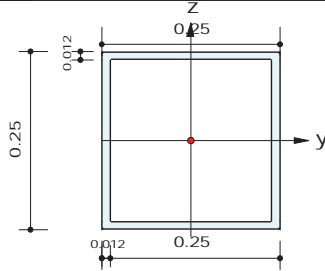
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20034
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.36222



2. Member Forces

Axial Force	Fxx = -2074.2 (LCB: 60-FX, POS:1/4)
Bending Moments	My = 4.43335, Mz = 2.69909
End Moments	Myi = 2.47524, Myj = -2.4841 (for Lb) Myi = 2.47524, Myj = -2.4841 (for Ly) Mzi = 4.50831, Mzj = -2.7286 (for Lz)
Shear Forces	Fyy = 4.07166 (LCB: 55+FY, POS:I) Fzz = 4.31812 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729


3. Design Parameters

Unbraced Lengths	Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

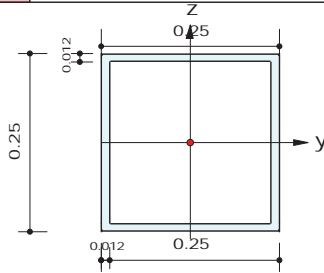
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2074.23/2393.58 = 0.867 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 4.433/345.011 = 0.013 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.699/345.011 = 0.008 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.558 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.003 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.003 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20035
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.36251



2. Member Forces

Axial Force Fxx = -1741.5 (LCB: 60-FX, POS:J)
Bending Moments My = -6.6619, Mz = -8.2708
End Moments Myi = 0.88704, Myj = -6.6619 (for Lb)
Myi = 0.88704, Myj = -6.6619 (for Ly)
Mzi = 6.39030, Mzj = -8.2708 (for Lz)
Shear Forces Fyy = 11.6842 (LCB: 60-MZ, POS:J)
Fzz = 5.46022 (LCB: 54-MY, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1741.48/2393.58 = 0.728 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 6.662/345.011 = 0.019 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 8.271/345.011 = 0.024 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}] \\ R.BiM &= (M_{Edy}/M_{ny_Rd})^\alpha + (M_{Edz}/M_{nz_Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.494 < 1.000 \dots\dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

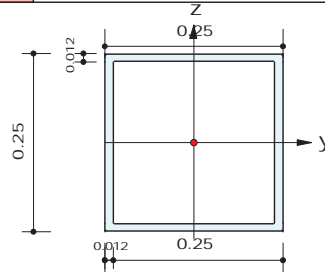
$$V_{Edz}/V_{z_Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20036
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 5.36281



2. Member Forces

Axial Force Fxx = -1220.8 (LCB: 60-FX, POS:J)
Bending Moments My = -9.8908, Mz = -33.423
End Moments Myi = -0.2704, Myj = -9.8908 (for Lb)
Myi = -0.2704, Myj = -9.8908 (for Ly)
Mzi = 21.2461, Mzj = -33.423 (for Lz)
Shear Forces Fyy = -21.237 (LCB: 60-FY, POS:J)
Fzz = 5.20025 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1220.78/2393.58 = 0.510 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 9.891/345.011 = 0.029 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 33.423/345.011 = 0.097 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}] \\ R.BiM &= (M_{Edy}/M_{ny_Rd})^\alpha + (M_{Edz}/M_{nz_Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.442 < 1.000 \dots\dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.018 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

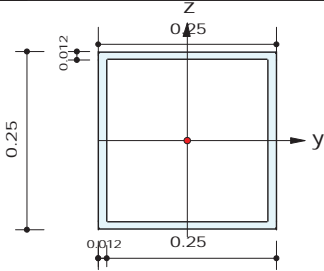
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20037
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.40163



2. Member Forces

Axial Force	Fxx = 1752.27 (LCB: 60+FX, POS:I)
Bending Moments	My = -5.6937, Mz = 12.5832
End Moments	Myi = -5.6937, Myj = -6.7487 (for Lb) Myi = -5.6937, Myj = -6.7487 (for Ly) Mzi = 12.5832, Mzj = -5.7920 (for Lz)
Shear Forces	Fyy = 10.6222 (LCB: 55-MY, POS:J) Fzz = 5.22241 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters


Unbraced Lengths	Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 1752.27/3862.40 = 0.454 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 5.694/345.011 = 0.017 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 12.583/345.011 = 0.036 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.507 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.009 < 1.000 O.K V_Edz/Vz_Rd = 0.004 < 1.000 O.K

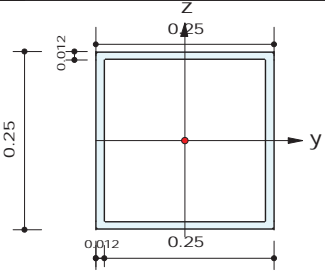
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20038
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonSUP (No:10) (Built-up Section).
Member Length	: 5.35159



2. Member Forces

Axial Force	Fxx = -437.08 (LCB: 61-FX, POS:I)
Bending Moments	My = -11.180, Mz = -17.533
End Moments	Myi = -11.180, Myj = -5.4482 (for Lb) Myi = -11.180, Myj = -5.4482 (for Ly) Mzi = -17.533, Mzj = 11.6431 (for Lz)
Shear Forces	Fyy = 14.4937 (LCB: 60-MZ, POS:J) Fzz = 5.51014 (LCB: 60-MZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729


3. Design Parameters

Unbraced Lengths	Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

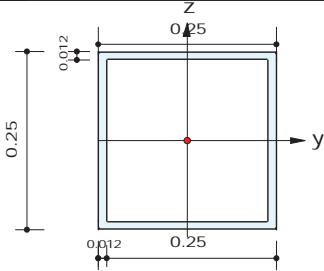
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 437.08/2393.58 = 0.183 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 11.180/345.011 = 0.032 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 17.533/345.011 = 0.051 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.196 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.012 < 1.000 O.K V_Edz/Vz_Rd = 0.004 < 1.000 O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 20039
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 2.70471



2. Member Forces

Axial Force Fxx = -22.116 (LCB: 60-MZ, POS:I)
Bending Moments My = -10.674, Mz = -18.580
End Moments Myi = -10.674, Myj = 6.34086 (for Lb)
Myi = -10.674, Myj = 6.34086 (for Ly)
Mzi = -18.580, Mzj = -6.5907 (for Lz)
Shear Forces Fyy = -10.163 (LCB: 60-MZ, POS:I)
Fzz = -10.843 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.80000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 22.12/3862.40 = 0.006 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 10.674/345.011 = 0.031 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 18.580/345.011 = 0.054 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.091 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.009 < 1.000 \dots\dots\dots O.K$$

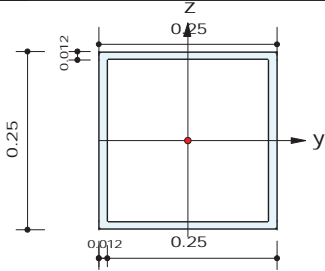
$$V_{Edz}/V_{z,Rd} = 0.009 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 10001
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonSUP (No:10)
(Built-up Section).
Member Length : 2.47270



2. Member Forces

Axial Force Fxx = 2.23941 (LCB: 60-MY, POS:J)
Bending Moments My = -9.3514, Mz = 2.18636
End Moments Myi = -6.7727, Myj = -9.3514 (for Lb)
Myi = -6.7727, Myj = -9.3514 (for Ly)
Mzi = -0.5062, Mzj = 2.18636 (for Lz)
Shear Forces Fyy = 3.04509 (LCB: 55-MX, POS:J)
Fzz = 7.23519 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01200
Flg Width	0.25000	Top F Thick	0.01200
Web Center	0.23800	Bot.F Thick	0.01200
Area	0.01142	Asz	0.00600
Oyb	0.02126	Ozb	0.02126
Iyy	0.00011	Izz	0.00011
Ybar	0.12500	Zbar	0.12500
Wely	0.00086	Welz	0.00086
ry	0.09729	rz	0.09729

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 6.10000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/N_{t,Rd} = 2.24/3862.40 = 0.001 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 9.351/345.011 = 0.027 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 2.186/345.011 = 0.006 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

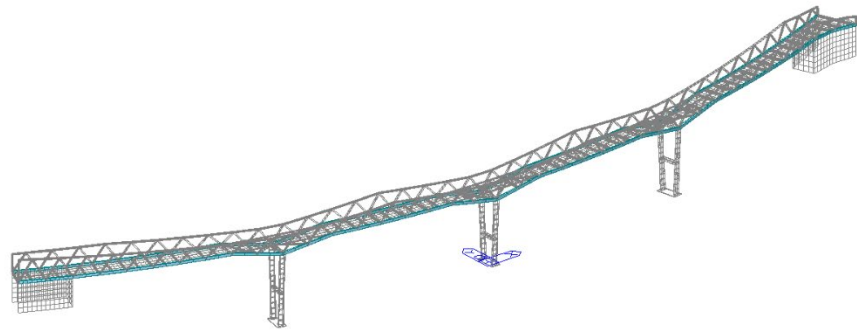
$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.034 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

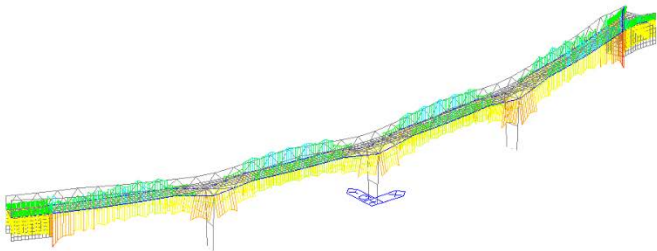
$$V_{Edy}/V_{y,Rd} = 0.003 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z,Rd} = 0.006 < 1.000 \dots\dots\dots O.K$$

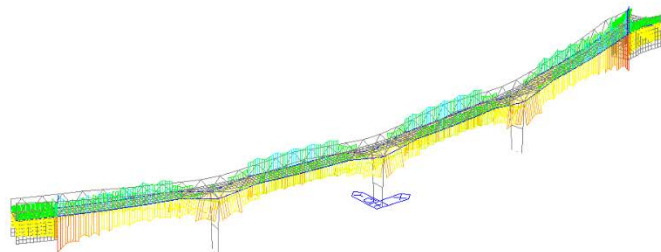
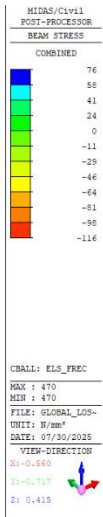
CORDÓ INFERIOR



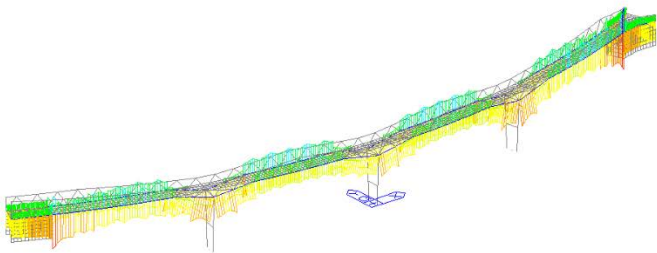
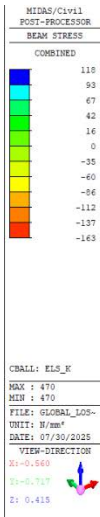
1 200_CordonInf



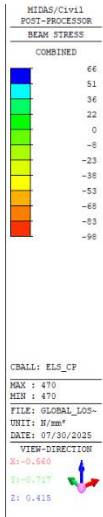
3 202_CordonInf_SigmaELsfrec

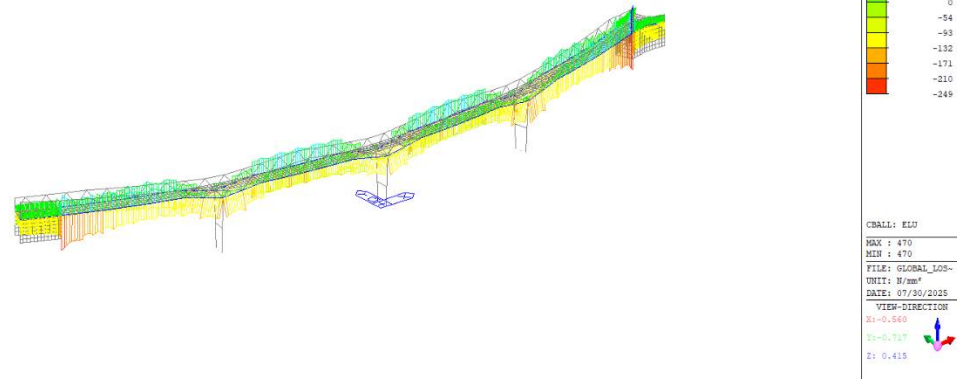


2 201_CordonInf_SigmaELSk



4 203_CordonInf_SigmaELScp






5 204_CordonInf_SigmaELU

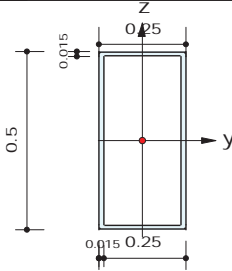
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	114
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.56972



2. Member Forces

Axial Force	Fxx = -1936.0 (LCB: 60-FX, POS:I)
Bending Moments	My = -45.461, Mz = -29.642
End Moments	Myi = -45.461, Myj = -11.449 (for Lb) Myi = -45.461, Myj = -11.449 (for Ly) Mzi = -29.642, Mzj = -1.5045 (for Lz)
Shear Forces	Fyy = -10.987 (LCB: 60-FY, POS:J) Fzz = -19.159 (LCB: 60-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Qyb	0.05792	Qzb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters


Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1936.00/7302.86 = 0.265 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 45.46/1175.05 = 0.039 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 29.642/718.621 = 0.041 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.345 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/Vy_Rd = 0.008 < 1.000$ O.K $V_{Edz}/Vz_Rd = 0.006 < 1.000$ O.K

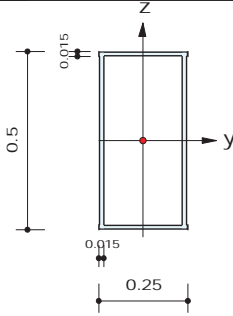
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	119
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF_Abaco_L (No:16)
Position I	BB 500x250x15/15 (Tapered Section)
Position J	: BB 500x325x15/15
Member Length	: 2.56921



2. Member Forces

Axial Force	Fxx = -2469.0 (LCB: 60-FX, POS:I)
Bending Moments	My = 0.38676, Mz = 45.0845
End Moments	Myi = 0.38676, Myj = -38.870 (for Lb) Myi = 0.38676, Myj = -38.870 (for Ly) Mzi = 45.0845, Mzj = -1.9291 (for Lz)
Shear Forces	Fyy = 18.2988 (LCB: 60-FX, POS:I) Fzz = 27.5135 (LCB: 54+FZ, POS:J)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Qyb	0.05793	Qzb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 4.50000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

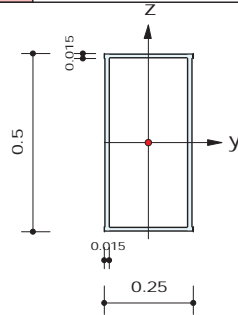
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2469.03/5952.04 = 0.415 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 0.39/1175.05 = 0.000 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 45.085/718.621 = 0.063 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.401 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/Vy_Rd = 0.012 < 1.000$ O.K $V_{Edz}/Vz_Rd = 0.008 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	124
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF_Abaco_L (No:16)
Position I	BB 500x250x15/15 (Tapered Section)
Position J	: BB 500x325x15/15
Member Length	: 2.51966



2. Member Forces

Axial Force	Fxx = -2120.5 (LCB: 60-FX, POS:I)
Bending Moments	My = 56.4436, Mz = 35.8922
End Moments	Myi = 56.4436, Myj = -38.600 (for Lb) Myi = 56.4436, Myj = -38.600 (for Ly) Mzi = 35.8922, Mzj = -2.3718 (for Lz)
Shear Forces	Fyy = 15.2202 (LCB: 54-FX, POS:I) Fzz = 49.7006 (LCB: 60-MY, POS:J)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05793	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 4.50000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

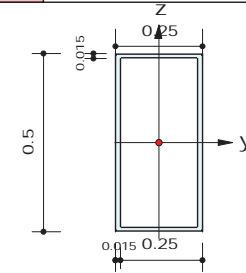
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2120.46/5952.04 = 0.356 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 56.44/1175.05 = 0.048 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 35.892/718.621 = 0.050 < 1.000$ O.K
Combined Resistance	$R_{MNRd} = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R_{BiM} = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.388 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.010 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.015 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	128
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.51915



2. Member Forces

Axial Force	Fxx = -2011.8 (LCB: 60-MY, POS:I)
Bending Moments	My = -62.836, Mz = -28.808
End Moments	Myi = -62.836, Myj = -24.798 (for Lb) Myi = -62.836, Myj = -24.798 (for Ly) Mzi = -28.808, Mzj = -3.3047 (for Lz)
Shear Forces	Fyy = -9.9901 (LCB: 54-MZ, POS:I) Fzz = -20.800 (LCB: 60-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

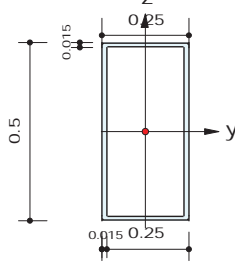
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2011.81/7302.86 = 0.275 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 62.84/1175.05 = 0.053 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 28.808/718.621 = 0.040 < 1.000$ O.K
Combined Resistance	$R_{MNRd} = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R_{BiM} = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.369 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.007 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.006 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 131
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF (No:15)
(Built-up Section).
Member Length : 2.47401



2. Member Forces

Axial Force Fxx = -2032.0 (LCB: 60-FX, POS:J)
Bending Moments My = 16.2544, Mz = 8.41889
End Moments Myi = -18.959, Myj = 16.2544 (for Lb)
Myi = -18.959, Myj = 16.2544 (for Ly)
Mzi = -5.5558, Mzj = 8.41889 (for Lz)
Shear Forces Fyy = -7.8107 (LCB: 60-FY, POS:J)
Fzz = -40.115 (LCB: 52-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2031.97/7302.86 = 0.278 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 16.25/1175.05 = 0.014 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 8.419/718.621 = 0.012 < 1.000 \dots\dots\dots O.K$$

Combined Resistance


$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$
$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$
$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$
$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$
$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$
$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.304 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.005 < 1.000 \dots\dots\dots O.K$$

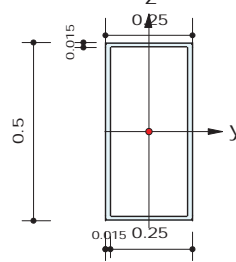
$$V_{Edz}/V_{z_Rd} = 0.012 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 134
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF (No:15)
(Built-up Section).
Member Length : 2.47401



2. Member Forces

Axial Force Fxx = -1732.3 (LCB: 60-FX, POS:I)
Bending Moments My = -17.955, Mz = -10.326
End Moments Myi = -17.955, Myj = 15.7168 (for Lb)
Myi = -17.955, Myj = 15.7168 (for Ly)
Mzi = -10.326, Mzj = 11.3294 (for Lz)
Shear Forces Fyy = -12.546 (LCB: 60-MZ, POS:I)
Fzz = -42.079 (LCB: 54-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1732.26/7302.86 = 0.237 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 17.96/1175.05 = 0.015 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 10.326/718.621 = 0.014 < 1.000 \dots\dots\dots O.K$$

Combined Resistance


$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$
$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$
$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$
$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$
$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$
$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.267 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.009 < 1.000 \dots\dots\dots O.K$$

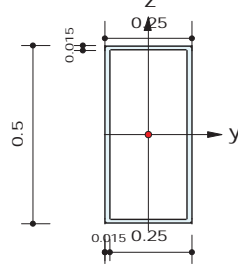
$$V_{Edz}/V_{z_Rd} = 0.013 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 137
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF (No:15)
(Built-up Section).
Member Length : 2.47401



2. Member Forces

Axial Force Fxx = -1431.2 (LCB: 60-FX, POS:J)
Bending Moments My = 19.5349, Mz = 16.6942
End Moments Myi = -15.567, Myj = 19.5349 (for Lb)
Myi = -15.567, Myj = 19.5349 (for Ly)
Mzi = -17.455, Mzj = 16.6942 (for Lz)
Shear Forces Fyy = -19.279 (LCB: 60-MZ, POS:1/4)
Fzz = -46.777 (LCB: 52-MY, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1431.25/7302.86 = 0.196 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 19.53/1175.05 = 0.017 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 16.694/718.621 = 0.023 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta$$

$$R.byN = N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$


$$R_{max} = \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.236 < 1.000 \dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.013 < 1.000 \dots\dots\dots \text{O.K}$$

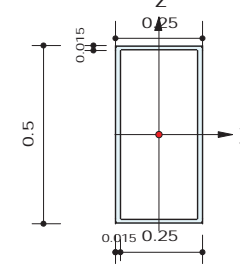
$$V_{Edz}/V_{z,Rd} = 0.014 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 140
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF (No:15)
(Built-up Section).
Member Length : 2.47401



2. Member Forces

Axial Force Fxx = -1095.8 (LCB: 60-FX, POS:J)
Bending Moments My = 23.7090, Mz = 20.1142
End Moments Myi = -16.216, Myj = 23.7090 (for Lb)
Myi = -16.216, Myj = 23.7090 (for Ly)
Mzi = -23.066, Mzj = 20.1142 (for Lz)
Shear Forces Fyy = -25.037 (LCB: 60-MZ, POS:1/4)
Fzz = -54.908 (LCB: 52-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1095.85/7302.86 = 0.150 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 23.71/1175.05 = 0.020 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 20.114/718.621 = 0.028 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta$$

$$R.byN = N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$


$$R_{max} = \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.198 < 1.000 \dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.017 < 1.000 \dots\dots\dots \text{O.K}$$

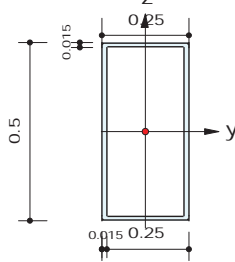
$$V_{Edz}/V_{z,Rd} = 0.017 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 143
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF (No:15)
(Built-up Section).
Member Length : 2.47401



2. Member Forces

Axial Force Fxx = -744.04 (LCB: 60-FX, POS:J)
Bending Moments My = 33.2412, Mz = 21.5956
End Moments Myi = -20.264, Myj = 33.2412 (for Lb)
Myi = -20.264, Myj = 33.2412 (for Ly)
Mzi = -27.790, Mzj = 21.5956 (for Lz)
Shear Forces Fyy = -27.009 (LCB: 60-MZ, POS:I)
Fzz = -47.345 (LCB: 54-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 744.04/7302.86 = 0.102 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 33.24/1175.05 = 0.028 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 21.596/718.621 = 0.030 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$
$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$
$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$
$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.160 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.018 < 1.000 \dots\dots\dots \text{O.K}$$

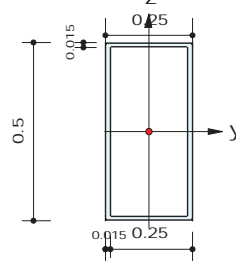
$$V_{Edz}/V_{z_Rd} = 0.014 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 146
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF (No:15)
(Built-up Section).
Member Length : 2.47401



2. Member Forces

Axial Force Fxx = -1330.6 (LCB: 60-FX, POS:I)
Bending Moments My = -151.77, Mz = 27.8649
End Moments Myi = -151.77, Myj = -25.189 (for Lb)
Myi = -151.77, Myj = -25.189 (for Ly)
Mzi = 27.8649, Mzj = -5.5767 (for Lz)
Shear Forces Fyy = -20.265 (LCB: 60-MZ, POS:1/4)
Fzz = -74.760 (LCB: 54-MY, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1330.57/7302.86 = 0.182 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 151.77/1175.05 = 0.129 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 27.865/718.621 = 0.039 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$
$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$
$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$
$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.350 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.014 < 1.000 \dots\dots\dots \text{O.K}$$

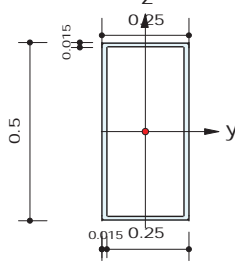
$$V_{Edz}/V_{z_Rd} = 0.023 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	149
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 0.82467



2. Member Forces

Axial Force	Fxx = -2216.1 (LCB: 60-FX, POS:I)
Bending Moments	My = -6.1336, Mz = -6.3556
End Moments	Myi = -6.1336, Myj = -1.6650 (for Lb) Myi = -6.1336, Myj = -1.6650 (for Ly) Mzi = -6.3556, Mzj = 6.29378 (for Lz)
Shear Forces	Fyy = -16.490 (LCB: 60-FY, POS:J) Fzz = -28.678 (LCB: 60-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

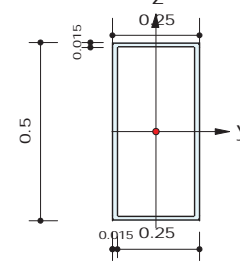
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2216.11/7302.86 = 0.303 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 6.13/1175.05 = 0.005 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 6.356/718.621 = 0.009 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.318 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.011 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.009 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	152
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 0.82467



2. Member Forces

Axial Force	Fxx = -1378.3 (LCB: 60-FY, POS:J)
Bending Moments	My = -69.423, Mz = 9.86864
End Moments	Myi = -56.738, Myj = -69.423 (for Lb) Myi = -56.738, Myj = -69.423 (for Ly) Mzi = -10.082, Mzj = 9.86864 (for Lz)
Shear Forces	Fyy = -24.192 (LCB: 60-FY, POS:J) Fzz = -48.535 (LCB: 60-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

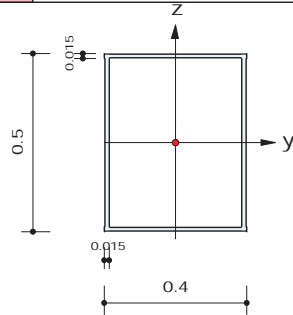
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1378.27/7302.86 = 0.189 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 69.42/1175.05 = 0.059 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 9.869/718.621 = 0.014 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.262 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.017 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.015 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 190
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF_Abaco_R (No:17)
Position I BB 500x400x15/15 (Tapered Section)
Position J : BB 500x325x15/15
Member Length : 2.56300



2. Member Forces

Axial Force Fxx = -2446.3 (LCB: 54-MZ, POS:I)
Bending Moments My = -109.97, Mz = -52.745
End Moments Myi = -109.97, Myj = -36.899 (for Lb)
Myi = -109.97, Myj = -36.899 (for Ly)
Mzi = -52.745, Mzj = -7.2977 (for Lz)
Shear Forces Fyy = -20.048 (LCB: 60-FY, POS:J)
Fzz = -44.173 (LCB: 54-MY, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.40000	Top F Thick	0.01500
Web Center	0.38500	Bot.F Thick	0.01500
Area	0.02610	Asz	0.01500
Oyb	0.07611	Ozb	0.06524
Iyy	0.00097	Izz	0.00068
Ybar	0.20000	Zbar	0.25000
Wely	0.00386	Welz	0.00341
ry	0.19233	rz	0.16174

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 4.50000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

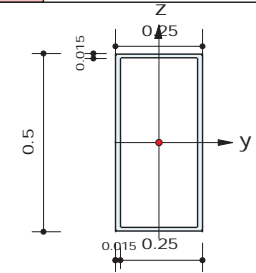
Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2446.27/8824.29 = 0.277 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 109.97/1544.00 = 0.071 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 52.75/1323.39 = 0.040 < 1.000$ O.K
Combined Resistance
 $R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$
 $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$
 $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$
 $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$
 $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$
 $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$
 $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$
 $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.388 < 1.000$.. O.K
Shear Resistance
 $V_{Edy}/Vy_Rd = 0.011 < 1.000$ O.K
 $V_{Edz}/Vz_Rd = 0.013 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 194
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF (No:15)
(Built-up Section).
Member Length : 2.56351



2. Member Forces

Axial Force Fxx = -1784.6 (LCB: 60-FX, POS:I)
Bending Moments My = -28.600, Mz = 22.5070
End Moments Myi = -28.600, Myj = -25.740 (for Lb)
Myi = -28.600, Myj = -25.740 (for Ly)
Mzi = 22.5070, Mzj = 3.28497 (for Lz)
Shear Forces Fyy = 7.55461 (LCB: 60+FY, POS:J)
Fzz = -12.605 (LCB: 52-MY, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

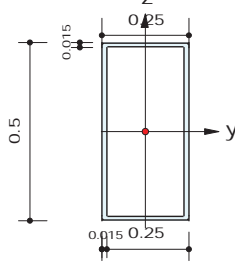
Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1784.64/7302.86 = 0.244 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 28.60/1175.05 = 0.024 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 22.507/718.621 = 0.031 < 1.000$ O.K
Combined Resistance
 $R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$
 $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$
 $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$
 $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$
 $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$
 $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$
 $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$
 $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.300 < 1.000$.. O.K
Shear Resistance
 $V_{Edy}/Vy_Rd = 0.005 < 1.000$ O.K
 $V_{Edz}/Vz_Rd = 0.004 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	197
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.52600



2. Member Forces

Axial Force	Fxx = -1443.1 (LCB: 60-MY, POS:I)
Bending Moments	My = -51.983, Mz = 1.56241
End Moments	Myi = -51.983, Myj = 6.25645 (for Lb) Myi = -51.983, Myj = 6.25645 (for Ly) Mzi = 1.56241, Mzj = 3.78879 (for Lz)
Shear Forces	Fyy = 13.3964 (LCB: 60-MZ, POS:I) Fzz = -48.582 (LCB: 52-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

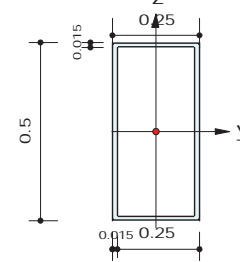
Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 1443.10/7302.86 = 0.198 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 51.98/1175.05 = 0.044 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.562/718.621 = 0.002 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.244 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.009 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.015 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	200
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.52600



2. Member Forces

Axial Force	Fxx = 870.043 (LCB: 54+FX, POS:J)
Bending Moments	My = 83.2376, Mz = -5.8932
End Moments	Myi = -19.742, Myj = 83.2376 (for Lb) Myi = -19.742, Myj = 83.2376 (for Ly) Mzi = 5.09404, Mzj = -5.8932 (for Lz)
Shear Forces	Fyy = 9.74796 (LCB: 52+FY, POS:I) Fzz = -45.214 (LCB: 52-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

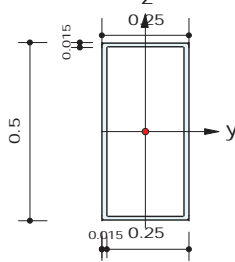
Axial Resistance	$N_{Ed}/N_{t,Rd} = 870.04/7302.86 = 0.119 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 83.24/1175.05 = 0.071 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 5.893/718.621 = 0.008 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.198 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.007 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.014 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	203
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.52600



2. Member Forces

Axial Force	Fxx = -1212.0 (LCB: 60-FX, POS:I)
Bending Moments	My = -12.463, Mz = 7.41402
End Moments	Myi = -12.463, Myj = 22.4627 (for Lb) Myi = -12.463, Myj = 22.4627 (for Ly) Mzi = 7.41402, Mzj = 0.67351 (for Lz)
Shear Forces	Fyy = 5.79302 (LCB: 52-MZ, POS:J) Fzz = -45.933 (LCB: 52-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

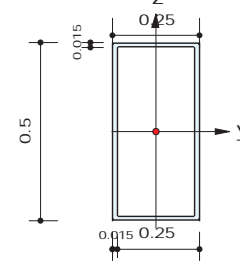
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1212.00/7302.86 = 0.166 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 12.46/1175.05 = 0.011 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 7.414/718.621 = 0.010 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.187 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.004 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.014 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	206
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.52600



2. Member Forces

Axial Force	Fxx = -1230.7 (LCB: 60-FX, POS:J)
Bending Moments	My = 25.1245, Mz = -1.6177
End Moments	Myi = -13.706, Myj = 25.1245 (for Lb) Myi = -13.706, Myj = 25.1245 (for Ly) Mzi = 8.39453, Mzj = -1.6177 (for Lz)
Shear Forces	Fyy = 6.08723 (LCB: 60+FY, POS:J) Fzz = -45.459 (LCB: 52-MY, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

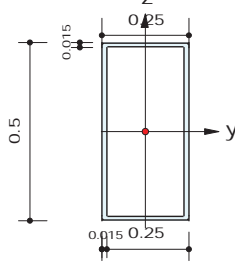
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1230.75/7302.86 = 0.169 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 25.12/1175.05 = 0.021 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.618/718.621 = 0.002 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.192 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.004 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.014 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	209
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.52600



2. Member Forces

Axial Force	Fxx = -1422.7 (LCB: 60-FX, POS:I)
Bending Moments	My = -8.5771, Mz = 7.47286
End Moments	Myi = -8.5771, Myj = 13.2863 (for Lb) Myi = -8.5771, Myj = 13.2863 (for Ly) Mzi = 7.47286, Mzj = -4.1202 (for Lz)
Shear Forces	Fyy = -6.4018 (LCB: 60-MZ, POS:I) Fzz = -40.611 (LCB: 52-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

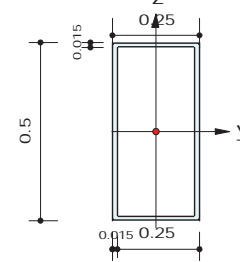
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1422.66/7302.86 = 0.195 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 8.58/1175.05 = 0.007 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 7.473/718.621 = 0.010 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.213 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.004 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.012 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	213
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.56972



2. Member Forces

Axial Force	Fxx = -1710.3 (LCB: 60-FX, POS:I)
Bending Moments	My = -30.110, Mz = 18.8598
End Moments	Myi = -30.110, Myj = -19.404 (for Lb) Myi = -30.110, Myj = -19.404 (for Ly) Mzi = 18.8598, Mzj = 3.16016 (for Lz)
Shear Forces	Fyy = 8.04768 (LCB: 60+MZ, POS:3/4) Fzz = -10.283 (LCB: 55-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

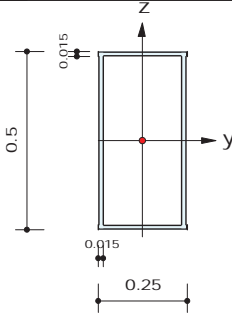
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1710.33/7302.86 = 0.234 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 30.11/1175.05 = 0.026 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 18.860/718.621 = 0.026 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.286 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.005 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.003 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	218
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF_Abaco_L (No:16)
Position I	BB 500x250x15/15 (Tapered Section)
Position J	: BB 500x325x15/15
Member Length	: 2.56921



2. Member Forces

Axial Force	Fxx = -2221.5 (LCB: 54-FX, POS:I)
Bending Moments	My = 12.1779, Mz = -22.663
End Moments	Myi = 12.1779, Myj = -29.825 (for Lb) Myi = 12.1779, Myj = -29.825 (for Ly) Mzi = -22.663, Mzj = 8.10864 (for Lz)
Shear Forces	Fyy = -12.077 (LCB: 54-FY, POS:I) Fzz = 34.1276 (LCB: 54+FZ, POS:J)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05793	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 4.50000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2221.46/5952.04 = 0.373 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 12.18/1175.05 = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 22.663/718.621 = 0.032 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$


$$Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.346 < 1.000 \dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.008 < 1.000 \dots\dots\dots \text{O.K}$$

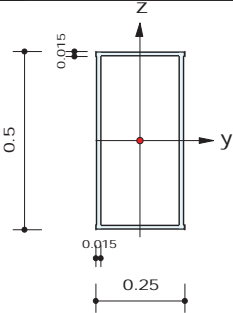
$$V_{Edz}/V_{z_Rd} = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	243
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF_Abaco_L (No:16)
Position I	BB 500x250x15/15 (Tapered Section)
Position J	: BB 500x325x15/15
Member Length	: 2.51966



2. Member Forces

Axial Force	Fxx = -1974.4 (LCB: 54-FX, POS:I)
Bending Moments	My = -8.7363, Mz = -31.402
End Moments	Myi = -8.7363, Myj = -19.217 (for Lb) Myi = -8.7363, Myj = -19.217 (for Ly) Mzi = -31.402, Mzj = 10.5992 (for Lz)
Shear Forces	Fyy = -17.596 (LCB: 60-FY, POS:I) Fzz = 44.2054 (LCB: 60+FZ, POS:J)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05793	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 4.50000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1974.40/5952.04 = 0.332 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 8.74/1175.05 = 0.007 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 31.402/718.621 = 0.044 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$


$$Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.321 < 1.000 \dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.012 < 1.000 \dots\dots\dots \text{O.K}$$

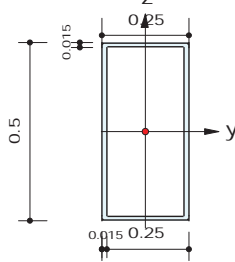
$$V_{Edz}/V_{z_Rd} = 0.013 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 244
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF (No:15)
(Built-up Section).
Member Length : 2.51915



2. Member Forces

Axial Force Fxx = -2159.4 (LCB: 60-MY, POS:I)
Bending Moments My = -62.020, Mz = 14.9537
End Moments Myi = -62.020, Myj = -14.487 (for Lb)
Myi = -62.020, Myj = -14.487 (for Ly)
Mzi = 14.9537, Mzj = -0.7466 (for Lz)
Shear Forces Fyy = 8.89223 (LCB: 60+FY, POS:J)
Fzz = -23.961 (LCB: 60-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2159.40/7302.86 = 0.296 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 62.02/1175.05 = 0.053 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 14.954/718.621 = 0.021 < 1.000 \dots\dots\dots O.K$$

Combined Resistance


$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$
$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$
$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$
$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.369 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.006 < 1.000 \dots\dots\dots O.K$$

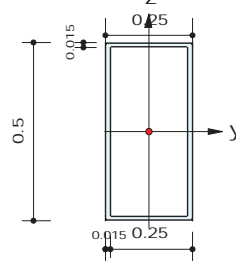
$$V_{Edz}/V_{z_Rd} = 0.007 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 245
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF (No:15)
(Built-up Section).
Member Length : 2.47401



2. Member Forces

Axial Force Fxx = -2612.2 (LCB: 60-FX, POS:I)
Bending Moments My = -21.461, Mz = 11.9805
End Moments Myi = -21.461, Myj = 9.06655 (for Lb)
Myi = -21.461, Myj = 9.06655 (for Ly)
Mzi = 11.9805, Mzj = -4.0810 (for Lz)
Shear Forces Fyy = 7.21379 (LCB: 60-MZ, POS:J)
Fzz = -38.089 (LCB: 54-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2612.16/7302.86 = 0.358 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 21.46/1175.05 = 0.018 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 11.980/718.621 = 0.017 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$
$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$
$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$
$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.393 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.005 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.012 < 1.000 \dots\dots\dots O.K$$

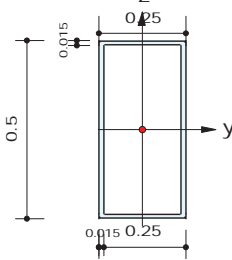
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	246
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.47401



2. Member Forces

Axial Force	Fxx = -2597.5 (LCB: 60-FX, POS:I)
Bending Moments	My = -28.428, Mz = 9.09511
End Moments	Myi = -28.428, Myj = 8.40383 (for Lb) Myi = -28.428, Myj = 8.40383 (for Ly) Mzi = 9.09511, Mzj = -1.8261 (for Lz)
Shear Forces	Fyy = 5.71561 (LCB: 60-FZ, POS:J) Fzz = -39.756 (LCB: 52-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters


Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2597.46/7302.86 = 0.356 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 28.43/1175.05 = 0.024 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 9.095/718.621 = 0.013 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.393 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.004 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.012 < 1.000$ O.K

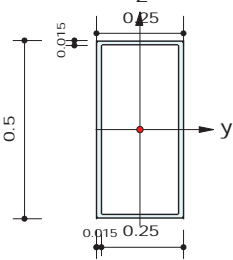
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	247
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.47401



2. Member Forces

Axial Force	Fxx = -2532.2 (LCB: 60-MY, POS:I)
Bending Moments	My = -42.689, Mz = 8.00877
End Moments	Myi = -42.689, Myj = -7.6373 (for Lb) Myi = -42.689, Myj = -7.6373 (for Ly) Mzi = 8.00877, Mzj = 3.01006 (for Lz)
Shear Forces	Fyy = 3.18967 (LCB: 55+FY, POS:J) Fzz = -40.565 (LCB: 52-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

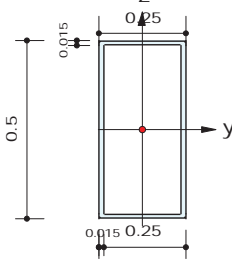
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2532.16/7302.86 = 0.347 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 42.69/1175.05 = 0.036 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.009/718.621 = 0.011 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.394 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.002 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.012 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 248
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF (No:15)
(Built-up Section).
Member Length : 2.47401



2. Member Forces

Axial Force Fxx = -2581.4 (LCB: 60-FX, POS:I)
Bending Moments My = -24.408, Mz = 0.97046
End Moments Myi = -24.408, Myj = 6.51931 (for Lb)
Myi = -24.408, Myj = 6.51931 (for Ly)
Mzi = 0.97046, Mzj = 7.31567 (for Lz)
Shear Forces Fyy = -3.6286 (LCB: 60-FY, POS:J)
Fzz = -42.782 (LCB: 52-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Qzb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2581.44/7302.86 = 0.353 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 24.41/1175.05 = 0.021 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 0.970/718.621 = 0.001 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.376 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.002 < 1.000 \dots\dots\dots O.K$$

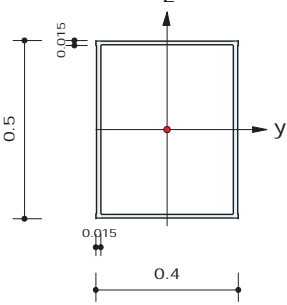
$$V_{Edz}/V_{z_Rd} = 0.013 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 5
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF_Abaco_R (No:17)
Position I BB 500x400x15/15 (Tapered Section)
Position J : BB 500x325x15/15
Member Length : 2.56300



2. Member Forces

Axial Force Fxx = -2256.0 (LCB: 54-FX, POS:I)
Bending Moments My = -143.25, Mz = 38.3589
End Moments Myi = -143.25, Myj = -50.511 (for Lb)
Myi = -143.25, Myj = -50.511 (for Ly)
Mzi = 38.3589, Mzj = 7.84596 (for Lz)
Shear Forces Fyy = 12.1363 (LCB: 54-FY, POS:J)
Fzz = -48.973 (LCB: 60-MY, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.40000	Top F Thick	0.01500
Web Center	0.38500	Bot.F Thick	0.01500
Area	0.02610	Asz	0.01500
Oyb	0.07611	Qzb	0.06524
Iyy	0.00097	Izz	0.00068
Ybar	0.20000	Zbar	0.25000
Wely	0.00386	Welz	0.00341
ry	0.19233	rz	0.16174

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 4.50000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2256.01/8824.29 = 0.256 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 143.25/1544.00 = 0.093 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 38.36/1323.39 = 0.029 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.377 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.006 < 1.000 \dots\dots\dots O.K$$

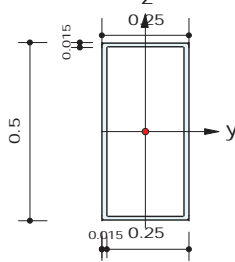
$$V_{Edz}/V_{z_Rd} = 0.015 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	9
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.56351



2. Member Forces

Axial Force	Fxx = -1789.7 (LCB: 60-FX, POS:I)
Bending Moments	My = -12.057, Mz = -13.199
End Moments	Myi = -12.057, Myj = -17.948 (for Lb) Myi = -12.057, Myj = -17.948 (for Ly) Mzi = -13.199, Mzj = 3.57512 (for Lz)
Shear Forces	Fyy = -8.3797 (LCB: 60-MZ, POS:I) Fzz = -15.807 (LCB: 60-MY, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1789.71/7302.86 = 0.245 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 12.06/1175.05 = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 13.199/718.621 = 0.018 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}] \\ R.BiM &= (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.274 < 1.000 \dots\dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.006 < 1.000 \dots\dots\dots \text{O.K}$$

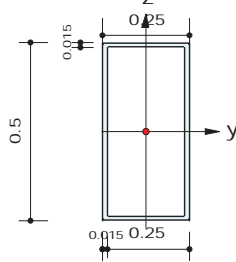
$$V_{Edz}/V_{z,Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	12
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.52600



2. Member Forces

Axial Force	Fxx = -1514.6 (LCB: 60-MY, POS:I)
Bending Moments	My = -58.261, Mz = 3.28100
End Moments	Myi = -58.261, Myj = 5.95749 (for Lb) Myi = -58.261, Myj = 5.95749 (for Ly) Mzi = 3.28100, Mzj = 4.14379 (for Lz)
Shear Forces	Fyy = 9.90705 (LCB: 60-MZ, POS:J) Fzz = -48.228 (LCB: 54-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1514.55/7302.86 = 0.207 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 58.26/1175.05 = 0.050 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 3.281/718.621 = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}] \\ R.BiM &= (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.262 < 1.000 \dots\dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.007 < 1.000 \dots\dots\dots \text{O.K}$$

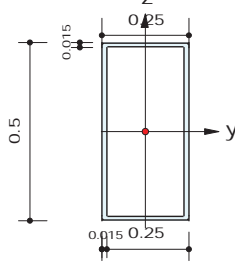
$$V_{Edz}/V_{z,Rd} = 0.015 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	15
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.52600



2. Member Forces

Axial Force	Fxx = -1305.1 (LCB: 60-FX, POS:J)
Bending Moments	My = 21.9673, Mz = 2.67302
End Moments	Myi = -8.4782, Myj = 21.9673 (for Lb) Myi = -8.4782, Myj = 21.9673 (for Ly) Mzi = 5.72786, Mzj = 2.67302 (for Lz)
Shear Forces	Fyy = 7.89069 (LCB: 52-MZ, POS:J) Fzz = -45.691 (LCB: 52-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

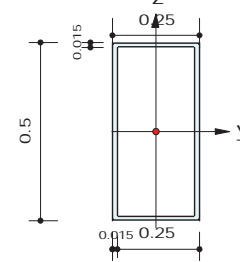
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1305.08/7302.86 = 0.179 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 21.97/1175.05 = 0.019 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.673/718.621 = 0.004 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.201 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.005 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.014 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	18
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.52600



2. Member Forces

Axial Force	Fxx = -1269.8 (LCB: 60-FX, POS:I)
Bending Moments	My = -13.071, Mz = 6.13322
End Moments	Myi = -13.071, Myj = 21.2818 (for Lb) Myi = -13.071, Myj = 21.2818 (for Ly) Mzi = 6.13322, Mzj = 0.95987 (for Lz)
Shear Forces	Fyy = 4.41616 (LCB: 52+FY, POS:J) Fzz = -45.575 (LCB: 52-MY, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

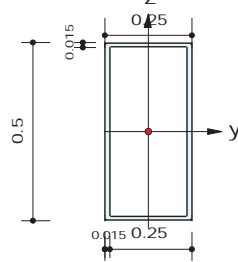
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1269.84/7302.86 = 0.174 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 13.07/1175.05 = 0.011 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 6.133/718.621 = 0.009 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.194 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.003 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.014 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 21
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF (No:15)
(Built-up Section).
Member Length : 2.52600



2. Member Forces

Axial Force Fxx = -1304.9 (LCB: 60-FX, POS:I)
Bending Moments My = -14.646, Mz = 6.95654
End Moments Myi = -14.646, Myj = 22.6879 (for Lb)
Myi = -14.646, Myj = 22.6879 (for Ly)
Mzi = 6.95654, Mzj = -1.3209 (for Lz)
Shear Forces Fyy = 5.06580 (LCB: 60+FY, POS:J)
Fzz = -45.167 (LCB: 52-MY, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1304.90/7302.86 = 0.179 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 14.65/1175.05 = 0.012 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 6.957/718.621 = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta$$

$$R.byN = N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$


$$R_{max} = \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.201 < 1.000 \dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

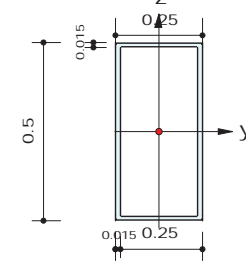
$$V_{Edz}/V_{z,Rd} = 0.014 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 24
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF (No:15)
(Built-up Section).
Member Length : 2.52600



2. Member Forces

Axial Force Fxx = -1516.5 (LCB: 60-FX, POS:I)
Bending Moments My = -10.352, Mz = 4.72699
End Moments Myi = -10.352, Myj = 8.28128 (for Lb)
Myi = -10.352, Myj = 8.28128 (for Ly)
Mzi = 4.72699, Mzj = -2.2746 (for Lz)
Shear Forces Fyy = -6.6757 (LCB: 60-FY, POS:J)
Fzz = -38.988 (LCB: 52-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 1516.46/7302.86 = 0.208 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 10.35/1175.05 = 0.009 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 4.727/718.621 = 0.007 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = \text{MAX}[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^\alpha + (M_{Edz}/M_{nz,Rd})^\beta$$

$$R.byN = N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1})$$


$$R_{max} = \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.223 < 1.000 \dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

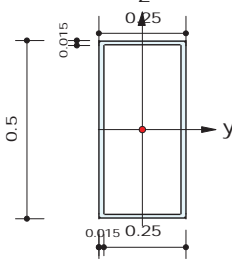
$$V_{Edz}/V_{z,Rd} = 0.012 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	28
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.56972



2. Member Forces

Axial Force	Fxx = -1838.3 (LCB: 60-FX, POS:I)
Bending Moments	My = -39.309, Mz = -15.036
End Moments	Myi = -39.309, Myj = -28.630 (for Lb) Myi = -39.309, Myj = -28.630 (for Ly) Mzi = -15.036, Mzj = 3.58192 (for Lz)
Shear Forces	Fyy = -7.3015 (LCB: 60-FY, POS:J) Fzz = -10.407 (LCB: 55-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1838.30/7302.86 = 0.252 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 39.31/1175.05 = 0.033 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 15.036/718.621 = 0.021 < 1.000 \dots\dots\dots O.K$$

Combined Resistance


$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$
$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$
$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$
$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.306 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.005 < 1.000 \dots\dots\dots O.K$$

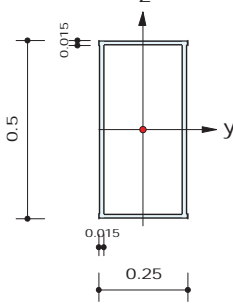
$$V_{Edz}/V_{z_Rd} = 0.003 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	33
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF_Abaco_L (No:16)
Position I	BB 500x250x15/15 (Tapered Section)
Position J	: BB 500x325x15/15
Member Length	: 2.56921



2. Member Forces

Axial Force	Fxx = -2592.3 (LCB: 60-FX, POS:I)
Bending Moments	My = -3.5382, Mz = 46.9833
End Moments	Myi = -3.5382, Myj = 2.95046 (for Lb) Myi = -3.5382, Myj = 2.95046 (for Ly) Mzi = 46.9833, Mzj = -8.0082 (for Lz)
Shear Forces	Fyy = 21.4040 (LCB: 60-FX, POS:I) Fzz = 28.5429 (LCB: 54-MY, POS:J)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05793	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 4.50000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2592.35/5952.04 = 0.436 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 3.54/1175.05 = 0.003 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 46.983/718.621 = 0.065 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$
$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$
$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$
$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.423 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.015 < 1.000 \dots\dots\dots O.K$$

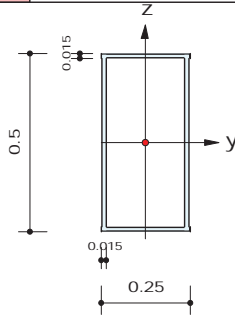
$$V_{Edz}/V_{z_Rd} = 0.009 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	56
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF_Abaco_L (No:16)
Position I	BB 500x250x15/15 (Tapered Section)
Position J	: BB 500x325x15/15
Member Length	: 2.51966



2. Member Forces

Axial Force	Fxx = -2124.7 (LCB: 54-FX, POS:I)
Bending Moments	My = -18.281, Mz = 33.3734
End Moments	Myi = -18.281, Myj = 7.78396 (for Lb) Myi = -18.281, Myj = 7.78396 (for Ly) Mzi = 33.3734, Mzj = -5.9148 (for Lz)
Shear Forces	Fyy = 16.7889 (LCB: 60+MZ, POS:I) Fzz = 55.4614 (LCB: 60+FZ, POS:J)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05793	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 4.50000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

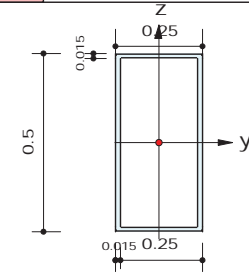
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2124.68/5952.04 = 0.357 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 18.28/1175.05 = 0.016 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 33.373/718.621 = 0.046 < 1.000$ O.K
Combined Resistance	$R_{MNRd} = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R_{BiM} = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $R_{max} = MAX[R_{MNRd}, R_{BiM}, (R_{byN} + R_{byM}), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.353 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/Vy_Rd = 0.011 < 1.000$ O.K $V_{Edz}/Vz_Rd = 0.017 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	57
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.51915



2. Member Forces

Axial Force	Fxx = -2080.6 (LCB: 60-FX, POS:I)
Bending Moments	My = -65.751, Mz = -21.449
End Moments	Myi = -65.751, Myj = -25.046 (for Lb) Myi = -65.751, Myj = -25.046 (for Ly) Mzi = -21.449, Mzj = -2.0016 (for Lz)
Shear Forces	Fyy = -9.0410 (LCB: 54-MZ, POS:I) Fzz = -20.236 (LCB: 60-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

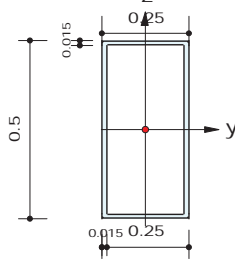
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2080.55/7302.86 = 0.285 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 65.75/1175.05 = 0.056 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 21.449/718.621 = 0.030 < 1.000$ O.K
Combined Resistance	$R_{MNRd} = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R_{BiM} = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $R_{max} = MAX[R_{MNRd}, R_{BiM}, (R_{byN} + R_{byM}), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.371 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/Vy_Rd = 0.006 < 1.000$ O.K $V_{Edz}/Vz_Rd = 0.006 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	58
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.47401



2. Member Forces

Axial Force	Fxx = -2650.9 (LCB: 60-FX, POS:I)
Bending Moments	My = -25.936, Mz = 9.32982
End Moments	Myi = -25.936, Myj = 10.7315 (for Lb) Myi = -25.936, Myj = 10.7315 (for Ly) Mzi = 9.32982, Mzj = -1.8624 (for Lz)
Shear Forces	Fyy = 5.58335 (LCB: 60+MZ, POS:1/4) Fzz = -39.457 (LCB: 54-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Qyb	0.05792	Qzb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

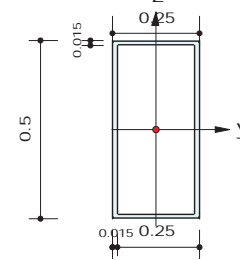
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2650.90/7302.86 = 0.363 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 25.94/1175.05 = 0.022 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 9.330/718.621 = 0.013 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.398 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.004 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.012 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	59
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.47401



2. Member Forces

Axial Force	Fxx = -2605.9 (LCB: 60-FX, POS:I)
Bending Moments	My = -26.702, Mz = 7.08388
End Moments	Myi = -26.702, Myj = 2.58651 (for Lb) Myi = -26.702, Myj = 2.58651 (for Ly) Mzi = 7.08388, Mzj = -1.5161 (for Lz)
Shear Forces	Fyy = 6.58869 (LCB: 60+FY, POS:J) Fzz = -39.368 (LCB: 52-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Qyb	0.05792	Qzb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

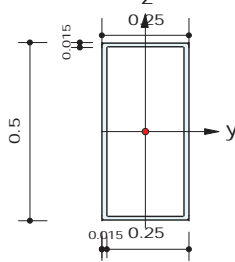
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2605.93/7302.86 = 0.357 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 26.70/1175.05 = 0.023 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 7.084/718.621 = 0.010 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.389 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.005 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.012 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	60
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.47401



2. Member Forces

Axial Force	Fxx = -2547.2 (LCB: 60-MY, POS:I)
Bending Moments	My = -41.940, Mz = 8.95421
End Moments	Myi = -41.940, Myj = -8.3627 (for Lb) Myi = -41.940, Myj = -8.3627 (for Ly) Mzi = 8.95421, Mzj = 1.92839 (for Lz)
Shear Forces	Fyy = 3.88254 (LCB: 60-MY, POS:I) Fzz = -40.794 (LCB: 52-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

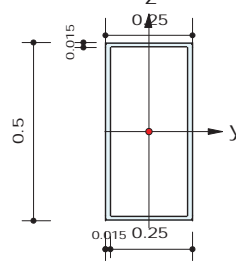
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2547.16/7302.86 = 0.349 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 41.94/1175.05 = 0.036 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.954/718.621 = 0.012 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.397 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.003 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.012 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	61
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.47401



2. Member Forces

Axial Force	Fxx = -2585.5 (LCB: 60-FX, POS:I)
Bending Moments	My = -22.917, Mz = 2.98833
End Moments	Myi = -22.917, Myj = 10.2369 (for Lb) Myi = -22.917, Myj = 10.2369 (for Ly) Mzi = 2.98833, Mzj = 4.32038 (for Lz)
Shear Forces	Fyy = -3.9725 (LCB: 60-FY, POS:J) Fzz = -42.573 (LCB: 52-MY, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

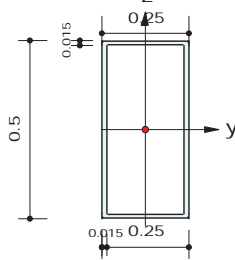
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2585.47/7302.86 = 0.354 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 22.92/1175.05 = 0.020 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.988/718.621 = 0.004 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.378 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.003 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.013 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	62
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.47401



2. Member Forces

Axial Force	Fxx = -2586.1 (LCB: 60-FX, POS:I)
Bending Moments	My = -72.802, Mz = -14.763
End Moments	Myi = -72.802, Myj = 12.0960 (for Lb) Myi = -72.802, Myj = 12.0960 (for Ly) Mzi = -14.763, Mzj = 12.1156 (for Lz)
Shear Forces	Fyy = -13.040 (LCB: 60-FY, POS:J) Fzz = -47.639 (LCB: 54-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Qyb	0.05792	Qzb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

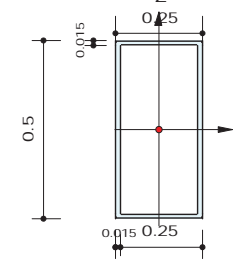
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2586.13/7302.86 = 0.354 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 72.80/1175.05 = 0.062 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 14.763/718.621 = 0.021 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.437 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.009 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.014 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	63
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.51282



2. Member Forces

Axial Force	Fxx = -2241.4 (LCB: 60-FX, POS:I)
Bending Moments	My = 34.9344, Mz = -19.542
End Moments	Myi = 34.9344, Myj = -10.420 (for Lb) Myi = 34.9344, Myj = -10.420 (for Ly) Mzi = -19.542, Mzj = -2.3791 (for Lz)
Shear Forces	Fyy = -8.7638 (LCB: 60-FY, POS:J) Fzz = -22.800 (LCB: 60-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Qyb	0.05792	Qzb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

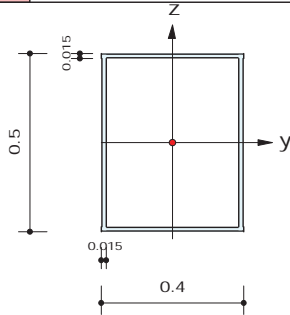
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2241.44/7302.86 = 0.307 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 34.93/1175.05 = 0.030 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 19.542/718.621 = 0.027 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.364 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.006 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.007 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	66
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF_Abaco_R (No:17)
Position I	BB 500x400x15/15 (Tapered Section)
Position J	: BB 500x325x15/15
Member Length	: 2.51333



2. Member Forces

Axial Force	Fxx = -2024.2 (LCB: 54-FX, POS:I)
Bending Moments	My = -105.98, Mz = 50.6627
End Moments	Myi = -105.98, Myj = -41.251 (for Lb) Myi = -105.98, Myj = -41.251 (for Ly) Mzi = 50.6627, Mzj = 9.84575 (for Lz)
Shear Forces	Fyy = 16.7200 (LCB: 60+FY, POS:J) Fzz = -37.849 (LCB: 52-MY, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.40000	Top F Thick	0.01500
Web Center	0.38500	Bot.F Thick	0.01500
Area	0.02610	Asz	0.01500
Qyb	0.07611	Qzb	0.06524
Iyy	0.00097	Izz	0.00068
Ybar	0.20000	Zbar	0.25000
Wely	0.00386	Welz	0.00341
ry	0.19233	rz	0.16174


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 4.50000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

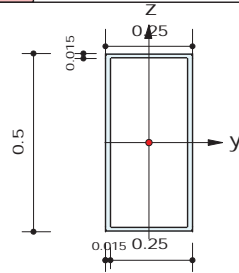
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2024.16/8824.29 = 0.229 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 105.98/1544.00 = 0.069 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 50.66/1323.39 = 0.038 < 1.000$ O.K
Combined Resistance	$R_{max} = MAX[R.MNRd, R.BIM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.336 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.009 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.011 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	99
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 0.84200



2. Member Forces

Axial Force	Fxx = -1545.2 (LCB: 60+MZ, POS:I)
Bending Moments	My = -70.328, Mz = 5.51156
End Moments	Myi = -70.328, Myj = -60.142 (for Lb) Myi = -70.328, Myj = -60.142 (for Ly) Mzi = 5.51156, Mzj = 2.76505 (for Lz)
Shear Forces	Fyy = 10.3915 (LCB: 55+FY, POS:J) Fzz = -45.627 (LCB: 60-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Qyb	0.05792	Qzb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408


3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

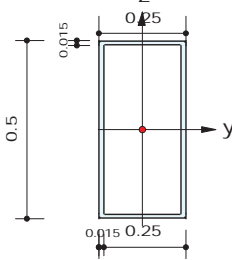
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1545.20/7302.86 = 0.212 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 70.33/1175.05 = 0.060 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 5.512/718.621 = 0.008 < 1.000$ O.K
Combined Resistance	$R_{max} = MAX[R.MNRd, R.BIM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.279 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.007 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.014 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 101
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF (No:15)
(Built-up Section).
Member Length : 0.84200



2. Member Forces

Axial Force Fxx = -2320.9 (LCB: 60-FX, POS:I)
Bending Moments My = -6.7856, Mz = 5.98383
End Moments Myi = -6.7856, Myj = -3.8741 (for Lb)
Myi = -6.7856, Myj = -3.8741 (for Ly)
Mzi = 5.98383, Mzj = -5.9299 (for Lz)
Shear Forces Fyy = 17.4204 (LCB: 60-MZ, POS:J)
Fzz = -28.501 (LCB: 60-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2320.85/7302.86 = 0.318 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 6.79/1175.05 = 0.006 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 5.984/718.621 = 0.008 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.332 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.012 < 1.000 \dots\dots\dots O.K$$

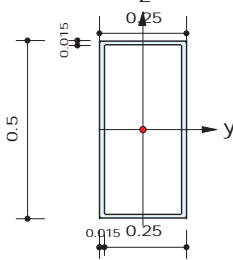
$$V_{Edz}/V_{z_Rd} = 0.009 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 103
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name cordonINF (No:15)
(Built-up Section).
Member Length : 2.52600



2. Member Forces

Axial Force Fxx = -3769.8 (LCB: 60-FX, POS:I)
Bending Moments My = -122.72, Mz = -34.884
End Moments Myi = -122.72, Myj = -13.744 (for Lb)
Myi = -122.72, Myj = -13.744 (for Ly)
Mzi = -34.884, Mzj = 8.52851 (for Lz)
Shear Forces Fyy = -18.026 (LCB: 60-FY, POS:J)
Fzz = -72.907 (LCB: 54-MY, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 3769.75/6651.15 = 0.567 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 122.72/1175.05 = 0.104 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 34.884/718.621 = 0.049 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.669 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.012 < 1.000 \dots\dots\dots O.K$$

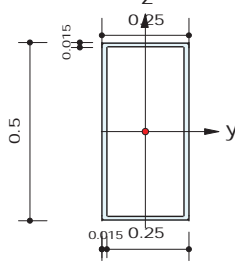
$$V_{Edz}/V_{z_Rd} = 0.022 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	105
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.52600



2. Member Forces

Axial Force	Fxx = -3020.5 (LCB: 60-FX, POS:I)
Bending Moments	My = -30.423, Mz = -8.9122
End Moments	Myi = -30.423, Myj = 27.0692 (for Lb) Myi = -30.423, Myj = 27.0692 (for Ly) Mzi = -8.9122, Mzj = 4.39455 (for Lz)
Shear Forces	Fyy = 23.8303 (LCB: 60-MZ, POS:J) Fzz = -46.555 (LCB: 52-FZ, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

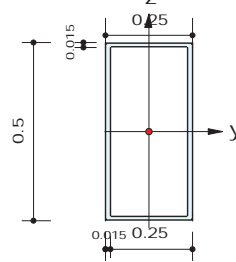
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 3020.50/6651.15 = 0.454 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 30.42/1175.05 = 0.026 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.912/718.621 = 0.012 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.452 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.016 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.014 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	107
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.52600



2. Member Forces

Axial Force	Fxx = -2472.8 (LCB: 60-FX, POS:I)
Bending Moments	My = -11.306, Mz = -19.628
End Moments	Myi = -11.306, Myj = 19.3335 (for Lb) Myi = -11.306, Myj = 19.3335 (for Ly) Mzi = -19.628, Mzj = 13.7656 (for Lz)
Shear Forces	Fyy = 23.2145 (LCB: 60-MZ, POS:J) Fzz = -57.316 (LCB: 54-MY, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2472.84/7302.86 = 0.339 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 11.31/1175.05 = 0.010 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 19.628/718.621 = 0.027 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.376 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.016 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.017 < 1.000$ O.K

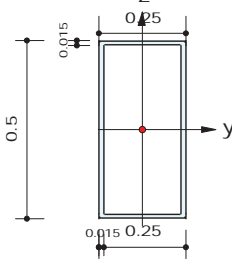
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	109
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.52600



2. Member Forces

Axial Force	Fxx = -2163.1 (LCB: 60-FX, POS:J)
Bending Moments	My = 22.6940, Mz = 15.2560
End Moments	Myi = -3.9122, Myj = 22.6940 (for Lb) Myi = -3.9122, Myj = 22.6940 (for Ly) Mzi = -17.239, Mzj = 15.2560 (for Lz)
Shear Forces	Fyy = 19.9451 (LCB: 60-MZ, POS:J) Fzz = -49.759 (LCB: 54-MY, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2163.05/7302.86 = 0.296 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 22.69/1175.05 = 0.019 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 15.256/718.621 = 0.021 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.337 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.014 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.015 < 1.000$ O.K

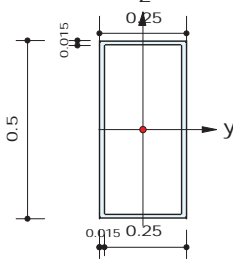
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	111
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.52600



2. Member Forces

Axial Force	Fxx = -1993.4 (LCB: 60-FX, POS:J)
Bending Moments	My = 24.0219, Mz = 16.4449
End Moments	Myi = -0.4868, Myj = 24.0219 (for Lb) Myi = -0.4868, Myj = 24.0219 (for Ly) Mzi = -16.262, Mzj = 16.4449 (for Lz)
Shear Forces	Fyy = -15.035 (LCB: 60-MZ, POS:I) Fzz = -44.716 (LCB: 52-MY, POS:I)

Depth	0.50000	Web Thick	0.01500
Flg Width	0.25000	Top F Thick	0.01500
Web Center	0.23500	Bot.F Thick	0.01500
Area	0.02160	Asz	0.01500
Oyb	0.05792	Ozb	0.03542
Iyy	0.00070	Izz	0.00023
Ybar	0.12500	Zbar	0.25000
Wely	0.00280	Welz	0.00187
ry	0.18012	rz	0.10408

3. Design Parameters


Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1993.37/7302.86 = 0.273 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 24.02/1175.05 = 0.020 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 16.445/718.621 = 0.023 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.316 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.010 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.014 < 1.000$ O.K

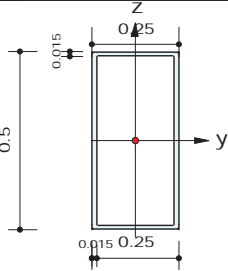
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	113
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	cordonINF (No:15) (Built-up Section).
Member Length	: 2.52600



2. Member Forces

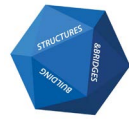
Axial Force	Fxx = -2019.2 (LCB: 60-FX, POS:J)	Depth	0.50000	Web Thick	0.01500
Bending Moments	My = 13.4564, Mz = 12.0980	Flg Width	0.25000	Top F Thick	0.01500
End Moments	Myi = 5.74027, Myj = 13.4564 (for Lb)	Web Center	0.23500	Bot.F Thick	0.01500
	Myi = 5.74027, Myj = 13.4564 (for Ly)	Area	0.02160	Asz	0.01500
	Mzi = -13.806, Mzj = 12.0980 (for Lz)	Oyb	0.05792	Ozb	0.03542
Shear Forces	Fyy = -12.022 (LCB: 60-MZ, POS:I)	Iyy	0.00070	Izz	0.00023
	Fzz = -40.357 (LCB: 54-FZ, POS:I)	Ybar	0.12500	Zbar	0.25000
		Wely	0.00280	Welz	0.00187
		ry	0.18012	rz	0.10408

3. Design Parameters

Unbraced Lengths	Ly = 4.50000, Lz = 2.25000, Lb = 0.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	
	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 2019.18/7302.86 = 0.276 < 1.000$ O.K
Bending Resistance	
	$M_{Edy}/M_{Rdy} = 13.46/1175.05 = 0.011 < 1.000$ O.K
	$M_{Edz}/M_{Rdz} = 12.098/718.621 = 0.017 < 1.000$ O.K
Combined Resistance	
	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$
	$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$
	$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$
	$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$
	$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$
	$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$
	$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$
	$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.305 < 1.000$.. O.K
Shear Resistance	
	$V_{Edy}/V_{y_Rd} = 0.008 < 1.000$ O.K
	$V_{Edz}/V_{z_Rd} = 0.012 < 1.000$ O.K



BSB

ESTRUCTURES
D'EDIFICACIÓ I PONTS S.L.

MIDAS Information Technology Co.,Ltd.

Civil 2025 (v1.1) / Checking

PROJECTE DE PASSERA PER A BICICLETES I VIANANTS
A CAN SANT JOAN A SANT CUGAT DEL VALLÈS

MIDAS Information Technology Co.,Ltd.

Civil 2025 (v1.1) / Checking

MEMBER NAME : Beam 470 cordonINF (ID : 15)

1. Member Information

1) Design Code

EN 1993-2: 2006 (NA:Recommended)

2) Material

$f_y = 355.000\text{MPa}$, $E_s = 210,000.000\text{MPa}$

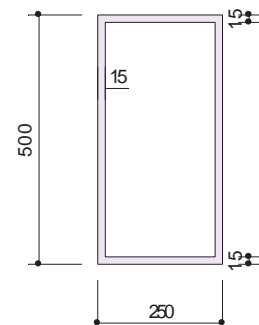
3) Length

$L = 2.678\text{m}$

4) Partial factors

$\gamma_{M0} = 1.050$ $\gamma_{M1} = 1.100$ $\gamma_{M2} = 1.250$

5) Section Properties



A	21,600.000mm ²	I _y	700,745,000.000mm ⁴	I _z	233,995,000.000mm ⁴	I _{yz}	0.000mm ⁴
C _y	125.000mm	C _z	250.000mm	i _y	180.116mm	i _z	104.082mm
W _{el,y}	2,802,980.000mm ³	W _{el,z}	1,871,960.000mm ³	W _{pl,y}	3,475,500.000mm ³	W _{pl,z}	2,125,500.000mm ³
I _T	541,262,526.042mm ⁴	I _w	0.000mm ⁶				

2. Check Axial Resistance (Sector J, 1.00L)

Axial	LCB	ELU_09-FX	
	N _{Ed} / N _{Rd}	3,806.063kN / 6,593.997kN = 0.577	OK

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ_1 (MPa)	σ_2 (MPa)	ϵ	λ_{lim1-2}	λ_{lim2-3}	λ_{lim3-4}	Class
internal top-flange	14.667	148.592	119.761	0.814	26.849	30.917	37.019	Class 1
internal bottom-flange	14.667	232.653	203.821	0.814	26.849	30.917	35.750	Class 1
left web	31.333	232.097	153.080	0.814	30.854	35.529	39.397	Class 2
right web	31.333	199.333	120.317	0.814	30.854	35.529	40.512	Class 2
Class of cross-section	-	-	-	-	-	-	-	Class 2

$$\epsilon = \sqrt{235 / f_y}$$

2) Check slenderness ratio of compressive member

$$\frac{KL}{i} = 26.649 < 200.000 \rightarrow \text{O.K}$$

3) Calculate design resistance of cross section

$$N_{c,Rd} = \frac{A f_y}{\gamma_{M0}} = 7,302.857\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

4) Calculate design resistance for flexural buckling (y-y axis)

Non-dimensional slenderness

$$K_y = 1.000$$

$$N_{cr,y} = \frac{\pi^2 E I_y}{(K_y L_y)^2} = 63,037.150\text{kN}$$

$$\lambda_b = \sqrt{\frac{A f_y}{N_{cr,y}}} = 0.349$$

EN 1993-1-1:2005, 6.3.1.3 (1)

Design resistance for flexural buckling

$\alpha = 0.340$ (Buckling curve: b)

EN 1993-1-1:2005, Table 6.1

$$\phi = 0.5 [1 + \alpha (\alpha_b - 0.2) + \lambda_b^2] = 0.586$$

$$\chi = \text{iError!} = 0.946 \quad \text{EN 1993-1-1:2005, 6.3.1.2 (1)}$$

$$N_{b,y,Rd} = \frac{\chi A F_y}{\gamma_{M1}} = 6,593.997\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

5) Calculate design resistance for flexural buckling (z-z axis)

Non-dimensional slenderness

$$K_z = 1.000$$

$$N_{cr,z} = \frac{\pi^2 E I_z}{(K_z L_z)^2} = 84,198.263\text{kN}$$

$$\lambda_b = \sqrt{\frac{A f_y}{N_{cr,z}}} = 0.302 \quad \text{EN 1993-1-1:2005, 6.3.1.3 (1)}$$

Design resistance for flexural buckling

$\alpha = 0.340$ (Buckling curve: b)

EN 1993-1-1:2005, Table 6.1

$$\phi = 0.5 [1 + \alpha (\lambda_b - 0.2) + \lambda_b^2] = 0.563$$

$$\chi = \text{iError!} = 0.963 \quad \text{EN 1993-1-1:2005, 6.3.1.2 (1)}$$

$$N_{b,z,Rd} = \frac{\chi A F_y}{\gamma_{M1}} = 6,716.143\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

6) Calculate design resistance for torsional buckling

Non-dimensional slenderness

$$G = \frac{E}{2 (1 + \nu) } = 80,769.231\text{MPa} \quad \text{EN 1993-1-1:2005, 3.2.6}$$

$y_o = 0.000\text{mm}$, $z_o = 0.000\text{mm}$ (Shear center from centroid)

$$a = \sqrt{y_o^2 + z_o^2} = 0.000\text{mm}$$

$$i_s = \sqrt{i_y^2 + i_z^2 + a^2} = 208.026\text{mm}$$

$$N_{cr,T} = \frac{1}{i_s^2} \left(\frac{\pi^2 E I_z a^2}{L_T^2} + \frac{\pi^2 E I_w}{L_T^2} + G I_T \right) = 1,010,222.019\text{kN}$$

$$\beta = 1 - (y_o / i_s)^2 = 1.000$$

$$N_{cr,TF} = \frac{N_{cr,y}}{2\beta} \left(1 + \frac{N_{cr,T}}{N_{cr,y}} - \sqrt{\left(1 - \frac{N_{cr,T}}{N_{cr,y}} \right)^2 + 4 \left(\frac{y_o}{i_s} \right)^2 \frac{N_{cr,T}}{N_{cr,y}}} \right) = \quad \text{EN 1993-1-3:2006, 6.2.3 (7)}$$

$$63,037.150\text{kN}$$

$$N_{cr} = \min (N_{cr,T}, N_{cr,TF}) = 63,037.150\text{kN}$$

$$\lambda_b = \sqrt{\frac{A f_y}{N_{cr}}} = 0.349 \quad \text{EN 1993-1-1:2005, 6.3.1.3 (1)}$$

Design resistance for Torsion and torsional-flexural buckling

$\alpha = 0.340$ (Buckling curve: b)

EN 1993-1-1:2005, Table 6.1

$$\phi = 0.5 [1 + \alpha (\lambda_b - 0.2) + \lambda_b^2] = 0.586$$

$$\chi = \text{iError!} = 0.946 \quad \text{EN 1993-1-1:2005, 6.3.1.2 (1)}$$

$$N_{b,Rd,TF} = \frac{\chi A F_y}{\gamma_{M1}} = 6,593.997\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

7) Design resistance of a compression member

$$N_{Rd} = \min (N_{c,Rd}, N_{b,y,Rd}, N_{b,z,Rd}, N_{b,Rd,TF}) = 6,593.997\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.3}$$

3. Check design resistance for shear about major axis (Sector J, 1.00L)

Shear	LCB	ELU_03+FZ	
	V _{z,Ed} / V _{c,z,Rd}	106.687kN / 3,302.773kN = 0.032	OK

* ELU_03+FZ : ELU SC dominante Termicas

1) Calculate design plastic shear resistance

$$A_{vz} = \eta \sum h_w t_w = 16,920.000\text{mm}^2 \quad \text{EN 1993-1-1:2005, 6.2.6 (3)}$$

$$V_{pl,z,Rd} = \frac{A_{vz} (f_y / \sqrt{3})}{\gamma_{M0}} = 3,302.773\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.6 (2)}$$

2) Determine whether to consider shear buckling

EN 1993-1-5:2006, 5.1 (2)

$$\eta = 1.200$$

$$\epsilon = \sqrt{\frac{235}{f_y}} = 0.814$$

$$\frac{h_w}{t} = 31.333 \leq \frac{72}{\eta} \quad \varepsilon = 48.817 \text{ (Unstiffened)}$$

∴ No need to check shear buckling

3) Calculate design shear resistance

$$V_{c.z,Rd} = V_{pl.z,Rd} = 3,302.773kN$$

4. Check design resistance for shear about minor axis (Sector J, 1.00L)

Shear	LCB	ELU_09+FY	OK
	$V_{y,Ed} / V_{c.y,Rd}$	$17.921kN / 1,463.995kN = 0.012$	

* ELU_09+FY : ELU Temp dominante SC concomitante

1) Calculate design plastic shear resistance

$$A_{vy} = A - 2h_w t_w = 7,500.000mm^2$$

EN 1993-1-1:2005, 6.2.6 (3)

$$V_{pl.y,Rd} = \frac{A_{vy} \left(f_y / \sqrt{3} \right)}{\gamma_{M0}} = 1,463.995kN$$

EN 1993-1-1:2005, 6.2.6 (2)

2) Determine whether to consider shear buckling

EN 1993-1-5:2006, 5.1 (2)

$$\eta = 1.200$$

$$\varepsilon = \sqrt{\frac{235}{f_y}} = 0.814$$

$$\frac{h_w}{t} = 14.667 \leq \frac{72}{\eta} \quad \varepsilon = 48.817 \text{ (Unstiffened)}$$

∴ No need to check shear buckling

3) Calculate design shear resistance

$$V_{c.y,Rd} = V_{pl.y,Rd} = 1,463.995kN$$

5. Check design resistance for bending about major axis (Sector J, 1.00L)

Moment	LCB	ELU_09-FX	OK
	$M_{y,Ed} / M_{c.y,Rd}$	$146.076kN \cdot m / 1,175.050kN \cdot m = 0.124$	
	Sectional class	Class 2 ≤ Class 1, 2, 3, or 4 (DCL)	

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ_1 (MPa)	σ_2 (MPa)	ε	λ_{lim1-2}	λ_{lim2-3}	λ_{lim3-4}	Class
internal top-flange	14.667	148.592	119.761	0.814	26.849	30.917	37.019	Class 1
internal bottom-flange	14.667	232.653	203.821	0.814	26.849	30.917	35.750	Class 1
left web	31.333	232.097	153.080	0.814	30.854	35.529	39.397	Class 2
right web	31.333	199.333	120.317	0.814	30.854	35.529	40.512	Class 2
Class of cross-section	-	-	-	-	-	-	-	Class 2

$$\varepsilon = \sqrt{235 / f_y}$$

2) Calculate design resistance of cross section

$$M_{c.y,Rd} = M_{pl.y,Rd} = \frac{W_{pl.y} f_y}{\gamma_{M0}} = 1,175.050kN \cdot m$$

EN 1993-1-1:2005, 6.2.5 (2)

6. Check design resistance for bending about minor axis (Sector J, 1.00L)

Moment	LCB	ELU_09-FX	OK
	$M_{z,Ed} / M_{c.z,Rd}$	$34.819kN \cdot m / 718.621kN \cdot m = 0.048$	
	Sectional class	Class 2 ≤ Class 1, 2, 3, or 4 (DCL)	

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ_1 (MPa)	σ_2 (MPa)	ε	λ_{lim1-2}	λ_{lim2-3}	λ_{lim3-4}	Class
internal top-flange	14.667	148.592	119.761	0.814	26.849	30.917	37.019	Class 1
internal bottom-flange	14.667	232.653	203.821	0.814	26.849	30.917	35.750	Class 1
left web	31.333	232.097	153.080	0.814	30.854	35.529	39.397	Class 2
right web	31.333	199.333	120.317	0.814	30.854	35.529	40.512	Class 2
Class of cross-section	-	-	-	-	-	-	-	Class 2

$$\varepsilon = \sqrt{235 / f_y}$$

2) Calculate design resistance of cross section

$$M_{c.z,Rd} = M_{pl.z,Rd} = \frac{W_{pl.z} f_y}{\gamma_{M0}} = 718.621kN \cdot m$$

EN 1993-1-1:2005, 6.2.5 (2)

7. Check design resistance for lateral-torsional buckling (Sector J, 1.00L)

Moment	LCB	ELU_09-FX	OK
	$M_{y,Ed} / M_{b,Rd}$	$0.000kN \cdot m / 0.000kN \cdot m = 0.000$	

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Calculate design resistance for lateral-torsional buckling

Asymmetric section about minor axis or not supported section

∴ Cannot check LTB

8. Check Interaction ratios (Sector J, 1.00L)

Interaction	LCB	ELU_09-FX	OK
	R_{max}	0.694	

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Applied forces for interaction ratio

$$N_{Ed} = -3,806.063kN$$

$$M_{y,Ed} = -146.076kN \cdot m, M_{z,Ed} = -34.819kN \cdot m$$

$$V_{y,Ed} = 17.101kN, V_{z,Ed} = 48.613kN$$

$$T_{Ed} = 17.778kN \cdot m$$

2) Reduced moment resistance for high shear about major axis

$$M_{c.y,Rd} = \frac{W_{pl.y} f_y}{\gamma_{M0}} = 1,175.050kN \cdot m$$

EN 1993-1-1:2005, 6.2.5 (2)

$$V_{z,Ed} < 0.5 V_{pl.z,Rd} = 488,535.240kN$$

EN 1993-1-1:2005, 6.2.8 (4)

$$M_{y,Rd} = M_{c.y,Rd} = 1,175.050kN \cdot m$$

EN 1993-1-1:2005, 6.2.8 (5)

3) Reduced moment resistance for high shear about minor axis

$$M_{c.z,Rd} = \frac{W_{pl.z} f_y}{\gamma_{M0}} = 718.621kN \cdot m$$

EN 1993-1-1:2005, 6.2.8 (4)

$$V_{y,Ed} < 0.5 V_{pl.y,Rd} = 731.998kN$$

EN 1993-1-1:2005, 6.2.8 (4)

$$M_{z,Rd} = M_{c.z,Rd} = 718.621kN \cdot m$$

EN 1993-1-1:2005, 6.2.8 (5)

4) Calculate interaction ratio of bending and axial force

$$R_{max1} = \frac{N_{Ed}}{A f_y / \gamma_{M0}} + \frac{M_{y,Ed}}{M_{y,Rd}} + \frac{M_{z,Ed}}{M_{z,Rd}} = 0.694$$

EN 1993-1-1:2005, 6.2.8 (5)

EN 1993-1-1:2005, 6.2.1 (7)

5) Calculate interaction ratio of a Class 1 and 2 cross-section (Bending and Compression)

$$N_{pl,Rd} = \frac{A f_y}{\gamma_{M0}} = 7,302.857kN$$

EN 1993-1-1:2005, 6.2.4 (2)

$$M_{pl.y,Rd} = 1,175.050kN \cdot m$$

EN 1993-1-1:2005, 6.2.5 (2)

$$M_{pl.z,Rd} = 718.621kN \cdot m$$

$$n = N_{Ed} / N_{pl,Rd} = 0.521$$

EN 1993-1-1:2005, 6.2.9.1 (5)

$$a_y = \min((A - b t_{f1} - b t_{f2}) / A, 0.5) = 0.500$$

$$a_z = \min((A - 2 b t_w) / A, 0.5) = 0.306$$

$$N_{Ed,y,lim} = \min(0.25 M_{pl,Rd}, \frac{h_w t_w f_y}{\gamma_{M0}}) = 1,825.714kN$$

$$N_{Ed,z,lim} = \frac{2 h_w t_w f_y}{\gamma_{M0}} = 4,767.143kN$$

$$N_{Ed} > N_{Ed,y,lim};$$

EN 1993-1-1:2005, 6.2.9.1 (4)

$$M_{N,y,Rd} = \min(M_{pl,y,Rd} (1 - n) / (1 - 0.5 a_y), M_{pl,y,Rd}) = 750.192kN \cdot m$$

EN 1993-1-1:2005, 6.2.9.1 (5)

$$N_{Ed} \leq N_{Ed,y,lim};$$

EN 1993-1-1:2005, 6.2.9.1 (4)

$$M_{N,z,Rd} = M_{pl,z,Rd} = 718.621kN \cdot m$$

EN 1993-1-1:2005, 6.2.9.1 (5)

$$\alpha = \beta = \min(\frac{1.66}{1 - 1.13 n^2}, 6.0) = 2.395$$

EN 1993-1-1:2005, 6.2.9.1 (6)

$$R_{max2} = [(\frac{M_{y,Ed}}{M_{N,y,Rd}})^\alpha + [(\frac{M_{z,Ed}}{M_{N,z,Rd}})^\beta] = 0.0206$$

EN 1993-1-1:2005, 6.2.9.1 (6)

6) Calculate maximum interaction ratio

$$R_{max} = \max(R_{max1}, R_{max2}) = 0.694$$

9. Check Deflection (Sector J, 1.00L)

Deflection	LCB	ELS_cp_01-MZ
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	$\delta_{\max} / \delta_{\text{allow}}$	0.000mm / 10.710mm = 0.000	OK
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* ELS_cp_01-MZ : ELS casi-permanente

- 1) Calculate allowable deflection
- L = 2,677.553mm
- $\delta_{\text{allow}} = \frac{L}{250} = 10.710\text{mm}$
- 2) Calculate maximum deflection
- Maximum deflection position 0.000mm from i-end.
- Deflection Amplification Factor (DAF) = 1.000
- $\delta = 0.000\text{mm}$
- $\delta_{\max} = \delta * \text{DAF} = 0.000\text{mm}$

MEMBER NAME : Brace 33 cordonINF_Abaco_L (ID : 16)

1. Member Information

1) Design Code

EN 1993-2: 2006 (NA:Recommended)

2) Material

f_y = 355.000MPa, E_s = 210,000.000MPa

3) Length

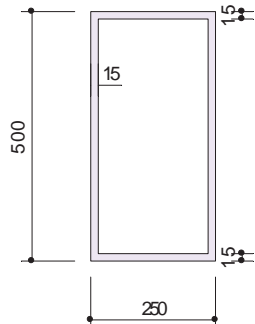
L = 2.569m

4) Partial factors

γ_{M0} = 1.050 γ_{M1} = 1.100 γ_{M2} = 1.250

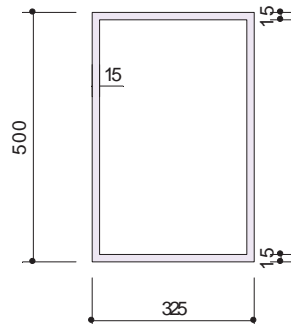
5) Section Properties

-Position I



A	21,600.000mm ²	I _y	700,745,000.000mm ⁴	I _z	233,995,000.000mm ⁴	I _{yz}	0.000mm ⁴
C _y	125.000mm	C _z	250.000mm	i _y	180.116mm	i _z	104.082mm
W _{el,y}	2,802,980.000mm ³	W _{el,z}	1,871,960.000mm ³	W _{pl,y}	3,475,500.000mm ³	W _{pl,z}	2,125,500.000mm ³
I _T	541,262,526.042mm ⁴	I _w	2.947174e+13mm ⁶				

-Position J



A	23,850.000mm ²	I _y	833,101,250.000mm ⁴	I _z	424,837,187.500mm ⁴	I _{yz}	0.000mm ⁴
C _y	162.500mm	C _z	250.000mm	i _y	186.898mm	i _z	133.465mm
W _{el,y}	3,332,405.000mm ³	W _{el,z}	2,614,382.692mm ³	W _{pl,y}	4,021,125.000mm ³	W _{pl,z}	2,977,687.500mm ³
I _T	853,023,490.566mm ⁴	I _w	5.234499e+13mm ⁶				

2. Check Axial Resistance (Sector I, 0.00R)

Axial	LCB	ELU_09-FX	
	N _{Ed} / N _{Rd}	2,592.349kN / 5,952.035kN = 0.436	OK

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ ₁ (MPa)	σ ₂ (MPa)	ε	λ _{lim1-2}	λ _{lim2-3}	λ _{lim3-4}	Class
internal top-flange	14.667	138.450	99.546	0.814	26.849	30.917	38.117	Class 1
internal bottom-flange	14.667	140.486	101.582	0.814	26.849	30.917	38.040	Class 1
left web	31.333	98.869	96.955	0.814	36.339	41.845	34.453	Class 1
right web	31.333	143.078	141.164	0.814	36.339	41.845	34.356	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$$\epsilon = \sqrt{235 / f_y}$$

2) Check slenderness ratio of compressive member

$$\frac{KL}{i} = 43.235 < 200.000 \rightarrow O.K$$

3) Calculate design resistance of cross section

$$N_{c,Rd} = \frac{A f_y}{\gamma_{M0}} = 7,302.857kN \quad EN 1993-1-1:2005, 6.2.4 (2)$$

4) Calculate design resistance for flexural buckling (z-z axis)

Non-dimensional slenderness

$$K_z = 1.000$$

$$N_{cr,z} = \frac{\pi^2 E I_z}{(K_z L_z)^2} = 23,949.728kN$$

$$\lambda_b = \sqrt{\frac{A f_y}{N_{cr,z}}} = 0.566 \quad EN 1993-1-1:2005, 6.3.1.3 (1)$$

Design resistance for flexural buckling

$$\alpha = 0.340 (\text{Buckling curve: b})$$

$$\phi = 0.5 [1 + \alpha (\lambda_b - 0.2) + \lambda_b^2] = 0.722$$

$$\chi = \frac{1}{\phi} = 1.384 \quad EN 1993-1-1:2005, 6.3.1.2 (1)$$

$$N_{b,z,Rd} = \frac{\chi A F_y}{\gamma_{M1}} = 5,952.035kN \quad EN 1993-1-1:2005, 6.2.4 (2)$$

5) Design resistance of a compression member

$$N_{Rd} = N_{c,Rd} = 5,952.035kN \quad EN 1993-1-1:2005, 6.2.3$$

3. Check design resistance for shear about major axis (Sector J, 1.00L)

Shear	LCB	ELU_03-MY	
	V _{z,Ed} / V _{c,z,Rd}	28.543kN / 3,302.773kN = 0.009	OK

* ELU_03-MY : ELU SC dominante Termicas

1) Calculate design plastic shear resistance

$$A_{vz} = \eta \sum h_w t_w = 16,920.000mm^2 \quad EN 1993-1-1:2005, 6.2.6 (3)$$

$$V_{pl,z,Rd} = \frac{A_{vz} (f_y / \sqrt{3})}{\gamma_{M0}} = 3,302.773kN \quad EN 1993-1-1:2005, 6.2.6 (2)$$

2) Determine whether to consider shear buckling

$$\eta = 1.200$$

$$\epsilon = \sqrt{\frac{235}{f_y}} = 0.814$$

$$\frac{h_w}{t} = 31.333 \leq \frac{72}{\eta} \epsilon = 48.817 (\text{Unstiffened})$$

∴ No need to check shear buckling

3) Calculate design shear resistance

$$V_{c,z,Rd} = V_{pl,z,Rd} = 3,302.773kN$$

4. Check design resistance for shear about minor axis (Sector I, 0.00R)

Shear	LCB	ELU_09-FX	
	V _{y,Ed} / V _{c,y,Rd}	21.404kN / 1,463.995kN = 0.015	OK

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Calculate design plastic shear resistance

$$A_{vy} = A - 2h_w t_w = 7,500.000mm^2 \quad EN 1993-1-1:2005, 6.2.6 (3)$$

$$V_{pl,y,Rd} = \frac{A_{vy} (f_y / \sqrt{3})}{\gamma_{M0}} = 1,463.995kN \quad EN 1993-1-1:2005, 6.2.6 (2)$$

2) Determine whether to consider shear buckling

$$\eta = 1.200$$

$$\epsilon = \sqrt{\frac{235}{f_y}} = 0.814$$

EN 1993-1-5:2006, 5.1 (2)

$$\frac{h_w}{t} = 14.667 \leq \frac{72}{\eta} \quad \epsilon = 48.817 \text{ (Unstiffened)}$$

∴ No need to check shear buckling

3) Calculate design shear resistance

$$V_{c,y,Rd} = V_{pl,y,Rd} = 1,463.995\text{kN}$$

5. Check design resistance for bending about major axis (Sector I, 0.00R)

Moment	LCB	ELU_09-FX	
	M _{y,Ed} / M _{c,y,Rd}	3.538kN·m / 1,175.050kN·m = 0.003	OK
	Sectional class	Class 2 ≤ Class 1, 2, 3, or 4 (DCL)	OK

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ ₁ (MPa)	σ ₂ (MPa)	ε	λ _{lim1-2}	λ _{lim2-3}	λ _{lim3-4}	Class
internal top-flange	14.667	138.450	99.546	0.814	26.849	30.917	38.117	Class 1
internal bottom-flange	14.667	140.486	101.582	0.814	26.849	30.917	38.040	Class 1
left web	31.333	98.869	96.955	0.814	36.339	41.845	34.453	Class 1
right web	31.333	143.078	141.164	0.814	36.339	41.845	34.356	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$$\epsilon = \sqrt{235 / f_y}$$

2) Calculate design resistance of cross section

$$M_{c,y,Rd} = M_{pl,y,Rd} = \frac{W_{pl,y} f_y}{\gamma_{M0}} = 1,175.050\text{kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.5 (2)}$$

6. Check design resistance for bending about minor axis (Sector I, 0.00R)

Moment	LCB	ELU_09-FX	
	M _{z,Ed} / M _{c,z,Rd}	46.983kN·m / 718.621kN·m = 0.065	OK
	Sectional class	Class 2 ≤ Class 1, 2, 3, or 4 (DCL)	OK

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ ₁ (MPa)	σ ₂ (MPa)	ε	λ _{lim1-2}	λ _{lim2-3}	λ _{lim3-4}	Class
internal top-flange	14.667	138.450	99.546	0.814	26.849	30.917	38.117	Class 1
internal bottom-flange	14.667	140.486	101.582	0.814	26.849	30.917	38.040	Class 1
left web	31.333	98.869	96.955	0.814	36.339	41.845	34.453	Class 1
right web	31.333	143.078	141.164	0.814	36.339	41.845	34.356	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$$\epsilon = \sqrt{235 / f_y}$$

2) Calculate design resistance of cross section

$$M_{c,z,Rd} = M_{pl,z,Rd} = \frac{W_{pl,z} f_y}{\gamma_{M0}} = 718.621\text{kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.5 (2)}$$

7. Check design resistance for lateral-torsional buckling (Sector I, 0.00R)

Moment	LCB	ELU_09-FX	
	M _{y,Ed} / M _{b,Rd}	0.000kN·m / 0.000kN·m = 0.000	OK

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Calculate design resistance for lateral-torsional buckling

Asymmetric section about minor axis or not supported section

∴ Cannot check LTB

8. Check Interaction ratios (Sector I, 0.00R)

Interaction	LCB	ELU_09-FX	
	R _{max}	0.423	OK

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Applied forces for interaction ratio

$$N_{Ed} = -2,592.349\text{kN}$$

$$M_{y,Ed} = -3.538\text{kN}\cdot\text{m} \text{ , } M_{z,Ed} = 46.983\text{kN}\cdot\text{m}$$

$$V_{y,Ed} = 21.404\text{kN} \text{ , } V_{z,Ed} = -5.458\text{kN}$$

$$T_{Ed} = 24.224\text{kN}\cdot\text{m}$$

2) Reduced moment resistance for high shear about major axis

$$M_{c,y,Rd} = \frac{W_{pl,y} f_y}{\gamma_{M0}} = 1,175.050\text{kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.5 (2)}$$

$$V_{z,Ed} < 0.5 V_{pl,z,Rd} = 488,535.240\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.8 (4)}$$

$$M_{y,Rd} = M_{c,y,Rd} = 1,175.050\text{kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.8 (5)}$$

3) Reduced moment resistance for high shear about minor axis

$$M_{c,z,Rd} = \frac{W_{pl,z} f_y}{\gamma_{M0}} = 718.621\text{kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.8 (4)}$$

$$V_{y,Ed} < 0.5 V_{pl,y,Rd} = 731.998\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.8 (4)}$$

$$M_{z,Rd} = M_{c,z,Rd} = 718.621\text{kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.8 (5)}$$

4) Calculate interaction ratio of bending and axial force

$$R_{max1} = \frac{N_{Ed}}{A f_y / \gamma_{M0}} + \frac{M_{y,Ed}}{M_{y,Rd}} + \frac{M_{z,Ed}}{M_{z,Rd}} = 0.423 \quad \begin{matrix} \text{EN 1993-1-1:2005, 6.2.8 (5)} \\ \text{EN 1993-1-1:2005, 6.2.1 (7)} \end{matrix}$$

5) Calculate interaction ratio of a Class 1 and 2 cross-section (Bending and Compression)

$$N_{pl,Rd} = \frac{A f_y}{\gamma_{M0}} = 7,302.857\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

$$M_{pl,y,Rd} = 1,175.050\text{kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.5 (2)}$$

$$M_{pl,z,Rd} = 718.621\text{kN}\cdot\text{m}$$

$$n = N_{Ed} / N_{pl,Rd} = 0.355 \quad \text{EN 1993-1-1:2005, 6.2.9.1 (5)}$$

$$a_y = \min((A - b t_{f1} - b t_{f2}) / A , 0.5) = 0.500$$

$$a_z = \min((A - 2 b t_w) / A , 0.5) = 0.306$$

$$N_{Ed,y,lim} = \min(0.25 M_{pl,Rd} , \frac{h_w t_w f_y}{\gamma_{M0}}) = 1,825.714\text{kN}$$

$$N_{Ed,z,lim} = \frac{2 h_w t_w f_y}{\gamma_{M0}} = 4,767.143\text{kN}$$

$$N_{Ed} > N_{Ed,y,lim} ; \quad \text{EN 1993-1-1:2005, 6.2.9.1 (4)}$$

$$M_{N,y,Rd} = \min(M_{pl,y,Rd} (1 - n) / (1 - 0.5 a_y) , M_{pl,y,Rd}) = 1,010.578\text{kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.9.1 (5)}$$

$$N_{Ed} \leq N_{Ed,y,lim} ; \quad \text{EN 1993-1-1:2005, 6.2.9.1 (4)}$$

$$M_{N,z,Rd} = M_{pl,z,Rd} = 718.621\text{kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.9.1 (5)}$$

$$\alpha = \beta = \min(\frac{1.66}{1 - 1.13 n^2} , 6.0) = 1.936 \quad \text{EN 1993-1-1:2005, 6.2.9.1 (6)}$$

$$R_{max2} = [(\frac{M_{y,Ed}}{M_{N,y,Rd}})^\alpha + [(\frac{M_{z,Ed}}{M_{N,z,Rd}})^\beta] = 0.00511 \quad \text{EN 1993-1-1:2005, 6.2.9.1 (6)}$$

6) Calculate maximum interaction ratio

$$R_{max} = \max (R_{max1} , R_{max2}) = 0.423$$

9. Check Deflection (Sector J, 1.00L)

Deflection	LCB	ELS_cp_01-MZ	
	δ _{max} / δ _{allow}	0.000mm / 10.277mm = 0.000	OK

* ELS_cp_01-MZ : ELS casi-permanente

1) Calculate allowable deflection

$$L = 2,569.214\text{mm}$$

$$\delta_{allow} = \frac{L}{250} = 10.277\text{mm}$$

2) Calculate maximum deflection

Maximum deflection position 0.000mm from i-end.

Deflection Amplification Factor (DAF) = 1.000

$$\delta = 0.000\text{mm}$$

$$\delta_{max} = \delta * \text{DAF} = 0.000\text{mm}$$

MEMBER NAME : Brace 463 cordonINF_Abaco_R (ID : 17)

1. Member Information

1) Design Code

EN 1993-2: 2006 (NA:Recommended)

2) Material

f_y = 355.000MPa, E_s = 210,000.000MPa

3) Length

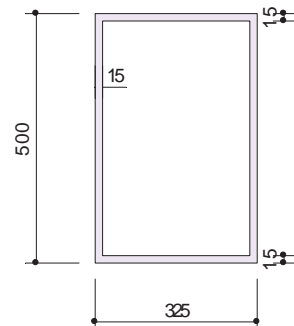
L = 2.714m

4) Partial factors

γ_{M0} = 1.050 γ_{M1} = 1.100 γ_{M2} = 1.250

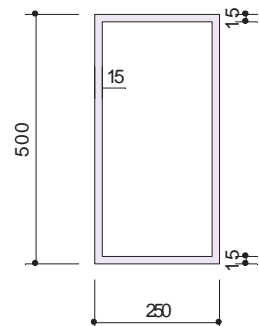
5) Section Properties

-Position I



A	23,850.000mm ²	I _y	833,101,250.000mm ⁴	I _z	424,837,187.500mm ⁴	I _{yz}	0.000mm ⁴
C _y	162.500mm	C _z	250.000mm	i _y	186.898mm	i _z	133.465mm
W _{el,y}	3,332,405.000mm ³	W _{el,z}	2,614,382.692mm ³	W _{pl,y}	4,021,125.000mm ³	W _{pl,z}	2,977,687.500mm ³
I _T	853,023,490.566mm ⁴	I _w	5.234499e+13mm ⁶				

-Position J



A	21,600.000mm ²	I _y	700,745,000.000mm ⁴	I _z	233,995,000.000mm ⁴	I _{yz}	0.000mm ⁴
C _y	125.000mm	C _z	250.000mm	i _y	180.116mm	i _z	104.082mm
W _{el,y}	2,802,980.000mm ³	W _{el,z}	1,871,960.000mm ³	W _{pl,y}	3,475,500.000mm ³	W _{pl,z}	2,125,500.000mm ³
I _T	541,262,526.042mm ⁴	I _w	2.947174e+13mm ⁶				

2. Check Axial Resistance (Sector J, 1.00L)

Axial	LCB	ELU_09-FX
	N _{Ed} / N _{Rd}	2,603.127kN / 5,822.587kN = 0.447

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ ₁ (MPa)	σ ₂ (MPa)	ε	λ _{lim1-2}	λ _{lim2-3}	λ _{lim3-4}	Class
internal top-flange	14.667	142.338	104.209	0.814	26.849	30.917	37.890	Class 1
internal bottom-flange	14.667	136.821	98.693	0.814	26.849	30.917	38.095	Class 1
left web	31.333	101.444	96.259	0.814	36.281	41.779	34.919	Class 1
right web	31.333	144.772	139.587	0.814	36.281	41.779	34.668	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$$\epsilon = \sqrt{235 / f_y}$$

2) Check slenderness ratio of compressive member

$$\frac{KL}{i} = 46.117 < 200.000 \rightarrow O.K$$

3) Calculate design resistance of cross section

$$N_{c,Rd} = \frac{A f_y}{\gamma_{M0}} = 7,302.857kN$$
 EN 1993-1-1:2005, 6.2.4 (2)

4) Calculate design resistance for flexural buckling (y-y axis)

Non-dimensional slenderness

$$K_y = 1.000$$

$$N_{cr,y} = \frac{\pi^2 E I_y}{(K_y L_y)^2} = 63,037.150kN$$

$$\lambda_b = \sqrt{\frac{A f_y}{N_{cr,y}}} = 0.349$$
 EN 1993-1-1:2005, 6.3.1.3 (1)

Design resistance for flexural buckling

$$\alpha = 0.340 \text{ (Buckling curve: b)}$$

$$\phi = 0.5 [1 + \alpha (\alpha_b - 0.2) + \lambda_b^2] = 0.586$$

$$\chi = \text{iError!} = 0.946$$
 EN 1993-1-1:2005, 6.3.1.2 (1)

$$N_{b,y,Rd} = \frac{\chi A F_y}{\gamma_{M1}} = 6,593.997kN$$
 EN 1993-1-1:2005, 6.2.4 (2)

5) Calculate design resistance for flexural buckling (z-z axis)

Non-dimensional slenderness

$$K_z = 1.000$$

$$N_{cr,z} = \frac{\pi^2 E I_z}{(K_z L_z)^2} = 21,049.566kN$$

$$\lambda_b = \sqrt{\frac{A f_y}{N_{cr,z}}} = 0.604$$
 EN 1993-1-1:2005, 6.3.1.3 (1)

Design resistance for flexural buckling

$$\alpha = 0.340 \text{ (Buckling curve: b)}$$

$$\phi = 0.5 [1 + \alpha (\lambda_b - 0.2) + \lambda_b^2] = 0.751$$

$$\chi = \text{iError!} = 0.835$$
 EN 1993-1-1:2005, 6.3.1.2 (1)

$$N_{b,z,Rd} = \frac{\chi A F_y}{\gamma_{M1}} = 5,822.587kN$$
 EN 1993-1-1:2005, 6.2.4 (2)

6) Calculate design resistance for torsional buckling

Non-dimensional slenderness

$$G = \frac{E}{2 (1 + \nu)} = 80,769.231MPa$$
 EN 1993-1-1:2005, 3.2.6

$$y_o = 0.000mm, z_o = 0.000mm \text{ (Shear center from centroid)}$$

$$a = \sqrt{y_o^2 + z_o^2} = 0.000mm$$

$$i_s = \sqrt{i_y^2 + i_z^2 + a^2} = 208.026mm$$

$$N_{cr,T} = \frac{1}{i_s^2} \left(\frac{\pi^2 E I_z a^2}{L_T^2} + \frac{\pi^2 E I_w}{L_T^2} + G I_T \right) = 1,010,222.019kN$$

$$\beta = 1 - (y_o / i_s)^2 = 1.000$$

$$N_{cr,TF} = \frac{N_{cr,y}}{2\beta} \left(1 + \frac{N_{cr,T}}{N_{cr,y}} - \sqrt{\left(1 - \frac{N_{cr,T}}{N_{cr,y}} \right)^2 + 4 \left(\frac{y_o}{i_s} \right)^2 \frac{N_{cr,T}}{N_{cr,y}}} \right) =$$
 EN 1993-1-3:2006, 6.2.3 (7)

$$63,037.150kN$$

$$N_{cr} = \min (N_{cr,T}, N_{cr,TF}) = 63,037.150kN$$

$$\lambda_b = \sqrt{\frac{A f_y}{N_{cr}}} = 0.349$$
 EN 1993-1-1:2005, 6.3.1.3 (1)

Design resistance for Torsion and torsional-flexural buckling

$$\alpha = 0.340 \text{ (Buckling curve: b)}$$

$$\phi = 0.5 [1 + \alpha (\lambda_b - 0.2) + \lambda_b^2] = 0.586$$

$$\chi = \text{iError!} = 0.946$$
 EN 1993-1-1:2005, 6.3.1.2 (1)

$$N_{b,Rd,TF} = \frac{\chi A F_y}{\gamma_{M1}} = 6,593.997kN$$
 EN 1993-1-1:2005, 6.2.4 (2)

7) Design resistance of a compression member

$$N_{Rd} = \min (N_{c,Rd} , N_{b,y,Rd} , N_{b,z,Rd} , N_{b,Rd,TF}) = 5,822.587kN$$

EN 1993-1-1:2005, 6.2.3

3. Check design resistance for shear about major axis (Sector I, 0.00R)

Shear	LCB	ELU_03-MY	OK
	V _{z,Ed} / V _{c,z,Rd}	37.719kN / 3,302.773kN = 0.011	

* ELU_03-MY : ELU SC dominante Termicas

1) Calculate design plastic shear resistance

$$A_{vz} = \eta \Sigma h_w t_w = 16,920.000mm^2$$

EN 1993-1-1:2005, 6.2.6 (3)

$$V_{pl,z,Rd} = \frac{A_{vz} \left(f_y / \sqrt{3} \right)}{Y_{M0}} = 3,302.773kN$$

EN 1993-1-1:2005, 6.2.6 (2)

2) Determine whether to consider shear buckling

EN 1993-1-5:2006, 5.1 (2)

$$\eta = 1.200$$

$$\epsilon = \sqrt{\frac{235}{f_y}} = 0.814$$

$$\frac{h_w}{t} = 31.333 \leq \frac{72}{\eta} \quad \epsilon = 48.817 \text{ (Unstiffened)}$$

∴ No need to check shear buckling

3) Calculate design shear resistance

$$V_{c,z,Rd} = V_{pl,z,Rd} = 3,302.773kN$$

4. Check design resistance for shear about minor axis (Sector J, 1.00L)

Shear	LCB	ELU_09-FY	OK
	V _{y,Ed} / V _{c,y,Rd}	18.462kN / 1,463.995kN = 0.013	

* ELU_09-FY : ELU Temp dominante SC concomitante

1) Calculate design plastic shear resistance

$$A_{vy} = A - 2h_w t_w = 7,500.000mm^2$$

EN 1993-1-1:2005, 6.2.6 (3)

$$V_{pl,y,Rd} = \frac{A_{vy} \left(f_y / \sqrt{3} \right)}{Y_{M0}} = 1,463.995kN$$

EN 1993-1-1:2005, 6.2.6 (2)

2) Determine whether to consider shear buckling

EN 1993-1-5:2006, 5.1 (2)

$$\eta = 1.200$$

$$\epsilon = \sqrt{\frac{235}{f_y}} = 0.814$$

$$\frac{h_w}{t} = 14.667 \leq \frac{72}{\eta} \quad \epsilon = 48.817 \text{ (Unstiffened)}$$

∴ No need to check shear buckling

3) Calculate design shear resistance

$$V_{c,y,Rd} = V_{pl,y,Rd} = 1,463.995kN$$

5. Check design resistance for bending about major axis (Sector J, 1.00L)

Moment	LCB	ELU_09-FX	OK
	M _{y,Ed} / M _{c,y,Rd}	9.586kN·m / 1,175.050kN·m = 0.008	
	Sectional class	Class 2 ≤ Class 1, 2, 3, or 4 (DCL)	

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ ₁ (MPa)	σ ₂ (MPa)	ε	λ _{lim1-2}	λ _{lim2-3}	λ _{lim3-4}	Class
internal top-flange	14.667	142.338	104.209	0.814	26.849	30.917	37.890	Class 1
internal bottom-flange	14.667	136.821	98.693	0.814	26.849	30.917	38.095	Class 1
left web	31.333	101.444	96.259	0.814	36.281	41.779	34.919	Class 1
right web	31.333	144.772	139.587	0.814	36.281	41.779	34.668	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$$\epsilon = \sqrt{235 / f_y}$$

2) Calculate design resistance of cross section

$$M_{c,y,Rd} = M_{pl,y,Rd} = \frac{W_{pl,y} f_y}{Y_{M0}} = 1,175.050kN \cdot m$$

EN 1993-1-1:2005, 6.2.5 (2)

6. Check design resistance for bending about minor axis (Sector J, 1.00L)

Moment	LCB	ELU_09-FX	OK
	M _{z,Ed} / M _{c,z,Rd}	46.047kN·m / 718.621kN·m = 0.064	
	Sectional class	Class 2 ≤ Class 1, 2, 3, or 4 (DCL)	

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ ₁ (MPa)	σ ₂ (MPa)	ε	λ _{lim1-2}	λ _{lim2-3}	λ _{lim3-4}	Class
internal top-flange	14.667	142.338	104.209	0.814	26.849	30.917	37.890	Class 1
internal bottom-flange	14.667	136.821	98.693	0.814	26.849	30.917	38.095	Class 1
left web	31.333	101.444	96.259	0.814	36.281	41.779	34.919	Class 1
right web	31.333	144.772	139.587	0.814	36.281	41.779	34.668	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$$\epsilon = \sqrt{235 / f_y}$$

2) Calculate design resistance of cross section

$$M_{c,z,Rd} = M_{pl,z,Rd} = \frac{W_{pl,z} f_y}{Y_{M0}} = 718.621kN \cdot m$$

EN 1993-1-1:2005, 6.2.5 (2)

7. Check design resistance for lateral-torsional buckling (Sector J, 1.00L)

Moment	LCB	ELU_09-FX	OK
	M _{y,Ed} / M _{b,Rd}	0.000kN·m / 0.000kN·m = 0.000	

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Calculate design resistance for lateral-torsional buckling

Asymmetric section about minor axis or not supported section

∴ Cannot check LTB

8. Check Interaction ratios (Sector J, 1.00L)

Interaction	LCB	ELU_09-FX	OK
	R _{max}	0.429	

* ELU_09-FX : ELU Temp dominante SC concomitante

1) Applied forces for interaction ratio

$$N_{Ed} = -2,603.127kN$$

$$M_{y,Ed} = 9.586kN \cdot m , M_{z,Ed} = 46.047kN \cdot m$$

$$V_{y,Ed} = -18.288kN , V_{z,Ed} = -20.311kN$$

$$T_{Ed} = -26.414kN \cdot m$$

2) Reduced moment resistance for high shear about major axis

$$M_{c,y,Rd} = \frac{W_{pl,y} f_y}{Y_{M0}} = 1,175.050kN \cdot m$$

EN 1993-1-1:2005, 6.2.5 (2)

$$V_{z,Ed} < 0.5 V_{pl,z,Rd} = 488,535.240kN$$

EN 1993-1-1:2005, 6.2.8 (4)

$$M_{y,Rd} = M_{c,y,Rd} = 1,175.050kN \cdot m$$

EN 1993-1-1:2005, 6.2.8 (5)

3) Reduced moment resistance for high shear about minor axis

$$M_{c,z,Rd} = \frac{W_{pl,z} f_y}{Y_{M0}} = 718.621kN \cdot m$$

EN 1993-1-1:2005, 6.2.8 (4)

$$V_{y,Ed} < 0.5 V_{pl,y,Rd} = 731.998kN$$

EN 1993-1-1:2005, 6.2.8 (4)

$$M_{z,Rd} = M_{c,z,Rd} = 718.621kN \cdot m$$

EN 1993-1-1:2005, 6.2.8 (5)

4) Calculate interaction ratio of bending and axial force

$$R_{max1} = \frac{N_{Ed}}{A f_y / Y_{M0}} + \frac{M_{y,Ed}}{M_{y,Rd}} + \frac{M_{z,Ed}}{M_{z,Rd}} = 0.429$$

EN 1993-1-1:2005, 6.2.8 (5)

EN 1993-1-1:2005, 6.2.1 (7)

5) Calculate interaction ratio of a Class 1 and 2 cross-section (Bending and Compression)

$$N_{pl,Rd} = \frac{A f_y}{Y_{M0}} = 7,302.857kN$$

EN 1993-1-1:2005, 6.2.4 (2)

$$M_{pl,y,Rd} = 1,175.050kN \cdot m$$

EN 1993-1-1:2005, 6.2.5 (2)

$$M_{pl,z,Rd} = 718.621kN \cdot m$$

EN 1993-1-1:2005, 6.2.5 (2)

$$n = N_{Ed} / N_{pl,Rd} = 0.356$$

EN 1993-1-1:2005, 6.2.9.1 (5)

$$a_y = \min ((A - b t_{f1} - b t_{f2}) / A , 0.5) = 0.500$$

$$a_z = \min ((A - 2 b t_w) / A , 0.5) = 0.306$$

$$N_{Ed,y,lim} = \min(0.25 M_{pl,Rd} , \frac{h_w t_w f_y}{\gamma_{M0}}) = 1,825.714kN$$
$$N_{Ed,z,lim} = \frac{2 h_w t_w f_y}{\gamma_{M0}} = 4,767.143kN$$
$$N_{Ed} > N_{Ed,y,lim} ;$$
$$M_{N,y,Rd} = \min(M_{pl,y,Rd} (1 - n) / (1 - 0.5 a_y) , M_{pl,y,Rd}) = 1,008.266kN\cdot m$$
$$N_{Ed} \leq N_{Ed,y,lim} ;$$
$$M_{N,z,Rd} = M_{pl,z,Rd} = 718.621kN\cdot m$$
$$\alpha = \beta = \min(\frac{1.66}{1 - 1.13 n^2} , 6.0) = 1.938$$
$$R_{max2} = [(\frac{M_{y,Ed}}{M_{N,y,Rd}})^\alpha + (\frac{M_{z,Ed}}{M_{N,z,Rd}})^\beta] = 0.00498$$

EN 1993-1-1:2005, 6.2.9.1 (4)

EN 1993-1-1:2005, 6.2.9.1 (5)

EN 1993-1-1:2005, 6.2.9.1 (4)

EN 1993-1-1:2005, 6.2.9.1 (5)

EN 1993-1-1:2005, 6.2.9.1 (6)

EN 1993-1-1:2005, 6.2.9.1 (6)

6) Calculate maximum interaction ratio

$$R_{max} = \max (R_{max1} , R_{max2}) = 0.429$$

9. Check Deflection (Sector J, 1.00L)

Deflection	LCB	ELS_cp_01-MZ	OK
	$\delta_{max} / \delta_{allow}$	0.000mm / 10.855mm = 0.000	

* ELS_cp_01-MZ : ELS casi-permanente

1) Calculate allowable deflection

$$L = 2,713.657mm$$
$$\delta_{allow} = \frac{L}{250} = 10.855mm$$

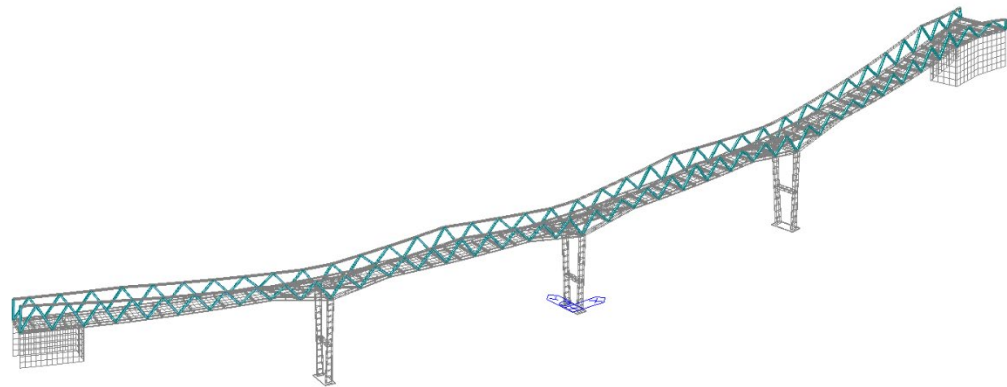
2) Calculate maximum deflection

Maximum deflection position 0.000mm from i-end.

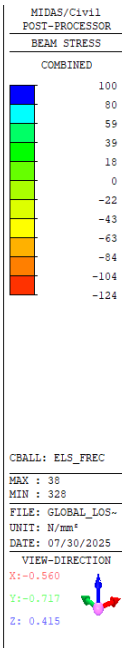
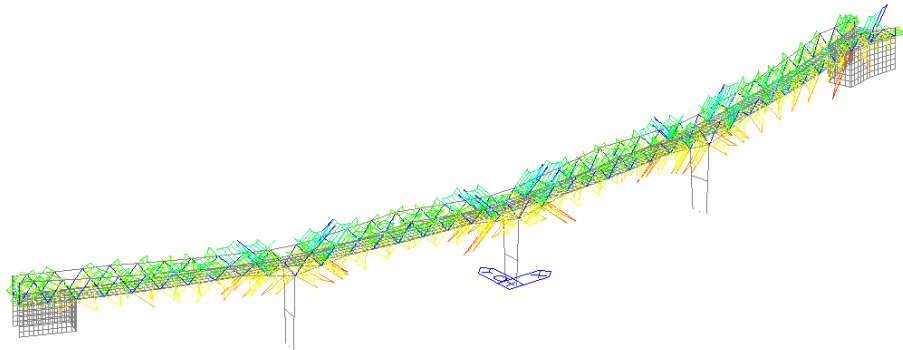
Deflection Amplification Factor (DAF) = 1.000

$$\delta = 0.000mm$$
$$\delta_{max} = \delta * DAF = 0.000mm$$

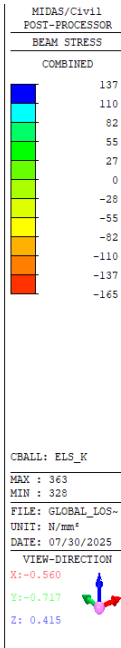
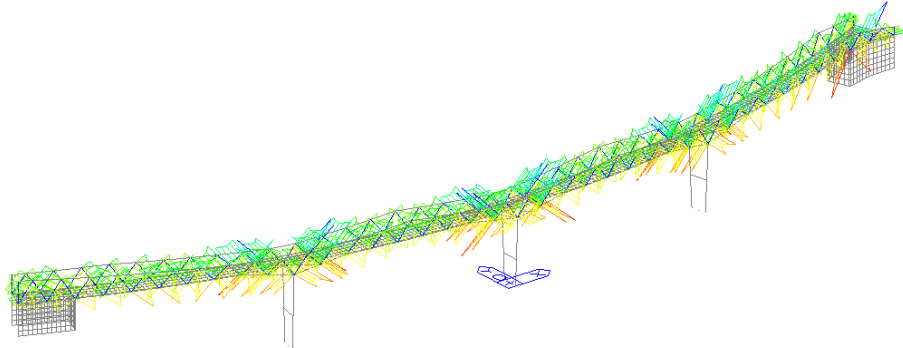
DIAGONALS



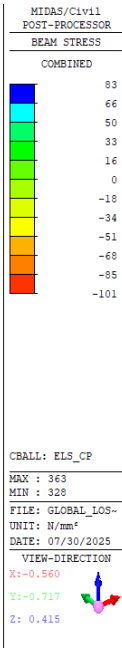
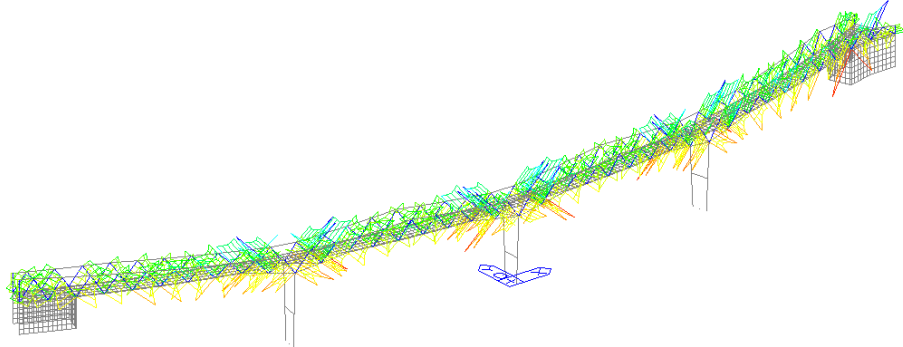
1 300_Diagonales



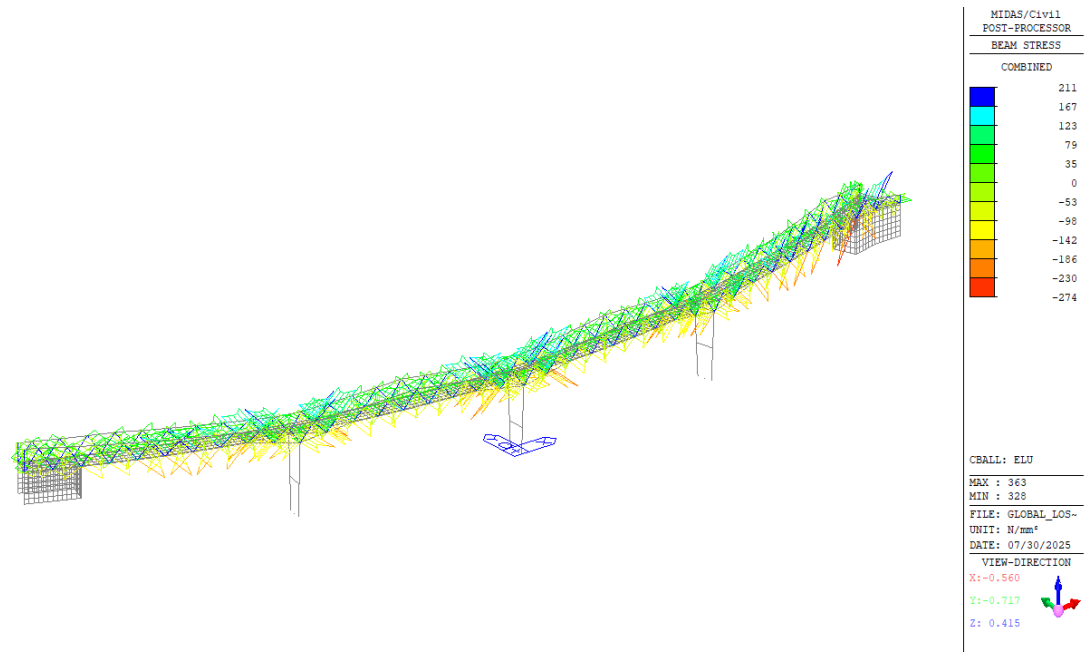
3 302_Diagonales_SigmaELSfrec



2 301_Diagonales_SigmaELSk



4 303_Diagonales_SigmaELScp



5 304_Diagonales_SigmaELU

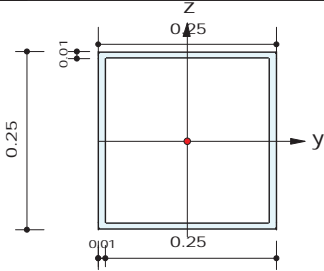
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	1
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.25441



2. Member Forces

Axial Force	Fxx = -560.95 (LCB: 54-MX, POS:J)
Bending Moments	My = -2.6394, Mz = 61.2654
End Moments	Myi = -8.4951, Myj = -2.6394 (for Lb) Myi = -8.4951, Myj = -2.6394 (for Ly) Mzi = -6.1352, Mzj = 61.2654 (for Lz)
Shear Forces	Fyy = -38.223 (LCB: 60-FY, POS:J) Fzz = 10.2669 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.25441, Lz = 2.25441, Lb = 2.25441
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 560.95/2430.08 = 0.231 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 2.639/292.283 = 0.009 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 61.265/292.283 = 0.210 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.462 < 1.000 \dots\dots\dots \text{O.K}$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.039 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

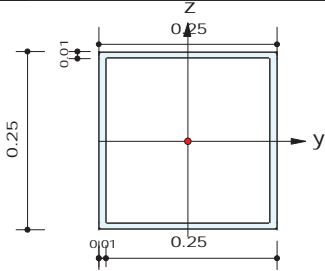
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	2
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.00735



2. Member Forces

Axial Force	Fxx = -475.77 (LCB: 54-MX, POS:I)
Bending Moments	My = -4.6330, Mz = 36.6705
End Moments	Myi = -4.6330, Myj = 0.33437 (for Lb) Myi = -4.6330, Myj = 0.33437 (for Ly) Mzi = 36.6705, Mzj = -6.5853 (for Lz)
Shear Forces	Fyy = 22.6426 (LCB: 60+MZ, POS:1/2) Fzz = -5.6064 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.00735, Lz = 2.00735, Lb = 2.00735
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 475.77/2549.07 = 0.187 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 4.633/292.283 = 0.016 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 36.671/292.283 = 0.125 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.330 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.023 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

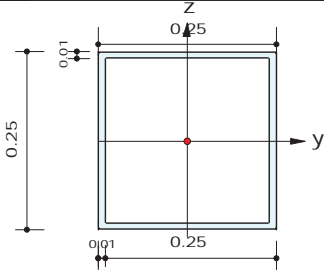
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 3
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 2.30092



2. Member Forces

Axial Force Fxx = 658.150 (LCB: 54+MX, POS:J)
Bending Moments My = -1.8050, Mz = 38.3977
End Moments Myi = 2.39675, Myj = -1.8050 (for Lb)
Myi = 2.39675, Myj = -1.8050 (for Ly)
Mzi = -8.1537, Mzj = 38.3977 (for Lz)
Shear Forces Fyy = -20.289 (LCB: 54-FY, POS:J)
Fzz = -13.073 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths Ly = 2.30092, Lz = 2.30092, Lb = 2.30092
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/N_{tRd} = 658.15/3245.71 = 0.203 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 1.805/292.283 = 0.006 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 38.398/292.283 = 0.131 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.340 < 1.000 O.K
Shear Resistance
V_Edy/Vy_Rd = 0.021 < 1.000 O.K
V_Edz/Vz_Rd = 0.012 < 1.000 O.K

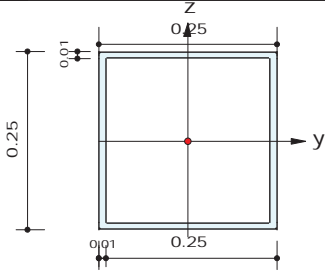
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 4
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 1.29206



2. Member Forces

Axial Force Fxx = 389.029 (LCB: 54+MZ, POS:I)
Bending Moments My = 16.8456, Mz = 92.5623
End Moments Myi = 16.8456, Myj = -7.8227 (for Lb)
Myi = 16.8456, Myj = -7.8227 (for Ly)
Mzi = 92.5623, Mzj = 13.6263 (for Lz)
Shear Forces Fyy = 117.239 (LCB: 60-MZ, POS:J)
Fzz = 37.1804 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 1.29206, Lz = 1.29206, Lb = 1.29206
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/N_{tRd} = 389.03/3245.71 = 0.120 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 16.846/292.283 = 0.058 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 92.562/292.283 = 0.317 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.494 < 1.000 O.K
Shear Resistance
V_Edy/Vy_Rd = 0.120 < 1.000 O.K
V_Edz/Vz_Rd = 0.035 < 1.000 O.K

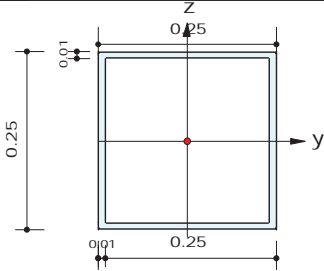
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	6
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.18992



2. Member Forces

Axial Force	Fxx = -507.66 (LCB: 54-MX, POS:J)
Bending Moments	My = -15.042, Mz = 109.166
End Moments	Myi = 29.6621, Myj = -15.042 (for Lb) Myi = 29.6621, Myj = -15.042 (for Ly) Mzi = -51.837, Mzj = 109.166 (for Lz)
Shear Forces	Fyy = -143.46 (LCB: 60-MX, POS:J) Fzz = 51.0238 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 1.18992, Lz = 1.18992, Lb = 1.18992
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 507.66/3245.71 = 0.156 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 15.042/292.283 = 0.051 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 109.166/292.283 = 0.373 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.581 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.147 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.047 < 1.000$ O.K

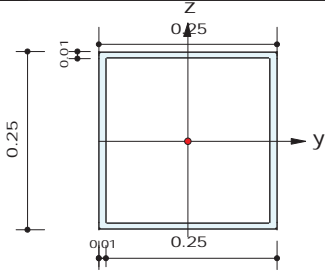
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	7
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.71399



2. Member Forces

Axial Force	Fxx = -654.13 (LCB: 54-MX, POS:I)
Bending Moments	My = 0.61710, Mz = 34.8137
End Moments	Myi = 0.61710, Myj = -1.7858 (for Lb) Myi = 0.61710, Myj = -1.7858 (for Ly) Mzi = 34.8137, Mzj = -8.1285 (for Lz)
Shear Forces	Fyy = 16.7198 (LCB: 60-MX, POS:J) Fzz = -9.6733 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.71399, Lz = 2.71399, Lb = 2.71399
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 654.13/2198.25 = 0.298 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 0.617/292.283 = 0.002 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 34.814/292.283 = 0.119 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.432 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.017 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.009 < 1.000$ O.K

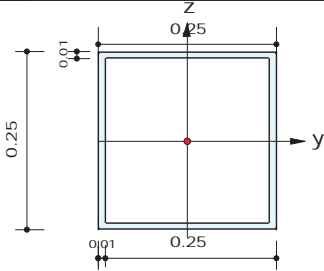
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	8
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.28454



2. Member Forces

Axial Force	Fxx = 648.188 (LCB: 54-MY, POS:J)
Bending Moments	My = -14.880, Mz = -12.280
End Moments	Myi = -4.4191, Myj = -14.880 (for Lb) Myi = -4.4191, Myj = -14.880 (for Ly) Mzi = -1.7199, Mzj = -12.280 (for Lz)
Shear Forces	Fyy = 12.8951 (LCB: 60+FY, POS:J) Fzz = 8.54330 (LCB: 54-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.28454, Lz = 3.28454, Lb = 3.28454
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 648.19/3245.71 = 0.200 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 14.880/292.283 = 0.051 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 12.280/292.283 = 0.042 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.293 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.013 < 1.000 O.K V_Edz/Vz_Rd = 0.008 < 1.000 O.K

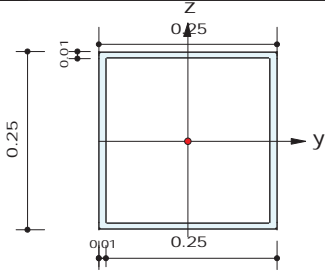
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	10
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.56858



2. Member Forces

Axial Force	Fxx = -464.70 (LCB: 54-MZ, POS:I)
Bending Moments	My = 7.83316, Mz = -53.381
End Moments	Myi = 7.83316, Myj = -5.5839 (for Lb) Myi = 7.83316, Myj = -5.5839 (for Ly) Mzi = -53.381, Mzj = -6.2457 (for Lz)
Shear Forces	Fyy = -16.684 (LCB: 60-MZ, POS:I) Fzz = 8.49305 (LCB: 52-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806


3. Design Parameters

Unbraced Lengths	Ly = 3.56858, Lz = 3.56858, Lb = 3.56858
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

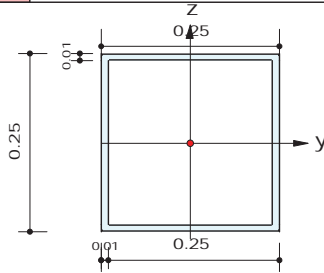
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 464.70/1759.62 = 0.264 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 7.833/292.283 = 0.027 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 53.381/292.283 = 0.183 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.491 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.017 < 1.000 O.K V_Edz/Vz_Rd = 0.008 < 1.000 O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	11
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.59334



2. Member Forces

Axial Force	Fxx = 369.952 (LCB: 54+FY, POS:J)
Bending Moments	My = 2.01321, Mz = -52.958
End Moments	Myi = -3.3785, Myj = 2.01321 (for Lb) Myi = -3.3785, Myj = 2.01321 (for Ly) Mzi = 23.7092, Mzj = -52.958 (for Lz)
Shear Forces	Fyy = 21.3358 (LCB: 54+FY, POS:J) Fzz = -6.1937 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806


3. Design Parameters

Unbraced Lengths	Ly = 3.59334, Lz = 3.59334, Lb = 3.59334
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

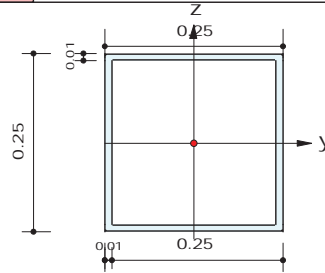
Axial Resistance	$N_{Ed}/N_{tRd} = 369.95/3245.71 = 0.114 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 2.013/292.283 = 0.007 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 52.958/292.283 = 0.181 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.302 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.022 < 1.000 O.K V_Edz/Vz_Rd = 0.006 < 1.000 O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	13
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.90424



2. Member Forces

Axial Force	Fxx = -155.53 (LCB: 52+MX, POS:I)
Bending Moments	My = 4.45388, Mz = -66.819
End Moments	Myi = 4.45388, Myj = -5.2618 (for Lb) Myi = 4.45388, Myj = -5.2618 (for Ly) Mzi = -66.819, Mzj = 6.22810 (for Lz)
Shear Forces	Fyy = -20.681 (LCB: 54-MZ, POS:3/4) Fzz = 6.65043 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.90424, Lz = 3.90424, Lb = 3.90424
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 155.53/1598.37 = 0.097 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 4.454/292.283 = 0.015 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 66.819/292.283 = 0.229 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(xy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(xLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(xz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(xLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.355 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.021 < 1.000 O.K V_Edz/Vz_Rd = 0.006 < 1.000 O.K

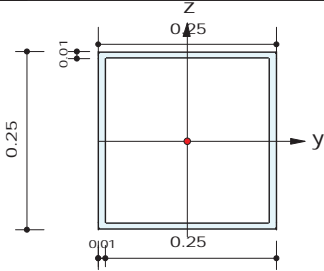
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	14
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.93094



2. Member Forces

Axial Force	Fxx = 86.9696 (LCB: 54-MZ, POS:J)
Bending Moments	My = 1.22947, Mz = -71.576
End Moments	Myi = -0.3970, Myj = 1.22947 (for Lb) Myi = -0.3970, Myj = 1.22947 (for Ly) Mzi = -5.1416, Mzj = -71.576 (for Lz)
Shear Forces	Fyy = 23.7646 (LCB: 54-MZ, POS:J) Fzz = -5.4584 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.93094, Lz = 3.93094, Lb = 3.93094
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	
$N_{Ed}/N_{tRd} = 86.97/3245.71 = 0.027 < 1.000$	O.K
Bending Resistance	
$M_{Edy}/M_{Rdy} = 1.229/292.283 = 0.004 < 1.000$	O.K
$M_{Edz}/M_{Rdz} = 71.576/292.283 = 0.245 < 1.000$	O.K
Combined Resistance	
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]	
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β	
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd	
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.276 < 1.000	O.K
Shear Resistance	
$V_{Edy}/V_{yRd} = 0.024 < 1.000$	O.K
$V_{Edz}/V_{zRd} = 0.005 < 1.000$	O.K

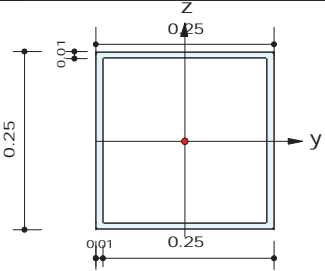
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	16
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 4.26237



2. Member Forces

Axial Force	Fxx = 147.042 (LCB: 54-MZ, POS:I)
Bending Moments	My = 0.96103, Mz = -79.020
End Moments	Myi = 0.96103, Myj = -1.4033 (for Lb) Myi = 0.96103, Myj = -1.4033 (for Ly) Mzi = -79.020, Mzj = -4.1728 (for Lz)
Shear Forces	Fyy = -22.194 (LCB: 54-MZ, POS:1/4) Fzz = 5.13995 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806


3. Design Parameters

Unbraced Lengths	Ly = 4.26237, Lz = 4.26237, Lb = 4.26237
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

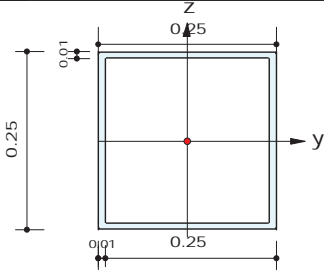
Axial Resistance	
$N_{Ed}/N_{tRd} = 147.04/3245.71 = 0.045 < 1.000$	O.K
Bending Resistance	
$M_{Edy}/M_{Rdy} = 0.961/292.283 = 0.003 < 1.000$	O.K
$M_{Edz}/M_{Rdz} = 79.020/292.283 = 0.270 < 1.000$	O.K
Combined Resistance	
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]	
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β	
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd	
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.319 < 1.000	O.K
Shear Resistance	
$V_{Edy}/V_{yRd} = 0.023 < 1.000$	O.K
$V_{Edz}/V_{zRd} = 0.005 < 1.000$	O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 17
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 4.29056



2. Member Forces

Axial Force Fxx = 119.922 (LCB: 54-MZ, POS:J)
Bending Moments My = 1.18594, Mz = -78.089
End Moments Myi = -1.9625, Myj = 1.18594 (for Lb)
Myi = -1.9625, Myj = 1.18594 (for Ly)
Mzi = -3.5588, Mzj = -78.089 (for Lz)
Shear Forces Fyy = 21.5217 (LCB: 54-MZ, POS:J)
Fzz = -5.0620 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806


3. Design Parameters

Unbraced Lengths Ly = 4.29056, Lz = 4.29056, Lb = 4.29056
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

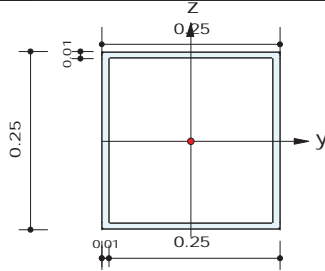
Axial Resistance
 $N_{Ed}/N_{tRd} = 119.92/3245.71 = 0.037 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 1.186/292.283 = 0.004 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 78.089/292.283 = 0.267 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.308 < 1.000 O.K
Shear Resistance
 $V_{Edy}/V_{yRd} = 0.022 < 1.000$ O.K
 $V_{Edz}/V_{zRd} = 0.005 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 19
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 3.90424



2. Member Forces

Axial Force Fxx = 114.883 (LCB: 54-FY, POS:I)
Bending Moments My = 0.91926, Mz = -70.538
End Moments Myi = 0.91926, Myj = -3.2261 (for Lb)
Myi = 0.91926, Myj = -3.2261 (for Ly)
Mzi = -70.538, Mzj = 22.9979 (for Lz)
Shear Forces Fyy = -23.958 (LCB: 54-FY, POS:J)
Fzz = 5.59927 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 3.90424, Lz = 3.90424, Lb = 3.90424
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/N_{tRd} = 114.88/3245.71 = 0.035 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 0.919/292.283 = 0.003 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 70.538/292.283 = 0.241 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.280 < 1.000 O.K
Shear Resistance
 $V_{Edy}/V_{yRd} = 0.025 < 1.000$ O.K
 $V_{Edz}/V_{zRd} = 0.005 < 1.000$ O.K

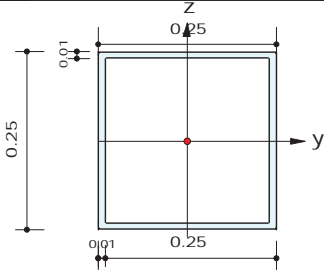
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	20
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.93094



2. Member Forces

Axial Force	Fxx = -150.95 (LCB: 54-MZ, POS:J)
Bending Moments	My = 5.23790, Mz = -70.536
End Moments	Myi = -2.9629, Myj = 5.23790 (for Lb) Myi = -2.9629, Myj = 5.23790 (for Ly) Mzi = -3.0523, Mzj = -70.536 (for Lz)
Shear Forces	Fyy = 19.3361 (LCB: 54-MZ, POS:J) Fzz = -6.5726 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.93094, Lz = 3.93094, Lb = 3.93094
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 150.95/1586.01 = 0.095 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 5.238/292.283 = 0.018 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 70.536/292.283 = 0.241 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.368 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.020 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.006 < 1.000$ O.K

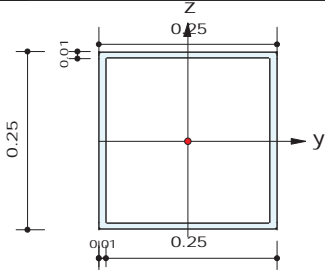
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	22
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.56858



2. Member Forces

Axial Force	Fxx = 405.856 (LCB: 54-MZ, POS:I)
Bending Moments	My = 0.03548, Mz = -49.270
End Moments	Myi = 0.03548, Myj = 0.38919 (for Lb) Myi = 0.03548, Myj = 0.38919 (for Ly) Mzi = -49.270, Mzj = -7.1289 (for Lz)
Shear Forces	Fyy = -20.253 (LCB: 54-FY, POS:J) Fzz = 6.32435 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.56858, Lz = 3.56858, Lb = 3.56858
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t_Rd} = 405.86/3245.71 = 0.125 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 0.035/292.283 = 0.000 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 49.270/292.283 = 0.169 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.294 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.021 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.006 < 1.000$ O.K

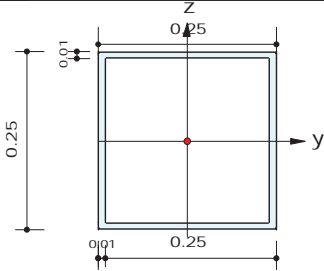
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	23
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.59334



2. Member Forces

Axial Force	Fxx = -499.52 (LCB: 54-MZ, POS:J)
Bending Moments	My = 7.62066, Mz = -51.539
End Moments	Myi = -5.9654, Myj = 7.62066 (for Lb) Myi = -5.9654, Myj = 7.62066 (for Ly) Mzi = -6.4922, Mzj = -51.539 (for Lz)
Shear Forces	Fyy = 15.3256 (LCB: 60-MZ, POS:J) Fzz = -8.0473 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.59334, Lz = 3.59334, Lb = 3.59334
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 499.52/1747.38 = 0.286 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 7.621/292.283 = 0.026 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 51.539/292.283 = 0.176 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.506 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.016 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.007 < 1.000$ O.K

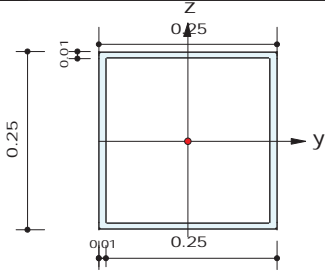
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	25
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.26232



2. Member Forces

Axial Force	Fxx = 680.301 (LCB: 54+FX, POS:I)
Bending Moments	My = -15.469, Mz = -11.107
End Moments	Myi = -15.469, Myj = 9.29978 (for Lb) Myi = -15.469, Myj = 9.29978 (for Ly) Mzi = -11.107, Mzj = 7.89528 (for Lz)
Shear Forces	Fyy = -10.713 (LCB: 60-FY, POS:J) Fzz = -8.8746 (LCB: 54-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806


3. Design Parameters

Unbraced Lengths	Ly = 3.26232, Lz = 3.26232, Lb = 3.26232
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

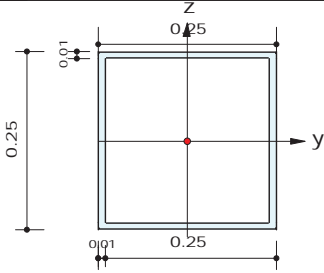
Axial Resistance	$N_{Ed}/N_{t,Rd} = 680.30/3245.71 = 0.210 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 15.469/292.283 = 0.053 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 11.107/292.283 = 0.038 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.301 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.011 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.008 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	26
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.73255



2. Member Forces

Axial Force	Fxx = -667.80 (LCB: 54-FY, POS:J)
Bending Moments	My = 0.54428, Mz = 33.2540
End Moments	Myi = -2.0280, Myj = 0.54428 (for Lb) Myi = -2.0280, Myj = 0.54428 (for Ly) Mzi = -7.3153, Mzj = 33.2540 (for Lz)
Shear Forces	Fyy = -16.782 (LCB: 60-FY, POS:J) Fzz = 9.51226 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.73255, Lz = 2.73255, Lb = 2.73255
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 667.80/2188.68 = 0.305 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 0.544/292.283 = 0.002 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 33.254/292.283 = 0.114 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$


$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.434 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.017 < 1.000 \dots\dots\dots O.K$$

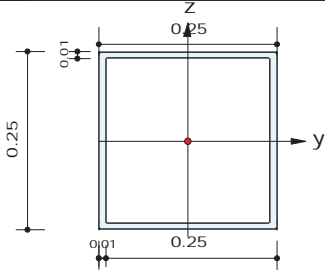
$$V_{Edz}/V_{z_Rd} = 0.009 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	27
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.19806



2. Member Forces

Axial Force	Fxx = -790.71 (LCB: 54+MZ, POS:I)
Bending Moments	My = -13.230, Mz = 37.1532
End Moments	Myi = -13.230, Myj = 14.6505 (for Lb) Myi = -13.230, Myj = 14.6505 (for Ly) Mzi = 37.1532, Mzj = 34.0875 (for Lz)
Shear Forces	Fyy = -45.641 (LCB: 60-FY, POS:J) Fzz = -39.446 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 1.19806, Lz = 1.19806, Lb = 1.19806
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 790.71/3245.71 = 0.244 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 13.230/292.283 = 0.045 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 37.153/292.283 = 0.127 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$

$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.416 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.047 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.037 < 1.000 \dots\dots\dots O.K$$

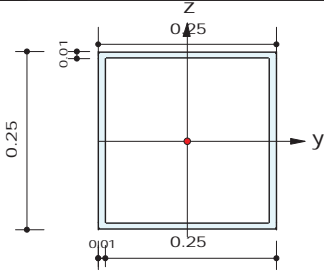
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	29
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.28315



2. Member Forces

Axial Force	Fxx = 608.305 (LCB: 54-MY, POS:I)
Bending Moments	My = -35.296, Mz = -7.9600
End Moments	Myi = -35.296, Myj = -5.5670 (for Lb) Myi = -35.296, Myj = -5.5670 (for Ly) Mzi = -7.9600, Mzj = 2.02171 (for Lz)
Shear Forces	Fyy = -29.566 (LCB: 54-MZ, POS:I) Fzz = -40.065 (LCB: 52-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 1.28315, Lz = 1.28315, Lb = 1.28315
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 608.31/3245.71 = 0.187 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 35.296/292.283 = 0.121 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 7.960/292.283 = 0.027 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.335 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.030 < 1.000 O.K V_Edz/Vz_Rd = 0.037 < 1.000 O.K

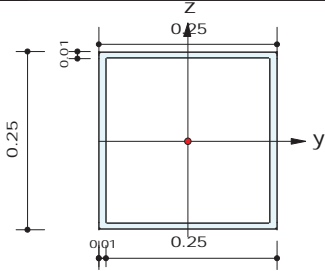
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	30
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.28506



2. Member Forces

Axial Force	Fxx = 647.320 (LCB: 54-MX, POS:I)
Bending Moments	My = -2.8919, Mz = 33.2964
End Moments	Myi = -2.8919, Myj = 3.21946 (for Lb) Myi = -2.8919, Myj = 3.21946 (for Ly) Mzi = 33.2964, Mzj = -6.2444 (for Lz)
Shear Forces	Fyy = 17.5150 (LCB: 60-MZ, POS:J) Fzz = 14.4340 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806


3. Design Parameters

Unbraced Lengths	Ly = 2.28506, Lz = 2.28506, Lb = 2.28506
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

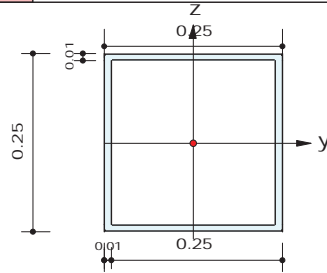
Axial Resistance	$N_{Ed}/N_{tRd} = 647.32/3245.71 = 0.199 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 2.892/292.283 = 0.010 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 33.296/292.283 = 0.114 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.323 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.018 < 1.000 O.K V_Edz/Vz_Rd = 0.013 < 1.000 O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 31
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 2.02063



2. Member Forces

Axial Force Fxx = -475.13 (LCB: 54+MX, POS:J)
Bending Moments My = 1.28367, Mz = 42.1679
End Moments Myi = -1.9137, Myj = 1.28367 (for Lb)
Myi = -1.9137, Myj = 1.28367 (for Ly)
Mzi = -6.2151, Mzj = 42.1679 (for Lz)
Shear Forces Fyy = -23.993 (LCB: 54-FY, POS:J)
Fzz = 13.8973 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 2.02063, Lz = 2.02063, Lb = 2.02063
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 475.13/2542.79 = 0.187 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 1.284/292.283 = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 42.168/292.283 = 0.144 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$\begin{aligned} R.MNRd &= MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}] \\ R.BiM &= (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta} \\ R.byN &= N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd \\ Rc.LT1 &= N_{Ed}/(\chi y * A * fy / \gamma M1) \\ Rb.LT1 &= (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1) \\ Rc.LT2 &= N_{Ed} / (\chi z * A * fy / \gamma M1) \\ Rb.LT2 &= (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1) \\ Rmax &= MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.343 < 1.000 \dots\dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.025 < 1.000 \dots\dots\dots \text{O.K}$$

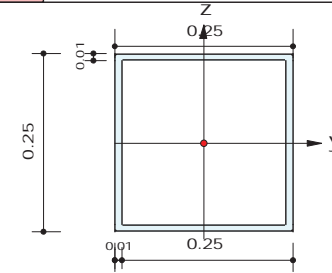
$$V_{Edz}/V_{z_Rd} = 0.013 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 32
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 2.26932



2. Member Forces

Axial Force Fxx = -547.01 (LCB: 54+MZ, POS:I)
Bending Moments My = -15.883, Mz = 86.0355
End Moments Myi = -15.883, Myj = -8.4747 (for Lb)
Myi = -15.883, Myj = -8.4747 (for Ly)
Mzi = 86.0355, Mzj = -1.4381 (for Lz)
Shear Forces Fyy = 57.1936 (LCB: 54+MZ, POS:1/4)
Fzz = -23.824 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 2.26932, Lz = 2.26932, Lb = 2.26932
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 547.01/2422.75 = 0.226 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 15.883/292.283 = 0.054 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 86.036/292.283 = 0.294 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$\begin{aligned} R.MNRd &= MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}] \\ R.BiM &= (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta} \\ R.byN &= N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd \\ Rc.LT1 &= N_{Ed}/(\chi y * A * fy / \gamma M1) \\ Rb.LT1 &= (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1) \\ Rc.LT2 &= N_{Ed} / (\chi z * A * fy / \gamma M1) \\ Rb.LT2 &= (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1) \\ Rmax &= MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.577 < 1.000 \dots\dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.059 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.022 < 1.000 \dots\dots\dots \text{O.K}$$

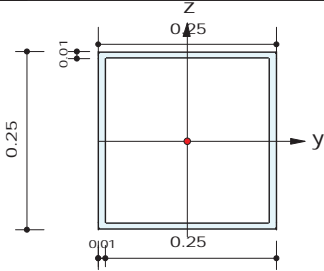
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	34
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.00634



2. Member Forces

Axial Force	Fxx = -512.06 (LCB: 54-FY, POS:J)
Bending Moments	My = -18.860, Mz = 64.9535
End Moments	Myi = 7.78102, Myj = -18.860 (for Lb) Myi = 7.78102, Myj = -18.860 (for Ly) Mzi = -12.220, Mzj = 64.9535 (for Lz)
Shear Forces	Fyy = -39.956 (LCB: 60-MZ, POS:I) Fzz = 17.7851 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.00634, Lz = 2.00634, Lb = 2.00634
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 512.06/2549.55 = 0.201 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 18.860/292.283 = 0.065 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 64.954/292.283 = 0.222 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.477 < 1.000 \dots\dots \text{O.K}$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.041 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.017 < 1.000 \dots\dots\dots \text{O.K}$$

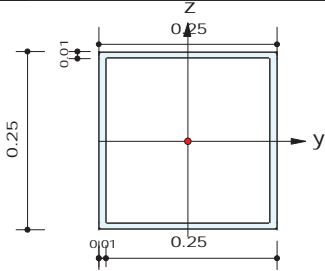
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	35
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.25327



2. Member Forces

Axial Force	Fxx = -619.18 (LCB: 54-MX, POS:I)
Bending Moments	My = -8.9139, Mz = -52.044
End Moments	Myi = -8.9139, Myj = -9.1582 (for Lb) Myi = -8.9139, Myj = -9.1582 (for Ly) Mzi = -52.044, Mzj = 15.8672 (for Lz)
Shear Forces	Fyy = -36.389 (LCB: 60-MZ, POS:I) Fzz = -21.757 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.25327, Lz = 2.25327, Lb = 2.25327
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 619.18/2430.63 = 0.255 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 8.914/292.283 = 0.030 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 52.044/292.283 = 0.178 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.466 < 1.000 \dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.037 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.020 < 1.000 \dots\dots\dots \text{O.K}$$

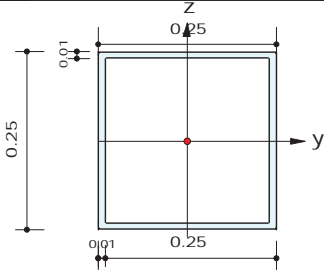
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	36
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.70917



2. Member Forces

Axial Force	Fxx = -704.64 (LCB: 60-FY, POS:J)
Bending Moments	My = -17.133, Mz = 52.5236
End Moments	Myi = 8.80820, Myj = -17.133 (for Lb) Myi = 8.80820, Myj = -17.133 (for Ly) Mzi = -13.490, Mzj = 52.5236 (for Lz)
Shear Forces	Fyy = 26.0794 (LCB: 60-MX, POS:J) Fzz = 11.9487 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 2.70917, Lz = 2.70917, Lb = 2.70917
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 704.64/2200.73 = 0.320 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 17.133/292.283 = 0.059 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 52.524/292.283 = 0.180 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.560 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.027 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.011 < 1.000$ O.K

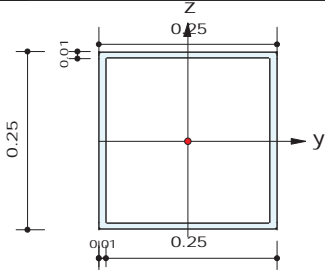
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	37
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.18781



2. Member Forces

Axial Force	Fxx = -573.51 (LCB: 52-MZ, POS:I)
Bending Moments	My = -12.780, Mz = -103.18
End Moments	Myi = -12.780, Myj = 3.12921 (for Lb) Myi = -12.780, Myj = 3.12921 (for Ly) Mzi = -103.18, Mzj = 6.87460 (for Lz)
Shear Forces	Fyy = -133.73 (LCB: 54-MZ, POS:I) Fzz = -44.044 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 1.18781, Lz = 1.18781, Lb = 1.18781
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 573.51/3245.71 = 0.177 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 12.780/292.283 = 0.044 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 103.182/292.283 = 0.353 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.573 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.137 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.041 < 1.000$ O.K

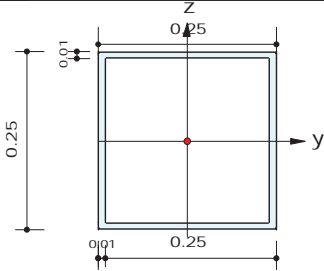
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	38
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.26988



2. Member Forces

Axial Force	Fxx = 618.102 (LCB: 54+MX, POS:J)
Bending Moments	My = 17.7831, Mz = -74.955
End Moments	Myi = -39.069, Myj = 17.7831 (for Lb) Myi = -39.069, Myj = 17.7831 (for Ly) Mzi = 41.5100, Mzj = -74.955 (for Lz)
Shear Forces	Fyy = 97.0695 (LCB: 54-MZ, POS:J) Fzz = -57.903 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 1.26988, Lz = 1.26988, Lb = 1.26988
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 618.10/3245.71 = 0.190 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 17.783/292.283 = 0.061 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 74.955/292.283 = 0.256 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.508 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.099 < 1.000 O.K V_Edz/Vz_Rd = 0.054 < 1.000 O.K

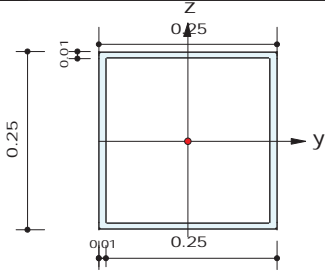
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	39
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.26143



2. Member Forces

Axial Force	Fxx = 728.823 (LCB: 54-MX, POS:I)
Bending Moments	My = -2.2475, Mz = 39.2411
End Moments	Myi = -2.2475, Myj = 3.66741 (for Lb) Myi = -2.2475, Myj = 3.66741 (for Ly) Mzi = 39.2411, Mzj = -8.0215 (for Lz)
Shear Forces	Fyy = -24.849 (LCB: 60-MZ, POS:1/2) Fzz = 6.88368 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.26143, Lz = 2.26143, Lb = 2.26143
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 728.82/3245.71 = 0.225 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 2.248/292.283 = 0.008 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 39.241/292.283 = 0.134 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.366 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.025 < 1.000 O.K V_Edz/Vz_Rd = 0.006 < 1.000 O.K

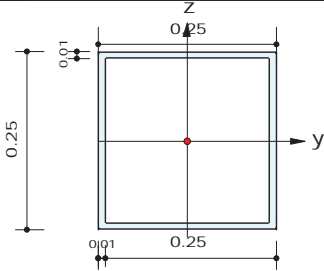
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	40
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.55597



2. Member Forces

Axial Force	Fxx = -358.86 (LCB: 54-MZ, POS:J)
Bending Moments	My = 15.1666, Mz = -49.158
End Moments	Myi = -1.7765, Myj = 15.1666 (for Lb) Myi = -1.7765, Myj = 15.1666 (for Ly) Mzi = -10.655, Mzj = -49.158 (for Lz)
Shear Forces	Fyy = 17.0827 (LCB: 60-MZ, POS:J) Fzz = -9.6022 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.55597, Lz = 3.55597, Lb = 3.55597
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 358.86/1765.87 = 0.203 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 15.167/292.283 = 0.052 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 49.158/292.283 = 0.168 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$

$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$

$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$

$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$R_{max} = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.426 < 1.000$.. O.K


Shear Resistance

$V_{Edy}/V_{y,Rd} = 0.018 < 1.000$ O.K

$V_{Edz}/V_{z,Rd} = 0.009 < 1.000$ O.K

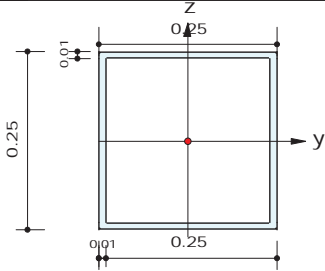
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	41
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.22132



2. Member Forces

Axial Force	Fxx = 638.364 (LCB: 60-MX, POS:I)
Bending Moments	My = -15.299, Mz = 32.9664
End Moments	Myi = -15.299, Myj = 12.7504 (for Lb) Myi = -15.299, Myj = 12.7504 (for Ly) Mzi = 32.9664, Mzj = -8.9133 (for Lz)
Shear Forces	Fyy = -13.088 (LCB: 60-MZ, POS:I) Fzz = -10.715 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.22132, Lz = 3.22132, Lb = 3.22132
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/N_{t,Rd} = 638.36/3245.71 = 0.197 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 15.299/292.283 = 0.052 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 32.966/292.283 = 0.113 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$

$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$

$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$

$R_{max} = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.362 < 1.000$ O.K

Shear Resistance

$V_{Edy}/V_{y,Rd} = 0.013 < 1.000$ O.K

$V_{Edz}/V_{z,Rd} = 0.010 < 1.000$ O.K

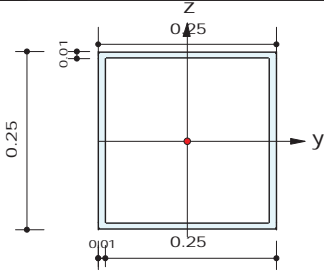
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	42
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.89665



2. Member Forces

Axial Force	Fxx = -142.02 (LCB: 52-MZ, POS:J)
Bending Moments	My = 10.0156, Mz = -45.221
End Moments	Myi = -3.0196, Myj = 10.0156 (for Lb) Myi = -3.0196, Myj = 10.0156 (for Ly) Mzi = -3.3802, Mzj = -45.221 (for Lz)
Shear Forces	Fyy = 15.3612 (LCB: 60-MZ, POS:J) Fzz = -8.8231 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.89665, Lz = 3.89665, Lb = 3.89665
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 142.02/1601.89 = 0.089 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 10.016/292.283 = 0.034 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 45.221/292.283 = 0.155 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.278 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.016 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.008 < 1.000$ O.K

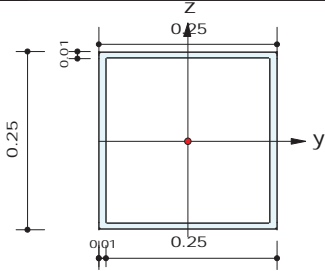
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	43
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.53095



2. Member Forces

Axial Force	Fxx = 227.317 (LCB: 54-FY, POS:I)
Bending Moments	My = 10.1048, Mz = -34.536
End Moments	Myi = 10.1048, Myj = -11.366 (for Lb) Myi = 10.1048, Myj = -11.366 (for Ly) Mzi = -34.536, Mzj = 15.1005 (for Lz)
Shear Forces	Fyy = -15.129 (LCB: 55-MZ, POS:I) Fzz = 9.36142 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.53095, Lz = 3.53095, Lb = 3.53095
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t,Rd} = 227.32/3245.71 = 0.070 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 10.105/292.283 = 0.035 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 34.536/292.283 = 0.118 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.223 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.016 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.009 < 1.000$ O.K

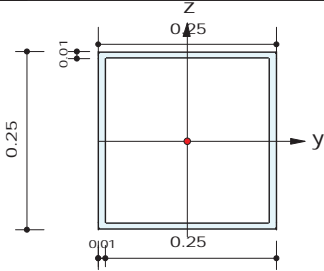
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	44
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 4.25901



2. Member Forces

Axial Force	Fxx = 94.0274 (LCB: 54-MZ, POS:J)
Bending Moments	My = 12.3581, Mz = -57.581
End Moments	Myi = 0.85837, Myj = 12.3581 (for Lb) Myi = 0.85837, Myj = 12.3581 (for Ly) Mzi = -2.6451, Mzj = -57.581 (for Lz)
Shear Forces	Fyy = 16.3953 (LCB: 55-MZ, POS:J) Fzz = -7.1855 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 4.25901, Lz = 4.25901, Lb = 4.25901
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 94.03/3245.71 = 0.029 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 12.358/292.283 = 0.042 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 57.581/292.283 = 0.197 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.268 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.017 < 1.000 O.K V_Edz/Vz_Rd = 0.007 < 1.000 O.K

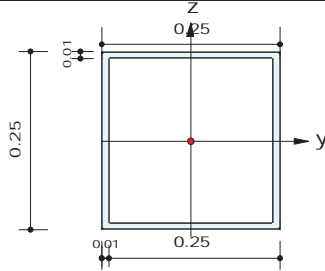
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	45
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.86971



2. Member Forces

Axial Force	Fxx = 58.0734 (LCB: 54-MZ, POS:I)
Bending Moments	My = 11.4574, Mz = -50.367
End Moments	Myi = 11.4574, Myj = 3.10908 (for Lb) Myi = 11.4574, Myj = 3.10908 (for Ly) Mzi = -50.367, Mzj = -3.3687 (for Lz)
Shear Forces	Fyy = -17.751 (LCB: 55-MZ, POS:I) Fzz = 8.31683 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.86971, Lz = 3.86971, Lb = 3.86971
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 58.07/3245.71 = 0.018 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 11.457/292.283 = 0.039 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 50.367/292.283 = 0.172 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.229 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.018 < 1.000 O.K V_Edz/Vz_Rd = 0.008 < 1.000 O.K

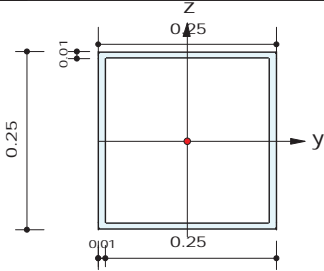
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	46
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.89665



2. Member Forces

Axial Force	Fxx = -22.125 (LCB: 60-MZ, POS:J)
Bending Moments	My = 13.0965, Mz = -53.455
End Moments	Myi = 5.70415, Myj = 13.0965 (for Lb) Myi = 5.70415, Myj = 13.0965 (for Ly) Mzi = -3.3609, Mzj = -53.455 (for Lz)
Shear Forces	Fyy = 17.6298 (LCB: 55-MZ, POS:J) Fzz = -8.4263 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.89665, Lz = 3.89665, Lb = 3.89665
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c_Rd}, N_{b_Rd}] = 22.12/3245.71 = 0.007 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 13.097/292.283 = 0.045 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 53.455/292.283 = 0.183 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.235 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.018 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.008 < 1.000$ O.K

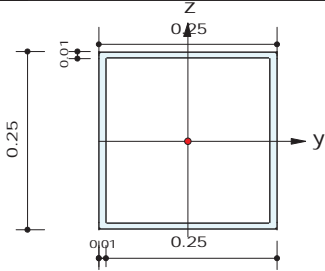
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	47
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 4.23061



2. Member Forces

Axial Force	Fxx = 114.724 (LCB: 54-MZ, POS:I)
Bending Moments	My = 12.2379, Mz = -57.419
End Moments	Myi = 12.2379, Myj = 1.73490 (for Lb) Myi = 12.2379, Myj = 1.73490 (for Ly) Mzi = -57.419, Mzj = -3.5342 (for Lz)
Shear Forces	Fyy = -16.785 (LCB: 55-MZ, POS:I) Fzz = 7.25801 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 4.23061, Lz = 4.23061, Lb = 4.23061
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t_Rd} = 114.72/3245.71 = 0.035 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 12.238/292.283 = 0.042 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 57.419/292.283 = 0.196 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.274 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.017 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.007 < 1.000$ O.K

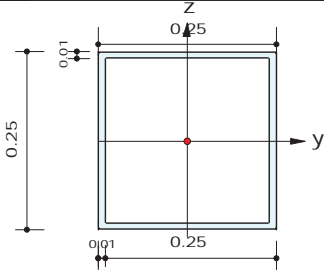
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	48
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.55597



2. Member Forces

Axial Force	Fxx = 190.503 (LCB: 54-MX, POS:J)
Bending Moments	My = 10.5840, Mz = -41.532
End Moments	Myi = -11.048, Myj = 10.5840 (for Lb) Myi = -11.048, Myj = 10.5840 (for Ly) Mzi = 14.4813, Mzj = -41.532 (for Lz)
Shear Forces	Fyy = 16.5953 (LCB: 60-MX, POS:J) Fzz = -9.2523 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.55597, Lz = 3.55597, Lb = 3.55597
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 190.50/3245.71 = 0.059 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 10.584/292.283 = 0.036 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 41.532/292.283 = 0.142 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.237 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.017 < 1.000 O.K V_Edz/Vz_Rd = 0.009 < 1.000 O.K

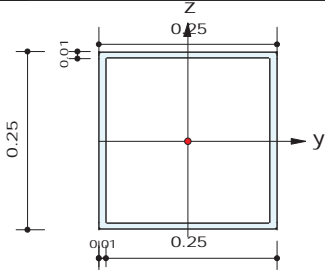
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	49
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.86971



2. Member Forces

Axial Force	Fxx = -147.36 (LCB: 52-FX, POS:I)
Bending Moments	My = 9.55742, Mz = -44.973
End Moments	Myi = 9.55742, Myj = -3.8280 (for Lb) Myi = 9.55742, Myj = -3.8280 (for Ly) Mzi = -44.973, Mzj = 3.42901 (for Lz)
Shear Forces	Fyy = -16.763 (LCB: 60-MZ, POS:3/4) Fzz = 9.24334 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.86971, Lz = 3.86971, Lb = 3.86971
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{cRd}, N_{bRd}] = 147.36/1614.45 = 0.091 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 9.557/292.283 = 0.033 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 44.973/292.283 = 0.154 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.279 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.017 < 1.000 O.K V_Edz/Vz_Rd = 0.009 < 1.000 O.K

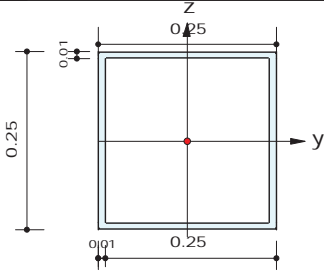
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	50
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.24382



2. Member Forces

Axial Force	Fxx = 727.014 (LCB: 60-MY, POS:J)
Bending Moments	My = -18.484, Mz = 36.4213
End Moments	Myi = -17.177, Myj = -18.484 (for Lb) Myi = -17.177, Myj = -18.484 (for Ly) Mzi = 8.39012, Mzj = 36.4213 (for Lz)
Shear Forces	Fyy = 15.0455 (LCB: 60-MZ, POS:J) Fzz = 11.2835 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.24382, Lz = 3.24382, Lb = 3.24382
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 727.01/3245.71 = 0.224 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 18.484/292.283 = 0.063 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 36.421/292.283 = 0.125 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.412 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.015 < 1.000 O.K V_Edz/Vz_Rd = 0.010 < 1.000 O.K

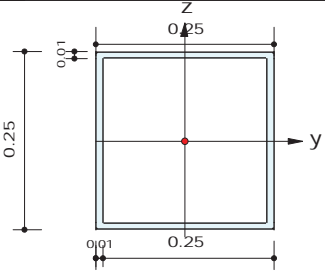
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	51
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.53095



2. Member Forces

Axial Force	Fxx = -450.80 (LCB: 52-FX, POS:I)
Bending Moments	My = 11.2972, Mz = -30.361
End Moments	Myi = 11.2972, Myj = -5.8717 (for Lb) Myi = 11.2972, Myj = -5.8717 (for Ly) Mzi = -30.361, Mzj = -2.4061 (for Lz)
Shear Forces	Fyy = -17.692 (LCB: 60-FY, POS:J) Fzz = 8.95501 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.53095, Lz = 3.53095, Lb = 3.53095
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 450.80/1778.31 = 0.253 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 11.297/292.283 = 0.039 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 30.361/292.283 = 0.104 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.397 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.018 < 1.000 O.K V_Edz/Vz_Rd = 0.008 < 1.000 O.K

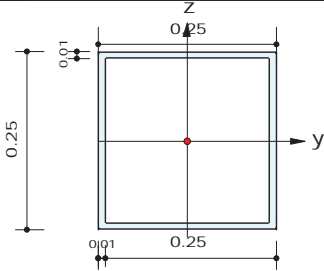
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	52
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.27746



2. Member Forces

Axial Force	Fxx = 801.077 (LCB: 60-FY, POS:J)
Bending Moments	My = -13.429, Mz = 54.0496
End Moments	Myi = 10.5890, Myj = -13.429 (for Lb) Myi = 10.5890, Myj = -13.429 (for Ly) Mzi = -10.729, Mzj = 54.0496 (for Lz)
Shear Forces	Fyy = -28.444 (LCB: 60-FY, POS:J) Fzz = -12.315 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 2.27746, Lz = 2.27746, Lb = 2.27746
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 801.08/3245.71 = 0.247 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 13.429/292.283 = 0.046 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 54.050/292.283 = 0.185 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.478 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.029 < 1.000 O.K V_Edz/Vz_Rd = 0.011 < 1.000 O.K

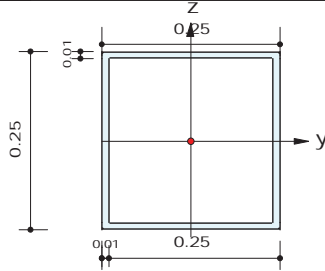
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	53
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.27888



2. Member Forces

Axial Force	Fxx = 655.655 (LCB: 60-MZ, POS:I)
Bending Moments	My = 4.51439, Mz = -76.664
End Moments	Myi = 4.51439, Myj = 6.75629 (for Lb) Myi = 4.51439, Myj = 6.75629 (for Ly) Mzi = -76.664, Mzj = -59.929 (for Lz)
Shear Forces	Fyy = -103.53 (LCB: 60-MZ, POS:I) Fzz = 37.5467 (LCB: 54-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 1.27888, Lz = 1.27888, Lb = 1.27888
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 655.66/3245.71 = 0.202 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 4.514/292.283 = 0.015 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 76.664/292.283 = 0.262 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.480 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.106 < 1.000 O.K V_Edz/Vz_Rd = 0.035 < 1.000 O.K

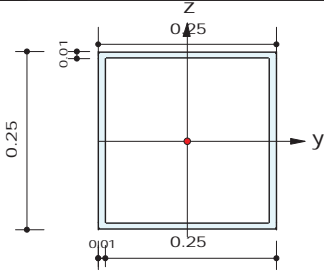
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	54
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.17960



2. Member Forces

Axial Force	Fxx = -665.04 (LCB: 60-MZ, POS:J)
Bending Moments	My = -5.0815, Mz = -88.365
End Moments	Myi = 13.9125, Myj = -5.0815 (for Lb) Myi = 13.9125, Myj = -5.0815 (for Ly) Mzi = -66.873, Mzj = -88.365 (for Lz)
Shear Forces	Fyy = 112.697 (LCB: 60-MZ, POS:J) Fzz = 28.3328 (LCB: 52-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 1.17960, Lz = 1.17960, Lb = 1.17960
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 665.04/3245.71 = 0.205 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 5.081/292.283 = 0.017 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 88.365/292.283 = 0.302 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.533 < 1.000 \dots\dots\dots O.K$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.115 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.026 < 1.000 \dots\dots\dots O.K$$

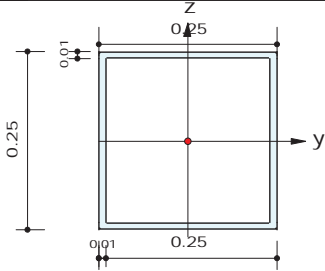
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	55
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.69045



2. Member Forces

Axial Force	Fxx = -720.18 (LCB: 60-MX, POS:I)
Bending Moments	My = -10.085, Mz = 54.8398
End Moments	Myi = -10.085, Myj = 5.58818 (for Lb) Myi = -10.085, Myj = 5.58818 (for Ly) Mzi = 54.8398, Mzj = -16.465 (for Lz)
Shear Forces	Fyy = -27.717 (LCB: 60-FY, POS:J) Fzz = 10.7038 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.69045, Lz = 2.69045, Lb = 2.69045
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 720.18/2210.37 = 0.326 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 10.085/292.283 = 0.035 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 54.840/292.283 = 0.188 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.559 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.028 < 1.000 \dots\dots\dots O.K$$

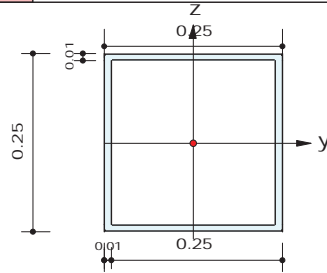
$$V_{Edz}/V_{z_Rd} = 0.010 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 64
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 1.99296



2. Member Forces

Axial Force Fxx = -524.41 (LCB: 60-MY, POS:I)
Bending Moments My = -17.600, Mz = 73.7389
End Moments Myi = -17.600, Myj = -10.562 (for Lb)
Myi = -17.600, Myj = -10.562 (for Ly)
Mzi = 73.7389, Mzj = 4.14762 (for Lz)
Shear Forces Fyy = 43.5784 (LCB: 60-MY, POS:1/2)
Fzz = -13.003 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 1.99296, Lz = 1.99296, Lb = 1.99296
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 524.41/2555.86 = 0.205 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 17.600/292.283 = 0.060 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 73.739/292.283 = 0.252 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}] \\ R.BiM &= (M_{Edy}/M_{ny_Rd})^\alpha + (M_{Edz}/M_{nz_Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.510 < 1.000 \dots\dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.045 < 1.000 \dots\dots\dots \text{O.K}$$

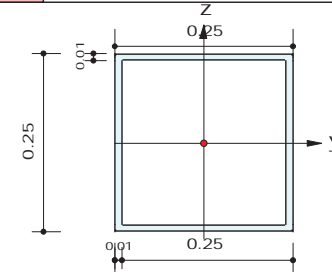
$$V_{Edz}/V_{z_Rd} = 0.012 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 65
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 2.23825



2. Member Forces

Axial Force Fxx = -660.15 (LCB: 54+FY, POS:J)
Bending Moments My = -7.1160, Mz = -86.469
End Moments Myi = 1.65525, Myj = -7.1160 (for Lb)
Myi = 1.65525, Myj = -7.1160 (for Ly)
Mzi = 48.3844, Mzj = -86.469 (for Lz)
Shear Forces Fyy = 60.2493 (LCB: 54+MZ, POS:I)
Fzz = -7.6042 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 2.23825, Lz = 2.23825, Lb = 2.23825
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/\text{MIN}[N_{c,Rd}, N_{b,Rd}] = 660.15/2438.00 = 0.271 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 7.116/292.283 = 0.024 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 86.469/292.283 = 0.296 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$\begin{aligned} R.MNRd &= \text{MAX}[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}] \\ R.BiM &= (M_{Edy}/M_{ny_Rd})^\alpha + (M_{Edz}/M_{nz_Rd})^\beta \\ R.byN &= N_{Ed}/(A \cdot f_y/\gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd} \\ Rc.LT1 &= N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT1 &= (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ Rc.LT2 &= N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1}) \\ Rb.LT2 &= (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y/\gamma_{M1}) \\ R_{max} &= \text{MAX}[R.MNRd, R.BiM, (R.byN+R.byM), \text{MAX}(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.606 < 1.000 \dots\dots\dots \text{O.K} \end{aligned}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.062 < 1.000 \dots\dots\dots \text{O.K}$$

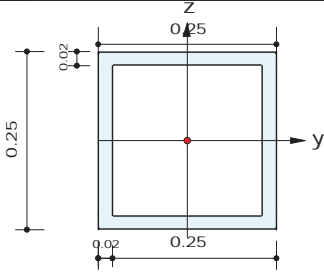
$$V_{Edz}/V_{z_Rd} = 0.007 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 98
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_20 (No:12)
(Built-up Section).
Member Length : 5.02654



2. Member Forces

Axial Force Fxx = -692.23 (LCB: 60-FX, POS:I)
Bending Moments My = 4.52596, Mz = -8.0308
End Moments Myi = 4.52596, Myj = -12.262 (for Lb)
Myi = 4.52596, Myj = -12.262 (for Ly)
Mzi = -8.0308, Mzj = -1.1284 (for Lz)
Shear Forces Fyy = -9.0675 (LCB: 55-MZ, POS:I)
Fzz = 5.67218 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters

Unbraced Lengths Ly = 5.02654, Lz = 5.02654, Lb = 5.02654
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 692.23/2082.69 = 0.332 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 4.526/537.910 = 0.008 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 8.031/537.910 = 0.015 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.356 < 1.000 \dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

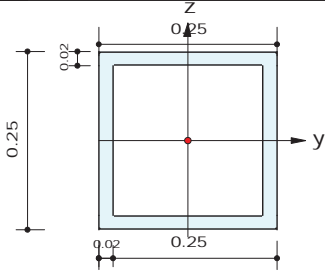
$$V_{Edz}/V_{z,Rd} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 100
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_20 (No:12)
(Built-up Section).
Member Length : 4.76602



2. Member Forces

Axial Force Fxx = 730.868 (LCB: 60-MX, POS:I)
Bending Moments My = -9.8074, Mz = 60.7092
End Moments Myi = -9.8074, Myj = 9.61945 (for Lb)
Myi = -9.8074, Myj = 9.61945 (for Ly)
Mzi = 60.7092, Mzj = 10.1170 (for Lz)
Shear Forces Fyy = 12.7726 (LCB: 55-MX, POS:I)
Fzz = 9.01071 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters

Unbraced Lengths Ly = 4.76602, Lz = 4.76602, Lb = 4.76602
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/N_{t,Rd} = 730.87/6220.95 = 0.117 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 9.807/537.910 = 0.018 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 60.709/537.910 = 0.113 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.249 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.007 < 1.000 \dots\dots\dots \text{O.K}$$

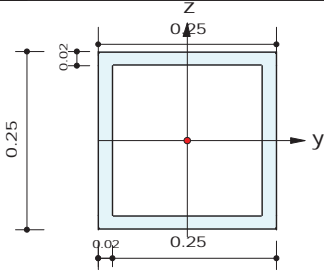
$$V_{Edz}/V_{z,Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	102
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.51099



2. Member Forces

Axial Force	Fxx = -551.28 (LCB: 54+MZ, POS:I)
Bending Moments	My = -18.884, Mz = 113.019
End Moments	Myi = -18.884, Myj = -13.493 (for Lb) Myi = -18.884, Myj = -13.493 (for Ly) Mzi = 113.019, Mzj = 5.04192 (for Lz)
Shear Forces	Fyy = 28.3311 (LCB: 60+FY, POS:J) Fzz = -14.745 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters

Unbraced Lengths	Ly = 4.51099, Lz = 4.51099, Lb = 4.51099
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 551.28/2430.89 = 0.227 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 18.884/537.910 = 0.035 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 113.019/537.910 = 0.210 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$


$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.491 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.015 < 1.000 \dots\dots\dots \text{O.K}$$

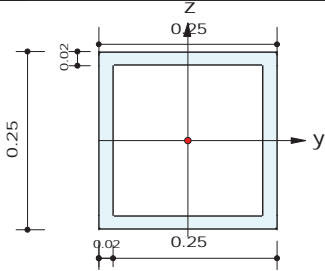
$$V_{Edz}/V_{z_Rd} = 0.007 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	104
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.26237



2. Member Forces

Axial Force	Fxx = -388.66 (LCB: 60-MZ, POS:I)
Bending Moments	My = 13.3674, Mz = -125.17
End Moments	Myi = 13.3674, Myj = 4.97675 (for Lb) Myi = 13.3674, Myj = 4.97675 (for Ly) Mzi = -125.17, Mzj = -15.046 (for Lz)
Shear Forces	Fyy = -27.427 (LCB: 60-FY, POS:J) Fzz = 14.5313 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters

Unbraced Lengths	Ly = 4.26237, Lz = 4.26237, Lb = 4.26237
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 388.66/2622.38 = 0.148 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 13.367/537.910 = 0.025 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 125.168/537.910 = 0.233 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$


$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.422 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.014 < 1.000 \dots\dots\dots \text{O.K}$$

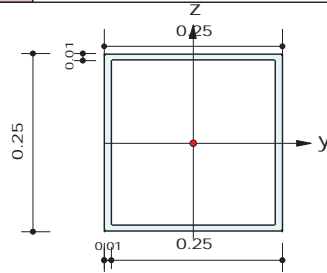
$$V_{Edz}/V_{z_Rd} = 0.007 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 106
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 4.02141



2. Member Forces

Axial Force Fxx = -320.54 (LCB: 54-MZ, POS:I)
Bending Moments My = 5.65700, Mz = -94.496
End Moments Myi = 5.65700, Myj = -0.0656 (for Lb)
Myi = 5.65700, Myj = -0.0656 (for Ly)
Mzi = -94.496, Mzj = -7.7506 (for Lz)
Shear Forces Fyy = -28.936 (LCB: 60-MZ, POS:3/4)
Fzz = 9.31430 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 4.02141, Lz = 4.02141, Lb = 4.02141
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 320.54/1544.74 = 0.208 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 5.657/292.283 = 0.019 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 94.496/292.283 = 0.323 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.585 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.030 < 1.000 \dots\dots\dots \text{O.K}$$

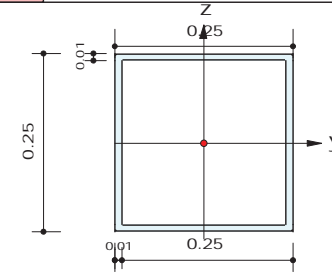
$$V_{Edz}/V_{z_Rd} = 0.009 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 108
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 3.78956



2. Member Forces

Axial Force Fxx = -49.895 (LCB: 60-MZ, POS:I)
Bending Moments My = 8.79694, Mz = -123.76
End Moments Myi = 8.79694, Myj = 3.41706 (for Lb)
Myi = 8.79694, Myj = 3.41706 (for Ly)
Mzi = -123.76, Mzj = -16.603 (for Lz)
Shear Forces Fyy = -39.791 (LCB: 60-MZ, POS:3/4)
Fzz = 10.2936 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 3.78956, Lz = 3.78956, Lb = 3.78956
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 49.89/3245.71 = 0.015 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 8.797/292.283 = 0.030 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 123.765/292.283 = 0.423 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.487 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.041 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

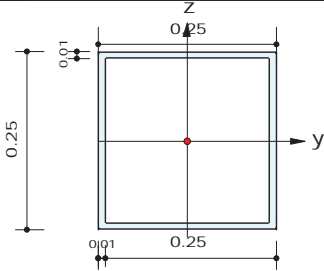
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	110
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.56858



2. Member Forces

Axial Force	Fxx = 167.042 (LCB: 60-MZ, POS:I)
Bending Moments	My = 9.61726, Mz = -110.16
End Moments	Myi = 9.61726, Myj = 3.77311 (for Lb) Myi = 9.61726, Myj = 3.77311 (for Ly) Mzi = -110.16, Mzj = -20.402 (for Lz)
Shear Forces	Fyy = -41.355 (LCB: 60-MZ, POS:1/2) Fzz = 10.7957 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.56858, Lz = 3.56858, Lb = 3.56858
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 167.04/3245.71 = 0.051 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 9.617/292.283 = 0.033 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 110.164/292.283 = 0.377 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.461 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.042 < 1.000 O.K V_Edz/Vz_Rd = 0.010 < 1.000 O.K

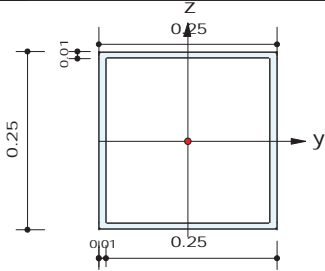
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	112
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.36063



2. Member Forces

Axial Force	Fxx = 411.831 (LCB: 60-MZ, POS:I)
Bending Moments	My = 8.22412, Mz = -79.761
End Moments	Myi = 8.22412, Myj = 3.50252 (for Lb) Myi = 8.22412, Myj = 3.50252 (for Ly) Mzi = -79.761, Mzj = -22.836 (for Lz)
Shear Forces	Fyy = -35.440 (LCB: 60-MZ, POS:1/4) Fzz = 10.4773 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.36063, Lz = 3.36063, Lb = 3.36063
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 411.83/3245.71 = 0.127 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 8.224/292.283 = 0.028 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 79.761/292.283 = 0.273 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.428 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.036 < 1.000 O.K V_Edz/Vz_Rd = 0.010 < 1.000 O.K

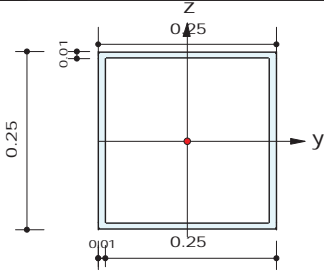
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	115
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.28315



2. Member Forces

Axial Force	Fxx = 483.140 (LCB: 54-FZ, POS:I)
Bending Moments	My = -41.472, Mz = 8.69972
End Moments	Myi = -41.472, Myj = 24.6770 (for Lb) Myi = -41.472, Myj = 24.6770 (for Ly) Mzi = 8.69972, Mzj = 10.6276 (for Lz)
Shear Forces	Fyy = -36.158 (LCB: 54-FY, POS:J) Fzz = -57.014 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 1.28315, Lz = 1.28315, Lb = 1.28315
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 483.14/3245.71 = 0.149 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 41.472/292.283 = 0.142 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.700/292.283 = 0.030 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.321 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.037 < 1.000 O.K V_Edz/Vz_Rd = 0.053 < 1.000 O.K

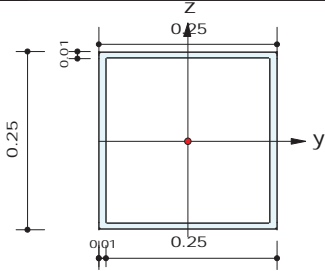
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	116
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.28506



2. Member Forces

Axial Force	Fxx = 520.154 (LCB: 54-MX, POS:I)
Bending Moments	My = 5.80349, Mz = 36.3836
End Moments	Myi = 5.80349, Myj = -0.9902 (for Lb) Myi = 5.80349, Myj = -0.9902 (for Ly) Mzi = 36.3836, Mzj = -9.2489 (for Lz)
Shear Forces	Fyy = 21.7221 (LCB: 60-MZ, POS:J) Fzz = 11.0293 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806


3. Design Parameters

Unbraced Lengths	Ly = 2.28506, Lz = 2.28506, Lb = 2.28506
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

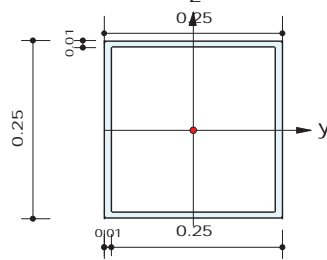
Axial Resistance	$N_{Ed}/N_{tRd} = 520.15/3245.71 = 0.160 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 5.803/292.283 = 0.020 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 36.384/292.283 = 0.124 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.305 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.022 < 1.000 O.K V_Edz/Vz_Rd = 0.010 < 1.000 O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 117
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 2.02063



2. Member Forces

Axial Force Fxx = -473.90 (LCB: 52-FX, POS:J)
Bending Moments My = -0.8995, Mz = 33.0952
End Moments Myi = -1.5840, Myj = -0.8995 (for Lb)
Myi = -1.5840, Myj = -0.8995 (for Ly)
Mzi = -3.4690, Mzj = 33.0952 (for Lz)
Shear Forces Fyy = -21.246 (LCB: 54-FY, POS:J)
Fzz = -16.292 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 2.02063, Lz = 2.02063, Lb = 2.02063
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 473.90/2542.79 = 0.186 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 0.900/292.283 = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 33.095/292.283 = 0.113 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.308 < 1.000 \dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.022 < 1.000 \dots\dots\dots \text{O.K}$$

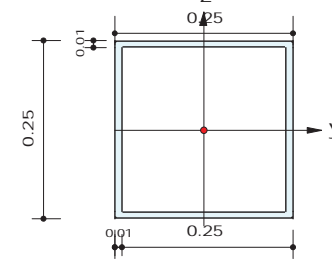
$$V_{Edz}/V_{z_Rd} = 0.015 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 118
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 2.26932



2. Member Forces

Axial Force Fxx = -557.19 (LCB: 54+MZ, POS:I)
Bending Moments My = 6.24961, Mz = 77.7384
End Moments Myi = 6.24961, Myj = 10.9702 (for Lb)
Myi = 6.24961, Myj = 10.9702 (for Ly)
Mzi = 77.7384, Mzj = -6.4347 (for Lz)
Shear Forces Fyy = 49.2451 (LCB: 54-MZ, POS:J)
Fzz = -18.965 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 2.26932, Lz = 2.26932, Lb = 2.26932
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 557.19/2422.75 = 0.230 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 6.250/292.283 = 0.021 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 77.738/292.283 = 0.266 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.530 < 1.000 \dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.050 < 1.000 \dots\dots\dots \text{O.K}$$

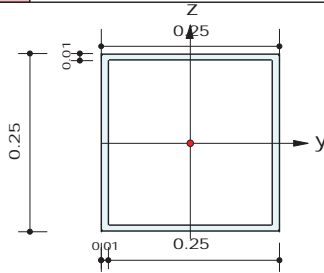
$$V_{Edz}/V_{z_Rd} = 0.018 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 120
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 2.25327



2. Member Forces

Axial Force Fxx = -647.41 (LCB: 54-MX, POS:I)
Bending Moments My = -6.8861, Mz = -49.671
End Moments Myi = -6.8861, Myj = 3.84589 (for Lb)
Myi = -6.8861, Myj = 3.84589 (for Ly)
Mzi = -49.671, Mzj = 13.8767 (for Lz)
Shear Forces Fyy = -32.050 (LCB: 54-MZ, POS:I)
Fzz = -10.670 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 2.25327, Lz = 2.25327, Lb = 2.25327
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 647.41/2430.63 = 0.266 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 6.886/292.283 = 0.024 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 49.671/292.283 = 0.170 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance


$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$
$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$
$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$
$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.465 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.033 < 1.000 \dots\dots\dots \text{O.K}$$

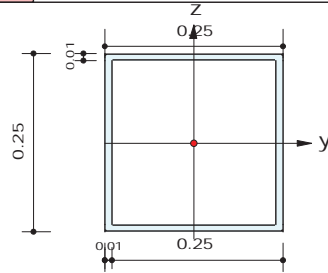
$$V_{Edz}/V_{z_Rd} = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 121
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 2.00634



2. Member Forces

Axial Force Fxx = -525.21 (LCB: 54-FY, POS:J)
Bending Moments My = -11.683, Mz = 56.9848
End Moments Myi = 3.49622, Myj = -11.683 (for Lb)
Myi = 3.49622, Myj = -11.683 (for Ly)
Mzi = -12.341, Mzj = 56.9848 (for Lz)
Shear Forces Fyy = -34.899 (LCB: 60-FY, POS:J)
Fzz = 10.2150 (LCB: 52-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 2.00634, Lz = 2.00634, Lb = 2.00634
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 525.21/2549.55 = 0.206 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 11.683/292.283 = 0.040 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 56.985/292.283 = 0.195 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$
$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$
$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$
$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.438 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.036 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.009 < 1.000 \dots\dots\dots \text{O.K}$$

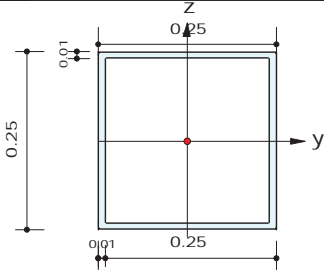
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	122
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.26143



2. Member Forces

Axial Force	Fxx = 659.098 (LCB: 60-MX, POS:I)
Bending Moments	My = -18.633, Mz = 47.5275
End Moments	Myi = -18.633, Myj = 12.3695 (for Lb) Myi = -18.633, Myj = 12.3695 (for Ly) Mzi = 47.5275, Mzj = -7.7472 (for Lz)
Shear Forces	Fyy = -26.142 (LCB: 60-MZ, POS:3/4) Fzz = 21.2344 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 2.26143, Lz = 2.26143, Lb = 2.26143
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 659.10/3245.71 = 0.203 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 18.633/292.283 = 0.064 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 47.527/292.283 = 0.163 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.429 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.027 < 1.000 O.K V_Edz/Vz_Rd = 0.020 < 1.000 O.K

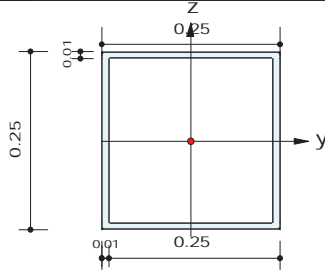
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	123
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.26988



2. Member Forces

Axial Force	Fxx = 570.281 (LCB: 54-MZ, POS:J)
Bending Moments	My = 6.08223, Mz = -78.656
End Moments	Myi = -8.4912, Myj = 6.08223 (for Lb) Myi = -8.4912, Myj = 6.08223 (for Ly) Mzi = -0.5717, Mzj = -78.656 (for Lz)
Shear Forces	Fyy = 97.6680 (LCB: 54-MZ, POS:J) Fzz = -48.506 (LCB: 54-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 1.26988, Lz = 1.26988, Lb = 1.26988
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 570.28/3245.71 = 0.176 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 6.082/292.283 = 0.021 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 78.656/292.283 = 0.269 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.466 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.100 < 1.000 O.K V_Edz/Vz_Rd = 0.045 < 1.000 O.K

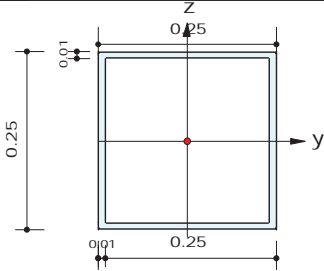
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	125
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.21405



2. Member Forces

Axial Force	Fxx = -546.94 (LCB: 52-MZ, POS:I)
Bending Moments	My = -9.3422, Mz = -99.398
End Moments	Myi = -9.3422, Myj = 4.95774 (for Lb) Myi = -9.3422, Myj = 4.95774 (for Ly) Mzi = -99.398, Mzj = 6.86433 (for Lz)
Shear Forces	Fyy = -128.30 (LCB: 54-MZ, POS:I) Fzz = -56.463 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 1.21405, Lz = 1.21405, Lb = 1.21405
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 546.94/3245.71 = 0.169 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 9.342/292.283 = 0.032 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 99.398/292.283 = 0.340 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$

$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$

$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$

$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.544 < 1.000$.. O.K


Shear Resistance

$V_{Edy}/V_{y_Rd} = 0.131 < 1.000$ O.K

$V_{Edz}/V_{z_Rd} = 0.052 < 1.000$ O.K

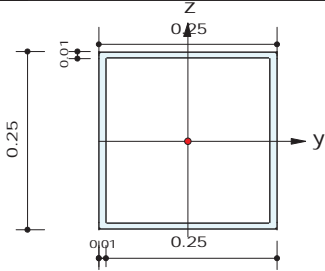
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	126
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.56668



2. Member Forces

Axial Force	Fxx = -577.69 (LCB: 60-FY, POS:J)
Bending Moments	My = 1.55769, Mz = 40.4713
End Moments	Myi = -1.6165, Myj = 1.55769 (for Lb) Myi = -1.6165, Myj = 1.55769 (for Ly) Mzi = -13.153, Mzj = 40.4713 (for Lz)
Shear Forces	Fyy = 22.3820 (LCB: 60-MX, POS:J) Fzz = 8.35046 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.56668, Lz = 2.56668, Lb = 2.56668
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 577.69/2273.76 = 0.254 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 1.558/292.283 = 0.005 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 40.471/292.283 = 0.138 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$

$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$

$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$

$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.410 < 1.000$.. O.K

Shear Resistance

$V_{Edy}/V_{y_Rd} = 0.023 < 1.000$ O.K

$V_{Edz}/V_{z_Rd} = 0.008 < 1.000$ O.K

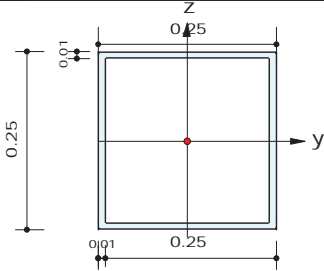
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	127
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.12610



2. Member Forces

Axial Force	Fxx = 550.068 (LCB: 60-MX, POS:I)
Bending Moments	My = -12.198, Mz = 38.2283
End Moments	Myi = -12.198, Myj = 7.54171 (for Lb) Myi = -12.198, Myj = 7.54171 (for Ly) Mzi = 38.2283, Mzj = -8.3965 (for Lz)
Shear Forces	Fyy = -15.592 (LCB: 60-MZ, POS:I) Fzz = -9.2113 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.12610, Lz = 3.12610, Lb = 3.12610
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 550.07/3245.71 = 0.169 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 12.198/292.283 = 0.042 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 38.228/292.283 = 0.131 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.342 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.016 < 1.000 O.K V_Edz/Vz_Rd = 0.009 < 1.000 O.K

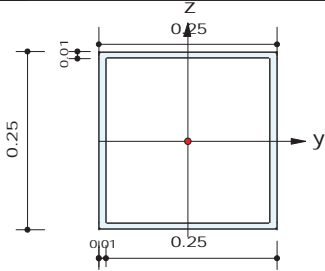
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	129
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.34419



2. Member Forces

Axial Force	Fxx = -394.31 (LCB: 54-MZ, POS:J)
Bending Moments	My = 14.8558, Mz = -41.467
End Moments	Myi = -2.6262, Myj = 14.8558 (for Lb) Myi = -2.6262, Myj = 14.8558 (for Ly) Mzi = -9.8134, Mzj = -41.467 (for Lz)
Shear Forces	Fyy = 15.2714 (LCB: 60-MX, POS:J) Fzz = -9.4676 (LCB: 54-FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.34419, Lz = 3.34419, Lb = 3.34419
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 394.31/1872.47 = 0.211 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 14.856/292.283 = 0.051 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 41.467/292.283 = 0.142 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(xy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.402 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.016 < 1.000 O.K V_Edz/Vz_Rd = 0.009 < 1.000 O.K

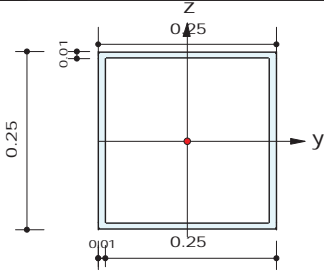
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	130
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.32078



2. Member Forces

Axial Force	Fxx = 267.227 (LCB: 54-MZ, POS:I)
Bending Moments	My = 11.2300, Mz = -40.734
End Moments	Myi = 11.2300, Myj = 0.08143 (for Lb) Myi = 11.2300, Myj = 0.08143 (for Ly) Mzi = -40.734, Mzj = -5.3037 (for Lz)
Shear Forces	Fyy = -18.636 (LCB: 60-MZ, POS:1/4) Fzz = 9.55880 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.32078, Lz = 3.32078, Lb = 3.32078
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 267.23/3245.71 = 0.082 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 11.230/292.283 = 0.038 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 40.734/292.283 = 0.139 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.260 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.019 < 1.000 O.K V_Edz/Vz_Rd = 0.009 < 1.000 O.K

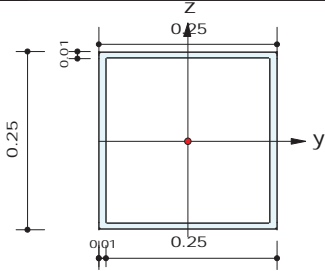
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	132
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.55597



2. Member Forces

Axial Force	Fxx = -122.08 (LCB: 54-MX, POS:J)
Bending Moments	My = 15.6176, Mz = -50.795
End Moments	Myi = -10.349, Myj = 15.6176 (for Lb) Myi = -10.349, Myj = 15.6176 (for Ly) Mzi = 8.70008, Mzj = -50.795 (for Lz)
Shear Forces	Fyy = 17.1375 (LCB: 60+FY, POS:J) Fzz = -9.9821 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.55597, Lz = 3.55597, Lb = 3.55597
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{cRd}, N_{bRd}] = 122.08/3245.71 = 0.038 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 15.618/292.283 = 0.053 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 50.795/292.283 = 0.174 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.265 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.018 < 1.000 O.K V_Edz/Vz_Rd = 0.009 < 1.000 O.K

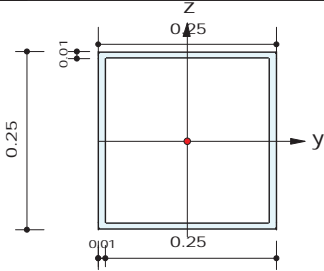
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	133
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.53095



2. Member Forces

Axial Force	Fxx = 81.4992 (LCB: 54-MZ, POS:I)
Bending Moments	My = 13.6361, Mz = -56.992
End Moments	Myi = 13.6361, Myj = -0.5420 (for Lb) Myi = 13.6361, Myj = -0.5420 (for Ly) Mzi = -56.992, Mzj = -4.8018 (for Lz)
Shear Forces	Fyy = -21.725 (LCB: 60-MZ, POS:I) Fzz = 8.82657 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.53095, Lz = 3.53095, Lb = 3.53095
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 81.50/3245.71 = 0.025 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 13.636/292.283 = 0.047 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 56.992/292.283 = 0.195 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.267 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.022 < 1.000 O.K V_Edz/Vz_Rd = 0.008 < 1.000 O.K

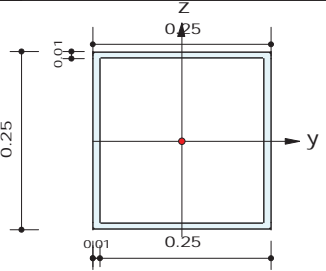
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	135
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.78039



2. Member Forces

Axial Force	Fxx = 81.8018 (LCB: 54-MX, POS:J)
Bending Moments	My = 12.7479, Mz = -54.645
End Moments	Myi = -7.7550, Myj = 12.7479 (for Lb) Myi = -7.7550, Myj = 12.7479 (for Ly) Mzi = 15.3471, Mzj = -54.645 (for Lz)
Shear Forces	Fyy = 18.5247 (LCB: 54+FY, POS:J) Fzz = -7.5859 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.78039, Lz = 3.78039, Lb = 3.78039
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 81.80/3245.71 = 0.025 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 12.748/292.283 = 0.044 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 54.645/292.283 = 0.187 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.256 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.019 < 1.000 O.K V_Edz/Vz_Rd = 0.007 < 1.000 O.K

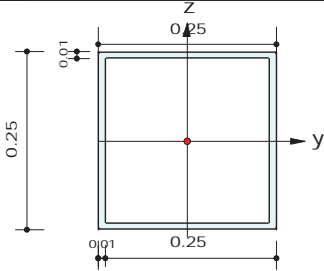
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 136
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 3.75403



2. Member Forces

Axial Force Fxx = -68.993 (LCB: 60-MZ, POS:I)
Bending Moments My = 13.3017, Mz = -66.215
End Moments Myi = 13.3017, Myj = -1.4801 (for Lb)
Myi = 13.3017, Myj = -1.4801 (for Ly)
Mzi = -66.215, Mzj = -5.6156 (for Lz)
Shear Forces Fyy = -20.440 (LCB: 60-MZ, POS:1/2)
Fzz = 7.86041 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 3.75403, Lz = 3.75403, Lb = 3.75403
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 68.99/3245.71 = 0.021 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 13.302/292.283 = 0.046 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 66.215/292.283 = 0.227 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.294 < 1.000 \dots\dots\dots \text{O.K}$$


Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.021 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z,Rd} = 0.007 < 1.000 \dots\dots\dots \text{O.K}$$

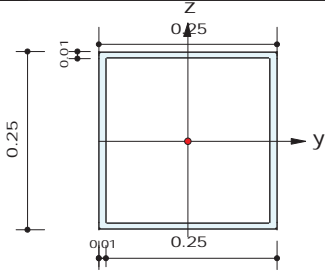
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 138
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 4.01531



2. Member Forces

Axial Force Fxx = 244.165 (LCB: 54-MX, POS:J)
Bending Moments My = 7.57608, Mz = -46.361
End Moments Myi = -5.1652, Myj = 7.57608 (for Lb)
Myi = -5.1652, Myj = 7.57608 (for Ly)
Mzi = 21.3867, Mzj = -46.361 (for Lz)
Shear Forces Fyy = 17.4681 (LCB: 55-MX, POS:J)
Fzz = -5.4800 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 4.01531, Lz = 4.01531, Lb = 4.01531
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/N_{t,Rd} = 244.17/3245.71 = 0.075 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 7.576/292.283 = 0.026 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 46.361/292.283 = 0.159 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.260 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.018 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z,Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

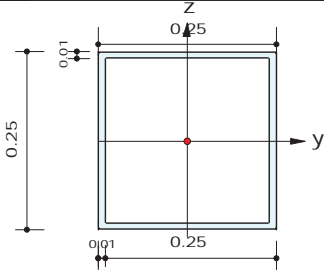
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	139
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.98784



2. Member Forces

Axial Force	Fxx = -240.27 (LCB: 54-MZ, POS:I)
Bending Moments	My = 10.2385, Mz = -50.056
End Moments	Myi = 10.2385, Myj = -5.2167 (for Lb) Myi = 10.2385, Myj = -5.2167 (for Ly) Mzi = -50.056, Mzj = -5.1271 (for Lz)
Shear Forces	Fyy = -14.117 (LCB: 60-MZ, POS:3/4) Fzz = 5.97094 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.98784, Lz = 3.98784, Lb = 3.98784
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 240.27/1559.95 = 0.154 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 10.238/292.283 = 0.035 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 50.056/292.283 = 0.171 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.366 < 1.000 \dots \text{O.K}$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.014 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.006 < 1.000 \dots\dots\dots \text{O.K}$$

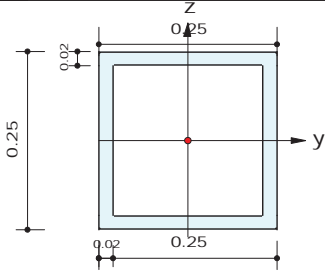
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	141
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.25901



2. Member Forces

Axial Force	Fxx = 348.785 (LCB: 54+FY, POS:J)
Bending Moments	My = 5.45555, Mz = -40.181
End Moments	Myi = -7.1875, Myj = 5.45555 (for Lb) Myi = -7.1875, Myj = 5.45555 (for Ly) Mzi = 23.3788, Mzj = -40.181 (for Lz)
Shear Forces	Fyy = 16.4948 (LCB: 60+FY, POS:J) Fzz = -6.7026 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters

Unbraced Lengths	Ly = 4.25901, Lz = 4.25901, Lb = 4.25901
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/N_{t_Rd} = 348.79/6220.95 = 0.056 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 5.456/537.910 = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 40.181/537.910 = 0.075 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.141 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.008 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

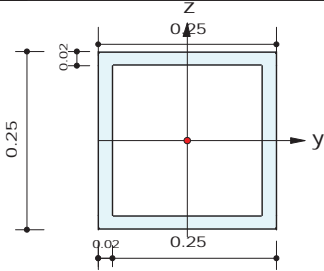
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	142
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.23061



2. Member Forces

Axial Force	Fxx = -468.23 (LCB: 54+FY, POS:I)	Depth	0.25000	Web Thick	0.02000
Bending Moments	My = 4.73624, Mz = 37.2244	Flg Width	0.25000	Top F Thick	0.02000
End Moments	Myi = 4.73624, Myj = -6.0354 (for Lb) Myi = 4.73624, Myj = -6.0354 (for Ly) Mzi = 37.2244, Mzj = -9.3982 (for Lz)	Web Center	0.23000	Bot.F Thick	0.02000
Shear Forces	Fyy = -12.793 (LCB: 60-FY, POS:J) Fzz = 8.39116 (LCB: 54-MZ, POS:J)	Area	0.01840	Asz	0.01000
		Qyb	0.01989	Qzb	0.01989
		Iyy	0.00016	Izz	0.00016
		Ybar	0.12500	Zbar	0.12500
		Wely	0.00131	Welz	0.00131
		ry	0.09425	rz	0.09425

3. Design Parameters


Unbraced Lengths	Ly = 4.23061, Lz = 4.23061, Lb = 4.23061
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 468.23/2647.98 = 0.177 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 4.736/537.910 = 0.009 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 37.224/537.910 = 0.069 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.260 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/Vy_Rd = 0.007 < 1.000$ O.K $V_{Edz}/Vz_Rd = 0.004 < 1.000$ O.K

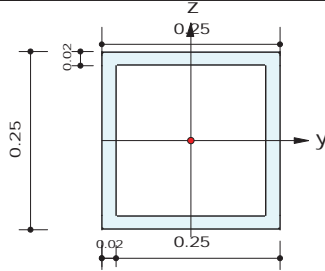
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	144
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.25901



2. Member Forces

Axial Force	Fxx = 636.024 (LCB: 54-FY, POS:J)	Depth	0.25000	Web Thick	0.02000
Bending Moments	My = -20.084, Mz = 48.8980	Flg Width	0.25000	Top F Thick	0.02000
End Moments	Myi = 5.46112, Myj = -20.084 (for Lb) Myi = 5.46112, Myj = -20.084 (for Ly) Mzi = -3.2003, Mzj = 48.8980 (for Lz)	Web Center	0.23000	Bot.F Thick	0.02000
Shear Forces	Fyy = -12.232 (LCB: 54-FY, POS:J) Fzz = 8.91823 (LCB: 54-MY, POS:J)	Area	0.01840	Asz	0.01000
		Qyb	0.01989	Qzb	0.01989
		Iyy	0.00016	Izz	0.00016
		Ybar	0.12500	Zbar	0.12500
		Wely	0.00131	Welz	0.00131
		ry	0.09425	rz	0.09425


3. Design Parameters

Unbraced Lengths	Ly = 4.25901, Lz = 4.25901, Lb = 4.25901
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

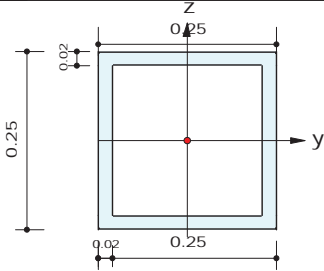
Axial Resistance	$N_{Ed}/Nt_{Rd} = 636.02/6220.95 = 0.102 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 20.084/537.910 = 0.037 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 48.898/537.910 = 0.091 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.230 < 1.000$ O.K
Shear Resistance	$V_{Edy}/Vy_Rd = 0.006 < 1.000$ O.K $V_{Edz}/Vz_Rd = 0.005 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	145
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.23061



2. Member Forces

Axial Force	Fxx = -576.19 (LCB: 54+MZ, POS:I)
Bending Moments	My = -29.321, Mz = 49.7682
End Moments	Myi = -29.321, Myj = -2.7275 (for Lb) Myi = -29.321, Myj = -2.7275 (for Ly) Mzi = 49.7682, Mzj = -2.1568 (for Lz)
Shear Forces	Fyy = -18.650 (LCB: 60-MZ, POS:1/4) Fzz = -12.812 (LCB: 54-MY, POS:I)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters

Unbraced Lengths	Ly = 4.23061, Lz = 4.23061, Lb = 4.23061
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 576.19/2647.98 = 0.218 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 29.321/537.910 = 0.055 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 49.768/537.910 = 0.093 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.359 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.010 < 1.000 \dots\dots\dots O.K$$

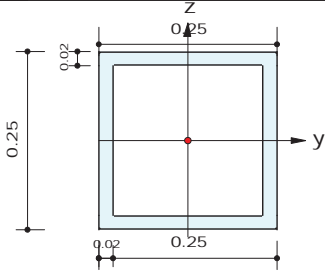
$$V_{Edz}/V_{z_Rd} = 0.007 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	147
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.25901



2. Member Forces

Axial Force	Fxx = -683.08 (LCB: 54-FY, POS:J)
Bending Moments	My = -5.6326, Mz = 44.9501
End Moments	Myi = 1.61912, Myj = -5.6326 (for Lb) Myi = 1.61912, Myj = -5.6326 (for Ly) Mzi = -12.261, Mzj = 44.9501 (for Lz)
Shear Forces	Fyy = -14.410 (LCB: 60-MZ, POS:I) Fzz = -7.8242 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters

Unbraced Lengths	Ly = 4.25901, Lz = 4.25901, Lb = 4.25901
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 683.08/2625.08 = 0.260 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 5.633/537.910 = 0.010 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 44.950/537.910 = 0.084 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.364 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.007 < 1.000 \dots\dots\dots O.K$$

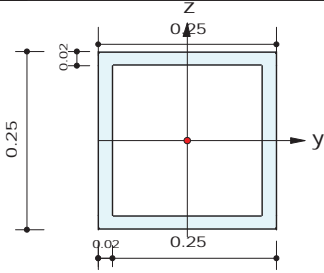
$$V_{Edz}/V_{z_Rd} = 0.004 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	148
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.23061



2. Member Forces

Axial Force	Fxx = 653.635 (LCB: 54-MY, POS:I)
Bending Moments	My = -14.586, Mz = 42.9866
End Moments	Myi = -14.586, Myj = -12.504 (for Lb) Myi = -14.586, Myj = -12.504 (for Ly) Mzi = 42.9866, Mzj = -5.4351 (for Lz)
Shear Forces	Fyy = 12.1525 (LCB: 55+MZ, POS:I) Fzz = 9.01585 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425


3. Design Parameters

Unbraced Lengths	Ly = 4.23061, Lz = 4.23061, Lb = 4.23061
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

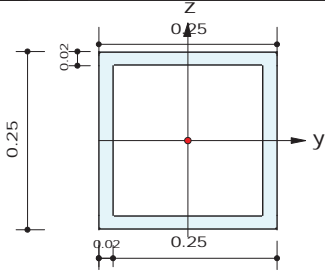
Axial Resistance	$N_{Ed}/N_{tRd} = 653.64/6220.95 = 0.105 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 14.586/537.910 = 0.027 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 42.987/537.910 = 0.080 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.212 < 1.000 O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.006 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.005 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	150
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.25901



2. Member Forces

Axial Force	Fxx = -461.41 (LCB: 60+MZ, POS:J)
Bending Moments	My = -0.4420, Mz = 27.7168
End Moments	Myi = -9.7491, Myj = -0.4420 (for Lb) Myi = -9.7491, Myj = -0.4420 (for Ly) Mzi = 8.54666, Mzj = 27.7168 (for Lz)
Shear Forces	Fyy = -11.464 (LCB: 55-FY, POS:J) Fzz = -8.3229 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters

Unbraced Lengths	Ly = 4.25901, Lz = 4.25901, Lb = 4.25901
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 461.41/2625.08 = 0.176 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 0.442/537.910 = 0.001 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 27.717/537.910 = 0.052 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.234 < 1.000 .. O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.006 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.004 < 1.000$ O.K

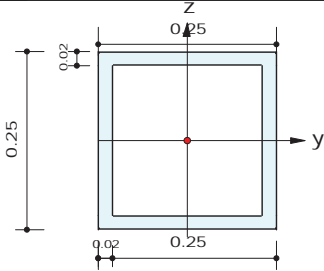
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	151
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.23061



2. Member Forces

Axial Force	Fxx = -556.50 (LCB: 60-FX, POS:J)
Bending Moments	My = -11.162, Mz = -4.0915
End Moments	Myi = 2.11119, Myj = -11.162 (for Lb) Myi = 2.11119, Myj = -11.162 (for Ly) Mzi = -3.9195, Mzj = -4.0915 (for Lz)
Shear Forces	Fyy = 7.64936 (LCB: 55-MY, POS:I) Fzz = 5.57836 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters

Unbraced Lengths	Ly = 4.23061, Lz = 4.23061, Lb = 4.23061
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 556.50/2647.98 = 0.210 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 11.162/537.910 = 0.021 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 4.091/537.910 = 0.008 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.233 < 1.000 \dots\dots \text{O.K}$$


Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z,Rd} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

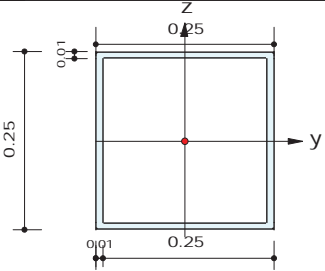
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	153
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.44816



2. Member Forces

Axial Force	Fxx = -3.8554 (LCB: 55-FY, POS:J)
Bending Moments	My = 0.51354, Mz = 17.3984
End Moments	Myi = -0.6785, Myj = 0.51354 (for Lb) Myi = -0.6785, Myj = 0.51354 (for Ly) Mzi = 1.18871, Mzj = 17.3984 (for Lz)
Shear Forces	Fyy = -6.4986 (LCB: 55-FY, POS:J) Fzz = -4.0467 (LCB: 60-FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.44816, Lz = 3.44816, Lb = 3.44816
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 3.86/3245.71 = 0.001 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 0.514/292.283 = 0.002 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 17.398/292.283 = 0.060 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.065 < 1.000 \dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.007 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z,Rd} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

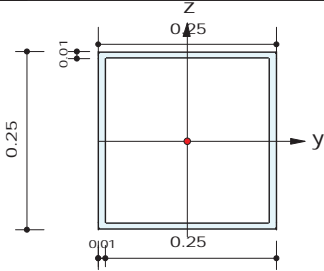
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	154
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 4.51700



2. Member Forces

Axial Force	Fxx = -4.8037 (LCB: 55-FY, POS:J)
Bending Moments	My = 0.73774, Mz = 22.5937
End Moments	Myi = -0.9241, Myj = 0.73774 (for Lb) Myi = -0.9241, Myj = 0.73774 (for Ly) Mzi = 1.39549, Mzj = 22.5937 (for Lz)
Shear Forces	Fyy = 7.14504 (LCB: 55-MZ, POS:J) Fzz = 2.92813 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 4.51700, Lz = 4.51700, Lb = 4.51700
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 4.80/3245.71 = 0.001 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 0.738/292.283 = 0.003 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 22.594/292.283 = 0.077 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.084 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.007 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.003 < 1.000$ O.K

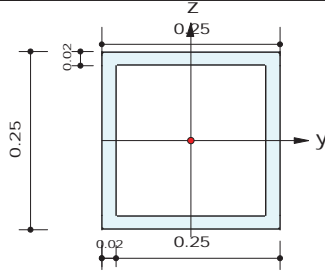
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	155
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 5.05678



2. Member Forces

Axial Force	Fxx = -728.22 (LCB: 60-FX, POS:J)
Bending Moments	My = 7.27918, Mz = 10.6722
End Moments	Myi = -6.3864, Myj = 7.27918 (for Lb) Myi = -6.3864, Myj = 7.27918 (for Ly) Mzi = -5.1761, Mzj = 10.6722 (for Lz)
Shear Forces	Fyy = -12.774 (LCB: 55-FY, POS:J) Fzz = -6.2140 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters

Unbraced Lengths	Ly = 5.05678, Lz = 5.05678, Lb = 5.05678
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 728.22/2064.22 = 0.353 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 7.279/537.910 = 0.014 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 10.672/537.910 = 0.020 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.386 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.007 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.003 < 1.000$ O.K

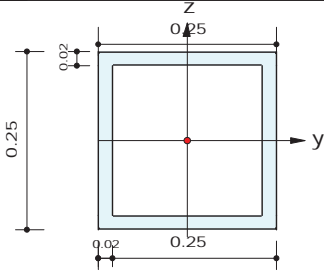
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	156
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.79568



2. Member Forces

Axial Force	Fxx = -818.87 (LCB: 60-FY, POS:J)
Bending Moments	My = 3.23684, Mz = 77.0320
End Moments	Myi = 0.08019, Myj = 3.23684 (for Lb) Myi = 0.08019, Myj = 3.23684 (for Ly) Mzi = -25.623, Mzj = 77.0320 (for Lz)
Shear Forces	Fyy = -21.406 (LCB: 60-MZ, POS:I) Fzz = -7.7511 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters

Unbraced Lengths	Ly = 4.79568, Lz = 4.79568, Lb = 4.79568
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{MIN[Nc_{Rd}, Nb_{Rd}]} = \frac{818.87}{2230.69} = 0.367 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{3.237}{537.910} = 0.006 < 1.000 \dots\dots\dots O.K$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{77.032}{537.910} = 0.143 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.545 < 1.000 \dots\dots\dots O.K$$


Shear Resistance

$$\frac{V_{Edy}}{V_{y_Rd}} = 0.011 < 1.000 \dots\dots\dots O.K$$

$$\frac{V_{Edz}}{V_{z_Rd}} = 0.004 < 1.000 \dots\dots\dots O.K$$

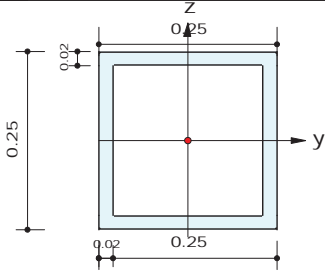
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	157
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.53998



2. Member Forces

Axial Force	Fxx = 705.425 (LCB: 54+FX, POS:J)
Bending Moments	My = -15.839, Mz = -49.000
End Moments	Myi = 0.84325, Myj = -15.839 (for Lb) Myi = 0.84325, Myj = -15.839 (for Ly) Mzi = 16.6709, Mzj = -49.000 (for Lz)
Shear Forces	Fyy = 22.4842 (LCB: 60-MZ, POS:J) Fzz = 11.5055 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters

Unbraced Lengths	Ly = 4.53998, Lz = 4.53998, Lb = 4.53998
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{N_{t_Rd}} = \frac{705.42}{6220.95} = 0.113 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{15.839}{537.910} = 0.029 < 1.000 \dots\dots\dots O.K$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{49.000}{537.910} = 0.091 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.234 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$\frac{V_{Edy}}{V_{y_Rd}} = 0.012 < 1.000 \dots\dots\dots O.K$$

$$\frac{V_{Edz}}{V_{z_Rd}} = 0.006 < 1.000 \dots\dots\dots O.K$$

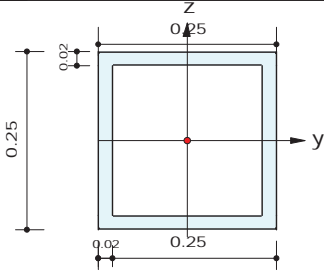
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	158
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.29056



2. Member Forces

Axial Force	Fxx = 419.404 (LCB: 60-MX, POS:J)
Bending Moments	My = 2.77956, Mz = -116.04
End Moments	Myi = -15.827, Myj = 2.77956 (for Lb) Myi = -15.827, Myj = 2.77956 (for Ly) Mzi = 42.6867, Mzj = -116.04 (for Lz)
Shear Forces	Fyy = 36.9935 (LCB: 60-MX, POS:J) Fzz = -11.266 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters


Unbraced Lengths	Ly = 4.29056, Lz = 4.29056, Lb = 4.29056
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 419.40/6220.95 = 0.067 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 2.780/537.910 = 0.005 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 116.036/537.910 = 0.216 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.288 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.019 < 1.000 O.K V_Edz/Vz_Rd = 0.006 < 1.000 O.K

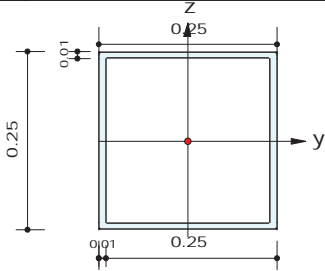
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	159
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 4.04865



2. Member Forces

Axial Force	Fxx = 233.171 (LCB: 60-MZ, POS:J)
Bending Moments	My = 2.85323, Mz = -105.53
End Moments	Myi = 4.55922, Myj = 2.85323 (for Lb) Myi = 4.55922, Myj = 2.85323 (for Ly) Mzi = -21.087, Mzj = -105.53 (for Lz)
Shear Forces	Fyy = 35.5347 (LCB: 60-MZ, POS:J) Fzz = -7.8224 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 4.04865, Lz = 4.04865, Lb = 4.04865
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 233.17/3245.71 = 0.072 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 2.853/292.283 = 0.010 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 105.528/292.283 = 0.361 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.443 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.036 < 1.000 O.K V_Edz/Vz_Rd = 0.007 < 1.000 O.K

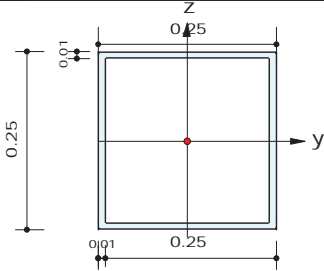
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	160
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.81567



2. Member Forces

Axial Force	Fxx = 30.1711 (LCB: 60-MZ, POS:J)
Bending Moments	My = 7.70001, Mz = -111.72
End Moments	Myi = 4.29694, Myj = 7.70001 (for Lb) Myi = 4.29694, Myj = 7.70001 (for Ly) Mzi = -13.832, Mzj = -111.72 (for Lz)
Shear Forces	Fyy = 36.5558 (LCB: 60-MZ, POS:J) Fzz = -9.8848 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.81567, Lz = 3.81567, Lb = 3.81567
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 30.17/3245.71 = 0.009 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 7.700/292.283 = 0.026 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 111.719/292.283 = 0.382 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.418 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.037 < 1.000 O.K V_Edz/Vz_Rd = 0.009 < 1.000 O.K

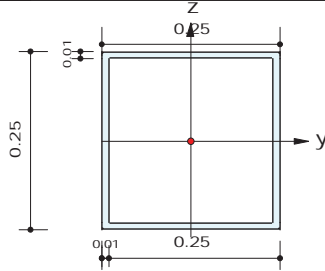
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	161
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.16827



2. Member Forces

Axial Force	Fxx = 597.851 (LCB: 54+FX, POS:I)
Bending Moments	My = -16.256, Mz = -8.5490
End Moments	Myi = -16.256, Myj = 10.8256 (for Lb) Myi = -16.256, Myj = 10.8256 (for Ly) Mzi = -8.5490, Mzj = 9.79232 (for Lz)
Shear Forces	Fyy = -20.245 (LCB: 60-MZ, POS:I) Fzz = -10.743 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.16827, Lz = 3.16827, Lb = 3.16827
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 597.85/3245.71 = 0.184 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 16.256/292.283 = 0.056 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.549/292.283 = 0.029 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.269 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.021 < 1.000 O.K V_Edz/Vz_Rd = 0.010 < 1.000 O.K

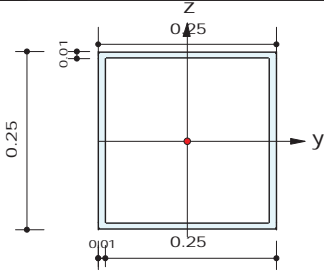
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	162
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.38377



2. Member Forces

Axial Force	Fxx = -582.41 (LCB: 54-MZ, POS:J)
Bending Moments	My = 10.8784, Mz = -65.120
End Moments	Myi = -2.5233, Myj = 10.8784 (for Lb) Myi = -2.5233, Myj = 10.8784 (for Ly) Mzi = -5.7257, Mzj = -65.120 (for Lz)
Shear Forces	Fyy = 22.2671 (LCB: 60-MZ, POS:J) Fzz = -11.437 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.38377, Lz = 3.38377, Lb = 3.38377
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 582.41/1852.34 = 0.314 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 10.878/292.283 = 0.037 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 65.120/292.283 = 0.223 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$

$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.597 < 1.000 \dots\dots\dots O.K$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.023 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.011 < 1.000 \dots\dots\dots O.K$$

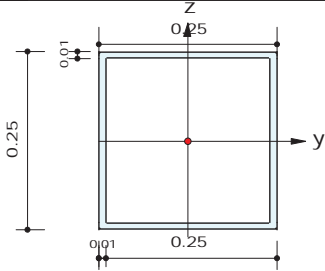
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	163
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.22516



2. Member Forces

Axial Force	Fxx = -679.94 (LCB: 54+MZ, POS:I)
Bending Moments	My = -14.944, Mz = 45.2055
End Moments	Myi = -14.944, Myj = 10.1748 (for Lb) Myi = -14.944, Myj = 10.1748 (for Ly) Mzi = 45.2055, Mzj = 36.5670 (for Lz)
Shear Forces	Fyy = -57.379 (LCB: 60-MZ, POS:I) Fzz = -44.734 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 1.22516, Lz = 1.22516, Lb = 1.22516
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 679.94/3245.71 = 0.209 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 14.944/292.283 = 0.051 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 45.206/292.283 = 0.155 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$

$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.415 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.059 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.042 < 1.000 \dots\dots\dots O.K$$

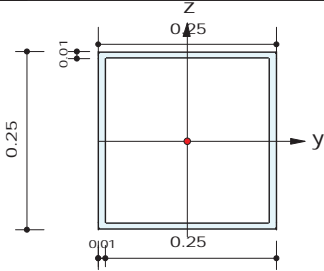
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	164
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.59017



2. Member Forces

Axial Force	Fxx = -508.95 (LCB: 54-FY, POS:J)
Bending Moments	My = -5.7706, Mz = 42.2003
End Moments	Myi = 3.50580, Myj = -5.7706 (for Lb) Myi = 3.50580, Myj = -5.7706 (for Ly) Mzi = -3.8768, Mzj = 42.2003 (for Lz)
Shear Forces	Fyy = 19.6825 (LCB: 60-MZ, POS:J) Fzz = -18.434 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 2.59017, Lz = 2.59017, Lb = 2.59017
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 508.95/2261.78 = 0.225 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 5.771/292.283 = 0.020 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 42.200/292.283 = 0.144 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.396 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.020 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.017 < 1.000$ O.K

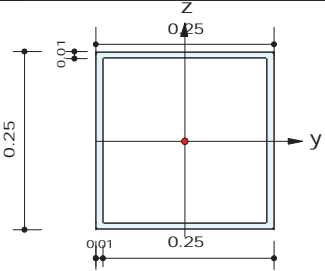
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	186
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.25441



2. Member Forces

Axial Force	Fxx = -538.80 (LCB: 54-FY, POS:J)
Bending Moments	My = -13.785, Mz = 81.4240
End Moments	Myi = 10.0792, Myj = -13.785 (for Lb) Myi = 10.0792, Myj = -13.785 (for Ly) Mzi = -39.349, Mzj = 81.4240 (for Lz)
Shear Forces	Fyy = -53.572 (LCB: 54-MZ, POS:I) Fzz = 20.8336 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.25441, Lz = 2.25441, Lb = 2.25441
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 538.80/2430.08 = 0.222 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 13.785/292.283 = 0.047 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 81.424/292.283 = 0.279 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.551 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.055 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.019 < 1.000$ O.K

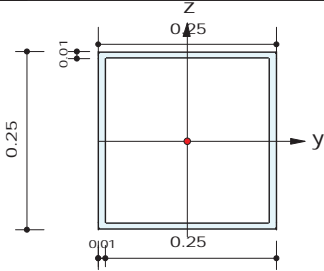
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	187
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.00735



2. Member Forces

Axial Force	Fxx = -478.25 (LCB: 54-MX, POS:I)
Bending Moments	My = 2.73308, Mz = 36.9156
End Moments	Myi = 2.73308, Myj = -2.4044 (for Lb) Myi = 2.73308, Myj = -2.4044 (for Ly) Mzi = 36.9156, Mzj = -5.4358 (for Lz)
Shear Forces	Fyy = 21.1477 (LCB: 54+MZ, POS:1/2) Fzz = -14.474 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.00735, Lz = 2.00735, Lb = 2.00735
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 478.25/2549.07 = 0.188 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 2.733/292.283 = 0.009 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 36.916/292.283 = 0.126 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.327 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.022 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.013 < 1.000$ O.K

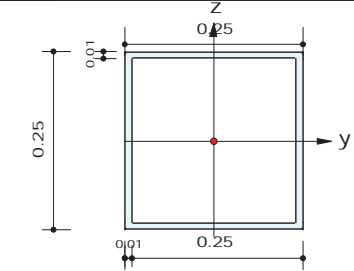
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	188
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.30092



2. Member Forces

Axial Force	Fxx = 640.074 (LCB: 54+MX, POS:J)
Bending Moments	My = -2.4750, Mz = 29.2400
End Moments	Myi = 2.84868, Myj = -2.4750 (for Lb) Myi = 2.84868, Myj = -2.4750 (for Ly) Mzi = -5.0954, Mzj = 29.2400 (for Lz)
Shear Forces	Fyy = -15.092 (LCB: 54-FY, POS:J) Fzz = -15.084 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806


3. Design Parameters

Unbraced Lengths	Ly = 2.30092, Lz = 2.30092, Lb = 2.30092
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

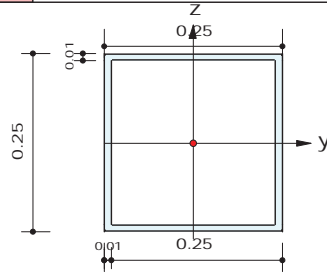
Axial Resistance	$N_{Ed}/N_{t_Rd} = 640.07/3245.71 = 0.197 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 2.475/292.283 = 0.008 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 29.240/292.283 = 0.100 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.306 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.015 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.014 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 189
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 1.29206



2. Member Forces

Axial Force Fxx = 600.044 (LCB: 54-MY, POS:J)
Bending Moments My = -36.580, Mz = -9.0312
End Moments Myi = -5.5112, Myj = -36.580 (for Lb)
Myi = -5.5112, Myj = -36.580 (for Ly)
Mzi = 4.09802, Mzj = -9.0312 (for Lz)
Shear Forces Fyy = 29.9487 (LCB: 60-MZ, POS:J)
Fzz = 43.6902 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806


3. Design Parameters

Unbraced Lengths Ly = 1.29206, Lz = 1.29206, Lb = 1.29206
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

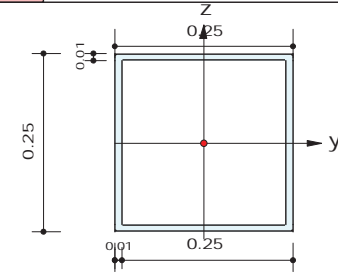
Axial Resistance
 $N_{Ed}/N_{tRd} = 600.04/3245.71 = 0.185 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 36.580/292.283 = 0.125 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 9.031/292.283 = 0.031 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.341 < 1.000 O.K
Shear Resistance
V_Edy/Vy_Rd = 0.031 < 1.000 O.K
V_Edz/Vz_Rd = 0.041 < 1.000 O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 191
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 1.18992



2. Member Forces

Axial Force Fxx = -785.47 (LCB: 54-FY, POS:J)
Bending Moments My = -11.865, Mz = 37.4171
End Moments Myi = 18.9743, Myj = -11.865 (for Lb)
Myi = 18.9743, Myj = -11.865 (for Ly)
Mzi = -8.1809, Mzj = 37.4171 (for Lz)
Shear Forces Fyy = 51.1526 (LCB: 60+FY, POS:J)
Fzz = 43.1430 (LCB: 54-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 1.18992, Lz = 1.18992, Lb = 1.18992
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 785.47/3245.71 = 0.242 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 11.865/292.283 = 0.041 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 37.417/292.283 = 0.128 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rc.LT1 = N_Ed/(xy*A*fy/γM1)
Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1)
Rc.LT2 = N_Ed/(xz*A*fy/γM1)
Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1)
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.411 < 1.000 .. O.K
Shear Resistance
V_Edy/Vy_Rd = 0.052 < 1.000 O.K
V_Edz/Vz_Rd = 0.040 < 1.000 O.K

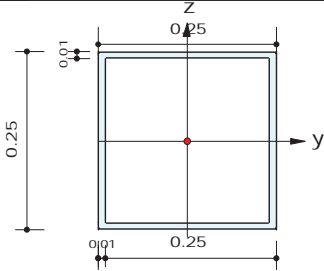
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	192
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length :	2.71399



2. Member Forces

Axial Force	Fxx = -660.28 (LCB: 54-MX, POS:I)
Bending Moments	My = 2.35093, Mz = 28.8223
End Moments	Myi = 2.35093, Myj = -3.0859 (for Lb) Myi = 2.35093, Myj = -3.0859 (for Ly) Mzi = 28.8223, Mzj = -5.8596 (for Lz)
Shear Forces	Fyy = -15.708 (LCB: 60-FY, POS:J) Fzz = -10.614 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.71399, Lz = 2.71399, Lb = 2.71399
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{MIN[Nc_{Rd}, Nb_{Rd}]} = \frac{660.28}{2198.25} = 0.300 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{2.351}{292.283} = 0.008 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{28.822}{292.283} = 0.099 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$

$$Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.416 < 1.000 \dots\dots\dots \text{O.K}$$


Shear Resistance

$$\frac{V_{Edy}}{V_{y_Rd}} = 0.016 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z_Rd}} = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

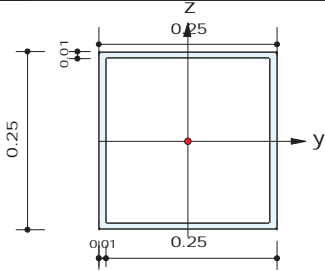
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	193
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length :	3.28454



2. Member Forces

Axial Force	Fxx = 680.711 (LCB: 54+FX, POS:J)
Bending Moments	My = -13.140, Mz = -13.798
End Moments	Myi = 8.18424, Myj = -13.140 (for Lb) Myi = 8.18424, Myj = -13.140 (for Ly) Mzi = 9.73563, Mzj = -13.798 (for Lz)
Shear Forces	Fyy = 11.3030 (LCB: 60+FY, POS:J) Fzz = 7.77750 (LCB: 54-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.28454, Lz = 3.28454, Lb = 3.28454
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{Nt_{Rd}} = \frac{680.71}{3245.71} = 0.210 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{13.140}{292.283} = 0.045 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{13.798}{292.283} = 0.047 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$

$$Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.302 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$\frac{V_{Edy}}{V_{y_Rd}} = 0.012 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z_Rd}} = 0.007 < 1.000 \dots\dots\dots \text{O.K}$$

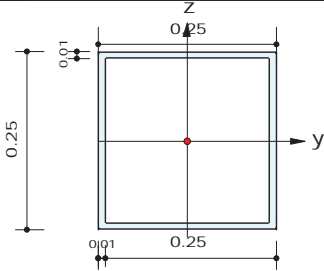
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	195
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.56858



2. Member Forces

Axial Force	Fxx = -489.23 (LCB: 54-MZ, POS:I)
Bending Moments	My = 8.12264, Mz = -55.847
End Moments	Myi = 8.12264, Myj = -7.3084 (for Lb) Myi = 8.12264, Myj = -7.3084 (for Ly) Mzi = -55.847, Mzj = -6.0544 (for Lz)
Shear Forces	Fyy = -16.129 (LCB: 60-MZ, POS:1/2) Fzz = 8.33714 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.56858, Lz = 3.56858, Lb = 3.56858
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 489.23/1759.62 = 0.278 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 8.123/292.283 = 0.028 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 55.847/292.283 = 0.191 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.516 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.017 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.008 < 1.000$ O.K

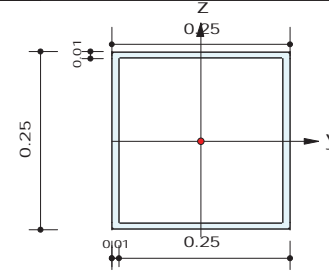
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	196
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.59334



2. Member Forces

Axial Force	Fxx = 386.816 (LCB: 54-MZ, POS:J)
Bending Moments	My = 0.88047, Mz = -53.193
End Moments	Myi = -0.0043, Myj = 0.88047 (for Lb) Myi = -0.0043, Myj = 0.88047 (for Ly) Mzi = -7.6668, Mzj = -53.193 (for Lz)
Shear Forces	Fyy = 21.6090 (LCB: 54-MZ, POS:J) Fzz = -6.1946 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.59334, Lz = 3.59334, Lb = 3.59334
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t,Rd} = 386.82/3245.71 = 0.119 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 0.880/292.283 = 0.003 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 53.193/292.283 = 0.182 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.304 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.022 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.006 < 1.000$ O.K

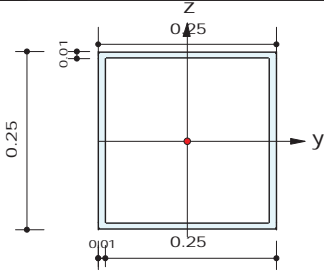
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	198
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.90424



2. Member Forces

Axial Force	Fxx = -141.83 (LCB: 54-MZ, POS:I)
Bending Moments	My = 5.27530, Mz = -75.454
End Moments	Myi = 5.27530, Myj = -3.2766 (for Lb) Myi = 5.27530, Myj = -3.2766 (for Ly) Mzi = -75.454, Mzj = -3.0399 (for Lz)
Shear Forces	Fyy = -21.014 (LCB: 54-FY, POS:J) Fzz = 6.70917 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.90424, Lz = 3.90424, Lb = 3.90424
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 141.83/1598.37 = 0.089 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 5.275/292.283 = 0.018 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 75.454/292.283 = 0.258 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.379 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.022 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.006 < 1.000$ O.K

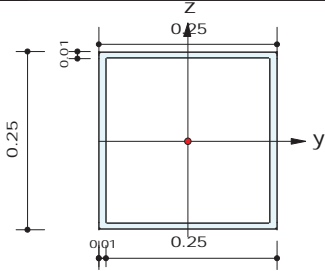
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	199
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.93094



2. Member Forces

Axial Force	Fxx = 101.860 (LCB: 54+FY, POS:J)
Bending Moments	My = 1.06378, Mz = -73.739
End Moments	Myi = -3.2817, Myj = 1.06378 (for Lb) Myi = -3.2817, Myj = 1.06378 (for Ly) Mzi = 23.8584, Mzj = -73.739 (for Lz)
Shear Forces	Fyy = 24.8279 (LCB: 54+FY, POS:J) Fzz = -5.4601 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.93094, Lz = 3.93094, Lb = 3.93094
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t,Rd} = 101.86/3245.71 = 0.031 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 1.064/292.283 = 0.004 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 73.739/292.283 = 0.252 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.287 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.025 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.005 < 1.000$ O.K

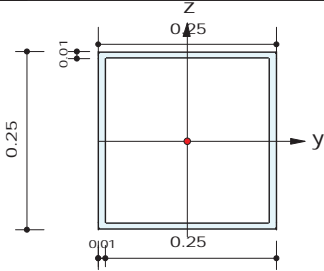
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 201
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 4.26237



2. Member Forces

Axial Force Fxx = 134.437 (LCB: 54-MZ, POS:I)
Bending Moments My = 1.13023, Mz = -82.914
End Moments Myi = 1.13023, Myj = -2.0156 (for Lb)
Myi = 1.13023, Myj = -2.0156 (for Ly)
Mzi = -82.914, Mzj = -3.6200 (for Lz)
Shear Forces Fyy = -23.052 (LCB: 54-MZ, POS:3/4)
Fzz = 5.21160 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths Ly = 4.26237, Lz = 4.26237, Lb = 4.26237
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/N_{tRd} = 134.44/3245.71 = 0.041 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 1.130/292.283 = 0.004 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 82.914/292.283 = 0.284 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.329 < 1.000 O.K
Shear Resistance
V_Edy/Vy_Rd = 0.024 < 1.000 O.K
V_Edz/Vz_Rd = 0.005 < 1.000 O.K

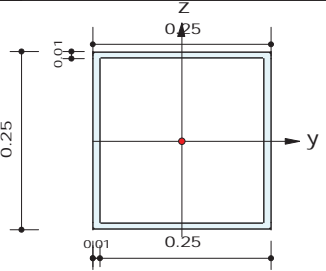
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 202
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 4.29056



2. Member Forces

Axial Force Fxx = 144.907 (LCB: 54-MZ, POS:J)
Bending Moments My = 1.00718, Mz = -81.939
End Moments Myi = -1.5865, Myj = 1.00718 (for Lb)
Myi = -1.5865, Myj = 1.00718 (for Ly)
Mzi = -4.5522, Mzj = -81.939 (for Lz)
Shear Forces Fyy = 22.7977 (LCB: 54-MZ, POS:J)
Fzz = -5.0567 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 4.29056, Lz = 4.29056, Lb = 4.29056
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/N_{tRd} = 144.91/3245.71 = 0.045 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 1.007/292.283 = 0.003 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 81.939/292.283 = 0.280 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.328 < 1.000 O.K
Shear Resistance
V_Edy/Vy_Rd = 0.023 < 1.000 O.K
V_Edz/Vz_Rd = 0.005 < 1.000 O.K

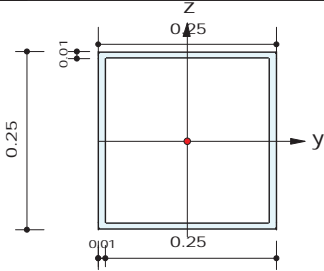
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	204
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.90424



2. Member Forces

Axial Force	Fxx = 91.1432 (LCB: 54-MZ, POS:I)
Bending Moments	My = 1.29591, Mz = -75.602
End Moments	Myi = 1.29591, Myj = -0.4233 (for Lb) Myi = 1.29591, Myj = -0.4233 (for Ly) Mzi = -75.602, Mzj = -5.2250 (for Lz)
Shear Forces	Fyy = -25.259 (LCB: 54-MZ, POS:1/4) Fzz = 5.64133 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.90424, Lz = 3.90424, Lb = 3.90424
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 91.14/3245.71 = 0.028 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 1.296/292.283 = 0.004 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 75.602/292.283 = 0.259 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.291 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.026 < 1.000 O.K V_Edz/Vz_Rd = 0.005 < 1.000 O.K

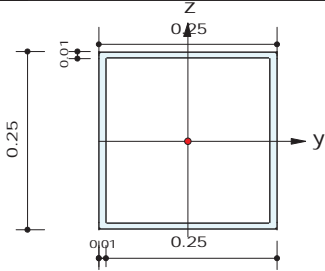
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	205
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.93094



2. Member Forces

Axial Force	Fxx = -166.11 (LCB: 52-MX, POS:J)
Bending Moments	My = 4.49538, Mz = -69.519
End Moments	Myi = -5.2430, Myj = 4.49538 (for Lb) Myi = -5.2430, Myj = 4.49538 (for Ly) Mzi = 6.09924, Mzj = -69.519 (for Lz)
Shear Forces	Fyy = 21.2714 (LCB: 54+FY, POS:J) Fzz = -6.4642 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806


3. Design Parameters

Unbraced Lengths	Ly = 3.93094, Lz = 3.93094, Lb = 3.93094
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

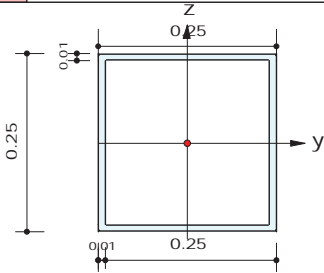
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 166.11/1586.01 = 0.105 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 4.495/292.283 = 0.015 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 69.519/292.283 = 0.238 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.373 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.022 < 1.000 O.K V_Edz/Vz_Rd = 0.006 < 1.000 O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	207
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.56858



2. Member Forces

Axial Force	Fxx = 374.277 (LCB: 54-MZ, POS:I)
Bending Moments	My = 2.06216, Mz = -55.849
End Moments	Myi = 2.06216, Myj = -1.0402 (for Lb) Myi = 2.06216, Myj = -1.0402 (for Ly) Mzi = -55.849, Mzj = -7.0249 (for Lz)
Shear Forces	Fyy = -22.633 (LCB: 54-MZ, POS:1/4) Fzz = 6.46133 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806


3. Design Parameters

Unbraced Lengths	Ly = 3.56858, Lz = 3.56858, Lb = 3.56858
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

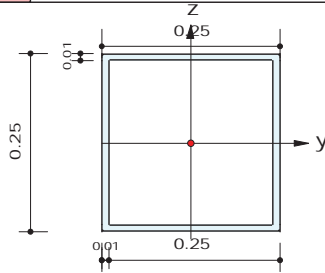
Axial Resistance	$N_{Ed}/N_{tRd} = 374.28/3245.71 = 0.115 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 2.062/292.283 = 0.007 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 55.849/292.283 = 0.191 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.313 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.023 < 1.000 O.K V_Edz/Vz_Rd = 0.006 < 1.000 O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	208
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.59334



2. Member Forces

Axial Force	Fxx = -527.96 (LCB: 52-MZ, POS:J)
Bending Moments	My = 9.22127, Mz = -46.398
End Moments	Myi = -5.1181, Myj = 9.22127 (for Lb) Myi = -5.1181, Myj = 9.22127 (for Ly) Mzi = -5.4131, Mzj = -46.398 (for Lz)
Shear Forces	Fyy = 17.4860 (LCB: 60-MZ, POS:J) Fzz = -8.5052 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.59334, Lz = 3.59334, Lb = 3.59334
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{cRd}, N_{bRd}] = 527.96/1747.38 = 0.302 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 9.221/292.283 = 0.032 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 46.398/292.283 = 0.159 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.507 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.018 < 1.000 O.K V_Edz/Vz_Rd = 0.008 < 1.000 O.K

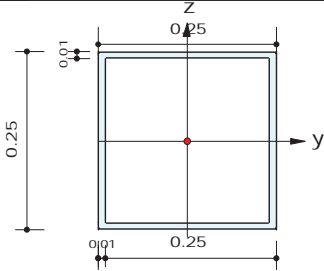
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	210
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.26232



2. Member Forces

Axial Force	Fxx = 659.240 (LCB: 54-MY, POS:I)
Bending Moments	My = -15.064, Mz = -12.922
End Moments	Myi = -15.064, Myj = -4.5756 (for Lb) Myi = -15.064, Myj = -4.5756 (for Ly) Mzi = -12.922, Mzj = -1.7559 (for Lz)
Shear Forces	Fyy = -14.244 (LCB: 60-FY, POS:J) Fzz = -8.7590 (LCB: 54-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.26232, Lz = 3.26232, Lb = 3.26232
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 659.24/3245.71 = 0.203 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 15.064/292.283 = 0.052 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 12.922/292.283 = 0.044 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.299 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.015 < 1.000 O.K V_Edz/Vz_Rd = 0.008 < 1.000 O.K

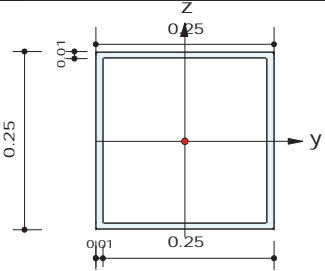
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	211
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.73255



2. Member Forces

Axial Force	Fxx = -674.46 (LCB: 54-FY, POS:J)
Bending Moments	My = 0.44947, Mz = 35.4853
End Moments	Myi = -1.6343, Myj = 0.44947 (for Lb) Myi = -1.6343, Myj = 0.44947 (for Ly) Mzi = -8.6172, Mzj = 35.4853 (for Lz)
Shear Forces	Fyy = -17.291 (LCB: 60-FY, POS:J) Fzz = 8.56320 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.73255, Lz = 2.73255, Lb = 2.73255
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 674.46/2188.68 = 0.308 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 0.449/292.283 = 0.002 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 35.485/292.283 = 0.121 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(xy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.445 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.018 < 1.000 O.K V_Edz/Vz_Rd = 0.008 < 1.000 O.K

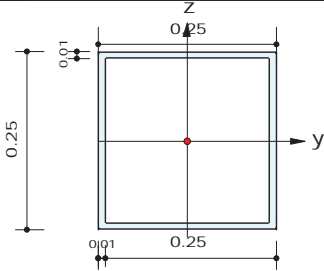
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	212
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.19806



2. Member Forces

Axial Force	Fxx = -515.97 (LCB: 54+MZ, POS:I)
Bending Moments	My = -12.987, Mz = 107.317
End Moments	Myi = -12.987, Myj = 4.67816 (for Lb) Myi = -12.987, Myj = 4.67816 (for Ly) Mzi = 107.317, Mzj = 7.89931 (for Lz)
Shear Forces	Fyy = 139.445 (LCB: 60+MZ, POS:1/2) Fzz = -40.992 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 1.19806, Lz = 1.19806, Lb = 1.19806
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 515.97/3245.71 = 0.159 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 12.987/292.283 = 0.044 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 107.317/292.283 = 0.367 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$

$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$

$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$

$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$R_{max} = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.571 < 1.000$.. O.K


Shear Resistance

$V_{Edy}/V_{y,Rd} = 0.143 < 1.000$ O.K

$V_{Edz}/V_{z,Rd} = 0.038 < 1.000$ O.K

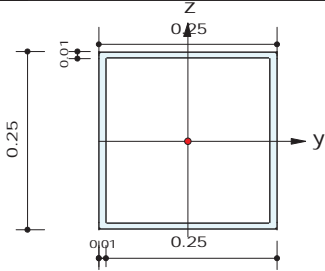
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	214
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.28315



2. Member Forces

Axial Force	Fxx = 415.973 (LCB: 54-MX, POS:J)
Bending Moments	My = 15.3811, Mz = 93.1441
End Moments	Myi = -17.257, Myj = 15.3811 (for Lb) Myi = -17.257, Myj = 15.3811 (for Ly) Mzi = -44.501, Mzj = 93.1441 (for Lz)
Shear Forces	Fyy = -118.66 (LCB: 60-MZ, POS:I) Fzz = -34.658 (LCB: 54-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 1.28315, Lz = 1.28315, Lb = 1.28315
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/N_{t,Rd} = 415.97/3245.71 = 0.128 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 15.381/292.283 = 0.053 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 93.144/292.283 = 0.319 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$

$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$

$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$


$R_{max} = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.499 < 1.000$ O.K

Shear Resistance

$V_{Edy}/V_{y,Rd} = 0.122 < 1.000$ O.K

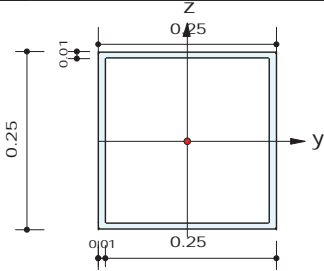
$V_{Edz}/V_{z,Rd} = 0.032 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 215
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 2.28506



2. Member Forces

Axial Force Fxx = 642.549 (LCB: 54-MX, POS:I)
Bending Moments My = -1.9422, Mz = 39.6959
End Moments Myi = -1.9422, Myj = 2.58118 (for Lb)
Myi = -1.9422, Myj = 2.58118 (for Ly)
Mzi = 39.6959, Mzj = -8.7492 (for Lz)
Shear Forces Fyy = 21.3469 (LCB: 54+MZ, POS:1/4)
Fzz = 12.3001 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806


3. Design Parameters

Unbraced Lengths Ly = 2.28506, Lz = 2.28506, Lb = 2.28506
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

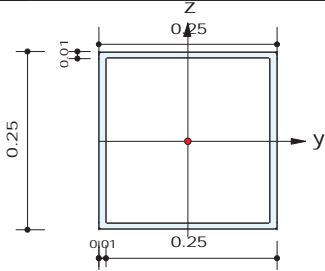
Axial Resistance
 $N_{Ed}/N_{tRd} = 642.55/3245.71 = 0.198 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 1.942/292.283 = 0.007 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 39.696/292.283 = 0.136 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.340 < 1.000 O.K
Shear Resistance
V_Edy/Vy_Rd = 0.022 < 1.000 O.K
V_Edz/Vz_Rd = 0.011 < 1.000 O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 216
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 2.02063



2. Member Forces

Axial Force Fxx = -470.47 (LCB: 54+MX, POS:J)
Bending Moments My = -3.6962, Mz = 36.7964
End Moments Myi = 0.39034, Myj = -3.6962 (for Lb)
Myi = 0.39034, Myj = -3.6962 (for Ly)
Mzi = -6.5372, Mzj = 36.7964 (for Lz)
Shear Forces Fyy = -22.601 (LCB: 60-FY, POS:J)
Fzz = 5.51593 (LCB: 54+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 2.02063, Lz = 2.02063, Lb = 2.02063
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 470.47/2542.79 = 0.185 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 3.696/292.283 = 0.013 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 36.796/292.283 = 0.126 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rc.LT1 = N_Ed/(χy*A*fy/γM1)
Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1)
Rc.LT2 = N_Ed/(χz*A*fy/γM1)
Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1)
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.326 < 1.000 .. O.K
Shear Resistance
V_Edy/Vy_Rd = 0.023 < 1.000 O.K
V_Edz/Vz_Rd = 0.005 < 1.000 O.K

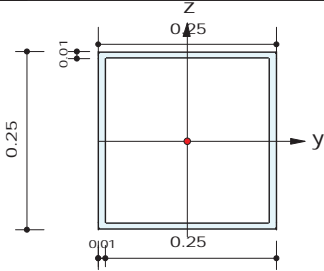
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	217
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.26932



2. Member Forces

Axial Force	Fxx = -608.00 (LCB: 54+MX, POS:I)
Bending Moments	My = -7.7315, Mz = 61.1401
End Moments	Myi = -7.7315, Myj = 9.63361 (for Lb) Myi = -7.7315, Myj = 9.63361 (for Ly) Mzi = 61.1401, Mzj = -7.3421 (for Lz)
Shear Forces	Fyy = 38.4657 (LCB: 60+MZ, POS:I) Fzz = -13.595 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.26932, Lz = 2.26932, Lb = 2.26932
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 608.00/2422.75 = 0.251 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 7.732/292.283 = 0.026 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 61.140/292.283 = 0.209 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.494 < 1.000 \dots\dots\dots O.K$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.039 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.013 < 1.000 \dots\dots\dots O.K$$

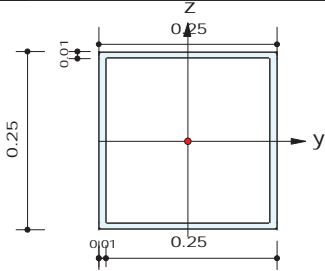
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	219
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.00634



2. Member Forces

Axial Force	Fxx = -502.89 (LCB: 60-MY, POS:J)
Bending Moments	My = -15.245, Mz = 73.3637
End Moments	Myi = -11.171, Myj = -15.245 (for Lb) Myi = -11.171, Myj = -15.245 (for Ly) Mzi = 3.66184, Mzj = 73.3637 (for Lz)
Shear Forces	Fyy = -43.030 (LCB: 60-MY, POS:J) Fzz = -11.850 (LCB: 60-MX, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.00634, Lz = 2.00634, Lb = 2.00634
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 502.89/2549.55 = 0.197 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 15.245/292.283 = 0.052 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 73.364/292.283 = 0.251 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.496 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.044 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.011 < 1.000 \dots\dots\dots O.K$$

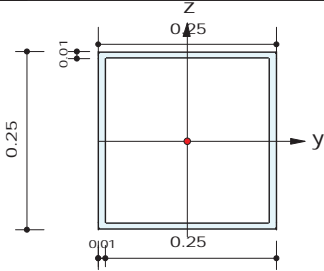
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	220
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.25327



2. Member Forces

Axial Force	Fxx = -631.90 (LCB: 54-MZ, POS:I)
Bending Moments	My = -3.5216, Mz = -85.613
End Moments	Myi = -3.5216, Myj = 8.63075 (for Lb) Myi = -3.5216, Myj = 8.63075 (for Ly) Mzi = -85.613, Mzj = 1.12544 (for Lz)
Shear Forces	Fyy = -58.690 (LCB: 54-MZ, POS:1/4) Fzz = -10.300 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.25327, Lz = 2.25327, Lb = 2.25327
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 631.90/2430.63 = 0.260 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 3.522/292.283 = 0.012 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 85.613/292.283 = 0.293 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.584 < 1.000 \dots\dots\dots \text{O.K}$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.060 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

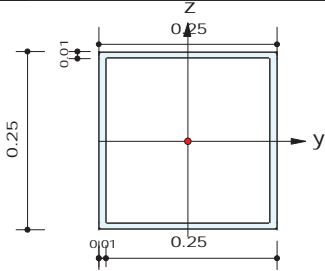
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	221
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.70917



2. Member Forces

Axial Force	Fxx = -736.76 (LCB: 60-FY, POS:J)
Bending Moments	My = -10.578, Mz = 56.3361
End Moments	Myi = 5.75597, Myj = -10.578 (for Lb) Myi = 5.75597, Myj = -10.578 (for Ly) Mzi = -17.077, Mzj = 56.3361 (for Lz)
Shear Forces	Fyy = 28.8394 (LCB: 60-MX, POS:J) Fzz = -12.264 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.70917, Lz = 2.70917, Lb = 2.70917
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 736.76/2200.73 = 0.335 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 10.578/292.283 = 0.036 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 56.336/292.283 = 0.193 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.576 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.030 < 1.000 \dots\dots\dots \text{O.K}$$

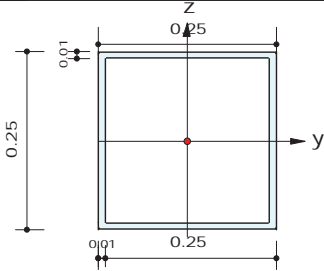
$$V_{Edz}/V_{z_Rd} = 0.011 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 222
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 1.18781



2. Member Forces

Axial Force Fxx = -683.63 (LCB: 60-MZ, POS:I)
Bending Moments My = -7.4314, Mz = -87.786
End Moments Myi = -7.4314, Myj = 1.66066 (for Lb)
Myi = -7.4314, Myj = 1.66066 (for Ly)
Mzi = -87.786, Mzj = -64.716 (for Lz)
Shear Forces Fyy = -110.41 (LCB: 60-MZ, POS:1/4)
Fzz = -25.444 (LCB: 54-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 1.18781, Lz = 1.18781, Lb = 1.18781
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 683.63/3245.71 = 0.211 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 7.431/292.283 = 0.025 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 87.786/292.283 = 0.300 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.541 < 1.000 \dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.113 < 1.000 \dots\dots\dots \text{O.K}$$

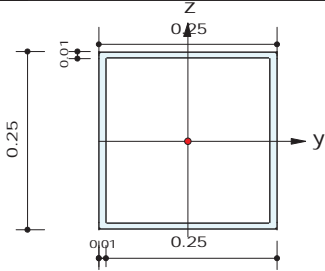
$$V_{Edz}/V_{z,Rd} = 0.024 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 223
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 1.26988



2. Member Forces

Axial Force Fxx = 610.368 (LCB: 60-MY, POS:I)
Bending Moments My = -38.429, Mz = 46.5452
End Moments Myi = -38.429, Myj = -6.2720 (for Lb)
Myi = -38.429, Myj = -6.2720 (for Ly)
Mzi = 46.5452, Mzj = 44.3798 (for Lz)
Shear Forces Fyy = 101.668 (LCB: 60+MZ, POS:I)
Fzz = -39.878 (LCB: 54-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 1.26988, Lz = 1.26988, Lb = 1.26988
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/N_{t,Rd} = 610.37/3245.71 = 0.188 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 38.429/292.283 = 0.131 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 46.545/292.283 = 0.159 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.479 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.104 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z,Rd} = 0.037 < 1.000 \dots\dots\dots \text{O.K}$$

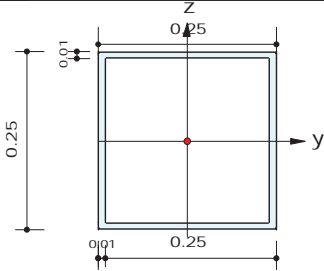
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	224
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.26143



2. Member Forces

Axial Force	Fxx = 769.795 (LCB: 60+MZ, POS:I)
Bending Moments	My = -13.660, Mz = 55.8103
End Moments	Myi = -13.660, Myj = -13.128 (for Lb) Myi = -13.660, Myj = -13.128 (for Ly) Mzi = 55.8103, Mzj = 10.8558 (for Lz)
Shear Forces	Fyy = 29.6674 (LCB: 60+MZ, POS:3/4) Fzz = -11.701 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 2.26143, Lz = 2.26143, Lb = 2.26143
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 769.80/3245.71 = 0.237 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 13.660/292.283 = 0.047 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 55.810/292.283 = 0.191 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.475 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.030 < 1.000 O.K V_Edz/Vz_Rd = 0.011 < 1.000 O.K

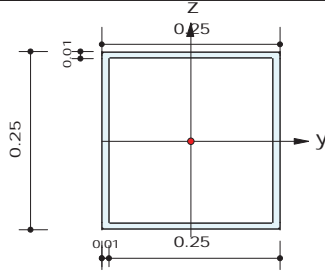
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	225
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.55597



2. Member Forces

Axial Force	Fxx = -454.31 (LCB: 52-FX, POS:J)
Bending Moments	My = 11.6535, Mz = -32.643
End Moments	Myi = -5.6782, Myj = 11.6535 (for Lb) Myi = -5.6782, Myj = 11.6535 (for Ly) Mzi = -2.2094, Mzj = -32.643 (for Lz)
Shear Forces	Fyy = 18.5912 (LCB: 60-MZ, POS:J) Fzz = -9.2406 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.55597, Lz = 3.55597, Lb = 3.55597
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 454.31/1765.87 = 0.257 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 11.654/292.283 = 0.040 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 32.643/292.283 = 0.112 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.411 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.019 < 1.000 O.K V_Edz/Vz_Rd = 0.009 < 1.000 O.K

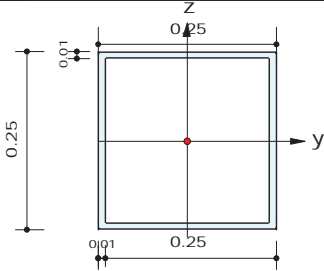
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	226
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.22132



2. Member Forces

Axial Force	Fxx = 734.030 (LCB: 60-MY, POS:I)
Bending Moments	My = -18.836, Mz = 38.8462
End Moments	Myi = -18.836, Myj = -17.715 (for Lb) Myi = -18.836, Myj = -17.715 (for Ly) Mzi = 38.8462, Mzj = 9.45650 (for Lz)
Shear Forces	Fyy = -16.276 (LCB: 60-MZ, POS:I) Fzz = -11.553 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.22132, Lz = 3.22132, Lb = 3.22132
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 734.03/3245.71 = 0.226 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 18.836/292.283 = 0.064 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 38.846/292.283 = 0.133 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.424 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.017 < 1.000 O.K V_Edz/Vz_Rd = 0.011 < 1.000 O.K

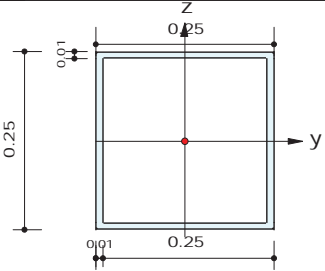
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	227
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.89665



2. Member Forces

Axial Force	Fxx = -149.53 (LCB: 52-FX, POS:J)
Bending Moments	My = 9.74173, Mz = -47.234
End Moments	Myi = -3.6089, Myj = 9.74173 (for Lb) Myi = -3.6089, Myj = 9.74173 (for Ly) Mzi = 3.65965, Mzj = -47.234 (for Lz)
Shear Forces	Fyy = 17.4545 (LCB: 60-MZ, POS:J) Fzz = -9.1453 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.89665, Lz = 3.89665, Lb = 3.89665
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 149.53/1601.89 = 0.093 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 9.742/292.283 = 0.033 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 47.234/292.283 = 0.162 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.290 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.018 < 1.000 O.K V_Edz/Vz_Rd = 0.008 < 1.000 O.K

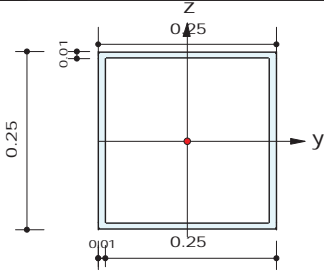
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 228
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 3.53095



2. Member Forces

Axial Force Fxx = 226.150 (LCB: 54-FY, POS:I)
Bending Moments My = 11.3304, Mz = -42.859
End Moments Myi = 11.3304, Myj = -11.249 (for Lb)
Myi = 11.3304, Myj = -11.249 (for Ly)
Mzi = -42.859, Mzj = 17.2393 (for Lz)
Shear Forces Fyy = -17.967 (LCB: 60-FY, POS:J)
Fzz = 9.71229 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths Ly = 3.53095, Lz = 3.53095, Lb = 3.53095
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/N_{tRd} = 226.15/3245.71 = 0.070 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 11.330/292.283 = 0.039 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 42.859/292.283 = 0.147 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.255 < 1.000 O.K
Shear Resistance
V_Edy/Vy_Rd = 0.018 < 1.000 O.K
V_Edz/Vz_Rd = 0.009 < 1.000 O.K

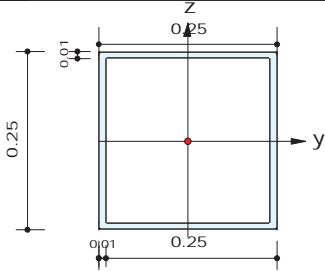
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 229
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 4.25901



2. Member Forces

Axial Force Fxx = 118.503 (LCB: 54-MZ, POS:J)
Bending Moments My = 12.5625, Mz = -59.597
End Moments Myi = 1.67253, Myj = 12.5625 (for Lb)
Myi = 1.67253, Myj = 12.5625 (for Ly)
Mzi = -3.9880, Mzj = -59.597 (for Lz)
Shear Forces Fyy = 17.2323 (LCB: 55-MZ, POS:J)
Fzz = -7.2594 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths Ly = 4.25901, Lz = 4.25901, Lb = 4.25901
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/N_{tRd} = 118.50/3245.71 = 0.037 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 12.563/292.283 = 0.043 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 59.597/292.283 = 0.204 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.283 < 1.000 O.K
Shear Resistance
V_Edy/Vy_Rd = 0.018 < 1.000 O.K
V_Edz/Vz_Rd = 0.007 < 1.000 O.K

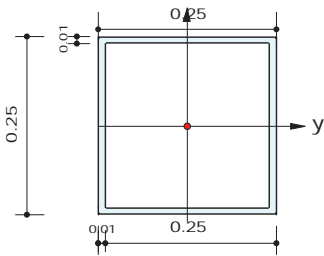
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	230
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.86971



2. Member Forces

Axial Force	Fxx = -32.389 (LCB: 60-MZ, POS:I)
Bending Moments	My = 13.9342, Mz = -57.163
End Moments	Myi = 13.9342, Myj = 4.74242 (for Lb) Myi = 13.9342, Myj = 4.74242 (for Ly) Mzi = -57.163, Mzj = -3.3668 (for Lz)
Shear Forces	Fyy = -18.640 (LCB: 55-MZ, POS:I) Fzz = 8.77956 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.86971, Lz = 3.86971, Lb = 3.86971
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 32.39/3245.71 = 0.010 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 13.934/292.283 = 0.048 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 57.163/292.283 = 0.196 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.253 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.019 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.008 < 1.000$ O.K

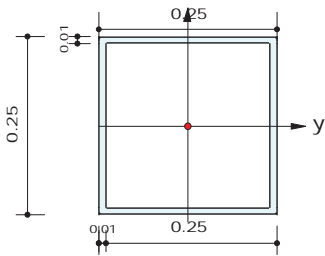
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	231
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.89665



2. Member Forces

Axial Force	Fxx = 51.7589 (LCB: 54-MZ, POS:J)
Bending Moments	My = 11.7838, Mz = -52.355
End Moments	Myi = 2.10062, Myj = 11.7838 (for Lb) Myi = 2.10062, Myj = 11.7838 (for Ly) Mzi = -3.7465, Mzj = -52.355 (for Lz)
Shear Forces	Fyy = 18.2721 (LCB: 55-MZ, POS:J) Fzz = -8.3077 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.89665, Lz = 3.89665, Lb = 3.89665
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t,Rd} = 51.76/3245.71 = 0.016 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 11.784/292.283 = 0.040 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 52.355/292.283 = 0.179 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.235 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.019 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.008 < 1.000$ O.K

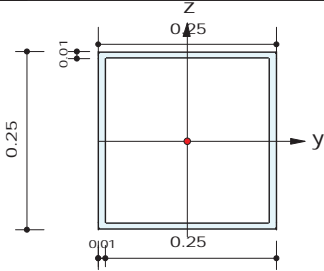
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	232
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 4.23061



2. Member Forces

Axial Force	Fxx = 98.5911 (LCB: 54-MZ, POS:I)
Bending Moments	My = 12.9808, Mz = -61.176
End Moments	Myi = 12.9808, Myj = -1.3107 (for Lb) Myi = 12.9808, Myj = -1.3107 (for Ly) Mzi = -61.176, Mzj = -2.5143 (for Lz)
Shear Forces	Fyy = -17.310 (LCB: 55-MZ, POS:I) Fzz = 7.46176 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 4.23061, Lz = 4.23061, Lb = 4.23061
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 98.59/3245.71 = 0.030 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 12.981/292.283 = 0.044 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 61.176/292.283 = 0.209 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.284 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.018 < 1.000 O.K V_Edz/Vz_Rd = 0.007 < 1.000 O.K

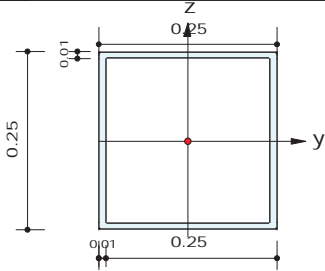
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	233
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.55597



2. Member Forces

Axial Force	Fxx = 262.360 (LCB: 54-MX, POS:J)
Bending Moments	My = 10.6944, Mz = -33.925
End Moments	Myi = -11.671, Myj = 10.6944 (for Lb) Myi = -11.671, Myj = 10.6944 (for Ly) Mzi = 17.9775, Mzj = -33.925 (for Lz)
Shear Forces	Fyy = 15.7277 (LCB: 55-MX, POS:J) Fzz = -9.4000 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.55597, Lz = 3.55597, Lb = 3.55597
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 262.36/3245.71 = 0.081 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 10.694/292.283 = 0.037 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 33.925/292.283 = 0.116 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.233 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.016 < 1.000 O.K V_Edz/Vz_Rd = 0.009 < 1.000 O.K

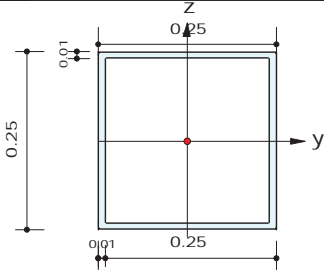
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	234
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.86971



2. Member Forces

Axial Force	Fxx = -127.86 (LCB: 52-FX, POS:I)
Bending Moments	My = 10.0681, Mz = -48.087
End Moments	Myi = 10.0681, Myj = -4.2371 (for Lb) Myi = 10.0681, Myj = -4.2371 (for Ly) Mzi = -48.087, Mzj = 2.78786 (for Lz)
Shear Forces	Fyy = -16.241 (LCB: 60-MZ, POS:3/4) Fzz = 9.11381 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.86971, Lz = 3.86971, Lb = 3.86971
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 127.86/1614.45 = 0.079 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 10.068/292.283 = 0.034 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 48.087/292.283 = 0.165 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.278 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.017 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.008 < 1.000$ O.K

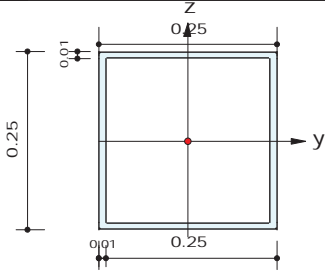
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	235
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.24382



2. Member Forces

Axial Force	Fxx = 641.634 (LCB: 60-FY, POS:J)
Bending Moments	My = -13.253, Mz = 31.5515
End Moments	Myi = 11.4475, Myj = -13.253 (for Lb) Myi = 11.4475, Myj = -13.253 (for Ly) Mzi = -8.4347, Mzj = 31.5515 (for Lz)
Shear Forces	Fyy = 12.7705 (LCB: 60-MZ, POS:J) Fzz = 9.60550 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.24382, Lz = 3.24382, Lb = 3.24382
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t,Rd} = 641.63/3245.71 = 0.198 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 13.253/292.283 = 0.045 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 31.552/292.283 = 0.108 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.351 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.013 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.009 < 1.000$ O.K

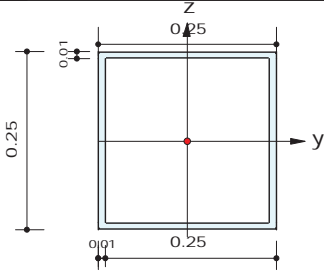
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 236
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 3.53095



2. Member Forces

Axial Force Fxx = -344.98 (LCB: 54-MZ, POS:I)
Bending Moments My = 15.9496, Mz = -52.400
End Moments Myi = 15.9496, Myj = -2.1597 (for Lb)
Myi = 15.9496, Myj = -2.1597 (for Ly)
Mzi = -52.400, Mzj = -9.7456 (for Lz)
Shear Forces Fyy = -17.822 (LCB: 60-MZ, POS:3/4)
Fzz = 9.89537 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 3.53095, Lz = 3.53095, Lb = 3.53095
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 344.98/1778.31 = 0.194 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 15.950/292.283 = 0.055 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 52.400/292.283 = 0.179 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.430 < 1.000 \dots\dots\dots \text{O.K}$$


Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.018 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z,Rd} = 0.009 < 1.000 \dots\dots\dots \text{O.K}$$

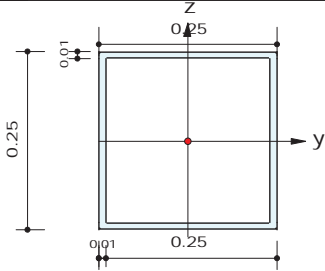
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 237
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 2.27746



2. Member Forces

Axial Force Fxx = 728.176 (LCB: 54-FY, POS:J)
Bending Moments My = -5.4237, Mz = 37.6388
End Moments Myi = 4.86520, Myj = -5.4237 (for Lb)
Myi = 4.86520, Myj = -5.4237 (for Ly)
Mzi = -7.4361, Mzj = 37.6388 (for Lz)
Shear Forces Fyy = 23.9368 (LCB: 60-MZ, POS:J)
Fzz = -6.3062 (LCB: 55-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 2.27746, Lz = 2.27746, Lb = 2.27746
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/N_{t,Rd} = 728.18/3245.71 = 0.224 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 5.424/292.283 = 0.019 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 37.639/292.283 = 0.129 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.372 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y,Rd} = 0.025 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z,Rd} = 0.006 < 1.000 \dots\dots\dots \text{O.K}$$

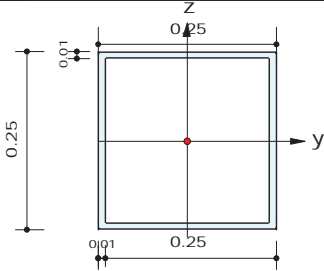
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	238
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.27888



2. Member Forces

Axial Force	Fxx = 608.706 (LCB: 54-MX, POS:I)
Bending Moments	My = 15.9797, Mz = -72.370
End Moments	Myi = 15.9797, Myj = -37.673 (for Lb) Myi = 15.9797, Myj = -37.673 (for Ly) Mzi = -72.370, Mzj = 39.2912 (for Lz)
Shear Forces	Fyy = -98.827 (LCB: 54-MZ, POS:1/4) Fzz = 53.9181 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 1.27888, Lz = 1.27888, Lb = 1.27888
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 608.71/3245.71 = 0.188 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 15.980/292.283 = 0.055 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 72.370/292.283 = 0.248 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.490 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.101 < 1.000 O.K V_Edz/Vz_Rd = 0.050 < 1.000 O.K

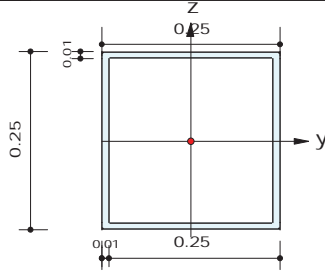
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	239
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.17960



2. Member Forces

Axial Force	Fxx = -597.22 (LCB: 52+MX, POS:J)
Bending Moments	My = -7.7169, Mz = -101.84
End Moments	Myi = 13.7010, Myj = -7.7169 (for Lb) Myi = 13.7010, Myj = -7.7169 (for Ly) Mzi = 47.0412, Mzj = -101.84 (for Lz)
Shear Forces	Fyy = 136.731 (LCB: 54-MZ, POS:J) Fzz = 39.1944 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 1.17960, Lz = 1.17960, Lb = 1.17960
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 597.22/3245.71 = 0.184 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 7.717/292.283 = 0.026 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 101.841/292.283 = 0.348 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.564 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.140 < 1.000 O.K V_Edz/Vz_Rd = 0.036 < 1.000 O.K

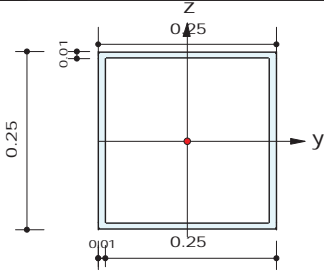
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	240
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.69045



2. Member Forces

Axial Force	Fxx = -701.18 (LCB: 60-MX, POS:I)
Bending Moments	My = -12.705, Mz = 49.9011
End Moments	Myi = -12.705, Myj = 6.41700 (for Lb) Myi = -12.705, Myj = 6.41700 (for Ly) Mzi = 49.9011, Mzj = -12.710 (for Lz)
Shear Forces	Fyy = -26.516 (LCB: 60-FY, POS:J) Fzz = 13.0698 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.69045, Lz = 2.69045, Lb = 2.69045
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 701.18/2210.37 = 0.317 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 12.705/292.283 = 0.043 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 49.901/292.283 = 0.171 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.537 < 1.000 \dots\dots\dots O.K$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.027 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.012 < 1.000 \dots\dots\dots O.K$$

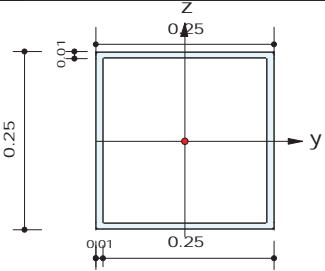
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	241
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.23825



2. Member Forces

Axial Force	Fxx = -608.45 (LCB: 54+MX, POS:J)
Bending Moments	My = -4.9290, Mz = -51.286
End Moments	Myi = -16.412, Myj = -4.9290 (for Lb) Myi = -16.412, Myj = -4.9290 (for Ly) Mzi = 15.1000, Mzj = -51.286 (for Lz)
Shear Forces	Fyy = 34.0098 (LCB: 60+FY, POS:J) Fzz = 14.4000 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 2.23825, Lz = 2.23825, Lb = 2.23825
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 608.45/2438.00 = 0.250 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 4.929/292.283 = 0.017 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 51.286/292.283 = 0.175 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.450 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.035 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.013 < 1.000 \dots\dots\dots O.K$$

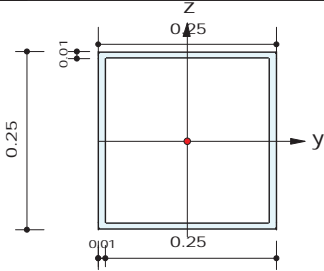
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	242
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.99296



2. Member Forces

Axial Force	Fxx = -516.92 (LCB: 54-MX, POS:I)
Bending Moments	My = -12.703, Mz = 60.2898
End Moments	Myi = -12.703, Myj = 4.94415 (for Lb) Myi = -12.703, Myj = 4.94415 (for Ly) Mzi = 60.2898, Mzj = -11.702 (for Lz)
Shear Forces	Fyy = 37.8883 (LCB: 60-MZ, POS:J) Fzz = 16.6329 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 1.99296, Lz = 1.99296, Lb = 1.99296
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 516.92/2555.86 = 0.202 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 12.703/292.283 = 0.043 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 60.290/292.283 = 0.206 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.448 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.039 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.015 < 1.000$ O.K

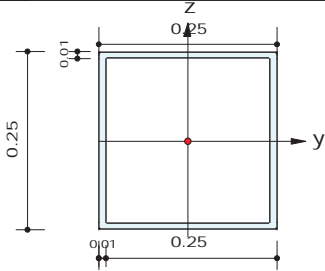
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	268
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.59334



2. Member Forces

Axial Force	Fxx = -219.52 (LCB: 60-MZ, POS:J)
Bending Moments	My = 12.9439, Mz = -100.49
End Moments	Myi = 4.26904, Myj = 12.9439 (for Lb) Myi = 4.26904, Myj = 12.9439 (for Ly) Mzi = -10.349, Mzj = -100.49 (for Lz)
Shear Forces	Fyy = 32.8703 (LCB: 60-MZ, POS:J) Fzz = -12.414 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.59334, Lz = 3.59334, Lb = 3.59334
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 219.52/1747.38 = 0.126 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 12.944/292.283 = 0.044 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 100.487/292.283 = 0.344 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.529 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.034 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.012 < 1.000$ O.K

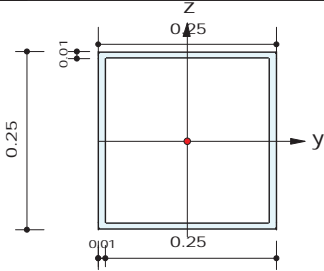
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 304
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 1.31040



2. Member Forces

Axial Force Fxx = 562.953 (LCB: 54+FZ, POS:J)
Bending Moments My = -50.564, Mz = 6.80449
End Moments Myi = 25.6151, Myj = -50.564 (for Lb)
Myi = 25.6151, Myj = -50.564 (for Ly)
Mzi = 5.75530, Mzj = 6.80449 (for Lz)
Shear Forces Fyy = 30.8810 (LCB: 54+FY, POS:J)
Fzz = 62.0152 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths Ly = 1.31040, Lz = 1.31040, Lb = 1.31040
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/N_{tRd} = 562.95/3245.71 = 0.173 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 50.564/292.283 = 0.173 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 6.804/292.283 = 0.023 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.370 < 1.000 O.K
Shear Resistance
 $V_{Edy}/V_{yRd} = 0.032 < 1.000$ O.K
 $V_{Edz}/V_{zRd} = 0.058 < 1.000$ O.K

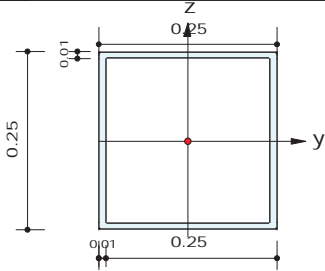
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 305
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 2.37935



2. Member Forces

Axial Force Fxx = 531.574 (LCB: 54-FY, POS:J)
Bending Moments My = 7.29802, Mz = 39.3104
End Moments Myi = -1.8651, Myj = 7.29802 (for Lb)
Myi = -1.8651, Myj = 7.29802 (for Ly)
Mzi = -10.580, Mzj = 39.3104 (for Lz)
Shear Forces Fyy = -22.692 (LCB: 60-MZ, POS:I)
Fzz = -11.633 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806


3. Design Parameters

Unbraced Lengths Ly = 2.37935, Lz = 2.37935, Lb = 2.37935
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

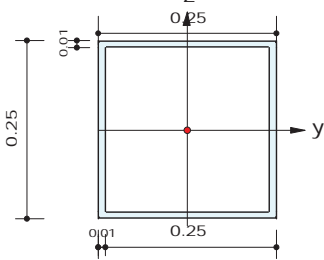
Axial Resistance
 $N_{Ed}/N_{tRd} = 531.57/3245.71 = 0.164 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 7.298/292.283 = 0.025 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 39.310/292.283 = 0.134 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.323 < 1.000 O.K
Shear Resistance
 $V_{Edy}/V_{yRd} = 0.023 < 1.000$ O.K
 $V_{Edz}/V_{zRd} = 0.011 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 306
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 2.05007



2. Member Forces

Axial Force Fxx = -469.34 (LCB: 52-FX, POS:I)
Bending Moments My = -2.5640, Mz = 36.6455
End Moments Myi = -2.5640, Myj = -0.6063 (for Lb)
Myi = -2.5640, Myj = -0.6063 (for Ly)
Mzi = 36.6455, Mzj = -5.5645 (for Lz)
Shear Forces Fyy = 24.5947 (LCB: 54+FY, POS:J)
Fzz = 16.4391 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 2.05007, Lz = 2.05007, Lb = 2.05007
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 469.34/2528.82 = 0.186 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 2.564/292.283 = 0.009 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 36.645/292.283 = 0.125 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.324 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.025 < 1.000 \dots\dots\dots O.K$$

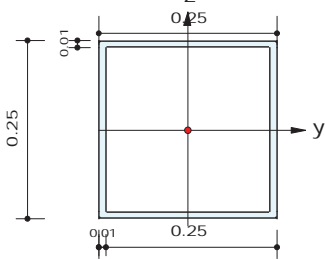
$$V_{Edz}/V_{z_Rd} = 0.015 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 307
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 2.30239



2. Member Forces

Axial Force Fxx = -535.49 (LCB: 54-FY, POS:J)
Bending Moments My = 7.03481, Mz = 81.8741
End Moments Myi = -19.840, Myj = 7.03481 (for Lb)
Myi = -19.840, Myj = 7.03481 (for Ly)
Mzi = -38.303, Mzj = 81.8741 (for Lz)
Shear Forces Fyy = -52.197 (LCB: 54-MZ, POS:I)
Fzz = -20.339 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 2.30239, Lz = 2.30239, Lb = 2.30239
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 535.49/2406.46 = 0.223 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 7.035/292.283 = 0.024 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 81.874/292.283 = 0.280 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.540 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.053 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.019 < 1.000 \dots\dots\dots O.K$$

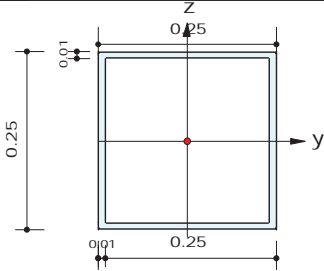
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	309
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.27605



2. Member Forces

Axial Force	Fxx = 535.263 (LCB: 54+MZ, POS:J)
Bending Moments	My = -9.9313, Mz = 27.3867
End Moments	Myi = -4.9939, Myj = -9.9313 (for Lb) Myi = -4.9939, Myj = -9.9313 (for Ly) Mzi = 21.2468, Mzj = 27.3867 (for Lz)
Shear Forces	Fyy = 20.2228 (LCB: 60+FY, POS:J) Fzz = 10.4809 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.27605, Lz = 3.27605, Lb = 3.27605
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 535.26/3245.71 = 0.165 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 9.931/292.283 = 0.034 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 27.387/292.283 = 0.094 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.293 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.021 < 1.000 O.K V_Edz/Vz_Rd = 0.010 < 1.000 O.K

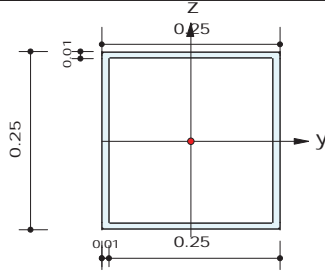
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	310
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 2.59273



2. Member Forces

Axial Force	Fxx = -551.97 (LCB: 54-MX, POS:I)
Bending Moments	My = -8.5457, Mz = 42.6989
End Moments	Myi = -8.5457, Myj = 3.95852 (for Lb) Myi = -8.5457, Myj = 3.95852 (for Ly) Mzi = 42.6989, Mzj = -7.9073 (for Lz)
Shear Forces	Fyy = -21.908 (LCB: 60-MZ, POS:I) Fzz = 19.4727 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 2.59273, Lz = 2.59273, Lb = 2.59273
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 551.97/2260.47 = 0.244 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 8.546/292.283 = 0.029 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 42.699/292.283 = 0.146 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.423 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.022 < 1.000 O.K V_Edz/Vz_Rd = 0.018 < 1.000 O.K

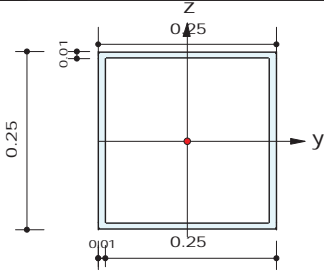
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	311
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 1.24193



2. Member Forces

Axial Force	Fxx = -728.48 (LCB: 54+MZ, POS:J)
Bending Moments	My = -17.488, Mz = 40.3923
End Moments	Myi = 20.1833, Myj = -17.488 (for Lb) Myi = 20.1833, Myj = -17.488 (for Ly) Mzi = 40.2202, Mzj = 40.3923 (for Lz)
Shear Forces	Fyy = 59.8085 (LCB: 60+FY, POS:J) Fzz = 49.9435 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 1.24193, Lz = 1.24193, Lb = 1.24193
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 728.48/3245.71 = 0.224 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 17.488/292.283 = 0.060 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 40.392/292.283 = 0.138 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.422 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.061 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.046 < 1.000$ O.K

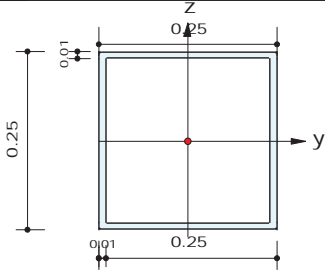
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	313
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.42206



2. Member Forces

Axial Force	Fxx = 542.070 (LCB: 54-MZ, POS:J)
Bending Moments	My = 10.5836, Mz = -74.846
End Moments	Myi = 1.36022, Myj = 10.5836 (for Lb) Myi = 1.36022, Myj = 10.5836 (for Ly) Mzi = -19.578, Mzj = -74.846 (for Lz)
Shear Forces	Fyy = 37.4036 (LCB: 60-MZ, POS:J) Fzz = -11.990 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.42206, Lz = 3.42206, Lb = 3.42206
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t,Rd} = 542.07/3245.71 = 0.167 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 10.584/292.283 = 0.036 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 74.846/292.283 = 0.256 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.459 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.038 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.011 < 1.000$ O.K

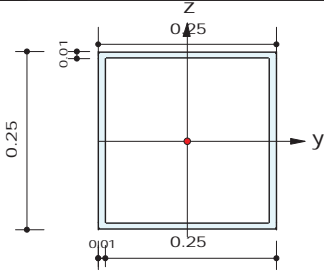
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	314
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.39913



2. Member Forces

Axial Force	Fxx = -641.24 (LCB: 54-MZ, POS:I)
Bending Moments	My = 12.7055, Mz = -71.760
End Moments	Myi = 12.7055, Myj = -3.1152 (for Lb) Myi = 12.7055, Myj = -3.1152 (for Ly) Mzi = -71.760, Mzj = -10.294 (for Lz)
Shear Forces	Fyy = -25.385 (LCB: 60-MZ, POS:1/2) Fzz = 12.6430 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.39913, Lz = 3.39913, Lb = 3.39913
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 641.24/1844.55 = 0.348 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 12.706/292.283 = 0.043 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 71.760/292.283 = 0.246 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.664 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.026 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.012 < 1.000$ O.K

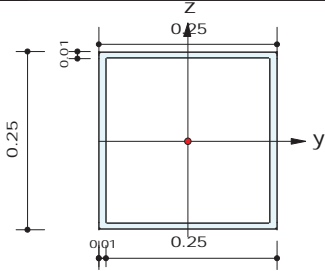
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	316
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.57867



2. Member Forces

Axial Force	Fxx = 176.936 (LCB: 60-MZ, POS:J)
Bending Moments	My = 13.3424, Mz = -114.25
End Moments	Myi = 4.24586, Myj = 13.3424 (for Lb) Myi = 4.24586, Myj = 13.3424 (for Ly) Mzi = -20.768, Mzj = -114.25 (for Lz)
Shear Forces	Fyy = 44.2586 (LCB: 60-MZ, POS:J) Fzz = -12.375 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.57867, Lz = 3.57867, Lb = 3.57867
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t,Rd} = 176.94/3245.71 = 0.055 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 13.342/292.283 = 0.046 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 114.254/292.283 = 0.391 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.491 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.045 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.011 < 1.000$ O.K

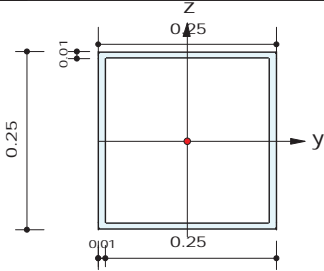
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	317
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.55422



2. Member Forces

Axial Force	Fxx = -257.62 (LCB: 54-MZ, POS:I)
Bending Moments	My = 16.0302, Mz = -104.26
End Moments	Myi = 16.0302, Myj = 1.33968 (for Lb) Myi = 16.0302, Myj = 1.33968 (for Ly) Mzi = -104.26, Mzj = -12.379 (for Lz)
Shear Forces	Fyy = -37.478 (LCB: 60-MZ, POS:1/2) Fzz = 14.0763 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.55422, Lz = 3.55422, Lb = 3.55422
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 257.62/1766.74 = 0.146 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 16.030/292.283 = 0.055 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 104.261/292.283 = 0.357 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.573 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.038 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.013 < 1.000$ O.K

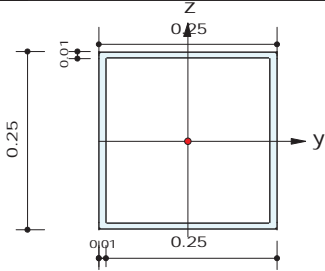
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	319
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.74457



2. Member Forces

Axial Force	Fxx = -58.047 (LCB: 60-MZ, POS:J)
Bending Moments	My = 12.3921, Mz = -127.39
End Moments	Myi = 4.06574, Myj = 12.3921 (for Lb) Myi = 4.06574, Myj = 12.3921 (for Ly) Mzi = -16.756, Mzj = -127.39 (for Lz)
Shear Forces	Fyy = 42.7501 (LCB: 60-MZ, POS:J) Fzz = -11.868 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths	Ly = 3.74457, Lz = 3.74457, Lb = 3.74457
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 58.05/3245.71 = 0.018 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 12.392/292.283 = 0.042 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 127.386/292.283 = 0.436 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.511 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.044 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.011 < 1.000$ O.K

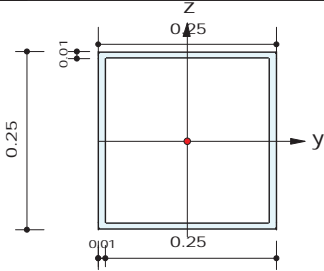
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 320
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 3.71877



2. Member Forces

Axial Force Fxx = 70.7750 (LCB: 54-MZ, POS:I)
Bending Moments My = 11.4934, Mz = -114.82
End Moments Myi = 11.4934, Myj = 1.67168 (for Lb)
Myi = 11.4934, Myj = 1.67168 (for Ly)
Mzi = -114.82, Mzj = -15.445 (for Lz)
Shear Forces Fyy = -41.619 (LCB: 60-MZ, POS:1/2)
Fzz = 11.7856 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths Ly = 3.71877, Lz = 3.71877, Lb = 3.71877
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/N_{tRd} = 70.77/3245.71 = 0.022 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 11.493/292.283 = 0.039 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 114.822/292.283 = 0.393 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.454 < 1.000 O.K
Shear Resistance
 $V_{Edy}/V_{yRd} = 0.043 < 1.000$ O.K
 $V_{Edz}/V_{zRd} = 0.011 < 1.000$ O.K

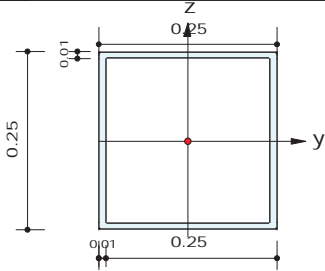
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 322
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name diagonales_10 (No:11)
(Built-up Section).
Member Length : 3.91855



2. Member Forces

Axial Force Fxx = -335.43 (LCB: 54-MZ, POS:J)
Bending Moments My = 8.06187, Mz = -101.86
End Moments Myi = 1.42785, Myj = 8.06187 (for Lb)
Myi = 1.42785, Myj = 8.06187 (for Ly)
Mzi = -5.3513, Mzj = -101.86 (for Lz)
Shear Forces Fyy = 30.6508 (LCB: 60-MZ, POS:J)
Fzz = -10.766 (LCB: 60-MY, POS:I)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Qyb	0.02161	Qzb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters

Unbraced Lengths Ly = 3.91855, Lz = 3.91855, Lb = 3.91855
Effective Length Factors Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 335.43/1591.74 = 0.211 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 8.062/292.283 = 0.028 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 101.861/292.283 = 0.349 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rc.LT1 = N_Ed/(χy*A*fy/γM1)
Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1)
Rc.LT2 = N_Ed/(χz*A*fy/γM1)
Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1)
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.622 < 1.000 .. O.K
Shear Resistance
 $V_{Edy}/V_{yRd} = 0.031 < 1.000$ O.K
 $V_{Edz}/V_{zRd} = 0.010 < 1.000$ O.K

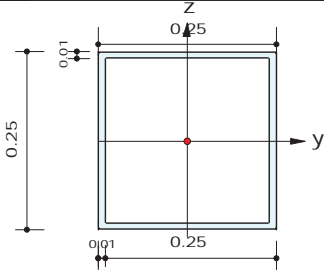
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	323
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_10 (No:11) (Built-up Section).
Member Length	: 3.89160



2. Member Forces

Axial Force	Fxx = 338.541 (LCB: 54-MZ, POS:I)
Bending Moments	My = 5.32622, Mz = -103.50
End Moments	Myi = 5.32622, Myj = 2.31660 (for Lb) Myi = 5.32622, Myj = 2.31660 (for Ly) Mzi = -103.50, Mzj = -23.582 (for Lz)
Shear Forces	Fyy = -40.102 (LCB: 60-MZ, POS:1/4) Fzz = 9.66158 (LCB: 60+FZ, POS:J)

Depth	0.25000	Web Thick	0.01000
Flg Width	0.25000	Top F Thick	0.01000
Web Center	0.24000	Bot.F Thick	0.01000
Area	0.00960	Asz	0.00500
Oyb	0.02161	Ozb	0.02161
Iyy	0.00009	Izz	0.00009
Ybar	0.12500	Zbar	0.12500
Wely	0.00074	Welz	0.00074
ry	0.09806	rz	0.09806

3. Design Parameters


Unbraced Lengths	Ly = 3.89160, Lz = 3.89160, Lb = 3.89160
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 338.54/3245.71 = 0.104 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 5.326/292.283 = 0.018 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 103.498/292.283 = 0.354 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.477 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.041 < 1.000 O.K V_Edz/Vz_Rd = 0.009 < 1.000 O.K

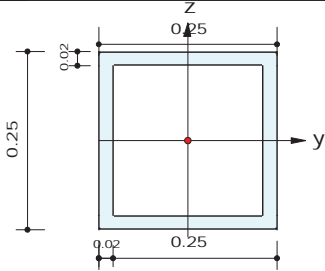
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	325
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.09961



2. Member Forces

Axial Force	Fxx = -580.47 (LCB: 54-MZ, POS:J)
Bending Moments	My = 19.2785, Mz = -105.76
End Moments	Myi = -20.324, Myj = 19.2785 (for Lb) Myi = -20.324, Myj = 19.2785 (for Ly) Mzi = -13.844, Mzj = -105.76 (for Lz)
Shear Forces	Fyy = 24.8183 (LCB: 55-MZ, POS:J) Fzz = -16.811 (LCB: 60-FZ, POS:I)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters

Unbraced Lengths	Ly = 4.09961, Lz = 4.09961, Lb = 4.09961
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 580.47/2756.25 = 0.211 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 19.278/537.910 = 0.036 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 105.761/537.910 = 0.197 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.458 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.013 < 1.000 O.K V_Edz/Vz_Rd = 0.009 < 1.000 O.K

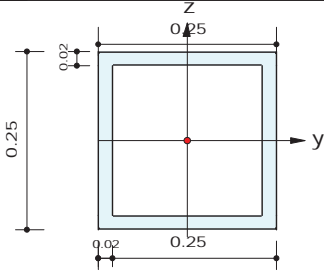
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	326
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.07164



2. Member Forces

Axial Force	Fxx = 582.744 (LCB: 54-FY, POS:I)
Bending Moments	My = 6.08733, Mz = -101.18
End Moments	Myi = 6.08733, Myj = -15.302 (for Lb) Myi = 6.08733, Myj = -15.302 (for Ly) Mzi = -101.18, Mzj = 43.7944 (for Lz)
Shear Forces	Fyy = -38.851 (LCB: 60-FY, POS:J) Fzz = 13.8440 (LCB: 60-MY, POS:J)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters


Unbraced Lengths	Ly = 4.07164, Lz = 4.07164, Lb = 4.07164
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 582.74/6220.95 = 0.094 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 6.087/537.910 = 0.011 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 101.176/537.910 = 0.188 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.293 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.020 < 1.000 O.K V_Edz/Vz_Rd = 0.007 < 1.000 O.K

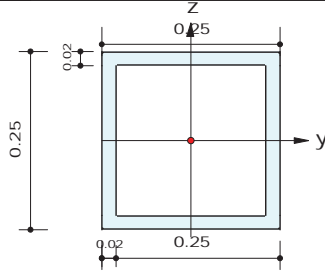
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	328
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	diagonales_20 (No:12) (Built-up Section).
Member Length	: 4.28684



2. Member Forces

Axial Force	Fxx = -1023.1 (LCB: 54-MZ, POS:J)
Bending Moments	My = -94.345, Mz = -191.17
End Moments	Myi = -15.888, Myj = -94.345 (for Lb) Myi = -15.888, Myj = -94.345 (for Ly) Mzi = -28.105, Mzj = -191.17 (for Lz)
Shear Forces	Fyy = 56.9761 (LCB: 60-MZ, POS:J) Fzz = 32.9140 (LCB: 60-MZ, POS:J)

Depth	0.25000	Web Thick	0.02000
Flg Width	0.25000	Top F Thick	0.02000
Web Center	0.23000	Bot.F Thick	0.02000
Area	0.01840	Asz	0.01000
Oyb	0.01989	Ozb	0.01989
Iyy	0.00016	Izz	0.00016
Ybar	0.12500	Zbar	0.12500
Wely	0.00131	Welz	0.00131
ry	0.09425	rz	0.09425

3. Design Parameters


Unbraced Lengths	Ly = 4.28684, Lz = 4.28684, Lb = 4.28684
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

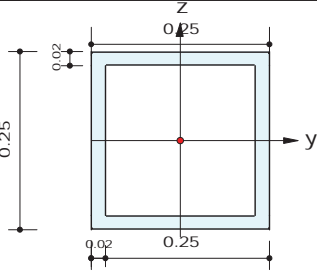
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1023.11/2602.83 = 0.393 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 94.345/537.910 = 0.175 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 191.173/537.910 = 0.355 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.951 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.029 < 1.000 O.K V_Edz/Vz_Rd = 0.017 < 1.000 O.K

MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)	
Unit System	kN, m	
Member No	329	
Material	S355 (No:10) (Fy = 355000, Es = 210000000)	
Section Name	diagonales_20 (No:12) (Built-up Section).	
Member Length	4.25799	

2. Member Forces

Axial Force	Fxx = 660.356 (LCB: 54-MZ, POS:I)	Depth	0.25000	Web Thick	0.02000
Bending Moments	My = -41.192, Mz = -127.38	Flg Width	0.25000	Top F Thick	0.02000
End Moments	Myi = -41.192, Myj = 13.3126 (for Lb)	Web Center	0.23000	Bot.F Thick	0.02000
	Myi = -41.192, Myj = 13.3126 (for Ly)	Area	0.01840	Asz	0.01000
	Mzi = -127.38, Mzj = -13.463 (for Lz)	Oyb	0.01989	Ozb	0.01989
Shear Forces	Fyy = -34.566 (LCB: 54-MZ, POS:I)	Iyy	0.00016	Izz	0.00016
	Fzz = -19.961 (LCB: 60-MY, POS:I)	Ybar	0.12500	Zbar	0.12500
		Wely	0.00131	Welz	0.00131
		ry	0.09425	rz	0.09425

3. Design Parameters

Unbraced Lengths	Ly = 4.25799, Lz = 4.25799, Lb = 4.25799
Effective Length Factors	Ky = 0.90, Kz = 2.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cnz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	
N_Ed/Nt_Rd = 660.36/6220.95 = 0.106 < 1.000	O.K
Bending Resistance	
M_Edy/M_Rdy = 41.192/537.910 = 0.077 < 1.000	O.K
M_Edz/M_Rdz = 127.377/537.910 = 0.237 < 1.000	O.K
Combined Resistance	
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]	
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β	
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd	
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.420 < 1.000	O.K
Shear Resistance	
V_Edy/Vy_Rd = 0.018 < 1.000	O.K
V_Edz/Vz_Rd = 0.010 < 1.000	O.K

■ MEMBER NAME : Brace 314 diagonales_10 (ID : 11)

1. Member Information

1) Design Code

EN 1993-2: 2006 (NA:Recommended)

2) Material

$f_y = 355.000\text{MPa}$, $E_s = 210,000.000\text{MPa}$

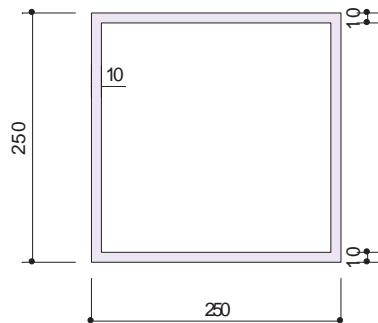
3) Length

$L = 3.399\text{m}$

4) Partial factors

$\gamma_{M0} = 1.050$ $\gamma_{M1} = 1.100$ $\gamma_{M2} = 1.250$

5) Section Properties



A	9,600.000mm ²	I _y	92,320,000.000mm ⁴	I _z	92,320,000.000mm ⁴	I _{yz}	0.000mm ⁴
C _y	125.000mm	C _z	125.000mm	i _y	98.065mm	i _z	98.065mm
W _{el,y}	738,560.000mm ³	W _{el,z}	738,560.000mm ³	W _{pl,y}	864,500.000mm ³	W _{pl,z}	864,500.000mm ³
I _t	138,240,000.000mm ⁴	I _w	0.000mm ⁶				

2. Check Axial Resistance (Sector I, 0.00R)

Axial	LCB	ELU_03-MZ	
	N _{Ed} / N _{Rd}	641.240kN / 1,844.551kN = 0.348	OK

* ELU_03-MZ : ELU SC dominante Termicas

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ_1 (MPa)	σ_2 (MPa)	ϵ	λ_{lim1-2}	λ_{lim2-3}	λ_{lim3-4}	Class
internal top-flange	23.000	157.860	5.126	0.814	26.849	30.917	51.796	Class 1
internal bottom-flange	23.000	128.466	-24.268	0.814	26.849	30.917	59.377	Class 1
left web	23.000	163.325	136.282	0.814	40.012	46.074	36.280	Class 1
right web	23.000	-2.690	-29.733	0.814	-	-	-	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$$\epsilon = \sqrt{235 / f_y}$$

2) Check slenderness ratio of compressive member

$$\frac{KL}{i} = 69.324 < 200.000 \rightarrow O.K$$

3) Calculate design resistance of cross section

$$N_{c,Rd} = \frac{A f_y}{\gamma_{M0}} = 3,245.714\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

4) Calculate design resistance for flexural buckling (z-z axis)

Non-dimensional slenderness

$$K_z = 2.000$$

$$N_{cr,z} = \frac{\pi^2 E I_z}{(K_z L_z)^2} = 4,140.191\text{kN}$$

$$\lambda_b = \sqrt{\frac{A f_y}{N_{cr,z}}} = 0.907$$

EN 1993-1-1:2005, 6.3.1.3 (1)

Design resistance for flexural buckling

$$\alpha = 0.490 \text{ (Buckling curve: c)}$$

EN 1993-1-1:2005, Table 6.1

$$\phi = 0.5 [1 + \alpha (\lambda_b - 0.2) + \lambda_b^2] = 1.085$$

$$\chi = \frac{1}{\phi} = 0.595 \quad \text{EN 1993-1-1:2005, 6.3.1.2 (1)}$$

$$N_{b,z,Rd} = \frac{\chi A f_y}{\gamma_{M1}} = 1,844.551\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

5) Design resistance of a compression member

$$N_{Rd} = N_{c,Rd} = 1,844.551\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.3}$$

3. Check design resistance for shear about major axis (Sector J, 1.00L)

Shear	LCB	ELU_09-MY	
	V _{z,Ed} / V _{c,z,Rd}	12.643kN / 1,077.501kN = 0.012	OK

* ELU_09-MY : ELU Temp dominante SC concomitante

1) Calculate design plastic shear resistance

$$A_{vz} = \eta \sum h_w t_w = 5,520.000\text{mm}^2 \quad \text{EN 1993-1-1:2005, 6.2.6 (3)}$$

$$V_{pl,z,Rd} = \frac{A_{vz} (f_y / \sqrt{3})}{\gamma_{M0}} = 1,077.501\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.6 (2)}$$

2) Determine whether to consider shear buckling

$$\eta = 1.200$$

$$\epsilon = \sqrt{\frac{235}{f_y}} = 0.814$$

$$\frac{h_w}{t} = 23.000 \leq \frac{72}{\eta} \epsilon = 48.817 \text{ (Unstiffened)}$$

∴ No need to check shear buckling

3) Calculate design shear resistance

$$V_{c,z,Rd} = V_{pl,z,Rd} = 1,077.501\text{kN}$$

4. Check design resistance for shear about minor axis (Middle, 0.50R)

Shear	LCB	ELU_09-MZ	
	V _{y,Ed} / V _{c,y,Rd}	25.385kN / 975.997kN = 0.026	OK

* ELU_09-MZ : ELU Temp dominante SC concomitante

1) Calculate design plastic shear resistance

$$A_{vy} = A - 2h_w t_w = 5,000.000\text{mm}^2 \quad \text{EN 1993-1-1:2005, 6.2.6 (3)}$$

$$V_{pl,y,Rd} = \frac{A_{vy} (f_y / \sqrt{3})}{\gamma_{M0}} = 975.997\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.6 (2)}$$

2) Determine whether to consider shear buckling

$$\eta = 1.200$$

$$\epsilon = \sqrt{\frac{235}{f_y}} = 0.814$$

$$\frac{h_w}{t} = 23.000 \leq \frac{72}{\eta} \epsilon = 48.817 \text{ (Unstiffened)}$$

∴ No need to check shear buckling

3) Calculate design shear resistance

$$V_{c,y,Rd} = V_{pl,y,Rd} = 975.997\text{kN}$$

5. Check design resistance for bending about major axis (Sector I, 0.00R)

Moment	LCB	ELU_03-MZ	
	M _{y,Ed} / M _{c,y,Rd}	12.706kN·m / 292.283kN·m = 0.043	OK
	Sectional class	Class 2 ≤ Class 1, 2, 3, or 4 (DCL)	OK

* ELU_03-MZ : ELU SC dominante Termicas

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ_1 (MPa)	σ_2 (MPa)	ϵ	λ_{lim1-2}	λ_{lim2-3}	λ_{lim3-4}	Class
internal top-flange	23.000	157.860	5.126	0.814	26.849	30.917	51.796	Class 1
internal bottom-flange	23.000	128.466	-24.268	0.814	26.849	30.917	59.377	Class 1
left web	23.000	163.325	136.282	0.814	40.012	46.074	36.280	Class 1
right web	23.000	-2.690	-29.733	0.814	-	-	-	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$$\epsilon = \sqrt{235 / f_y}$$

2) Calculate design resistance of cross section

$$M_{c,y,Rd} = M_{pl,y,Rd} = \frac{W_{pl,y} f_y}{\gamma_{M0}} = 292.283 \text{ kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.5 (2)}$$

6. Check design resistance for bending about minor axis (Sector I, 0.00R)

Moment	LCB	ELU_03-MZ	
	M _{z,Ed} / M _{c,z,Rd}	71.760kN·m / 292.283kN·m = 0.246	OK
	Sectional class	Class 2 ≤ Class 1, 2, 3, or 4 (DCL)	OK

* ELU_03-MZ : ELU SC dominante Termicas

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ ₁ (MPa)	σ ₂ (MPa)	ε	λ _{lim1-2}	λ _{lim2-3}	λ _{lim3-4}	Class
internal top-flange	23.000	157.860	5.126	0.814	26.849	30.917	51.796	Class 1
internal bottom-flange	23.000	128.466	-24.268	0.814	26.849	30.917	59.377	Class 1
left web	23.000	163.325	136.282	0.814	40.012	46.074	36.280	Class 1
right web	23.000	-2.690	-29.733	0.814	-	-	-	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$$\epsilon = \sqrt{235 / f_y}$$

2) Calculate design resistance of cross section

$$M_{c,z,Rd} = M_{pl,z,Rd} = \frac{W_{pl,z} f_y}{\gamma_{M0}} = 292.283 \text{ kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.5 (2)}$$

7. Check design resistance for lateral-torsional buckling (Sector I, 0.00R)

Moment	LCB	ELU_03-MZ	
	M _{y,Ed} / M _{b,Rd}	0.000kN·m / 0.000kN·m = 0.000	OK

* ELU_03-MZ : ELU SC dominante Termicas

1) Calculate design resistance for lateral-torsional buckling

Buckling slenderness

$$C_1 = 1.170$$

$$M_{cr,0} = \frac{\pi^2 E I_z}{L_b^2} \sqrt{\frac{I_w}{I_T} + \frac{L_b^2 G I_T}{\pi^2 E I_z}} = 13,598.157 \text{ kN}\cdot\text{m} \quad \text{ENV 1993-1-1:1992, F.1.1}$$

$$M_{cr} = C_1 M_{cr,0} = 15,915.282 \text{ kN}\cdot\text{m} \quad \text{ENV 1993-1-1:1992, F.1.3}$$

$$\lambda_{LT} = \sqrt{\frac{W_{pl,y} f_y}{M_{cr}}} = 0.139 \quad \text{EN 1993-1-1:2005, 6.3.2.3 (1)}$$

$$\lambda_{LT} \leq \lambda_{LT,0} \text{ and } \frac{M_{y,Ed}}{M_{cr}} \leq \lambda_{LT,0}^2 \quad \text{EN 1993-1-1:2005, 6.3.2.2 (4)}$$

∴ No need to check LTB

8. Check Interaction ratios (Sector I, 0.00R)

Interaction	LCB	ELU_03-MZ	
	R _{max}	0.664	OK

* ELU_03-MZ : ELU SC dominante Termicas

1) Applied forces for interaction ratio

$$N_{Ed} = -641.240 \text{ kN}$$

$$M_{y,Ed} = 12.706 \text{ kN}\cdot\text{m}, M_{z,Ed} = -71.760 \text{ kN}\cdot\text{m}$$

$$V_{y,Ed} = -22.916 \text{ kN}, V_{z,Ed} = 6.725 \text{ kN}$$

$$T_{Ed} = 18.549 \text{ kN}\cdot\text{m}$$

2) Reduced moment resistance for high shear about major axis

$$M_{c,y,Rd} = \frac{W_{ply} f_y}{\gamma_{M0}} = 292.283 \text{ kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.5 (2)}$$

$$V_{z,Ed} < 0.5 V_{pl,z,Rd} = 159,380.291 \text{ kN} \quad \text{EN 1993-1-1:2005, 6.2.8 (4)}$$

$$M_{y,Rd} = M_{c,y,Rd} = 292.283 \text{ kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.8 (5)}$$

3) Reduced moment resistance for high shear about minor axis

$$M_{c,z,Rd} = \frac{W_{pl,z} f_y}{\gamma_{M0}} = 292.283 \text{ kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.8 (4)}$$

$$V_{y,Ed} < 0.5 V_{pl,y,Rd} = 487.998 \text{ kN} \quad \text{EN 1993-1-1:2005, 6.2.8 (4)}$$

$$M_{z,Rd} = M_{c,z,Rd} = 292.283 \text{ kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.8 (5)}$$

4) Calculate interaction ratio of bending and axial force

$$R_{max1} = \frac{N_{Ed}}{A f_y / \gamma_{M0}} + \frac{M_{y,Ed}}{M_{y,Rd}} + \frac{M_{z,Ed}}{M_{z,Rd}} = 0.487 \quad \begin{array}{l} \text{EN 1993-1-1:2005, 6.2.8 (5)} \\ \text{EN 1993-1-1:2005, 6.2.1 (7)} \end{array}$$

5) Calculate interaction ratio of a Class 1 and 2 cross-section (Bending and Compression)

$$N_{pl,Rd} = \frac{A f_y}{\gamma_{M0}} = 3,245.714 \text{ kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

$$M_{pl,y,Rd} = 292.283 \text{ kN}\cdot\text{m}$$

EN 1993-1-1:2005, 6.2.5 (2)

$$M_{pl,z,Rd} = 292.283 \text{ kN}\cdot\text{m}$$

$$N_{Ed,y,lim} = \min(0.25 M_{pl,Rd}, \frac{h_w t_w f_y}{\gamma_{M0}}) = 777.619 \text{ kN}$$

$$N_{Ed,z,lim} = \frac{2 h_w t_w f_y}{\gamma_{M0}} = 1,555.238 \text{ kN}$$

$$N_{Ed} \leq N_{Ed,y,lim};$$

EN 1993-1-1:2005, 6.2.9.1 (4)

$$M_{N,y,Rd} = M_{pl,y,Rd} = 292.283 \text{ kN}\cdot\text{m}$$

EN 1993-1-1:2005, 6.2.9.1 (5)

$$N_{Ed} \leq N_{Ed,y,lim};$$

EN 1993-1-1:2005, 6.2.9.1 (4)

$$M_{N,z,Rd} = M_{pl,z,Rd} = 292.283 \text{ kN}\cdot\text{m}$$

EN 1993-1-1:2005, 6.2.9.1 (5)

$$\alpha = \beta = \min(\frac{1.66}{1 - 1.13 n^2}, 6.0) = 1.737 \quad \text{EN 1993-1-1:2005, 6.2.9.1 (6)}$$

$$R_{max2} = [(\frac{M_{y,Ed}}{M_{N,y,Rd}})^\alpha + ((\frac{M_{z,Ed}}{M_{N,z,Rd}})^\beta] = 0.0916 \quad \text{EN 1993-1-1:2005, 6.2.9.1 (6)}$$

6) Calculate interaction ratio of a buckling resistance (Bending and Axial force)

Reduction factors for buckling

EN 1993-1-1:2005, 6.3.1.2 (1)

$$\chi_y = 1.000, \chi_z = 0.595, \chi_{LT} = 1.000$$

Efficiency factor

EN 1993-1-1:2005 Table A.1

$$\mu_y = \frac{1 - N_{Ed} / N_{cr,y}}{1 - \chi_y N_{Ed} / N_{cr,y}} = 1.000, \mu_z = \frac{1 - N_{Ed} / N_{cr,z}}{1 - \chi_z N_{Ed} / N_{cr,z}} = 0.931$$

Buckling force

$$N_{cr,y} = \frac{\pi^2 E I_y}{(K_y L_y)^2} = 20,445.389 \text{ kN}$$

$$N_{cr,z} = \frac{\pi^2 E I_z}{(K_z L_z)^2} = 4,140.191 \text{ kN}$$

$$G = \text{iError!}$$

EN 1993-1-1:2005, 3.2.6

$$y_o = 0.000 \text{ mm}, z_o = 0.000 \text{ mm (Shear center from centroid)}$$

$$i_s = \sqrt{i_y^2 + i_z^2 + y_o^2 + z_o^2} = 138.684 \text{ mm}$$

$$N_{cr,T} = \frac{1}{i_s^2} \left(\frac{\pi^2 E I_z a^2}{L_T^2} + \frac{\pi^2 E I_w}{L_T^2} + G I_T \right) = 580,530.596 \text{ kN}$$

$$\beta = 1 - (y_o / i_s)^2 = 1.000$$

$$N_{cr,TF} = \frac{N_{cr,y}}{2\beta} \left(1 + \frac{N_{cr,T}}{N_{cr,y}} - \sqrt{\left(1 - \frac{N_{cr,T}}{N_{cr,y}} \right)^2 + 4 \left(\frac{y_o}{i_s} \right)^2 \frac{N_{cr,T}}{N_{cr,y}}} \right) =$$

EN 1993-1-3:2006, 6.2.3 (7)

$$20,445.389 \text{ kN}$$

Buckling resistance moment

$$C_1 = 1.170$$

$$M_{cr,0} = \frac{\pi^2 E I_z}{L_b^2} \sqrt{\frac{I_w}{I_T} + \frac{L_b^2 G I_T}{\pi^2 E I_z}} = 13,598.157 \text{ kN}\cdot\text{m} \quad \text{ENV 1993-1-1:1992, F.1.1}$$

$$M_{cr} = C_1 M_{cr,0} = 15,915.282 \text{ kN}\cdot\text{m} \quad \text{ENV 1993-1-1:1992, F.1.3}$$

Non-dimensional slenderness

$$\lambda_y = \sqrt{\frac{A f_y}{N_{cr,y}}} = 0.408, \lambda_z = \sqrt{\frac{A f_y}{N_{cr,z}}} = 0.907$$

$$\lambda_{max} = \max(\lambda_y, \lambda_z) = 0.907$$

$$\lambda_0 = \sqrt{\frac{W_y f_y}{M_{cr,0}}} = 0.150 \quad \text{EN 1993-1-1:2005, 6.3.2.2 (1)}$$

$$\lambda_{LT} = \sqrt{\frac{W_y f_y}{M_{cr}}} = 0.139 \quad \text{EN 1993-1-1:2005, 6.3.2.2 (1)}$$

Equivalent uniform moment factors

EN 1993-1-1:2005 Table A.1,2

$$\delta_x = 0.000$$

$$M_{y,Ed} (x) = 12,705,541.386$$

$$C_{my,0} = 1 + \left(\frac{s^2 E I_y |\pi_k|}{L^2 |M_{y,Ed}(x)|} - 1 \right) \frac{N_{Ed}}{N_{cr,y}} = \delta$$

$$\delta_x = 0.000$$

$$M_{z,Ed}(x) = 71,759,961.199$$

$$C_{mz,0} = 1 + \left(\frac{s^2 E I_z |\pi_k|}{L^2 |M_{z,Ed}(x)|} - 1 \right) \frac{N_{Ed}}{N_{cr,z}} = \delta$$

$$\lambda_{0,Lim} = 0.2 \sqrt{C_1} \left[\left(1 - \frac{N_{Ed}}{N_{cr,z}} \right) \left(1 - \frac{N_{Ed}}{N_{cr,TF}} \right) \right]^{1/4} = 0.206$$

$$\lambda_0 \leq \lambda_{0,Lim} :$$

$$C_{my} = 1.000 \text{ (Default or User defined)}$$

$$C_{mz} = 1.000 \text{ (Default or User defined)}$$

$$C_{mLT} = 1.000 \text{ (Default or User defined)}$$

Auxiliary terms

$$w_y = \min \left(\frac{W_{pl,y}}{W_{el,y}}, 1.5 \right) = 1.171$$

$$w_z = \min \left(\frac{W_{pl,z}}{W_{el,z}}, 1.5 \right) = 1.171$$

$$N_{Rk} = 3,408.000 \text{ kN}$$

$$n_{pl} = \frac{N_{Ed}}{N_{Rk} / \gamma_{M0}} = 0.198$$

$$a_{LT} = \max \left(1 - \frac{I_T}{I_y}, 0 \right) = 0.000$$

$$b_{LT} = 0.5 a_{LT} \lambda_0^2 \frac{M_{y,Ed}}{\chi_{LT} M_{pl,y,Rd}} \frac{M_{z,Ed}}{M_{pl,z,Rd}} = 0.000$$

$$c_{LT} = 10 a_{LT} \frac{\lambda_0^2}{5 + \lambda_z^4} \frac{M_{y,Ed}}{C_{my} \chi_{LT} M_{pl,y,Rd}} = 0.000$$

$$d_{LT} = 2 a_{LT} \frac{\lambda_0}{0.1 + \lambda_z^4} \frac{M_{y,Ed}}{C_{my} \chi_{LT} M_{pl,y,Rd}} \frac{M_{z,Ed}}{C_{mz} M_{pl,z,Rd}} = 0.000$$

$$e_{LT} = 1.7 a_{LT} \frac{\lambda_0^2}{0.1 + \lambda_z^4} \frac{M_{y,Ed}}{C_{my} \chi_{LT} M_{pl,y,Rd}} = 0.000$$

$$C_{yy} = \max \left(1 + (w_y - 1) \left[\left(2 - \frac{1.6}{w_y} C_{my}^2 \lambda_{max} - \frac{1.6}{w_y} C_{my}^2 \lambda_{max}^2 \right) n_{pl} - b_{LT} \right], \frac{W_{el,y}}{W_{pl,y}} \right) = 0.988$$

$$C_{yz} = \max \left(1 + (w_z - 1) \left[\left(2 - 14 \frac{C_{mz}^2 \lambda_{max}^2}{w_z^5} \right) n_{pl} - c_{LT} \right], 0.6 \sqrt{\frac{w_z}{w_y}} \frac{W_{el,z}}{W_{pl,z}} \right) = 0.891$$

$$C_{zy} = \max \left(1 + (w_y - 1) \left[\left(2 - 14 \frac{C_{my}^2 \lambda_{max}^2}{w_y^5} \right) n_{pl} - d_{LT} \right], 0.6 \sqrt{\frac{w_y}{w_z}} \frac{W_{el,y}}{W_{pl,y}} \right) = 0.891$$

$$C_{zz} = \max \left(1 + (w_z - 1) \left[\left(2 - \frac{1.6}{w_z} C_{mz}^2 \lambda_{max} - \frac{1.6}{w_z} C_{mz}^2 \lambda_{max}^2 \right) n_{pl} - b_{LT} \right], \frac{W_{el,z}}{W_{pl,z}} \right) = 0.988$$

Interaction factors k_{ij}

$$k_{yy} = C_{my} C_{mLT} \frac{\mu_y}{1 - \frac{N_{Ed}}{N_{cr,y}}} \frac{1}{C_{yy}} = 1.045$$

$$k_{yz} = C_{mz} \frac{\mu_y}{1 - \frac{N_{Ed}}{N_{cr,z}}} \frac{1}{C_{yz}} 0.6 \sqrt{\frac{w_z}{w_y}} = 0.797$$

$$k_{zy} = C_{my} C_{mLT} \frac{\mu_z}{1 - \frac{N_{Ed}}{N_{cr,y}}} \frac{1}{C_{zy}} 0.6 \sqrt{\frac{w_y}{w_z}} = 0.647$$

$$k_{zz} = C_{mz} \frac{\mu_z}{1 - \frac{N_{Ed}}{N_{cr,z}}} \frac{1}{C_{zz}} = 1.115$$

Interaction values

$$N_{Rk} = f_y A = 3,408.000 \text{ kN}$$

$$M_{y,Rk} = f_y W_{pl,y} = 306.897 \text{ kN}\cdot\text{m}$$

$$M_{z,Rk} = f_y W_{pl,z} = 306.897 \text{ kN}\cdot\text{m}$$

$$\Delta M_{y,Ed} = 0.000 \text{ kN}\cdot\text{m}$$

$$\Delta M_{z,Ed} = 0.000 \text{ kN}\cdot\text{m}$$

Interaction ratios

EN 1993-1-1:2005 Table A.1

EN 1993-1-1:2005 Table 6.7

EN 1993-1-1:2005 6.3.3 (4)

$$R_{max3} = \frac{N_{Ed}}{\chi_y N_{Rk}} + k_{yy} \frac{M_{y,Ed} + \Delta M_{y,Ed}}{\chi_{LT} \frac{M_{y,Rk}}{\gamma_{M1}}} + k_{yz} \frac{M_{z,Ed} + \Delta M_{z,Ed}}{\gamma_{M1} \frac{M_{z,Rk}}{\gamma_{M1}}} = 0.460$$

$$R_{max4} = \frac{N_{Ed}}{\chi_z N_{Rk}} + k_{zy} \frac{M_{y,Ed} + \Delta M_{y,Ed}}{\chi_{LT} \frac{M_{y,Rk}}{\gamma_{M1}}} + k_{zz} \frac{M_{z,Ed} + \Delta M_{z,Ed}}{\gamma_{M1} \frac{M_{z,Rk}}{\gamma_{M1}}} = 0.664$$

7) Calculate maximum interaction ratio

$$R_{max} = \max (R_{max1}, R_{max2}, R_{max3}, R_{max4}) = 0.664$$

9. Check Deflection (Sector J, 1.00L)

Deflection	LCB	ELS_cp_01-MZ	
	$\delta_{max} / \delta_{allow}$	0.000mm / 13.597mm = 0.000	OK

* ELS_cp_01-MZ : ELS casi-permanente

1) Calculate allowable deflection

$$L = 3,399.126 \text{ mm}$$

$$\delta_{allow} = \frac{L}{250} = 13.597 \text{ mm}$$

2) Calculate maximum deflection

Maximum deflection position 0.000mm from i-end.

Deflection Amplification Factor (DAF) = 1.000

$$\delta = 0.000 \text{ mm}$$

$$\delta_{max} = \delta * \text{DAF} = 0.000 \text{ mm}$$

■ MEMBER NAME : Brace 328 diagonales_20 (ID : 12)

1. Member Information

1) Design Code

EN 1993-2: 2006 (NA:Recommended)

2) Material

$f_y = 355.000\text{MPa}$, $E_s = 210,000.000\text{MPa}$

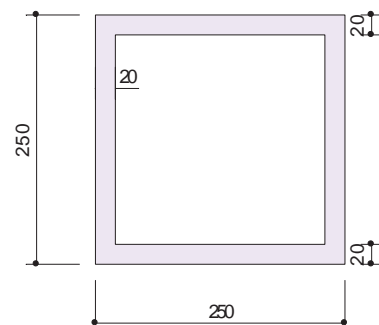
3) Length

$L = 4.287\text{m}$

4) Partial factors

$\gamma_{M0} = 1.050$ $\gamma_{M1} = 1.100$ $\gamma_{M2} = 1.250$

5) Section Properties



A	18,400.000mm ²	I _y	163,453,333.333mm ⁴	I _z	163,453,333.333mm ⁴	I _{yz}	0.000mm ⁴
C _y	125.000mm	C _z	125.000mm	i _y	94.251mm	i _z	94.251mm
W _{el,y}	1,307,626.667mm ³	W _{el,z}	1,307,626.667mm ³	W _{pl,y}	1,591,000.000mm ³	W _{pl,z}	1,591,000.000mm ³
I _T	243,340,000.000mm ⁴	I _w	0.000mm ⁶				

2. Check Axial Resistance (Sector J, 1.00L)

Axial	LCB	ELU_03-MZ	
	N _{Ed} / N _{Rd}	1,023.109kN / 2,602.833kN = 0.393	OK

* ELU_03-MZ : ELU SC dominante Termicas

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ_1 (MPa)	σ_2 (MPa)	ϵ	λ_{lim1-2}	λ_{lim2-3}	λ_{lim3-4}	Class
internal top-flange	10.500	97.238	-104.629	0.814	26.849	30.917	133.525	Class 1
internal bottom-flange	10.500	215.837	13.969	0.814	26.849	30.917	50.512	Class 1
left web	10.500	225.574	125.951	0.814	41.680	47.995	40.318	Class 1
right web	10.500	-14.744	-114.367	0.814	-	-	-	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$$\epsilon = \sqrt{235 / f_y}$$

2) Check slenderness ratio of compressive member

$$\frac{KL}{i} = 90.966 < 200.000 \rightarrow \text{O.K}$$

3) Calculate design resistance of cross section

$$N_{c,Rd} = \frac{A f_y}{\gamma_{M0}} = 6,220.952\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

4) Calculate design resistance for flexural buckling (y-y axis)

Non-dimensional slenderness

$$K_y = 0.900$$

$$N_{cr,y} = \frac{\pi^2 E I_y}{(K_y L_y)^2} = 22,758.982\text{kN}$$

$$\lambda_b = \sqrt{\frac{A f_y}{N_{cr,y}}} = 0.536 \quad \text{EN 1993-1-1:2005, 6.3.1.3 (1)}$$

Design resistance for flexural buckling

$$\alpha = 0.490 \text{ (Buckling curve: c)} \quad \text{EN 1993-1-1:2005, Table 6.1}$$

$$\phi = 0.5 [1 + \alpha (\lambda_b - 0.2) + \lambda_b^2] = 0.726$$

$$\chi = \text{iError!} = 0.823 \quad \text{EN 1993-1-1:2005, 6.3.1.2 (1)}$$

$$N_{b,y,Rd} = \frac{\chi A F_y}{\gamma_{M1}} = 4,885.918\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

5) Calculate design resistance for flexural buckling (z-z axis)

Non-dimensional slenderness

$$K_z = 2.000$$

$$N_{cr,z} = \frac{\pi^2 E I_z}{(K_z L_z)^2} = 4,608.694\text{kN}$$

$$\lambda_b = \sqrt{\frac{A f_y}{N_{cr,z}}} = 1.191 \quad \text{EN 1993-1-1:2005, 6.3.1.3 (1)}$$

Design resistance for flexural buckling

$$\alpha = 0.490 \text{ (Buckling curve: c)} \quad \text{EN 1993-1-1:2005, Table 6.1}$$

$$\phi = 0.5 [1 + \alpha (\lambda_b - 0.2) + \lambda_b^2] = 1.451$$

$$\chi = \text{iError!} = 0.438 \quad \text{EN 1993-1-1:2005, 6.3.1.2 (1)}$$

$$N_{b,z,Rd} = \frac{\chi A F_y}{\gamma_{M1}} = 2,602.833\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

6) Calculate design resistance for torsional buckling

Non-dimensional slenderness

$$G = \frac{E}{2 (1 + \nu) } = 80,769.231\text{MPa} \quad \text{EN 1993-1-1:2005, 3.2.6}$$

$y_o = 0.000\text{mm}$, $z_o = 0.000\text{mm}$ (Shear center from centroid)

$$a = \sqrt{y_o^2 + z_o^2} = 0.000\text{mm}$$

$$i_s = \sqrt{i_y^2 + i_z^2 + a^2} = 133.292\text{mm}$$

$$N_{cr,T} = \frac{1}{i_s^2} \left(\frac{\pi^2 E I_z a^2}{L_T^2} + \frac{\pi^2 E I_w}{L_T^2} + G I_T \right) = 1,106,250.541\text{kN}$$

$$\beta = 1 - (y_o / i_s)^2 = 1.000$$

$$N_{cr,TF} = \frac{N_{cr,y}}{2\beta} \left(1 + \frac{N_{cr,T}}{N_{cr,y}} - \sqrt{\left(1 - \frac{N_{cr,T}}{N_{cr,y}} \right)^2 + 4 \left(\frac{y_o}{i_s} \right)^2 \frac{N_{cr,T}}{N_{cr,y}}} \right) = \quad \text{EN 1993-1-3:2006, 6.2.3 (7)}$$

$$22,758.982\text{kN}$$

$$N_{cr} = \min (N_{cr,T}, N_{cr,TF}) = 22,758.982\text{kN}$$

$$\lambda_b = \sqrt{\frac{A f_y}{N_{cr}}} = 0.536 \quad \text{EN 1993-1-1:2005, 6.3.1.3 (1)}$$

Design resistance for Torsion and torsional-flexural buckling

$$\alpha = 0.490 \text{ (Buckling curve: c)} \quad \text{EN 1993-1-1:2005, Table 6.1}$$

$$\phi = 0.5 [1 + \alpha (\lambda_b - 0.2) + \lambda_b^2] = 0.726$$

$$\chi = \text{iError!} = 0.823 \quad \text{EN 1993-1-1:2005, 6.3.1.2 (1)}$$

$$N_{b,Rd,TF} = \frac{\chi A F_y}{\gamma_{M1}} = 4,885.918\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.4 (2)}$$

7) Design resistance of a compression member

$$N_{Rd} = \min (N_{c,Rd}, N_{b,y,Rd}, N_{b,z,Rd}, N_{b,Rd,TF}) = 2,602.833\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.3}$$

3. Check design resistance for shear about major axis (Sector J, 1.00L)

Shear	LCB	ELU_09-MZ	
	V _{z,Ed} / V _{c,z,Rd}	32.914kN / 1,967.610kN = 0.017	OK

* ELU_09-MZ : ELU Temp dominante SC concomitante

1) Calculate design plastic shear resistance

$$A_{vz} = \eta \sum h_w t_w = 10,080.000\text{mm}^2 \quad \text{EN 1993-1-1:2005, 6.2.6 (3)}$$

$$V_{pl,z,Rd} = \frac{A_{vz} (f_y / \sqrt{3})}{\gamma_{M0}} = 1,967.610\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.6 (2)}$$

2) Determine whether to consider shear buckling

$$\eta = 1.200 \quad \text{EN 1993-1-5:2006, 5.1 (2)}$$

$$\epsilon = \sqrt{\frac{235}{f_y}} = 0.814$$

$$\frac{h_w}{t} = 10.500 \leq \frac{72}{\eta} \quad \varepsilon = 48.817 \text{ (Unstiffened)}$$

∴ No need to check shear buckling

3) Calculate design shear resistance

$$V_{c,z,Rd} = V_{pl,z,Rd} = 1,967.610\text{kN}$$

4. Check design resistance for shear about minor axis (Sector J, 1.00L)

Shear	LCB	ELU_09-MZ	OK
	$V_{y,Ed} / V_{c,y,Rd}$	$56.976\text{kN} / 1,951.994\text{kN} = 0.029$	

* ELU_09-MZ : ELU Temp dominante SC concomitante

1) Calculate design plastic shear resistance

$$A_{vy} = A - 2h_w t_w = 10,000.000\text{mm}^2$$

EN 1993-1-1:2005, 6.2.6 (3)

$$V_{pl,y,Rd} = \frac{A_{vy} \left(f_y / \sqrt{3} \right)}{\gamma_{M0}} = 1,951.994\text{kN}$$

EN 1993-1-1:2005, 6.2.6 (2)

2) Determine whether to consider shear buckling

$$\eta = 1.200$$
$$\varepsilon = \sqrt{\frac{235}{f_y}} = 0.814$$
$$\frac{h_w}{t} = 10.500 \leq \frac{72}{\eta} \quad \varepsilon = 48.817 \text{ (Unstiffened)}$$

∴ No need to check shear buckling

3) Calculate design shear resistance

$$V_{c,y,Rd} = V_{pl,y,Rd} = 1,951.994\text{kN}$$

5. Check design resistance for bending about major axis (Sector J, 1.00L)

Moment	LCB	ELU_03-MZ	OK
	$M_{y,Ed} / M_{c,y,Rd}$	$94.345\text{kN}\cdot\text{m} / 537.910\text{kN}\cdot\text{m} = 0.175$	
	Sectional class	Class 2 ≤ Class 1, 2, 3, or 4 (DCL)	OK

* ELU_03-MZ : ELU SC dominante Termicas

1) Section classification *EN 1993-1-1:2005, 5.5.2*

Part	WTR	σ_1 (MPa)	σ_2 (MPa)	ε	λ_{lim1-2}	λ_{lim2-3}	λ_{lim3-4}	Class
internal top-flange	10.500	97.238	-104.629	0.814	26.849	30.917	133.525	Class 1
internal bottom-flange	10.500	215.837	13.969	0.814	26.849	30.917	50.512	Class 1
left web	10.500	225.574	125.951	0.814	41.680	47.995	40.318	Class 1
right web	10.500	-14.744	-114.367	0.814	-	-	-	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$$\varepsilon = \sqrt{235 / f_y}$$

2) Calculate design resistance of cross section

$$M_{c,y,Rd} = M_{pl,y,Rd} = \frac{W_{pl,y} f_y}{\gamma_{M0}} = 537.910\text{kN}\cdot\text{m}$$

EN 1993-1-1:2005, 6.2.5 (2)

6. Check design resistance for bending about minor axis (Sector J, 1.00L)

Moment	LCB	ELU_03-MZ	OK
	$M_{z,Ed} / M_{c,z,Rd}$	$191.173\text{kN}\cdot\text{m} / 537.910\text{kN}\cdot\text{m} = 0.355$	
	Sectional class	Class 2 ≤ Class 1, 2, 3, or 4 (DCL)	OK

* ELU_03-MZ : ELU SC dominante Termicas

1) Section classification *EN 1993-1-1:2005, 5.5.2*

Part	WTR	σ_1 (MPa)	σ_2 (MPa)	ε	λ_{lim1-2}	λ_{lim2-3}	λ_{lim3-4}	Class
internal top-flange	10.500	97.238	-104.629	0.814	26.849	30.917	133.525	Class 1
internal bottom-flange	10.500	215.837	13.969	0.814	26.849	30.917	50.512	Class 1
left web	10.500	225.574	125.951	0.814	41.680	47.995	40.318	Class 1
right web	10.500	-14.744	-114.367	0.814	-	-	-	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$$\varepsilon = \sqrt{235 / f_y}$$

2) Calculate design resistance of cross section

$$M_{c,z,Rd} = M_{pl,z,Rd} = \frac{W_{pl,z} f_y}{\gamma_{M0}} = 537.910\text{kN}\cdot\text{m}$$

EN 1993-1-1:2005, 6.2.5 (2)

7. Check design resistance for lateral-torsional buckling (Sector J, 1.00L)

Moment	LCB	ELU_03-MZ	OK
	$M_{y,Ed} / M_{b,Rd}$	$0.000\text{kN}\cdot\text{m} / 0.000\text{kN}\cdot\text{m} = 0.000$	

* ELU_03-MZ : ELU SC dominante Termicas

1) Calculate design resistance for lateral-torsional buckling

Buckling slenderness

$$C_1 = 1.170$$
$$M_{cr,0} = \frac{\pi^2 E I_z}{L_b^2} \sqrt{\frac{I_w}{I_T} + \frac{L_b^2 G I_T}{\pi^2 E I_z}} = 19,034.815\text{kN}\cdot\text{m}$$

ENV 1993-1-1:1992, F.1.1

$$M_{cr} = C_1 M_{cr,0} = 22,278.347\text{kN}\cdot\text{m}$$

ENV 1993-1-1:1992, F.1.3

$$\lambda_{LT} = \sqrt{\frac{W_{ply} f_y}{M_{cr}}} = 0.159$$

EN 1993-1-1:2005, 6.3.2.3 (1)

$$\lambda_{LT} \leq \lambda_{LT,0} \text{ and } \frac{M_{y,Ed}}{M_{cr}} \leq \lambda_{LT,0}^2$$

EN 1993-1-1:2005, 6.3.2.2 (4)

∴ No need to check LTB

8. Check Interaction ratios (Sector J, 1.00L)

Interaction	LCB	ELU_03-MZ	OK
	R_{max}	0.951	

* ELU_03-MZ : ELU SC dominante Termicas

1) Applied forces for interaction ratio

$$N_{Ed} = -1,023.109\text{kN}$$
$$M_{y,Ed} = -94.345\text{kN}\cdot\text{m} , M_{z,Ed} = -191.173\text{kN}\cdot\text{m}$$
$$V_{y,Ed} = 55.253\text{kN} , V_{z,Ed} = 32.606\text{kN}$$
$$T_{Ed} = -34.776\text{kN}\cdot\text{m}$$

2) Reduced moment resistance for high shear about major axis

$$M_{c,y,Rd} = \frac{W_{ply} f_y}{\gamma_{M0}} = 537.910\text{kN}\cdot\text{m}$$

EN 1993-1-1:2005, 6.2.5 (2)

$$V_{z,Ed} < 0.5 V_{pl,z,Rd} = 291,042.271\text{kN}$$

EN 1993-1-1:2005, 6.2.8 (4)

$$M_{y,Rd} = M_{c,y,Rd} = 537.910\text{kN}\cdot\text{m}$$

EN 1993-1-1:2005, 6.2.8 (5)

3) Reduced moment resistance for high shear about minor axis

$$M_{c,z,Rd} = \frac{W_{pl,z} f_y}{\gamma_{M0}} = 537.910\text{kN}\cdot\text{m}$$

EN 1993-1-1:2005, 6.2.8 (4)

$$V_{y,Ed} < 0.5 V_{pl,y,Rd} = 975.997\text{kN}$$

EN 1993-1-1:2005, 6.2.8 (4)

$$M_{z,Rd} = M_{c,z,Rd} = 537.910\text{kN}\cdot\text{m}$$

EN 1993-1-1:2005, 6.2.8 (5)

4) Calculate interaction ratio of bending and axial force

$$R_{max1} = \frac{N_{Ed}}{A f_y / \gamma_{M0}} + \frac{M_{y,Ed}}{M_{y,Rd}} + \frac{M_{z,Ed}}{M_{z,Rd}} = 0.695$$

EN 1993-1-1:2005, 6.2.8 (5)
EN 1993-1-1:2005, 6.2.1 (7)

5) Calculate interaction ratio of a Class 1 and 2 cross-section (Bending and Compression)

$$N_{pl,Rd} = \frac{A f_y}{\gamma_{M0}} = 6,220.952\text{kN}$$

EN 1993-1-1:2005, 6.2.4 (2)

$$M_{pl,y,Rd} = 537.910\text{kN}\cdot\text{m}$$

EN 1993-1-1:2005, 6.2.5 (2)

$$M_{pl,z,Rd} = 537.910\text{kN}\cdot\text{m}$$
$$N_{Ed,y,lim} = \min(0.25 M_{pl,Rd} , \frac{h_w t_w f_y}{\gamma_{M0}}) = 1,420.000\text{kN}$$
$$N_{Ed,z,lim} = \frac{2 h_w t_w f_y}{\gamma_{M0}} = 2,840.000\text{kN}$$

EN 1993-1-1:2005, 6.2.9.1 (4)
EN 1993-1-1:2005, 6.2.9.1 (5)
EN 1993-1-1:2005, 6.2.9.1 (4)
EN 1993-1-1:2005, 6.2.9.1 (5)

$$N_{Ed} \leq N_{Ed,y,lim} ;$$
$$M_{N,y,Rd} = M_{pl,y,Rd} = 537.910\text{kN}\cdot\text{m}$$
$$N_{Ed} \leq N_{Ed,y,lim} ;$$
$$M_{N,z,Rd} = M_{pl,z,Rd} = 537.910\text{kN}\cdot\text{m}$$
$$\alpha = \beta = \min(\frac{1.66}{1 - 1.13 n^2} , 6.0) = 1.712$$

EN 1993-1-1:2005, 6.2.9.1 (6)

$$R_{max2} = [(\frac{M_{y,Ed}}{M_{N,y,Rd}})^\alpha + [(\frac{M_{z,Ed}}{M_{N,z,Rd}})^\beta] = 0.221$$

EN 1993-1-1:2005, 6.2.9.1 (6)

6) Calculate interaction ratio of a buckling resistance (Bending and Axial force)

Reduction factors for buckling

$$\chi_y = 0.823, \chi_z = 0.438, \chi_{LT} = 1.000$$

Efficiency factor

$$\mu_y = \frac{1 - N_{Ed} / N_{cr,y}}{1 - \chi_y N_{Ed} / N_{cr,y}} = 0.992, \mu_z = \frac{1 - N_{Ed} / N_{cr,z}}{1 - \chi_z N_{Ed} / N_{cr,z}} = 0.862$$

Buckling force

$$N_{cr,y} = \frac{\pi^2 E I_y}{(K_y L_y)^2} = 22,758.982 \text{ kN}$$

$$N_{cr,z} = \frac{\pi^2 E I_z}{(K_z L_z)^2} = 4,608.694 \text{ kN}$$

G = **iError!**

$y_o = 0.000 \text{ mm}, z_o = 0.000 \text{ mm}$ (Shear center from centroid)

$$i_s = \sqrt{i_y^2 + i_z^2 + y_o^2 + z_o^2} = 133.292 \text{ mm}$$

$$N_{cr,T} = \frac{1}{i_s^2} \left(\frac{\pi^2 E I_z a^2}{L_T^2} + \frac{\pi^2 E I_w}{L_T^2} + G I_T \right) = 1,106,250.541 \text{ kN}$$

$$\beta = 1 - (y_o / i_s)^2 = 1.000$$

$$N_{cr,TF} = \frac{N_{cr,y}}{2\beta} \left(1 + \frac{N_{cr,T}}{N_{cr,y}} - \sqrt{\left(1 - \frac{N_{cr,T}}{N_{cr,y}} \right)^2 + 4 \left(\frac{y_o}{i_s} \right)^2 \frac{N_{cr,T}}{N_{cr,y}}} \right) =$$

22,758.982 kN

Buckling resistance moment

$$C_1 = 1.170$$

$$M_{cr,0} = \frac{\pi^2 E I_z}{L_b^2} \sqrt{\frac{I_w}{I_T} + \frac{L_b^2 G I_T}{\pi^2 E I_z}} = 19,034.815 \text{ kN}\cdot\text{m}$$

$$M_{cr} = C_1 M_{cr,0} = 22,278.347 \text{ kN}\cdot\text{m}$$

Non-dimensional slenderness

$$\lambda_y = \sqrt{\frac{A f_y}{N_{cr,y}}} = 0.536, \lambda_z = \sqrt{\frac{A f_y}{N_{cr,z}}} = 1.191$$

$$\lambda_{\max} = \max(\lambda_y, \lambda_z) = 1.191$$

$$\lambda_0 = \sqrt{\frac{W_y f_y}{M_{cr,0}}} = 0.172$$

$$\lambda_{LT} = \sqrt{\frac{W_y f_y}{M_{cr}}} = 0.159$$

Equivalent uniform moment factors

$$\delta_x = 0.000$$

$$M_{y,Ed}(x) = 94,345,240.451$$

$$C_{my,0} = 1 + \left(\frac{s^2 E I_y |\pi x|}{L^2 |M_{y,Ed}(x)|} - 1 \right) \frac{N_{Ed}}{N_{cr,y}} = \delta$$

$$\delta_x = 0.000$$

$$M_{z,Ed}(x) = 191,173,278.513$$

$$C_{mz,0} = 1 + \left(\frac{s^2 E I_z |\pi x|}{L^2 |M_{z,Ed}(x)|} - 1 \right) \frac{N_{Ed}}{N_{cr,z}} = \delta$$

$$\lambda_{0, \text{Lim}} = 0.2 \sqrt{C_1} \left[\left(1 - \frac{N_{Ed}}{N_{cr,z}} \right) \left(1 - \frac{N_{Ed}}{N_{cr,TF}} \right) \right]^{1/4} = 0.201$$

$$\lambda_0 \leq \lambda_{0, \text{Lim}} :$$

$$C_{my} = 1.000 \text{ (Default or User defined)}$$

$$C_{mz} = 1.000 \text{ (Default or User defined)}$$

$$C_{mLT} = 1.000 \text{ (Default or User defined)}$$

Auxiliary terms

$$w_y = \min\left(\frac{W_{pl,y}}{W_{el,y}}, 1.5\right) = 1.217$$

$$w_z = \min\left(\frac{W_{pl,z}}{W_{el,z}}, 1.5\right) = 1.217$$

$$N_{Rk} = 6,532.000 \text{ kN}$$

$$\eta_{pl} = \frac{N_{Ed}}{N_{Rk} / \gamma_{M0}} = 0.164$$

$$a_{LT} = \max\left(1 - \frac{I_T}{I_y}, 0\right) = 0.000$$

EN 1993-1-1:2005, 6.3.1.2 (1)

EN 1993-1-1:2005 Table A.1

EN 1993-1-1:2005, 3.2.6

EN 1993-1-3:2006, 6.2.3 (7)

ENV 1993-1-1:1992, F.1.1

ENV 1993-1-1:1992, F.1.3

EN 1993-1-1:2005, 6.3.2.2 (1)

EN 1993-1-1:2005, 6.3.2.2 (1)

EN 1993-1-1:2005 Table A.1,2

EN 1993-1-1:2005 Table A.1

$$b_{LT} = 0.5 a_{LT} \lambda_0^2 \frac{M_{y,Ed}}{\chi_{LT} M_{pl,y,Rd}} \frac{M_{z,Ed}}{M_{pl,z,Rd}} = 0.000$$

$$c_{LT} = 10 a_{LT} \frac{\lambda_0^2}{5 + \lambda_z^4} \frac{M_{y,Ed}}{C_{my} \chi_{LT} M_{pl,y,Rd}} = 0.000$$

$$d_{LT} = 2 a_{LT} \frac{\lambda_0}{0.1 + \lambda_z^4} \frac{M_{y,Ed}}{C_{my} \chi_{LT} M_{pl,y,Rd}} \frac{M_{z,Ed}}{C_{mz} M_{pl,z,Rd}} = 0.000$$

$$e_{LT} = 1.7 a_{LT} \frac{\lambda_0^2}{0.1 + \lambda_z^4} \frac{M_{y,Ed}}{C_{my} \chi_{LT} M_{pl,y,Rd}} = 0.000$$

$$C_{yy} = \max\left(1 + (w_y - 1) \left[\left(2 - \frac{1.6}{w_y} C_{my}^2 \lambda_{\max} - \frac{1.6}{w_y} C_{my}^2 \lambda_{\max}^2 \right) \eta_{pl} - b_{LT} \right], \frac{W_{el,y}}{W_{pl,y}} \right) = 0.949$$

$$C_{yz} = \max\left(1 + (w_z - 1) \left[\left(2 - 14 \frac{C_{mz}^2 \lambda_{\max}^2}{w_z^5} \right) \eta_{pl} - c_{LT} \right], 0.6 \sqrt{\frac{w_z}{w_y}} \frac{W_{el,z}}{W_{pl,z}} \right) = 0.806$$

$$C_{zy} = \max\left(1 + (w_y - 1) \left[\left(2 - 14 \frac{C_{my}^2 \lambda_{\max}^2}{w_y^5} \right) \eta_{pl} - d_{LT} \right], 0.6 \sqrt{\frac{w_y}{w_z}} \frac{W_{el,y}}{W_{pl,y}} \right) = 0.806$$

$$C_{zz} = \max\left(1 + (w_z - 1) \left[\left(2 - \frac{1.6}{w_z} C_{mz}^2 \lambda_{\max} - \frac{1.6}{w_z} C_{mz}^2 \lambda_{\max}^2 \right) \eta_{pl} - b_{LT} \right], \frac{W_{el,z}}{W_{pl,z}} \right) = 0.949$$

EN 1993-1-1:2005 Table A.1

Interaction factors k_{ij}

$$k_{yy} = C_{my} C_{mLT} \frac{\mu_y}{1 - \frac{N_{Ed}}{N_{cr,y}}} \frac{1}{C_{yy}} = 1.094$$

$$k_{yz} = C_{mz} \frac{\mu_y}{1 - \frac{N_{Ed}}{N_{cr,z}}} \frac{1}{C_{yz}} 0.6 \sqrt{\frac{w_z}{w_y}} = 0.949$$

$$k_{zy} = C_{my} C_{mLT} \frac{\mu_z}{1 - \frac{N_{Ed}}{N_{cr,y}}} \frac{1}{C_{zy}} 0.6 \sqrt{\frac{w_y}{w_z}} = 0.672$$

$$k_{zz} = C_{mz} \frac{\mu_z}{1 - \frac{N_{Ed}}{N_{cr,z}}} \frac{1}{C_{zz}} = 1.167$$

Interaction values

EN 1993-1-1:2005 Table 6.7

$$N_{Rk} = f_y A = 6,532.000 \text{ kN}$$

$$M_{y,Rk} = f_y W_{pl,y} = 564.805 \text{ kN}\cdot\text{m}$$

$$M_{z,Rk} = f_y W_{pl,z} = 564.805 \text{ kN}\cdot\text{m}$$

$$\Delta M_{y,Ed} = 0.000 \text{ kN}\cdot\text{m}$$

$$\Delta M_{z,Ed} = 0.000 \text{ kN}\cdot\text{m}$$

Interaction ratios

EN 1993-1-1:2005 6.3.3 (4)

$$R_{\max 3} = \frac{N_{Ed}}{\frac{\chi_y N_{Rk}}{\gamma_{M1}}} + k_{yy} \frac{M_{y,Ed} + \Delta M_{y,Ed}}{\chi_{LT} \frac{M_{y,Rk}}{\gamma_{M1}}} + k_{yz} \frac{M_{z,Ed} + \Delta M_{z,Ed}}{\frac{M_{z,Rk}}{\gamma_{M1}}} = 0.764$$

$$R_{\max 4} = \frac{N_{Ed}}{\frac{\chi_z N_{Rk}}{\gamma_{M1}}} + k_{zy} \frac{M_{y,Ed} + \Delta M_{y,Ed}}{\chi_{LT} \frac{M_{y,Rk}}{\gamma_{M1}}} + k_{zz} \frac{M_{z,Ed} + \Delta M_{z,Ed}}{\frac{M_{z,Rk}}{\gamma_{M1}}} = 0.951$$

7) Calculate maximum interaction ratio

$$R_{\max} = \max(R_{\max 1}, R_{\max 2}, R_{\max 3}, R_{\max 4}) = 0.951$$

9. Check Deflection (Sector J, 1.00L)

Deflection	LCB	ELS_cp_01-MZ	
	$\delta_{\max} / \delta_{\text{allow}}$	0.000mm / 17.147mm = 0.000	OK

* ELS_cp_01-MZ : ELS casi-permanente

1) Calculate allowable deflection

$$L = 4,286.842 \text{ mm}$$

$$\delta_{\text{allow}} = \frac{L}{250} = 17.147 \text{ mm}$$

2) Calculate maximum deflection

Maximum deflection position 0.000mm from i-end.

Deflection Amplification Factor (DAF) = 1.000



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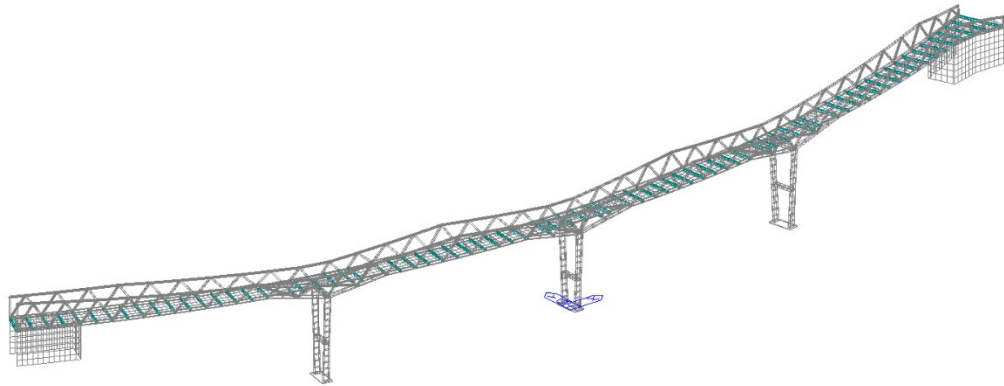
MIDAS Information Technology Co.,Ltd.

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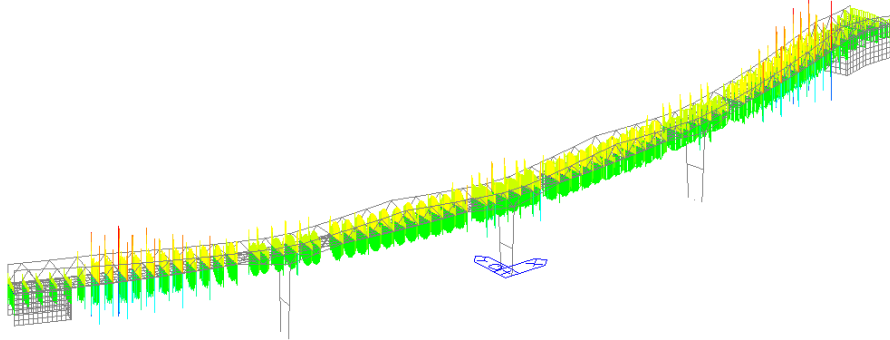
PROJECTE DE PASSERA PER A BICICLETES I VIANANTS
A CAN SANT JOAN A SANT CUGAT DEL VALLÈS

$\delta = 0.000\text{mm}$
 $\delta_{\text{max}} = \delta * \text{DAF} = 0.000\text{mm}$

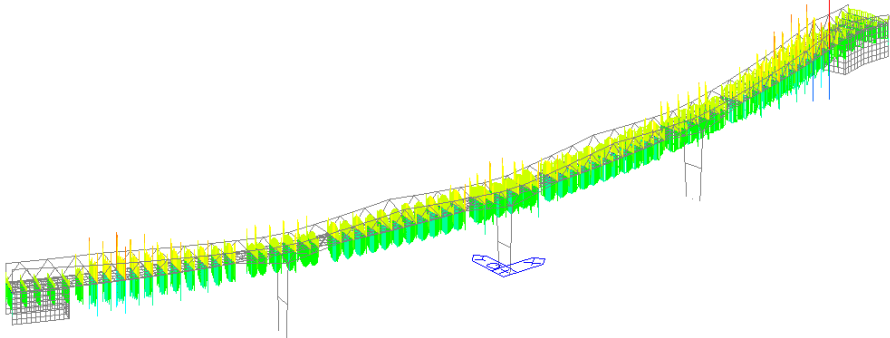
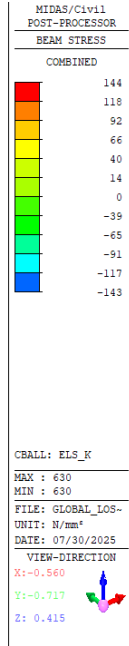
BARRES TRANSVERSALS



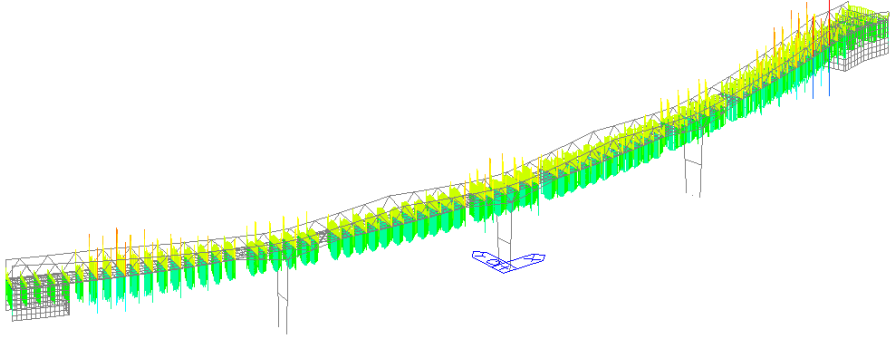
1 400_VigasTrans



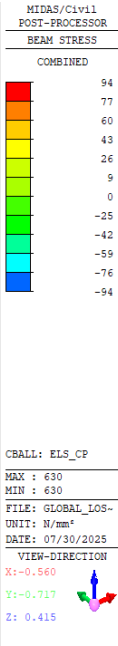
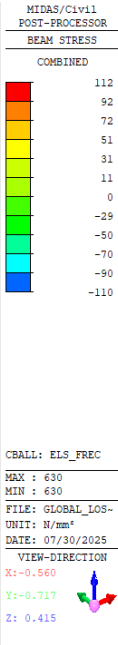
2 401_VigasTrans_SigmaELSk

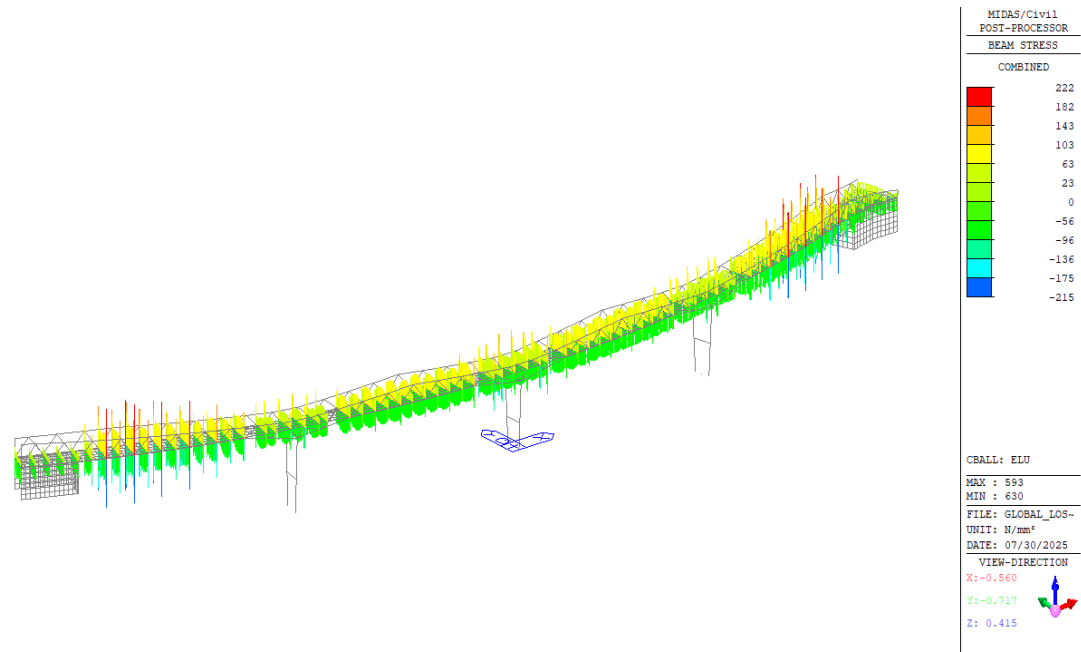


3 402_VigasTrans_SigmaELSfrec



4 403_VigasTrans_SigmaELScp



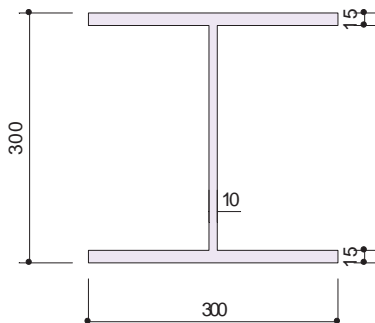


5 404_VigasTrans_SigmaELU

MEMBER NAME : Beam 591 V_Transv_H300_Met (ID : 30)

1. Member Information

- 1) Design Code
EN 1993-2: 2006 (NA:Recommended)
- 2) Material
f_y = 355.000MPa, E_s = 210,000.000MPa
- 3) Length
L = 0.287m
- 4) Partial factors
γ_{M0} = 1.050 γ_{M1} = 1.100 γ_{M2} = 1.250
- 5) Section Properties



A	11,700.000mm²	I _y	199,327,500.000mm⁴	I _z	67,522,500.000mm⁴	I _{yz}	0.000mm⁴
C _y	150.000mm	C _z	150.000mm	i _y	130.524mm	i _z	75.968mm
W _{el,y}	1,328,850.000mm³	W _{el,z}	450,150.000mm³	W _{pl,y}	1,464,750.000mm³	W _{pl,z}	681,750.000mm³
I _t	770,000.000mm⁴	I _w	1.370672e+12mm⁶				

2. Check Axial Resistance (Sector J, 1.00L)

Axial	LCB	ELU_09-FY	
	N _{Ed} / N _{Rd}	66.699kN / 3,955.714kN = 0.017	OK

* ELU_09-FY : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ ₁ (MPa)	σ ₂ (MPa)	ε	λ _{lim1-2}	λ _{lim2-3}	λ _{lim3-4}	Class
left top-flange	9.667	55.845	-39.270	0.814	-	-	-	Class 1
right top-flange	9.667	213.606	69.555	0.814	7.323	8.136	11.391	Class 3
left bottom-flange	9.667	-51.003	-146.117	0.814	-	-	-	Class 1
right bottom-flange	9.667	95.832	-48.219	0.814	7.323	8.136	14.227	Class 3
web	27.000	53.782	-42.381	0.814	54.129	62.330	97.467	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 3

ε = √ 235 / f_y

2) Check slenderness ratio of compressive member

$\frac{KL}{i} = 3.784 < 200.000 \rightarrow O.K$

3) Calculate design resistance of cross section

$N_{c,Rd} = \frac{A f_y}{\gamma_{M0}} = 3,955.714kN$ EN 1993-1-1:2005, 6.2.4 (2)

4) Design resistance of a compression member

N_{Rd} = N_{c,Rd} = 3,955.714kN EN 1993-1-1:2005, 6.2.3

3. Check design resistance for shear about major axis (Sector J, 1.00L)

Shear	LCB	ELU_03-MY	
	V _{z,Ed} / V _{c,z,Rd}	96.687kN / 632.446kN = 0.153	OK

* ELU_03-MY : ELU SC dominante Termicas

1) Calculate design plastic shear resistance

A_{vz} = ηΣh_w t_w = 3,240.000mm² EN 1993-1-1:2005, 6.2.6 (3)

$V_{pl,z,Rd} = \frac{A_{vz} (f_y / \sqrt{3})}{\gamma_{M0}} = 632.446kN$ EN 1993-1-1:2005, 6.2.6 (2)

2) Determine whether to consider shear buckling

EN 1993-1-5:2006, 5.1 (2)

η = 1.200

ε = √ $\frac{235}{f_y}$ = 0.814

$\frac{h_w}{t} = 27.000 \leq \frac{72}{\eta} \epsilon = 48.817$ (Unstiffened)

∴ No need to check shear buckling

3) Calculate design shear resistance

V_{c,z,Rd} = V_{pl,z,Rd} = 632.446kN

4. Check design resistance for shear about minor axis (Sector J, 1.00L)

Shear	LCB	ELU_09-FY	
	V _{y,Ed} / V _{c,y,Rd}	264.747kN / 1,756.794kN = 0.151	OK

* ELU_09-FY : ELU Temp dominante SC concomitante

1) Calculate design plastic shear resistance

A_{vy} = A - h_w t_w = 9,000.000mm² EN 1993-1-1:2005, 6.2.6 (3)

$V_{pl,y,Rd} = \frac{A_{vy} (f_y / \sqrt{3})}{\gamma_{M0}} = 1,756.794kN$ EN 1993-1-1:2005, 6.2.6 (2)

2) Calculate design shear resistance

V_{c,y,Rd} = V_{pl,y,Rd} = 1,756.794kN

5. Check design resistance for bending about major axis (Sector J, 1.00L)

Moment	LCB	ELU_09-FY	
	M _{y,Ed} / M _{c,y,Rd}	78.252kN·m / 449.278kN·m = 0.174	OK
	Sectional class	Class 3 > Class 1, 2, 3, or 4 (DCL)	OK

* ELU_09-FY : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ ₁ (MPa)	σ ₂ (MPa)	ε	λ _{lim1-2}	λ _{lim2-3}	λ _{lim3-4}	Class
left top-flange	9.667	55.845	-39.270	0.814	-	-	-	Class 1
right top-flange	9.667	213.606	69.555	0.814	7.323	8.136	11.391	Class 3
left bottom-flange	9.667	-51.003	-146.117	0.814	-	-	-	Class 1
right bottom-flange	9.667	95.832	-48.219	0.814	7.323	8.136	14.227	Class 3
web	27.000	53.782	-42.381	0.814	54.129	62.330	97.467	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 3

ε = √ 235 / f_y

2) Calculate design resistance of cross section

$M_{c,y,Rd} = M_{el,y,Rd} = \frac{W_{el,y} f_y}{\gamma_{M0}} = 449.278kN·m$ EN 1993-1-1:2005, 6.2.5 (2)

6. Check design resistance for bending about minor axis (Sector J, 1.00L)

Moment	LCB	ELU_09-FY	
	M _{z,Ed} / M _{c,z,Rd}	67.080kN·m / 152.194kN·m = 0.441	OK
	Sectional class	Class 3 > Class 1, 2, 3, or 4 (DCL)	OK

* ELU_09-FY : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ ₁ (MPa)	σ ₂ (MPa)	ε	λ _{lim1-2}	λ _{lim2-3}	λ _{lim3-4}	Class
left top-flange	9.667	55.845	-39.270	0.814	-	-	-	Class 1
right top-flange	9.667	213.606	69.555	0.814	7.323	8.136	11.391	Class 3
left bottom-flange	9.667	-51.003	-146.117	0.814	-	-	-	Class 1
right bottom-flange	9.667	95.832	-48.219	0.814	7.323	8.136	14.227	Class 3
web	27.000	53.782	-42.381	0.814	54.129	62.330	97.467	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 3

ε = √ 235 / f_y

2) Calculate design resistance of cross section

$$M_{c.z.Rd} = M_{el.z.Rd} = \frac{W_{el.z} f_y}{\gamma_{M0}} = 152.194 \text{ kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.5 (2)}$$

7. Check design resistance for lateral-torsional buckling (Sector J, 1.00L)

Moment	LCB	ELU_09-FY	
	$M_{y.Ed} / M_{b.Rd}$	$0.000 \text{ kN}\cdot\text{m} / 0.000 \text{ kN}\cdot\text{m} = 0.000$	OK

* ELU_09-FY : ELU Temp dominante SC concomitante

1) Calculate design resistance for lateral-torsional buckling

Buckling slenderness

$$C_1 = 1.285$$

$$M_{cr.0} = \frac{\pi^2 E I_z}{L_b^2} \sqrt{\frac{I_w}{I_T} + \frac{L_b^2 G I_T}{\pi^2 E I_z}} = 241,528.380 \text{ kN}\cdot\text{m} \quad \text{ENV 1993-1-1:1992, F.1.1}$$

$$M_{cr} = C_1 M_{cr.0} = 310,363.969 \text{ kN}\cdot\text{m} \quad \text{ENV 1993-1-1:1992, F.1.3}$$

$$\lambda_{LT} = \sqrt{\frac{W_{el.y} f_y}{M_{cr}}} = 0.0390 \quad \text{EN 1993-1-1:2005, 6.3.2.3 (1)}$$

$$\lambda_{LT} \leq \lambda_{LT.0} \text{ and } \frac{M_{y.Ed}}{M_{cr}} \leq \lambda_{LT.0}^2 \quad \text{EN 1993-1-1:2005, 6.3.2.2 (4)}$$

∴ No need to check LTB

8. Check Interaction ratios (Sector J, 1.00L)

Interaction	LCB	ELU_09-FY	
	R_{max}	0.662	OK

* ELU_09-FY : ELU Temp dominante SC concomitante

1) Applied forces for interaction ratio

$$N_{Ed} = -66.699 \text{ kN}$$

$$M_{y.Ed} = 78.252 \text{ kN}\cdot\text{m}, M_{z.Ed} = 67.080 \text{ kN}\cdot\text{m}$$

$$V_{y.Ed} = -264.747 \text{ kN}, V_{z.Ed} = 24.713 \text{ kN}$$

$$T_{Ed} = 1.299 \text{ kN}\cdot\text{m}$$

2) Reduced moment resistance for high shear about major axis

$$M_{c.y.Rd} = \frac{W_{el.y} f_y}{\gamma_{M0}} = 449.278 \text{ kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.5 (2)}$$

$$V_{z.Ed} < 0.5 V_{pl.z.Rd} = 93,549.301 \text{ kN} \quad \text{EN 1993-1-1:2005, 6.2.8 (4)}$$

$$M_{y.Rd} = M_{c.y.Rd} = 449.278 \text{ kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.8 (5)}$$

3) Reduced moment resistance for high shear about minor axis

$$M_{c.z.Rd} = \frac{W_{el.z} f_y}{\gamma_{M0}} = 152.194 \text{ kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.8 (4)}$$

$$V_{y.Ed} < 0.5 V_{pl.y.Rd} = 878.397 \text{ kN} \quad \text{EN 1993-1-1:2005, 6.2.8 (4)}$$

$$M_{z.Rd} = M_{c.z.Rd} = 152.194 \text{ kN}\cdot\text{m} \quad \text{EN 1993-1-1:2005, 6.2.8 (5)}$$

4) Calculate interaction ratio of bending and axial force

$$R_{max1} = \frac{N_{Ed}}{A f_y / \gamma_{M0}} + \frac{M_{y.Ed}}{M_{y.Rd}} + \frac{M_{z.Ed}}{M_{z.Rd}} = 0.632 \quad \text{EN 1993-1-1:2005, 6.2.8 (5)}$$

EN 1993-1-1:2005, 6.2.1 (7)

5) Calculate interaction ratio of a buckling resistance (Bending and Axial force)

Reduction factors for buckling

$$\chi_y = 1.000, \chi_z = 1.000, \chi_{LT} = 1.000$$

Efficiency factor

EN 1993-1-1:2005 Table A.1

$$\mu_y = \frac{1 - N_{Ed} / N_{cr.y}}{1 - \chi_y N_{Ed} / N_{cr.y}} = 1.000, \mu_z = \frac{1 - N_{Ed} / N_{cr.z}}{1 - \chi_z N_{Ed} / N_{cr.z}} = 1.000$$

Buckling force

$$N_{cr.y} = \frac{\pi^2 E I_y}{(K_y L_y)^2} = 4,999,791.970 \text{ kN}$$

$$N_{cr.z} = \frac{\pi^2 E I_z}{(K_z L_z)^2} = 1,693,687.290 \text{ kN}$$

G = **iError!**

EN 1993-1-1:2005, 3.2.6

$$y_0 = 0.000 \text{ mm}, z_0 = 0.000 \text{ mm} \text{ (Shear center from centroid)}$$

$$i_s = \sqrt{i_y^2 + i_z^2 + y_0^2 + z_0^2} = 151.022 \text{ mm}$$

$$N_{cr.T} = \frac{1}{i_s^2} \left(\frac{\pi^2 E I_z a^2}{L_T^2} + \frac{\pi^2 E I_w}{L_T^2} + G I_T \right) = 1,510,155.830 \text{ kN}$$

$$\beta = 1 - (y_0 / i_s)^2 = 1.000$$

$$N_{cr.TF} = \frac{N_{cr.y}}{2\beta} \left(1 + \frac{N_{cr.T}}{N_{cr.y}} - \sqrt{\left(1 - \frac{N_{cr.T}}{N_{cr.y}} \right)^2 + 4 \left(\frac{y_0}{i_s} \right)^2 \frac{N_{cr.T}}{N_{cr.y}}} \right) = \quad \text{EN 1993-1-3:2006, 6.2.3 (7)}$$

$$1,510,155.830 \text{ kN}$$

Buckling resistance moment

$$C_1 = 1.285$$

$$M_{cr.0} = \frac{\pi^2 E I_z}{L_b^2} \sqrt{\frac{I_w}{I_T} + \frac{L_b^2 G I_T}{\pi^2 E I_z}} = 241,528.380 \text{ kN}\cdot\text{m} \quad \text{ENV 1993-1-1:1992, F.1.1}$$

$$M_{cr} = C_1 M_{cr.0} = 310,363.969 \text{ kN}\cdot\text{m} \quad \text{ENV 1993-1-1:1992, F.1.3}$$

Non-dimensional slenderness

$$\lambda_y = \sqrt{\frac{A f_y}{N_{cr.y}}} = 0.0288, \lambda_z = \sqrt{\frac{A f_y}{N_{cr.z}}} = 0.0495$$

$$\lambda_{max} = \max(\lambda_y, \lambda_z) = 0.0495$$

$$\lambda_0 = \sqrt{\frac{W_y f_y}{M_{cr.0}}} = 0.0442 \quad \text{EN 1993-1-1:2005, 6.3.2.2 (1)}$$

$$\lambda_{LT} = \sqrt{\frac{W_y f_y}{M_{cr}}} = 0.0390 \quad \text{EN 1993-1-1:2005, 6.3.2.2 (1)}$$

Equivalent uniform moment factors

EN 1993-1-1:2005 Table A.1,2

$$\psi_y = 0.920$$

$$C_{my.0} = 0.79 + 0.21 \psi_y + 0.36 (\psi_y - 0.33) \frac{N_{Ed}}{N_{cr.y}} = 0.983$$

$$\psi_z = -0.134$$

$$C_{mz.0} = 0.79 + 0.21 \psi_z + 0.36 (\psi_z - 0.33) \frac{N_{Ed}}{N_{cr.z}} = 0.762$$

$$\lambda_{0.Lim} = 0.2 \sqrt{C_1} [((1 - \frac{N_{Ed}}{N_{cr.z}})(1 - \frac{N_{Ed}}{N_{cr.TF}}))]^{1/4} = 0.227$$

$$\lambda_0 \leq \lambda_{0.Lim} :$$

$$C_{my} = 1.000 \text{ (Default or User defined)}$$

$$C_{mz} = 1.000 \text{ (Default or User defined)}$$

$$C_{mLT} = 1.000 \text{ ((Default or User defined))}$$

EN 1993-1-1:2005 Table A.1

Auxiliary terms

$$w_y = \min\left(\frac{W_{pl.y}}{W_{el.y}}, 1.5\right) = 1.102$$

$$w_z = \min\left(\frac{W_{pl.z}}{W_{el.z}}, 1.5\right) = 1.500$$

$$N_{Rk} = 4,153.500 \text{ kN}$$

$$n_{pl} = \frac{N_{Ed}}{N_{Rk} / \gamma_{M0}} = 0.0169$$

$$a_{LT} = \max\left(1 - \frac{I_T}{I_y}, 0\right) = 0.996$$

$$b_{LT} = 0.5 a_{LT} \lambda_0^2 \frac{M_{y.Ed}}{\chi_{LT} M_{pl.y.Rd}} \frac{M_{z.Ed}}{M_{pl.z.Rd}} = 0.0000447$$

$$c_{LT} = 10 a_{LT} \frac{\lambda_0^2}{5 + \lambda_z^4} \frac{M_{y.Ed}}{C_{my} \chi_{LT} M_{pl.y.Rd}} = 0.000615$$

$$d_{LT} = 2 a_{LT} \frac{\lambda_0}{0.1 + \lambda_z^4} \frac{M_{y.Ed}}{C_{my} \chi_{LT} M_{pl.y.Rd}} \frac{M_{z.Ed}}{C_{mz} M_{pl.z.Rd}} = 0.0405$$

$$e_{LT} = 1.7 a_{LT} \frac{\lambda_0^2}{0.1 + \lambda_z^4} \frac{M_{y.Ed}}{C_{my} \chi_{LT} M_{pl.y.Rd}} = 42,248.098$$

$$C_{yy} = \max\left(1 + (w_y - 1) \left[\left(2 - \frac{1.6}{w_y} C_{my}^2 \lambda_{max} - \frac{1.6}{w_y} C_{my}^2 \lambda_{max}^2 \right) n_{pl} - b_{LT} \right], \frac{W_{el.y}}{W_{pl.y}} \right) = 1.003$$

$$C_{yz} = \max\left(1 + (w_z - 1) \left[\left(2 - 14 \frac{C_{mz}^2 \lambda_{max}^2}{w_z^5} \right) n_{pl} - c_{LT} \right], 0.6 \sqrt{\frac{w_z}{w_y}} \frac{W_{el.z}}{W_{pl.z}} \right) = 1.017$$

$$C_{zy} = \max\left(1 + (w_y - 1) \left[\left(2 - 14 \frac{C_{my}^2 \lambda_{max}^2}{w_y^5} \right) n_{pl} - d_{LT} \right], 0.6 \sqrt{\frac{w_y}{w_z}} \frac{W_{el.y}}{W_{pl.y}} \right) = 0.999$$

$$C_{zz} = \max\left(1 + (w_z - 1) \left[\left(2 - \frac{1.6}{w_z} C_{mz}^2 \lambda_{max} - \frac{1.6}{w_z} C_{mz}^2 \lambda_{max}^2 - b_{LT} \right), \frac{W_{el.z}}{W_{pl.z}} \right] \right) = 0.660$$

Interaction factors k_{ij}

EN 1993-1-1:2005 Table A.1

$$k_{yy} = C_{my} C_{mLT} \frac{\mu_y}{1 - \frac{N_{Ed}}{N_{cr,y}}} = 1.000$$

$$k_{yz} = C_{mz} \frac{\mu_y}{1 - \frac{N_{Ed}}{N_{cr,z}}} = 1.000$$

$$k_{zy} = C_{my} C_{mLT} \frac{\mu_z}{1 - \frac{N_{Ed}}{N_{cr,y}}} = 1.000$$

$$k_{zz} = C_{mz} \frac{\mu_z}{1 - \frac{N_{Ed}}{N_{cr,z}}} = 1.000$$

Interaction values

EN 1993-1-1:2005 Table 6.7

$N_{Rk} = f_y A = 4,153.500kN$
 $M_{y,Rk} = f_y W_y = 471.742kN \cdot m$
 $M_{z,Rk} = f_y W_z = 159.803kN \cdot m$
 $\Delta M_{y,Ed} = 0.000kN \cdot m$
 $\Delta M_{z,Ed} = 0.000kN \cdot m$

Interaction ratios

EN 1993-1-1:2005 6.3.3 (4)

$$R_{max2} = \frac{\frac{N_{Ed}}{\chi_y N_{Rk}}}{\gamma_{M1}} + k_{yy} \frac{\frac{M_{y,Ed} + \Delta M_{y,Ed}}{\chi_{LT} M_{y,Rk}}}{\gamma_{M1}} + k_{yz} \frac{\frac{M_{z,Ed} + \Delta M_{z,Ed}}{M_{z,Rk}}}{\gamma_{M1}} = 0.662$$

$$R_{max3} = \frac{\frac{N_{Ed}}{\chi_z N_{Rk}}}{\gamma_{M1}} + k_{zy} \frac{\frac{M_{y,Ed} + \Delta M_{y,Ed}}{\chi_{LT} M_{y,Rk}}}{\gamma_{M1}} + k_{zz} \frac{\frac{M_{z,Ed} + \Delta M_{z,Ed}}{M_{z,Rk}}}{\gamma_{M1}} = 0.662$$

6) Calculate maximum interaction ratio

$R_{max} = \max (R_{max1} , R_{max2} , R_{max3}) = 0.662$

9. Check Deflection (Sector J, 1.00L)

Deflection	LCB	ELS_cp_01-MZ	OK
	$\delta_{max} / \delta_{allow}$	0.000mm / 1.150mm = 0.000	

* ELS_cp_01-MZ : ELS casi-permanente

1) Calculate allowable deflection

$L = 287.453mm$

$\delta_{allow} = \frac{L}{250} = 1.150mm$

2) Calculate maximum deflection

Maximum deflection position 0.000mm from i-end.
Deflection Amplification Factor (DAF) = 1.000
 $\delta = 0.000mm$
 $\delta_{max} = \delta * DAF = 0.000mm$

MEMBER NAME : Beam 601 V_Abaco_300_Met (ID : 32)

1. Member Information

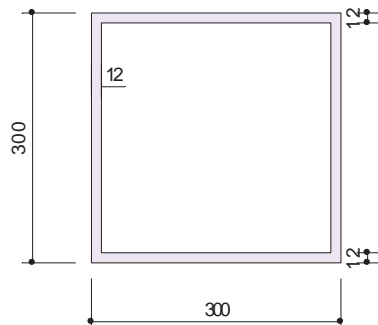
1) Design Code
EN 1993-2: 2006 (NA:Recommended)

2) Material
 $f_y = 355.000\text{MPa}$, $E_s = 210,000.000\text{MPa}$

3) Length
 $L = 0.287\text{m}$

4) Partial factors
 $\gamma_{M0} = 1.050$ $\gamma_{M1} = 1.100$ $\gamma_{M2} = 1.250$

5) Section Properties



A	13,824,000mm ²	I _y	191,434,752.000mm ⁴	I _z	191,434,752.000mm ⁴	I _{yz}	0.000mm ⁴
C _y	150.000mm	C _z	150.000mm	i _y	117.678mm	i _z	117.678mm
W _{el,y}	1,276,231.680mm ³	W _{el,z}	1,276,231.680mm ³	W _{pl,y}	1,493,856.000mm ³	W _{pl,z}	1,493,856.000mm ³
I _t	286,654,464.000mm ⁴	I _w	0.000mm ⁶				

2. Check Axial Resistance (Sector J, 1.00L)

Axial	LCB	ELU_09-MY	
	N _{Ed} / N _{Rd}	74.845kN / 4,673.829kN = 0.016	OK

* ELU_09-MY : ELU Temp dominante SC concomitante

1) Section classification								
Part	WTR	σ ₁ (MPa)	σ ₂ (MPa)	ε	λ _{lim1-2}	λ _{lim2-3}	λ _{lim3-4}	Class
internal top-flange	23.000	-29.983	-93.862	0.814	-	-	-	Class 1
internal bottom-flange	23.000	83.034	19.155	0.814	26.849	30.917	45.653	Class 1
left web	23.000	81.291	-22.685	0.814	56.457	65.011	58.718	Class 1
right web	23.000	11.857	-92.119	0.814	56.457	65.011	1,114.685	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$$\epsilon = \sqrt{235 / f_y}$$

2) Check slenderness ratio of tensile member

$$\frac{L}{i} = 2.443 < 300.000 \rightarrow \text{O.K}$$

3) Calculate design resistance of cross section

$$N_{t,Rd} = N_{pl,Rd} = A f_y / \gamma_{M0} = 4,673.829\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.3 (2)}$$

4) Design resistance of a tension member

$$N_{Rd} = N_{t,Rd} = 4,673.829\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.3}$$

3. Check design resistance for shear about major axis (Sector J, 1.00L)

Shear	LCB	ELU_01+FZ	
	V _{z,Ed} / V _{c,z,Rd}	104.899kN / 1,551.601kN = 0.068	OK

* ELU_01+FZ : ELU SC dominante Viento transv.

1) Calculate design plastic shear resistance

$$A_{vz} = \eta \sum h_w t_w = 7,948.800\text{mm}^2 \quad \text{EN 1993-1-1:2005, 6.2.6 (3)}$$

$$V_{pl,z,Rd} = \frac{A_{vz} (f_y / \sqrt{3})}{\gamma_{M0}} = 1,551.601\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.6 (2)}$$

2) Determine whether to consider shear buckling

$$\eta = 1.200$$

$$\epsilon = \sqrt{\frac{235}{f_y}} = 0.814$$

$$\frac{h_w}{t} = 23.000 \leq \frac{72}{\eta} \quad \epsilon = 48.817 \text{ (Unstiffened)}$$

∴ No need to check shear buckling

3) Calculate design shear resistance

$$V_{c,z,Rd} = V_{pl,z,Rd} = 1,551.601\text{kN}$$

4. Check design resistance for shear about minor axis (Sector J, 1.00L)

Shear	LCB	ELU_09-MX	
	V _{y,Ed} / V _{c,y,Rd}	557.195kN / 1,405.436kN = 0.396	OK

* ELU_09-MX : ELU Temp dominante SC concomitante

1) Calculate design plastic shear resistance

$$A_{vy} = A - 2h_w t_w = 7,200.000\text{mm}^2 \quad \text{EN 1993-1-1:2005, 6.2.6 (3)}$$

$$V_{pl,y,Rd} = \frac{A_{vy} (f_y / \sqrt{3})}{\gamma_{M0}} = 1,405.436\text{kN} \quad \text{EN 1993-1-1:2005, 6.2.6 (2)}$$

2) Determine whether to consider shear buckling

$$\eta = 1.200$$

$$\epsilon = \sqrt{\frac{235}{f_y}} = 0.814$$

$$\frac{h_w}{t} = 23.000 \leq \frac{72}{\eta} \quad \epsilon = 48.817 \text{ (Unstiffened)}$$

∴ No need to check shear buckling

3) Calculate design shear resistance

$$V_{c,y,Rd} = V_{pl,y,Rd} = 1,405.436\text{kN}$$

5. Check design resistance for bending about major axis (Sector J, 1.00L)

Moment	LCB	ELU_09-MY	
	M _{y,Ed} / M _{c,y,Rd}	84.416kN·m / 505.066kN·m = 0.167	OK
	Sectional class	Class 2 ≤ Class 1, 2, 3, or 4 (DCL)	OK

* ELU_09-MY : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ ₁ (MPa)	σ ₂ (MPa)	ε	λ _{lim1-2}	λ _{lim2-3}	λ _{lim3-4}	Class
internal top-flange	23.000	-29.983	-93.862	0.814	-	-	-	Class 1
internal bottom-flange	23.000	83.034	19.155	0.814	26.849	30.917	45.653	Class 1
left web	23.000	81.291	-22.685	0.814	56.457	65.011	58.718	Class 1
right web	23.000	11.857	-92.119	0.814	56.457	65.011	1,114.685	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$$\epsilon = \sqrt{235 / f_y}$$

2) Calculate design resistance of cross section

$$M_{c,y,Rd} = M_{pl,y,Rd} = \frac{W_{pl,y} f_y}{\gamma_{M0}} = 505.066\text{kN·m} \quad \text{EN 1993-1-1:2005, 6.2.5 (2)}$$

6. Check design resistance for bending about minor axis (Sector J, 1.00L)

Moment	LCB	ELU_09-MY	
	M _{z,Ed} / M _{c,z,Rd}	51.862kN·m / 505.066kN·m = 0.103	OK
	Sectional class	Class 2 ≤ Class 1, 2, 3, or 4 (DCL)	OK

* ELU_09-MY : ELU Temp dominante SC concomitante

1) Section classification

EN 1993-1-1:2005, 5.5.2

Part	WTR	σ ₁ (MPa)	σ ₂ (MPa)	ε	λ _{lim1-2}	λ _{lim2-3}	λ _{lim3-4}	Class
internal top-flange	23.000	-29.983	-93.862	0.814	-	-	-	Class 1
internal bottom-flange	23.000	83.034	19.155	0.814	26.849	30.917	45.653	Class 1

left web	23.000	81.291	-22.685	0.814	56.457	65.011	58.718	Class 1
right web	23.000	11.857	-92.119	0.814	56.457	65.011	1,114.685	Class 1
Class of cross-section	-	-	-	-	-	-	-	Class 1

$\epsilon = \sqrt{235 / f_y}$

2) Calculate design resistance of cross section

$M_{c.z.Rd} = M_{pl.z.Rd} = \frac{W_{pl.z} f_y}{\gamma_{M0}} = 505.066kN \cdot m$ EN 1993-1-1:2005, 6.2.5 (2)

7. Check design resistance for lateral-torsional buckling (Sector J, 1.00L)

Moment	LCB	ELU_09-MY	
	M _{y,Ed} / M _{b,Rd}	0.000kN·m / 0.000kN·m = 0.000	OK

* ELU_09-MY : ELU Temp dominante SC concomitante

1) Calculate design resistance for lateral-torsional buckling

Buckling slenderness

$C_1 = 1.285$

$M_{cr,0} = \frac{\pi^2 E I_z}{L_b^2} \sqrt{\frac{I_w}{I_T} + \frac{L_b^2 G I_T}{\pi^2 E I_z}} = 333,430.308kN \cdot m$ ENV 1993-1-1:1992, F.1.1

$M_{cr} = C_1 M_{cr,0} = 428,457.945kN \cdot m$ ENV 1993-1-1:1992, F.1.3

$\lambda_{LT} = \sqrt{\frac{W_{pl,y} f_y}{M_{cr}}} = 0.0352$ EN 1993-1-1:2005, 6.3.2.3 (1)

$\lambda_{LT} \leq \lambda_{LT,0}$ and $\frac{M_{y.Ed}}{M_{cr}} \leq \lambda_{LT,0}^2$ EN 1993-1-1:2005, 6.3.2.2 (4)

∴ No need to check LTB

8. Check Interaction ratios (Sector J, 1.00L)

Interaction	LCB	ELU_09-MY	
	R _{max}	0.286	OK

* ELU_09-MY : ELU Temp dominante SC concomitante

1) Applied forces for interaction ratio

$N_{Ed} = 74.845kN$

$M_{y.Ed} = -84.416kN \cdot m$, $M_{z.Ed} = -51.862kN \cdot m$

$V_{y.Ed} = 427.095kN$, $V_{z.Ed} = 74.990kN$

$T_{Ed} = -31.366kN \cdot m$

2) Reduced moment resistance for high shear about major axis

$M_{c.y.Rd} = \frac{W_{pl,y} f_y}{\gamma_{M0}} = 505.066kN \cdot m$ EN 1993-1-1:2005, 6.2.5 (2)

$V_{z.Ed} < 0.5 V_{pl.z.Rd} = 229,507.619kN$ EN 1993-1-1:2005, 6.2.8 (4)

$M_{y.Rd} = M_{c.y.Rd} = 505.066kN \cdot m$ EN 1993-1-1:2005, 6.2.8 (5)

3) Reduced moment resistance for high shear about minor axis

$M_{c.z.Rd} = \frac{W_{pl,z} f_y}{\gamma_{M0}} = 505.066kN \cdot m$ EN 1993-1-1:2005, 6.2.8 (4)

$V_{y.Ed} < 0.5 V_{pl.y.Rd} = 702.718kN$ EN 1993-1-1:2005, 6.2.8 (4)

$M_{z.Rd} = M_{c.z.Rd} = 505.066kN \cdot m$ EN 1993-1-1:2005, 6.2.8 (5)

4) Calculate interaction ratio of bending and axial force

$R_{max1} = \frac{N_{Ed}}{A f_y / \gamma_{M0}} + \frac{M_{y.Ed}}{M_{y.Rd}} + \frac{M_{z.Ed}}{M_{z.Rd}} = 0.286$ EN 1993-1-1:2005, 6.2.8 (5)
EN 1993-1-1:2005, 6.2.1 (7)

5) Calculate interaction ratio of a Class 1 and 2 cross-section (Bending and Compression)

$N_{pl.Rd} = \frac{A f_y}{\gamma_{M0}} = 4,673.829kN$ EN 1993-1-1:2005, 6.2.3 (2)

$M_{pl,y.Rd} = 505.066kN \cdot m$ EN 1993-1-1:2005, 6.2.5 (2)

$M_{pl,z.Rd} = 505.066kN \cdot m$

$N_{Ed,y.lim} = \min(0.25 M_{pl.Rd} , \frac{h_w t_w f_y}{\gamma_{M0}}) = 1,119.771kN$

$N_{Ed,z.lim} = \frac{2 h_w t_w f_y}{\gamma_{M0}} = 2,239.543kN$

$N_{Ed} \leq N_{Ed,y.lim}$; EN 1993-1-1:2005, 6.2.9.1 (4)

$M_{N,y.Rd} = M_{pl,y.Rd} = 505.066kN \cdot m$

EN 1993-1-1:2005, 6.2.9.1 (5)

$N_{Ed} \leq N_{Ed,y.lim}$; EN 1993-1-1:2005, 6.2.9.1 (4)

$M_{N,z.Rd} = M_{pl,z.Rd} = 505.066kN \cdot m$ EN 1993-1-1:2005, 6.2.9.1 (5)

$\alpha = \beta = \min(\frac{1.66}{1 - 1.13 n^2} , 6.0) = 1.660$ EN 1993-1-1:2005, 6.2.9.1 (6)

$R_{max2} = [(\frac{M_{y.Ed}}{M_{N,y.Rd}})^\alpha + [(\frac{M_{z.Ed}}{M_{N,z.Rd}})^\beta] = 0.0741$ EN 1993-1-1:2005, 6.2.9.1 (6)

6) Calculate maximum interaction ratio

$R_{max} = \max (R_{max1} , R_{max2}) = 0.286$

9. Check Deflection (Sector J, 1.00L)

Deflection	LCB	ELS_cp_01-MZ	
	$\delta_{\max} / \delta_{\text{allow}}$	0.000mm / 1.150mm = 0.000	OK

* ELS_cp_01-MZ : ELS casi-permanente

1) Calculate allowable deflection

$L = 287.453mm$

$\delta_{allow} = \frac{L}{250} = 1.150mm$

2) Calculate maximum deflection

Maximum deflection position 0.000mm from i-end.

Deflection Amplification Factor (DAF) = 1.000

$\delta = 0.000mm$

$\delta_{max} = \delta * DAF = 0.000mm$

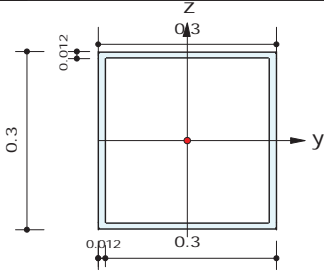
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	70
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -117.02 (LCB: 54+MY, POS:I)
Bending Moments	My = 94.6061, Mz = 2.03542
End Moments	Myi = 94.6061, Myj = 80.3888 (for Lb) Myi = 94.6061, Myj = 38.5491 (for Ly) Mzi = 2.03542, Mzj = -2.9781 (for Lz)
Shear Forces	Fyy = 47.3156 (LCB: 60-MZ, POS:J) Fzz = 85.8341 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 117.02/4673.83 = 0.025 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 94.606/505.066 = 0.187 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.035/505.066 = 0.004 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.224 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.034 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.055 < 1.000$ O.K

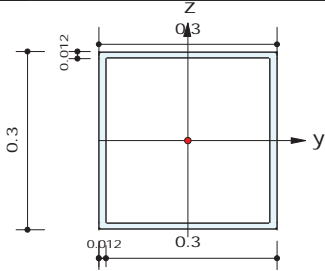
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	71
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -267.10 (LCB: 60+MY, POS:I)
Bending Moments	My = 84.6667, Mz = 1.34487
End Moments	Myi = 84.6667, Myj = 72.5993 (for Lb) Myi = 84.6667, Myj = 40.7978 (for Ly) Mzi = 1.34487, Mzj = -0.5408 (for Lz)
Shear Forces	Fyy = -20.663 (LCB: 60-FY, POS:J) Fzz = 85.2496 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 267.10/4673.83 = 0.057 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 84.667/505.066 = 0.168 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.345/505.066 = 0.003 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.235 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.015 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.055 < 1.000$ O.K

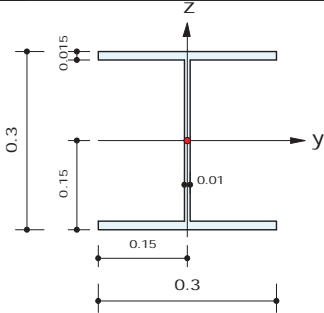
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	72
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -213.83 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 89.8775, Mz = -3.4599
End Moments	Myi = 86.4340, Myj = 77.6758 (for Lb) Myi = 86.2311, Myj = 77.6758 (for Ly) Mzi = -4.3371, Mzj = 1.73966 (for Lz)
Shear Forces	Fyy = -8.8646 (LCB: 60-MZ, POS:3/4) Fzz = 54.8998 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{\min[N_{c,Rd}, N_{b,Rd}]} = \frac{213.83}{3955.71} = 0.054 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{89.877}{449.278} = 0.200 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{3.460}{152.194} = 0.023 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{byN} = \frac{N_{Ed}}{A \cdot f_y / \gamma_{M0}}, R_{byM} = \frac{M_{Edy}}{M_{y,Rd}} + \frac{M_{Edz}}{M_{z,Rd}}$$

$$R_{c,LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{c,LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = \max[R_{byN} + R_{byM}, \max(R_{c,LT1} + R_{b,LT1}, R_{c,LT2} + R_{b,LT2})] = 0.291 < 1.000 \dots \text{O.K}$$


Shear Resistance

$$\frac{V_{Edy}}{V_{y,Rd}} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z,Rd}} = 0.087 < 1.000 \dots\dots\dots \text{O.K}$$

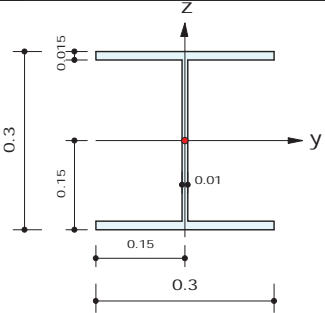
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	73
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -253.02 (LCB: 60+MY, POS:I)
Bending Moments	My = 88.4870, Mz = 2.58223
End Moments	Myi = 88.4870, Myj = 74.6830 (for Lb) Myi = 88.4870, Myj = 49.0454 (for Ly) Mzi = 2.58223, Mzj = -1.5901 (for Lz)
Shear Forces	Fyy = 9.18444 (LCB: 60+MZ, POS:3/4) Fzz = 76.8329 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{\min[N_{c,Rd}, N_{b,Rd}]} = \frac{253.02}{3955.71} = 0.064 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{88.487}{449.278} = 0.197 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{2.582}{152.194} = 0.017 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{byN} = \frac{N_{Ed}}{A \cdot f_y / \gamma_{M0}}, R_{byM} = \frac{M_{Edy}}{M_{y,Rd}} + \frac{M_{Edz}}{M_{z,Rd}}$$

$$R_{c,LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{c,LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = \max[R_{byN} + R_{byM}, \max(R_{c,LT1} + R_{b,LT1}, R_{c,LT2} + R_{b,LT2})] = 0.292 < 1.000 \dots \text{O.K}$$

Shear Resistance

$$\frac{V_{Edy}}{V_{y,Rd}} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z,Rd}} = 0.121 < 1.000 \dots\dots\dots \text{O.K}$$

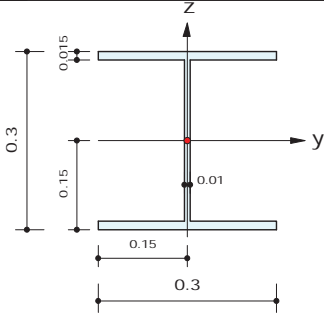
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	74
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -195.45 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 95.7573, Mz = -1.8537
End Moments	Myi = 91.6412, Myj = 87.0429 (for Lb) Myi = 89.2666, Myj = 87.0429 (for Ly) Mzi = -1.7574, Mzj = 0.37086 (for Lz)
Shear Forces	Fyy = 1.26477 (LCB: 60+FY, POS:1/2) Fzz = 49.7154 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{\min[N_{c,Rd}, N_{b,Rd}]} = \frac{195.45}{3955.71} = 0.049 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{95.757}{449.278} = 0.213 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{1.854}{152.194} = 0.012 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{byN} = \frac{N_{Ed}}{A \cdot f_y / \gamma_{M0}}, R_{byM} = \frac{M_{Edy}}{M_{y,Rd}} + \frac{M_{Edz}}{M_{z,Rd}}$$

$$R_{c,LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{c,LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = \max[R_{byN} + R_{byM}, \max(R_{c,LT1} + R_{b,LT1}, R_{c,LT2} + R_{b,LT2})] = 0.288 < 1.000 \dots \text{O.K}$$


Shear Resistance

$$\frac{V_{Edy}}{V_{y,Rd}} = 0.002 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z,Rd}} = 0.079 < 1.000 \dots\dots\dots \text{O.K}$$

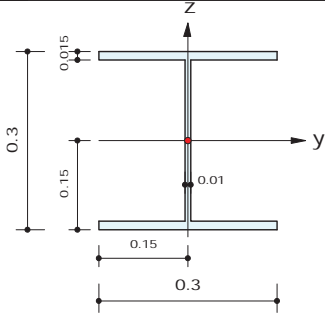
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	75
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -247.84 (LCB: 60+MY, POS:I)
Bending Moments	My = 92.0896, Mz = 1.45992
End Moments	Myi = 92.0896, Myj = 75.6938 (for Lb) Myi = 92.0896, Myj = 50.9085 (for Ly) Mzi = 1.45992, Mzj = -0.9594 (for Lz)
Shear Forces	Fyy = 4.47539 (LCB: 60-MZ, POS:J) Fzz = 84.2823 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{\min[N_{c,Rd}, N_{b,Rd}]} = \frac{247.84}{3955.71} = 0.063 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{92.090}{449.278} = 0.205 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{1.460}{152.194} = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{byN} = \frac{N_{Ed}}{A \cdot f_y / \gamma_{M0}}, R_{byM} = \frac{M_{Edy}}{M_{y,Rd}} + \frac{M_{Edz}}{M_{z,Rd}}$$

$$R_{c,LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{c,LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = \max[R_{byN} + R_{byM}, \max(R_{c,LT1} + R_{b,LT1}, R_{c,LT2} + R_{b,LT2})] = 0.291 < 1.000 \dots \text{O.K}$$

Shear Resistance

$$\frac{V_{Edy}}{V_{y,Rd}} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z,Rd}} = 0.133 < 1.000 \dots\dots\dots \text{O.K}$$

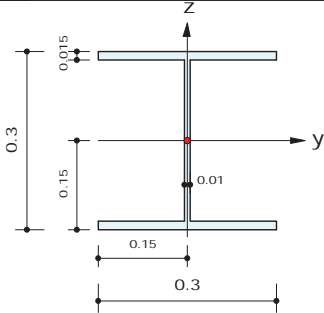
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	76
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -193.33 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 96.6140, Mz = 0.00144
End Moments	Myi = 92.4023, Myj = 88.2337 (for Lb) Myi = 89.5984, Myj = 88.2337 (for Ly) Mzi = -0.4415, Mzj = -0.0447 (for Lz)
Shear Forces	Fyy = 2.28371 (LCB: 54+FY, POS:J) Fzz = 49.6981 (LCB: 54-MZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Oyb	0.07324	Ozb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 193.33/3955.71 = 0.049 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 96.614/449.278 = 0.215 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.001/152.194 = 0.000 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.277 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.001 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.079 < 1.000$ O.K

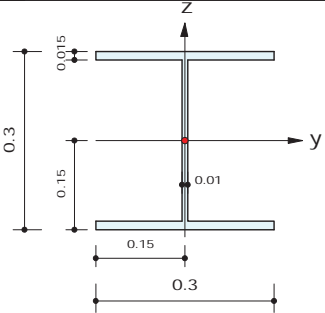
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	77
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -140.34 (LCB: 54+MY, POS:I)
Bending Moments	My = 104.836, Mz = 0.11651
End Moments	Myi = 104.836, Myj = 79.4059 (for Lb) Myi = 104.836, Myj = 43.6692 (for Ly) Mzi = 0.11651, Mzj = 0.15865 (for Lz)
Shear Forces	Fyy = -2.5004 (LCB: 60-MZ, POS:3/4) Fzz = 84.7384 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Oyb	0.07324	Ozb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 140.34/3955.71 = 0.035 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 104.836/449.278 = 0.233 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.117/152.194 = 0.001 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.283 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.001 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.134 < 1.000$ O.K

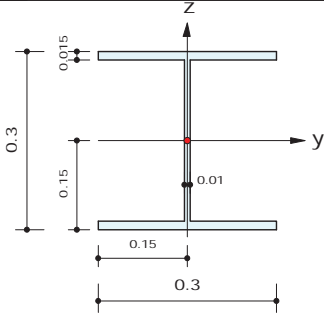
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	78
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -203.45 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 93.4339, Mz = 2.23169
End Moments	Myi = 89.5483, Myj = 83.5695 (for Lb) Myi = 87.3927, Myj = 83.5695 (for Ly) Mzi = 2.64060, Mzj = -1.3739 (for Lz)
Shear Forces	Fyy = 7.85405 (LCB: 54-MZ, POS:J) Fzz = 54.8507 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Oyb	0.07324	Ozb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{\min[N_{c,Rd}, N_{b,Rd}]} = \frac{203.45}{3955.71} = 0.051 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{93.434}{449.278} = 0.208 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{2.232}{152.194} = 0.015 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{byN} = \frac{N_{Ed}}{A \cdot f_y / \gamma_{M0}}, R_{byM} = \frac{M_{Edy}}{M_{y,Rd}} + \frac{M_{Edz}}{M_{z,Rd}}$$

$$R_{c,LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{c,LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = \max[R_{byN} + R_{byM}, \max(R_{c,LT1} + R_{b,LT1}, R_{c,LT2} + R_{b,LT2})] = 0.288 < 1.000 \dots \text{O.K}$$


Shear Resistance

$$\frac{V_{Edy}}{V_{y,Rd}} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z,Rd}} = 0.087 < 1.000 \dots\dots\dots \text{O.K}$$

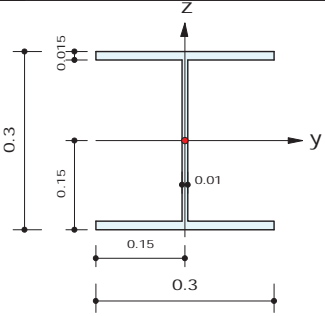
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	79
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -251.32 (LCB: 60+MY, POS:I)
Bending Moments	My = 90.5448, Mz = -1.5907
End Moments	Myi = 90.5448, Myj = 74.6601 (for Lb) Myi = 90.5448, Myj = 48.2404 (for Ly) Mzi = -1.5907, Mzj = 1.58504 (for Lz)
Shear Forces	Fyy = -7.6305 (LCB: 60-MZ, POS:1/2) Fzz = 78.6499 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Oyb	0.07324	Ozb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{\min[N_{c,Rd}, N_{b,Rd}]} = \frac{251.32}{3955.71} = 0.064 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{90.545}{449.278} = 0.202 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{1.591}{152.194} = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{byN} = \frac{N_{Ed}}{A \cdot f_y / \gamma_{M0}}, R_{byM} = \frac{M_{Edy}}{M_{y,Rd}} + \frac{M_{Edz}}{M_{z,Rd}}$$

$$R_{c,LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{c,LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = \max[R_{byN} + R_{byM}, \max(R_{c,LT1} + R_{b,LT1}, R_{c,LT2} + R_{b,LT2})] = 0.289 < 1.000 \dots \text{O.K}$$

Shear Resistance

$$\frac{V_{Edy}}{V_{y,Rd}} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z,Rd}} = 0.124 < 1.000 \dots\dots\dots \text{O.K}$$

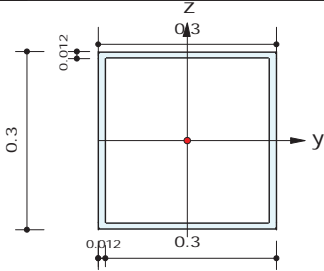
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	80
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -202.29 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 87.2054, Mz = -18.328
End Moments	Myi = 87.2054, Myj = 74.7214 (for Lb) Myi = 84.6849, Myj = 74.7214 (for Ly) Mzi = -18.328, Mzj = 24.9998 (for Lz)
Shear Forces	Fyy = -48.862 (LCB: 60-FY, POS:J) Fzz = 84.6180 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 202.29/4673.83 = 0.043 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 87.205/505.066 = 0.173 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 18.328/505.066 = 0.036 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.252 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.035 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.055 < 1.000$ O.K

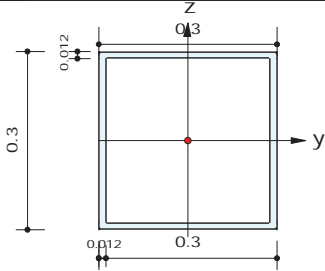
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	81
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -278.02 (LCB: 60+MY, POS:I)
Bending Moments	My = 88.8224, Mz = 0.43939
End Moments	Myi = 88.8224, Myj = 65.7424 (for Lb) Myi = 88.8224, Myj = 25.4482 (for Ly) Mzi = 0.43939, Mzj = 0.96733 (for Lz)
Shear Forces	Fyy = 19.0236 (LCB: 60+FY, POS:J) Fzz = 91.9713 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 278.02/4673.83 = 0.059 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 88.822/505.066 = 0.176 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.439/505.066 = 0.001 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.245 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.014 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.059 < 1.000$ O.K

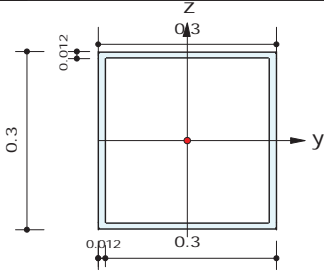
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Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	85
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -408.12 (LCB: 60+MY, POS:I)
Bending Moments	My = 71.5720, Mz = 1.03122
End Moments	Myi = 71.5720, Myj = 47.6868 (for Lb) Myi = 71.5720, Myj = 31.6400 (for Ly) Mzi = 1.03122, Mzj = 0.00465 (for Lz)
Shear Forces	Fyy = 8.01232 (LCB: 60+FY, POS:J) Fzz = 77.8612 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 408.12/4673.83 = 0.087 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 71.572/505.066 = 0.142 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.031/505.066 = 0.002 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.238 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.006 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.050 < 1.000$ O.K

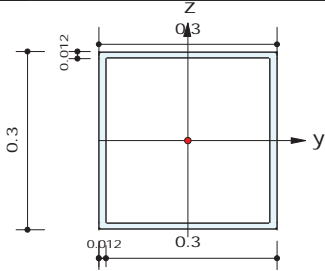
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	86
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -379.43 (LCB: 60+MY, POS:I)
Bending Moments	My = 64.1759, Mz = -0.3893
End Moments	Myi = 64.1759, Myj = 55.6251 (for Lb) Myi = 64.1759, Myj = 35.5819 (for Ly) Mzi = -0.3893, Mzj = -0.5389 (for Lz)
Shear Forces	Fyy = 14.7122 (LCB: 60-MZ, POS:J) Fzz = 69.0928 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 379.43/4673.83 = 0.081 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 64.176/505.066 = 0.127 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.389/505.066 = 0.001 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.216 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.010 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.045 < 1.000$ O.K

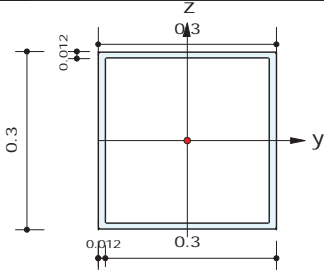
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	87
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -356.06 (LCB: 60+MY, POS:I)
Bending Moments	My = 70.1384, Mz = 0.33568
End Moments	Myi = 70.1384, Myj = 64.5713 (for Lb) Myi = 70.1384, Myj = 37.8471 (for Ly) Mzi = 0.33568, Mzj = 2.12143 (for Lz)
Shear Forces	Fyy = -10.843 (LCB: 60-FY, POS:J) Fzz = 67.2512 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 356.06/4673.83 = 0.076 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 70.138/505.066 = 0.139 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 0.336/505.066 = 0.001 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.223 < 1.000 \dots\dots\dots O.K$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.008 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.043 < 1.000 \dots\dots\dots O.K$$

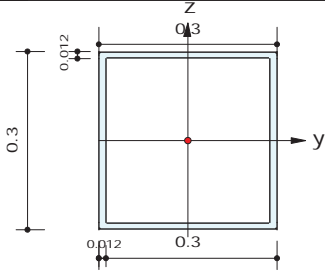
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	88
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -398.22 (LCB: 60+MY, POS:I)
Bending Moments	My = 78.2946, Mz = -0.7116
End Moments	Myi = 78.2946, Myj = 43.6956 (for Lb) Myi = 78.2946, Myj = 29.8505 (for Ly) Mzi = -0.7116, Mzj = 0.07470 (for Lz)
Shear Forces	Fyy = -14.650 (LCB: 60-FY, POS:J) Fzz = 90.0080 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 398.22/4673.83 = 0.085 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 78.295/505.066 = 0.155 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 0.712/505.066 = 0.001 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.249 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.010 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.058 < 1.000 \dots\dots\dots O.K$$

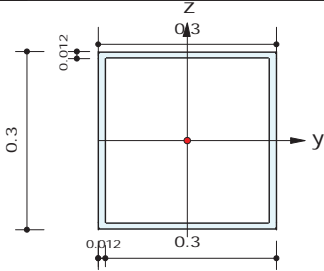
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	89
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -318.08 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 80.0426, Mz = -1.8815
End Moments	Myi = 62.9184, Myj = 80.0426 (for Lb) Myi = 62.9184, Myj = 76.3098 (for Ly) Mzi = 0.40995, Mzj = -1.8815 (for Lz)
Shear Forces	Fyy = 19.7007 (LCB: 60+MZ, POS:1/2) Fzz = 72.1452 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 318.08/4673.83 = 0.068 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 80.043/505.066 = 0.158 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 1.882/505.066 = 0.004 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$

$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$

$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$

$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$R_{max} = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.237 < 1.000$.. O.K


Shear Resistance

$V_{Edy}/V_{y,Rd} = 0.014 < 1.000$ O.K

$V_{Edz}/V_{z,Rd} = 0.046 < 1.000$ O.K

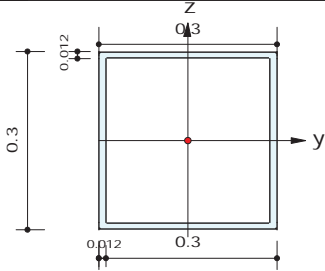
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	90
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -398.58 (LCB: 60+MY, POS:I)
Bending Moments	My = 74.2072, Mz = 0.29361
End Moments	Myi = 74.2072, Myj = 53.7798 (for Lb) Myi = 74.2072, Myj = 43.3158 (for Ly) Mzi = 0.29361, Mzj = -0.3274 (for Lz)
Shear Forces	Fyy = 10.5427 (LCB: 60-MZ, POS:J) Fzz = 74.3422 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 398.58/4673.83 = 0.085 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 74.207/505.066 = 0.147 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 0.294/505.066 = 0.001 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$

$R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$

$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y,Rd} + M_{Edz}/M_{z,Rd}$

$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$


$R_{max} = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.241 < 1.000$.. O.K

Shear Resistance

$V_{Edy}/V_{y,Rd} = 0.008 < 1.000$ O.K

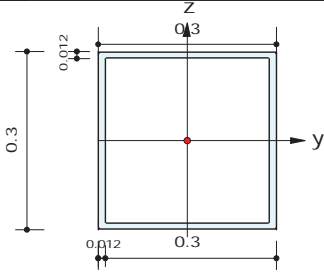
$V_{Edz}/V_{z,Rd} = 0.048 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 91
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 2.00000



2. Member Forces

Axial Force Fxx = -330.63 (LCB: 60+MY, POS:1/2)
Bending Moments My = 80.1264, Mz = -0.6755
End Moments Myi = 74.7438, Myj = 74.6624 (for Lb)
Myi = 68.9993, Myj = 74.6624 (for Ly)
Mzi = 0.03035, Mzj = -6.0504 (for Lz)
Shear Forces Fyy = -15.215 (LCB: 60-MZ, POS:1/2)
Fzz = 91.1348 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 330.63/4673.83 = 0.071 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 80.126/505.066 = 0.159 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 0.676/505.066 = 0.001 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.238 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.011 < 1.000 \dots\dots\dots O.K$$

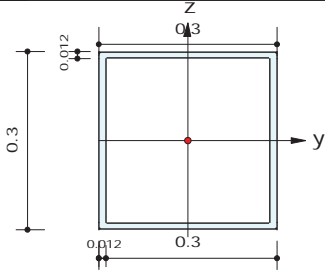
$$V_{Edz}/V_{z_Rd} = 0.059 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 92
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 2.00000



2. Member Forces

Axial Force Fxx = -412.65 (LCB: 60+MY, POS:I)
Bending Moments My = 71.5816, Mz = -0.3571
End Moments Myi = 71.5816, Myj = 43.8962 (for Lb)
Myi = 71.5816, Myj = 31.3975 (for Ly)
Mzi = -0.3571, Mzj = -0.4394 (for Lz)
Shear Forces Fyy = -18.218 (LCB: 60-FY, POS:J)
Fzz = 70.1934 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 412.65/4673.83 = 0.088 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 71.582/505.066 = 0.142 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 0.357/505.066 = 0.001 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.238 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.013 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.045 < 1.000 \dots\dots\dots O.K$$

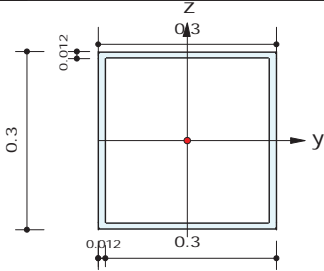
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	93
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -289.09 (LCB: 60-MZ, POS:1/2)
Bending Moments	My = 87.3059, Mz = -2.8206
End Moments	Myi = 13.1967, Myj = 60.2294 (for Lb) Myi = 63.4417, Myj = 60.2294 (for Ly) Mzi = -4.3508, Mzj = -19.233 (for Lz)
Shear Forces	Fyy = 21.2172 (LCB: 60+FY, POS:J) Fzz = 80.6960 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 289.09/4673.83 = 0.062 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 87.306/505.066 = 0.173 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 2.821/505.066 = 0.006 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$

$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$

$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$

$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.247 < 1.000$.. O.K


Shear Resistance

$V_{Edy}/V_{y_Rd} = 0.015 < 1.000$ O.K

$V_{Edz}/V_{z_Rd} = 0.052 < 1.000$ O.K

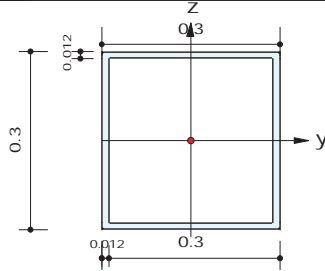
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	94
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -401.92 (LCB: 60+MY, POS:I)
Bending Moments	My = 71.1827, Mz = -0.1910
End Moments	Myi = 71.1827, Myj = 49.8226 (for Lb) Myi = 71.1827, Myj = 28.8623 (for Ly) Mzi = -0.1910, Mzj = 0.90989 (for Lz)
Shear Forces	Fyy = -11.677 (LCB: 60-FY, POS:J) Fzz = 73.7100 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 401.92/4673.83 = 0.086 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 71.183/505.066 = 0.141 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 0.191/505.066 = 0.000 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$

$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$

$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$

$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.235 < 1.000$.. O.K

Shear Resistance

$V_{Edy}/V_{y_Rd} = 0.008 < 1.000$ O.K

$V_{Edz}/V_{z_Rd} = 0.048 < 1.000$ O.K

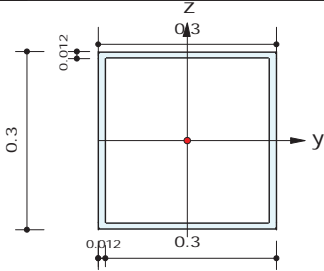
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	95
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -357.09 (LCB: 60+MY, POS:I)
Bending Moments	My = 70.3663, Mz = 1.23908
End Moments	Myi = 70.3663, Myj = 60.1742 (for Lb) Myi = 70.3663, Myj = 37.2239 (for Ly) Mzi = 1.23908, Mzj = -1.2608 (for Lz)
Shear Forces	Fyy = 11.1574 (LCB: 60-MZ, POS:J) Fzz = 84.7795 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 357.09/4673.83 = 0.076 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 70.366/505.066 = 0.139 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 1.239/505.066 = 0.002 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$

$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$

$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$

$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.225 < 1.000$.. O.K


Shear Resistance

$V_{Edy}/V_{y_Rd} = 0.008 < 1.000$ O.K

$V_{Edz}/V_{z_Rd} = 0.055 < 1.000$ O.K

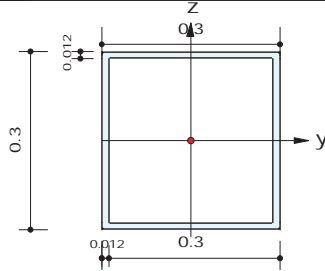
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	96
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -386.69 (LCB: 60+MY, POS:I)
Bending Moments	My = 64.0426, Mz = 0.68971
End Moments	Myi = 64.0426, Myj = 57.9897 (for Lb) Myi = 64.0426, Myj = 34.5992 (for Ly) Mzi = 0.68971, Mzj = 0.55925 (for Lz)
Shear Forces	Fyy = -8.0154 (LCB: 60-MZ, POS:1/2) Fzz = 51.9061 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 386.69/4673.83 = 0.083 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 64.043/505.066 = 0.127 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 0.690/505.066 = 0.001 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$

$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$

$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$

$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.218 < 1.000$.. O.K

Shear Resistance

$V_{Edy}/V_{y_Rd} = 0.006 < 1.000$ O.K

$V_{Edz}/V_{z_Rd} = 0.033 < 1.000$ O.K

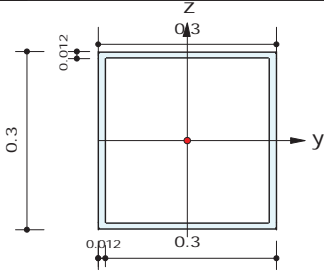
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	97
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -409.30 (LCB: 60+MY, POS:I)
Bending Moments	My = 71.8489, Mz = -0.0422
End Moments	Myi = 71.8489, Myj = 48.5834 (for Lb) Myi = 71.8489, Myj = 35.4706 (for Ly) Mzi = -0.0422, Mzj = 0.25434 (for Lz)
Shear Forces	Fyy = -8.3436 (LCB: 60-FY, POS:J) Fzz = 78.6201 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 409.30/4673.83 = 0.088 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 71.849/505.066 = 0.142 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 0.042/505.066 = 0.000 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$

$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$

$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$

$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.238 < 1.000 ..$ O.K


Shear Resistance

$V_{Edy}/V_{y_Rd} = 0.006 < 1.000$ O.K

$V_{Edz}/V_{z_Rd} = 0.051 < 1.000$ O.K

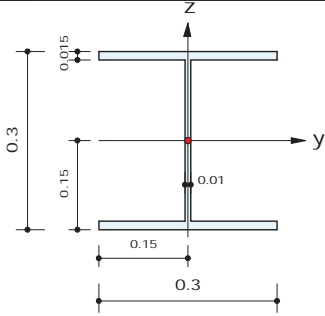
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	165
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -259.01 (LCB: 60-MY, POS:1/2)
Bending Moments	My = -19.587, Mz = 18.4441
End Moments	Myi = -19.587, Myj = -20.108 (for Lb) Myi = -2.7876, Myj = -20.108 (for Ly) Mzi = 18.4441, Mzj = -5.5072 (for Lz)
Shear Forces	Fyy = 31.7124 (LCB: 60-MZ, POS:J) Fzz = 39.9035 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 259.01/3955.71 = 0.065 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 19.587/449.278 = 0.044 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 18.444/152.194 = 0.121 < 1.000$ O.K

Combined Resistance

$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.242 < 1.000 ...$ O.K

Shear Resistance

$V_{Edy}/V_{y_Rd} = 0.018 < 1.000$ O.K

$V_{Edz}/V_{z_Rd} = 0.063 < 1.000$ O.K

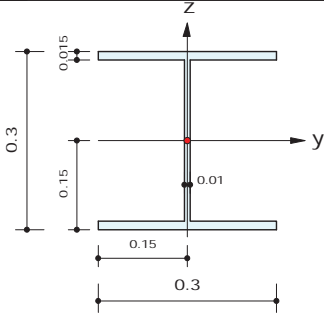
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	166
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -709.38 (LCB: 60+MX, POS:J)
Bending Moments	My = 3.88432, Mz = -2.8981
End Moments	Myi = -0.9112, Myj = 3.88432 (for Lb) Myi = 0.06256, Myj = 3.88432 (for Ly) Mzi = -2.1787, Mzj = -2.8981 (for Lz)
Shear Forces	Fyy = -1.6285 (LCB: 60-FY, POS:J) Fzz = 23.3657 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 709.38/3955.71 = 0.179 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 3.884/449.278 = 0.009 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 2.898/152.194 = 0.019 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$$

$$Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.217 < 1.000 \dots\dots\dots O.K$$


Shear Resistance

$$V_{Edy}/Vy_{Rd} = 0.001 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/Vz_{Rd} = 0.037 < 1.000 \dots\dots\dots O.K$$

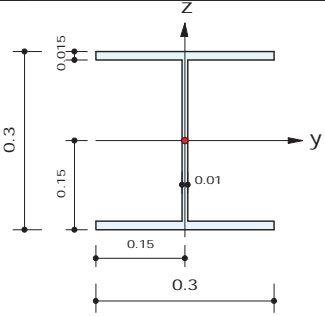
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	167
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -715.71 (LCB: 60-FX, POS:J)
Bending Moments	My = -4.4398, Mz = 0.39760
End Moments	Myi = -3.0870, Myj = -4.4398 (for Lb) Myi = -1.5870, Myj = -4.4398 (for Ly) Mzi = -0.0733, Mzj = 0.39760 (for Lz)
Shear Forces	Fyy = 1.41957 (LCB: 60+FY, POS:J) Fzz = 19.5921 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 715.71/3955.71 = 0.181 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 4.440/449.278 = 0.010 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 0.398/152.194 = 0.003 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$$

$$Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.203 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/Vy_{Rd} = 0.001 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/Vz_{Rd} = 0.031 < 1.000 \dots\dots\dots O.K$$

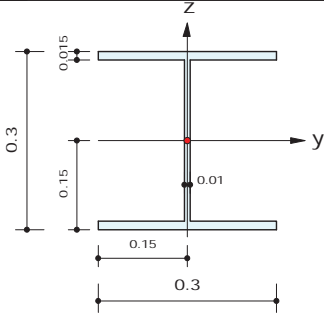
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	168
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -700.00 (LCB: 60+FY, POS:I)
Bending Moments	My = -1.7867, Mz = 0.17990
End Moments	Myi = -1.7867, Myj = -1.1759 (for Lb) Myi = -1.7867, Myj = -2.5086 (for Ly) Mzi = 0.17990, Mzj = -0.0545 (for Lz)
Shear Forces	Fyy = -0.8854 (LCB: 60-FY, POS:J) Fzz = 18.0197 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 700.00/3955.71 = 0.177 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 1.787/449.278 = 0.004 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.180/152.194 = 0.001 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.191 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.001 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.028 < 1.000$ O.K

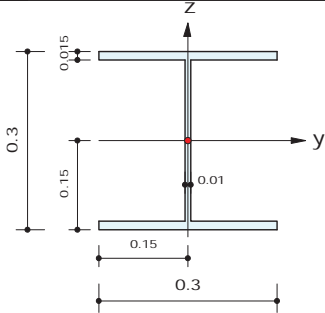
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	169
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28768



2. Member Forces

Axial Force	Fxx = -605.94 (LCB: 60-MZ, POS:I)
Bending Moments	My = 17.9246, Mz = -2.9360
End Moments	Myi = 17.9246, Myj = -3.0608 (for Lb) Myi = 17.9246, Myj = -3.0608 (for Ly) Mzi = -2.9360, Mzj = -6.6587 (for Lz)
Shear Forces	Fyy = 33.4322 (LCB: 54-MZ, POS:J) Fzz = 46.5479 (LCB: 52+MX, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28768, Lz = 0.28768, Lb = 0.28768
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 605.94/3955.71 = 0.153 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 17.925/449.278 = 0.040 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.936/152.194 = 0.019 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.222 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.019 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.074 < 1.000$ O.K

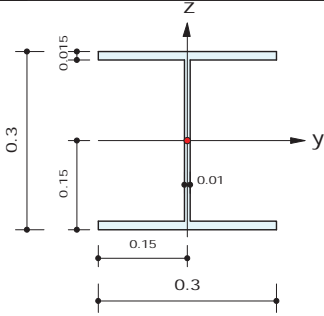
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	170
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 1.00006



2. Member Forces

Axial Force	Fxx = -729.34 (LCB: 60-FX, POS:J)
Bending Moments	My = -1.7217, Mz = 1.76199
End Moments	Myi = -0.7528, Myj = -1.7217 (for Lb) Myi = -0.7528, Myj = -1.7217 (for Ly) Mzi = -1.7977, Mzj = 1.76199 (for Lz)
Shear Forces	Fyy = -4.4069 (LCB: 60-MZ, POS:I) Fzz = -18.801 (LCB: 52-FZ, POS:I)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 1.00006, Lz = 1.00006, Lb = 1.00006
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{\min[N_{c,Rd}, N_{b,Rd}]} = \frac{729.34}{3955.71} = 0.184 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{1.722}{449.278} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{1.762}{152.194} = 0.012 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{byN} = \frac{N_{Ed}}{A \cdot f_y / \gamma_{M0}}, R_{byM} = \frac{M_{Edy}}{M_{y,Rd}} + \frac{M_{Edz}}{M_{z,Rd}}$$

$$R_{c,LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{c,LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = \max[R_{byN} + R_{byM}, \max(R_{c,LT1} + R_{b,LT1}, R_{c,LT2} + R_{b,LT2})] = 0.209 < 1.000 \dots \text{O.K}$$


Shear Resistance

$$\frac{V_{Edy}}{V_{y,Rd}} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z,Rd}} = 0.030 < 1.000 \dots\dots\dots \text{O.K}$$

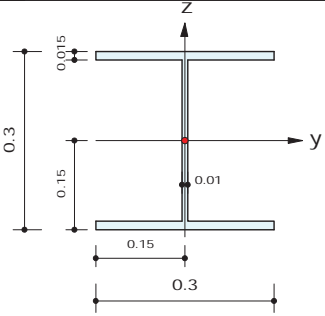
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	171
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -258.11 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 78.3569, Mz = 16.3341
End Moments	Myi = 73.7030, Myj = 79.7350 (for Lb) Myi = 73.7030, Myj = 74.4579 (for Ly) Mzi = -8.9726, Mzj = 11.6461 (for Lz)
Shear Forces	Fyy = -29.427 (LCB: 60-MZ, POS:I) Fzz = 76.9066 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{\min[N_{c,Rd}, N_{b,Rd}]} = \frac{258.11}{3955.71} = 0.065 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{78.357}{449.278} = 0.174 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{16.334}{152.194} = 0.107 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{byN} = \frac{N_{Ed}}{A \cdot f_y / \gamma_{M0}}, R_{byM} = \frac{M_{Edy}}{M_{y,Rd}} + \frac{M_{Edz}}{M_{z,Rd}}$$

$$R_{c,LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{c,LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = \max[R_{byN} + R_{byM}, \max(R_{c,LT1} + R_{b,LT1}, R_{c,LT2} + R_{b,LT2})] = 0.365 < 1.000 \dots \text{O.K}$$

Shear Resistance

$$\frac{V_{Edy}}{V_{y,Rd}} = 0.017 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z,Rd}} = 0.122 < 1.000 \dots\dots\dots \text{O.K}$$

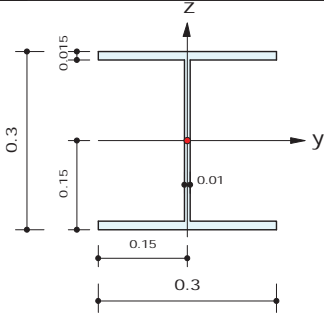
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	172
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -33.065 (LCB: 54-MZ, POS:1/2)
Bending Moments	My = 88.6014, Mz = -16.778
End Moments	Myi = 88.6014, Myj = -58.017 (for Lb) Myi = 20.5153, Myj = -58.017 (for Ly) Mzi = -16.778, Mzj = -3.6735 (for Lz)
Shear Forces	Fyy = -26.486 (LCB: 60-MZ, POS:1/2) Fzz = 83.1296 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Oyb	0.07324	Ozb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{MIN[Nc_{Rd}, Nb_{Rd}]} = \frac{33.06}{3955.71} = 0.008 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{88.601}{449.278} = 0.197 < 1.000 \dots\dots\dots O.K$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{16.778}{152.194} = 0.110 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.byN = \frac{N_{Ed}}{(A \cdot f_y / \gamma_{M0})}, R.byM = \frac{M_{Edy}}{M_{yRd}} + \frac{M_{Edz}}{M_{zRd}}$$

$$Rc.LT1 = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$Rb.LT1 = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$Rc.LT2 = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$Rb.LT2 = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = MAX[R.byN + R.byM, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.331 < 1.000 \dots O.K$$


Shear Resistance

$$\frac{V_{Edy}}{V_{yRd}} = 0.015 < 1.000 \dots\dots\dots O.K$$

$$\frac{V_{Edz}}{V_{zRd}} = 0.131 < 1.000 \dots\dots\dots O.K$$

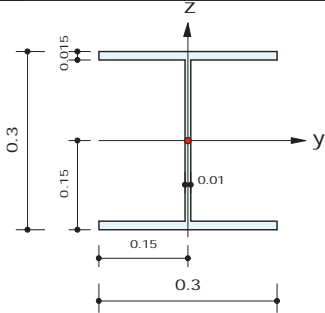
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	173
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -200.55 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 91.8757, Mz = 15.2880
End Moments	Myi = 85.6216, Myj = 94.2049 (for Lb) Myi = 85.6216, Myj = 89.5928 (for Ly) Mzi = -9.9783, Mzj = 12.8933 (for Lz)
Shear Forces	Fyy = -10.647 (LCB: 60-FY, POS:1/2) Fzz = 66.6145 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Oyb	0.07324	Ozb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{MIN[Nc_{Rd}, Nb_{Rd}]} = \frac{200.55}{3955.71} = 0.051 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{91.876}{449.278} = 0.204 < 1.000 \dots\dots\dots O.K$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{15.288}{152.194} = 0.100 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.byN = \frac{N_{Ed}}{(A \cdot f_y / \gamma_{M0})}, R.byM = \frac{M_{Edy}}{M_{yRd}} + \frac{M_{Edz}}{M_{zRd}}$$

$$Rc.LT1 = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$Rb.LT1 = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$Rc.LT2 = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$Rb.LT2 = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = MAX[R.byN + R.byM, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.374 < 1.000 \dots O.K$$

Shear Resistance

$$\frac{V_{Edy}}{V_{yRd}} = 0.019 < 1.000 \dots\dots\dots O.K$$

$$\frac{V_{Edz}}{V_{zRd}} = 0.105 < 1.000 \dots\dots\dots O.K$$

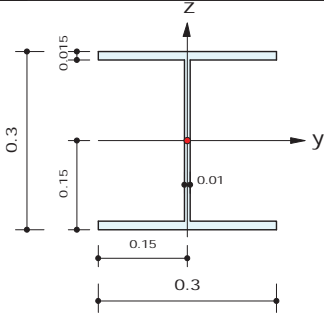
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	174
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -0.2147 (LCB: 54-MX, POS:1/2)
Bending Moments	My = 97.9180, Mz = -16.551
End Moments	Myi = 43.1242, Myj = 13.7481 (for Lb) Myi = 43.1242, Myj = 69.3919 (for Ly) Mzi = -6.0356, Mzj = 5.51003 (for Lz)
Shear Forces	Fyy = 27.9305 (LCB: 60+MZ, POS:I) Fzz = 91.1834 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 0.21/3955.71 = 0.000 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 97.918/449.278 = 0.218 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 16.551/152.194 = 0.109 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.342 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.016 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.144 < 1.000$ O.K

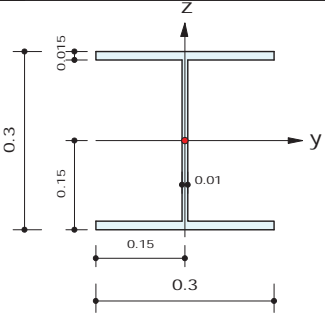
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	175
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -211.19 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 98.1490, Mz = 11.2696
End Moments	Myi = 89.6935, Myj = 98.1490 (for Lb) Myi = 89.6935, Myj = 93.6576 (for Ly) Mzi = -9.0029, Mzj = 11.2696 (for Lz)
Shear Forces	Fyy = -28.130 (LCB: 60-MZ, POS:I) Fzz = 57.8574 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 211.19/3955.71 = 0.053 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 98.149/449.278 = 0.218 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 11.270/152.194 = 0.074 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.363 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.016 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.091 < 1.000$ O.K

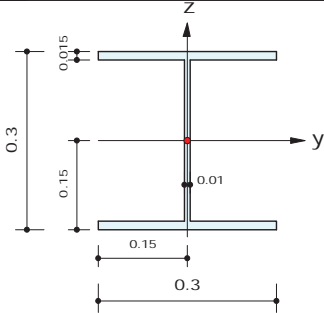
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	176
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -241.71 (LCB: 60+MY, POS:I)
Bending Moments	My = 90.2251, Mz = -8.5066
End Moments	Myi = 90.2251, Myj = 83.4317 (for Lb) Myi = 90.2251, Myj = 76.5698 (for Ly) Mzi = -8.5066, Mzj = -12.880 (for Lz)
Shear Forces	Fyy = -24.987 (LCB: 60-MZ, POS:I) Fzz = 93.3257 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 241.71/3955.71 = 0.061 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 90.225/449.278 = 0.201 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.507/152.194 = 0.056 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.334 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.014 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.148 < 1.000$ O.K

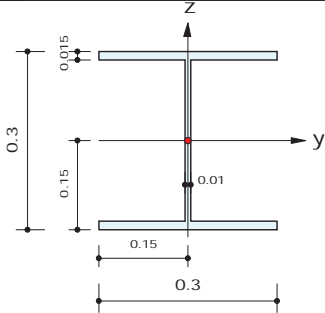
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	177
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -211.01 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 97.4779, Mz = 8.91652
End Moments	Myi = 90.2432, Myj = 97.4779 (for Lb) Myi = 90.2432, Myj = 91.4494 (for Ly) Mzi = -7.6294, Mzj = 8.91652 (for Lz)
Shear Forces	Fyy = -21.872 (LCB: 60-MZ, POS:I) Fzz = 54.9505 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 211.01/3955.71 = 0.053 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 97.478/449.278 = 0.217 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.917/152.194 = 0.059 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.345 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.012 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.087 < 1.000$ O.K

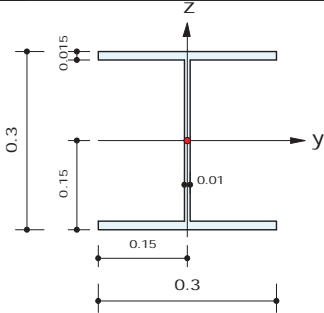
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	178
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -244.12 (LCB: 60+MY, POS:I)
Bending Moments	My = 91.0888, Mz = -7.8971
End Moments	Myi = 91.0888, Myj = 79.6070 (for Lb) Myi = 91.0888, Myj = 69.3180 (for Ly) Mzi = -7.8971, Mzj = -4.2370 (for Lz)
Shear Forces	Fyy = -21.614 (LCB: 60-MZ, POS:I) Fzz = 91.8169 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 244.12/3955.71 = 0.062 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 91.089/449.278 = 0.203 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 7.897/152.194 = 0.052 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.332 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.012 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.145 < 1.000$ O.K

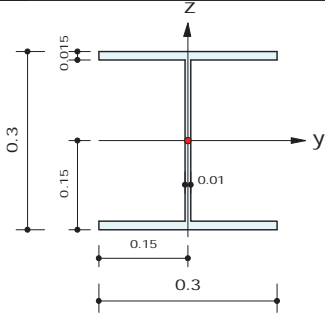
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	179
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -224.75 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 91.2468, Mz = 6.49647
End Moments	Myi = 88.5199, Myj = 80.5338 (for Lb) Myi = 87.3306, Myj = 80.5338 (for Ly) Mzi = 2.99412, Mzj = -0.6503 (for Lz)
Shear Forces	Fyy = -11.966 (LCB: 60-FY, POS:1/2) Fzz = 57.1611 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597


3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

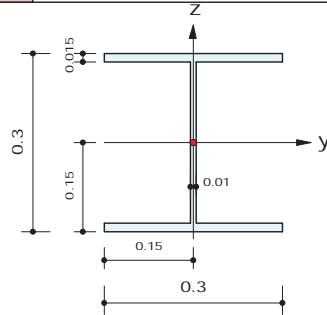
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 224.75/3955.71 = 0.057 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 91.247/449.278 = 0.203 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 6.496/152.194 = 0.043 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.318 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.009 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.090 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 180
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Transv_H300_Met (No:30)
(Built-up Section).
Member Length : 2.00000



2. Member Forces

Axial Force Fxx = -251.45 (LCB: 60+MY, POS:I)
Bending Moments My = 88.2603, Mz = -7.0214
End Moments Myi = 88.2603, Myj = 75.3765 (for Lb)
Myi = 88.2603, Myj = 59.0948 (for Ly)
Mzi = -7.0214, Mzj = 3.47728 (for Lz)
Shear Forces Fyy = -19.134 (LCB: 60-MZ, POS:I)
Fzz = 82.8955 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 251.45/3955.71 = 0.064 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 88.260/449.278 = 0.196 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 7.021/152.194 = 0.046 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{byN} = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R_{byM} = M_{Edy}/M_{yRd} + M_{Edz}/M_{zRd}$$

$$R_{c.LT1} = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$R_{b.LT1} = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{elz} \cdot f_y / \gamma_{M1})$$

$$R_{c.LT2} = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$R_{b.LT2} = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{elz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R_{byN} + R_{byM}, MAX(R_{c.LT1} + R_{b.LT1}, R_{c.LT2} + R_{b.LT2})] = 0.322 < 1.000 \dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{yRd} = 0.011 < 1.000 \dots\dots\dots \text{O.K}$$

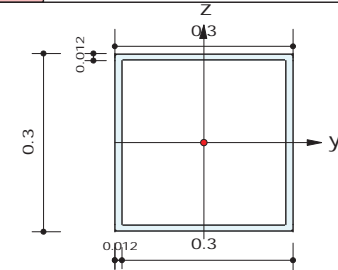
$$V_{Edz}/V_{zRd} = 0.131 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 181
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 2.00000



2. Member Forces

Axial Force Fxx = -129.15 (LCB: 54+MY, POS:I)
Bending Moments My = 96.8618, Mz = -1.3235
End Moments Myi = 96.8618, Myj = 81.8232 (for Lb)
Myi = 96.8618, Myj = 40.5640 (for Ly)
Mzi = -1.3235, Mzj = 0.59380 (for Lz)
Shear Forces Fyy = 25.4448 (LCB: 60+FY, POS:J)
Fzz = 86.1425 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 129.15/4673.83 = 0.028 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 96.862/505.066 = 0.192 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 1.324/505.066 = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{MNRd} = MAX[M_{Edy}/M_{nyRd}, M_{Edz}/M_{nzRd}]$$

$$R_{BiM} = (M_{Edy}/M_{nyRd})^\alpha + (M_{Edz}/M_{nzRd})^\beta$$

$$R_{byN} = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R_{byM} = M_{Edy}/M_{yRd} + M_{Edz}/M_{zRd}$$

$$R_{c.LT1} = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$R_{b.LT1} = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{c.LT2} = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$R_{b.LT2} = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R_{MNRd}, R_{BiM}, (R_{byN} + R_{byM}), MAX(R_{c.LT1} + R_{b.LT1}, R_{c.LT2} + R_{b.LT2})] = 0.230 < 1.000 \dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{yRd} = 0.018 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{zRd} = 0.056 < 1.000 \dots\dots\dots \text{O.K}$$

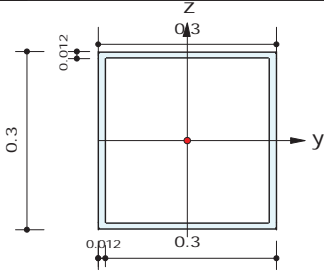
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	182
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -273.86 (LCB: 60+MY, POS:I)
Bending Moments	My = 83.6380, Mz = -3.9281
End Moments	Myi = 83.6380, Myj = 71.5870 (for Lb) Myi = 83.6380, Myj = 43.6244 (for Ly) Mzi = -3.9281, Mzj = 6.36052 (for Lz)
Shear Forces	Fyy = -51.029 (LCB: 60-FY, POS:J) Fzz = 88.4016 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 273.86/4673.83 = 0.059 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 83.638/505.066 = 0.166 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 3.928/505.066 = 0.008 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.237 < 1.000 \dots\dots\dots O.K$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.036 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.057 < 1.000 \dots\dots\dots O.K$$

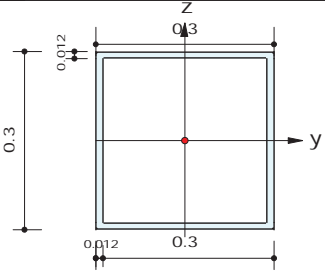
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	184
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -358.19 (LCB: 60+MY, POS:I)
Bending Moments	My = 68.5911, Mz = 0.18258
End Moments	Myi = 68.5911, Myj = 64.4520 (for Lb) Myi = 68.5911, Myj = 39.1421 (for Ly) Mzi = 0.18258, Mzj = -1.1753 (for Lz)
Shear Forces	Fyy = 9.58847 (LCB: 54-MZ, POS:J) Fzz = 66.2779 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 358.19/4673.83 = 0.077 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 68.591/505.066 = 0.136 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 0.183/505.066 = 0.000 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.220 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.007 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.043 < 1.000 \dots\dots\dots O.K$$

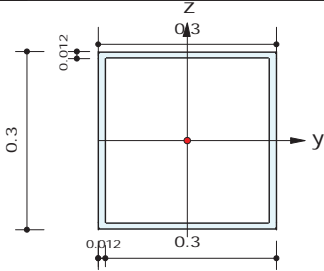
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	185
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -378.60 (LCB: 60+MY, POS:I)
Bending Moments	My = 64.5695, Mz = -0.6848
End Moments	Myi = 64.5695, Myj = 59.5337 (for Lb) Myi = 64.5695, Myj = 43.6591 (for Ly) Mzi = -0.6848, Mzj = -0.1851 (for Lz)
Shear Forces	Fyy = -12.290 (LCB: 54-FY, POS:J) Fzz = 71.8132 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 378.60/4673.83 = 0.081 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 64.569/505.066 = 0.128 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.685/505.066 = 0.001 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.217 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.009 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.046 < 1.000$ O.K

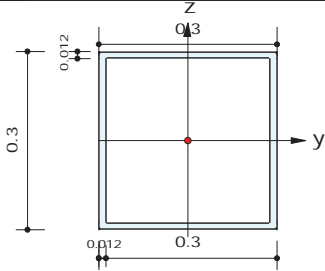
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	253
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -239.15 (LCB: 60-FZ, POS:J)
Bending Moments	My = 75.5645, Mz = -27.496
End Moments	Myi = 71.1248, Myj = 75.5645 (for Lb) Myi = 78.9834, Myj = 75.5645 (for Ly) Mzi = 16.7351, Mzj = -27.496 (for Lz)
Shear Forces	Fyy = 50.1394 (LCB: 60-MZ, POS:J) Fzz = 84.6232 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 239.15/4673.83 = 0.051 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 75.565/505.066 = 0.150 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 27.496/505.066 = 0.054 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.255 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.036 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.055 < 1.000$ O.K

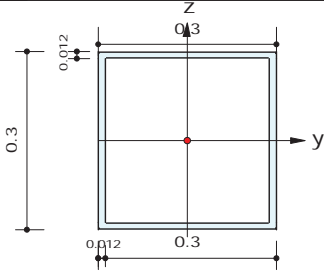
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Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	254
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -279.09 (LCB: 60+MY, POS:I)
Bending Moments	My = 89.8154, Mz = 1.05357
End Moments	Myi = 89.8154, Myj = 66.1019 (for Lb) Myi = 89.8154, Myj = 25.7973 (for Ly) Mzi = 1.05357, Mzj = 0.02931 (for Lz)
Shear Forces	Fyy = -18.066 (LCB: 60-FY, POS:J) Fzz = 92.9109 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 279.09/4673.83 = 0.060 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 89.815/505.066 = 0.178 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 1.054/505.066 = 0.002 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$

$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$

$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$

$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.248 < 1.000 ..$ O.K


Shear Resistance

$V_{Edy}/V_{y_Rd} = 0.013 < 1.000$ O.K

$V_{Edz}/V_{z_Rd} = 0.060 < 1.000$ O.K

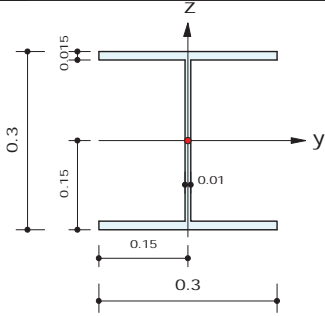
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	255
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -198.53 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 95.2006, Mz = -2.9768
End Moments	Myi = 88.4807, Myj = 95.2006 (for Lb) Myi = 88.4807, Myj = 86.3349 (for Ly) Mzi = 2.05959, Mzj = -2.9768 (for Lz)
Shear Forces	Fyy = -8.6934 (LCB: 54-MZ, POS:3/4) Fzz = 54.5952 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 198.53/3955.71 = 0.050 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 95.201/449.278 = 0.212 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 2.977/152.194 = 0.020 < 1.000$ O.K

Combined Resistance

$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.296 < 1.000 ...$ O.K

Shear Resistance

$V_{Edy}/V_{y_Rd} = 0.005 < 1.000$ O.K

$V_{Edz}/V_{z_Rd} = 0.086 < 1.000$ O.K

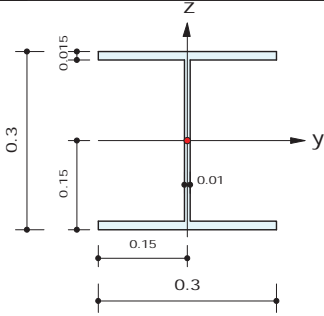
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	256
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -249.15 (LCB: 60+MY, POS:I)
Bending Moments	My = 91.8076, Mz = 2.31101
End Moments	Myi = 91.8076, Myj = 75.0846 (for Lb) Myi = 91.8076, Myj = 48.6085 (for Ly) Mzi = 2.31101, Mzj = -1.3609 (for Lz)
Shear Forces	Fyy = 8.44102 (LCB: 60-MZ, POS:J) Fzz = 79.4352 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 249.15/3955.71 = 0.063 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 91.808/449.278 = 0.204 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.311/152.194 = 0.015 < 1.000$ O.K
Combined Resistance	$R.byN = N_{Ed}/(A*fy/\gamma M0)$, $R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN + R.byM, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.297 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.005 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.126 < 1.000$ O.K

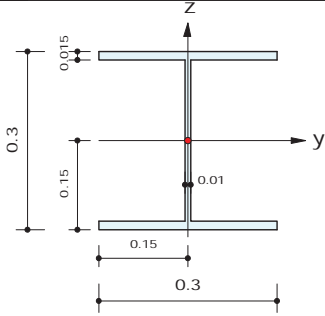
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	257
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -189.66 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 98.3935, Mz = -0.6833
End Moments	Myi = 90.7533, Myj = 98.3935 (for Lb) Myi = 90.7533, Myj = 90.8322 (for Ly) Mzi = 0.33556, Mzj = -0.6833 (for Lz)
Shear Forces	Fyy = -2.9361 (LCB: 54-FY, POS:J) Fzz = 48.9606 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 189.66/3955.71 = 0.048 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 98.393/449.278 = 0.219 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.683/152.194 = 0.004 < 1.000$ O.K
Combined Resistance	$R.byN = N_{Ed}/(A*fy/\gamma M0)$, $R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN + R.byM, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.285 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.002 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.077 < 1.000$ O.K

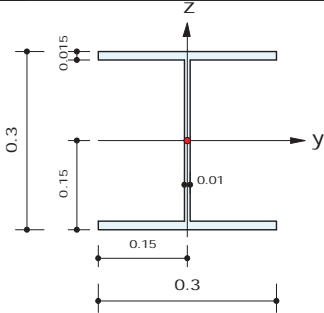
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	258
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -244.20 (LCB: 60+MY, POS:I)
Bending Moments	My = 93.9441, Mz = 0.78642
End Moments	Myi = 93.9441, Myj = 76.8157 (for Lb) Myi = 93.9441, Myj = 51.9509 (for Ly) Mzi = 0.78642, Mzj = -0.2320 (for Lz)
Shear Forces	Fyy = 3.35590 (LCB: 60-MZ, POS:J) Fzz = 85.9285 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 244.20/3955.71 = 0.062 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 93.944/449.278 = 0.209 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 0.786/152.194 = 0.005 < 1.000$ O.K

Combined Resistance

$R_{byN} = N_{Ed}/(A*fy/\gamma M0), R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.290 < 1.000$... O.K


Shear Resistance

$V_{Edy}/Vy_{Rd} = 0.002 < 1.000$ O.K

$V_{Edz}/Vz_{Rd} = 0.136 < 1.000$ O.K

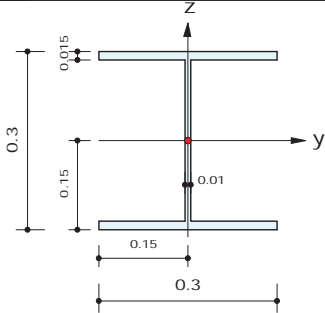
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	259
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -192.22 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 97.3650, Mz = 1.12649
End Moments	Myi = 90.4017, Myj = 97.3650 (for Lb) Myi = 90.4017, Myj = 89.3657 (for Ly) Mzi = -1.3708, Mzj = 1.12649 (for Lz)
Shear Forces	Fyy = -3.2688 (LCB: 60-MZ, POS:I) Fzz = 48.6640 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 192.22/3955.71 = 0.049 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 97.365/449.278 = 0.217 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 1.126/152.194 = 0.007 < 1.000$ O.K

Combined Resistance

$R_{byN} = N_{Ed}/(A*fy/\gamma M0), R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.286 < 1.000$... O.K

Shear Resistance

$V_{Edy}/Vy_{Rd} = 0.002 < 1.000$ O.K

$V_{Edz}/Vz_{Rd} = 0.077 < 1.000$ O.K

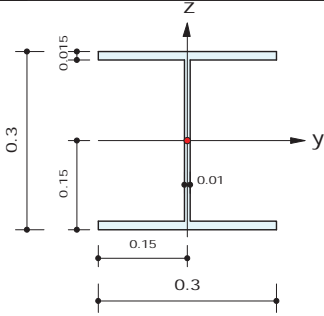
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	260
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -245.06 (LCB: 60+MY, POS:I)
Bending Moments	My = 93.4457, Mz = -0.7848
End Moments	Myi = 93.4457, Myj = 76.5734 (for Lb) Myi = 93.4457, Myj = 52.4166 (for Ly) Mzi = -0.7848, Mzj = 1.00181 (for Lz)
Shear Forces	Fyy = 3.31810 (LCB: 60+MZ, POS:I) Fzz = 85.6542 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 245.06/3955.71 = 0.062 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 93.446/449.278 = 0.208 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.785/152.194 = 0.005 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.289 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.002 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.135 < 1.000$ O.K

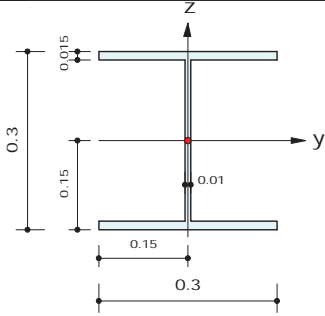
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	261
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -211.14 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 91.1433, Mz = 2.89930
End Moments	Myi = 87.2207, Myj = 91.1433 (for Lb) Myi = 87.2207, Myj = 79.4335 (for Ly) Mzi = -2.7187, Mzj = 2.89930 (for Lz)
Shear Forces	Fyy = 8.56296 (LCB: 60-MZ, POS:J) Fzz = 53.6201 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597


3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

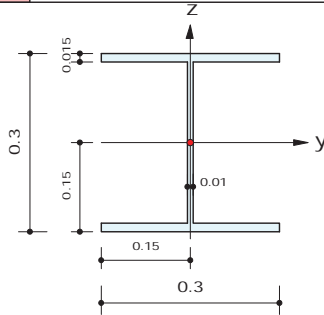
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 211.14/3955.71 = 0.053 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 91.143/449.278 = 0.203 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.899/152.194 = 0.019 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.289 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.005 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.085 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 262
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Transv_H300_Met (No:30)
(Built-up Section).
Member Length : 2.00000



2. Member Forces

Axial Force Fxx = -251.80 (LCB: 60+MY, POS:I)
Bending Moments My = 89.7277, Mz = -1.8807
End Moments Myi = 89.7277, Myj = 75.5627 (for Lb)
Myi = 89.7277, Myj = 50.8951 (for Ly)
Mzi = -1.8807, Mzj = 1.75206 (for Lz)
Shear Forces Fyy = -8.2056 (LCB: 60-FY, POS:J)
Fzz = 78.3962 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597


3. Design Parameters

Unbraced Lengths Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

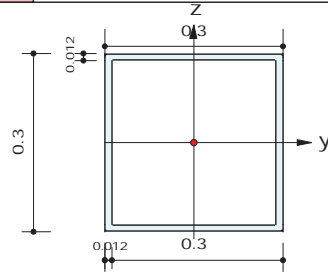
Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 251.80/3955.71 = 0.064 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 89.728/449.278 = 0.200 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 1.881/152.194 = 0.012 < 1.000$ O.K
Combined Resistance
R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$
Rc.LT1 = $N_{Ed}/(\chi y * A * fy / \gamma M1)$
Rb.LT1 = $(kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$
Rc.LT2 = $N_{Ed} / (\chi z * A * fy / \gamma M1)$
Rb.LT2 = $(Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$
 $Rmax = MAX[R.byN + R.byM, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.289 < 1.000$... O.K
Shear Resistance
 $V_{Edy}/Vy_{Rd} = 0.005 < 1.000$ O.K
 $V_{Edz}/Vz_{Rd} = 0.124 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 263
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 2.00000



2. Member Forces

Axial Force Fxx = -119.35 (LCB: 54+MY, POS:I)
Bending Moments My = 94.8440, Mz = -3.4582
End Moments Myi = 94.8440, Myj = 81.0470 (for Lb)
Myi = 94.8440, Myj = 39.2523 (for Ly)
Mzi = -3.4582, Mzj = 2.07227 (for Lz)
Shear Forces Fyy = -49.136 (LCB: 60-FY, POS:J)
Fzz = 84.4854 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 119.35/4673.83 = 0.026 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 94.844/505.066 = 0.188 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 3.458/505.066 = 0.007 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_{Edy}/Mny_{Rd} , M_{Edz}/Mnz_{Rd}]
R.BiM = $(M_{Edy}/Mny_{Rd})^\alpha + (M_{Edz}/Mnz_{Rd})^\beta$
R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$
Rc.LT1 = $N_{Ed}/(\chi y * A * fy / \gamma M1)$
Rb.LT1 = $(kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$
Rc.LT2 = $N_{Ed} / (\chi z * A * fy / \gamma M1)$
Rb.LT2 = $(Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$
 $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.227 < 1.000$.. O.K
Shear Resistance
 $V_{Edy}/Vy_{Rd} = 0.035 < 1.000$ O.K
 $V_{Edz}/Vz_{Rd} = 0.054 < 1.000$ O.K

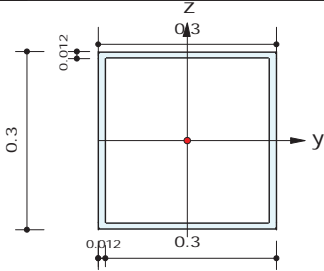
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	264
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -269.16 (LCB: 60+MY, POS:I)
Bending Moments	My = 85.2903, Mz = -0.2257
End Moments	Myi = 85.2903, Myj = 73.0806 (for Lb) Myi = 85.2903, Myj = 42.5094 (for Ly) Mzi = -0.2257, Mzj = 1.66926 (for Lz)
Shear Forces	Fyy = 20.1588 (LCB: 55-MZ, POS:J) Fzz = 86.0031 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 269.16/4673.83 = 0.058 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 85.290/505.066 = 0.169 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.226/505.066 = 0.000 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.235 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.014 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.055 < 1.000$ O.K

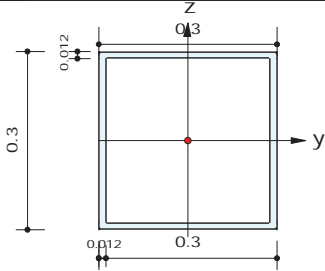
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	273
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -367.28 (LCB: 60+MY, POS:I)
Bending Moments	My = 70.8363, Mz = -1.9896
End Moments	Myi = 70.8363, Myj = 59.6099 (for Lb) Myi = 70.8363, Myj = 36.0806 (for Ly) Mzi = -1.9896, Mzj = 0.21325 (for Lz)
Shear Forces	Fyy = -16.350 (LCB: 60-FY, POS:J) Fzz = 83.0535 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768


3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

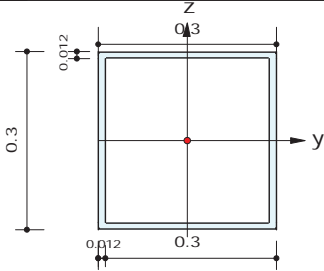
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 367.28/4673.83 = 0.079 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 70.836/505.066 = 0.140 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.990/505.066 = 0.004 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.229 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.012 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.054 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 274
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 2.00000



2. Member Forces

Axial Force Fxx = -343.89 (LCB: 60+MY, POS:1/2)
Bending Moments My = 74.2087, Mz = -1.0765
End Moments Myi = 68.8962, Myj = 61.2805 (for Lb)
Myi = 66.6580, Myj = 61.2805 (for Ly)
Mzi = 1.08404, Mzj = -5.6366 (for Lz)
Shear Forces Fyy = -10.677 (LCB: 60-FY, POS:J)
Fzz = 78.5780 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 343.89/4673.83 = 0.074 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 74.209/505.066 = 0.147 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 1.077/505.066 = 0.002 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.230 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.008 < 1.000 \dots\dots\dots \text{O.K}$$

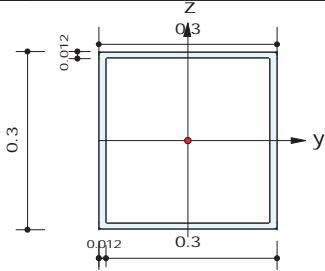
$$V_{Edz}/V_{z_Rd} = 0.051 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 275
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 2.00000



2. Member Forces

Axial Force Fxx = -372.55 (LCB: 60+MY, POS:1/4)
Bending Moments My = 65.4606, Mz = -0.4631
End Moments Myi = 65.2395, Myj = 60.7039 (for Lb)
Myi = 65.2395, Myj = 45.7807 (for Ly)
Mzi = -0.0650, Mzj = -0.8477 (for Lz)
Shear Forces Fyy = 12.2145 (LCB: 54-MZ, POS:J)
Fzz = 74.3163 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 372.55/4673.83 = 0.080 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 65.461/505.066 = 0.130 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 0.463/505.066 = 0.001 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.217 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.009 < 1.000 \dots\dots\dots \text{O.K}$$

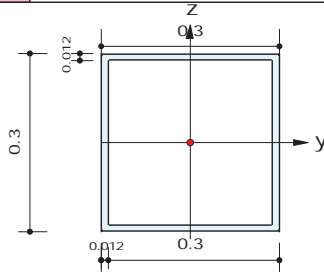
$$V_{Edz}/V_{z_Rd} = 0.048 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 277
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 2.00000



2. Member Forces

Axial Force Fxx = -123.82 (LCB: 54+MY, POS:I)
Bending Moments My = 97.2629, Mz = -0.0202
End Moments Myi = 97.2629, Myj = 83.1017 (for Lb)
Myi = 97.2629, Myj = 42.4419 (for Ly)
Mzi = -0.0202, Mzj = -1.6289 (for Lz)
Shear Forces Fyy = -28.182 (LCB: 60-FY, POS:J)
Fzz = 85.6003 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

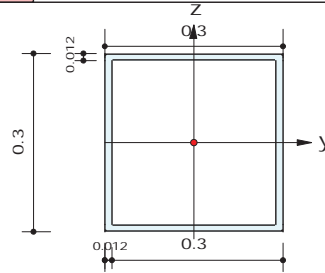
Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 123.82/4673.83 = 0.026 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 97.263/505.066 = 0.193 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 0.020/505.066 = 0.000 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rc.LT1 = N_Ed/(xy*A*fy/γM1)
Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1)
Rc.LT2 = N_Ed/(xz*A*fy/γM1)
Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1)
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.228 < 1.000 .. O.K
Shear Resistance
V_Edy/Vy_Rd = 0.020 < 1.000 O.K
V_Edz/Vz_Rd = 0.055 < 1.000 O.K

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 278
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 2.00000



2. Member Forces

Axial Force Fxx = -268.43 (LCB: 60+MY, POS:I)
Bending Moments My = 84.4614, Mz = 5.09066
End Moments Myi = 84.4614, Myj = 71.6155 (for Lb)
Myi = 84.4614, Myj = 44.1738 (for Ly)
Mzi = 5.09066, Mzj = -5.4766 (for Lz)
Shear Forces Fyy = 50.6677 (LCB: 60-MZ, POS:J)
Fzz = 88.2665 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 268.43/4673.83 = 0.057 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 84.461/505.066 = 0.167 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 5.091/505.066 = 0.010 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rc.LT1 = N_Ed/(xy*A*fy/γM1)
Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1)
Rc.LT2 = N_Ed/(xz*A*fy/γM1)
Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1)
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.239 < 1.000 .. O.K
Shear Resistance
V_Edy/Vy_Rd = 0.036 < 1.000 O.K
V_Edz/Vz_Rd = 0.057 < 1.000 O.K

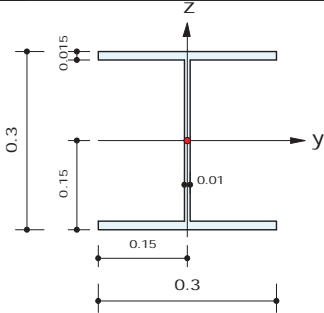
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	279
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -221.24 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 93.1454, Mz = -6.2119
End Moments	Myi = 90.4567, Myj = 84.0005 (for Lb) Myi = 88.0236, Myj = 84.0005 (for Ly) Mzi = -2.1143, Mzj = -0.1623 (for Lz)
Shear Forces	Fyy = 12.8532 (LCB: 60+FY, POS:1/2) Fzz = 54.8792 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 221.24/3955.71 = 0.056 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 93.145/449.278 = 0.207 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 6.212/152.194 = 0.041 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.319 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.009 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.087 < 1.000$ O.K

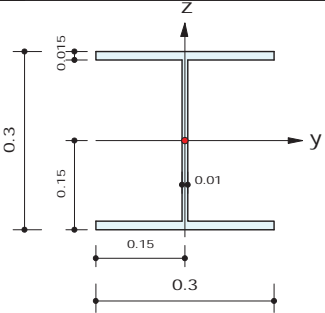
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	280
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -250.61 (LCB: 60+MY, POS:I)
Bending Moments	My = 89.1606, Mz = 6.93433
End Moments	Myi = 89.1606, Myj = 74.9773 (for Lb) Myi = 89.1606, Myj = 57.5152 (for Ly) Mzi = 6.93433, Mzj = -8.3960 (for Lz)
Shear Forces	Fyy = -16.887 (LCB: 60-MZ, POS:1/2) Fzz = 83.6564 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 250.61/3955.71 = 0.063 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 89.161/449.278 = 0.198 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 6.934/152.194 = 0.046 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.323 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.010 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.132 < 1.000$ O.K

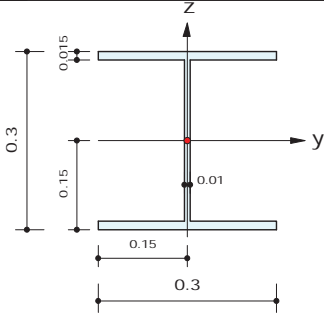
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	281
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -204.87 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 100.150, Mz = -8.9585
End Moments	Myi = 97.1262, Myj = 95.8098 (for Lb) Myi = 91.1563, Myj = 95.8098 (for Ly) Mzi = -7.2224, Mzj = 2.24372 (for Lz)
Shear Forces	Fyy = -12.909 (LCB: 60-MZ, POS:1/2) Fzz = 51.6566 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 204.87/3955.71 = 0.052 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 100.150/449.278 = 0.223 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 8.958/152.194 = 0.059 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$$

$$Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.350 < 1.000 \dots O.K$$


Shear Resistance

$$V_{Edy}/Vy_{Rd} = 0.012 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/Vz_{Rd} = 0.082 < 1.000 \dots\dots\dots O.K$$

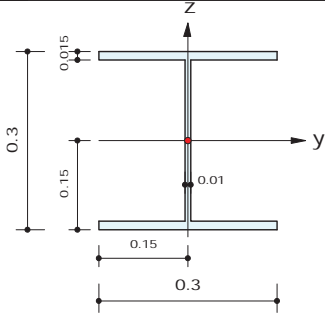
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	282
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -241.69 (LCB: 60+MY, POS:I)
Bending Moments	My = 92.5595, Mz = 7.96282
End Moments	Myi = 92.5595, Myj = 76.9231 (for Lb) Myi = 92.5595, Myj = 65.1725 (for Ly) Mzi = 7.96282, Mzj = 4.27148 (for Lz)
Shear Forces	Fyy = -14.731 (LCB: 60-MZ, POS:1/2) Fzz = 92.7301 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 241.69/3955.71 = 0.061 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 92.559/449.278 = 0.206 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 7.963/152.194 = 0.052 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$$

$$Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.336 < 1.000 \dots O.K$$

Shear Resistance

$$V_{Edy}/Vy_{Rd} = 0.013 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/Vz_{Rd} = 0.147 < 1.000 \dots\dots\dots O.K$$

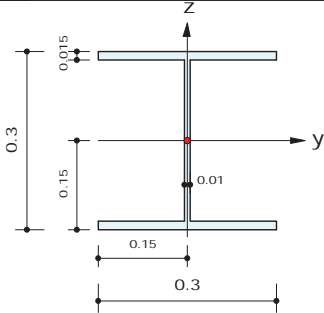
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	283
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -200.04 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 101.403, Mz = -12.293
End Moments	Myi = 98.6518, Myj = 98.9051 (for Lb) Myi = 90.7980, Myj = 98.9051 (for Ly) Mzi = -13.409, Mzj = 5.12911 (for Lz)
Shear Forces	Fyy = -23.229 (LCB: 60-MZ, POS:1/2) Fzz = 54.1593 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 200.04/3955.71 = 0.051 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 101.403/449.278 = 0.226 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 12.293/152.194 = 0.081 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.375 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.017 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.086 < 1.000$ O.K

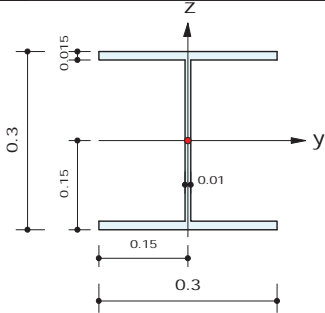
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	284
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -234.29 (LCB: 60+MY, POS:I)
Bending Moments	My = 92.5327, Mz = 8.78807
End Moments	Myi = 92.5327, Myj = 77.2416 (for Lb) Myi = 92.5327, Myj = 69.0850 (for Ly) Mzi = 8.78807, Mzj = 7.42180 (for Lz)
Shear Forces	Fyy = 25.8357 (LCB: 60+MZ, POS:I) Fzz = 94.0128 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597


3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

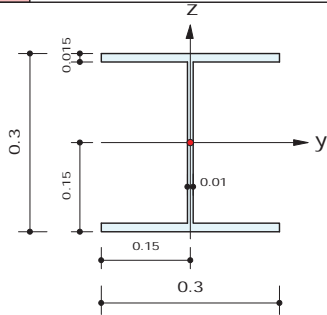
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 234.29/3955.71 = 0.059 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 92.533/449.278 = 0.206 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.788/152.194 = 0.058 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.339 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.015 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.149 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	285
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -183.91 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 97.0089, Mz = -17.649
End Moments	Myi = 97.0089, Myj = 95.7050 (for Lb) Myi = 89.7021, Myj = 95.7050 (for Ly) Mzi = -17.649, Mzj = 6.85283 (for Lz)
Shear Forces	Fyy = -31.536 (LCB: 60-MZ, POS:1/2) Fzz = 61.0283 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597


3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

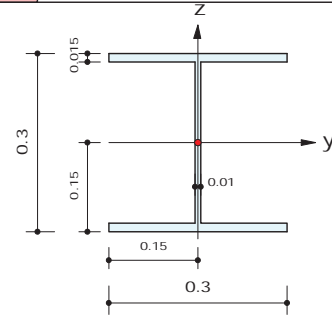
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 183.91/3955.71 = 0.046 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 97.009/449.278 = 0.216 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 17.649/152.194 = 0.116 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.397 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.020 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.096 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	286
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -79.245 (LCB: 54+MZ, POS:1/2)
Bending Moments	My = 79.6285, Mz = 19.3614
End Moments	Myi = 20.3098, Myj = 76.7737 (for Lb) Myi = 20.3098, Myj = -60.928 (for Ly) Mzi = 9.63761, Mzj = 13.2110 (for Lz)
Shear Forces	Fyy = 28.7172 (LCB: 60+FY, POS:1/2) Fzz = 91.0004 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 79.24/3955.71 = 0.020 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 79.629/449.278 = 0.177 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 19.361/152.194 = 0.127 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.340 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.016 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.144 < 1.000$ O.K

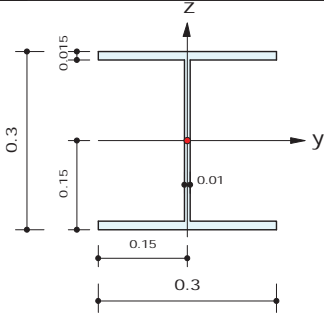
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	287
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -238.58 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 86.4482, Mz = -18.934
End Moments	Myi = 85.9537, Myj = 85.8844 (for Lb) Myi = 85.9537, Myj = 77.9557 (for Ly) Mzi = 10.0981, Mzj = -13.422 (for Lz)
Shear Forces	Fyy = -33.021 (LCB: 60-MZ, POS:3/4) Fzz = 61.4769 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Oyb	0.07324	Ozb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 238.58/3955.71 = 0.060 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 86.448/449.278 = 0.192 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 18.934/152.194 = 0.124 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$$

$$Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.396 < 1.000 \dots\dots\dots O.K$$


Shear Resistance

$$V_{Edy}/Vy_{Rd} = 0.019 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/Vz_{Rd} = 0.097 < 1.000 \dots\dots\dots O.K$$

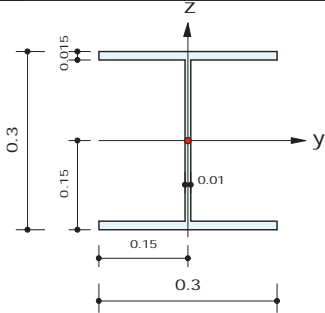
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	288
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -211.39 (LCB: 60+MY, POS:I)
Bending Moments	My = 83.6336, Mz = 8.41462
End Moments	Myi = 83.6336, Myj = 67.1669 (for Lb) Myi = 83.6336, Myj = 43.5211 (for Ly) Mzi = 8.41462, Mzj = -7.5043 (for Lz)
Shear Forces	Fyy = 33.7287 (LCB: 60-MZ, POS:J) Fzz = 85.1554 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Oyb	0.07324	Ozb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 211.39/3955.71 = 0.053 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 83.634/449.278 = 0.186 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 8.415/152.194 = 0.055 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$$

$$Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.310 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/Vy_{Rd} = 0.019 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/Vz_{Rd} = 0.135 < 1.000 \dots\dots\dots O.K$$

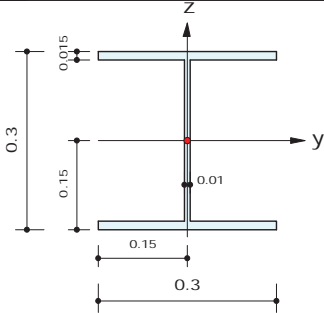
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	289
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = -616.19 (LCB: 60+MZ, POS:I)
Bending Moments	My = 17.6231, Mz = 3.64722
End Moments	Myi = 17.6231, Myj = -5.4714 (for Lb) Myi = 17.6231, Myj = -5.4714 (for Ly) Mzi = 3.64722, Mzj = 8.43566 (for Lz)
Shear Forces	Fyy = -44.703 (LCB: 54-FY, POS:J) Fzz = 44.5348 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{\min[N_{c,Rd}, N_{b,Rd}]} = \frac{616.19}{3955.71} = 0.156 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{17.623}{449.278} = 0.039 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{3.647}{152.194} = 0.024 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{byN} = \frac{N_{Ed}}{A \cdot f_y / \gamma_{M0}}, R_{byM} = \frac{M_{Edy}}{M_{y,Rd}} + \frac{M_{Edz}}{M_{z,Rd}}$$

$$R_{c,LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{c,LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = \max[R_{byN} + R_{byM}, \max(R_{c,LT1} + R_{b,LT1}, R_{c,LT2} + R_{b,LT2})] = 0.229 < 1.000 \dots \text{O.K}$$


Shear Resistance

$$\frac{V_{Edy}}{V_{y,Rd}} = 0.025 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z,Rd}} = 0.070 < 1.000 \dots\dots\dots \text{O.K}$$

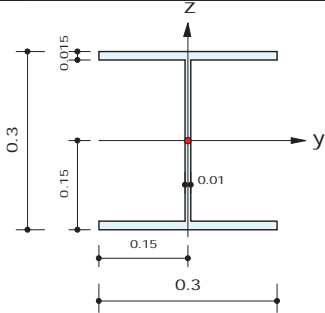
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	290
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 1.00007



2. Member Forces

Axial Force	Fxx = -759.79 (LCB: 60-FX, POS:J)
Bending Moments	My = -0.6283, Mz = -2.2692
End Moments	Myi = -0.2433, Myj = -0.6283 (for Lb) Myi = -0.2433, Myj = -0.6283 (for Ly) Mzi = 2.34772, Mzj = -2.2692 (for Lz)
Shear Forces	Fyy = 5.41816 (LCB: 60-MZ, POS:J) Fzz = 18.5152 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 1.00007, Lz = 1.00007, Lb = 1.00007
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{\min[N_{c,Rd}, N_{b,Rd}]} = \frac{759.79}{3955.71} = 0.192 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{0.628}{449.278} = 0.001 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{2.269}{152.194} = 0.015 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{byN} = \frac{N_{Ed}}{A \cdot f_y / \gamma_{M0}}, R_{byM} = \frac{M_{Edy}}{M_{y,Rd}} + \frac{M_{Edz}}{M_{z,Rd}}$$

$$R_{c,LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{c,LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = \max[R_{byN} + R_{byM}, \max(R_{c,LT1} + R_{b,LT1}, R_{c,LT2} + R_{b,LT2})] = 0.218 < 1.000 \dots \text{O.K}$$

Shear Resistance

$$\frac{V_{Edy}}{V_{y,Rd}} = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z,Rd}} = 0.029 < 1.000 \dots\dots\dots \text{O.K}$$

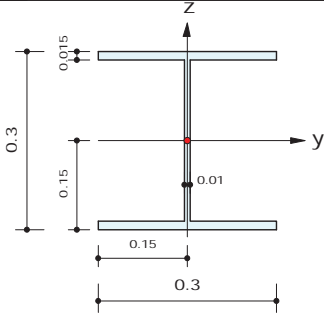
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	359
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = -759.95 (LCB: 60-MZ, POS:3/4)
Bending Moments	My = -22.312, Mz = -0.4022
End Moments	Myi = 27.2203, Myj = -30.643 (for Lb) Myi = 27.2203, Myj = -30.643 (for Ly) Mzi = -1.5941, Mzj = -1.2824 (for Lz)
Shear Forces	Fyy = 15.0523 (LCB: 54+FY, POS:J) Fzz = -12.454 (LCB: 54-MY, POS:I)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 759.95/3955.71 = 0.192 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 22.312/449.278 = 0.050 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 0.402/152.194 = 0.003 < 1.000$ O.K

Combined Resistance

$R_{byN} = N_{Ed}/(A*fy/\gamma M0), R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$

$Rmax = MAX[R_{byN}+R_{byM}, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.256 < 1.000$... O.K


Shear Resistance

$V_{Edy}/Vy_{Rd} = 0.009 < 1.000$ O.K

$V_{Edz}/Vz_{Rd} = 0.020 < 1.000$ O.K

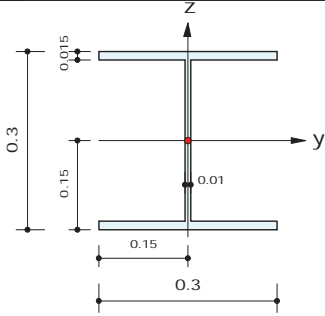
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	360
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = -679.58 (LCB: 60+MY, POS:I)
Bending Moments	My = 17.6907, Mz = 2.41371
End Moments	Myi = 17.6907, Myj = 15.0385 (for Lb) Myi = 17.6907, Myj = 15.0385 (for Ly) Mzi = 2.41371, Mzj = -0.7389 (for Lz)
Shear Forces	Fyy = -15.335 (LCB: 52-MZ, POS:3/4) Fzz = -18.945 (LCB: 54-MY, POS:I)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 679.58/3955.71 = 0.172 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 17.691/449.278 = 0.039 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 2.414/152.194 = 0.016 < 1.000$ O.K

Combined Resistance

$R_{byN} = N_{Ed}/(A*fy/\gamma M0), R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$

$Rmax = MAX[R_{byN}+R_{byM}, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.238 < 1.000$... O.K

Shear Resistance

$V_{Edy}/Vy_{Rd} = 0.009 < 1.000$ O.K

$V_{Edz}/Vz_{Rd} = 0.030 < 1.000$ O.K

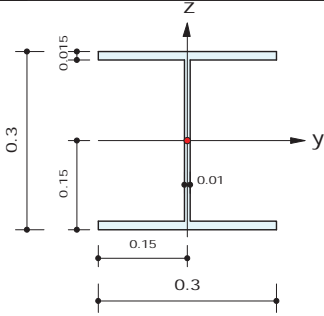
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 361
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Transv_H300_Met (No:30)
(Built-up Section).
Member Length : 0.28731



2. Member Forces

Axial Force Fxx = -480.12 (LCB: 60-MZ, POS:I)
Bending Moments My = -22.783, Mz = -24.452
End Moments Myi = -22.783, Myj = -11.202 (for Lb)
Myi = -22.783, Myj = -11.202 (for Ly)
Mzi = -24.452, Mzj = -1.1962 (for Lz)
Shear Forces Fyy = -89.519 (LCB: 60-FY, POS:J)
Fzz = -26.020 (LCB: 60-FZ, POS:I)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Oyb	0.07324	Ozb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 480.12/3955.71 = 0.121 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 22.783/449.278 = 0.051 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 24.452/152.194 = 0.161 < 1.000$ O.K
Combined Resistance
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rc.LT1 = N_Ed/(χy*A*fy/γM1)
Rb.LT1 = (kyy*M_Edy)/(χLT*Wely*fy/γM1) + (kyz*M_Edz)/(Welz*fy/γM1)
Rc.LT2 = N_Ed/(χz*A*fy/γM1)
Rb.LT2 = (Kzy*M_Edy)/(χLT*Wely*fy/γM1) + (Kzz*M_Edz)/(Welz*fy/γM1)
Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.349 < 1.000 ... O.K
Shear Resistance
V_Edy/Vy_Rd = 0.051 < 1.000 O.K
V_Edz/Vz_Rd = 0.041 < 1.000 O.K

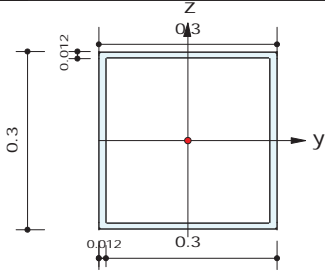
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 376
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 2.00000



2. Member Forces

Axial Force Fxx = -345.19 (LCB: 60+MY, POS:1/2)
Bending Moments My = 73.9533, Mz = -1.7266
End Moments Myi = 68.0242, Myj = 62.4707 (for Lb)
Myi = 65.9054, Myj = 62.4707 (for Ly)
Mzi = -0.7068, Mzj = -6.5881 (for Lz)
Shear Forces Fyy = -9.3910 (LCB: 60-FY, POS:J)
Fzz = 79.2537 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

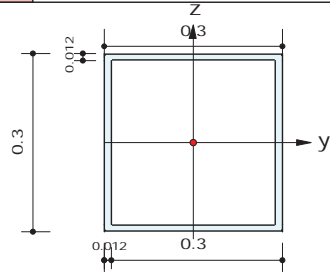
Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 345.19/4673.83 = 0.074 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 73.953/505.066 = 0.146 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 1.727/505.066 = 0.003 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rc.LT1 = N_Ed/(χy*A*fy/γM1)
Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1)
Rc.LT2 = N_Ed/(χz*A*fy/γM1)
Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1)
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.230 < 1.000 .. O.K
Shear Resistance
V_Edy/Vy_Rd = 0.007 < 1.000 O.K
V_Edz/Vz_Rd = 0.051 < 1.000 O.K

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 377
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 2.00000



2. Member Forces

Axial Force Fxx = -385.14 (LCB: 60+MY, POS:I)
Bending Moments My = 64.2223, Mz = 0.28091
End Moments Myi = 64.2223, Myj = 58.9687 (for Lb)
Myi = 64.2223, Myj = 36.4612 (for Ly)
Mzi = 0.28091, Mzj = 0.18254 (for Lz)
Shear Forces Fyy = 6.96282 (LCB: 60+MZ, POS:1/2)
Fzz = 51.5200 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 385.14/4673.83 = 0.082 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 64.222/505.066 = 0.127 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 0.281/505.066 = 0.001 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$
$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$
$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$
$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.217 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

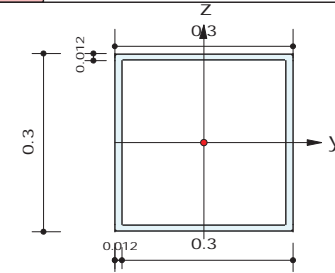
$$V_{Edz}/V_{z_Rd} = 0.033 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

MIDAS	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 378
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 2.00000



2. Member Forces

Axial Force Fxx = -359.29 (LCB: 60+MY, POS:I)
Bending Moments My = 70.4435, Mz = -2.2830
End Moments Myi = 70.4435, Myj = 59.5492 (for Lb)
Myi = 70.4435, Myj = 35.6370 (for Ly)
Mzi = -2.2830, Mzj = 0.45734 (for Lz)
Shear Forces Fyy = -12.967 (LCB: 60-FY, POS:J)
Fzz = 82.9228 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 359.29/4673.83 = 0.077 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 70.444/505.066 = 0.139 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 2.283/505.066 = 0.005 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A*fy/\gamma M0), \quad R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$
$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$
$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$
$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$$
$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.227 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.009 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.053 < 1.000 \dots\dots\dots \text{O.K}$$

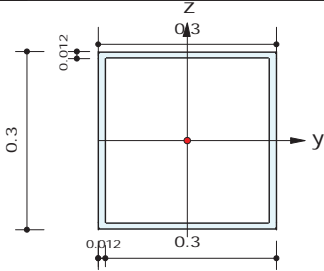
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	379
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -287.58 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 87.6219, Mz = 1.39876
End Moments	Myi = 79.3808, Myj = 82.1250 (for Lb) Myi = 68.0833, Myj = 82.1250 (for Ly) Mzi = -1.8020, Mzj = 13.3629 (for Lz)
Shear Forces	Fyy = -19.661 (LCB: 60-FY, POS:J) Fzz = 80.5828 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 287.58/4673.83 = 0.062 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 87.622/505.066 = 0.173 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.399/505.066 = 0.003 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.245 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.014 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.052 < 1.000$ O.K

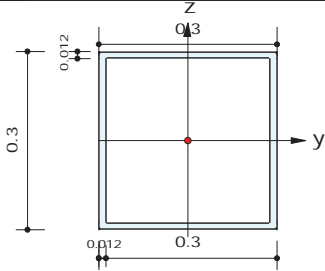
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	380
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -414.48 (LCB: 60+MY, POS:I)
Bending Moments	My = 71.7239, Mz = 1.36788
End Moments	Myi = 71.7239, Myj = 44.3590 (for Lb) Myi = 71.7239, Myj = 31.6329 (for Ly) Mzi = 1.36788, Mzj = 0.88753 (for Lz)
Shear Forces	Fyy = 18.0429 (LCB: 60+MZ, POS:1/2) Fzz = 69.9595 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 414.48/4673.83 = 0.089 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 71.724/505.066 = 0.142 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.368/505.066 = 0.003 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.240 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.013 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.045 < 1.000$ O.K

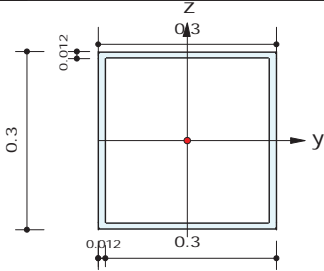
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	381
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -333.76 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 79.5315, Mz = -0.1801
End Moments	Myi = 73.9936, Myj = 74.4248 (for Lb) Myi = 68.4444, Myj = 74.4248 (for Ly) Mzi = -0.8956, Mzj = 6.30797 (for Lz)
Shear Forces	Fyy = 15.3173 (LCB: 60-MZ, POS:J) Fzz = 90.9981 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 333.76/4673.83 = 0.071 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 79.532/505.066 = 0.157 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 0.180/505.066 = 0.000 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$
 $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$
 $R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$
 $Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$
 $Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$
 $Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$
 $Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$
 $R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.237 < 1.000$.. O.K


Shear Resistance

$V_{Edy}/V_{y_Rd} = 0.011 < 1.000$ O.K

$V_{Edz}/V_{z_Rd} = 0.059 < 1.000$ O.K

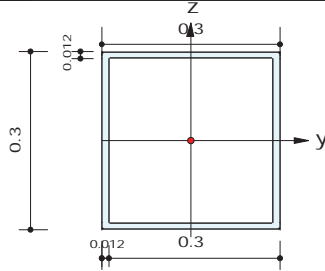
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	382
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -395.97 (LCB: 60+MY, POS:I)
Bending Moments	My = 74.8725, Mz = 0.57715
End Moments	Myi = 74.8725, Myj = 53.1618 (for Lb) Myi = 74.8725, Myj = 42.9703 (for Ly) Mzi = 0.57715, Mzj = 1.18961 (for Lz)
Shear Forces	Fyy = -11.033 (LCB: 60-FY, POS:J) Fzz = 74.9087 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 395.97/4673.83 = 0.085 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 74.872/505.066 = 0.148 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 0.577/505.066 = 0.001 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$
 $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$
 $R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$
 $Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$
 $Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$
 $Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$
 $Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$
 $R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.242 < 1.000$.. O.K

Shear Resistance

$V_{Edy}/V_{y_Rd} = 0.008 < 1.000$ O.K

$V_{Edz}/V_{z_Rd} = 0.048 < 1.000$ O.K

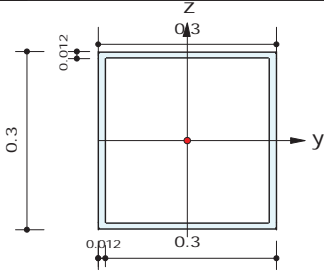
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	383
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -316.06 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 80.0626, Mz = 0.68668
End Moments	Myi = 71.6477, Myj = 76.2933 (for Lb) Myi = 62.7334, Myj = 76.2933 (for Ly) Mzi = -3.5536, Mzj = 13.0152 (for Lz)
Shear Forces	Fyy = -18.580 (LCB: 60-MZ, POS:1/2) Fzz = 71.6945 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 316.06/4673.83 = 0.068 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 80.063/505.066 = 0.159 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 0.687/505.066 = 0.001 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$

$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$

$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$

$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$R_{max} = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.235 < 1.000$.. O.K


Shear Resistance

$V_{Edy}/V_{y_Rd} = 0.013 < 1.000$ O.K

$V_{Edz}/V_{z_Rd} = 0.046 < 1.000$ O.K

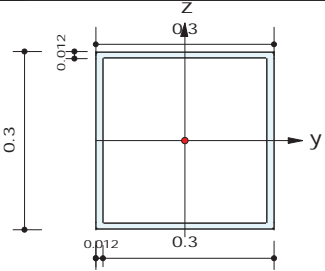
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	384
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -400.74 (LCB: 60+MY, POS:I)
Bending Moments	My = 77.9398, Mz = 1.85857
End Moments	Myi = 77.9398, Myj = 43.5335 (for Lb) Myi = 77.9398, Myj = 29.6963 (for Ly) Mzi = 1.85857, Mzj = 0.40730 (for Lz)
Shear Forces	Fyy = 14.4972 (LCB: 60+FY, POS:J) Fzz = 90.1720 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 400.74/4673.83 = 0.086 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 77.940/505.066 = 0.154 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 1.859/505.066 = 0.004 < 1.000$ O.K

Combined Resistance

$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$

$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$

$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$

$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$

$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$

$R_{max} = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.251 < 1.000$.. O.K

Shear Resistance

$V_{Edy}/V_{y_Rd} = 0.010 < 1.000$ O.K

$V_{Edz}/V_{z_Rd} = 0.058 < 1.000$ O.K

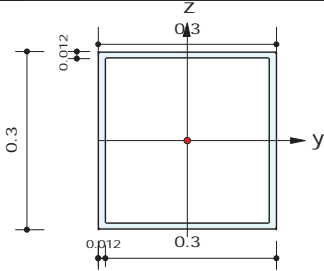
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	385
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -349.12 (LCB: 60+MY, POS:1/4)
Bending Moments	My = 72.2658, Mz = -0.6001
End Moments	Myi = 66.5214, Myj = 72.0195 (for Lb) Myi = 66.5214, Myj = 57.1894 (for Ly) Mzi = -0.9895, Mzj = -0.2180 (for Lz)
Shear Forces	Fyy = -9.0830 (LCB: 60-FY, POS:J) Fzz = 77.7812 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 349.12/4673.83 = 0.075 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 72.266/505.066 = 0.143 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 0.600/505.066 = 0.001 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.226 < 1.000 \dots\dots\dots O.K$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.006 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.050 < 1.000 \dots\dots\dots O.K$$

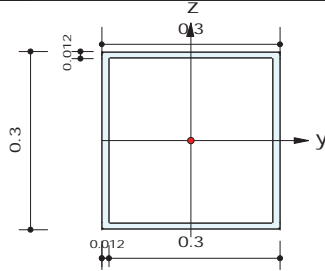
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	386
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -355.68 (LCB: 60+MY, POS:I)
Bending Moments	My = 70.1447, Mz = 0.64792
End Moments	Myi = 70.1447, Myj = 63.8486 (for Lb) Myi = 70.1447, Myj = 36.2689 (for Ly) Mzi = 0.64792, Mzj = -1.1601 (for Lz)
Shear Forces	Fyy = 10.5977 (LCB: 54-MZ, POS:J) Fzz = 67.2682 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 355.68/4673.83 = 0.076 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 70.145/505.066 = 0.139 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 0.648/505.066 = 0.001 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.224 < 1.000 \dots\dots\dots O.K$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.008 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.043 < 1.000 \dots\dots\dots O.K$$

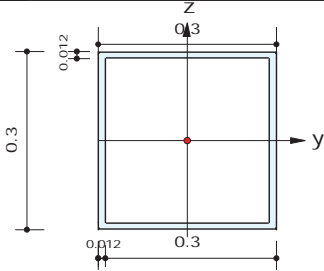
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	387
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -378.57 (LCB: 60+MY, POS:I)
Bending Moments	My = 63.7515, Mz = -0.5017
End Moments	Myi = 63.7515, Myj = 56.5078 (for Lb) Myi = 63.7515, Myj = 37.7353 (for Ly) Mzi = -0.5017, Mzj = -0.3363 (for Lz)
Shear Forces	Fyy = -17.014 (LCB: 60-FY, POS:J) Fzz = 69.8292 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 378.57/4673.83 = 0.081 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 63.751/505.066 = 0.126 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.502/505.066 = 0.001 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.215 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.012 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.045 < 1.000$ O.K

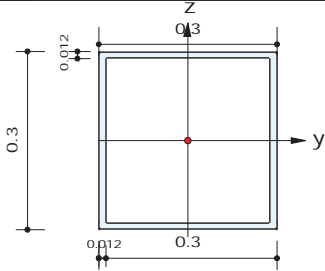
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	388
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -341.51 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 75.3163, Mz = 0.87587
End Moments	Myi = 65.8598, Myj = 75.3163 (for Lb) Myi = 65.8598, Myj = 65.4407 (for Ly) Mzi = -0.4670, Mzj = 0.87587 (for Lz)
Shear Forces	Fyy = -10.459 (LCB: 60-FY, POS:J) Fzz = 80.7592 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 341.51/4673.83 = 0.073 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 75.316/505.066 = 0.149 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.876/505.066 = 0.002 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.231 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.007 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.052 < 1.000$ O.K

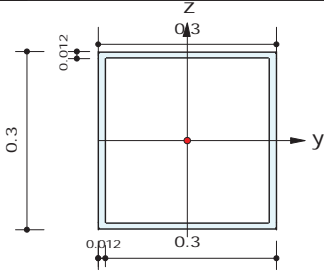
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	389
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -368.88 (LCB: 60+MY, POS:I)
Bending Moments	My = 70.3463, Mz = 1.03000
End Moments	Myi = 70.3463, Myj = 58.5501 (for Lb) Myi = 70.3463, Myj = 33.6709 (for Ly) Mzi = 1.03000, Mzj = -1.2082 (for Lz)
Shear Forces	Fyy = 13.2651 (LCB: 60+FY, POS:J) Fzz = 82.4566 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 368.88/4673.83 = 0.079 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 70.346/505.066 = 0.139 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.030/505.066 = 0.002 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.227 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.009 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.053 < 1.000$ O.K

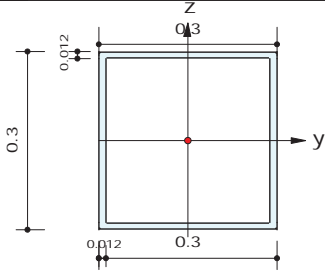
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	390
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -384.86 (LCB: 60+MY, POS:I)
Bending Moments	My = 65.2346, Mz = 0.38189
End Moments	Myi = 65.2346, Myj = 56.5667 (for Lb) Myi = 65.2346, Myj = 31.2270 (for Ly) Mzi = 0.38189, Mzj = 0.64284 (for Lz)
Shear Forces	Fyy = -7.8436 (LCB: 60-FY, POS:J) Fzz = 56.7714 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768


3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

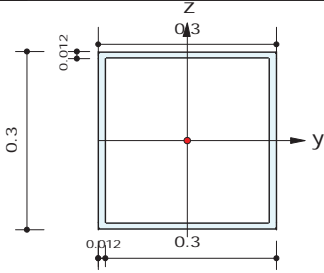
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 384.86/4673.83 = 0.082 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 65.235/505.066 = 0.129 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.382/505.066 = 0.001 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.220 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.006 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.037 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 391
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 2.00000



2. Member Forces

Axial Force Fxx = -356.37 (LCB: 60+MY, POS:I)
Bending Moments My = 69.2399, Mz = 0.91719
End Moments Myi = 69.2399, Myj = 64.8712 (for Lb)
Myi = 69.2399, Myj = 39.2274 (for Ly)
Mzi = 0.91719, Mzj = 1.86721 (for Lz)
Shear Forces Fyy = -12.156 (LCB: 54-FY, POS:J)
Fzz = 65.5166 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 356.37/4673.83 = 0.076 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 69.240/505.066 = 0.137 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 0.917/505.066 = 0.002 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.222 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.009 < 1.000 \dots\dots\dots \text{O.K}$$

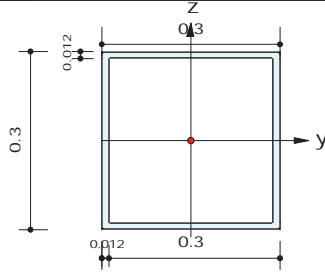
$$V_{Edz}/V_{z_Rd} = 0.042 < 1.000 \dots\dots\dots \text{O.K}$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 392
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 2.00000



2. Member Forces

Axial Force Fxx = -403.50 (LCB: 60+MZ, POS:I)
Bending Moments My = 71.7281, Mz = 1.43041
End Moments Myi = 71.7281, Myj = 26.0428 (for Lb)
Myi = 71.7281, Myj = 15.4241 (for Ly)
Mzi = 1.43041, Mzj = 1.11943 (for Lz)
Shear Forces Fyy = 13.9679 (LCB: 60+FY, POS:J)
Fzz = 74.7838 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 403.50/4673.83 = 0.086 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 71.728/505.066 = 0.142 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 1.430/505.066 = 0.003 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.238 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.048 < 1.000 \dots\dots\dots \text{O.K}$$

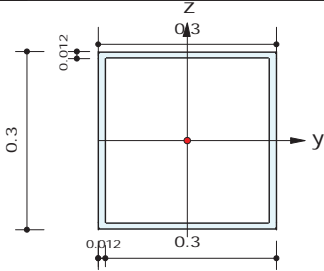
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	393
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -384.14 (LCB: 60+MY, POS:I)
Bending Moments	My = 66.0341, Mz = 0.53526
End Moments	Myi = 66.0341, Myj = 56.9241 (for Lb) Myi = 66.0341, Myj = 34.6013 (for Ly) Mzi = 0.53526, Mzj = -0.0475 (for Lz)
Shear Forces	Fyy = 8.48663 (LCB: 54-MZ, POS:J) Fzz = 55.9281 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 384.14/4673.83 = 0.082 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 66.034/505.066 = 0.131 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.535/505.066 = 0.001 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.221 < 1.000 ..$ O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.006 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.036 < 1.000$ O.K

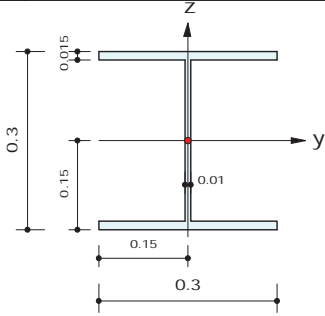
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	405
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.99989



2. Member Forces

Axial Force	Fxx = -711.23 (LCB: 60+MX, POS:J)
Bending Moments	My = -5.6143, Mz = 1.36635
End Moments	Myi = -0.6724, Myj = -5.6143 (for Lb) Myi = -0.6724, Myj = -5.6143 (for Ly) Mzi = -2.7711, Mzj = 1.36635 (for Lz)
Shear Forces	Fyy = -4.1889 (LCB: 60-FY, POS:J) Fzz = 20.5461 (LCB: 52+MX, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.99989, Lz = 0.99989, Lb = 0.99989
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 711.23/3955.71 = 0.180 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 5.614/449.278 = 0.012 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.366/152.194 = 0.009 < 1.000$ O.K
Combined Resistance	$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.211 < 1.000 ...$ O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.002 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.032 < 1.000$ O.K

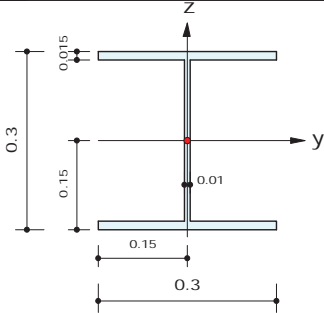
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	406
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 1.00007



2. Member Forces

Axial Force	Fxx = -722.04 (LCB: 60+FZ, POS:J)
Bending Moments	My = -5.6735, Mz = -2.2396
End Moments	Myi = 0.64689, Myj = -5.6735 (for Lb) Myi = 0.64689, Myj = -5.6735 (for Ly) Mzi = 2.94983, Mzj = -2.2396 (for Lz)
Shear Forces	Fyy = 5.81310 (LCB: 60-MZ, POS:J) Fzz = 19.9456 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 1.00007, Lz = 1.00007, Lb = 1.00007
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 722.04/3955.71 = 0.183 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 5.673/449.278 = 0.013 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.240/152.194 = 0.015 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.220 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.003 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.032 < 1.000$ O.K

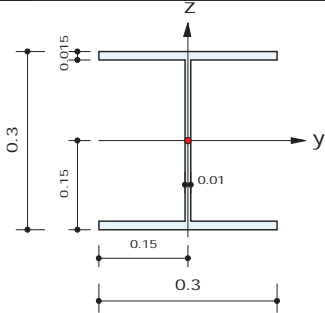
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	512
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -337.67 (LCB: 60+MY, POS:I)
Bending Moments	My = 51.8540, Mz = -4.4554
End Moments	Myi = 51.8540, Myj = 44.7066 (for Lb) Myi = 51.8540, Myj = 30.4239 (for Ly) Mzi = -4.4554, Mzj = 4.85124 (for Lz)
Shear Forces	Fyy = -11.730 (LCB: 60-MZ, POS:1/2) Fzz = 55.7851 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 337.67/3955.71 = 0.085 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 51.854/449.278 = 0.115 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 4.455/152.194 = 0.029 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.242 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.010 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.088 < 1.000$ O.K

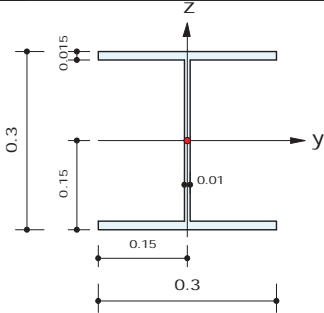
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	513
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -269.47 (LCB: 60+MY, POS:I)
Bending Moments	My = 76.6392, Mz = -8.6030
End Moments	Myi = 76.6392, Myj = 66.3733 (for Lb) Myi = 76.6392, Myj = 50.2078 (for Ly) Mzi = -8.6030, Mzj = -8.9312 (for Lz)
Shear Forces	Fyy = 28.2518 (LCB: 60+MZ, POS:I) Fzz = 61.8499 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 269.47/3955.71 = 0.068 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 76.639/449.278 = 0.171 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.603/152.194 = 0.057 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.310 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.016 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.098 < 1.000$ O.K

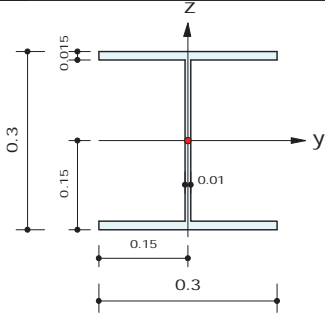
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	514
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -257.24 (LCB: 60+MY, POS:I)
Bending Moments	My = 83.0381, Mz = -8.8861
End Moments	Myi = 83.0381, Myj = 70.4291 (for Lb) Myi = 83.0381, Myj = 49.6107 (for Ly) Mzi = -8.8861, Mzj = 0.26885 (for Lz)
Shear Forces	Fyy = -20.165 (LCB: 60-FY, POS:1/2) Fzz = 63.2745 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 257.24/3955.71 = 0.065 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 83.038/449.278 = 0.185 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.886/152.194 = 0.058 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.324 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.016 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.100 < 1.000$ O.K

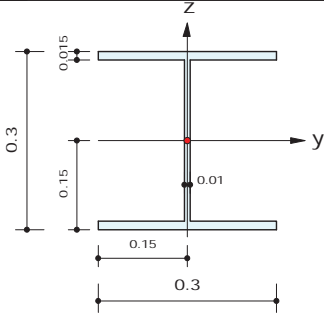
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	515
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -256.15 (LCB: 60+MY, POS:I)
Bending Moments	My = 85.2015, Mz = -8.3643
End Moments	Myi = 85.2015, Myj = 72.3577 (for Lb) Myi = 85.2015, Myj = 46.3197 (for Ly) Mzi = -8.3643, Mzj = 9.45423 (for Lz)
Shear Forces	Fyy = -23.854 (LCB: 60-MZ, POS:I) Fzz = 64.0039 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 256.15/3955.71 = 0.065 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 85.202/449.278 = 0.190 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.364/152.194 = 0.055 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.325 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.014 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.101 < 1.000$ O.K

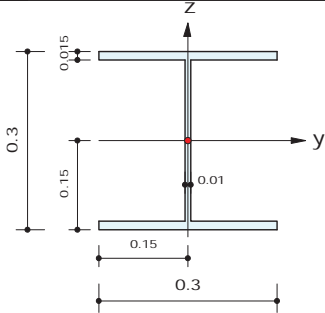
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	516
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -258.09 (LCB: 60+MY, POS:I)
Bending Moments	My = 84.6515, Mz = -7.6992
End Moments	Myi = 84.6515, Myj = 72.8688 (for Lb) Myi = 84.6515, Myj = 44.5084 (for Ly) Mzi = -7.6992, Mzj = 9.44880 (for Lz)
Shear Forces	Fyy = -20.907 (LCB: 60-MZ, POS:I) Fzz = 63.2937 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 258.09/3955.71 = 0.065 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 84.651/449.278 = 0.188 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 7.699/152.194 = 0.051 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.320 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.012 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.100 < 1.000$ O.K

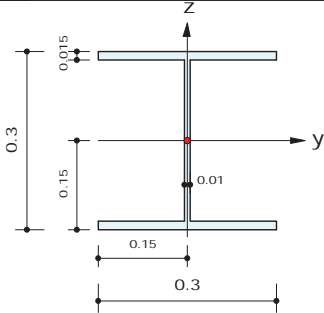
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	517
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -272.52 (LCB: 60+MY, POS:I)
Bending Moments	My = 81.0488, Mz = -5.5197
End Moments	Myi = 81.0488, Myj = 70.6420 (for Lb) Myi = 81.0488, Myj = 44.0846 (for Ly) Mzi = -5.5197, Mzj = 7.29734 (for Lz)
Shear Forces	Fyy = -14.563 (LCB: 60-MZ, POS:I) Fzz = 60.7758 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 272.52/3955.71 = 0.069 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 81.049/449.278 = 0.180 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 5.520/152.194 = 0.036 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.300 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.008 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.096 < 1.000$ O.K

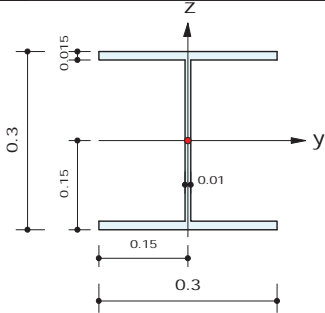
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	518
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -270.76 (LCB: 60+MY, POS:I)
Bending Moments	My = 81.8140, Mz = -1.8954
End Moments	Myi = 81.8140, Myj = 72.1649 (for Lb) Myi = 81.8140, Myj = 46.4391 (for Ly) Mzi = -1.8954, Mzj = 1.91614 (for Lz)
Shear Forces	Fyy = -8.3157 (LCB: 60-MZ, POS:3/4) Fzz = 61.1473 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 270.76/3955.71 = 0.068 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 81.814/449.278 = 0.182 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.895/152.194 = 0.012 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.276 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.005 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.097 < 1.000$ O.K

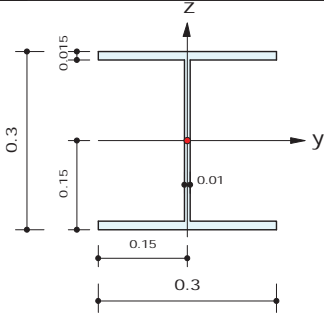
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	519
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -254.24 (LCB: 60+MY, POS:I)
Bending Moments	My = 86.0638, Mz = -1.4053
End Moments	Myi = 86.0638, Myj = 74.0660 (for Lb) Myi = 86.0638, Myj = 47.5054 (for Ly) Mzi = -1.4053, Mzj = 1.42392 (for Lz)
Shear Forces	Fyy = -5.5087 (LCB: 60-MZ, POS:1/2) Fzz = 63.8965 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 254.24/3955.71 = 0.064 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 86.064/449.278 = 0.192 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.405/152.194 = 0.009 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.278 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.003 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.101 < 1.000$ O.K

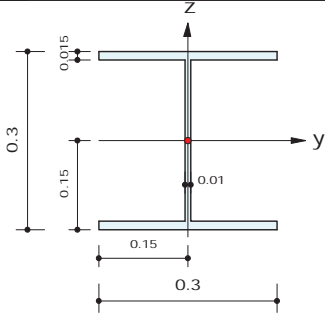
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	520
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -147.25 (LCB: 54+MY, POS:I)
Bending Moments	My = 99.1385, Mz = 0.21548
End Moments	Myi = 99.1385, Myj = 80.8178 (for Lb) Myi = 99.1385, Myj = 42.9652 (for Ly) Mzi = 0.21548, Mzj = 0.19022 (for Lz)
Shear Forces	Fyy = 1.22568 (LCB: 53+FY, POS:1/2) Fzz = 64.6951 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 147.25/3955.71 = 0.037 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 99.138/449.278 = 0.221 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.215/152.194 = 0.001 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.272 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.001 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.102 < 1.000$ O.K

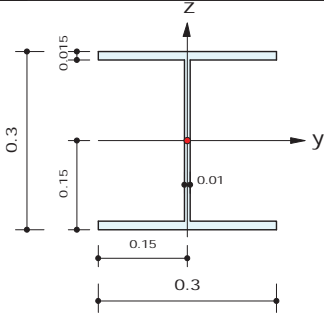
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	521
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -253.43 (LCB: 60+MY, POS:I)
Bending Moments	My = 86.9127, Mz = 1.52523
End Moments	Myi = 86.9127, Myj = 74.2261 (for Lb) Myi = 86.9127, Myj = 47.2749 (for Ly) Mzi = 1.52523, Mzj = -0.8310 (for Lz)
Shear Forces	Fyy = 5.23158 (LCB: 54+FY, POS:J) Fzz = 63.9897 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 253.43/3955.71 = 0.064 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 86.913/449.278 = 0.193 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.525/152.194 = 0.010 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.281 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.003 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.101 < 1.000$ O.K

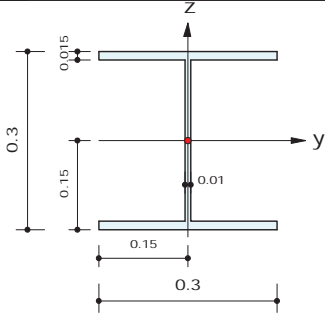
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	522
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -264.97 (LCB: 60+MY, POS:I)
Bending Moments	My = 84.8671, Mz = 2.63662
End Moments	Myi = 84.8671, Myj = 71.3177 (for Lb) Myi = 84.8671, Myj = 43.0377 (for Ly) Mzi = 2.63662, Mzj = -2.0820 (for Lz)
Shear Forces	Fyy = -4.9374 (LCB: 60-MZ, POS:1/2) Fzz = 62.4240 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 264.97/3955.71 = 0.067 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 84.867/449.278 = 0.189 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.637/152.194 = 0.017 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.287 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.004 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.099 < 1.000$ O.K

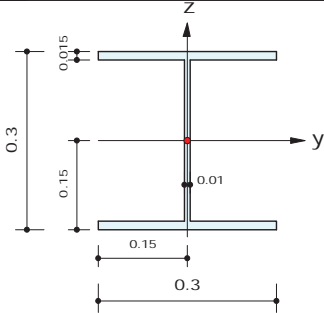
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	523
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -267.31 (LCB: 60+MY, POS:I)
Bending Moments	My = 84.0945, Mz = -2.0346
End Moments	Myi = 84.0945, Myj = 70.7777 (for Lb) Myi = 84.0945, Myj = 42.6994 (for Ly) Mzi = -2.0346, Mzj = 2.35601 (for Lz)
Shear Forces	Fyy = -6.8212 (LCB: 60-MZ, POS:I) Fzz = 62.2336 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 267.31/3955.71 = 0.068 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 84.095/449.278 = 0.187 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.035/152.194 = 0.013 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rc.LT1 = $N_{Ed}/(\chi y * A * fy / \gamma M1)$ Rb.LT1 = $(kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$ Rc.LT2 = $N_{Ed}/(\chi z * A * fy / \gamma M1)$ Rb.LT2 = $(Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.282 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.004 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.098 < 1.000$ O.K

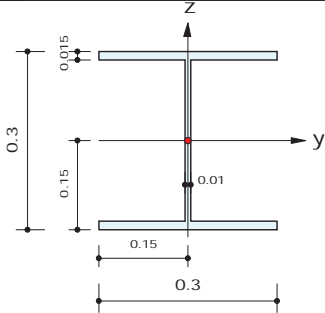
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	524
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -254.10 (LCB: 60+MY, POS:I)
Bending Moments	My = 85.9941, Mz = -0.8506
End Moments	Myi = 85.9941, Myj = 73.5988 (for Lb) Myi = 85.9941, Myj = 46.7363 (for Ly) Mzi = -0.8506, Mzj = 0.89940 (for Lz)
Shear Forces	Fyy = -4.4689 (LCB: 54-MZ, POS:3/4) Fzz = 63.7792 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 254.10/3955.71 = 0.064 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 85.994/449.278 = 0.191 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.851/152.194 = 0.006 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rc.LT1 = $N_{Ed}/(\chi y * A * fy / \gamma M1)$ Rb.LT1 = $(kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$ Rc.LT2 = $N_{Ed}/(\chi z * A * fy / \gamma M1)$ Rb.LT2 = $(Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.274 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.003 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.101 < 1.000$ O.K

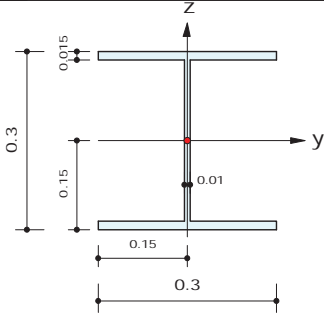
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	525
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -253.96 (LCB: 60+MY, POS:I)
Bending Moments	My = 86.3296, Mz = 0.76335
End Moments	Myi = 86.3296, Myj = 73.9196 (for Lb) Myi = 86.3296, Myj = 47.3185 (for Ly) Mzi = 0.76335, Mzj = -0.4081 (for Lz)
Shear Forces	Fyy = -1.0326 (LCB: 60-FY, POS:1/2) Fzz = 64.3832 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 253.96/3955.71 = 0.064 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 86.330/449.278 = 0.192 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.763/152.194 = 0.005 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.274 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.001 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.102 < 1.000$ O.K

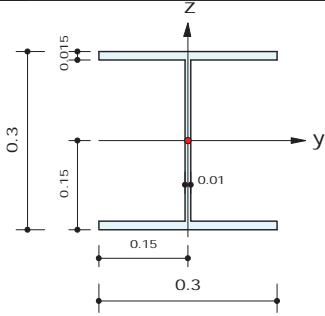
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	526
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -255.35 (LCB: 60+MY, POS:I)
Bending Moments	My = 85.0687, Mz = 2.16811
End Moments	Myi = 85.0687, Myj = 73.2880 (for Lb) Myi = 85.0687, Myj = 46.6741 (for Ly) Mzi = 2.16811, Mzj = -1.4588 (for Lz)
Shear Forces	Fyy = 6.50650 (LCB: 60-MZ, POS:J) Fzz = 63.5094 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 255.35/3955.71 = 0.065 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 85.069/449.278 = 0.189 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.168/152.194 = 0.014 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.282 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.004 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.100 < 1.000$ O.K

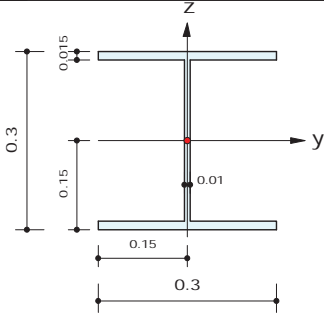
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	527
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -271.06 (LCB: 60+MY, POS:I)
Bending Moments	My = 81.0187, Mz = 2.44159
End Moments	Myi = 81.0187, Myj = 71.5405 (for Lb) Myi = 81.0187, Myj = 45.7064 (for Ly) Mzi = 2.44159, Mzj = -1.7466 (for Lz)
Shear Forces	Fyy = 8.58703 (LCB: 60-MZ, POS:J) Fzz = 60.7179 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 271.06/3955.71 = 0.069 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 81.019/449.278 = 0.180 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.442/152.194 = 0.016 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.278 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.005 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.096 < 1.000$ O.K

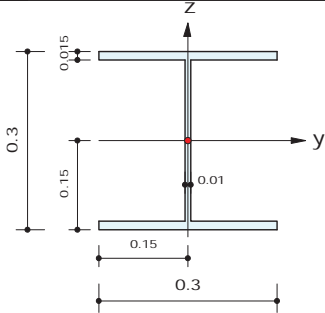
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	528
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -271.88 (LCB: 60+MY, POS:I)
Bending Moments	My = 81.0643, Mz = 5.46437
End Moments	Myi = 81.0643, Myj = 70.9601 (for Lb) Myi = 81.0643, Myj = 44.5607 (for Ly) Mzi = 5.46437, Mzj = -6.5825 (for Lz)
Shear Forces	Fyy = -13.771 (LCB: 60-MZ, POS:1/2) Fzz = 60.8023 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 271.88/3955.71 = 0.069 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 81.064/449.278 = 0.180 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 5.464/152.194 = 0.036 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.299 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.008 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.096 < 1.000$ O.K

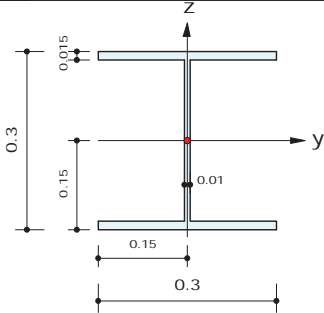
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	529
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -257.96 (LCB: 60+MY, POS:I)
Bending Moments	My = 84.9899, Mz = 7.65107
End Moments	Myi = 84.9899, Myj = 73.0660 (for Lb) Myi = 84.9899, Myj = 45.0870 (for Ly) Mzi = 7.65107, Mzj = -8.6789 (for Lz)
Shear Forces	Fyy = 20.0182 (LCB: 60+MZ, POS:I) Fzz = 63.1815 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 257.96/3955.71 = 0.065 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 84.990/449.278 = 0.189 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 7.651/152.194 = 0.050 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.320 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.011 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.100 < 1.000$ O.K

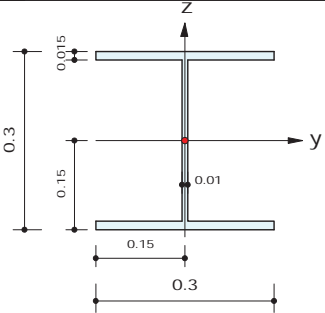
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	530
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -253.28 (LCB: 60+MY, POS:I)
Bending Moments	My = 85.9840, Mz = 8.57979
End Moments	Myi = 85.9840, Myj = 72.8577 (for Lb) Myi = 85.9840, Myj = 44.4384 (for Ly) Mzi = 8.57979, Mzj = -8.8075 (for Lz)
Shear Forces	Fyy = -12.958 (LCB: 60-MZ, POS:1/2) Fzz = 63.8635 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 253.28/3955.71 = 0.064 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 85.984/449.278 = 0.191 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 8.580/152.194 = 0.056 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.328 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.014 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.101 < 1.000$ O.K

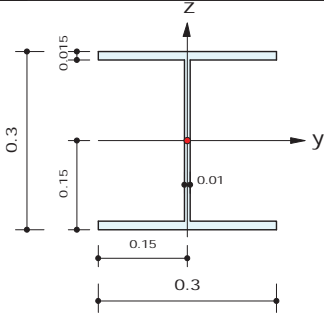
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	531
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -247.92 (LCB: 60+MY, POS:I)
Bending Moments	My = 85.0608, Mz = 9.35316
End Moments	Myi = 85.0608, Myj = 70.7490 (for Lb) Myi = 85.0608, Myj = 42.9221 (for Ly) Mzi = 9.35316, Mzj = -8.7992 (for Lz)
Shear Forces	Fyy = 28.5015 (LCB: 60+MZ, POS:I) Fzz = 63.2099 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 247.92/3955.71 = 0.063 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 85.061/449.278 = 0.189 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 9.353/152.194 = 0.061 < 1.000$ O.K
Combined Resistance	$R.byN = N_{Ed}/(A*fy/\gamma M0)$, $R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN + R.byM, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.329 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.016 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.100 < 1.000$ O.K

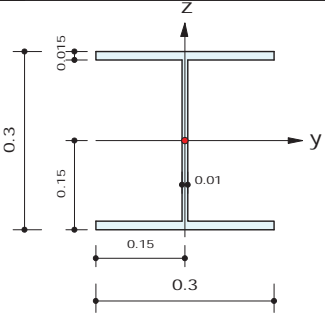
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	532
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -241.34 (LCB: 60+MY, POS:I)
Bending Moments	My = 81.9795, Mz = 9.73096
End Moments	Myi = 81.9795, Myj = 67.7809 (for Lb) Myi = 81.9795, Myj = 37.7156 (for Ly) Mzi = 9.73096, Mzj = -8.6807 (for Lz)
Shear Forces	Fyy = -29.939 (LCB: 60-MZ, POS:I) Fzz = 62.1161 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 241.34/3955.71 = 0.061 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 81.979/449.278 = 0.182 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 9.731/152.194 = 0.064 < 1.000$ O.K
Combined Resistance	$R.byN = N_{Ed}/(A*fy/\gamma M0)$, $R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN + R.byM, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.323 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.017 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.098 < 1.000$ O.K

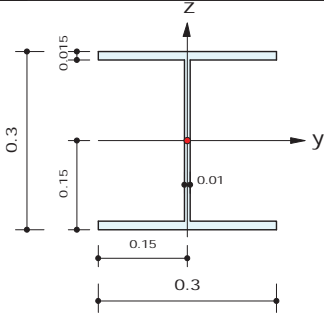
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	533
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -310.36 (LCB: 60+MY, POS:I)
Bending Moments	My = 56.6550, Mz = 5.21890
End Moments	Myi = 56.6550, Myj = 49.4479 (for Lb) Myi = 56.6550, Myj = 25.8063 (for Ly) Mzi = 5.21890, Mzj = -5.2420 (for Lz)
Shear Forces	Fyy = 13.9408 (LCB: 60+FY, POS:1/2) Fzz = 59.0859 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 310.36/3955.71 = 0.078 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 56.655/449.278 = 0.126 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 5.219/152.194 = 0.034 < 1.000$ O.K

Combined Resistance

$R_{byN} = N_{Ed}/(A*fy/\gamma M0), R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.251 < 1.000$... O.K


Shear Resistance

$V_{Edy}/Vy_{Rd} = 0.010 < 1.000$ O.K

$V_{Edz}/Vz_{Rd} = 0.093 < 1.000$ O.K

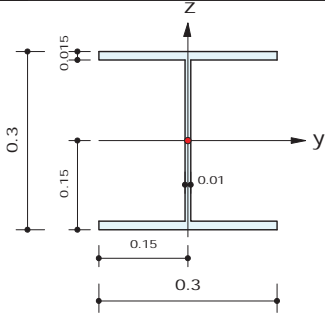
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	534
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -371.91 (LCB: 60+MY, POS:I)
Bending Moments	My = 55.2371, Mz = -6.9079
End Moments	Myi = 55.2371, Myj = 51.3808 (for Lb) Myi = 55.2371, Myj = 37.0299 (for Ly) Mzi = -6.9079, Mzj = 7.39090 (for Lz)
Shear Forces	Fyy = -19.268 (LCB: 60-MZ, POS:I) Fzz = 57.7411 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 371.91/3955.71 = 0.094 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 55.237/449.278 = 0.123 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 6.908/152.194 = 0.045 < 1.000$ O.K

Combined Resistance

$R_{byN} = N_{Ed}/(A*fy/\gamma M0), R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.276 < 1.000$... O.K

Shear Resistance

$V_{Edy}/Vy_{Rd} = 0.011 < 1.000$ O.K

$V_{Edz}/Vz_{Rd} = 0.091 < 1.000$ O.K

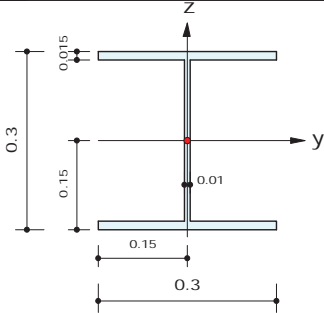
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	535
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -268.31 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 74.6602, Mz = 13.8028
End Moments	Myi = 77.4391, Myj = 75.8918 (for Lb) Myi = 77.4391, Myj = 58.3502 (for Ly) Mzi = -10.235, Mzj = 12.9529 (for Lz)
Shear Forces	Fyy = -33.135 (LCB: 60-MZ, POS:I) Fzz = 63.5586 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{\min[N_{c,Rd}, N_{b,Rd}]} = \frac{268.31}{3955.71} = 0.068 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{74.660}{449.278} = 0.166 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{13.803}{152.194} = 0.091 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{byN} = \frac{N_{Ed}}{A \cdot f_y / \gamma_{M0}}, R_{byM} = \frac{M_{Edy}}{M_{y,Rd}} + \frac{M_{Edz}}{M_{z,Rd}}$$

$$R_{c,LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{c,LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = \max[R_{byN} + R_{byM}, \max(R_{c,LT1} + R_{b,LT1}, R_{c,LT2} + R_{b,LT2})] = 0.341 < 1.000 \dots \text{O.K}$$


Shear Resistance

$$\frac{V_{Edy}}{V_{y,Rd}} = 0.019 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z,Rd}} = 0.100 < 1.000 \dots\dots\dots \text{O.K}$$

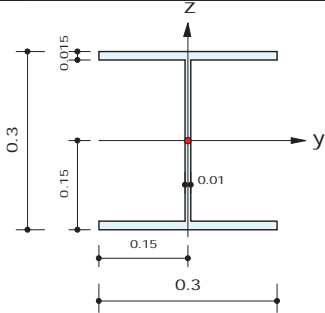
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	536
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -250.92 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 81.4932, Mz = 12.3726
End Moments	Myi = 79.7206, Myj = 62.6185 (for Lb) Myi = 83.0928, Myj = 62.6185 (for Ly) Mzi = 12.5811, Mzj = -3.6579 (for Lz)
Shear Forces	Fyy = -31.185 (LCB: 60-MZ, POS:I) Fzz = 60.6705 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{\min[N_{c,Rd}, N_{b,Rd}]} = \frac{250.92}{3955.71} = 0.063 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{81.493}{449.278} = 0.181 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{12.373}{152.194} = 0.081 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{byN} = \frac{N_{Ed}}{A \cdot f_y / \gamma_{M0}}, R_{byM} = \frac{M_{Edy}}{M_{y,Rd}} + \frac{M_{Edz}}{M_{z,Rd}}$$

$$R_{c,LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{c,LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = \max[R_{byN} + R_{byM}, \max(R_{c,LT1} + R_{b,LT1}, R_{c,LT2} + R_{b,LT2})] = 0.343 < 1.000 \dots \text{O.K}$$

Shear Resistance

$$\frac{V_{Edy}}{V_{y,Rd}} = 0.018 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z,Rd}} = 0.096 < 1.000 \dots\dots\dots \text{O.K}$$

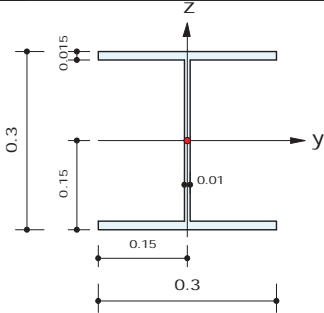
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	537
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -243.94 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 82.5433, Mz = 10.2229
End Moments	Myi = 84.8452, Myj = 82.5433 (for Lb) Myi = 84.8452, Myj = 62.6431 (for Ly) Mzi = -8.3758, Mzj = 10.2229 (for Lz)
Shear Forces	Fyy = -25.320 (LCB: 60-MZ, POS:I) Fzz = 58.5417 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 243.94/3955.71 = 0.062 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 82.543/449.278 = 0.184 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 10.223/152.194 = 0.067 < 1.000$ O.K

Combined Resistance

$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$

$Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.328 < 1.000$... O.K


Shear Resistance

$V_{Edy}/Vy_{Rd} = 0.014 < 1.000$ O.K

$V_{Edz}/Vz_{Rd} = 0.093 < 1.000$ O.K

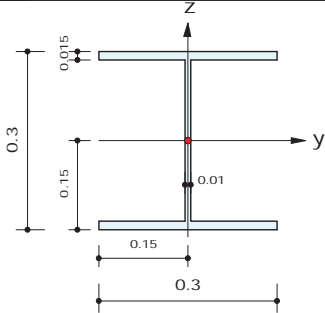
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	538
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -244.36 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 80.7482, Mz = 7.76124
End Moments	Myi = 83.8806, Myj = 80.7482 (for Lb) Myi = 83.8806, Myj = 59.2607 (for Ly) Mzi = -6.8262, Mzj = 7.76124 (for Lz)
Shear Forces	Fyy = -19.125 (LCB: 60-MZ, POS:I) Fzz = 58.5724 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 244.36/3955.71 = 0.062 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 80.748/449.278 = 0.180 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 7.761/152.194 = 0.051 < 1.000$ O.K

Combined Resistance

$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$

$Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.307 < 1.000$... O.K

Shear Resistance

$V_{Edy}/Vy_{Rd} = 0.011 < 1.000$ O.K

$V_{Edz}/Vz_{Rd} = 0.093 < 1.000$ O.K

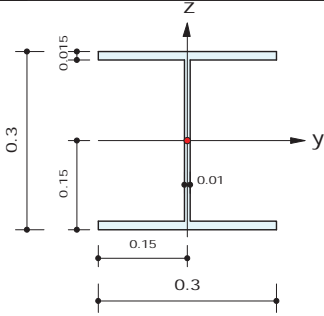
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	539
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -250.93 (LCB: 60+MY, POS:I)
Bending Moments	My = 80.2796, Mz = -4.6944
End Moments	Myi = 80.2796, Myj = 75.3021 (for Lb) Myi = 80.2796, Myj = 51.3273 (for Ly) Mzi = -4.6944, Mzj = 5.07965 (for Lz)
Shear Forces	Fyy = -12.430 (LCB: 60-MZ, POS:I) Fzz = 59.7437 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 250.93/3955.71 = 0.063 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 80.280/449.278 = 0.179 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 4.694/152.194 = 0.031 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rc.LT1 = $N_{Ed}/(\chi y * A * fy / \gamma M1)$ Rb.LT1 = $(kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$ Rc.LT2 = $N_{Ed}/(\chi z * A * fy / \gamma M1)$ Rb.LT2 = $(Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.287 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.007 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.094 < 1.000$ O.K

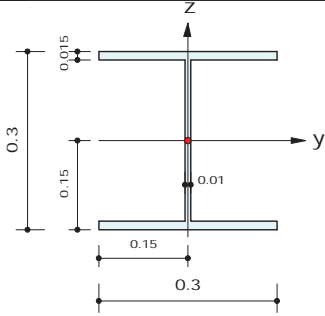
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	540
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -240.27 (LCB: 60+MY, POS:I)
Bending Moments	My = 79.7837, Mz = -2.7362
End Moments	Myi = 79.7837, Myj = 74.0859 (for Lb) Myi = 79.7837, Myj = 48.7902 (for Ly) Mzi = -2.7362, Mzj = 2.71949 (for Lz)
Shear Forces	Fyy = 7.57298 (LCB: 60-MZ, POS:J) Fzz = 57.8289 (LCB: 52+MX, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 240.27/3955.71 = 0.061 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 79.784/449.278 = 0.178 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.736/152.194 = 0.018 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rc.LT1 = $N_{Ed}/(\chi y * A * fy / \gamma M1)$ Rb.LT1 = $(kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$ Rc.LT2 = $N_{Ed}/(\chi z * A * fy / \gamma M1)$ Rb.LT2 = $(Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.269 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.004 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.091 < 1.000$ O.K

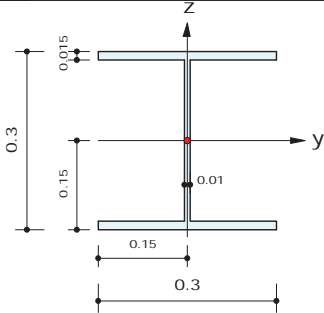
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	541
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -214.65 (LCB: 60+MY, POS:I)
Bending Moments	My = 83.5114, Mz = -2.2368
End Moments	Myi = 83.5114, Myj = 80.0131 (for Lb) Myi = 83.5114, Myj = 56.8452 (for Ly) Mzi = -2.2368, Mzj = 2.21023 (for Lz)
Shear Forces	Fyy = -1.5156 (LCB: 60-FY, POS:1/2) Fzz = 55.7415 (LCB: 52+MX, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 214.65/3955.71 = 0.054 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 83.511/449.278 = 0.186 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.237/152.194 = 0.015 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.267 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.003 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.088 < 1.000$ O.K

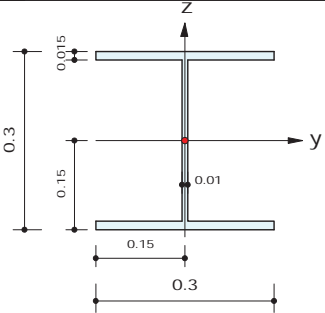
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	542
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -114.36 (LCB: 54+MY, POS:I)
Bending Moments	My = 96.8918, Mz = -0.6348
End Moments	Myi = 96.8918, Myj = 90.4268 (for Lb) Myi = 96.8918, Myj = 59.6100 (for Ly) Mzi = -0.6348, Mzj = 0.23148 (for Lz)
Shear Forces	Fyy = -0.9124 (LCB: 60-MZ, POS:1/2) Fzz = 54.6632 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 114.36/3955.71 = 0.029 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 96.892/449.278 = 0.216 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.635/152.194 = 0.004 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.261 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.001 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.086 < 1.000$ O.K

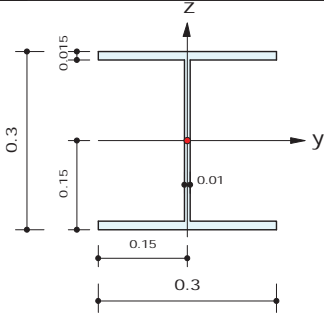
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	543
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -121.04 (LCB: 54+MY, POS:1/4)
Bending Moments	My = 96.8716, Mz = -0.4349
End Moments	Myi = 96.2764, Myj = 89.4842 (for Lb) Myi = 96.2764, Myj = 58.0295 (for Ly) Mzi = 0.51342, Mzj = -1.3274 (for Lz)
Shear Forces	Fyy = -4.7745 (LCB: 60-MZ, POS:1/2) Fzz = 55.6283 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 121.04/3955.71 = 0.031 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 96.872/449.278 = 0.216 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 0.435/152.194 = 0.003 < 1.000$ O.K

Combined Resistance

$R_{byN} = N_{Ed}/(A*fy/\gamma M0), R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.261 < 1.000$... O.K


Shear Resistance

$V_{Edy}/Vy_{Rd} = 0.003 < 1.000$ O.K

$V_{Edz}/Vz_{Rd} = 0.088 < 1.000$ O.K

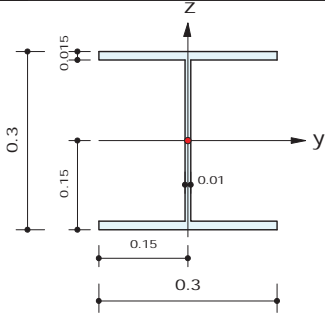
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	544
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -232.62 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 79.4569, Mz = -3.3853
End Moments	Myi = 75.3681, Myj = 56.7468 (for Lb) Myi = 81.9334, Myj = 56.7468 (for Ly) Mzi = -3.9173, Mzj = 1.22917 (for Lz)
Shear Forces	Fyy = -8.6431 (LCB: 60-MZ, POS:1/2) Fzz = 56.7046 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 232.62/3955.71 = 0.059 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 79.457/449.278 = 0.177 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 3.385/152.194 = 0.022 < 1.000$ O.K

Combined Resistance

$R_{byN} = N_{Ed}/(A*fy/\gamma M0), R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$

$Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.271 < 1.000$... O.K

Shear Resistance

$V_{Edy}/Vy_{Rd} = 0.005 < 1.000$ O.K

$V_{Edz}/Vz_{Rd} = 0.090 < 1.000$ O.K

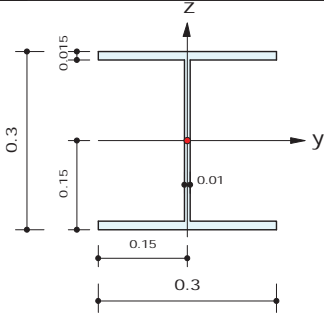
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	545
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -234.51 (LCB: 60+MY, POS:I)
Bending Moments	My = 81.1744, Mz = -2.7732
End Moments	Myi = 81.1744, Myj = 78.5874 (for Lb) Myi = 81.1744, Myj = 55.5900 (for Ly) Mzi = -2.7732, Mzj = 2.76163 (for Lz)
Shear Forces	Fyy = 7.40324 (LCB: 60-MZ, POS:J) Fzz = 56.9297 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 234.51/3955.71 = 0.059 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 81.174/449.278 = 0.181 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.773/152.194 = 0.018 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.271 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.004 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.090 < 1.000$ O.K

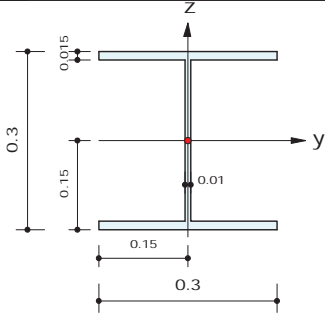
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	546
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -212.59 (LCB: 60+MY, POS:I)
Bending Moments	My = 83.2489, Mz = -1.3752
End Moments	Myi = 83.2489, Myj = 80.2595 (for Lb) Myi = 83.2489, Myj = 57.3997 (for Ly) Mzi = -1.3752, Mzj = 1.08436 (for Lz)
Shear Forces	Fyy = -4.6004 (LCB: 60-MZ, POS:I) Fzz = 55.9161 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 212.59/3955.71 = 0.054 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 83.249/449.278 = 0.185 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.375/152.194 = 0.009 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.260 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.003 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.088 < 1.000$ O.K

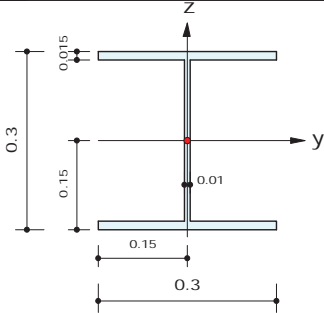
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	547
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -120.86 (LCB: 54+MY, POS:1/4)
Bending Moments	My = 96.6786, Mz = -0.2717
End Moments	Myi = 96.1156, Myj = 89.4590 (for Lb) Myi = 96.1156, Myj = 58.4136 (for Ly) Mzi = 0.25529, Mzj = -0.8178 (for Lz)
Shear Forces	Fyy = 0.53325 (LCB: 60+FY, POS:1/2) Fzz = 54.9784 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 120.86/3955.71 = 0.031 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 96.679/449.278 = 0.215 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 0.272/152.194 = 0.002 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$$

$$Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.260 < 1.000 \dots O.K$$


Shear Resistance

$$V_{Edy}/Vy_{Rd} = 0.001 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/Vz_{Rd} = 0.087 < 1.000 \dots\dots\dots O.K$$

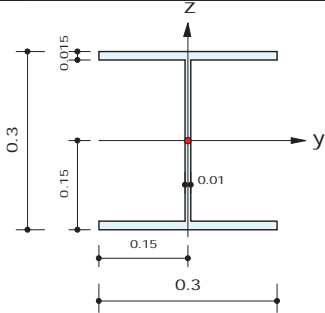
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	548
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -216.55 (LCB: 60+MY, POS:I)
Bending Moments	My = 82.6891, Mz = 2.06614
End Moments	Myi = 82.6891, Myj = 79.0548 (for Lb) Myi = 82.6891, Myj = 55.9103 (for Ly) Mzi = 2.06614, Mzj = -2.8619 (for Lz)
Shear Forces	Fyy = -4.8516 (LCB: 60-MZ, POS:1/2) Fzz = 56.0239 (LCB: 52-MX, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 216.55/3955.71 = 0.055 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 82.689/449.278 = 0.184 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 2.066/152.194 = 0.014 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$$

$$Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.265 < 1.000 \dots O.K$$

Shear Resistance

$$V_{Edy}/Vy_{Rd} = 0.004 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/Vz_{Rd} = 0.089 < 1.000 \dots\dots\dots O.K$$

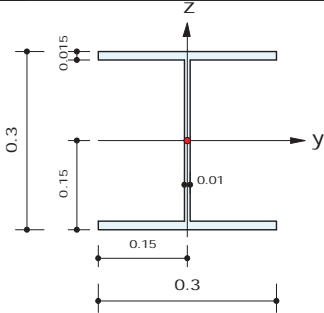
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	549
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -241.87 (LCB: 60+MY, POS:I)
Bending Moments	My = 79.2259, Mz = 2.44194
End Moments	Myi = 79.2259, Myj = 73.3265 (for Lb) Myi = 79.2259, Myj = 48.2894 (for Ly) Mzi = 2.44194, Mzj = -3.1644 (for Lz)
Shear Forces	Fyy = -7.3976 (LCB: 60-MZ, POS:1/2) Fzz = 58.1015 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 241.87/3955.71 = 0.061 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 79.226/449.278 = 0.176 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.442/152.194 = 0.016 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.266 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.004 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.092 < 1.000$ O.K

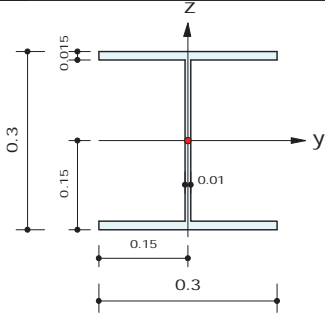
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	550
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -260.80 (LCB: 60+MY, POS:I)
Bending Moments	My = 80.2692, Mz = 4.15058
End Moments	Myi = 80.2692, Myj = 75.5877 (for Lb) Myi = 80.2692, Myj = 52.0461 (for Ly) Mzi = 4.15058, Mzj = -4.7095 (for Lz)
Shear Forces	Fyy = -6.3034 (LCB: 60-MZ, POS:1/2) Fzz = 58.7808 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 260.80/3955.71 = 0.066 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 80.269/449.278 = 0.179 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 4.151/152.194 = 0.027 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.285 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.006 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.093 < 1.000$ O.K

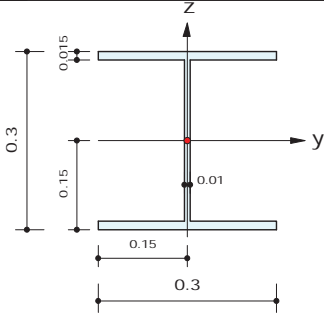
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	551
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -242.64 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 81.2309, Mz = -7.5273
End Moments	Myi = 78.9506, Myj = 60.4826 (for Lb) Myi = 84.0214, Myj = 60.4826 (for Ly) Mzi = -4.6177, Mzj = 0.88933 (for Lz)
Shear Forces	Fyy = 17.9062 (LCB: 60+MZ, POS:I) Fzz = 57.3893 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 242.64/3955.71 = 0.061 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 81.231/449.278 = 0.181 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 7.527/152.194 = 0.049 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.306 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.010 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.091 < 1.000$ O.K

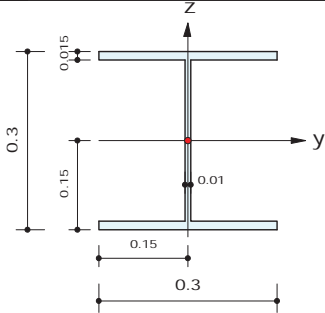
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	552
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -239.58 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 83.3887, Mz = -10.522
End Moments	Myi = 85.1447, Myj = 83.3887 (for Lb) Myi = 85.1447, Myj = 64.3660 (for Ly) Mzi = 8.45090, Mzj = -10.522 (for Lz)
Shear Forces	Fyy = -15.974 (LCB: 60-MZ, POS:1/2) Fzz = 56.9472 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 239.58/3955.71 = 0.061 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 83.389/449.278 = 0.186 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 10.522/152.194 = 0.069 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.331 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.015 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.090 < 1.000$ O.K

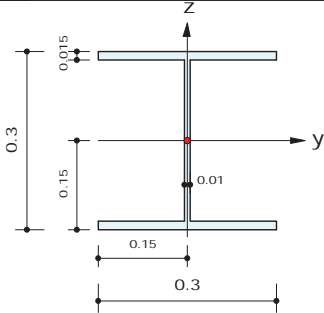
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	553
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -230.12 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 81.6820, Mz = -14.398
End Moments	Myi = 84.8883, Myj = 83.2259 (for Lb) Myi = 84.8883, Myj = 65.4036 (for Ly) Mzi = 10.1153, Mzj = -13.213 (for Lz)
Shear Forces	Fyy = -24.263 (LCB: 60-MZ, POS:1/2) Fzz = 57.9980 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Oyb	0.07324	Ozb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 230.12/3955.71 = 0.058 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 81.682/449.278 = 0.182 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 14.398/152.194 = 0.095 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.352 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.019 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.092 < 1.000$ O.K

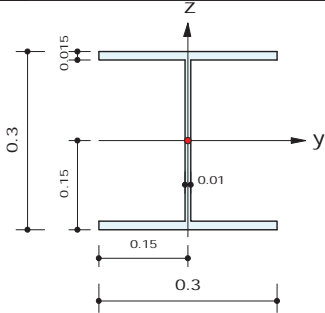
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	554
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -252.54 (LCB: 60+MY, POS:1/2)
Bending Moments	My = 79.6318, Mz = -16.505
End Moments	Myi = 83.3037, Myj = 80.0839 (for Lb) Myi = 83.3037, Myj = 62.5247 (for Ly) Mzi = 11.0470, Mzj = -14.519 (for Lz)
Shear Forces	Fyy = -29.190 (LCB: 60-MZ, POS:1/2) Fzz = 57.6733 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Oyb	0.07324	Ozb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 252.54/3955.71 = 0.064 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 79.632/449.278 = 0.177 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 16.505/152.194 = 0.108 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.367 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.020 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.091 < 1.000$ O.K

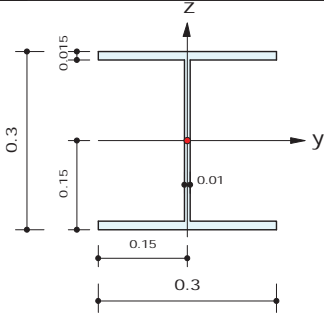
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	555
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -350.22 (LCB: 60+MY, POS:I)
Bending Moments	My = 60.6464, Mz = 7.16750
End Moments	Myi = 60.6464, Myj = 54.2626 (for Lb) Myi = 60.6464, Myj = 38.8654 (for Ly) Mzi = 7.16750, Mzj = -8.2399 (for Lz)
Shear Forces	Fyy = -19.542 (LCB: 60-MZ, POS:1/2) Fzz = 54.0255 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 350.22/3955.71 = 0.089 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 60.646/449.278 = 0.135 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 7.167/152.194 = 0.047 < 1.000$ O.K

Combined Resistance

$R_{byN} = N_{Ed}/(A*fy/\gamma M0), R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$

$Rmax = MAX[R_{byN}+R_{byM}, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.284 < 1.000$... O.K


Shear Resistance

$V_{Edy}/Vy_{Rd} = 0.012 < 1.000$ O.K

$V_{Edz}/Vz_{Rd} = 0.085 < 1.000$ O.K

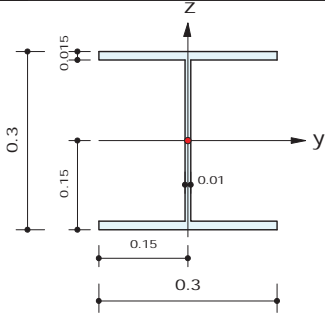
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	556
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = -602.17 (LCB: 60-FX, POS:I)
Bending Moments	My = -0.9377, Mz = 1.67591
End Moments	Myi = -0.9377, Myj = -0.9269 (for Lb) Myi = -0.9377, Myj = -0.9269 (for Ly) Mzi = 1.67591, Mzj = -0.3180 (for Lz)
Shear Forces	Fyy = -23.135 (LCB: 60-FY, POS:J) Fzz = -5.3068 (LCB: 54-FZ, POS:I)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 602.17/3955.71 = 0.152 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 0.938/449.278 = 0.002 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 1.676/152.194 = 0.011 < 1.000$ O.K

Combined Resistance

$R_{byN} = N_{Ed}/(A*fy/\gamma M0), R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$

$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$

$Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$

$Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$

$Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$

$Rmax = MAX[R_{byN}+R_{byM}, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.173 < 1.000$... O.K

Shear Resistance

$V_{Edy}/Vy_{Rd} = 0.013 < 1.000$ O.K

$V_{Edz}/Vz_{Rd} = 0.008 < 1.000$ O.K

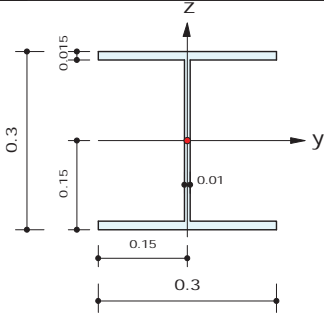
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	557
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -681.81 (LCB: 60-FY, POS:J)
Bending Moments	My = -1.1521, Mz = 0.59895
End Moments	Myi = -0.8955, Myj = -1.1521 (for Lb) Myi = -2.4486, Myj = -1.1521 (for Ly) Mzi = -0.1854, Mzj = 0.59895 (for Lz)
Shear Forces	Fyy = -0.7843 (LCB: 60-FY, POS:J) Fzz = 17.9178 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 681.81/3955.71 = 0.172 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 1.152/449.278 = 0.003 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 0.599/152.194 = 0.004 < 1.000$ O.K

Combined Resistance

$R_{byN} = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R_{byM} = M_{Edy}/M_{yRd} + M_{Edz}/M_{zRd}$

$R_{c.LT1} = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$

$R_{b.LT1} = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{elz} \cdot f_y / \gamma_{M1})$

$R_{c.LT2} = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$

$R_{b.LT2} = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{elz} \cdot f_y / \gamma_{M1})$

$R_{max} = MAX[R_{byN} + R_{byM}, MAX(R_{c.LT1} + R_{b.LT1}, R_{c.LT2} + R_{b.LT2})] = 0.187 < 1.000$... O.K


Shear Resistance

$V_{Edy}/V_{yRd} = 0.000 < 1.000$ O.K

$V_{Edz}/V_{zRd} = 0.028 < 1.000$ O.K

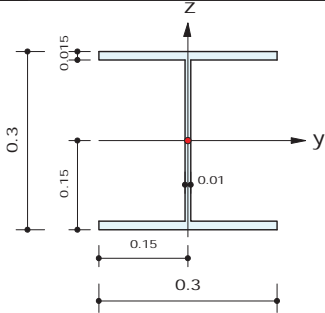
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	558
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = -585.09 (LCB: 60+FZ, POS:I)
Bending Moments	My = 5.00049, Mz = -4.2307
End Moments	Myi = 5.00049, Myj = 4.30846 (for Lb) Myi = 5.00049, Myj = 4.30846 (for Ly) Mzi = -4.2307, Mzj = 0.43477 (for Lz)
Shear Forces	Fyy = 42.6171 (LCB: 60+FY, POS:J) Fzz = -5.2607 (LCB: 54-FZ, POS:I)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 585.09/3955.71 = 0.148 < 1.000$ O.K

Bending Resistance

$M_{Edy}/M_{Rdy} = 5.000/449.278 = 0.011 < 1.000$ O.K

$M_{Edz}/M_{Rdz} = 4.231/152.194 = 0.028 < 1.000$ O.K

Combined Resistance

$R_{byN} = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R_{byM} = M_{Edy}/M_{yRd} + M_{Edz}/M_{zRd}$

$R_{c.LT1} = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$

$R_{b.LT1} = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{elz} \cdot f_y / \gamma_{M1})$

$R_{c.LT2} = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$

$R_{b.LT2} = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{elz} \cdot f_y / \gamma_{M1})$

$R_{max} = MAX[R_{byN} + R_{byM}, MAX(R_{c.LT1} + R_{b.LT1}, R_{c.LT2} + R_{b.LT2})] = 0.196 < 1.000$... O.K

Shear Resistance

$V_{Edy}/V_{yRd} = 0.024 < 1.000$ O.K

$V_{Edz}/V_{zRd} = 0.008 < 1.000$ O.K

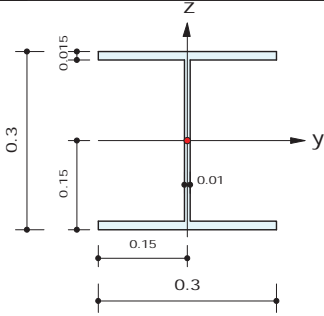
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	559
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = -626.29 (LCB: 60-FX, POS:I)
Bending Moments	My = -0.5392, Mz = 3.25130
End Moments	Myi = -0.5392, Myj = -0.3628 (for Lb) Myi = -0.5392, Myj = -0.3628 (for Ly) Mzi = 3.25130, Mzj = -1.8425 (for Lz)
Shear Forces	Fyy = 22.1058 (LCB: 60+MZ, POS:1/4) Fzz = -9.1899 (LCB: 54-FZ, POS:I)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 626.29/3955.71 = 0.158 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 0.539/449.278 = 0.001 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 3.251/152.194 = 0.021 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$$

$$Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.190 < 1.000 \dots O.K$$


Shear Resistance

$$V_{Edy}/Vy_{Rd} = 0.013 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/Vz_{Rd} = 0.015 < 1.000 \dots\dots\dots O.K$$

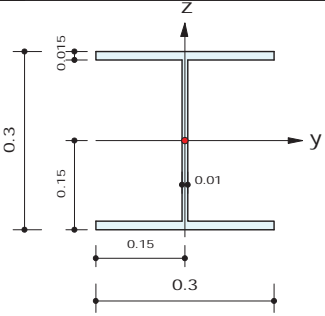
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	560
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -720.32 (LCB: 60-FX, POS:J)
Bending Moments	My = -3.6473, Mz = 0.85232
End Moments	Myi = -2.9795, Myj = -3.6473 (for Lb) Myi = -1.7108, Myj = -3.6473 (for Ly) Mzi = -0.3336, Mzj = 0.85232 (for Lz)
Shear Forces	Fyy = 2.81366 (LCB: 60-MZ, POS:J) Fzz = 18.1883 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 720.32/3955.71 = 0.182 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 3.647/449.278 = 0.008 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 0.852/152.194 = 0.006 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$$

$$Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.205 < 1.000 \dots O.K$$

Shear Resistance

$$V_{Edy}/Vy_{Rd} = 0.002 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/Vz_{Rd} = 0.029 < 1.000 \dots\dots\dots O.K$$

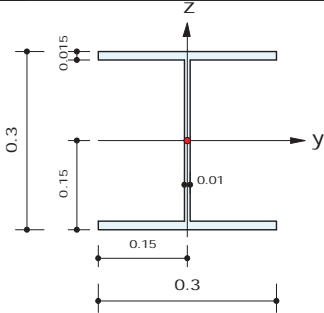
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	561
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 2.00000



2. Member Forces

Axial Force	Fxx = -697.79 (LCB: 60-FX, POS:J)
Bending Moments	My = -7.5865, Mz = -0.9345
End Moments	Myi = -4.0805, Myj = -7.5865 (for Lb) Myi = -1.2499, Myj = -7.5865 (for Ly) Mzi = 1.37567, Mzj = -0.9345 (for Lz)
Shear Forces	Fyy = 2.78693 (LCB: 60-MZ, POS:J) Fzz = 20.2686 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 2.00000, Lz = 2.00000, Lb = 2.00000
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{\min[N_{c,Rd}, N_{b,Rd}]} = \frac{697.79}{3955.71} = 0.176 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{7.587}{449.278} = 0.017 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{0.935}{152.194} = 0.006 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{byN} = \frac{N_{Ed}}{A \cdot f_y / \gamma_{M0}}, R_{byM} = \frac{M_{Edy}}{M_{y,Rd}} + \frac{M_{Edz}}{M_{z,Rd}}$$

$$R_{c,LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{c,LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = \max[R_{byN} + R_{byM}, \max(R_{c,LT1} + R_{b,LT1}, R_{c,LT2} + R_{b,LT2})] = 0.209 < 1.000 \dots \text{O.K}$$


Shear Resistance

$$\frac{V_{Edy}}{V_{y,Rd}} = 0.002 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z,Rd}} = 0.032 < 1.000 \dots\dots\dots \text{O.K}$$

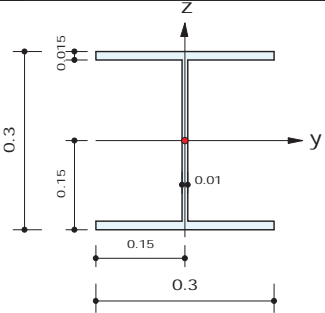
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	562
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = -725.69 (LCB: 60-FX, POS:I)
Bending Moments	My = -16.700, Mz = -0.6024
End Moments	Myi = -16.700, Myj = -15.831 (for Lb) Myi = -16.700, Myj = -15.831 (for Ly) Mzi = -0.6024, Mzj = -0.7382 (for Lz)
Shear Forces	Fyy = -17.283 (LCB: 55-MZ, POS:1/4) Fzz = -6.7747 (LCB: 54-MY, POS:I)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$\frac{N_{Ed}}{\min[N_{c,Rd}, N_{b,Rd}]} = \frac{725.69}{3955.71} = 0.183 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$\frac{M_{Edy}}{M_{Rdy}} = \frac{16.700}{449.278} = 0.037 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{M_{Edz}}{M_{Rdz}} = \frac{0.602}{152.194} = 0.004 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R_{byN} = \frac{N_{Ed}}{A \cdot f_y / \gamma_{M0}}, R_{byM} = \frac{M_{Edy}}{M_{y,Rd}} + \frac{M_{Edz}}{M_{z,Rd}}$$

$$R_{c,LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{c,LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$$

$$R_{b,LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$$

$$R_{max} = \max[R_{byN} + R_{byM}, \max(R_{c,LT1} + R_{b,LT1}, R_{c,LT2} + R_{b,LT2})] = 0.235 < 1.000 \dots \text{O.K}$$

Shear Resistance

$$\frac{V_{Edy}}{V_{y,Rd}} = 0.010 < 1.000 \dots\dots\dots \text{O.K}$$

$$\frac{V_{Edz}}{V_{z,Rd}} = 0.011 < 1.000 \dots\dots\dots \text{O.K}$$

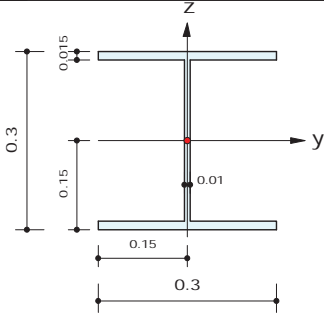
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	563
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = -771.11 (LCB: 60-FX, POS:I)
Bending Moments	My = -29.579, Mz = -1.7515
End Moments	Myi = -29.579, Myj = -28.351 (for Lb) Myi = -29.579, Myj = -28.351 (for Ly) Mzi = -1.7515, Mzj = 0.12633 (for Lz)
Shear Forces	Fyy = -12.146 (LCB: 60-FY, POS:J) Fzz = -10.110 (LCB: 54-MY, POS:I)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 771.11/3955.71 = 0.195 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 29.579/449.278 = 0.066 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 1.752/152.194 = 0.012 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.285 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.007 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.016 < 1.000$ O.K

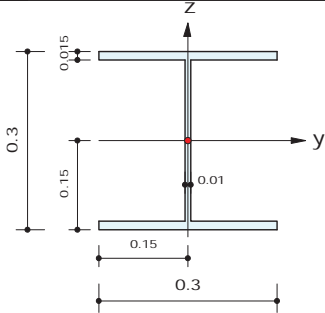
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	564
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = -239.30 (LCB: 60+MZ, POS:I)
Bending Moments	My = -2.0620, Mz = 23.1856
End Moments	Myi = -2.0620, Myj = -12.314 (for Lb) Myi = -2.0620, Myj = -12.314 (for Ly) Mzi = 23.1856, Mzj = 2.12116 (for Lz)
Shear Forces	Fyy = 89.2732 (LCB: 60+MZ, POS:I) Fzz = 20.6884 (LCB: 60+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 239.30/3955.71 = 0.060 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 2.062/449.278 = 0.005 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 23.186/152.194 = 0.152 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.228 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.051 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.033 < 1.000$ O.K

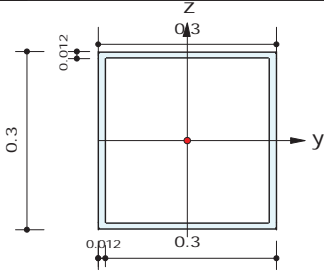
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	565
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 234.088 (LCB: 60+FX, POS:I)
Bending Moments	My = -37.144, Mz = -56.244
End Moments	Myi = -37.144, Myj = -53.540 (for Lb) Myi = -37.144, Myj = -53.540 (for Ly) Mzi = -56.244, Mzj = 19.9238 (for Lz)
Shear Forces	Fyy = -325.65 (LCB: 60-MZ, POS:1/4) Fzz = 103.177 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 234.09/4673.83 = 0.050 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 37.144/505.066 = 0.074 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 56.244/505.066 = 0.111 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.235 < 1.000 O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.232 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.066 < 1.000$ O.K

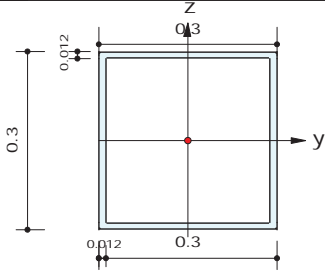
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	566
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 65.7066 (LCB: 60+FZ, POS:J)
Bending Moments	My = -56.106, Mz = 26.3269
End Moments	Myi = -34.894, Myj = -56.106 (for Lb) Myi = -34.894, Myj = -56.106 (for Ly) Mzi = -8.5576, Mzj = 26.3269 (for Lz)
Shear Forces	Fyy = 166.114 (LCB: 60+FY, POS:J) Fzz = 102.185 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 65.71/4673.83 = 0.014 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 56.106/505.066 = 0.111 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 26.327/505.066 = 0.052 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.177 < 1.000 O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.118 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.066 < 1.000$ O.K

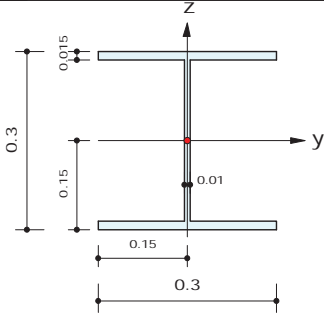
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	567
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -78.700 (LCB: 60-FX, POS:J)
Bending Moments	My = 60.6201, Mz = 15.1431
End Moments	Myi = 68.4252, Myj = 60.6201 (for Lb) Myi = 68.4252, Myj = 60.6201 (for Ly) Mzi = -2.2899, Mzj = 15.1431 (for Lz)
Shear Forces	Fyy = -86.634 (LCB: 60-MZ, POS:I) Fzz = 66.7115 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 78.70/3955.71 = 0.020 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 60.620/449.278 = 0.135 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 15.143/152.194 = 0.099 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN + R.byM, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.266 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.049 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.105 < 1.000$ O.K

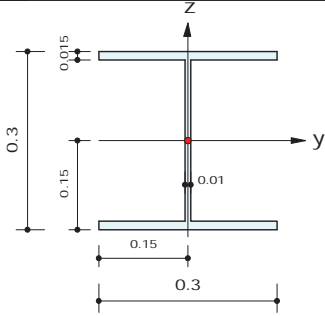
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	568
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 31.5061 (LCB: 54-MX, POS:J)
Bending Moments	My = -56.823, Mz = -17.323
End Moments	Myi = -33.649, Myj = -56.823 (for Lb) Myi = -33.649, Myj = -56.823 (for Ly) Mzi = 6.58025, Mzj = -17.323 (for Lz)
Shear Forces	Fyy = 92.2451 (LCB: 60-MX, POS:J) Fzz = 91.3863 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/Nt_{Rd} = 31.51/3955.71 = 0.008 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 56.823/449.278 = 0.126 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 17.323/152.194 = 0.114 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRRd, (R.byN + R.byM)] = 0.248 < 1.000$ O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.053 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.144 < 1.000$ O.K

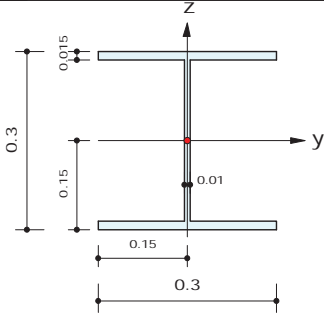
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	569
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -77.666 (LCB: 60+MY, POS:J)
Bending Moments	My = 73.4340, Mz = 6.63978
End Moments	Myi = 81.2698, Myj = 73.4340 (for Lb) Myi = 81.2698, Myj = 73.4340 (for Ly) Mzi = -1.2194, Mzj = 6.63978 (for Lz)
Shear Forces	Fyy = -37.340 (LCB: 60-MZ, POS:I) Fzz = 61.7556 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 77.67/3955.71 = 0.020 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 73.434/449.278 = 0.163 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 6.640/152.194 = 0.044 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.238 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.021 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.098 < 1.000$ O.K

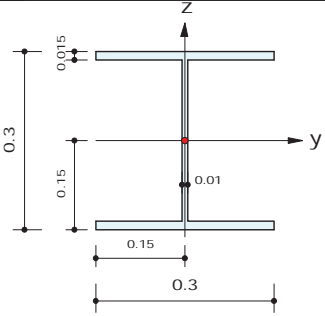
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	570
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 63.0279 (LCB: 60+FX, POS:J)
Bending Moments	My = -90.084, Mz = 4.02722
End Moments	Myi = -69.437, Myj = -90.084 (for Lb) Myi = -69.437, Myj = -90.084 (for Ly) Mzi = -0.5971, Mzj = 4.02722 (for Lz)
Shear Forces	Fyy = 43.9506 (LCB: 60-MZ, POS:J) Fzz = 99.2115 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/Nt_{Rd} = 63.03/3955.71 = 0.016 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 90.084/449.278 = 0.201 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 4.027/152.194 = 0.026 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R_{MNRd}, (R_{byN} + R_{byM})] = 0.243 < 1.000$ O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.025 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.157 < 1.000$ O.K

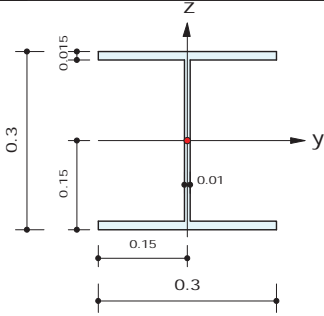
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	571
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -54.187 (LCB: 54+MY, POS:I)
Bending Moments	My = 86.9389, Mz = 0.02929
End Moments	Myi = 86.9389, Myj = 73.1105 (for Lb) Myi = 86.9389, Myj = 73.1105 (for Ly) Mzi = 0.02929, Mzj = -1.4256 (for Lz)
Shear Forces	Fyy = 21.8781 (LCB: 54-MZ, POS:J) Fzz = 61.9090 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$\frac{N_{Ed}}{MIN[Nc_{Rd}, Nb_{Rd}]} = \frac{54.19}{3955.71} = 0.014 < 1.000$ O.K
Bending Resistance	$\frac{M_{Edy}}{M_{Rdy}} = \frac{86.939}{449.278} = 0.194 < 1.000$ O.K $\frac{M_{Edz}}{M_{Rdz}} = \frac{0.029}{152.194} = 0.000 < 1.000$ O.K
Combined Resistance	$R_{byN} = \frac{N_{Ed}}{(A \cdot fy / \gamma_{M0})}$, $R_{byM} = \frac{M_{Edy}}{My_{Rd}} + \frac{M_{Edz}}{Mz_{Rd}}$ $R_{c.LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot fy / \gamma_{M1})}$ $R_{b.LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot fy / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot fy / \gamma_{M1})}{1}$ $R_{c.LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot fy / \gamma_{M1})}$ $R_{b.LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot fy / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot fy / \gamma_{M1})}{1}$ $R_{max} = MAX[R_{byN} + R_{byM}, MAX(R_{c.LT1} + R_{b.LT1}, R_{c.LT2} + R_{b.LT2})] = 0.217 < 1.000$... O.K
Shear Resistance	$\frac{V_{Edy}}{V_{yRd}} = 0.012 < 1.000$ O.K $\frac{V_{Edz}}{V_{zRd}} = 0.098 < 1.000$ O.K

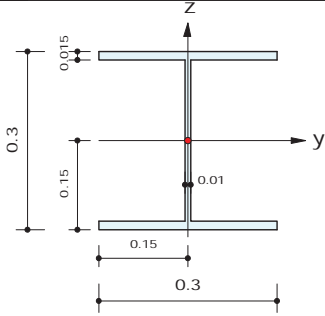
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	572
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 63.0284 (LCB: 60+FX, POS:J)
Bending Moments	My = -91.100, Mz = -3.6870
End Moments	Myi = -70.379, Myj = -91.100 (for Lb) Myi = -70.379, Myj = -91.100 (for Ly) Mzi = 0.54984, Mzj = -3.6870 (for Lz)
Shear Forces	Fyy = -24.538 (LCB: 54-FY, POS:J) Fzz = 99.7185 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$\frac{N_{Ed}}{Nt_{Rd}} = \frac{63.03}{3955.71} = 0.016 < 1.000$ O.K
Bending Resistance	$\frac{M_{Edy}}{M_{Rdy}} = \frac{91.100}{449.278} = 0.203 < 1.000$ O.K $\frac{M_{Edz}}{M_{Rdz}} = \frac{3.687}{152.194} = 0.024 < 1.000$ O.K
Combined Resistance	$R_{byN} = \frac{N_{Ed}}{(A \cdot fy / \gamma_{M0})}$, $R_{byM} = \frac{M_{Edy}}{My_{Rd}} + \frac{M_{Edz}}{Mz_{Rd}}$ $R_{max} = MAX[R_{MNRd}, (R_{byN} + R_{byM})] = 0.243 < 1.000$ O.K
Shear Resistance	$\frac{V_{Edy}}{V_{yRd}} = 0.014 < 1.000$ O.K $\frac{V_{Edz}}{V_{zRd}} = 0.158 < 1.000$ O.K

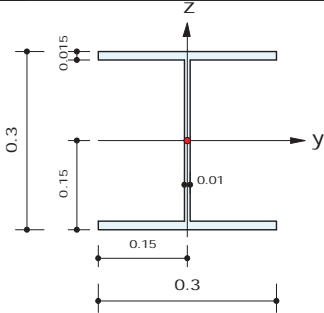
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	573
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -80.122 (LCB: 60-FX, POS:J)
Bending Moments	My = 68.7886, Mz = -10.469
End Moments	Myi = 76.1163, Myj = 68.7886 (for Lb) Myi = 76.1163, Myj = 68.7886 (for Ly) Mzi = 1.60976, Mzj = -10.469 (for Lz)
Shear Forces	Fyy = 77.0268 (LCB: 60-MZ, POS:J) Fzz = 66.8988 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 80.12/3955.71 = 0.020 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 68.789/449.278 = 0.153 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 10.469/152.194 = 0.069 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.254 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.044 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.106 < 1.000$ O.K

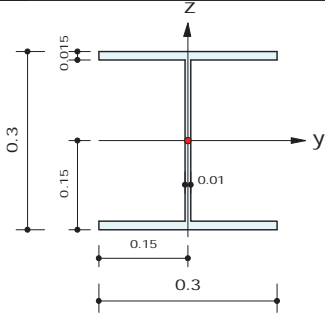
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	574
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 62.8356 (LCB: 60+FX, POS:J)
Bending Moments	My = -78.092, Mz = -9.7052
End Moments	Myi = -58.646, Myj = -78.092 (for Lb) Myi = -58.646, Myj = -78.092 (for Ly) Mzi = -0.3294, Mzj = -9.7052 (for Lz)
Shear Forces	Fyy = -74.050 (LCB: 60-FY, POS:J) Fzz = 93.4331 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/Nt_{Rd} = 62.84/3955.71 = 0.016 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 78.092/449.278 = 0.174 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 9.705/152.194 = 0.064 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R_{MNRd}, (R_{byN} + R_{byM})] = 0.253 < 1.000$ O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.042 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.148 < 1.000$ O.K

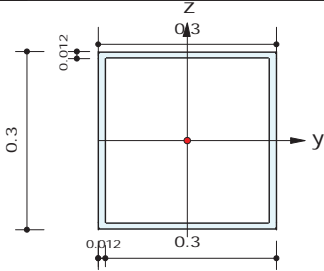
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	575
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -82.254 (LCB: 60-FX, POS:I)
Bending Moments	My = 68.5223, Mz = 65.6637
End Moments	Myi = 68.5223, Myj = 57.1336 (for Lb) Myi = 68.5223, Myj = 57.1336 (for Ly) Mzi = 65.6637, Mzj = -39.507 (for Lz)
Shear Forces	Fyy = 443.158 (LCB: 60-MZ, POS:J) Fzz = 99.1952 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 82.25/4673.83 = 0.018 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 68.522/505.066 = 0.136 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 65.664/505.066 = 0.130 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.283 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.315 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.064 < 1.000$ O.K

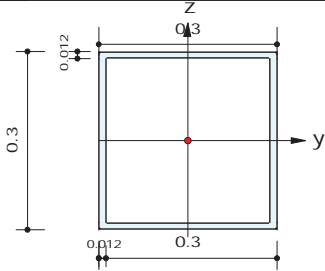
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	576
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 192.698 (LCB: 60-MY, POS:J)
Bending Moments	My = -94.129, Mz = -43.545
End Moments	Myi = -71.111, Myj = -94.129 (for Lb) Myi = -71.111, Myj = -94.129 (for Ly) Mzi = 4.09246, Mzj = -43.545 (for Lz)
Shear Forces	Fyy = 220.239 (LCB: 60-MZ, POS:J) Fzz = 110.784 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t,Rd} = 192.70/4673.83 = 0.041 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 94.129/505.066 = 0.186 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 43.545/505.066 = 0.086 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.314 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.157 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.071 < 1.000$ O.K

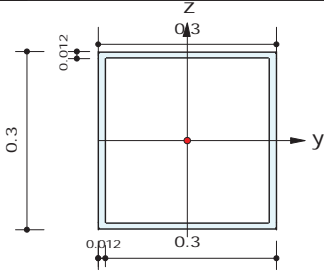
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	577
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -32.475 (LCB: 60-MZ, POS:J)
Bending Moments	My = -78.588, Mz = -42.343
End Moments	Myi = -55.715, Myj = -78.588 (for Lb) Myi = -55.715, Myj = -78.588 (for Ly) Mzi = -14.037, Mzj = -42.343 (for Lz)
Shear Forces	Fyy = 112.082 (LCB: 60-MX, POS:J) Fzz = 103.747 (LCB: 54-MX, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 32.48/4673.83 = 0.007 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 78.588/505.066 = 0.156 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 42.343/505.066 = 0.084 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.246 < 1.000 \dots\dots\dots O.K$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.080 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.067 < 1.000 \dots\dots\dots O.K$$

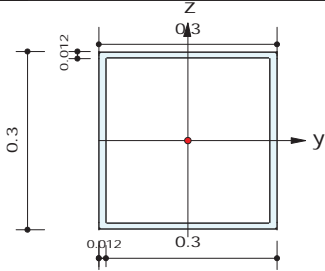
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	578
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -45.156 (LCB: 54-MY, POS:J)
Bending Moments	My = -71.869, Mz = -42.481
End Moments	Myi = -49.183, Myj = -71.869 (for Lb) Myi = -49.183, Myj = -71.869 (for Ly) Mzi = -35.939, Mzj = -42.481 (for Lz)
Shear Forces	Fyy = 110.075 (LCB: 60+FY, POS:J) Fzz = 85.9638 (LCB: 52-MX, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 45.16/4673.83 = 0.010 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 71.869/505.066 = 0.142 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 42.481/505.066 = 0.084 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.236 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.078 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.055 < 1.000 \dots\dots\dots O.K$$

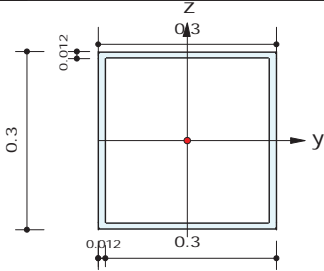
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	579
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = 56.8219 (LCB: 60-MY, POS:J)
Bending Moments	My = -40.360, Mz = -17.669
End Moments	Myi = -25.273, Myj = -40.360 (for Lb) Myi = -25.273, Myj = -40.360 (for Ly) Mzi = 0.36507, Mzj = -17.669 (for Lz)
Shear Forces	Fyy = 137.251 (LCB: 54+FZ, POS:J) Fzz = 83.7856 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 56.82/4673.83 = 0.012 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 40.360/505.066 = 0.080 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 17.669/505.066 = 0.035 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.127 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.098 < 1.000 O.K V_Edz/Vz_Rd = 0.054 < 1.000 O.K

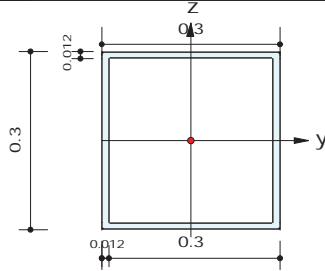
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	580
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -84.173 (LCB: 60-MY, POS:J)
Bending Moments	My = -100.14, Mz = 63.5537
End Moments	Myi = -73.218, Myj = -100.14 (for Lb) Myi = -73.218, Myj = -100.14 (for Ly) Mzi = 21.7852, Mzj = 63.5537 (for Lz)
Shear Forces	Fyy = -157.17 (LCB: 54-FY, POS:J) Fzz = 110.215 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768


3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

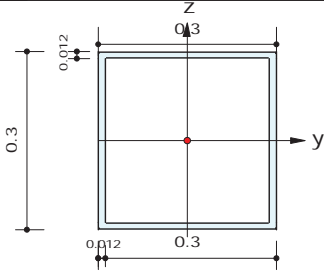
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 84.17/4673.83 = 0.018 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 100.143/505.066 = 0.198 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 63.554/505.066 = 0.126 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.342 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.112 < 1.000 O.K V_Edz/Vz_Rd = 0.071 < 1.000 O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 581
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 0.28742



2. Member Forces

Axial Force Fxx = -49.113 (LCB: 60-MY, POS:J)
Bending Moments My = -89.241, Mz = 56.4584
End Moments Myi = -68.268, Myj = -89.241 (for Lb)
Myi = -68.268, Myj = -89.241 (for Ly)
Mzi = 39.3049, Mzj = 56.4584 (for Lz)
Shear Forces Fyy = -71.503 (LCB: 54-FY, POS:J)
Fzz = 88.3215 (LCB: 54+MX, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 49.11/4673.83 = 0.011 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 89.241/505.066 = 0.177 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 56.458/505.066 = 0.112 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.299 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.051 < 1.000 \dots\dots\dots O.K$$

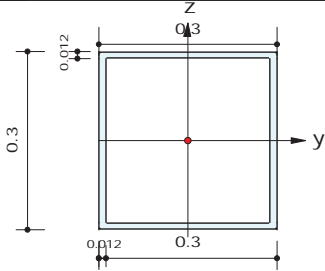
$$V_{Edz}/V_{z_Rd} = 0.057 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 582
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 0.28742



2. Member Forces

Axial Force Fxx = -5.2783 (LCB: 60-MY, POS:J)
Bending Moments My = -81.855, Mz = 38.1809
End Moments Myi = -63.793, Myj = -81.855 (for Lb)
Myi = -63.793, Myj = -81.855 (for Ly)
Mzi = 20.4016, Mzj = 38.1809 (for Lz)
Shear Forces Fyy = -87.124 (LCB: 54-FY, POS:J)
Fzz = 95.3542 (LCB: 54-FY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 5.28/4673.83 = 0.001 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 81.855/505.066 = 0.162 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 38.181/505.066 = 0.076 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), \quad R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.239 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.062 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.061 < 1.000 \dots\dots\dots O.K$$

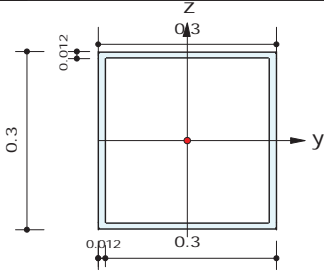
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	583
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = 2.78172 (LCB: 60-MY, POS:J)
Bending Moments	My = -118.45, Mz = 58.3621
End Moments	Myi = -93.192, Myj = -118.45 (for Lb) Myi = -93.192, Myj = -118.45 (for Ly) Mzi = 33.2485, Mzj = 58.3621 (for Lz)
Shear Forces	Fyy = -99.083 (LCB: 54-FY, POS:J) Fzz = 110.304 (LCB: 54-FY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 2.78/4673.83 = 0.001 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 118.454/505.066 = 0.235 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 58.362/505.066 = 0.116 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.351 < 1.000 O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.071 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.071 < 1.000$ O.K

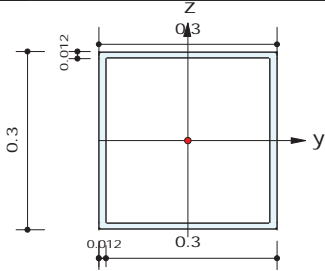
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	584
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -86.426 (LCB: 60-MY, POS:J)
Bending Moments	My = -73.544, Mz = 47.6699
End Moments	Myi = -57.357, Myj = -73.544 (for Lb) Myi = -57.357, Myj = -73.544 (for Ly) Mzi = 41.0268, Mzj = 47.6699 (for Lz)
Shear Forces	Fyy = -37.346 (LCB: 52-FY, POS:J) Fzz = 80.7939 (LCB: 54+MZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768


3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

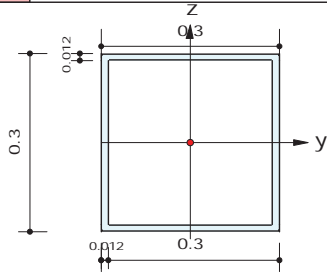
Axial Resistance	$N_{Ed}/MIN[N_{cRd}, N_{bRd}] = 86.43/4673.83 = 0.018 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 73.544/505.066 = 0.146 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 47.670/505.066 = 0.094 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.258 < 1.000 .. O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.027 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.052 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	585
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -51.414 (LCB: 60-MY, POS:J)
Bending Moments	My = -85.678, Mz = 54.2470
End Moments	Myi = -66.089, Myj = -85.678 (for Lb) Myi = -66.089, Myj = -85.678 (for Ly) Mzi = 31.9262, Mzj = 54.2470 (for Lz)
Shear Forces	Fyy = -113.08 (LCB: 54-FY, POS:J) Fzz = 89.0375 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768


3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

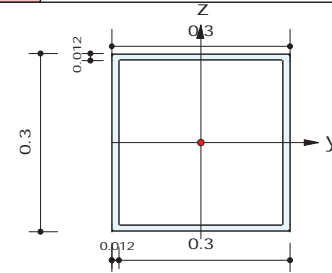
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 51.41/4673.83 = 0.011 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 85.678/505.066 = 0.170 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 54.247/505.066 = 0.107 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.288 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.080 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.057 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	586
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -31.356 (LCB: 60-MY, POS:J)
Bending Moments	My = -70.700, Mz = 35.4199
End Moments	Myi = -52.549, Myj = -70.700 (for Lb) Myi = -52.549, Myj = -70.700 (for Ly) Mzi = 29.1639, Mzj = 35.4199 (for Lz)
Shear Forces	Fyy = -92.792 (LCB: 54-FY, POS:J) Fzz = 89.5336 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768


3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

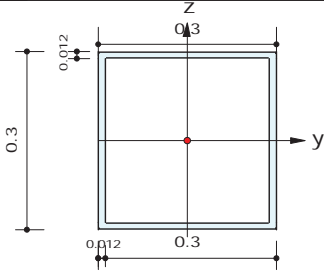
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 31.36/4673.83 = 0.007 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 70.700/505.066 = 0.140 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 35.420/505.066 = 0.070 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.217 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.066 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.058 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	587
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -64.431 (LCB: 54-MZ, POS:J)
Bending Moments	My = -86.117, Mz = -54.039
End Moments	Myi = -36.737, Myj = -86.117 (for Lb) Myi = -36.737, Myj = -86.117 (for Ly) Mzi = -15.412, Mzj = -54.039 (for Lz)
Shear Forces	Fyy = 154.242 (LCB: 54+FZ, POS:J) Fzz = 101.495 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 64.43/4673.83 = 0.014 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 86.117/505.066 = 0.171 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 54.039/505.066 = 0.107 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$


$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.291 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.110 < 1.000 \dots\dots\dots O.K$$

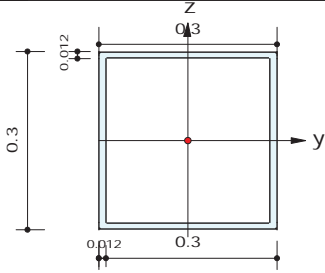
$$V_{Edz}/V_{z_Rd} = 0.065 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	588
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -31.629 (LCB: 60+MY, POS:I)
Bending Moments	My = 29.6902, Mz = 13.9731
End Moments	Myi = 29.6902, Myj = 19.4860 (for Lb) Myi = 29.6902, Myj = 19.4860 (for Ly) Mzi = 13.9731, Mzj = 8.38807 (for Lz)
Shear Forces	Fyy = 45.9583 (LCB: 60+FY, POS:J) Fzz = 61.5628 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 31.63/4673.83 = 0.007 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 29.690/505.066 = 0.059 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 13.973/505.066 = 0.028 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.093 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.033 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.040 < 1.000 \dots\dots\dots O.K$$

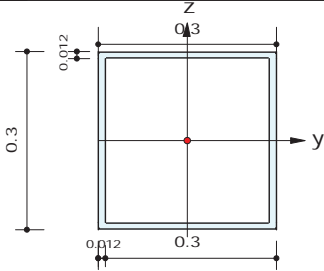
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	589
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -36.738 (LCB: 60-MY, POS:J)
Bending Moments	My = -82.965, Mz = 44.9234
End Moments	Myi = -59.991, Myj = -82.965 (for Lb) Myi = -59.991, Myj = -82.965 (for Ly) Mzi = 15.9473, Mzj = 44.9234 (for Lz)
Shear Forces	Fyy = -116.20 (LCB: 60-FY, POS:J) Fzz = 105.022 (LCB: 54-FY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 36.74/4673.83 = 0.008 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 82.965/505.066 = 0.164 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 44.923/505.066 = 0.089 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$

$$Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$$

$$Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz})/(Wplz * fy / \gamma M1)$$

$$Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$$

$$Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz})/(Wplz * fy / \gamma M1)$$

$$Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.261 < 1.000 \dots\dots\dots \text{O.K}$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.083 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.068 < 1.000 \dots\dots\dots \text{O.K}$$

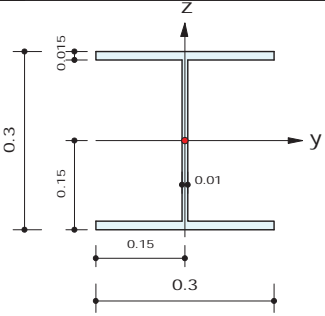
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	590
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 0.69889 (LCB: 60-MZ, POS:J)
Bending Moments	My = 6.98479, Mz = -74.206
End Moments	Myi = 16.7680, Myj = 6.98479 (for Lb) Myi = 16.7680, Myj = 6.98479 (for Ly) Mzi = -9.3601, Mzj = -74.206 (for Lz)
Shear Forces	Fyy = 304.980 (LCB: 60-MZ, POS:J) Fzz = 91.9157 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Oyb	0.07324	Ozb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/N_{t_Rd} = 0.70/3955.71 = 0.000 < 1.000 \dots\dots\dots \text{O.K}$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 6.985/449.278 = 0.016 < 1.000 \dots\dots\dots \text{O.K}$$

$$M_{Edz}/M_{Rdz} = 74.206/152.194 = 0.488 < 1.000 \dots\dots\dots \text{O.K}$$

Combined Resistance

$$R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$$

$$Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.503 < 1.000 \dots\dots\dots \text{O.K}$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.174 < 1.000 \dots\dots\dots \text{O.K}$$

$$V_{Edz}/V_{z_Rd} = 0.145 < 1.000 \dots\dots\dots \text{O.K}$$

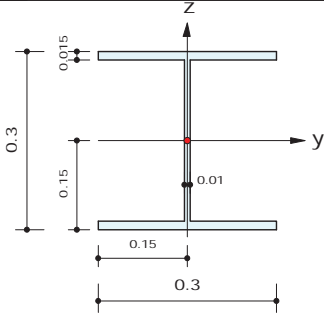
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	591
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -66.699 (LCB: 60-FY, POS:J)
Bending Moments	My = 78.2523, Mz = 67.0805
End Moments	Myi = 85.0271, Myj = 78.2523 (for Lb) Myi = 85.0271, Myj = 78.2523 (for Ly) Mzi = -9.0220, Mzj = 67.0805 (for Lz)
Shear Forces	Fyy = -264.75 (LCB: 60-FY, POS:J) Fzz = 96.6870 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 66.70/3955.71 = 0.017 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 78.252/449.278 = 0.174 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 67.080/152.194 = 0.441 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.662 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.151 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.153 < 1.000$ O.K

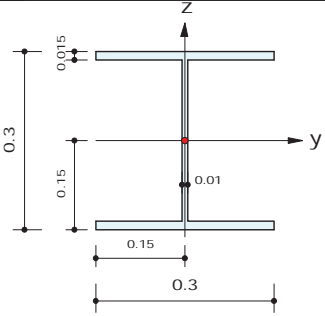
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	592
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -36.110 (LCB: 60+MY, POS:J)
Bending Moments	My = 68.6844, Mz = -58.870
End Moments	Myi = 75.1677, Myj = 68.6844 (for Lb) Myi = 75.1677, Myj = 68.6844 (for Ly) Mzi = 11.1479, Mzj = -58.870 (for Lz)
Shear Forces	Fyy = 315.880 (LCB: 60-MZ, POS:J) Fzz = 82.7485 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 36.11/3955.71 = 0.009 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 68.684/449.278 = 0.153 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 58.870/152.194 = 0.387 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.575 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.180 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.131 < 1.000$ O.K

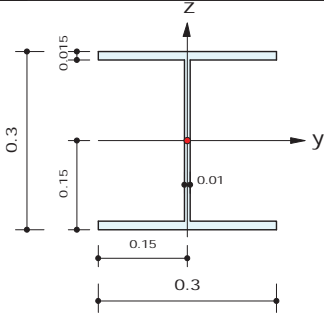
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	593
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 105.683 (LCB: 60-MZ, POS:J)
Bending Moments	My = -134.35, Mz = -50.437
End Moments	Myi = -41.460, Myj = -134.35 (for Lb) Myi = -41.460, Myj = -134.35 (for Ly) Mzi = -14.480, Mzj = -50.437 (for Lz)
Shear Forces	Fyy = -272.09 (LCB: 60-FY, POS:J) Fzz = 105.140 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 105.68/3955.71 = 0.027 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 134.347/449.278 = 0.299 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 50.437/152.194 = 0.331 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.657 < 1.000 O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.155 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.166 < 1.000$ O.K

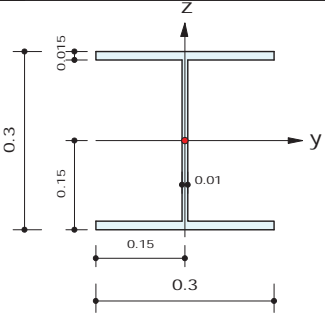
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	594
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -47.659 (LCB: 60+MY, POS:J)
Bending Moments	My = 75.3744, Mz = -49.638
End Moments	Myi = 82.4932, Myj = 75.3744 (for Lb) Myi = 82.4932, Myj = 75.3744 (for Ly) Mzi = 8.63477, Mzj = -49.638 (for Lz)
Shear Forces	Fyy = 256.519 (LCB: 60-MZ, POS:J) Fzz = 73.9214 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 47.66/3955.71 = 0.012 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 75.374/449.278 = 0.168 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 49.638/152.194 = 0.326 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rc.LT1 = $N_{Ed}/(\chi y * A * fy / \gamma M1)$ Rb.LT1 = $(kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ Rc.LT2 = $N_{Ed} / (\chi z * A * fy / \gamma M1)$ Rb.LT2 = $(Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.530 < 1.000 ... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.146 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.117 < 1.000$ O.K

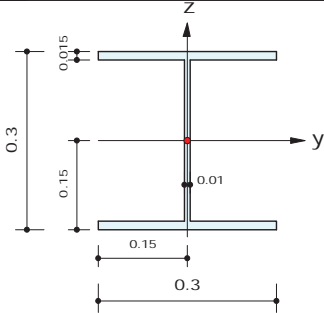
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	595
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 100.083 (LCB: 60-MZ, POS:J)
Bending Moments	My = -130.17, Mz = -48.878
End Moments	Myi = -54.870, Myj = -130.17 (for Lb) Myi = -54.870, Myj = -130.17 (for Ly) Mzi = -12.332, Mzj = -48.878 (for Lz)
Shear Forces	Fyy = -221.49 (LCB: 60-FY, POS:J) Fzz = 107.363 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 100.08/3955.71 = 0.025 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 130.171/449.278 = 0.290 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 48.878/152.194 = 0.321 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.636 < 1.000 O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.126 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.170 < 1.000$ O.K

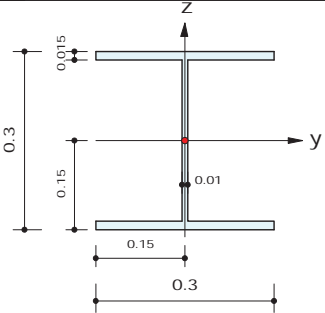
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	596
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -55.262 (LCB: 60+MY, POS:J)
Bending Moments	My = 73.5576, Mz = -34.901
End Moments	Myi = 81.0659, Myj = 73.5576 (for Lb) Myi = 81.0659, Myj = 73.5576 (for Ly) Mzi = 6.09237, Mzj = -34.901 (for Lz)
Shear Forces	Fyy = 176.601 (LCB: 60-MZ, POS:J) Fzz = 70.6720 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 55.26/3955.71 = 0.014 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 73.558/449.278 = 0.164 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 34.901/152.194 = 0.229 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rc.LT1 = $N_{Ed}/(\chi y * A * fy / \gamma M1)$ Rb.LT1 = $(kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ Rc.LT2 = $N_{Ed} / (\chi z * A * fy / \gamma M1)$ Rb.LT2 = $(Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.426 < 1.000 ... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.101 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.112 < 1.000$ O.K

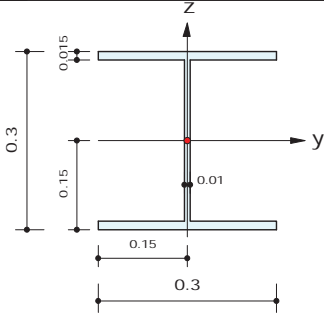
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	597
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 109.363 (LCB: 60-MY, POS:J)
Bending Moments	My = -140.22, Mz = -37.929
End Moments	Myi = -116.60, Myj = -140.22 (for Lb) Myi = -116.60, Myj = -140.22 (for Ly) Mzi = 7.53009, Mzj = -37.929 (for Lz)
Shear Forces	Fyy = 180.440 (LCB: 60-MZ, POS:J) Fzz = 105.886 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 109.36/3955.71 = 0.028 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 140.222/449.278 = 0.312 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 37.929/152.194 = 0.249 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.589 < 1.000 O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.103 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.167 < 1.000$ O.K

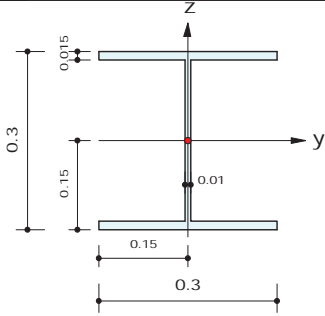
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	598
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -49.436 (LCB: 60-MZ, POS:J)
Bending Moments	My = 50.3103, Mz = -28.167
End Moments	Myi = -13.525, Myj = 50.3103 (for Lb) Myi = -13.525, Myj = 50.3103 (for Ly) Mzi = -5.8930, Mzj = -28.167 (for Lz)
Shear Forces	Fyy = -133.82 (LCB: 60-MZ, POS:I) Fzz = 71.8341 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597


3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

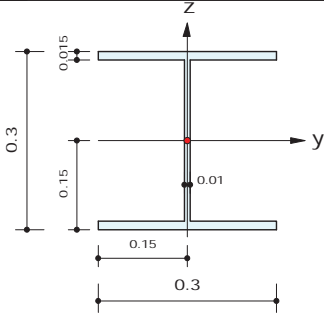
Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 49.44/3955.71 = 0.012 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 50.310/449.278 = 0.112 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 28.167/152.194 = 0.185 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rc.LT1 = $N_{Ed}/(\chi y * A * fy / \gamma M1)$ Rb.LT1 = $(kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ Rc.LT2 = $N_{Ed} / (\chi z * A * fy / \gamma M1)$ Rb.LT2 = $(Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.324 < 1.000 ... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.076 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.114 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	599
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 96.6008 (LCB: 60-MY, POS:J)
Bending Moments	My = -111.53, Mz = -34.024
End Moments	Myi = -91.392, Myj = -111.53 (for Lb) Myi = -91.392, Myj = -111.53 (for Ly) Mzi = 10.1176, Mzj = -34.024 (for Lz)
Shear Forces	Fyy = 182.749 (LCB: 60-MZ, POS:J) Fzz = 96.4836 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597


3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

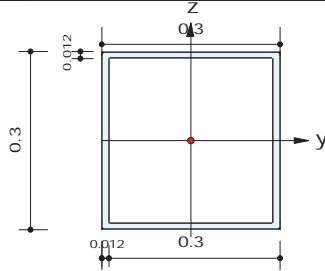
Axial Resistance	$N_{Ed}/N_{tRd} = 96.60/3955.71 = 0.024 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 111.532/449.278 = 0.248 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 34.024/152.194 = 0.224 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A \cdot f_y / \gamma_{M0})$, R.byM = $M_{Edy}/M_{yRd} + M_{Edz}/M_{zRd}$ Rmax = $MAX[R.MNRd, (R.byN + R.byM)] = 0.496 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.104 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.153 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	600
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 159.787 (LCB: 60+FX, POS:J)
Bending Moments	My = -48.102, Mz = -24.710
End Moments	Myi = -32.192, Myj = -48.102 (for Lb) Myi = -32.192, Myj = -48.102 (for Ly) Mzi = -17.164, Mzj = -24.710 (for Lz)
Shear Forces	Fyy = 207.372 (LCB: 60+FY, POS:J) Fzz = 105.916 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 159.79/4673.83 = 0.034 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 48.102/505.066 = 0.095 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 24.710/505.066 = 0.049 < 1.000$ O.K
Combined Resistance	R.MNRd = $MAX[M_{Edy}/M_{nyRd}, M_{Edz}/M_{nzRd}]$ R.BiM = $(M_{Edy}/M_{nyRd})^\alpha + (M_{Edz}/M_{nzRd})^\beta$ R.byN = $N_{Ed}/(A \cdot f_y / \gamma_{M0})$, R.byM = $M_{Edy}/M_{yRd} + M_{Edz}/M_{zRd}$ Rmax = $MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.178 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.148 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.068 < 1.000$ O.K

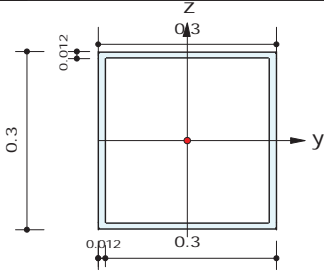
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 601
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 0.28745



2. Member Forces

Axial Force Fxx = 74.8447 (LCB: 60-MY, POS:J)
Bending Moments My = -84.416, Mz = -51.862
End Moments Myi = -64.770, Myj = -84.416 (for Lb)
Myi = -64.770, Myj = -84.416 (for Ly)
Mzi = 70.5979, Mzj = -51.862 (for Lz)
Shear Forces Fyy = 557.195 (LCB: 60-MX, POS:J)
Fzz = 104.899 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/N_{tRd} = 74.84/4673.83 = 0.016 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 84.416/505.066 = 0.167 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 51.862/505.066 = 0.103 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.286 < 1.000 O.K
Shear Resistance
 $V_{Edy}/V_{yRd} = 0.396 < 1.000$ O.K
 $V_{Edz}/V_{zRd} = 0.068 < 1.000$ O.K

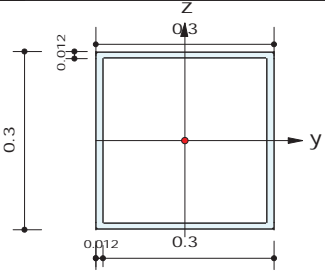
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 602
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 0.28742



2. Member Forces

Axial Force Fxx = 35.9541 (LCB: 60-MY, POS:J)
Bending Moments My = -43.003, Mz = 19.7449
End Moments Myi = -31.330, Myj = -43.003 (for Lb)
Myi = -31.330, Myj = -43.003 (for Ly)
Mzi = 11.5729, Mzj = 19.7449 (for Lz)
Shear Forces Fyy = -143.05 (LCB: 54-FY, POS:J)
Fzz = 81.8236 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768


3. Design Parameters

Unbraced Lengths Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

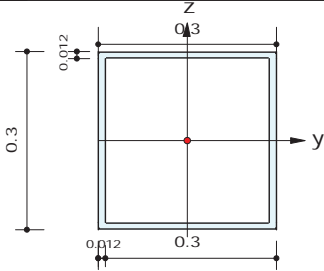
Axial Resistance
 $N_{Ed}/N_{tRd} = 35.95/4673.83 = 0.008 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 43.003/505.066 = 0.085 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 19.745/505.066 = 0.039 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.132 < 1.000 O.K
Shear Resistance
 $V_{Edy}/V_{yRd} = 0.102 < 1.000$ O.K
 $V_{Edz}/V_{zRd} = 0.053 < 1.000$ O.K

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	603
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -54.993 (LCB: 54-MY, POS:J)
Bending Moments	My = -79.238, Mz = 52.8045
End Moments	Myi = -54.266, Myj = -79.238 (for Lb) Myi = -54.266, Myj = -79.238 (for Ly) Mzi = 25.7283, Mzj = 52.8045 (for Lz)
Shear Forces	Fyy = -106.36 (LCB: 60-FY, POS:J) Fzz = 89.2486 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 54.99/4673.83 = 0.012 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 79.238/505.066 = 0.157 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 52.804/505.066 = 0.105 < 1.000 \dots\dots\dots O.K$$

Combined Resistance


$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$
$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$
$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$
$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$
$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$
$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.273 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.076 < 1.000 \dots\dots\dots O.K$$

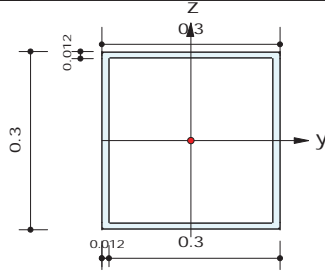
$$V_{Edz}/V_{z_Rd} = 0.058 < 1.000 \dots\dots\dots O.K$$

MIDAS/Civil Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	604
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -84.410 (LCB: 60-FX, POS:I)
Bending Moments	My = 70.8704, Mz = -70.220
End Moments	Myi = 70.8704, Myj = 61.2452 (for Lb) Myi = 70.8704, Myj = 61.2452 (for Ly) Mzi = -70.220, Mzj = 41.9587 (for Lz)
Shear Forces	Fyy = -478.35 (LCB: 60-FY, POS:J) Fzz = 100.130 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 84.41/4673.83 = 0.018 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 70.870/505.066 = 0.140 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 70.220/505.066 = 0.139 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$
$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$
$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$
$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$
$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$
$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$
$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$
$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.297 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.340 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.065 < 1.000 \dots\dots\dots O.K$$

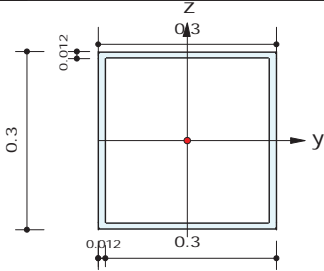
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	605
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 186.652 (LCB: 60-MY, POS:J)
Bending Moments	My = -97.171, Mz = 40.0570
End Moments	Myi = -73.203, Myj = -97.171 (for Lb) Myi = -73.203, Myj = -97.171 (for Ly) Mzi = -3.8832, Mzj = 40.0570 (for Lz)
Shear Forces	Fyy = -204.77 (LCB: 60-FY, POS:J) Fzz = 113.495 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 186.65/4673.83 = 0.040 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 97.171/505.066 = 0.192 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 40.057/505.066 = 0.079 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.312 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.146 < 1.000 O.K V_Edz/Vz_Rd = 0.073 < 1.000 O.K

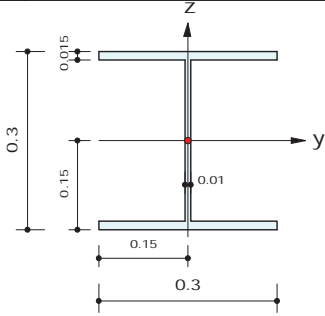
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	606
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -81.165 (LCB: 60-FX, POS:J)
Bending Moments	My = 72.5618, Mz = 10.6486
End Moments	Myi = 79.4777, Myj = 72.5618 (for Lb) Myi = 79.4777, Myj = 72.5618 (for Ly) Mzi = -2.3091, Mzj = 10.6486 (for Lz)
Shear Forces	Fyy = -83.272 (LCB: 60-MZ, POS:I) Fzz = 65.7487 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 81.16/3955.71 = 0.021 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 72.562/449.278 = 0.162 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 10.649/152.194 = 0.070 < 1.000$ O.K
Combined Resistance	R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wely*fy/γM1) + (kyz*M_Edz)/(Welz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wely*fy/γM1) + (Kzz*M_Edz)/(Welz*fy/γM1) Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.264 < 1.000 ... O.K
Shear Resistance	V_Edy/Vy_Rd = 0.047 < 1.000 O.K V_Edz/Vz_Rd = 0.104 < 1.000 O.K

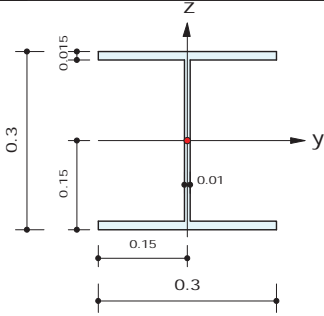
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	607
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 63.4169 (LCB: 60+FZ, POS:J)
Bending Moments	My = -81.643, Mz = 10.9995
End Moments	Myi = -61.751, Myj = -81.643 (for Lb) Myi = -61.751, Myj = -81.643 (for Ly) Mzi = -0.4408, Mzj = 10.9995 (for Lz)
Shear Forces	Fyy = 79.8631 (LCB: 60-MZ, POS:J) Fzz = 94.0405 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 63.42/3955.71 = 0.016 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 81.643/449.278 = 0.182 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 10.999/152.194 = 0.072 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.270 < 1.000 O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.045 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.149 < 1.000$ O.K

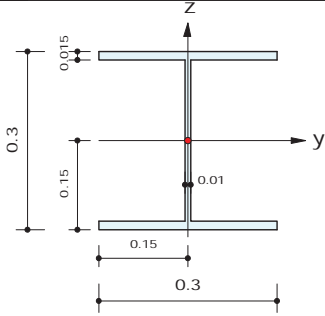
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	608
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -55.549 (LCB: 54+MY, POS:I)
Bending Moments	My = 90.3842, Mz = -0.6757
End Moments	Myi = 90.3842, Myj = 76.8492 (for Lb) Myi = 90.3842, Myj = 76.8492 (for Ly) Mzi = -0.6757, Mzj = 1.45753 (for Lz)
Shear Forces	Fyy = -26.873 (LCB: 54-FY, POS:J) Fzz = 60.7612 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 55.55/3955.71 = 0.014 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 90.384/449.278 = 0.201 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.676/152.194 = 0.004 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rc.LT1 = $N_{Ed}/(\chi y * A * fy / \gamma M1)$ Rb.LT1 = $(kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ Rc.LT2 = $N_{Ed} / (\chi z * A * fy / \gamma M1)$ Rb.LT2 = $(Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.230 < 1.000 ... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.015 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.096 < 1.000$ O.K

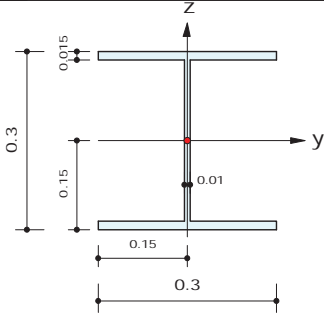
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	609
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 63.4018 (LCB: 60+FX, POS:J)
Bending Moments	My = -94.971, Mz = 4.49342
End Moments	Myi = -73.869, Myj = -94.971 (for Lb) Myi = -73.869, Myj = -94.971 (for Ly) Mzi = -1.3568, Mzj = 4.49342 (for Lz)
Shear Forces	Fyy = 31.5585 (LCB: 60-MZ, POS:J) Fzz = 100.831 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 63.40/3955.71 = 0.016 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 94.971/449.278 = 0.211 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 4.493/152.194 = 0.030 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A \cdot f_y/\gamma_{M0})$, R.byM = $M_{Edy}/M_{yRd} + M_{Edz}/M_{zRd}$ Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.257 < 1.000 O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.018 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.159 < 1.000$ O.K

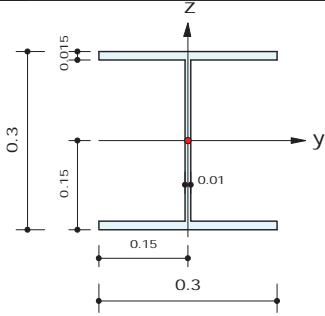
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	610
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -78.890 (LCB: 60+MY, POS:J)
Bending Moments	My = 76.5378, Mz = -6.4514
End Moments	Myi = 84.2828, Myj = 76.5378 (for Lb) Myi = 84.2828, Myj = 76.5378 (for Ly) Mzi = 0.55051, Mzj = -6.4514 (for Lz)
Shear Forces	Fyy = 33.3673 (LCB: 60-MZ, POS:J) Fzz = 60.6681 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{cRd}, N_{bRd}] = 78.89/3955.71 = 0.020 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 76.538/449.278 = 0.170 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 6.451/152.194 = 0.042 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A \cdot f_y/\gamma_{M0})$, R.byM = $M_{Edy}/M_{yRd} + M_{Edz}/M_{zRd}$ Rc.LT1 = $N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1})$ Rb.LT1 = $(k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ely} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{elz} \cdot f_y/\gamma_{M1})$ Rc.LT2 = $N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1})$ Rb.LT2 = $(K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ely} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{elz} \cdot f_y/\gamma_{M1})$ Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.244 < 1.000 ... O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.019 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.096 < 1.000$ O.K

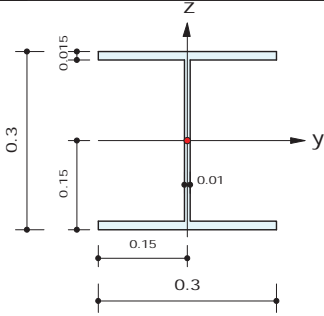
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	611
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 54.3221 (LCB: 54-MY, POS:J)
Bending Moments	My = -102.18, Mz = 0.92232
End Moments	Myi = -74.022, Myj = -102.18 (for Lb) Myi = -74.022, Myj = -102.18 (for Ly) Mzi = -0.8515, Mzj = 0.92232 (for Lz)
Shear Forces	Fyy = -34.656 (LCB: 60-MZ, POS:I) Fzz = 100.573 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 54.32/3955.71 = 0.014 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 102.184/449.278 = 0.227 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 0.922/152.194 = 0.006 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.247 < 1.000 O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.020 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.159 < 1.000$ O.K

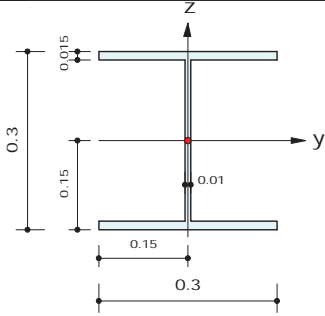
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	612
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -79.792 (LCB: 60-FX, POS:J)
Bending Moments	My = 62.6387, Mz = -15.148
End Moments	Myi = 70.6069, Myj = 62.6387 (for Lb) Myi = 70.6069, Myj = 62.6387 (for Ly) Mzi = 1.71693, Mzj = -15.148 (for Lz)
Shear Forces	Fyy = 84.5678 (LCB: 60-MZ, POS:J) Fzz = 65.8976 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 79.79/3955.71 = 0.020 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 62.639/449.278 = 0.139 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 15.148/152.194 = 0.100 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rc.LT1 = $N_{Ed}/(\chi y * A * fy / \gamma M1)$ Rb.LT1 = $(kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ Rc.LT2 = $N_{Ed} / (\chi z * A * fy / \gamma M1)$ Rb.LT2 = $(Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.271 < 1.000 ... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.048 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.104 < 1.000$ O.K

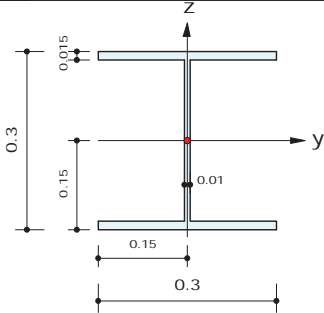
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	613
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 34.1788 (LCB: 54-FY, POS:J)
Bending Moments	My = -63.426, Mz = 15.7198
End Moments	Myi = -39.386, Myj = -63.426 (for Lb) Myi = -39.386, Myj = -63.426 (for Ly) Mzi = -6.4619, Mzj = 15.7198 (for Lz)
Shear Forces	Fyy = -84.441 (LCB: 60-MZ, POS:I) Fzz = 93.5383 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 34.18/3955.71 = 0.009 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 63.426/449.278 = 0.141 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 15.720/152.194 = 0.103 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A \cdot f_y/\gamma_{M0})$, R.byM = $M_{Edy}/M_{yRd} + M_{Edz}/M_{zRd}$ Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.253 < 1.000 O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.048 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.148 < 1.000$ O.K

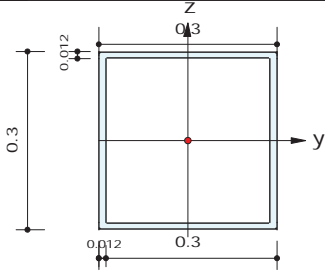
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	614
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 209.443 (LCB: 60+FX, POS:I)
Bending Moments	My = -34.560, Mz = 61.5124
End Moments	Myi = -34.560, Myj = -52.140 (for Lb) Myi = -34.560, Myj = -52.140 (for Ly) Mzi = 61.5124, Mzj = -22.907 (for Lz)
Shear Forces	Fyy = 347.079 (LCB: 60-MZ, POS:J) Fzz = 102.089 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 209.44/4673.83 = 0.045 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 34.560/505.066 = 0.068 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 61.512/505.066 = 0.122 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_{Edy}/M_{nyRd} , M_{Edz}/M_{nzRd}] R.BiM = $(M_{Edy}/M_{nyRd})^\alpha + (M_{Edz}/M_{nzRd})^\beta$ R.byN = $N_{Ed}/(A \cdot f_y/\gamma_{M0})$, R.byM = $M_{Edy}/M_{yRd} + M_{Edz}/M_{zRd}$ Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.235 < 1.000 O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.247 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.066 < 1.000$ O.K

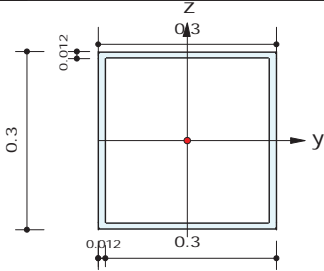
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	615
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 74.1663 (LCB: 60+FZ, POS:J)
Bending Moments	My = -66.028, Mz = -15.715
End Moments	Myi = -45.180, Myj = -66.028 (for Lb) Myi = -45.180, Myj = -66.028 (for Ly) Mzi = -2.9189, Mzj = -15.715 (for Lz)
Shear Forces	Fyy = -178.42 (LCB: 60-FY, POS:J) Fzz = 103.980 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 74.17/4673.83 = 0.016 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 66.028/505.066 = 0.131 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 15.715/505.066 = 0.031 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.178 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.127 < 1.000 O.K V_Edz/Vz_Rd = 0.067 < 1.000 O.K

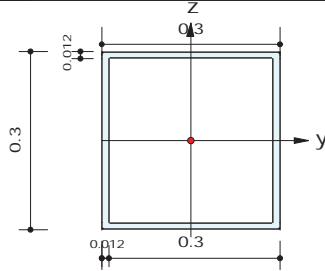
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	616
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -80.756 (LCB: 54+MZ, POS:J)
Bending Moments	My = -76.672, Mz = 55.1057
End Moments	Myi = -47.941, Myj = -76.672 (for Lb) Myi = -47.941, Myj = -76.672 (for Ly) Mzi = 31.3898, Mzj = 55.1057 (for Lz)
Shear Forces	Fyy = -170.11 (LCB: 54-FY, POS:J) Fzz = 98.5119 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 80.76/4673.83 = 0.017 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 76.672/505.066 = 0.152 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 55.106/505.066 = 0.109 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.278 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.121 < 1.000 O.K V_Edz/Vz_Rd = 0.063 < 1.000 O.K

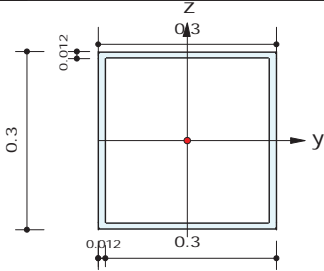
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	617
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28741



2. Member Forces

Axial Force	Fxx = 19.5862 (LCB: 60-MY, POS:J)
Bending Moments	My = -82.473, Mz = 39.7705
End Moments	Myi = -63.485, Myj = -82.473 (for Lb) Myi = -63.485, Myj = -82.473 (for Ly) Mzi = 23.1763, Mzj = 39.7705 (for Lz)
Shear Forces	Fyy = -88.099 (LCB: 54-FY, POS:J) Fzz = 93.6528 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28741, Lz = 0.28741, Lb = 0.28741
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 19.59/4673.83 = 0.004 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 82.473/505.066 = 0.163 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 39.771/505.066 = 0.079 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.246 < 1.000 O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.063 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.060 < 1.000$ O.K

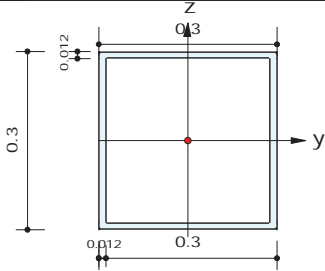
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	618
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28741



2. Member Forces

Axial Force	Fxx = -60.866 (LCB: 54-MZ, POS:J)
Bending Moments	My = -84.216, Mz = -59.378
End Moments	Myi = -49.184, Myj = -84.216 (for Lb) Myi = -49.184, Myj = -84.216 (for Ly) Mzi = -28.286, Mzj = -59.378 (for Lz)
Shear Forces	Fyy = 118.892 (LCB: 60+FY, POS:J) Fzz = 94.8654 (LCB: 54-MZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28741, Lz = 0.28741, Lb = 0.28741
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 60.87/4673.83 = 0.013 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 84.216/505.066 = 0.167 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 59.378/505.066 = 0.118 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.297 < 1.000 .. O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.085 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.061 < 1.000$ O.K

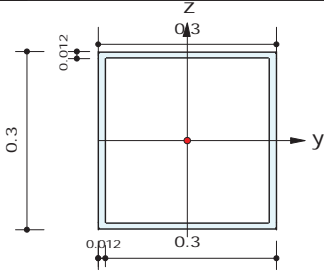
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	619
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -81.199 (LCB: 60-MX, POS:J)
Bending Moments	My = -45.895, Mz = -33.621
End Moments	Myi = -29.685, Myj = -45.895 (for Lb) Myi = -29.685, Myj = -45.895 (for Ly) Mzi = 21.2760, Mzj = -33.621 (for Lz)
Shear Forces	Fyy = 190.976 (LCB: 60-MX, POS:J) Fzz = 103.995 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 81.20/4673.83 = 0.017 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 45.895/505.066 = 0.091 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 33.621/505.066 = 0.067 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.175 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.136 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.067 < 1.000$ O.K

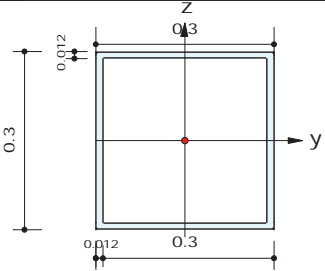
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	620
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 82.1447 (LCB: 60+FZ, POS:I)
Bending Moments	My = -64.253, Mz = -72.543
End Moments	Myi = -64.253, Myj = -87.213 (for Lb) Myi = -64.253, Myj = -87.213 (for Ly) Mzi = -72.543, Mzj = 45.2790 (for Lz)
Shear Forces	Fyy = -545.23 (LCB: 60-MZ, POS:I) Fzz = 106.675 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t_Rd} = 82.14/4673.83 = 0.018 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 64.253/505.066 = 0.127 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 72.543/505.066 = 0.144 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.288 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.388 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.069 < 1.000$ O.K

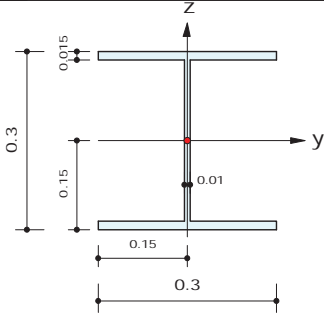
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	621
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -57.388 (LCB: 60-FY, POS:J)
Bending Moments	My = 55.0002, Mz = 23.2162
End Moments	Myi = 58.1746, Myj = 55.0002 (for Lb) Myi = 58.1746, Myj = 55.0002 (for Ly) Mzi = -5.0235, Mzj = 23.2162 (for Lz)
Shear Forces	Fyy = 131.264 (LCB: 60-MZ, POS:J) Fzz = 71.0033 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 57.39/3955.71 = 0.015 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 55.000/449.278 = 0.122 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 23.216/152.194 = 0.153 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.303 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.075 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.112 < 1.000$ O.K

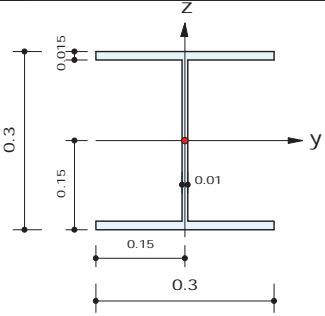
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	622
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 104.523 (LCB: 60-MY, POS:J)
Bending Moments	My = -114.64, Mz = 31.2813
End Moments	Myi = -93.321, Myj = -114.64 (for Lb) Myi = -93.321, Myj = -114.64 (for Ly) Mzi = -11.419, Mzj = 31.2813 (for Lz)
Shear Forces	Fyy = -172.68 (LCB: 60-FY, POS:J) Fzz = 99.0317 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/Nt_{Rd} = 104.52/3955.71 = 0.026 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 114.642/449.278 = 0.255 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 31.281/152.194 = 0.206 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRRd, (R_{byN} + R_{byM})] = 0.487 < 1.000$ O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.098 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.157 < 1.000$ O.K

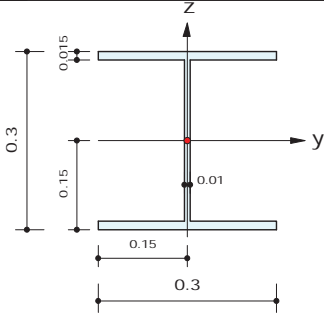
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	623
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -64.464 (LCB: 60+MY, POS:J)
Bending Moments	My = 80.9264, Mz = 31.6054
End Moments	Myi = 87.2930, Myj = 80.9264 (for Lb) Myi = 87.2930, Myj = 80.9264 (for Ly) Mzi = -6.4829, Mzj = 31.6054 (for Lz)
Shear Forces	Fyy = -166.57 (LCB: 60-FY, POS:J) Fzz = 68.4992 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 64.46/3955.71 = 0.016 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 80.926/449.278 = 0.180 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 31.605/152.194 = 0.208 < 1.000$ O.K
Combined Resistance	$R.byN = N_{Ed}/(A*fy/\gamma M0)$, $R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN + R.byM, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.423 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.095 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.108 < 1.000$ O.K

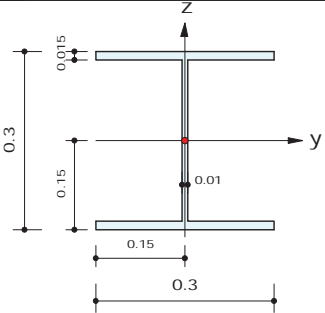
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	624
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 117.605 (LCB: 60-MY, POS:J)
Bending Moments	My = -142.58, Mz = 35.0812
End Moments	Myi = -118.20, Myj = -142.58 (for Lb) Myi = -118.20, Myj = -142.58 (for Ly) Mzi = -8.3970, Mzj = 35.0812 (for Lz)
Shear Forces	Fyy = -175.54 (LCB: 60-MZ, POS:I) Fzz = 108.277 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/Nt_{Rd} = 117.60/3955.71 = 0.030 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 142.581/449.278 = 0.317 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 35.081/152.194 = 0.231 < 1.000$ O.K
Combined Resistance	$R.byN = N_{Ed}/(A*fy/\gamma M0)$, $R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRRd, (R.byN + R.byM)] = 0.578 < 1.000$ O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.100 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.171 < 1.000$ O.K

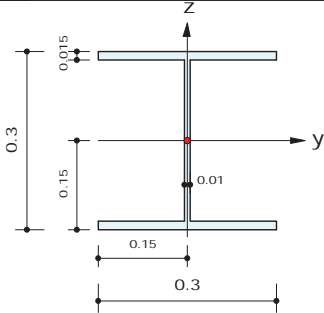
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	625
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -56.683 (LCB: 60+MY, POS:J)
Bending Moments	My = 84.2013, Mz = 48.9718
End Moments	Myi = 89.7232, Myj = 84.2013 (for Lb) Myi = 89.7232, Myj = 84.2013 (for Ly) Mzi = -9.9137, Mzj = 48.9718 (for Lz)
Shear Forces	Fyy = -261.60 (LCB: 60-MZ, POS:I) Fzz = 70.6724 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 56.68/3955.71 = 0.014 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 84.201/449.278 = 0.187 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 48.972/152.194 = 0.322 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.548 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.149 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.112 < 1.000$ O.K

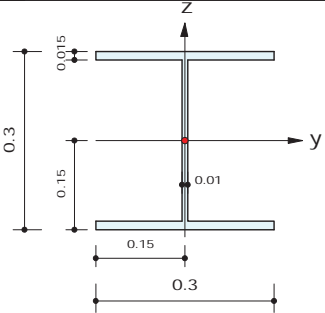
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	626
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 106.352 (LCB: 60+MZ, POS:J)
Bending Moments	My = -127.00, Mz = 46.2997
End Moments	Myi = 45.0272, Myj = -127.00 (for Lb) Myi = 45.0272, Myj = -127.00 (for Ly) Mzi = 11.8947, Mzj = 46.2997 (for Lz)
Shear Forces	Fyy = 219.726 (LCB: 60-MX, POS:J) Fzz = 109.135 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/Nt_{Rd} = 106.35/3955.71 = 0.027 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 126.999/449.278 = 0.283 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 46.300/152.194 = 0.304 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R_{MNRd}, (R_{byN} + R_{byM})] = 0.614 < 1.000$ O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.125 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.173 < 1.000$ O.K

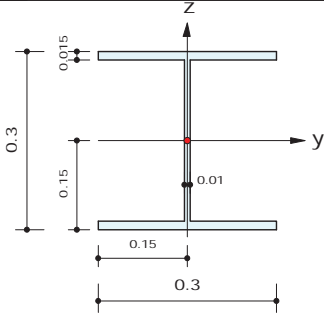
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	627
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -3.8116 (LCB: 60-FY, POS:J)
Bending Moments	My = 13.4481, Mz = 79.8081
End Moments	Myi = 18.9911, Myj = 13.4481 (for Lb) Myi = 18.9911, Myj = 13.4481 (for Ly) Mzi = -16.395, Mzj = 79.8081 (for Lz)
Shear Forces	Fyy = -334.67 (LCB: 60-MZ, POS:I) Fzz = 76.3348 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 3.81/3955.71 = 0.001 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 13.448/449.278 = 0.030 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 79.808/152.194 = 0.524 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed}/(\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rmax = MAX[R_{byN} + R_{byM}, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.582 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.191 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.121 < 1.000$ O.K

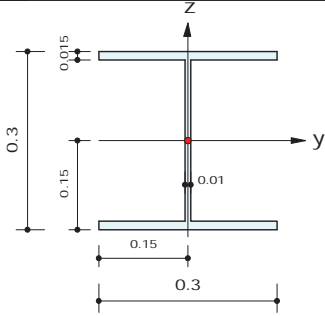
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	628
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = 109.652 (LCB: 60-FY, POS:J)
Bending Moments	My = -116.78, Mz = 50.7187
End Moments	Myi = -101.03, Myj = -116.78 (for Lb) Myi = -101.03, Myj = -116.78 (for Ly) Mzi = -6.5658, Mzj = 50.7187 (for Lz)
Shear Forces	Fyy = 285.258 (LCB: 60-MZ, POS:J) Fzz = 105.697 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/Nt_{Rd} = 109.65/3955.71 = 0.028 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 116.779/449.278 = 0.260 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 50.719/152.194 = 0.333 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRRd, (R_{byN} + R_{byM})] = 0.621 < 1.000$ O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.162 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.167 < 1.000$ O.K

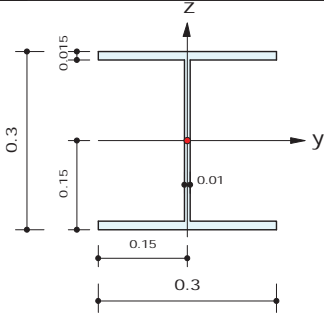
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	629
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -1.5006 (LCB: 60-FY, POS:J)
Bending Moments	My = 7.06632, Mz = 79.1860
End Moments	Myi = 14.4698, Myj = 7.06632 (for Lb) Myi = 14.4698, Myj = 7.06632 (for Ly) Mzi = -15.462, Mzj = 79.1860 (for Lz)
Shear Forces	Fyy = -329.26 (LCB: 60-MZ, POS:I) Fzz = 72.8293 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 1.50/3955.71 = 0.000 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 7.066/449.278 = 0.016 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 79.186/152.194 = 0.520 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rc.LT1 = $N_{Ed}/(\chi y * A * fy / \gamma M1)$ Rb.LT1 = $(kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$ Rc.LT2 = $N_{Ed}/(\chi z * A * fy / \gamma M1)$ Rb.LT2 = $(Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.562 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.187 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.115 < 1.000$ O.K

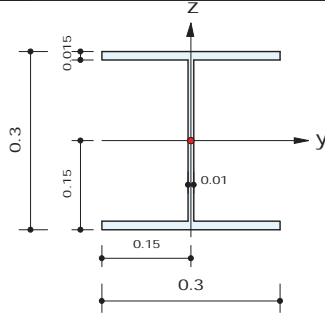
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	630
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28745



2. Member Forces

Axial Force	Fxx = -27.841 (LCB: 60-MZ, POS:J)
Bending Moments	My = -17.834, Mz = -78.624
End Moments	Myi = 20.0914, Myj = -17.834 (for Lb) Myi = 20.0914, Myj = -17.834 (for Ly) Mzi = -6.8297, Mzj = -78.624 (for Lz)
Shear Forces	Fyy = 285.136 (LCB: 60-MZ, POS:J) Fzz = 97.3815 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28745, Lz = 0.28745, Lb = 0.28745
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 27.84/3955.71 = 0.007 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 17.834/449.278 = 0.040 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 78.624/152.194 = 0.517 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A*fy/\gamma M0)$, R.byM = $M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ Rc.LT1 = $N_{Ed}/(\chi y * A * fy / \gamma M1)$ Rb.LT1 = $(kyy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz})/(Welz * fy / \gamma M1)$ Rc.LT2 = $N_{Ed}/(\chi z * A * fy / \gamma M1)$ Rb.LT2 = $(Kzy * M_{Edy})/(\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz})/(Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.590 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.162 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.154 < 1.000$ O.K

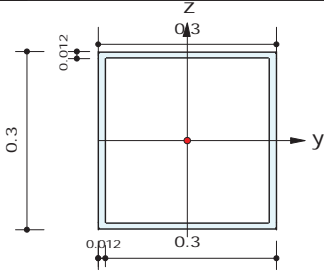
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	631
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = 21.7456 (LCB: 60-MY, POS:J)
Bending Moments	My = -89.950, Mz = 41.2550
End Moments	Myi = -65.788, Myj = -89.950 (for Lb) Myi = -65.788, Myj = -89.950 (for Ly) Mzi = 20.9088, Mzj = 41.2550 (for Lz)
Shear Forces	Fyy = -81.556 (LCB: 54-MY, POS:J) Fzz = 102.079 (LCB: 54-MY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 21.75/4673.83 = 0.005 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 89.950/505.066 = 0.178 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 41.255/505.066 = 0.082 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.264 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.058 < 1.000 O.K V_Edz/Vz_Rd = 0.066 < 1.000 O.K

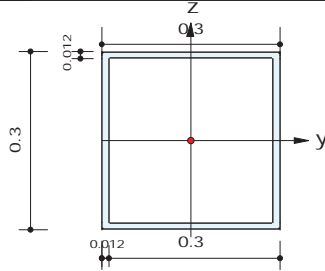
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	632
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -32.718 (LCB: 60+MY, POS:I)
Bending Moments	My = 25.4625, Mz = -11.444
End Moments	Myi = 25.4625, Myj = 14.3417 (for Lb) Myi = 25.4625, Myj = 14.3417 (for Ly) Mzi = -11.444, Mzj = -4.1360 (for Lz)
Shear Forces	Fyy = -47.281 (LCB: 60-FY, POS:J) Fzz = 62.9745 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 32.72/4673.83 = 0.007 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 25.462/505.066 = 0.050 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 11.444/505.066 = 0.023 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.080 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.034 < 1.000 O.K V_Edz/Vz_Rd = 0.041 < 1.000 O.K

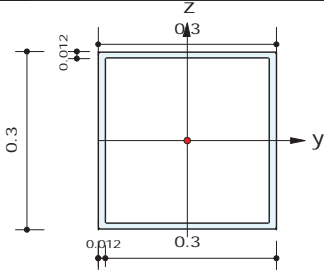
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	633
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -63.331 (LCB: 54-MY, POS:J)
Bending Moments	My = -81.335, Mz = 51.6627
End Moments	Myi = -54.943, Myj = -81.335 (for Lb) Myi = -54.943, Myj = -81.335 (for Ly) Mzi = 12.3633, Mzj = 51.6627 (for Lz)
Shear Forces	Fyy = -139.10 (LCB: 54-FY, POS:J) Fzz = 96.5632 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 63.33/4673.83 = 0.014 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 81.335/505.066 = 0.161 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 51.663/505.066 = 0.102 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.277 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.099 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.062 < 1.000$ O.K

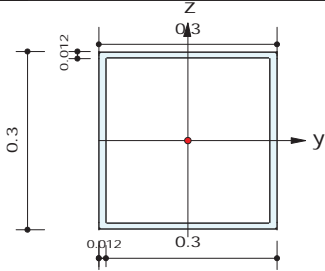
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	634
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -46.526 (LCB: 60-MZ, POS:J)
Bending Moments	My = -86.878, Mz = -53.748
End Moments	Myi = -65.872, Myj = -86.878 (for Lb) Myi = -65.872, Myj = -86.878 (for Ly) Mzi = -32.396, Mzj = -53.748 (for Lz)
Shear Forces	Fyy = 114.819 (LCB: 54+FY, POS:J) Fzz = 89.4448 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 46.53/4673.83 = 0.010 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 86.878/505.066 = 0.172 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 53.748/505.066 = 0.106 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.288 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.082 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.058 < 1.000$ O.K

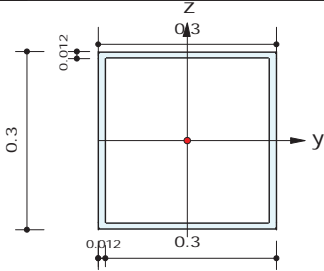
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	635
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -83.829 (LCB: 60-MY, POS:J)
Bending Moments	My = -73.556, Mz = -48.781
End Moments	Myi = -57.753, Myj = -73.556 (for Lb) Myi = -57.753, Myj = -73.556 (for Ly) Mzi = -38.932, Mzj = -48.781 (for Lz)
Shear Forces	Fyy = 41.7607 (LCB: 54-MZ, POS:J) Fzz = 80.2164 (LCB: 54-MZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 83.83/4673.83 = 0.018 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 73.556/505.066 = 0.146 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 48.781/505.066 = 0.097 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.260 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.030 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.052 < 1.000$ O.K

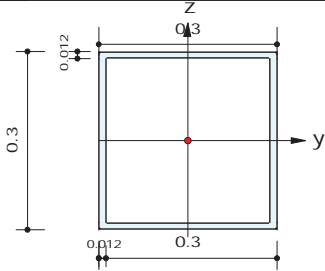
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	636
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = 3.19656 (LCB: 60-MZ, POS:J)
Bending Moments	My = -118.53, Mz = -56.497
End Moments	Myi = -92.457, Myj = -118.53 (for Lb) Myi = -92.457, Myj = -118.53 (for Ly) Mzi = -36.250, Mzj = -56.497 (for Lz)
Shear Forces	Fyy = 87.7131 (LCB: 54+FY, POS:J) Fzz = 111.618 (LCB: 54-MZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t_Rd} = 3.20/4673.83 = 0.001 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 118.525/505.066 = 0.235 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 56.497/505.066 = 0.112 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.347 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.062 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.072 < 1.000$ O.K

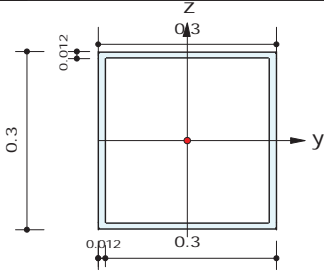
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	637
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -6.6894 (LCB: 60-MZ, POS:J)
Bending Moments	My = -81.395, Mz = -37.841
End Moments	Myi = -62.814, Myj = -81.395 (for Lb) Myi = -62.814, Myj = -81.395 (for Ly) Mzi = -24.955, Mzj = -37.841 (for Lz)
Shear Forces	Fyy = 75.8772 (LCB: 54+FY, POS:J) Fzz = 96.5928 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 6.69/4673.83 = 0.001 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 81.395/505.066 = 0.161 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 37.841/505.066 = 0.075 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.238 < 1.000 \dots\dots\dots O.K$$


Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.054 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.062 < 1.000 \dots\dots\dots O.K$$

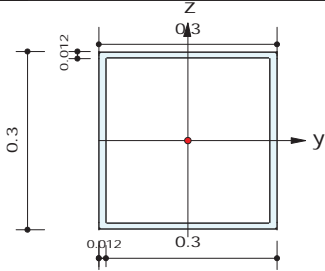
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	638
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -52.304 (LCB: 60-MZ, POS:J)
Bending Moments	My = -88.844, Mz = -56.173
End Moments	Myi = -67.834, Myj = -88.844 (for Lb) Myi = -67.834, Myj = -88.844 (for Ly) Mzi = -37.040, Mzj = -56.173 (for Lz)
Shear Forces	Fyy = 73.8898 (LCB: 54-MZ, POS:J) Fzz = 87.2702 (LCB: 54-MX, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance

$$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 52.30/4673.83 = 0.011 < 1.000 \dots\dots\dots O.K$$

Bending Resistance

$$M_{Edy}/M_{Rdy} = 88.844/505.066 = 0.176 < 1.000 \dots\dots\dots O.K$$

$$M_{Edz}/M_{Rdz} = 56.173/505.066 = 0.111 < 1.000 \dots\dots\dots O.K$$

Combined Resistance

$$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$$

$$R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$$

$$R.byN = N_{Ed}/(A \cdot f_y / \gamma_{M0}), R.byM = M_{Edy}/M_{y_Rd} + M_{Edz}/M_{z_Rd}$$

$$Rc.LT1 = N_{Ed}/(\chi_y \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT1 = (k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$Rc.LT2 = N_{Ed}/(\chi_z \cdot A \cdot f_y / \gamma_{M1})$$

$$Rb.LT2 = (K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ply} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{plz} \cdot f_y / \gamma_{M1})$$

$$R_{max} = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.298 < 1.000 \dots\dots\dots O.K$$

Shear Resistance

$$V_{Edy}/V_{y_Rd} = 0.053 < 1.000 \dots\dots\dots O.K$$

$$V_{Edz}/V_{z_Rd} = 0.056 < 1.000 \dots\dots\dots O.K$$

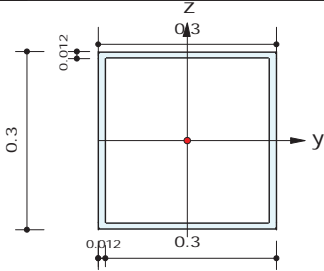
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	639
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -90.396 (LCB: 60-MZ, POS:J)
Bending Moments	My = -99.127, Mz = -65.268
End Moments	Myi = -71.013, Myj = -99.127 (for Lb) Myi = -71.013, Myj = -99.127 (for Ly) Mzi = -22.504, Mzj = -65.268 (for Lz)
Shear Forces	Fyy = 167.224 (LCB: 54+FY, POS:J) Fzz = 108.448 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c,Rd}, N_{b,Rd}] = 90.40/4673.83 = 0.019 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 99.127/505.066 = 0.196 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 65.268/505.066 = 0.129 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.345 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.119 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.070 < 1.000$ O.K

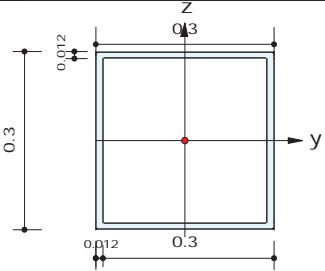
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	640
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = 19.1898 (LCB: 60-MZ, POS:J)
Bending Moments	My = -78.651, Mz = -35.511
End Moments	Myi = -55.699, Myj = -78.651 (for Lb) Myi = -55.699, Myj = -78.651 (for Ly) Mzi = -20.232, Mzj = -35.511 (for Lz)
Shear Forces	Fyy = 90.9473 (LCB: 54+FZ, POS:J) Fzz = 96.2074 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t,Rd} = 19.19/4673.83 = 0.004 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 78.651/505.066 = 0.156 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 35.511/505.066 = 0.070 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny,Rd}, M_{Edz}/M_{nz,Rd}]$ $R.BiM = (M_{Edy}/M_{ny,Rd})^{\alpha} + (M_{Edz}/M_{nz,Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.230 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y,Rd} = 0.065 < 1.000$ O.K $V_{Edz}/V_{z,Rd} = 0.062 < 1.000$ O.K

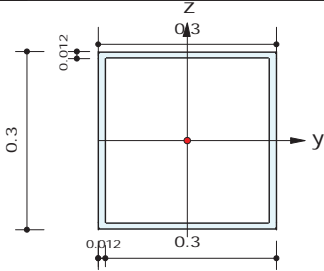
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 641
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 0.28742



2. Member Forces

Axial Force Fxx = 50.2004 (LCB: 60-MY, POS:J)
Bending Moments My = -42.419, Mz = 19.0275
End Moments Myi = -27.100, Myj = -42.419 (for Lb)
Myi = -27.100, Myj = -42.419 (for Ly)
Mzi = -4.1646, Mzj = 19.0275 (for Lz)
Shear Forces Fyy = -132.93 (LCB: 54-FY, POS:J)
Fzz = 85.9488 (LCB: 54-FY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/N_{tRd} = 50.20/4673.83 = 0.011 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 42.419/505.066 = 0.084 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 19.028/505.066 = 0.038 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.132 < 1.000 O.K
Shear Resistance
 $V_{Edy}/V_{yRd} = 0.095 < 1.000$ O.K
 $V_{Edz}/V_{zRd} = 0.055 < 1.000$ O.K

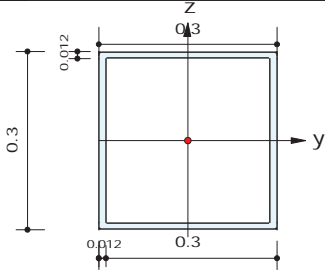
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code Eurocode3-2:05(Recommended)
Unit System kN, m
Member No 642
Material S355 (No:10)
(Fy = 355000, Es = 210000000)
Section Name V_Abaco_300_Met (No:32)
(Built-up Section).
Member Length : 0.28742



2. Member Forces

Axial Force Fxx = -46.872 (LCB: 54-MY, POS:J)
Bending Moments My = -73.818, Mz = 44.1552
End Moments Myi = -51.651, Myj = -73.818 (for Lb)
Myi = -51.651, Myj = -73.818 (for Ly)
Mzi = 40.7749, Mzj = 44.1552 (for Lz)
Shear Forces Fyy = -101.10 (LCB: 60-FY, POS:J)
Fzz = 82.7816 (LCB: 52+MX, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient
Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance
 $N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 46.87/4673.83 = 0.010 < 1.000$ O.K
Bending Resistance
 $M_{Edy}/M_{Rdy} = 73.818/505.066 = 0.146 < 1.000$ O.K
 $M_{Edz}/M_{Rdz} = 44.155/505.066 = 0.087 < 1.000$ O.K
Combined Resistance
R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd]
R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd
Rc.LT1 = N_Ed/(χy*A*fy/γM1)
Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1)
Rc.LT2 = N_Ed/(χz*A*fy/γM1)
Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1)
Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.244 < 1.000 .. O.K
Shear Resistance
 $V_{Edy}/V_{yRd} = 0.072 < 1.000$ O.K
 $V_{Edz}/V_{zRd} = 0.053 < 1.000$ O.K

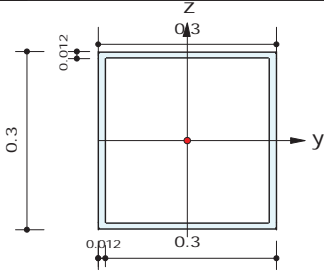
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	643
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = 23.0090 (LCB: 60-MZ, POS:J)
Bending Moments	My = -95.475, Mz = -43.562
End Moments	Myi = -68.216, Myj = -95.475 (for Lb) Myi = -68.216, Myj = -95.475 (for Ly) Mzi = -21.515, Mzj = -43.562 (for Lz)
Shear Forces	Fyy = 98.5231 (LCB: 54+FY, POS:J) Fzz = 106.556 (LCB: 54-MZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 23.01/4673.83 = 0.005 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 95.475/505.066 = 0.189 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 43.562/505.066 = 0.086 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.280 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.070 < 1.000 O.K V_Edz/Vz_Rd = 0.069 < 1.000 O.K

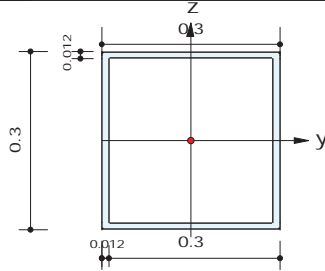
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	644
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -73.011 (LCB: 54-MY, POS:J)
Bending Moments	My = -75.992, Mz = -48.966
End Moments	Myi = -50.462, Myj = -75.992 (for Lb) Myi = -50.462, Myj = -75.992 (for Ly) Mzi = -23.759, Mzj = -48.966 (for Lz)
Shear Forces	Fyy = 168.084 (LCB: 54+FY, POS:J) Fzz = 101.362 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 73.01/4673.83 = 0.016 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 75.992/505.066 = 0.150 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 48.966/505.066 = 0.097 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(χy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.263 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.120 < 1.000 O.K V_Edz/Vz_Rd = 0.065 < 1.000 O.K

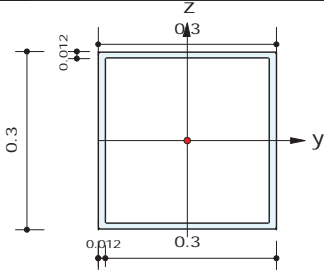
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	645
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = 23.2422 (LCB: 60-MY, POS:J)
Bending Moments	My = -41.931, Mz = -17.931
End Moments	Myi = -30.256, Myj = -41.931 (for Lb) Myi = -30.256, Myj = -41.931 (for Ly) Mzi = 6.83331, Mzj = -17.931 (for Lz)
Shear Forces	Fyy = 123.946 (LCB: 60+FZ, POS:J) Fzz = 76.2419 (LCB: 54+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 23.24/4673.83 = 0.005 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 41.931/505.066 = 0.083 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 17.931/505.066 = 0.036 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM)] = 0.123 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.088 < 1.000 O.K V_Edz/Vz_Rd = 0.049 < 1.000 O.K

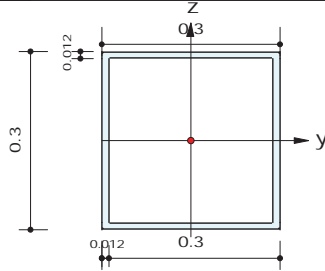
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	646
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28742



2. Member Forces

Axial Force	Fxx = -50.323 (LCB: 60+MZ, POS:I)
Bending Moments	My = 34.2905, Mz = 34.4375
End Moments	Myi = 34.2905, Myj = 18.7259 (for Lb) Myi = 34.2905, Myj = 18.7259 (for Ly) Mzi = 34.4375, Mzj = 12.1840 (for Lz)
Shear Forces	Fyy = 162.435 (LCB: 54+FY, POS:J) Fzz = 80.2219 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Qyb	0.03112	Qzb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28742, Lz = 0.28742, Lb = 0.28742
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 50.32/4673.83 = 0.011 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 34.291/505.066 = 0.068 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 34.438/505.066 = 0.068 < 1.000$ O.K
Combined Resistance	R.MNRd = MAX[M_Edy/Mny_Rd, M_Edz/Mnz_Rd] R.BiM = (M_Edy/Mny_Rd)^α + (M_Edz/Mnz_Rd)^β R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rc.LT1 = N_Ed/(xy*A*fy/γM1) Rb.LT1 = (kyy*M_Edy)/(χLT*Wply*fy/γM1) + (kyz*M_Edz)/(Wplz*fy/γM1) Rc.LT2 = N_Ed/(χz*A*fy/γM1) Rb.LT2 = (Kzy*M_Edy)/(χLT*Wply*fy/γM1) + (Kzz*M_Edz)/(Wplz*fy/γM1) Rmax = MAX[R.MNRd, R.BiM, (R.byN+R.byM), MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.147 < 1.000 .. O.K
Shear Resistance	V_Edy/Vy_Rd = 0.116 < 1.000 O.K V_Edz/Vz_Rd = 0.052 < 1.000 O.K

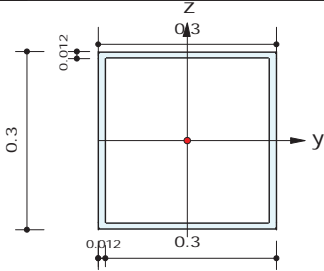
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	647
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28741



2. Member Forces

Axial Force	Fxx = -34.813 (LCB: 60-MZ, POS:J)
Bending Moments	My = -75.557, Mz = -41.161
End Moments	Myi = -56.765, Myj = -75.557 (for Lb) Myi = -56.765, Myj = -75.557 (for Ly) Mzi = -33.627, Mzj = -41.161 (for Lz)
Shear Forces	Fyy = 93.4901 (LCB: 54+FY, POS:J) Fzz = 91.9818 (LCB: 54-MZ, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters


Unbraced Lengths	Ly = 0.28741, Lz = 0.28741, Lb = 0.28741
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{c_Rd}, N_{b_Rd}] = 34.81/4673.83 = 0.007 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 75.557/505.066 = 0.150 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 41.161/505.066 = 0.081 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (kyz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wply * fy / \gamma M1) + (Kzz * M_{Edz}) / (Wplz * fy / \gamma M1)$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM), MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.239 < 1.000$.. O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.067 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.059 < 1.000$ O.K

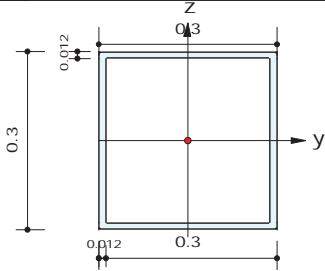
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	648
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Abaco_300_Met (No:32) (Built-up Section).
Member Length	: 0.28741



2. Member Forces

Axial Force	Fxx = 26.9014 (LCB: 60-MY, POS:J)
Bending Moments	My = -41.558, Mz = 18.1136
End Moments	Myi = -30.701, Myj = -41.558 (for Lb) Myi = -30.701, Myj = -41.558 (for Ly) Mzi = -5.8315, Mzj = 18.1136 (for Lz)
Shear Forces	Fyy = -124.25 (LCB: 60-FY, POS:J) Fzz = 76.0186 (LCB: 54-FY, POS:J)

Depth	0.30000	Web Thick	0.01200
Flg Width	0.30000	Top F Thick	0.01200
Web Center	0.28800	Bot.F Thick	0.01200
Area	0.01382	Asz	0.00720
Oyb	0.03112	Ozb	0.03112
Iyy	0.00019	Izz	0.00019
Ybar	0.15000	Zbar	0.15000
Wely	0.00128	Welz	0.00128
ry	0.11768	rz	0.11768

3. Design Parameters

Unbraced Lengths	Ly = 0.28741, Lz = 0.28741, Lb = 0.28741
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{t_Rd} = 26.90/4673.83 = 0.006 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 41.558/505.066 = 0.082 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 18.114/505.066 = 0.036 < 1.000$ O.K
Combined Resistance	$R.MNRd = MAX[M_{Edy}/M_{ny_Rd}, M_{Edz}/M_{nz_Rd}]$ $R.BiM = (M_{Edy}/M_{ny_Rd})^{\alpha} + (M_{Edz}/M_{nz_Rd})^{\beta}$ $R.byN = N_{Ed}/(A*fy/\gamma M0), R.byM = M_{Edy}/My_Rd + M_{Edz}/Mz_Rd$ $Rmax = MAX[R.MNRd, R.BiM, (R.byN + R.byM)] = 0.124 < 1.000$ O.K
Shear Resistance	$V_{Edy}/V_{y_Rd} = 0.088 < 1.000$ O.K $V_{Edz}/V_{z_Rd} = 0.049 < 1.000$ O.K

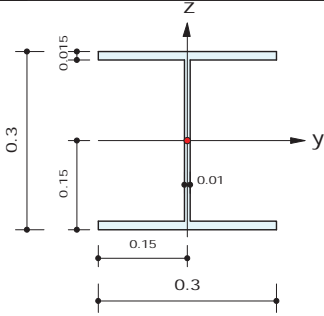
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	649
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = -4.7465 (LCB: 60-MZ, POS:J)
Bending Moments	My = -35.514, Mz = -36.875
End Moments	Myi = 16.0083, Myj = -35.514 (for Lb) Myi = 16.0083, Myj = -35.514 (for Ly) Mzi = -7.4374, Mzj = -36.875 (for Lz)
Shear Forces	Fyy = -154.98 (LCB: 60-MZ, POS:I) Fzz = 66.1370 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$\frac{N_{Ed}}{MIN[Nc_{Rd}, Nb_{Rd}]} = \frac{4.75}{3955.71} = 0.001 < 1.000$ O.K
Bending Resistance	$\frac{M_{Edy}}{M_{Rdy}} = \frac{35.514}{449.278} = 0.079 < 1.000$ O.K $\frac{M_{Edz}}{M_{Rdz}} = \frac{36.875}{152.194} = 0.242 < 1.000$ O.K
Combined Resistance	$R_{byN} = \frac{N_{Ed}}{(A \cdot f_y / \gamma_{M0})}$, $R_{byM} = \frac{M_{Edy}}{M_{yRd}} + \frac{M_{Edz}}{M_{zRd}}$ $R_{c.LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$ $R_{b.LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$ $R_{c.LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$ $R_{b.LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$ $R_{max} = MAX[R_{byN} + R_{byM}, MAX(R_{c.LT1} + R_{b.LT1}, R_{c.LT2} + R_{b.LT2})] = 0.338 < 1.000$... O.K
Shear Resistance	$\frac{V_{Edy}}{V_{yRd}} = 0.088 < 1.000$ O.K $\frac{V_{Edz}}{V_{zRd}} = 0.105 < 1.000$ O.K

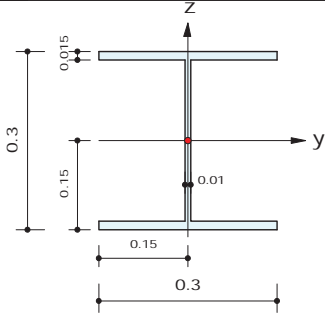
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	650
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = -11.717 (LCB: 60-FY, POS:J)
Bending Moments	My = 35.3950, Mz = 59.8236
End Moments	Myi = 47.4185, Myj = 35.3950 (for Lb) Myi = 47.4185, Myj = 35.3950 (for Ly) Mzi = -16.498, Mzj = 59.8236 (for Lz)
Shear Forces	Fyy = -265.65 (LCB: 60-MZ, POS:I) Fzz = 74.6783 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$\frac{N_{Ed}}{MIN[Nc_{Rd}, Nb_{Rd}]} = \frac{11.72}{3955.71} = 0.003 < 1.000$ O.K
Bending Resistance	$\frac{M_{Edy}}{M_{Rdy}} = \frac{35.395}{449.278} = 0.079 < 1.000$ O.K $\frac{M_{Edz}}{M_{Rdz}} = \frac{59.824}{152.194} = 0.393 < 1.000$ O.K
Combined Resistance	$R_{byN} = \frac{N_{Ed}}{(A \cdot f_y / \gamma_{M0})}$, $R_{byM} = \frac{M_{Edy}}{M_{yRd}} + \frac{M_{Edz}}{M_{zRd}}$ $R_{c.LT1} = \frac{N_{Ed}}{(\chi_y \cdot A \cdot f_y / \gamma_{M1})}$ $R_{b.LT1} = \frac{(k_{yy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (k_{yz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$ $R_{c.LT2} = \frac{N_{Ed}}{(\chi_z \cdot A \cdot f_y / \gamma_{M1})}$ $R_{b.LT2} = \frac{(K_{zy} \cdot M_{Edy}) / (\chi_{LT} \cdot W_{ely} \cdot f_y / \gamma_{M1}) + (K_{zz} \cdot M_{Edz}) / (W_{elz} \cdot f_y / \gamma_{M1})}{1}$ $R_{max} = MAX[R_{byN} + R_{byM}, MAX(R_{c.LT1} + R_{b.LT1}, R_{c.LT2} + R_{b.LT2})] = 0.497 < 1.000$... O.K
Shear Resistance	$\frac{V_{Edy}}{V_{yRd}} = 0.151 < 1.000$ O.K $\frac{V_{Edz}}{V_{zRd}} = 0.118 < 1.000$ O.K

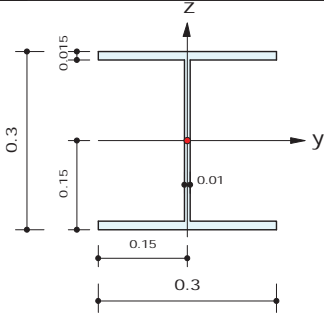
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	651
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = -3.0044 (LCB: 60-FY, POS:J)
Bending Moments	My = 34.4292, Mz = 55.2712
End Moments	Myi = 47.6812, Myj = 34.4292 (for Lb) Myi = 47.6812, Myj = 34.4292 (for Ly) Mzi = -14.633, Mzj = 55.2712 (for Lz)
Shear Forces	Fyy = -243.31 (LCB: 60-MZ, POS:I) Fzz = 78.3727 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[Nc_{Rd}, Nb_{Rd}] = 3.00/3955.71 = 0.001 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 34.429/449.278 = 0.077 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 55.271/152.194 = 0.363 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rc.LT1 = N_{Ed}/(\chi y * A * fy / \gamma M1)$ $Rb.LT1 = (kyy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (kyz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rc.LT2 = N_{Ed} / (\chi z * A * fy / \gamma M1)$ $Rb.LT2 = (Kzy * M_{Edy}) / (\chi LT * Wely * fy / \gamma M1) + (Kzz * M_{Edz}) / (Welz * fy / \gamma M1)$ $Rmax = MAX[R.byN + R.byM, MAX(Rc.LT1 + Rb.LT1, Rc.LT2 + Rb.LT2)] = 0.462 < 1.000$... O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.138 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.124 < 1.000$ O.K

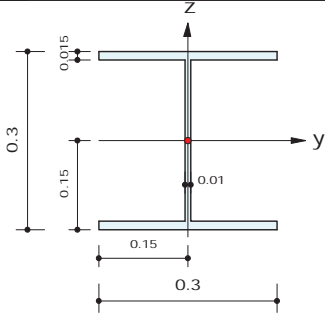
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	652
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = 10.5439 (LCB: 60-MZ, POS:J)
Bending Moments	My = -50.583, Mz = -41.773
End Moments	Myi = 43.7684, Myj = -50.583 (for Lb) Myi = 43.7684, Myj = -50.583 (for Ly) Mzi = -10.734, Mzj = -41.773 (for Lz)
Shear Forces	Fyy = 183.009 (LCB: 60-MZ, POS:J) Fzz = 79.5549 (LCB: 52-FY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/Nt_{Rd} = 10.54/3955.71 = 0.003 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 50.583/449.278 = 0.113 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 41.773/152.194 = 0.274 < 1.000$ O.K
Combined Resistance	$R_{byN} = N_{Ed}/(A*fy/\gamma M0)$, $R_{byM} = M_{Edy}/My_{Rd} + M_{Edz}/Mz_{Rd}$ $Rmax = MAX[R.MNRRd, (R.byN + R.byM)] = 0.390 < 1.000$ O.K
Shear Resistance	$V_{Edy}/Vy_{Rd} = 0.104 < 1.000$ O.K $V_{Edz}/Vz_{Rd} = 0.126 < 1.000$ O.K

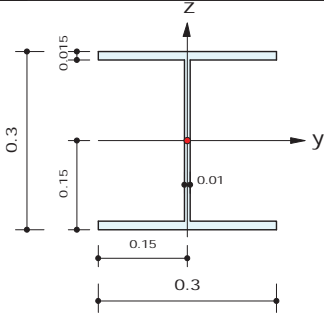
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	653
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = 12.1927 (LCB: 60-MY, POS:J)
Bending Moments	My = -48.985, Mz = -36.090
End Moments	Myi = -38.321, Myj = -48.985 (for Lb) Myi = -38.321, Myj = -48.985 (for Ly) Mzi = 8.16639, Mzj = -36.090 (for Lz)
Shear Forces	Fyy = 176.898 (LCB: 60-MZ, POS:J) Fzz = 78.6266 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	
N_Ed/Nt_Rd = 12.19/3955.71 = 0.003 < 1.000	O.K
Bending Resistance	
M_Edy/M_Rdy = 48.985/449.278 = 0.109 < 1.000	O.K
M_Edz/M_Rdz = 36.090/152.194 = 0.237 < 1.000	O.K
Combined Resistance	
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd	
Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.349 < 1.000	O.K
Shear Resistance	
V_Edy/Vy_Rd = 0.101 < 1.000	O.K
V_Edz/Vz_Rd = 0.124 < 1.000	O.K

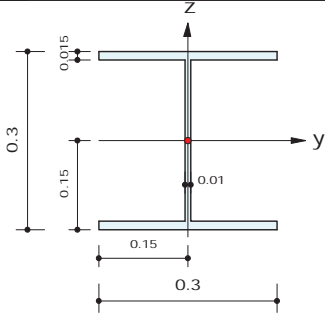
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	654
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = 14.5185 (LCB: 60-MY, POS:J)
Bending Moments	My = -35.671, Mz = -31.258
End Moments	Myi = -27.561, Myj = -35.671 (for Lb) Myi = -27.561, Myj = -35.671 (for Ly) Mzi = 4.17168, Mzj = -31.258 (for Lz)
Shear Forces	Fyy = 146.387 (LCB: 60-MZ, POS:J) Fzz = 73.8015 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	
	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	
N_Ed/Nt_Rd = 14.52/3955.71 = 0.004 < 1.000	O.K
Bending Resistance	
M_Edy/M_Rdy = 35.671/449.278 = 0.079 < 1.000	O.K
M_Edz/M_Rdz = 31.258/152.194 = 0.205 < 1.000	O.K
Combined Resistance	
R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd	
Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.288 < 1.000	O.K
Shear Resistance	
V_Edy/Vy_Rd = 0.083 < 1.000	O.K
V_Edz/Vz_Rd = 0.117 < 1.000	O.K

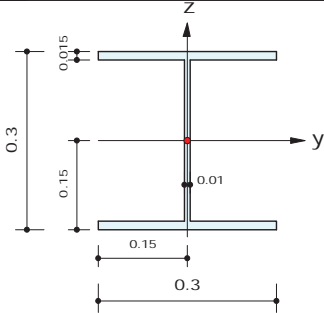
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	655
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = 7.45588 (LCB: 60-FY, POS:J)
Bending Moments	My = -17.822, Mz = 18.8381
End Moments	Myi = -5.5574, Myj = -17.822 (for Lb) Myi = -5.5574, Myj = -17.822 (for Ly) Mzi = -4.1864, Mzj = 18.8381 (for Lz)
Shear Forces	Fyy = -80.140 (LCB: 60-FY, POS:J) Fzz = 74.9528 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	N_Ed/Nt_Rd = 7.46/3955.71 = 0.002 < 1.000 O.K
Bending Resistance	M_Edy/M_Rdy = 17.822/449.278 = 0.040 < 1.000 O.K M_Edz/M_Rdz = 18.838/152.194 = 0.124 < 1.000 O.K
Combined Resistance	R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.165 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.046 < 1.000 O.K V_Edz/Vz_Rd = 0.119 < 1.000 O.K

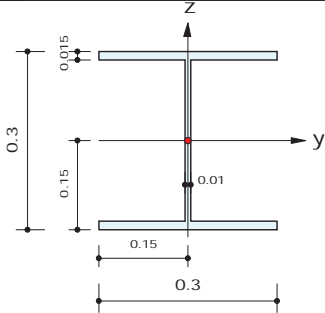
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	656
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = 7.92446 (LCB: 54-FY, POS:J)
Bending Moments	My = -30.251, Mz = 12.4850
End Moments	Myi = -10.369, Myj = -30.251 (for Lb) Myi = -10.369, Myj = -30.251 (for Ly) Mzi = -3.4606, Mzj = 12.4850 (for Lz)
Shear Forces	Fyy = -59.881 (LCB: 60-MZ, POS:I) Fzz = 79.6431 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	N_Ed/Nt_Rd = 7.92/3955.71 = 0.002 < 1.000 O.K
Bending Resistance	M_Edy/M_Rdy = 30.251/449.278 = 0.067 < 1.000 O.K M_Edz/M_Rdz = 12.485/152.194 = 0.082 < 1.000 O.K
Combined Resistance	R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.151 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.034 < 1.000 O.K V_Edz/Vz_Rd = 0.126 < 1.000 O.K

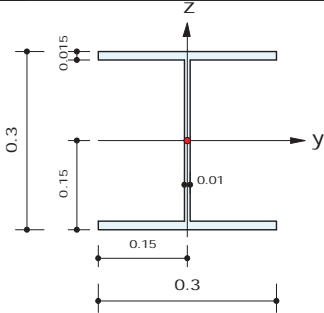
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	657
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = 6.75039 (LCB: 54+MX, POS:J)
Bending Moments	My = -35.913, Mz = 2.51183
End Moments	Myi = -18.812, Myj = -35.913 (for Lb) Myi = -18.812, Myj = -35.913 (for Ly) Mzi = -0.8764, Mzj = 2.51183 (for Lz)
Shear Forces	Fyy = -14.041 (LCB: 53-MZ, POS:I) Fzz = 80.0882 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 6.75/3955.71 = 0.002 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 35.913/449.278 = 0.080 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 2.512/152.194 = 0.017 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A \cdot f_y / \gamma_{M0})$, R.byM = $M_{Edy}/M_{yRd} + M_{Edz}/M_{zRd}$ Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.098 < 1.000 O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.008 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.127 < 1.000$ O.K

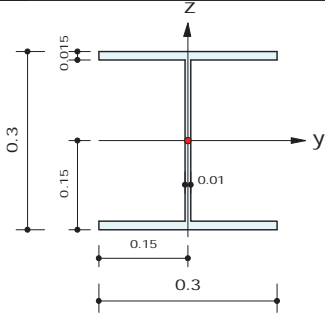
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	658
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = 8.64131 (LCB: 54-MY, POS:J)
Bending Moments	My = -36.684, Mz = -5.4671
End Moments	Myi = -21.775, Myj = -36.684 (for Lb) Myi = -21.775, Myj = -36.684 (for Ly) Mzi = 0.35549, Mzj = -5.4671 (for Lz)
Shear Forces	Fyy = 54.8818 (LCB: 60-MZ, POS:J) Fzz = 79.4906 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 8.64/3955.71 = 0.002 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 36.684/449.278 = 0.082 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 5.467/152.194 = 0.036 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A \cdot f_y / \gamma_{M0})$, R.byM = $M_{Edy}/M_{yRd} + M_{Edz}/M_{zRd}$ Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.120 < 1.000 O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.031 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.126 < 1.000$ O.K

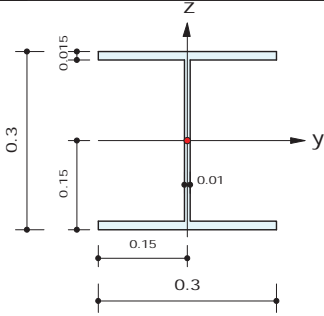
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	659
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = 0.20567 (LCB: 60-FY, POS:J)
Bending Moments	My = -20.270, Mz = 13.8333
End Moments	Myi = -12.424, Myj = -20.270 (for Lb) Myi = -12.424, Myj = -20.270 (for Ly) Mzi = -4.3831, Mzj = 13.8333 (for Lz)
Shear Forces	Fyy = 65.5473 (LCB: 60-MZ, POS:J) Fzz = 76.4827 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/N_{tRd} = 0.21/3955.71 = 0.000 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 20.270/449.278 = 0.045 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 13.833/152.194 = 0.091 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A \cdot f_y/\gamma_{M0})$, R.byM = $M_{Edy}/M_{yRd} + M_{Edz}/M_{zRd}$ Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.136 < 1.000 O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.037 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.121 < 1.000$ O.K

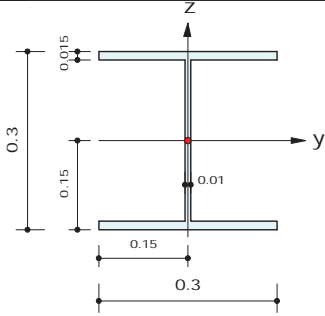
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	660
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = -0.6455 (LCB: 60-MZ, POS:J)
Bending Moments	My = -18.797, Mz = -13.862
End Moments	Myi = 17.8133, Myj = -18.797 (for Lb) Myi = 17.8133, Myj = -18.797 (for Ly) Mzi = -3.2521, Mzj = -13.862 (for Lz)
Shear Forces	Fyy = -63.910 (LCB: 60-FY, POS:J) Fzz = 76.5995 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	$N_{Ed}/MIN[N_{cRd}, N_{bRd}] = 0.65/3955.71 = 0.000 < 1.000$ O.K
Bending Resistance	$M_{Edy}/M_{Rdy} = 18.797/449.278 = 0.042 < 1.000$ O.K $M_{Edz}/M_{Rdz} = 13.862/152.194 = 0.091 < 1.000$ O.K
Combined Resistance	R.byN = $N_{Ed}/(A \cdot f_y/\gamma_{M0})$, R.byM = $M_{Edy}/M_{yRd} + M_{Edz}/M_{zRd}$ Rc.LT1 = $N_{Ed}/(\chi_y \cdot A \cdot f_y/\gamma_{M1})$ Rb.LT1 = $(k_{yy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ely} \cdot f_y/\gamma_{M1}) + (k_{yz} \cdot M_{Edz})/(W_{elz} \cdot f_y/\gamma_{M1})$ Rc.LT2 = $N_{Ed}/(\chi_z \cdot A \cdot f_y/\gamma_{M1})$ Rb.LT2 = $(K_{zy} \cdot M_{Edy})/(\chi_{LT} \cdot W_{ely} \cdot f_y/\gamma_{M1}) + (K_{zz} \cdot M_{Edz})/(W_{elz} \cdot f_y/\gamma_{M1})$ Rmax = MAX[R.byN+R.byM, MAX(Rc.LT1+Rb.LT1, Rc.LT2+Rb.LT2)] = 0.139 < 1.000 ... O.K
Shear Resistance	$V_{Edy}/V_{yRd} = 0.036 < 1.000$ O.K $V_{Edz}/V_{zRd} = 0.121 < 1.000$ O.K

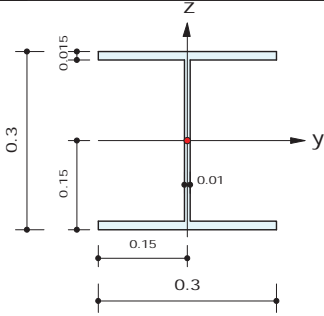
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	661
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = 8.38486 (LCB: 54-MY, POS:J)
Bending Moments	My = -35.270, Mz = 4.66325
End Moments	Myi = -20.667, Myj = -35.270 (for Lb) Myi = -20.667, Myj = -35.270 (for Ly) Mzi = -0.3739, Mzj = 4.66325 (for Lz)
Shear Forces	Fyy = -47.855 (LCB: 60-MZ, POS:I) Fzz = 79.6661 (LCB: 52-FY, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	N_Ed/Nt_Rd = 8.38/3955.71 = 0.002 < 1.000 O.K
Bending Resistance	M_Edy/M_Rdy = 35.270/449.278 = 0.079 < 1.000 O.K M_Edz/M_Rdz = 4.663/152.194 = 0.031 < 1.000 O.K
Combined Resistance	R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.111 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.027 < 1.000 O.K V_Edz/Vz_Rd = 0.126 < 1.000 O.K

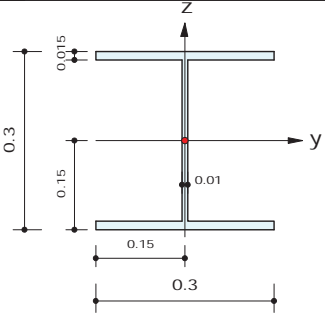
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	662
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = 5.93817 (LCB: 60-MZ, POS:J)
Bending Moments	My = -34.542, Mz = -3.9205
End Moments	Myi = 23.3859, Myj = -34.542 (for Lb) Myi = 23.3859, Myj = -34.542 (for Ly) Mzi = -0.9873, Mzj = -3.9205 (for Lz)
Shear Forces	Fyy = 17.4031 (LCB: 60-MZ, POS:J) Fzz = 79.7910 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Qyb	0.07324	Qzb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters


Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	N_Ed/Nt_Rd = 5.94/3955.71 = 0.002 < 1.000 O.K
Bending Resistance	M_Edy/M_Rdy = 34.542/449.278 = 0.077 < 1.000 O.K M_Edz/M_Rdz = 3.920/152.194 = 0.026 < 1.000 O.K
Combined Resistance	R.byN = N_Ed/(A*fy/γM0), R.byM = M_Edy/My_Rd + M_Edz/Mz_Rd Rmax = MAX[R.MNRd, (R.byN+R.byM)] = 0.104 < 1.000 O.K
Shear Resistance	V_Edy/Vy_Rd = 0.010 < 1.000 O.K V_Edz/Vz_Rd = 0.126 < 1.000 O.K

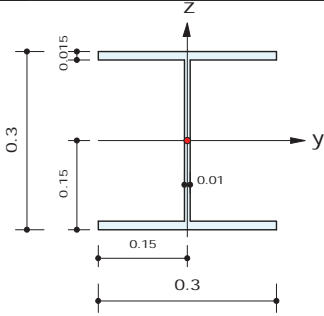
MIDAS/Civil

Steel Checking Result

	Company		Project Title	
	Author	rmm	File Name	Global_Losa_AMB Sant Cugat.mcb

1. Design Information

Design Code	Eurocode3-2:05(Recommended)
Unit System	kN, m
Member No	663
Material	S355 (No:10) (Fy = 355000, Es = 210000000)
Section Name	V_Transv_H300_Met (No:30) (Built-up Section).
Member Length	: 0.28731



2. Member Forces

Axial Force	Fxx = 7.45469 (LCB: 54-MZ, POS:J)
Bending Moments	My = -27.660, Mz = -13.999
End Moments	Myi = 14.9804, Myj = -27.660 (for Lb) Myi = 14.9804, Myj = -27.660 (for Ly) Mzi = -1.9510, Mzj = -13.999 (for Lz)
Shear Forces	Fyy = 68.4094 (LCB: 60-MZ, POS:J) Fzz = 78.8223 (LCB: 52+FZ, POS:J)

Depth	0.30000	Web Thick	0.01000
Top F Width	0.30000	Top F Thick	0.01500
Bot.F Width	0.30000	Bot.F Thick	0.01500
Area	0.01170	Asz	0.00300
Oyb	0.07324	Ozb	0.01125
Iyy	0.00020	Izz	0.00007
Ybar	0.15000	Zbar	0.15000
Wely	0.00133	Welz	0.00045
ry	0.13052	rz	0.07597

3. Design Parameters

Unbraced Lengths	Ly = 0.28731, Lz = 0.28731, Lb = 0.28731
Effective Length Factors	Ky = 1.00, Kz = 1.00
Moment Factor / Bending Coefficient	Cmy = 1.00, Cmz = 1.00, Cb = 1.00

4. Checking Result

Axial Resistance	
N_{Ed}/N_{tRd}	= 7.45/3955.71 = 0.002 < 1.000 O.K
Bending Resistance	
M_{Edy}/M_{Rdy}	= 27.660/449.278 = 0.062 < 1.000 O.K
M_{Edz}/M_{Rdz}	= 13.999/152.194 = 0.092 < 1.000 O.K
Combined Resistance	
R_{byN}	= $N_{Ed}/(A \cdot f_y / \gamma_{M0})$, R_{byM} = M_{Edy}/M_{yRd} + M_{Edz}/M_{zRd}
R_{max}	= MAX[R_{MNRd} , ($R_{byN} + R_{byM}$)] = 0.155 < 1.000 O.K
Shear Resistance	
V_{Edy}/V_{yRd}	= 0.039 < 1.000 O.K
V_{Edz}/V_{zRd}	= 0.125 < 1.000 O.K