APÉNDICE Nº 10.3

NOTA DE CÁLCULO PASARELA PEATONAL

Pasarela de la estación de Bedia

NOTA DE CÁLCULO

Rev. 1 Marzo 2021

Información del Documento

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1. INTRODUCCIÓN

Como parte de la actuación del proyecto denominado "PROYECTO CONSTRUCTIVO DE LA SUPRESIÓN DEL PASO A NIVEL DE LA ESTACIÓN DE BEDIA Y NUEVO APARCAMIENTO" la empresa DAIR, redactora del proyecto encarga a SILGA el diseño y dimensionamiento de una pasarela que formara parte del mencionado proyecto. Se han presentado varias alternativas, desarrollando finalmente el diseño elegido por la propiedad.

2. DESCRIPCIÓN DE LA PASARELA

En las figuras 1 y 2 se presentan dos alzados, y en la figura 3 una planta de la solución desarrollada.

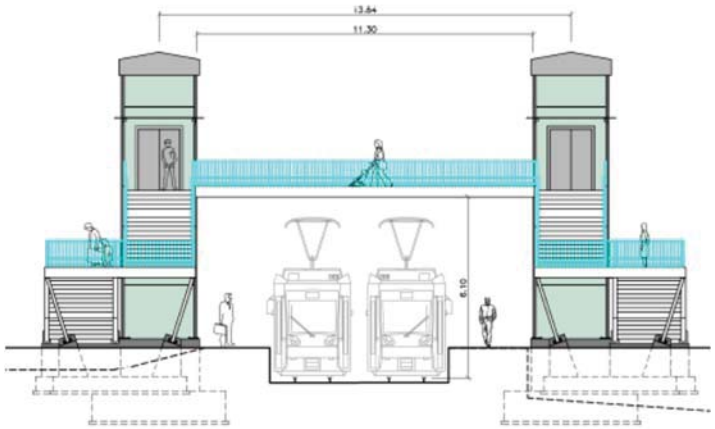


Figura 1. Alzado frontal de la pasarela

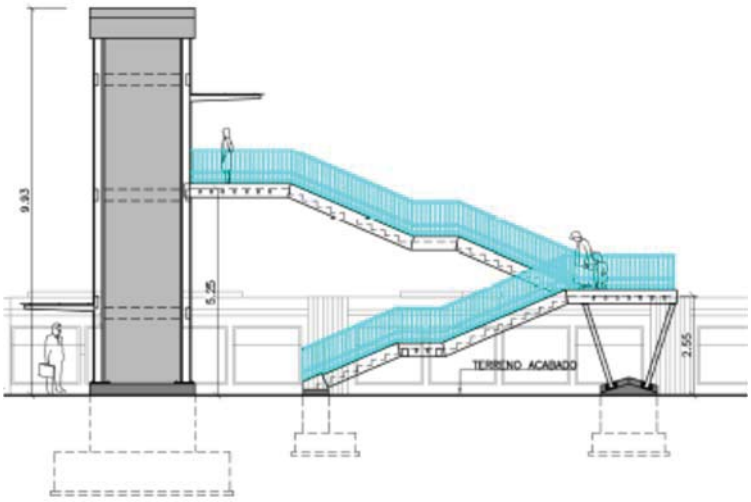


Figura 2. Alzado lateral de la pasarela

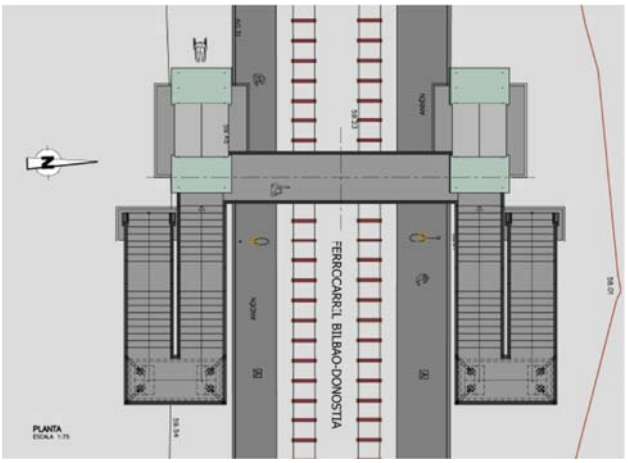


Figura 3. Planta de la pasarela

La pasarela está formada por tres elementos diferenciados, el tablero central, las escaleras y las torres de ascensores. Los accesos a un lado y otro son muy similares entre sí, partiendo de la misma cota a cada lado. diferente.

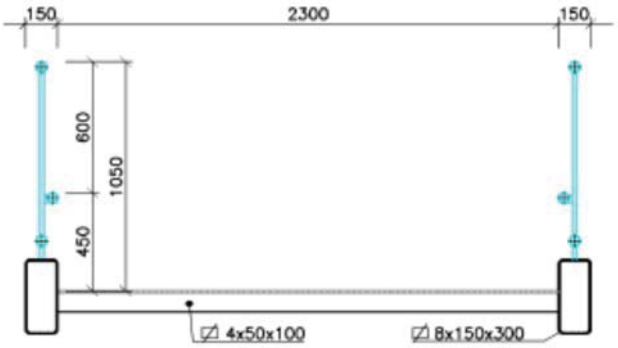


Figura 4. Sección transversal del tablero

El tablero central es metálico, está formado por una chapa lagrimada de 5mm sustentada por dos vigas laterales de sección rectangular tubular de 350x150x8 mm y 37 vigas transversales, 100x50x4, que unen ambas vigas longitudinales justo por debajo de la chapa lagrimada.

Las escaleras mantienen el sistema estructural del tablero central, las mismas dos vigas laterales y la chapa lagrimada central. En los descansillos se mantienen las vigas transversales bajo la chapa lagrimada, mientras que en las zonas de peldaños solamente la chapa lagrimada une las dos vigas laterales. Los descansillos intermedios reposan sobre 4 pilares inclinados de 100x100x8.

Las torres que acogen a los ascensores están soportadas por una estructura de acero realizada a base de perfiles rectangulares huecos. Los dos paramentos perpendiculares a la vía están hechos con vidrio laminado, mientras que los dos restantes a base de chapa totalmente opaca.

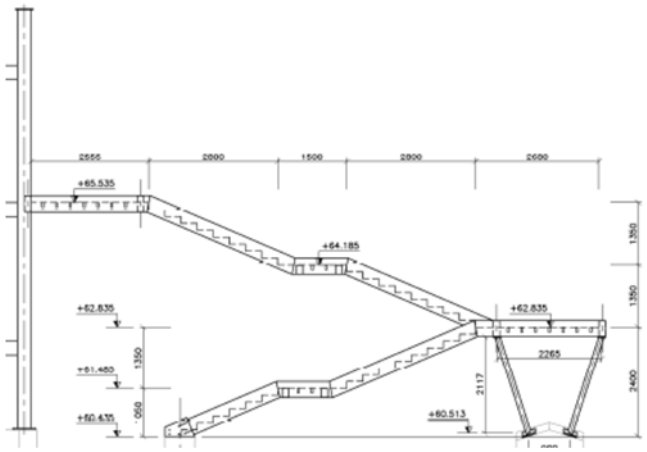


Figura 5. Vista transversal de las escaleras

La cimentación tanto de las torres como de las escaleras es directa por medio de zapatas.

3. MATERIALES

Los materiales usados en la estrupasarela son:

Hormigones

- Hormigón de limpieza: HL-150/P/20/IIa
- Cimentaciones HA-30/B/30/IIa recubrimiento: 70 mm
- Alzados HA-30/B/20/IIa recubrimiento: 30+5 mm

Aceros

- Tablero S 355 J2H
- Chapas y rigidizadores S 355 J2
- Perfiles S355 J0
- Pernos 8.8
- Acero en armadura pasiva B 500 S
- Acero en cables fu>1570 MPa
- Acero inoxidable AISI 316

4. MODELO DE CÁLCULO

En el análisis y dimensionamiento se ha utilizado el programa de elementos finitos SOFISTIK. Este es un programa tiene aplicaciones adecuadas para el análisis y dimensionamiento de estructuras habituales en la obra civil, pudiendo realizar cálculos y comprobaciones tanto para elementos metálicos como de hormigón. Permite una entrada interactiva de datos y una gran flexibilidad en la obtención de resultados, que pueden obtenerse tanto de forma numérica como gráfica.

El modelo utilizado a sido único, representando en el mismo el conjunto estructural de toda la pasarela. Para ellos se han utilizado elementos "beam" para pilares y vigas, en general para todos los elementos 1D. Elementos "quad" para los elementos planos, a saber, zapatas, paredes del foso y alzados de las otras cimentaciones, chapas lagrimadas de escaleras y del tablero central. Elementos "constraint" y "spring" para uniones entre elementos planos y elementos lineales, y elementos de "contorno" para el balasto axial y transversal en zapatas.

En la figura 6 se muestra un gráfico del modelo usado.

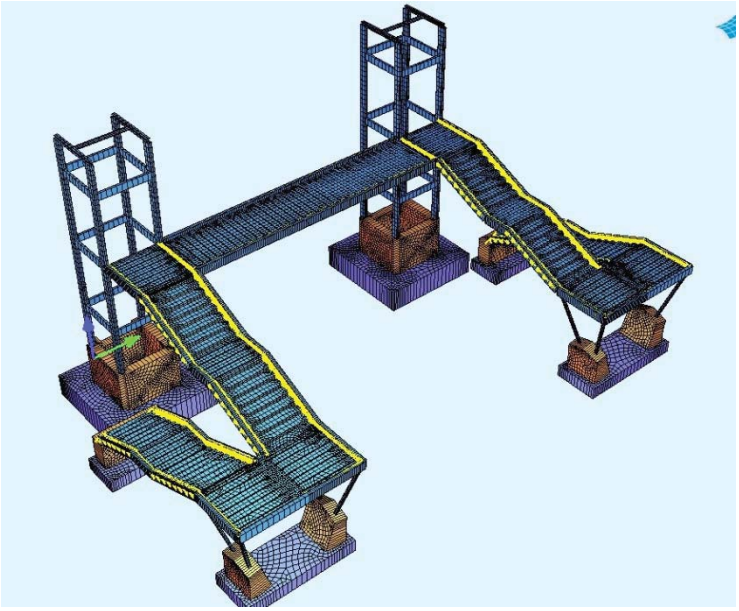


Figura 6. Modelo de elementos finitos de la estructura

El análisis se ha realizado de acuerdo con los Eurocódigos 2 y 3, complementados con las normas españolas:

EHE-08 Instrucción de Hormigón Estructural

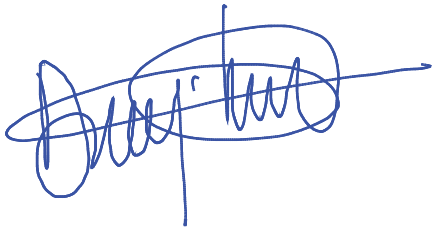
EAE Instrucción de acero estructural

IAP-11 Instrucción sobre las acciones a considerar en el proyecto de puentes de carretera

5. RESULTADOS

Tanto las acciones utilizadas como los resultados obtenidos se presentan en los anejos a esta nota de cálculo.

1 de marzo de 2021



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Dr. Ingeniero de Caminos, Canales y Puertos

6. ANEJO 1. ACCIONES

ACCIONES

Peso propio

Se introduce de forma automática con las propiedades geométricas del modelo, considerando los pesos específicos de:

$\gamma_{hor} := 25\ \frac{kN}{m^3}$ hormigón $\gamma_{ace} := 78.5\ \frac{kN}{m^3}$ acero

Cargas permanentes

Barandilla	$1\ \frac{kN}{m}$
Peldaños	chapa de 5 mm, como Pp
Pavimento	$0.03\ m \cdot 24\ \frac{kN}{m^3} = 0.72\ kPa$
Superficie acristalada (espesor 12mm)	$25.31 \cdot \frac{kN}{m^3} \cdot 12\ mm = 0.304\ kPa$
Entramado metálico secundario	$0.6\ kPa = 0.6\ kPa$

Sobrecargas de uso

Según IAP-11 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 q_{fk} de valor igual a 5 kN/m2

b) Una fuerza horizontal longitudinal q_{flk} de valor igual al 10% del total de la carga vertical uniformemente distribuida, actuando en el eje del tablero al nivel de la superficie del pavimento.

Ambas cargas se consideran como una acción única, cuyo valor constituye el valor característico de la sobrecarga de uso cuando se combina con el resto de las acciones (cargas permanentes, viento, etc.). A efectos de las comprobaciones locales, se considerará una carga vertical puntual q_{fwk} de valor igual a 10 kN, actuando sobre una superficie cuadrada de 0,10 m de lado.

$Q_{flk} := 10\% \cdot 2.3\ m \cdot 16\ m \cdot 5\ \frac{kN}{m^2} = 18.4\ kN$ Fuerza horizontal en tablero

$$\frac{Q_{flk}}{2.2\ m \cdot 11.65\ m} = 0.718\ \frac{kN}{m^2}$$

Acciones térmicas

- Temperatura máxima y mínima del aire

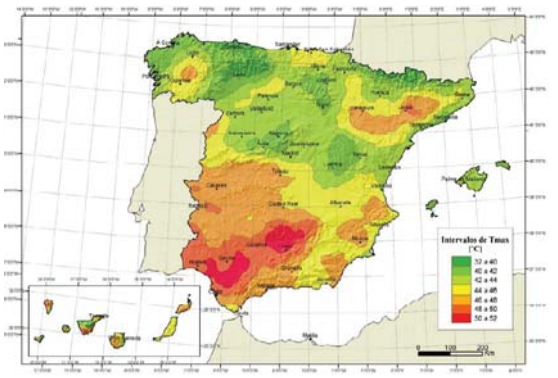


Figura 4.3-a Isotermas de la temperatura máxima anual del aire, T_{max} [ºC]
(Coincide con el mapa correspondiente del Código Técnico de la Edificación)



Figura 4.3-b Zonas climáticas de invierno
(Coincide con el mapa correspondiente del Código Técnico de la Edificación)

Tabla 4.3-a Temperatura mínima anual del aire, T_{min} [ºC]
(Coincide con la tabla correspondiente del Código Técnico de la Edificación)

Altitud [m]	Zona de clima invernal (según *figura 4.3-b*)						
	1	2	3	4	5	6	7
0	-7	-11	-11	-6	-5	-6	6
200	-10	-13	-12	-8	-8	-8	5
400	-12	-15	-14	-10	-11	-9	3
600	-15	-16	-15	-12	-14	-11	2
800	-18	-18	-17	-14	-17	-13	0
1000	-20	-20	-19	-16	-20	-14	-2
1200	-23	-21	-20	-18	-23	-16	-3
1400	-26	-23	-22	-20	-26	-17	-5
1600	-28	-25	-23	-22	-29	-19	-7
1800	-31	-26	-25	-24	-32	-21	-8
2000	-33	-28	-27	-26	-35	-22	-10

$T_{max} := 44$ $T_{min} := -9$

Para un periodo de retorno de 100 años

$p := 0.01$ $k_1 := 0.781$ $k_2 := 0.056$

$k_3 := 0.393$ $k_4 := 0.156$

$T_{max_p} := T_{max} \cdot \left(k_1 - k_2 \cdot \ln\left(-\ln\left(1-p\right)\right)\right)$ $T_{max_p} = 45.699$

$T_{min_p} := T_{min} \cdot \left(k_3 - k_4 \cdot \ln\left(-\ln\left(1-p\right)\right)\right)$ $T_{min_p} = -9.996$

- Componente uniforme de temperatura del tablero

Tablero de Acero

$\Delta T_{e_min_ac} := -3$ $\Delta T_{e_max_ac} := 16$

$T_{e_min_ac} := T_{min_p} + \Delta T_{e_min_ac} = -12.996$

$T_{e_max_ac} := T_{max_p} + \Delta T_{e_max_ac} = 61.699$

Losa de Hormigón

$\Delta T_{e_min_hor} := 8$ $\Delta T_{e_max_hor} := 2$

$T_{e_min_hor} := T_{min_p} + \Delta T_{e_min_hor} = -1.996$

$T_{e_max_hor} := T_{max_p} + \Delta T_{e_max_hor} = 47.699$

- Rango de la componente uniforme de temperatura del tablero $T_o := 20$ ºC

$\Delta T_N := T_{e_max_ac} - T_{e_min_ac} = 74.694$

Variación de la temperatura en contracción

$\Delta T_{N_con_ac} := T_o - T_{e_min_ac} = 33.0$ ºC **acero**

$\Delta T_{N_con_hor} := T_o - T_{e_min_hor} = 22.0$ºC **hormigón**

Variación de la temperatura en dilatación

$\Delta T_{N_exp_ac} := T_{e_max_ac} - T_o = 41.7$ ºC

$\Delta T_{N_exp_hor} := T_{e_max_hor} - T_o = 27.7$ ºC

- Componente de la diferencia de temperatura del tablero

Diferencia vertical

4.3.1.2 Componente de la diferencia de temperatura

4.3.1.2.1 Diferencia vertical

a) Puentes de acero (Tipo 1) y puentes de hormigón (Tipo 3), 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 con *TM,heat* y *TM,cool*. Estos valores son diferencias de temperatura entre las fibras superior e inferior del tablero. Para tableros de acero (Tipo1) o tableros de hormigón (Tipo 3), los valores TM,heat y TM,cool serán los que figuran en la *tabla 4.3-d*.

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
	$\Delta T_{M,heat}$ [°C]	$\Delta T_{M,cool}$ [°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

$\Delta T_{M_heat_ac} := 18\ ^{o}C$ $\Delta T_{M_heat_hor} := 15^{o}C$

$\Delta T_{M_cool_ac} := 13\ ^{o}C$ $\Delta T_{M_cool_hor} := 8\ ^{o}C$

Simultaneidad de la componente uniforme y de la diferencia de temperatura

Si debido al esquema estructural, es necesario tener en cuenta la actuación simultánea de la variación de la componente uniforme, $\Delta T_{N,exp}$ o $\Delta T_{N,con}$, y la diferencia de temperatura, $\Delta T_{M,heat}$ o $\Delta T_{M,cool}$, ambas componentes se combinarán de acuerdo con las expresiones siguientes:

$$\Delta T_M + \omega_N \Delta T_N$$

$$\omega_M \Delta T_M + \Delta T_N$$

con $\omega_N = 0{,}35$ y $\omega_M = 0{,}75$

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 para el elemento en estudio.

Casos de temperatura

Dilatación acero

$$\begin{bmatrix}40\\40\end{bmatrix} + 0.75 \cdot \begin{bmatrix}9\\-9\end{bmatrix} = \begin{bmatrix}46.75\\33.25\end{bmatrix} \qquad \begin{bmatrix}40\\40\end{bmatrix} + 0.75 \cdot \begin{bmatrix}-6.5\\6.5\end{bmatrix} = \begin{bmatrix}35.125\\44.875\end{bmatrix}$$

$$\begin{bmatrix}40\\40\end{bmatrix} \cdot 0.35 + \begin{bmatrix}9\\-9\end{bmatrix} = \begin{bmatrix}23\\5\end{bmatrix} \qquad \begin{bmatrix}40\\40\end{bmatrix} \cdot 0.35 + \begin{bmatrix}-6.5\\6.5\end{bmatrix} = \begin{bmatrix}7.5\\20.5\end{bmatrix}$$

Contracción acero

$$\begin{bmatrix}-32\\-32\end{bmatrix}+0.75\cdot\begin{bmatrix}9\\-9\end{bmatrix}=\begin{bmatrix}-25.25\\-38.75\end{bmatrix} \qquad \begin{bmatrix}-32\\-32\end{bmatrix}+0.75\cdot\begin{bmatrix}-6.5\\6.5\end{bmatrix}=\begin{bmatrix}-36.88\\-27.13\end{bmatrix}$$

$$\begin{bmatrix}-32\\-32\end{bmatrix}\cdot 0.35+\begin{bmatrix}9\\-9\end{bmatrix}=\begin{bmatrix}-2.2\\-20.2\end{bmatrix} \qquad \begin{bmatrix}-32\\-32\end{bmatrix}\cdot 0.35+\begin{bmatrix}-6.5\\6.5\end{bmatrix}=\begin{bmatrix}-17.7\\-4.7\end{bmatrix}$$

Dilatación hormigón

$$\begin{bmatrix}26\\26\end{bmatrix}+0.75\cdot\begin{bmatrix}7.5\\-7.5\end{bmatrix}=\begin{bmatrix}31.63\\20.38\end{bmatrix} \qquad \begin{bmatrix}26\\26\end{bmatrix}+0.75\cdot\begin{bmatrix}-4\\4\end{bmatrix}=\begin{bmatrix}23\\29\end{bmatrix}$$

$$\begin{bmatrix}26\\26\end{bmatrix}\cdot 0.35+\begin{bmatrix}7.5\\-7.5\end{bmatrix}=\begin{bmatrix}16.6\\1.6\end{bmatrix} \qquad \begin{bmatrix}26\\26\end{bmatrix}\cdot 0.35+\begin{bmatrix}-4\\4\end{bmatrix}=\begin{bmatrix}5.1\\13.1\end{bmatrix}$$

Contracción hormigón

$$\begin{bmatrix}-21\\-21\end{bmatrix}+0.75\cdot\begin{bmatrix}7.5\\-7.5\end{bmatrix}=\begin{bmatrix}-15.38\\-26.63\end{bmatrix} \qquad \begin{bmatrix}-21\\-32\end{bmatrix}+0.75\cdot\begin{bmatrix}-4\\4\end{bmatrix}=\begin{bmatrix}-24\\-29\end{bmatrix}$$

$$\begin{bmatrix}-21\\-21\end{bmatrix}\cdot 0.35+\begin{bmatrix}7.5\\-7.5\end{bmatrix}=\begin{bmatrix}0.15\\-14.85\end{bmatrix} \qquad \begin{bmatrix}-21\\-21\end{bmatrix}\cdot 0.35+\begin{bmatrix}-4\\4\end{bmatrix}=\begin{bmatrix}-11.35\\-3.35\end{bmatrix}$$

4.3.3 DIFERENCIAS DE TEMPERATURA UNIFORME ENTRE ELEMENTOS ESTRUCTURALES

Cuando las diferencias en la componente uniforme de temperatura de diferentes tipos de elementos estructurales puedan producir efectos adversos, se tendrán en cuenta según lo indicado en este apartado. Los efectos de la diferencia de temperatura entre distintos elementos estructurales se considerarán simultáneamente con los producidos por la variación de la componente uniforme de temperatura de todos los elementos.

Acciones del viento

- Velocidad básica fundamental del viento



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)

zona **C**

$v_{bo} := 29\ \frac{m}{s}$

- Velocidad básica del viento

$c_{dir} := 1.0$ $c_{season} := 1.0$ $v_b := c_{dir} \cdot c_{season} \cdot v_{bo} = 29\ \frac{m}{s}$ $K := 0.2$ $n := 0.5$

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

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

$v_b(100) = 30.116\ \frac{m}{s}$

- Velocidad media del viento

Entorno tipo II

$k_r := 0.190$

$z_o := 0.05\ m$

$z_{min} := 2.0\ m$

$c_o := 1.1$

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

$$c_r(z) := \begin{cases} \text{if } z \geq z_{min} \\ \quad k_r \cdot \ln\left(\frac{z}{z_o}\right) \\ \text{if } z < z_{min} \\ \quad c_r(z_{min}) \end{cases}$$

$$v_m(z, T) := c_r(z) \cdot c_o \cdot v_b(T)$$

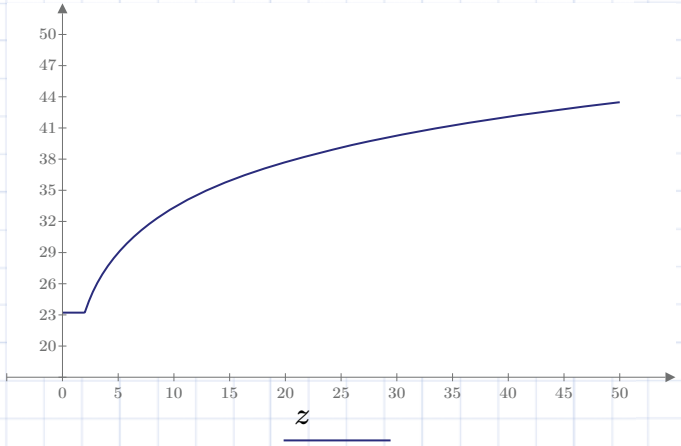
$v_m(z\ m, 100)\ \left(\frac{m}{s}\right)$

$v_m(0\ m, 100) = 23.219\ \frac{m}{s}$

$v_m(7.6\ m, 100) = 31.621\ \frac{m}{s}$

$v_m(12\ m, 100) = 34.496\ \frac{m}{s}$

$v_m(20\ m, 100) = 37.712\ \frac{m}{s}$



- Empuje del viento

$\rho_a := 1.25\ \frac{kg}{m^3}$ $k_l := 1$ factor de turbulencia

$c_f := 1$ coeficiente de fuerza del elemento determinado

$A_{ref} := 1$ Área de referencia

$$c_e(z) := \begin{cases} \text{if } z \geq z_{min} \\ \quad k_r^2 \cdot \left(c_o^2 \cdot \ln\left(\frac{z}{z_o}\right)^2 + 7 \cdot k_l \cdot c_o \cdot \ln\left(\frac{z}{z_o}\right)\right) \\ \text{if } z < z_{min} \\ \quad c_e(z_{min}) \end{cases}$$

coeficiente de exposición

$c_e(0\ m) = 1.62$ $c_e(z_{min}) = 1.62$

$c_e(7\ m) = 2.44$ $c_e(12\ m) = 2.836$

$c_e(20\ m) = 3.233$ $c_e(50\ m) = 4.004$

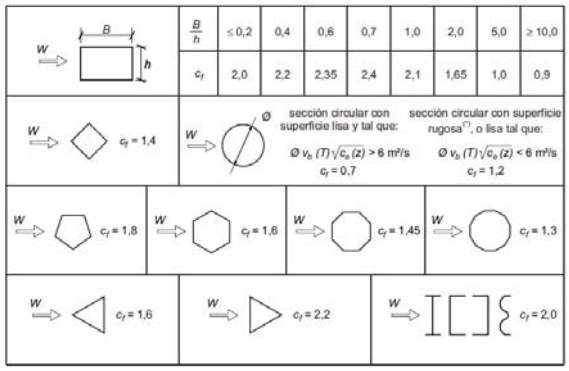
$$F_w(z, T, c_f, A_{ref}) := \left(\frac{1}{2} \cdot \rho_a \cdot v_b(T)^2\right) \cdot c_e(z) \cdot c_f \cdot A_{ref}$$

La sobrecarga de uso supondrá un área expuesta, medida desde la superficie del pavimento, de:

- 1.25 en pasarelas

En caso de coexistir distintos tipos de carga sólo se considerará la más desfavorable

Coeficiente de fuerza. Secciones habituales



(*) Se tomará siempre superficie rugosa excepto si la rugosidad superficial equivalente resulta menor de $\phi \cdot 10^{-5}$ m

Figura 4.2-b Coeficiente de fuerza c_f para las secciones más habituales

Coeficiente de ocultamiento

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	≥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

$A_n := 1$ $A_{tot} := 1$ $\lambda := \frac{A_n}{A_{tot}} = 1$ relación de solidez

$s := 1$ $h_p := 1$ $s_r := \frac{s}{h_p}$ espaciamiento relativo

Cuando sea necesario considerar el efecto del ocultamiento sobre cualquier elemento no expuesto directamente a la acción del viento (por quedar oculto tras 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 definido en la tabla 4.2-c, donde:

λ es relación de solidez correspondiente al elemento de barlovento más próximo, donde A_n es el área sólida neta o real (descontando los huecos) que el elemento de barlovento presenta al viento, y A_{tot} es el área bruta o total (sin descontar huecos) del elemento de barlovento delimitada por su contorno externo.

s_r es el espaciamiento relativo entre el elemento de barlovento y el de sotavento, donde s es la distancia horizontal entre las superficies de ambos elementos, proyectadas sobre un plano perpendicular a la dirección del viento, y h_p altura protegida u ocultada por el elemento de barlovento.

- Dirección del viento: **Perpendicular a la estructura**

<u>Empuje del viento sobre el tablero</u>

- Efectos provocados por el viento transversal

Canto equivalente: $h_{tab} := 0.35\ m$ $h_{sob} := 1.25\ m$ Ancho tablero: $B := 2.35\ m$

$$h_{eq} := \frac{h_{tab}}{2} + h_{sob} = 1.425\ m$$

$$c_{f_x} := 2.5 - 0.3 \cdot \left\langle \frac{B}{h_{eq}} \right\rangle = 2.005 \qquad 1.3 \le c_{f_x} \le 2.4$$

Empuje horizontal $T := 100$ $c_f := c_{f_x}$ $A_{ref} := h_{eq} = 1.425\ m$

$$F_w(7.0\ m, T, c_f, A_{ref}) = 3.953\ \frac{kN}{m}$$

Empuje vertical

$c_{f_z} := 0.9$ $A_{ref_z} := B = 2.35\ m$ $F_w(7.6\ m, T, c_{f_z}, A_{ref_z}) = 2.996\ \frac{kN}{m}$

aplicado a $\frac{B}{4} = 0.588\ m$ desde el borde de barlovento.

<u>Empuje del viento sobre las torres del ascensor</u>

- Efectos provocados por el viento transversal $A_{torre} := 2.50\ m$ $B_{torre} := 2.40\ m$

$\frac{B_{torre}}{A_{torre}} = 0.96$ $c_{f_torre} := 2.1$ $A_{ref_torre} := A_{torre}$

$F_w(0.0\ m, T, c_{f_torre}, A_{ref_torre}) = 4.82\ \frac{kN}{m}$ $F_w(z_{min}, T, c_{f_torre}, A_{ref_torre}) = 4.82\ \frac{kN}{m}$

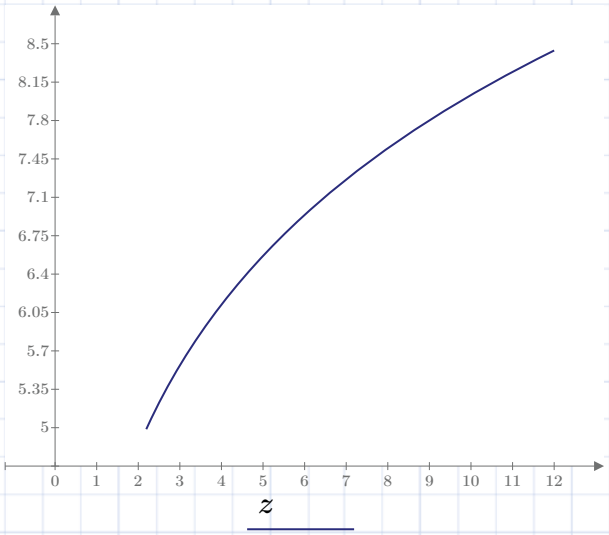
$F_w(3.0\ m, T, c_{f_torre}, A_{ref_torre}) = 5.57\ \frac{kN}{m}$ $F_w(4.0\ m, T, c_{f_torre}, A_{ref_torre}) = 6.12\ \frac{kN}{m}$

$F_w(5.0\ m, T, c_{f_torre}, A_{ref_torre}) = 6.57\ \frac{kN}{m}$ $F_w(6.0\ m, T, c_{f_torre}, A_{ref_torre}) = 6.94\ \frac{kN}{m}$

$F_w(7.0\ m, T, c_{f_torre}, A_{ref_torre}) = 7.26\ \frac{kN}{m}$ $F_w(8.0\ m, T, c_{f_torre}, A_{ref_torre}) = 7.55\ \frac{kN}{m}$

$F_w(9.0\ m, T, c_{f_torre}, A_{ref_torre}) = 7.8\ \frac{kN}{m}$ $F_w(10\ m, T, c_{f_torre}, A_{ref_torre}) = 8.03\ \frac{kN}{m}$

$F_w(11\ m, T, c_{f_torre}, A_{ref_torre}) = 8.24\ \frac{kN}{m}$ $F_w(12\ m, T, c_{f_torre}, A_{ref_torre}) = 8.44\ \frac{kN}{m}$



$F_w(z\ m, T, c_{f_torre}, A_{ref_torre})\ \left(\frac{kN}{m}\right)$

- Dirección del viento: **En la dirección del eje longitudinal del tablero**

Empuje del viento longitudinal sobre el tablero

Este empuje será un fraccion del empuje producido por el viento transversal, multiplicado por un coeficiente reductor.

Como el tablero no tiene huecos el porcentaje es el 25% $P_{tab} := 25\%$

Para barandillas, barreras y sobrecarga de uso el porcentaje es el 50% $P_{bbs} := 50\%$

El coeficiente reductor es: $\alpha_{re} := 0.52$ $c_o = 1.1$

Tabla 4.2-d Coeficiente α según el tipo de entorno

Tipo le entorno	α
0	0,38
I	0,44
II	0,52
III	0,61
IV	0,67

$$L(z) := \begin{cases} \text{if } z < z_{min} \\ \quad 300\ m \cdot \left(\frac{z_{min}}{200\ m}\right)^{\alpha} \\ \text{if } z_{min} \le z \le 200\ m \\ \quad 300\ m \cdot \left(\frac{z}{200\ m}\right)^{\alpha} \\ \text{if } z > 200\ m \\ \quad 300\ m \end{cases}$$

$L_{tab} := 16\ m$

$L(7\ m) = 292.75\ m$

$$C_{re}(z) := 1 - \left(\frac{7}{c_o \cdot \ln\left(\frac{z}{z_o}\right) + 7}\right) \cdot \Phi\left(\frac{L_{tab}}{L(z)}\right)$$

$C_{re}(7\ m) = 0.437$

$A_{ref_lon} := 1.425\ m = 1.425\ m$

$F_{w_l}(z, T, c_f, A_{ref}) := F_w(z, T, c_f, A_{ref}) \cdot P_{tab} \cdot C_{re}(z)$

$F_{w_l}(7\ m, T, c_f, A_{ref_lon}) = 0.432\ \frac{kN}{m}$

Para escaleras inferiores:

$F_w(1.6\ m, T, c_f, A_{ref}) = 2.624\ \frac{kN}{m}$

Para escaleras superiores:

$F_w(3.6\ m, T, c_f, A_{ref_lon}) = 3.22\ \frac{kN}{m}$

Efectos aeroelásticos

Necesidad de comprobación:

- Esbeltez tablero $h_{tab} := 0.35\ m$ $L_{tab_met} := 11.6\ m$

  $\frac{L_{tab_met}}{h_{tab}} = 33.143$ >30

- Frecuencia fundamental vertical $f_{ver} := 6.87\ Hz$ $f_{ver} < 2\ Hz$

- Frecuencia fundamental de torsión $f_{tor} := 12.47\ Hz$

- Divergencia torsional

Se podrá descartar que se produzcan fenómenos de divergencia torsional si se cumple la condición:

$$7{,}3 f_T\, r \sqrt{\frac{m}{\rho B^2}} \geq 2\, v_m$$

donde:

f_T	frecuencia del primer modo de vibración de torsión del puente [Hz]
r	radio de giro másico del tablero [m]
m	masa unitaria del tablero [kg/m]
ρ	densidad del aire, que se tomará igual a 1,25 kg/m^3
B	ancho de la sección [m]
v_m	velocidad media del viento [m/s]

$r_{tab} := B - 0.15\ m = 2.2\ m$ $m_{tab} := (2.2 \cdot 0.005 + 2 \cdot 0.0077)\ m^2 \cdot 7850\ \frac{kg}{m^3} = 207.24\ \frac{kg}{m}$

$\rho_a = 1.25\ \frac{kg}{m^3}$ $B = 2.35\ m$

$$7.3 \cdot f_{tor} \cdot r_{tab} \cdot \sqrt{\frac{m_{tab}}{\rho_a \cdot B^2}} = 1097.301\ \frac{m}{s}$$

$$2 \cdot v_m(7\ m, 100) = 62.207\ \frac{m}{s}$$

se cumple la condición, no hay riesgo de divergencia torsional

- Desprendimiento de torbellinos

Si la primera frecuencia de flexión vertical medida en Hz es superior a (7,5/*h*), en donde *h* es el canto de la sección en metros, se considera que el puente no va a estar sometido a vibraciones apreciables por desprendimiento de torbellinos y no será necesario realizar más comprobaciones relativas a este efecto.

En caso contrario, se calculará el número de Scruton:

$$S_c = \frac{2\,\delta_s\,m}{\rho\,h^2}$$

y se comprobará que es superior a los dos valores siguientes:

$$S_c \geq 2600\,\frac{B}{l} \qquad S_c \geq 2100\,\frac{f_B^2\,B}{g}$$

$h_{tab} := 0.35\ m$ $f_{ver} := 6.870\ \frac{1}{s}$ no es mayor que $\frac{7.5}{h_{tab}} = 21.429\ \frac{1}{m}$

número de Scruton:

δ_s amortiguamiento logarítmico estructural, cuya relación con el índice de amortiguamiento ξ, expresado como porcentaje respecto del amortiguamiento crítico, es la siguiente:

$$\delta_s = \frac{2\pi}{100}\,\xi$$

$\xi := 1.2$ $\delta_s := \frac{2 \cdot \pi}{100} \cdot \xi = 0.075$ $g = 9.807\ \frac{m}{s^2}$ $S_c := \frac{2 \cdot \delta_s \cdot m_{tab}}{\rho_a \cdot h_{tab}^{\ 2}} = 204.1$

mayor que, $2600 \cdot \frac{B}{L_{tab_met}} = 526.7$ $2100 \cdot \frac{f_{ver}^{\ 2} \cdot B}{g} = 23750.9$

- Oscilaciones divergentes por galope y flameo

– Se podrá descartar el riesgo de oscilaciones divergentes en el plano vertical si se cumple la condición:

$$\frac{m\,\delta_s\,f_B}{\rho\,h} \geq 1{,}25\,v_m$$

$\frac{m_{tab} \cdot \delta_s \cdot f_{ver}}{\rho_a \cdot h_{tab}} = 245.365\ \frac{m}{s}$ $1.25 \cdot v_m(6\ m, 100) = 37.667\ \frac{m}{s}$

se cumple la condición, no hay riesgo de oscilaciones divergentes en el plano vertical

- Se podrá descartar el riesgo de oscilaciones divergentes de torsión (flameo) si se cumple la condición:

$$5\, f_T\, B \geq 1{,}25\, v_c$$

donde:

f_T frecuencia del primer modo de torsión del tablero [Hz]

B anchura del tablero [m]

$$5 \cdot f_{tor} \cdot B = 146.523\ \frac{m}{s}$$

$$v_c(z,T) := \sqrt{c_e(z)} \cdot v_b(T) \qquad 1.25 \cdot v_c(7\ m, 100) = 58.807\ \frac{m}{s}$$

se cumple la condición, no hay riesgo de oscilaciones divergentes de torsión

- Se podrá descartar el riesgo de oscilaciones divergentes acopladas de flexión y torsión (flameo clásico) si se cumple la condición:

$$1{,}8\, f_T\, B\left[1 - 1{,}1\left(\frac{f_B}{f_T}\right)^2\right]^{1/2} \sqrt{\frac{m\, r}{\rho\, B^3}} \geq 1{,}25\, v_c$$

$$1.8 \cdot f_{tor} \cdot B \cdot \left(1 - 1.1 \cdot \left(\frac{f_{ver}}{f_{tor}}\right)^2\right)^{\frac{1}{2}} \cdot \sqrt{\frac{m_{tab} \cdot r_{tab}}{\rho_a \cdot B^3}} = 228.233\ \frac{m}{s}$$

$$1.25 \cdot v_c(7\ m, 100) = 58.807\ \frac{m}{s}$$

se cumple la condición, no hay riesgo de oscilaciones divergentes acopladas de flexión y torsión.

4.2.9.3.4 *Oscilaciones producidas por las ráfagas (bataneo)*

Se podrán despreciar los efectos de estas oscilaciones cuando se cumpla la condición:

$$\frac{f_B\, L(z)}{v_m} \geq 3$$

$$\frac{f_{ver} \cdot L(7\ m)}{v_m(7\ m, 100)} = 64.661$$

se cumple la condición, no hay riesgo de oscilaciones producidas por rafagas.

7. ANEJO 2. CARACTERISTICAS MODELO FEM

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Materials

Default design code is EuroNorm EN 1993-2:2006 Steel Structures (Espagna) V 2020
Structure: C (Footbridges)

National Defined Parameters

Reference of parameter in design code	Value
long term reduction concrete compressive strength α-cc EN 1992-2 3.1.6	0.850¹
long term reduction concrete tensile strength α-ct EN 1992-1-1 3.1.6 (2)	1.000¹
safety coefficient γ-c for concrete EN 1992-1-1 2.4.2.4	1.500¹
safety coefficient γ-CE for concrete elasticity EN 1992-1-1 5.8.6 (3)	1.200¹
safety coefficient γ-s for reinforcing steel EN 1992-1-1 2.4.2.4	1.150¹
safety coefficient γ-M0 for structural steel EN 1993-1-1 6.1	1.000¹
safety coefficient γ-M1 for structural steel EN 1993-2 6.1	1.100¹
safety coefficient γ-M2 for structural steel EN 1993-1-1 6.1	1.250¹

¹ national defined parameter taken from the INI-files

Materials

Mat	Classification
1	S 355 (EN 1993)
2	C 30/37 (EN 1992)
3	C 30/37 (EN 1992)
4	B 500 B (EN 1992)

Mat 1 S 355 (EN 1993)

Young's modulus	E	210000 [N/mm2]	Safetyfactor		1.10 [-]
Poisson's ratio	μ	0.30 [-]	Yield stress	fy	355.00 [MPa]
Shear modulus	G	80769 [N/mm2]	Compressive yield	fyc	355.00 [MPa]
Compression modulus	K	175000 [N/mm2]	Tensile strength	ft	490.00 [MPa]
Nominal Weight	γ	78.5 [kN/m3]	Compressive strength	fc	490.00 [MPa]
Mean density	ρ	7850.0 [kg/m3]	Ultimate strain		100.00 [o/oo]
Elongation coefficient	α	1.20E-05 [1/K]	relative bond coeff.		0.00 [-]
max. thickness	t-max	40.00 [mm]	EN 1992 bond coeff.	k1	0.00 [-]
Safety sectional design	γ-M0	1.00 [-]	Hardening modulus	Eh	0.00 [MPa]
Safety stability design	γ-M1	1.10 [-]	Proportional limit	fp	355.00 [MPa]
Safety rupture	γ-M2	1.25 [-]	Dynamic allowance	σ-dyn	0.00 [MPa]

Stress-Strain for serviceability	ε[o/oo]	σ-m[MPa]	E-t[N/mm2]
Is also extended beyond the	1000.000	490.00	0
defined stress range	100.000	490.00	0
	1.690	355.00	1373
	0.000	0.00	210000
	-1.690	-355.00	1373
	-100.000	-490.00	0
	-1000.000	-490.00	0
	Safetyfactor		1.00

Stress-Strain for ultimate load	ε[o/oo]	σ-u[MPa]	E-t[N/mm2]
Is also extended beyond the	1000.000	490.00	0
defined stress range	100.000	490.00	0
	1.690	355.00	1373
	0.000	0.00	210000
	-1.690	-355.00	1373
	-100.000	-490.00	0
	-1000.000	-490.00	0
	Safetyfactor		1.10

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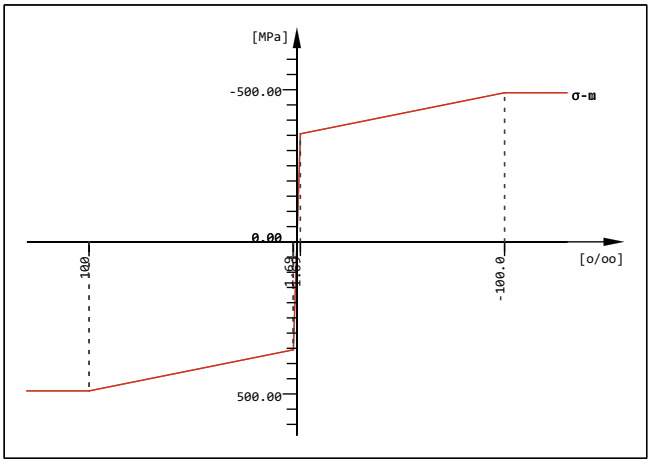
Materials



S 355 (EN 1993)

Mat 2 C 30/37 (EN 1992)

Young's modulus	E	32837 [N/mm2]	Safetyfactor		1.50 [-]
Poisson's ratio	μ	0.20 [-]	Strength	fc	25.50 [MPa]
Shear modulus	G	13682 [N/mm2]	Nominal strength	fck	30.00 [MPa]
Compression modulus	K	18243 [N/mm2]	Tensile strength	fctm	2.90 [MPa]
Nominal Weight	γ	25.0 [kN/m3]	Tensile strength	fctk,05	2.03 [MPa]
Mean density	ρ	2400.0 [kg/m3]	Tensile strength	fctk,95	3.77 [MPa]
Elongation coefficient	α	1.00E-05 [1/K]	Bond strength	fbd	3.04 [MPa]
			Service strength	fcm	38.00 [MPa]
			Fatigue strength	fcd,fat	14.96 [MPa]
			Tensile strength	fctd	1.35 [MPa]
			Tensile failure energy	Gf	0.14 [N/mm]

Stress-Strain for serviceability	**ε[o/oo]**	**σ-m[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	34478
stress range	-0.540	-16.42	26234
	-1.081	-28.31	17746
	-1.621	-35.55	9005
	-2.162	-38.00	0
	-3.500	-22.47	-23499
	Safetyfactor		1.50

Stress-Strain for ultimate load	**ε[o/oo]**	**σ-u[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	25500
stress range	-2.000	-25.50	0
	-3.500	-25.50	0
	Safetyfactor		1.50

Stress-Strain of calc. mean values	**ε[o/oo]**	**σ-r[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	28732
stress range	-0.540	-10.23	12007
	-1.081	-14.67	5278
	-1.621	-16.53	1917
	-2.162	-17.00	0
	-3.500	-15.23	-2279
	Safetyfactor		(1.50)

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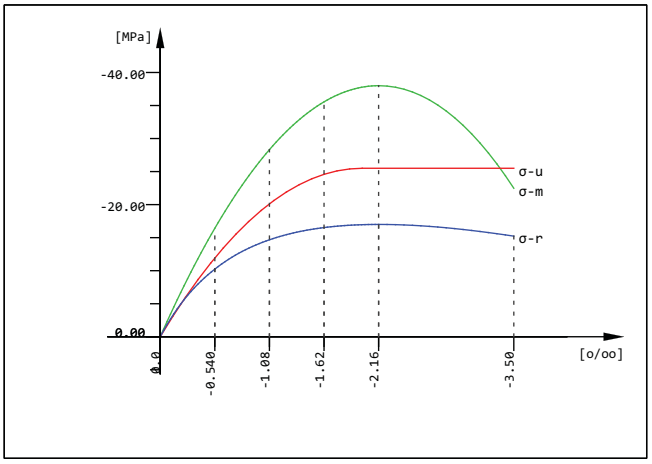
Materials



C 30/37 (EN 1992)

Mat 3 C 30/37 (EN 1992)

Young's modulus	E	32837 [N/mm2]	Safetyfactor		1.50 [-]
Poisson's ratio	μ	0.20 [-]	Strength	fc	25.50 [MPa]
Shear modulus	G	13682 [N/mm2]	Nominal strength	fck	30.00 [MPa]
Compression modulus	K	18243 [N/mm2]	Tensile strength	fctm	2.90 [MPa]
Nominal Weight	γ	25.0 [kN/m3]	Tensile strength	fctk,05	2.03 [MPa]
Mean density	ρ	2400.0 [kg/m3]	Tensile strength	fctk,95	3.77 [MPa]
Elongation coefficient	α	1.00E-05 [1/K]	Bond strength	fbd	3.04 [MPa]
			Service strength	fcm	38.00 [MPa]
			Fatigue strength	fcd,fat	14.96 [MPa]
			Tensile strength	fctd	1.35 [MPa]
			Tensile failure energy	Gf	0.14 [N/mm]

Stress-Strain for serviceability	**ε[o/oo]**	**σ-m[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	34478
stress range	-0.540	-16.42	26234
	-1.081	-28.31	17746
	-1.621	-35.55	9005
	-2.162	-38.00	0
	-3.500	-22.47	-23499
Safetyfactor			1.50

Stress-Strain for ultimate load	**ε[o/oo]**	**σ-u[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	25500
stress range	-2.000	-25.50	0
	-3.500	-25.50	0
Safetyfactor			1.50

Stress-Strain of calc. mean values	**ε[o/oo]**	**σ-r[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	28732
stress range	-0.540	-10.23	12007
	-1.081	-14.67	5278
	-1.621	-16.53	1917
	-2.162	-17.00	0
	-3.500	-15.23	-2279
Safetyfactor			(1.50)

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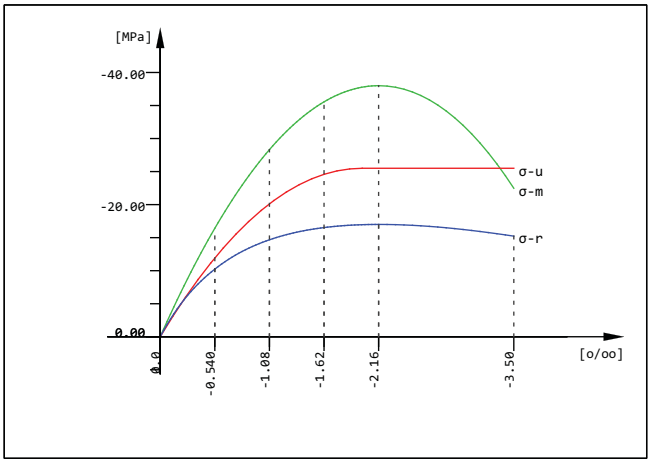
Materials



C 30/37 (EN 1992)

Mat 4 B 500 B (EN 1992)

Young's modulus	E	200000 [N/mm2]	Safetyfactor		1.15 [-]
Poisson's ratio	μ	0.30 [-]	Yield stress	fy	500.00 [MPa]
Shear modulus	G	76923 [N/mm2]	Compressive yield	fyc	500.00 [MPa]
Compression modulus	K	166667 [N/mm2]	Tensile strength	ft	540.00 [MPa]
Nominal Weight	γ	78.5 [kN/m3]	Compressive strength	fc	540.00 [MPa]
Mean density	ρ	7850.0 [kg/m3]	Ultimate strain		50.00 [o/oo]
Elongation coefficient	α	1.20E-05 [1/K]	relative bond coeff.		1.00 [-]
max. thickness	t-max	32.00 [mm]	EN 1992 bond coeff.	k1	0.80 [-]
			Hardening modulus	Eh	0.00 [MPa]
			Proportional limit	fp	500.00 [MPa]
			Dynamic allowance	σ-dyn	152.17 [MPa]

Stress-Strain for serviceability	**ε[o/oo]**	**σ-m[MPa]**	**E-t[N/mm2]**
Is also extended beyond the	1000.000	540.00	0
defined stress range	50.000	540.00	0
	2.500	500.00	842
	0.000	0.00	200000
	-2.500	-500.00	842
	-50.000	-540.00	0
	-1000.000	-540.00	0
	Safetyfactor		1.15

Stress-Strain for ultimate load	**ε[o/oo]**	**σ-u[MPa]**	**E-t[N/mm2]**
Is also extended beyond the	1000.000	469.57	0
defined stress range	50.000	469.57	0
	2.174	434.78	727
	0.000	0.00	200000
	-2.174	-434.78	727
	-50.000	-469.57	0
	-1000.000	-469.57	0
	Safetyfactor		(1.15)

Stress-Strain of calc. mean values	**ε[o/oo]**	**σ-r[MPa]**	**E-t[N/mm2]**
Is also extended beyond the	1000.000	469.57	0
defined stress range	50.000	469.57	0
	2.174	434.78	727
	0.000	0.00	200000
	-2.174	-434.78	727
	-50.000	-469.57	0
	-1000.000	-469.57	0
	Safetyfactor		(1.15)

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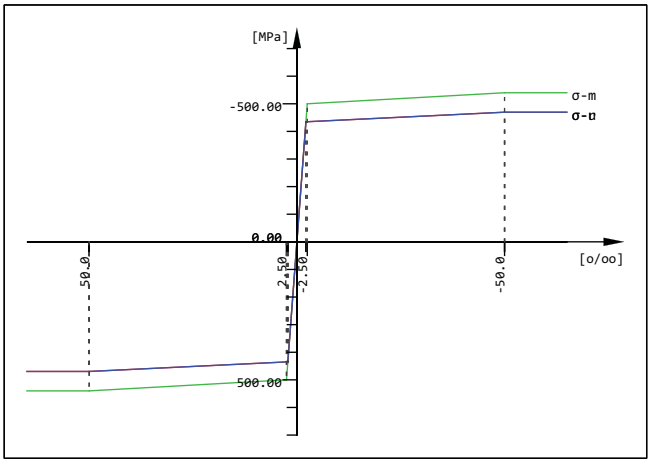
Materials



B 500 B (EN 1992)

Elastic bedding

Mat	Cs[kN/m3]	Ct[kN/m3]	ft[MPa]	fy[MPa]	tan[-]	c[MPa]	dil[-]	w[t/m2]
3	1.0000E+04	5.0000E+03	0.00	0.00	0.00	0.00	0.00	0.000

Cs[kN/m3]	normal bedding	tan[-]	Friction coefficient at wall
Ct[kN/m3]	transverse bedding	c[MPa]	Cohesion
ft[MPa]	maximum tensile bedding	dil[-]	Dilatancy coefficient
fy[MPa]	Maximum pressure	w[t/m2]	Nominal Weight

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Sections

Default design code is EuroNorm EN 1993-2:2006 Steel Structures (Espagna) V 2020
Structure: C (Footbridges)

Materials

Mat	Classification
1	S 355 (EN 1993)
2	C 30/37 (EN 1992)
3	C 30/37 (EN 1992)
4	B 500 B (EN 1992)

Cross-sections static properties

SNo	Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kg/m]	I-1[m4]
	MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]		I-2[m4]
			Ayz[m2]	Iyz[m4]					α[°]
1	1	1.0875E-02	1.845E-03	3.405E-04	0.0	0.0	210000	85.4	
		2.102E-04	7.290E-03	8.134E-05	0.0	0.0	80769	(CENTR)	
	=	RHS 500 x 200 x 8 (EN 10210-2)							
2	1	2.1236E-03	1.333E-03	3.492E-06	0.0	0.0	210000	16.7	
		4.117E-08	4.474E-04	1.333E-06	0.0	0.0	80769	(CENTR)	
	=	HE 100 A (EN 10365)							
3	1	6.1054E-03	7.912E-04	6.374E-05	0.0	0.0	210000	47.9	
		3.037E-05	4.334E-03	1.084E-05	150.0	150.0	80769	(CENTR)	
	=	RHS 300 x 100 x 8 (EN 10210-2)							
	=	RHS 300 x 100 x 8 (EN 10210-2)							
4	1	7.7054E-03	1.405E-03	1.186E-04	0.0	0.0	210000	60.5	
		7.849E-05	5.059E-03	3.120E-05	125.0	125.0	80769	(CENTR)	
	=	RHS 350 x 150 x 8 (EN 10210-2)							
	=	RHS 350 x 150 x 8 (EN 10210-2)							
5	1	5.3170E-03	1.820E-03	3.015E-05	0.0	0.0	210000	41.7	
		3.679E-05	2.769E-03	1.919E-05	100.0	100.0	80769	(BEAM)	
	=	RHS 200 x 150 x 8 (EN 10210-2)							
6	1	9.0880E-04	2.086E-04	1.160E-06	0.0	0.0	210000	7.1	
		9.491E-07	5.773E-04	3.881E-07	50.0	50.0	80769	(BEAM)	
	=	RHS 100 x 50 x 3.2 (EN 10210-2)							
7	1	6.9051E-03	1.564E-03	8.080E-05	0.0	0.0	210000	54.2	
		6.513E-05	4.338E-03	2.719E-05	75.0	75.0	80769	(BEAM)	
	=	RHS 300 x 200 x 8 (EN 10210-2)							
8	1	2.8749E-03	1.305E-03	3.995E-06	0.0	0.0	210000	22.6	
		6.634E-06	1.305E-03	3.995E-06	0.0	0.0	80769	(BEAM)	
	=	SHS 100 x 100 x 8 (EN 10210-2)							

SNo	section number	yc[mm],zc[mm]	ordinate of elastic centroid
Mat	material number	ysc[mm],zsc[mm]	ordinate of shear centre
A[m2]	sectional area	E[N/mm2]	Young's modulus
Ay[m2],Az[m2],Ayz[m2]	transverse shear deformation area	g[kg/m]	weight per length
Iy[m4],Iz[m4],Iyz[m4]	bending moment of inertia		
I-1[m4],I-2[m4],α[°]	principal moments of inertia and angle of the principal axes		
MRf	reinforcement material number		
It[m4]	torsional moment of inertia		
G[N/mm2]	Shear modulus		

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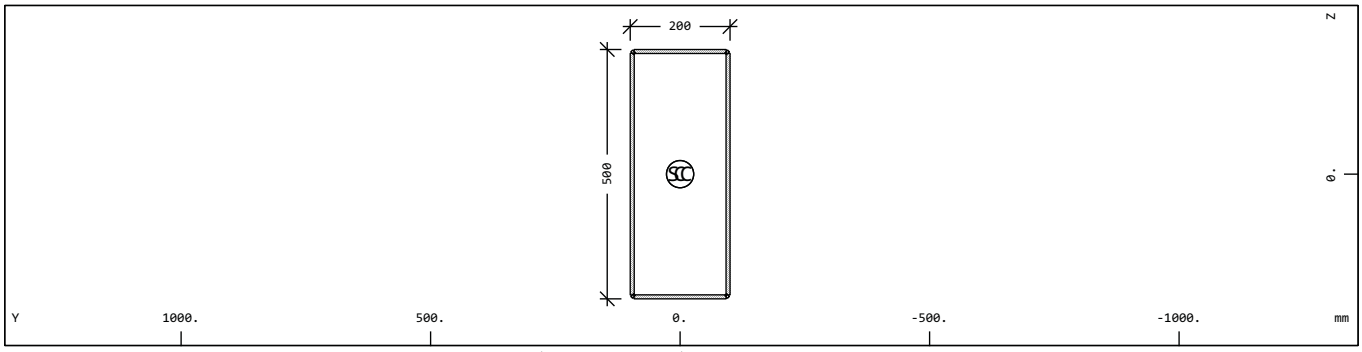
Sections

Cross section No. 1 - RHS 500 x 200 x 8 (EN 10210-2)



Cross section No. 1 - RHS 500 x 200 x 8 (EN 10210-2)

Static properties of cross section

Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kg/m]	I-1[m4]
MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]		I-2[m4]
		Ayz[m2]	Iyz[m4]					α[°]
1	1.0875E-02	1.845E-03	3.405E-04	0.0	0.0	210000	85.4	
	2.102E-04	7.290E-03	8.134E-05	0.0	0.0	80769	(CENTR)	

Mat	material number	yc[mm],zc[mm]	ordinate of elastic centroid
A[m2]	sectional area	ysc[mm],zsc[mm]	ordinate of shear centre
Ay[m2],Az[m2],Ayz[m2]	transverse shear deformation area	E[N/mm2]	Young's modulus
Iy[m4],Iz[m4],Iyz[m4]	bending moment of inertia	g[kg/m]	weight per length
I-1[m4],I-2[m4],α[°]	principal moments of inertia and angle of the principal axes		
MRf	reinforcement material number		
It[m4]	torsional moment of inertia		
G[N/mm2]	Shear modulus		

Additional static properties of cross section

α-T[1/K]	ymin[mm]	zmin[mm]	hymin[mm]	AK[m2]	MRs	1/WT[1/m3]	1/WVy[1/m2]
	ymax[mm]	zmax[mm]	hzmin[mm]	AB[m2]		1/WT2[1/m3]	1/WVz[1/m2]
1.2E-05	-100.0	-250.0	181.5	9.454E-02		6.992E+02	3.444E+02
	100.0	250.0	398.9			2.571E+03	1.567E+02

α-T[1/K]	Elongation coefficient
ymin[mm],zmin[mm],ymax[mm],zmax[mm]	extreme coordinates relative to centroid
hymin[mm],hzmin[mm]	minimum value for internal lever
AK[m2]	torsional equivalent area (Bredt)
MRs	transverse reinforcements material number
1/WT[1/m3],1/WT2[1/m3]	torsional resistance
1/WVy[1/m2],1/WVz[1/m2]	shear force resistance
AB[m2]	gross concrete area

Section values for warping

Wmin[m2]	Wmax[m2]	CM[m6]	CMS[m4]	ASwyy[m6]	ASwzz[m6]	ry[mm]	rz[mm]
-0.0104	0.0104	3.932E-07	0.000	-4.282E-23	-3.087E-22	0.0	0.0

Wmin[m2],Wmax[m2]	unit warping	ASwyy[m6],ASwzz[m6]	warping sectional value
CM[m6]	warping resistance	ry[mm],rz[mm]	sectional distance
CMS[m4]	warping shear resistance		

Design forces and moments

	N[kN]	Vy[kN]	Vz[kN]	Mt[kNm]	Mt2[kNm]	Mb[kNm2]	My[kNm]	Mz[kNm]	y[mm]	z[mm]	BUCK
P[1,2]	3860.7	636.86	1613.44	317.10	54.21	45.29	605.98	318.25	0.0	0.0	-, a, a
E[3,2]	3860.7	595.05	1308.29	293.15	79.72	13.41	491.37	300.77	0.0	0.0	

[1] P = plastic design values (ultimate bearing capacity)
[2] Material safety γ-M0 for structural steel = 1.00
[3] E = elastic design values (stress limit reached)

N[kN]	normal force	Mb[kNm2]	warping moment
Vy[kN],Vz[kN]	shear force	My[kNm],Mz[kNm]	bending moment
Mt[kNm]	primary torsional moment	y[mm],z[mm]	ordinate of plastic centre
Mt2[kNm]	secondary torsional moment	BUCK	buckling curve (LTB, y-y, z-z)

Additional design data

Mat	periphery-O/-I	deff	t-min	t-max	thet-p	thet-y	thet-z	thet-yz	yg	zg
	[m2/m] [m2/m]	[mm]	[mm]	[mm]	[kgm2/m]	[kgm2/m]	[kgm2/m]	[kgm2/m]	[mm]	[mm]
	2.719	8.0	8.0	8.0	3.311	2.673	0.638		0.0	0.0

Mat	material number	t-min,t-max	thickness
periphery-O/-I	peripheral area per length	thet-p,thet-y,thet-z,thet-yz	rotational mass
deff	effective depth	yg,zg	ordinate of the mass centre

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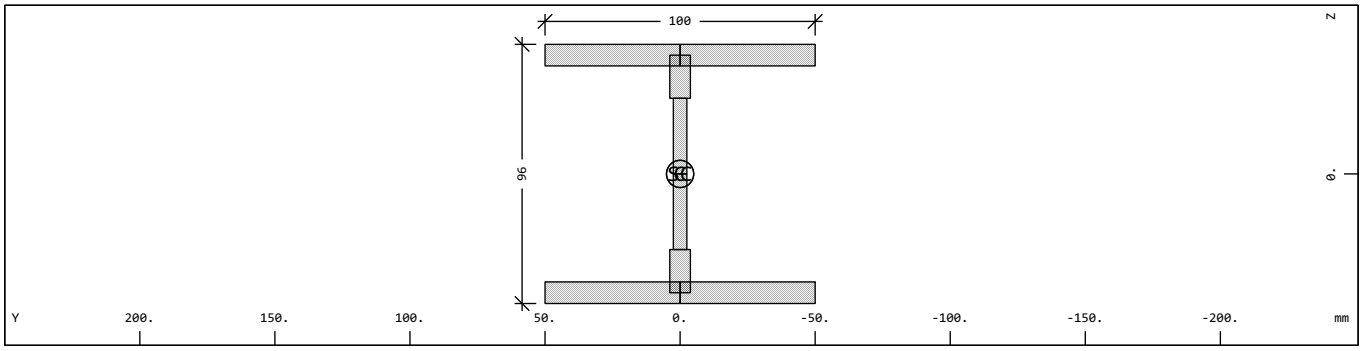
Sections

Rolled steel

Rolled steel				D[mm]	B[mm]	s[mm]	t[mm]	r[mm]	yr[mm]	zr[mm]	[grd]
RHS	500	200	8	500.0	200.0	8.0	8.0	12.0			

D[mm]	height	t[mm]	flange thickness
B[mm]	width	r[mm]	fillet radius
s[mm]	web thickness	yr[mm],zr[mm]	sectional coordinate

Cross section No. 2 - HE 100 A (EN 10365)



Cross section No. 2 - HE 100 A (EN 10365)

Static properties of cross section

Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kg/m]	I-1[m4]
MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]		I-2[m4]
		Ayz[m2]	Iyz[m4]					α[°]
1	2.1236E-03	1.333E-03	3.492E-06	0.0	0.0	210000	16.7	
	4.117E-08	4.474E-04	1.333E-06	0.0	0.0	80769	(CENTR)	

Mat	material number	yc[mm],zc[mm]	ordinate of elastic centroid
A[m2]	sectional area	ysc[mm],zsc[mm]	ordinate of shear centre
Ay[m2],Az[m2],Ayz[m2]	transverse shear deformation area	E[N/mm2]	Young's modulus
Iy[m4],Iz[m4],Iyz[m4]	bending moment of inertia	g[kg/m]	weight per length
I-1[m4],I-2[m4],α[°]	principal moments of inertia and angle of the principal axes		
MRf	reinforcement material number		
It[m4]	torsional moment of inertia		
G[N/mm2]	Shear modulus		

Additional static properties of cross section

α-T[1/K]	ymin[mm]	zmin[mm]	hymin[mm]	AK[m2]	MRs	1/WT[1/m3]	1/WVy[1/m2]
	ymax[mm]	zmax[mm]	hzmin[mm]	AB[m2]		1/WT2[1/m3]	1/WVz[1/m2]
1.2E-05	-50.0	-48.0	66.7	1.075E-03		1.943E+05	9.375E+02
	50.0	48.0	84.0			2.131E+04	2.380E+03

α-T[1/K]	Elongation coefficient
ymin[mm],zmin[mm],ymax[mm],zmax[mm]	extreme coordinates relative to centroid
hymin[mm],hzmin[mm]	minimum value for internal lever
AK[m2]	torsional equivalent area (Bredt)
MRs	transverse reinforcements material number
1/WT[1/m3],1/WT2[1/m3]	torsional resistance
1/WVy[1/m2],1/WVz[1/m2]	shear force resistance
AB[m2]	gross concrete area

Section values for warping

Wmin[m2]	Wmax[m2]	CM[m6]	CMS[m4]	ASwyy[m6]	ASwzz[m6]	ry[mm]	rz[mm]
-0.0022	0.0022	2.581E-09	0.000	1.322E-25	2.643E-25	0.0	0.0

Wmin[m2],Wmax[m2]	unit warping	ASwyy[m6],ASwzz[m6]	warping sectional value
CM[m6]	warping resistance	ry[mm],rz[mm]	sectional distance
CMS[m4]	warping shear resistance		

Design forces and moments

	N[kN]	Vy[kN]	Vz[kN]	Mt[kNm]	Mt2[kNm]	Mb[kNm2]	My[kNm]	Mz[kNm]	y[mm]	z[mm]	BUCK
P[1,2]	753.9	327.93	154.87	1.70	14.43	0.62	29.50	14.49	0.0	0.0	-, b, c
E[3,2]	753.9	218.62	86.13	1.05	9.62	0.42	28.17	9.47	0.0	0.0	

[1] P = plastic design values (ultimate bearing capacity)
[2] Material safety γ-M0 for structural steel = 1.00
[3] E = elastic design values (stress limit reached)

N[kN]	normal force	Mb[kNm2]	warping moment
Vy[kN],Vz[kN]	shear force	My[kNm],Mz[kNm]	bending moment
Mt[kNm]	primary torsional moment	y[mm],z[mm]	ordinate of plastic centre
Mt2[kNm]	secondary torsional moment	BUCK	buckling curve (LTB, y-y, z-z)

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Sections

Additional design data

Mat	periphery-O/-I [m2/m]	[m2/m]	deff [mm]	t-min [mm]	t-max [mm]	thet-p [kgm2/m]	thet-y [kgm2/m]	thet-z [kgm2/m]	thet-yz [kgm2/m]	yg [mm]	zg [mm]
	0.576		7.4	5.0	8.0	0.038	0.027	0.010		0.0	0.0

Mat	material number		t-min,t-max		thickness
periphery-O/-I	peripheral area per length		thet-p,thet-y,thet-z,thet-yz		rotational mass
deff	effective depth		yg,zg		ordinate of the mass centre

Rolled steel

Rolled steel			D[mm]	B[mm]	s[mm]	t[mm]	r[mm]	yr[mm]	zr[mm]	[grd]
HEA	100		96.0	100.0	5.0	8.0	12.0			

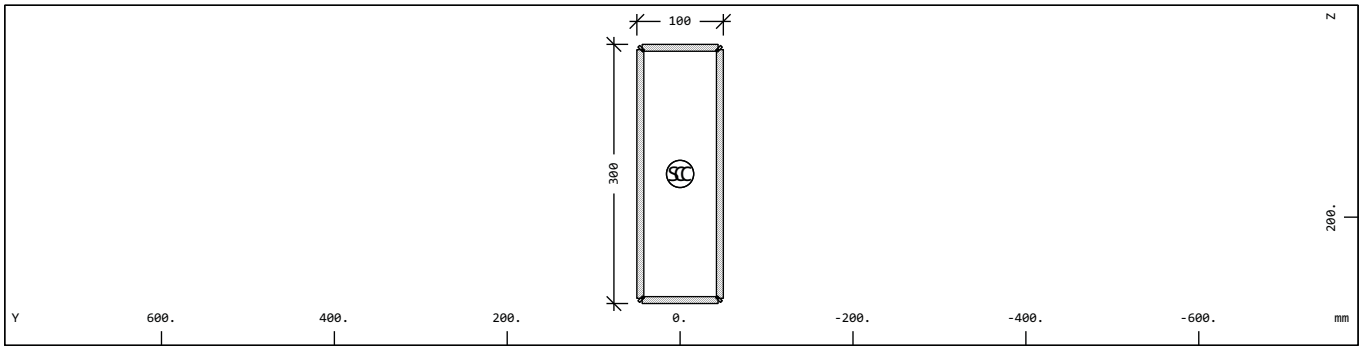
D[mm]	height	t[mm]	flange thickness
B[mm]	width	r[mm]	fillet radius
s[mm]	web thickness	yr[mm],zr[mm]	sectional coordinate

Hydrodynamic coefficients for wind and wave loading

α[°]	cw-y[-]	cw-z[-]	cw-t[-]	ref	c-m[-]	c-lat[-]	Strouhal
-180.00	-1.700	0.000	0.000	BH	2.000	0.300	0.140
-135.00	-1.500	-1.500	0.000	BH	2.000	0.300	0.140
-90.00	0.000	-1.700	0.000	BH	2.000	0.300	0.140
-45.00	1.500	-1.500	0.000	BH	2.000	0.300	0.140
0.00	1.700	0.000	0.000	BH	2.000	0.300	0.140
45.00	1.500	1.500	0.000	BH	2.000	0.300	0.140
90.00	0.000	1.700	0.000	BH	2.000	0.300	0.140
135.00	-1.500	1.500	0.000	BH	2.000	0.300	0.140
180.00	-1.700	0.000	0.000	BH	2.000	0.300	0.140

α[°]	angle of attack	ref	reference for force coefficients
cw-y[-]	drag coefficient	c-m[-]	hydrodynamic coefficient
cw-z[-]	lift coefficient	c-lat[-]	lateral coefficient
cw-t[-]	moment coefficient	Strouhal	Strouhal number

Cross section No. 3 - RHS 300 x 100 x 8 (EN 10210-2)



Cross section No. 3 - RHS 300 x 100 x 8 (EN 10210-2)

Static properties of cross section

Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kg/m]	I-1[m4]
MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]		I-2[m4]
		Ayz[m2]	Iyz[m4]					α[°]
1	6.1054E-03	7.912E-04	6.374E-05	0.0	0.0	210000	47.9	
	3.037E-05	4.334E-03	1.084E-05	150.0	150.0	80769	(CENTR)	

Mat	material number	yc[mm],zc[mm]	ordinate of elastic centroid
A[m2]	sectional area	ysc[mm],zsc[mm]	ordinate of shear centre
Ay[m2],Az[m2],Ayz[m2]	transverse shear deformation area	E[N/mm2]	Young's modulus
Iy[m4],Iz[m4],Iyz[m4]	bending moment of inertia	g[kg/m]	weight per length
I-1[m4],I-2[m4],α[°]	principal moments of inertia and angle of the principal axes		
MRf	reinforcement material number		
It[m4]	torsional moment of inertia		
G[N/mm2]	Shear modulus		

Additional static properties of cross section

α-T[1/K]	ymin[mm]	zmin[mm]	hymin[mm]	AK[m2]	MRs	1/WT[1/m3]	1/WVy[1/m2]
	ymax[mm]	zmax[mm]	hzmin[mm]	AB[m2]		1/WT2[1/m3]	1/WVz[1/m2]
1.2E-05	-50.0	-150.0	87.8	2.697E-02		2.581E+03	7.120E+02
	50.0	150.0	231.7			7.803E+03	2.698E+02

α-T[1/K]	Elongation coefficient

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Sections

ymin[mm],zmin[mm],ymax[mm],zmax[mm]	extreme coordinates relative to centroid
hymin[mm],hzmin[mm]	minimum value for internal lever
AK[m2]	torsional equivalent area (Bredt)
MRs	transverse reinforcements material number
1/WT[1/m3],1/WT2[1/m3]	torsional resistance
1/WVy[1/m2],1/WVz[1/m2]	shear force resistance
AB[m2]	gross concrete area

Section values for warping

Wmin[m2]	Wmax[m2]	CM[m6]	CMS[m4]	ASwyy[m6]	ASwzz[m6]	ry[mm]	rz[mm]
-0.0035	0.0035	2.517E-08	0.000	8.360E-24	5.155E-23	0.0	0.0

Wmin[m2],Wmax[m2]	unit warping	ASwyy[m6],ASwzz[m6]	warping sectional value
CM[m6]	warping resistance	ry[mm],rz[mm]	sectional distance
CMS[m4]	warping shear resistance		

Design forces and moments

	N[kN]	Vy[kN]	Vz[kN]	Mt[kNm]	Mt2[kNm]	Mb[kNm2]	My[kNm]	Mz[kNm]	y[mm]	z[mm]	BUCK
P[1,2]	2167.4	312.84	957.57	91.58	23.62	7.23	195.36	87.67	0.0	150.0	-, a, a
E[3,2]	2167.4	287.88	759.70	79.42	26.27	2.55	154.99	83.66	0.0	150.0	

[1] P = plastic design values (ultimate bearing capacity)
[2] Material safety γ-M0 for structural steel = 1.00
[3] E = elastic design values (stress limit reached)

N[kN]	normal force	Mb[kNm2]	warping moment
Vy[kN],Vz[kN]	shear force	My[kNm],Mz[kNm]	bending moment
Mt[kNm]	primary torsional moment	y[mm],z[mm]	ordinate of plastic centre
Mt2[kNm]	secondary torsional moment	BUCK	buckling curve (LTB, y-y, z-z)

Additional design data

Mat	periphery-O/-I [m2/m]	deff [m2/m]	t-min [mm]	t-max [mm]	thet-p [kgm2/m]	thet-y [kgm2/m]	thet-z [kgm2/m]	thet-yz [kgm2/m]	yg [mm]	zg [mm]
	1.526		8.0	8.0	8.0	0.585	0.500	0.085	0.000	0.0	150.0

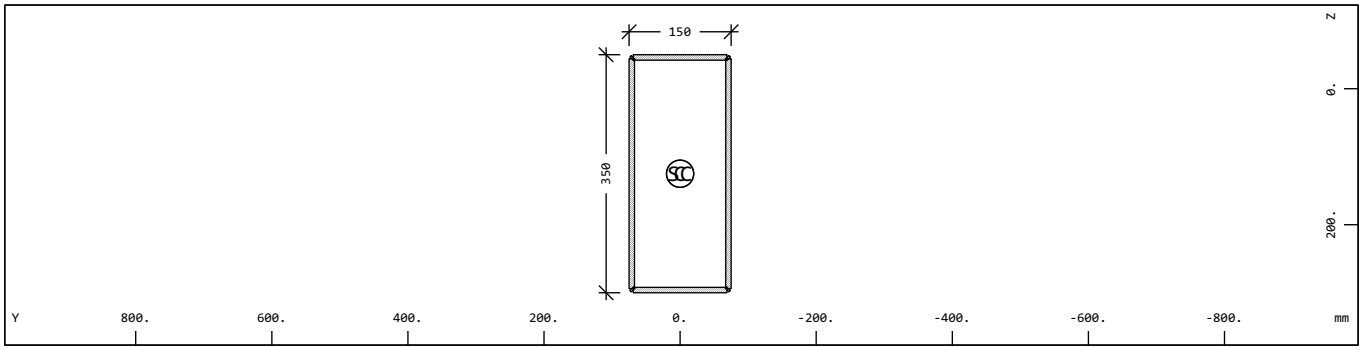
Mat	material number	t-min,t-max	thickness
periphery-O/-I	peripheral area per length	thet-p,thet-y,thet-z,thet-yz	rotational mass
deff	effective depth	yg,zg	ordinate of the mass centre

Rolled steel

Rolled steel			D[mm]	B[mm]	s[mm]	t[mm]	r[mm]	yr[mm]	zr[mm]	[grd]
RHS	300	200 8	300.0	100.0	8.0	8.0	9.0			

D[mm]	height	t[mm]	flange thickness
B[mm]	width	r[mm]	fillet radius
s[mm]	web thickness	yr[mm],zr[mm]	sectional coordinate

Cross section No. 4 - RHS 350 x 150 x 8 (EN 10210-2)



Cross section No. 4 - RHS 350 x 150 x 8 (EN 10210-2)

Static properties of cross section

Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kg/m]	I-1[m4]
MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]		I-2[m4]
		Ayz[m2]	Iyz[m4]					α[°]
1	7.7054E-03	1.405E-03	1.186E-04	0.0	0.0	210000	60.5	
	7.849E-05	5.059E-03	3.120E-05	125.0	125.0	80769	(CENTR)	

Mat	material number	yc[mm],zc[mm]	ordinate of elastic centroid
A[m2]	sectional area	ysc[mm],zsc[mm]	ordinate of shear centre
Ay[m2],Az[m2],Ayz[m2]	transverse shear deformation area	E[N/mm2]	Young's modulus
Iy[m4],Iz[m4],Iyz[m4]	bending moment of inertia	g[kg/m]	weight per length
I-1[m4],I-2[m4],α[°]	principal moments of inertia and angle of the principal axes		
MRf	reinforcement material number		
It[m4]	torsional moment of inertia		

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Sections

G[N/mm2]	Shear modulus

Additional static properties of cross section

α-T[1/K]	ymin[mm]	zmin[mm]	hymin[mm]	AK[m2]	MRs	1/WT[1/m3]	1/WVy[1/m2]
	ymax[mm]	zmax[mm]	hzmin[mm]	AB[m2]		1/WT2[1/m3]	1/WVz[1/m2]
1.2E-05	-75.0	-175.0	133.8	4.866E-02		1.386E+03	4.671E+02
	75.0	175.0	279.2			5.276E+03	2.238E+02

α-T[1/K]	Elongation coefficient
ymin[mm],zmin[mm],ymax[mm],zmax[mm]	extreme coordinates relative to centroid
hymin[mm],hzmin[mm]	minimum value for internal lever
AK[m2]	torsional equivalent area (Bredt)
MRs	transverse reinforcements material number
1/WT[1/m3],1/WT2[1/m3]	torsional resistance
1/WVy[1/m2],1/WVz[1/m2]	shear force resistance
AB[m2]	gross concrete area

Section values for warping

Wmin[m2]	Wmax[m2]	CM[m6]	CMS[m4]	ASwyy[m6]	ASwzz[m6]	ry[mm]	rz[mm]
-0.0050	0.0050	6.523E-08	0.000	-3.238E-24	-5.710E-23	0.0	0.0

Wmin[m2],Wmax[m2]	unit warping	ASwyy[m6],ASwzz[m6]	warping sectional value
CM[m6]	warping resistance	ry[mm],rz[mm]	sectional distance
CMS[m4]	warping shear resistance		

Design forces and moments

	N[kN]	Vy[kN]	Vz[kN]	Mt[kNm]	Mt2[kNm]	Mb[kNm2]	My[kNm]	Mz[kNm]	y[mm]	z[mm]	BUCK
P[1,2]	2735.4	473.79	1121.54	164.14	22.32	16.52	301.66	165.57	0.0	125.0	-, a, a
E[3,2]	2735.4	438.80	915.66	147.83	38.85	4.60	246.28	156.02	0.0	125.0	

[1] P = plastic design values (ultimate bearing capacity)
[2] Material safety γ-M0 for structural steel = 1.00
[3] E = elastic design values (stress limit reached)

N[kN]	normal force	Mb[kNm2]	warping moment
Vy[kN],Vz[kN]	shear force	My[kNm],Mz[kNm]	bending moment
Mt[kNm]	primary torsional moment	y[mm],z[mm]	ordinate of plastic centre
Mt2[kNm]	secondary torsional moment	BUCK	buckling curve (LTB, y-y, z-z)

Additional design data

Mat	periphery-O/-I [m2/m]	deff [mm]	t-min [mm]	t-max [mm]	thet-p [kgm2/m]	thet-y [kgm2/m]	thet-z [kgm2/m]	thet-yz [kgm2/m]	yg [mm]	zg [mm]
	1.926	8.0	8.0	8.0	1.176	0.931	0.245	0.000	0.0	125.0

Mat	material number	t-min,t-max	thickness
periphery-O/-I	peripheral area per length	thet-p,thet-y,thet-z,thet-yz	rotational mass
deff	effective depth	yg,zg	ordinate of the mass centre

Rolled steel

Rolled steel				D[mm]	B[mm]	s[mm]	t[mm]	r[mm]	yr[mm]	zr[mm]	[grd]
RHS	350	250	8	350.0	150.0	8.0	8.0	9.0		-50.0	

D[mm]	height	t[mm]	flange thickness
B[mm]	width	r[mm]	fillet radius
s[mm]	web thickness	yr[mm],zr[mm]	sectional coordinate

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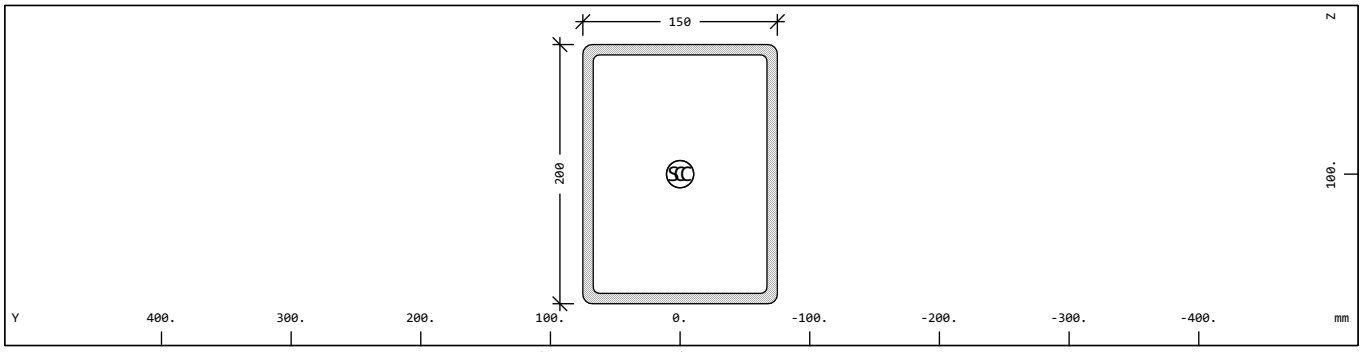
Sections

Cross section No. 5 - RHS 200 x 150 x 8 (EN 10210-2)



Cross section No. 5 - RHS 200 x 150 x 8 (EN 10210-2)

Static properties of cross section

Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kg/m]	I-1[m4]
MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]		I-2[m4]
		Ayz[m2]	Iyz[m4]					α[°]
1	5.3170E-03	1.820E-03	3.015E-05	0.0	0.0	210000	41.7	
	3.679E-05	2.769E-03	1.919E-05	100.0	100.0	80769	(BEAM)	

Mat	material number	yc[mm],zc[mm]	ordinate of elastic centroid
A[m2]	sectional area	ysc[mm],zsc[mm]	ordinate of shear centre
Ay[m2],Az[m2],Ayz[m2]	transverse shear deformation area	E[N/mm2]	Young's modulus
Iy[m4],Iz[m4],Iyz[m4]	bending moment of inertia	g[kg/m]	weight per length
I-1[m4],I-2[m4],α[°]	principal moments of inertia and angle of the principal axes		
MRf	reinforcement material number		
It[m4]	torsional moment of inertia		
G[N/mm2]	Shear modulus		

Additional static properties of cross section

α-T[1/K]	ymin[mm]	zmin[mm]	hymin[mm]	AK[m2]	MRs	1/WT[1/m3]	1/WVy[1/m2]
	ymax[mm]	zmax[mm]	hzmin[mm]	AB[m2]		1/WT2[1/m3]	1/WVz[1/m2]
1.2E-05	-75.0	-100.0	129.3	2.677E-02		3.181E+03	5.557E+02
	75.0	100.0	166.1			2.050E+04	3.763E+02

α-T[1/K]	Elongation coefficient
ymin[mm],zmin[mm],ymax[mm],zmax[mm]	extreme coordinates relative to centroid
hymin[mm],hzmin[mm]	minimum value for internal lever
AK[m2]	torsional equivalent area (Bredt)
MRs	transverse reinforcements material number
1/WT[1/m3],1/WT2[1/m3]	torsional resistance
1/WVy[1/m2],1/WVz[1/m2]	shear force resistance
AB[m2]	gross concrete area

Section values for warping

Wmin[m2]	Wmax[m2]	CM[m6]	CMS[m4]	ASwyy[m6]	ASwzz[m6]	ry[mm]	rz[mm]
-0.0015	0.0015	2.208E-09	0.000	-2.361E-17	4.706E-17	0.0	0.0

Wmin[m2],Wmax[m2]	unit warping	ASwyy[m6],ASwzz[m6]	warping sectional value
CM[m6]	warping resistance	ry[mm],rz[mm]	sectional distance
CMS[m4]	warping shear resistance		

Design forces and moments

	N[kN]	Vy[kN]	Vz[kN]	Mt[kNm]	Mt2[kNm]	Mb[kNm2]	My[kNm]	Mz[kNm]	y[mm]	z[mm]	BUCK
P[1,2]	1887.5	467.06	622.75	89.41	17.10	6.47	128.87	105.39	0.0	100.0	-, a, a
E[3,2]	1887.5	368.84	544.67	64.43	10.00	0.53	107.02	90.83	0.0	100.0	

[1] P = plastic design values (ultimate bearing capacity)
[2] Material safety γ-M0 for structural steel = 1.00
[3] E = elastic design values (stress limit reached)

N[kN]	normal force	Mb[kNm2]	warping moment
Vy[kN],Vz[kN]	shear force	My[kNm],Mz[kNm]	bending moment
Mt[kNm]	primary torsional moment	y[mm],z[mm]	ordinate of plastic centre
Mt2[kNm]	secondary torsional moment	BUCK	buckling curve (LTB, y-y, z-z)

Additional design data

Mat	periphery-O/-I	deff	t-min	t-max	thet-p	thet-y	thet-z	thet-yz	yg	zg
	[m2/m]	[m2/m]	[mm]	[mm]	[mm]	[kgm2/m]	[kgm2/m]	[kgm2/m]	[kgm2/m]	[mm]	[mm]
	0.687	0.628		8.0	8.0	0.387	0.237	0.151	0.000	0.0	100.0

Mat	material number	t-min,t-max	thickness
periphery-O/-I	peripheral area per length	thet-p,thet-y,thet-z,thet-yz	rotational mass
deff	effective depth	yg,zg	ordinate of the mass centre

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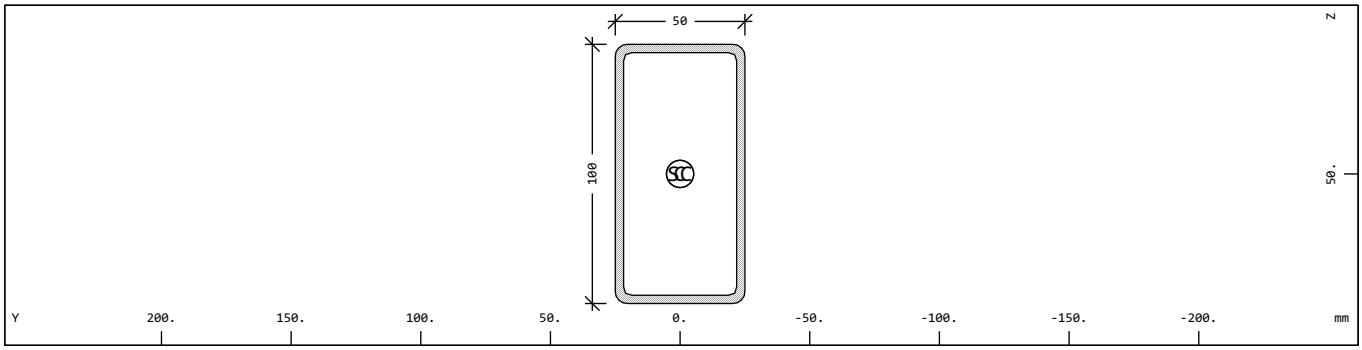
Sections

Rolled steel

Rolled steel				D[mm]	B[mm]	s[mm]	t[mm]	r[mm]	yr[mm]	zr[mm]	[grd]
RHS	200	200	8	200.0	150.0	8.0	8.0	7.5			

D[mm]	height	t[mm]	flange thickness
B[mm]	width	r[mm]	fillet radius
s[mm]	web thickness	yr[mm],zr[mm]	sectional coordinate

Cross section No. 6 - RHS 100 x 50 x 3.2 (EN 10210-2)



Cross section No. 6 - RHS 100 x 50 x 3.2 (EN 10210-2)

Static properties of cross section

Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kg/m]	I-1[m4]
MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]		I-2[m4]
		Ayz[m2]	Iyz[m4]					α[°]
1	9.0880E-04	2.086E-04	1.160E-06	0.0	0.0	210000	7.1	
	9.491E-07	5.773E-04	3.881E-07	50.0	50.0	80769	(BEAM)	

Mat	material number	yc[mm],zc[mm]	ordinate of elastic centroid
A[m2]	sectional area	ysc[mm],zsc[mm]	ordinate of shear centre
Ay[m2],Az[m2],Ayz[m2]	transverse shear deformation area	E[N/mm2]	Young's modulus
Iy[m4],Iz[m4],Iyz[m4]	bending moment of inertia	g[kg/m]	weight per length
I-1[m4],I-2[m4],α[°]	principal moments of inertia and angle of the principal axes		
MRf	reinforcement material number		
It[m4]	torsional moment of inertia		
G[N/mm2]	Shear modulus		

Additional static properties of cross section

α-T[1/K]	ymin[mm]	zmin[mm]	hymin[mm]	AK[m2]	MRs	1/WT[1/m3]	1/WVy[1/m2]
	ymax[mm]	zmax[mm]	hzmin[mm]	AB[m2]		1/WT2[1/m3]	1/WVz[1/m2]
1.2E-05	-25.0	-50.0	43.7	4.466E-03		3.828E+04	3.694E+03
	25.0	50.0	80.1			1.520E+05	1.951E+03

α-T[1/K]	Elongation coefficient
ymin[mm],zmin[mm],ymax[mm],zmax[mm]	extreme coordinates relative to centroid
hymin[mm],hzmin[mm]	minimum value for internal lever
AK[m2]	torsional equivalent area (Bredt)
MRs	transverse reinforcements material number
1/WT[1/m3],1/WT2[1/m3]	torsional resistance
1/WVy[1/m2],1/WVz[1/m2]	shear force resistance
AB[m2]	gross concrete area

Section values for warping

Wmin[m2]	Wmax[m2]	CM[m6]	CMS[m4]	ASwyy[m6]	ASwzz[m6]	ry[mm]	rz[mm]
-0.0005	0.0005	5.396E-11	0.000	-2.666E-19	-5.234E-19	0.0	0.0

Wmin[m2],Wmax[m2]	unit warping	ASwyy[m6],ASwzz[m6]	warping sectional value
CM[m6]	warping resistance	ry[mm],rz[mm]	sectional distance
CMS[m4]	warping shear resistance		

Design forces and moments

	N[kN]	Vy[kN]	Vz[kN]	Mt[kNm]	Mt2[kNm]	Mb[kNm2]	My[kNm]	Mz[kNm]	y[mm]	z[mm]	BUCK
P[1,2]	322.6	62.04	124.08	5.94	1.57	0.18	10.29	6.30	0.0	50.0	-, a, a
E[3,2]	322.6	55.48	105.03	5.35	1.35	0.04	8.24	5.51	0.0	50.0	

[1] P = plastic design values (ultimate bearing capacity)
[2] Material safety γ-M0 for structural steel = 1.00
[3] E = elastic design values (stress limit reached)

N[kN]	normal force	Mb[kNm2]	warping moment
Vy[kN],Vz[kN]	shear force	My[kNm],Mz[kNm]	bending moment
Mt[kNm]	primary torsional moment	y[mm],z[mm]	ordinate of plastic centre
Mt2[kNm]	secondary torsional moment	BUCK	buckling curve (LTB, y-y, z-z)

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Sections

Additional design data

Mat	periphery-O/-I	deff	t-min	t-max	thet-p	thet-y	thet-z	thet-yz	yg	zg
	[m2/m]	[m2/m]	[mm]	[mm]	[mm]	[kgm2/m]	[kgm2/m]	[kgm2/m]	[kgm2/m]	[mm]	[mm]
	0.292	0.269		3.2	3.2	0.012	0.009	0.003	0.000	0.0	50.0

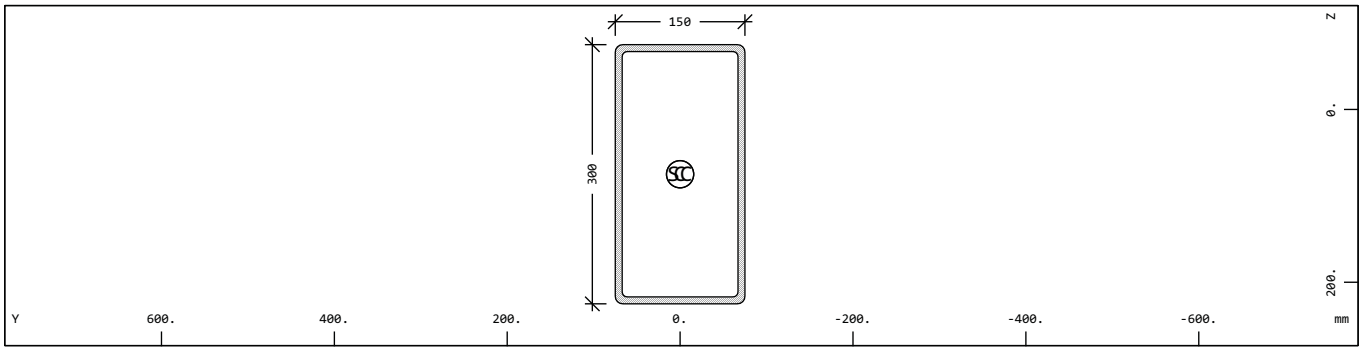
Mat	material number		t-min,t-max		thickness
periphery-O/-I	peripheral area per length		thet-p,thet-y,thet-z,thet-yz		rotational mass
deff	effective depth		yg,zg		ordinate of the mass centre

Rolled steel

Rolled steel				D[mm]	B[mm]	s[mm]	t[mm]	r[mm]	yr[mm]	zr[mm]	[grd]
RHS	100	50	3.2	100.0	50.0	3.2	3.2	4.8			

D[mm]	height	t[mm]	flange thickness
B[mm]	width	r[mm]	fillet radius
s[mm]	web thickness	yr[mm],zr[mm]	sectional coordinate

Cross section No. 7 - RHS 300 x 200 x 8 (EN 10210-2)



Cross section No. 7 - RHS 300 x 200 x 8 (EN 10210-2)

Static properties of cross section

Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kg/m]	I-1[m4]
MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]		I-2[m4]
		Ayz[m2]	Iyz[m4]					α[°]
1	6.9051E-03	1.564E-03	8.080E-05	0.0	0.0	210000	54.2	
	6.513E-05	4.338E-03	2.719E-05	75.0	75.0	80769	(BEAM)	

Mat	material number	yc[mm],zc[mm]	ordinate of elastic centroid
A[m2]	sectional area	ysc[mm],zsc[mm]	ordinate of shear centre
Ay[m2],Az[m2],Ayz[m2]	transverse shear deformation area	E[N/mm2]	Young's modulus
Iy[m4],Iz[m4],Iyz[m4]	bending moment of inertia	g[kg/m]	weight per length
I-1[m4],I-2[m4],α[°]	principal moments of inertia and angle of the principal axes		
MRf	reinforcement material number		
It[m4]	torsional moment of inertia		
G[N/mm2]	Shear modulus		

Additional static properties of cross section

α-T[1/K]	ymin[mm]	zmin[mm]	hymin[mm]	AK[m2]	MRs	1/WT[1/m3]	1/WVy[1/m2]
	ymax[mm]	zmax[mm]	hzmin[mm]	AB[m2]		1/WT2[1/m3]	1/WVz[1/m2]
1.2E-05	-75.0	-150.0	132.8	4.087E-02		2.001E+03	5.484E+02
	75.0	150.0	242.3			6.829E+03	2.580E+02

α-T[1/K]	Elongation coefficient
ymin[mm],zmin[mm],ymax[mm],zmax[mm]	extreme coordinates relative to centroid
hymin[mm],hzmin[mm]	minimum value for internal lever
AK[m2]	torsional equivalent area (Bredt)
MRs	transverse reinforcements material number
1/WT[1/m3],1/WT2[1/m3]	torsional resistance
1/WVy[1/m2],1/WVz[1/m2]	shear force resistance
AB[m2]	gross concrete area

Section values for warping

Wmin[m2]	Wmax[m2]	CM[m6]	CMS[m4]	ASwyy[m6]	ASwzz[m6]	ry[mm]	rz[mm]
-0.0043	0.0043	3.278E-08	0.000	-1.896E-16	6.126E-16	0.0	0.0

Wmin[m2],Wmax[m2]	unit warping	ASwyy[m6],ASwzz[m6]	warping sectional value
CM[m6]	warping resistance	ry[mm],rz[mm]	sectional distance
CMS[m4]	warping shear resistance		

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Sections

Design forces and moments

	N[kN]	Vy[kN]	Vz[kN]	Mt[kNm]	Mt2[kNm]	Mb[kNm2]	My[kNm]	Mz[kNm]	y[mm]	z[mm]	BUCK
P[1,2]	2451.3	471.77	943.55	135.97	33.17	12.78	236.80	145.39	0.0	75.0	-, a, a
E[3,2]	2451.3	373.73	794.46	102.45	30.01	2.73	191.22	128.71	0.0	75.0	

[1] P = plastic design values (ultimate bearing capacity)
[2] Material safety γ-M0 for structural steel = 1.00
[3] E = elastic design values (stress limit reached)

N[kN]	normal force	Mb[kNm2]	warping moment
Vy[kN],Vz[kN]	shear force	My[kNm],Mz[kNm]	bending moment
Mt[kNm]	primary torsional moment	y[mm],z[mm]	ordinate of plastic centre
Mt2[kNm]	secondary torsional moment	BUCK	buckling curve (LTB, y-y, z-z)

Additional design data

Mat	periphery-O/-I [m2/m]	deff [mm]	t-min [mm]	t-max [mm]	thet-p [kgm2/m]	thet-y [kgm2/m]	thet-z [kgm2/m]	thet-yz [kgm2/m]	yg [mm]	zg [mm]
	0.885	0.826	8.0	8.0	0.848	0.634	0.213	0.000	0.0	75.0

Mat	material number	t-min,t-max	thickness
periphery-O/-I	peripheral area per length	thet-p,thet-y,thet-z,thet-yz	rotational mass
deff	effective depth	yg,zg	ordinate of the mass centre

Rolled steel

Rolled steel			D[mm]	B[mm]	s[mm]	t[mm]	r[mm]	yr[mm]	zr[mm]	[grd]
RHS	300	150 8	300.0	150.0	8.0	8.0	9.0		75.0	

D[mm]	height	t[mm]	flange thickness
B[mm]	width	r[mm]	fillet radius
s[mm]	web thickness	yr[mm],zr[mm]	sectional coordinate

Cross section No. 8 - SHS 100 x 100 x 8 (EN 10210-2)

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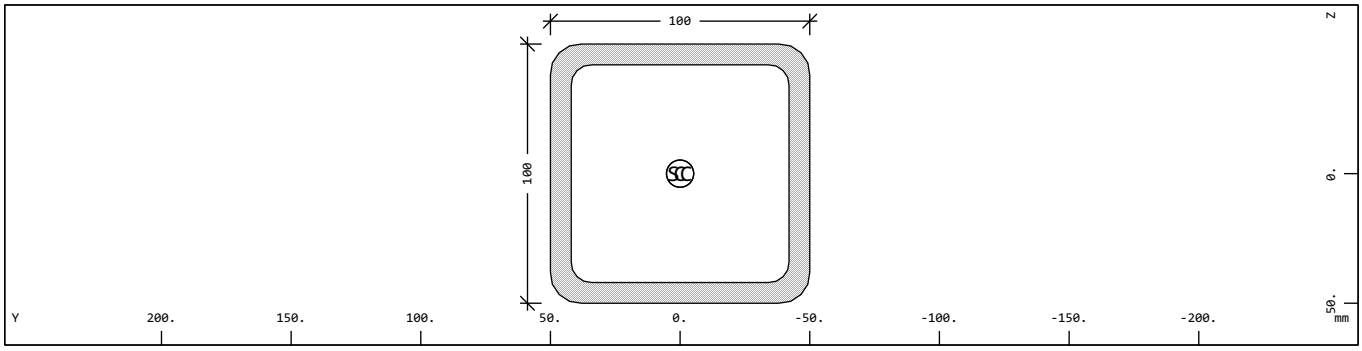

Cross section No. 8 - SHS 100 x 100 x 8 (EN 10210-2)

Static properties of cross section

Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kg/m]	I-1[m4]
MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]		I-2[m4]
		Ayz[m2]	Iyz[m4]					α[°]
1	2.8749E-03	1.305E-03	3.995E-06	0.0	0.0	210000	22.6	
	6.634E-06	1.305E-03	3.995E-06	0.0	0.0	80769	(BEAM)	

Mat	material number	yc[mm],zc[mm]	ordinate of elastic centroid
A[m2]	sectional area	ysc[mm],zsc[mm]	ordinate of shear centre
Ay[m2],Az[m2],Ayz[m2]	transverse shear deformation area	E[N/mm2]	Young's modulus
Iy[m4],Iz[m4],Iyz[m4]	bending moment of inertia	g[kg/m]	weight per length
I-1[m4],I-2[m4],α[°]	principal moments of inertia and angle of the principal axes		
MRf	reinforcement material number		
It[m4]	torsional moment of inertia		
G[N/mm2]	Shear modulus		

Additional static properties of cross section

α-T[1/K]	ymin[mm]	zmin[mm]	hymin[mm]	AK[m2]	MRs	1/WT[1/m3]	1/WVy[1/m2]
	ymax[mm]	zmax[mm]	hzmin[mm]	AB[m2]		1/WT2[1/m3]	1/WVz[1/m2]
1.2E-05	-50.0	-50.0	81.4	8.227E-03		8.634E+03	7.691E+02
	50.0	50.0	81.4			9.571E+04	7.693E+02

α-T[1/K]	Elongation coefficient
ymin[mm],zmin[mm],ymax[mm],zmax[mm]	extreme coordinates relative to centroid
hymin[mm],hzmin[mm]	minimum value for internal lever
AK[m2]	torsional equivalent area (Bredt)
MRs	transverse reinforcements material number
1/WT[1/m3],1/WT2[1/m3]	torsional resistance
1/WVy[1/m2],1/WVz[1/m2]	shear force resistance
AB[m2]	gross concrete area

Sections

Section values for warping

Wmin[m2]	Wmax[m2]	CM[m6]	CMS[m4]	ASwyy[m6]	ASwzz[m6]	ry[mm]	rz[mm]
-0.0002	0.0002	2.042E-11	0.000	3.422E-19	4.786E-19	0.0	0.0

Wmin[m2],Wmax[m2]	unit warping	ASwyy[m6],ASwzz[m6]	warping sectional value
CM[m6]	warping resistance	ry[mm],rz[mm]	sectional distance
CMS[m4]	warping shear resistance		

Design forces and moments

	N[kN]	Vy[kN]	Vz[kN]	Mt[kNm]	Mt2[kNm]	Mb[kNm2]	My[kNm]	Mz[kNm]	y[mm]	z[mm]	BUCK
P[1,2]	1020.6	294.66	294.66	27.76	1.76	1.11	34.85	34.85	0.0	0.0	-, a, a
E[3,2]	1020.6	266.50	266.41	23.74	2.14	0.03	28.37	28.37	0.0	0.0	

[1] P = plastic design values (ultimate bearing capacity)
[2] Material safety γ-M0 for structural steel = 1.00
[3] E = elastic design values (stress limit reached)

N[kN]	normal force	Mb[kNm2]	warping moment
Vy[kN],Vz[kN]	shear force	My[kNm],Mz[kNm]	bending moment
Mt[kNm]	primary torsional moment	y[mm],z[mm]	ordinate of plastic centre
Mt2[kNm]	secondary torsional moment	BUCK	buckling curve (LTB, y-y, z-z)

Additional design data

Mat	periphery-O/-I [m2/m]	periphery-I [m2/m]	deff [mm]	t-min [mm]	t-max [mm]	thet-p [kgm2/m]	thet-y [kgm2/m]	thet-z [kgm2/m]	thet-yz [kgm2/m]	yg [mm]	zg [mm]
	0.380	0.323		8.0	8.0	0.063	0.031	0.031	0.000	0.0	0.0

Mat	material number	t-min,t-max	thickness
periphery-O/-I	peripheral area per length	thet-p,thet-y,thet-z,thet-yz	rotational mass
deff	effective depth	yg,zg	ordinate of the mass centre

Rolled steel

Rolled steel			D[mm]	B[mm]	s[mm]	t[mm]	r[mm]	yr[mm]	zr[mm]	[grd]
RHS	100	100 8	100.0	100.0	8.0	8.0	12.0			

D[mm]	height	t[mm]	flange thickness
B[mm]	width	r[mm]	fillet radius
s[mm]	web thickness	yr[mm],zr[mm]	sectional coordinate

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Mesh Generation

Default design code is EuroNorm EN 1993-2:2006 Steel Structures (Espagna) V 2020
Structure: C (Footbridges)

National Defined Parameters

Reference of parameter in design code	Value
long term reduction concrete compressive strength α-cc EN 1992-2 3.1.6	0.850¹
long term reduction concrete tensile strength α-ct EN 1992-1-1 3.1.6 (2)	1.000¹
safety coefficient γ-c for concrete EN 1992-1-1 2.4.2.4	1.500¹
safety coefficient γ-CE for concrete elasticity EN 1992-1-1 5.8.6 (3)	1.200¹
safety coefficient γ-s for reinforcing steel EN 1992-1-1 2.4.2.4	1.150¹
safety coefficient γ-M0 for structural steel EN 1993-1-1 6.1	1.000¹
safety coefficient γ-M1 for structural steel EN 1993-2 6.1	1.100¹
safety coefficient γ-M2 for structural steel EN 1993-1-1 6.1	1.250¹

¹ national defined parameter taken from the INI-files

Materials

Mat	Classification
1	S 355 (EN 1993)
2	C 30/37 (EN 1992)
3	C 30/37 (EN 1992)
4	B 500 B (EN 1992)

Mat 1 S 355 (EN 1993)

Young's modulus	E	210000 [N/mm2]	Safetyfactor		1.10 [-]
Poisson's ratio	μ	0.30 [-]	Yield stress	fy	355.00 [MPa]
Shear modulus	G	80769 [N/mm2]	Compressive yield	fyc	355.00 [MPa]
Compression modulus	K	175000 [N/mm2]	Tensile strength	ft	490.00 [MPa]
Nominal Weight	γ	78.5 [kN/m3]	Compressive strength	fc	490.00 [MPa]
Mean density	ρ	7850.0 [kg/m3]	Ultimate strain		100.00 [o/oo]
Elongation coefficient	α	1.20E-05 [1/K]	relative bond coeff.		0.00 [-]
max. thickness	t-max	40.00 [mm]	EN 1992 bond coeff.	k1	0.00 [-]
Safety sectional design	γ-M0	1.00 [-]	Hardening modulus	Eh	0.00 [MPa]
Safety stability design	γ-M1	1.10 [-]	Proportional limit	fp	355.00 [MPa]
Safety rupture	γ-M2	1.25 [-]	Dynamic allowance	σ-dyn	0.00 [MPa]

Stress-Strain for serviceability	ε[o/oo]	σ-m[MPa]	E-t[N/mm2]
Is also extended beyond the	1000.000	490.00	0
defined stress range	100.000	490.00	0
	1.690	355.00	1373
	0.000	0.00	210000
	-1.690	-355.00	1373
	-100.000	-490.00	0
	-1000.000	-490.00	0
	Safetyfactor		1.00

Stress-Strain for ultimate load	ε[o/oo]	σ-u[MPa]	E-t[N/mm2]
Is also extended beyond the	1000.000	490.00	0
defined stress range	100.000	490.00	0
	1.690	355.00	1373
	0.000	0.00	210000
	-1.690	-355.00	1373
	-100.000	-490.00	0
	-1000.000	-490.00	0
	Safetyfactor		1.10

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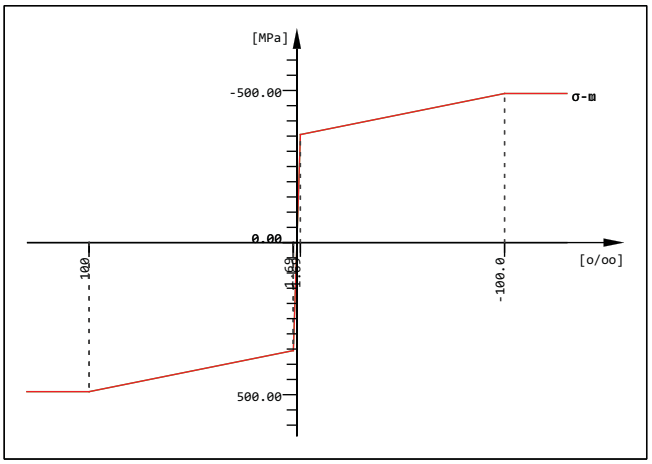
Mesh Generation



S 355 (EN 1993)

Mat 2 C 30/37 (EN 1992)

Young's modulus	E	32837 [N/mm2]	Safetyfactor		1.50 [-]
Poisson's ratio	μ	0.20 [-]	Strength	fc	25.50 [MPa]
Shear modulus	G	13682 [N/mm2]	Nominal strength	fck	30.00 [MPa]
Compression modulus	K	18243 [N/mm2]	Tensile strength	fctm	2.90 [MPa]
Nominal Weight	γ	25.0 [kN/m3]	Tensile strength	fctk,05	2.03 [MPa]
Mean density	ρ	2400.0 [kg/m3]	Tensile strength	fctk,95	3.77 [MPa]
Elongation coefficient	α	1.00E-05 [1/K]	Bond strength	fbd	3.04 [MPa]
			Service strength	fcm	38.00 [MPa]
			Fatigue strength	fcd,fat	14.96 [MPa]
			Tensile strength	fctd	1.35 [MPa]
			Tensile failure energy	Gf	0.14 [N/mm]

Stress-Strain for serviceability	**ε[o/oo]**	**σ-m[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	34478
stress range	-0.540	-16.42	26234
	-1.081	-28.31	17746
	-1.621	-35.55	9005
	-2.162	-38.00	0
	-3.500	-22.47	-23499
	Safetyfactor		1.50

Stress-Strain for ultimate load	**ε[o/oo]**	**σ-u[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	25500
stress range	-2.000	-25.50	0
	-3.500	-25.50	0
	Safetyfactor		1.50

Stress-Strain of calc. mean values	**ε[o/oo]**	**σ-r[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	28732
stress range	-0.540	-10.23	12007
	-1.081	-14.67	5278
	-1.621	-16.53	1917
	-2.162	-17.00	0
	-3.500	-15.23	-2279
	Safetyfactor		(1.50)

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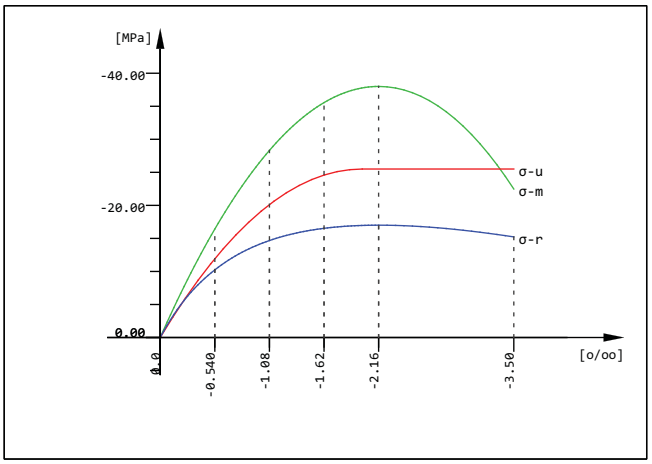
Mesh Generation



C 30/37 (EN 1992)

Mat 3 C 30/37 (EN 1992)

Young's modulus	E	32837 [N/mm2]	Safetyfactor		1.50 [-]
Poisson's ratio	μ	0.20 [-]	Strength	fc	25.50 [MPa]
Shear modulus	G	13682 [N/mm2]	Nominal strength	fck	30.00 [MPa]
Compression modulus	K	18243 [N/mm2]	Tensile strength	fctm	2.90 [MPa]
Nominal Weight	γ	25.0 [kN/m3]	Tensile strength	fctk,05	2.03 [MPa]
Mean density	ρ	2400.0 [kg/m3]	Tensile strength	fctk,95	3.77 [MPa]
Elongation coefficient	α	1.00E-05 [1/K]	Bond strength	fbd	3.04 [MPa]
			Service strength	fcm	38.00 [MPa]
			Fatigue strength	fcd,fat	14.96 [MPa]
			Tensile strength	fctd	1.35 [MPa]
			Tensile failure energy	Gf	0.14 [N/mm]

Stress-Strain for serviceability	**ε[o/oo]**	**σ-m[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	34478
stress range	-0.540	-16.42	26234
	-1.081	-28.31	17746
	-1.621	-35.55	9005
	-2.162	-38.00	0
	-3.500	-22.47	-23499
	Safetyfactor		1.50

Stress-Strain for ultimate load	**ε[o/oo]**	**σ-u[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	25500
stress range	-2.000	-25.50	0
	-3.500	-25.50	0
	Safetyfactor		1.50

Stress-Strain of calc. mean values	**ε[o/oo]**	**σ-r[MPa]**	**E-t[N/mm2]**
Is only valid within the defined	0.000	0.00	28732
stress range	-0.540	-10.23	12007
	-1.081	-14.67	5278
	-1.621	-16.53	1917
	-2.162	-17.00	0
	-3.500	-15.23	-2279
	Safetyfactor		(1.50)

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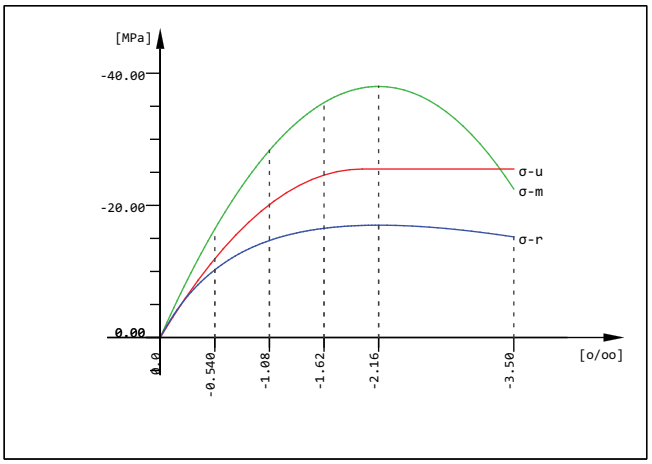
Mesh Generation



C 30/37 (EN 1992)

Mat 4 B 500 B (EN 1992)

Young's modulus	E	200000 [N/mm2]	Safetyfactor		1.15 [-]
Poisson's ratio	μ	0.30 [-]	Yield stress	fy	500.00 [MPa]
Shear modulus	G	76923 [N/mm2]	Compressive yield	fyc	500.00 [MPa]
Compression modulus	K	166667 [N/mm2]	Tensile strength	ft	540.00 [MPa]
Nominal Weight	γ	78.5 [kN/m3]	Compressive strength	fc	540.00 [MPa]
Mean density	ρ	7850.0 [kg/m3]	Ultimate strain		50.00 [o/oo]
Elongation coefficient	α	1.20E-05 [1/K]	relative bond coeff.		1.00 [-]
max. thickness	t-max	32.00 [mm]	EN 1992 bond coeff.	k1	0.80 [-]
			Hardening modulus	Eh	0.00 [MPa]
			Proportional limit	fp	500.00 [MPa]
			Dynamic allowance	σ-dyn	152.17 [MPa]

Stress-Strain for serviceability	**ε[o/oo]**	**σ-m[MPa]**	**E-t[N/mm2]**
Is also extended beyond the	1000.000	540.00	0
defined stress range	50.000	540.00	0
	2.500	500.00	842
	0.000	0.00	200000
	-2.500	-500.00	842
	-50.000	-540.00	0
	-1000.000	-540.00	0
	Safetyfactor		1.15

Stress-Strain for ultimate load	**ε[o/oo]**	**σ-u[MPa]**	**E-t[N/mm2]**
Is also extended beyond the	1000.000	469.57	0
defined stress range	50.000	469.57	0
	2.174	434.78	727
	0.000	0.00	200000
	-2.174	-434.78	727
	-50.000	-469.57	0
	-1000.000	-469.57	0
	Safetyfactor		(1.15)

Stress-Strain of calc. mean values	**ε[o/oo]**	**σ-r[MPa]**	**E-t[N/mm2]**
Is also extended beyond the	1000.000	469.57	0
defined stress range	50.000	469.57	0
	2.174	434.78	727
	0.000	0.00	200000
	-2.174	-434.78	727
	-50.000	-469.57	0
	-1000.000	-469.57	0
	Safetyfactor		(1.15)

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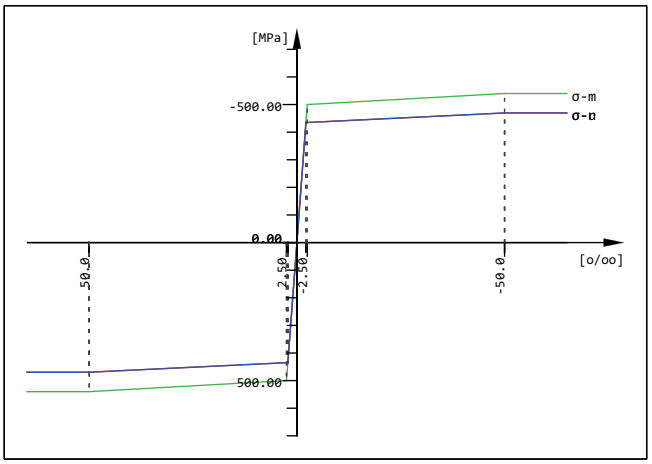
Mesh Generation



B 500 B (EN 1992)

Elastic bedding

Mat	Cs[kN/m3]	Ct[kN/m3]	ft[MPa]	fy[MPa]	tan[-]	c[MPa]	dil[-]	w[t/m2]
3	1.0000E+04	5.0000E+03	0.00	0.00	0.00	0.00	0.00	0.000

Cs[kN/m3]	normal bedding	tan[-]	Friction coefficient at wall
Ct[kN/m3]	transverse bedding	c[MPa]	Cohesion
ft[MPa]	maximum tensile bedding	dil[-]	Dilatancy coefficient
fy[MPa]	Maximum pressure	w[t/m2]	Nominal Weight

Thermal material constants

Mat	T[°C]	S[kJ/K/m3]	Kxx[W/K/m]	Kyy[W/K/m]	Kzz[W/K/m]	
1	AUTO	3.45E+03	5.333E+01			S 355 (EN 1993)
2	AUTO	2.16E+03	1.951E+00			C 30/37 (EN 1992)
3	AUTO	2.16E+03	1.951E+00			C 30/37 (EN 1992)
4	AUTO	3.45E+03	5.333E+01			B 500 B (EN 1992)

Mat	material number	S[kJ/K/m3]	Heat capacity
T[°C]	Temperature	Kxx[W/K/m],Kyy[W/K/m],Kzz[W/K/m]	Heat conductivity

Sectional Values

SNo	Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kg/m]	I-1[m4]
	MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]		I-2[m4]
			Ayz[m2]	Iyz[m4]					α[°]
1	1	1.0875E-02	1.845E-03	3.405E-04	0.0	0.0	210000	85.4	
		2.102E-04	7.290E-03	8.134E-05	0.0	0.0	80769	(CENTR)	
	=	RHS 500 x 200 x 8 (EN 10210-2)							
2	1	2.1236E-03	1.333E-03	3.492E-06	0.0	0.0	210000	16.7	
		4.117E-08	4.474E-04	1.333E-06	0.0	0.0	80769	(CENTR)	
	=	HE 100 A (EN 10365)							
3	1	6.1054E-03	7.912E-04	6.374E-05	0.0	0.0	210000	47.9	
		3.037E-05	4.334E-03	1.084E-05	150.0	150.0	80769	(CENTR)	
	=	RHS 300 x 100 x 8 (EN 10210-2)							
	=	RHS 300 x 100 x 8 (EN 10210-2)							
4	1	7.7054E-03	1.405E-03	1.186E-04	0.0	0.0	210000	60.5	
		7.849E-05	5.059E-03	3.120E-05	125.0	125.0	80769	(CENTR)	
	=	RHS 350 x 150 x 8 (EN 10210-2)							
	=	RHS 350 x 150 x 8 (EN 10210-2)							
5	1	5.3170E-03	1.820E-03	3.015E-05	0.0	0.0	210000	41.7	
		3.679E-05	2.769E-03	1.919E-05	100.0	100.0	80769	(BEAM)	
	=	RHS 200 x 150 x 8 (EN 10210-2)							
6	1	9.0880E-04	2.086E-04	1.160E-06	0.0	0.0	210000	7.1	
		9.491E-07	5.773E-04	3.881E-07	50.0	50.0	80769	(BEAM)	
	=	RHS 100 x 50 x 3.2 (EN 10210-2)							
7	1	6.9051E-03	1.564E-03	8.080E-05	0.0	0.0	210000	54.2	
		6.513E-05	4.338E-03	2.719E-05	75.0	75.0	80769	(BEAM)	
	=	RHS 300 x 200 x 8 (EN 10210-2)							
8	1	2.8749E-03	1.305E-03	3.995E-06	0.0	0.0	210000	22.6	
		6.634E-06	1.305E-03	3.995E-06	0.0	0.0	80769	(BEAM)	
	=	SHS 100 x 100 x 8 (EN 10210-2)							

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Mesh Generation

Sectional Values

SNo	Mat	A[m2]	Ay[m2]	Iy[m4]	yc[mm]	ysc[mm]	E[N/mm2]	g[kg/m]	I-1[m4]
	MRf	It[m4]	Az[m2]	Iz[m4]	zc[mm]	zsc[mm]	G[N/mm2]		I-2[m4]
			Ayz[m2]	Iyz[m4]					α[°]
9	1	4.2963E-03	2.993E-03	1.509E-05	0.0	0.0	210000	33.7	
		2.029E-07	9.400E-04	5.497E-06	-70.0	-70.0	80769	(BEAM)	
	=	HE 140 B (EN 10365)							

SNo	section number	yc[mm],zc[mm]	ordinate of elastic centroid
Mat	material number	ysc[mm],zsc[mm]	ordinate of shear centre
A[m2]	sectional area	E[N/mm2]	Young's modulus
Ay[m2],Az[m2],Ayz[m2]	transverse shear deformation area	g[kg/m]	weight per length
Iy[m4],Iz[m4],Iyz[m4]	bending moment of inertia		
I-1[m4],I-2[m4],α[°]	principal moments of inertia and angle of the principal axes		
MRf	reinforcement material number		
It[m4]	torsional moment of inertia		
G[N/mm2]	Shear modulus		

Structural Elements

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
1	13.800	0.000	3.350		
2	13.800	-0.350	3.350		
3	11.600	-2.650	3.350		
4	11.600	-2.650	3.450		
5	11.600	-0.350	3.350		
6	11.600	-0.350	3.450		
7	11.600	0.000	3.350		
8	11.600	0.000	3.450		
9	11.600	2.300	3.350		
10	11.600	2.300	3.450		
11	4.600	2.300	5.750		
12	4.600	2.300	5.850		
13	4.750	0.000	5.850		Point
14	5.100	0.000	5.700		Point
15	5.450	0.000	5.550		Point
16	5.800	0.000	5.400		Point
17	6.150	0.000	5.250		Point
18	6.500	0.000	5.100		Point
19	6.850	0.000	4.950		Point
20	7.200	0.000	4.800		Point
21	4.750	2.300	5.850		Point
22	5.100	2.300	5.700		Point
23	5.450	2.300	5.550		Point
24	5.800	2.300	5.400		Point
25	6.150	2.300	5.250		Point
26	6.500	2.300	5.100		Point
27	6.850	2.300	4.950		Point
28	7.200	2.300	4.800		Point
29	8.750	0.000	4.650		Point
30	9.100	0.000	4.500		Point
31	9.450	0.000	4.350		Point
32	9.800	0.000	4.200		Point
33	10.150	0.000	4.050		Point
34	10.500	0.000	3.900		Point
35	10.850	0.000	3.750		Point
36	11.200	0.000	3.600		Point
37	11.550	0.000	3.450		Point
38	9.450	-2.650	2.550		Point
39	9.100	-2.650	2.400		Point
40	11.550	-0.350	3.450		Point
41	11.200	-0.350	3.300		Point
42	10.850	-0.350	3.150		Point
43	10.500	-0.350	3.000		Point
44	10.150	-0.350	2.850		Point

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
45	9.800	-0.350	2.700		Point
46	9.450	-0.350	2.550		Point
47	9.100	-0.350	2.400		Point
48	11.550	-2.650	3.450		Point
49	11.200	-2.650	3.300		Point
50	10.850	-2.650	3.150		Point
51	10.500	-2.650	3.000		Point
52	10.150	-2.650	2.850		Point
53	9.800	-2.650	2.700		Point
54	7.550	-0.350	2.250		Point
55	7.200	-0.350	2.100		Point
56	6.850	-0.350	1.950		Point
57	6.500	-0.350	1.800		Point
58	6.150	-0.350	1.650		Point
59	5.800	-0.350	1.500		Point
60	5.450	-0.350	1.350		Point
61	4.600	0.000	5.750		
62	8.750	2.300	4.650		Point
63	9.100	2.300	4.500		Point
64	9.450	2.300	4.350		Point
65	9.800	2.300	4.200		Point
66	10.150	2.300	4.050		Point
67	10.500	2.300	3.900		Point
68	10.850	2.300	3.750		Point
69	11.200	2.300	3.600		Point
70	11.550	2.300	3.450		Point
71	7.550	-2.650	2.250		Point
72	7.200	-2.650	2.100		Point
73	6.850	-2.650	1.950		Point
74	6.500	-2.650	1.800		Point
75	6.150	-2.650	1.650		Point
76	5.800	-2.650	1.500		Point
77	5.450	-2.650	1.350		Point
78	4.600	0.000	5.850		
79	13.900	0.000	3.450		Point
80	13.900	-0.350	3.450		Point
81	11.600	18.800	3.350		
82	11.600	18.800	3.450		
83	11.550	16.500	3.450		Point
84	11.200	16.500	3.300		Point
85	10.850	16.500	3.150		Point
86	10.500	16.500	3.000		Point
87	10.150	16.500	2.850		Point
88	9.800	16.500	2.700		Point
89	9.450	16.500	2.550		Point
90	9.100	16.500	2.400		Point
91	11.550	18.800	3.450		Point
92	11.200	18.800	3.300		Point
93	10.850	18.800	3.150		Point
94	10.500	18.800	3.000		Point
95	10.150	18.800	2.850		Point
96	9.800	18.800	2.700		Point
97	9.450	18.800	2.550		Point
98	9.100	18.800	2.400		Point
99	7.550	16.500	2.250		Point
100	7.200	16.500	2.100		Point
101	6.850	16.500	1.950		Point
102	6.500	16.500	1.800		Point
103	6.150	16.500	1.650		Point

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
104	5.800	16.500	1.500		Point
105	5.450	16.500	1.350		Point
106	11.600	16.500	3.350		
107	8.750	13.850	4.650		Point
108	9.100	13.850	4.500		Point
109	9.800	13.850	4.200		Point
110	10.150	13.850	4.050		Point
111	10.500	13.850	3.900		Point
112	10.850	13.850	3.750		Point
113	11.200	13.850	3.600		Point
114	11.550	13.850	3.450		Point
115	9.450	13.850	4.350		Point
116	7.550	18.800	2.250		Point
117	7.200	18.800	2.100		Point
118	6.850	18.800	1.950		Point
119	6.500	18.800	1.800		Point
120	6.150	18.800	1.650		Point
121	5.800	18.800	1.500		Point
122	5.450	18.800	1.350		Point
123	5.100	18.800	1.200		Point
124	6.850	13.850	4.950		Point
125	7.200	13.850	4.800		Point
126	4.750	16.150	5.850		Point
127	5.100	16.150	5.700		Point
128	5.450	16.150	5.550		Point
129	5.800	16.150	5.400		Point
130	6.150	16.150	5.250		Point
131	6.500	16.150	5.100		Point
132	6.850	16.150	4.950		Point
133	7.200	16.150	4.800		Point
134	4.750	13.850	5.850		Point
135	5.100	13.850	5.700		Point
136	5.450	13.850	5.550		Point
137	5.800	13.850	5.400		Point
138	6.150	13.850	5.250		Point
139	6.500	13.850	5.100		Point
140	8.750	16.150	4.650		Point
141	9.100	16.150	4.500		Point
142	9.450	16.150	4.350		Point
143	9.800	16.150	4.200		Point
144	10.150	16.150	4.050		Point
145	10.500	16.150	3.900		Point
146	10.850	16.150	3.750		Point
147	11.200	16.150	3.600		Point
148	11.550	16.150	3.450		Point
149	11.600	16.500	3.450		
150	11.600	16.150	3.350		
151	13.900	16.150	3.450		Point
152	13.900	16.500	3.450		Point
153	11.600	16.150	3.450		
154	11.600	13.850	3.350		
155	11.600	13.850	3.450		
156	4.600	13.850	5.750		
157	4.600	13.850	5.850		
158	4.600	16.150	5.750		
159	4.600	16.150	5.850		
160	13.800	16.150	3.350		
161	13.800	16.500	3.350		
162	5.275	18.800	1.275		

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
163	5.088	18.800	0.952		
164	5.088	16.700	0.952		
165	5.275	-0.350	1.275		
166	5.088	-0.450	0.952		
167	5.275	-2.650	1.275		
168	5.088	-2.550	0.952		
1001	2.300	0.100	5.750		
1002	4.750	0.100	5.750		
1003	4.750	2.200	5.750		
1004	2.300	2.200	5.750		
1006	4.750	0.100	5.600		
1007	4.750	2.200	5.600		
1010	5.100	0.100	5.600		
1011	5.100	2.200	5.600		
1014	5.100	0.100	5.450		
1015	5.100	2.200	5.450		
1018	5.450	0.100	5.450		
1019	5.450	2.200	5.450		
1022	5.450	0.100	5.300		
1023	5.450	2.200	5.300		
1026	5.800	0.100	5.300		
1027	5.800	2.200	5.300		
1030	5.800	0.100	5.150		
1031	5.800	2.200	5.150		
1034	6.150	0.100	5.150		
1035	6.150	2.200	5.150		
1038	6.150	0.100	5.000		
1039	6.150	2.200	5.000		
1042	6.500	0.100	5.000		
1043	6.500	2.200	5.000		
1046	6.500	0.100	4.850		
1047	6.500	2.200	4.850		
1050	6.850	0.100	4.850		
1051	6.850	2.200	4.850		
1054	6.850	0.100	4.700		
1055	6.850	2.200	4.700		
1058	7.200	0.100	4.700		
1059	7.200	2.200	4.700		
1062	7.200	0.100	4.550		
1063	7.200	2.200	4.550		
1066	8.750	0.100	4.550		
1067	8.750	2.200	4.550		
1070	8.750	0.100	4.400		
1071	8.750	2.200	4.400		
1074	9.100	0.100	4.400		
1075	9.100	2.200	4.400		
1078	9.100	0.100	4.250		
1079	9.100	2.200	4.250		
1082	9.450	0.100	4.250		
1083	9.450	2.200	4.250		
1085	9.450	0.100	4.100		
1086	9.450	2.200	4.100		
1090	9.800	0.100	4.100		
1091	9.800	2.200	4.100		
1094	9.800	0.100	3.950		
1095	9.800	2.200	3.950		
1098	10.150	0.100	3.950		
1099	10.150	2.200	3.950		
1102	10.150	0.100	3.800		

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
1103	10.150	2.200	3.800		
1106	10.500	0.100	3.800		
1107	10.500	2.200	3.800		
1110	10.500	0.100	3.650		
1111	10.500	2.200	3.650		
1114	10.850	0.100	3.650		
1115	10.850	2.200	3.650		
1118	10.850	0.100	3.500		
1119	10.850	2.200	3.500		
1122	11.200	0.100	3.500		
1123	11.200	2.200	3.500		
1126	11.200	0.100	3.350		
1127	11.200	2.200	3.350		
1130	11.600	0.100	3.350		
1131	11.600	2.200	3.350		
1133	9.100	-0.450	2.150		
1134	7.550	-0.450	2.150		
1135	7.550	-2.550	2.150		
1136	9.100	-2.550	2.150		
1138	7.550	-0.450	2.000		
1139	7.550	-2.550	2.000		
1142	7.200	-0.450	2.000		
1143	7.200	-2.550	2.000		
1146	7.200	-0.450	1.850		
1147	7.200	-2.550	1.850		
1150	6.850	-0.450	1.850		
1151	6.850	-2.550	1.850		
1153	6.850	-0.450	1.700		
1154	6.850	-2.550	1.700		
1158	6.500	-0.450	1.700		
1159	6.500	-2.550	1.700		
1162	6.500	-0.450	1.550		
1163	6.500	-2.550	1.550		
1166	6.150	-0.450	1.550		
1167	6.150	-2.550	1.550		
1170	6.150	-0.450	1.400		
1171	6.150	-2.550	1.400		
1174	5.800	-0.450	1.400		
1175	5.800	-2.550	1.400		
1178	5.800	-0.450	1.250		
1179	5.800	-2.550	1.250		
1182	5.450	-0.450	1.250		
1183	5.450	-2.550	1.250		
1186	5.450	-0.450	1.100		
1187	5.450	-2.550	1.100		
1190	5.100	-0.450	1.100		
1191	5.100	-2.550	1.100		
1197	2.300	16.150	0.805		
1198	2.300	16.150	-0.995		
1199	0.000	16.150	-0.995		
1200	0.000	16.150	0.805		
1201	11.550	-0.450	3.350		
1202	11.550	-0.450	3.200		
1203	11.550	-2.550	3.200		
1204	11.550	-2.550	3.350		
1206	11.200	-0.450	3.200		
1207	11.200	-2.550	3.200		
1210	11.200	-0.450	3.050		
1211	11.200	-2.550	3.050		

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
1214	10.850	-0.450	3.050		
1215	10.850	-2.550	3.050		
1218	10.850	-0.450	2.900		
1219	10.850	-2.550	2.900		
1222	10.500	-0.450	2.900		
1223	10.500	-2.550	2.900		
1226	10.500	-0.450	2.750		
1227	10.500	-2.550	2.750		
1230	10.150	-0.450	2.750		
1231	10.150	-2.550	2.750		
1234	10.150	-0.450	2.600		
1235	10.150	-2.550	2.600		
1238	9.800	-0.450	2.600		
1239	9.800	-2.550	2.600		
1242	9.800	-0.450	2.450		
1243	9.800	-2.550	2.450		
1246	9.450	-0.450	2.450		
1247	9.450	-2.550	2.450		
1250	9.450	-0.450	2.300		
1251	9.450	-2.550	2.300		
1254	9.100	-0.450	2.300		
1255	9.100	-2.550	2.300		
1262	13.800	2.200	3.350		
1265	11.550	-0.350	3.350		
1267	13.800	-2.550	3.350		
1273	9.100	16.600	2.150		
1274	7.550	16.600	2.150		
1275	7.550	18.700	2.150		
1276	9.100	18.700	2.150		
1278	7.550	16.600	2.000		
1279	7.550	18.700	2.000		
1282	7.200	16.600	2.000		
1283	7.200	18.700	2.000		
1286	7.200	16.600	1.850		
1287	7.200	18.700	1.850		
1290	6.850	16.600	1.850		
1291	6.850	18.700	1.850		
1293	6.850	16.600	1.700		
1294	6.850	18.700	1.700		
1298	6.500	16.600	1.700		
1299	6.500	18.700	1.700		
1302	6.500	16.600	1.550		
1303	6.500	18.700	1.550		
1306	6.150	16.600	1.550		
1307	6.150	18.700	1.550		
1310	6.150	16.600	1.400		
1311	6.150	18.700	1.400		
1314	5.800	16.600	1.400		
1315	5.800	18.700	1.400		
1318	5.800	16.600	1.250		
1319	5.800	18.700	1.250		
1322	5.450	16.600	1.250		
1323	5.450	18.700	1.250		
1326	5.450	16.600	1.100		
1327	5.450	18.700	1.100		
1330	5.100	16.600	1.100		
1331	5.100	18.700	1.100		
1334	5.088	16.600	0.952		
1335	5.088	18.700	0.952		

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
1339	2.300	13.850	-0.995		
1340	2.300	13.850	0.805		
1341	11.550	16.600	3.350		
1342	11.550	16.600	3.200		
1343	11.550	18.700	3.200		
1344	11.550	18.700	3.350		
1346	11.200	16.600	3.200		
1347	11.200	18.700	3.200		
1350	11.200	16.600	3.050		
1351	11.200	18.700	3.050		
1354	10.850	16.600	3.050		
1355	10.850	18.700	3.050		
1358	10.850	16.600	2.900		
1359	10.850	18.700	2.900		
1362	10.500	16.600	2.900		
1363	10.500	18.700	2.900		
1366	10.500	16.600	2.750		
1367	10.500	18.700	2.750		
1370	10.150	16.600	2.750		
1371	10.150	18.700	2.750		
1374	10.150	16.600	2.600		
1375	10.150	18.700	2.600		
1378	9.800	16.600	2.600		
1379	9.800	18.700	2.600		
1382	9.800	16.600	2.450		
1383	9.800	18.700	2.450		
1386	9.450	16.600	2.450		
1387	9.450	18.700	2.450		
1390	9.450	16.600	2.300		
1391	9.450	18.700	2.300		
1394	9.100	16.600	2.300		
1395	9.100	18.700	2.300		
1401	7.200	16.050	4.550		
1402	8.750	16.050	4.550		
1403	8.750	13.950	4.550		
1404	7.200	13.950	4.550		
1406	8.750	16.050	4.400		
1407	8.750	13.950	4.400		
1410	9.100	16.050	4.400		
1411	9.100	13.950	4.400		
1414	9.100	16.050	4.250		
1415	9.100	13.950	4.250		
1418	9.450	16.050	4.250		
1419	9.450	13.950	4.250		
1421	9.450	16.050	4.100		
1422	9.450	13.950	4.100		
1426	9.800	16.050	4.100		
1427	9.800	13.950	4.100		
1430	9.800	16.050	3.950		
1431	9.800	13.950	3.950		
1434	10.150	16.050	3.950		
1435	10.150	13.950	3.950		
1438	10.150	16.050	3.800		
1439	10.150	13.950	3.800		
1442	10.500	16.050	3.800		
1443	10.500	13.950	3.800		
1446	10.500	16.050	3.650		
1447	10.500	13.950	3.650		
1450	10.850	16.050	3.650		

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
1451	10.850	13.950	3.650		
1454	10.850	16.050	3.500		
1455	10.850	13.950	3.500		
1458	11.200	16.050	3.500		
1459	11.200	13.950	3.500		
1462	11.200	16.050	3.350		
1463	11.200	13.950	3.350		
1466	11.600	16.050	3.350		
1467	11.600	13.950	3.350		
1469	2.300	16.050	5.750		
1470	4.750	16.050	5.750		
1471	4.750	13.950	5.750		
1472	2.300	13.950	5.750		
1474	4.750	16.050	5.600		
1475	4.750	13.950	5.600		
1478	5.100	16.050	5.600		
1479	5.100	13.950	5.600		
1482	5.100	16.050	5.450		
1483	5.100	13.950	5.450		
1486	5.450	16.050	5.450		
1487	5.450	13.950	5.450		
1490	5.450	16.050	5.300		
1491	5.450	13.950	5.300		
1494	5.800	16.050	5.300		
1495	5.800	13.950	5.300		
1498	5.800	16.050	5.150		
1499	5.800	13.950	5.150		
1502	6.150	16.050	5.150		
1503	6.150	13.950	5.150		
1506	6.150	16.050	5.000		
1507	6.150	13.950	5.000		
1510	6.500	16.050	5.000		
1511	6.500	13.950	5.000		
1514	6.500	16.050	4.850		
1515	6.500	13.950	4.850		
1518	6.850	16.050	4.850		
1519	6.850	13.950	4.850		
1522	6.850	16.050	4.700		
1523	6.850	13.950	4.700		
1526	7.200	16.050	4.700		
1527	7.200	13.950	4.700		
1534	13.800	13.950	3.350		
1537	11.550	16.500	3.350		
1539	13.800	18.700	3.350		
1546	4.500	2.200	5.750		
1547	4.500	13.950	5.750		
1549	0.000	13.850	0.805		
1552	0.000	13.850	-0.995		
1553	3.400	12.750	-0.995		
1554	3.400	17.250	-0.995		
1555	-1.100	17.250	-0.995		
1556	-1.100	12.750	-0.995		
1557	2.300	2.300	0.805		
1558	2.300	2.300	-0.995		
1559	0.000	2.300	-0.995		
1560	0.000	2.300	0.805		
1563	2.300	0.000	-0.995		
1564	2.300	0.000	0.805		
1565	0.000	0.000	0.805		

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
1568	0.000	0.000	-0.995		
1573	0.000	0.350	0.805		
1574	0.000	0.350	0.495		
1575	0.000	1.950	0.495		
1576	0.000	1.950	0.805		
1577	3.400	-1.100	-0.995		
1578	3.400	3.400	-0.995		
1579	-1.100	3.400	-0.995		
1580	-1.100	-1.100	-0.995		
1581	0.000	15.800	0.805		
1586	0.000	14.200	0.805		
1587	0.000	14.200	0.495		
1588	0.000	15.800	0.495		
1589	4.563	19.275	-0.198		
1590	4.563	16.225	-0.198		
1591	6.113	16.225	-0.198		
1592	6.113	19.275	-0.198		
1593	5.088	16.425	0.952		
1594	5.088	19.075	0.952		
1595	5.088	19.075	-0.198		
1596	5.088	16.425	-0.198		
1597	4.563	0.125	-0.198		
1598	4.563	-2.925	-0.198		
1599	6.113	-2.925	-0.198		
1600	6.113	0.125	-0.198		
1601	5.088	-2.725	0.952		
1602	5.088	-0.075	0.952		
1603	5.088	-0.075	-0.198		
1604	5.088	-2.725	-0.198		
1605	12.750	-1.947	1.030		
1606	13.475	-1.909	0.808		
1607	13.475	-1.713	-0.345		
1608	12.025	-1.713	-0.345		
1609	12.025	-1.909	0.808		
1610	13.475	1.403	-0.345		
1611	12.025	1.403	-0.345		
1612	12.025	1.629	0.802		
1613	12.750	1.671	1.019		
1614	13.475	1.629	0.802		
1615	11.825	-2.392	-0.345		
1616	13.675	-2.392	-0.345		
1617	13.675	2.083	-0.345		
1618	11.825	2.083	-0.345		
1619	12.750	14.533	1.030		
1620	13.475	14.571	0.808		
1621	13.475	14.767	-0.345		
1622	12.025	14.767	-0.345		
1623	12.025	14.571	0.808		
1624	13.475	17.883	-0.345		
1625	12.025	17.883	-0.345		
1626	12.025	18.109	0.802		
1627	12.750	18.151	1.019		
1628	13.475	18.109	0.802		
1629	11.825	14.087	-0.345		
1630	13.675	14.087	-0.345		
1631	13.675	18.562	-0.345		
1632	11.825	18.562	-0.345		
1633	0.000	0.000	10.010		
1634	2.300	0.000	10.010		

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
1635	2.300	2.300	5.750		
1636	0.000	2.300	10.010		
1637	0.000	0.000	2.850		
1638	2.300	0.000	2.850		
1639	2.300	2.300	2.850		
1640	0.000	2.300	2.850		
1641	0.000	0.000	5.850		
1642	2.300	0.000	5.850		
1643	0.000	13.850	10.010		
1644	2.300	2.300	5.850		
1645	0.000	2.300	5.850		
1646	0.000	0.000	8.850		
1647	2.300	0.000	8.850		
1648	2.300	2.300	8.850		
1649	0.000	2.300	8.850		
1650	2.300	0.000	5.750		
1651	2.300	13.850	5.750		
1652	2.300	16.150	10.010		
1653	0.000	16.150	10.010		
1654	0.000	13.850	2.850		
1655	2.300	13.850	2.850		
1656	2.300	16.150	2.850		
1657	0.000	16.150	2.850		
1658	0.000	13.850	5.850		
1659	2.300	13.850	5.850		
1660	2.300	16.150	5.850		
1661	0.000	16.150	5.850		
1662	0.000	13.850	8.850		
1663	2.300	13.850	8.850		
1664	2.300	16.150	8.850		
1665	0.000	16.150	8.850		
1666	2.300	16.150	5.750		
1667	7.550	0.000	4.650		
1668	8.750	-0.350	2.250		
1669	2.300	13.850	10.010		
1670	13.900	-2.650	3.450		
1671	13.900	2.300	3.450		
1672	7.550	2.300	4.650		
1673	11.600	-2.605	3.350		
1674	12.325	-1.925	0.900		
1675	1.150	13.850	10.010		
1676	1.150	16.150	10.010		
1677	12.321	1.646	0.891		
1678	11.600	2.255	3.350		
1679	7.550	0.100	4.550		
1680	7.550	2.200	4.550		
1681	8.750	-0.450	2.150		
1682	8.750	-2.550	2.150		
1683	8.750	-2.650	2.250		
1684	2.300	2.300	10.010		
1685	1.150	0.000	10.010		
1686	1.150	2.300	10.010		
1687	2.600	2.200	5.750		
1688	2.600	0.100	5.750		
1689	2.900	2.200	5.750		
1690	2.900	0.100	5.750		
1691	3.200	2.200	5.750		
1692	3.200	0.100	5.750		
1693	3.500	2.200	5.750		

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
1694	3.500	0.100	5.750		
1695	3.800	2.200	5.750		
1696	3.800	0.100	5.750		
1697	4.100	2.200	5.750		
1698	4.100	0.100	5.750		
1699	4.400	2.200	5.750		
1700	4.400	0.100	5.750		
1701	4.700	2.200	5.750		
1702	4.700	0.100	5.750		
1703	13.600	2.200	3.350		
1704	13.600	0.000	3.350		
1705	13.300	2.200	3.350		
1706	13.300	0.000	3.350		
1707	13.000	2.200	3.350		
1708	13.000	0.000	3.350		
1709	12.700	2.200	3.350		
1710	12.700	0.000	3.350		
1711	12.400	2.200	3.350		
1712	12.400	0.000	3.350		
1713	12.100	2.200	3.350		
1714	12.100	0.000	3.350		
1715	11.800	2.200	3.350		
1716	11.800	0.000	3.350		
1717	13.600	-0.350	3.350		
1718	13.600	-2.550	3.350		
1719	13.300	-0.350	3.350		
1720	13.300	-2.550	3.350		
1721	13.000	-0.350	3.350		
1722	13.000	-2.550	3.350		
1723	12.700	-0.350	3.350		
1724	12.700	-2.550	3.350		
1725	12.400	-0.350	3.350		
1726	12.400	-2.550	3.350		
1727	12.100	-0.350	3.350		
1728	12.100	-2.550	3.350		
1729	11.800	-0.350	3.350		
1730	11.800	-2.550	3.350		
1731	7.975	2.200	4.550		
1732	7.975	0.100	4.550		
1733	8.275	2.200	4.550		
1734	8.275	0.100	4.550		
1735	8.575	2.200	4.550		
1736	8.575	0.100	4.550		
1737	7.675	2.200	4.550		
1738	7.675	0.100	4.550		
1739	7.375	2.200	4.550		
1740	7.375	0.100	4.550		
1741	8.325	-0.450	2.150		
1742	8.325	-2.550	2.150		
1743	8.625	-0.450	2.150		
1744	8.625	-2.550	2.150		
1745	8.925	-0.450	2.150		
1746	8.925	-2.550	2.150		
1747	8.025	-0.450	2.150		
1748	8.025	-2.550	2.150		
1749	7.725	-0.450	2.150		
1750	7.725	-2.550	2.150		
1751	8.750	16.600	2.150		
1752	8.750	16.500	2.250		

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
1753	8.750	18.700	2.150		
1754	8.750	18.800	2.250		
1755	7.550	16.050	4.550		
1756	7.550	16.150	4.650		
1757	7.550	13.950	4.550		
1758	7.550	13.850	4.650		
1759	13.900	18.800	3.450		
1760	13.900	13.850	3.450		
1761	11.600	18.755	3.350		
1762	12.324	18.126	0.892		
1763	12.324	14.555	0.900		
1764	11.600	13.895	3.350		
1765	2.600	13.950	5.750		
1766	2.600	16.050	5.750		
1767	2.900	13.950	5.750		
1768	2.900	16.050	5.750		
1769	3.200	13.950	5.750		
1770	3.200	16.050	5.750		
1771	3.500	13.950	5.750		
1772	3.500	16.050	5.750		
1773	3.800	13.950	5.750		
1774	3.800	16.050	5.750		
1775	4.100	13.950	5.750		
1776	4.100	16.050	5.750		
1777	4.400	13.950	5.750		
1778	4.400	16.050	5.750		
1779	4.700	13.950	5.750		
1780	4.700	16.050	5.750		
1781	13.600	13.950	3.350		
1782	13.600	16.150	3.350		
1783	13.300	13.950	3.350		
1784	13.300	16.150	3.350		
1785	13.000	13.950	3.350		
1786	13.000	16.150	3.350		
1787	12.700	13.950	3.350		
1788	12.700	16.150	3.350		
1789	12.400	13.950	3.350		
1790	12.400	16.150	3.350		
1791	12.100	13.950	3.350		
1792	12.100	16.150	3.350		
1793	11.800	13.950	3.350		
1794	11.800	16.150	3.350		
1795	13.600	16.500	3.350		
1796	13.600	18.700	3.350		
1797	13.300	16.500	3.350		
1798	13.300	18.700	3.350		
1799	13.000	16.500	3.350		
1800	13.000	18.700	3.350		
1801	12.700	16.500	3.350		
1802	12.700	18.700	3.350		
1803	12.400	16.500	3.350		
1804	12.400	18.700	3.350		
1805	12.100	16.500	3.350		
1806	12.100	18.700	3.350		
1807	11.800	16.500	3.350		
1808	11.800	18.700	3.350		
1809	7.975	13.950	4.550		
1810	7.975	16.050	4.550		
1811	8.275	13.950	4.550		

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
1812	8.275	16.050	4.550		
1813	8.575	13.950	4.550		
1814	8.575	16.050	4.550		
1815	7.675	13.950	4.550		
1816	7.675	16.050	4.550		
1817	7.375	13.950	4.550		
1818	7.375	16.050	4.550		
1819	8.325	16.600	2.150		
1820	8.325	18.700	2.150		
1821	8.625	16.600	2.150		
1822	8.625	18.700	2.150		
1823	8.925	16.600	2.150		
1824	8.925	18.700	2.150		
1825	8.025	16.600	2.150		
1826	8.025	18.700	2.150		
1827	7.725	16.600	2.150		
1828	7.725	18.700	2.150		
1829	13.175	-1.925	0.900		
1830	13.179	1.646	0.891		
1831	13.176	14.555	0.900		
1832	13.176	18.126	0.892		
1833	4.500	2.300	5.750		
1834	4.500	13.850	5.750		
1835	2.300	13.625	5.750		
1836	4.500	13.625	5.750		
1837	2.300	13.325	5.750		
1838	4.500	13.325	5.750		
1839	2.300	13.025	5.750		
1840	4.500	13.025	5.750		
1841	2.300	12.725	5.750		
1842	4.500	12.725	5.750		
1843	2.300	12.425	5.750		
1844	4.500	12.425	5.750		
1845	2.300	12.125	5.750		
1846	4.500	12.125	5.750		
1847	2.300	11.825	5.750		
1848	4.500	11.825	5.750		
1849	2.300	11.525	5.750		
1850	4.500	11.525	5.750		
1851	2.300	11.225	5.750		
1852	4.500	11.225	5.750		
1853	2.300	10.925	5.750		
1854	4.500	10.925	5.750		
1855	2.300	10.625	5.750		
1856	4.500	10.625	5.750		
1857	2.300	10.325	5.750		
1858	4.500	10.325	5.750		
1859	2.300	10.025	5.750		
1860	4.500	10.025	5.750		
1861	2.300	9.725	5.750		
1862	4.500	9.725	5.750		
1863	2.300	9.425	5.750		
1864	4.500	9.425	5.750		
1865	2.300	9.125	5.750		
1866	4.500	9.125	5.750		
1867	2.300	8.825	5.750		
1868	4.500	8.825	5.750		
1869	2.300	8.525	5.750		
1870	4.500	8.525	5.750		

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
1871	2.300	8.225	5.750		
1872	4.500	8.225	5.750		
1873	2.300	7.925	5.750		
1874	4.500	7.925	5.750		
1875	2.300	7.625	5.750		
1876	4.500	7.625	5.750		
1877	2.300	7.325	5.750		
1878	4.500	7.325	5.750		
1879	2.300	7.025	5.750		
1880	4.500	7.025	5.750		
1881	2.300	6.725	5.750		
1882	4.500	6.725	5.750		
1883	2.300	6.425	5.750		
1884	4.500	6.425	5.750		
1885	2.300	6.125	5.750		
1886	4.500	6.125	5.750		
1887	2.300	5.825	5.750		
1888	4.500	5.825	5.750		
1889	2.300	5.525	5.750		
1890	4.500	5.525	5.750		
1891	2.300	5.225	5.750		
1892	4.500	5.225	5.750		
1893	2.300	4.925	5.750		
1894	4.500	4.925	5.750		
1895	2.300	4.625	5.750		
1896	4.500	4.625	5.750		
1897	2.300	4.325	5.750		
1898	4.500	4.325	5.750		
1899	2.300	4.025	5.750		
1900	4.500	4.025	5.750		
1901	2.300	3.725	5.750		
1902	4.500	3.725	5.750		
1903	2.300	3.425	5.750		
1904	4.500	3.425	5.750		
1905	2.300	3.125	5.750		
1906	4.500	3.125	5.750		
1907	2.300	2.825	5.750		
1908	4.500	2.825	5.750		
1909	2.300	2.525	5.750		
1910	4.500	2.525	5.750		
1911	11.598	-2.550	3.350		
1912	11.647	2.200	3.350		
1913	3.200	0.000	5.850		
1914	2.600	0.000	5.850		
1915	4.365	2.300	5.750		
1916	3.990	2.300	5.750		
1917	3.145	2.300	5.750		
1918	2.582	2.300	5.750		
1919	7.375	0.000	4.725		
1920	8.275	0.000	4.650		
1921	7.975	0.000	4.650		
1922	7.675	0.000	4.650		
1923	7.375	2.300	4.725		
1924	8.275	2.300	4.650		
1925	7.975	2.300	4.650		
1926	7.675	2.300	4.650		
1927	8.925	-0.350	2.325		
1928	8.325	-0.350	2.250		
1929	8.625	-0.350	2.250		

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
1930	8.925	-2.650	2.325		
1931	8.325	-2.650	2.250		
1932	8.625	-2.650	2.250		
1933	4.643	13.950	5.750		
1934	8.925	16.500	2.325		
1935	8.325	16.500	2.250		
1936	8.625	16.500	2.250		
1937	8.925	18.800	2.325		
1938	8.325	18.800	2.250		
1939	8.625	18.800	2.250		
1940	7.375	16.150	4.725		
1941	8.275	16.150	4.650		
1942	7.975	16.150	4.650		
1943	7.675	16.150	4.650		
1944	7.375	13.850	4.725		
1945	8.275	13.850	4.650		
1946	7.975	13.850	4.650		
1947	7.675	13.850	4.650		
1948	3.200	16.150	5.850		
1949	2.600	16.150	5.850		
1950	11.598	18.700	3.350		
1951	11.647	13.950	3.350		
1952	2.300	13.625	5.850		
1953	2.300	13.325	5.850		
1954	2.300	13.025	5.850		
1955	2.300	12.725	5.850		
1956	2.300	12.425	5.850		
1957	2.300	12.125	5.850		
1958	2.300	11.825	5.850		
1959	2.300	11.525	5.850		
1960	2.300	11.225	5.850		
1961	2.300	10.925	5.850		
1962	2.300	10.625	5.850		
1963	2.300	10.325	5.850		
1964	2.300	10.025	5.850		
1965	2.300	9.725	5.850		
1966	2.300	9.425	5.850		
1967	2.300	9.125	5.850		
1968	2.300	8.825	5.850		
1969	2.300	8.525	5.850		
1970	2.300	8.225	5.850		
1971	2.300	7.925	5.850		
1972	2.300	7.625	5.850		
1973	2.300	7.325	5.850		
1974	2.300	7.025	5.850		
1975	2.300	6.725	5.850		
1976	2.300	6.425	5.850		
1977	2.300	6.125	5.850		
1978	2.300	5.825	5.850		
1979	2.300	5.525	5.850		
1980	2.300	5.225	5.850		
1981	2.300	4.925	5.850		
1982	2.300	4.625	5.850		
1983	2.300	4.325	5.850		
1984	2.300	4.025	5.850		
1985	2.300	3.725	5.850		
1986	2.300	3.425	5.850		
1987	2.300	3.125	5.850		
1988	2.300	2.825	5.850		

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
1989	2.300	2.525	5.850		
1990	4.600	13.625	5.850		
1991	4.600	13.325	5.850		
1992	4.600	13.025	5.850		
1993	4.600	12.725	5.850		
1994	4.600	12.425	5.850		
1995	4.600	12.125	5.850		
1996	4.600	11.825	5.850		
1997	4.600	11.525	5.850		
1998	4.600	11.225	5.850		
1999	4.600	10.925	5.850		
2000	4.600	10.625	5.850		
2001	4.600	10.325	5.850		
2002	4.600	10.025	5.850		
2003	4.600	9.725	5.850		
2004	4.600	9.425	5.850		
2005	4.600	9.125	5.850		
2006	4.600	8.825	5.850		
2007	4.600	8.525	5.850		
2008	4.600	8.225	5.850		
2009	4.600	7.925	5.850		
2010	4.600	7.625	5.850		
2011	4.600	7.325	5.850		
2012	4.600	7.025	5.850		
2013	4.600	6.725	5.850		
2014	4.600	6.425	5.850		
2015	4.600	6.125	5.850		
2016	4.600	5.825	5.850		
2017	4.600	5.525	5.850		
2018	4.600	5.225	5.850		
2019	4.600	4.925	5.850		
2020	4.600	4.625	5.850		
2021	4.600	4.325	5.850		
2022	4.600	4.025	5.850		
2023	4.600	3.725	5.850		
2024	4.600	3.425	5.850		
2025	4.600	3.125	5.850		
2026	4.600	2.825	5.850		
2027	4.600	2.525	5.850		
2028	13.064	-2.650	3.450		
2029	12.751	-2.650	3.450		
2030	12.438	-2.650	3.450		
2031	12.124	-2.650	3.450		
2032	11.811	-2.650	3.450		
2033	13.045	2.300	3.450		
2034	12.725	2.300	3.450		
2035	12.405	2.300	3.450		
2036	12.084	2.300	3.450		
2037	11.764	2.300	3.450		
2038	4.100	0.000	5.850		
2039	3.500	0.000	5.850		
2040	2.900	0.000	5.850		
2041	4.553	2.300	5.750		
2042	4.643	2.200	5.750		
2043	4.271	2.300	5.750		
2044	3.427	2.300	5.750		
2045	2.863	2.300	5.750		
2046	8.575	0.000	4.650		
2047	8.575	2.300	4.650		

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Mesh Generation

Structural Points

Number	X[m]	Y[m]	Z[m]	Support Conditions	Designation
2048	8.025	-0.350	2.250		
2049	8.025	-2.650	2.250		
2050	4.365	13.850	5.750		
2051	3.145	13.850	5.750		
2052	2.582	13.850	5.750		
2053	4.553	13.850	5.750		
2054	8.025	16.500	2.250		
2055	8.025	18.800	2.250		
2056	8.575	16.150	4.650		
2057	8.575	13.850	4.650		
2058	3.500	16.150	5.850		
2059	2.900	16.150	5.850		
2060	13.064	18.800	3.450		
2061	12.751	18.800	3.450		
2062	12.438	18.800	3.450		
2063	12.124	18.800	3.450		
2064	11.811	18.800	3.450		
2065	13.045	13.850	3.450		
2066	12.725	13.850	3.450		
2067	12.405	13.850	3.450		
2068	12.084	13.850	3.450		
2069	11.764	13.850	3.450		
2070	13.691	-2.650	3.450		
2071	13.378	-2.650	3.450		
2072	13.686	2.300	3.450		
2073	13.366	2.300	3.450		
2074	4.400	0.000	5.850		
2075	3.800	0.000	5.850		
2076	3.708	2.300	5.750		
2077	7.725	-0.350	2.250		
2078	7.725	-2.650	2.250		
2079	3.990	13.850	5.750		
2080	3.427	13.850	5.750		
2081	2.863	13.850	5.750		
2082	7.725	16.500	2.250		
2083	7.725	18.800	2.250		
2084	3.800	16.150	5.850		
2085	13.691	18.800	3.450		
2086	13.378	18.800	3.450		
2087	13.686	13.850	3.450		
2088	13.366	13.850	3.450		
2089	4.700	0.000	5.850		
2090	4.600	0.100	5.750		
2091	4.271	13.850	5.750		
2092	3.708	13.850	5.750		
2093	4.100	16.150	5.850		
2094	4.400	16.150	5.850		
2095	4.700	16.150	5.850		
2096	4.600	16.050	5.750		
2097	4.600	2.200	5.750		
2098	4.459	2.300	5.750		
2099	4.600	13.950	5.750		
2100	4.459	13.850	5.750		

Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
1	1565	1637		BEAM	7	1			Line
	1637	1641		BEAM	7	1			Line
	1641	1646		BEAM	7	1			Line

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Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
	1646	1633		BEAM	7	1			Line
2	1564	1638		BEAM	7	1			Line
	1638	1650		BEAM	7	1			Line
	1650	1642		BEAM	7	1			Line
	1642	1647		BEAM	7	1			Line
	1647	1634		BEAM	7	1			Line
3	1557	1639		BEAM	7	1			Line
	1639	1635		BEAM	7	1			Line
4	1560	1640		BEAM	7	1			Line
	1640	1645		BEAM	7	1			Line
	1645	1649		BEAM	7	1			Line
	1649	1636		BEAM	7	1			Line
5	1637	1638		BEAM	3	1			Line
6	1638	1639		BEAM	3	1			Line
7	1639	1640		BEAM	3	1			Line
8	1640	1637		BEAM	3	1			Line
9	1641	1642		BEAM	3	1			Line
10	1549	1654		BEAM	7	1			Line
	1654	1658		BEAM	7	1			Line
	1658	1662		BEAM	7	1			Line
	1662	1643		BEAM	7	1			Line
11	1644	1645		BEAM	3	1			Line
12	1645	1641		BEAM	3	1			Line
13	1646	1647		BEAM	3	1			Line
14	1647	1648		BEAM	3	1			Line
15	1648	1649		BEAM	3	1			Line
16	1649	1646		BEAM	3	1			Line
17	1635	1004		BEAM	5	1			Line
	1004	1001		BEAM	5	1			Line
	1001	1650		BEAM	5	1			Line
18	1340	1655		BEAM	7	1			Line
	1655	1651		BEAM	7	1			Line
19	1197	1656		BEAM	7	1			Line
	1656	1666		BEAM	7	1			Line
	1666	1660		BEAM	7	1			Line
	1660	1664		BEAM	7	1			Line
	1664	1652		BEAM	7	1			Line
20	1200	1657		BEAM	7	1			Line
	1657	1661		BEAM	7	1			Line
	1661	1665		BEAM	7	1			Line
	1665	1653		BEAM	7	1			Line
21	1654	1655		BEAM	3	1			Line
22	1655	1656		BEAM	3	1			Line
23	1656	1657		BEAM	3	1			Line
24	1657	1654		BEAM	3	1			Line
25	1658	1659		BEAM	3	1			Line
26	1660	1661		BEAM	3	1			Line
27	1661	1658		BEAM	3	1			Line
28	1662	1663		BEAM	3	1			Line
29	1663	1664		BEAM	3	1			Line
30	1664	1665		BEAM	3	1			Line
31	1665	1662		BEAM	3	1			Line
32	1666	1469		BEAM	5	1			Line
	1469	1472		BEAM	5	1			Line
	1472	1651		BEAM	5	1			Line
33	1644	1989		BEAM	4	1			Line
	1989	1988		BEAM	4	1			Line
	1988	1987		BEAM	4	1			Line
	1987	1986		BEAM	4	1			Line

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Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
	1986	1985		BEAM	4	1			Line
	1985	1984		BEAM	4	1			Line
	1984	1983		BEAM	4	1			Line
	1983	1982		BEAM	4	1			Line
	1982	1981		BEAM	4	1			Line
	1981	1980		BEAM	4	1			Line
	1980	1979		BEAM	4	1			Line
	1979	1978		BEAM	4	1			Line
	1978	1977		BEAM	4	1			Line
	1977	1976		BEAM	4	1			Line
	1976	1975		BEAM	4	1			Line
	1975	1974		BEAM	4	1			Line
	1974	1973		BEAM	4	1			Line
	1973	1972		BEAM	4	1			Line
	1972	1971		BEAM	4	1			Line
	1971	1970		BEAM	4	1			Line
	1970	1969		BEAM	4	1			Line
	1969	1968		BEAM	4	1			Line
	1968	1967		BEAM	4	1			Line
	1967	1966		BEAM	4	1			Line
	1966	1965		BEAM	4	1			Line
	1965	1964		BEAM	4	1			Line
	1964	1963		BEAM	4	1			Line
	1963	1962		BEAM	4	1			Line
	1962	1961		BEAM	4	1			Line
	1961	1960		BEAM	4	1			Line
	1960	1959		BEAM	4	1			Line
	148	153		BEAM	4	1			Line
34	12	2027		BEAM	4	1			Line
	2027	2026		BEAM	4	1			Line
	2026	2025		BEAM	4	1			Line
	2025	2024		BEAM	4	1			Line
	2024	2023		BEAM	4	1			Line
	2023	2022		BEAM	4	1			Line
	2022	2021		BEAM	4	1			Line
	2021	2020		BEAM	4	1			Line
	2020	2019		BEAM	4	1			Line
	2019	2018		BEAM	4	1			Line
	2018	2017		BEAM	4	1			Line
	2017	2016		BEAM	4	1			Line
	2016	2015		BEAM	4	1			Line
	2015	2014		BEAM	4	1			Line
	2014	2013		BEAM	4	1			Line
	2013	2012		BEAM	4	1			Line
	2012	2011		BEAM	4	1			Line
	2011	2010		BEAM	4	1			Line
	2010	2009		BEAM	4	1			Line
	2009	2008		BEAM	4	1			Line
	2008	2007		BEAM	4	1			Line
	2007	2006		BEAM	4	1			Line
	2006	2005		BEAM	4	1			Line
	2005	2004		BEAM	4	1			Line
	2004	2003		BEAM	4	1			Line
	2003	2002		BEAM	4	1			Line
	2002	2001		BEAM	4	1			Line
	2001	2000		BEAM	4	1			Line
	2000	1999		BEAM	4	1			Line
	1999	1998		BEAM	4	1			Line
	1998	1997		BEAM	4	1			Line

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Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
	148	153		BEAM	4	1			Line
35	1642	1914		BEAM	4	1			Line
	1914	2040		BEAM	4	1			Line
	2040	1913		BEAM	4	1			Line
	1913	2039		BEAM	4	1			Line
	2039	2075		BEAM	4	1			Line
	2075	2038		BEAM	4	1			Line
	2038	2074		BEAM	4	1			Line
	2074	78		BEAM	4	1			Line
	78	2089		BEAM	4	1			Line
	2089	13		BEAM	4	1			Line
36	1667	1919		BEAM	4	1			Line
	1919	20		BEAM	4	1			Line
	20	19		BEAM	4	1			Line
	19	18		BEAM	4	1			Line
	18	17		BEAM	4	1			Line
	17	16		BEAM	4	1			Line
	16	15		BEAM	4	1			Line
	15	14		BEAM	4	1			Line
	14	13		BEAM	4	1			Line
37	1667	1922		BEAM	4	1			Line
	1922	1921		BEAM	4	1			Line
	1921	1920		BEAM	4	1			Line
	1920	2046		BEAM	4	1			Line
	2046	29		BEAM	4	1			Line
38	37	36		BEAM	4	1			Line
	36	35		BEAM	4	1			Line
	35	34		BEAM	4	1			Line
	34	33		BEAM	4	1			Line
	33	32		BEAM	4	1			Line
	32	31		BEAM	4	1			Line
	31	30		BEAM	4	1			Line
	30	29		BEAM	4	1			Line
39	8	6		BEAM	4	1			Line
40	40	6		BEAM	4	1			Line
41	1668	1927		BEAM	4	1			Line
	1927	47		BEAM	4	1			Line
	47	46		BEAM	4	1			Line
	46	45		BEAM	4	1			Line
	45	44		BEAM	4	1			Line
	44	43		BEAM	4	1			Line
	43	42		BEAM	4	1			Line
	42	41		BEAM	4	1			Line
	41	40		BEAM	4	1			Line
42	1668	1929		BEAM	4	1			Line
	1929	1928		BEAM	4	1			Line
	1928	2048		BEAM	4	1			Line
	2048	2077		BEAM	4	1			Line
	2077	54		BEAM	4	1			Line
43	165	60		BEAM	4	1			Line
	60	59		BEAM	4	1			Line
	59	58		BEAM	4	1			Line
	58	57		BEAM	4	1			Line
	57	56		BEAM	4	1			Line
	56	55		BEAM	4	1			Line
	55	54		BEAM	4	1			Line
44	1643	1675		BEAM	9	1			Line
	1675	1669		BEAM	9	1			Line
45	7	1716		BEAM	5	1			Line

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Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
	1716	1714		BEAM	5	1			Line
	1714	1712		BEAM	5	1			Line
	1712	1710		BEAM	5	1			Line
	1710	1708		BEAM	5	1			Line
	1708	1706		BEAM	5	1			Line
	1706	1704		BEAM	5	1			Line
	1704	1		BEAM	5	1			Line
46	1653	1676		BEAM	9	1			Line
	1676	1652		BEAM	9	1			Line
47	48	4		BEAM	4	1			Line
	4	2032		BEAM	4	1			Line
	2032	2031		BEAM	4	1			Line
	2031	2030		BEAM	4	1			Line
	2030	2029		BEAM	4	1			Line
	2029	2028		BEAM	4	1			Line
	2028	2071		BEAM	4	1			Line
	2071	2070		BEAM	4	1			Line
	2070	1670		BEAM	4	1			Line
48	1671	79		BEAM	4	1			Line
49	70	10		BEAM	4	1			Line
	10	2037		BEAM	4	1			Line
	2037	2036		BEAM	4	1			Line
	2036	2035		BEAM	4	1			Line
	2035	2034		BEAM	4	1			Line
	2034	2033		BEAM	4	1			Line
	2033	2073		BEAM	4	1			Line
	2073	2072		BEAM	4	1			Line
	2072	1671		BEAM	4	1			Line
50	70	69		BEAM	4	1			Line
	69	68		BEAM	4	1			Line
	68	67		BEAM	4	1			Line
	67	66		BEAM	4	1			Line
	66	65		BEAM	4	1			Line
	65	64		BEAM	4	1			Line
	64	63		BEAM	4	1			Line
	63	62		BEAM	4	1			Line
51	1672	1926		BEAM	4	1			Line
	1926	1925		BEAM	4	1			Line
	1925	1924		BEAM	4	1			Line
	1924	2047		BEAM	4	1			Line
	2047	62		BEAM	4	1			Line
52	1672	1923		BEAM	4	1			Line
	1923	28		BEAM	4	1			Line
	28	27		BEAM	4	1			Line
	27	26		BEAM	4	1			Line
	26	25		BEAM	4	1			Line
	25	24		BEAM	4	1			Line
	24	23		BEAM	4	1			Line
	23	22		BEAM	4	1			Line
	22	21		BEAM	4	1			Line
53	21	12		BEAM	4	1			Line
54	1635	1918		BEAM	5	1			Line
	1918	2045		BEAM	5	1			Line
	2045	1917		BEAM	5	1			Line
	1917	2044		BEAM	5	1			Line
	2044	2076		BEAM	5	1			Line
	2076	1916		BEAM	5	1			Line
	1916	2043		BEAM	5	1			Line
	2043	1915		BEAM	5	1			Line

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Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
	1915	2098		BEAM	5	1			Line
	2098	1833		BEAM	5	1			Line
	1833	2041		BEAM	5	1			Line
	2041	11		BEAM	5	1			Line
55	37	8		BEAM	4	1			Line
56	5	1911		BEAM	5	1			Line
	1911	1673		BEAM	5	1			Line
	1673	3		BEAM	5	1			Line
57	9	1678		BEAM	5	1			Line
	1678	1131		BEAM	5	1			Line
	1131	1130		BEAM	5	1			Line
	1130	7		BEAM	5	1			Line
58	1673	1674		BEAM	8	1			Line
59	1675	1676		BEAM	9	1			Line
60	1633	1685		BEAM	9	1			Line
	1685	1634		BEAM	9	1			Line
61	1677	1678		BEAM	8	1			Line
62	61	2090		BEAM	5	1			Line
	2090	2097		BEAM	5	1			Line
	2097	11		BEAM	5	1			Line
63	1001	1688							Line
	1688	1690							Line
	1690	1692							Line
	1692	1694							Line
	1694	1696							Line
	1696	1698							Line
	1698	1700							Line
	1700	2090							Line
	2090	1702							Line
	1702	1002							Line
64	1002	1006							Line
65	1006	1010							Line
66	1010	1014							Line
67	1014	1018							Line
68	1018	1022							Line
69	1022	1026							Line
70	1026	1030							Line
71	1030	1034							Line
72	1034	1038							Line
73	1038	1042							Line
74	1042	1046							Line
75	1046	1050							Line
76	1050	1054							Line
77	1054	1058							Line
78	1058	1062							Line
79	1642	1914		BEAM	4	1			Line
	1914	2040		BEAM	4	1			Line
	2040	1913		BEAM	4	1			Line
	1913	2039		BEAM	4	1			Line
	2039	2075		BEAM	4	1			Line
	2075	2038		BEAM	4	1			Line
	2038	2074		BEAM	4	1			Line
	2074	78		BEAM	4	1			Line
	78	2089		BEAM	4	1			Line
	2089	13		BEAM	4	1			Line
80	14	13		BEAM	4	1			Line
81	15	14		BEAM	4	1			Line
82	16	15		BEAM	4	1			Line
83	17	16		BEAM	4	1			Line

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Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
84	18	17		BEAM	4	1			Line
85	19	18		BEAM	4	1			Line
86	20	19		BEAM	4	1			Line
87	1919	20		BEAM	4	1			Line
	1667	1919		BEAM	4	1			Line
88	1004	1687							Line
	1687	1689							Line
	1689	1691							Line
	1691	1693							Line
	1693	1695							Line
	1695	1697							Line
	1697	1699							Line
	1699	1546							Line
	1546	2097							Line
	2097	2042							Line
	2042	1701							Line
	1701	1003							Line
89	1007	1011							Line
90	1015	1019							Line
91	1023	1027							Line
92	1031	1035							Line
93	1039	1043							Line
94	1047	1051							Line
95	1055	1059							Line
96	1635	1918		BEAM	5	1			Line
	1918	2045		BEAM	5	1			Line
	2045	1917		BEAM	5	1			Line
	1917	2044		BEAM	5	1			Line
	2044	2076		BEAM	5	1			Line
	2076	1916		BEAM	5	1			Line
	1916	2043		BEAM	5	1			Line
	2043	1915		BEAM	5	1			Line
	1915	2098		BEAM	5	1			Line
	2098	1833		BEAM	5	1			Line
	1833	2041		BEAM	5	1			Line
	2041	11		BEAM	5	1			Line
97	22	21		BEAM	4	1			Line
98	23	22		BEAM	4	1			Line
99	24	23		BEAM	4	1			Line
100	25	24		BEAM	4	1			Line
101	26	25		BEAM	4	1			Line
102	27	26		BEAM	4	1			Line
103	28	27		BEAM	4	1			Line
104	1003	1007							Line
105	1011	1015							Line
106	1019	1023							Line
107	1027	1031							Line
108	1035	1039							Line
109	1043	1047							Line
110	1051	1055							Line
111	1059	1063							Line
112	1062	1740							Line
	1740	1679							Line
113	1679	1738							Line
	1738	1732							Line
	1732	1734							Line
	1734	1736							Line
	1736	1066							Line
114	1919	20		BEAM	4	1			Line

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Mesh Generation

Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
	1667	1919		BEAM	4	1			Line
115	1667	1922		BEAM	4	1			Line
	1922	1921		BEAM	4	1			Line
	1921	1920		BEAM	4	1			Line
	1920	2046		BEAM	4	1			Line
	2046	29		BEAM	4	1			Line
116	1063	1739							Line
	1739	1680							Line
117	1680	1737							Line
	1737	1731							Line
	1731	1733							Line
	1733	1735							Line
	1735	1067							Line
118	1923	28		BEAM	4	1			Line
	1672	1923		BEAM	4	1			Line
119	1672	1926		BEAM	4	1			Line
	1926	1925		BEAM	4	1			Line
	1925	1924		BEAM	4	1			Line
	1924	2047		BEAM	4	1			Line
	2047	62		BEAM	4	1			Line
120	30	29		BEAM	4	1			Line
121	31	30		BEAM	4	1			Line
122	32	31		BEAM	4	1			Line
123	33	32		BEAM	4	1			Line
124	34	33		BEAM	4	1			Line
125	35	34		BEAM	4	1			Line
126	36	35		BEAM	4	1			Line
127	37	36		BEAM	4	1			Line
128	1066	1070							Line
129	1070	1074							Line
130	1074	1078							Line
131	1078	1082							Line
132	1082	1085							Line
133	1085	1090							Line
134	1090	1094							Line
135	1094	1098							Line
136	1098	1102							Line
137	1102	1106							Line
138	1106	1110							Line
139	1110	1114							Line
140	1114	1118							Line
141	1118	1122							Line
142	1122	1126							Line
143	1126	1130							Line
144	1211	1215							Line
145	1219	1223							Line
146	1227	1231							Line
147	1235	1239							Line
148	1243	1247							Line
149	1251	1255							Line
150	49	48		BEAM	4	1			Line
151	50	49		BEAM	4	1			Line
152	51	50		BEAM	4	1			Line
153	52	51		BEAM	4	1			Line
154	53	52		BEAM	4	1			Line
155	38	53		BEAM	4	1			Line
156	39	38		BEAM	4	1			Line
157	1204	1203							Line
158	1207	1211							Line

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Mesh Generation

Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
159	1215	1219							Line
160	1223	1227							Line
161	1231	1235							Line
162	1239	1243							Line
163	1247	1251							Line
164	1255	1136							Line
165	1133	1745							Line
	1745	1681							Line
166	1681	1743							Line
	1743	1741							Line
	1741	1747							Line
	1747	1749							Line
	1749	1134							Line
167	1927	47		BEAM	4	1			Line
	1668	1927		BEAM	4	1			Line
168	1668	1929		BEAM	4	1			Line
	1929	1928		BEAM	4	1			Line
	1928	2048		BEAM	4	1			Line
	2048	2077		BEAM	4	1			Line
	2077	54		BEAM	4	1			Line
169	1136	1746							Line
	1746	1682							Line
170	1682	1744							Line
	1744	1742							Line
	1742	1748							Line
	1748	1750							Line
	1750	1135							Line
171	1930	39		BEAM	4	1			Line
	1683	1930		BEAM	4	1			Line
172	1683	1932		BEAM	4	1			Line
	1932	1931		BEAM	4	1			Line
	1931	2049		BEAM	4	1			Line
	2049	2078		BEAM	4	1			Line
	2078	71		BEAM	4	1			Line
173	55	54		BEAM	4	1			Line
174	56	55		BEAM	4	1			Line
175	57	56		BEAM	4	1			Line
176	58	57		BEAM	4	1			Line
177	59	58		BEAM	4	1			Line
178	60	59		BEAM	4	1			Line
179	165	60		BEAM	4	1			Line
180	1636	1686		BEAM	9	1			Line
	1686	1684		BEAM	9	1			Line
181	1134	1138							Line
182	1138	1142							Line
183	1142	1146							Line
184	1146	1150							Line
185	1150	1153							Line
186	1153	1158							Line
187	1158	1162							Line
188	1162	1166							Line
189	1166	1170							Line
190	1170	1174							Line
191	1174	1178							Line
192	1178	1182							Line
193	1182	1186							Line
194	1685	1686		BEAM	9	1			Line
197	1201	1202							Line
198	1202	1206							Line

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Mesh Generation

Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
199	1206	1210							Line
200	1210	1214							Line
201	1214	1218							Line
202	1218	1222							Line
203	1222	1226							Line
204	1226	1230							Line
205	1230	1234							Line
206	1234	1238							Line
207	1238	1242							Line
208	1242	1246							Line
209	1246	1250							Line
210	1250	1254							Line
211	1254	1133							Line
212	41	40		BEAM	4	1			Line
213	42	41		BEAM	4	1			Line
214	43	42		BEAM	4	1			Line
215	44	43		BEAM	4	1			Line
216	45	44		BEAM	4	1			Line
217	46	45		BEAM	4	1			Line
218	47	46		BEAM	4	1			Line
219	1927	47		BEAM	4	1			Line
	1668	1927		BEAM	4	1			Line
220	1203	1207							Line
222	1683	1932		BEAM	4	1			Line
	1932	1931		BEAM	4	1			Line
	1931	2049		BEAM	4	1			Line
	2049	2078		BEAM	4	1			Line
	2078	71		BEAM	4	1			Line
223	1683	1930		BEAM	4	1			Line
	1930	39		BEAM	4	1			Line
	39	38		BEAM	4	1			Line
	38	53		BEAM	4	1			Line
	53	52		BEAM	4	1			Line
	52	51		BEAM	4	1			Line
	51	50		BEAM	4	1			Line
	50	49		BEAM	4	1			Line
	49	48		BEAM	4	1			Line
224	63	62		BEAM	4	1			Line
225	64	63		BEAM	4	1			Line
226	65	64		BEAM	4	1			Line
227	66	65		BEAM	4	1			Line
228	67	66		BEAM	4	1			Line
229	68	67		BEAM	4	1			Line
230	69	68		BEAM	4	1			Line
231	70	69		BEAM	4	1			Line
232	1067	1071							Line
233	1071	1075							Line
234	1075	1079							Line
235	1079	1083							Line
236	1083	1086							Line
237	1086	1091							Line
238	1091	1095							Line
239	1095	1099							Line
240	1099	1103							Line
241	1103	1107							Line
242	1107	1111							Line
243	1111	1115							Line
244	1115	1119							Line
245	1119	1123							Line

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Mesh Generation

Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
246	1123	1127							Line
247	1127	1131							Line
248	72	71		BEAM	4	1			Line
249	73	72		BEAM	4	1			Line
250	74	73		BEAM	4	1			Line
251	75	74		BEAM	4	1			Line
252	76	75		BEAM	4	1			Line
253	77	76		BEAM	4	1			Line
256	1135	1139							Line
257	1139	1143							Line
258	1143	1147							Line
259	1147	1151							Line
260	1151	1154							Line
261	1154	1159							Line
262	1159	1163							Line
263	1163	1167							Line
264	1167	1171							Line
265	1171	1175							Line
266	1175	1179							Line
267	1179	1183							Line
268	1183	1187							Line
272	5	1729		BEAM	5	1			Line
	1729	1727		BEAM	5	1			Line
	1727	1725		BEAM	5	1			Line
	1725	1723		BEAM	5	1			Line
	1723	1721		BEAM	5	1			Line
	1721	1719		BEAM	5	1			Line
	1719	1717		BEAM	5	1			Line
	1717	2		BEAM	5	1			Line
273	1131	1912							Line
	1912	1715							Line
	1715	1713							Line
	1713	1711							Line
	1711	1709							Line
	1709	1707							Line
	1707	1705							Line
	1705	1703							Line
	1703	1262							Line
274	1262	1							Line
275	2	1267							Line
276	1204	1911							Line
	1911	1730							Line
	1730	1728							Line
	1728	1726							Line
	1726	1724							Line
	1724	1722							Line
	1722	1720							Line
	1720	1718							Line
	1718	1267							Line
277	1	2							Line
278	7	5							Line
279	1687	1688		BEAM	6	1			Line
280	1689	1690		BEAM	6	1			Line
281	1691	1692		BEAM	6	1			Line
282	1693	1694		BEAM	6	1			Line
283	1695	1696		BEAM	6	1			Line
284	1697	1698		BEAM	6	1			Line
285	1699	1700		BEAM	6	1			Line
286	1701	1702		BEAM	6	1			Line

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Mesh Generation

Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
287	1703	1704		BEAM	6	1			Line
288	1705	1706		BEAM	6	1			Line
289	1707	1708		BEAM	6	1			Line
290	1709	1710		BEAM	6	1			Line
291	1711	1712		BEAM	6	1			Line
292	1713	1714		BEAM	6	1			Line
293	1715	1716		BEAM	6	1			Line
294	1717	1718		BEAM	6	1			Line
295	1719	1720		BEAM	6	1			Line
296	1721	1722		BEAM	6	1			Line
297	1723	1724		BEAM	6	1			Line
298	1725	1726		BEAM	6	1			Line
299	1727	1728		BEAM	6	1			Line
300	1729	1730		BEAM	6	1			Line
301	1731	1732		BEAM	6	1			Line
302	1733	1734		BEAM	6	1			Line
303	1735	1736		BEAM	6	1			Line
304	1737	1738		BEAM	6	1			Line
305	1739	1740		BEAM	6	1			Line
306	1741	1742		BEAM	6	1			Line
307	1743	1744		BEAM	6	1			Line
308	1745	1746		BEAM	6	1			Line
309	1747	1748		BEAM	6	1			Line
310	1749	1750		BEAM	6	1			Line
311	1483	1487							Line
312	1491	1495							Line
313	1499	1503							Line
314	1507	1511							Line
315	1515	1519							Line
316	1523	1527							Line
317	1651	2052		BEAM	5	1			Line
	2052	2081		BEAM	5	1			Line
	2081	2051		BEAM	5	1			Line
	2051	2080		BEAM	5	1			Line
	2080	2092		BEAM	5	1			Line
	2092	2079		BEAM	5	1			Line
	2079	2091		BEAM	5	1			Line
	2091	2050		BEAM	5	1			Line
	2050	2100		BEAM	5	1			Line
	2100	1834		BEAM	5	1			Line
	1834	2053		BEAM	5	1			Line
	2053	156		BEAM	5	1			Line
318	135	134		BEAM	4	1			Line
319	136	135		BEAM	4	1			Line
320	137	136		BEAM	4	1			Line
321	138	137		BEAM	4	1			Line
322	139	138		BEAM	4	1			Line
323	124	139		BEAM	4	1			Line
324	125	124		BEAM	4	1			Line
325	122	121		BEAM	4	1			Line
328	1344	1343							Line
329	1347	1351							Line
330	1355	1359							Line
331	1363	1367							Line
332	1371	1375							Line
333	1379	1383							Line
334	1387	1391							Line
335	1395	1276							Line
336	1273	1823							Line

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Mesh Generation

Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
	1823	1751							Line
337	1751	1821							Line
	1821	1819							Line
	1819	1825							Line
	1825	1827							Line
	1827	1274							Line
338	1934	90		BEAM	4	1			Line
	1752	1934		BEAM	4	1			Line
339	1752	1936		BEAM	4	1			Line
	1936	1935		BEAM	4	1			Line
	1935	2054		BEAM	4	1			Line
	2054	2082		BEAM	4	1			Line
	2082	99		BEAM	4	1			Line
340	1276	1824							Line
	1824	1753							Line
341	1753	1822							Line
	1822	1820							Line
	1820	1826							Line
	1826	1828							Line
	1828	1275							Line
342	1937	98		BEAM	4	1			Line
	1754	1937		BEAM	4	1			Line
343	1754	1939		BEAM	4	1			Line
	1939	1938		BEAM	4	1			Line
	1938	2055		BEAM	4	1			Line
	2055	2083		BEAM	4	1			Line
	2083	116		BEAM	4	1			Line
344	100	99		BEAM	4	1			Line
345	101	100		BEAM	4	1			Line
346	102	101		BEAM	4	1			Line
347	103	102		BEAM	4	1			Line
348	104	103		BEAM	4	1			Line
349	105	104		BEAM	4	1			Line
352	1274	1278							Line
353	1278	1282							Line
354	1282	1286							Line
355	1286	1290							Line
356	1290	1293							Line
357	1293	1298							Line
358	1298	1302							Line
359	1302	1306							Line
360	1306	1310							Line
361	1310	1314							Line
362	1314	1318							Line
363	1318	1322							Line
364	1322	1326							Line
367	1752	1934		BEAM	4	1			Line
	1934	90		BEAM	4	1			Line
	90	89		BEAM	4	1			Line
	89	88		BEAM	4	1			Line
	88	87		BEAM	4	1			Line
	87	86		BEAM	4	1			Line
	86	85		BEAM	4	1			Line
	85	84		BEAM	4	1			Line
	84	83		BEAM	4	1			Line
368	1752	1936		BEAM	4	1			Line
	1936	1935		BEAM	4	1			Line
	1935	2054		BEAM	4	1			Line
	2054	2082		BEAM	4	1			Line

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Mesh Generation

Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
	2082	99		BEAM	4	1			Line
369	105	104		BEAM	4	1			Line
	104	103		BEAM	4	1			Line
	103	102		BEAM	4	1			Line
	102	101		BEAM	4	1			Line
	101	100		BEAM	4	1			Line
	100	99		BEAM	4	1			Line
370	162	122		BEAM	4	1			Line
	122	121		BEAM	4	1			Line
	121	120		BEAM	4	1			Line
	120	119		BEAM	4	1			Line
	119	118		BEAM	4	1			Line
	118	117		BEAM	4	1			Line
	117	116		BEAM	4	1			Line
371	1754	1939		BEAM	4	1			Line
	1939	1938		BEAM	4	1			Line
	1938	2055		BEAM	4	1			Line
	2055	2083		BEAM	4	1			Line
	2083	116		BEAM	4	1			Line
372	1754	1937		BEAM	4	1			Line
	1937	98		BEAM	4	1			Line
	98	97		BEAM	4	1			Line
	97	96		BEAM	4	1			Line
	96	95		BEAM	4	1			Line
	95	94		BEAM	4	1			Line
	94	93		BEAM	4	1			Line
	93	92		BEAM	4	1			Line
	92	91		BEAM	4	1			Line
373	1341	1342							Line
374	1342	1346							Line
375	1346	1350							Line
376	1350	1354							Line
377	1354	1358							Line
378	1358	1362							Line
379	1362	1366							Line
380	1366	1370							Line
381	1370	1374							Line
382	1374	1378							Line
383	1378	1382							Line
384	1382	1386							Line
385	1386	1390							Line
386	1390	1394							Line
387	1394	1273							Line
388	84	83		BEAM	4	1			Line
389	85	84		BEAM	4	1			Line
390	86	85		BEAM	4	1			Line
391	87	86		BEAM	4	1			Line
392	88	87		BEAM	4	1			Line
393	89	88		BEAM	4	1			Line
394	90	89		BEAM	4	1			Line
395	1934	90		BEAM	4	1			Line
	1752	1934		BEAM	4	1			Line
396	1343	1347							Line
397	1351	1355							Line
398	1359	1363							Line
399	1367	1371							Line
400	1375	1379							Line
401	1383	1387							Line
402	1391	1395							Line

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Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
403	92	91		BEAM	4	1			Line
404	93	92		BEAM	4	1			Line
405	94	93		BEAM	4	1			Line
406	95	94		BEAM	4	1			Line
407	96	95		BEAM	4	1			Line
408	97	96		BEAM	4	1			Line
409	98	97		BEAM	4	1			Line
410	167	77		BEAM	4	1			Line
	77	76		BEAM	4	1			Line
	76	75		BEAM	4	1			Line
	75	74		BEAM	4	1			Line
	74	73		BEAM	4	1			Line
	73	72		BEAM	4	1			Line
	72	71		BEAM	4	1			Line
411	108	107		BEAM	4	1			Line
412	115	108		BEAM	4	1			Line
413	110	109		BEAM	4	1			Line
414	111	110		BEAM	4	1			Line
415	112	111		BEAM	4	1			Line
416	113	112		BEAM	4	1			Line
417	114	113		BEAM	4	1			Line
418	1403	1407							Line
419	1407	1411							Line
420	1411	1415							Line
421	1415	1419							Line
422	1419	1422							Line
423	1422	1427							Line
424	1427	1431							Line
425	1431	1435							Line
426	1435	1439							Line
427	1439	1443							Line
428	1443	1447							Line
429	1447	1451							Line
430	1451	1455							Line
431	1455	1459							Line
432	1459	1463							Line
433	1463	1467							Line
434	109	115		BEAM	4	1			Line
435	117	116		BEAM	4	1			Line
436	118	117		BEAM	4	1			Line
437	119	118		BEAM	4	1			Line
438	120	119		BEAM	4	1			Line
439	121	120		BEAM	4	1			Line
442	1275	1279							Line
443	1279	1283							Line
444	1283	1287							Line
445	1287	1291							Line
446	1291	1294							Line
447	1294	1299							Line
448	1299	1303							Line
449	1303	1307							Line
450	1307	1311							Line
451	1311	1315							Line
452	1315	1319							Line
453	1319	1323							Line
454	1323	1327							Line
458	1471	1475							Line
459	1479	1483							Line
460	1487	1491							Line

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Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
461	1495	1499							Line
462	1503	1507							Line
463	1511	1515							Line
464	1519	1523							Line
465	1527	1404							Line
466	150	106							Line
467	1401	1818							Line
	1818	1755							Line
468	1755	1816							Line
	1816	1810							Line
	1810	1812							Line
	1812	1814							Line
	1814	1402							Line
469	1940	133		BEAM	4	1			Line
	1756	1940		BEAM	4	1			Line
470	1756	1943		BEAM	4	1			Line
	1943	1942		BEAM	4	1			Line
	1942	1941		BEAM	4	1			Line
	1941	2056		BEAM	4	1			Line
	2056	140		BEAM	4	1			Line
471	1404	1817							Line
	1817	1757							Line
472	1757	1815							Line
	1815	1809							Line
	1809	1811							Line
	1811	1813							Line
	1813	1403							Line
473	1944	125		BEAM	4	1			Line
	1758	1944		BEAM	4	1			Line
474	1758	1947		BEAM	4	1			Line
	1947	1946		BEAM	4	1			Line
	1946	1945		BEAM	4	1			Line
	1945	2057		BEAM	4	1			Line
	2057	107		BEAM	4	1			Line
475	141	140		BEAM	4	1			Line
476	142	141		BEAM	4	1			Line
477	143	142		BEAM	4	1			Line
478	144	143		BEAM	4	1			Line
479	145	144		BEAM	4	1			Line
480	146	145		BEAM	4	1			Line
481	147	146		BEAM	4	1			Line
482	148	147		BEAM	4	1			Line
483	1402	1406							Line
484	1406	1410							Line
485	1410	1414							Line
486	1414	1418							Line
487	1418	1421							Line
488	1421	1426							Line
489	1426	1430							Line
490	1430	1434							Line
491	1434	1438							Line
492	1438	1442							Line
493	1442	1446							Line
494	1446	1450							Line
495	1450	1454							Line
496	1454	1458							Line
497	1458	1462							Line
498	1462	1466							Line
499	1469	1766							Line

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Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
	1766	1768							Line
	1768	1770							Line
	1770	1772							Line
	1772	1774							Line
	1774	1776							Line
	1776	1778							Line
	1778	2096							Line
	2096	1780							Line
	1780	1470							Line
500	1470	1474							Line
501	1474	1478							Line
502	1478	1482							Line
503	1482	1486							Line
504	1486	1490							Line
505	1490	1494							Line
506	1494	1498							Line
507	1498	1502							Line
508	1502	1506							Line
509	1506	1510							Line
510	1510	1514							Line
511	1514	1518							Line
512	1518	1522							Line
513	1522	1526							Line
514	1526	1401							Line
515	1660	1949		BEAM	4	1			Line
	1949	2059		BEAM	4	1			Line
	2059	1948		BEAM	4	1			Line
	1948	2058		BEAM	4	1			Line
	2058	2084		BEAM	4	1			Line
	2084	2093		BEAM	4	1			Line
	2093	2094		BEAM	4	1			Line
	2094	159		BEAM	4	1			Line
	159	2095		BEAM	4	1			Line
	2095	126		BEAM	4	1			Line
516	127	126		BEAM	4	1			Line
517	128	127		BEAM	4	1			Line
518	129	128		BEAM	4	1			Line
519	130	129		BEAM	4	1			Line
520	131	130		BEAM	4	1			Line
521	132	131		BEAM	4	1			Line
522	133	132		BEAM	4	1			Line
523	1940	133		BEAM	4	1			Line
	1756	1940		BEAM	4	1			Line
524	1472	1765							Line
	1765	1767							Line
	1767	1769							Line
	1769	1771							Line
	1771	1773							Line
	1773	1775							Line
	1775	1777							Line
	1777	1547							Line
	1547	2099							Line
	2099	1933							Line
	1933	1779							Line
	1779	1471							Line
525	1475	1479							Line
526	1660	1949		BEAM	4	1			Line
	1949	2059		BEAM	4	1			Line
	2059	1948		BEAM	4	1			Line

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Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
	1948	2058		BEAM	4	1			Line
	2058	2084		BEAM	4	1			Line
	2084	2093		BEAM	4	1			Line
	2093	2094		BEAM	4	1			Line
	2094	159		BEAM	4	1			Line
	159	2095		BEAM	4	1			Line
	2095	126		BEAM	4	1			Line
527	1756	1940		BEAM	4	1			Line
	1940	133		BEAM	4	1			Line
	133	132		BEAM	4	1			Line
	132	131		BEAM	4	1			Line
	131	130		BEAM	4	1			Line
	130	129		BEAM	4	1			Line
	129	128		BEAM	4	1			Line
	128	127		BEAM	4	1			Line
	127	126		BEAM	4	1			Line
528	1756	1943		BEAM	4	1			Line
	1943	1942		BEAM	4	1			Line
	1942	1941		BEAM	4	1			Line
	1941	2056		BEAM	4	1			Line
	2056	140		BEAM	4	1			Line
529	148	147		BEAM	4	1			Line
	147	146		BEAM	4	1			Line
	146	145		BEAM	4	1			Line
	145	144		BEAM	4	1			Line
	144	143		BEAM	4	1			Line
	143	142		BEAM	4	1			Line
	142	141		BEAM	4	1			Line
	141	140		BEAM	4	1			Line
530	153	149		BEAM	4	1			Line
531	83	149		BEAM	4	1			Line
532	91	82		BEAM	4	1			Line
	82	2064		BEAM	4	1			Line
	2064	2063		BEAM	4	1			Line
	2063	2062		BEAM	4	1			Line
	2062	2061		BEAM	4	1			Line
	2061	2060		BEAM	4	1			Line
	2060	2086		BEAM	4	1			Line
	2086	2085		BEAM	4	1			Line
	2085	1759		BEAM	4	1			Line
533	1760	151		BEAM	4	1			Line
534	114	155		BEAM	4	1			Line
	155	2069		BEAM	4	1			Line
	2069	2068		BEAM	4	1			Line
	2068	2067		BEAM	4	1			Line
	2067	2066		BEAM	4	1			Line
	2066	2065		BEAM	4	1			Line
	2065	2088		BEAM	4	1			Line
	2088	2087		BEAM	4	1			Line
	2087	1760		BEAM	4	1			Line
535	114	113		BEAM	4	1			Line
	113	112		BEAM	4	1			Line
	112	111		BEAM	4	1			Line
	111	110		BEAM	4	1			Line
	110	109		BEAM	4	1			Line
	109	115		BEAM	4	1			Line
	115	108		BEAM	4	1			Line
	108	107		BEAM	4	1			Line
536	1758	1947		BEAM	4	1			Line

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Mesh Generation

Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
	1947	1946		BEAM	4	1			Line
	1946	1945		BEAM	4	1			Line
	1945	2057		BEAM	4	1			Line
	2057	107		BEAM	4	1			Line
537	1758	1944		BEAM	4	1			Line
	1944	125		BEAM	4	1			Line
	125	124		BEAM	4	1			Line
	124	139		BEAM	4	1			Line
	139	138		BEAM	4	1			Line
	138	137		BEAM	4	1			Line
	137	136		BEAM	4	1			Line
	136	135		BEAM	4	1			Line
	135	134		BEAM	4	1			Line
538	134	157		BEAM	4	1			Line
539	1651	2052		BEAM	5	1			Line
	2052	2081		BEAM	5	1			Line
	2081	2051		BEAM	5	1			Line
	2051	2080		BEAM	5	1			Line
	2080	2092		BEAM	5	1			Line
	2092	2079		BEAM	5	1			Line
	2079	2091		BEAM	5	1			Line
	2091	2050		BEAM	5	1			Line
	2050	2100		BEAM	5	1			Line
	2100	1834		BEAM	5	1			Line
	1834	2053		BEAM	5	1			Line
	2053	156		BEAM	5	1			Line
540	148	153		BEAM	4	1			Line
541	106	1950		BEAM	5	1			Line
	1950	1761		BEAM	5	1			Line
	1761	81		BEAM	5	1			Line
542	154	1764		BEAM	5	1			Line
	1764	1467		BEAM	5	1			Line
	1467	1466		BEAM	5	1			Line
	1466	150		BEAM	5	1			Line
543	1761	1762		BEAM	8	1			Line
546	1763	1764		BEAM	8	1			Line
547	158	2096		BEAM	5	1			Line
	2096	2099		BEAM	5	1			Line
	2099	156		BEAM	5	1			Line
548	1765	1766		BEAM	6	1			Line
549	1767	1768		BEAM	6	1			Line
550	1769	1770		BEAM	6	1			Line
551	1771	1772		BEAM	6	1			Line
552	1773	1774		BEAM	6	1			Line
553	1775	1776		BEAM	6	1			Line
554	1777	1778		BEAM	6	1			Line
555	1779	1780		BEAM	6	1			Line
556	1781	1782		BEAM	6	1			Line
557	1783	1784		BEAM	6	1			Line
558	1785	1786		BEAM	6	1			Line
559	1787	1788		BEAM	6	1			Line
560	1789	1790		BEAM	6	1			Line
561	1791	1792		BEAM	6	1			Line
562	1793	1794		BEAM	6	1			Line
563	1795	1796		BEAM	6	1			Line
564	1797	1798		BEAM	6	1			Line
565	1799	1800		BEAM	6	1			Line
566	1801	1802		BEAM	6	1			Line
567	1803	1804		BEAM	6	1			Line

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Mesh Generation

Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
568	1805	1806		BEAM	6	1			Line
569	1807	1808		BEAM	6	1			Line
570	150	1794		BEAM	5	1			Line
	1794	1792		BEAM	5	1			Line
	1792	1790		BEAM	5	1			Line
	1790	1788		BEAM	5	1			Line
	1788	1786		BEAM	5	1			Line
	1786	1784		BEAM	5	1			Line
	1784	1782		BEAM	5	1			Line
	1782	160		BEAM	5	1			Line
571	106	1807		BEAM	5	1			Line
	1807	1805		BEAM	5	1			Line
	1805	1803		BEAM	5	1			Line
	1803	1801		BEAM	5	1			Line
	1801	1799		BEAM	5	1			Line
	1799	1797		BEAM	5	1			Line
	1797	1795		BEAM	5	1			Line
	1795	161		BEAM	5	1			Line
572	1467	1951							Line
	1951	1793							Line
	1793	1791							Line
	1791	1789							Line
	1789	1787							Line
	1787	1785							Line
	1785	1783							Line
	1783	1781							Line
	1781	1534							Line
573	1534	160							Line
574	161	1539							Line
575	1344	1950							Line
	1950	1808							Line
	1808	1806							Line
	1806	1804							Line
	1804	1802							Line
	1802	1800							Line
	1800	1798							Line
	1798	1796							Line
	1796	1539							Line
576	160	161							Line
577	1809	1810		BEAM	6	1			Line
578	1811	1812		BEAM	6	1			Line
579	1813	1814		BEAM	6	1			Line
580	1815	1816		BEAM	6	1			Line
581	1817	1818		BEAM	6	1			Line
582	1819	1820		BEAM	6	1			Line
583	1821	1822		BEAM	6	1			Line
584	1823	1824		BEAM	6	1			Line
585	1825	1826		BEAM	6	1			Line
586	1827	1828		BEAM	6	1			Line
587	1670	1829		BEAM	8	1			Line
590	1830	1671		BEAM	8	1			Line
591	1760	1831		BEAM	8	1			Line
594	1832	1759		BEAM	8	1			Line
595	1635	1909							Line
	1909	1907							Line
	1907	1905							Line
	1905	1903							Line
	1903	1901							Line
	1901	1899							Line

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Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
	1899	1897							Line
	1897	1895							Line
	1895	1893							Line
	1893	1891							Line
	1891	1889							Line
	1889	1887							Line
	1887	1885							Line
	1885	1883							Line
	1883	1881							Line
	1881	1879							Line
	1879	1877							Line
	1877	1875							Line
	1875	1873							Line
	1873	1871							Line
	1871	1869							Line
	1869	1867							Line
	1867	1865							Line
	1865	1863							Line
	1863	1861							Line
	1861	1859							Line
	1859	1857							Line
	1857	1855							Line
	1855	1853							Line
	1853	1851							Line
	1851	1849							Line
	148	153		BEAM	4	1			Line
596	1833	1910							Line
	1910	1908							Line
	1908	1906							Line
	1906	1904							Line
	1904	1902							Line
	1902	1900							Line
	1900	1898							Line
	1898	1896							Line
	1896	1894							Line
	1894	1892							Line
	1892	1890							Line
	1890	1888							Line
	1888	1886							Line
	1886	1884							Line
	1884	1882							Line
	1882	1880							Line
	1880	1878							Line
	1878	1876							Line
	1876	1874							Line
	1874	1872							Line
	1872	1870							Line
	1870	1868							Line
	1868	1866							Line
	1866	1864							Line
	1864	1862							Line
	1862	1860							Line
	1860	1858							Line
	1858	1856							Line
	1856	1854							Line
	1854	1852							Line
	1852	1850							Line
	148	153		BEAM	4	1			Line
597	1835	1836		BEAM	6	1			Line

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Mesh Generation

Structural Lines

Number	SPt-a	SPt-e	Ref	Type	SNo	Grp	Hinges-a	Hinges-e	Designation
599	1837	1838		BEAM	6	1			Line
600	1839	1840		BEAM	6	1			Line
601	1841	1842		BEAM	6	1			Line
602	1843	1844		BEAM	6	1			Line
603	1845	1846		BEAM	6	1			Line
604	1847	1848		BEAM	6	1			Line
605	1849	1850		BEAM	6	1			Line
606	1851	1852		BEAM	6	1			Line
607	1853	1854		BEAM	6	1			Line
608	1855	1856		BEAM	6	1			Line
609	1857	1858		BEAM	6	1			Line
610	1859	1860		BEAM	6	1			Line
611	1861	1862		BEAM	6	1			Line
612	1863	1864		BEAM	6	1			Line
613	1865	1866		BEAM	6	1			Line
614	1867	1868		BEAM	6	1			Line
615	1869	1870		BEAM	6	1			Line
616	1871	1872		BEAM	6	1			Line
617	1873	1874		BEAM	6	1			Line
618	1875	1876		BEAM	6	1			Line
619	1877	1878		BEAM	6	1			Line
620	1879	1880		BEAM	6	1			Line
621	1881	1882		BEAM	6	1			Line
622	1883	1884		BEAM	6	1			Line
623	1885	1886		BEAM	6	1			Line
624	1887	1888		BEAM	6	1			Line
625	1889	1890		BEAM	6	1			Line
626	1891	1892		BEAM	6	1			Line
627	1893	1894		BEAM	6	1			Line
628	1895	1896		BEAM	6	1			Line
629	1897	1898		BEAM	6	1			Line
630	1899	1900		BEAM	6	1			Line
631	1901	1902		BEAM	6	1			Line
632	1903	1904		BEAM	6	1			Line
633	1905	1906		BEAM	6	1			Line
634	1907	1908		BEAM	6	1			Line
635	1909	1910		BEAM	6	1			Line

SPt-a,SPt-e structural point start / end SNo section number
Ref reference line, reference axis Grp primary group number
Type element type

Structural Lines - Support Conditions and Elastic bedding

Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference	Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
35	1642	1914	1							
	1914	2040	1							
	2040	1913	1							
	1913	2039	1							
	2039	2075	1							
	2075	2038	1							
	2038	2074	1							
	2074	78	1							
	78	2089	1							
	2089	13	1							
36	1667	1919	1							
	1667	1919	1							
	1919	20	1							
	1919	20	1							
	20	19	1							
	19	18	1							
	18	17	1							

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Structural Lines - Support Conditions and Elastic bedding

Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference	Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
	17	16	1							
	16	15	1							
	15	14	1							
	14	13	1							
37	1667	1922	1							
	1922	1921	1							
	1921	1920	1							
	1920	2046	1							
	2046	29	1							
38	37	36	1							
	36	35	1							
	35	34	1							
	34	33	1							
	33	32	1							
	32	31	1							
	31	30	1							
	30	29	1							
41	1668	1927	1							
	1668	1927	1							
	1927	47	1							
	1927	47	1							
	47	46	1							
	46	45	1							
	45	44	1							
	44	43	1							
	43	42	1							
	42	41	1							
	41	40	1							
42	1668	1929	1							
	1929	1928	1							
	1928	2048	1							
	2048	2077	1							
	2077	54	1							
43	165	60	1							
	60	59	1							
	59	58	1							
	58	57	1							
	57	56	1							
	56	55	1							
	55	54	1							
50	70	69	1							
	69	68	1							
	68	67	1							
	67	66	1							
	66	65	1							
	65	64	1							
	64	63	1							
	63	62	1							
51	1672	1926	1							
	1926	1925	1							
	1925	1924	1							
	1924	2047	1							
	2047	62	1							
52	1672	1923	1							
	1923	28	1							
	28	27	1							
	27	26	1							
	26	25	1							
	25	24	1							

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Mesh Generation

Structural Lines - Support Conditions and Elastic bedding

Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference	Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
	24	23	1							
	23	22	1							
	22	21	1							
54	1635	1918	1							
	1918	2045	1							
	2045	1917	1							
	1917	2044	1							
	2044	2076	1							
	2076	1916	1							
	1916	2043	1							
	2043	1915	1							
	1915	2098	1							
	2098	1833	1							
	1833	2041	1							
	2041	11	1							
63	1001	1688	0		PPMM	->GLN				
	1688	1690	0		PPMM	->GLN				
	1690	1692	0		PPMM	->GLN				
	1692	1694	0		PPMM	->GLN				
	1694	1696	0		PPMM	->GLN				
	1696	1698	0		PPMM	->GLN				
	1698	1700	0		PPMM	->GLN				
	1700	2090	0		PPMM	->GLN				
	2090	1702	0		PPMM	->GLN				
	1702	1002	0		PPMM	->GLN				
64	1002	1006	0		PPMM	->GPT 13				
65	1006	1010	0		PPMM	->GLN				
66	1010	1014	0		PPMM	->GPT 14				
67	1014	1018	0		PPMM	->GLN				
68	1018	1022	0		PPMM	->GPT 15				
69	1022	1026	0		PPMM	->GLN				
70	1026	1030	0		PPMM	->GPT 16				
71	1030	1034	0		PPMM	->GLN				
72	1034	1038	0		PPMM	->GPT 17				
73	1038	1042	0		PPMM	->GLN				
74	1042	1046	0		PPMM	->GPT 18				
75	1046	1050	0		PPMM	->GLN				
76	1050	1054	0		PPMM	->GPT 19				
77	1054	1058	0		PPMM	->GLN				
78	1058	1062	0		PPMM	->GPT 20				
79	1642	1914	1							
	1914	2040	1							
	2040	1913	1							
	1913	2039	1							
	2039	2075	1							
	2075	2038	1							
	2038	2074	1							
	2074	78	1							
	78	2089	1							
	2089	13	1							
80	14	13	1							
81	15	14	1							
82	16	15	1							
83	17	16	1							
84	18	17	1							
85	19	18	1							
86	20	19	1							
87	1919	20	1							
	1919	20	1							

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Structural Lines - Support Conditions and Elastic bedding

Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference		Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
	1667	1919	1								
	1667	1919	1								
88	1004	1687	0		PPMM	->GLN					
	1687	1689	0		PPMM	->GLN					
	1689	1691	0		PPMM	->GLN					
	1691	1693	0		PPMM	->GLN					
	1693	1695	0		PPMM	->GLN					
	1695	1697	0		PPMM	->GLN					
	1697	1699	0		PPMM	->GLN					
	1699	1546	0		PPMM	->GLN					
	1546	2097	0		PPMM	->GLN					
	2097	2042	0		PPMM	->GLN					
	2042	1701	0		PPMM	->GLN					
	1701	1003	0		PPMM	->GLN					
89	1007	1011	0		PPMM	->GLN					
90	1015	1019	0		PPMM	->GLN					
91	1023	1027	0		PPMM	->GLN					
92	1031	1035	0		PPMM	->GLN					
93	1039	1043	0		PPMM	->GLN					
94	1047	1051	0		PPMM	->GLN					
95	1055	1059	0		PPMM	->GLN					
96	1635	1918	1								
	1918	2045	1								
	2045	1917	1								
	1917	2044	1								
	2044	2076	1								
	2076	1916	1								
	1916	2043	1								
	2043	1915	1								
	1915	2098	1								
	2098	1833	1								
	1833	2041	1								
	2041	11	1								
97	22	21	1								
98	23	22	1								
99	24	23	1								
100	25	24	1								
101	26	25	1								
102	27	26	1								
103	28	27	1								
104	1003	1007	0		PPMM	->GPT	21				
105	1011	1015	0		PPMM	->GPT	22				
106	1019	1023	0		PPMM	->GPT	23				
107	1027	1031	0		PPMM	->GPT	24				
108	1035	1039	0		PPMM	->GPT	25				
109	1043	1047	0		PPMM	->GPT	26				
110	1051	1055	0		PPMM	->GPT	27				
111	1059	1063	0		PPMM	->GPT	28				
112	1062	1740	0		PPMM	->GLN					
	1740	1679	0		PPMM	->GLN					
113	1679	1738	0		PPMM	->GLN					
	1738	1732	0		PPMM	->GLN					
	1732	1734	0		PPMM	->GLN					
	1734	1736	0		PPMM	->GLN					
	1736	1066	0		PPMM	->GLN					
114	1919	20	1								
	1919	20	1								
	1667	1919	1								
	1667	1919	1								

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Mesh Generation

Structural Lines - Support Conditions and Elastic bedding

Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference		Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
115	1667	1922	1								
	1922	1921	1								
	1921	1920	1								
	1920	2046	1								
	2046	29	1								
116	1063	1739	0		PPMM	->GLN					
	1739	1680	0		PPMM	->GLN					
117	1680	1737	0		PPMM	->GLN					
	1737	1731	0		PPMM	->GLN					
	1731	1733	0		PPMM	->GLN					
	1733	1735	0		PPMM	->GLN					
	1735	1067	0		PPMM	->GLN					
118	1923	28	1								
	1672	1923	1								
119	1672	1926	1								
	1926	1925	1								
	1925	1924	1								
	1924	2047	1								
	2047	62	1								
120	30	29	1								
121	31	30	1								
122	32	31	1								
123	33	32	1								
124	34	33	1								
125	35	34	1								
126	36	35	1								
127	37	36	1								
128	1066	1070	0		PPMM	->GPT	29				
129	1070	1074	0		PPMM	->GLN					
130	1074	1078	0		PPMM	->GPT	30				
131	1078	1082	0		PPMM	->GLN					
132	1082	1085	0		PPMM	->GPT	31				
133	1085	1090	0		PPMM	->GLN					
134	1090	1094	0		PPMM	->GPT	32				
135	1094	1098	0		PPMM	->GLN					
136	1098	1102	0		PPMM	->GPT	33				
137	1102	1106	0		PPMM	->GLN					
138	1106	1110	0		PPMM	->GPT	34				
139	1110	1114	0		PPMM	->GLN					
140	1114	1118	0		PPMM	->GPT	35				
141	1118	1122	0		PPMM	->GLN					
142	1122	1126	0		PPMM	->GPT	36				
143	1126	1130	0		PPMM	->GLN					
144	1211	1215	0		PPMM	->GLN					
145	1219	1223	0		PPMM	->GLN					
146	1227	1231	0		PPMM	->GLN					
147	1235	1239	0		PPMM	->GLN					
148	1243	1247	0		PPMM	->GLN					
149	1251	1255	0		PPMM	->GLN					
150	49	48	1								
151	50	49	1								
152	51	50	1								
153	52	51	1								
154	53	52	1								
155	38	53	1								
156	39	38	1								
157	1204	1203	0		PPMM	->GPT	48				
158	1207	1211	0		PPMM	->GPT	49				
159	1215	1219	0		PPMM	->GPT	50				

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Structural Lines - Support Conditions and Elastic bedding

Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference		Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
160	1223	1227	0		PPMM	->GPT	51				
161	1231	1235	0		PPMM	->GPT	52				
162	1239	1243	0		PPMM	->GPT	53				
163	1247	1251	0		PPMM	->GPT	38				
164	1255	1136	0		PPMM	->GPT	39				
165	1133	1745	0		PPMM	->GLN					
	1745	1681	0		PPMM	->GLN					
166	1681	1743	0		PPMM	->GLN					
	1743	1741	0		PPMM	->GLN					
	1741	1747	0		PPMM	->GLN					
	1747	1749	0		PPMM	->GLN					
	1749	1134	0		PPMM	->GLN					
167	1927	47	1								
	1927	47	1								
	1668	1927	1								
	1668	1927	1								
168	1668	1929	1								
	1929	1928	1								
	1928	2048	1								
	2048	2077	1								
	2077	54	1								
169	1136	1746	0		PPMM	->GLN					
	1746	1682	0		PPMM	->GLN					
170	1682	1744	0		PPMM	->GLN					
	1744	1742	0		PPMM	->GLN					
	1742	1748	0		PPMM	->GLN					
	1748	1750	0		PPMM	->GLN					
	1750	1135	0		PPMM	->GLN					
171	1930	39	1								
	1683	1930	1								
172	1683	1932	1								
	1932	1931	1								
	1931	2049	1								
	2049	2078	1								
	2078	71	1								
173	55	54	1								
174	56	55	1								
175	57	56	1								
176	58	57	1								
177	59	58	1								
178	60	59	1								
179	165	60	1								
181	1134	1138	0		PPMM	->GPT	54				
182	1138	1142	0		PPMM	->GLN					
183	1142	1146	0		PPMM	->GPT	55				
184	1146	1150	0		PPMM	->GLN					
185	1150	1153	0		PPMM	->GPT	56				
186	1153	1158	0		PPMM	->GLN					
187	1158	1162	0		PPMM	->GPT	57				
188	1162	1166	0		PPMM	->GLN					
189	1166	1170	0		PPMM	->GPT	58				
190	1170	1174	0		PPMM	->GLN					
191	1174	1178	0		PPMM	->GPT	59				
192	1178	1182	0		PPMM	->GLN					
193	1182	1186	0		PPMM	->GPT	60				
197	1201	1202	0		PPMM	->GPT	40				
198	1202	1206	0		PPMM	->GLN					
199	1206	1210	0		PPMM	->GPT	41				
200	1210	1214	0		PPMM	->GLN					

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Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference	Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
201	1214	1218	0		PPMM	->GPT 42				
202	1218	1222	0		PPMM	->GLN				
203	1222	1226	0		PPMM	->GPT 43				
204	1226	1230	0		PPMM	->GLN				
205	1230	1234	0		PPMM	->GPT 44				
206	1234	1238	0		PPMM	->GLN				
207	1238	1242	0		PPMM	->GPT 45				
208	1242	1246	0		PPMM	->GLN				
209	1246	1250	0		PPMM	->GPT 46				
210	1250	1254	0		PPMM	->GLN				
211	1254	1133	0		PPMM	->GPT 47				
212	41	40	1							
213	42	41	1							
214	43	42	1							
215	44	43	1							
216	45	44	1							
217	46	45	1							
218	47	46	1							
219	1927	47	1							
	1927	47	1							
	1668	1927	1							
	1668	1927	1							
220	1203	1207	0		PPMM	->GLN				
222	1683	1932	1							
	1932	1931	1							
	1931	2049	1							
	2049	2078	1							
	2078	71	1							
223	1683	1930	1							
	1930	39	1							
	39	38	1							
	38	53	1							
	53	52	1							
	52	51	1							
	51	50	1							
	50	49	1							
	49	48	1							
224	63	62	1							
225	64	63	1							
226	65	64	1							
227	66	65	1							
228	67	66	1							
229	68	67	1							
230	69	68	1							
231	70	69	1							
232	1067	1071	0		PPMM	->GPT 62				
233	1071	1075	0		PPMM	->GLN				
234	1075	1079	0		PPMM	->GPT 63				
235	1079	1083	0		PPMM	->GLN				
236	1083	1086	0		PPMM	->GPT 64				
237	1086	1091	0		PPMM	->GLN				
238	1091	1095	0		PPMM	->GPT 65				
239	1095	1099	0		PPMM	->GLN				
240	1099	1103	0		PPMM	->GPT 66				
241	1103	1107	0		PPMM	->GLN				
242	1107	1111	0		PPMM	->GPT 67				
243	1111	1115	0		PPMM	->GLN				
244	1115	1119	0		PPMM	->GPT 68				
245	1119	1123	0		PPMM	->GLN				

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Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference	Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
246	1123	1127	0		PPMM	->GPT 69				
247	1127	1131	0		PPMM	->GLN				
248	72	71	1							
249	73	72	1							
250	74	73	1							
251	75	74	1							
252	76	75	1							
253	77	76	1							
256	1135	1139	0		PPMM	->GPT 71				
257	1139	1143	0		PPMM	->GLN				
258	1143	1147	0		PPMM	->GPT 72				
259	1147	1151	0		PPMM	->GLN				
260	1151	1154	0		PPMM	->GPT 73				
261	1154	1159	0		PPMM	->GLN				
262	1159	1163	0		PPMM	->GPT 74				
263	1163	1167	0		PPMM	->GLN				
264	1167	1171	0		PPMM	->GPT 75				
265	1171	1175	0		PPMM	->GLN				
266	1175	1179	0		PPMM	->GPT 76				
267	1179	1183	0		PPMM	->GLN				
268	1183	1187	0		PPMM	->GPT 77				
273	1131	1912	0		PPMM	->GLN				
	1912	1715	0		PPMM	->GLN				
	1715	1713	0		PPMM	->GLN				
	1713	1711	0		PPMM	->GLN				
	1711	1709	0		PPMM	->GLN				
	1709	1707	0		PPMM	->GLN				
	1707	1705	0		PPMM	->GLN				
	1705	1703	0		PPMM	->GLN				
	1703	1262	0		PPMM	->GLN				
274	1262	1	0		PPMM	->GLN				
276	1204	1911	0		PPMM	->GLN				
	1911	1730	0		PPMM	->GLN				
	1730	1728	0		PPMM	->GLN				
	1728	1726	0		PPMM	->GLN				
	1726	1724	0		PPMM	->GLN				
	1724	1722	0		PPMM	->GLN				
	1722	1720	0		PPMM	->GLN				
	1720	1718	0		PPMM	->GLN				
	1718	1267	0		PPMM	->GLN				
278	7	5	0		PPMM	->GLN				
311	1483	1487	0		PPMM	->GLN				
312	1491	1495	0		PPMM	->GLN				
313	1499	1503	0		PPMM	->GLN				
314	1507	1511	0		PPMM	->GLN				
315	1515	1519	0		PPMM	->GLN				
316	1523	1527	0		PPMM	->GLN				
317	1651	2052	1							
	2052	2081	1							
	2081	2051	1							
	2051	2080	1							
	2080	2092	1							
	2092	2079	1							
	2079	2091	1							
	2091	2050	1							
	2050	2100	1							
	2100	1834	1							
	1834	2053	1							
	2053	156	1							

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Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference	Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
318	135	134	1							
319	136	135	1							
320	137	136	1							
321	138	137	1							
322	139	138	1							
323	124	139	1							
324	125	124	1							
325	122	121	1							
328	1344	1343	0		PPMM	->GPT 91				
329	1347	1351	0		PPMM	->GPT 92				
330	1355	1359	0		PPMM	->GPT 93				
331	1363	1367	0		PPMM	->GPT 94				
332	1371	1375	0		PPMM	->GPT 95				
333	1379	1383	0		PPMM	->GPT 96				
334	1387	1391	0		PPMM	->GPT 97				
335	1395	1276	0		PPMM	->GPT 98				
336	1273	1823	0		PPMM	->GLN				
	1823	1751	0		PPMM	->GLN				
337	1751	1821	0		PPMM	->GLN				
	1821	1819	0		PPMM	->GLN				
	1819	1825	0		PPMM	->GLN				
	1825	1827	0		PPMM	->GLN				
	1827	1274	0		PPMM	->GLN				
338	1934	90	1							
	1934	90	1							
	1752	1934	1							
	1752	1934	1							
339	1752	1936	1							
	1936	1935	1							
	1935	2054	1							
	2054	2082	1							
	2082	99	1							
340	1276	1824	0		PPMM	->GLN				
	1824	1753	0		PPMM	->GLN				
341	1753	1822	0		PPMM	->GLN				
	1822	1820	0		PPMM	->GLN				
	1820	1826	0		PPMM	->GLN				
	1826	1828	0		PPMM	->GLN				
	1828	1275	0		PPMM	->GLN				
342	1937	98	1							
	1754	1937	1							
343	1754	1939	1							
	1939	1938	1							
	1938	2055	1							
	2055	2083	1							
	2083	116	1							
344	100	99	1							
345	101	100	1							
346	102	101	1							
347	103	102	1							
348	104	103	1							
349	105	104	1							
352	1274	1278	0		PPMM	->GPT 99				
353	1278	1282	0		PPMM	->GLN				
354	1282	1286	0		PPMM	->GPT 100				
355	1286	1290	0		PPMM	->GLN				
356	1290	1293	0		PPMM	->GPT 101				
357	1293	1298	0		PPMM	->GLN				
358	1298	1302	0		PPMM	->GPT 102				

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Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference	Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
359	1302	1306	0		PPMM	->GLN				
360	1306	1310	0		PPMM	->GPT 103				
361	1310	1314	0		PPMM	->GLN				
362	1314	1318	0		PPMM	->GPT 104				
363	1318	1322	0		PPMM	->GLN				
364	1322	1326	0		PPMM	->GPT 105				
367	1752	1934	1							
	1752	1934	1							
	1934	90	1							
	1934	90	1							
	90	89	1							
	89	88	1							
	88	87	1							
	87	86	1							
	86	85	1							
	85	84	1							
	84	83	1							
368	1752	1936	1							
	1936	1935	1							
	1935	2054	1							
	2054	2082	1							
	2082	99	1							
369	105	104	1							
	104	103	1							
	103	102	1							
	102	101	1							
	101	100	1							
	100	99	1							
370	122	121	1							
	121	120	1							
	120	119	1							
	119	118	1							
	118	117	1							
	117	116	1							
371	1754	1939	1							
	1939	1938	1							
	1938	2055	1							
	2055	2083	1							
	2083	116	1							
372	1754	1937	1							
	1937	98	1							
	98	97	1							
	97	96	1							
	96	95	1							
	95	94	1							
	94	93	1							
	93	92	1							
	92	91	1							
373	1341	1342	0		PPMM	->GPT 83				
374	1342	1346	0		PPMM	->GLN				
375	1346	1350	0		PPMM	->GPT 84				
376	1350	1354	0		PPMM	->GLN				
377	1354	1358	0		PPMM	->GPT 85				
378	1358	1362	0		PPMM	->GLN				
379	1362	1366	0		PPMM	->GPT 86				
380	1366	1370	0		PPMM	->GLN				
381	1370	1374	0		PPMM	->GPT 87				
382	1374	1378	0		PPMM	->GLN				
383	1378	1382	0		PPMM	->GPT 88				

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Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference	Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
384	1382	1386	0		PPMM	->GLN				
385	1386	1390	0		PPMM	->GPT 89				
386	1390	1394	0		PPMM	->GLN				
387	1394	1273	0		PPMM	->GPT 90				
388	84	83	1							
389	85	84	1							
390	86	85	1							
391	87	86	1							
392	88	87	1							
393	89	88	1							
394	90	89	1							
395	1934	90	1							
	1934	90	1							
	1752	1934	1							
	1752	1934	1							
396	1343	1347	0		PPMM	->GLN				
397	1351	1355	0		PPMM	->GLN				
398	1359	1363	0		PPMM	->GLN				
399	1367	1371	0		PPMM	->GLN				
400	1375	1379	0		PPMM	->GLN				
401	1383	1387	0		PPMM	->GLN				
402	1391	1395	0		PPMM	->GLN				
403	92	91	1							
404	93	92	1							
405	94	93	1							
406	95	94	1							
407	96	95	1							
408	97	96	1							
409	98	97	1							
410	77	76	1							
	76	75	1							
	75	74	1							
	74	73	1							
	73	72	1							
	72	71	1							
411	108	107	1							
412	115	108	1							
413	110	109	1							
414	111	110	1							
415	112	111	1							
416	113	112	1							
417	114	113	1							
418	1403	1407	0		PPMM	->GPT 107				
419	1407	1411	0		PPMM	->GLN				
420	1411	1415	0		PPMM	->GPT 108				
421	1415	1419	0		PPMM	->GLN				
422	1419	1422	0		PPMM	->GPT 115				
423	1422	1427	0		PPMM	->GLN				
424	1427	1431	0		PPMM	->GPT 109				
425	1431	1435	0		PPMM	->GLN				
426	1435	1439	0		PPMM	->GPT 110				
427	1439	1443	0		PPMM	->GLN				
428	1443	1447	0		PPMM	->GPT 111				
429	1447	1451	0		PPMM	->GLN				
430	1451	1455	0		PPMM	->GPT 112				
431	1455	1459	0		PPMM	->GLN				
432	1459	1463	0		PPMM	->GPT 113				
433	1463	1467	0		PPMM	->GLN				
434	109	115	1							

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Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference	Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
435	117	116	1							
436	118	117	1							
437	119	118	1							
438	120	119	1							
439	121	120	1							
442	1275	1279	0		PPMM	->GPT 116				
443	1279	1283	0		PPMM	->GLN				
444	1283	1287	0		PPMM	->GPT 117				
445	1287	1291	0		PPMM	->GLN				
446	1291	1294	0		PPMM	->GPT 118				
447	1294	1299	0		PPMM	->GLN				
448	1299	1303	0		PPMM	->GPT 119				
449	1303	1307	0		PPMM	->GLN				
450	1307	1311	0		PPMM	->GPT 120				
451	1311	1315	0		PPMM	->GLN				
452	1315	1319	0		PPMM	->GPT 121				
453	1319	1323	0		PPMM	->GLN				
454	1323	1327	0		PPMM	->GPT 122				
458	1471	1475	0		PPMM	->GPT 134				
459	1479	1483	0		PPMM	->GPT 135				
460	1487	1491	0		PPMM	->GPT 136				
461	1495	1499	0		PPMM	->GPT 137				
462	1503	1507	0		PPMM	->GPT 138				
463	1511	1515	0		PPMM	->GPT 139				
464	1519	1523	0		PPMM	->GPT 124				
465	1527	1404	0		PPMM	->GPT 125				
466	150	106	0		PPMM	->GLN				
467	1401	1818	0		PPMM	->GLN				
	1818	1755	0		PPMM	->GLN				
468	1755	1816	0		PPMM	->GLN				
	1816	1810	0		PPMM	->GLN				
	1810	1812	0		PPMM	->GLN				
	1812	1814	0		PPMM	->GLN				
	1814	1402	0		PPMM	->GLN				
469	1940	133	1							
	1940	133	1							
	1756	1940	1							
	1756	1940	1							
470	1756	1943	1							
	1943	1942	1							
	1942	1941	1							
	1941	2056	1							
	2056	140	1							
471	1404	1817	0		PPMM	->GLN				
	1817	1757	0		PPMM	->GLN				
472	1757	1815	0		PPMM	->GLN				
	1815	1809	0		PPMM	->GLN				
	1809	1811	0		PPMM	->GLN				
	1811	1813	0		PPMM	->GLN				
	1813	1403	0		PPMM	->GLN				
473	1944	125	1							
	1758	1944	1							
474	1758	1947	1							
	1947	1946	1							
	1946	1945	1							
	1945	2057	1							
	2057	107	1							
475	141	140	1							
476	142	141	1							

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Mesh Generation

Structural Lines - Support Conditions and Elastic bedding

Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference	Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
477	143	142	1							
478	144	143	1							
479	145	144	1							
480	146	145	1							
481	147	146	1							
482	148	147	1							
483	1402	1406	0		PPMM	->GPT 140				
484	1406	1410	0		PPMM	->GLN				
485	1410	1414	0		PPMM	->GPT 141				
486	1414	1418	0		PPMM	->GLN				
487	1418	1421	0		PPMM	->GPT 142				
488	1421	1426	0		PPMM	->GLN				
489	1426	1430	0		PPMM	->GPT 143				
490	1430	1434	0		PPMM	->GLN				
491	1434	1438	0		PPMM	->GPT 144				
492	1438	1442	0		PPMM	->GLN				
493	1442	1446	0		PPMM	->GPT 145				
494	1446	1450	0		PPMM	->GLN				
495	1450	1454	0		PPMM	->GPT 146				
496	1454	1458	0		PPMM	->GLN				
497	1458	1462	0		PPMM	->GPT 147				
498	1462	1466	0		PPMM	->GLN				
499	1469	1766	0		PPMM	->GLN				
	1766	1768	0		PPMM	->GLN				
	1768	1770	0		PPMM	->GLN				
	1770	1772	0		PPMM	->GLN				
	1772	1774	0		PPMM	->GLN				
	1774	1776	0		PPMM	->GLN				
	1776	1778	0		PPMM	->GLN				
	1778	2096	0		PPMM	->GLN				
	2096	1780	0		PPMM	->GLN				
	1780	1470	0		PPMM	->GLN				
500	1470	1474	0		PPMM	->GPT 126				
501	1474	1478	0		PPMM	->GLN				
502	1478	1482	0		PPMM	->GPT 127				
503	1482	1486	0		PPMM	->GLN				
504	1486	1490	0		PPMM	->GPT 128				
505	1490	1494	0		PPMM	->GLN				
506	1494	1498	0		PPMM	->GPT 129				
507	1498	1502	0		PPMM	->GLN				
508	1502	1506	0		PPMM	->GPT 130				
509	1506	1510	0		PPMM	->GLN				
510	1510	1514	0		PPMM	->GPT 131				
511	1514	1518	0		PPMM	->GLN				
512	1518	1522	0		PPMM	->GPT 132				
513	1522	1526	0		PPMM	->GLN				
514	1526	1401	0		PPMM	->GPT 133				
515	1660	1949	1							
	1949	2059	1							
	2059	1948	1							
	1948	2058	1							
	2058	2084	1							
	2084	2093	1							
	2093	2094	1							
	2094	159	1							
	159	2095	1							
	2095	126	1							
516	127	126	1							
517	128	127	1							

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Mesh Generation

Structural Lines - Support Conditions and Elastic bedding

Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference	Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
518	129	128	1							
519	130	129	1							
520	131	130	1							
521	132	131	1							
522	133	132	1							
523	1940	133	1							
	1940	133	1							
	1756	1940	1							
	1756	1940	1							
524	1472	1765	0		PPMM	->GLN				
	1765	1767	0		PPMM	->GLN				
	1767	1769	0		PPMM	->GLN				
	1769	1771	0		PPMM	->GLN				
	1771	1773	0		PPMM	->GLN				
	1773	1775	0		PPMM	->GLN				
	1775	1777	0		PPMM	->GLN				
	1777	1547	0		PPMM	->GLN				
	1547	2099	0		PPMM	->GLN				
	2099	1933	0		PPMM	->GLN				
	1933	1779	0		PPMM	->GLN				
	1779	1471	0		PPMM	->GLN				
525	1475	1479	0		PPMM	->GLN				
526	1660	1949	1							
	1949	2059	1							
	2059	1948	1							
	1948	2058	1							
	2058	2084	1							
	2084	2093	1							
	2093	2094	1							
	2094	159	1							
	159	2095	1							
	2095	126	1							
527	1756	1940	1							
	1756	1940	1							
	1940	133	1							
	1940	133	1							
	133	132	1							
	132	131	1							
	131	130	1							
	130	129	1							
	129	128	1							
	128	127	1							
	127	126	1							
528	1756	1943	1							
	1943	1942	1							
	1942	1941	1							
	1941	2056	1							
	2056	140	1							
529	148	147	1							
	147	146	1							
	146	145	1							
	145	144	1							
	144	143	1							
	143	142	1							
	142	141	1							
	141	140	1							
535	114	113	1							
	113	112	1							
	112	111	1							

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Mesh Generation

Structural Lines - Support Conditions and Elastic bedding

Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference	Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
	111	110	1							
	110	109	1							
	109	115	1							
	115	108	1							
	108	107	1							
536	1758	1947	1							
	1947	1946	1							
	1946	1945	1							
	1945	2057	1							
	2057	107	1							
537	1758	1944	1							
	1944	125	1							
	125	124	1							
	124	139	1							
	139	138	1							
	138	137	1							
	137	136	1							
	136	135	1							
	135	134	1							
539	1651	2052	1							
	2052	2081	1							
	2081	2051	1							
	2051	2080	1							
	2080	2092	1							
	2092	2079	1							
	2079	2091	1							
	2091	2050	1							
	2050	2100	1							
	2100	1834	1							
	1834	2053	1							
	2053	156	1							
572	1467	1951	0		PPMM	->GLN				
	1951	1793	0		PPMM	->GLN				
	1793	1791	0		PPMM	->GLN				
	1791	1789	0		PPMM	->GLN				
	1789	1787	0		PPMM	->GLN				
	1787	1785	0		PPMM	->GLN				
	1785	1783	0		PPMM	->GLN				
	1783	1781	0		PPMM	->GLN				
	1781	1534	0		PPMM	->GLN				
573	1534	160	0		PPMM	->GLN				
575	1344	1950	0		PPMM	->GLN				
	1950	1808	0		PPMM	->GLN				
	1808	1806	0		PPMM	->GLN				
	1806	1804	0		PPMM	->GLN				
	1804	1802	0		PPMM	->GLN				
	1802	1800	0		PPMM	->GLN				
	1800	1798	0		PPMM	->GLN				
	1798	1796	0		PPMM	->GLN				
	1796	1539	0		PPMM	->GLN				
595	1635	1909	0		PPMM	->GLN				
	1909	1907	0		PPMM	->GLN				
	1907	1905	0		PPMM	->GLN				
	1905	1903	0		PPMM	->GLN				
	1903	1901	0		PPMM	->GLN				
	1901	1899	0		PPMM	->GLN				
	1899	1897	0		PPMM	->GLN				
	1897	1895	0		PPMM	->GLN				
	1895	1893	0		PPMM	->GLN				

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Mesh Generation

Structural Lines - Support Conditions and Elastic bedding

Number	SPt-a	SPt-e	Grp	Mat	Properties	Reference	Ca[kN/m2]	Ct[kN/m2]	Cm[kNm/m/ra	w[m]
	1893	1891	0		PPMM	->GLN				
	1891	1889	0		PPMM	->GLN				
	1889	1887	0		PPMM	->GLN				
	1887	1885	0		PPMM	->GLN				
	1885	1883	0		PPMM	->GLN				
	1883	1881	0		PPMM	->GLN				
	1881	1879	0		PPMM	->GLN				
	1879	1877	0		PPMM	->GLN				
	1877	1875	0		PPMM	->GLN				
	1875	1873	0		PPMM	->GLN				
	1873	1871	0		PPMM	->GLN				
	1871	1869	0		PPMM	->GLN				
	1869	1867	0		PPMM	->GLN				
	1867	1865	0		PPMM	->GLN				
	1865	1863	0		PPMM	->GLN				
	1863	1861	0		PPMM	->GLN				
	1861	1859	0		PPMM	->GLN				
	1859	1857	0		PPMM	->GLN				
	1857	1855	0		PPMM	->GLN				
	1855	1853	0		PPMM	->GLN				
	1853	1851	0		PPMM	->GLN				
	1851	1849	0		PPMM	->GLN				
596	1833	1910	0		PPMM	->GLN				
	1910	1908	0		PPMM	->GLN				
	1908	1906	0		PPMM	->GLN				
	1906	1904	0		PPMM	->GLN				
	1904	1902	0		PPMM	->GLN				
	1902	1900	0		PPMM	->GLN				
	1900	1898	0		PPMM	->GLN				
	1898	1896	0		PPMM	->GLN				
	1896	1894	0		PPMM	->GLN				
	1894	1892	0		PPMM	->GLN				
	1892	1890	0		PPMM	->GLN				
	1890	1888	0		PPMM	->GLN				
	1888	1886	0		PPMM	->GLN				
	1886	1884	0		PPMM	->GLN				
	1884	1882	0		PPMM	->GLN				
	1882	1880	0		PPMM	->GLN				
	1880	1878	0		PPMM	->GLN				
	1878	1876	0		PPMM	->GLN				
	1876	1874	0		PPMM	->GLN				
	1874	1872	0		PPMM	->GLN				
	1872	1870	0		PPMM	->GLN				
	1870	1868	0		PPMM	->GLN				
	1868	1866	0		PPMM	->GLN				
	1866	1864	0		PPMM	->GLN				
	1864	1862	0		PPMM	->GLN				
	1862	1860	0		PPMM	->GLN				
	1860	1858	0		PPMM	->GLN				
	1858	1856	0		PPMM	->GLN				
	1856	1854	0		PPMM	->GLN				
	1854	1852	0		PPMM	->GLN				
	1852	1850	0		PPMM	->GLN				

SPt-a,SPt-e	structural point start / end	Reference	kinematic constraint
Grp	primary group number	Ca[kN/m2],Ct[kN/m2]	axial / lateral bedding
Mat	material number	Cm[kNm/m/rad]	torsional bedding
Properties	type of support / coupling conditions	w[m]	width of support

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Mesh Generation

Structural Areas

Number	Grp	Mat	MRf	t[mm]	Kind	locX	dX[-]	dY[-]	dZ[-]	dRot[°]	Designation
1	1	1		5.0	-	RADI	1.000	0.000	0.000		Area
2	2	1		5.0	-	RADI	0.000	0.000	1.000		Area
3	3	1		5.0	-	RADI	1.000	0.000	0.000		Area
4	4	1		5.0	-	RADI	0.000	0.000	1.000		Area
5	5	1		5.0	-	RADI	1.000	0.000	0.000		Area
6	6	1		5.0	-	RADI	0.000	0.000	1.000		Area
7	7	1		5.0	-	RADI	1.000	0.000	0.000		Area
8	8	1		5.0	-	RADI	0.000	0.000	1.000		Area
9	9	1		5.0	-	RADI	1.000	0.000	0.000		Area
10	10	1		5.0	-	RADI	0.000	0.000	1.000		Area
11	11	1		5.0	-	RADI	1.000	0.000	0.000		Area
12	12	1		5.0	-	RADI	0.000	0.000	1.000		Area
13	13	1		5.0	-	RADI	1.000	0.000	0.000		Area
14	14	1		5.0	-	RADI	0.000	0.000	1.000		Area
15	15	1		5.0	-	RADI	1.000	0.000	0.000		Area
16	16	1		5.0	-	RADI	0.000	0.000	1.000		Area
17	17	1		5.0	-	RADI	1.000	0.000	0.000		Area
18	18	1		5.0	-	RADI	0.000	0.000	1.000		Area
19	19	1		5.0	-	RADI	1.000	0.000	0.000		Area
20	20	1		5.0	-	RADI	0.000	0.000	1.000		Area
21	21	1		5.0	-	RADI	1.000	0.000	0.000		Area
22	22	1		5.0	-	RADI	0.000	0.000	1.000		Area
23	23	1		5.0	-	RADI	1.000	0.000	0.000		Area
24	24	1		5.0	-	RADI	0.000	0.000	1.000		Area
25	25	1		5.0	-	RADI	1.000	0.000	0.000		Area
26	26	1		5.0	-	RADI	0.000	0.000	1.000		Area
27	27	1		5.0	-	RADI	1.000	0.000	0.000		Area
28	28	1		5.0	-	RADI	0.000	0.000	1.000		Area
29	29	1		5.0	-	RADI	1.000	0.000	0.000		Area
30	30	1		5.0	-	RADI	0.000	0.000	1.000		Area
31	31	1		5.0	-	RADI	1.000	0.000	0.000		Area
32	32	1		5.0	-	RADI	0.000	0.000	1.000		Area
33	33	1		5.0	-	RADI	1.000	0.000	0.000		Area
34	17	1		5.0	-	RADI	-1.000	0.000	0.000		Area
35	18	1		5.0	-	RADI	0.000	0.000	1.000		Area
36	19	1		5.0	-	RADI	-1.000	0.000	0.000		Area
37	20	1		5.0	-	RADI	0.000	0.000	1.000		Area
38	21	1		5.0	-	RADI	-1.000	0.000	0.000		Area
39	22	1		5.0	-	RADI	0.000	0.000	1.000		Area
40	23	1		5.0	-	RADI	-1.000	0.000	0.000		Area
41	24	1		5.0	-	RADI	0.000	0.000	1.000		Area
42	25	1		5.0	-	RADI	-1.000	0.000	0.000		Area
43	26	1		5.0	-	RADI	0.000	0.000	1.000		Area
44	27	1		5.0	-	RADI	-1.000	0.000	0.000		Area
45	28	1		5.0	-	RADI	0.000	0.000	1.000		Area
46	29	1		5.0	-	RADI	-1.000	0.000	0.000		Area
47	30	1		5.0	-	RADI	0.000	0.000	1.000		Area
48	31	1		5.0	-	RADI	-1.000	0.000	0.000		Area
49	32	1		5.0	-	RADI	0.000	0.000	1.000		Area
50	50	2	4	400.0		RADI	1.000	0.000	0.000		Area
51	2	1		5.0	-	RADI	0.000	0.000	1.000		Area
52	3	1		5.0	-	RADI	-1.000	0.000	0.000		Area
53	4	1		5.0	-	RADI	0.000	0.000	1.000		Area
54	5	1		5.0	-	RADI	-1.000	0.000	0.000		Area
55	6	1		5.0	-	RADI	0.000	0.000	1.000		Area
56	7	1		5.0	-	RADI	-1.000	0.000	0.000		Area
57	8	1		5.0	-	RADI	0.000	0.000	1.000		Area
58	9	1		5.0	-	RADI	-1.000	0.000	0.000		Area
59	10	1		5.0	-	RADI	0.000	0.000	1.000		Area

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Mesh Generation

Structural Areas

Number	Grp	Mat	MRf	t[mm]	Kind	locX	dX[-]	dY[-]	dZ[-]	dRot[°]	Designation
60	11	1		5.0	-	RADI	-1.000	0.000	0.000		Area
61	12	1		5.0	-	RADI	0.000	0.000	1.000		Area
62	13	1		5.0	-	RADI	-1.000	0.000	0.000		Area
63	14	1		5.0	-	RADI	0.000	0.000	1.000		Area
64	15	1		5.0	-	RADI	-1.000	0.000	0.000		Area
65	16	1		5.0	-	RADI	0.000	0.000	1.000		Area
66	66	1		5.0	-	RADI	1.000	0.000	0.000		Area
67	67	1		5.0	-	RADI	1.000	0.000	0.000		Area
68	68	1		5.0	-	RADI	1.000	0.000	0.000		Area
69	17	1		5.0	-	RADI	-1.000	0.000	0.000		Area
70	18	1		5.0	-	RADI	0.000	0.000	1.000		Area
71	19	1		5.0	-	RADI	-1.000	0.000	0.000		Area
72	20	1		5.0	-	RADI	0.000	0.000	1.000		Area
73	21	1		5.0	-	RADI	-1.000	0.000	0.000		Area
74	22	1		5.0	-	RADI	0.000	0.000	1.000		Area
75	23	1		5.0	-	RADI	-1.000	0.000	0.000		Area
76	24	1		5.0	-	RADI	0.000	0.000	1.000		Area
77	25	1		5.0	-	RADI	-1.000	0.000	0.000		Area
78	26	1		5.0	-	RADI	0.000	0.000	1.000		Area
79	27	1		5.0	-	RADI	-1.000	0.000	0.000		Area
80	28	1		5.0	-	RADI	0.000	0.000	1.000		Area
81	29	1		5.0	-	RADI	-1.000	0.000	0.000		Area
82	30	1		5.0	-	RADI	0.000	0.000	1.000		Area
83	31	1		5.0	-	RADI	-1.000	0.000	0.000		Area
84	32	1		5.0	-	RADI	0.000	0.000	1.000		Area
85	85	2	4	400.0		RADI	0.000	1.000	0.000		Area
86	2	1		5.0	-	RADI	0.000	0.000	1.000		Area
87	3	1		5.0	-	RADI	-1.000	0.000	0.000		Area
88	4	1		5.0	-	RADI	0.000	0.000	1.000		Area
89	5	1		5.0	-	RADI	-1.000	0.000	0.000		Area
90	6	1		5.0	-	RADI	0.000	0.000	1.000		Area
91	7	1		5.0	-	RADI	-1.000	0.000	0.000		Area
92	8	1		5.0	-	RADI	0.000	0.000	1.000		Area
93	9	1		5.0	-	RADI	-1.000	0.000	0.000		Area
94	10	1		5.0	-	RADI	0.000	0.000	1.000		Area
95	11	1		5.0	-	RADI	-1.000	0.000	0.000		Area
96	12	1		5.0	-	RADI	0.000	0.000	1.000		Area
97	13	1		5.0	-	RADI	-1.000	0.000	0.000		Area
98	14	1		5.0	-	RADI	0.000	0.000	1.000		Area
99	15	1		5.0	-	RADI	-1.000	0.000	0.000		Area
100	16	1		5.0	-	RADI	0.000	0.000	1.000		Area
101	17	1		5.0	-	RADI	1.000	0.000	0.000		Area
102	18	1		5.0	-	RADI	0.000	0.000	1.000		Area
103	19	1		5.0	-	RADI	1.000	0.000	0.000		Area
104	20	1		5.0	-	RADI	0.000	0.000	1.000		Area
105	21	1		5.0	-	RADI	1.000	0.000	0.000		Area
106	22	1		5.0	-	RADI	0.000	0.000	1.000		Area
107	23	1		5.0	-	RADI	1.000	0.000	0.000		Area
108	24	1		5.0	-	RADI	0.000	0.000	1.000		Area
109	25	1		5.0	-	RADI	1.000	0.000	0.000		Area
110	26	1		5.0	-	RADI	0.000	0.000	1.000		Area
111	27	1		5.0	-	RADI	1.000	0.000	0.000		Area
112	28	1		5.0	-	RADI	0.000	0.000	1.000		Area
113	29	1		5.0	-	RADI	1.000	0.000	0.000		Area
114	30	1		5.0	-	RADI	0.000	0.000	1.000		Area
115	31	1		5.0	-	RADI	1.000	0.000	0.000		Area
116	32	1		5.0	-	RADI	0.000	0.000	1.000		Area
117	33	1		5.0	-	RADI	1.000	0.000	0.000		Area
118	1	1		5.0	-	RADI	1.000	0.000	0.000		Area

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Mesh Generation

Structural Areas

Number	Grp	Mat	MRf	t[mm]	Kind		locX	dX[-]	dY[-]	dZ[-]	dRot[°]	Designation
119	2	1		5.0	-		RADI	0.000	0.000	1.000		Area
120	3	1		5.0	-		RADI	1.000	0.000	0.000		Area
121	4	1		5.0	-		RADI	0.000	0.000	1.000		Area
122	5	1		5.0	-		RADI	1.000	0.000	0.000		Area
123	6	1		5.0	-		RADI	0.000	0.000	1.000		Area
124	7	1		5.0	-		RADI	1.000	0.000	0.000		Area
125	8	1		5.0	-		RADI	0.000	0.000	1.000		Area
126	9	1		5.0	-		RADI	1.000	0.000	0.000		Area
127	10	1		5.0	-		RADI	0.000	0.000	1.000		Area
128	11	1		5.0	-		RADI	1.000	0.000	0.000		Area
129	12	1		5.0	-		RADI	0.000	0.000	1.000		Area
130	13	1		5.0	-		RADI	1.000	0.000	0.000		Area
131	14	1		5.0	-		RADI	0.000	0.000	1.000		Area
132	15	1		5.0	-		RADI	1.000	0.000	0.000		Area
133	16	1		5.0	-		RADI	0.000	0.000	1.000		Area
134	66	1		5.0	-		RADI	1.000	0.000	0.000		Area
135	67	1		5.0	-		RADI	1.000	0.000	0.000		Area
136	68	1		5.0	-		RADI	1.000	0.000	0.000		Area
137	137	1		5.0	-		RADI	1.000	0.000	0.000		Area
138	138	2	4	400.0			RADI	1.000	0.000	0.000		Area
139	139	3	4	1000.0	+	*	RADI	1.000	0.000	0.000		Area
140	140	2	4	400.0			RADI	1.000	0.000	0.000		Area
141	141	2	4	400.0			RADI	0.000	1.000	0.000		Area
142	142	2	4	400.0			RADI	1.000	0.000	0.000		Area
143	143	2	4	400.0			RADI	0.000	1.000	0.000		Area
144	144	3	4	1000.0	+	*	RADI	1.000	0.000	0.000		Area
145	145	2	4	400.0			RADI	0.000	1.000	0.000		Area
146	146	3	4	500.0	+	*	RADI	1.000	0.000	0.000		Area
147	147	2	4	650.0			RADI	0.000	1.000	0.000		Area
148	146	3	4	500.0	+	*	RADI	1.000	0.000	0.000		Area
149	147	2	4	650.0			RADI	0.000	1.000	0.000		Area
150	150	2	4				RADI	1.000	0.000	0.000		Area
151	151	2	4				RADI	1.000	0.000	0.000		Area
152	152	3	4	500.0	+	*	RADI	1.000	0.000	0.000		Area
153	150	2	4				RADI	1.000	0.000	0.000		Area
154	151	2	4				RADI	1.000	0.000	0.000		Area
155	152	3	4	500.0	+	*	RADI	1.000	0.000	0.000		Area

Kind "-": Elements are above the plane of the nodes
Kind "+": Elements are below the plane of the nodes
Kind "*": isotropic bedding

Grp	primary group number	locX	direction of the local x axis
Mat	material number	dX[-],dY[-],dZ[-]	explicit components of the direction
MRf	reinforcement material number	dRot[°]	additional rotation about beam axis
t[mm]	thickness		

Structural Areas - Orthotropic thickness, Support Conditions and Elastic bedding

Number	tx[mm]	ty[mm]	txy[mm]	td[mm]	Support Condition	Cb[kN/m3]	Ct[kN/m3]
139						10000	5000
144						10000	5000
146						10000	5000
148						10000	5000
152						10000	5000
155						10000	5000

tx[mm],ty[mm],txy[mm],td[mm]	orthotropic thickness
Cb[kN/m3],Ct[kN/m3]	axial / lateral bedding

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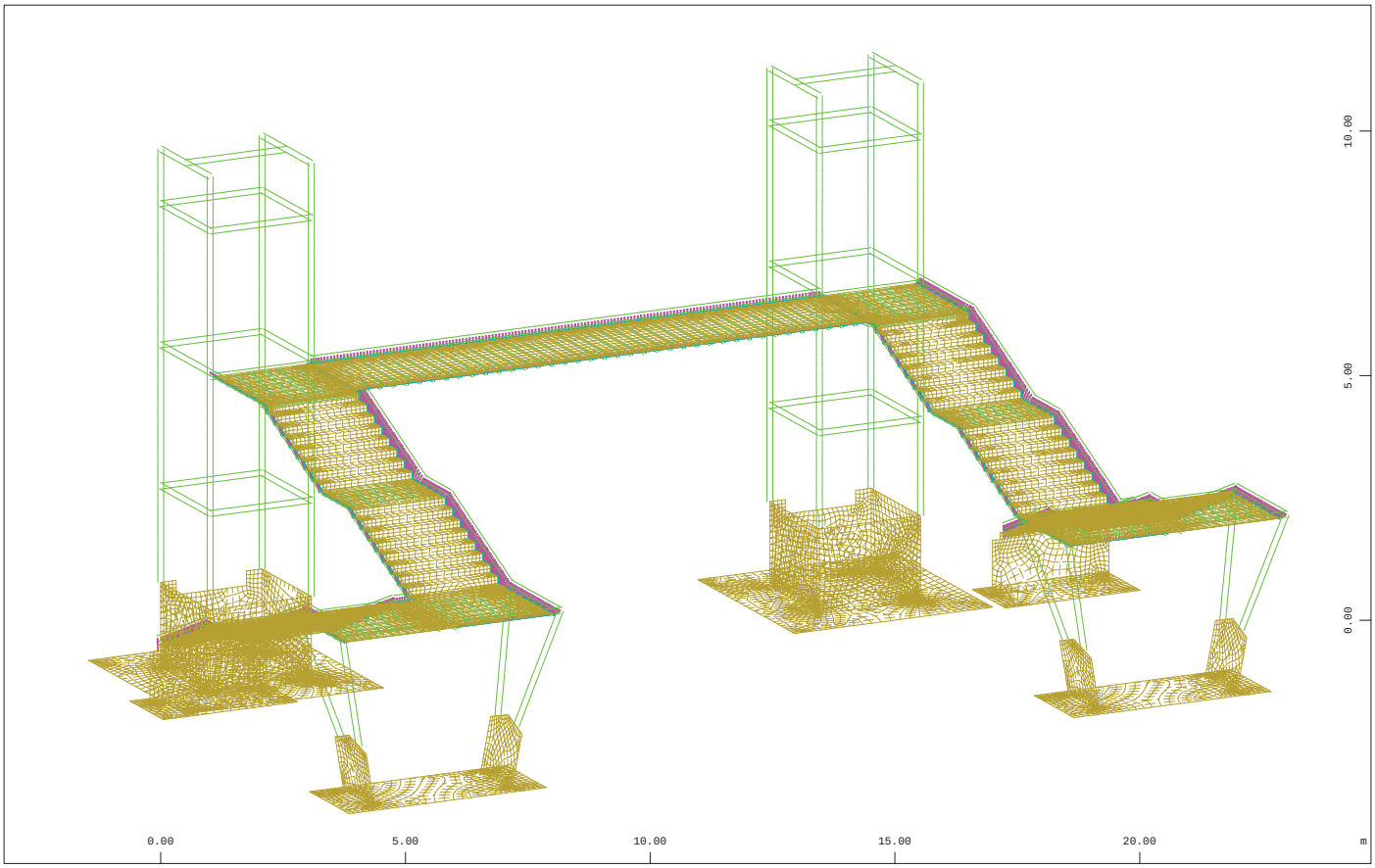
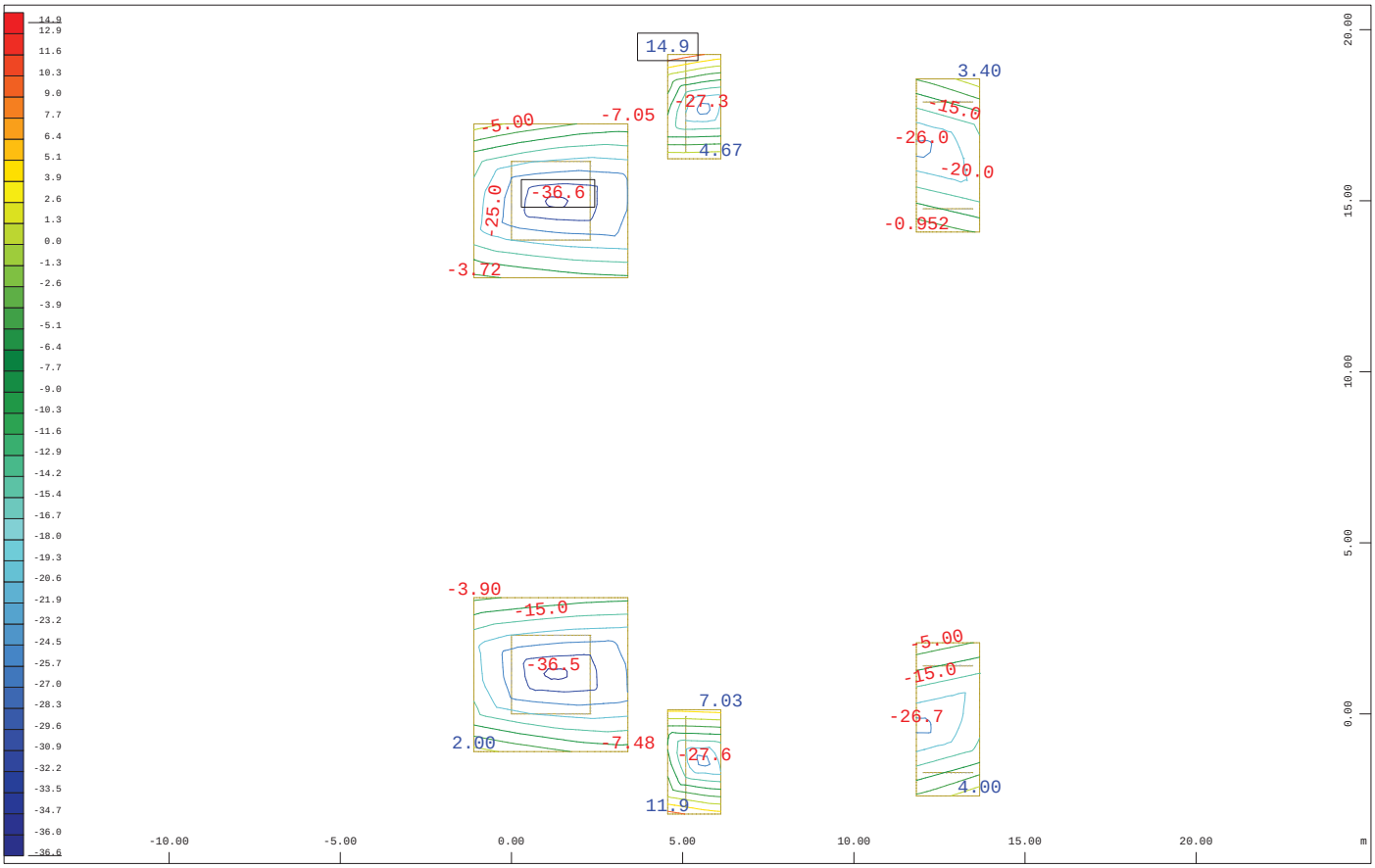
8. ANEJO 3. RESULTADOS ZAPATAS



Z
Y
X
Structure

M 1 : 107
X * 0.502
Y * 0.906
Z * 0.962

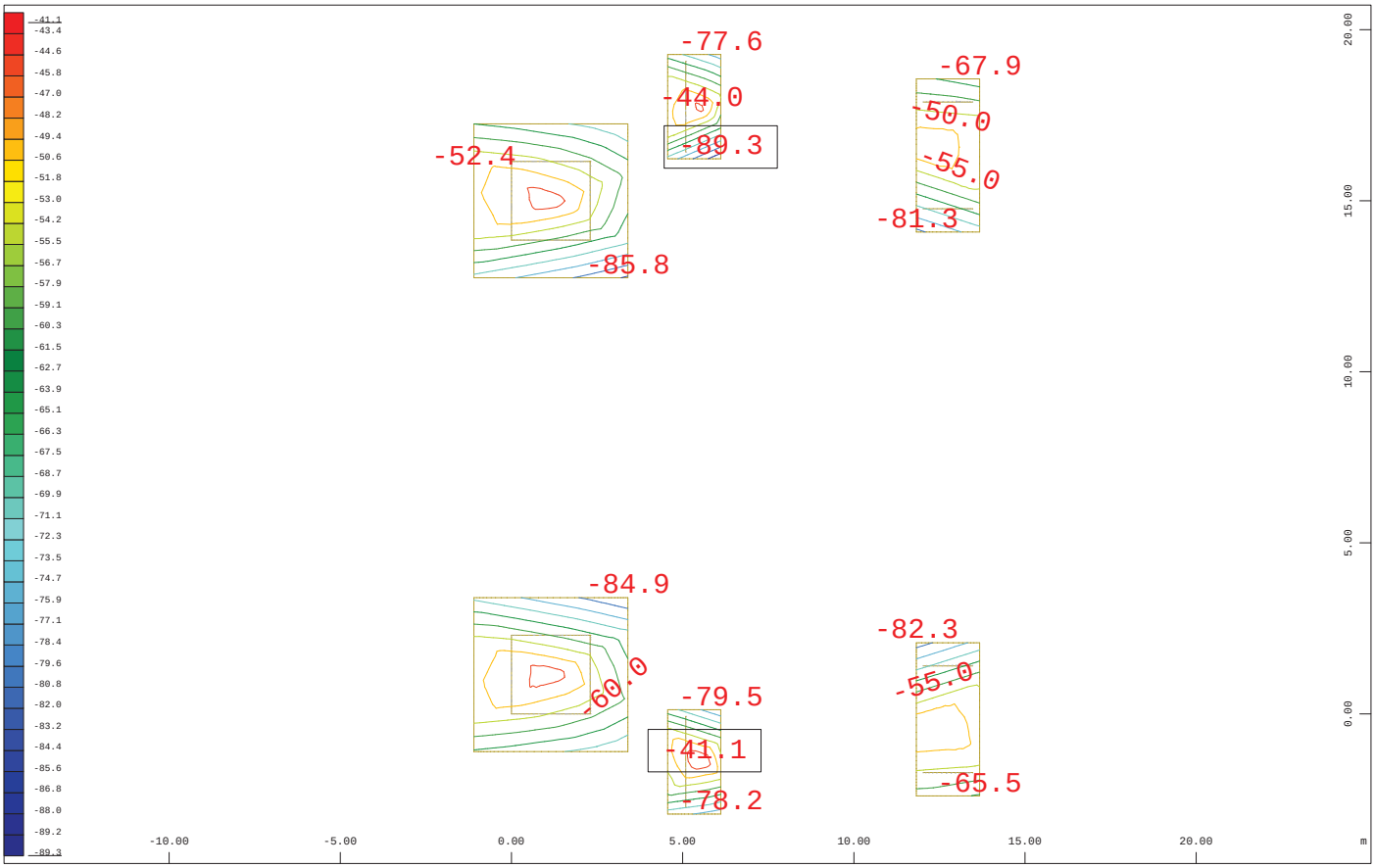


Y
Z—X

Sector of system Quadrilateral Elements Group 139 144 146 152

Bedding stress in Node ◯, Loadcase 1117 MAXR-P QUAD Reacciones Zapata-te , from -36.6 to 14.9 step 5.00 kN/m2

M 1 : 153

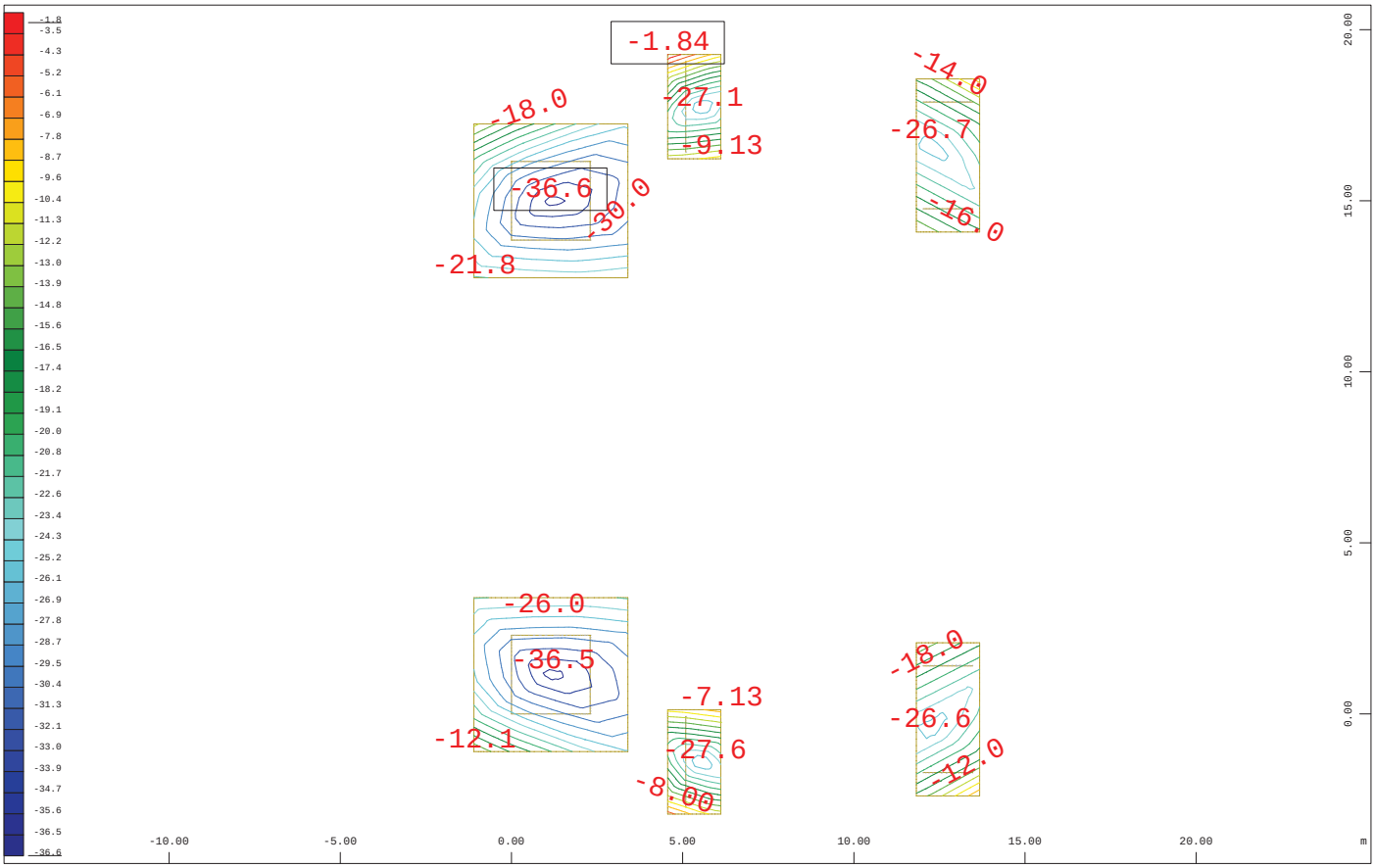


Y
Z—X

Sector of system Quadrilateral Elements Group 139 144 146 152

Bedding stress in Node ◯, Loadcase 1118 MINR-P QUAD Reacciones Zapata-te , from -89.3 to -41.1 step 5.00 kN/m2

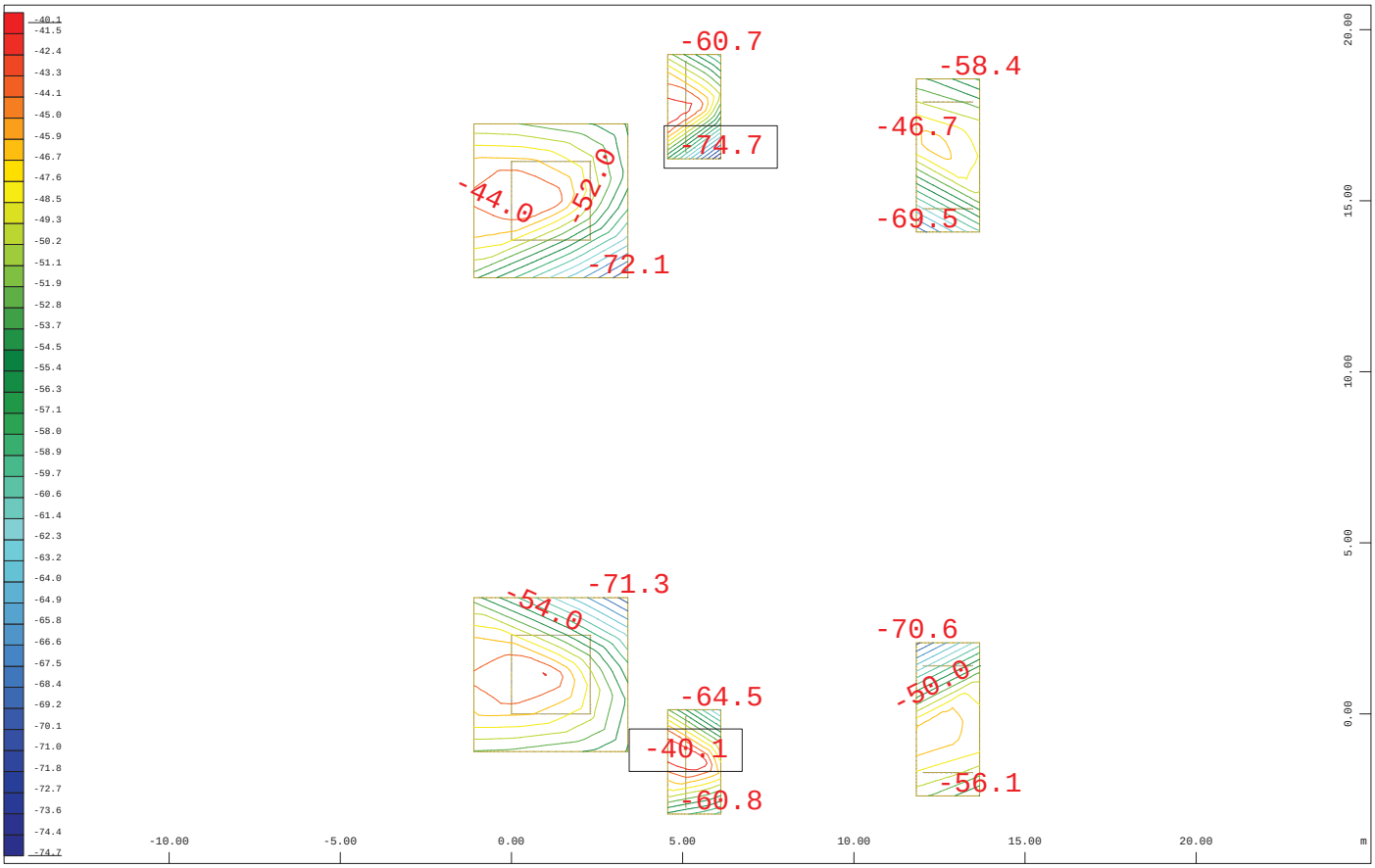
M 1 : 153



Sector of system Quadrilateral Elements Group 139 144 146 152

Bedding stress in Node ◯, Loadcase 1217 MAXR-P QUAD Reacciones Zapata-te , from -36.6 to -1.84 step 2.00 kN/m2

M 1 : 153

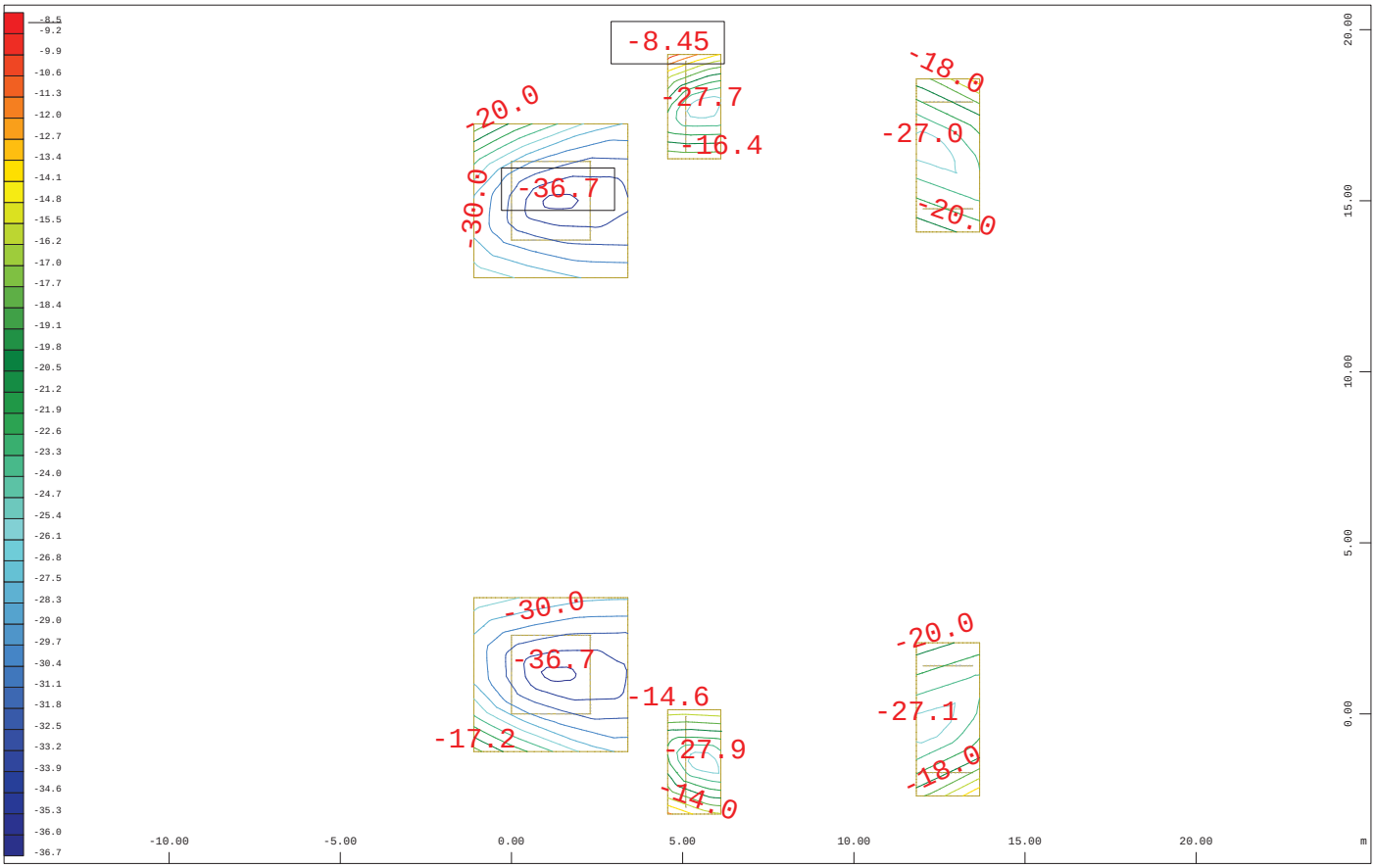


Y
Z—X

Sector of system Quadrilateral Elements Group 139 144 146 152

Bedding stress in Node ◯, Loadcase 1218 MINR-P QUAD Reacciones Zapata-te , from -74.7 to -40.1 step 2.00 kN/m2

M 1 : 153

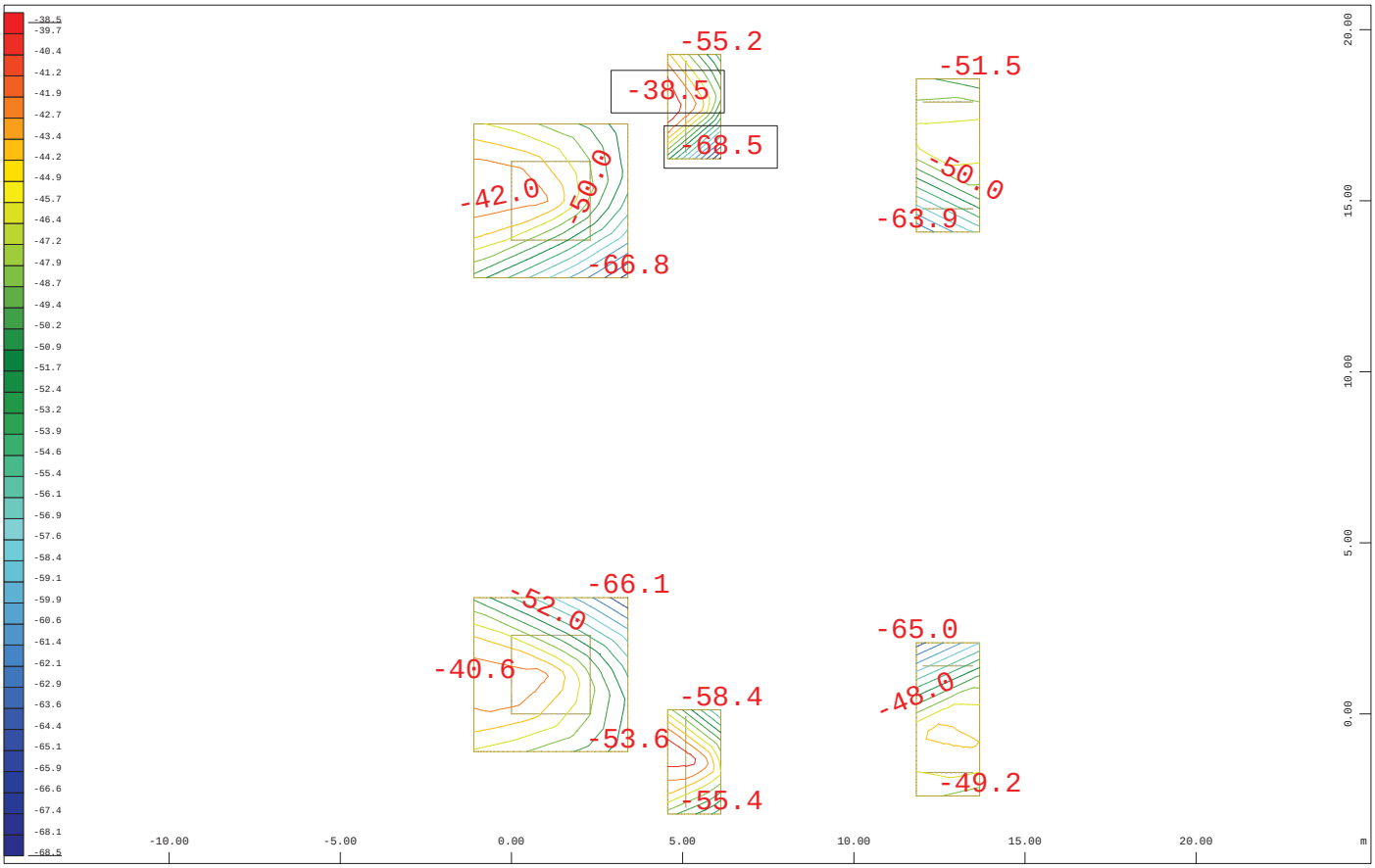


Y
Z—X

Sector of system Quadrilateral Elements Group 139 144 146 152

Bedding stress in Node ◯, Loadcase 1317 MAXF-P QUAD Reacciones Zapata-te , from -36.7 to -8.45 step 2.00 kN/m2

M 1 : 153

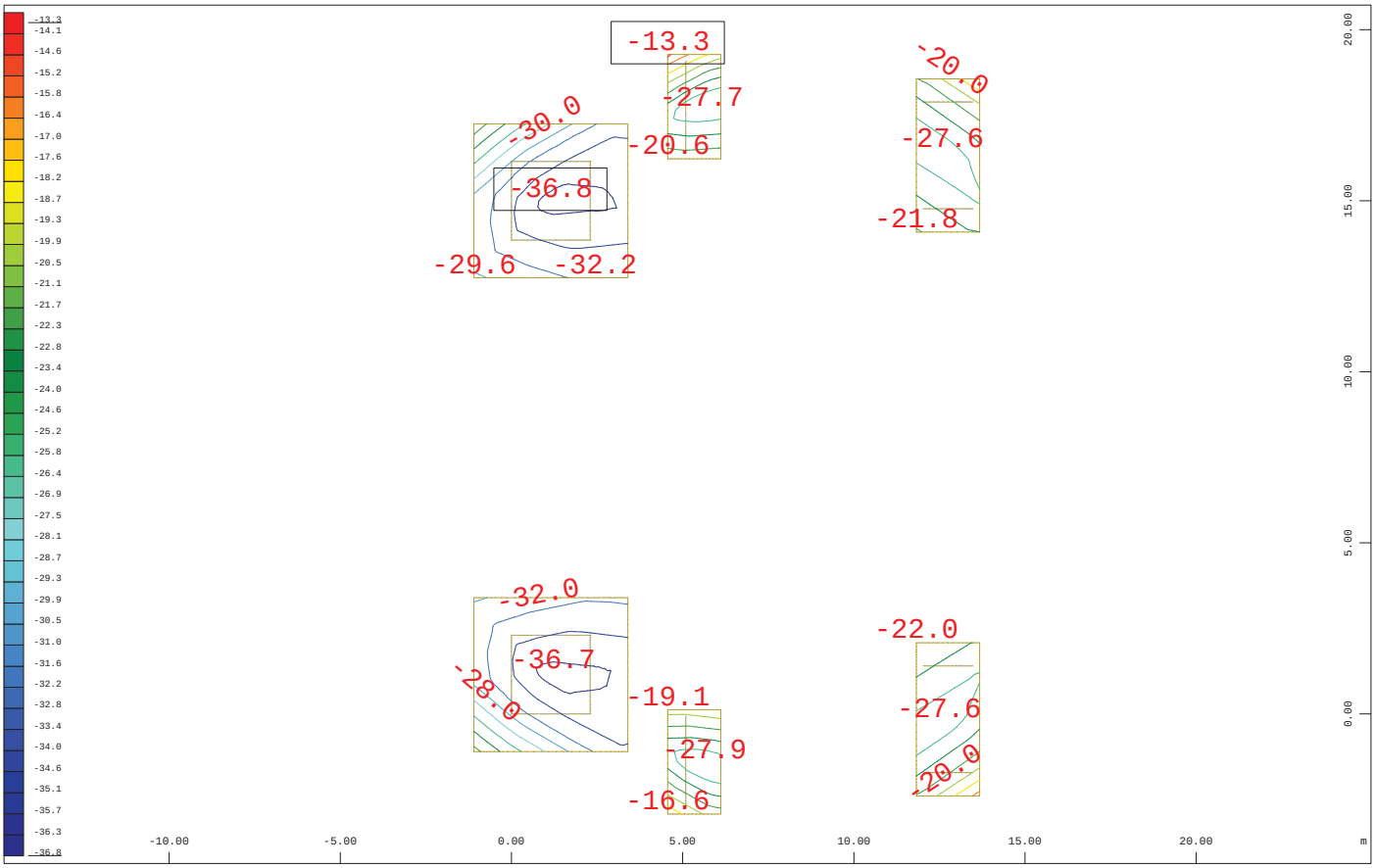


Y
Z—X

Sector of system Quadrilateral Elements Group 139 144 146 152

Bedding stress in Node ◯, Loadcase 1318 MINF-P QUAD Reacciones Zapata-te , from -68.5 to -38.5 step 2.00 kN/m2

M 1 : 153

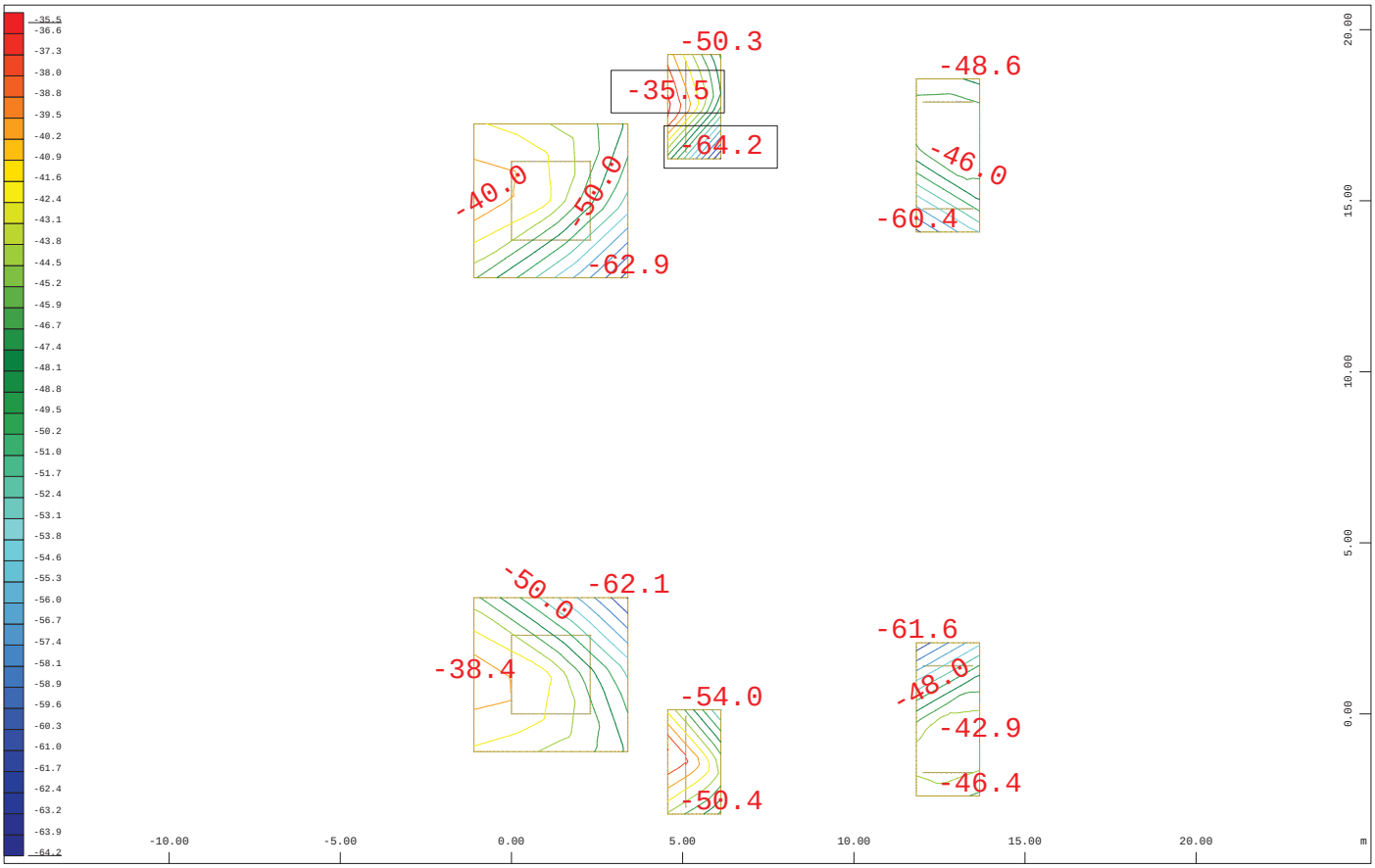


Y
Z X

Sector of system Quadrilateral Elements Group 139 144 146 152

Bedding stress in Node ◯, Loadcase 1417 MAXF-P QUAD Reacciones Zapata-te , from -36.8 to -13.3 step 2.00 kN/m2

M 1 : 153

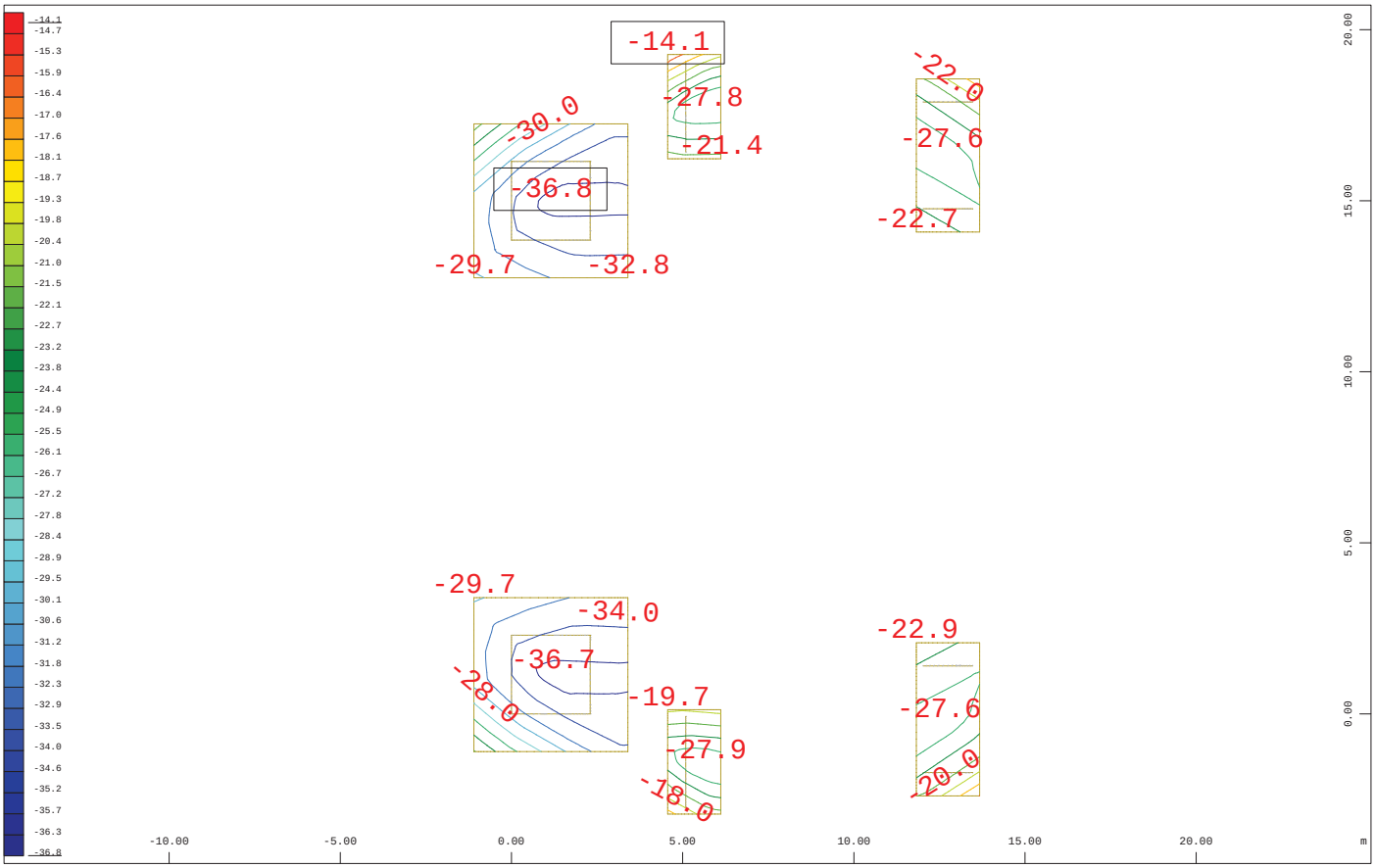


Y
Z X

Sector of system Quadrilateral Elements Group 139 144 146 152

Bedding stress in Node ◯, Loadcase 1418 MINF-P QUAD Reacciones Zapata-te , from -64.2 to -35.5 step 2.00 kN/m2

M 1 : 153

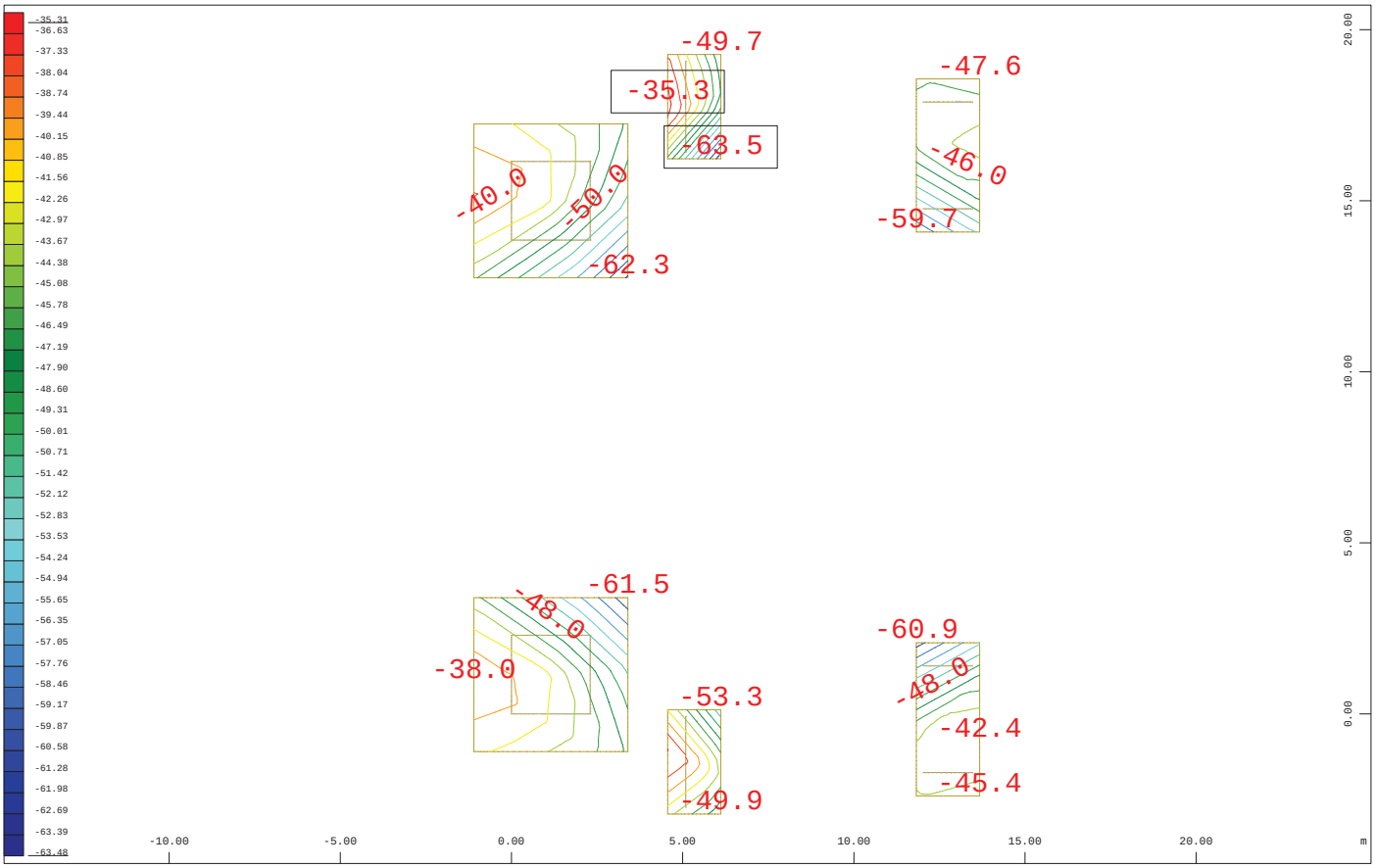


Y
Z X

Sector of system Quadrilateral Elements Group 139 144 146 152

Bedding stress in Node ◯, Loadcase 1517 MAXP-P QUAD Reacciones Zapata-te , from -36.8 to -14.1 step 2.00 kN/m2

M 1 : 153

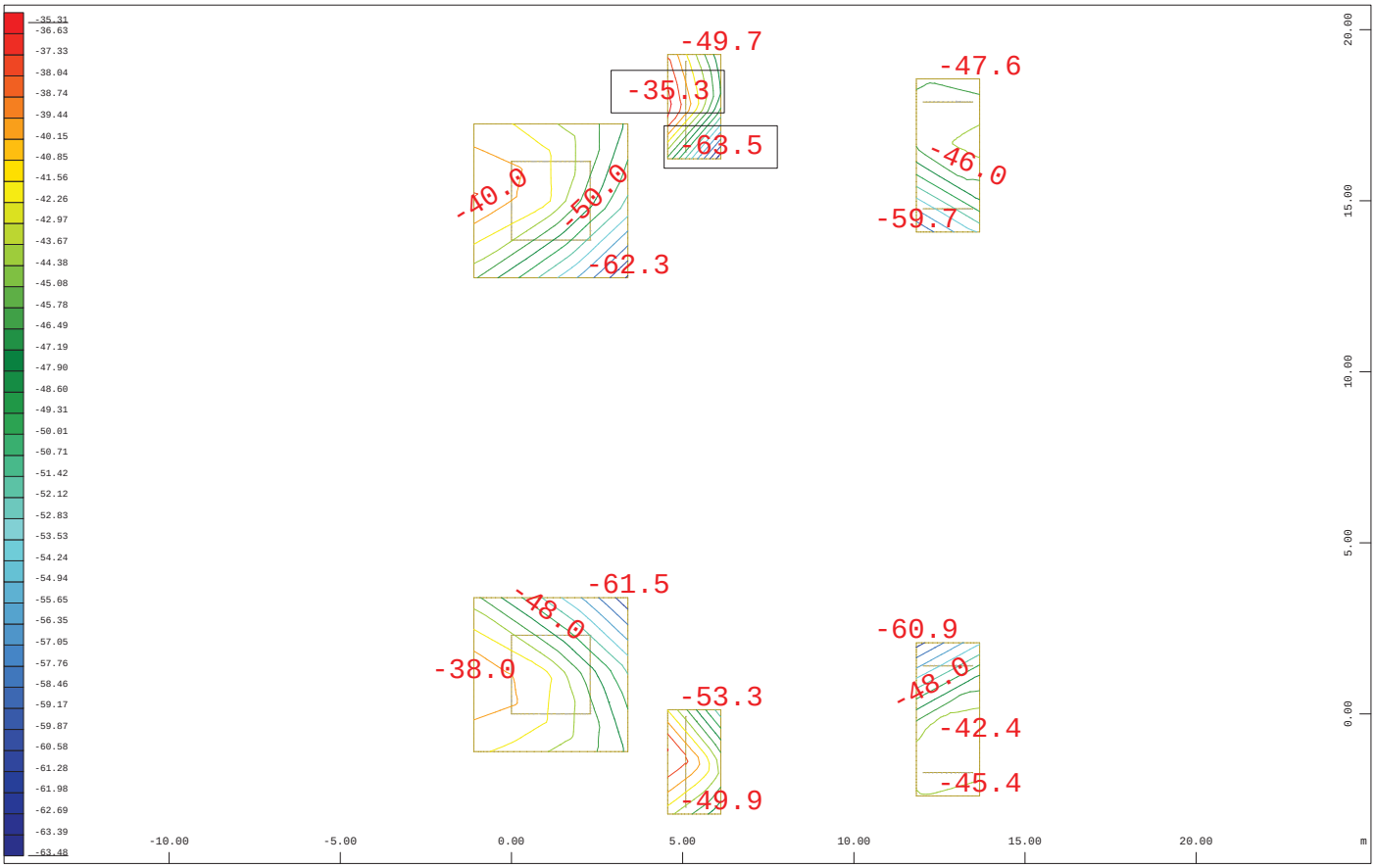


Y
Z X

Sector of system Quadrilateral Elements Group 139 144 146 152

Bedding stress in Node ◯, Loadcase 1518 MINP-P QUAD Reacciones Zapata-te , from -63.5 to -35.3 step 2.00 kN/m2

M 1 : 153



Y
Z X

Sector of system Quadrilateral Elements Group 139 144 146 152

Bedding stress in Node ◯, Loadcase 1518 MINP-P QUAD Reacciones Zapata-te , from -63.5 to -35.3 step 2.00 kN/m2

M 1 : 153

9. ANEJO 4. MODOS DE VIBRACIÓN

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Eigenvalues Easy

System- and Control Information
Control Information

QUAD-elements with higher non conforming modes 3
QUAD-elements with all rotational degrees of freedom
Primary load case 1 +Opt:add_GS
Number of unknowns 130596
unknowns per node 6
Number eigenvalues 12

Groups

Grp	Option	CS	Factor	Rayleigh-A [1/sec]	Rayleigh-B [sec]	ξ [o/o]	Wind
0	FULL		1.000	0.000000	0.000000	0.00	
1	FULL		1.000	0.000000	0.000000	0.00	
2	FULL		1.000	0.000000	0.000000	0.00	
3	FULL		1.000	0.000000	0.000000	0.00	
4	FULL		1.000	0.000000	0.000000	0.00	
5	FULL		1.000	0.000000	0.000000	0.00	
6	FULL		1.000	0.000000	0.000000	0.00	
7	FULL		1.000	0.000000	0.000000	0.00	
8	FULL		1.000	0.000000	0.000000	0.00	
9	FULL		1.000	0.000000	0.000000	0.00	
10	FULL		1.000	0.000000	0.000000	0.00	
11	FULL		1.000	0.000000	0.000000	0.00	
12	FULL		1.000	0.000000	0.000000	0.00	
13	FULL		1.000	0.000000	0.000000	0.00	
14	FULL		1.000	0.000000	0.000000	0.00	
15	FULL		1.000	0.000000	0.000000	0.00	
16	FULL		1.000	0.000000	0.000000	0.00	
17	FULL		1.000	0.000000	0.000000	0.00	
18	FULL		1.000	0.000000	0.000000	0.00	
19	FULL		1.000	0.000000	0.000000	0.00	
20	FULL		1.000	0.000000	0.000000	0.00	
21	FULL		1.000	0.000000	0.000000	0.00	
22	FULL		1.000	0.000000	0.000000	0.00	
23	FULL		1.000	0.000000	0.000000	0.00	
24	FULL		1.000	0.000000	0.000000	0.00	
25	FULL		1.000	0.000000	0.000000	0.00	
26	FULL		1.000	0.000000	0.000000	0.00	
27	FULL		1.000	0.000000	0.000000	0.00	
28	FULL		1.000	0.000000	0.000000	0.00	
29	FULL		1.000	0.000000	0.000000	0.00	
30	FULL		1.000	0.000000	0.000000	0.00	
31	FULL		1.000	0.000000	0.000000	0.00	
32	FULL		1.000	0.000000	0.000000	0.00	
33	FULL		1.000	0.000000	0.000000	0.00	
50	FULL		1.000	0.000000	0.000000	0.00	
66	FULL		1.000	0.000000	0.000000	0.00	
67	FULL		1.000	0.000000	0.000000	0.00	
68	FULL		1.000	0.000000	0.000000	0.00	
85	FULL		1.000	0.000000	0.000000	0.00	
137	FULL		1.000	0.000000	0.000000	0.00	
138	FULL		1.000	0.000000	0.000000	0.00	
139	FULL		1.000	0.000000	0.000000	0.00	
140	FULL		1.000	0.000000	0.000000	0.00	
141	FULL		1.000	0.000000	0.000000	0.00	
142	FULL		1.000	0.000000	0.000000	0.00	
143	FULL		1.000	0.000000	0.000000	0.00	
144	FULL		1.000	0.000000	0.000000	0.00	
145	FULL		1.000	0.000000	0.000000	0.00	

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Groups

Grp	Option	CS	Factor	Rayleigh-A [1/sec]	Rayleigh-B [sec]	ξ [o/o]	Wind
146	FULL		1.000	0.000000	0.000000	0.00	
147	FULL		1.000	0.000000	0.000000	0.00	
150	FULL		1.000	0.000000	0.000000	0.00	
151	FULL		1.000	0.000000	0.000000	0.00	
152	FULL		1.000	0.000000	0.000000	0.00	

CS construction stage
Factor Factor on stiffness
Rayleigh-A mass proportional damping ratio
Rayleigh-B stiffness proportional daming ratio
ξ modal damping ratio
Wind options for dynamic wind loading

Beam Elements

Finite beam elements without intermediate sections
Shear deformations accounted for with nonconforming SOFiSTiK-Timoshenko beam
Primary load case 1

Sum of masses and mass moments of inertia

Node	TM			RM			RMB
	X[t]	Y[t]	Z[t]	X[tm2]	Y[tm2]	Z[tm2]	[tm2]
total[1]	210.259	210.259	210.259	0.331	0.390	0.136	-
		S[m][2]			RM(S)[3]		
	3.896	8.087	-0.027	12805.158	6.393	332.274	
				6.393	5064.058	0.045	
				332.274	0.045	16489.143	
active[1]	210.259	210.259	210.259	0.331	0.390	0.136	-
		S[m][2]			RM(S)[3]		
	3.896	8.087	-0.027	12805.158	6.393	332.274	
				6.393	5064.058	0.045	
				332.274	0.045	16489.143	

[1] sum of the total and the active nodal masses
[2] coordinates of the center of gravity
[3] 3x3 rotational mass matrix at the center of gravity
TM translational masses in X-, Y- and Z-direction
RM rotational masses about X-, Y- and Z-axis
RMB warping mass

Processing
Parameter of System of Equations

Number of unknowns 130596 (Direct sparse Gauss-Solver)
Total entries 2751000
Total entries after fill in 15535839
Mass matrix 484870 (consistent), incl. rotational masses

Control Information

Using Lanczos Method
Iteration vectors 24

Eigenvalues

No.	LC	λ [rad2/sec2]	error [-]	ω [rad/sec]	f [Hz]	T [sec]	ξ [%]	Meff X[%]	Meff Y[%]	Meff Z[%]	participation X[%]	participation Y[%]	participation Z[%]
1	2001	5.0731E+02	0.0E+00	22.524	3.585	0.279	0.000	0.0	20.8	0.0	0.0	20.8	0.0
2	2002	9.6274E+02	3.9E-13	31.028	4.938	0.203	0.000	38.3	0.0	0.0	38.3	0.0	0.0
3	2003	1.2021E+03	9.5E-09	34.671	5.518	0.181	0.000	0.0	0.1	0.0	0.0	0.1	0.0
4	2004	1.5317E+03	1.7E-03	39.137	6.229	0.161	0.000	13.9	0.0	0.7	13.9	0.0	0.7
5	2005	1.5621E+03	2.2E-02	39.523	6.290	0.159	0.000	4.1	0.0	0.2	4.1	0.0	0.2
6	2006	1.5820E+03	9.2E-03	39.775	6.330	0.158	0.000	0.2	47.6	0.0	0.2	47.6	0.0
7	2007	1.6298E+03	4.5E-03	40.371	6.425	0.156	0.000	22.6	1.8	0.0	22.6	1.8	0.0
8	2008	1.7751E+03	8.7E-02	42.132	6.706	0.149	0.000	1.1	1.1	0.0	1.1	1.1	0.0
9	2009	1.9352E+03	2.5E-01	43.991	7.001	0.143	0.000	1.9	3.3	0.3	1.9	3.3	0.3
10	2010	2.0585E+03	8.2E-02	45.371	7.221	0.138	0.000	0.2	3.9	0.1	0.2	3.9	0.1
11	2011	2.3103E+03	8.9E-02	48.066	7.650	0.131	0.000	0.7	11.4	1.6	0.7	11.4	1.6
12	2012	2.5343E+03	1.3E-01	50.342	8.012	0.125	0.000	0.5	0.4	6.7	0.5	0.4	6.7

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Eigenvalues Easy

Eigenvalues

No.	LC	λ	error	ω	f	T	ξ	Meff			participation		
		[rad2/sec2]	[-]	[rad/sec]	[Hz]	[sec]	[%]	X[%]	Y[%]	Z[%]	X[%]	Y[%]	Z[%]
13		2.7143E+03	7.5E-02	52.099	8.292	0.121	Σ(%)¹	83.4	90.5	9.6	83.4	90.5	9.6
14		3.1904E+03	3.2E-02	56.484	8.990	0.111							
15		3.8632E+03	1.0E-01	62.155	9.892	0.101							
16		4.6000E+03	2.3E-01	67.823	10.794	0.093							
17		5.7524E+03	2.4E-01	75.845	12.071	0.083							
18		6.7841E+03	3.8E-01	82.366	13.109	0.076							
19		9.6367E+03	2.0E-01	98.167	15.624	0.064							
20		1.2617E+04	4.9E-01	112.327	17.877	0.056							
21		3.4031E+04	3.0E-01	184.474	29.360	0.034							
22		7.0825E+04	1.1E+00	266.129	42.356	0.024							
23		3.1556E+05	2.4E+00	561.746	89.405	0.011							
24		1.1860E+07	8.9E+00	3443.852	548.106	0.002							

¹ Total effective mass / participation factors of activated masses in X-, Y- and Z-direction.

No.	eigenmode number	f	eigenfrequency
LC	load case	T	eigenperiod
λ	eigenvalue	ξ	modal damping ratio
error	relative eigenvalue error	Meff	effective modal mass in X-, Y- and Z-direction
ω	circular eigenfrequency	participation	participation factors in X-, Y- and Z-direction

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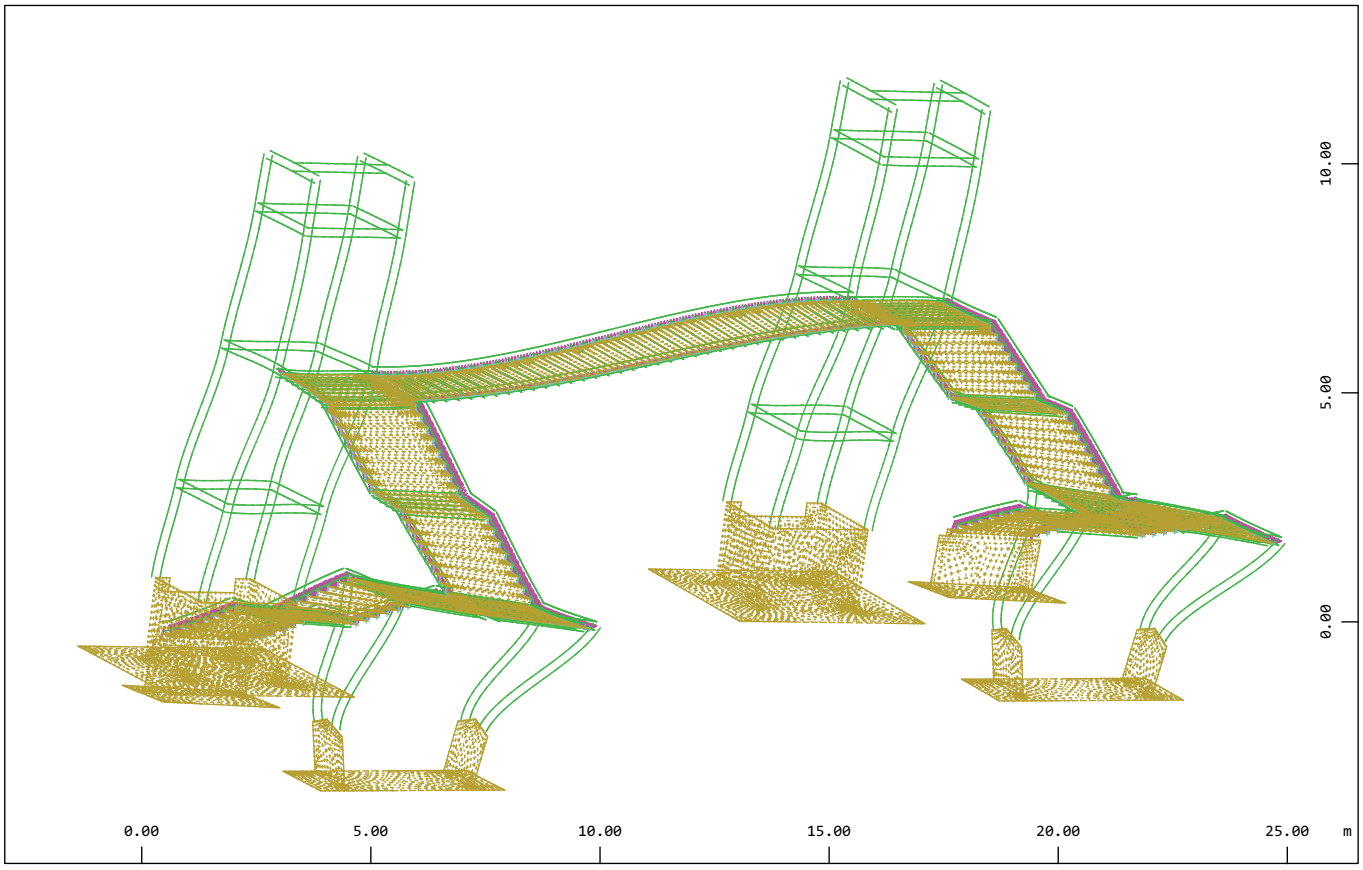
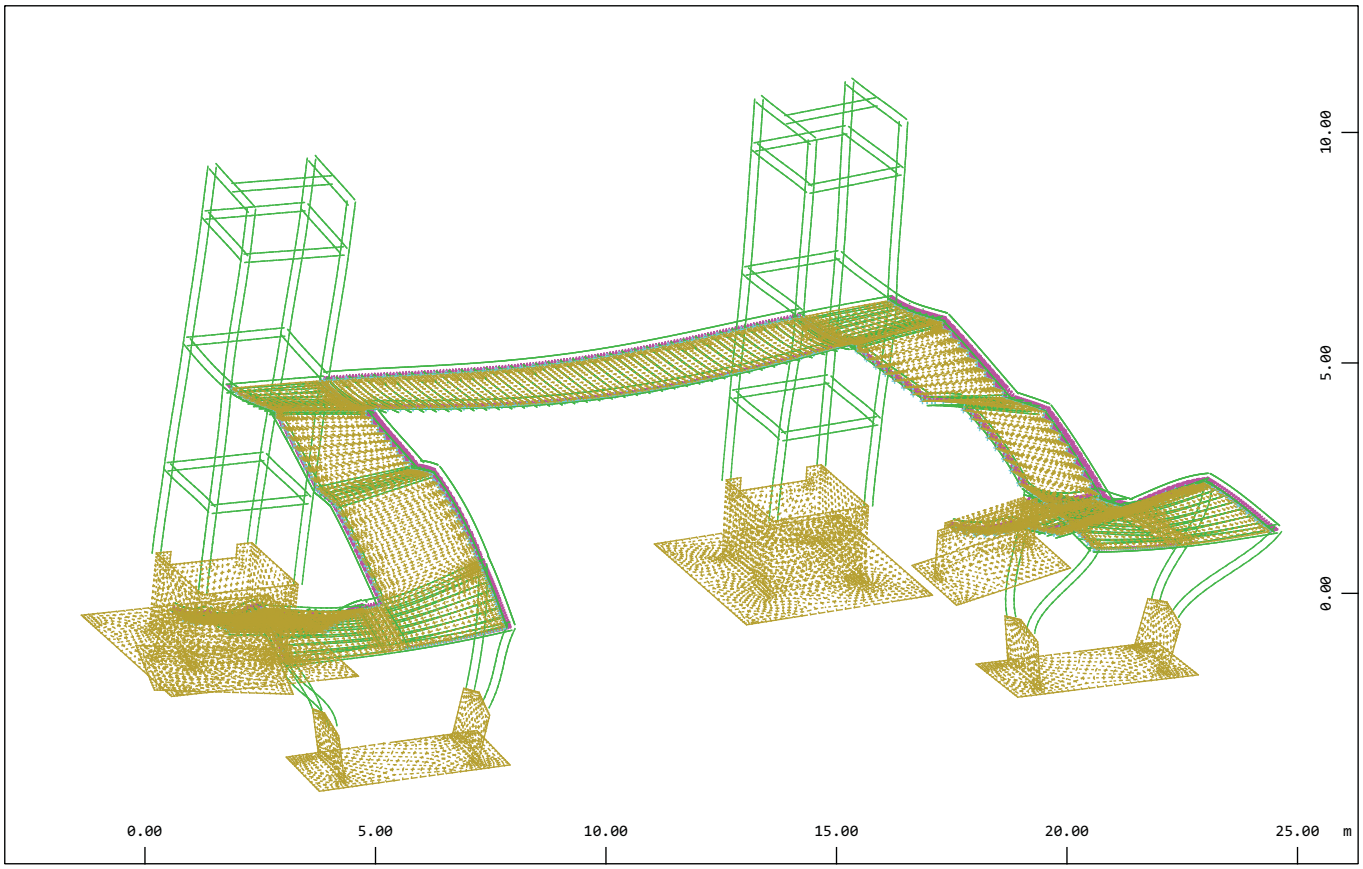
Graphical Output



Deformed Structure from LC 2001 Eigenform 1 f= 3.585 Hz Enlarged by 10.0

M 1 : 165
X * 0.502
Y * 0.906
Z * 0.962



Deformed Structure from LC 2002 Eigenform 2 f= 4.938 Hz Enlarged by 10.0

M 1 : 164
X * 0.502
Y * 0.906
Z * 0.962

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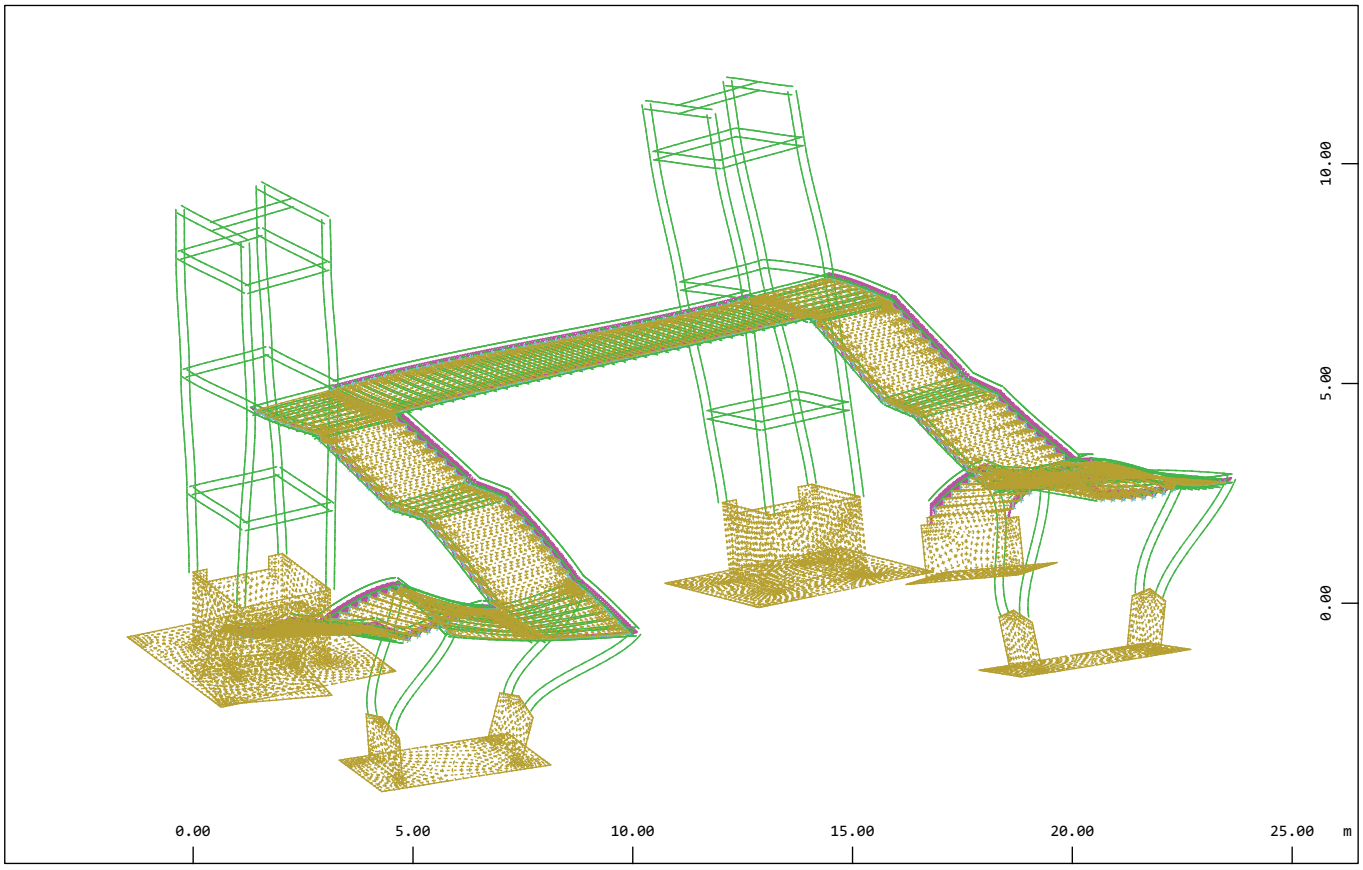
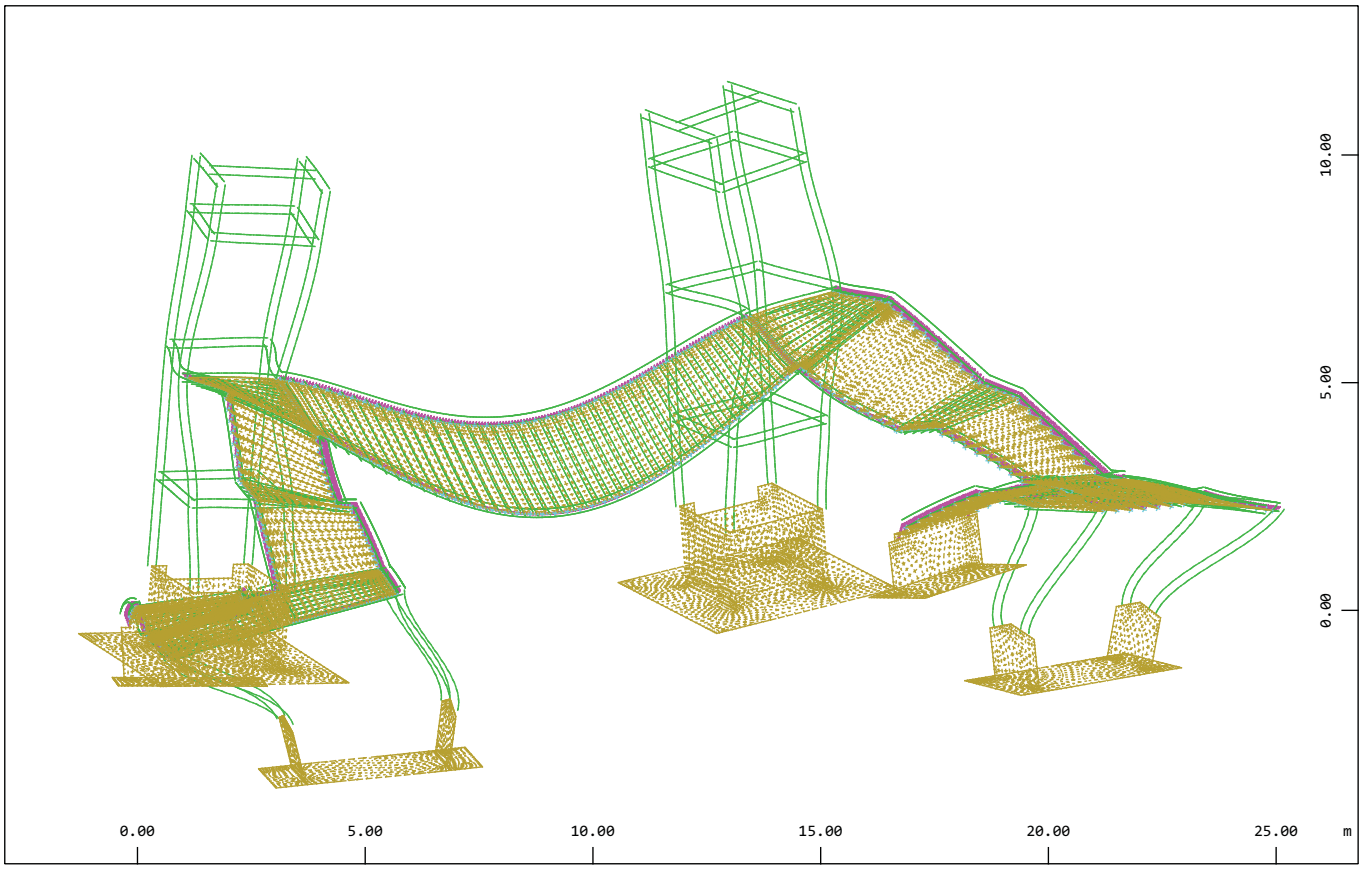
Graphical Output



Deformed Structure from LC 2003 Eigenform 3 f= 5.518 Hz Enlarged by 10.0

M 1 : 172
X * 0.502
Y * 0.906
Z * 0.962



Deformed Structure from LC 2004 Eigenform 4 f= 6.229 Hz Enlarged by 10.0

M 1 : 166
X * 0.502
Y * 0.906
Z * 0.962

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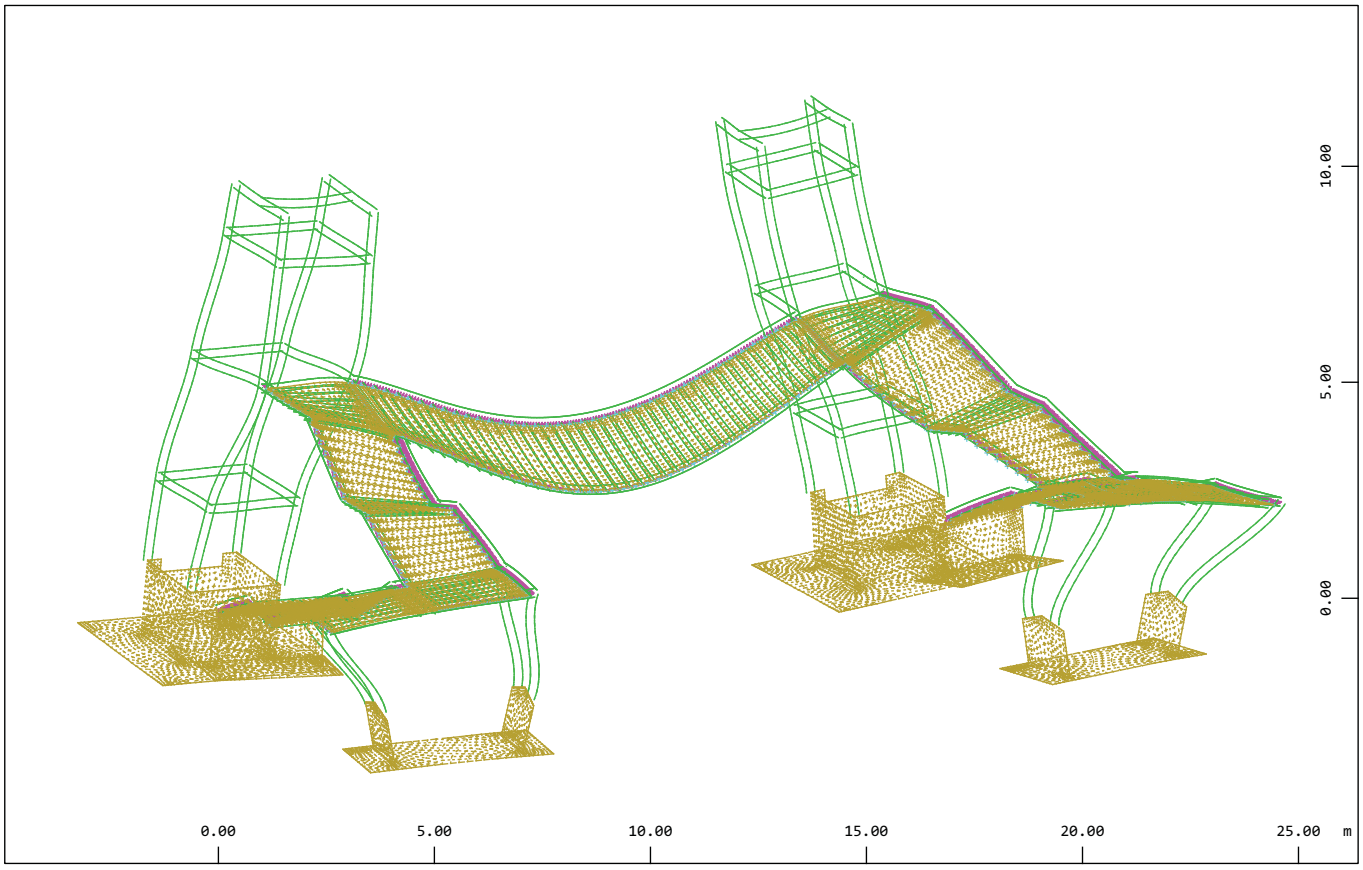
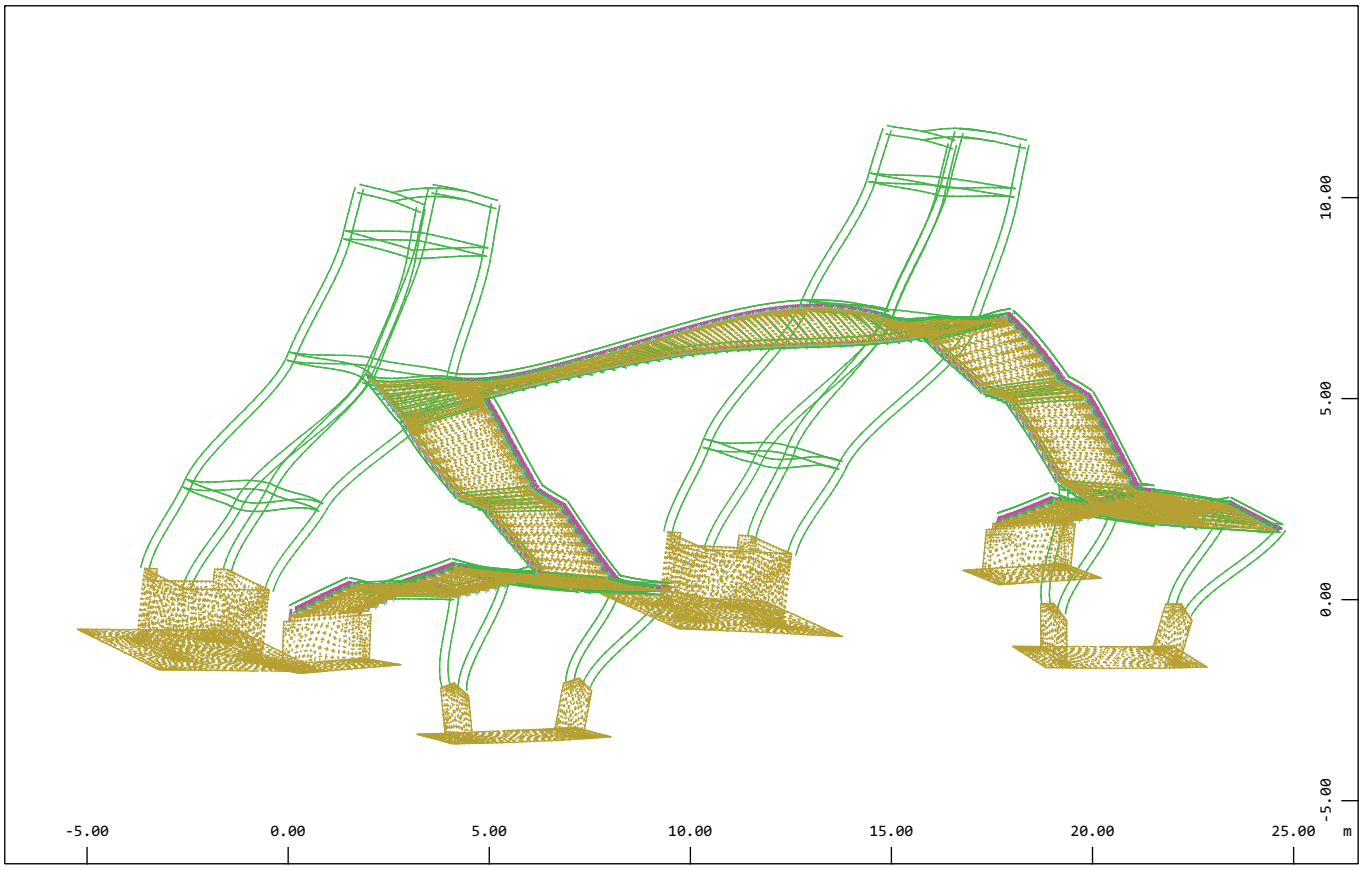
Graphical Output



Deformed Structure from LC 2005 Eigenform 5 f= 6.290 Hz Enlarged by 20.0

M 1 : 175
X * 0.502
Y * 0.906
Z * 0.962



Deformed Structure from LC 2006 Eigenform 6 f= 6.330 Hz Enlarged by 50.0

M 1 : 188
X * 0.502
Y * 0.906
Z * 0.962

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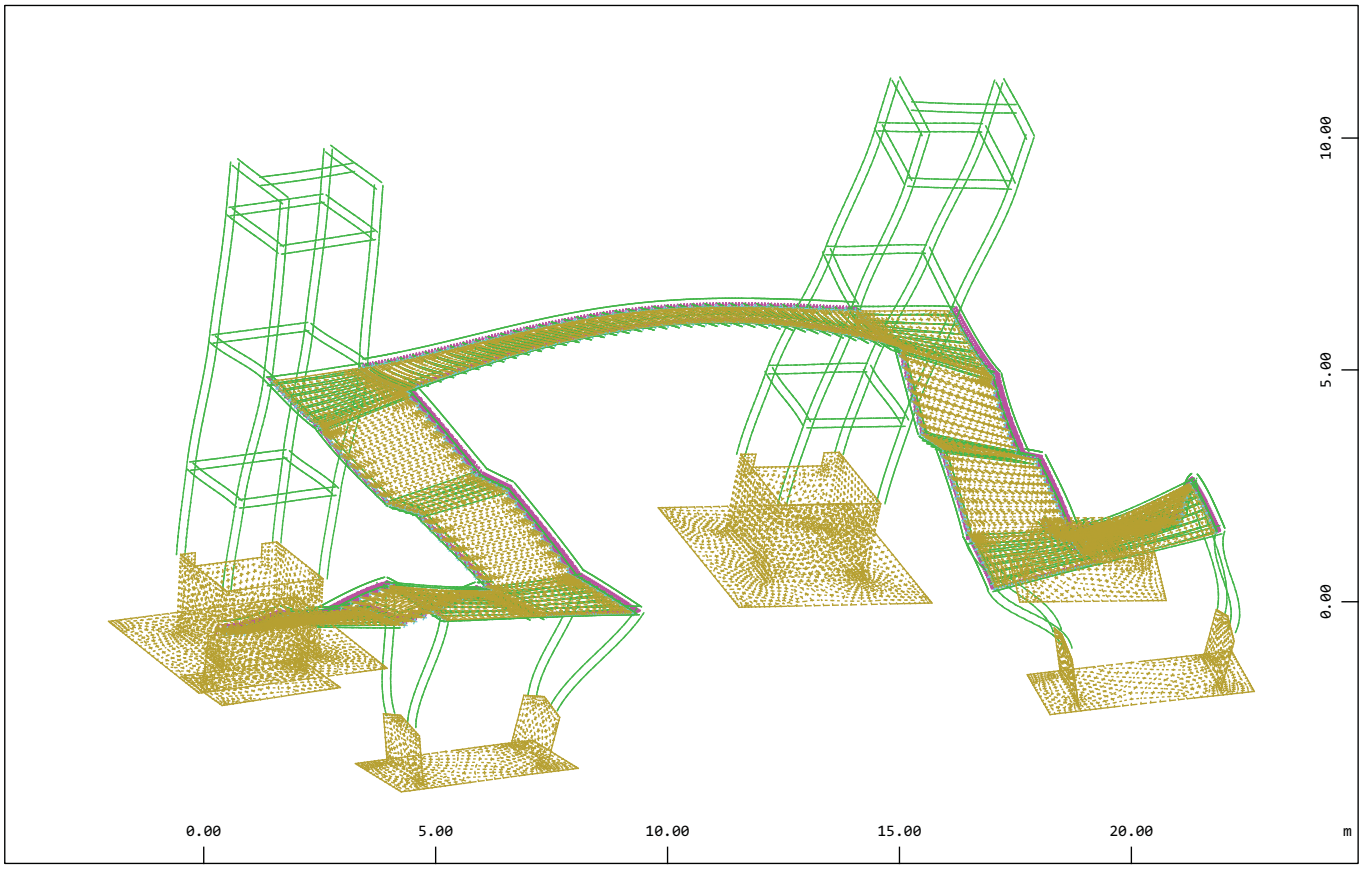
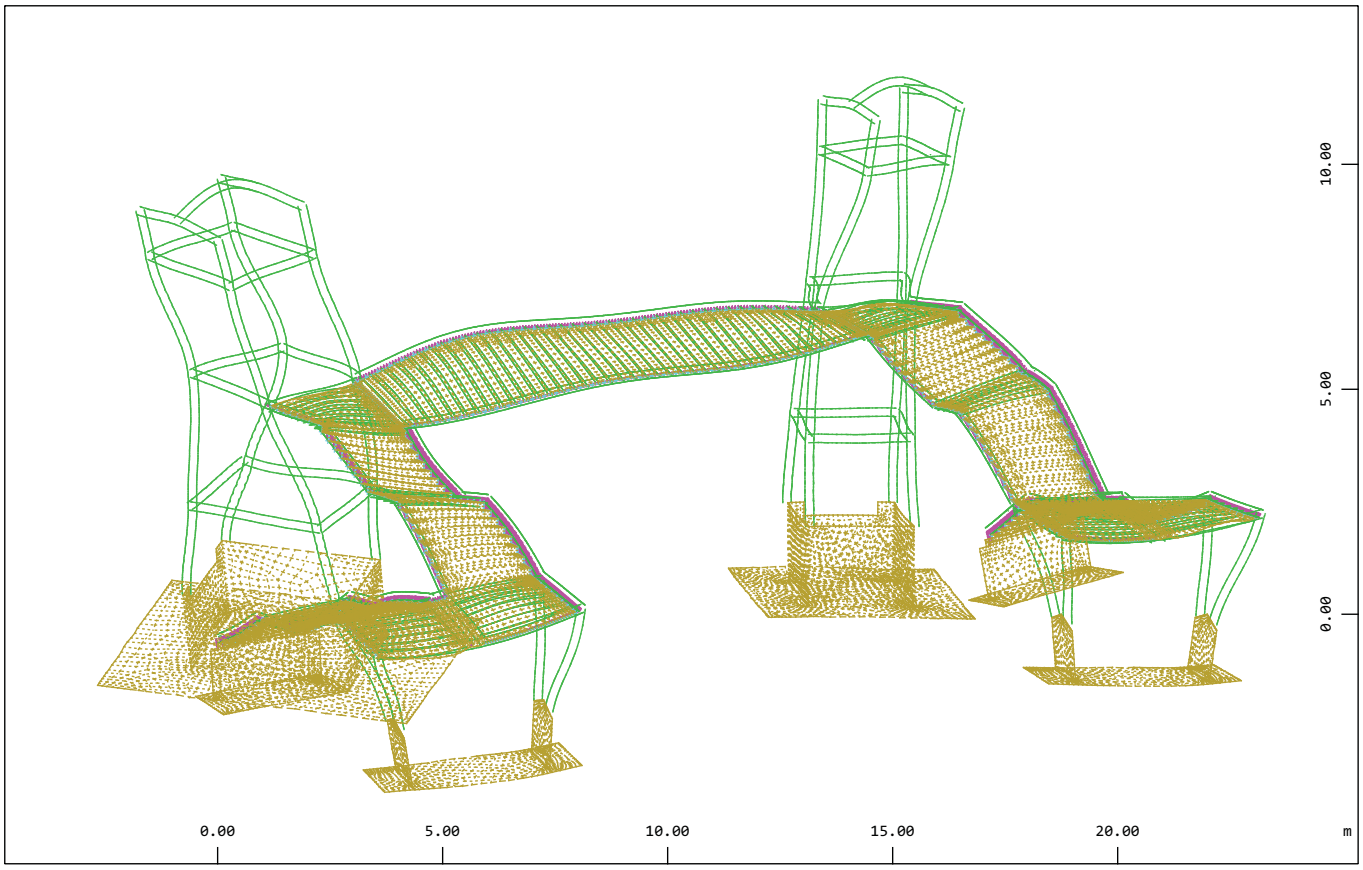
Graphical Output



Z
Y
X

Deformed Structure from LC 2007 Eigenform 7 f= 6.425 Hz Enlarged by 20.0

M 1 : 163
X * 0.502
Y * 0.906
Z * 0.962



Z
Y
X

Deformed Structure from LC 2008 Eigenform 8 f= 6.706 Hz Enlarged by 20.0

M 1 : 168
X * 0.502
Y * 0.906
Z * 0.962

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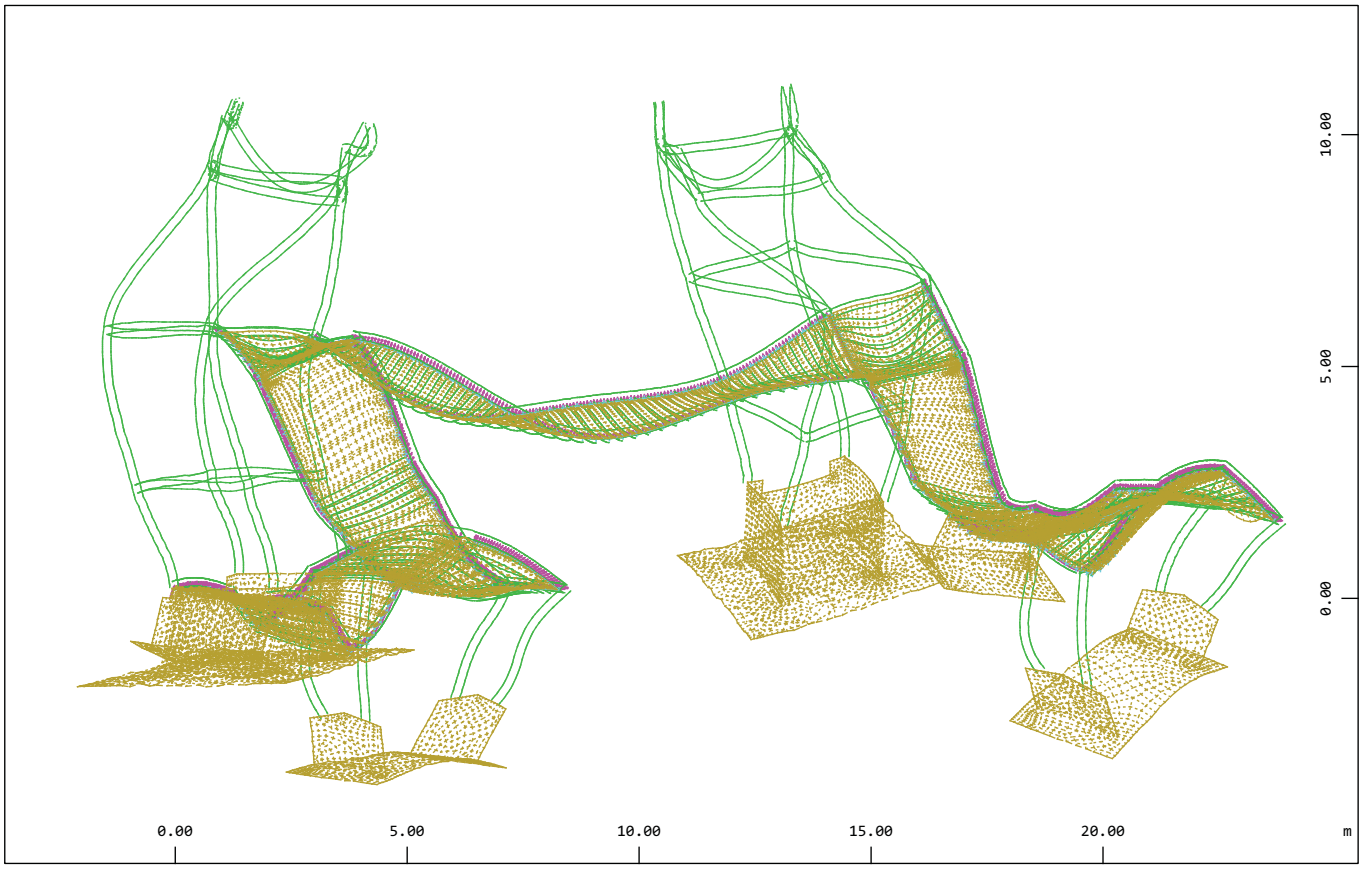
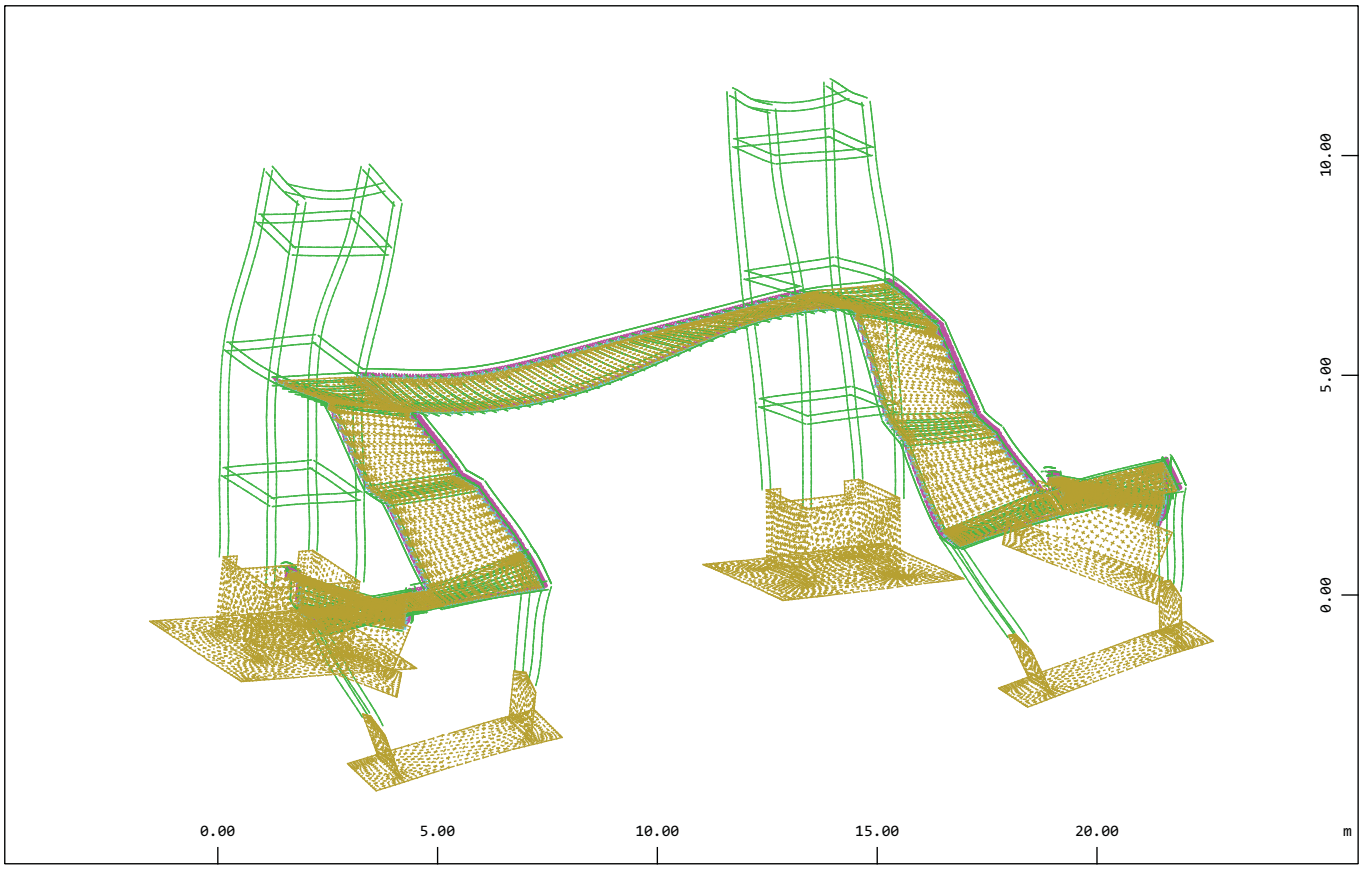
Graphical Output



Deformed Structure from LC 2009 Eigenform 9 f= 7.001 Hz Enlarged by 20.0

M 1 : 163
X * 0.502
Y * 0.906
Z * 0.962



Deformed Structure from LC 2010 Eigenform 10 f= 7.221 Hz Enlarged by 10.0

M 1 : 172
X * 0.502
Y * 0.906
Z * 0.962

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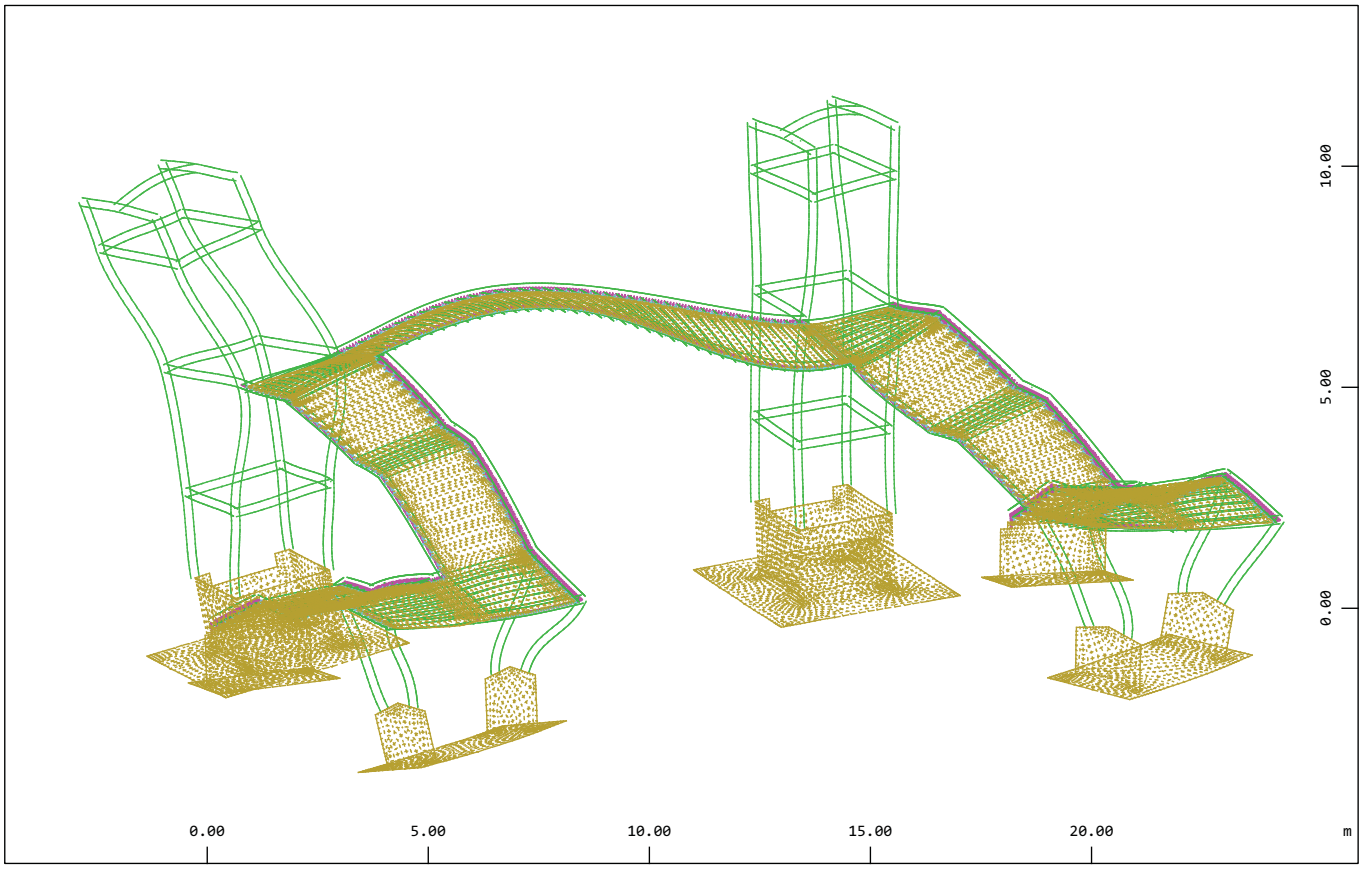
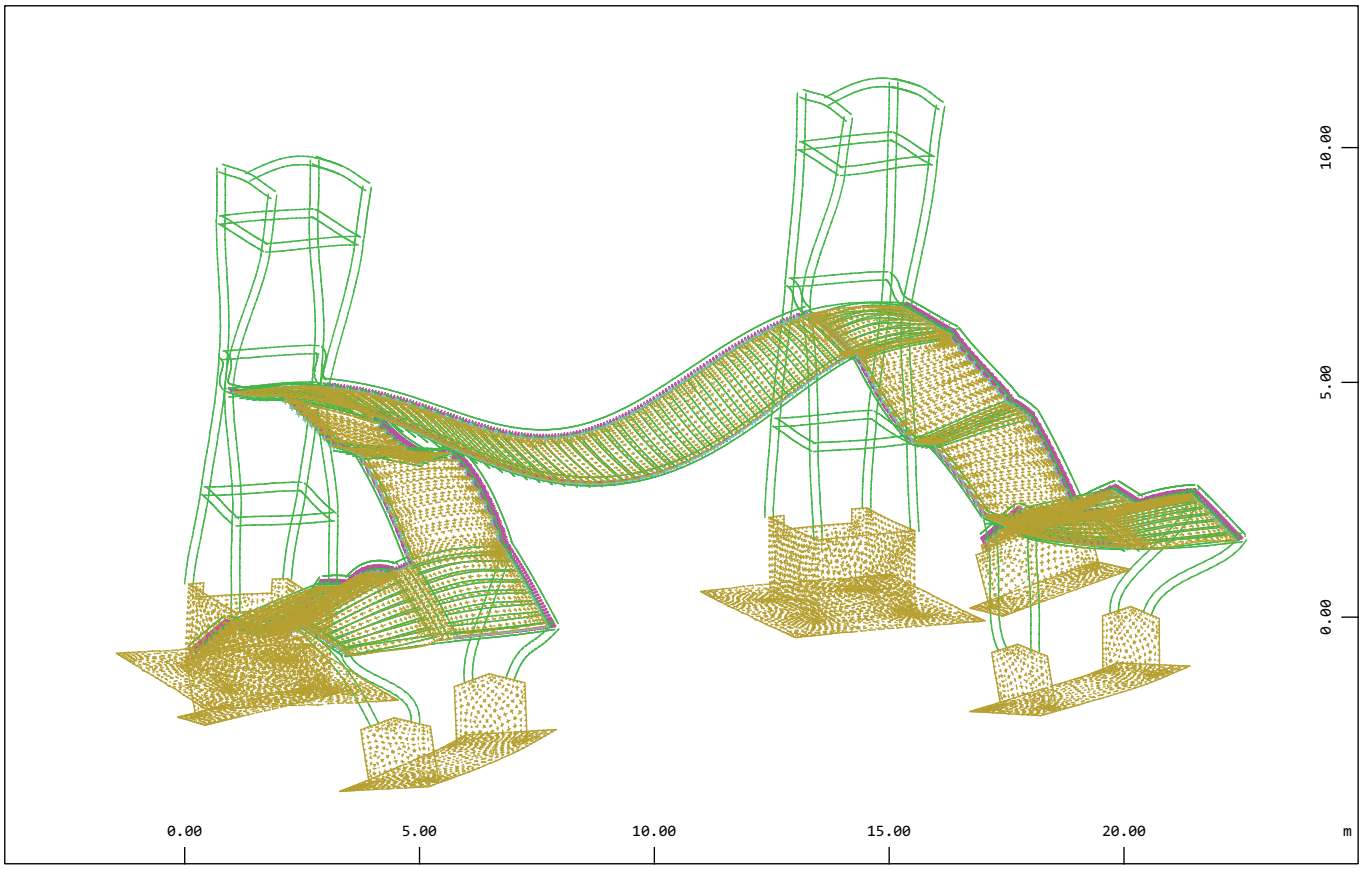
Graphical Output



Deformed Structure from LC 2011 Eigenform 11 f= 7.650 Hz Enlarged by 10.0

M 1 : 171
X * 0.502
Y * 0.906
Z * 0.962



Deformed Structure from LC 2012 Eigenform 12 f= 8.012 Hz Enlarged by 10.0

M 1 : 161
X * 0.502
Y * 0.906
Z * 0.962

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10. ANEJO 5. MODOS DE PANDEO

Table of Contents

Buckling Eigenvalues

Buckling Eigenvalues
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Buckling Eigenvalues 2

Graphical Output
deformed Structure (Nodal displacement + beam displacement + cable displacement) 3
deformed Structure (Nodal displacement + beam displacement + cable displacement) 3
deformed Structure (Nodal displacement + beam displacement + cable displacement) 4
deformed Structure (Nodal displacement + beam displacement + cable displacement) 4
deformed Structure (Nodal displacement + beam displacement + cable displacement) 5
deformed Structure (Nodal displacement + beam displacement + cable displacement) 5

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Eigenvalues Easy

Primary loadcase for eigenvalue analysis is loadcase 1001
with deformation factor 0.0000 (on undeformed system)
Element stiffnesses are calculated on the stress state of the primary loadcase

Parameter of System of Equations

Number of unknowns 130596 DIRECT-SPARSE
Total entries 2398422
Total entries after fill in 14474576
Mass matrix 0 -
Geometric matrix 1064796 (consistent)

Buckling Eigenvalues

Using Vectoriteration
Iterationsvectors 6
Eigenvalueshift 9.750 (automatically determined)

No	LC	Relativ error	buckling factor
1	3001	2.60E-19	9.862
2	3002	2.78E-19	9.996
3	3003	3.68E-10	12.143
4	3004	6.31E-09	12.678
5	3005	1.93E-08	12.846
6	3006	3.36E-07	13.749

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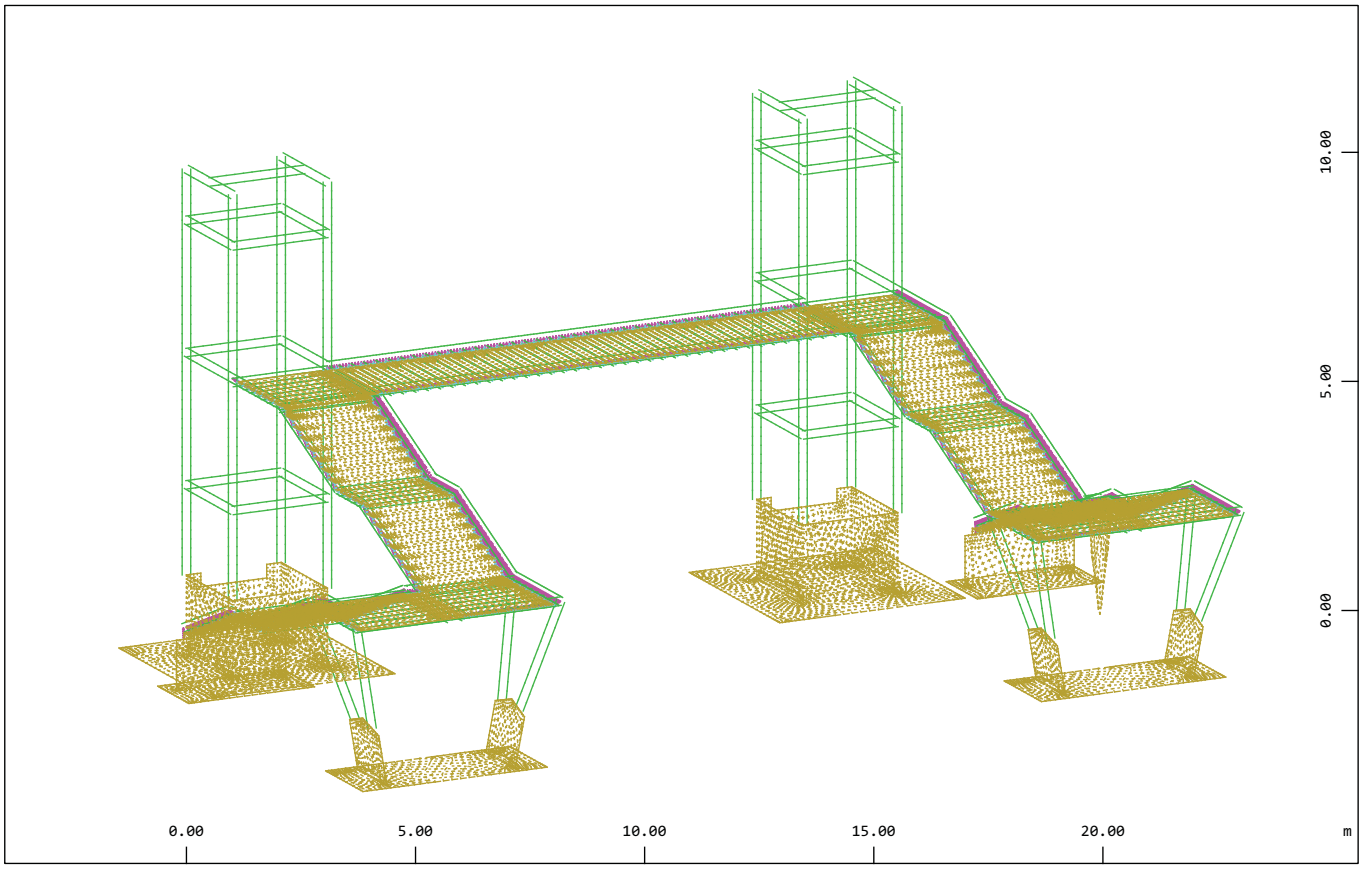
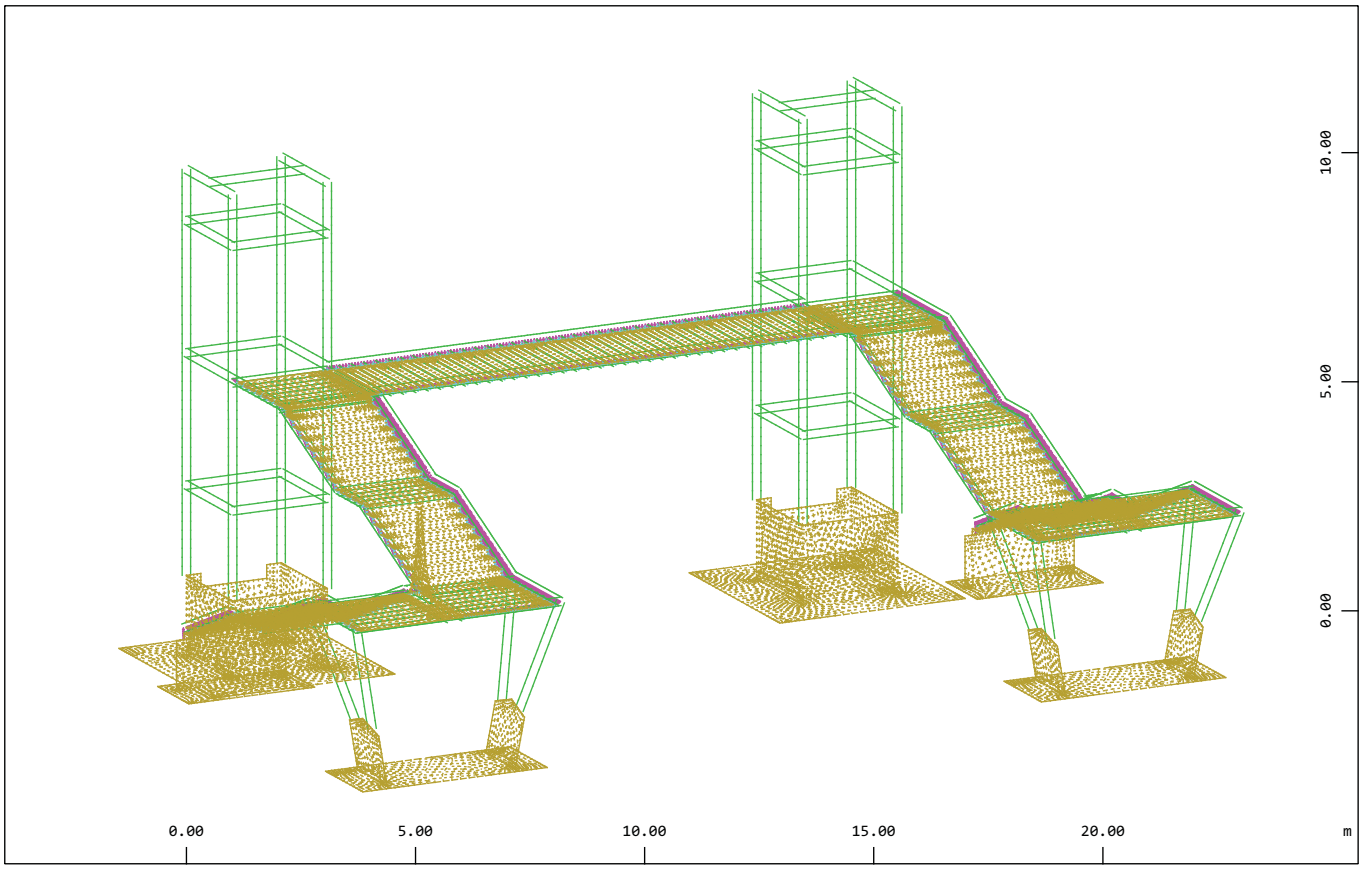
Graphical Output



Deformed Structure from LC 3001 Buckling 1 fact 9.86 Enlarged by 50.0

M 1 : 165
X * 0.502
Y * 0.906
Z * 0.962



Deformed Structure from LC 3002 Buckling 2 fact 10.00 Enlarged by 50.0

M 1 : 165
X * 0.502
Y * 0.906
Z * 0.962

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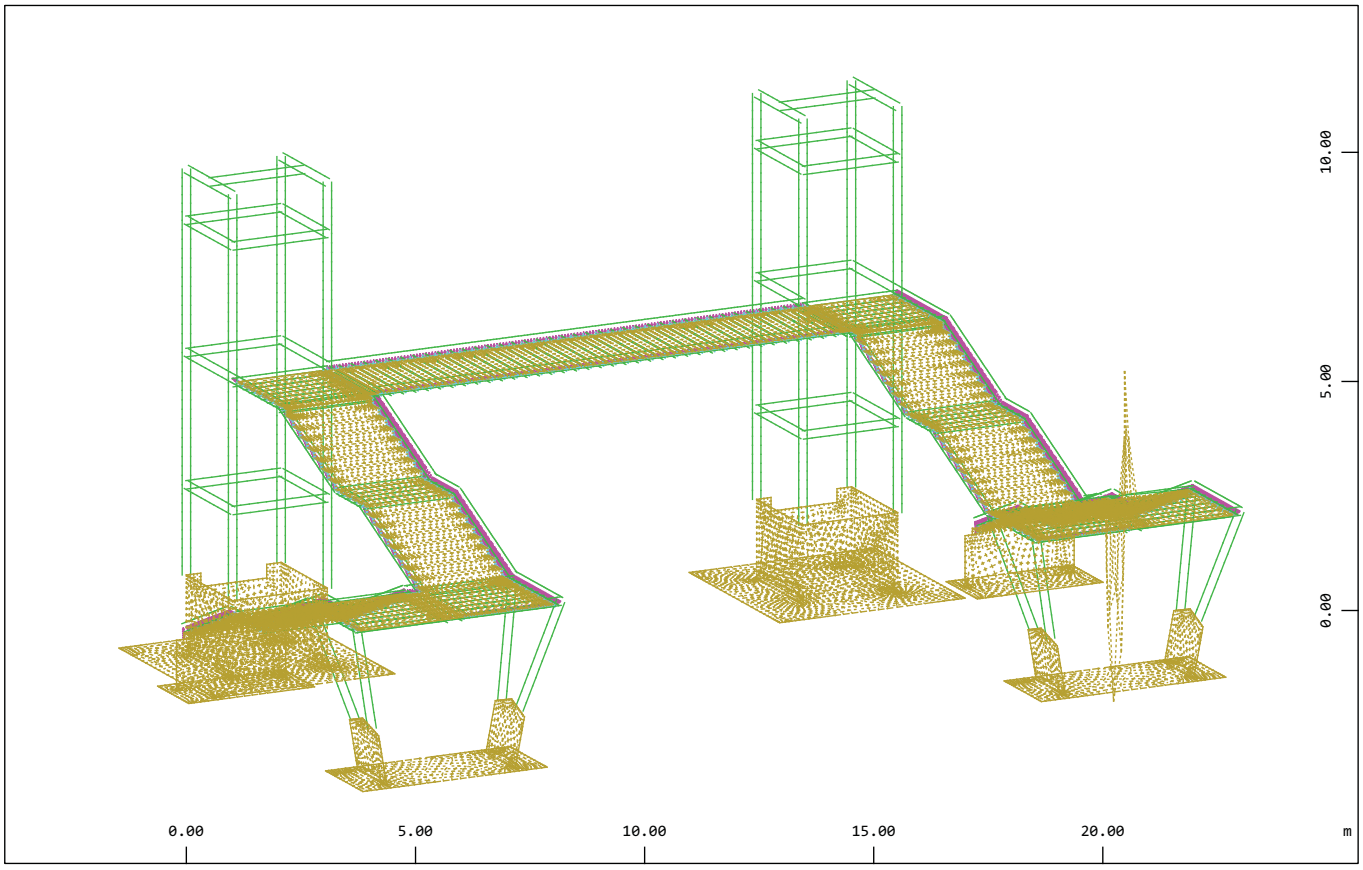
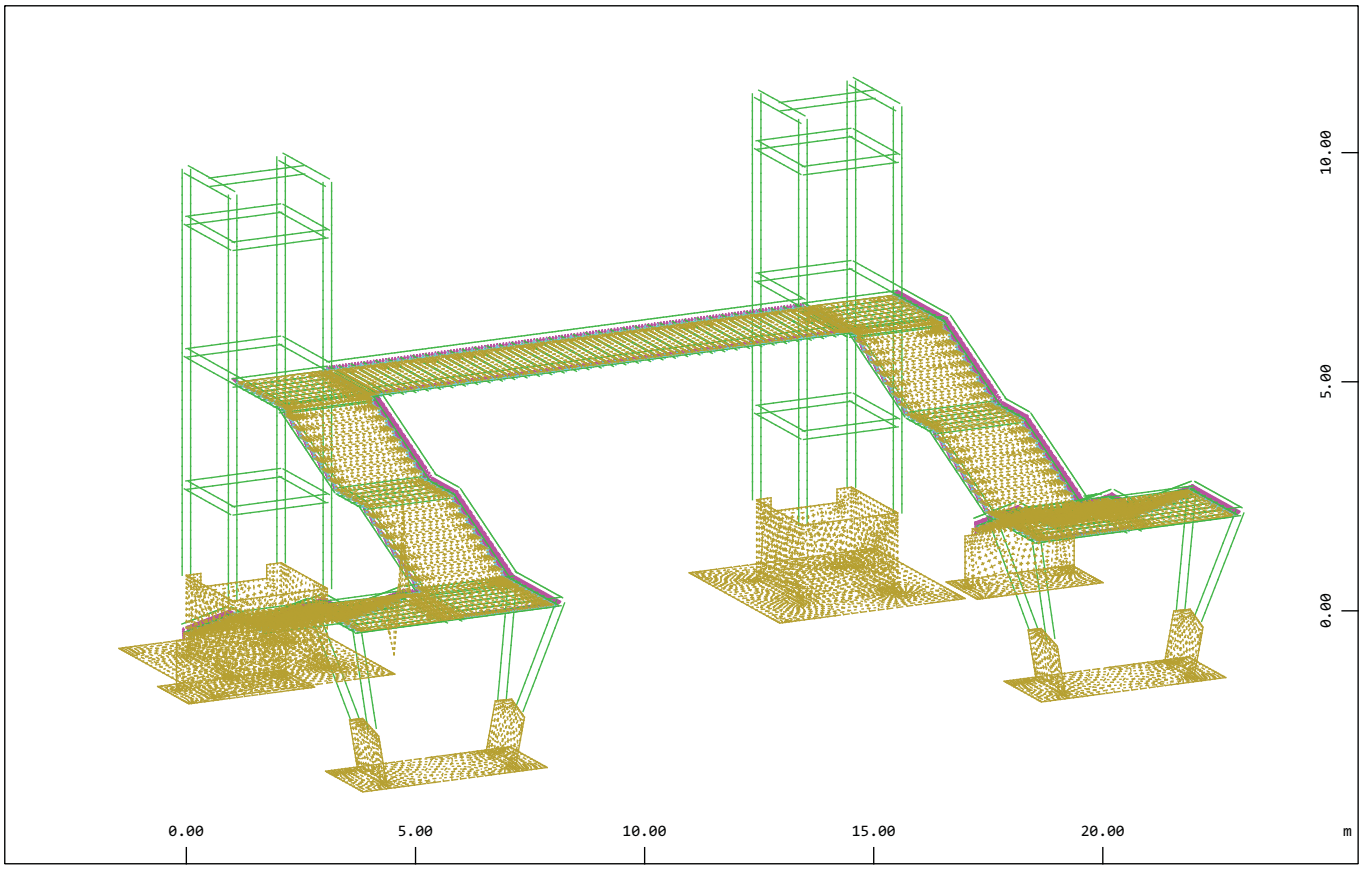
Graphical Output



Z
Y
X

Deformed Structure from LC 3003 Buckling 3 fact 12.14 Enlarged by 100.0

M 1 : 165
X * 0.502
Y * 0.906
Z * 0.962



Z
Y
X

Deformed Structure from LC 3004 Buckling 4 fact 12.68 Enlarged by 50.0

M 1 : 165
X * 0.502
Y * 0.906
Z * 0.962

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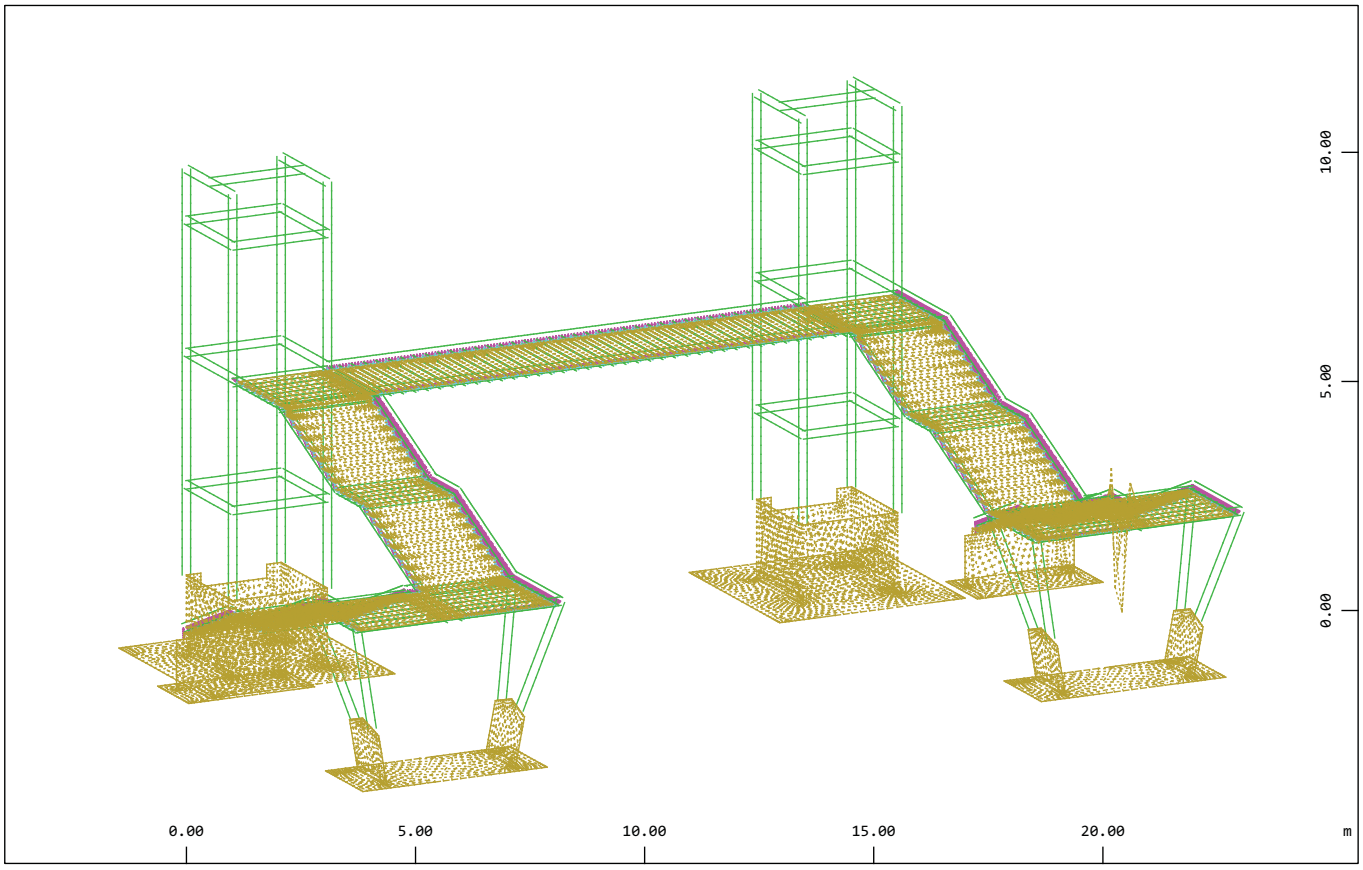
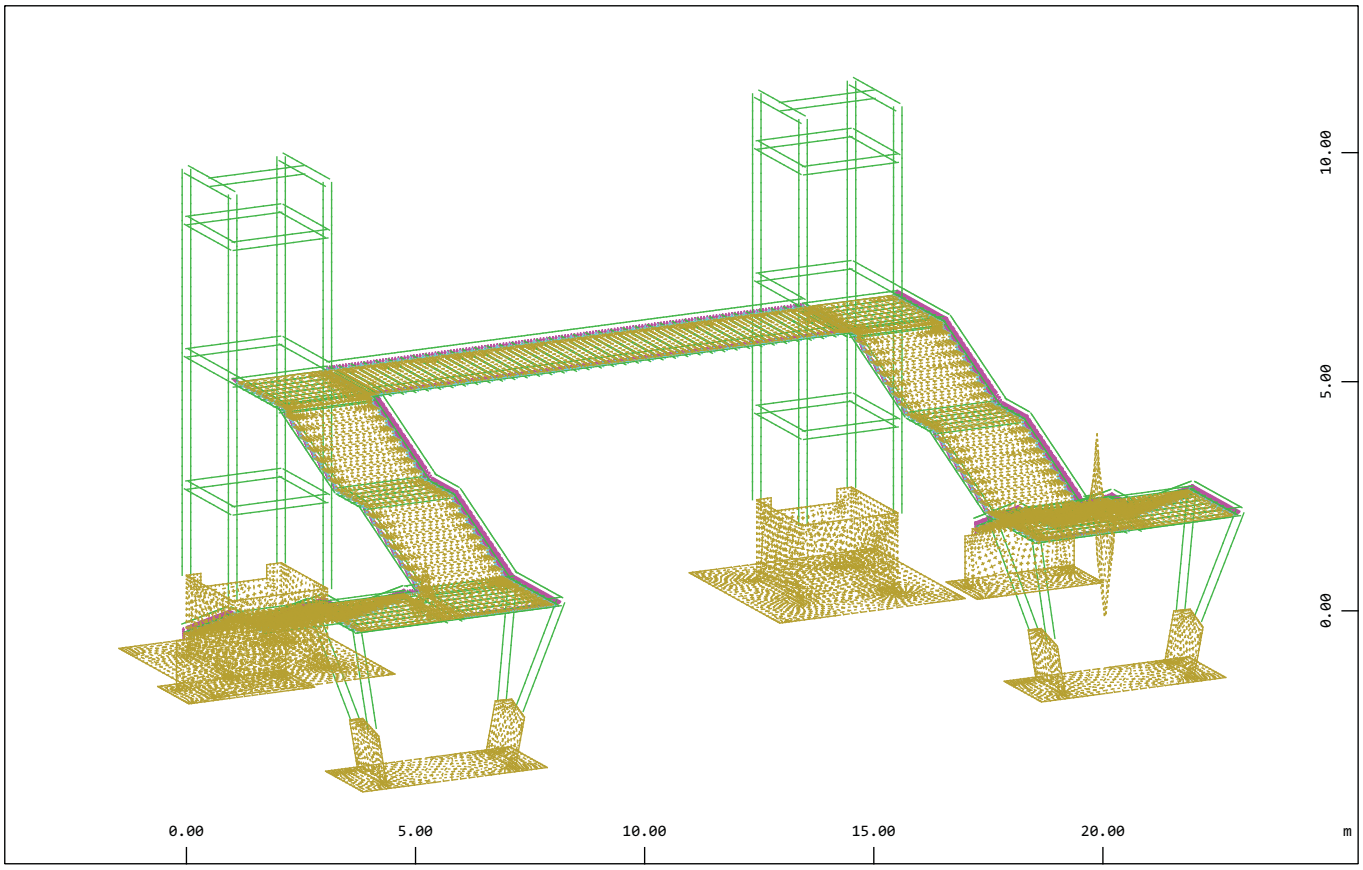
Graphical Output



Deformed Structure from LC 3005 Buckling 5 fact 12.85 Enlarged by 50.0

M 1 : 165
X * 0.502
Y * 0.906
Z * 0.962



Deformed Structure from LC 3006 Buckling 6 fact 13.75 Enlarged by 50.0

M 1 : 165
X * 0.502
Y * 0.906
Z * 0.962

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11. ANEJO 6. VERIFICACIÓN ESTRUCTURA METÁLICA

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Steel Cross Sections Resistance (Beams)

Steel Cross Sections Resistance (Beams) (Beams)
Default design code is EuroNorm EN 1993-2:2006 Steel Structures (Espagna) V 2020 2
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Selected Beam Elements 2
Considered Load Cases 2
Stresses and Resistance of Sections 3
Combinations of Load Cases 3
Maximum Stresses and Checked Limits 3
Maximum Utilisation Level 3

Graphical Output
Beam Elements , Utilisation level Decisive - Total DC: 901 4

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Steel Cross Sections Resistance (Beams)

Default design code is EuroNorm EN 1993-2:2006 Steel Structures (Espagna) V 2020
Structure: C (Footbridges)

Materials

Mat	Classification
1	S 355 (EN 1993)
2	C 30/37 (EN 1992)
3	C 30/37 (EN 1992)
4	B 500 B (EN 1992)

Selected Beam Elements

Selection	NoA	NoE	x[m]	Type
Grp 1	10001			

NoA,NoE range of element numbers
x[m] x-ordinate of beam section or station on axis
Type element type

Reinforcement will be accounted for sectional values as defined in AQUA
Reinforcements saved as Design case No. 1

Considered Load Cases

LC	ACT	REF	CS	Designation	γ-u	γ-f	ψ_0	ψ_1	ψ_2	$\psi_1$inf	SUP
1001	(D)			1.35G_1+1.5Q+1.5Q+1.5Q+1.5Q+...							
1002	(D)			G_1+G_1+G_1+1.5Q+1.5Q+1.5Q+1...							
2121	(D)			MAX-N BEAM Forces in Beam Elemen							
2122	(D)			MIN-N BEAM Forces in Beam Elemen							
2123	(D)			MAX-VY BEAM Forces in Beam Eleme							
2124	(D)			MIN-VY BEAM Forces in Beam Eleme							
2125	(D)			MAX-VZ BEAM Forces in Beam Eleme							
2126	(D)			MIN-VZ BEAM Forces in Beam Eleme							
2127	(D)			MAX-MT BEAM Forces in Beam Eleme							
2128	(D)			MIN-MT BEAM Forces in Beam Eleme							
2129	(D)			MAX-MY BEAM Forces in Beam Eleme							
2130	(D)			MIN-MY BEAM Forces in Beam Eleme							
2131	(D)			MAX-MZ BEAM Forces in Beam Eleme							
2132	(D)			MIN-MZ BEAM Forces in Beam Eleme							
2221	(D)			MAX-N BEAM Forces in Beam Elemen							
2222	(D)			MIN-N BEAM Forces in Beam Elemen							
2223	(D)			MAX-VY BEAM Forces in Beam Eleme							
2224	(D)			MIN-VY BEAM Forces in Beam Eleme							
2225	(D)			MAX-VZ BEAM Forces in Beam Eleme							
2226	(D)			MIN-VZ BEAM Forces in Beam Eleme							
2227	(D)			MAX-MT BEAM Forces in Beam Eleme							
2228	(D)			MIN-MT BEAM Forces in Beam Eleme							
2229	(D)			MAX-MY BEAM Forces in Beam Eleme							
2230	(D)			MIN-MY BEAM Forces in Beam Eleme							
2231	(D)			MAX-MZ BEAM Forces in Beam Eleme							
2232	(D)			MIN-MZ BEAM Forces in Beam Eleme							

LC load case
ACT action
REF reference point for forces and moments
CS section the load case is acting on
SUP action type, group and superposition category

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Steel Cross Sections Resistance (Beams)

Stresses and Resistance of Sections

Combinations of Load Cases

Results are saved for load cases 1001 1002 2121 2122 2123 2124 2125
Results are saved for load cases 2126 2127 2128 2129 2130 2131 2132
Results are saved for load cases 2221 2222 2223 2224 2225 2226 2227
Results are saved for load cases 2228 2229 2230 2231 2232
Maximum results are saved to load case 901 GlobalMAX SIGMA

Maximum Stresses and Checked Limits

Mat	Check or Criterion		Value	Limit	Unit	Level	LC	Beam	x[m]
1	Centric compression	σ-n,c	159.93	355.00	MPa	0.451	2222	11457	0.000
	Centric tension	σ-n,t	125.87	355.00	MPa	0.355	2221	11457	0.000
	Longitud. compressive stress	σ-x	280.01	355.00	MPa	0.789	2122	11420	0.000
	Longitud. tensile stress	σ+x	273.05	355.00	MPa	0.769	2126	13737	0.000
	Shear stress	τ	167.70	204.96	MPa	0.818	2227	12941	0.000
	Von Mises stress	σ-v	311.16	355.00	MPa	0.876	2228	11452	0.000
	Shear in weldings			251.47	MPa				
	Plate slenderness c/t			1.00					
	Used safety factor	γ-m0		1.00	[-]				

Check for stress limits passed✓

Maximum Utilisation Level

	N	Vy	Vz	My	Mz	Mtp	Mts	Mb	Ncr	SCL	Total
	σ-x	σ+x	τ	σ-v	σ-s	σ-dyn	As-l	As-v	crack	c/t	
Section 3	0.011	0.018	0.057	0.328	0.070	0.042	0.000	0.000	-	(3)[1]	0.328
RHS 300 x 100 x 8 (EN	0.488	0.477	0.085	0.489	-	-	-	-	-	0.183	
Section 4	0.319	0.365	0.065	0.393	0.096	0.173	0.000	0.000	-	(3)[1]	0.589
RHS 350 x 150 x 8 (EN	0.610	0.556	0.560	0.615	-	-	-	-	-	0.678	
Section 5	0.410	0.317	0.194	0.445	0.136	0.202	0.000	0.000	-	(1)	0.454
RHS 200 x 150 x 8 (EN	0.789	0.573	0.818	0.876	-	-	-	-	-	0.374	
Section 6	0.189	0.095	0.035	0.177	0.144	0.040	0.000	0.000	-	(2)	0.382
RHS 100 x 50 x 3.2 (EN	0.513	0.327	0.163	0.513	-	-	-	-	-	0.342	
Section 7	0.075	0.172	0.035	0.180	0.112	0.026	0.000	0.000	-	(3)[1]	0.693
RHS 300 x 200 x 8 (EN	0.693	0.594	0.290	0.693	-	-	-	-	-	0.522	
Section 8	0.183	0.021	0.042	0.481	0.242	0.024	0.000	0.000	-	(1)	0.540
SHS 100 x 100 x 8 (EN	0.773	0.769	0.080	0.774	-	-	-	-	-	0.217	
Section 9	0.008	0.005	0.014	0.055	0.054	0.003	0.000	0.000	-	(1)	0.060
HE 140 B (EN 10365)	0.121	0.125	0.024	0.125	-	-	-	-	-	0.045	
Total	0.410	0.365	0.194	0.481	0.242	0.202	0.000	0.000	-	(3)[1]	0.693
	0.789	0.769	0.818	0.876	-	-	-	-	-	0.678	

[1] Section of class 4 has small stresses allowing to be treated as class 3 (see EN 1993-1-1 5.5.2 (9))

N	normal force	τ	shear stress
Vy,Vz	shear force	σ-v	principal or von Mises stress
My,Mz	bending	σ-s	stress in reinforcements
Mtp,Mts	torsion (p)rimary and (s)econdary	σ-dyn	stress range
Mb	warping moment	As-l	longitudinal reinforcements
Ncr	flexural buckling	As-v	transverse reinforcements or concrete shear strength
SCL	cross-section class	crack	crack width
σ-x	longitud. compressive stress	c/t	stress dependant utilisation level (see AQB Manual 2.3.2)
σ+x	longitud. tensile stress	Total	most unfavorable utilisation for all checks

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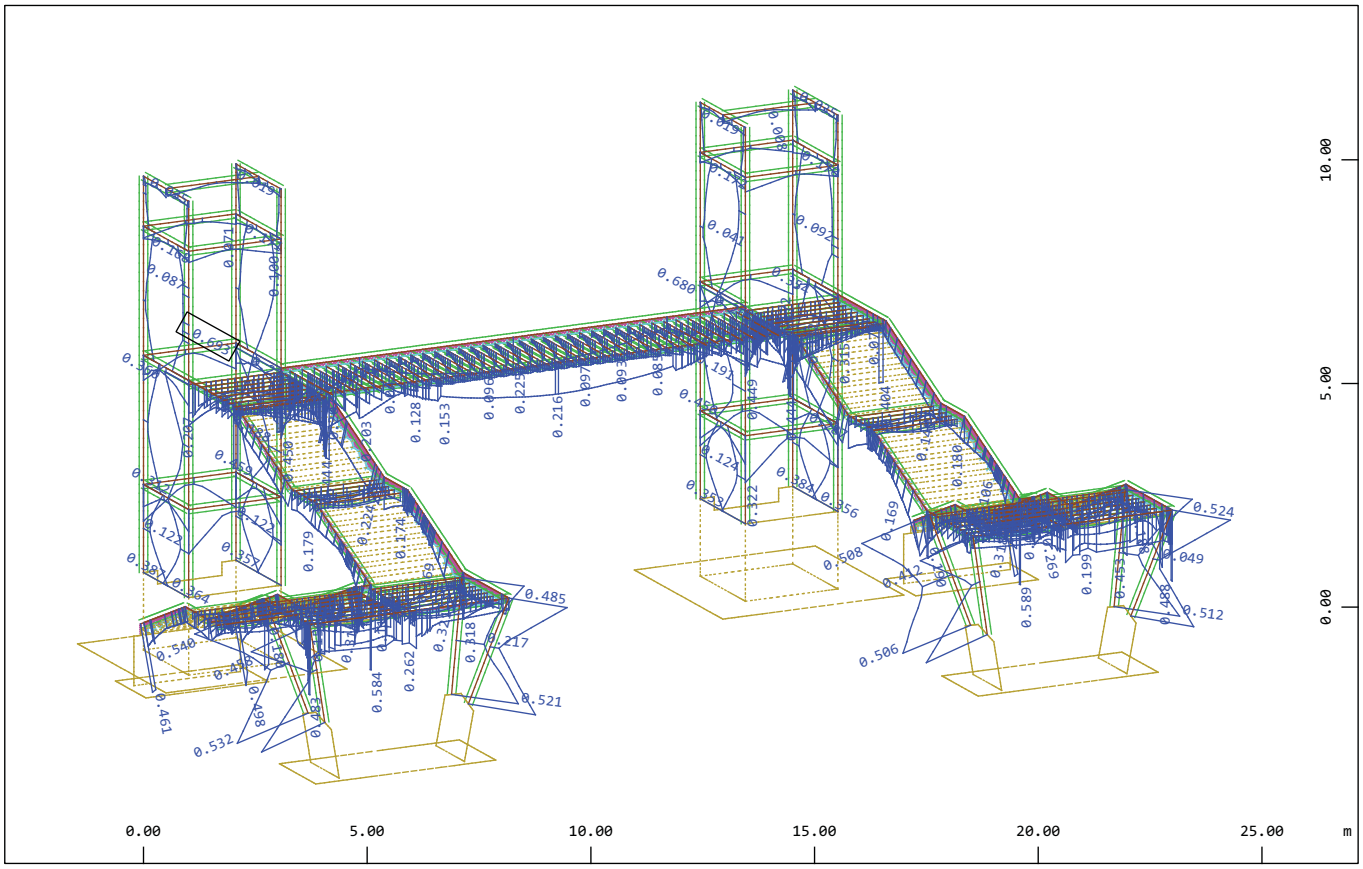
Graphical Output



Z
Y
X

Beam Elements , Utilisation level Decisive - Total, Design Case 901 GlobalMAX SIGMA , 1
cm 3D = 0.500 - (Max=0.693)

M 1 : 169
X * 0.502
Y * 0.906
Z * 0.962

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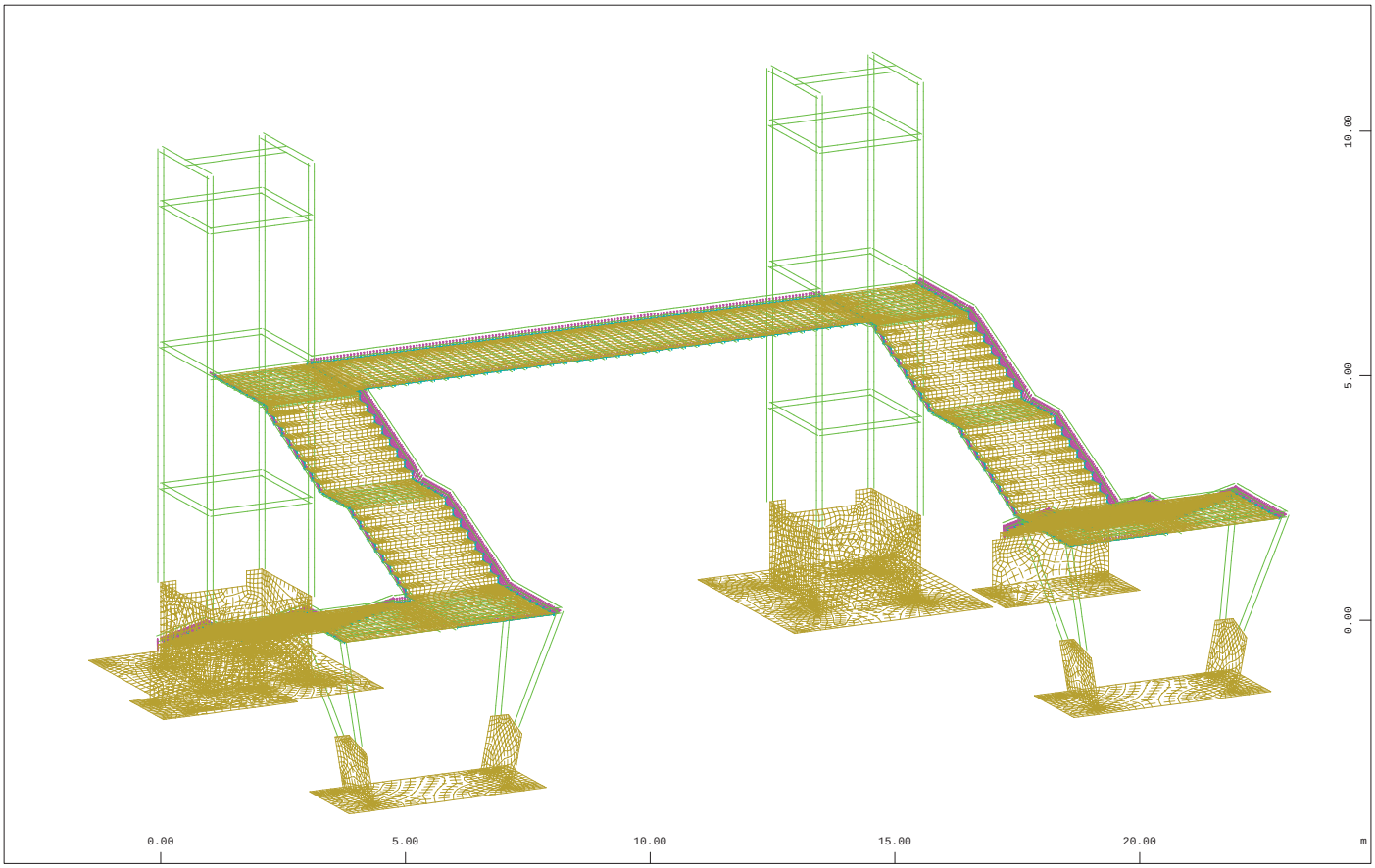
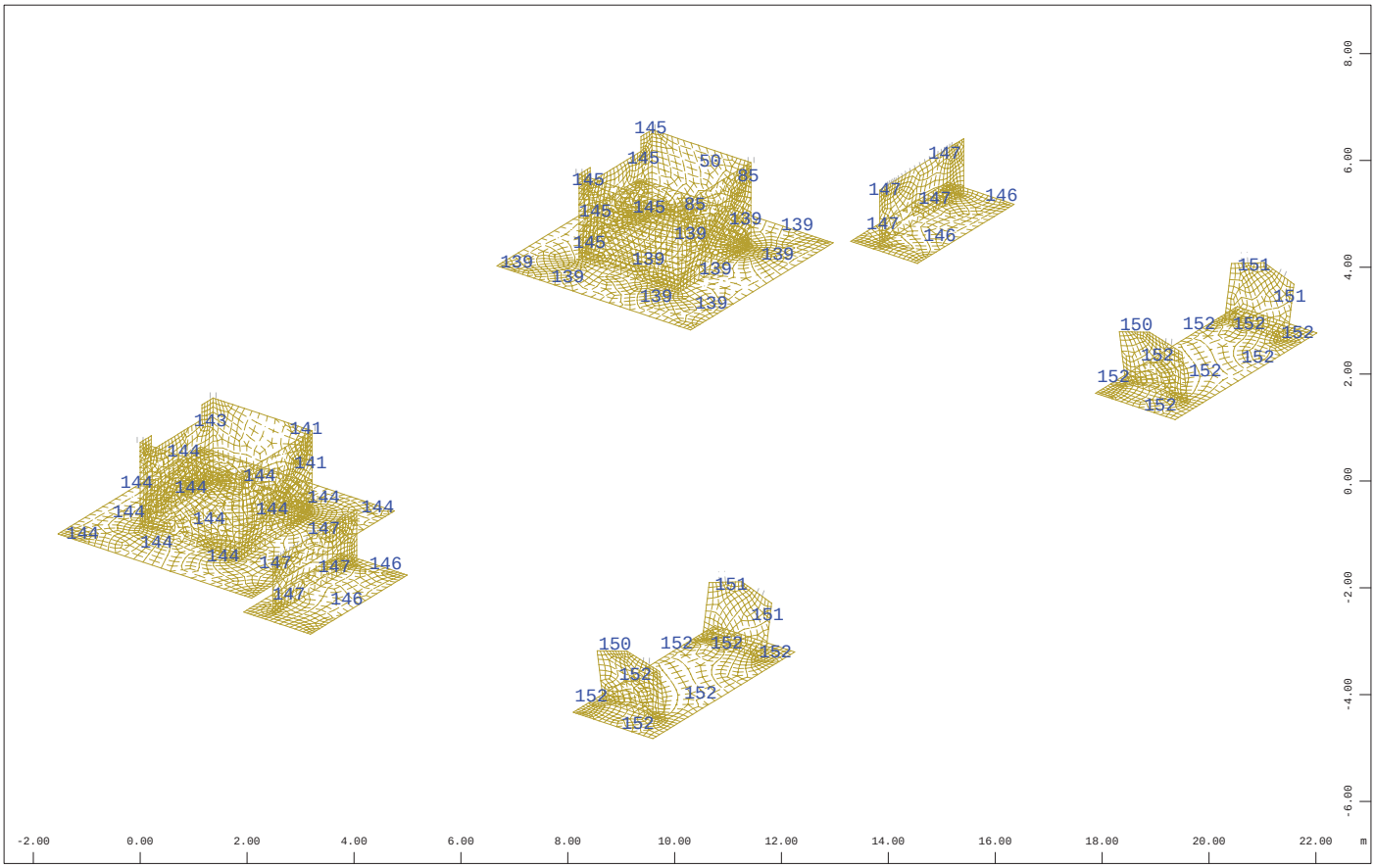
12. ANEJO 7. VERIFICACIÓN ESTRUCTURA DE HORMIGÓN



Z
Y
X
Structure

M 1 : 107
X * 0.502
Y * 0.906
Z * 0.962



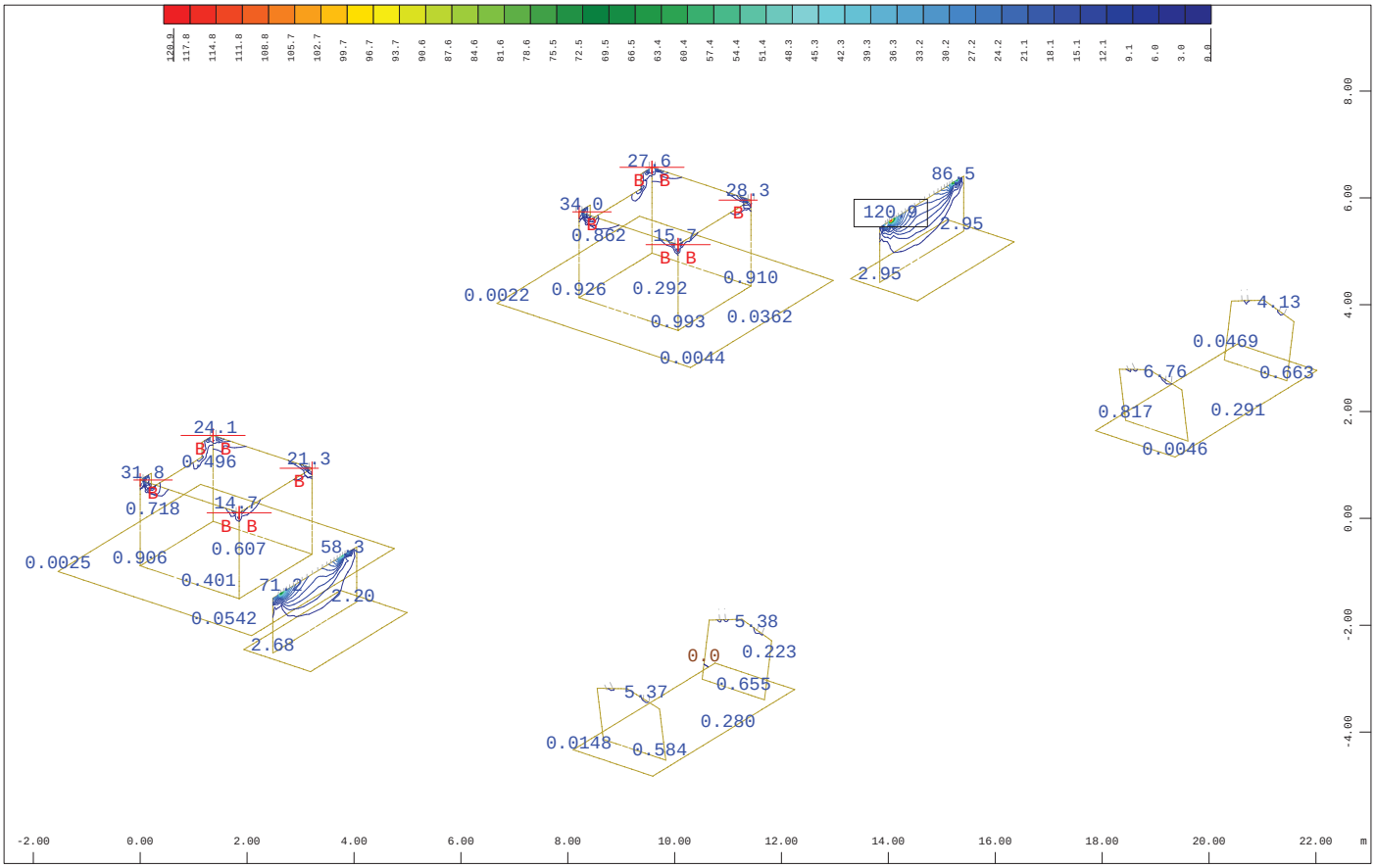
Z
Y
X

Sector of system Quadrilateral Elements Group 50 85 138...147 150...152

Quadrilateral Elements , Number of group (Max=152)

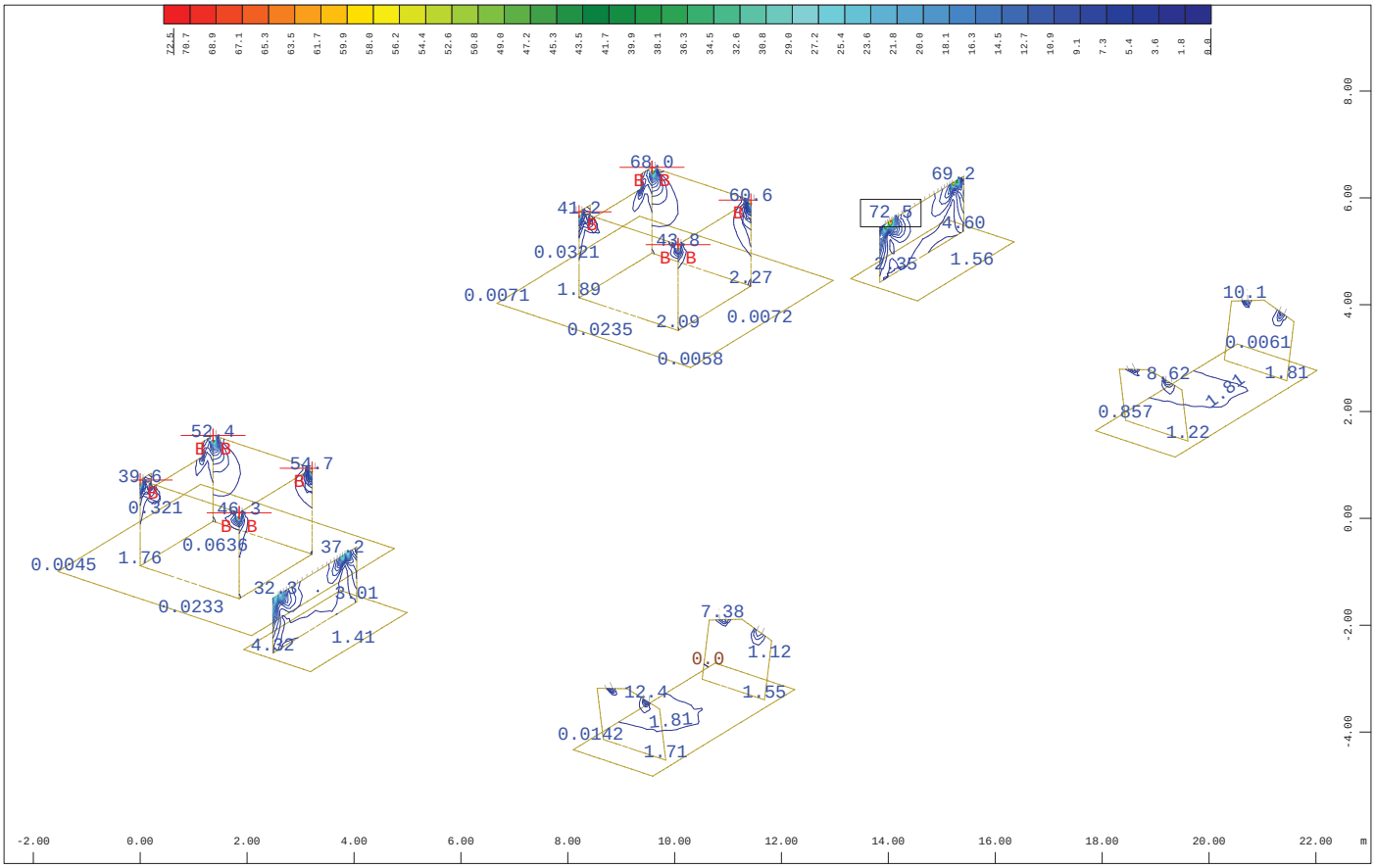
M 1 : 98

X * 0.848
Y * 0.695
Z * 0.893



Sector of system Quadrilateral Elements Group 50 85 138...147 150...152
Quadrilateral Elements , upper Principal reinforcements (1st layer), Design Case 1 ULS design , in Node(Max=120.9cm2/m), Design error in the reinforcement (=B) in Node, from 0 to 120.9 step 3.02

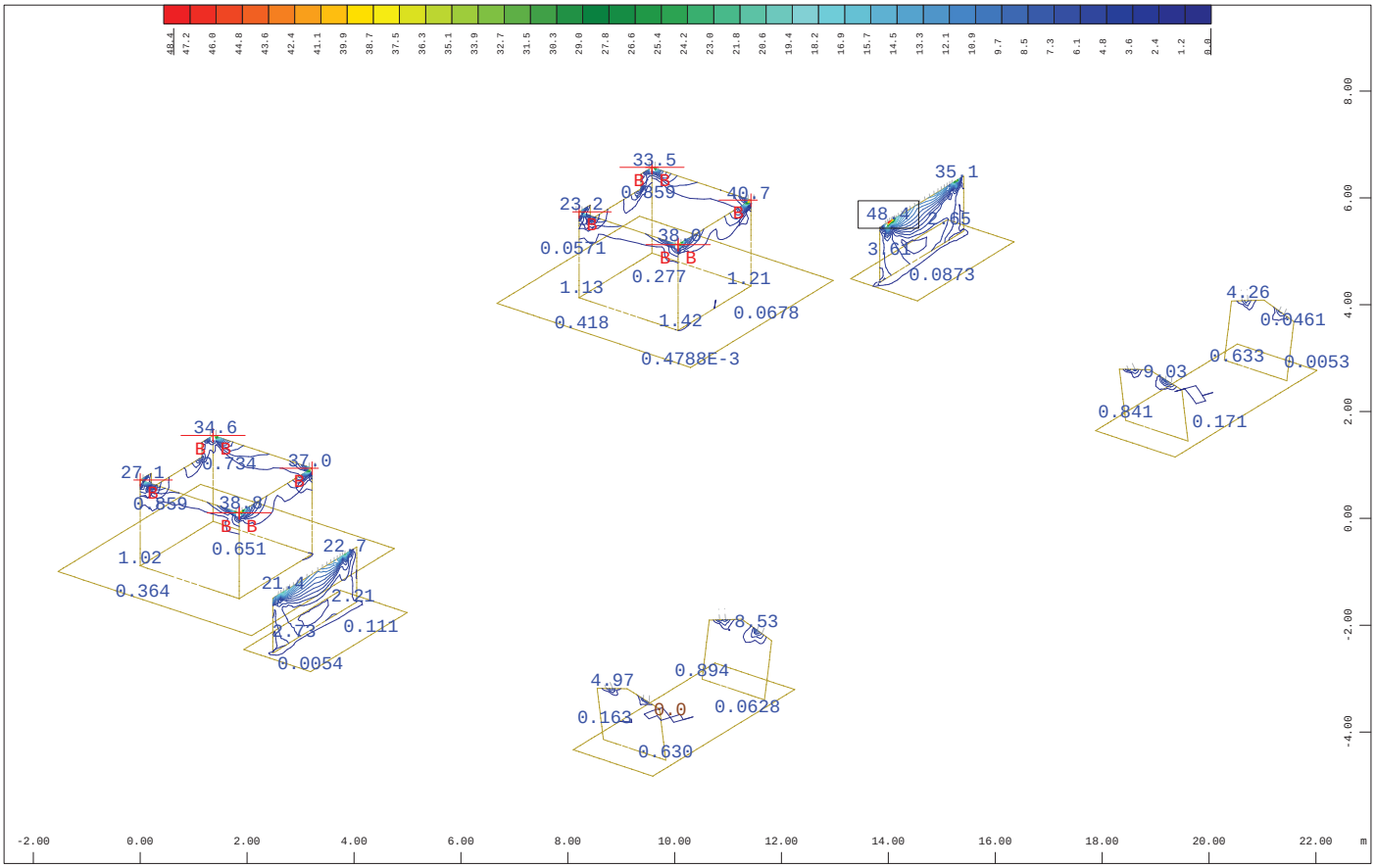
M 1 : 98
X * 0.848
Y * 0.695
Z * 0.893



Z
Y
X

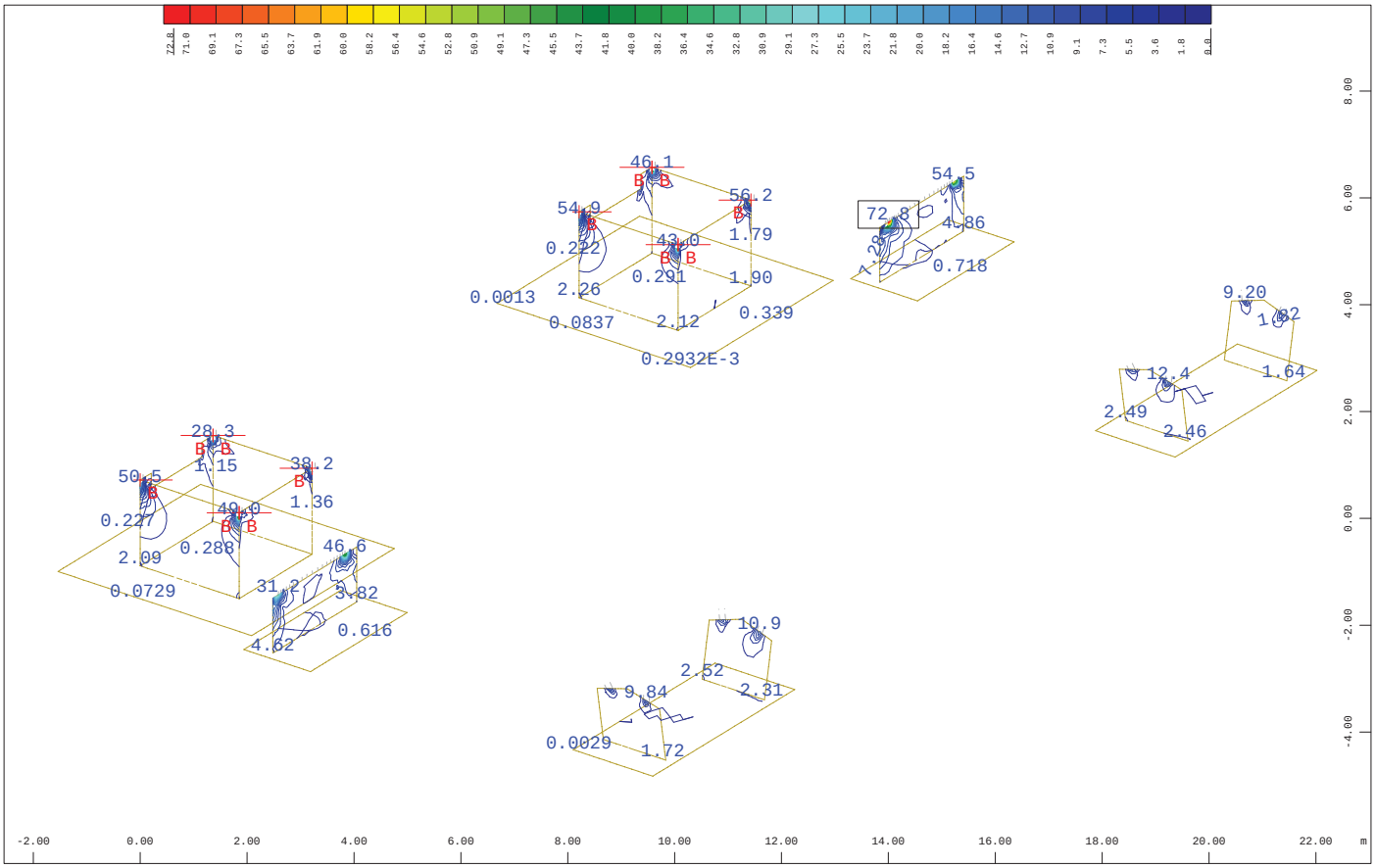
Sector of system Quadrilateral Elements Group 50 85 138...147 150...152
Quadrilateral Elements , upper Cross reinforcements (2nd layer), Design Case 1 ULS design , in Node(Max=72.5cm2/m), Design error in the reinforcement (=B) in Node, from 0 to 72.5 step 1.81

M 1 : 98
X * 0.848
Y * 0.695
Z * 0.893



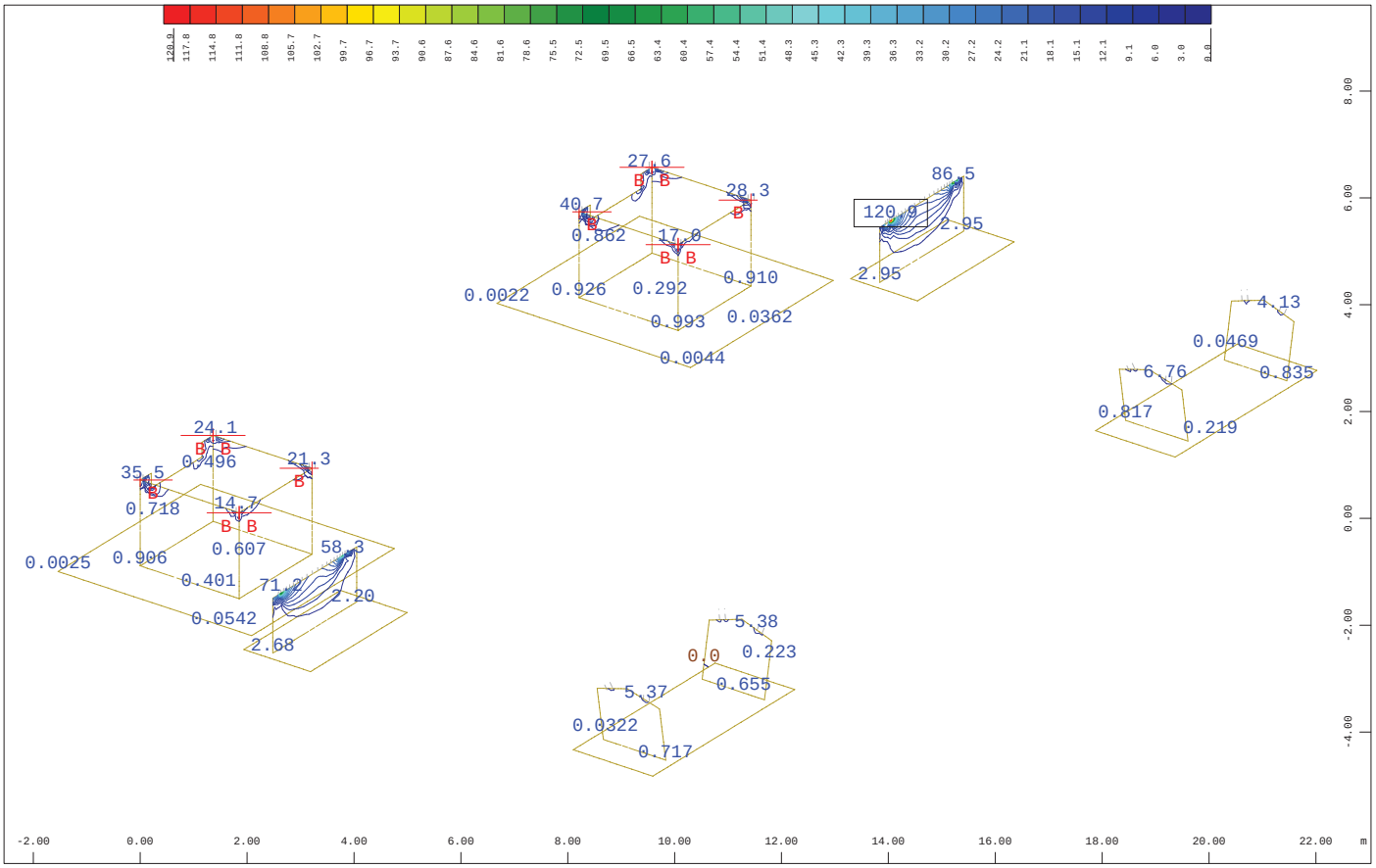
Sector of system Quadrilateral Elements Group 50 85 138...147 150...152
Quadrilateral Elements , lower Principal reinforcements (1st layer), Design Case 1 ULS design , in Node(Max=48.4cm2/m), Design error in the reinforcement (=B) in Node, from 0 to 48.4 step 1.21

M 1 : 98
X * 0.848
Y * 0.695
Z * 0.893



Sector of system Quadrilateral Elements Group 50 85 138...147 150...152
Quadrilateral Elements , lower Cross reinforcements (2nd layer), Design Case 1 ULS design , in Node(Max=72.8cm2/m), Design error in the reinforcement (=B) in Node, from 0 to 72.8 step 1.82

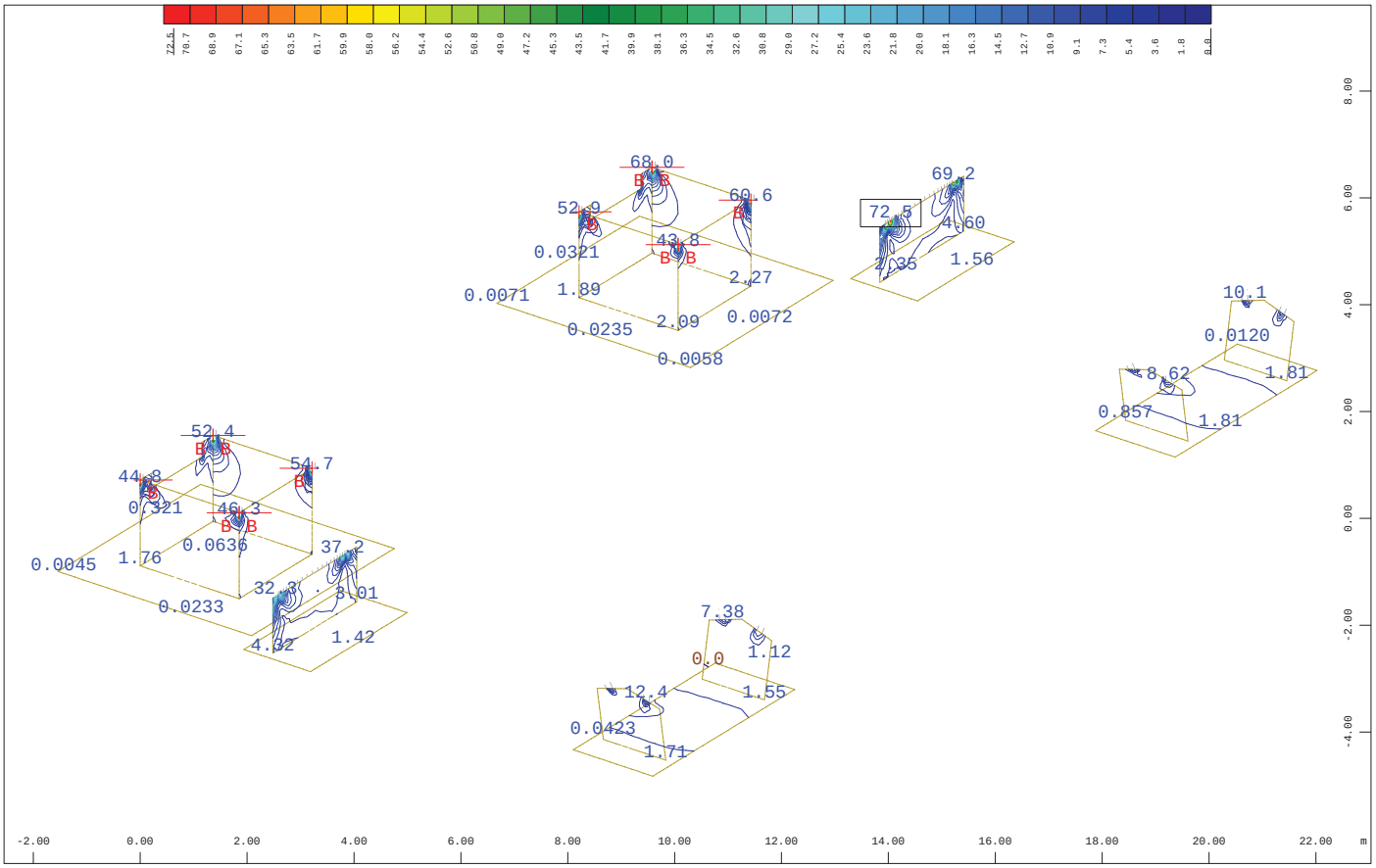
M 1 : 98
X * 0.848
Y * 0.695
Z * 0.893



Z
Y
X

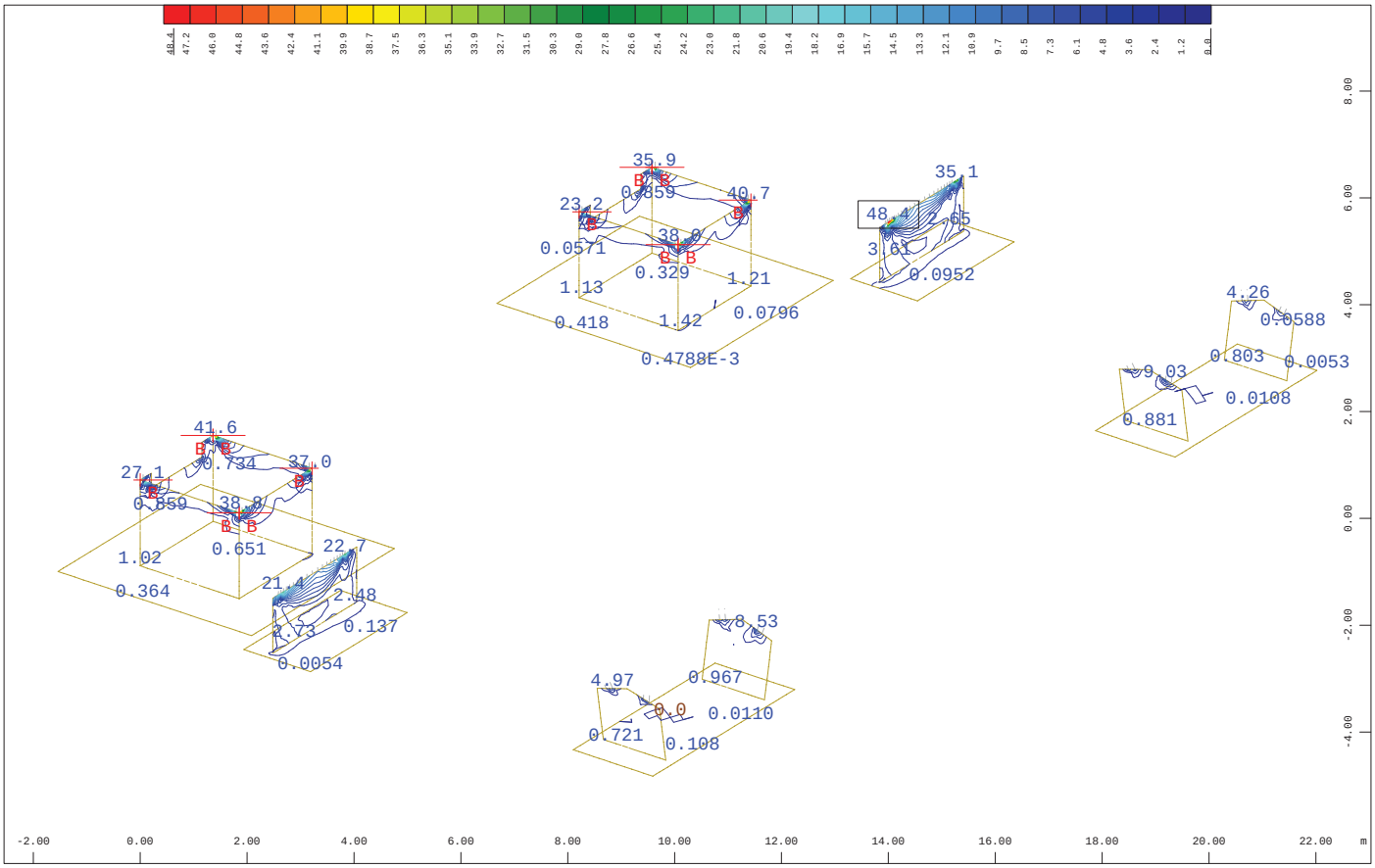
Sector of system Quadrilateral Elements Group 50 85 138...147 150...152
Quadrilateral Elements , upper Principal reinforcements (1st layer), Design Case 2 After the crack width design , in Node(Max=120.9cm2/m),
Design error in the reinforcement (=B) in Node, from 0 to 120.9 step 3.02

M 1 : 98
X * 0.848
Y * 0.695
Z * 0.893



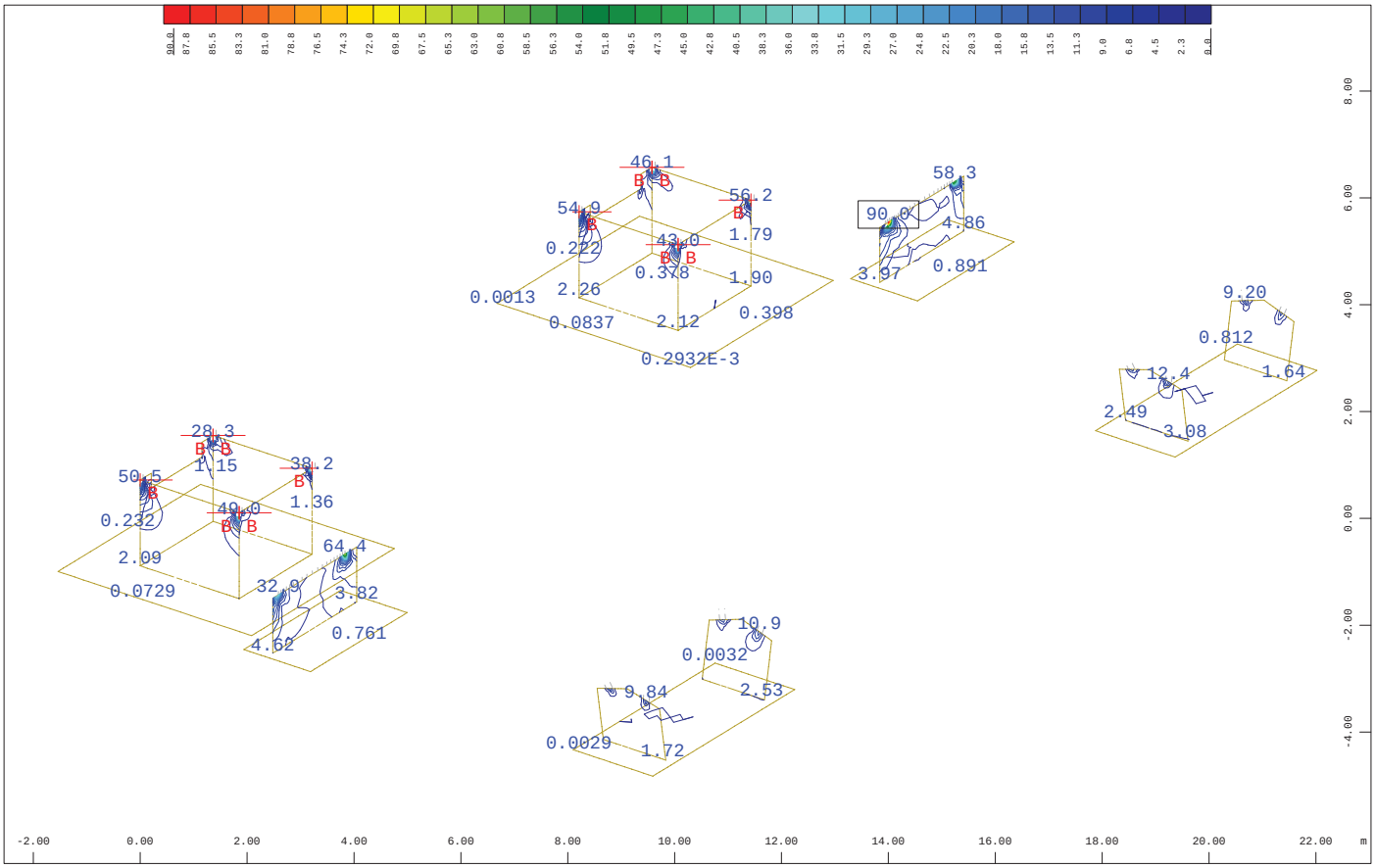
Sector of system Quadrilateral Elements Group 50 85 138...147 150...152
Quadrilateral Elements , upper Cross reinforcements (2nd layer), Design Case 2 After the crack width design , in Node(Max=72.5cm2/m), Design error in the reinforcement (=B) in Node, from 0 to 72.5 step 1.81

M 1 : 98
X * 0.848
Y * 0.695
Z * 0.893



Sector of system Quadrilateral Elements Group 50 85 138...147 150...152
Quadrilateral Elements , lower Principal reinforcements (1st layer), Design Case 2 After the crack width design , in Node(Max=48.4cm2/m),
Design error in the reinforcement (=B) in Node, from 0 to 48.4 step 1.21

M 1 : 98
X * 0.848
Y * 0.695
Z * 0.893



Sector of system Quadrilateral Elements Group 50 85 138...147 150...152
Quadrilateral Elements , lower Cross reinforcements (2nd layer), Design Case 2 After the crack width design , in Node(Max=90.0cm2/m), Design error in the reinforcement (=B) in Node, from 0 to 90.0 step 2.25

M 1 : 98
X * 0.848
Y * 0.695
Z * 0.893