

TOMO II ESTRUCTURA

DOCUMENTO V ANEJO DE CÁLCULO

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| JESUS JIMENEZ CAÑAS & ASOCIADOS | |
| REORDENACIÓN DEL PASEO DE LAS CANTERAS PROYECTO DE ESTRUCTURA. ANEJO DE CÁLCULO. | DICIEMBRE 2015 |

REORDENACIÓN DEL PASEO DE LAS CANTERAS FRETE LA CIGER

PROYECTO DE ESTRUCTURAS ANEJO DE CÁLCULO

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- DESPLAZAMIENTOS Y ENVOLVENTES DE ESFUERZOS EN FORJADOS POR ISOVALORES**
- COMPROBACIÓN DE PUNZONAMIENTO**
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- JUSTIFICACIÓN DE LA ACCIÓN SÍSMICA**
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1.- EDIFICIO NORTE

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Listado de datos de la obra

CON PILARES NUEVOS_cargas ajustadas_muros ajustados_igualada PO cim

Fecha: 29/11/15

1.- VERSIÓN DEL PROGRAMA Y NÚMERO DE LICENCIA

Versión: 2015

Número de licencia: 108826

2.- DATOS GENERALES DE LA ESTRUCTURA

Proyecto: CON PILARES NUEVOS_cargas ajustadas_muros ajustados_igualada PO cim

Clave: 3DR_Edificio Norte_02_+PILdef

3.- NORMAS CONSIDERADAS

Hormigón: EHE-08

Aceros conformados: CTE DB SE-A

Aceros laminados y armados: CTE DB SE-A

Fuego: CTE DB SI - Anejo C: Resistencia al fuego de las estructuras de hormigón armado.

Categoría de uso: C. Zonas de acceso al público

4.- ACCIONES CONSIDERADAS

4.1.- Gravitatorias

| Planta | S.C.U (kN/m ²) | Cargas muertas (kN/m ²) |
|--------|-------------------------------|--|
| +8.40 | 10.0 | 2.5 |
| +4.90 | 5.0 | 1.0 |
| +3.00 | 5.0 | 1.5 |

4.2.- Viento

CTE DB SE-AE

Código Técnico de la Edificación.

Documento Básico Seguridad Estructural - Acciones en la Edificación

Zona eólica: C

Grado de aspereza: I. Borde del mar o de un lago

La acción del viento se calcula a partir de la presión estática q_e que actúa en la dirección perpendicular a la superficie expuesta. El programa obtiene de forma automática dicha presión, conforme a los criterios del Código Técnico de la Edificación DB-SE AE, en función de la geometría del edificio, la zona eólica y grado de aspereza seleccionados, y la altura sobre el terreno del punto considerado:

$$q_e = q_b \cdot c_e \cdot c_p$$

Donde:

q_b Es la presión dinámica del viento conforme al mapa eólico del Anejo D.

c_e Es el coeficiente de exposición, determinado conforme a las especificaciones del Anejo D.2, en función del grado de aspereza del entorno y la altura sobre el terreno del punto considerado.

c_p Es el coeficiente eólico o de presión, calculado según la tabla 3.5 del apartado 3.3.4, en función de la esbeltez del edificio en el plano paralelo al viento.

| q_b (kN/m ²) | Viento X | | | Viento Y | | |
|-------------------------------|----------|-----------------|-----------------|----------|-----------------|-----------------|
| | esbeltez | c_p (presión) | c_p (succión) | esbeltez | c_p (presión) | c_p (succión) |
| 0.520 | 0.25 | 0.70 | -0.30 | 0.25 | 0.70 | -0.30 |

| Presión estática | | | |
|------------------|--------------------------|----------------------------------|----------------------------------|
| Planta | C_e (Coef. exposición) | Viento X (kN/m ²) | Viento Y (kN/m ²) |
| +8.40 | 2.64 | 1.375 | 1.375 |
| +4.90 | 2.11 | 1.098 | 1.098 |

| Anchos de banda | | |
|----------------------|-------------------------|-------------------------|
| Plantas | Ancho de banda Y (m) | Ancho de banda X (m) |
| En todas las plantas | 22.00 | 21.60 |

Se realiza análisis de los efectos de 2º orden

Valor para multiplicar los desplazamientos 1.00

Coefficientes de Cargas

+X: 1.00 -X: 1.00



Listado de datos de la obra

CON PILARES NUEVOS_cargas ajustadas_muros ajustados_igualada PO cim

Fecha: 29/11/15

+Y: 1.00

-Y: 1.00

| Cargas de viento | | |
|------------------|---------------|---------------|
| Planta | Viento X (kN) | Viento Y (kN) |
| +8.40 | 52.936 | 51.973 |
| +4.90 | 65.226 | 64.040 |

Conforme al artículo 3.3.2., apartado 2 del Documento Básico AE, se ha considerado que las fuerzas de viento por planta, en cada dirección del análisis, actúan con una excentricidad de $\pm 5\%$ de la dimensión máxima del edificio.

4.3.- Sismo

Norma utilizada: NCSE-02

Norma de Construcción Sismorresistente NCSE-02

Método de cálculo: Análisis mediante espectros de respuesta (NCSE-02, 3.6.2)

4.3.1.- Datos generales de sismo

Caracterización del emplazamiento

a_b : Aceleración básica (NCSE-02, 2.1 y Anejo 1)

a_b : 0.040 g

K: Coeficiente de contribución (NCSE-02, 2.1 y Anejo 1)

K : 1.00

Tipo de suelo (NCSE-02, 2.4): Tipo III

Sistema estructural

Ductilidad (NCSE-02, Tabla 3.1): Ductilidad baja

W: Amortiguamiento (NCSE-02, Tabla 3.1)

W : 4.00 %

Tipo de construcción (NCSE-02, 2.2): Construcciones de importancia especial

Parámetros de cálculo

Número de modos de vibración que intervienen en el análisis: Según norma

Fracción de sobrecarga de uso

: 0.60

Fracción de sobrecarga de nieve

: 0.50

Se realiza análisis de los efectos de 2º orden

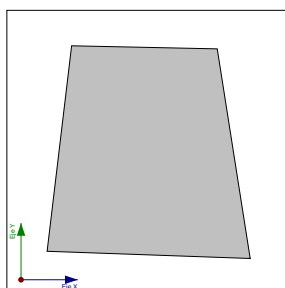
Valor para multiplicar los desplazamientos 1.20

Criterio de armado a aplicar por ductilidad: Ninguno

Direcciones de análisis

Acción sísmica según X

Acción sísmica según Y



Proyección en planta de la obra

4.4.- Fuego

| Datos por planta | | | | |
|--|---------|----------|--|----------------------------|
| Planta | R. req. | F. Comp. | Revestimiento de elementos de hormigón | |
| | | | Inferior (forjados y vigas) | Pilares y muros |
| +8.40 | R 60 | - | Sin revestimiento ignífugo | Sin revestimiento ignífugo |
| +4.90 | R 60 | - | Sin revestimiento ignífugo | Sin revestimiento ignífugo |
| Notas: - R. req.: resistencia requerida, periodo de tiempo durante el cual un elemento estructural debe mantener su capacidad portante, expresado en minutos. - F. Comp.: indica si el forjado tiene función de compartimentación. | | | | |



Listado de datos de la obra

CON PILARES NUEVOS_cargas ajustadas_muros ajustados_igualada PO cim

Fecha: 29/11/15

4.5.- Hipótesis de carga

| | |
|-------------|--|
| Automáticas | Peso propio Cargas muertas Sobrecarga de uso Sismo X Sismo Y Viento +X exc. + Viento +X exc. - Viento -X exc. + Viento -X exc. - Viento +Y exc. + Viento +Y exc. - Viento -Y exc. + Viento -Y exc. - |
|-------------|--|

4.6.- Cargas horizontales y en cabeza de pilares

4.6.1.- Cargas en cabeza de pilar

| Referencia pilar | Hipótesis | N (kN) | Mx (kN·m) | My (kN·m) | Qx (kN) | Qy (kN) | T (kN·m) |
|------------------|-------------------|--------|-----------|-----------|---------|---------|----------|
| P5 | Peso propio | 430.00 | 0.00 | 0.00 | -86.00 | -6.00 | 0.00 |
| | Cargas muertas | 64.00 | 0.00 | 0.00 | -16.00 | -0.50 | 0.00 |
| | Sobrecarga de uso | 352.00 | 0.00 | 0.00 | -88.00 | -3.00 | 0.00 |
| P6 | Peso propio | 530.00 | 0.00 | 0.00 | -94.00 | 7.00 | 0.00 |
| | Cargas muertas | 83.00 | 0.00 | 0.00 | -18.00 | 1.00 | 0.00 |
| | Sobrecarga de uso | 460.00 | 0.00 | 0.00 | -96.00 | 6.00 | 0.00 |

4.7.- Empujes en muros

TERRENO 1

Una situación de relleno

Carga: Cargas muertas

Con relleno: Cota 5.40 m

Ángulo de talud 0.00 Grados

Densidad aparente 20.00 kN/m³

Densidad sumergida 11.00 kN/m³

Ángulo rozamiento interno 30.00 Grados

Evacuación por drenaje 100.00 %

Carga 1:

Tipo: Uniforme

Valor: 10.00 kN/m²

TERRENO MAR

Una situación de relleno

Carga: Cargas muertas

Con nivel freático: Cota 1.80 m

Con relleno: Cota 0.50 m

Ángulo de talud 0.00 Grados

Densidad aparente 18.00 kN/m³

Densidad sumergida 11.00 kN/m³

Ángulo rozamiento interno 30.00 Grados

Evacuación por drenaje 100.00 %

5.- ESTADOS LÍMITE

| | |
|---|--|
| E.L.U. de rotura. Hormigón | CTE |
| E.L.U. de rotura. Hormigón en cimentaciones | Cota de nieve: Altitud inferior o igual a 1000 m |
| Tensiones sobre el terreno | Acciones características |
| Desplazamientos | |



Listado de datos de la obra

CON PILARES NUEVOS_cargas ajustadas_muros ajustados_igualada PO cim

Fecha: 29/11/15

6.- SITUACIONES DE PROYECTO

Para las distintas situaciones de proyecto, las combinaciones de acciones se definirán de acuerdo con los siguientes criterios:

- Situaciones persistentes o transitorias
 - Con coeficientes de combinación

$$\sum_{j \geq 1} \gamma_{Gj} G_{kj} + \gamma_P P_k + \gamma_{Q1} \Psi_{p1} Q_{k1} + \sum_{i \geq 1} \gamma_{Qi} \Psi_{ai} Q_{ki}$$

- Sin coeficientes de combinación

$$\sum_{j \geq 1} \gamma_{Gj} G_{kj} + \gamma_P P_k + \sum_{i \geq 1} \gamma_{Qi} Q_{ki}$$

- Situaciones sísmicas
 - Con coeficientes de combinación

$$\sum_{j \geq 1} \gamma_{Gj} G_{kj} + \gamma_P P_k + \gamma_{AE} A_E + \sum_{i \geq 1} \gamma_{Qi} \Psi_{ai} Q_{ki}$$

- Sin coeficientes de combinación

$$\sum_{j \geq 1} \gamma_{Gj} G_{kj} + \gamma_P P_k + \gamma_{AE} A_E + \sum_{i \geq 1} \gamma_{Qi} Q_{ki}$$

- Donde:

- G_k Acción permanente
- P_k Acción de pretensado
- Q_k Acción variable
- A_E Acción sísmica
- γ_G Coeficiente parcial de seguridad de las acciones permanentes
- γ_P Coeficiente parcial de seguridad de la acción de pretensado
- $\gamma_{Q,1}$ Coeficiente parcial de seguridad de la acción variable principal
- $\gamma_{Q,i}$ Coeficiente parcial de seguridad de las acciones variables de acompañamiento
- γ_{AE} Coeficiente parcial de seguridad de la acción sísmica
- $\Psi_{p,1}$ Coeficiente de combinación de la acción variable principal
- $\Psi_{a,i}$ Coeficiente de combinación de las acciones variables de acompañamiento

6.1.- Coeficientes parciales de seguridad (γ) y coeficientes de combinación (ψ)

Para cada situación de proyecto y estado límite los coeficientes a utilizar serán:

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| Persistente o transitoria | | | | |
|---------------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_s) |
| Carga permanente (G) | 1.000 | 1.350 | - | - |
| Sobrecarga (Q) | 0.000 | 1.500 | 1.000 | 0.700 |
| Viento (Q) | 0.000 | 1.500 | 1.000 | 0.600 |

| Sísmica | | | | |
|----------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_s) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 0.600 | 0.600 |
| Viento (Q) | 0.000 | 1.000 | 0.000 | 0.000 |
| Sismo (E) | -1.000 | 1.000 | 1.000 | 0.300 ⁽¹⁾ |

Notas:
⁽¹⁾ Fracción de las solicitaciones sísmicas a considerar en la dirección ortogonal: Las solicitaciones obtenidas de los resultados del análisis en cada una de las direcciones ortogonales se combinarán con el 30 % de los de la otra.



Listado de datos de la obra

CON PILARES NUEVOS_cargas ajustadas_muros ajustados_igualada PO cim

Fecha: 29/11/15

E.L.U. de rotura. Hormigón en cimentaciones: EHE-08 / CTE DB-SE C

| Persistente o transitoria | | | | |
|---------------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_s) |
| Carga permanente (G) | 1.000 | 1.600 | - | - |
| Sobrecarga (Q) | 0.000 | 1.600 | 1.000 | 0.700 |
| Viento (Q) | 0.000 | 1.600 | 1.000 | 0.600 |

| Sísmica | | | | |
|--|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_s) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 0.600 | 0.600 |
| Viento (Q) | 0.000 | 1.000 | 0.000 | 0.000 |
| Sismo (E) | -1.000 | 1.000 | 1.000 | 0.300 ⁽¹⁾ |
| Notas: ⁽¹⁾ Fracción de las solicitaciones sísmicas a considerar en la dirección ortogonal: Las solicitaciones obtenidas de los resultados del análisis en cada una de las direcciones ortogonales se combinarán con el 30 % de los de la otra. | | | | |

Tensiones sobre el terreno

| Característica | | | | |
|----------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_s) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 1.000 | 1.000 |
| Viento (Q) | 0.000 | 1.000 | 1.000 | 1.000 |

| Sísmica | | | | |
|----------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_s) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 1.000 | 1.000 |
| Viento (Q) | | | | |
| Sismo (E) | -1.000 | 1.000 | 1.000 | 0.000 |

Desplazamientos

| Característica | | | | |
|----------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_s) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 1.000 | 1.000 |
| Viento (Q) | 0.000 | 1.000 | 1.000 | 1.000 |

| Sísmica | | | | |
|----------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_s) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 1.000 | 1.000 |
| Viento (Q) | | | | |
| Sismo (E) | -1.000 | 1.000 | 1.000 | 0.000 |



6.2.- Combinaciones

▪ Nombres de las hipótesis

| | |
|-------------|-------------------|
| PP | Peso propio |
| CM | Cargas muertas |
| Qa | Sobrecarga de uso |
| V(+X exc.+) | Viento +X exc. + |
| V(+X exc.-) | Viento +X exc. - |
| V(-X exc.+) | Viento -X exc. + |
| V(-X exc.-) | Viento -X exc. - |
| V(+Y exc.+) | Viento +Y exc. + |
| V(+Y exc.-) | Viento +Y exc. - |
| V(-Y exc.+) | Viento -Y exc. + |
| V(-Y exc.-) | Viento -Y exc. - |
| SX | Sismo X |
| SY | Sismo Y |

▪ E.L.U. de rotura. Hormigón



Listado de datos de la obra

CON PILARES NUEVOS_cargas ajustadas_muros ajustados_igualada P0 cim

Fecha: 29/11/15

| Comb. | PP | CM | Qa | V(+X exc.+) | V(+X exc.-) | V(-X exc.+) | V(-X exc.-) | V(+Y exc.+) | V(+Y exc.-) | V(-Y exc.+) | V(-Y exc.-) | SX | SY |
|-------|-------|-------|-------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------|--------|
| 1 | 1.000 | 1.000 | | | | | | | | | | | |
| 2 | 1.350 | 1.350 | | | | | | | | | | | |
| 3 | 1.000 | 1.000 | 1.500 | | | | | | | | | | |
| 4 | 1.350 | 1.350 | 1.500 | | | | | | | | | | |
| 5 | 1.000 | 1.000 | | 1.500 | | | | | | | | | |
| 6 | 1.350 | 1.350 | | 1.500 | | | | | | | | | |
| 7 | 1.000 | 1.000 | 1.050 | 1.500 | | | | | | | | | |
| 8 | 1.350 | 1.350 | 1.050 | 1.500 | | | | | | | | | |
| 9 | 1.000 | 1.000 | 1.500 | 0.900 | | | | | | | | | |
| 10 | 1.350 | 1.350 | 1.500 | 0.900 | | | | | | | | | |
| 11 | 1.000 | 1.000 | | | 1.500 | | | | | | | | |
| 12 | 1.350 | 1.350 | | | 1.500 | | | | | | | | |
| 13 | 1.000 | 1.000 | 1.050 | | 1.500 | | | | | | | | |
| 14 | 1.350 | 1.350 | 1.050 | | 1.500 | | | | | | | | |
| 15 | 1.000 | 1.000 | 1.500 | | 0.900 | | | | | | | | |
| 16 | 1.350 | 1.350 | 1.500 | | 0.900 | | | | | | | | |
| 17 | 1.000 | 1.000 | | | | 1.500 | | | | | | | |
| 18 | 1.350 | 1.350 | | | | 1.500 | | | | | | | |
| 19 | 1.000 | 1.000 | 1.050 | | | 1.500 | | | | | | | |
| 20 | 1.350 | 1.350 | 1.050 | | | 1.500 | | | | | | | |
| 21 | 1.000 | 1.000 | 1.500 | | | 0.900 | | | | | | | |
| 22 | 1.350 | 1.350 | 1.500 | | | 0.900 | | | | | | | |
| 23 | 1.000 | 1.000 | | | | | 1.500 | | | | | | |
| 24 | 1.350 | 1.350 | | | | | 1.500 | | | | | | |
| 25 | 1.000 | 1.000 | 1.050 | | | | 1.500 | | | | | | |
| 26 | 1.350 | 1.350 | 1.050 | | | | 1.500 | | | | | | |
| 27 | 1.000 | 1.000 | 1.500 | | | | 0.900 | | | | | | |
| 28 | 1.350 | 1.350 | 1.500 | | | | 0.900 | | | | | | |
| 29 | 1.000 | 1.000 | | | | | | 1.500 | | | | | |
| 30 | 1.350 | 1.350 | | | | | | 1.500 | | | | | |
| 31 | 1.000 | 1.000 | 1.050 | | | | | 1.500 | | | | | |
| 32 | 1.350 | 1.350 | 1.050 | | | | | 1.500 | | | | | |
| 33 | 1.000 | 1.000 | 1.500 | | | | | 0.900 | | | | | |
| 34 | 1.350 | 1.350 | 1.500 | | | | | 0.900 | | | | | |
| 35 | 1.000 | 1.000 | | | | | | | 1.500 | | | | |
| 36 | 1.350 | 1.350 | | | | | | | 1.500 | | | | |
| 37 | 1.000 | 1.000 | 1.050 | | | | | | 1.500 | | | | |
| 38 | 1.350 | 1.350 | 1.050 | | | | | | 1.500 | | | | |
| 39 | 1.000 | 1.000 | 1.500 | | | | | | 0.900 | | | | |
| 40 | 1.350 | 1.350 | 1.500 | | | | | | 0.900 | | | | |
| 41 | 1.000 | 1.000 | | | | | | | | 1.500 | | | |
| 42 | 1.350 | 1.350 | | | | | | | | 1.500 | | | |
| 43 | 1.000 | 1.000 | 1.050 | | | | | | | 1.500 | | | |
| 44 | 1.350 | 1.350 | 1.050 | | | | | | | 1.500 | | | |
| 45 | 1.000 | 1.000 | 1.500 | | | | | | | 0.900 | | | |
| 46 | 1.350 | 1.350 | 1.500 | | | | | | | 0.900 | | | |
| 47 | 1.000 | 1.000 | | | | | | | | | 1.500 | | |
| 48 | 1.350 | 1.350 | | | | | | | | | 1.500 | | |
| 49 | 1.000 | 1.000 | 1.050 | | | | | | | | 1.500 | | |
| 50 | 1.350 | 1.350 | 1.050 | | | | | | | | 1.500 | | |
| 51 | 1.000 | 1.000 | 1.500 | | | | | | | | 0.900 | | |
| 52 | 1.350 | 1.350 | 1.500 | | | | | | | | 0.900 | | |
| 53 | 1.000 | 1.000 | | | | | | | | | | -0.300 | -1.000 |
| 54 | 1.000 | 1.000 | 0.600 | | | | | | | | | -0.300 | -1.000 |
| 55 | 1.000 | 1.000 | | | | | | | | | | 0.300 | -1.000 |
| 56 | 1.000 | 1.000 | 0.600 | | | | | | | | | 0.300 | -1.000 |
| 57 | 1.000 | 1.000 | | | | | | | | | | -1.000 | -0.300 |
| 58 | 1.000 | 1.000 | 0.600 | | | | | | | | | -1.000 | -0.300 |
| 59 | 1.000 | 1.000 | | | | | | | | | | -1.000 | 0.300 |
| 60 | 1.000 | 1.000 | 0.600 | | | | | | | | | -1.000 | 0.300 |
| 61 | 1.000 | 1.000 | | | | | | | | | | 0.300 | 1.000 |
| 62 | 1.000 | 1.000 | 0.600 | | | | | | | | | 0.300 | 1.000 |
| 63 | 1.000 | 1.000 | | | | | | | | | | -0.300 | 1.000 |
| 64 | 1.000 | 1.000 | 0.600 | | | | | | | | | -0.300 | 1.000 |
| 65 | 1.000 | 1.000 | | | | | | | | | | 1.000 | 0.300 |
| 66 | 1.000 | 1.000 | 0.600 | | | | | | | | | 1.000 | 0.300 |
| 67 | 1.000 | 1.000 | | | | | | | | | | 1.000 | -0.300 |
| 68 | 1.000 | 1.000 | 0.600 | | | | | | | | | 1.000 | -0.300 |



Listado de datos de la obra

CON PILARES NUEVOS_cargas ajustadas_muros ajustados_igualada P0 cim

Fecha: 29/11/15

▪ E.L.U. de rotura. Hormigón en cimentaciones

| Comb. | PP | CM | Qa | V(+X exc. +) | V(+X exc.-) | V(-X exc. +) | V(-X exc.-) | V(+Y exc. +) | V(+Y exc.-) | V(-Y exc. +) | V(-Y exc.-) | SX | SY |
|-------|-------|-------|-------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|--------|--------|
| 1 | 1.000 | 1.000 | | | | | | | | | | | |
| 2 | 1.600 | 1.600 | | | | | | | | | | | |
| 3 | 1.000 | 1.000 | 1.600 | | | | | | | | | | |
| 4 | 1.600 | 1.600 | 1.600 | | | | | | | | | | |
| 5 | 1.000 | 1.000 | | 1.600 | | | | | | | | | |
| 6 | 1.600 | 1.600 | | 1.600 | | | | | | | | | |
| 7 | 1.000 | 1.000 | 1.120 | 1.600 | | | | | | | | | |
| 8 | 1.600 | 1.600 | 1.120 | 1.600 | | | | | | | | | |
| 9 | 1.000 | 1.000 | 1.600 | 0.960 | | | | | | | | | |
| 10 | 1.600 | 1.600 | 1.600 | 0.960 | | | | | | | | | |
| 11 | 1.000 | 1.000 | | | 1.600 | | | | | | | | |
| 12 | 1.600 | 1.600 | | | 1.600 | | | | | | | | |
| 13 | 1.000 | 1.000 | 1.120 | | 1.600 | | | | | | | | |
| 14 | 1.600 | 1.600 | 1.120 | | 1.600 | | | | | | | | |
| 15 | 1.000 | 1.000 | 1.600 | | 0.960 | | | | | | | | |
| 16 | 1.600 | 1.600 | 1.600 | | 0.960 | | | | | | | | |
| 17 | 1.000 | 1.000 | | | | 1.600 | | | | | | | |
| 18 | 1.600 | 1.600 | | | | 1.600 | | | | | | | |
| 19 | 1.000 | 1.000 | 1.120 | | | 1.600 | | | | | | | |
| 20 | 1.600 | 1.600 | 1.120 | | | 1.600 | | | | | | | |
| 21 | 1.000 | 1.000 | 1.600 | | | 0.960 | | | | | | | |
| 22 | 1.600 | 1.600 | 1.600 | | | 0.960 | | | | | | | |
| 23 | 1.000 | 1.000 | | | | | 1.600 | | | | | | |
| 24 | 1.600 | 1.600 | | | | | 1.600 | | | | | | |
| 25 | 1.000 | 1.000 | 1.120 | | | | 1.600 | | | | | | |
| 26 | 1.600 | 1.600 | 1.120 | | | | 1.600 | | | | | | |
| 27 | 1.000 | 1.000 | 1.600 | | | | 0.960 | | | | | | |
| 28 | 1.600 | 1.600 | 1.600 | | | | 0.960 | | | | | | |
| 29 | 1.000 | 1.000 | | | | | | 1.600 | | | | | |
| 30 | 1.600 | 1.600 | | | | | | 1.600 | | | | | |
| 31 | 1.000 | 1.000 | 1.120 | | | | | 1.600 | | | | | |
| 32 | 1.600 | 1.600 | 1.120 | | | | | 1.600 | | | | | |
| 33 | 1.000 | 1.000 | 1.600 | | | | | 0.960 | | | | | |
| 34 | 1.600 | 1.600 | 1.600 | | | | | 0.960 | | | | | |
| 35 | 1.000 | 1.000 | | | | | | | 1.600 | | | | |
| 36 | 1.600 | 1.600 | | | | | | | 1.600 | | | | |
| 37 | 1.000 | 1.000 | 1.120 | | | | | | 1.600 | | | | |
| 38 | 1.600 | 1.600 | 1.120 | | | | | | 1.600 | | | | |
| 39 | 1.000 | 1.000 | 1.600 | | | | | | 0.960 | | | | |
| 40 | 1.600 | 1.600 | 1.600 | | | | | | 0.960 | | | | |
| 41 | 1.000 | 1.000 | | | | | | | | 1.600 | | | |
| 42 | 1.600 | 1.600 | | | | | | | | 1.600 | | | |
| 43 | 1.000 | 1.000 | 1.120 | | | | | | | 1.600 | | | |
| 44 | 1.600 | 1.600 | 1.120 | | | | | | | 1.600 | | | |
| 45 | 1.000 | 1.000 | 1.600 | | | | | | | 0.960 | | | |
| 46 | 1.600 | 1.600 | 1.600 | | | | | | | 0.960 | | | |
| 47 | 1.000 | 1.000 | | | | | | | | | 1.600 | | |
| 48 | 1.600 | 1.600 | | | | | | | | | 1.600 | | |
| 49 | 1.000 | 1.000 | 1.120 | | | | | | | | 1.600 | | |
| 50 | 1.600 | 1.600 | 1.120 | | | | | | | | 1.600 | | |
| 51 | 1.000 | 1.000 | 1.600 | | | | | | | | 0.960 | | |
| 52 | 1.600 | 1.600 | 1.600 | | | | | | | | 0.960 | | |
| 53 | 1.000 | 1.000 | | | | | | | | | | -0.300 | -1.000 |
| 54 | 1.000 | 1.000 | 0.600 | | | | | | | | | -0.300 | -1.000 |
| 55 | 1.000 | 1.000 | | | | | | | | | | 0.300 | -1.000 |
| 56 | 1.000 | 1.000 | 0.600 | | | | | | | | | 0.300 | -1.000 |
| 57 | 1.000 | 1.000 | | | | | | | | | | -1.000 | -0.300 |
| 58 | 1.000 | 1.000 | 0.600 | | | | | | | | | -1.000 | -0.300 |
| 59 | 1.000 | 1.000 | | | | | | | | | | -1.000 | 0.300 |
| 60 | 1.000 | 1.000 | 0.600 | | | | | | | | | -1.000 | 0.300 |
| 61 | 1.000 | 1.000 | | | | | | | | | | 0.300 | 1.000 |
| 62 | 1.000 | 1.000 | 0.600 | | | | | | | | | 0.300 | 1.000 |
| 63 | 1.000 | 1.000 | | | | | | | | | | -0.300 | 1.000 |
| 64 | 1.000 | 1.000 | 0.600 | | | | | | | | | -0.300 | 1.000 |
| 65 | 1.000 | 1.000 | | | | | | | | | | 1.000 | 0.300 |
| 66 | 1.000 | 1.000 | 0.600 | | | | | | | | | 1.000 | 0.300 |
| 67 | 1.000 | 1.000 | | | | | | | | | | 1.000 | -0.300 |
| 68 | 1.000 | 1.000 | 0.600 | | | | | | | | | 1.000 | -0.300 |



Listado de datos de la obra

CON PILARES NUEVOS_cargas ajustadas_muros ajustados_igualada P0 cim

Fecha: 29/11/15

- Tensiones sobre el terreno
- Desplazamientos

| Comb. | PP | CM | Qa | V(+X exc. +) | V(+X exc.-) | V(-X exc. +) | V(-X exc.-) | V(+Y exc. +) | V(+Y exc.-) | V(-Y exc. +) | V(-Y exc.-) | SX | SY |
|-------|-------|-------|-------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|--------|--------|
| 1 | 1.000 | 1.000 | | | | | | | | | | | |
| 2 | 1.000 | 1.000 | 1.000 | | | | | | | | | | |
| 3 | 1.000 | 1.000 | | 1.000 | | | | | | | | | |
| 4 | 1.000 | 1.000 | 1.000 | 1.000 | | | | | | | | | |
| 5 | 1.000 | 1.000 | | | 1.000 | | | | | | | | |
| 6 | 1.000 | 1.000 | 1.000 | | 1.000 | | | | | | | | |
| 7 | 1.000 | 1.000 | | | | 1.000 | | | | | | | |
| 8 | 1.000 | 1.000 | 1.000 | | | 1.000 | | | | | | | |
| 9 | 1.000 | 1.000 | | | | | 1.000 | | | | | | |
| 10 | 1.000 | 1.000 | 1.000 | | | | 1.000 | | | | | | |
| 11 | 1.000 | 1.000 | | | | | | 1.000 | | | | | |
| 12 | 1.000 | 1.000 | 1.000 | | | | | 1.000 | | | | | |
| 13 | 1.000 | 1.000 | | | | | | | 1.000 | | | | |
| 14 | 1.000 | 1.000 | 1.000 | | | | | | 1.000 | | | | |
| 15 | 1.000 | 1.000 | | | | | | | | 1.000 | | | |
| 16 | 1.000 | 1.000 | 1.000 | | | | | | | 1.000 | | | |
| 17 | 1.000 | 1.000 | | | | | | | | | 1.000 | | |
| 18 | 1.000 | 1.000 | 1.000 | | | | | | | | 1.000 | | |
| 19 | 1.000 | 1.000 | | | | | | | | | | -1.000 | |
| 20 | 1.000 | 1.000 | 1.000 | | | | | | | | | -1.000 | |
| 21 | 1.000 | 1.000 | | | | | | | | | | 1.000 | |
| 22 | 1.000 | 1.000 | 1.000 | | | | | | | | | 1.000 | |
| 23 | 1.000 | 1.000 | | | | | | | | | | | -1.000 |
| 24 | 1.000 | 1.000 | 1.000 | | | | | | | | | | -1.000 |
| 25 | 1.000 | 1.000 | | | | | | | | | | | 1.000 |
| 26 | 1.000 | 1.000 | 1.000 | | | | | | | | | | 1.000 |

7.- DATOS GEOMÉTRICOS DE GRUPOS Y PLANTAS

| Grupo | Nombre del grupo | Planta | Nombre planta | Altura | Cota |
|-------|------------------|--------|---------------|--------|------|
| 2 | +8.40 | 2 | +8.40 | 3.50 | 5.40 |
| 1 | +4.90 | 1 | +4.90 | 1.90 | 1.90 |
| 0 | +3.00 | | | | 0.00 |

8.- DATOS GEOMÉTRICOS DE PILARES, PANTALLAS Y MUROS

8.1.- Pilares

GI: grupo inicial

GF: grupo final

Ang: ángulo del pilar en grados sexagesimales

Datos de los pilares

| Referencia | Coord(P.Fijo) | GI- GF | Vinculación exterior | Ang. | Punto fijo |
|------------|-----------------|--------|--------------------------|------|----------------|
| P1 | (53.59, 5.50) | 0-2 | Sin vinculación exterior | -2.0 | Centro |
| P2 | (60.15, 5.27) | 0-2 | Sin vinculación exterior | -2.0 | Centro |
| P3 | (59.00, 12.58) | 0-2 | Sin vinculación exterior | -2.0 | Centro |
| P4 | (54.45, 12.67) | 0-2 | Sin vinculación exterior | -2.0 | Centro |
| P5 | (65.92, 11.65) | 0-0 | Sin vinculación exterior | 0.0 | Esq. inf. izq. |
| P6 | (65.62, 18.00) | 0-0 | Sin vinculación exterior | 0.0 | Esq. sup. izq. |

8.2.- Muros

- Las coordenadas de los vértices inicial y final son absolutas.

- Las dimensiones están expresadas en metros.

Datos geométricos del muro

| Referencia | Tipo muro | GI- GF | Vértices | | Planta | Dimensiones Izquierda+Derecha=Total |
|------------|-------------------------|--------|-----------------|-----------------|--------|--|
| | | | Inicial | Final | | |
| M7 | Muro de hormigón armado | 0-2 | (46.52, -1.40) | (49.07, 19.99) | 2 1 | 0.2+0.2=0.4 0.2+0.2=0.4 |



Listado de datos de la obra

CON PILARES NUEVOS_cargas ajustadas_muros ajustados_igualada PO cim

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| Referencia | Tipo muro | GI- GF | Vértices | | Planta | Dimensiones Izquierda+Derecha=Total |
|------------|-------------------------|--------|------------------|------------------|--------|--|
| | | | Inicial | Final | | |
| M8 | Muro de hormigón armado | 0-2 | (49.07, 19.99) | (64.16, 19.67) | 2 1 | 0.2+0.2=0.4 0.2+0.2=0.4 |
| M9 | Muro de hormigón armado | 0-2 | (64.16, 19.67) | (67.59, -2.15) | 2 1 | 0.2+0.2=0.4 0.2+0.2=0.4 |
| M12 | Muro de hormigón armado | 0-2 | (46.52, -1.40) | (55.77, -1.73) | 2 1 | 0.15+0.15=0.3 0.2+0.2=0.4 |
| M13 | Muro de hormigón armado | 0-2 | (55.77, -1.73) | (67.59, -2.15) | 2 1 | 0.15+0.15=0.3 0.2+0.2=0.4 |

Empujes y zapata del muro

| Referencia | Empujes | Zapata del muro |
|------------|--|--|
| M7 | Empuje izquierdo: TERRENO 1 Empuje derecho: Sin empujes | Viga de cimentación: 0.400 x 0.500 Vuelos: izq.:0.00 der.:0.00 canto:0.50 Tensiones admisibles -Situaciones persistentes: 0.080 MPa -Situaciones accidentales: 0.120 MPa Módulo de balasto: 7663.00 kN/m ³ |
| M8 | Empuje izquierdo: TERRENO 1 Empuje derecho: Sin empujes | Viga de cimentación: 0.400 x 0.500 Vuelos: izq.:0.00 der.:0.00 canto:0.50 Tensiones admisibles -Situaciones persistentes: 0.080 MPa -Situaciones accidentales: 0.120 MPa Módulo de balasto: 7663.00 kN/m ³ |
| M9 | Empuje izquierdo: TERRENO MAR Empuje derecho: Sin empujes | Viga de cimentación: 0.400 x 0.500 Vuelos: izq.:0.00 der.:0.00 canto:0.50 Tensiones admisibles -Situaciones persistentes: 0.080 MPa -Situaciones accidentales: 0.120 MPa Módulo de balasto: 7663.00 kN/m ³ |
| M12 | Empuje izquierdo: Sin empujes Empuje derecho: TERRENO MAR | Viga de cimentación: 0.400 x 0.500 Vuelos: izq.:0.00 der.:0.00 canto:0.50 Tensiones admisibles -Situaciones persistentes: 0.080 MPa -Situaciones accidentales: 0.120 MPa Módulo de balasto: 7663.00 kN/m ³ |
| M13 | Empuje izquierdo: Sin empujes Empuje derecho: TERRENO MAR | Viga de cimentación: 0.400 x 0.500 Vuelos: izq.:0.00 der.:0.00 canto:0.50 Tensiones admisibles -Situaciones persistentes: 0.080 MPa -Situaciones accidentales: 0.120 MPa Módulo de balasto: 7663.00 kN/m ³ |

9.- DIMENSIONES, COEFICIENTES DE EMPOTRAMIENTO Y COEFICIENTES DE PANDEO PARA CADA PLANTA

| Pilar | Planta | Dimensiones (cm) | Coeficiente de empotramiento | | Coeficiente de pandeo | | Coeficiente de rigidez axil |
|----------------|--------|---------------------|------------------------------|------|-----------------------|------|-----------------------------|
| | | | Cabeza | Pie | X | Y | |
| P1, P2, P3, P4 | 2 | 35x35 | 0.30 | 1.00 | 1.00 | 1.00 | 2.00 |
| | 1 | 35x35 | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 |
| P5, P6 | 1 | 75x75 | | | | | |

10.- LOSAS Y ELEMENTOS DE CIMENTACIÓN

| Losas cimentación | Canto (cm) | Módulo balasto (kN/m ³) | Tensión admisible en situaciones persistentes (MPa) | Tensión admisible en situaciones accidentales (MPa) |
|-------------------|------------|-------------------------------------|---|---|
| Todas | 50 | 7663.00 | 0.080 | 0.120 |

11.- MATERIALES UTILIZADOS

11.1.- Hormigones

| Elemento | Hormigón | f _{ck} (MPa) | γ _c | Árido | |
|----------|----------|--------------------------|----------------|------------|-----------------------|
| | | | | Naturaleza | Tamaño máximo (mm) |
| Todos | HA-30 | 30 | 1.30 a 1.50 | Cuarcita | 15 |



Listado de datos de la obra

CON PILARES NUEVOS_cargas ajustadas_muros ajustados_igualada PO cim

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11.2.- Aceros por elemento y posición

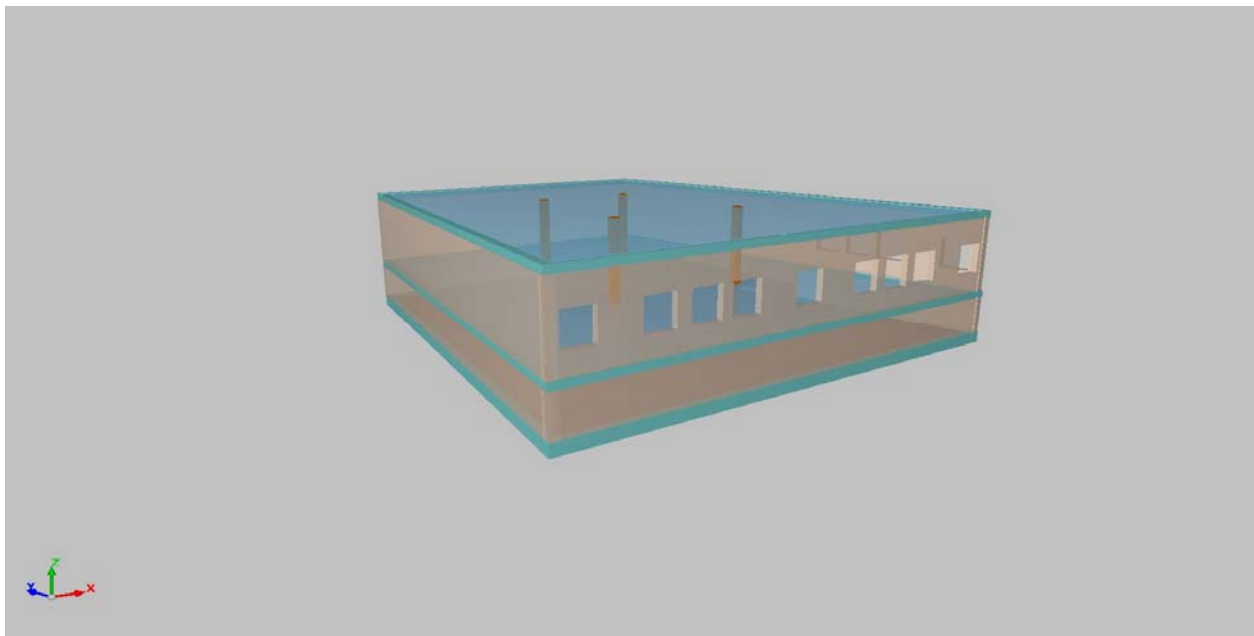
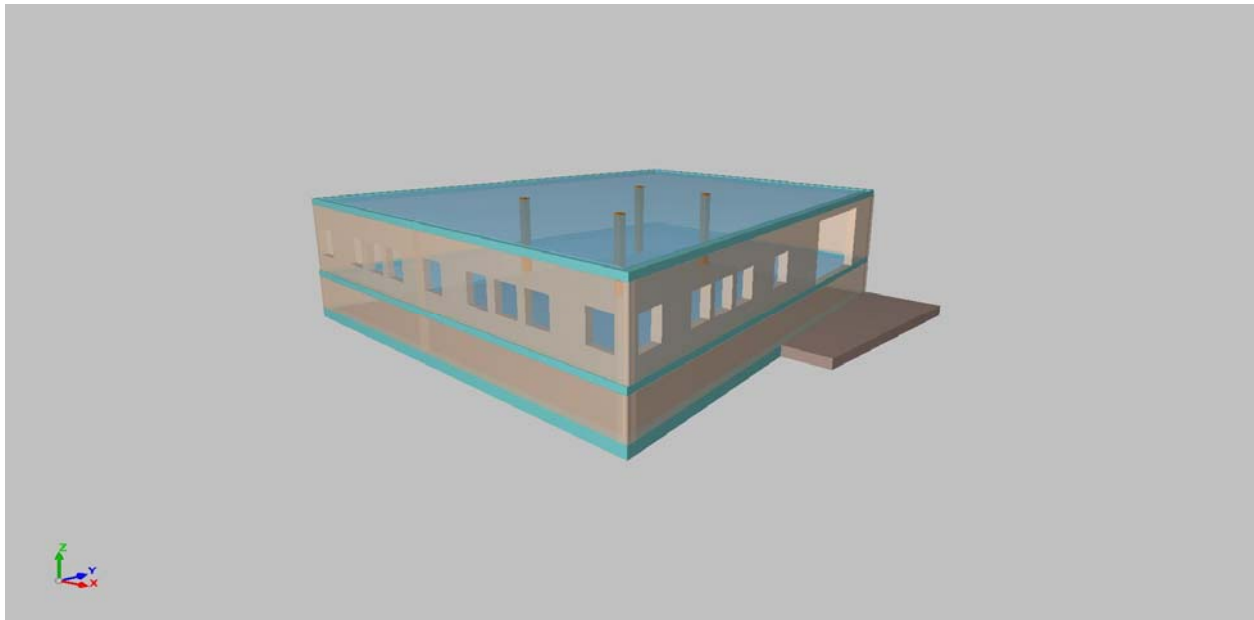
11.2.1.- Aceros en barras

| Elemento | Acero | f_{yk} (MPa) | γ_s |
|----------|---------|-------------------|-------------|
| Todos | B 500 S | 500 | 1.00 a 1.15 |

JESUS JIMENEZ CAÑAS & ASOCIADOS

REORDENACIÓN DEL PASEO DE LAS CANTERAS
PROYECTO DE ESTRUCTURA. ANEJO DE CÁLCULO.

DICIEMBRE 2015



| | |
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1.- SISMO

Norma utilizada: NCSE-02

Norma de Construcción Sismorresistente NCSE-02

Método de cálculo: Análisis mediante espectros de respuesta (NCSE-02, 3.6.2)

1.1.- Datos generales de sismo

Caracterización del emplazamiento

a_b : Aceleración básica (NCSE-02, 2.1 y Anejo 1)

a_b : 0.040 g

K: Coeficiente de contribución (NCSE-02, 2.1 y Anejo 1)

K : 1.00

Tipo de suelo (NCSE-02, 2.4): Tipo III

Sistema estructural

Ductilidad (NCSE-02, Tabla 3.1): Ductilidad baja

W: Amortiguamiento (NCSE-02, Tabla 3.1)

W : 4.00 %

Tipo de construcción (NCSE-02, 2.2): Construcciones de importancia especial

Parámetros de cálculo

Número de modos de vibración que intervienen en el análisis: Según norma

Fracción de sobrecarga de uso

: 0.60

Fracción de sobrecarga de nieve

: 0.50

Se realiza análisis de los efectos de 2º orden

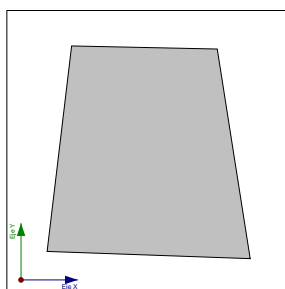
Valor para multiplicar los desplazamientos 1.20

Criterio de armado a aplicar por ductilidad: Ninguno

Direcciones de análisis

Acción sísmica según X

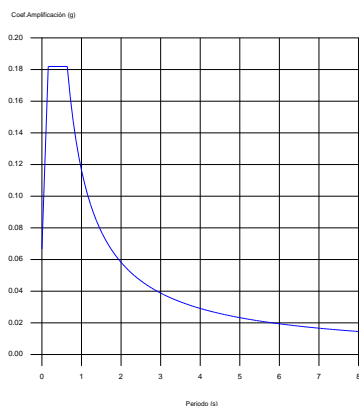
Acción sísmica según Y



Proyección en planta de la obra

1.2.- Espectro de cálculo

1.2.1.- Espectro elástico de aceleraciones



Coef. Amplificación:

$$S_{ae} = a_c \cdot \alpha(T)$$

Donde:

$$\alpha(T) = 1 + (2,5 \cdot v - 1) \cdot \frac{T}{T_A}$$

$$T < T_A$$

$$\alpha(T) = 2,5 \cdot v$$

$$T_A \leq T \leq T_B$$

$$\alpha(T) = \frac{K \cdot C}{T} \cdot v$$

$$T > T_B$$

es el espectro normalizado de respuesta elástica.

El valor máximo de las ordenadas espectrales es 0.182 g.

NCSE-02 (2.2, 2.3 y 2.4)

Parámetros necesarios para la definición del espectro

a_c : Aceleración sísmica de cálculo (NCSE-02, 2.2)

a_c : 0.067 g

$$a_c = S \cdot \rho \cdot a_b$$



Justificación de la acción sísmica

CON PILARES NUEVOS_cargas ajustadas_muros ajus...

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a_b : Aceleración básica (NCSE-02, 2.1 y Anejo 1)

a_b : 0.040 g

r : Coeficiente adimensional de riesgo

r : 1.30

Tipo de construcción: Construcciones de importancia especial

S : Coeficiente de amplificación del terreno (NCSE-02, 2.2)

S : 1.28

$$S = \frac{C}{1,25}$$

$$\rho \cdot a_b \leq 0,1g$$

$$S = \frac{C}{1,25} + 3,33 \cdot \left(\rho \cdot \frac{a_b}{g} - 0,1 \right) \cdot \left(1 - \frac{C}{1,25} \right)$$

$$0,1g < \rho \cdot a_b < 0,4g$$

$$S = 1,0$$

$$0,4g \leq \rho \cdot a_b$$

C : Coeficiente del terreno (NCSE-02, 2.4)

C : 1.60

Tipo de suelo (NCSE-02, 2.4): Tipo III

a_b : Aceleración básica (NCSE-02, 2.1 y Anejo 1)

a_b : 0.040 g

r : Coeficiente adimensional de riesgo

r : 1.30

n : Coeficiente dependiente del amortiguamiento (NCSE-02, 2.5)

n : 1.09

$$v = \left(\frac{5}{\Omega} \right)^{0,4}$$

W : Amortiguamiento (NCSE-02, Tabla 3.1)

W : 4.00 %

T_A : Periodo característico del espectro (NCSE-02, 2.3)

T_A : 0.16 s

$$T_A = \frac{K \cdot C}{10}$$

K : Coeficiente de contribución (NCSE-02, 2.1 y Anejo 1)

K : 1.00

C : Coeficiente del terreno (NCSE-02, 2.4)

C : 1.60

Tipo de suelo (NCSE-02, 2.4): Tipo III

T_B : Periodo característico del espectro (NCSE-02, 2.3)

T_B : 0.64 s

$$T_B = \frac{K \cdot C}{2,5}$$

K : Coeficiente de contribución (NCSE-02, 2.1 y Anejo 1)

K : 1.00

C : Coeficiente del terreno (NCSE-02, 2.4)

C : 1.60

Tipo de suelo (NCSE-02, 2.4): Tipo III

1.2.2.- Espectro de diseño de aceleraciones

El espectro de diseño sísmico se obtiene reduciendo el espectro elástico por el coeficiente (μ) correspondiente a cada dirección de análisis.

$$S_a = a_c \cdot \left(1 + \left(2,5 \cdot \frac{v}{\mu} - 1 \right) \cdot \frac{T}{T_A} \right) \quad T < T_A$$

$$S_a = a_c \cdot 2,5 \cdot \frac{v}{\mu} \quad T_A \leq T \leq T_B$$

$$S_a = a_c \cdot \frac{K \cdot C}{T} \cdot \frac{v}{\mu} \quad T > T_B$$

b : Coeficiente de respuesta

b : 0.55

$$\beta = \frac{v}{\mu}$$

n : Coeficiente dependiente del amortiguamiento (NCSE-02, 2.5)

n : 1.09

$$v = \left(\frac{5}{\Omega} \right)^{0,4}$$

W : Amortiguamiento (NCSE-02, Tabla 3.1)

W : 4.00 %

m : Coeficiente de comportamiento por ductilidad (NCSE-02, 3.7.3.1)

m : 2.00

Ductilidad (NCSE-02, Tabla 3.1): Ductilidad baja

a_c : Aceleración sísmica de cálculo (NCSE-02, 2.2)

a_c : 0.067 g

K : Coeficiente de contribución (NCSE-02, 2.1 y Anejo 1)

K : 1.00

C : Coeficiente del terreno (NCSE-02, 2.4)

C : 1.60

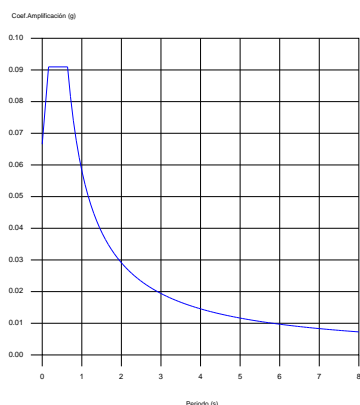
T_A : Periodo característico del espectro (NCSE-02, 2.3)

T_A : 0.16 s

T_B : Periodo característico del espectro (NCSE-02, 2.3)

T_B : 0.64 s

NCSE-02 (3.6.2.2)



1.3.- Coeficientes de participación

| Modo | T | L _x | L _y | L _{gz} | M _x | M _y | Hipótesis X(1) | Hipótesis Y(1) |
|--------|-------|----------------|----------------|-----------------|----------------|----------------|---|---|
| Modo 1 | 0.197 | 0.1337 | 0.1102 | 0.9849 | 63.69 % | 40.07 % | R = 2 A = 0.892 m/s ² D = 0.87527 mm | R = 2 A = 0.892 m/s ² D = 0.87527 mm |
| Modo 2 | 0.191 | 0.1178 | 0.1644 | 0.9793 | 29.56 % | 53.41 % | R = 2 A = 0.892 m/s ² D = 0.82201 mm | R = 2 A = 0.892 m/s ² D = 0.82201 mm |
| Modo 3 | 0.025 | 0.0168 | 0.0291 | 0.9994 | 0.18 % | 0.5 % | R = 2 A = 0.691 m/s ² D = 0.01102 mm | R = 2 A = 0.691 m/s ² D = 0.01102 mm |
| Total | | | | | 93.43 % | 93.98 % | | |

T: Periodo de vibración en segundos.

L_x, L_y: Coeficientes de participación normalizados en cada dirección del análisis.

L_{gz}: Coeficiente de participación normalizado correspondiente al grado de libertad rotacional.

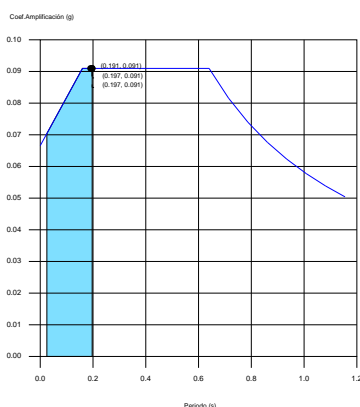
M_x, M_y: Porcentaje de masa desplazada por cada modo en cada dirección del análisis.

R: Relación entre la aceleración de cálculo usando la ductilidad asignada a la estructura y la aceleración de cálculo obtenida sin ductilidad.

A: Aceleración de cálculo, incluyendo la ductilidad.

D: Coeficiente del modo. Equivale al desplazamiento máximo del grado de libertad dinámico.

Representación de los periodos modales



Se representa el rango de periodos abarcado por los modos estudiados, con indicación de los modos en los que se desplaza más del 30% de la masa:

| Hipótesis Sismo 1 | | |
|-------------------|-------|-------|
| Hipótesis modal | T (s) | A (g) |
| Modo 1 | 0.197 | 0.091 |
| Modo 1 | 0.197 | 0.091 |
| Modo 2 | 0.191 | 0.091 |



1.4.- Centro de masas, centro de rigidez y excentricidades de cada planta

| Planta | c.d.m. (m) | c.d.r. (m) | e_x (m) | e_y (m) |
|--------|---------------|----------------|--------------|--------------|
| +8.40 | (56.74, 8.57) | (53.72, 13.21) | 3.02 | -4.64 |
| +4.90 | (56.72, 8.54) | (56.12, 8.74) | 0.60 | -0.20 |

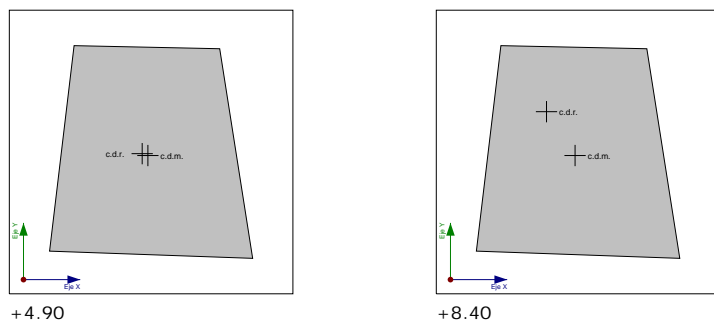
c.d.m.: Coordenadas del centro de masas de la planta (X,Y)

c.d.r.: Coordenadas del centro de rigidez de la planta (X,Y)

e_x : Excentricidad del centro de masas respecto al centro de rigidez (X)

e_y : Excentricidad del centro de masas respecto al centro de rigidez (Y)

Representación gráfica del centro de masas y del centro de rigidez por planta



1.5.- Cortante sísmico combinado por planta

El valor máximo del cortante por planta en una hipótesis sísmica dada se obtiene mediante la Combinación Cuadrática Completa (CQC) de los correspondientes cortantes modales.

Si la obra tiene vigas con vinculación exterior o estructuras 3D integradas, los esfuerzos de dichos elementos no se muestran en el siguiente listado.

1.5.1.- Cortante sísmico combinado y fuerza sísmica equivalente por planta

Los valores que se muestran en las siguientes tablas no están ajustados por el factor de modificación calculado en el apartado 'Corrección por cortante basal'.

Hipótesis sísmica: Sismo X1

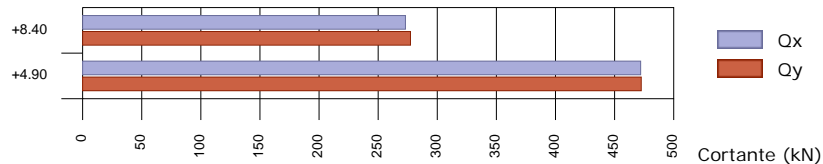
| Planta | Q_x (kN) | $F_{eq,X}$ (kN) | Q_y (kN) | $F_{eq,Y}$ (kN) |
|--------|---------------|--------------------|---------------|--------------------|
| +8.40 | 2678.872 | 2678.872 | 2720.732 | 2720.732 |
| +4.90 | 4630.711 | 1956.862 | 4635.796 | 1921.148 |

Hipótesis sísmica: Sismo Y1

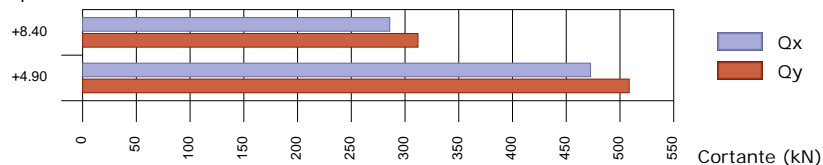
| Planta | Q_x (kN) | $F_{eq,X}$ (kN) | Q_y (kN) | $F_{eq,Y}$ (kN) |
|--------|---------------|--------------------|---------------|--------------------|
| +8.40 | 2803.513 | 2803.513 | 3061.265 | 3061.265 |
| +4.90 | 4636.423 | 1839.715 | 4989.402 | 1934.902 |

Cortantes sísmicos máximos por planta

Hipótesis sísmica: Sismo X1



Hipótesis sísmica: Sismo Y1



Fuerzas sísmicas equivalentes por planta

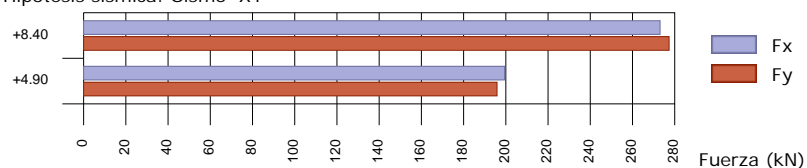


Justificación de la acción sísmica

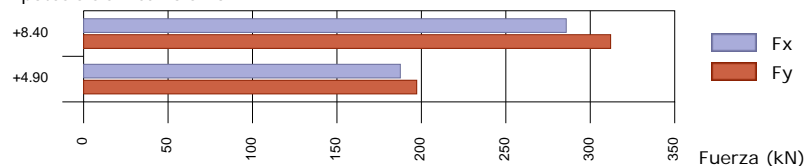
CON PILARES NUEVOS_cargas ajustadas_muros ajus...

Fecha: 29/11/15

Hipótesis sísmica: Sismo X1



Hipótesis sísmica: Sismo Y1



1.5.2.- Porcentaje de cortante sísmico resistido por tipo de soporte y por planta

El porcentaje de cortante sísmico de la columna 'Muros' incluye el cortante resistido por muros, pantallas y elementos de arriostramiento.

Hipótesis sísmica: Sismo X1

| Planta | %Q _x | | %Q _y | |
|--------|-----------------|-------|-----------------|-------|
| | Pilares | Muros | Pilares | Muros |
| +8.40 | 0.11 | 99.89 | 0.07 | 99.93 |
| +4.90 | 0.80 | 99.20 | 0.75 | 99.25 |

Hipótesis sísmica: Sismo Y1

| Planta | %Q _x | | %Q _y | |
|--------|-----------------|-------|-----------------|-------|
| | Pilares | Muros | Pilares | Muros |
| +8.40 | 0.11 | 99.89 | 0.07 | 99.93 |
| +4.90 | 0.79 | 99.21 | 0.75 | 99.25 |

1.5.3.- Porcentaje de cortante sísmico resistido por tipo de soporte en arranques

El porcentaje de cortante sísmico de la columna 'Muros' incluye el cortante resistido por muros, pantallas y elementos de arriostramiento.

| Hipótesis sísmica | %Q _x | | %Q _y | |
|-------------------|-----------------|-------|-----------------|-------|
| | Pilares | Muros | Pilares | Muros |
| Sismo X1 | 0.80 | 99.20 | 0.75 | 99.25 |
| Sismo Y1 | 0.79 | 99.21 | 0.75 | 99.25 |

Distorsiones de pilares

Nombre Obra: 3DR_Edificio Norte_02_+PILdef

Fecha: 29/11/15

CON PILARES NUEVOS_cargas ajustadas_muros ajus...

▪ h: Altura del nivel respecto al inmediato inferior

▪ Distorsión:

Absoluta: Diferencia entre los desplazamientos de un nivel y los del inmediatamente inferior
Relativa: Relación entre la altura y la distorsión absoluta

▪ Origen:

G: Sólo gravitatorias
GV: Gravitatorias + viento

▪ Nota:

Las diferentes normas suelen limitar el valor de la distorsión relativa entre plantas y de la distorsión total (desplome) del edificio. El valor absoluto se utilizará para definir las juntas sísmicas. El valor relativo suele limitarse en función de la altura de la planta 'h'. Se comprueba el valor 'Total' tomando en ese caso como valor de 'h' la altura total.

| Situaciones persistentes o transitorias | | | | | | | | | |
|---|--------|----------|-------|--------------|----------|--------|--------------|----------|--------|
| Pilar | Planta | Cota (m) | h (m) | Distorsión X | | | Distorsión Y | | |
| | | | | Absoluta (m) | Relativa | Origen | Absoluta (m) | Relativa | Origen |
| P1 | +8.40 | 5.25 | 3.50 | 0.0002 | ---- | GV | 0.0002 | ---- | GV |
| | +4.90 | 1.75 | 1.75 | 0.0001 | ---- | GV | 0.0001 | ---- | GV |
| | +3.00 | 0.00 | | | | | | | |
| | Total | | 5.25 | 0.0003 | ---- | GV | 0.0002 | ---- | GV |
| P2 | +8.40 | 5.25 | 3.50 | 0.0002 | ---- | GV | 0.0002 | ---- | GV |
| | +4.90 | 1.75 | 1.75 | 0.0001 | ---- | GV | 0.0001 | ---- | GV |
| | +3.00 | 0.00 | | | | | | | |
| | Total | | 5.25 | 0.0003 | ---- | GV | 0.0002 | ---- | GV |
| P3 | +8.40 | 5.25 | 3.50 | 0.0002 | ---- | GV | 0.0002 | ---- | GV |
| | +4.90 | 1.75 | 1.75 | 0.0001 | ---- | GV | 0.0001 | ---- | GV |
| | +3.00 | 0.00 | | | | | | | |
| | Total | | 5.25 | 0.0003 | ---- | GV | 0.0002 | ---- | GV |
| P4 | +8.40 | 5.25 | 3.50 | 0.0002 | ---- | GV | 0.0002 | ---- | GV |
| | +4.90 | 1.75 | 1.75 | 0.0001 | ---- | GV | 0.0001 | ---- | GV |
| | +3.00 | 0.00 | | | | | | | |
| | Total | | 5.25 | 0.0003 | ---- | GV | 0.0002 | ---- | GV |

| Situaciones sísmicas ⁽¹⁾ | | | | | | | | | |
|-------------------------------------|--------|----------|-------|--------------|----------|--------|--------------|----------|--------|
| Pilar | Planta | Cota (m) | h (m) | Distorsión X | | | Distorsión Y | | |
| | | | | Absoluta (m) | Relativa | Origen | Absoluta (m) | Relativa | Origen |
| P1 | +8.40 | 5.25 | 3.50 | 0.0017 | h / 2059 | ---- | 0.0015 | h / 2334 | ---- |
| | +4.90 | 1.75 | 1.75 | 0.0009 | h / 1945 | ---- | 0.0008 | h / 2188 | ---- |
| | +3.00 | 0.00 | | | | | | | |
| | Total | | 5.25 | 0.0026 | h / 2020 | ---- | 0.0024 | h / 2188 | ---- |
| P2 | +8.40 | 5.25 | 3.50 | 0.0017 | h / 2059 | ---- | 0.0016 | h / 2188 | ---- |
| | +4.90 | 1.75 | 1.75 | 0.0009 | h / 1945 | ---- | 0.0008 | h / 2188 | ---- |
| | +3.00 | 0.00 | | | | | | | |
| | Total | | 5.25 | 0.0026 | h / 2020 | ---- | 0.0024 | h / 2188 | ---- |
| P3 | +8.40 | 5.25 | 3.50 | 0.0016 | h / 2188 | ---- | 0.0016 | h / 2188 | ---- |
| | +4.90 | 1.75 | 1.75 | 0.0009 | h / 1945 | ---- | 0.0008 | h / 2188 | ---- |
| | +3.00 | 0.00 | | | | | | | |
| | Total | | 5.25 | 0.0025 | h / 2100 | ---- | 0.0024 | h / 2188 | ---- |
| P4 | +8.40 | 5.25 | 3.50 | 0.0016 | h / 2188 | ---- | 0.0015 | h / 2334 | ---- |
| | +4.90 | 1.75 | 1.75 | 0.0009 | h / 1945 | ---- | 0.0008 | h / 2188 | ---- |
| | +3.00 | 0.00 | | | | | | | |
| | Total | | 5.25 | 0.0025 | h / 2100 | ---- | 0.0024 | h / 2188 | ---- |

Notas:

⁽¹⁾ Las distorsiones están mayoradas por la ductilidad.

Los valores indicados tienen en cuenta los factores de desplazamientos definidos para los efectos multiplicadores de segundo orden. Valores máximos

| Desplome local máximo de los pilares (d / h) | | | | |
|--|---|-------------|-------------------------------------|-------------|
| Planta | Situaciones persistentes o transitorias | | Situaciones sísmicas ⁽¹⁾ | |
| | Dirección X | Dirección Y | Dirección X | Dirección Y |
| +8.40 | ---- | ---- | 1 / 2059 | 1 / 2188 |
| +4.90 | ---- | ---- | 1 / 1945 | 1 / 2188 |

Notas:

⁽¹⁾ Los desplazamientos están mayorados por la ductilidad.

Distorsiones de pilares

Nombre Obra: 3DR_Edificio Norte_02_+PILdef

Fecha: 29/11/15

CON PILARES NUEVOS_cargas ajustadas_muros ajus...

| Desplome total máximo de los pilares (D / H) | | | |
|---|-------------|-------------------------------------|-------------|
| Situaciones persistentes o transitorias | | Situaciones sísmicas ⁽¹⁾ | |
| Dirección X | Dirección Y | Dirección X | Dirección Y |
| ---- | ---- | 1 / 2020 | 1 / 2188 |
| Notas: ⁽¹⁾ Los desplazamientos están mayorados por la ductilidad. | | | |

Los valores indicados tienen en cuenta los factores de desplazamientos definidos para los efectos multiplicadores de segundo orden.



Esfuerzos y armados de pilares, pantallas y muros

CON PILARES NUEVOS_cargas ajustadas_muros ajustados_igualada P0 cim

Fecha: 29/11/15

1.- ESFUERZOS DE PILARES, PANTALLAS Y MUROS POR HIPÓTESIS

▪ Tramo: Nivel inicial / nivel final del tramo entre plantas.

▪ Nota:

Los esfuerzos están referidos a ejes locales del pilar.

| Soporte | Planta | Dimensión (cm) | Tramo (m) | Hipótesis | Base | | | | | | Cabeza | | | | | | |
|-----------------|-----------------|----------------|-----------|-------------------|-------------------|-----------|-----------|---------|---------|----------|--------|-----------|-----------|---------|---------|----------|------|
| | | | | | N (kN) | Mx (kN-m) | My (kN-m) | Qx (kN) | Qy (kN) | T (kN-m) | N (kN) | Mx (kN-m) | My (kN-m) | Qx (kN) | Qy (kN) | T (kN-m) | |
| P1 | +8.40 | 35x35 | 1.90/5.10 | Peso propio | 368.7 | -1.3 | -3.3 | -0.6 | -1.7 | 0.0 | 359.1 | 0.6 | 2.1 | -0.6 | -1.7 | 0.0 | |
| | | | | Cargas muertas | 102.4 | 0.8 | 0.6 | 0.5 | 0.3 | -0.0 | 102.4 | -0.8 | -0.4 | 0.5 | 0.3 | -0.0 | |
| | | | | Sobrecarga de uso | 446.0 | 3.5 | 0.3 | 2.0 | 0.1 | 0.0 | 446.0 | -2.9 | 0.0 | 2.0 | 0.1 | 0.0 | |
| | | | | Viento +X exc.+ | -0.5 | -0.0 | 0.0 | -0.0 | 0.0 | -0.0 | -0.5 | 0.0 | -0.0 | -0.0 | 0.0 | -0.0 | |
| | | | | Viento +X exc.- | -0.5 | -0.0 | 0.0 | -0.0 | 0.0 | -0.0 | -0.5 | 0.0 | -0.0 | -0.0 | 0.0 | -0.0 | |
| | | | | Viento -X exc.+ | 0.5 | 0.0 | -0.0 | 0.0 | -0.0 | 0.0 | 0.5 | -0.0 | 0.0 | 0.0 | -0.0 | 0.0 | |
| | | | | Viento -X exc.- | 0.5 | 0.0 | -0.0 | 0.0 | -0.0 | 0.0 | 0.5 | -0.0 | 0.0 | 0.0 | -0.0 | 0.0 | |
| | | | | Viento +Y exc.+ | -0.3 | 0.0 | -0.0 | 0.0 | -0.0 | -0.0 | -0.3 | -0.0 | 0.0 | 0.0 | -0.0 | -0.0 | |
| | | | | Viento +Y exc.- | -0.3 | 0.0 | -0.0 | 0.0 | -0.0 | -0.0 | -0.3 | -0.0 | 0.0 | 0.0 | -0.0 | -0.0 | |
| | | | | Viento -Y exc.+ | 0.3 | -0.0 | 0.0 | -0.0 | 0.0 | 0.0 | 0.3 | 0.0 | -0.0 | -0.0 | 0.0 | 0.0 | |
| | Viento -Y exc.- | 0.3 | -0.0 | 0.0 | -0.0 | 0.0 | 0.0 | 0.3 | 0.0 | -0.0 | -0.0 | 0.0 | 0.0 | | | | |
| | Sismo X Modo 1 | -6.2 | -0.9 | 1.1 | -0.5 | 0.6 | -0.0 | -6.2 | 0.7 | -0.8 | -0.5 | 0.6 | -0.0 | | | | |
| | Sismo X Modo 2 | -15.2 | 0.5 | -0.0 | 0.2 | -0.1 | -0.0 | -15.2 | -0.2 | 0.2 | 0.2 | -0.1 | -0.0 | | | | |
| | Sismo X Modo 3 | 0.0 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | | | | |
| | Sismo Y Modo 1 | -5.1 | -0.7 | 0.9 | -0.4 | 0.5 | -0.0 | -5.1 | 0.6 | -0.7 | -0.4 | 0.5 | -0.0 | | | | |
| | Sismo Y Modo 2 | -21.2 | 0.7 | -0.0 | 0.3 | -0.1 | -0.0 | -21.2 | -0.3 | 0.3 | 0.3 | -0.1 | -0.0 | | | | |
| | Sismo Y Modo 3 | 0.1 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.1 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | | | | |
| | | +4.90 | 35x35 | 0.00/1.60 | Peso propio | 741.8 | -7.6 | -6.5 | -8.1 | -8.7 | -0.0 | 737.0 | 5.4 | 7.5 | -8.1 | -8.7 | -0.0 |
| | | | | | Cargas muertas | 140.7 | -3.4 | 4.3 | -3.0 | 4.6 | -0.0 | 140.7 | 1.3 | -3.1 | -3.0 | 4.6 | -0.0 |
| | | | | | Sobrecarga de uso | 658.1 | 3.4 | 2.0 | 5.5 | 2.3 | 0.0 | 658.1 | -5.3 | -1.6 | 5.5 | 2.3 | 0.0 |
| Viento +X exc.+ | | | | | -1.1 | -0.2 | 0.1 | -0.2 | 0.1 | 0.0 | -1.1 | 0.1 | -0.1 | -0.2 | 0.1 | 0.0 | |
| Viento +X exc.- | | | | | -1.1 | -0.2 | 0.1 | -0.2 | 0.1 | -0.0 | -1.1 | 0.1 | -0.1 | -0.2 | 0.1 | -0.0 | |
| Viento -X exc.+ | | | | | 1.1 | 0.2 | -0.1 | 0.2 | -0.1 | -0.0 | 1.1 | -0.1 | 0.1 | 0.2 | -0.1 | -0.0 | |
| Viento -X exc.- | | | | | 1.1 | 0.2 | -0.1 | 0.2 | -0.1 | 0.0 | 1.1 | -0.1 | 0.1 | 0.2 | -0.1 | 0.0 | |
| Viento +Y exc.+ | | | | | -0.8 | 0.1 | -0.2 | 0.1 | -0.2 | -0.0 | -0.8 | -0.1 | 0.1 | 0.1 | -0.2 | -0.0 | |
| Viento +Y exc.- | | | | | -0.8 | 0.1 | -0.2 | 0.1 | -0.2 | 0.0 | -0.8 | -0.1 | 0.1 | 0.1 | -0.2 | 0.0 | |
| Viento -Y exc.+ | | | | | 0.8 | -0.1 | 0.2 | -0.1 | 0.2 | 0.0 | 0.8 | 0.1 | -0.1 | -0.1 | 0.2 | 0.0 | |
| Viento -Y exc.- | | 0.8 | -0.1 | 0.2 | -0.1 | 0.2 | -0.0 | 0.8 | 0.1 | -0.1 | -0.1 | 0.2 | -0.0 | | | | |
| Sismo X Modo 1 | | -14.2 | -7.1 | 6.6 | -7.0 | 6.7 | 0.0 | -14.2 | 4.0 | -4.2 | -7.0 | 6.7 | 0.0 | | | | |
| Sismo X Modo 2 | | -36.0 | -0.4 | -3.6 | 0.1 | -3.1 | -0.0 | -36.0 | -0.7 | 1.4 | 0.1 | -3.1 | -0.0 | | | | |
| Sismo X Modo 3 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 0.0 | -0.0 | -0.0 | 0.0 | 0.0 | -0.0 | | | | |
| Sismo Y Modo 1 | | -11.7 | -5.9 | 5.4 | -5.7 | 5.5 | 0.0 | -11.7 | 3.3 | -3.4 | -5.7 | 5.5 | 0.0 | | | | |
| Sismo Y Modo 2 | | -50.2 | -0.6 | -5.0 | 0.2 | -4.3 | -0.0 | -50.2 | -0.9 | 1.9 | 0.2 | -4.3 | -0.0 | | | | |
| Sismo Y Modo 3 | | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 0.1 | -0.0 | -0.0 | 0.0 | 0.0 | -0.0 | | | | |
| P2 | | +8.40 | 35x35 | 1.90/5.10 | Peso propio | 365.4 | 1.9 | -3.2 | 1.0 | -1.6 | 0.0 | 355.7 | -1.2 | 1.8 | 1.0 | -1.6 | 0.0 |
| | | | | | Cargas muertas | 127.2 | -1.0 | 0.2 | -0.6 | 0.1 | -0.0 | 127.2 | 0.9 | -0.2 | -0.6 | 0.1 | -0.0 |
| | | | | | Sobrecarga de uso | 455.8 | -3.2 | 0.0 | -1.8 | -0.0 | 0.0 | 455.8 | 2.5 | 0.1 | -1.8 | -0.0 | 0.0 |
| | Viento +X exc.+ | | | | 0.4 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.4 | 0.0 | -0.0 | -0.0 | -0.0 | -0.0 | |
| | Viento +X exc.- | | | | 0.4 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.4 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | |
| | Viento -X exc.+ | | | | -0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.4 | -0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| | Viento -X exc.- | | | | -0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.4 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 | |
| | Viento +Y exc.+ | | | | -0.4 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | -0.4 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | |
| | Viento +Y exc.- | | | | -0.4 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | -0.4 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | |
| | Viento -Y exc.+ | | | | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 | |
| | Viento -Y exc.- | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 | | | | |
| | Sismo X Modo 1 | 21.4 | -0.5 | 0.3 | -0.3 | 0.2 | -0.0 | 21.4 | 0.5 | -0.4 | -0.3 | 0.2 | -0.0 | | | | |
| | Sismo X Modo 2 | -2.8 | -1.2 | -0.4 | -0.6 | -0.2 | -0.0 | -2.8 | 0.8 | 0.4 | -0.6 | -0.2 | -0.0 | | | | |
| | Sismo X Modo 3 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | | | | |
| | Sismo Y Modo 1 | 17.6 | -0.4 | 0.2 | -0.3 | 0.2 | -0.0 | 17.6 | 0.4 | -0.4 | -0.3 | 0.2 | -0.0 | | | | |
| | Sismo Y Modo 2 | -3.9 | -1.6 | -0.5 | -0.8 | -0.3 | -0.0 | -3.9 | 1.1 | 0.5 | -0.8 | -0.3 | -0.0 | | | | |
| | Sismo Y Modo 3 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | | | | |
| | | +4.90 | 35x35 | 0.00/1.60 | Peso propio | 730.7 | 12.6 | -5.4 | 13.2 | -7.9 | -0.0 | 725.9 | -8.4 | 7.2 | 13.2 | -7.9 | -0.0 |
| | | | | | Cargas muertas | 182.4 | -3.8 | 3.5 | -4.3 | 3.3 | -0.0 | 182.4 | 3.0 | -1.9 | -4.3 | 3.3 | -0.0 |
| | | | | | Sobrecarga de uso | 672.0 | -2.6 | 1.5 | -4.5 | 1.4 | 0.0 | 672.0 | 4.7 | -0.8 | -4.5 | 1.4 | 0.0 |
| Viento +X exc.+ | | | | | 0.9 | -0.2 | 0.0 | -0.2 | 0.0 | 0.0 | 0.9 | 0.2 | 0.0 | -0.2 | 0.0 | 0.0 | |
| Viento +X exc.- | | | | | 0.9 | -0.2 | 0.0 | -0.2 | 0.0 | -0.0 | 0.9 | 0.2 | 0.0 | -0.2 | 0.0 | -0.0 | |
| Viento -X exc.+ | | | | | -0.9 | 0.2 | -0.0 | 0.2 | -0.0 | -0.0 | -0.9 | -0.2 | -0.0 | 0.2 | -0.0 | -0.0 | |
| Viento -X exc.- | | | | | -0.9 | 0.2 | -0.0 | 0.2 | -0.0 | 0.0 | -0.9 | -0.2 | -0.0 | 0.2 | -0.0 | 0.0 | |
| Viento +Y exc.+ | | | | | -1.0 | -0.1 | -0.2 | -0.1 | -0.2 | -0.0 | -1.0 | 0.1 | 0.1 | -0.1 | -0.2 | -0.0 | |
| Viento +Y exc.- | | | | | -1.0 | -0.1 | -0.2 | -0.1 | -0.2 | 0.0 | -1.0 | 0.1 | 0.1 | -0.1 | -0.2 | 0.0 | |
| Viento -Y exc.+ | | | | | 1.0 | 0.1 | 0.2 | 0.1 | 0.2 | 0.0 | 1.0 | -0.1 | -0.1 | 0.1 | 0.2 | 0.0 | |
| Viento -Y exc.- | 1.0 | 0.1 | 0.2 | 0.1 | 0.2 | -0.0 | 1.0 | -0.1 | -0.1 | 0.1 | 0.2 | -0.0 | | | | | |
| Sismo X Modo 1 | 49.6 | -5.7 | 5.2 | -5.4 | 4.7 | 0.0 | 49.6 | 2.9 | -2.4 | -5.4 | 4.7 | 0.0 | | | | | |
| Sismo X Modo 2 | -7.7 | -5.0 | -4.2 | -5.5 | -3.9 | -0.0 | -7.7 | 3.7 | 2.1 | -5.5 | -3.9 | -0.0 | | | | | |
| Sismo X Modo 3 | -0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.0 | 0.0 | -0.0 | | | | | |
| Sismo Y Modo 1 | 40.8 | -4.7 | 4.3 | -4.4 | 3.9 | 0.0 | 40.8 | 2.4 | -1.9 | -4.4 | 3.9 | 0.0 | | | | | |
| Sismo Y Modo 2 | -10.8 | -7.0 | -5.8 | -7.6 | -5.5 | -0.0 | -10.8 | 5.1 | 2.9 | -7.6 | -5.5 | -0.0 | | | | | |
| Sismo Y Modo 3 | -0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.0 | 0.0 | -0.0 | | | | | |
| P3 | +8.40 | 35x35 | 1.90/5.10 | Peso propio | 309.5 | 8.0 | 1.4 | 4.0 | 0.7 | 0.0 | 299.9 | -4.8 | -1.0 | 4.0 | 0.7 | 0.0 | |
| | | | | Cargas muertas | 93.7 | -0.7 | -0.8 | -0.3 | -0.5 | -0.0 | 93.7 | 0.2 | 0.7 | -0.3 | -0.5 | -0.0 | |
| | | | | Sobrecarga de uso | 385.5 | 2.9 | -2.8 | 1.7 | -1.5 | 0.0 | 385.5 | -2.5 | 2.0 | 1.7 | -1.5 | 0.0 | |
| | | | | Viento +X exc.+ | 0.2 | -0.1 | -0.0 | -0.0 | -0.0 | -0.0 | 0.2 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | |
| | | | | Viento +X exc.- | 0.2 | -0.1 | -0.0 | -0.0 | -0.0 | -0.0 | 0.2 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | |
| | | | | Viento -X exc.+ | -0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 | |
| | | | | Viento -X exc.- | -0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 | |
| | | | | Viento +Y exc.+ | 0.3 | 0.0 | -0.0 | 0.0 | -0.0 | -0.0 | 0.3 | -0.0 | 0.0 | 0.0 | -0.0 | -0.0 | |
| | | | | Viento +Y exc.- | 0.3 | 0.0 | -0.0 | 0.0 | -0.0 | -0.0 | 0.3 | -0.0 | 0.0 | 0.0 | -0.0 | -0.0 | |
| | | | | Viento -Y exc.+ | -0.3 | -0.0 | 0.0 | -0.0 | 0.0 | 0.0 | -0.3 | 0.0 | -0.0 | -0.0 | 0.0 | 0.0 | |
| | Viento -Y exc.- | -0.3 | -0.0 | 0.0 | -0.0 | 0.0 | 0.0 | -0.3 | 0.0 | -0.0 | -0.0 | 0.0 | 0.0 | | | | |
| | Sismo X Modo 1 | -0.6 | -2.6 | 0.4 | -1.3 | 0.3 | -0.0 | -0.6 | 1.6 | -0.5 | -1.3 | 0.3 | -0.0 | | | | |
| | Sismo X Modo 2 | 9.6 | -0.4 | -0.6 | -0.2 | -0.3 | -0.0 | 9.6 | 0.2 | 0.5 | -0.2 | -0.3 | -0.0 | | | | |
| | Sismo X Modo 3 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | | | | |
| | Sismo Y Modo 1 | -0.5 | -2.1 | 0.4 | -1.1 | 0.2 | -0.0 | -0.5 | 1.3 | -0.4 | -1.1 | 0.2 | -0.0 | | | | |
| | Sismo Y Modo 2 | 13.3 | -0.5 | -0.8 | -0.2 | -0.5 | -0.0 | 13.3 | 0.3 | 0.6 | -0.2 | -0.5 | -0.0 | | | | |
| | Sismo Y Modo 3 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | | | | |



Esfuerzos y armados de pilares, pantallas y muros

CON PILARES NUEVOS_cargas ajustadas_muros ajustados_igualada PO cim

Fecha: 29/11/15

| Soporte | Planta | Dimensión (cm) | Tramo (m) | Hipótesis | Base | | | | | | Cabeza | | | | | | | | | |
|------------------|--------|----------------|-------------------|-------------------|--------|-----------|-----------|-------------------|---------|----------|--------|-----------|-----------|---------|---------|----------|-------|--------|--------|--------|
| | | | | | N (kN) | Mx (kN-m) | My (kN-m) | Qx (kN) | Qy (kN) | T (kN-m) | N (kN) | Mx (kN-m) | My (kN-m) | Qx (kN) | Qy (kN) | T (kN-m) | | | | |
| | + 4.90 | 35x35 | 0.00/1.60 | Peso propio | 614.3 | 13.9 | 8.2 | 19.7 | 8.4 | -0.0 | 609.5 | -17.6 | -5.2 | 19.7 | 8.4 | -0.0 | | | | |
| | | | | Cargas muertas | 127.4 | -6.3 | 2.8 | -6.7 | 2.1 | -0.0 | 127.4 | 4.5 | -0.7 | -6.7 | 2.1 | -0.0 | | | | |
| | | | | Sobrecarga de uso | 570.0 | -2.3 | -2.0 | -0.3 | -4.0 | 0.0 | 570.0 | -1.8 | 4.5 | -0.3 | -4.0 | 0.0 | 0.0 | | | |
| | | | | Viento +X exc. + | 0.4 | -0.3 | 0.0 | -0.3 | 0.0 | 0.0 | 0.4 | 0.2 | 0.0 | -0.3 | 0.0 | 0.0 | | | | |
| | | | | Viento +X exc. - | 0.4 | -0.3 | 0.0 | -0.3 | 0.0 | -0.0 | 0.4 | 0.2 | 0.0 | -0.3 | 0.0 | -0.0 | | | | |
| | | | | Viento -X exc. + | -0.4 | 0.3 | -0.0 | 0.3 | -0.0 | -0.0 | -0.4 | -0.2 | -0.0 | 0.3 | -0.0 | -0.0 | | | | |
| | | | | Viento -X exc. - | -0.4 | 0.3 | -0.0 | 0.3 | -0.0 | 0.0 | -0.4 | -0.2 | -0.0 | 0.3 | -0.0 | 0.0 | | | | |
| | | | | Viento +Y exc. + | 0.6 | 0.1 | -0.2 | 0.1 | -0.2 | -0.0 | 0.6 | -0.1 | 0.1 | 0.1 | -0.2 | -0.0 | | | | |
| | | | | Viento +Y exc. - | 0.6 | 0.1 | -0.2 | 0.1 | -0.2 | 0.0 | 0.6 | -0.1 | 0.1 | 0.1 | -0.2 | 0.0 | | | | |
| | | | | Viento -Y exc. + | -0.6 | -0.1 | 0.2 | -0.1 | 0.2 | 0.0 | -0.6 | 0.1 | -0.1 | -0.1 | 0.2 | 0.0 | | | | |
| | | | | Viento -Y exc. - | -0.6 | -0.1 | 0.2 | -0.1 | 0.2 | -0.0 | -0.6 | 0.1 | -0.1 | -0.1 | 0.2 | -0.0 | | | | |
| | | | | Sismo X Modo 1 | -2.8 | -10.2 | 5.4 | -11.4 | 5.1 | 0.0 | -2.8 | 8.1 | -2.7 | -11.4 | 5.1 | 0.0 | | | | |
| | | | | Sismo X Modo 2 | 20.5 | -1.7 | -4.1 | -1.9 | -4.1 | -0.0 | 20.5 | 1.3 | 2.5 | -1.9 | -4.1 | -0.0 | | | | |
| | | | | Sismo X Modo 3 | -0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.0 | 0.0 | -0.0 | | | | |
| | | | | Sismo Y Modo 1 | -2.3 | -8.4 | 4.4 | -9.4 | 4.2 | 0.0 | -2.3 | 6.7 | -2.3 | -9.4 | 4.2 | 0.0 | | | | |
| | | | | Sismo Y Modo 2 | 28.6 | -2.4 | -5.7 | -2.7 | -5.7 | -0.0 | 28.6 | 1.8 | 3.5 | -2.7 | -5.7 | -0.0 | | | | |
| | | | | Sismo Y Modo 3 | -0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.0 | 0.0 | -0.0 | | | | |
| | | | | P4 | + 8.40 | 35x35 | 1.90/5.10 | Peso propio | 310.4 | -6.7 | 1.9 | -3.3 | 0.9 | 0.0 | 300.8 | 3.7 | -1.1 | -3.3 | 0.9 | 0.0 |
| | | | | | | | | Cargas muertas | 68.5 | 0.2 | -1.1 | 0.1 | -0.6 | -0.0 | 68.5 | -0.1 | 0.8 | 0.1 | -0.6 | -0.0 |
| | | | | | | | | Sobrecarga de uso | 365.7 | -1.7 | -2.4 | -1.0 | -1.3 | 0.0 | 365.7 | 1.3 | 1.8 | -1.0 | -1.3 | 0.0 |
| Viento +X exc. + | -0.5 | -0.0 | -0.0 | | | | | -0.0 | -0.0 | -0.0 | -0.5 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | | | | |
| Viento +X exc. - | -0.5 | -0.0 | -0.0 | | | | | -0.0 | -0.0 | -0.0 | -0.5 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | | | | |
| Viento -X exc. + | 0.5 | 0.0 | 0.0 | | | | | 0.0 | 0.0 | 0.0 | 0.5 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 | | | | |
| Viento -X exc. - | 0.5 | 0.0 | 0.0 | | | | | 0.0 | 0.0 | 0.0 | 0.5 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 | | | | |
| Viento +Y exc. + | 0.4 | -0.0 | -0.0 | | | | | -0.0 | -0.0 | -0.0 | 0.4 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | | | | |
| Viento +Y exc. - | 0.4 | -0.0 | -0.0 | | | | | -0.0 | -0.0 | -0.0 | 0.4 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | | | | |
| Viento -Y exc. + | -0.4 | 0.0 | 0.0 | | | | | 0.0 | 0.0 | 0.0 | -0.4 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 | | | | |
| Viento -Y exc. - | -0.4 | 0.0 | 0.0 | | | | | 0.0 | 0.0 | 0.0 | -0.4 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 | | | | |
| Sismo X Modo 1 | -22.9 | 0.2 | -0.3 | | | | | 0.1 | -0.1 | -0.0 | -22.9 | 0.0 | 0.0 | 0.1 | -0.1 | -0.0 | | | | |
| Sismo X Modo 2 | 1.5 | -0.7 | -0.8 | | | | | -0.4 | -0.4 | -0.0 | 1.5 | 0.5 | 0.6 | -0.4 | -0.4 | -0.0 | | | | |
| Sismo X Modo 3 | 0.0 | -0.0 | -0.0 | | | | | -0.0 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | | | | |
| Sismo Y Modo 1 | -18.9 | 0.2 | -0.2 | | | | | 0.0 | -0.1 | -0.0 | -18.9 | 0.0 | 0.0 | 0.0 | -0.1 | -0.0 | | | | |
| Sismo Y Modo 2 | 2.2 | -1.0 | -1.1 | | | | | -0.5 | -0.6 | -0.0 | 2.2 | 0.7 | 0.8 | -0.5 | -0.6 | -0.0 | | | | |
| Sismo Y Modo 3 | 0.0 | -0.0 | -0.0 | | | | | -0.0 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | | | | |
| + 4.90 | 35x35 | 0.00/1.60 | Peso propio | | | | | 634.3 | -8.4 | 7.7 | -13.7 | 8.6 | -0.0 | 629.5 | 13.6 | -6.0 | -13.7 | 8.6 | -0.0 | |
| | | | Cargas muertas | | | | | 91.0 | -1.5 | 1.5 | -1.5 | 0.8 | -0.0 | 91.0 | 0.8 | 0.2 | -1.5 | 0.8 | -0.0 | |
| | | | Sobrecarga de uso | | | | | 551.8 | 3.1 | -2.4 | 1.6 | -3.9 | 0.0 | 551.8 | 0.5 | 3.9 | 1.6 | -3.9 | 0.0 | 0.0 |
| | | | Viento +X exc. + | | -1.1 | -0.2 | -0.1 | -0.2 | -0.1 | 0.0 | -1.1 | 0.1 | 0.1 | -0.2 | -0.1 | 0.0 | | | | |
| | | | Viento +X exc. - | | -1.1 | -0.2 | -0.1 | -0.2 | -0.1 | -0.0 | -1.1 | 0.1 | 0.1 | -0.2 | -0.1 | -0.0 | | | | |
| | | | Viento -X exc. + | | 1.1 | 0.2 | 0.1 | 0.2 | 0.1 | -0.0 | 1.1 | -0.1 | -0.1 | 0.2 | 0.1 | -0.0 | | | | |
| | | | Viento -X exc. - | | 1.1 | 0.2 | 0.1 | 0.2 | 0.1 | 0.0 | 1.1 | -0.1 | -0.1 | 0.2 | 0.1 | 0.0 | | | | |
| | | | Viento +Y exc. + | | 0.9 | -0.1 | -0.2 | -0.1 | -0.2 | -0.0 | 0.9 | 0.1 | 0.1 | -0.1 | -0.2 | -0.0 | | | | |
| | | | Viento +Y exc. - | | 0.9 | -0.1 | -0.2 | -0.1 | -0.2 | 0.0 | 0.9 | 0.1 | 0.1 | -0.1 | -0.2 | 0.0 | | | | |
| | | | Viento -Y exc. + | | -0.9 | 0.1 | 0.2 | 0.1 | 0.2 | 0.0 | -0.9 | -0.1 | -0.1 | 0.1 | 0.2 | 0.0 | | | | |
| | | | Viento -Y exc. - | | -0.9 | 0.1 | 0.2 | 0.1 | 0.2 | -0.0 | -0.9 | -0.1 | -0.1 | 0.1 | 0.2 | -0.0 | | | | |
| | | | Sismo X Modo 1 | | -53.7 | -3.7 | 2.9 | -3.0 | 2.2 | 0.0 | -53.7 | 1.1 | -0.6 | -3.0 | 2.2 | 0.0 | | | | |
| | | | Sismo X Modo 2 | | 3.3 | -3.8 | -5.4 | -4.0 | -5.4 | -0.0 | 3.3 | 2.6 | 3.3 | -4.0 | -5.4 | -0.0 | | | | |
| | | | Sismo X Modo 3 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 0.0 | -0.0 | -0.0 | 0.0 | 0.0 | -0.0 | | | | |
| | | | Sismo Y Modo 1 | | -44.2 | -3.1 | 2.4 | -2.5 | 1.8 | 0.0 | -44.2 | 0.9 | -0.5 | -2.5 | 1.8 | 0.0 | | | | |
| | | | Sismo Y Modo 2 | | 4.7 | -5.3 | -7.5 | -5.6 | -7.6 | -0.0 | 4.7 | 3.7 | 4.6 | -5.6 | -7.6 | -0.0 | | | | |
| | | | Sismo Y Modo 3 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.0 | 0.0 | -0.0 | -0.0 | 0.0 | 0.0 | -0.0 | | | | |
| | | | M7 | | + 8.40 | 40.0 | 1.90/5.40 | Peso propio | 1128.6 | -444.5 | 54.1 | -261.4 | -53.1 | 30.3 | 448.7 | 378.6 | -12.5 | -249.2 | -44.2 | -14.6 |
| | | | | | | | | Cargas muertas | 94.6 | 465.8 | -591.5 | 1018.0 | -426.2 | 76.0 | 180.3 | 261.4 | -45.7 | -478.7 | -163.3 | -153.0 |
| | | | | | | | | Sobrecarga de uso | 645.7 | -389.5 | 119.7 | -303.5 | 55.2 | 20.5 | 657.1 | 677.4 | -69.0 | -329.7 | 54.8 | 21.6 |
| Viento +X exc. + | -8.3 | -1.1 | | | | | | -18.7 | -0.2 | -0.8 | -0.2 | -1.0 | 0.6 | -1.2 | -0.1 | -1.0 | -0.2 | | | |
| Viento +X exc. - | -8.3 | -1.1 | | | | | | -19.5 | -0.6 | -4.0 | -0.7 | -1.1 | 0.8 | 0.5 | -0.5 | -4.2 | -0.2 | | | |
| Viento -X exc. + | 8.3 | 1.1 | | | | | | 18.7 | 0.2 | 0.8 | 0.2 | 1.0 | -0.6 | 1.2 | 0.1 | 1.0 | 0.2 | | | |
| Viento -X exc. - | 8.3 | 1.1 | | 19.5 | | | | 0.6 | 4.0 | 0.7 | 1.1 | -0.8 | -0.5 | 0.5 | 4.2 | 0.2 | | | | |
| Viento +Y exc. + | -0.4 | 5.8 | | 48.7 | | | | 3.4 | 27.3 | 5.6 | -0.0 | -1.0 | -8.6 | 3.3 | 27.2 | -0.2 | | | | |
| Viento +Y exc. - | -0.4 | 5.8 | | 49.5 | | | | 3.7 | 30.3 | 6.1 | 0.0 | -1.2 | -10.3 | 3.6 | 30.2 | -0.3 | | | | |
| Viento -Y exc. + | 0.4 | -5.8 | | -48.7 | | | | -3.4 | -27.3 | -5.6 | 0.0 | 1.0 | 8.6 | -3.3 | -27.2 | 0.2 | | | | |
| Viento -Y exc. - | 0.4 | -5.8 | | -49.5 | | | | -3.7 | -30.3 | -6.1 | -0.0 | 1.2 | 10.3 | -3.6 | -30.2 | 0.3 | | | | |
| Sismo X Modo 1 | -249.2 | -185.2 | | -189.4 | | | | -98.0 | -801.7 | -174.3 | -33.4 | 46.6 | 219.9 | -94.7 | -806.2 | -2.3 | | | | |
| Sismo X Modo 2 | -177.1 | 153.1 | | 1117.3 | | | | 130.3 | 1059.5 | 95.8 | -20.0 | -37.2 | -413.7 | 128.6 | 1058.1 | -19.8 | | | | |
| Sismo X Modo 3 | -0.4 | 1.5 | | 7.7 | | | | -1.4 | -13.4 | 0.3 | -0.2 | 0.9 | 9.3 | -1.4 | -13.2 | 0.5 | | | | |
| Sismo Y Modo 1 | -205.3 | -152.6 | | -156.0 | | | | -80.8 | -660.6 | -143.6 | -27.5 | 38.4 | 181.2 | -78.0 | -664.4 | -1.9 | | | | |
| Sismo Y Modo 2 | -247.4 | 213.7 | | 1560.2 | | | | 181.9 | 1479.5 | 133.7 | -28.0 | -51.9 | -577.7 | 179.5 | 1477.5 | -27.6 | | | | |
| Sismo Y Modo 3 | -0.7 | 2.5 | | 13.3 | | | | -2.4 | -23.1 | 0.5 | -0.4 | 1.6 | 16.1 | -2.5 | -22.9 | 0.8 | | | | |
| + 4.90 | 40.0 | 0.00/1.90 | | Peso propio | | | | 1898.4 | 1583.1 | 152.1 | 934.5 | -125.8 | -374.6 | 1554.6 | -130.6 | 183.6 | 860.6 | -135.9 | -238.6 | |
| | | | | Cargas muertas | | | | -16.5 | -55.5 | -766.9 | 601.7 | -890.5 | 467.4 | 106.5 | 592.3 | -222.9 | -1066 | -655.2 | 323.2 | |
| | | | | Sobrecarga de uso | | | | 933.8 | 622.0 | 226.0 | 369.4 | 80.6 | -213.9 | 931.4 | -36.3 | 120.0 | 337.5 | 75.3 | -131.8 | |
| | | | | Viento +X exc. + | -16.1 | -11.1 | 4.1 | -5.2 | 20.1 | 0.1 | -10.5 | -0.4 | -24.1 | -4.8 | 20.2 | 0.2 | | | | |
| | | | | Viento +X exc. - | -16.1 | -11.2 | 2.9 | -6.1 | 12.8 | 0.9 | -10.4 | 0.1 | -20.9 | -5.7 | 12.9 | 0.7 | | | | |
| | | | | Viento -X exc. + | 16.1 | 11.1 | -4.1 | 5.2 | -20.1 | -0.1 | 10.5 | 0.4 | 24.1 | 4.8 | -20.2 | -0.2 | | | | |
| | | | | Viento -X exc. - | 16.1 | 11.2 | -2.9 | 6.1 | -12.8 | -0.9 | 10.4 | -0.1 | 20.9 | 5.7 | -12.9 | -0.7 | | | | |
| | | | | Viento +Y exc. + | 1.2 | 7.7 | 58.4 | 6.0 | 46.8 | -33.6 | -0.0 | 2.9 | 24.3 | 5.8 | 46.4 | -27.6 | | | | |
| | | | | Viento +Y exc. - | 1.2 | 7.8 | 59.6 | 6.8 | 53.6 | -34.4 | -0.1 | 2.5 | 21.4 | 6.7 | 53.3 | -28.1 | | | | |
| | | | | Viento -Y exc. + | -1.2 | -7.7 | -58.4 | -6.0 | -46.8 | 33.6 | 0.0 | -2.9 | -24.3 | -5.8 | -46.4 | 27.6 | | | | |
| | | | | Viento -Y exc. - | -1.2 | -7.8 | -59.6 | -6.8 | -53.6 | 34.4 | 0.1 | -2.5 | -21.4 | -6.7 | -53.3 | 28.1 | | | | |
| | | | | Sismo X Modo 1 | -505.9 | -522.5 | -1350 | -324.9 | -726.6 | 856.5 | -317.3 | -78.1 | -1324 | -309.9 | -715.9 | 703.9 | | | | |
| | | | | Sismo X Modo 2 | -236.7 | -12.6 | 1371.6 | 20.7 | 1158.6 | -739.9 | -194.6 | 100.0 | 471.7 | 22.9 | 1151.8 | -597.4 | | | | |
| | | | | Sismo X Modo 3 | -0.0 | -0.4 | -2.9 | -2.9 | -21.8 | 0.8 | -0.2 | 2.5 | 17.2 | -2.9 | -21.8 | -0.5 | | | | |
| | | | | Sismo Y Modo 1 | -416.9 | -430.6 | -1112 | -267.8 | -598.8 | 705.8 | -261.5 | -64.4 | -1091 | -255.4 | -589.9 | 580.0 | | | | |
| | | | | Sismo Y Modo 2 | -330.6 | -17.6 | 1915.3 | 28.9 | 1617.9 | -1033 | -271.7 | 139.6 | 658.6 | 32.0 | 1608.4 | -834.2 | | | | |
| | | | | Sismo Y Modo 3 | -0.0 | -0.7 | -5.0 | -5.0 | -37.7 | 1.4 | -0.4 | 4.4 | 29.8 | -5.1 | -37.8 | -0.0 | | | | |



Esfuerzos y armados de pilares, pantallas y muros

CON PILARES NUEVOS_cargas ajustadas_muros ajustados_igualada PO cim

Fecha: 29/11/15

| Soporte | Planta | Dimensión (cm) | Tramo (m) | Hipótesis | Base | | | | | | Cabeza | | | | | |
|---------|--------|----------------|-----------|-------------------|--------|-----------|-----------|---------|---------|----------|--------|-----------|-----------|---------|---------|----------|
| | | | | | N (kN) | Mx (kN-m) | My (kN-m) | Qx (kN) | Qy (kN) | T (kN-m) | N (kN) | Mx (kN-m) | My (kN-m) | Qx (kN) | Qy (kN) | T (kN-m) |
| M8 | +8.40 | 40.0 | 1.90/5.40 | Peso propio | 738.0 | 101.6 | 314.5 | 85.4 | 192.8 | 8.1 | 310.9 | -35.8 | -291.1 | 75.1 | 180.9 | 56.7 |
| | | | | Cargas muertas | 60.1 | 31.7 | -359.3 | 295.3 | -725.6 | 13.4 | 125.7 | -50.7 | -180.3 | 244.6 | 298.1 | 96.8 |
| | | | | Sobrecarga de uso | 495.3 | 162.4 | 278.0 | -5.9 | 215.5 | 32.8 | 458.2 | 1.8 | -480.1 | -17.1 | 250.1 | 88.0 |
| | | | | Viento +X exc.+ | -1.8 | 16.8 | -0.7 | 31.1 | -0.7 | 3.4 | -0.0 | -12.4 | -0.1 | 30.7 | -0.5 | -0.2 |
| | | | | Viento +X exc.- | -1.6 | 17.4 | -0.6 | 28.6 | -0.6 | 3.2 | -0.0 | -11.2 | -0.1 | 28.3 | -0.5 | -0.1 |
| | | | | Viento -X exc.+ | 1.8 | -16.8 | 0.7 | -31.1 | 0.7 | -3.4 | 0.0 | 12.4 | 0.1 | -30.7 | 0.5 | 0.2 |
| | | | | Viento -X exc.- | 1.6 | -17.4 | 0.6 | -28.6 | 0.6 | -3.2 | 0.0 | 11.2 | 0.1 | -28.3 | 0.5 | 0.1 |
| | | | | Viento +Y exc.+ | 6.0 | -2.5 | 0.7 | -3.7 | 0.1 | -0.1 | 0.6 | 0.7 | 0.4 | -3.9 | 0.1 | -0.2 |
| | | | | Viento +Y exc.- | 5.8 | -3.1 | 0.7 | -1.4 | 0.1 | 0.1 | 0.6 | -0.4 | 0.4 | -1.7 | 0.1 | -0.2 |
| | | | | Viento -Y exc.+ | -6.0 | 2.5 | -0.7 | 3.7 | -0.1 | 0.1 | -0.6 | -0.7 | -0.4 | 3.9 | -0.1 | 0.2 |
| | | | | Viento -Y exc.- | -5.8 | 3.1 | -0.7 | 1.4 | -0.1 | -0.1 | -0.6 | 0.4 | -0.4 | 1.7 | -0.1 | 0.2 |
| | | | | Sismo X Modo 1 | -202.5 | 671.7 | -41.5 | 1023.1 | -25.4 | 90.3 | -17.1 | -377.4 | -10.7 | 1023.0 | -19.5 | -0.9 |
| | | | | Sismo X Modo 2 | 122.2 | 332.6 | 6.3 | 744.2 | -12.2 | 32.1 | 16.9 | -324.2 | 9.7 | 736.6 | -12.0 | -14.0 |
| | | | | Sismo X Modo 3 | 1.8 | 5.6 | 0.3 | -12.5 | 0.6 | 0.7 | 0.2 | 6.2 | -0.2 | -12.4 | 0.4 | 0.3 |
| | | | | Sismo Y Modo 1 | -166.8 | 553.5 | -34.2 | 843.1 | -20.9 | 74.4 | -14.1 | -311.0 | -8.8 | 843.0 | -16.1 | -0.8 |
| | | | | Sismo Y Modo 2 | 170.6 | 464.5 | 8.9 | 1039.2 | -17.0 | 44.9 | 23.7 | -452.7 | 13.5 | 1028.5 | -16.8 | -19.5 |
| | | | | Sismo Y Modo 3 | 3.1 | 9.7 | 0.6 | -21.6 | 1.0 | 1.2 | 0.3 | 10.8 | -0.4 | -21.5 | 0.6 | 0.5 |
| | +4.90 | 40.0 | 0.00/1.90 | Peso propio | 1249.5 | -172.5 | -1002 | -160.1 | -609.3 | 133.3 | 1037.3 | 101.0 | 67.6 | -146.9 | -534.5 | 67.0 |
| | | | | Cargas muertas | -1.0 | 437.1 | -27.8 | 861.4 | -500.9 | -230.9 | 70.2 | -362.7 | -411.4 | 863.9 | 657.2 | -116.7 |
| | | | | Sobrecarga de uso | 731.0 | 171.0 | -476.6 | -130.2 | -293.3 | -52.4 | 705.2 | 246.0 | 35.7 | -140.0 | -252.5 | -30.5 |
| | | | | Viento +X exc.+ | -3.8 | 19.5 | 2.9 | 47.7 | 1.4 | -9.5 | -2.4 | -11.5 | -0.5 | 48.4 | 0.9 | -7.6 |
| | | | | Viento +X exc.- | -3.8 | 18.8 | 2.9 | 42.7 | 1.5 | -9.1 | -2.2 | -8.2 | -0.5 | 43.4 | 1.0 | -7.4 |
| | | | | Viento -X exc.+ | 3.8 | -19.5 | -2.9 | -47.7 | -1.4 | 9.5 | 2.4 | 11.5 | 0.5 | -48.4 | -0.9 | 7.6 |
| | | | | Viento -X exc.- | 3.8 | -18.8 | -2.9 | -42.7 | -1.5 | 9.1 | 2.2 | 8.2 | 0.5 | -43.4 | -1.0 | 7.4 |
| | | | | Viento +Y exc.+ | 9.2 | -5.2 | -6.6 | 6.4 | -4.5 | 3.1 | 7.1 | -5.8 | 1.5 | 7.1 | -4.3 | 1.0 |
| | | | | Viento +Y exc.- | 9.2 | -4.5 | -6.6 | 11.1 | -4.5 | 2.7 | 6.9 | -8.9 | 1.5 | 11.8 | -4.4 | 0.8 |
| | | | | Viento -Y exc.+ | -9.2 | 5.2 | 6.6 | -6.4 | 4.5 | -3.1 | -7.1 | 5.8 | -1.5 | -7.1 | 4.3 | -1.0 |
| | | | | Viento -Y exc.- | -9.2 | 4.5 | 6.6 | -11.1 | 4.5 | -2.7 | -6.9 | 8.9 | -1.5 | -11.8 | 4.4 | -0.8 |
| | | | | Sismo X Modo 1 | -339.1 | 659.1 | 247.2 | 942.4 | 159.1 | -334.3 | -245.9 | 42.9 | -57.8 | 944.6 | 140.0 | -239.3 |
| | | | | Sismo X Modo 2 | 148.8 | 171.9 | -106.3 | 753.1 | -78.9 | 133.1 | -182.4 | 26.9 | 780.9 | -83.4 | -90.5 | |
| | | | | Sismo X Modo 3 | 0.3 | -0.7 | -0.2 | -10.2 | -0.1 | 0.2 | 1.5 | 11.3 | 0.2 | -10.2 | -0.1 | -0.1 |
| | | | | Sismo Y Modo 1 | -279.5 | 543.1 | 203.7 | 776.6 | 131.1 | -275.5 | -202.6 | 35.3 | -47.7 | 778.4 | 115.3 | -197.2 |
| | | | | Sismo Y Modo 2 | 207.8 | 240.0 | -148.4 | 1051.6 | -110.2 | -98.5 | 185.9 | -254.7 | 37.6 | 1090.5 | -116.5 | -126.4 |
| | | | | Sismo Y Modo 3 | 0.4 | -1.3 | -0.3 | -17.6 | -0.2 | 0.3 | 2.6 | 19.5 | 0.3 | -17.7 | -0.2 | -0.1 |
| M9 | +8.40 | 40.0 | 1.90/5.40 | Peso propio | 964.3 | 267.9 | 236.8 | 197.2 | 43.5 | 151.0 | 467.1 | -373.8 | 47.3 | 197.3 | 47.0 | 123.9 |
| | | | | Cargas muertas | 265.1 | -19.3 | 531.4 | 77.7 | -139.3 | 34.7 | 165.9 | -139.6 | 6.9 | 70.8 | -74.7 | 121.6 |
| | | | | Sobrecarga de uso | 630.0 | 425.0 | -476.4 | 278.3 | -24.0 | 168.5 | 661.2 | -612.7 | -56.5 | 314.7 | -36.0 | 64.6 |
| | | | | Viento +X exc.+ | 9.9 | -8.1 | 51.0 | -0.8 | 2.5 | 2.8 | 1.4 | -0.5 | 2.9 | -0.3 | 2.4 | 0.6 |
| | | | | Viento +X exc.- | 9.7 | -7.7 | 48.8 | -1.3 | 5.7 | 2.3 | 1.4 | -0.3 | 0.9 | -0.8 | 5.6 | 0.7 |
| | | | | Viento -X exc.+ | -9.9 | 8.1 | -51.0 | 0.8 | -2.5 | -2.8 | -1.4 | 0.5 | -2.9 | 0.3 | -2.4 | -0.6 |
| | | | | Viento -X exc.- | -9.7 | 7.7 | -48.8 | 1.3 | -5.7 | -2.3 | -1.4 | 0.3 | -0.9 | 0.8 | -5.6 | -0.7 |
| | | | | Viento +Y exc.+ | -0.6 | -1.8 | 9.5 | -4.2 | 24.8 | -1.2 | 0.3 | 1.6 | -12.5 | -3.8 | 24.7 | 1.8 |
| | | | | Viento +Y exc.- | -0.4 | -2.2 | 11.7 | -3.7 | 21.7 | -0.8 | 0.2 | 1.3 | -10.5 | -3.4 | 21.7 | 1.7 |
| | | | | Viento -Y exc.+ | 0.6 | 1.8 | -9.5 | 4.2 | -24.8 | 1.2 | -0.3 | -1.6 | 12.5 | 3.8 | -24.7 | -1.8 |
| | | | | Viento -Y exc.- | 0.4 | 2.2 | -11.7 | 3.7 | -21.7 | 0.8 | -0.2 | -1.3 | 10.5 | 3.4 | -21.7 | -1.7 |
| | | | | Sismo X Modo 1 | 317.6 | -187.2 | 1243.3 | 74.4 | -496.4 | 82.9 | 36.6 | -52.9 | 363.7 | 80.3 | -497.6 | -24.6 |
| | | | | Sismo X Modo 2 | 178.3 | -230.2 | 1420.0 | -77.9 | 429.8 | -8.1 | 29.7 | 6.6 | -91.9 | -65.6 | 427.4 | 40.0 |
| | | | | Sismo X Modo 3 | -0.6 | 2.9 | -14.5 | -2.8 | 19.5 | 0.7 | 0.2 | 1.7 | -12.8 | -2.9 | 19.6 | 1.0 |
| | | | | Sismo Y Modo 1 | 261.7 | -154.3 | 1024.5 | 61.3 | -409.0 | 68.3 | 30.2 | -43.6 | 299.7 | 66.2 | -410.1 | -20.3 |
| | | | | Sismo Y Modo 2 | 248.9 | -321.5 | 1982.9 | -108.7 | 600.2 | -11.3 | 41.5 | 9.2 | -128.4 | -91.6 | 596.8 | 55.8 |
| | | | | Sismo Y Modo 3 | -1.1 | 5.0 | -25.2 | -4.9 | 33.8 | 1.2 | 0.4 | 2.9 | -22.1 | -5.0 | 34.0 | 1.8 |
| | +4.90 | 40.0 | 0.00/1.90 | Peso propio | 1769.5 | -1150 | 700.2 | -558.2 | 62.7 | -492.0 | 1418.3 | -116.3 | 400.4 | -507.6 | 47.1 | -598.4 |
| | | | | Cargas muertas | 483.6 | -48.1 | -803.0 | -97.0 | -1402 | -773.8 | 376.0 | -168.0 | 941.3 | 231.8 | -1319 | -590.7 |
| | | | | Sobrecarga de uso | 890.6 | -382.8 | -1050 | -288.9 | -94.2 | -73.2 | 914.5 | 73.2 | -566.5 | -249.4 | -107.3 | -273.5 |
| | | | | Viento +X exc.+ | 20.9 | -6.1 | 47.6 | 4.5 | -18.6 | -35.2 | 13.4 | -10.1 | 60.8 | 3.6 | -18.2 | -24.7 |
| | | | | Viento +X exc.- | 20.9 | -6.3 | 48.7 | 3.3 | -11.1 | -34.5 | 13.3 | -9.1 | 54.8 | 2.4 | -10.7 | -24.3 |
| | | | | Viento -X exc.+ | -20.9 | 6.1 | -47.6 | -4.5 | 18.6 | 35.2 | -13.4 | 10.1 | -60.8 | -3.6 | 18.2 | 24.7 |
| | | | | Viento -X exc.- | -20.9 | 6.3 | -48.7 | -3.3 | 11.1 | 34.5 | -13.3 | 9.1 | -54.8 | -2.4 | 10.7 | 24.3 |
| | | | | Viento +Y exc.+ | 3.2 | -10.9 | 102.9 | -8.6 | 78.3 | 11.0 | 0.5 | 0.9 | -11.9 | -9.1 | 78.3 | 12.0 |
| | | | | Viento +Y exc.- | 3.2 | -10.7 | 102.0 | -7.5 | 71.2 | 10.3 | 0.7 | -0.0 | -6.3 | -8.0 | 71.2 | 11.6 |
| | | | | Viento -Y exc.+ | -3.2 | 10.9 | -102.9 | 8.6 | -78.3 | -11.0 | -0.5 | -0.9 | 11.9 | 9.1 | -78.3 | -12.0 |
| | | | | Viento -Y exc.- | -3.2 | 10.7 | -102.0 | 7.5 | -71.2 | -10.3 | -0.7 | 0.0 | 6.3 | 8.0 | -71.2 | -11.6 |
| | | | | Sismo X Modo 1 | 540.5 | 72.1 | -1049 | 287.8 | -2137 | -1271 | 391.9 | -286.1 | 1898.8 | 276.2 | -2125 | -998.7 |
| | | | | Sismo X Modo 2 | 417.4 | -349.9 | 3099.9 | -80.2 | 1179.6 | -317.9 | 255.1 | -213.6 | 1181.6 | -106.4 | 1185.0 | -115.2 |
| | | | | Sismo X Modo 3 | -0.2 | 0.0 | -1.6 | -2.0 | 10.1 | -0.1 | -0.7 | 3.5 | -18.6 | -2.0 | 10.1 | -0.8 |
| | | | | Sismo Y Modo 1 | 445.4 | 59.4 | -864.6 | 237.2 | -1761 | -1048 | 322.9 | -235.8 | 1564.7 | 227.6 | -1751 | -823.0 |
| | | | | Sismo Y Modo 2 | 582.9 | -488.6 | 4328.7 | -112.0 | 1647.1 | -443.9 | 356.2 | -298.3 | 1650.0 | -148.6 | 1654.7 | -160.8 |
| | | | | Sismo Y Modo 3 | -0.4 | 0.0 | -2.7 | -3.4 | 17.5 | -0.2 | -1.2 | 6.0 | -32.3 | -3.5 | 17.6 | -1.3 |
| M12 | +8.40 | 30.0 | 1.90/5.40 | Peso propio | 372.1 | 278.4 | -123.7 | 9.1 | -80.0 | -67.0 | 190.4 | 204.6 | 141.3 | 42.1 | -80.6 | -68.7 |
| | | | | Cargas muertas | 62.5 | -85.0 | -24.4 | 147.4 | -28.7 | -33.5 | 63.8 | 61.2 | 46.0 | 101.3 | -23.0 | -49.7 |
| | | | | Sobrecarga de uso | 260.6 | 205.7 | -141.9 | -30.2 | -103.2 | -141.0 | 265.8 | 312.9 | 222.7 | 11.9 | -116.1 | -92.4 |
| | | | | Viento +X exc.+ | -2.3 | -12.0 | 0.4 | 9.3 | -0.4 | -0.1 | 0.6 | -3.2 | 0.4 | 9.3 | -0.5 | 0.1 |
| | | | | Viento +X exc.- | -2.6 | -12.9 | 0.5 | 10.7 | -0.4 | -0.2 | 0.7 | -3.6 | 0.4 | 10.7 | -0.6 | 0.2 |
| | | | | Viento -X exc.+ | 2.3 | 12.0 | -0.4 | -9.3 | 0.4 | 0.1 | -0.6 | 3.2 | -0.4 | -9.3 | 0.5 | -0.1 |
| | | | | Viento -X exc.- | 2.6 | 12.9 | -0.5 | -10.7 | 0.4 | 0.2 | -0.7 | 3.6 | -0.4 | -10.7 | 0.6 | -0.2 |
| | | | | Viento +Y exc.+ | -2.4 | -1.1 | 0.1 | -2.5 | 0.0 | 0.1 | -0.3 | 1.6 | 0.0 | -2.4 | 0.1 | -0.1 |
| | | | | Viento +Y exc.- | -2.1 | -0.3 | 0.1 | -3.8 | 0.1 | 0.2 | -0.4 | 2.0 | 0.0 | -3.7 | 0.2 | -0.2 |
| | | | | Viento -Y exc.+ | 2.4 | 1.1 | -0.1 | 2.5 | -0.0 | -0.1 | 0.3 | -1.6 | -0.0 | 2.4 | -0.1 | 0.1 |
| | | | | Viento -Y exc.- | 2.1 | 0.3 | -0.1 | 3.8 | -0.1 | -0.2 | 0.4 | -2.0 | -0.0 | 3.7 | -0.2 | 0.2 |
| | | | | Sismo X Modo 1 | -20.6 | -360.0 | 11.1 | 384.4 | -13.9 | -6.4 | 29.2 | -149.5 | 12.5 | 386.2 | -20.1 | 8.5 |
| | | | | Sismo X Modo 2 | -93.5 | -105.1 | 7.4 | 14.9 | -0.1 | -7.2 | -5.2 | 21.6 | 4.7 | 14.9 | -1.9 | -3.5 |
| | | | | Sismo X Modo 3 | -2.0 | -4.6 | 0.2 | 8.3 | -0.3 | -0.0 | 0.5 | -2.7 | 0.2 | 8.5 | -0.4 | 0.2 |
| | | | | Sismo Y Modo 1 | -17.0 | -296.7 | 9.1 | 316.7 | -11.5 | -5.3 | 24.1 | -123.2 | 10.3 | 318.3 | -16.5 | 7.0 |
| | | | | Sismo Y Modo 2 | -130.5 | -146.8 | 10.3 | 20.8 | -0.1 | -10.1 | -7.3 | 30.1 | 6.5 | 20.9 | -2.6 | -4.9 |
| | | | | Sismo Y Modo 3 | -3.4 | -8.0 | 0.3 | 14.4 | -0.5 | -0.1 | 0.8 | -4.6 | 0.3 | 14.8 | -0.6 | 0.4 |



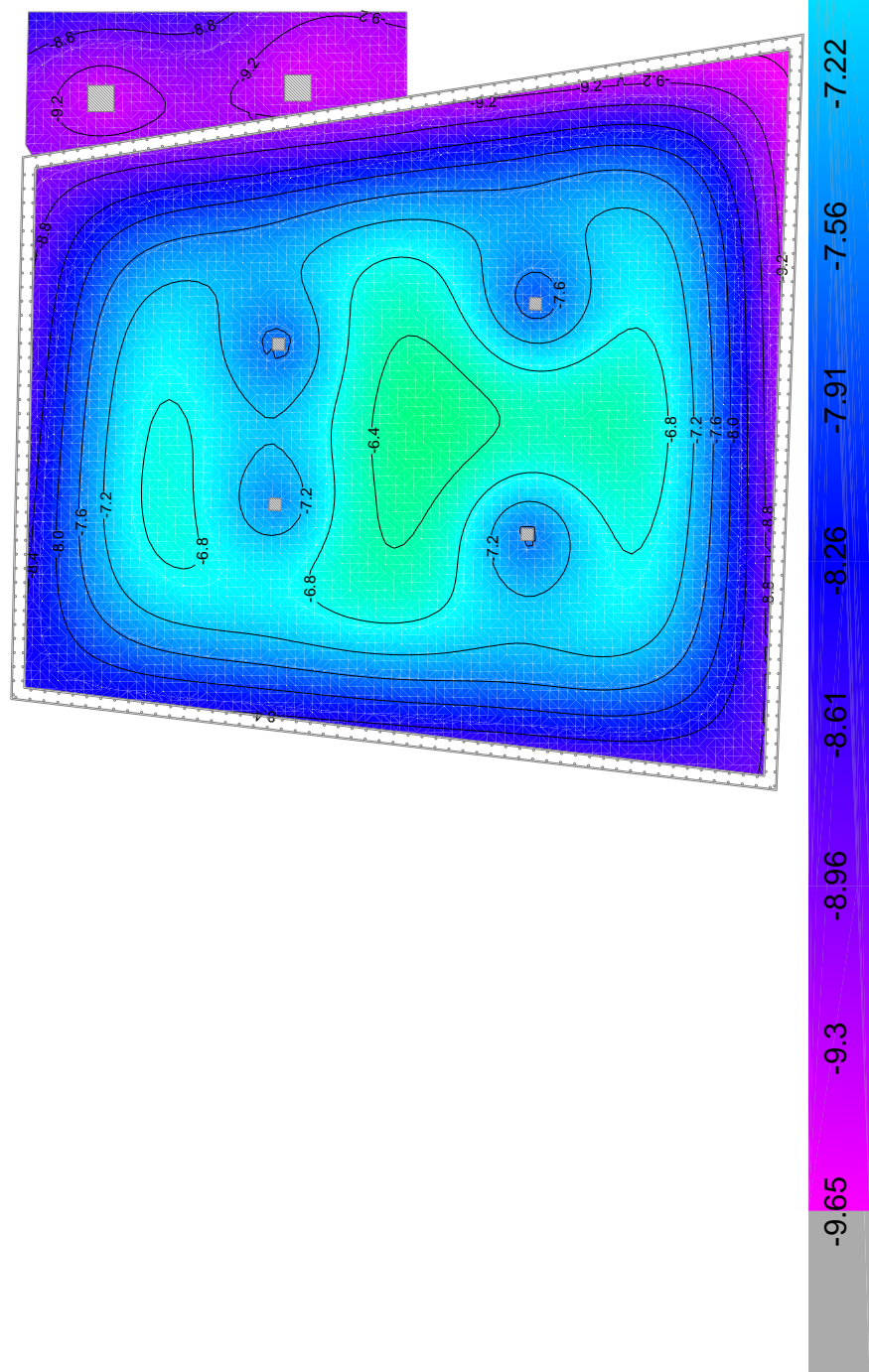
Esfuerzos y armados de pilares, pantallas y muros

CON PILARES NUEVOS_cargas ajustadas_muros ajustados_igualada PO cim

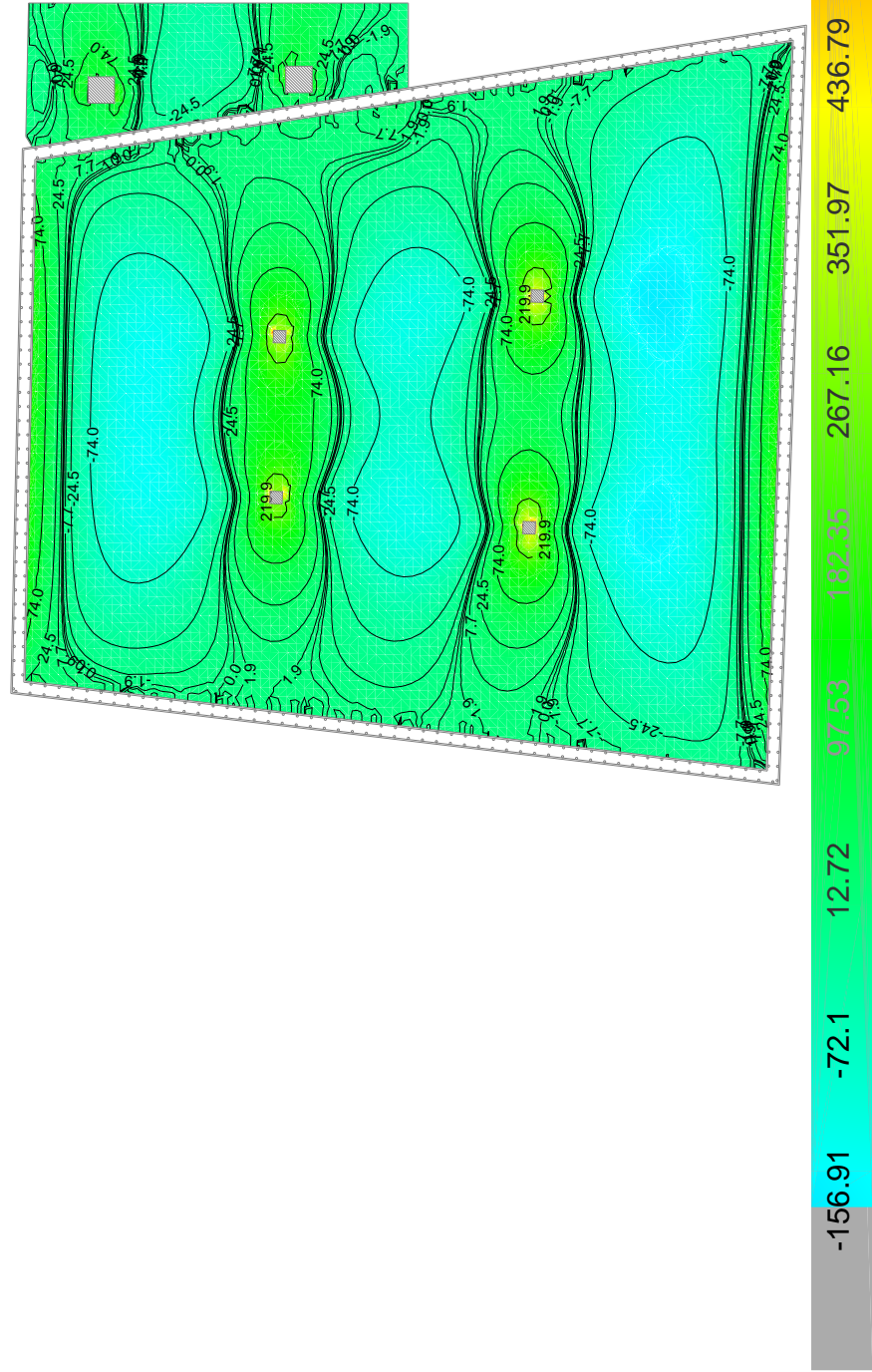
Fecha: 29/11/15

| Soporte | Planta | Dimensión (cm) | Tramo (m) | Hipótesis | Base | | | | | | Cabeza | | | | | |
|---------|--------|----------------|-----------|-------------------|--------|-----------|-----------|---------|---------|----------|--------|-----------|-----------|---------|---------|----------|
| | | | | | N (kN) | Mx (kN-m) | My (kN-m) | Qx (kN) | Qy (kN) | T (kN-m) | N (kN) | Mx (kN-m) | My (kN-m) | Qx (kN) | Qy (kN) | T (kN-m) |
| | +4.90 | 40.0 | 0.00/1.90 | Peso propio | 742.2 | 657.5 | 568.0 | 46.1 | 303.1 | 267.3 | 573.7 | 458.1 | 28.8 | 95.6 | 272.5 | 383.0 |
| | | | | Cargas muertas | 81.1 | 239.2 | 44.9 | 896.7 | 79.1 | 128.0 | 100.4 | -387.3 | 31.3 | 861.1 | -54.2 | 52.0 |
| | | | | Sobrecarga de uso | 383.3 | 329.8 | 234.2 | -33.8 | 127.2 | 91.5 | 387.9 | 357.9 | 7.6 | -6.9 | 114.4 | 141.8 |
| | | | | Viento +X exc. + | -4.7 | 1.9 | -3.7 | 29.9 | -3.5 | -0.3 | -2.3 | -22.1 | 1.4 | 29.4 | -3.2 | -1.1 |
| | | | | Viento +X exc. - | -4.7 | 2.1 | -3.7 | 33.1 | -3.7 | -0.1 | -2.5 | -24.2 | 1.5 | 32.6 | -3.4 | -1.0 |
| | | | | Viento -X exc. + | 4.7 | -1.9 | 3.7 | -29.9 | 3.5 | 0.3 | 2.3 | 22.1 | -1.4 | -29.4 | 3.2 | 1.1 |
| | | | | Viento -X exc. - | 4.7 | -2.1 | 3.7 | -33.1 | 3.7 | 0.1 | 2.5 | 24.2 | -1.5 | -32.6 | 3.4 | 1.0 |
| | | | | Viento +Y exc. + | -5.4 | -7.1 | -3.5 | -17.0 | -1.5 | -3.5 | -3.3 | 6.2 | 0.1 | -17.1 | -1.4 | -4.1 |
| | | | | Viento +Y exc. - | -5.4 | -7.3 | -3.4 | -20.0 | -1.4 | -3.6 | -3.1 | 8.1 | -0.0 | -20.1 | -1.3 | -4.2 |
| | | | | Viento -Y exc. + | 5.4 | 7.1 | 3.5 | 17.0 | 1.5 | 3.5 | 3.3 | -6.2 | -0.1 | 17.1 | 1.4 | 4.1 |
| | | | | Viento -Y exc. - | 5.4 | 7.3 | 3.4 | 20.0 | 1.4 | 3.6 | 3.1 | -8.1 | 0.0 | 20.1 | 1.3 | 4.2 |
| | | | | Sismo X Modo 1 | -6.8 | 233.1 | -24.2 | 1370.6 | -70.5 | 81.0 | 4.2 | -861.8 | 42.7 | 1358.7 | -62.4 | 71.0 |
| | | | | Sismo X Modo 2 | -198.3 | -133.1 | -140.2 | -12.2 | -90.1 | -83.5 | -116.3 | -74.1 | 21.6 | -21.8 | -82.0 | -107.7 |
| | | | | Sismo X Modo 3 | -0.1 | 0.2 | -0.1 | 4.1 | -0.3 | 0.2 | -1.5 | -5.7 | 0.3 | 4.0 | -0.3 | 0.2 |
| | | | | Sismo Y Modo 1 | -5.6 | 192.1 | -19.9 | 1129.5 | -58.1 | 66.8 | 3.5 | -710.1 | 35.2 | 1119.7 | -51.4 | 58.5 |
| | | | | Sismo Y Modo 2 | -277.0 | -185.8 | -195.8 | -17.0 | -125.8 | -116.6 | -162.3 | -103.5 | 30.2 | -30.4 | -114.5 | -150.4 |
| | | | | Sismo Y Modo 3 | -0.2 | 0.4 | -0.2 | 7.2 | -0.5 | 0.3 | -2.6 | -9.8 | 0.6 | 7.0 | -0.5 | 0.3 |
| M13 | +8.40 | 30.0 | 1.90/5.40 | Peso propio | 469.1 | -388.4 | -140.6 | -29.3 | -104.8 | 121.7 | 249.9 | -265.1 | 215.9 | -64.3 | -104.8 | 117.9 |
| | | | | Cargas muertas | 138.2 | -303.9 | -31.5 | 79.3 | -35.5 | 56.1 | 84.7 | -123.2 | 79.3 | 61.7 | -37.7 | 38.2 |
| | | | | Sobrecarga de uso | 364.3 | -351.2 | -175.2 | 62.2 | -146.3 | 222.6 | 353.6 | -434.0 | 338.6 | 21.0 | -155.5 | 173.9 |
| | | | | Viento +X exc. + | 2.9 | -7.9 | 0.2 | 13.6 | -0.6 | -0.8 | -0.6 | -4.2 | -0.1 | 13.2 | -0.3 | 0.2 |
| | | | | Viento +X exc. - | 3.1 | -9.1 | 0.3 | 15.5 | -0.7 | -0.9 | -0.7 | -4.9 | -0.1 | 15.1 | -0.4 | 0.2 |
| | | | | Viento -X exc. + | -2.9 | 7.9 | -0.2 | -13.6 | 0.6 | 0.8 | 0.6 | 4.2 | 0.1 | -13.2 | 0.3 | -0.2 |
| | | | | Viento -X exc. - | -3.1 | 9.1 | -0.3 | -15.5 | 0.7 | 0.9 | 0.7 | 4.9 | 0.1 | -15.1 | 0.4 | -0.2 |
| | | | | Viento +Y exc. + | -2.6 | 1.7 | 0.1 | 6.9 | -0.3 | -0.4 | -0.5 | -4.2 | 0.2 | 6.9 | -0.2 | 0.3 |
| | | | | Viento +Y exc. - | -2.7 | 2.8 | 0.1 | 5.1 | -0.3 | -0.3 | -0.4 | -3.5 | 0.3 | 5.2 | -0.2 | 0.3 |
| | | | | Viento -Y exc. + | 2.6 | -1.7 | -0.1 | -6.9 | 0.3 | 0.4 | 0.5 | 4.2 | -0.2 | -6.9 | 0.2 | -0.3 |
| | | | | Viento -Y exc. - | 2.7 | -2.8 | -0.1 | -5.1 | 0.3 | 0.3 | 0.4 | 3.5 | -0.3 | -5.2 | 0.2 | -0.3 |
| | | | | Sismo X Modo 1 | 163.1 | -284.9 | 3.5 | 298.3 | -13.0 | -18.1 | -7.0 | -40.1 | -7.5 | 287.3 | -6.9 | -1.8 |
| | | | | Sismo X Modo 2 | -23.0 | -27.0 | 3.4 | 271.8 | -13.4 | -19.4 | -14.5 | -126.4 | 4.8 | 268.8 | -7.8 | 8.2 |
| | | | | Sismo X Modo 3 | 1.2 | -8.0 | 0.5 | 11.7 | -0.3 | 0.1 | -0.6 | -4.3 | -0.1 | 11.5 | -0.2 | 0.2 |
| | | | | Sismo Y Modo 1 | 134.4 | -234.8 | 2.9 | 245.8 | -10.7 | -14.9 | -5.7 | -33.1 | -6.2 | 236.8 | -5.7 | -1.5 |
| | | | | Sismo Y Modo 2 | -32.1 | -37.7 | 4.8 | 379.5 | -18.7 | -27.1 | -20.3 | -176.6 | 6.7 | 375.3 | -11.0 | 11.4 |
| | | | | Sismo Y Modo 3 | 2.0 | -13.8 | 0.9 | 20.2 | -0.5 | 0.2 | -1.1 | -7.4 | -0.1 | 19.9 | -0.4 | 0.4 |
| | +4.90 | 40.0 | 0.00/1.90 | Peso propio | 907.6 | -1009 | 767.1 | -251.2 | 369.2 | -514.2 | 730.7 | -604.0 | 90.3 | -290.7 | 350.8 | -595.0 |
| | | | | Cargas muertas | 299.7 | -59.9 | 213.7 | 714.3 | 220.6 | -118.9 | 193.9 | -584.0 | 13.2 | 712.8 | 28.4 | -70.8 |
| | | | | Sobrecarga de uso | 539.1 | -463.1 | 365.1 | 85.6 | 175.4 | -178.4 | 538.8 | -583.4 | 42.5 | 61.0 | 165.8 | -221.0 |
| | | | | Viento +X exc. + | 4.5 | 10.1 | 2.6 | 40.4 | 0.6 | 3.2 | 2.7 | -23.0 | 0.3 | 40.7 | 0.3 | 2.3 |
| | | | | Viento +X exc. - | 4.6 | 10.6 | 2.6 | 44.3 | 0.5 | 3.4 | 2.8 | -25.8 | 0.4 | 44.6 | 0.2 | 2.5 |
| | | | | Viento -X exc. + | -4.5 | -10.1 | -2.6 | -40.4 | -0.6 | -3.2 | -2.7 | 23.0 | -0.3 | -40.7 | -0.3 | -2.3 |
| | | | | Viento -X exc. - | -4.6 | -10.6 | -2.6 | -44.3 | -0.5 | -3.4 | -2.8 | 25.8 | -0.4 | -44.6 | -0.2 | -2.5 |
| | | | | Viento +Y exc. + | -8.0 | 10.0 | -6.0 | 13.2 | -3.8 | 6.1 | -4.1 | -5.2 | 0.8 | 13.4 | -3.7 | 6.3 |
| | | | | Viento +Y exc. - | -8.1 | 9.5 | -6.1 | 9.6 | -3.7 | 5.9 | -4.2 | -2.6 | 0.7 | 9.7 | -3.6 | 6.1 |
| | | | | Viento -Y exc. + | 8.0 | -10.0 | 6.0 | -13.2 | 3.8 | -6.1 | 4.1 | 5.2 | -0.8 | -13.4 | 3.7 | -6.3 |
| | | | | Viento -Y exc. - | 8.1 | -9.5 | 6.1 | -9.6 | 3.7 | -5.9 | 4.2 | 2.6 | -0.7 | -9.7 | 3.6 | -6.1 |
| | | | | Sismo X Modo 1 | 332.6 | 67.6 | 225.6 | 956.2 | 110.1 | -47.7 | 188.3 | -603.0 | -9.9 | 962.6 | 98.2 | -79.2 |
| | | | | Sismo X Modo 2 | -111.3 | 373.7 | -97.5 | 819.2 | -73.7 | 186.3 | -57.5 | -376.6 | 19.1 | 825.0 | -76.0 | 178.8 |
| | | | | Sismo X Modo 3 | 0.1 | 0.1 | -0.0 | 3.8 | -0.2 | 0.1 | 0.9 | -8.2 | 0.4 | 4.0 | -0.2 | -0.0 |
| | | | | Sismo Y Modo 1 | 274.0 | 55.7 | 185.9 | 788.0 | 90.7 | -39.3 | 155.2 | -496.9 | -8.1 | 793.2 | 80.9 | -65.3 |
| | | | | Sismo Y Modo 2 | -155.4 | 521.8 | -136.2 | 1143.9 | -102.9 | 260.2 | -80.3 | -525.8 | 26.7 | 1152.0 | -106.1 | 249.6 |
| | | | | Sismo Y Modo 3 | 0.2 | 0.2 | -0.0 | 6.5 | -0.4 | 0.1 | 1.5 | -14.1 | 0.8 | 6.9 | -0.4 | -0.1 |

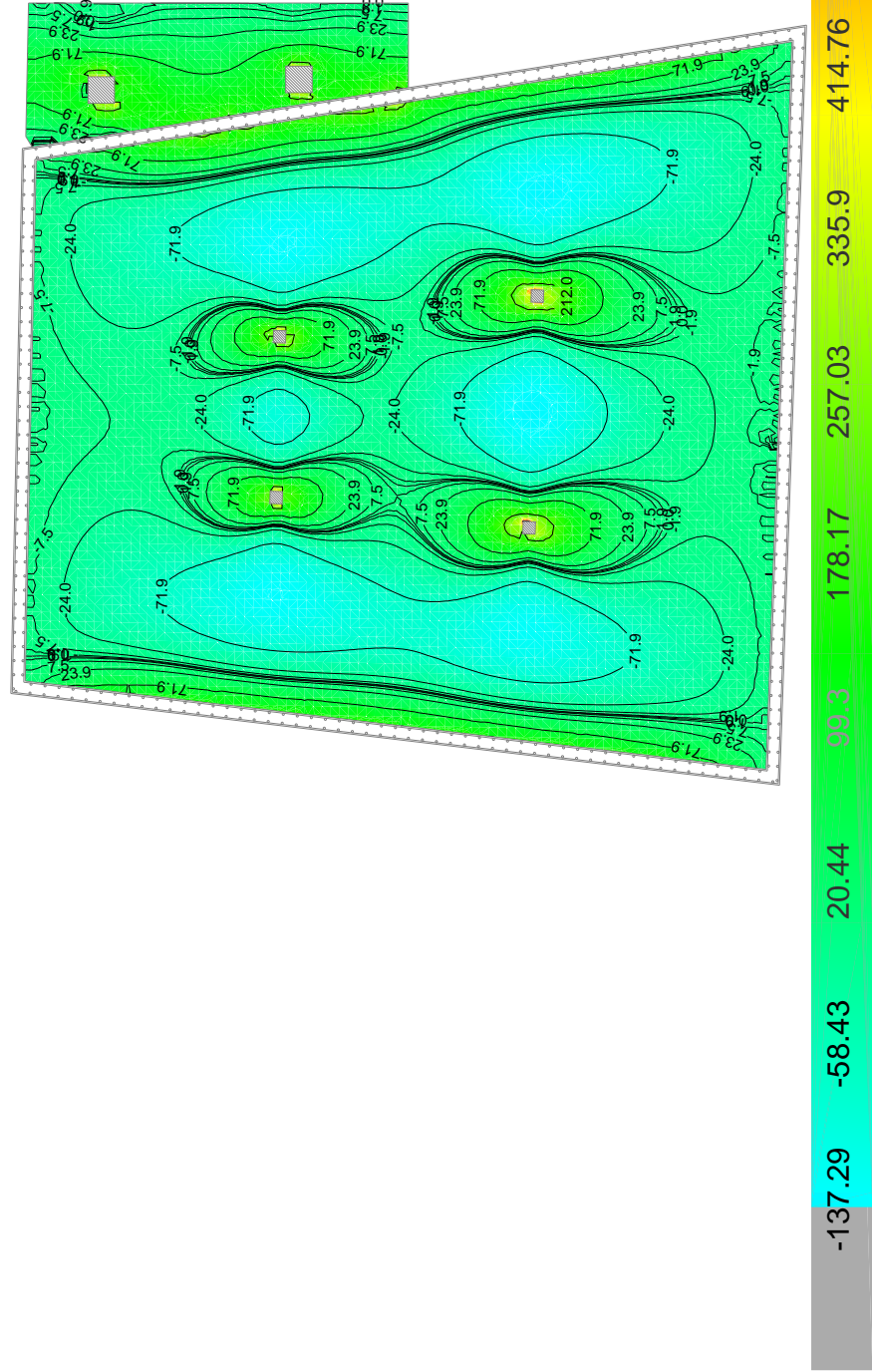
Planta 0, Desplazamiento Z (mm), PP+CM+Oa



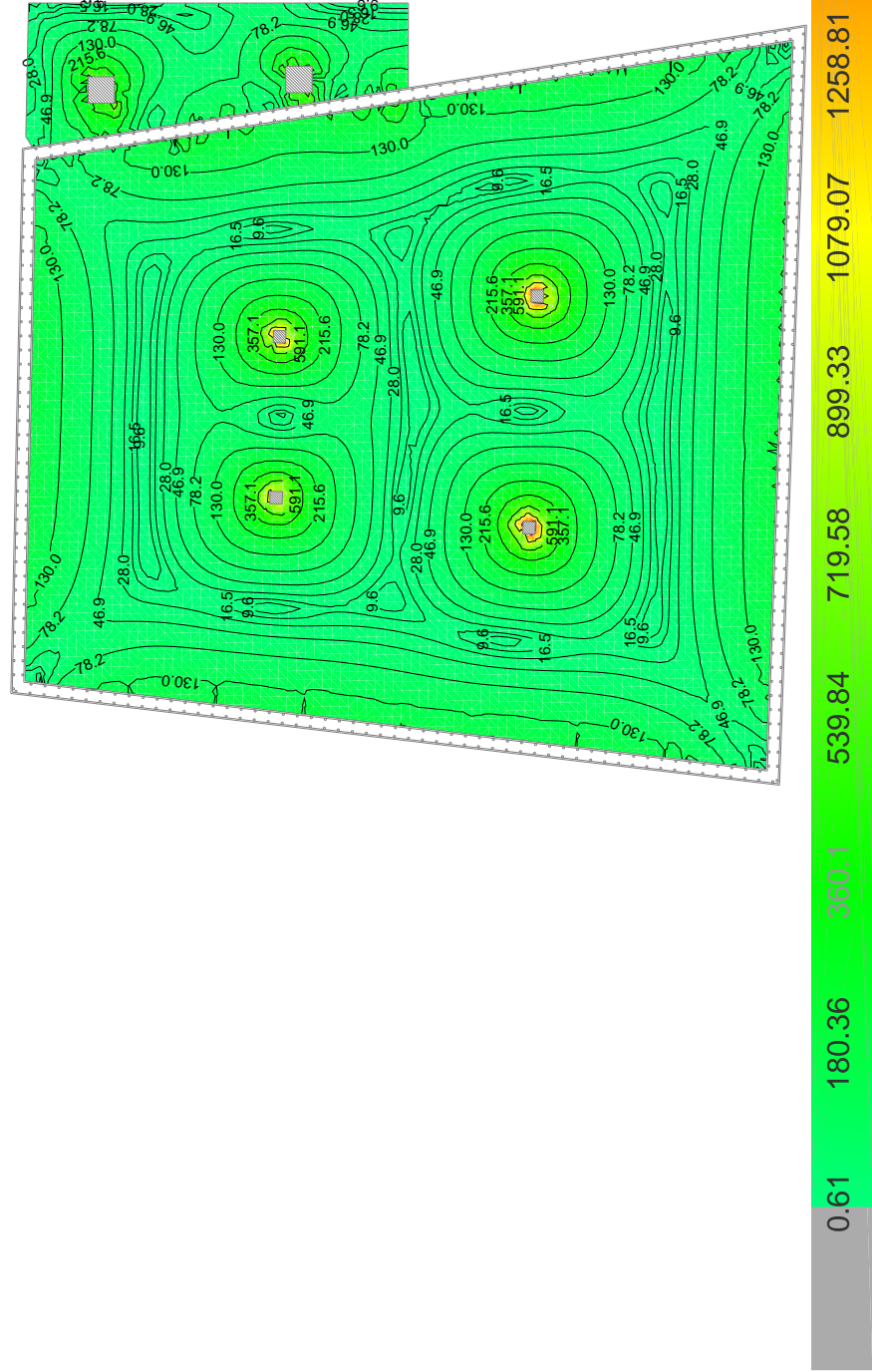
Planta O, Momento X (kN·m/m), 1.35·PP+1.35·CM+1.5·Qa



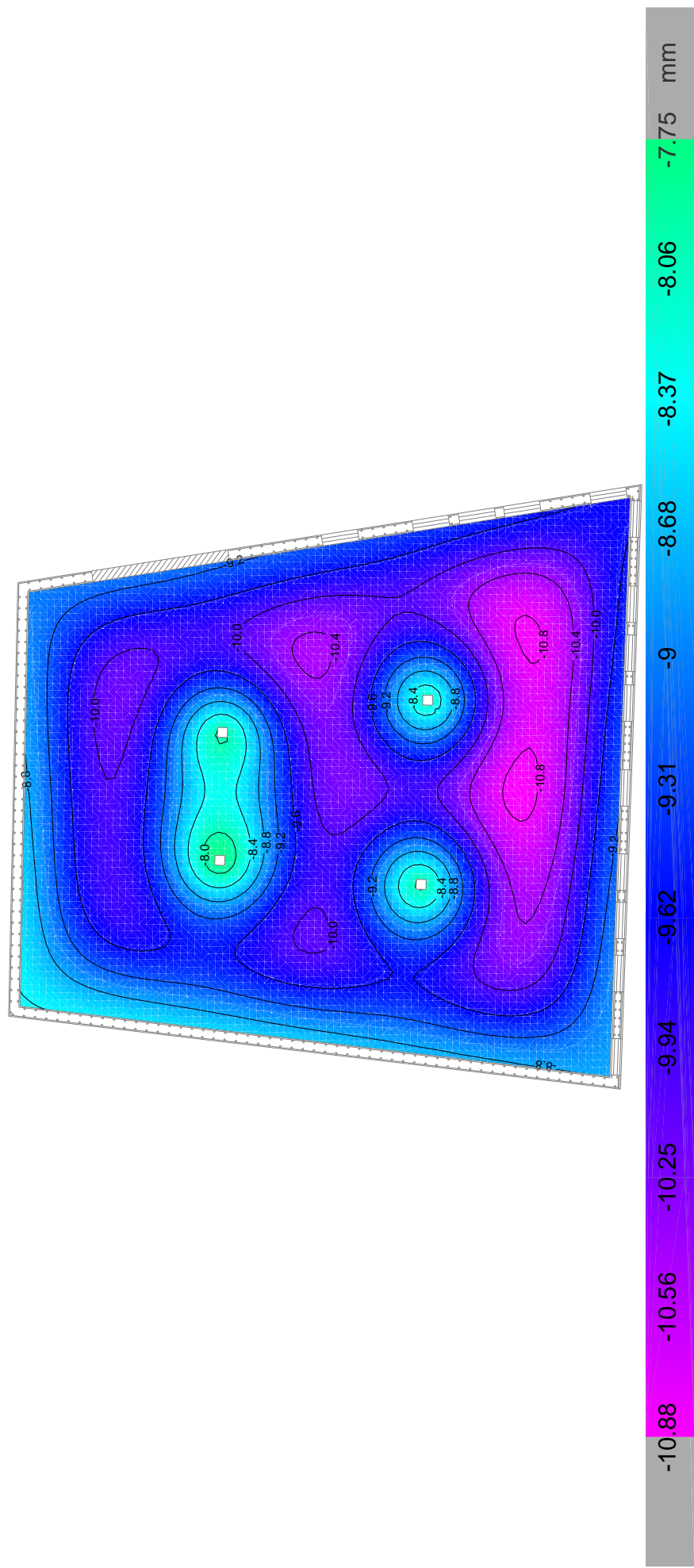
Planta O, Momento Y (kN·m/m) , 1.35·PP+1.35·CM+1.5·Qa



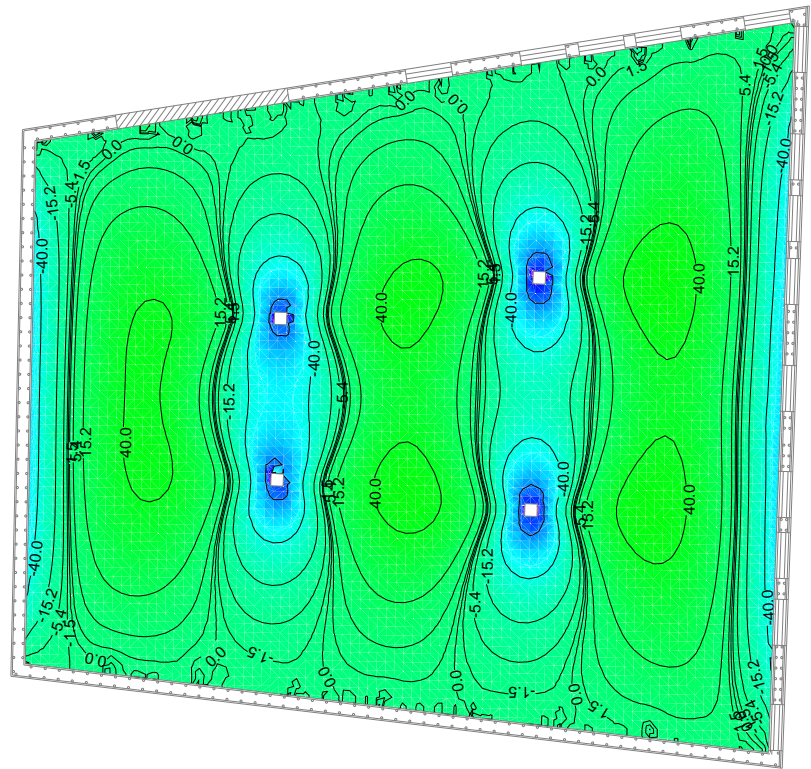
Planta 0, Cortante total (kN/m), 1.35·PP+1.35·CM+1.5·Qa



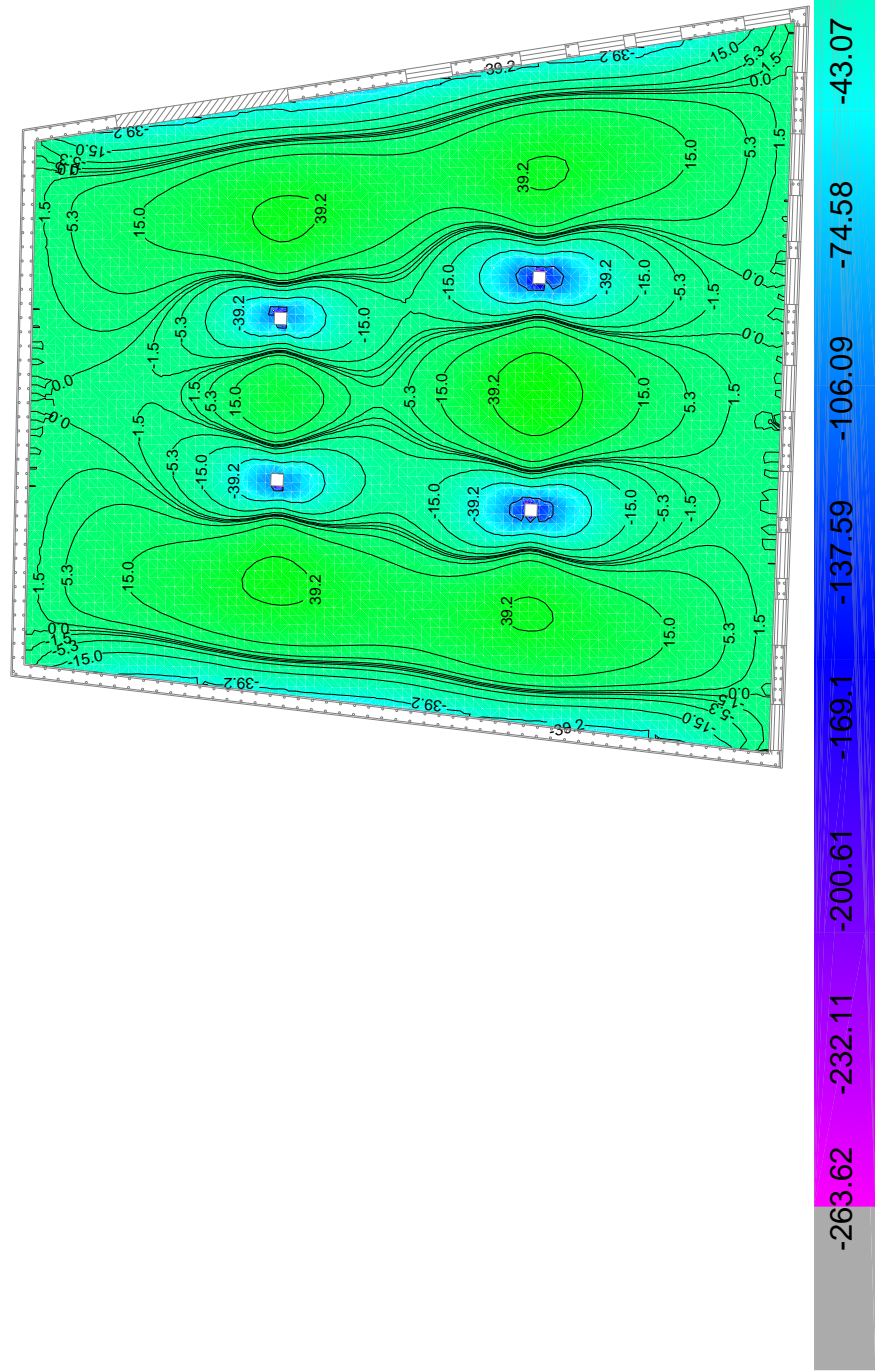
Planta 1, Desplazamiento Z (mm), PP+CM+Qa



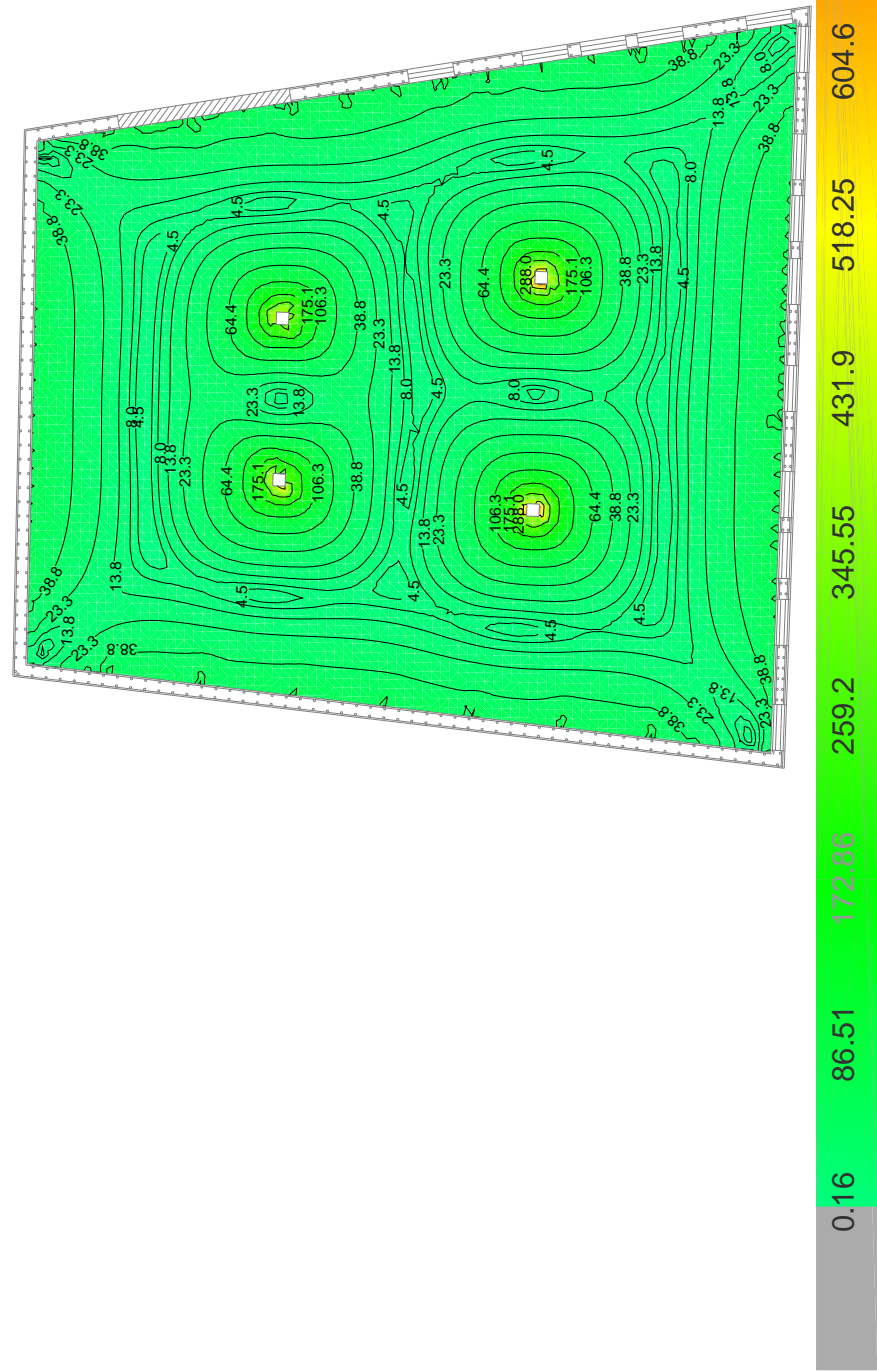
Planta 1, Momento X (kN·m/m), 1.35·PP+1.35·CM+1.5·Qa



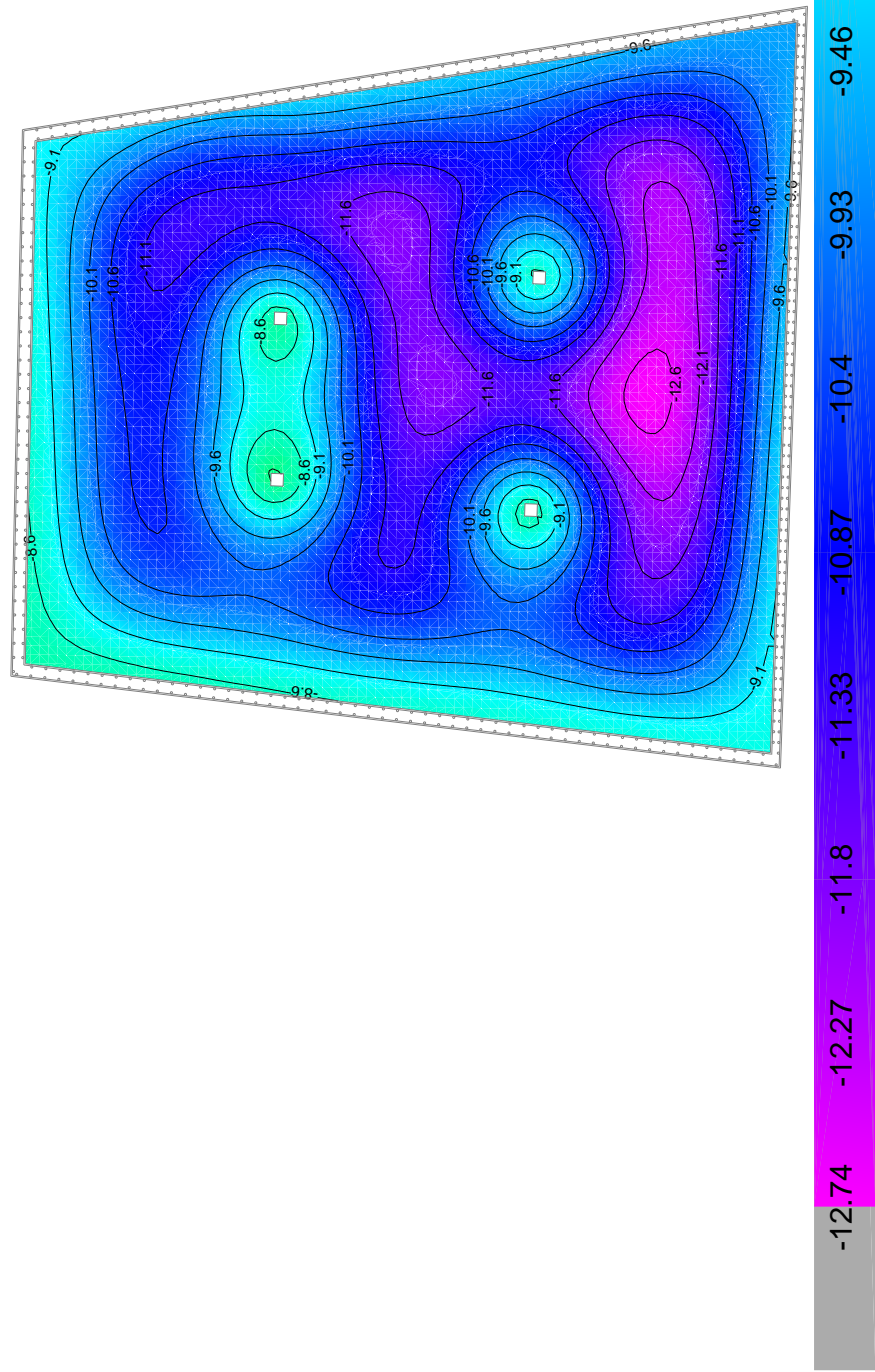
Planta 1, Momento Y (kN·m/m), 1.35·PP+1.35·CM+1.5·Oa



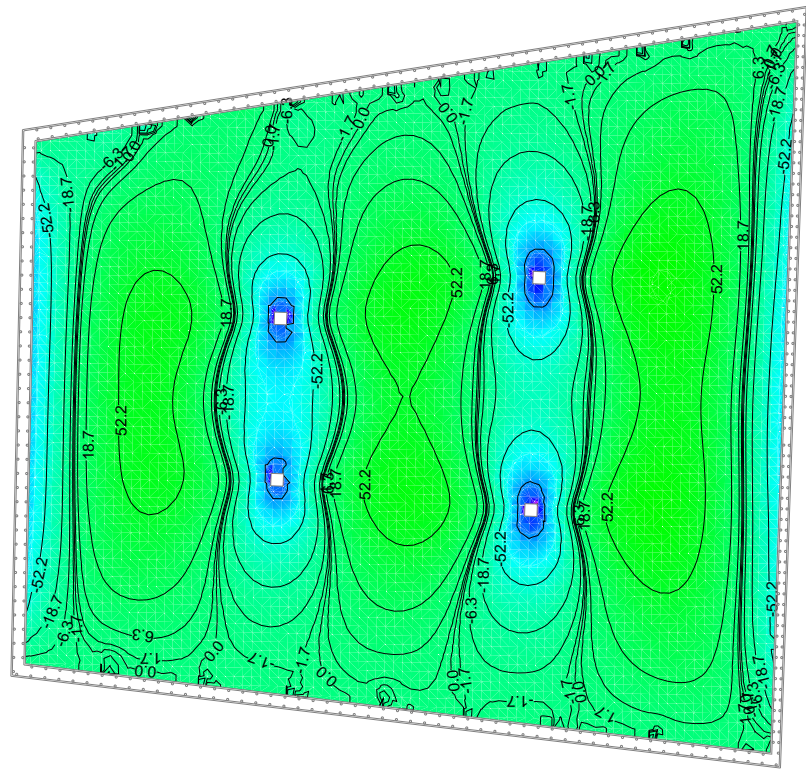
Planta 1, Cortante total (kN/m), 1.35·PP+1.35·CM+1.5·Qa



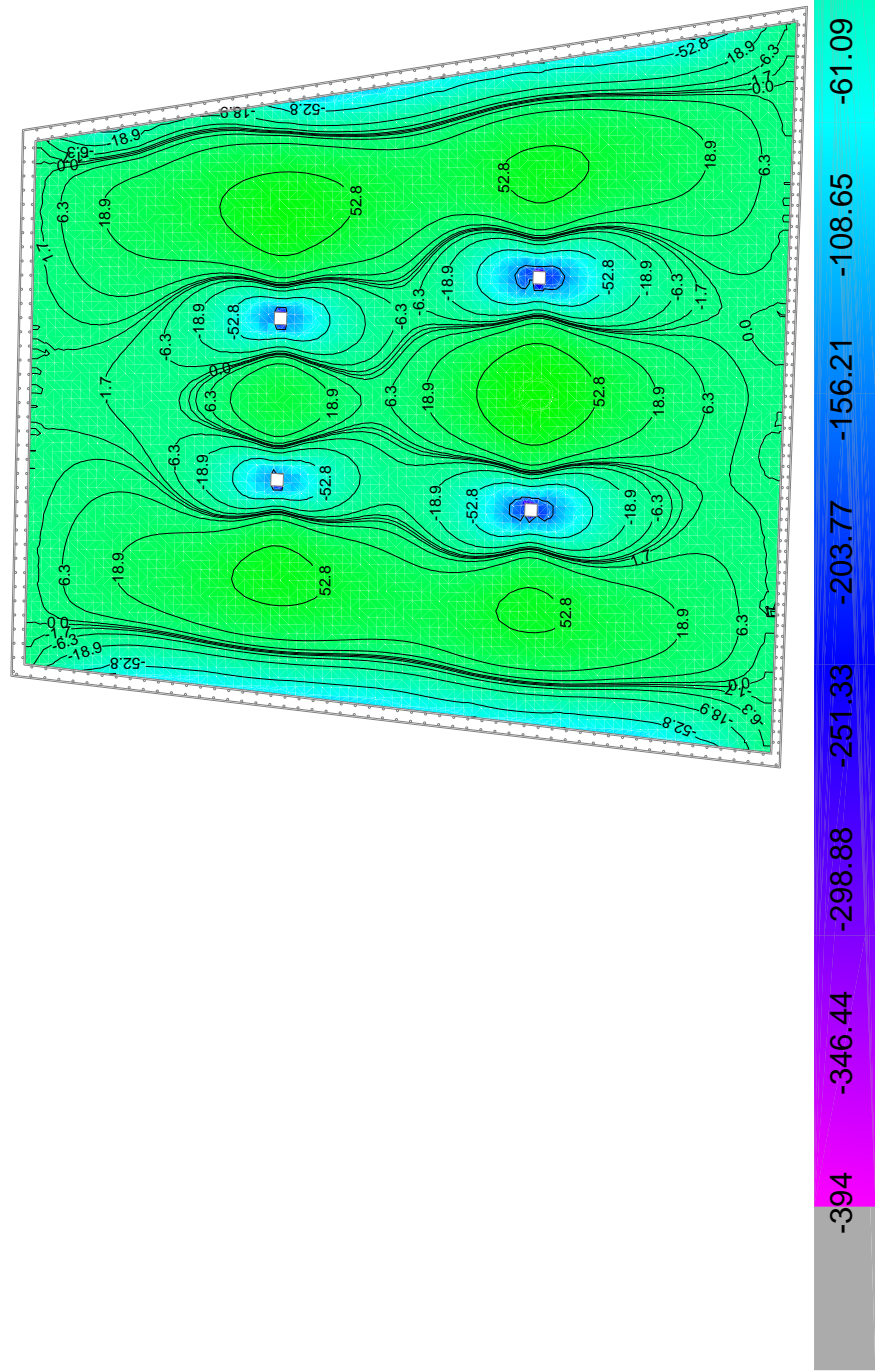
Planta 2, Desplazamiento Z (mm), PP+CM+Oa

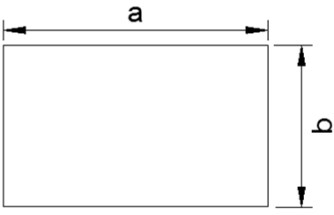
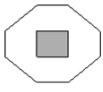



Planta 2, Momento X (kN·m/m), 1.35·PP+1.35·CM+1.5·Qa



Planta 2, Momento Y (kN·m/m), 1.35·PP+1.35·CM+1.5·Oa



| NB35 INGENIERÍA | | Refuerzo de punzonamiento en pilar cuadrado ó rectangular interior | |
|--|---------------------|--|--|
| DATOS | | COMPROBACIONES | RESULTADOS |
| $F_{sd} =$ | 130,00 t | | |
| $\beta =$ | 1,15 | $F_{sd,ef} =$ | 149,50 t → ↙ |
| $a =$ | 0,35 m | | |
| $b =$ | 0,35 m | | $u_0 =$ 1,40 m |
| $d =$ | 0,25 m | [1] $V_{u1} > F_{sd,ef}$ | $\xi =$ 1,89 |
| $f_{ck} =$ | 30 MPa | $V_{u1} =$ | 210 t VALE ↙ |
| $f_{y\alpha,d} =$ | 4 t/cm ² | | $u_1 =$ 4,54 m |
| $\rho =$ | 3,00 ‰ | [2] $\tau_{rd}^* \cdot u_1 \cdot d < F_{sd,ef}$ | $\tau_{rd}^* =$ 54,07 t/m ² |
| $\alpha =$ | 90 ° | $\tau_{rd}^* \cdot u_1 \cdot d =$ | 61,39 t ARMAR ↙ |
| $\theta =$ | 45 ° | | $V_{cu} =$ 61,39 t |
| $s =$ | 0,20 m < 0,188 m | | $V_{su} =$ 88 t |
| $s_{cara\ pilar} =$ | 0,10 m < 0,125 m | | $u_{n,ef} =$ 9,62 m |
| $n =$ | 28 ramas/1ª fila | | $A_v =$ 98 cm ² /m |
| | | | $A_{sw} =$ 20 cm ² /fila |
| | | | $\rho_{critico} =$ 7,75 ‰ |
|  | |  | |
| | | $L =$ 0,95 m $Sup =$ 0,70 cm ² $\emptyset_{ramas} =$ Ø10 ↙ 6 filas Ø10 a cara de pilar | |
| | |  | |
| | | $L =$ 0,53 m $Sup =$ 0,70 cm ² $\emptyset_{ramas} =$ Ø10 ↙ 4 filas Ø10 a cara de pilar | |

| | |
|--|----------------|
| JESUS JIMENEZ CAÑAS & ASOCIADOS | |
| REORDENACIÓN DEL PASEO DE LAS CANTERAS PROYECTO DE ESTRUCTURA. ANEJO DE CÁLCULO. | DICIEMBRE 2015 |

2.- EDIFICIO SUR

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1.- VERSIÓN DEL PROGRAMA Y NÚMERO DE LICENCIA

Versión: 2015

Número de licencia: 108826

2.- DATOS GENERALES DE LA ESTRUCTURA

Proyecto: SALIDA CÁLCULO

Clave: 3DR_Edificio Sur_06_def

3.- NORMAS CONSIDERADAS

Hormigón: EHE-08

Aceros conformados: CTE DB SE-A

Aceros laminados y armados: CTE DB SE-A

Fuego: CTE DB SI - Anejo C: Resistencia al fuego de las estructuras de hormigón armado.

Categoría de uso: C. Zonas de acceso al público

4.- ACCIONES CONSIDERADAS

4.1.- Gravitatorias

| Planta | S.C.U (kN/m ²) | Cargas muertas (kN/m ²) |
|--------|-------------------------------|--|
| +9.60 | 10.0 | 2.0 |
| +6.15 | 5.0 | 1.5 |
| +3.20 | 5.0 | 1.5 |

4.2.- Viento

CTE DB SE-AE

Código Técnico de la Edificación.

Documento Básico Seguridad Estructural - Acciones en la Edificación

Zona eólica: C

Grado de aspereza: I. Borde del mar o de un lago

La acción del viento se calcula a partir de la presión estática q_e que actúa en la dirección perpendicular a la superficie expuesta. El programa obtiene de forma automática dicha presión, conforme a los criterios del Código Técnico de la Edificación DB-SE AE, en función de la geometría del edificio, la zona eólica y grado de aspereza seleccionados, y la altura sobre el terreno del punto considerado:

$$q_e = q_b \cdot C_e \cdot C_p$$

Donde:

q_b Es la presión dinámica del viento conforme al mapa eólico del Anejo D.

C_e Es el coeficiente de exposición, determinado conforme a las especificaciones del Anejo D.2, en función del grado de aspereza del entorno y la altura sobre el terreno del punto considerado.



Listado de datos de la obra

SALIDA CÁLCULO

Fecha: 29/11/15

c_p Es el coeficiente eólico o de presión, calculado según la tabla 3.5 del apartado 3.3.4, en función de la esbeltez del edificio en el plano paralelo al viento.

| | Viento X | | | Viento Y | | |
|-------------------------------|----------|-----------------|-----------------|----------|-----------------|-----------------|
| q_b (kN/m ²) | esbeltez | c_p (presión) | c_p (succión) | esbeltez | c_p (presión) | c_p (succión) |
| 0.520 | 0.38 | 0.70 | -0.35 | 0.38 | 0.70 | -0.35 |

| Presión estática | | | |
|------------------|-----------------------|----------------------------------|----------------------------------|
| Planta | Ce (Coef. exposición) | Viento X (kN/m ²) | Viento Y (kN/m ²) |
| +9.60 | 2.74 | 1.497 | 1.498 |
| +6.15 | 2.33 | 1.275 | 1.276 |

| Anchos de banda | | |
|----------------------|-------------------------|-------------------------|
| Plantas | Ancho de banda Y (m) | Ancho de banda X (m) |
| En todas las plantas | 16.70 | 16.80 |

Se realiza análisis de los efectos de 2º orden

Valor para multiplicar los desplazamientos 1.00

Coeficientes de Cargas

+X: 1.00 -X: 1.00

+Y: 1.00 -Y: 1.00

| Cargas de viento | | |
|------------------|------------------|------------------|
| Planta | Viento X (kN) | Viento Y (kN) |
| +9.60 | 43.128 | 43.424 |
| +6.15 | 68.124 | 68.592 |

Conforme al artículo 3.3.2., apartado 2 del Documento Básico AE, se ha considerado que las fuerzas de viento por planta, en cada dirección del análisis, actúan con una excentricidad de $\pm 5\%$ de la dimensión máxima del edificio.

4.3.- Sismo

Norma utilizada: NCSE-02

Norma de Construcción Sismorresistente NCSE-02

Método de cálculo: Análisis mediante espectros de respuesta (NCSE-02, 3.6.2)

**4.3.1.- Datos generales de sismo****Caracterización del emplazamiento** a_b : Aceleración básica (NCSE-02, 2.1 y Anejo 1) a_b : 0.040 g K : Coeficiente de contribución (NCSE-02, 2.1 y Anejo 1) K : 1.00

Tipo de suelo (NCSE-02, 2.4): Tipo III

Sistema estructural

Ductilidad (NCSE-02, Tabla 3.1): Ductilidad baja

 Ω : Amortiguamiento (NCSE-02, Tabla 3.1) Ω : 4.00 %**Tipo de construcción (NCSE-02, 2.2):** Construcciones de importancia especial**Parámetros de cálculo**

Número de modos de vibración que intervienen en el análisis: Según norma

Fracción de sobrecarga de uso

: 0.60

Fracción de sobrecarga de nieve

: 0.50

Se realiza análisis de los efectos de 2º orden

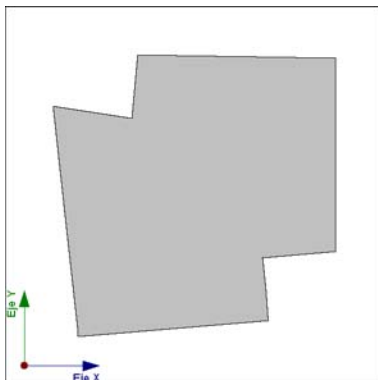
Valor para multiplicar los desplazamientos 1.20

Criterio de armado a aplicar por ductilidad: Ninguno

Direcciones de análisis

Acción sísmica según X

Acción sísmica según Y



Proyección en planta de la obra

4.4.- Fuego

| Datos por planta | | | | |
|------------------|---------|----------|--|----------------------------|
| Planta | R. req. | F. Comp. | Revestimiento de elementos de hormigón | |
| | | | Inferior (forjados y vigas) | Pilares y muros |
| +9.60 | R 60 | - | Sin revestimiento ignífugo | Sin revestimiento ignífugo |
| +6.15 | R 60 | - | Sin revestimiento ignífugo | Sin revestimiento ignífugo |

Notas:

- R. req.: resistencia requerida, periodo de tiempo durante el cual un elemento estructural debe mantener su capacidad portante, expresado en minutos.
- F. Comp.: indica si el forjado tiene función de compartimentación.



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4.5.- Hipótesis de carga

| | |
|-------------|--|
| Automáticas | Peso propio Cargas muertas Sobrecarga de uso Sismo X Sismo Y Viento +X exc. + Viento +X exc. - Viento -X exc. + Viento -X exc. - Viento +Y exc. + Viento +Y exc. - Viento -Y exc. + Viento -Y exc. - |
|-------------|--|

4.6.- Cargas horizontales y en cabeza de pilares

4.6.1.- Cargas en cabeza de pilar

| Referencia pilar | Hipótesis | N (kN) | Mx (kN·m) | My (kN·m) | Qx (kN) | Qy (kN) | T (kN·m) |
|------------------|-------------------|--------|-----------|-----------|---------|---------|----------|
| PP19 | Peso propio | 715.00 | 0.00 | 0.00 | 75.00 | -9.00 | 0.00 |
| | Cargas muertas | 109.00 | 0.00 | 0.00 | 13.00 | -3.00 | 0.00 |
| | Sobrecarga de uso | 603.00 | 0.00 | 0.00 | 75.00 | -12.00 | 0.00 |
| PP20 | Peso propio | 628.00 | 0.00 | 0.00 | 69.00 | 12.00 | 0.00 |
| | Cargas muertas | 98.00 | 0.00 | 0.00 | 13.00 | 3.00 | 0.00 |
| | Sobrecarga de uso | 540.00 | 0.00 | 0.00 | 22.00 | -1.70 | 0.00 |

4.7.- Empujes en muros

TERRENO+SUMERGIDO

Una situación de relleno

Carga: Cargas muertas

Con relleno: Cota 6.40 m

Ángulo de talud 0.00 Grados

Densidad aparente 20.00 kN/m³

Densidad sumergida 11.00 kN/m³

Ángulo rozamiento interno 30.00 Grados

Evacuación por drenaje 100.00 %

Carga 1:

Tipo: Uniforme

Valor: 10.00 kN/m²

MURO MAR

Una situación de relleno

Carga: Cargas muertas

Con nivel freático: Cota 3.15 m

Con relleno: Cota 1.80 m

Ángulo de talud 0.00 Grados

Densidad aparente 18.00 kN/m³



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Densidad sumergida 11.00 kN/m³

Ángulo rozamiento interno 30.00 Grados

Evacuación por drenaje 100.00 %

TERRENO2

Una situación de relleno

Carga: Cargas muertas

Con relleno: Cota 6.40 m

Ángulo de talud 0.00 Grados

Densidad aparente 20.00 kN/m³

Densidad sumergida 11.00 kN/m³

Ángulo rozamiento interno 30.00 Grados

Evacuación por drenaje 100.00 %

Carga 1:

Tipo: Uniforme

Valor: 10.00 kN/m²

MURO PASARELA

Una situación de relleno

Carga: Cargas muertas

Con nivel freático: Cota 3.15 m

Con relleno: Cota 2.00 m

Ángulo de talud 0.00 Grados

Densidad aparente 18.00 kN/m³

Densidad sumergida 11.00 kN/m³

Ángulo rozamiento interno 30.00 Grados

Evacuación por drenaje 100.00 %

MURO GRADA

Una situación de relleno

Carga: Cargas muertas

Con relleno: Cota 2.95 m

Ángulo de talud 0.00 Grados

Densidad aparente 18.00 kN/m³

Densidad sumergida 11.00 kN/m³

Ángulo rozamiento interno 30.00 Grados

Evacuación por drenaje 100.00 %

Carga 1:

Tipo: Uniforme

Valor: 10.00 kN/m²



4.8.- Listado de cargas

Cargas especiales introducidas (en kN, kN/m y kN/m²)

| Grupo | Hipótesis | Tipo | Valor | Coordenadas |
|-------|----------------------------|------|-------|---------------------------------|
| 0 | Cargas muertas Superficial | | 3.60 | (196.24, 12.80) (179.62, 11.40) |
| | | | | (180.50, 21.18) (176.72, 21.47) |
| | | | | (175.65, 8.44) (180.18, 8.10) |
| | | | | (180.22, 8.60) (196.24, 10.10) |
| | Cargas muertas Superficial | | 3.60 | (175.65, 8.44) (175.38, 5.17) |
| | | | | (179.91, 4.89) (180.18, 8.10) |
| 2 | Cargas muertas Superficial | | 0.50 | (180.95, 19.09) (185.54, 19.09) |
| | | | | (185.54, 12.93) (180.03, 12.93) |

5.- ESTADOS LÍMITE

| | |
|---|--|
| E.L.U. de rotura. Hormigón | CTE |
| E.L.U. de rotura. Hormigón en cimentaciones | Cota de nieve: Altitud inferior o igual a 1000 m |
| Tensiones sobre el terreno | Acciones características |
| Desplazamientos | |

6.- SITUACIONES DE PROYECTO

Para las distintas situaciones de proyecto, las combinaciones de acciones se definirán de acuerdo con los siguientes criterios:

- Situaciones persistentes o transitorias

- Con coeficientes de combinación

$$\sum_{j \geq 1} \gamma_{Gj} G_{kj} + \gamma_P P_k + \gamma_{Q1} \Psi_{p1} Q_{k1} + \sum_{i \geq 2} \gamma_{Qi} \Psi_{ai} Q_{ki}$$

- Sin coeficientes de combinación

$$\sum_{j \geq 1} \gamma_{Gj} G_{kj} + \gamma_P P_k + \sum_{i \geq 1} \gamma_{Qi} Q_{ki}$$

- Situaciones sísmicas

- Con coeficientes de combinación

$$\sum_{j \geq 1} \gamma_{Gj} G_{kj} + \gamma_P P_k + \gamma_{A_E} A_E + \sum_{i \geq 1} \gamma_{Qi} \Psi_{ai} Q_{ki}$$

- Sin coeficientes de combinación

$$\sum_{j \geq 1} \gamma_{Gj} G_{kj} + \gamma_P P_k + \gamma_{A_E} A_E + \sum_{i \geq 1} \gamma_{Qi} Q_{ki}$$

- Donde:

- G_k Acción permanente
- P_k Acción de pretensado
- Q_k Acción variable
- A_E Acción sísmica



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- γ_G Coeficiente parcial de seguridad de las acciones permanentes
 γ_P Coeficiente parcial de seguridad de la acción de pretensado
 $\gamma_{Q,1}$ Coeficiente parcial de seguridad de la acción variable principal
 $\gamma_{Q,i}$ Coeficiente parcial de seguridad de las acciones variables de acompañamiento
 γ_{AE} Coeficiente parcial de seguridad de la acción sísmica
 $\psi_{p,1}$ Coeficiente de combinación de la acción variable principal
 $\psi_{a,i}$ Coeficiente de combinación de las acciones variables de acompañamiento

6.1.- Coeficientes parciales de seguridad (γ) y coeficientes de combinación (ψ)

Para cada situación de proyecto y estado límite los coeficientes a utilizar serán:

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| Persistente o transitoria | | | | |
|---------------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_a) |
| Carga permanente (G) | 1.000 | 1.350 | - | - |
| Sobrecarga (Q) | 0.000 | 1.500 | 1.000 | 0.700 |
| Viento (Q) | 0.000 | 1.500 | 1.000 | 0.600 |

| Sísmica | | | | |
|----------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_a) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 0.600 | 0.600 |
| Viento (Q) | 0.000 | 1.000 | 0.000 | 0.000 |
| Sismo (E) | -1.000 | 1.000 | 1.000 | 0.300 ⁽¹⁾ |

Notas:
⁽¹⁾ Fracción de las solicitaciones sísmicas a considerar en la dirección ortogonal: Las solicitaciones obtenidas de los resultados del análisis en cada una de las direcciones ortogonales se combinarán con el 30 % de los de la otra.

E.L.U. de rotura. Hormigón en cimentaciones: EHE-08 / CTE DB-SE C

| Persistente o transitoria | | | | |
|---------------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_a) |
| Carga permanente (G) | 1.000 | 1.600 | - | - |
| Sobrecarga (Q) | 0.000 | 1.600 | 1.000 | 0.700 |
| Viento (Q) | 0.000 | 1.600 | 1.000 | 0.600 |

| Sísmica | | | | |
|----------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_a) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |



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| Sísmica | | | | |
|---|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_a) |
| Sobrecarga (Q) | 0.000 | 1.000 | 0.600 | 0.600 |
| Viento (Q) | 0.000 | 1.000 | 0.000 | 0.000 |
| Sismo (E) | -1.000 | 1.000 | 1.000 | 0.300 ⁽¹⁾ |
| Notas: ⁽¹⁾ Fracción de las solicitaciones sísmicas a considerar en la dirección ortogonal: Las solicitaciones obtenidas de los resultados del análisis en cada una de las direcciones ortogonales se combinarán con el 30 % de los de la otra. | | | | |

Tensiones sobre el terreno

| Característica | | | | |
|----------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_a) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 1.000 | 1.000 |
| Viento (Q) | 0.000 | 1.000 | 1.000 | 1.000 |

| Sísmica | | | | |
|----------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_a) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 1.000 | 1.000 |
| Viento (Q) | | | | |
| Sismo (E) | -1.000 | 1.000 | 1.000 | 0.000 |

Desplazamientos

| Característica | | | | |
|----------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_a) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 1.000 | 1.000 |
| Viento (Q) | 0.000 | 1.000 | 1.000 | 1.000 |

| Sísmica | | | | |
|----------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_a) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 1.000 | 1.000 |
| Viento (Q) | | | | |
| Sismo (E) | -1.000 | 1.000 | 1.000 | 0.000 |



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6.2.- Combinaciones

■ Nombres de las hipótesis

| | |
|-------------|-------------------|
| PP | Peso propio |
| CM | Cargas muertas |
| Qa | Sobrecarga de uso |
| V(+X exc.+) | Viento +X exc.+ |
| V(+X exc.-) | Viento +X exc.- |
| V(-X exc.+) | Viento -X exc.+ |
| V(-X exc.-) | Viento -X exc.- |
| V(+Y exc.+) | Viento +Y exc.+ |
| V(+Y exc.-) | Viento +Y exc.- |
| V(-Y exc.+) | Viento -Y exc.+ |
| V(-Y exc.-) | Viento -Y exc.- |
| SX | Sismo X |
| SY | Sismo Y |

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| Com b. | PP | CM | Qa | V(+X exc.+) | V(+X exc.-) | V(-X exc.+) | V(-X exc.-) | V(+Y exc.+) | V(+Y exc.-) | V(-Y exc.+) | V(-Y exc.-) | SX | SY |
|-----------|-----------|-----------|-----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|----|
| 1 | 1.00 0 | 1.00 0 | | | | | | | | | | | |
| 2 | 1.35 0 | 1.35 0 | | | | | | | | | | | |
| 3 | 1.00 0 | 1.00 0 | 1.50 0 | | | | | | | | | | |
| 4 | 1.35 0 | 1.35 0 | 1.50 0 | | | | | | | | | | |
| 5 | 1.00 0 | 1.00 0 | | 1.500 | | | | | | | | | |
| 6 | 1.35 0 | 1.35 0 | | 1.500 | | | | | | | | | |
| 7 | 1.00 0 | 1.00 0 | 1.05 0 | 1.500 | | | | | | | | | |
| 8 | 1.35 0 | 1.35 0 | 1.05 0 | 1.500 | | | | | | | | | |
| 9 | 1.00 0 | 1.00 0 | 1.50 0 | 0.900 | | | | | | | | | |
| 10 | 1.35 0 | 1.35 0 | 1.50 0 | 0.900 | | | | | | | | | |
| 11 | 1.00 0 | 1.00 0 | | | 1.500 | | | | | | | | |
| 12 | 1.35 0 | 1.35 0 | | | 1.500 | | | | | | | | |
| 13 | 1.00 0 | 1.00 0 | 1.05 0 | | 1.500 | | | | | | | | |
| 14 | 1.35 0 | 1.35 0 | 1.05 0 | | 1.500 | | | | | | | | |
| 15 | 1.00 0 | 1.00 0 | 1.50 0 | | 0.900 | | | | | | | | |
| 16 | 1.35 0 | 1.35 0 | 1.50 0 | | 0.900 | | | | | | | | |



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| Com b. | PP | CM | Qa | V(+X exc. +) | V(+X exc. -) | V(-X exc. +) | V(-X exc. -) | V(+Y exc. +) | V(+Y exc. -) | V(-Y exc. +) | V(-Y exc. -) | SX | SY |
|-----------|-----------|-----------|-----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----|----|
| 17 | 1.00 0 | 1.00 0 | | | | 1.500 | | | | | | | |
| 18 | 1.35 0 | 1.35 0 | | | | 1.500 | | | | | | | |
| 19 | 1.00 0 | 1.00 0 | 1.05 0 | | | 1.500 | | | | | | | |
| 20 | 1.35 0 | 1.35 0 | 1.05 0 | | | 1.500 | | | | | | | |
| 21 | 1.00 0 | 1.00 0 | 1.50 0 | | | 0.900 | | | | | | | |
| 22 | 1.35 0 | 1.35 0 | 1.50 0 | | | 0.900 | | | | | | | |
| 23 | 1.00 0 | 1.00 0 | | | | | 1.500 | | | | | | |
| 24 | 1.35 0 | 1.35 0 | | | | | 1.500 | | | | | | |
| 25 | 1.00 0 | 1.00 0 | 1.05 0 | | | | 1.500 | | | | | | |
| 26 | 1.35 0 | 1.35 0 | 1.05 0 | | | | 1.500 | | | | | | |
| 27 | 1.00 0 | 1.00 0 | 1.50 0 | | | | 0.900 | | | | | | |
| 28 | 1.35 0 | 1.35 0 | 1.50 0 | | | | 0.900 | | | | | | |
| 29 | 1.00 0 | 1.00 0 | | | | | | 1.500 | | | | | |
| 30 | 1.35 0 | 1.35 0 | | | | | | 1.500 | | | | | |
| 31 | 1.00 0 | 1.00 0 | 1.05 0 | | | | | 1.500 | | | | | |
| 32 | 1.35 0 | 1.35 0 | 1.05 0 | | | | | 1.500 | | | | | |
| 33 | 1.00 0 | 1.00 0 | 1.50 0 | | | | | 0.900 | | | | | |
| 34 | 1.35 0 | 1.35 0 | 1.50 0 | | | | | 0.900 | | | | | |
| 35 | 1.00 0 | 1.00 0 | | | | | | | 1.500 | | | | |
| 36 | 1.35 0 | 1.35 0 | | | | | | | 1.500 | | | | |
| 37 | 1.00 0 | 1.00 0 | 1.05 0 | | | | | | 1.500 | | | | |
| 38 | 1.35 0 | 1.35 0 | 1.05 0 | | | | | | 1.500 | | | | |
| 39 | 1.00 0 | 1.00 0 | 1.50 0 | | | | | | 0.900 | | | | |
| 40 | 1.35 0 | 1.35 0 | 1.50 0 | | | | | | 0.900 | | | | |
| 41 | 1.00 0 | 1.00 0 | | | | | | | | 1.500 | | | |
| 42 | 1.35 0 | 1.35 0 | | | | | | | | 1.500 | | | |
| 43 | 1.00 0 | 1.00 0 | 1.05 0 | | | | | | | 1.500 | | | |



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| Com b. | PP | CM | Qa | V(+X exc. +) | V(+X exc. -) | V(-X exc. +) | V(-X exc. -) | V(+Y exc. +) | V(+Y exc. -) | V(-Y exc. +) | V(-Y exc. -) | SX | SY |
|-----------|-----------|-----------|-----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| 44 | 1.35 0 | 1.35 0 | 1.05 0 | | | | | | | 1.500 | | | |
| 45 | 1.00 0 | 1.00 0 | 1.50 0 | | | | | | | 0.900 | | | |
| 46 | 1.35 0 | 1.35 0 | 1.50 0 | | | | | | | 0.900 | | | |
| 47 | 1.00 0 | 1.00 0 | | | | | | | | | 1.500 | | |
| 48 | 1.35 0 | 1.35 0 | | | | | | | | | 1.500 | | |
| 49 | 1.00 0 | 1.00 0 | 1.05 0 | | | | | | | | 1.500 | | |
| 50 | 1.35 0 | 1.35 0 | 1.05 0 | | | | | | | | 1.500 | | |
| 51 | 1.00 0 | 1.00 0 | 1.50 0 | | | | | | | | 0.900 | | |
| 52 | 1.35 0 | 1.35 0 | 1.50 0 | | | | | | | | 0.900 | | |
| 53 | 1.00 0 | 1.00 0 | | | | | | | | | | - 0.30 0 | - 1.00 0 |
| 54 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | - 0.30 0 | - 1.00 0 |
| 55 | 1.00 0 | 1.00 0 | | | | | | | | | | 0.30 0 | - 1.00 0 |
| 56 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | 0.30 0 | - 1.00 0 |
| 57 | 1.00 0 | 1.00 0 | | | | | | | | | | - 1.00 0 | - 0.30 0 |
| 58 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | - 1.00 0 | - 0.30 0 |
| 59 | 1.00 0 | 1.00 0 | | | | | | | | | | - 1.00 0 | 0.30 0 |
| 60 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | - 1.00 0 | 0.30 0 |
| 61 | 1.00 0 | 1.00 0 | | | | | | | | | | 0.30 0 | 1.00 0 |
| 62 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | 0.30 0 | 1.00 0 |
| 63 | 1.00 0 | 1.00 0 | | | | | | | | | | - 0.30 0 | 1.00 0 |
| 64 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | - 0.30 0 | 1.00 0 |
| 65 | 1.00 0 | 1.00 0 | | | | | | | | | | 1.00 0 | 0.30 0 |
| 66 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | 1.00 0 | 0.30 0 |



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| Com b. | PP | CM | Qa | V(+X exc. +) | V(+X exc. -) | V(-X exc. +) | V(-X exc. -) | V(+Y exc. +) | V(+Y exc. -) | V(-Y exc. +) | V(-Y exc. -) | SX | SY |
|-----------|-----------|-----------|-----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------|----------------|
| 67 | 1.00 0 | 1.00 0 | | | | | | | | | | 1.00 0 | - 0.30 0 |
| 68 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | 1.00 0 | - 0.30 0 |

■ E.L.U. de rotura. Hormigón en cimentaciones

| Com b. | PP | CM | Qa | V(+X exc. +) | V(+X exc. -) | V(-X exc. +) | V(-X exc. -) | V(+Y exc. +) | V(+Y exc. -) | V(-Y exc. +) | V(-Y exc. -) | SX | SY |
|-----------|-----------|-----------|-----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----|----|
| 1 | 1.00 0 | 1.00 0 | | | | | | | | | | | |
| 2 | 1.60 0 | 1.60 0 | | | | | | | | | | | |
| 3 | 1.00 0 | 1.00 0 | 1.60 0 | | | | | | | | | | |
| 4 | 1.60 0 | 1.60 0 | 1.60 0 | | | | | | | | | | |
| 5 | 1.00 0 | 1.00 0 | | 1.600 | | | | | | | | | |
| 6 | 1.60 0 | 1.60 0 | | 1.600 | | | | | | | | | |
| 7 | 1.00 0 | 1.00 0 | 1.12 0 | 1.600 | | | | | | | | | |
| 8 | 1.60 0 | 1.60 0 | 1.12 0 | 1.600 | | | | | | | | | |
| 9 | 1.00 0 | 1.00 0 | 1.60 0 | 0.960 | | | | | | | | | |
| 10 | 1.60 0 | 1.60 0 | 1.60 0 | 0.960 | | | | | | | | | |
| 11 | 1.00 0 | 1.00 0 | | | 1.600 | | | | | | | | |
| 12 | 1.60 0 | 1.60 0 | | | 1.600 | | | | | | | | |
| 13 | 1.00 0 | 1.00 0 | 1.12 0 | | 1.600 | | | | | | | | |
| 14 | 1.60 0 | 1.60 0 | 1.12 0 | | 1.600 | | | | | | | | |
| 15 | 1.00 0 | 1.00 0 | 1.60 0 | | 0.960 | | | | | | | | |
| 16 | 1.60 0 | 1.60 0 | 1.60 0 | | 0.960 | | | | | | | | |
| 17 | 1.00 0 | 1.00 0 | | | | 1.600 | | | | | | | |
| 18 | 1.60 0 | 1.60 0 | | | | 1.600 | | | | | | | |
| 19 | 1.00 0 | 1.00 0 | 1.12 0 | | | 1.600 | | | | | | | |
| 20 | 1.60 0 | 1.60 0 | 1.12 0 | | | 1.600 | | | | | | | |
| 21 | 1.00 0 | 1.00 0 | 1.60 0 | | | 0.960 | | | | | | | |



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| Com b. | PP | CM | Qa | V(+X exc. +) | V(+X exc. -) | V(-X exc. +) | V(-X exc. -) | V(+Y exc. +) | V(+Y exc. -) | V(-Y exc. +) | V(-Y exc. -) | SX | SY |
|-----------|-----------|-----------|-----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----|----|
| 22 | 1.60 0 | 1.60 0 | 1.60 0 | | | 0.960 | | | | | | | |
| 23 | 1.00 0 | 1.00 0 | | | | | 1.600 | | | | | | |
| 24 | 1.60 0 | 1.60 0 | | | | | 1.600 | | | | | | |
| 25 | 1.00 0 | 1.00 0 | 1.12 0 | | | | 1.600 | | | | | | |
| 26 | 1.60 0 | 1.60 0 | 1.12 0 | | | | 1.600 | | | | | | |
| 27 | 1.00 0 | 1.00 0 | 1.60 0 | | | | 0.960 | | | | | | |
| 28 | 1.60 0 | 1.60 0 | 1.60 0 | | | | 0.960 | | | | | | |
| 29 | 1.00 0 | 1.00 0 | | | | | | 1.600 | | | | | |
| 30 | 1.60 0 | 1.60 0 | | | | | | 1.600 | | | | | |
| 31 | 1.00 0 | 1.00 0 | 1.12 0 | | | | | 1.600 | | | | | |
| 32 | 1.60 0 | 1.60 0 | 1.12 0 | | | | | 1.600 | | | | | |
| 33 | 1.00 0 | 1.00 0 | 1.60 0 | | | | | 0.960 | | | | | |
| 34 | 1.60 0 | 1.60 0 | 1.60 0 | | | | | 0.960 | | | | | |
| 35 | 1.00 0 | 1.00 0 | | | | | | | 1.600 | | | | |
| 36 | 1.60 0 | 1.60 0 | | | | | | | 1.600 | | | | |
| 37 | 1.00 0 | 1.00 0 | 1.12 0 | | | | | | 1.600 | | | | |
| 38 | 1.60 0 | 1.60 0 | 1.12 0 | | | | | | 1.600 | | | | |
| 39 | 1.00 0 | 1.00 0 | 1.60 0 | | | | | | 0.960 | | | | |
| 40 | 1.60 0 | 1.60 0 | 1.60 0 | | | | | | 0.960 | | | | |
| 41 | 1.00 0 | 1.00 0 | | | | | | | | 1.600 | | | |
| 42 | 1.60 0 | 1.60 0 | | | | | | | | 1.600 | | | |
| 43 | 1.00 0 | 1.00 0 | 1.12 0 | | | | | | | 1.600 | | | |
| 44 | 1.60 0 | 1.60 0 | 1.12 0 | | | | | | | 1.600 | | | |
| 45 | 1.00 0 | 1.00 0 | 1.60 0 | | | | | | | 0.960 | | | |
| 46 | 1.60 0 | 1.60 0 | 1.60 0 | | | | | | | 0.960 | | | |
| 47 | 1.00 0 | 1.00 0 | | | | | | | | | 1.600 | | |
| 48 | 1.60 0 | 1.60 0 | | | | | | | | | 1.600 | | |



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| Com b. | PP | CM | Qa | V(+X exc. +) | V(+X exc. -) | V(-X exc. +) | V(-X exc. -) | V(+Y exc. +) | V(+Y exc. -) | V(-Y exc. +) | V(-Y exc. -) | SX | SY |
|-----------|-----------|-----------|-----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| 49 | 1.00 0 | 1.00 0 | 1.12 0 | | | | | | | | 1.600 | | |
| 50 | 1.60 0 | 1.60 0 | 1.12 0 | | | | | | | | 1.600 | | |
| 51 | 1.00 0 | 1.00 0 | 1.60 0 | | | | | | | | 0.960 | | |
| 52 | 1.60 0 | 1.60 0 | 1.60 0 | | | | | | | | 0.960 | | |
| 53 | 1.00 0 | 1.00 0 | | | | | | | | | | - 0.30 0 | - 1.00 0 |
| 54 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | - 0.30 0 | - 1.00 0 |
| 55 | 1.00 0 | 1.00 0 | | | | | | | | | | 0.30 0 | - 1.00 0 |
| 56 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | 0.30 0 | - 1.00 0 |
| 57 | 1.00 0 | 1.00 0 | | | | | | | | | | - 1.00 0 | - 0.30 0 |
| 58 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | - 1.00 0 | - 0.30 0 |
| 59 | 1.00 0 | 1.00 0 | | | | | | | | | | - 1.00 0 | 0.30 0 |
| 60 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | - 1.00 0 | 0.30 0 |
| 61 | 1.00 0 | 1.00 0 | | | | | | | | | | 0.30 0 | 1.00 0 |
| 62 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | 0.30 0 | 1.00 0 |
| 63 | 1.00 0 | 1.00 0 | | | | | | | | | | - 0.30 0 | 1.00 0 |
| 64 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | - 0.30 0 | 1.00 0 |
| 65 | 1.00 0 | 1.00 0 | | | | | | | | | | 1.00 0 | 0.30 0 |
| 66 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | 1.00 0 | 0.30 0 |
| 67 | 1.00 0 | 1.00 0 | | | | | | | | | | 1.00 0 | - 0.30 0 |
| 68 | 1.00 0 | 1.00 0 | 0.60 0 | | | | | | | | | 1.00 0 | - 0.30 0 |



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■ Tensiones sobre el terreno

■ Desplazamientos

| Com b. | PP | CM | Qa | V(+X exc. +) | V(+X exc. -) | V(-X exc. +) | V(-X exc. -) | V(+Y exc. +) | V(+Y exc. -) | V(-Y exc. +) | V(-Y exc. -) | SX | SY |
|-----------|-----------|-----------|-----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| 1 | 1.00 0 | 1.00 0 | | | | | | | | | | | |
| 2 | 1.00 0 | 1.00 0 | 1.00 0 | | | | | | | | | | |
| 3 | 1.00 0 | 1.00 0 | | 1.000 | | | | | | | | | |
| 4 | 1.00 0 | 1.00 0 | 1.00 0 | 1.000 | | | | | | | | | |
| 5 | 1.00 0 | 1.00 0 | | | 1.000 | | | | | | | | |
| 6 | 1.00 0 | 1.00 0 | 1.00 0 | | 1.000 | | | | | | | | |
| 7 | 1.00 0 | 1.00 0 | | | | 1.000 | | | | | | | |
| 8 | 1.00 0 | 1.00 0 | 1.00 0 | | | 1.000 | | | | | | | |
| 9 | 1.00 0 | 1.00 0 | | | | | 1.000 | | | | | | |
| 10 | 1.00 0 | 1.00 0 | 1.00 0 | | | | 1.000 | | | | | | |
| 11 | 1.00 0 | 1.00 0 | | | | | | 1.000 | | | | | |
| 12 | 1.00 0 | 1.00 0 | 1.00 0 | | | | | 1.000 | | | | | |
| 13 | 1.00 0 | 1.00 0 | | | | | | | 1.000 | | | | |
| 14 | 1.00 0 | 1.00 0 | 1.00 0 | | | | | | 1.000 | | | | |
| 15 | 1.00 0 | 1.00 0 | | | | | | | | 1.000 | | | |
| 16 | 1.00 0 | 1.00 0 | 1.00 0 | | | | | | | 1.000 | | | |
| 17 | 1.00 0 | 1.00 0 | | | | | | | | | 1.000 | | |
| 18 | 1.00 0 | 1.00 0 | 1.00 0 | | | | | | | | 1.000 | | |
| 19 | 1.00 0 | 1.00 0 | | | | | | | | | | - 1.00 0 | |
| 20 | 1.00 0 | 1.00 0 | 1.00 0 | | | | | | | | | - 1.00 0 | |
| 21 | 1.00 0 | 1.00 0 | | | | | | | | | | 1.00 0 | |
| 22 | 1.00 0 | 1.00 0 | 1.00 0 | | | | | | | | | 1.00 0 | |
| 23 | 1.00 0 | 1.00 0 | | | | | | | | | | | - 1.00 0 |



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| Com b. | PP | CM | Qa | V(+X exc.+) | V(+X exc.-) | V(-X exc.+) | V(-X exc.-) | V(+Y exc.+) | V(+Y exc.-) | V(-Y exc.+) | V(-Y exc.-) | SX | SY |
|-----------|-----------|-----------|-----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|----------------|
| 24 | 1.00 0 | 1.00 0 | 1.00 0 | | | | | | | | | | - 1.00 0 |
| 25 | 1.00 0 | 1.00 0 | | | | | | | | | | | 1.00 0 |
| 26 | 1.00 0 | 1.00 0 | 1.00 0 | | | | | | | | | | 1.00 0 |

7.- DATOS GEOMÉTRICOS DE GRUPOS Y PLANTAS

| Grupo | Nombre del grupo | Planta | Nombre planta | Altura | Cota |
|-------|------------------|--------|---------------|--------|------|
| 2 | +9.60 | 2 | +9.60 | 3.45 | 6.40 |
| 1 | +6.15 | 1 | +6.15 | 2.95 | 2.95 |
| 0 | +3.20 | | | | 0.00 |

8.- DATOS GEOMÉTRICOS DE PILARES, PANTALLAS Y MUROS

8.1.- Pilares

GI: grupo inicial

GF: grupo final

Ang: ángulo del pilar en grados sexagesimales

Datos de los pilares

| Referencia | Coord(P.Fijo) | GI- GF | Vinculación exterior | Ang. | Punto fijo | Canto de apoyo |
|------------|-----------------|--------|--------------------------|------|----------------|----------------|
| PS-01 | (185.80, 19.82) | 0-1 | Sin vinculación exterior | 0.0 | Centro | |
| PS-02 | (191.04, 19.82) | 0-1 | Sin vinculación exterior | 0.0 | Centro | |
| PP-21 | (176.49, 6.27) | 0-1 | Sin vinculación exterior | 4.8 | Esq. inf. izq. | |
| PR-1 | (188.50, 7.63) | 0-1 | Con vinculación exterior | 4.8 | Esq. sup. izq. | 0.00 |
| PR-2 | (190.59, 7.81) | 0-1 | Con vinculación exterior | 4.8 | Esq. sup. izq. | 0.00 |
| PP19 | (178.44, 18.15) | 0-0 | Sin vinculación exterior | 0.0 | Esq. sup. izq. | |
| PP20 | (178.44, 11.80) | 0-0 | Sin vinculación exterior | 0.0 | Esq. inf. izq. | |

8.2.- Muros

- Las coordenadas de los vértices inicial y final son absolutas.

- Las dimensiones están expresadas en metros.

Datos geométricos del muro

| Referencia | Tipo muro | GI- GF | Vértices | | Planta | Dimensiones Izquierda+Derecha=Total |
|------------|-------------------------|--------|-----------------|-----------------|--------|--|
| | | | Inicial | Final | | |
| M1 | Muro de hormigón armado | 0-2 | (179.84, 11.62) | (196.24, 13.00) | 2 1 | 0.2+0.2=0.4 0.2+0.2=0.4 |
| M2 | Muro de hormigón armado | 0-2 | (196.24, 13.00) | (196.24, 27.54) | 2 1 | 0.2+0.2=0.4 0.2+0.2=0.4 |
| M3 | Muro de hormigón armado | 0-2 | (181.30, 27.81) | (196.24, 27.54) | 2 1 | 0.2+0.2=0.4 0.2+0.2=0.4 |



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| Referencia | Tipo muro | GI-GF | Vértices Inicial Final | Planta | Dimensiones Izquierda+Derecha=Total |
|------------|-------------------------|-------|---------------------------------|--------|--|
| M4 | Muro de hormigón armado | 0-2 | (179.84, 11.62) (181.30, 27.81) | 21 | 0.2+0.2=0.4 0.2+0.2=0.4 |
| M5 | Muro de hormigón armado | 0-1 | (174.73, 23.84) (175.17, 19.95) | 1 | 0.15+0.15=0.3 |
| M8 | Muro de hormigón armado | 0-1 | (174.73, 23.84) (180.86, 22.91) | 1 | 0.15+0.15=0.3 |

Empujes y zapata del muro

| Referencia | Empujes | Zapata del muro |
|------------|--|--|
| M1 | Empuje izquierdo: Sin empujes Empuje derecho: MURO MAR | Viga de cimentación: 0.400 x 0.500 Vuelos: izq.:0.00 der.:0.00 canto:0.50 Tensiones admisibles -Situaciones persistentes: 0.080 MPa -Situaciones accidentales: 0.120 MPa Módulo de balasto: 7756.00 kN/m ³ |
| M2 | Empuje izquierdo: Sin empujes Empuje derecho: TERRENO+SUMERGIDO | Viga de cimentación: 0.400 x 0.500 Vuelos: izq.:0.00 der.:0.00 canto:0.50 Tensiones admisibles -Situaciones persistentes: 0.080 MPa -Situaciones accidentales: 0.120 MPa Módulo de balasto: 7756.00 kN/m ³ |
| M3 | Empuje izquierdo: TERRENO+SUMERGIDO Empuje derecho: Sin empujes | Viga de cimentación: 0.400 x 0.500 Vuelos: izq.:0.00 der.:0.00 canto:0.50 Tensiones admisibles -Situaciones persistentes: 0.080 MPa -Situaciones accidentales: 0.120 MPa Módulo de balasto: 7756.00 kN/m ³ |
| M4 | Empuje izquierdo: MURO PASARELA Empuje derecho: Sin empujes | Viga de cimentación: 0.400 x 0.500 Vuelos: izq.:0.00 der.:0.00 canto:0.50 Tensiones admisibles -Situaciones persistentes: 0.080 MPa -Situaciones accidentales: 0.120 MPa Módulo de balasto: 7756.00 kN/m ³ |
| M5 | Empuje izquierdo: Sin empujes Empuje derecho: Sin empujes | Viga de cimentación: 0.300 x 0.500 Vuelos: izq.:0.00 der.:0.00 canto:0.50 Tensiones admisibles -Situaciones persistentes: 0.080 MPa -Situaciones accidentales: 0.120 MPa Módulo de balasto: 7756.00 kN/m ³ |
| M8 | Empuje izquierdo: MURO GRADA Empuje derecho: Sin empujes | Viga de cimentación: 0.300 x 0.500 Vuelos: izq.:0.00 der.:0.00 canto:0.50 Tensiones admisibles -Situaciones persistentes: 0.080 MPa -Situaciones accidentales: 0.120 MPa Módulo de balasto: 7756.00 kN/m ³ |

9.- DIMENSIONES, COEFICIENTES DE EMPOTRAMIENTO Y COEFICIENTES DE PANDEO PARA CADA PLANTA

| Pilar | Planta | Dimensiones (cm) | Coeficiente de empotramiento | | Coeficiente de pandeo | | Coeficiente de rigidez axil |
|--------|--------|------------------|------------------------------|------|-----------------------|------|-----------------------------|
| | | | Cabeza | Pie | X | Y | |
| 01, 02 | 1 | 35x35 | 0.30 | 1.00 | 1.00 | 1.00 | 2.00 |
| 97, 98 | 1 | 60x40 | 0.30 | 1.00 | 1.00 | 1.00 | 2.00 |
| 03 | 1 | 75x75 | 0.30 | 1.00 | 1.00 | 1.00 | 2.00 |



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| Pilar | Planta | Dimensiones (cm) | Coeficiente de empotramiento | | Coeficiente de pandeo | | Coeficiente de rigidez axil |
|------------|--------|------------------|------------------------------|-----|-----------------------|---|-----------------------------|
| | | | Cabeza | Pie | X | Y | |
| PP19, PP20 | 1 | 75x75 | | | | | |

10.- LISTADO DE PAÑOS

Placas aligeradas consideradas

| Nombre | Descripción |
|------------------|---|
| Rodiñas 50+5/120 | <p>Prefabricados Rodiñas, S.L.</p> <p>Canto total del forjado: 55 cm</p> <p>Espesor de la capa de compresión: 5 cm</p> <p>Ancho de la placa: 1200 mm</p> <p>Ancho mínimo de la placa: 120 mm</p> <p>Entrega mínima: 10 cm</p> <p>Entrega máxima: 15 cm</p> <p>Entrega lateral: 5 cm</p> <p>Hormigón de la placa: HA-45, Yc=1.5</p> <p>Hormigón de la capa y juntas: HA-25, Yc=1.5</p> <p>Acero de negativos: B 500 S, Ys=1.15</p> <p>Peso propio: 7.5537 kN/m²</p> <p>Volumen de hormigón: 0.072 m³/m²</p> |

10.1.- Autorización de uso

Ficha de características técnicas del forjado de placas aligeradas:

Rodiñas 50+5/120

| |
|---|
| <p>Prefabricados Rodiñas, S.L.</p> <p>Canto total del forjado: 55 cm</p> <p>Espesor de la capa de compresión: 5 cm</p> <p>Ancho de la placa: 1200 mm</p> <p>Ancho mínimo de la placa: 120 mm</p> <p>Entrega mínima: 10 cm</p> <p>Entrega máxima: 15 cm</p> <p>Entrega lateral: 5 cm</p> <p>Hormigón de la placa: HA-45, Yc=1.5</p> <p>Hormigón de la capa y juntas: HA-25, Yc=1.5</p> <p>Acero de negativos: B 500 S, Ys=1.15</p> <p>Peso propio: 7.5537 kN/m²</p> <p>Volumen de hormigón: 0.072 m³/m²</p> |
|---|

Esfuerzos por bandas de 1 m

| Referencia | Flexión positiva | | | | | | | Cortante | Último |
|------------|------------------|-------|----------|---------|----------------------------------|-------|---------|----------|--------|
| | Momento | | Rigidez | | Momento de servicio | | | | |
| | | | | | Según la clase de exposición (1) | | | | |
| | | | | | | | | | |
| Último | Fisura | Total | Fisura | I | II | III | Md > Mg | Md < Mg | |
| | kN·m/m | | kN·m²/m | | kN·m/m | | | kN/m | |
| ROD 50 T.1 | 195.6 | 201.8 | 386700.4 | 17844.4 | 112.0 | 201.8 | 247.6 | 211.3 | 348.2 |
| ROD 50 T.2 | 258.5 | 238.3 | 388691.8 | 22837.7 | 147.9 | 238.3 | 284.4 | 231.6 | 363.1 |
| ROD 50 T.3 | 319.7 | 277.1 | 390418.4 | 28645.2 | 186.1 | 277.1 | 323.5 | 247.8 | 374.5 |
| ROD 50 T.4 | 366.4 | 303.4 | 392095.9 | 31588.2 | 211.9 | 303.4 | 350.1 | 266.0 | 387.0 |
| ROD 50 T.5 | 471.8 | 370.1 | 394646.5 | 40888.1 | 277.6 | 370.1 | 417.2 | 296.8 | 407.3 |
| ROD 50 T.6 | 572.0 | 435.4 | 397177.5 | 49785.8 | 342.0 | 435.4 | 483.1 | 307.1 | 426.7 |
| ROD 50 T.7 | 697.9 | 518.2 | 401856.8 | 59693.9 | 423.2 | 518.2 | 566.6 | 310.8 | 445.2 |
| ROD 50 T.8 | 808.1 | 580.2 | 404319.2 | 64814.7 | 484.3 | 580.2 | 629.1 | 309.5 | 463.0 |



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| Refuerzo Superior | Flexión negativa B 500 S, Ys=1.15 | | | | | |
|-------------------|-----------------------------------|----------|---------|----------|---------|----------|
| | Momento último | | Momento | Rigidez | | Cortante |
| | Tipo | Macizado | Fisura | Total | Fisura | Último |
| | kN·m/m | | kN·m/m | kN·m²/m | | kN/m |
| Ø8 c/200 | 53.7 | 53.7 | 154.4 | 305738.5 | 9662.9 | 348.2 |
| Ø8 c/170 | 64.5 | 64.5 | 154.9 | 306385.9 | 11183.4 | 348.2 |
| Ø8 c/150 | 75.4 | 75.4 | 155.4 | 307023.6 | 12684.3 | 348.2 |
| Ø10 c/200 | 86.2 | 86.2 | 156.1 | 307906.5 | 19227.6 | 348.2 |
| Ø10 c/170 | 97.1 | 97.1 | 156.9 | 308916.9 | 20758.0 | 348.2 |
| Ø10 c/150 | 118.9 | 118.9 | 157.7 | 309897.9 | 22268.7 | 348.2 |
| Ø12 c/200 | 129.9 | 129.9 | 158.2 | 310545.4 | 23259.5 | 348.2 |
| Ø12 c/170 | 140.8 | 140.8 | 159.3 | 311967.8 | 25457.0 | 348.2 |
| Ø12 c/150 | 162.8 | 162.8 | 160.5 | 313380.5 | 27644.6 | 348.2 |
| Ø16 c/200 | 218.2 | 218.2 | 163.5 | 317118.1 | 33481.5 | 348.2 |
| Ø16 c/170 | 251.7 | 251.7 | 165.5 | 319570.6 | 37385.9 | 348.2 |
| Ø16 c/150 | 296.7 | 296.7 | 167.5 | 322013.3 | 41280.5 | 348.2 |
| Ø20 c/200 | 342.0 | 342.0 | 170.2 | 325329.0 | 46656.4 | 348.2 |
| Ø20 c/170 | 399.2 | 399.2 | 173.3 | 329027.4 | 52748.4 | 348.2 |
| Ø20 c/150 | 453.3 | 453.3 | 176.4 | 332676.7 | 58840.4 | 348.2 |
| Ø20 c/130 | 499.5 | 499.5 | 179.6 | 336267.2 | 64932.4 | 348.2 |

(1) Según la clase de exposición:

- Clase I: Ambiente agresivo (Ambiente III)
- Clase II: Ambiente exterior (Ambiente II)
- Clase III: Ambiente interior (Ambiente I)

11.- LOSAS Y ELEMENTOS DE CIMENTACIÓN

| Losas cimentación | Canto (cm) | Módulo balasto (kN/m ³) | Tensión admisible en situaciones persistentes (MPa) | Tensión admisible en situaciones accidentales (MPa) |
|-------------------|------------|-------------------------------------|---|---|
| Todas | 50 | 7663.00 | 0.080 | 0.120 |

12.- MATERIALES UTILIZADOS

12.1.- Hormigones

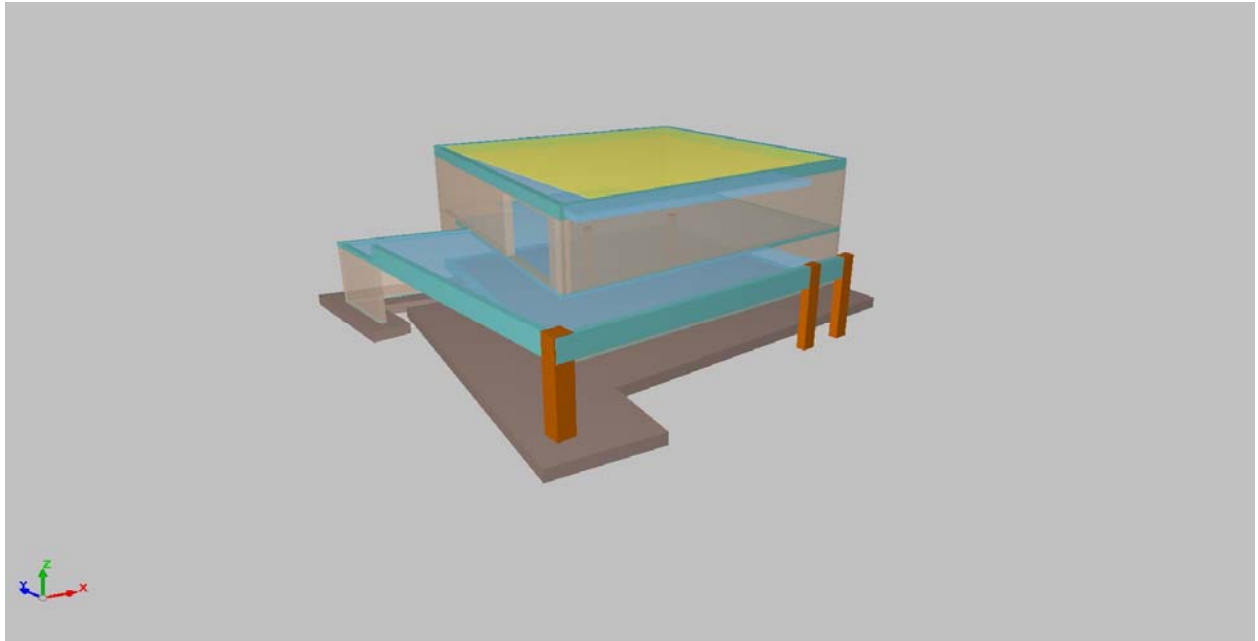
| Elemento | Hormigón | f_{ck} (MPa) | γ_c | Árido | |
|----------|----------|-------------------|-------------|------------|--------------------|
| | | | | Naturaleza | Tamaño máximo (mm) |
| Todos | HA-30 | 30 | 1.30 a 1.50 | Cuarcita | 15 |

12.2.- Aceros por elemento y posición

12.2.1.- Aceros en barras

| Elemento | Acero | f_{yk} (MPa) | γ_s |
|----------|---------|-------------------|-------------|
| Todos | B 500 S | 500 | 1.00 a 1.15 |

| | |
|--|----------------|
| JESUS JIMENEZ CAÑAS & ASOCIADOS | |
| REORDENACIÓN DEL PASEO DE LAS CANTERAS PROYECTO DE ESTRUCTURA. ANEJO DE CÁLCULO. | DICIEMBRE 2015 |



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1.- SISMO

Norma utilizada: NCSE-02

Norma de Construcción Sismorresistente NCSE-02

Método de cálculo: Análisis mediante espectros de respuesta (NCSE-02, 3.6.2)

1.1.- Datos generales de sismo

Caracterización del emplazamiento

 a_b : Aceleración básica (NCSE-02, 2.1 y Anejo 1) a_b : 0.040 g

K: Coeficiente de contribución (NCSE-02, 2.1 y Anejo 1)

K : 1.00

Tipo de suelo (NCSE-02, 2.4): Tipo III

Sistema estructural

Ductilidad (NCSE-02, Tabla 3.1): Ductilidad baja

W: Amortiguamiento (NCSE-02, Tabla 3.1)

W : 4.00 %

Tipo de construcción (NCSE-02, 2.2): Construcciones de importancia especial

Parámetros de cálculo

Número de modos de vibración que intervienen en el análisis: Según norma

Fracción de sobrecarga de uso

: 0.60

Fracción de sobrecarga de nieve

: 0.50

Se realiza análisis de los efectos de 2º orden

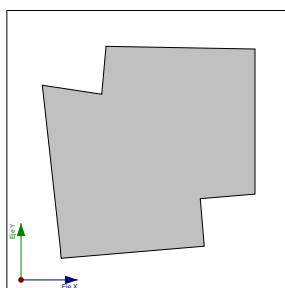
Valor para multiplicar los desplazamientos 1.20

Criterio de armado a aplicar por ductilidad: Ninguno

Direcciones de análisis

Acción sísmica según X

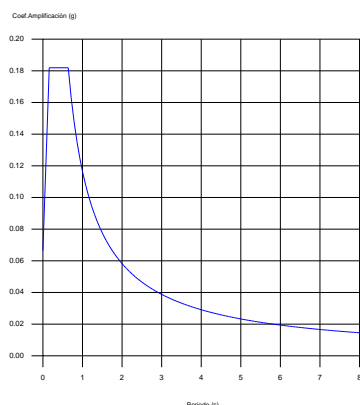
Acción sísmica según Y



Proyección en planta de la obra

1.2.- Espectro de cálculo

1.2.1.- Espectro elástico de aceleraciones



Coef. Amplificación:

$$S_{ae} = a_c \cdot \alpha(T)$$

Donde:

$$\alpha(T) = 1 + (2,5 \cdot v - 1) \cdot \frac{T}{T_A}$$

$$T < T_A$$

$$\alpha(T) = 2,5 \cdot v$$

$$T_A \leq T \leq T_B$$

$$\alpha(T) = \frac{K \cdot C}{T} \cdot v$$

$$T > T_B$$

es el espectro normalizado de respuesta elástica.

El valor máximo de las ordenadas espectrales es 0.182 g.

NCSE-02 (2.2, 2.3 y 2.4)

Parámetros necesarios para la definición del espectro

 a_c : Aceleración sísmica de cálculo (NCSE-02, 2.2) a_c : 0.067 g



$$a_c = S \cdot \rho \cdot a_b$$

a_b : Aceleración básica (NCSE-02, 2.1 y Anejo 1)

$$a_b : 0.040 \text{ g}$$

r : Coeficiente adimensional de riesgo

$$r : 1.30$$

Tipo de construcción: Construcciones de importancia especial

S : Coeficiente de amplificación del terreno (NCSE-02, 2.2)

$$S : 1.28$$

$$S = \frac{C}{1.25}$$

$$\rho \cdot a_b \leq 0.1g$$

$$S = \frac{C}{1.25} + 3.33 \cdot \left(\rho \cdot \frac{a_b}{g} - 0.1 \right) \cdot \left(1 - \frac{C}{1.25} \right)$$

$$0.1g < \rho \cdot a_b < 0.4g$$

$$S = 1.0$$

$$0.4g \leq \rho \cdot a_b$$

C : Coeficiente del terreno (NCSE-02, 2.4)

$$C : 1.60$$

Tipo de suelo (NCSE-02, 2.4): Tipo III

a_b : Aceleración básica (NCSE-02, 2.1 y Anejo 1)

$$a_b : 0.040 \text{ g}$$

r : Coeficiente adimensional de riesgo

$$r : 1.30$$

n : Coeficiente dependiente del amortiguamiento (NCSE-02, 2.5)

$$n : 1.09$$

$$v = \left(\frac{5}{\Omega} \right)^{0.4}$$

W : Amortiguamiento (NCSE-02, Tabla 3.1)

$$W : 4.00 \%$$

T_A : Periodo característico del espectro (NCSE-02, 2.3)

$$T_A : 0.16 \text{ s}$$

$$T_A = \frac{K \cdot C}{10}$$

K : Coeficiente de contribución (NCSE-02, 2.1 y Anejo 1)

$$K : 1.00$$

C : Coeficiente del terreno (NCSE-02, 2.4)

$$C : 1.60$$

Tipo de suelo (NCSE-02, 2.4): Tipo III

T_B : Periodo característico del espectro (NCSE-02, 2.3)

$$T_B : 0.64 \text{ s}$$

$$T_B = \frac{K \cdot C}{2.5}$$

K : Coeficiente de contribución (NCSE-02, 2.1 y Anejo 1)

$$K : 1.00$$

C : Coeficiente del terreno (NCSE-02, 2.4)

$$C : 1.60$$

Tipo de suelo (NCSE-02, 2.4): Tipo III

1.2.2.- Espectro de diseño de aceleraciones

El espectro de diseño sísmico se obtiene reduciendo el espectro elástico por el coeficiente (μ) correspondiente a cada dirección de análisis.

$$S_a = a_c \cdot \left(1 + \left(2.5 \cdot \frac{v}{\mu} - 1 \right) \cdot \frac{T}{T_A} \right) \quad T < T_A$$

$$S_a = a_c \cdot 2.5 \cdot \frac{v}{\mu} \quad T_A \leq T \leq T_B$$

$$S_a = a_c \cdot \frac{K \cdot C}{T} \cdot \frac{v}{\mu} \quad T > T_B$$

b : Coeficiente de respuesta

$$b : 0.55$$

$$\beta = \frac{v}{\mu}$$

n : Coeficiente dependiente del amortiguamiento (NCSE-02, 2.5)

$$n : 1.09$$

$$v = \left(\frac{5}{\Omega} \right)^{0.4}$$

W : Amortiguamiento (NCSE-02, Tabla 3.1)

$$W : 4.00 \%$$

m : Coeficiente de comportamiento por ductilidad (NCSE-02, 3.7.3.1)

$$m : 2.00$$

Ductilidad (NCSE-02, Tabla 3.1): Ductilidad baja

a_c : Aceleración sísmica de cálculo (NCSE-02, 2.2)

$$a_c : 0.067 \text{ g}$$

K : Coeficiente de contribución (NCSE-02, 2.1 y Anejo 1)

$$K : 1.00$$

C : Coeficiente del terreno (NCSE-02, 2.4)

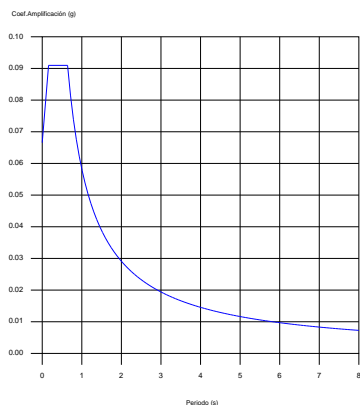
$$C : 1.60$$

T_A : Periodo característico del espectro (NCSE-02, 2.3)

$$T_A : 0.16 \text{ s}$$

T_B : Periodo característico del espectro (NCSE-02, 2.3)

$$T_B : 0.64 \text{ s}$$



1.3.- Coeficientes de participación

| Modo | T | L_x | L_y | L_{gz} | M_x | M_y | Hipótesis X(1) | Hipótesis Y(1) |
|--------|-------|--------|--------|----------|--------|---------|---|---|
| Modo 1 | 0.220 | 0.1367 | 0.5147 | 0.8464 | 7.6 % | 89.75 % | R = 2 A = 0.892 m/s ² D = 1.09891 mm | R = 2 A = 0.892 m/s ² D = 1.09891 mm |
| Modo 2 | 0.193 | 0.0639 | 0.0173 | 0.9978 | 86.7 % | 5.28 % | R = 2 A = 0.892 m/s ² D = 0.84328 mm | R = 2 A = 0.892 m/s ² D = 0.84328 mm |
| Modo 3 | 0.024 | 0.0002 | 0.0119 | 0.9999 | 0 % | 0.3 % | R = 2 A = 0.688 m/s ² D = 0.00969 mm | R = 2 A = 0.688 m/s ² D = 0.00969 mm |
| Total | | | | | 94.3 % | 95.33 % | | |

T: Periodo de vibración en segundos.

L_x , L_y : Coeficientes de participación normalizados en cada dirección del análisis.

L_{gz} : Coeficiente de participación normalizado correspondiente al grado de libertad rotacional.

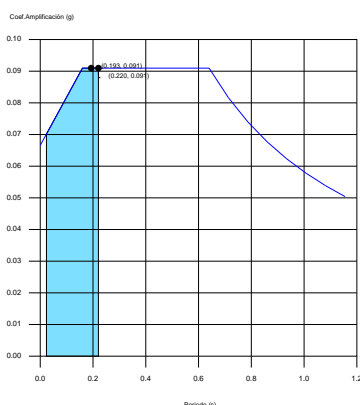
M_x , M_y : Porcentaje de masa desplazada por cada modo en cada dirección del análisis.

R: Relación entre la aceleración de cálculo usando la ductilidad asignada a la estructura y la aceleración de cálculo obtenida sin ductilidad.

A: Aceleración de cálculo, incluyendo la ductilidad.

D: Coeficiente del modo. Equivale al desplazamiento máximo del grado de libertad dinámico.

Representación de los periodos modales



Se representa el rango de periodos abarcado por los modos estudiados, con indicación de los modos en los que se desplaza más del 30% de la masa:

| Hipótesis Sismo 1 | | |
|-------------------|-------|-------|
| Hipótesis modal | T (s) | A (g) |
| Modo 1 | 0.220 | 0.091 |
| Modo 2 | 0.193 | 0.091 |



1.4.- Centro de masas, centro de rigidez y excentricidades de cada planta

| Planta | c.d.m. (m) | c.d.r. (m) | e_x (m) | e_y (m) |
|--------|-----------------|-----------------|--------------|--------------|
| +9.60 | (188.21, 19.34) | (189.44, 19.70) | -1.23 | -0.35 |
| +6.15 | (186.13, 17.87) | (188.00, 19.72) | -1.87 | -1.85 |

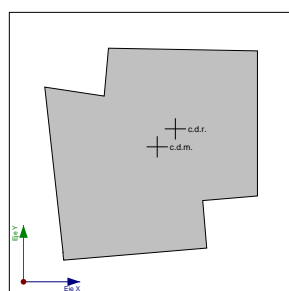
c.d.m.: Coordenadas del centro de masas de la planta (X,Y)

c.d.r.: Coordenadas del centro de rigidez de la planta (X,Y)

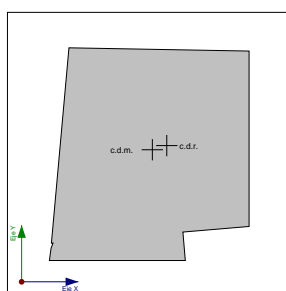
e_x : Excentricidad del centro de masas respecto al centro de rigidez (X)

e_y : Excentricidad del centro de masas respecto al centro de rigidez (Y)

Representación gráfica del centro de masas y del centro de rigidez por planta



+6.15



+9.60

1.5.- Cortante sísmico combinado por planta

El valor máximo del cortante por planta en una hipótesis sísmica dada se obtiene mediante la Combinación Cuadrática Completa (CQC) de los correspondientes cortantes modales.

Si la obra tiene vigas con vinculación exterior o estructuras 3D integradas, los esfuerzos de dichos elementos no se muestran en el siguiente listado.

1.5.1.- Cortante sísmico combinado y fuerza sísmica equivalente por planta

Los valores que se muestran en las siguientes tablas no están ajustados por el factor de modificación calculado en el apartado 'Corrección por cortante basal'.

Hipótesis sísmica: Sismo X1

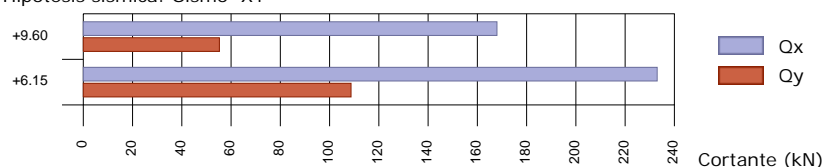
| Planta | Q_x (kN) | $F_{eq,X}$ (kN) | Q_y (kN) | $F_{eq,Y}$ (kN) |
|--------|---------------|--------------------|---------------|--------------------|
| +9.60 | 1647.697 | 1647.697 | 542.019 | 542.019 |
| +6.15 | 2285.911 | 638.222 | 1066.485 | 543.220 |

Hipótesis sísmica: Sismo Y1

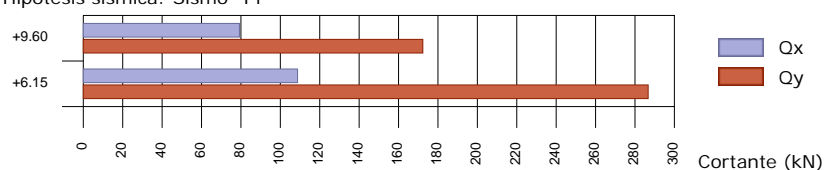
| Planta | Q_x (kN) | $F_{eq,X}$ (kN) | Q_y (kN) | $F_{eq,Y}$ (kN) |
|--------|---------------|--------------------|---------------|--------------------|
| +9.60 | 777.354 | 777.354 | 1690.459 | 1690.459 |
| +6.15 | 1066.701 | 289.426 | 2812.536 | 1123.272 |

Cortantes sísmicos máximos por planta

Hipótesis sísmica: Sismo X1



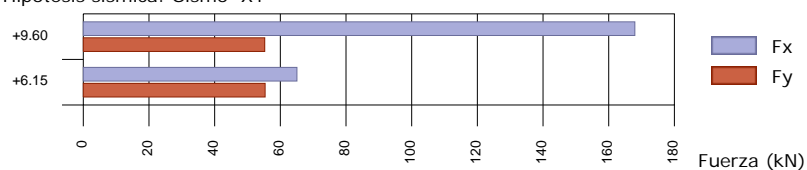
Hipótesis sísmica: Sismo Y1



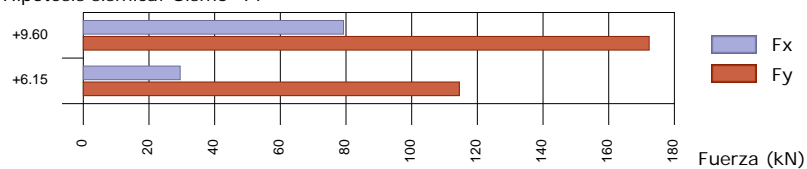
Fuerzas sísmicas equivalentes por planta



Hipótesis sísmica: Sismo X1



Hipótesis sísmica: Sismo Y1



1.5.2.- Porcentaje de cortante sísmico resistido por tipo de soporte y por planta

El porcentaje de cortante sísmico de la columna 'Muros' incluye el cortante resistido por muros, pantallas y elementos de arriostramiento.

Hipótesis sísmica: Sismo X1

| Planta | %Q _x | | %Q _y | |
|--------|-----------------|--------|-----------------|--------|
| | Pilares | Muros | Pilares | Muros |
| +9.60 | 0.00 | 100.00 | 0.00 | 100.00 |
| +6.15 | 2.76 | 97.24 | 1.99 | 98.01 |

Hipótesis sísmica: Sismo Y1

| Planta | %Q _x | | %Q _y | |
|--------|-----------------|--------|-----------------|--------|
| | Pilares | Muros | Pilares | Muros |
| +9.60 | 0.00 | 100.00 | 0.00 | 100.00 |
| +6.15 | 3.95 | 96.05 | 2.64 | 97.36 |

1.5.3.- Porcentaje de cortante sísmico resistido por tipo de soporte en arranques

El porcentaje de cortante sísmico de la columna 'Muros' incluye el cortante resistido por muros, pantallas y elementos de arriostramiento.

| Hipótesis sísmica | %Q _x | | %Q _y | |
|-------------------|-----------------|-------|-----------------|-------|
| | Pilares | Muros | Pilares | Muros |
| Sismo X1 | 2.76 | 97.24 | 1.99 | 98.01 |
| Sismo Y1 | 3.95 | 96.05 | 2.64 | 97.36 |



1.- DATOS GENERALES

• Norma: CTE DB SI - Anejo C: Resistencia al fuego de las estructuras de hormigón armado.

• Referencias:

- R. req.: resistencia requerida, periodo de tiempo durante el cual un elemento estructural debe mantener su capacidad portante, expresado en minutos.
- F. Comp.: indica si el forjado tiene función de compartimentación.
- a_m : distancia equivalente al eje de las armaduras (CTE DB SI - Anejo C - Fórmula C.1).
- a_{min} : distancia mínima equivalente al eje exigida por la norma para cada tipo de elemento estructural.
- b: menor dimensión de la sección transversal.
- b_{min} : valor mínimo de la menor dimensión exigido por la norma.

• Comprobaciones:

Generales:

- Distancia equivalente al eje: $a_m \geq a_{min}$ (se indica el espesor de revestimiento necesario para cumplir esta condición cuando resulte necesario).
- Dimensión mínima: $b \geq b_{min}$.

Particulares:

- Se han realizado las comprobaciones particulares para aquellos elementos estructurales en los que la norma así lo exige.

| Datos por planta | | | | |
|------------------|---------|----------|--|----------------------------|
| Planta | R. req. | F. Comp. | Revestimiento de elementos de hormigón | |
| | | | Inferior (forjados y vigas) | Pilares y muros |
| +9.60 | R 60 | - | Sin revestimiento ignífugo | Sin revestimiento ignífugo |
| +6.15 | R 60 | - | Sin revestimiento ignífugo | Sin revestimiento ignífugo |

2.- COMPROBACIONES

2.1.- +6.15

| +6.15 - Pilares - R 60 | | | | | |
|---------------------------------------|---------------|---------------|---------------|---------------|--------|
| b_{min} : 200 mm; a_{min} : 20 mm | | | | | |
| Refs. | Cara X | | Cara Y | | Estado |
| | b_x (mm) | a_m (mm) | b_y (mm) | a_m (mm) | |
| 01 | 350 | 50 | 350 | 50 | Cumple |
| 02 | 350 | 50 | 350 | 50 | Cumple |
| 03 | 750 | 50 | 750 | 50 | Cumple |
| 97 | 600 | 50 | 400 | 50 | Cumple |
| 98 | 600 | 50 | 400 | 50 | Cumple |

| +6.15 - Muros - R 60 | | | | | |
|----------------------|-----------------|-------------------|---------------|-------------------|--------|
| Ref. | Espesor (mm) | b_{min} (mm) | a_m (mm) | a_{min} (mm) | Estado |
| M1 | 400 | 120 | 57 | 15 | Cumple |
| M2 | 400 | 120 | 53 | 15 | Cumple |
| M3 | 400 | 120 | 53 | 15 | Cumple |
| M4 | 400 | 120 | 53 | 15 | Cumple |
| M5 | 300 | 140 | 46 | 15 | Cumple |
| M8 | 300 | 120 | 47 | 15 | Cumple |

| +6.15 - Losas macizas - R 60 | | | | |
|------------------------------|---------------|---------------|-------------------|--------|
| Paño | Canto (mm) | a_m (mm) | a_{min} (mm) | Estado |
| L1 y L2 | 200 | 32 | 20 | Cumple |



2.2.- +9.60

| +9.60 - Muros - R 60 | | | | | |
|----------------------|--------------|----------------|------------|----------------|--------|
| Ref. | Espesor (mm) | b_{min} (mm) | a_m (mm) | a_{min} (mm) | Estado |
| M1 | 400 | 120 | 53 | 15 | Cumple |
| M2 | 400 | 120 | 57 | 15 | Cumple |
| M3 | 400 | 120 | 53 | 15 | Cumple |
| M4 | 400 | 120 | 57 | 15 | Cumple |

| +9.60 - Losas macizas - R 60 | | | | |
|------------------------------|------------|------------|----------------|--------|
| Paño | Canto (mm) | a_m (mm) | a_{min} (mm) | Estado |
| L1 y L2 | 300 | 32 | 20 | Cumple |

| +9.60 - Placas aligeradas - R 60 | | | | |
|----------------------------------|---------|------------|----------------|--------|
| Paño | Forjado | a_m (mm) | a_{min} (mm) | Estado |
| PL1 | ROD505 | 35 | 35 | Cumple |

■ h: Altura del nivel respecto al inmediato inferior

■ Distorsión:

Absoluta: Diferencia entre los desplazamientos de un nivel y los del inmediatamente inferior

Relativa: Relación entre la altura y la distorsión absoluta

■ Origen:

G: Sólo gravitatorias

GV: Gravitatorias + viento

■ Nota:

Las diferentes normas suelen limitar el valor de la distorsión relativa entre plantas y de la distorsión total (desplome) del edificio.

El valor absoluto se utilizará para definir las juntas sísmicas. El valor relativo suele limitarse en función de la altura de la planta 'h'. Se comprueba el valor 'Total' tomando en ese caso como valor de 'h' la altura total.

| Situaciones persistentes o transitorias | | | | | | | | | |
|---|--------|----------|-------|--------------|----------|--------|--------------|----------|--------|
| Pilar | Planta | Cota (m) | h (m) | Distorsión X | | | Distorsión Y | | |
| | | | | Absoluta (m) | Relativa | Origen | Absoluta (m) | Relativa | Origen |
| PS-01 | +6.15 | 2.85 | 2.85 | 0.0002 | ---- | GV | 0.0001 | ---- | GV |
| | +3.20 | 0.00 | | | | | | | |
| | Total | | 2.85 | 0.0002 | ---- | GV | 0.0001 | ---- | GV |
| PS-02 | +6.15 | 2.85 | 2.85 | 0.0002 | ---- | GV | 0.0001 | ---- | GV |
| | +3.20 | 0.00 | | | | | | | |
| | Total | | 2.85 | 0.0002 | ---- | GV | 0.0001 | ---- | GV |
| PP-03 | +6.15 | 3.20 | 3.20 | 0.0002 | ---- | GV | 0.0001 | ---- | GV |
| | +3.20 | 0.00 | | | | | | | |
| | Total | | 3.20 | 0.0002 | ---- | GV | 0.0001 | ---- | GV |
| PR-1 | +6.15 | 3.20 | 3.20 | 0.0002 | ---- | GV | 0.0001 | ---- | GV |
| | +3.20 | 0.00 | | | | | | | |
| | Total | | 3.20 | 0.0002 | ---- | GV | 0.0001 | ---- | GV |
| PR-2 | +6.15 | 3.20 | 3.20 | 0.0002 | ---- | GV | 0.0001 | ---- | GV |
| | +3.20 | 0.00 | | | | | | | |
| | Total | | 3.20 | 0.0002 | ---- | GV | 0.0001 | ---- | GV |

| Situaciones sísmicas ⁽¹⁾ | | | | | | | | | |
|-------------------------------------|--------|----------|-------|--------------|----------|--------|--------------|----------|--------|
| Pilar | Planta | Cota (m) | h (m) | Distorsión X | | | Distorsión Y | | |
| | | | | Absoluta (m) | Relativa | Origen | Absoluta (m) | Relativa | Origen |
| PS-01 | +6.15 | 2.85 | 2.85 | 0.0010 | h / 2850 | ---- | 0.0013 | h / 2193 | ---- |
| | +3.20 | 0.00 | | | | | | | |
| | Total | | 2.85 | 0.0010 | h / 2850 | ---- | 0.0013 | h / 2193 | ---- |
| PS-02 | +6.15 | 2.85 | 2.85 | 0.0010 | h / 2850 | ---- | 0.0013 | h / 2193 | ---- |
| | +3.20 | 0.00 | | | | | | | |
| | Total | | 2.85 | 0.0010 | h / 2850 | ---- | 0.0013 | h / 2193 | ---- |
| PP-21 | +6.15 | 3.20 | 3.20 | 0.0010 | h / 3200 | ---- | 0.0013 | h / 2462 | ---- |
| | +3.20 | 0.00 | | | | | | | |
| | Total | | 3.20 | 0.0010 | h / 3200 | ---- | 0.0013 | h / 2462 | ---- |
| PR-1 | +6.15 | 3.20 | 3.20 | 0.0010 | h / 3200 | ---- | 0.0013 | h / 2462 | ---- |
| | +3.20 | 0.00 | | | | | | | |
| | Total | | 3.20 | 0.0010 | h / 3200 | ---- | 0.0013 | h / 2462 | ---- |
| PR-2 | +6.15 | 3.20 | 3.20 | 0.0010 | h / 3200 | ---- | 0.0013 | h / 2462 | ---- |
| | +3.20 | 0.00 | | | | | | | |
| | Total | | 3.20 | 0.0010 | h / 3200 | ---- | 0.0013 | h / 2462 | ---- |

| Situaciones sísmicas ⁽¹⁾ | | | | | | | | | |
|--|--------|----------|-------|--------------|----------|--------|--------------|----------|--------|
| Pilar | Planta | Cota (m) | h (m) | Distorsión X | | | Distorsión Y | | |
| | | | | Absoluta (m) | Relativa | Origen | Absoluta (m) | Relativa | Origen |
| | Total | | 3.20 | 0.0010 | h / 3200 | ---- | 0.0013 | h / 2462 | ---- |
| Notas: ⁽¹⁾ Las distorsiones están mayoradas por la ductilidad. | | | | | | | | | |

Los valores indicados tienen en cuenta los factores de desplazamientos definidos para los efectos multiplicadores de segundo orden.

Valores máximos

| Desplome local máximo de los pilares (δ / h) | | | | |
|---|---|-------------|-------------------------------------|-------------|
| Planta | Situaciones persistentes o transitorias | | Situaciones sísmicas ⁽¹⁾ | |
| | Dirección X | Dirección Y | Dirección X | Dirección Y |
| +6.15 | ---- | ---- | 1 / 2850 | 1 / 2193 |
| Notas: ⁽¹⁾ Los desplazamientos están mayorados por la ductilidad. | | | | |

| Desplome total máximo de los pilares (Δ / H) | | | |
|---|-------------|-------------------------------------|-------------|
| Situaciones persistentes o transitorias | | Situaciones sísmicas ⁽¹⁾ | |
| Dirección X | Dirección Y | Dirección X | Dirección Y |
| ---- | ---- | 1 / 2850 | 1 / 2193 |
| Notas: ⁽¹⁾ Los desplazamientos están mayorados por la ductilidad. | | | |

Los valores indicados tienen en cuenta los factores de desplazamientos definidos para los efectos multiplicadores de segundo orden.



1.- ESFUERZOS DE PILARES, PANTALLAS Y MUROS POR HIPÓTESIS

■ Tramo: Nivel inicial / nivel final del tramo entre plantas.

■ Nota:

Los esfuerzos están referidos a ejes locales del pilar.

| Sopor te | Plan ta | Dimensi ón (cm) | Tramo (m) | Hipótesis | Base | | | | | | Cabeza | | | | | |
|-------------|------------|-----------------------|---------------|-------------------|-----------|------------------|------------------|------------|------------|-----------------|-----------|------------------|------------------|------------|------------|-----------------|
| | | | | | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) |
| PS-1 | +6.1 5 | 35x35 | 0.00/2. 75 | Peso propio | | | | | | | | | | | | |
| | | | | Cargas muertas | | | | | | | | | | | | |
| | | | | Sobrecarga de uso | | | | | | | | | | | | |
| | | | | Viento +X exc. + | 239. | | | | | | 230. | | | | | |
| | | | | Viento +X exc. - | 2 | -16.0 | -3.7 | -7.9 | -1.4 | 0.0 | 9 | 5.8 | 0.2 | -7.9 | -1.4 | 0.0 |
| | | | | Viento -X exc. + | 64.0 | 2.7 | 2.8 | 1.4 | 1.1 | -0.0 | 64.0 | -1.2 | -0.2 | 1.4 | 1.1 | -0.0 |
| | | | | Viento -X exc. - | 222. | -6.0 | -1.2 | -3.0 | -0.5 | 0.0 | 222. | 2.1 | 0.2 | -3.0 | -0.5 | 0.0 |
| | | | | Viento -X exc. + | 2 | -0.1 | 0.0 | -0.1 | 0.0 | -0.0 | 2 | 0.1 | -0.0 | -0.1 | 0.0 | -0.0 |
| | | | | Viento -X exc. - | -0.1 | -0.1 | 0.0 | -0.1 | 0.0 | -0.0 | -0.1 | 0.1 | -0.0 | -0.1 | 0.0 | -0.0 |
| | | | | Viento +Y exc. + | 0.1 | 0.1 | -0.0 | 0.1 | -0.0 | 0.0 | -0.1 | -0.1 | 0.0 | 0.1 | -0.0 | 0.0 |
| | | | | Viento +Y exc. - | 0.1 | -0.1 | -0.1 | -0.0 | -0.1 | 0.0 | 0.1 | 0.0 | 0.0 | -0.0 | -0.1 | 0.0 |
| | | | | Viento -Y exc. + | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | -0.0 | 0.1 | -0.0 | -0.0 | 0.0 | 0.1 | -0.0 |
| | | | | Viento -Y exc. - | -0.1 | -0.8 | -1.1 | -0.4 | -0.5 | -0.0 | -0.1 | 0.3 | 0.2 | -0.4 | -0.5 | -0.0 |
| | | | | Sismo X Modo 1 | -1.8 | 0.0 | -0.0 | 0.0 | -0.0 | 0.0 | -1.8 | -0.0 | 0.0 | 0.0 | -0.0 | 0.0 |
| | | | | Sismo X Modo 2 | -0.0 | -3.1 | -4.1 | -1.5 | -1.7 | -0.0 | -0.0 | 1.1 | 0.6 | -1.5 | -1.7 | -0.0 |
| | | | | Sismo X Modo 3 | 2.6 | -0.9 | 0.3 | -0.4 | 0.1 | -0.0 | 2.6 | 0.3 | -0.0 | -0.4 | 0.1 | -0.0 |
| | | | | Sismo Y Modo 1 | -0.5 | 0.0 | -0.0 | 0.0 | -0.0 | 0.0 | -0.5 | -0.0 | 0.0 | 0.0 | -0.0 | 0.0 |
| | | | | Sismo Y Modo 2 | -0.0 | | | | | | -0.0 | | | | | |
| | | | | Sismo Y Modo 3 | | | | | | | | | | | | |



Esfuerzos y armados de pilares, pantallas y muros

SALIDA CÁLCULO

Fecha: 29/11/15

| Sopor te | Plan ta | Dimensi ón (cm) | Tramo (m) | Hipótesis | Base | | | | | | Cabeza | | | | | |
|-------------|------------|-----------------------|---------------|-------------------|-----------|------------------|------------------|------------|------------|-----------------|-----------|------------------|------------------|------------|------------|-----------------|
| | | | | | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) |
| PS-2 | +6.1 5 | 35x35 | 0.00/2. 75 | Peso propio | | | | | | | | | | | | |
| | | | | Cargas muertas | | | | | | | | | | | | |
| | | | | Sobrecarga de uso | | | | | | | | | | | | |
| | | | | Viento +X | | | | | | | | | | | | |
| | | | | exc. + | 244. | | | | | | 236. | | | | | |
| | | | | Viento +X | 8 | 12.3 | -6.0 | 6.0 | -2.8 | 0.0 | 6 | -4.2 | 1.9 | 6.0 | -2.8 | 0.0 |
| | | | | exc. - | 55.8 | 1.1 | 3.0 | 0.3 | 1.1 | -0.0 | 55.8 | 0.3 | 0.0 | 0.3 | 1.1 | -0.0 |
| | | | | Viento -X | 221. | 5.1 | -2.5 | 2.3 | -1.5 | 0.0 | 221. | -1.2 | 1.5 | 2.3 | -1.5 | 0.0 |
| | | | | exc. + | 7 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 7 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 |
| | | | | Viento -X | 0.3 | -0.0 | -0.0 | -0.0 | -0.0 | -0.0 | 0.3 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 |
| | | | | exc. - | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 |
| | | | | Viento +Y | -0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.3 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 |
| | | | | exc. + | -0.3 | 0.1 | -0.2 | 0.0 | -0.1 | 0.0 | -0.3 | -0.0 | 0.0 | 0.0 | -0.1 | 0.0 |
| | | | | Viento +Y | 0.1 | 0.1 | -0.2 | 0.0 | -0.1 | 0.0 | 0.1 | -0.0 | 0.0 | 0.0 | -0.1 | 0.0 |
| | | | | exc. - | 0.1 | -0.1 | 0.2 | -0.0 | 0.1 | -0.0 | 0.1 | 0.0 | -0.0 | -0.0 | 0.1 | -0.0 |
| | | | | Viento -Y | -0.1 | -0.1 | 0.2 | -0.0 | 0.1 | -0.0 | -0.1 | 0.0 | -0.0 | -0.0 | 0.1 | -0.0 |
| | | | | exc. + | -0.1 | 0.4 | -1.2 | 0.2 | -0.5 | -0.0 | -0.1 | -0.2 | 0.2 | 0.2 | -0.5 | -0.0 |
| | | | | Viento -Y exc. - | 1.6 | -1.1 | 0.4 | -0.4 | 0.2 | -0.0 | 1.6 | 0.1 | -0.1 | -0.4 | 0.2 | -0.0 |
| | | | | Sismo X Modo 1 | 6.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.7 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 |
| | | | | Sismo X Modo 2 | 0.0 | 1.7 | -4.4 | 0.9 | -1.8 | -0.0 | 0.0 | -0.7 | 0.6 | 0.9 | -1.8 | -0.0 |
| | | | | Sismo X Modo 3 | 6.1 | -0.3 | 0.1 | -0.1 | 0.0 | -0.0 | 6.1 | 0.0 | -0.0 | -0.1 | 0.0 | -0.0 |
| | | | | Sismo Y Modo 1 | 1.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 | -0.0 | -0.0 | 0.0 | 0.0 | 0.0 |
| | | | | Sismo Y Modo 2 | 0.0 | | | | | | 0.0 | | | | | |
| | | | | Sismo Y Modo 3 | | | | | | | | | | | | |
| PP-21 | +6.1 5 | 75x75 | 0.00/2. 75 | Peso propio | | | | | | | | | | | | |
| | | | | Cargas muertas | | | | | | | | | | | | |
| | | | | Sobrecarga de uso | | | | | | | | | | | | |
| | | | | Viento +X | | | | | | | | | | | | |
| | | | | exc. + | 206. | | 72.6 | 11.0 | | | 168. | | | 11.0 | | |
| | | | | Viento +X | 2 | -21.0 | 94.7 | 24.7 | 73.7 | 0.0 | 3 | -51.3 | 130. | 24.7 | 73.7 | 0.0 |
| | | | | exc. - | 44.0 | 54.2 | 104. | 25.6 | 48.4 | -0.0 | 44.0 | -13.6 | 1 | 25.6 | 48.4 | -0.0 |
| | | | | Viento -X | 111. | 24.7 | 6 | -0.9 | 71.5 | 0.0 | 111. | -45.6 | -38.3 | -0.9 | 71.5 | 0.0 |
| | | | | exc. + | 5 | -2.0 | -1.4 | -0.9 | -0.6 | -0.0 | 5 | 0.3 | -92.1 | -0.9 | -0.6 | -0.0 |
| | | | | Viento -X | -0.4 | -2.1 | -1.3 | 0.9 | -0.6 | -0.0 | -0.4 | 0.3 | 0.3 | 0.9 | -0.6 | -0.0 |
| | | | | exc. - | -0.4 | 2.0 | 1.4 | 0.9 | 0.6 | 0.0 | -0.4 | -0.3 | 0.3 | 0.9 | 0.6 | 0.0 |
| | | | | Viento +Y | 0.4 | 2.1 | 1.3 | -0.6 | 0.6 | 0.0 | 0.4 | -0.3 | -0.3 | -0.6 | 0.6 | 0.0 |
| | | | | exc. + | 0.4 | -1.7 | -3.5 | -0.6 | -1.4 | 0.0 | 0.4 | -0.0 | -0.3 | -0.6 | -1.4 | 0.0 |
| | | | | Viento +Y | -0.5 | -1.6 | 3.5 | 0.6 | -1.4 | 0.0 | -0.5 | -0.0 | 0.4 | 0.6 | -1.4 | 0.0 |
| | | | | exc. - | -0.5 | 1.7 | 3.5 | 0.6 | 1.4 | -0.0 | -0.5 | 0.0 | 0.5 | 0.6 | 1.4 | -0.0 |
| | | | | Viento -Y | 0.5 | 1.6 | 3.5 | -6.4 | 1.4 | -0.0 | 0.5 | 0.0 | -0.4 | -6.4 | 1.4 | -0.0 |
| | | | | exc. + | 0.5 | -17.3 | -29.6 | - | -12.3 | -0.0 | 0.5 | 0.4 | -0.5 | - | -12.3 | -0.0 |
| | | | | Viento -Y exc. - | -4.6 | -42.3 | -16.5 | 18.3 | -8.4 | -0.0 | -4.6 | 8.0 | 4.2 | 18.3 | -8.4 | -0.0 |
| | | | | Sismo X Modo 1 | -7.2 | 0.0 | - | 0.0 | -0.0 | 0.0 | -7.2 | -0.0 | 6.6 | 0.0 | -0.0 | 0.0 |
| | | | | Sismo X Modo 2 | 0.0 | -65.2 | 111. | - | -46.2 | -0.0 | 0.0 | 1.4 | 0.0 | - | -46.2 | -0.0 |
| | | | | Sismo X Modo 3 | -17.3 | -11.4 | 4 | 24.2 | -2.3 | -0.0 | -17.3 | 2.2 | 15.7 | 24.2 | -2.3 | -0.0 |
| | | | | Sismo Y Modo 1 | -1.9 | 0.1 | -4.5 | -4.9 | -0.0 | 0.0 | -1.9 | -0.0 | 1.8 | -4.9 | -0.0 | 0.0 |
| | | | | Sismo Y Modo 2 | 0.0 | | -0.0 | 0.0 | | | 0.0 | | 0.0 | 0.0 | | |
| | | | | Sismo Y Modo 3 | | | | | | | | | | | | |



Esfuerzos y armados de pilares, pantallas y muros

SALIDA CÁLCULO

Fecha: 29/11/15

| Sopor te | Plan ta | Dimensi ón (cm) | Tramo (m) | Hipótesis | Base | | | | | | Cabeza | | | | | |
|-------------|------------|-----------------------|---------------|-------------------|-----------|------------------|------------------|------------|------------|-----------------|-----------|------------------|------------------|------------|------------|-----------------|
| | | | | | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) |
| PR-1 | +6.1 5 | 60x40 | 0.00/2. 75 | Peso propio | | | | | | | | | | | | |
| | | | | Cargas muertas | | | | | | | | | | | | |
| | | | | Sobrecarga de uso | | | | | | | | | | | | |
| | | | | Viento +X exc. + | 262. | | | - | | | 246. | | | - | | |
| | | | | Viento +X exc. - | 6 | -42.1 | 28.2 | 26.8 | 22.7 | 0.0 | 5 | 31.7 | -34.3 | 26.8 | 22.7 | 0.0 |
| | | | | Viento -X exc. + | 90.0 | 21.7 | 22.0 | 9.7 | 12.7 | -0.0 | 90.0 | -5.0 | -12.8 | 9.7 | 12.7 | -0.0 |
| | | | | Viento -X exc. - | 170. | -14.2 | 26.7 | - | 19.3 | 0.0 | 170. | 15.0 | -26.3 | - | 19.3 | 0.0 |
| | | | | Viento +Y exc. + | 7 | -1.6 | 0.1 | 10.6 | 0.1 | -0.0 | 7 | 0.7 | -0.1 | 10.6 | 0.1 | -0.0 |
| | | | | Viento +Y exc. - | -1.0 | -1.6 | 0.1 | -0.8 | 0.1 | -0.0 | -1.0 | 0.7 | -0.1 | -0.8 | 0.1 | -0.0 |
| | | | | Viento -Y exc. + | -1.0 | 1.6 | -0.1 | -0.8 | -0.1 | 0.0 | -1.0 | -0.7 | 0.1 | -0.8 | -0.1 | 0.0 |
| | | | | Viento -Y exc. - | 1.0 | 1.6 | -0.1 | 0.8 | -0.1 | 0.0 | 1.0 | -0.7 | 0.1 | 0.8 | -0.1 | 0.0 |
| | | | | Viento +Y exc. + | 1.0 | -0.0 | -0.9 | 0.8 | -0.5 | 0.0 | 1.0 | -0.0 | 0.4 | 0.8 | -0.5 | 0.0 |
| | | | | Viento +Y exc. - | -1.0 | -0.0 | -0.9 | -0.0 | -0.5 | 0.0 | -1.0 | -0.0 | 0.4 | -0.0 | -0.5 | 0.0 |
| | | | | Viento -Y exc. + | -0.9 | 0.0 | 0.9 | 0.0 | 0.5 | -0.0 | -0.9 | 0.0 | -0.4 | 0.0 | 0.5 | -0.0 |
| | | | | Viento -Y exc. - | 1.0 | 0.0 | 0.9 | 0.0 | 0.5 | -0.0 | 1.0 | 0.0 | -0.4 | 0.0 | 0.5 | -0.0 |
| | | | | Viento -Y exc. - | 0.9 | -3.9 | -6.5 | -0.0 | -3.3 | -0.0 | 0.9 | 1.3 | 2.6 | -0.0 | -3.3 | -0.0 |
| | | | | Sismo X Modo 1 | -9.7 | -39.7 | 8.3 | -1.9 | 4.6 | -0.0 | -9.7 | 16.5 | -4.3 | -1.9 | 4.6 | -0.0 |
| | | | | Sismo X Modo 2 | -20.5 | 0.0 | 0.0 | - | 0.0 | 0.0 | -20.5 | -0.0 | -0.0 | - | 0.0 | 0.0 |
| | | | | Sismo X Modo 3 | 0.0 | -14.5 | -24.4 | 20.4 | -12.4 | -0.0 | 0.0 | 4.8 | 9.7 | 20.4 | -12.4 | -0.0 |
| | | | | Sismo Y Modo 1 | -36.5 | -10.7 | 2.3 | 0.0 | 1.2 | -0.0 | -36.5 | 4.5 | -1.2 | 0.0 | 1.2 | -0.0 |
| | | | | Sismo Y Modo 2 | -5.5 | 0.1 | 0.0 | -7.0 | 0.0 | 0.0 | -5.5 | -0.0 | -0.0 | -7.0 | 0.0 | 0.0 |
| | | | | Sismo Y Modo 3 | 0.0 | | | 0.0 | | | 0.0 | | | 0.0 | | |
| PR-2 | +6.1 5 | 60x40 | 0.00/2. 75 | Peso propio | | | | | | | | | | | | |
| | | | | Cargas muertas | | | | | | | | | | | | |
| | | | | Sobrecarga de uso | | | | | | | | | | | | |
| | | | | Viento +X exc. + | | | | | | | | | | | | |
| | | | | Viento +X exc. - | -43.8 | -9.4 | 17.5 | -3.5 | 15.1 | 0.0 | -60.0 | 0.2 | -24.1 | -3.5 | 15.1 | 0.0 |
| | | | | Viento -X exc. + | -42.3 | 29.9 | 16.4 | 15.5 | 8.6 | -0.0 | -42.3 | -12.9 | -7.4 | 15.5 | 8.6 | -0.0 |
| | | | | Viento -X exc. - | -48.2 | 6.4 | 17.6 | 4.1 | 12.8 | 0.0 | -48.2 | -4.8 | -17.5 | 4.1 | 12.8 | 0.0 |
| | | | | Viento +Y exc. + | 1.3 | -1.6 | 0.1 | -0.8 | 0.1 | -0.0 | 1.3 | 0.6 | -0.1 | -0.8 | 0.1 | -0.0 |
| | | | | Viento +Y exc. - | 1.3 | -1.6 | 0.1 | -0.8 | 0.1 | -0.0 | 1.3 | 0.6 | -0.1 | -0.8 | 0.1 | -0.0 |
| | | | | Viento -Y exc. + | -1.3 | 1.6 | -0.1 | 0.8 | -0.1 | 0.0 | -1.3 | -0.6 | 0.1 | 0.8 | -0.1 | 0.0 |
| | | | | Viento -Y exc. - | -1.3 | 1.6 | -0.1 | 0.8 | -0.1 | 0.0 | -1.3 | -0.6 | 0.1 | 0.8 | -0.1 | 0.0 |
| | | | | Viento +Y exc. + | 0.2 | -0.1 | -0.7 | -0.1 | -0.3 | 0.0 | 0.2 | 0.1 | 0.2 | -0.1 | -0.3 | 0.0 |
| | | | | Viento +Y exc. - | 0.2 | -0.1 | -0.7 | -0.1 | -0.3 | 0.0 | 0.2 | 0.1 | 0.2 | -0.1 | -0.3 | 0.0 |
| | | | | Viento -Y exc. + | -0.2 | 0.1 | 0.7 | 0.1 | 0.3 | -0.0 | -0.2 | -0.1 | -0.2 | 0.1 | 0.3 | -0.0 |
| | | | | Viento -Y exc. - | -0.2 | 0.1 | 0.7 | 0.1 | 0.3 | -0.0 | -0.2 | -0.1 | -0.2 | 0.1 | 0.3 | -0.0 |
| | | | | Viento -Y exc. - | 4.6 | -4.5 | -5.1 | -2.3 | -2.3 | -0.0 | 4.6 | 1.9 | 1.2 | -2.3 | -2.3 | -0.0 |
| | | | | Sismo X Modo 1 | 30.5 | -38.2 | 6.7 | - | 3.5 | -0.0 | 30.5 | 15.1 | -2.8 | - | 3.5 | -0.0 |
| | | | | Sismo X Modo 2 | -0.0 | 0.0 | 0.0 | 19.4 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | 19.4 | 0.0 | 0.0 |
| | | | | Sismo X Modo 3 | 17.3 | -16.8 | -19.2 | 0.0 | -8.7 | -0.0 | 17.3 | 7.1 | 4.7 | 0.0 | -8.7 | -0.0 |
| | | | | Sismo Y Modo 1 | 8.2 | -10.3 | 1.8 | -8.7 | 0.9 | -0.0 | 8.2 | 4.1 | -0.8 | -8.7 | 0.9 | -0.0 |
| | | | | Sismo Y Modo 2 | -0.0 | 0.1 | 0.0 | -5.2 | 0.0 | 0.0 | -0.0 | -0.0 | -0.0 | -5.2 | 0.0 | 0.0 |
| | | | | Sismo Y Modo 3 | | | | 0.0 | | | | | | 0.0 | | |



Esfuerzos y armados de pilares, pantallas y muros

SALIDA CÁLCULO

Fecha: 29/11/15

| Sopor te | Plan ta | Dimensi ón (cm) | Tramo (m) | Hipótesis | Base | | | | | | Cabeza | | | | | |
|-------------|------------|-----------------------|---------------|-------------------|-----------|------------------|------------------|------------|------------|-----------------|-----------|------------------|------------------|------------|------------|-----------------|
| | | | | | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) |
| M1 | +9.6 0 | 40.0 | 2.95/6. 40 | Peso propio | | | | | | | | | | | | |
| | | | | Cargas muertas | | | | | | | | | | | | |
| | | | | Sobrecarga de uso | | 247.4 | | 75.8 | | | | 105.6 | | 87.9 | | |
| | | | | Viento +X | 1569.9 | - | - | 183.4 | - | - | | 6 | | - | - | - |
| | | | | exc. + | 342.3 | 413.0 | 338.9 | 81.2 | 367.3 | 259.2 | 1056.5 | 43.9 | 1083.0 | 121.2 | 473.0 | - |
| | | | | Viento +X | | | | | | | | | | | | |
| | | | | exc. - | 1326.4 | - | -11.8 | 26.4 | -60.6 | -31.6 | 280.1 | -8.2 | 271.0 | 87.8 | - | 510.6 |
| | | | | Viento -X | | | | | | | | | | | | |
| | | | | exc. + | 2.9 | 241.0 | 418.7 | - | - | - | 1337.3 | -9.6 | 1416.9 | 26.0 | 102.8 | -68.1 |
| | | | | Viento -X | | | | | | | | | | | | |
| | | | | exc. - | 2.9 | 42.4 | 3.2 | 26.4 | 461.1 | 258.3 | 107.9 | -7.1 | -0.5 | 29.0 | 8 | - |
| | | | | Viento +Y | -2.9 | 45.2 | 3.4 | 29.5 | 2.3 | -3.4 | 0.3 | -5.8 | -0.6 | 26.0 | 607.7 | 673.7 |
| | | | | exc. + | -2.9 | -42.4 | -3.2 | -0.4 | 2.6 | -4.2 | 0.2 | 7.1 | 0.5 | - | 1 | 0.1 |
| | | | | Viento +Y | -10.3 | -45.2 | -3.4 | -3.3 | -2.3 | 3.4 | -0.3 | 5.8 | 0.6 | -0.4 | 2.2 | -0.1 |
| | | | | exc. - | -10.3 | -6.8 | -1.3 | 0.4 | -2.6 | 4.2 | -0.2 | - | -0.9 | -3.2 | -2.0 | -0.1 |
| | | | | Viento -Y | 10.3 | -9.5 | -1.5 | 3.3 | -0.7 | -0.5 | -1.7 | - | -0.8 | 0.4 | -2.2 | -1.3 |
| | | | | exc. + | 10.3 | 6.8 | 1.3 | 100.3 | -0.9 | 0.3 | 107.1 | 0.9 | 3.2 | -0.1 | -1.2 | |
| | | | | Viento -Y exc. - | -86.1 | 9.5 | 1.5 | 3 | 0.7 | 0.5 | 1.7 | 0 | 0.9 | 99.8 | -0.3 | 1.3 |
| | | | | Sismo X Modo 1 | 130.0 | 73.8 | 2.7 | 872.1 | 0.9 | -0.3 | -15.3 | 231.3 | -11.5 | 867.2 | 0.1 | 1.2 |
| | | | | Sismo X Modo 2 | -0.0 | 1586.7 | 128.1 | 2 | 5.7 | -9.6 | 17.6 | 3 | -12.7 | 2 | 0.3 | -11.2 |
| | | | | Sismo X Modo 3 | 324.0 | 277.8 | -0.0 | 377.7 | 21.3 | -36.0 | -57.5 | - | -43.3 | 8 | -0.0 | -42.0 |
| | | | | Sismo Y Modo 1 | 35.1 | 429.0 | -1.0 | 8 | -1.3 | 1.9 | 0.3 | 8 | 0.4 | 234.5 | 31.1 | 2.5 |
| | | | | Sismo Y Modo 2 | -0.2 | -15.0 | | | | | | -62.5 | - | 5 | 18.3 | -0.1 |
| | | | | Sismo Y Modo 3 | | | | 17.7 | | | | 7.7 | | 17.6 | | |
| | +6.1 5 | 40.0 | 0.00/2. 95 | Peso propio | | | | | | | | | | | | |
| | | | | Cargas muertas | | | | | | | | | | | | |
| | | | | Sobrecarga de uso | 2548.3 | 538.0 | | 514.4 | | 386.5 | | - | | 500.5 | | |
| | | | | Viento +X | 637.8 | - | 346.6 | 961.3 | 175.9 | 432.8 | 1938.0 | 390.1 | - | 874.5 | 267.9 | - |
| | | | | exc. + | 1750.1 | 2162.1 | 134.8 | 397.6 | 373.9 | 387.8 | 460.3 | 1 | 293.4 | 393.5 | - | 159.3 |
| | | | | Viento +X | | | | | | | | | | | | |
| | | | | exc. - | 10.2 | 720.2 | 66.1 | 53.8 | 108.8 | -16.0 | 1673.2 | 1 | 75.1 | 327.3 | - | 52.4 |
| | | | | Viento -X | | | | | | | | | | | | |
| | | | | exc. + | 10.2 | 91.6 | 9.6 | 61.0 | 108.8 | -15.3 | 880.3 | 1 | 373.1 | 63.5 | 220.7 | 162.7 |
| | | | | Viento -X | -10.2 | 93.0 | 9.7 | - | 6.3 | 16.0 | 3.7 | 2 | - | - | 0 | -1.3 |
| | | | | exc. - | -10.2 | -91.6 | -9.6 | 53.8 | 6.9 | 15.3 | -3.7 | 25.0 | 1.8 | 56.3 | 5.3 | -0.9 |
| | | | | Viento +Y | -29.0 | -93.0 | -9.7 | - | -6.3 | -18.5 | -3.6 | 24.7 | 1.8 | - | 5.9 | 1.3 |
| | | | | exc. + | -28.9 | 26.2 | 11.8 | 6.1 | -6.9 | -19.2 | -12.0 | -25.0 | -1.8 | 63.5 | -5.3 | 0.9 |
| | | | | Viento +Y | 29.0 | 24.7 | 11.7 | -1.0 | 8.3 | 18.5 | -11.9 | -24.7 | -4.2 | 8.0 | -5.9 | -5.0 |
| | | | | exc. - | 28.9 | -26.2 | -11.8 | -6.1 | 7.7 | 19.2 | -12.0 | -8.8 | -4.1 | 0.8 | 4.5 | -5.4 |
| | | | | Viento -Y | - | -24.7 | -11.7 | -6.1 | -8.3 | - | 11.9 | -8.4 | -4.1 | -8.0 | 4.0 | 5.0 |
| | | | | exc. + | 201.1 | 404.5 | 111.1 | 153.8 | -7.7 | 177.7 | -95.6 | 8.8 | 4.2 | -0.8 | -4.5 | 5.4 |
| | | | | Viento -Y exc. - | 1 | 5 | 1 | 153.8 | 75.6 | - | 157.4 | 8.4 | 4.1 | 173.7 | -4.0 | -42.1 |
| | | | | Sismo X Modo 1 | 412.1 | 2135.9 | 179.6 | 895.7 | 80.5 | 326.9 | 15.9 | 113.0 | -23.5 | 7 | 44.0 | -12.1 |
| | | | | Sismo X Modo 2 | 0.0 | -0.1 | -0.0 | - | 284.4 | -0.0 | 1241.8 | 0 | - | 5 | -0.0 | - |
| | | | | Sismo X Modo 3 | 757.0 | 1522.6 | 418.0 | 579.1 | 21.8 | - | 359.7 | -0.1 | -0.0 | 165.7 | 158.4 | |
| | | | | Sismo Y Modo 1 | 111.4 | 577.5 | 48.6 | 242.2 | -1.5 | 669.0 | 42.6 | 335.8 | -0.3 | 256.5 | -1.6 | -3.3 |
| | | | | Sismo Y Modo 2 | 0.2 | -4.6 | | | | -88.4 | -0.1 | -6.1 | | - | | -0.6 |
| | | | | Sismo Y Modo 3 | | | | 17.3 | | -1.7 | | | | 17.5 | | |



Esfuerzos y armados de pilares, pantallas y muros

SALIDA CÁLCULO

Fecha: 29/11/15

| Sopor te | Plan ta | Dimensi ón (cm) | Tramo (m) | Hipótesis | Base | | | | | | Cabeza | | | | | |
|-------------|------------|-----------------------|---------------|-------------------|-----------|------------------|------------------|------------|------------|-----------------|-----------|------------------|------------------|------------|------------|-----------------|
| | | | | | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) |
| M2 | +9.6 0 | 40.0 | 2.95/6. 40 | Peso propio | | | | | | | | | | | | |
| | | | | Cargas muertas | | | | | | | | | | | | |
| | | | | Sobrecarga de uso | | | | | | | | | | | | |
| | | | | Viento +X | | | 167. | | 121. | | | | 130. | | - | |
| | | | | exc. + | 597.9 | 198.7 | 6 | | 9 | | | | 5 | | 143.2 | |
| | | | | Viento +X | | | 185. | 62.6 | - | 3.9 | 142. | | 106. | | -67.9 | |
| | | | | exc. - | 13.4 | 7 | 0 | - | 178. | - | 1 | -7.3 | 89.1 | 58.0 | - | -5.4 |
| | | | | Viento -X | | | 34.2 | 759. | 2 | 217. | 20.4 | -6.5 | 2.7 | 155. | 124. | 70.9 |
| | | | | exc. + | 260.7 | 512.7 | -4.0 | 1 | -98.2 | 5 | 134. | -5.2 | 0.9 | 35.0 | 3 | -2.7 |
| | | | | Viento -X | | | -5.4 | 17.4 | -5.0 | -6.7 | 9 | 0.1 | -2.7 | 0.2 | -5.1 | 0.1 |
| | | | | exc. - | 4.7 | 92.3 | 4.0 | 0.3 | -3.0 | -1.1 | 1.1 | 0.1 | -0.9 | 0.2 | -3.1 | 0.0 |
| | | | | Viento +Y | | | 5.4 | 0.3 | 5.0 | -1.4 | 1.1 | -0.1 | -0.9 | 0.2 | 5.1 | -0.1 |
| | | | | exc. + | -4.7 | 1.2 | 8.1 | -0.3 | 3.0 | 1.1 | -1.1 | -0.1 | -15.7 | -0.2 | 3.1 | -0.0 |
| | | | | Viento +Y | | | 9.5 | -0.3 | 22.2 | 1.4 | -1.1 | 0.0 | -14.0 | -0.2 | 22.1 | -1.4 |
| | | | | exc. - | 1.6 | -1.2 | -8.1 | 0.1 | 20.3 | -2.4 | 0.4 | 0.0 | 15.7 | 0.2 | 20.2 | -1.3 |
| | | | | Viento -Y | | | -9.5 | 0.1 | -22.2 | -2.1 | 0.4 | -0.0 | 14.0 | 0.2 | -22.1 | 1.4 |
| | | | | exc. + | -1.6 | 0.7 | 152. | -0.1 | -20.3 | 2.4 | -0.4 | -0.0 | - | -0.2 | -20.2 | 1.3 |
| | | | | Viento -Y exc.- | | | 9 | -0.1 | 232. | 2.1 | -0.4 | 0.5 | 154. | -0.2 | 231. | -12.6 |
| | | | | Sismo X Modo 1 | 153.5 | 9.0 | - | 1.9 | 0 | -19.6 | 6.7 | 3.7 | 196. | 6.0 | 3 | 13.4 |
| | | | | Sismo X Modo 2 | | 35.0 | 269. | 11.8 | - | 17.6 | 37.6 | 0.0 | 8 | 0.0 | - | 0.0 |
| | | | | Sismo X Modo 3 | 112.8 | 0.0 | 0.1 | 7.0 | 6 | -73.7 | 25.1 | 1.0 | 0.2 | 6.9 | 4 | 3.6 |
| | | | | Sismo Y Modo 1 | 8 | 34.0 | 575. | 3.2 | -0.2 | 4.7 | 10.2 | 0.0 | - | 1.6 | -0.1 | 0.5 |
| | | | | Sismo Y Modo 2 | 41.5 | 9.5 | 4 | 0.0 | 873. | 0.6 | -0.0 | | 581. | 0.0 | 870. | |
| | | | | Sismo Y Modo 3 | 0.0 | 0.0 | -72.9 | | 3 | | | | 7 | | 7 | |
| | | | | | | | 8.9 | | -84.8 | | | | 53.2 | | -85.0 | |
| | | | | | | | | | -9.1 | | | | 9.4 | | -9.0 | |
| | +6.1 5 | 40.0 | 0.00/2. 95 | Peso propio | | | | | | | | | | | | |
| | | | | Cargas muertas | | | | | | | | | | | | |
| | | | | Sobrecarga de uso | | | | | | | | | | | | |
| | | | | Viento +X | | | | 432. | - | | | | | | | |
| | | | | exc. + | | 923.2 | 740. | 8 | 111.6 | 383. | 747. | 173. | 285. | 335.2 | 184.6 | |
| | | | | Viento +X | | | | | | | | | | | | |
| | | | | exc. - | 1169.4 | 152.1 | 2 | 959.9 | 799.7 | 1 | 4 | 5 | 2 | 930.4 | 707.1 | 73.0 |
| | | | | Viento -X | | | 607. | - | 7 | 293. | 33.5 | - | 379.8 | - | 1 | 147.9 |
| | | | | exc. + | 542.8 | 391.8 | 270. | 9 | 148.1 | 0 | 409.7 | 534.2 | 144.2 | 136.8 | 191.0 | 27.1 |
| | | | | Viento -X | | | 8 | -3.3 | 0.9 | 5 | 6.0 | 52.5 | 2 | -2.8 | 0 | 0.3 |
| | | | | exc. - | 12.2 | -7.5 | 4.4 | -3.3 | 8.0 | 2.9 | -6.0 | 1.5 | -2.1 | -2.8 | -0.0 | 0.4 |
| | | | | Viento +Y | | | 5.5 | 3.3 | -0.9 | 3.4 | -5.8 | -6.6 | -6.6 | 2.8 | 7.1 | -0.3 |
| | | | | exc. + | -12.2 | 7.5 | -4.4 | 3.3 | -0.9 | -2.9 | -5.8 | 1.5 | 2.1 | 2.8 | 0.0 | -0.4 |
| | | | | Viento +Y | | | -5.5 | -2.4 | -8.0 | -3.4 | 1.5 | -1.5 | 6.6 | -1.5 | -7.1 | 3.1 |
| | | | | exc. - | 5.2 | -4.5 | 22.8 | -2.4 | 39.5 | 7.0 | 1.8 | 0.9 | -8.7 | -1.5 | 39.9 | 3.0 |
| | | | | Viento -Y | | | 21.8 | 2.4 | 32.4 | -1.5 | 0.9 | -4.3 | -1.5 | 32.8 | -3.1 | |
| | | | | exc. + | -5.2 | 4.5 | -22.8 | 2.4 | -39.5 | 6.6 | -1.8 | 0.9 | 8.7 | 1.5 | -39.9 | -3.0 |
| | | | | Viento -Y exc.- | | | -21.8 | - | -32.4 | -7.0 | -6.6 | -0.9 | 4.3 | - | -32.8 | -3.0 |
| | | | | Sismo X Modo 1 | 286.0 | -51.7 | 181. | 26.7 | 256.1 | 59.8 | 184. | 11.0 | 33.9 | 18.2 | 258.6 | 24.5 |
| | | | | Sismo X Modo 2 | | | -22.7 | - | - | 29.0 | 0.0 | 39.2 | -75.5 | - | - | -25.4 |
| | | | | Sismo X Modo 3 | 0.0 | 171.9 | -0.0 | 77.1 | 282.6 | -0.0 | 123.6 | -0.0 | 0.3 | 66.0 | 308.7 | -0.0 |
| | | | | Sismo Y Modo 1 | 256.6 | -0.0 | 684. | - | 6 | 225.1 | 41.3 | 10.6 | 127.4 | 0.0 | 7 | 92.1 |
| | | | | Sismo Y Modo 2 | 77.3 | - | 8 | 100. | -0.4 | 7.8 | 49.8 | -20.4 | - | -0.4 | - | -6.9 |
| | | | | Sismo Y Modo 3 | 0.0 | 194.7 | -6.1 | 4 | 963.9 | -1.2 | 0.4 | 18.9 | 68.4 | 973.3 | - | -0.2 |
| | | | | | | | -3.0 | - | -76.4 | | | | 17.8 | - | 3 | |
| | | | | | | | | 20.8 | -23.4 | | | | 0.0 | -83.5 | | |
| | | | | | | | | -0.0 | | | | | | -23.3 | | |



Esfuerzos y armados de pilares, pantallas y muros

SALIDA CÁLCULO

Fecha: 29/11/15

| Sopor te | Plan ta | Dimensi ón (cm) | Tramo (m) | Hipótesis | Base | | | | | | Cabeza | | | | | |
|-------------|------------|-----------------------|---------------|-------------------|-----------|------------------|------------------|------------|------------|-----------------|-----------|------------------|------------------|------------|------------|-----------------|
| | | | | | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) |
| M3 | +9.6 0 | 40.0 | 2.95/6. 40 | Peso propio | | | | | | | | | | | | |
| | | | | Cargas muertas | | | | | | | | | | | | |
| | | | | Sobrecarga de uso | | | | | | | | | | | | |
| | | | | Viento +X | | 102. | | 115. | | | | -76.7 | | | | |
| | | | | exc. + | 1108 | 9 | 540. | 8 | 434. | - | 842. | 3.7 | - | 90.8 | | 554. |
| | | | | Viento +X | .2 | 227. | 2 | 130. | 6 | 107. | 4 | - | 1268 | | 675. | 1 |
| | | | | exc. - | 93.0 | 1 | - | 1 | - | 5 | 210. | 151. | - | 26.2 | 1 | - |
| | | | | Viento -X | 858. | - | 353. | - | 595. | 92.4 | 5 | 0 | 398. | 58.6 | 2 | 180. |
| | | | | exc. + | 9 | 177. | 9 | 90.0 | 0 | - | 1066 | -11.7 | 0 | 16.8 | 835. | 8 |
| | | | | Viento -X | 1.4 | 1 | 514. | 16.7 | 500. | 127. | .7 | -9.8 | - | 14.0 | 2 | - |
| | | | | exc. - | 1.3 | -2.0 | 3 | 13.9 | 8 | 3 | 11.7 | 1653 | - | - | 2 | 737. |
| | | | | Viento +Y | -1.4 | -1.5 | 0.6 | - | -0.1 | 0.7 | 0.1 | 9.8 | 0.2 | 16.8 | -0.1 | 5 |
| | | | | exc. + | -1.3 | 2.0 | 0.6 | 16.7 | -0.1 | 0.7 | -0.1 | 1.6 | 0.2 | - | 0.1 | 1.1 |
| | | | | Viento +Y | 7.2 | 1.5 | -0.6 | - | 0.1 | -0.7 | -0.1 | -0.2 | -0.2 | 14.0 | 0.1 | 1.0 |
| | | | | exc. - | 7.3 | -1.0 | -0.6 | 13.9 | 0.1 | -0.7 | -0.1 | -1.6 | -0.2 | -1.6 | 0.6 | -1.1 |
| | | | | Viento -Y | -7.2 | -1.6 | 1.8 | -1.5 | 0.8 | -0.4 | 1.6 | 0.2 | -0.5 | 1.1 | 0.6 | -1.0 |
| | | | | exc. + | -7.3 | 1.0 | 1.9 | 1.1 | 0.7 | -0.3 | -1.6 | -5.9 | -0.5 | 1.6 | -0.6 | -0.8 |
| | | | | Viento -Y exc. - | 68.1 | 1.6 | -1.8 | 1.5 | -0.8 | 0.4 | -1.6 | - | 0.5 | -1.1 | -0.6 | -0.8 |
| | | | | Sismo X Modo 1 | 3.8 | 16.2 | -1.9 | -1.1 | -0.7 | 0.3 | 15.6 | 442. | 0.5 | 24.8 | 5.2 | 0.8 |
| | | | | | 0.0 | 494. | -4.0 | 24.7 | 5.8 | -1.9 | -6.2 | -0.2 | -4.1 | 729. | -11.6 | 0.8 |
| | | | | Sismo X Modo 2 | 256. | 4 | 0.0 | 727. | -12.3 | 28.2 | 0.0 | -0.2 | 9.4 | 6 | -0.0 | -5.4 |
| | | | | | 3 | 0.1 | 61.6 | 1 | -0.0 | 0.0 | -22.3 | 0.0 | 0.3 | 19.7 | 35.0 | |
| | | | | Sismo X Modo 3 | 1.0 | 61.0 | -1.1 | 0.3 | 21.7 | -7.3 | 58.8 | - | -15.4 | 93.5 | -3.1 | 0.0 |
| | | | | | 1.3 | 133. | 0.1 | 93.0 | -3.3 | 7.6 | -1.7 | 119. | 2.5 | 197. | -20.4 | |
| | | | | Sismo Y Modo 1 | | 7 | | 196. | -0.2 | 0.2 | | 5 | 0.1 | 3 | 9.5 | |
| | | | | | | 5.8 | | 6 | | | -11.3 | | | 16.4 | 0.0 | |
| | | | | Sismo Y Modo 2 | | | | 16.4 | | | | | | | | |
| | | | | Sismo Y Modo 3 | | | | | | | | | | | | |
| | +6.1 5 | 40.0 | 0.00/2. 95 | Peso propio | | | | | | | | | | | | |
| | | | | Cargas muertas | | | | | | | | | | | | |
| | | | | Sobrecarga de uso | | | | | | | | | | | | |
| | | | | Viento +X | | 149. | | | | | | | | | | |
| | | | | exc. + | 1452 | 6 | 1159 | 19.2 | 603. | | 1254 | 117. | 357. | 20.8 | 436. | |
| | | | | Viento +X | .5 | - | - | - | 9 | 6.1 | .4 | 1 | 6 | - | 6 | |
| | | | | exc. - | -86.2 | 519. | 186. | 733. | - | 211. | 107. | 393. | - | 597. | 857. | 32.1 |
| | | | | Viento -X | 724. | 3 | 0 | 6 | 1025 | 7 | 6 | 4 | 436. | -4.3 | 6 | 57.7 |
| | | | | exc. + | 9 | -60.1 | 566. | 39.0 | 332. | 59.3 | 983. | - | 0 | 37.5 | 246. | 54.5 |
| | | | | Viento -X | 4.1 | 26.5 | 5 | 32.5 | 7 | -9.4 | 2 | 217. | 293. | 31.2 | 1 | -2.7 |
| | | | | exc. - | 4.1 | 25.5 | -4.3 | - | -2.5 | 8.9 | 1.5 | 4 | 3 | - | -2.0 | -2.6 |
| | | | | Viento +Y | -4.1 | -26.5 | -4.3 | 39.0 | -2.4 | 8.9 | 1.5 | -16.9 | 1.1 | 37.5 | -1.9 | 2.7 |
| | | | | exc. + | -4.1 | -25.5 | 4.3 | - | 2.5 | -1.5 | -13.5 | 1.0 | - | - | 2.0 | 2.6 |
| | | | | Viento +Y | 15.7 | -2.0 | 4.3 | 32.5 | 2.4 | 1.3 | -1.5 | 16.9 | -1.1 | 31.2 | 1.9 | 0.4 |
| | | | | exc. - | 15.7 | -1.0 | -9.5 | -5.5 | -4.6 | 0.9 | 8.7 | 13.5 | -1.0 | -5.3 | -3.3 | 0.4 |
| | | | | Viento -Y | -15.7 | 2.0 | -9.6 | 0.9 | -4.7 | -1.3 | 8.8 | 2.4 | 2.0 | -3.4 | -3.4 | -0.4 |
| | | | | exc. + | -15.7 | 1.0 | 9.5 | 5.5 | 4.6 | -0.9 | -8.7 | -0.9 | 2.1 | 5.3 | 3.3 | -0.4 |
| | | | | Viento -Y exc. - | 131. | 39.7 | 9.6 | -0.9 | 4.7 | -9.1 | -8.8 | -2.4 | -2.0 | -1.1 | 3.4 | -2.7 |
| | | | | Sismo X Modo 1 | 2 | 675. | -84.4 | 12.3 | -41.5 | 79.3 | 0.9 | -2.1 | 12.3 | -29.7 | -80.4 | |
| | | | | | 23.4 | 4 | -59.2 | 861. | -37.3 | -3.1 | 21.6 | 18.7 | 842. | -32.0 | -0.0 | |
| | | | | Sismo X Modo 2 | 0.0 | 0.0 | -0.0 | 8 | -0.0 | 0.0 | 111. | 7.9 | 1 | -0.0 | -10.3 | |
| | | | | | 493. | 149. | - | 0.3 | - | 298. | 5 | 0.0 | 0.3 | - | -21.7 | |
| | | | | Sismo X Modo 3 | 7 | 5 | 317. | 46.4 | 156. | -34.2 | 6 | -0.0 | 70.4 | 46.4 | 111. | -0.5 |
| | | | | | 6.3 | 182. | 8 | 233. | 2 | -65.8 | -0.8 | 81.3 | 2.1 | 227. | 8 | |
| | | | | Sismo Y Modo 1 | 0.1 | 6 | -16.0 | 0 | -10.1 | 1.0 | 30.2 | 0.3 | 7 | -8.6 | | |
| | | | | | | 2.5 | -0.2 | 15.9 | -0.4 | | -2.5 | | 15.9 | -0.4 | | |
| | | | | Sismo Y Modo 2 | | | | | | | | | | | | |
| | | | | Sismo Y Modo 3 | | | | | | | | | | | | |



Esfuerzos y armados de pilares, pantallas y muros

SALIDA CÁLCULO

Fecha: 29/11/15

| Sopor te | Plan ta | Dimensi ón (cm) | Tramo (m) | Hipótesis | Base | | | | | | Cabeza | | | | | |
|-------------|------------|-----------------------|---------------|-------------------|-----------|------------------|------------------|------------|------------|-----------------|-----------|------------------|------------------|------------|------------|-----------------|
| | | | | | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) |
| M4 | +9.6 0 | 40.0 | 2.95/6. 40 | Peso propio | | | | | | | | | | | | |
| | | | | Cargas muertas | | | | | | | | | | | | |
| | | | | Sobrecarga de uso | | | | | | | | | | | | |
| | | | | Viento +X | 611.9 | | 1810.8 | | 54.6 | | | | | | -58.9 | |
| | | | | exc. + | | | 319.5 | | | | 212. | | 15.3 | | 177. | |
| | | | | Viento +X | 120.1 | 79.8 | 5 | 22.6 | 246. | 4.4 | 0 | 36.6 | 46.1 | 55.1 | 6 | -29.3 |
| | | | | exc. - | | 83.9 | 1195.4 | 1.0 | 58.5 | -38.3 | 227. | 44.1 | -1.7 | | -103. | -47.4 |
| | | | | Viento -X | 320.4 | -0.2 | 7.9 | -8.6 | 2.8 | -2.8 | 4 | -0.1 | -0.3 | 64.3 | 7 | 0.3 |
| | | | | exc. + | -9.1 | -0.0 | 9.4 | -0.3 | 0.5 | -3.2 | -1.5 | 0.0 | 1.7 | 0.1 | 3.3 | 0.3 |
| | | | | Viento -X | -8.8 | 0.2 | -7.9 | -0.6 | -2.8 | 2.8 | -1.4 | 0.1 | 0.3 | -0.1 | 1.0 | -0.3 |
| | | | | exc. - | 9.1 | 0.0 | -9.4 | 0.3 | -0.5 | 3.2 | 1.5 | -0.0 | -8.5 | -0.1 | -3.3 | -0.3 |
| | | | | Viento +Y | 8.8 | 0.3 | 6.4 | 0.6 | 21.1 | 1.5 | 1.4 | -0.7 | -9.8 | 0.1 | -1.0 | 0.4 |
| | | | | exc. + | 1.5 | 0.1 | 4.9 | 1.8 | 23.3 | 1.8 | -0.2 | -0.8 | 8.5 | 1.8 | 20.8 | 0.4 |
| | | | | Viento +Y | 1.2 | -0.3 | -6.4 | 2.1 | -21.1 | -1.5 | -0.3 | 0.7 | 9.8 | 2.0 | 22.9 | -0.4 |
| | | | | exc. - | -1.5 | -0.1 | -4.9 | -1.8 | -23.3 | -1.8 | 0.2 | 0.8 | -71.2 | -1.8 | -20.8 | -0.4 |
| | | | | Viento -Y | -1.2 | 10.9 | 166.5 | -2.1 | 201. | 6.3 | 0.3 | -5.9 | -34.9 | -2.0 | -22.9 | 4.7 |
| | | | | exc. + | -12.0 | 9.1 | 5 | 16.5 | 4 | -49.3 | -7.0 | -1.1 | -0.2 | 16.9 | 200. | 8.0 |
| | | | | Viento -Y exc. - | | | | | | | | | | | | |
| | | | | Sismo X Modo 1 | | 0.0 | 256.0 | -7.4 | 34.0 | 0.0 | -49.1 | -0.0 | | 0.8 | 0 | 0.0 |
| | | | | Sismo X Modo 2 | 287.3 | 40.8 | 3 | 0.0 | 0.3 | 23.8 | -0.0 | -22.2 | 268. | 0.0 | 45.1 | 17.6 |
| | | | | Sismo X Modo 3 | -0.0 | 2.5 | 0.0 | 62.2 | 757. | -13.3 | -26.4 | -0.3 | 1 | 63.6 | 0.3 | 2.2 |
| | | | | Sismo Y Modo 1 | -45.2 | 0.0 | 626.6 | 1.5 | 9 | 0.6 | -13.3 | -0.8 | -9.4 | 0.2 | 752. | 0.2 |
| | | | | Sismo Y Modo 2 | -77.7 | | | | 9.2 | | -0.6 | | -9.3 | 1.4 | 6 | |
| | | | | Sismo Y Modo 3 | -1.2 | | 69.3 | | 16.3 | | | | | | 12.2 | |
| | | | | | | | 0.4 | | | | | | | | 16.2 | |
| | +6.1 5 | 40.0 | 0.00/2. 95 | Peso propio | | | | | | | | | | | | |
| | | | | Cargas muertas | | | | | | | | | | | | |
| | | | | Sobrecarga de uso | 1075.6 | | 3425.3 | 715.3 | 362.6 | | | | 1290.6 | | 307.6 | 202.9 |
| | | | | Viento +X | 250.1 | 1118.1 | | 306.9 | 1187.9 | 44.5 | 205. | 30.7 | 366.9 | 173.9 | | |
| | | | | exc. + | 6 | -74.8 | 1554.9 | 309.3 | 843.1 | | 104.3 | 104.3 | 758.2 | 278.4 | 1011.8 | - |
| | | | | Viento +X | 380.8 | 695.2 | 2695.9 | 374.9 | 309.3 | 843.1 | 576.3 | 104.3 | 758.2 | 278.4 | 233.8 | 147.5 |
| | | | | exc. - | -17.3 | 11.1 | 53.3 | 4.5 | -5.2 | 1 | 4 | 34.6 | 12.9 | 97.2 | -4.1 | 222.9 |
| | | | | Viento -X | -17.3 | 11.0 | 52.0 | 3.8 | -13.1 | 24.8 | -10.4 | 0.2 | 17.3 | 1.6 | -12.0 | |
| | | | | exc. + | 17.3 | -11.1 | -53.3 | 5.2 | 5.2 | -24.8 | -10.0 | 0.6 | -12.9 | 0.9 | 4.1 | 4.7 |
| | | | | Viento -X | 17.3 | -11.0 | -52.0 | -4.5 | 13.1 | -24.8 | 10.4 | -0.2 | -17.3 | -1.6 | 12.0 | 4.9 |
| | | | | exc. - | 3.1 | 12.3 | 71.2 | -3.8 | 64.1 | -25.5 | 10.0 | -0.6 | -17.3 | -1.6 | 66.9 | -4.7 |
| | | | | Viento +Y | 3.1 | 12.4 | 72.5 | 12.5 | 71.8 | 1.5 | 1.4 | -1.6 | -13.0 | -0.9 | 74.7 | -4.9 |
| | | | | exc. + | -3.1 | -12.3 | -71.2 | 13.2 | -64.1 | 0.9 | 1.1 | -2.0 | -17.4 | 6.6 | -66.9 | -0.6 |
| | | | | Viento +Y | -3.1 | -12.4 | -72.5 | - | -64.1 | -1.5 | -1.4 | 1.6 | 13.0 | 7.3 | -74.7 | -0.8 |
| | | | | exc. - | -15.5 | 118.7 | 659.5 | 12.5 | -71.8 | -0.9 | -1.1 | 2.0 | 17.4 | -6.6 | 433.0 | 0.6 |
| | | | | Viento -Y | -15.5 | 118.7 | 659.5 | 12.5 | -71.8 | -0.9 | -1.1 | 2.0 | 17.4 | -6.6 | 433.0 | 0.6 |
| | | | | exc. + | | | | | | | | | | | | |
| | | | | Viento -Y exc. - | | | | | | | | | | | | |
| | | | | Sismo X Modo 1 | 462.0 | 211.8 | 996.7 | 13.2 | 5 | 614.7 | -14.3 | -0.9 | 437.0 | 48.1 | | 0.8 |
| | | | | Sismo X Modo 2 | | | | | | | | | | | | |
| | | | | Sismo X Modo 3 | | | | | | | | | | | | |
| | | | | Sismo Y Modo 1 | | | | | | | | | | | | |
| | | | | Sismo Y Modo 2 | | | | | | | | | | | | |
| | | | | Sismo Y Modo 3 | | | | | | | | | | | | |



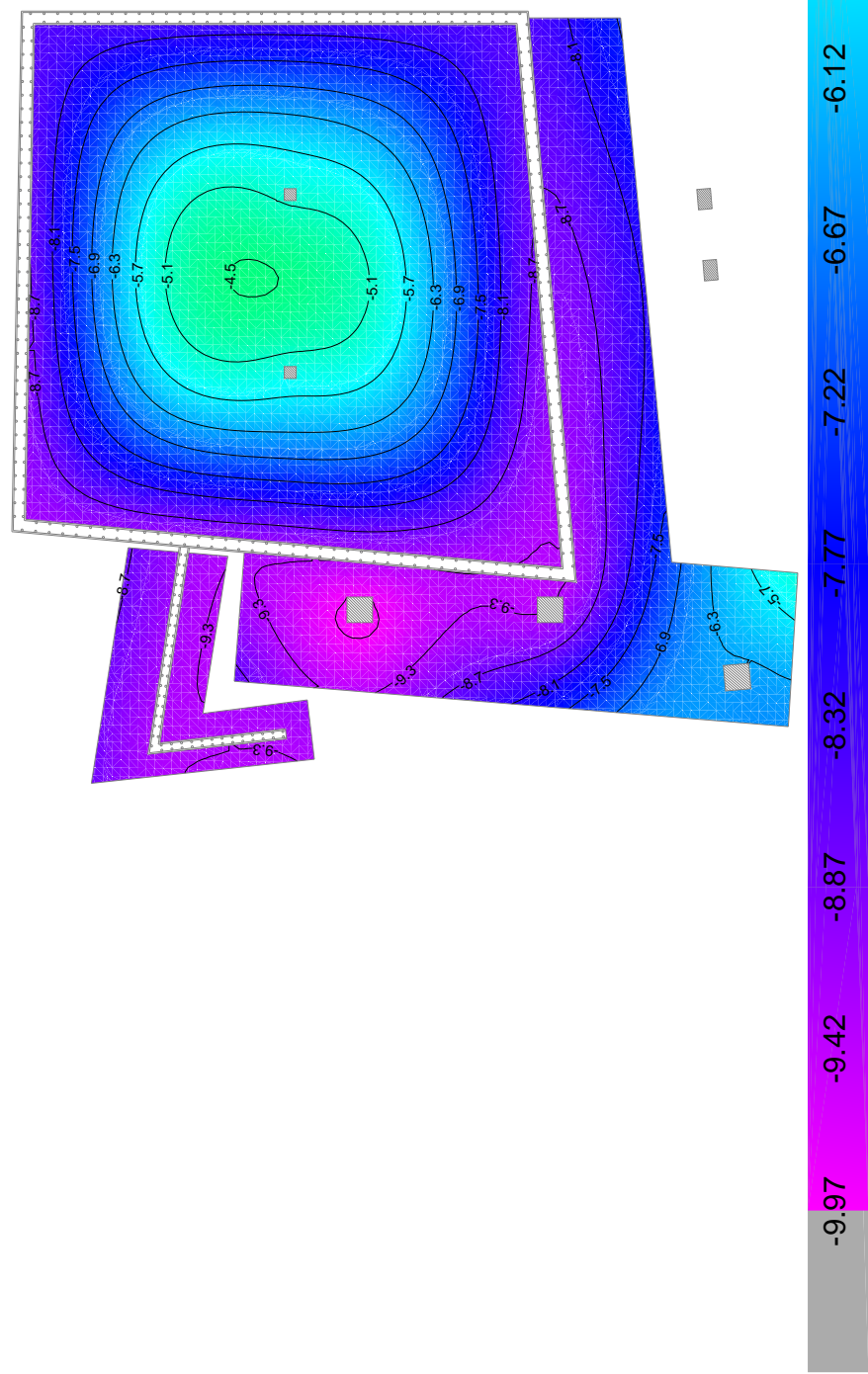
Esfuerzos y armados de pilares, pantallas y muros

SALIDA CÁLCULO

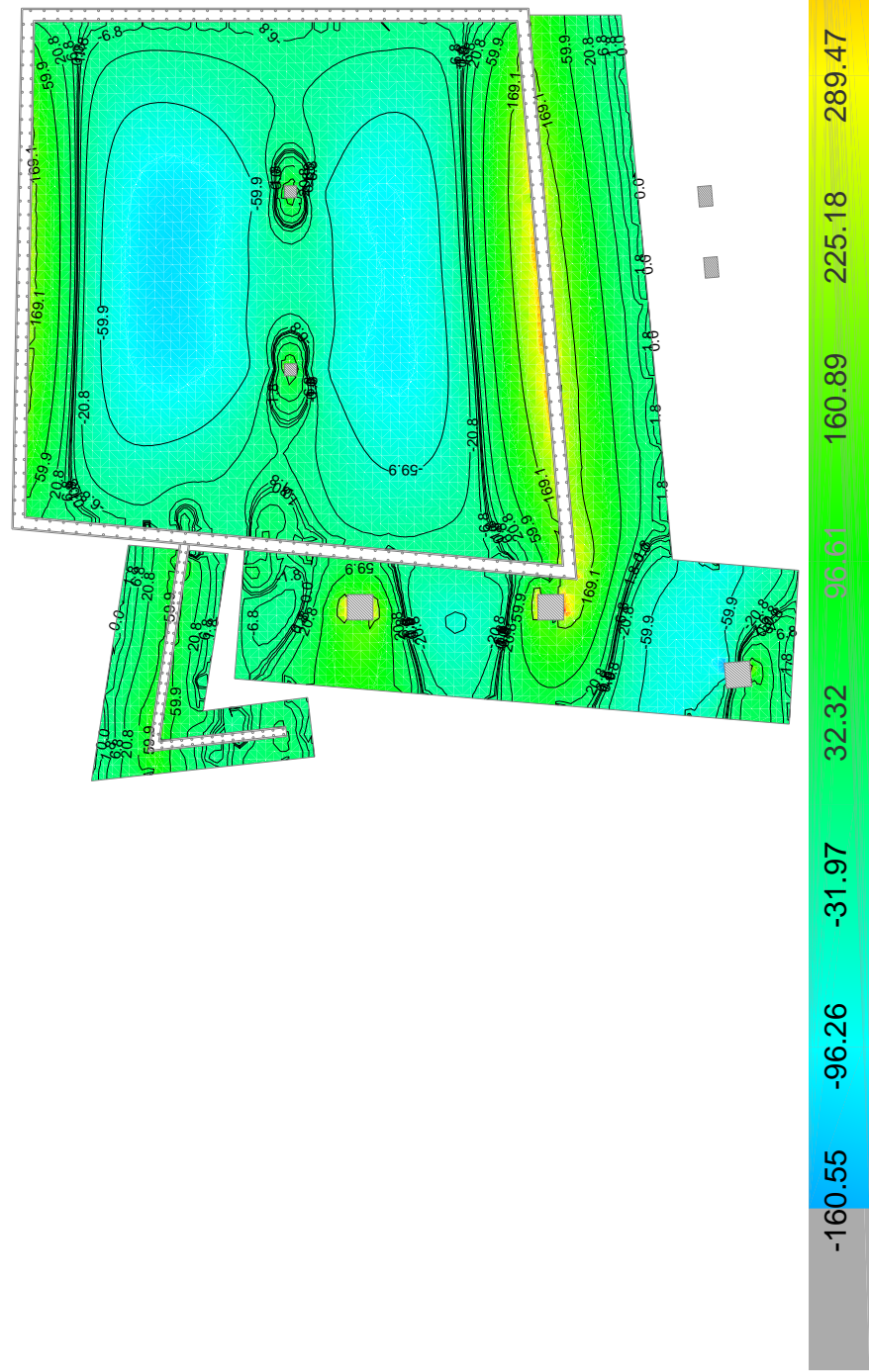
Fecha: 29/11/15

| Sopor te | Plan ta | Dimensi ón (cm) | Tramo (m) | Hipótesis | Base | | | | | | Cabeza | | | | | |
|-------------|------------|-----------------------|---------------|-------------------|-----------|------------------|------------------|------------|------------|-----------------|-----------|------------------|------------------|------------|------------|-----------------|
| | | | | | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) | N (kN) | Mx (kN· m) | My (kN· m) | Qx (kN) | Qy (kN) | T (kN· m) |
| M5 | +6.1 5 | 30.0 | 0.00/2. 95 | Peso propio | | | | | | | | | | | | |
| | | | | Cargas muertas | | | | | | | | | | | | |
| | | | | Sobrecarga de uso | | | | | | | | | | | | |
| | | | | Viento +X | | | | | | | | | | | | |
| | | | | exc. + | 197.3 | -12.1 | -58.9 | 38.0 | 91.2 | 2.0 | 140.7 | 351.7 | - | - | 119.2 | -15.0 |
| | | | | Viento +X | 41.0 | -5.8 | -49.2 | 12.7 | -35.3 | 9.7 | 25.4 | 11.6 | -53.4 | -0.3 | 12.6 | -12.2 |
| | | | | exc. - | 129.4 | -9.7 | -50.0 | - | 38.8 | -6.4 | 112.2 | 60.3 | - | - | 50.8 | -13.5 |
| | | | | Viento -X | -3.1 | 0.1 | 1.2 | 26.5 | 2.8 | -0.5 | -0.4 | 0.1 | 231.8 | 24.2 | 2.5 | 0.1 |
| | | | | exc. + | -3.1 | -0.1 | -1.2 | 0.1 | -2.8 | 0.5 | -0.4 | -0.1 | -1.2 | -0.2 | 2.4 | -0.1 |
| | | | | Viento -X | 3.1 | -0.1 | -1.2 | -0.1 | -2.8 | 0.5 | 0.4 | -0.1 | -1.2 | 0.3 | -2.5 | -0.1 |
| | | | | exc. - | 3.1 | -0.2 | 0.5 | -0.1 | -0.3 | 0.3 | 0.4 | 0.1 | 1.2 | 0.2 | -2.4 | -0.1 |
| | | | | Viento +Y | 0.9 | -0.3 | 0.5 | -0.2 | -0.3 | 0.3 | 0.3 | 0.1 | 1.2 | -0.0 | 0.1 | -0.1 |
| | | | | exc. + | 0.9 | 0.2 | -0.5 | -0.2 | 0.3 | -0.3 | 0.3 | -0.1 | -0.7 | -0.0 | 0.1 | 0.1 |
| | | | | Viento +Y | -0.9 | 0.3 | -0.5 | 0.2 | 0.3 | -0.3 | -0.3 | -0.1 | -0.7 | 0.0 | -0.1 | 0.1 |
| | | | | exc. - | -0.9 | -1.6 | 6.4 | 0.2 | 3.6 | 1.4 | -0.3 | 0.8 | 0.7 | 0.0 | -0.1 | -0.4 |
| | | | | Viento -Y | 0.3 | 4.7 | 27.1 | -1.6 | 72.8 | -13.5 | 1.4 | 2.1 | 0.7 | -0.6 | 5.9 | 3.5 |
| | | | | exc. + | -83.1 | -0.0 | 0.0 | 2.7 | 0.0 | -0.0 | -11.8 | 0.0 | -7.6 | -6.4 | 62.0 | -0.0 |
| | | | | Viento -Y exc.- | -0.0 | -6.0 | 24.0 | 0.0 | 13.6 | 5.3 | 0.0 | 3.0 | -28.3 | -0.0 | 0.0 | -1.6 |
| | | | | Sismo X Modo 1 | 1.3 | 1.3 | 7.3 | -0.0 | 19.7 | -3.6 | 5.2 | 0.6 | -0.0 | -2.3 | 22.2 | 1.0 |
| | | | | Sismo X Modo 2 | -22.5 | -0.0 | 0.0 | -5.9 | 0.1 | -0.0 | -3.2 | 0.0 | -28.6 | -1.7 | 16.8 | -0.0 |
| | | | | Sismo X Modo 3 | -0.1 | | | -0.0 | | | 0.0 | | -7.7 | -0.0 | 0.1 | |
| | | | | Sismo Y Modo 1 | | | | | | | | | -0.1 | | | |
| | | | | Sismo Y Modo 2 | | | | | | | | | | | | |
| | | | | Sismo Y Modo 3 | | | | | | | | | | | | |
| M8 | +6.1 5 | 30.0 | 0.00/2. 95 | Peso propio | | | | - | | | | | | | | |
| | | | | Cargas muertas | | | | 770.3 | | | | | | | | |
| | | | | Sobrecarga de uso | | | | - | | | | | | | | |
| | | | | Viento +X | | 504.0 | | 107.3 | | | | | | | | |
| | | | | exc. + | 477.5 | - | | - | 191.2 | | | 165.6 | | 205.6 | | |
| | | | | Viento +X | 114.6 | 111.5 | 140.9 | 559.5 | - | -36.4 | 87.3 | 55.0 | -65.9 | - | 84.1 | 23.0 |
| | | | | exc. - | 286.7 | - | -25.7 | 14.7 | 133.1 | 29.8 | 37.9 | 149.6 | -35.3 | 319.4 | 101.0 | -2.1 |
| | | | | Viento -X | -6.3 | 291.3 | 80.2 | 14.7 | 126.1 | -24.2 | 79.0 | -5.1 | 0.8 | 15.3 | 82.1 | 24.9 |
| | | | | exc. + | -6.3 | 6.7 | -1.6 | - | 8.0 | 0.7 | -0.7 | -5.1 | 0.8 | 15.3 | -2.4 | -0.1 |
| | | | | Viento -X | -6.3 | 6.7 | -1.6 | 14.7 | -2.9 | -0.7 | 0.7 | 5.1 | -0.8 | - | -2.4 | 0.1 |
| | | | | exc. - | 6.3 | -6.7 | 1.6 | - | -2.9 | -0.7 | 0.8 | 5.1 | -0.8 | 15.3 | 2.4 | 0.0 |
| | | | | Viento +Y | 5.0 | -6.7 | 1.8 | - | 2.9 | -0.0 | 0.7 | 3.2 | -0.5 | - | 2.4 | -0.1 |
| | | | | exc. + | 5.0 | -6.2 | 1.8 | 11.0 | 2.9 | -0.0 | 0.7 | 3.2 | -0.5 | 15.3 | 1.3 | -0.1 |
| | | | | Viento +Y | -5.0 | -6.2 | -1.8 | - | 2.6 | 0.0 | -0.7 | -3.2 | 0.5 | -8.2 | 1.3 | -0.1 |
| | | | | exc. - | -5.0 | 6.2 | -1.8 | 10.9 | -2.6 | 0.8 | 3.6 | 12.8 | -2.1 | 8.1 | -1.3 | 0.1 |
| | | | | Viento -Y | 24.3 | 6.2 | 10.0 | 11.0 | -2.6 | 0.8 | - | - | 24.0 | - | 4.8 | -0.5 |
| | | | | exc. + | - | -32.6 | -49.1 | 10.9 | 13.6 | 17.7 | -22.6 | 0.0 | 0.0 | - | -1.1 | -1.1 |
| | | | | Viento -Y exc.- | 184.2 | 200.9 | -0.0 | - | -86.7 | -0.0 | 0.0 | 146.5 | 0.0 | 28.7 | -0.0 | -0.0 |
| | | | | Sismo X Modo 1 | -0.0 | 0.0 | 37.6 | 51.5 | -0.0 | 4.8 | -6.1 | -0.0 | -8.0 | 431.4 | 18.0 | -1.9 |
| | | | | Sismo X Modo 2 | 91.5 | - | -0.0 | 3 | 51.4 | -0.0 | 0.0 | 48.1 | 0.0 | 0.0 | -18.6 | -0.3 |
| | | | | Sismo X Modo 3 | -49.8 | 122.7 | | 0.0 | -23.4 | | | -39.6 | | - | -0.0 | -0.0 |
| | | | | Sismo Y Modo 1 | -0.0 | | | - | -0.0 | | | -0.0 | | 108.0 | | |
| | | | | Sismo Y Modo 2 | | 54.3 | | 193.9 | | | | | | 116.7 | | |
| | | | | Sismo Y Modo 3 | | 0.0 | | 116.4 | | | | | | 0.2 | | |

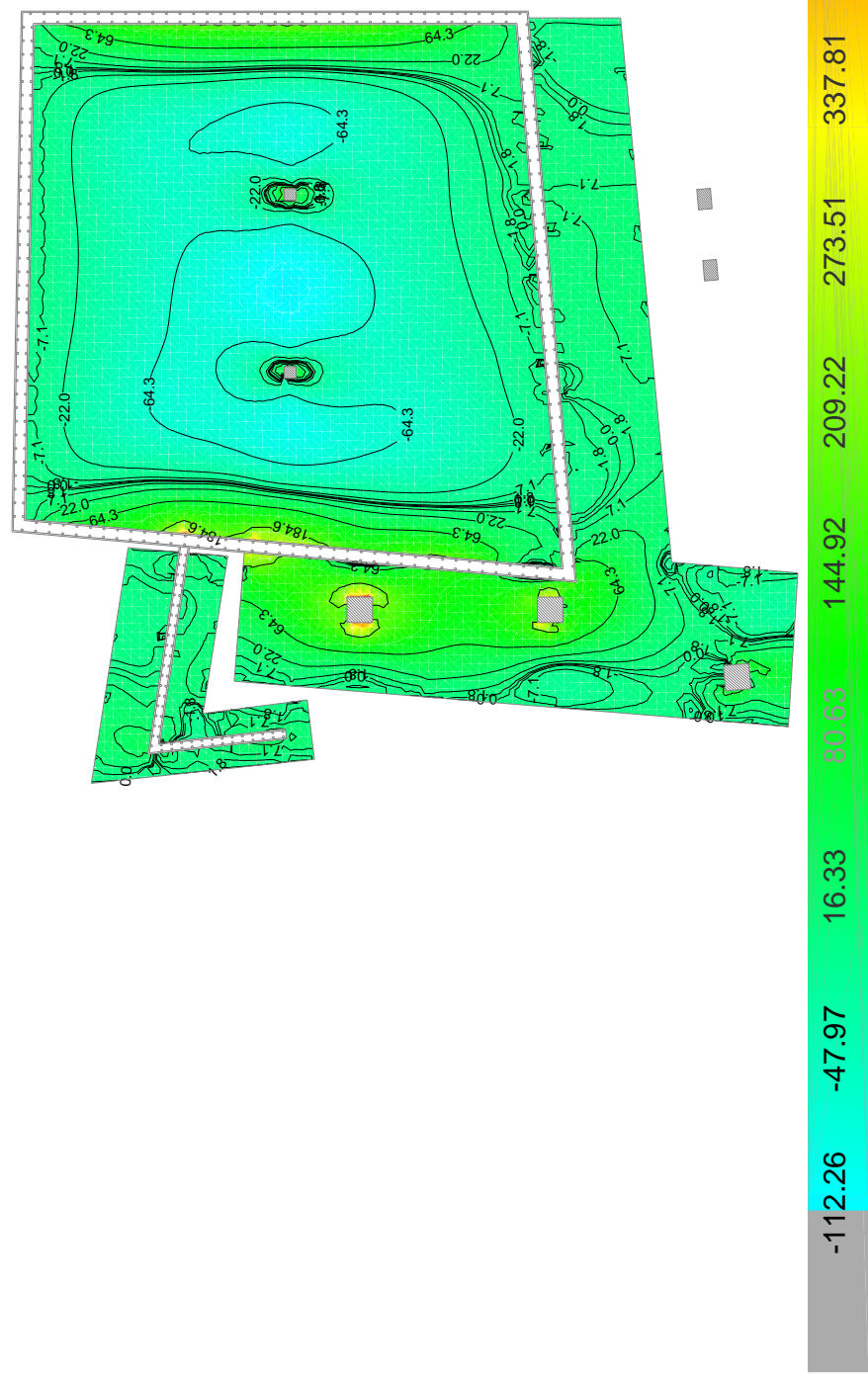
Planta 0, Desplazamiento Z (mm), PP+CM+Oa



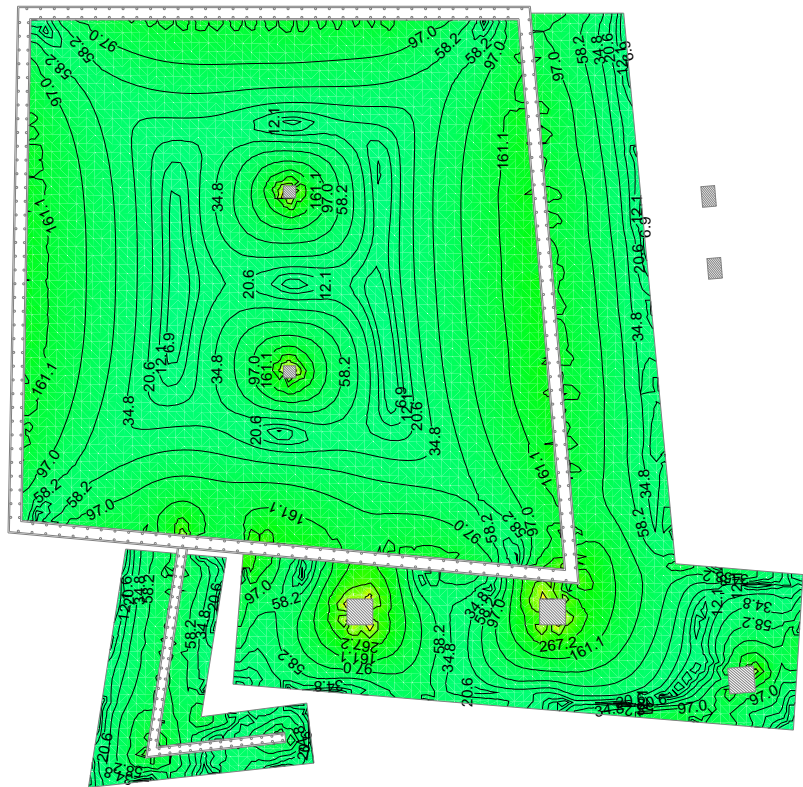
Planta 0, Momento X (kN·m/m), 1.35·PP+1.35·CM+1.5·Qa



Planta 0, Momento Y (kN·m/m) , 1.35·PP+1.35·CM+1.5·Qa

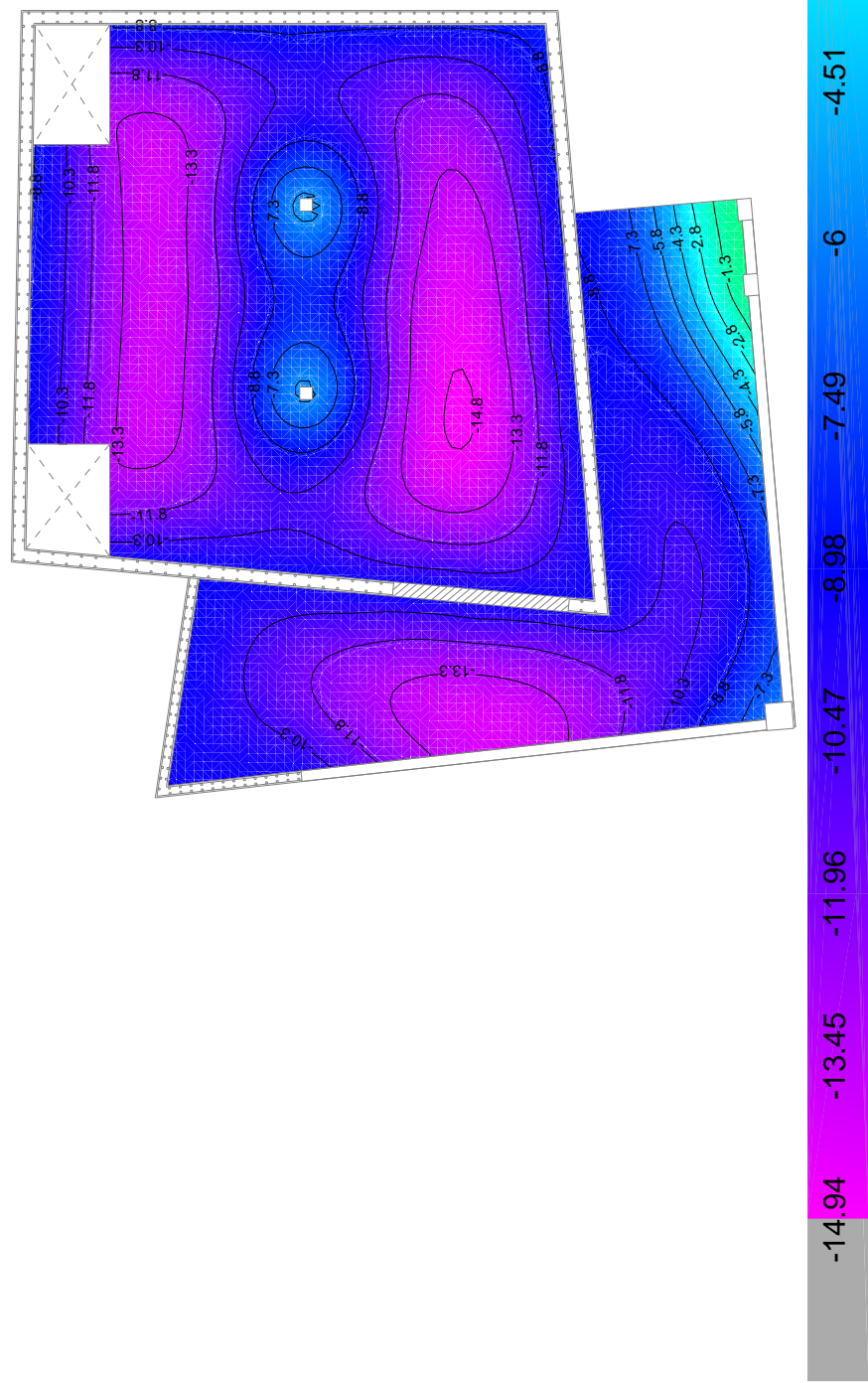


Planta 0, Cortante total (kN/m), 1.35·PP+1.35·CM+1.5·Qa

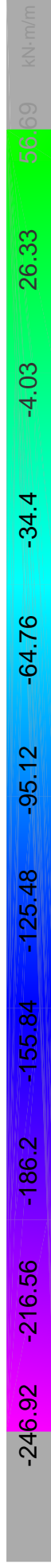
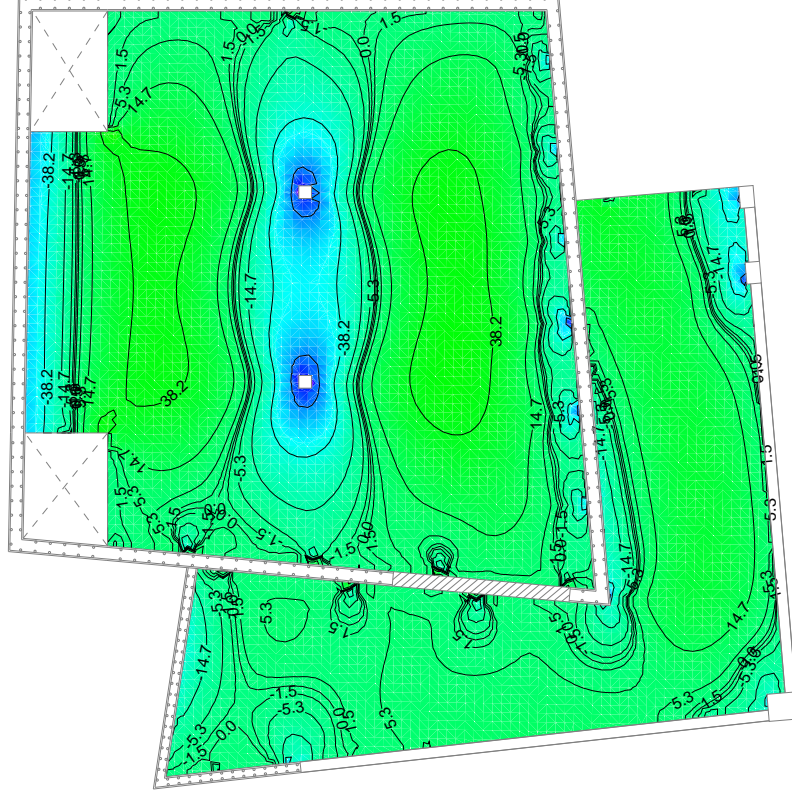


| | | | | | | | | | | | |
|-----|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|------|
| 0.2 | 135.13 | 270.06 | 404.98 | 539.91 | 674.84 | 809.77 | 944.69 | 1079.62 | 1214.55 | 1349.48 | kN/m |
|-----|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|------|

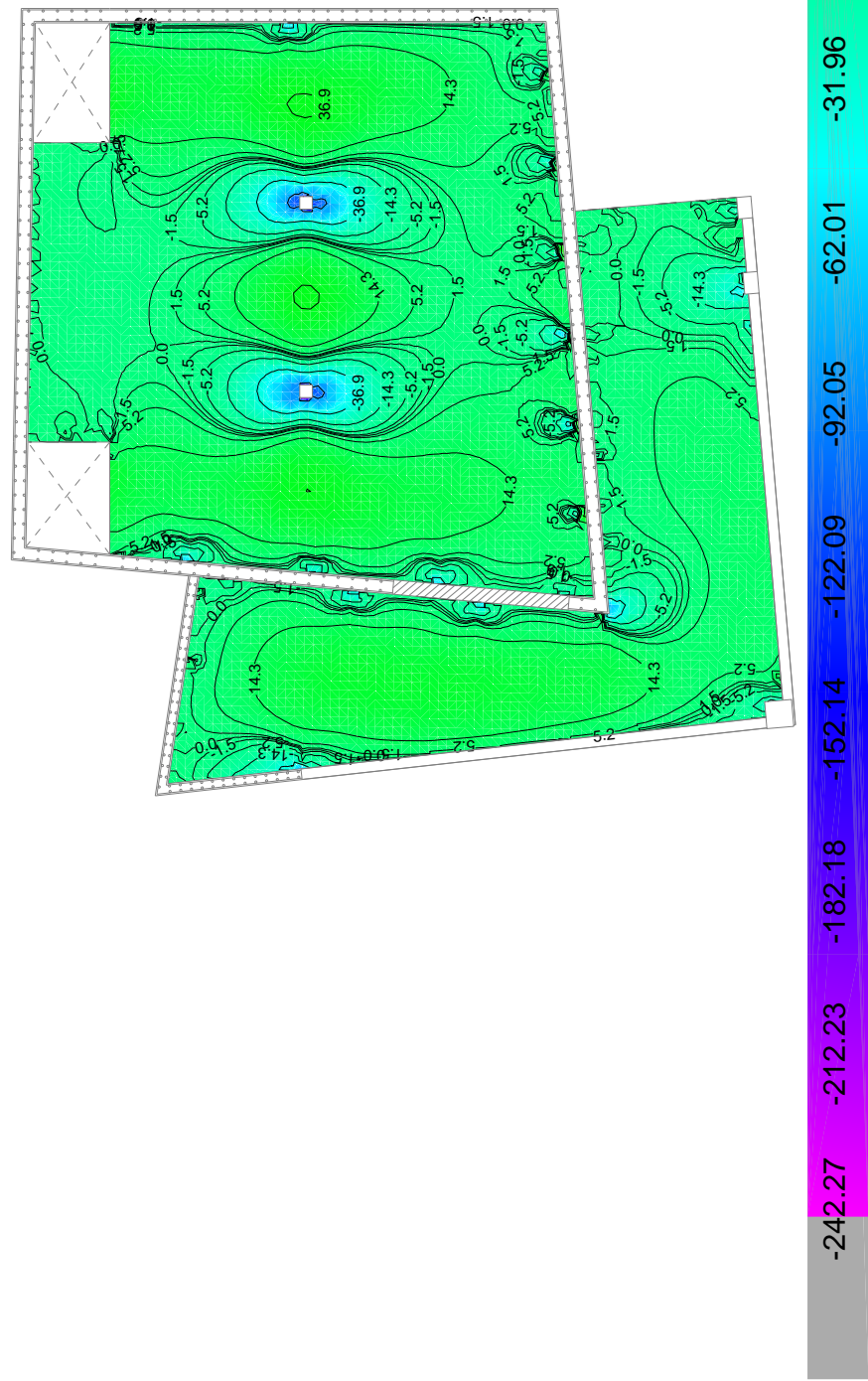
Planta 1, Desplazamiento Z (mm), PP+CM+Qa



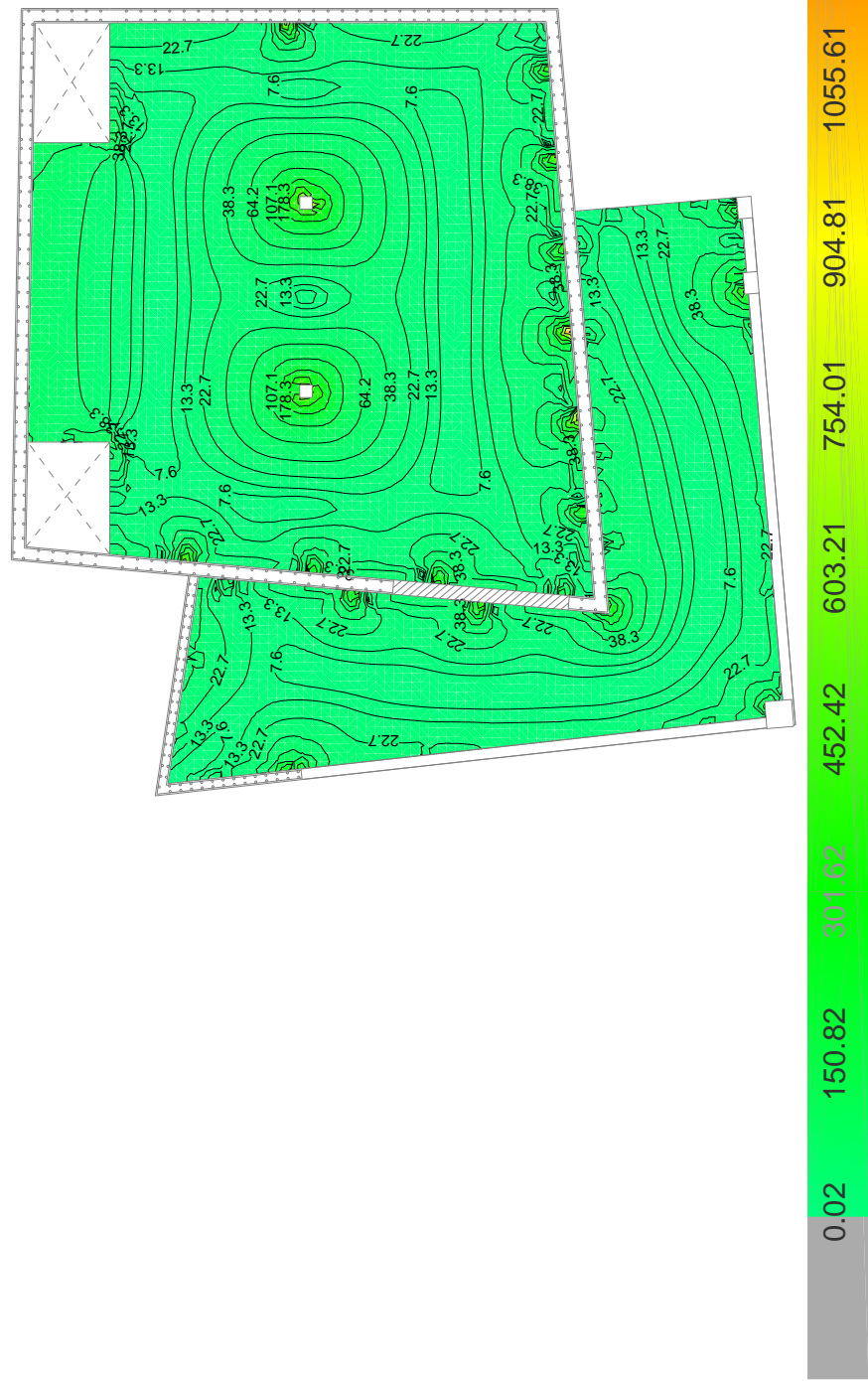
Planta 1, Momento X (kN.m/m), 1.35.PP+1.35.CM+1.5.Qa



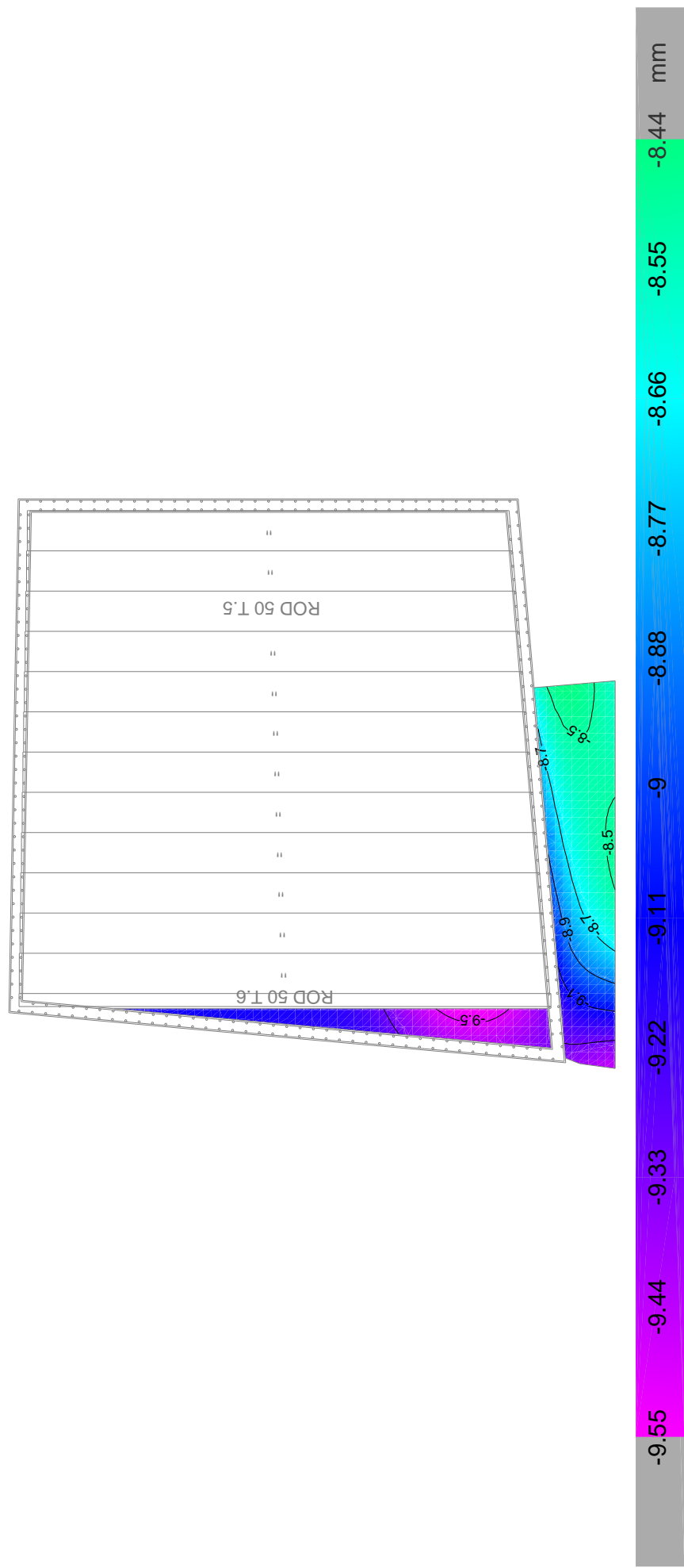
Planta 1, Momento Y (kN·m/m), 1.35·PP+1.35·PM+1.35·CM+1.5·Qa



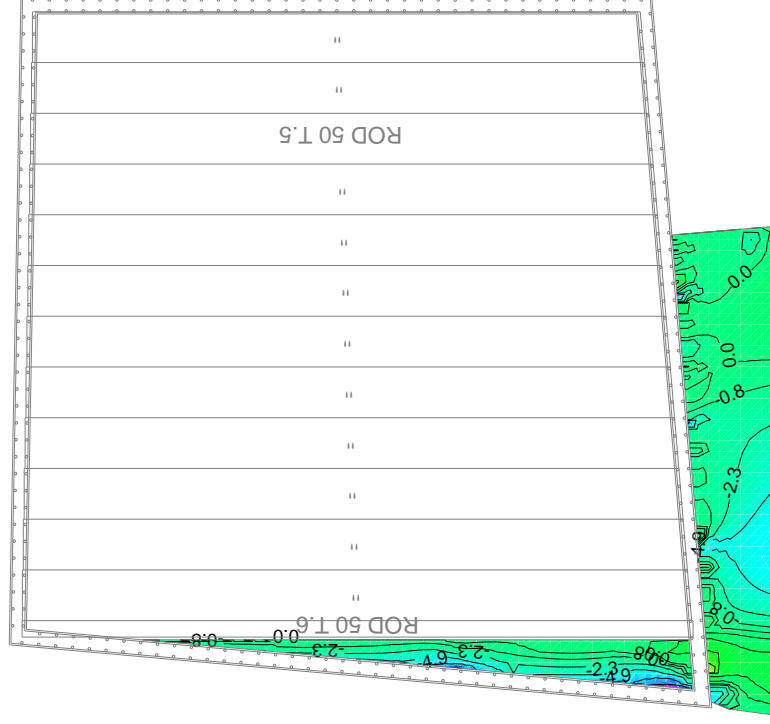
Planta 1, Cortante total (kN/m), 1.35·PP+1.35·CM+1.5·Qa



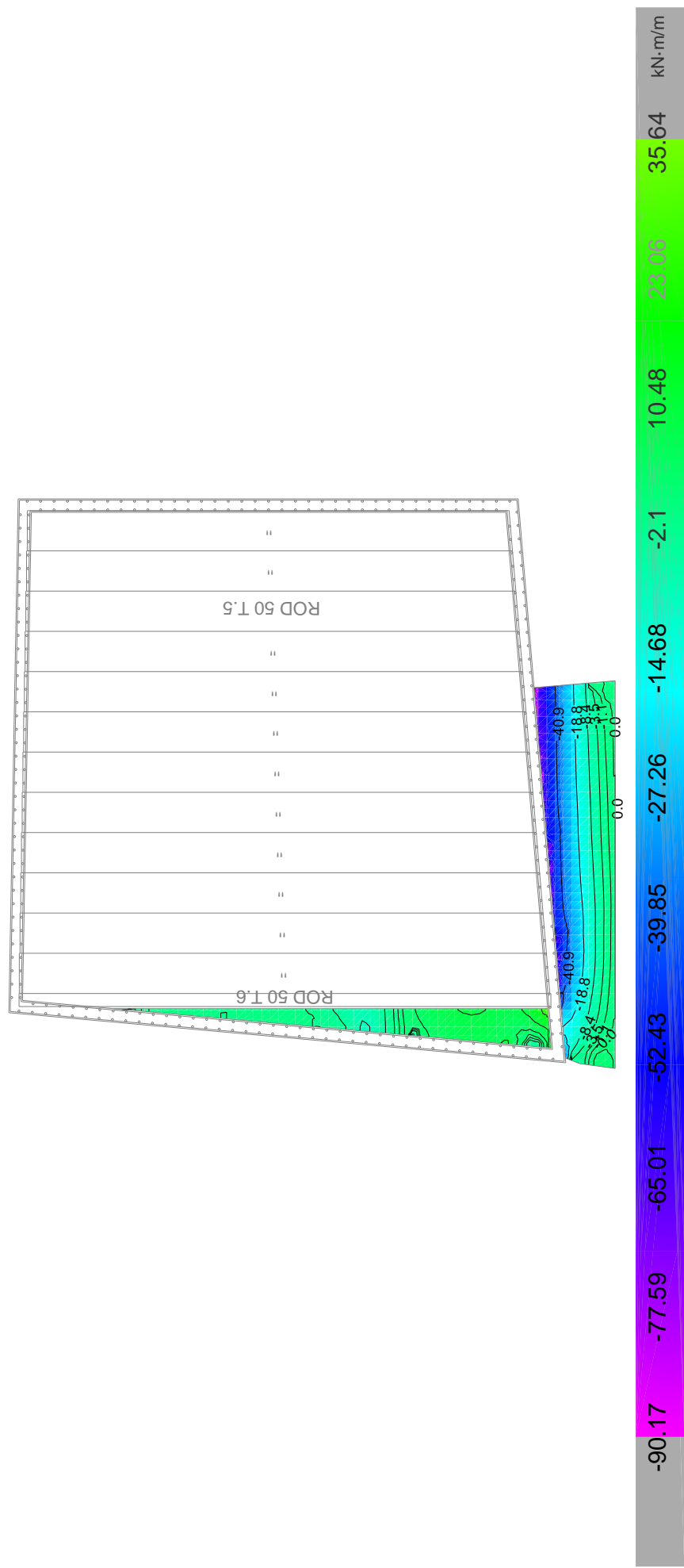
Planta 2, Desplazamiento Z (mm), PP+CM+Qa



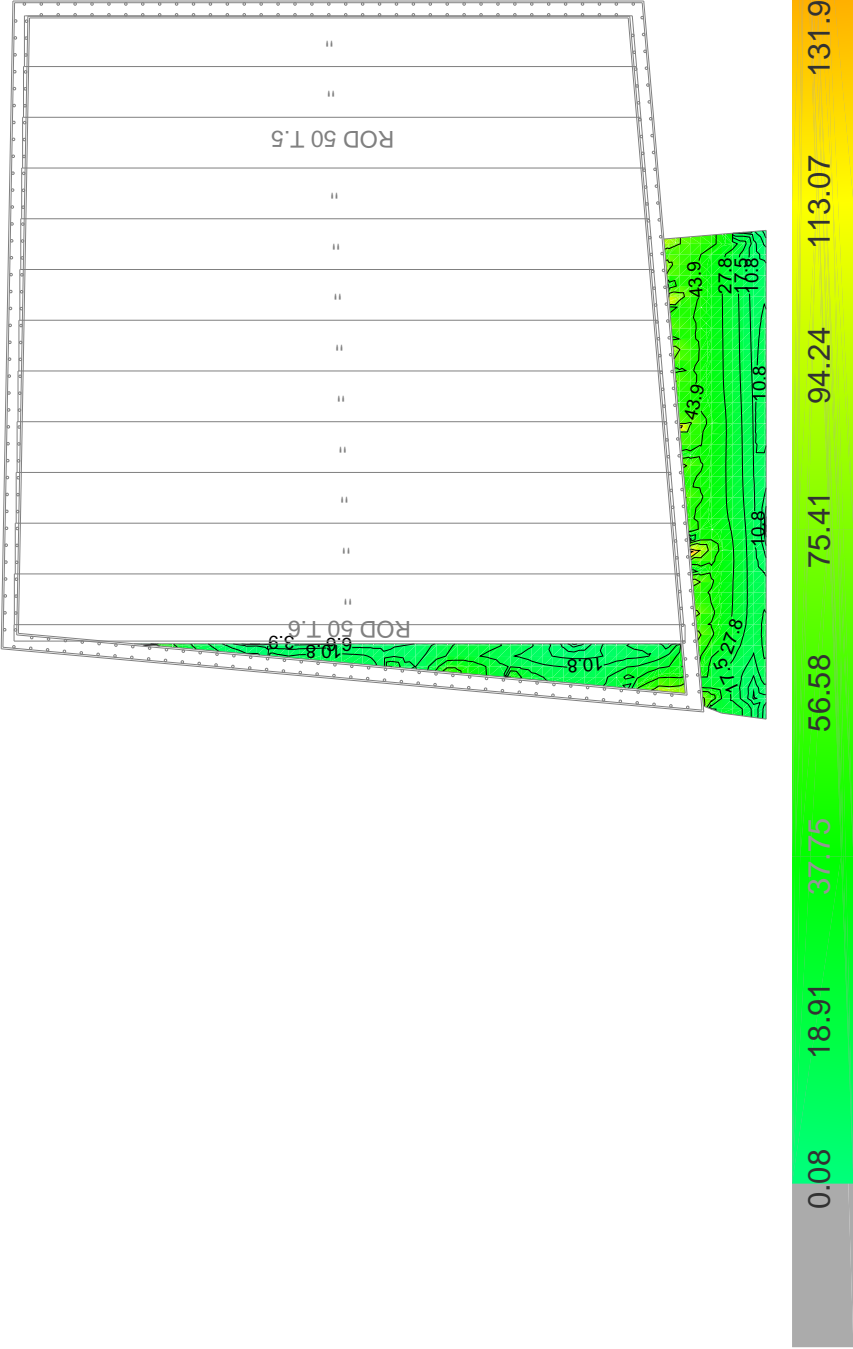
Planta 2, Momento X (kN·m/m), 1.35·PP+1.35·CM+1.5·Qa

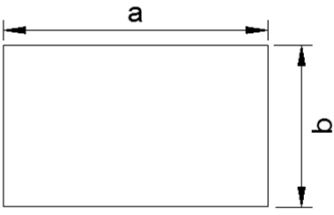
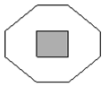




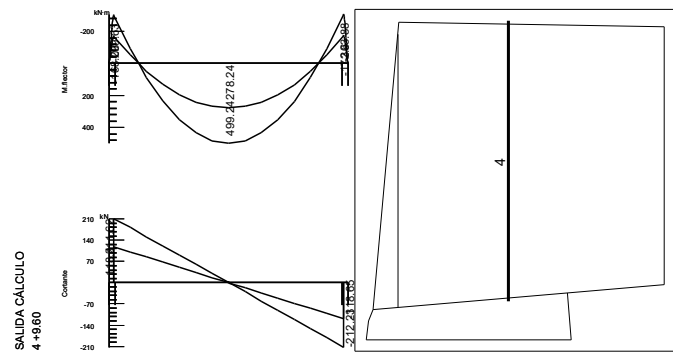
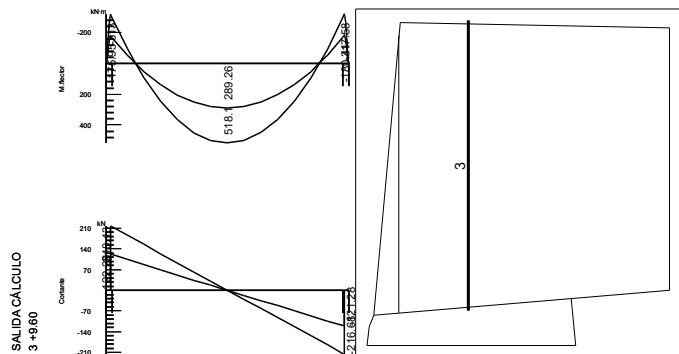
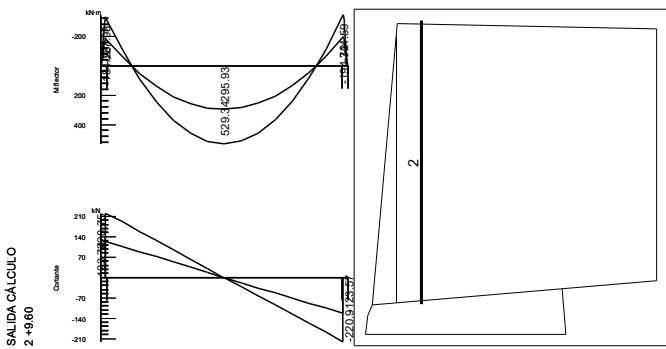
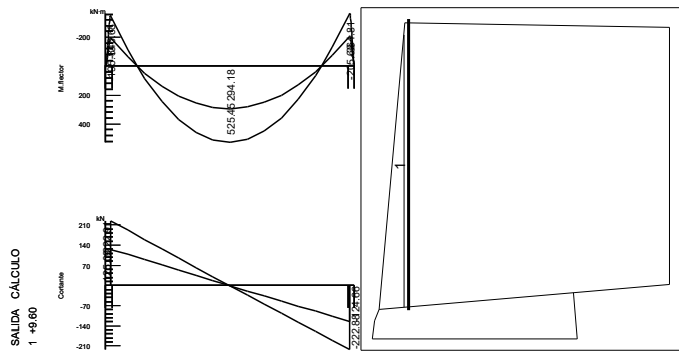
Planta 2, Momento Y (kN·m/m) , 1.35·PP+1.35·CM+1.5·Qa

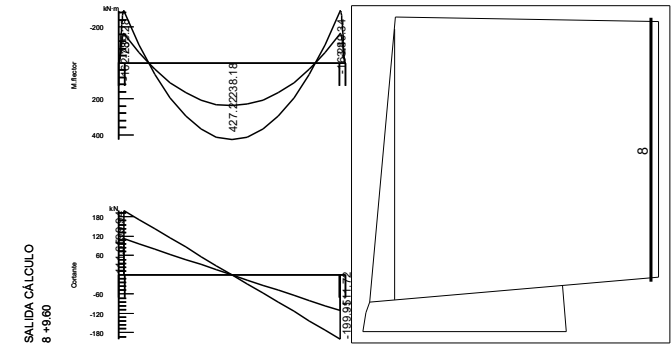
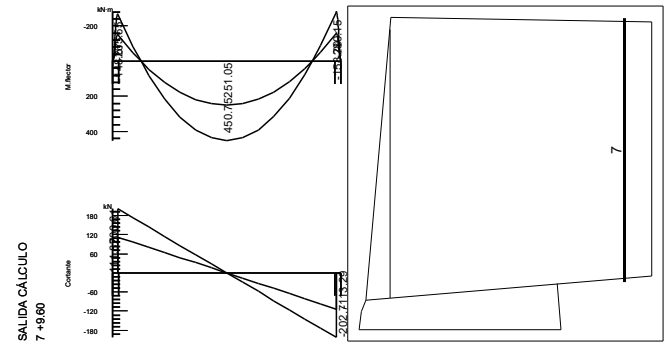
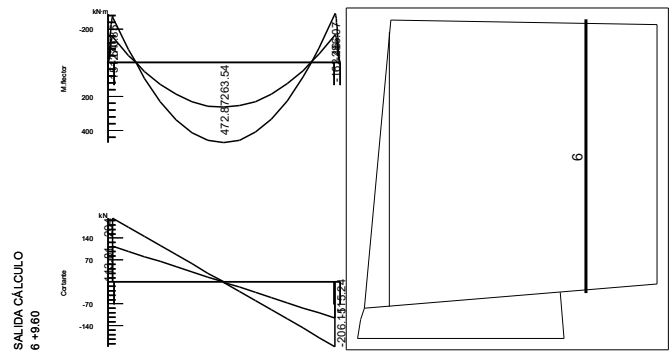
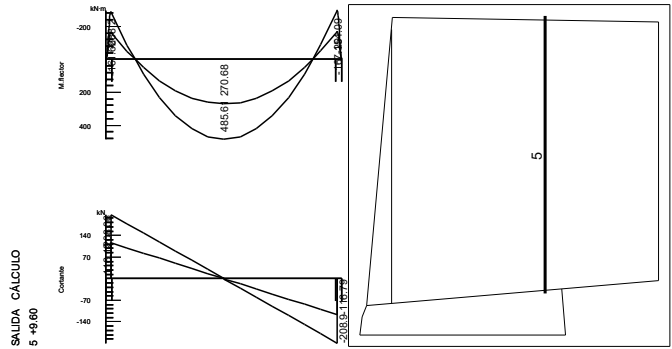


Planta 2, Cortante total (kN/m) , 1.35·PP+1.35·CM+1.5·Qa



| DATOS | | COMPROBACIONES | | RESULTADOS | | |
|---|---------------------|---|---|--------------------|--------------------------|--|
| $F_{sd} =$ | 72,00 t | | | | | |
| $\beta =$ | 1,15 | $F_{sd,ef} =$ | 82,80 t | → | ↘ | |
| $a =$ | 0,35 m | | | | | |
| $b =$ | 0,35 m | | | $u_0 =$ | 1,40 m | |
| $d =$ | 0,163 m | [1] | $V_{u1} > F_{sd,ef}$ | $\xi =$ | 2,11 | |
| $f_{ck} =$ | 30 MPa | $V_{u1} =$ | 136,92 t | VALE | ↘ | |
| $f_{y\alpha,d} =$ | 4 t/cm ² | | | $u_1 =$ | 3,45 m | |
| $\rho =$ | 3,00 ‰ | [2] | $\tau_{rd}^* \cdot u_1 \cdot d < F_{sd,ef}$ | $\tau_{rd}^* =$ | 54,07 t/m ² | |
| $\alpha =$ | 90 ° | $\tau_{rd}^* \cdot u_1 \cdot d =$ | 30,39 t | ARMAR | ↘ | |
| $\theta =$ | 45 ° | | | $V_{cu} =$ | 30,39 t | |
| $s =$ | 0,20 m < 0,122 m | | | $V_{su} =$ | 52 t | |
| $s_{cara\ pilar} =$ | 0,10 m < 0,082 m | | | $u_{n,ef} =$ | 8,17 m | |
| $n =$ | 28 ramas/1ª fila | | | $A_v =$ | 89 cm ² /m | |
| | | | | $A_{sw} =$ | 18 cm ² /fila | |
| | | | | $\rho_{critico} =$ | 5,63 ‰ | |
|  | |  | | | | |
| | | $L =$ | 0,87 | m | | |
| | | $Sup =$ | 0,64 | cm ² | | |
| | | $\phi_{ramas} =$ | Ø10 | ↘ | | |
|  | |  | | | | |
| | | $L =$ | 0,52 | m | | |
| | | $Sup =$ | 0,64 | cm ² | | |
| | | $\phi_{ramas} =$ | Ø10 | ↘ | | |





| | |
|--|----------------|
| JESUS JIMENEZ CAÑAS & ASOCIADOS | |
| REORDENACIÓN DEL PASEO DE LAS CANTERAS PROYECTO DE ESTRUCTURA. ANEJO DE CÁLCULO. | DICIEMBRE 2015 |

3.- PASARELA

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1.- DATOS DE OBRA

1.1.- Normas consideradas

Cimentación: EHE-08

Hormigón: EHE-08

Categoría de uso: C. Zonas de acceso al público

1.2.- Estados límite

| | |
|---|--|
| E.L.U. de rotura. Hormigón | CTE |
| E.L.U. de rotura. Hormigón en cimentaciones | Cota de nieve: Altitud inferior o igual a 1000 m |
| Tensiones sobre el terreno | Acciones características |
| Desplazamientos | |

1.2.1.- Situaciones de proyecto

Para las distintas situaciones de proyecto, las combinaciones de acciones se definirán de acuerdo con los siguientes criterios:

- Situaciones persistentes o transitorias
- Con coeficientes de combinación

$$\sum_{j \geq 1} \gamma_{Gj} G_{kj} + \gamma_P P_k + \gamma_{Q1} \Psi_{p1} Q_{k1} + \sum_{i \geq 1} \gamma_{Qi} \Psi_{ai} Q_{ki}$$

- Sin coeficientes de combinación

$$\sum_{j \geq 1} \gamma_{Gj} G_{kj} + \gamma_P P_k + \sum_{i \geq 1} \gamma_{Qi} Q_{ki}$$

- Situaciones sísmicas
- Con coeficientes de combinación

$$\sum_{j \geq 1} \gamma_{Gj} G_{kj} + \gamma_P P_k + \gamma_{AE} A_E + \sum_{i \geq 1} \gamma_{Qi} \Psi_{ai} Q_{ki}$$

- Sin coeficientes de combinación

$$\sum_{j \geq 1} \gamma_{Gj} G_{kj} + \gamma_P P_k + \gamma_{AE} A_E + \sum_{i \geq 1} \gamma_{Qi} Q_{ki}$$

- Donde:

- G_k Acción permanente
- P_k Acción de pretensado
- Q_k Acción variable
- A_E Acción sísmica
- γ_G Coeficiente parcial de seguridad de las acciones permanentes
- γ_P Coeficiente parcial de seguridad de la acción de pretensado
- $\gamma_{Q,1}$ Coeficiente parcial de seguridad de la acción variable principal
- $\gamma_{Q,i}$ Coeficiente parcial de seguridad de las acciones variables de acompañamiento
- γ_{AE} Coeficiente parcial de seguridad de la acción sísmica
- $\Psi_{p,1}$ Coeficiente de combinación de la acción variable principal
- $\Psi_{a,i}$ Coeficiente de combinación de las acciones variables de acompañamiento

Para cada situación de proyecto y estado límite los coeficientes a utilizar serán:

E.L.U. de rotura. Hormigón: EHE-08

| Persistente o transitoria | | | | |
|---------------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_a) |
| Carga permanente (G) | 1.000 | 1.350 | - | - |
| Sobrecarga (Q) | 0.000 | 1.500 | 1.000 | 0.700 |
| Retracción (R) | 1.000 | 1.350 | - | - |
| Viento (Q) | 0.000 | 1.500 | 1.000 | 0.600 |
| Temperatura (T) | 0.000 | 1.500 | 1.000 | 0.600 |



| Sísmica | | | | |
|--|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_s) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 0.600 | 0.600 |
| Retracción (R) | 1.000 | 1.000 | - | - |
| Viento (Q) | 0.000 | 1.000 | 0.000 | 0.000 |
| Temperatura (T) | 0.000 | 1.000 | 0.000 | 0.000 |
| Sismo (E) | -1.000 | 1.000 | 1.000 | 0.300 ⁽¹⁾ |
| Notas: ⁽¹⁾ Fracción de las solicitaciones sísmicas a considerar en la dirección ortogonal: Las solicitaciones obtenidas de los resultados del análisis en cada una de las direcciones ortogonales se combinarán con el 30 % de los de la otra. | | | | |

E.L.U. de rotura. Hormigón en cimentaciones: EHE-08 / CTE DB-SE C

| Persistente o transitoria | | | | |
|---------------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_s) |
| Carga permanente (G) | 1.000 | 1.600 | - | - |
| Sobrecarga (Q) | 0.000 | 1.600 | 1.000 | 0.700 |
| Retracción (R) | 1.000 | 1.600 | - | - |
| Viento (Q) | 0.000 | 1.600 | 1.000 | 0.600 |
| Temperatura (T) | 0.000 | 1.600 | 1.000 | 0.600 |

| Sísmica | | | | |
|--|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_s) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 0.600 | 0.600 |
| Retracción (R) | 1.000 | 1.000 | - | - |
| Viento (Q) | 0.000 | 1.000 | 0.000 | 0.000 |
| Temperatura (T) | 0.000 | 1.000 | 0.000 | 0.000 |
| Sismo (E) | -1.000 | 1.000 | 1.000 | 0.300 ⁽¹⁾ |
| Notas: ⁽¹⁾ Fracción de las solicitaciones sísmicas a considerar en la dirección ortogonal: Las solicitaciones obtenidas de los resultados del análisis en cada una de las direcciones ortogonales se combinarán con el 30 % de los de la otra. | | | | |

Tensiones sobre el terreno

| Característica | | | | |
|----------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_s) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 1.000 | 1.000 |
| Retracción (R) | 1.000 | 1.000 | - | - |
| Viento (Q) | 0.000 | 1.000 | 1.000 | 1.000 |
| Temperatura (T) | 0.000 | 1.000 | 1.000 | 1.000 |

| Sísmica | | | | |
|----------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_s) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 1.000 | 1.000 |
| Retracción (R) | 1.000 | 1.000 | - | - |
| Viento (Q) | | | | |
| Temperatura (T) | | | | |
| Sismo (E) | -1.000 | 1.000 | 1.000 | 0.000 |

Desplazamientos



| Característica | | | | |
|----------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_s) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 1.000 | 1.000 |
| Retracción (R) | 1.000 | 1.000 | - | - |
| Viento (Q) | 0.000 | 1.000 | 1.000 | 1.000 |
| Temperatura (T) | 0.000 | 1.000 | 1.000 | 1.000 |

| Sísmica | | | | |
|----------------------|--|--------------|--|-----------------------------|
| | Coeficientes parciales de seguridad (γ) | | Coeficientes de combinación (ψ) | |
| | Favorable | Desfavorable | Principal (ψ_p) | Acompañamiento (ψ_s) |
| Carga permanente (G) | 1.000 | 1.000 | - | - |
| Sobrecarga (Q) | 0.000 | 1.000 | 1.000 | 1.000 |
| Retracción (R) | 1.000 | 1.000 | - | - |
| Viento (Q) | | | | |
| Temperatura (T) | | | | |
| Sismo (E) | -1.000 | 1.000 | 1.000 | 0.000 |

1.3.- Sismo

Norma utilizada: NCSE-02

Norma de Construcción Sismorresistente NCSE-02

Método de cálculo: Análisis mediante espectros de respuesta (NCSE-02, 3.6.2)

1.3.1.- Datos generales de sismo

Caracterización del emplazamiento

a_b : Aceleración básica (NCSE-02, 2.1 y Anejo 1)

a_b : 0.040 g

K: Coeficiente de contribución (NCSE-02, 2.1 y Anejo 1)

K : 1.00

Tipo de suelo (NCSE-02, 2.4): Tipo III

Sistema estructural

Ductilidad (NCSE-02, Tabla 3.1): Ductilidad baja

W: Amortiguamiento (NCSE-02, Tabla 3.1)

W : 4.00 %

Tipo de construcción (NCSE-02, 2.2): Construcciones de importancia normal

Parámetros de cálculo

Número de modos de vibración que intervienen en el análisis: Según norma

Fracción de sobrecarga de uso

: 0.50

Fracción de sobrecarga de nieve

: 0.50

No se realiza análisis de los efectos de 2º orden

Direcciones de análisis

Acción sísmica según X

Acción sísmica según Y

2.- ESTRUCTURA

2.1.- Geometría

2.1.1.- Nudos

Referencias:

Δ_x , Δ_y , Δ_z : Desplazamientos prescritos en ejes globales.

θ_x , θ_y , θ_z : Giros prescritos en ejes globales.

Cada grado de libertad se marca con 'X' si está coaccionado y, en caso contrario, con '-'.



| Nudos | | | | | | | | | | |
|------------|-------------|----------|----------|----------------------|------------|------------|------------|------------|------------|----------------------|
| Referencia | Coordenadas | | | Vinculación exterior | | | | | | Vinculación interior |
| | X (m) | Y (m) | Z (m) | Δ_x | Δ_y | Δ_z | θ_x | θ_y | θ_z | |
| N1 | 2.108 | -350.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N2 | 17.071 | -350.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N3 | 25.020 | -353.246 | 8.259 | - | - | - | - | - | - | Empotrado |
| N4 | 26.157 | -350.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N5 | 42.288 | -350.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N6 | 43.791 | -353.324 | 8.259 | - | - | - | - | - | - | Empotrado |
| N7 | 50.125 | -350.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N8 | 68.401 | -350.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N9 | 73.620 | -352.590 | 8.259 | - | - | - | - | - | - | Empotrado |
| N10 | 74.680 | -350.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N11 | 91.992 | -350.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N12 | 93.276 | -352.549 | 8.259 | - | - | - | - | - | - | Empotrado |
| N13 | 97.434 | -350.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N14 | 112.236 | -350.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N15 | 112.614 | -353.653 | 8.259 | - | - | - | - | - | - | Empotrado |
| N16 | 116.253 | -353.321 | 8.259 | - | - | - | - | - | - | Empotrado |
| N17 | 0.560 | -340.391 | 8.259 | - | - | - | - | - | - | Empotrado |
| N18 | 16.107 | -340.708 | 8.259 | - | - | - | - | - | - | Empotrado |
| N19 | 16.128 | -339.708 | 8.259 | - | - | - | - | - | - | Empotrado |
| N20 | 44.763 | -340.293 | 8.259 | - | - | - | - | - | - | Empotrado |
| N21 | 44.763 | -339.293 | 8.259 | - | - | - | - | - | - | Empotrado |
| N22 | 65.474 | -339.716 | 8.259 | - | - | - | - | - | - | Empotrado |
| N23 | 65.474 | -338.716 | 8.259 | - | - | - | - | - | - | Empotrado |
| N24 | 93.563 | -339.289 | 8.259 | - | - | - | - | - | - | Empotrado |
| N25 | 93.583 | -338.289 | 8.259 | - | - | - | - | - | - | Empotrado |
| N26 | 116.731 | -338.762 | 8.259 | - | - | - | - | - | - | Empotrado |
| N27 | 1.951 | -349.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N28 | 17.254 | -349.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N29 | 24.438 | -351.957 | 8.259 | - | - | - | - | - | - | Empotrado |
| N30 | 25.467 | -349.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N31 | 42.913 | -349.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N32 | 44.252 | -351.987 | 8.259 | - | - | - | - | - | - | Empotrado |
| N33 | 49.894 | -349.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N34 | 68.616 | -349.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N35 | 73.119 | -351.268 | 8.259 | - | - | - | - | - | - | Empotrado |
| N36 | 74.033 | -349.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N37 | 92.580 | -349.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N38 | 93.664 | -351.189 | 8.259 | - | - | - | - | - | - | Empotrado |
| N39 | 97.174 | -349.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N40 | 112.952 | -349.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N41 | 113.324 | -352.790 | 8.259 | - | - | - | - | - | - | Empotrado |
| N42 | 116.279 | -352.541 | 8.259 | - | - | - | - | - | - | Empotrado |
| N43 | 0.718 | -341.394 | 8.259 | - | - | - | - | - | - | Empotrado |
| N44 | 17.107 | -341.729 | 8.259 | - | - | - | - | - | - | Empotrado |
| N45 | 17.128 | -340.729 | 8.259 | - | - | - | - | - | - | Empotrado |
| N46 | 45.763 | -341.313 | 8.259 | - | - | - | - | - | - | Empotrado |
| N47 | 45.783 | -340.314 | 8.259 | - | - | - | - | - | - | Empotrado |
| N48 | 66.474 | -340.736 | 8.259 | - | - | - | - | - | - | Empotrado |
| N49 | 66.474 | -339.736 | 8.259 | - | - | - | - | - | - | Empotrado |
| N50 | 94.563 | -340.309 | 8.259 | - | - | - | - | - | - | Empotrado |
| N51 | 94.583 | -339.310 | 8.259 | - | - | - | - | - | - | Empotrado |
| N52 | 116.698 | -339.761 | 8.259 | - | - | - | - | - | - | Empotrado |
| N53 | 18.168 | -347.687 | 0.709 | X | X | X | - | - | - | Empotrado |
| N54 | 18.168 | -347.687 | 8.259 | - | - | - | - | - | - | Empotrado |
| N55 | 20.150 | -342.449 | 0.709 | X | X | X | - | - | - | Empotrado |
| N56 | 20.150 | -342.449 | 8.259 | - | - | - | - | - | - | Empotrado |
| N57 | 23.406 | -349.669 | 0.709 | X | X | X | - | - | - | Empotrado |
| N58 | 23.406 | -349.669 | 8.259 | - | - | - | - | - | - | Empotrado |
| N59 | 25.388 | -344.431 | 0.709 | X | X | X | - | - | - | Empotrado |



| Nudos | | | | | | | | | | |
|------------|-------------|----------|----------|----------------------|------------|------------|------------|------------|------------|----------------------|
| Referencia | Coordenadas | | | Vinculación exterior | | | | | | Vinculación interior |
| | X (m) | Y (m) | Z (m) | Δ_x | Δ_y | Δ_z | θ_x | θ_y | θ_z | |
| N60 | 25.388 | -344.431 | 8.259 | - | - | - | - | - | - | Empotrado |
| N61 | 45.070 | -349.614 | 0.709 | X | X | X | - | - | - | Empotrado |
| N62 | 45.070 | -349.614 | 8.259 | - | - | - | - | - | - | Empotrado |
| N63 | 42.618 | -344.580 | 0.709 | X | X | X | - | - | - | Empotrado |
| N64 | 42.618 | -344.580 | 8.259 | - | - | - | - | - | - | Empotrado |
| N65 | 47.652 | -342.127 | 0.709 | X | X | X | - | - | - | Empotrado |
| N66 | 47.652 | -342.127 | 8.259 | - | - | - | - | - | - | Empotrado |
| N67 | 50.105 | -347.162 | 0.709 | X | X | X | - | - | - | Empotrado |
| N68 | 50.105 | -347.162 | 8.259 | - | - | - | - | - | - | Empotrado |
| N69 | 67.124 | -346.618 | 0.709 | X | X | X | - | - | - | Empotrado |
| N70 | 67.124 | -346.618 | 8.259 | - | - | - | - | - | - | Empotrado |
| N71 | 69.424 | -341.512 | 0.709 | X | X | X | - | - | - | Empotrado |
| N72 | 69.424 | -341.512 | 8.259 | - | - | - | - | - | - | Empotrado |
| N73 | 74.530 | -343.813 | 0.709 | X | X | X | - | - | - | Empotrado |
| N74 | 74.530 | -343.813 | 8.259 | - | - | - | - | - | - | Empotrado |
| N75 | 72.229 | -348.918 | 0.709 | X | X | X | - | - | - | Empotrado |
| N76 | 72.229 | -348.918 | 8.259 | - | - | - | - | - | - | Empotrado |
| N77 | 2.200 | -348.137 | 0.709 | X | X | X | - | - | - | Empotrado |
| N78 | 2.200 | -348.137 | 8.259 | - | - | - | - | - | - | Empotrado |
| N79 | 2.200 | -342.535 | 0.709 | X | X | X | - | - | - | Empotrado |
| N80 | 2.200 | -342.535 | 8.259 | - | - | - | - | - | - | Empotrado |
| N81 | 91.753 | -343.923 | 0.709 | X | X | X | - | - | - | Empotrado |
| N82 | 91.753 | -343.923 | 8.259 | - | - | - | - | - | - | Empotrado |
| N83 | 96.619 | -341.152 | 0.709 | X | X | X | - | - | - | Empotrado |
| N84 | 96.619 | -341.152 | 8.259 | - | - | - | - | - | - | Empotrado |
| N85 | 99.390 | -346.018 | 0.709 | X | X | X | - | - | - | Empotrado |
| N86 | 99.390 | -346.018 | 8.259 | - | - | - | - | - | - | Empotrado |
| N87 | 94.524 | -348.790 | 0.709 | X | X | X | - | - | - | Empotrado |
| N88 | 94.524 | -348.790 | 8.259 | - | - | - | - | - | - | Empotrado |
| N89 | 115.028 | -347.987 | 0.709 | X | X | X | - | - | - | Empotrado |
| N90 | 115.028 | -347.987 | 8.259 | - | - | - | - | - | - | Empotrado |
| N91 | 115.028 | -342.386 | 0.709 | X | X | X | - | - | - | Empotrado |
| N92 | 115.028 | -342.386 | 8.259 | - | - | - | - | - | - | Empotrado |
| N93 | 17.540 | -349.347 | 8.259 | - | - | - | - | - | - | Empotrado |
| N94 | 20.773 | -340.803 | 8.259 | - | - | - | - | - | - | Empotrado |
| N95 | 38.095 | -349.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N96 | 44.002 | -351.474 | 8.259 | - | - | - | - | - | - | Empotrado |
| N97 | 44.736 | -351.751 | 8.259 | - | - | - | - | - | - | Empotrado |
| N98 | 25.066 | -350.297 | 8.259 | - | - | - | - | - | - | Empotrado |
| N99 | 43.475 | -350.392 | 8.259 | - | - | - | - | - | - | Empotrado |
| N100 | 49.073 | -347.664 | 8.259 | - | - | - | - | - | - | Empotrado |
| N101 | 63.422 | -340.674 | 8.259 | - | - | - | - | - | - | Empotrado |
| N102 | 46.779 | -340.334 | 8.259 | - | - | - | - | - | - | Empotrado |
| N103 | 35.258 | -348.165 | 8.259 | - | - | - | - | - | - | Empotrado |
| N104 | 45.007 | -343.416 | 8.259 | - | - | - | - | - | - | Empotrado |
| N105 | 65.943 | -349.239 | 8.259 | - | - | - | - | - | - | Empotrado |
| N106 | 70.190 | -339.812 | 8.259 | - | - | - | - | - | - | Empotrado |
| N107 | 73.849 | -349.648 | 8.259 | - | - | - | - | - | - | Empotrado |
| N108 | 76.276 | -339.936 | 8.259 | - | - | - | - | - | - | Empotrado |
| N109 | 95.355 | -350.250 | 8.259 | - | - | - | - | - | - | Empotrado |
| N110 | 89.637 | -340.209 | 8.259 | - | - | - | - | - | - | Empotrado |
| N111 | 110.596 | -339.637 | 8.259 | - | - | - | - | - | - | Empotrado |
| N112 | 95.581 | -339.330 | 8.259 | - | - | - | - | - | - | Empotrado |
| N113 | 115.028 | -352.646 | 8.259 | - | - | - | - | - | - | Empotrado |
| N114 | 115.028 | -339.727 | 8.259 | - | - | - | - | - | - | Empotrado |
| N115 | 2.200 | -341.424 | 8.259 | - | - | - | - | - | - | Empotrado |
| N116 | 2.200 | -349.239 | 8.259 | - | - | - | - | - | - | Empotrado |



2.1.2.- Barras

2.1.2.1.- Materiales utilizados

| Materiales utilizados | | | | | | |
|--|---------------|------------|-------|------------|-----------------------|---------------------|
| Material | | E (MPa) | ν | G (MPa) | α_t (m/m°C) | γ (kN/m³) |
| Tipo | Designación | | | | | |
| Hormigón | HA-35, Yc=1.5 | 29779.00 | 0.200 | 12407.92 | 0.000010 | 24.53 |
| Notación: E: Módulo de elasticidad ν : Módulo de Poisson G: Módulo de cortadura α_t : Coeficiente de dilatación γ : Peso específico | | | | | | |

2.1.2.2.- Descripción

| Descripción | | | | | | | | | |
|---|---------------|------------------|------------------|----------------------------|-----------------|--------------|--------------|---------------------------|---------------------------|
| Material | | Barra (Ni/Nf) | Pieza (Ni/Nf) | Perfil(Serie) | Longitud (m) | β_{xy} | β_{xz} | Lb _{sup.} (m) | Lb _{inf.} (m) |
| Tipo | Designación | | | | | | | | |
| Hormigón | HA-35, Yc=1.5 | N53/N54 | N53/N54 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N55/N56 | N55/N56 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N57/N58 | N57/N58 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N59/N60 | N59/N60 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N61/N62 | N61/N62 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N63/N64 | N63/N64 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N65/N66 | N65/N66 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N67/N68 | N67/N68 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N69/N70 | N69/N70 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N71/N72 | N71/N72 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N73/N74 | N73/N74 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N75/N76 | N75/N76 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N77/N78 | N77/N78 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N79/N80 | N79/N80 | 150x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N81/N82 | N81/N82 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N83/N84 | N83/N84 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N85/N86 | N85/N86 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N87/N88 | N87/N88 | 75x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N89/N90 | N89/N90 | 110x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| | | N91/N92 | N91/N92 | 165x75 (Pilar rectangular) | 7.550 | 1.00 | 1.00 | - | - |
| Notación: Ni: Nudo inicial Nf: Nudo final β_{xy} : Coeficiente de pandeo en el plano 'XY' β_{xz} : Coeficiente de pandeo en el plano 'XZ' Lb _{sup.} : Separación entre arriostramientos del ala superior Lb _{inf.} : Separación entre arriostramientos del ala inferior | | | | | | | | | |

2.1.2.3.- Características mecánicas

| Tipos de pieza | |
|----------------|--|
| Ref. | Piezas |
| 1 | N53/N54, N55/N56, N57/N58, N59/N60, N61/N62, N63/N64, N65/N66, N67/N68, N69/N70, N71/N72, N73/N74, N75/N76, N77/N78, N81/N82, N83/N84, N85/N86 y N87/N88 |
| 2 | N79/N80 |
| 3 | N89/N90 |
| 4 | N91/N92 |

| Características mecánicas | | | | | | | | | |
|---------------------------|---------------|------|-----------------------------|------------|--------------|--------------|--------------------------|--------------------------|-------------------------|
| Material | | Ref. | Descripción | A (cm²) | Avy (cm²) | Avz (cm²) | I _{yy} (cm⁴) | I _{zz} (cm⁴) | I _t (cm⁴) |
| Tipo | Designación | | | | | | | | |
| Hormigón | HA-35, Yc=1.5 | 1 | 75x75, (Pilar rectangular) | 5625.00 | 4687.50 | 4687.50 | 2636718.75 | 2636718.75 | 4429687.50 |
| | | 2 | 150x75, (Pilar rectangular) | 11250.00 | 9375.00 | 9375.00 | 5273437.50 | 21093750.00 | 14491406.25 |
| | | 3 | 110x75, (Pilar rectangular) | 8250.00 | 6875.00 | 6875.00 | 3867187.50 | 8318750.00 | 8940937.50 |
| | | 4 | 165x75, (Pilar rectangular) | 12375.00 | 10312.50 | 10312.50 | 5800781.25 | 28075781.25 | 16413890.63 |



Listados

CALCULADO DATOS OK

Fecha: 29/11/15

| Características mecánicas | | | | | | | | | |
|---|-------------|------|-------------|-------------------------|---------------------------|---------------------------|--------------|--------------|-------------|
| Material | | Ref. | Descripción | A (cm ²) | Avy (cm ²) | Avz (cm ²) | Iyy (cm4) | Izz (cm4) | It (cm4) |
| Tipo | Designación | | | | | | | | |
| Notación: Ref.: Referencia A: Área de la sección transversal Avy: Área de cortante de la sección según el eje local 'Y' Avz: Área de cortante de la sección según el eje local 'Z' Iyy: Inercia de la sección alrededor del eje local 'Y' Izz: Inercia de la sección alrededor del eje local 'Z' It: Inercia a torsión Las características mecánicas de las piezas corresponden a la sección en el punto medio de las mismas. | | | | | | | | | |

2.1.3.- Láminas

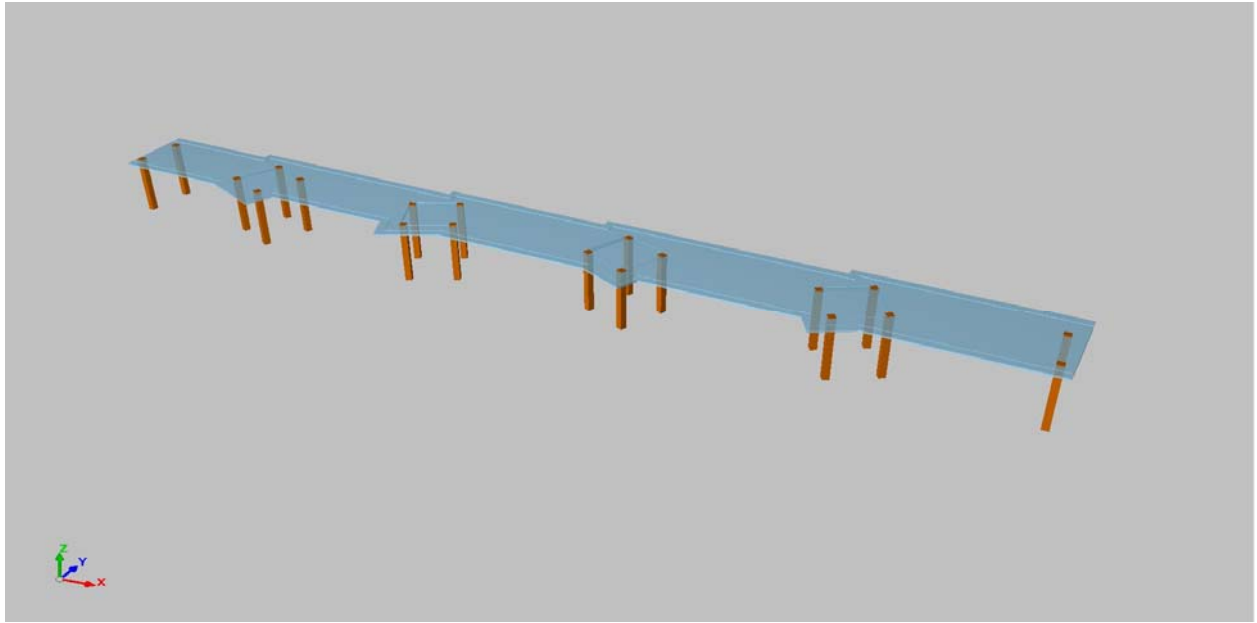
2.1.3.1.- Materiales utilizados

| Materiales utilizados | | | | | |
|---|---------------|------------|-------|------------|---------------------------|
| Material | | E (MPa) | ν | G (MPa) | α _t (m/m°C) |
| Tipo | Designación | | | | |
| Hormigón | HA-45, Yc=1.5 | 31928.00 | 0.200 | 13303.33 | 0.000010 |
| Notación: E: Módulo de elasticidad ν: Módulo de Poisson G: Módulo de cortadura α _t : Coeficiente de dilatación g: Peso específico | | | | | |

2.1.3.2.- Descripción

| Material | | Lámina | Descripción | Espesor (mm) | Área (m²) | Vinc. interior |
|----------|----------------|--------|--|--------------|-----------|------------------|
| Tipo | Designación | | | | | |
| Hormigón | HA-45, Yc= 1.5 | L1 | N95, N30, N98, N29, N93, N28, N116, N27, N1, N2, N3, N4, N5, N6, N7, N8, N9, N10, N11, N12, N13, N14, N15, N16, N42, N113, N41, N40, N39, N109, N38, N37, N36, N107, N35, N34, N105, N33, N97, N32, N96, N99 y N31 | 200.0 | 124.687 | Todas empotradas |
| | | L2 | N24, N23, N22, N21, N20, N19, N18, N17, N43, N115, N44, N45, N94, N46, N47, N102, N101, N48, N49, N106, N108, N110, N50, N51, N112, N111, N114, N52, N26 y N25 | 200.0 | 120.111 | Todas empotradas |
| | | L3 | N58, N54, N93, N29 y N98 | 450.0 | 13.091 | Todas empotradas |
| | | L4 | N60, N56, N54 y N58 | 650.0 | 31.360 | Todas empotradas |
| | | L5 | N103, N60, N58, N98, N30 y N95 | 450.0 | 36.330 | Todas empotradas |
| | | L6 | N101, N102, N66 y N68 | 450.0 | 56.250 | Todas empotradas |
| | | L7 | N46, N94, N56, N60, N103, N64, N104, N66, N102 y N47 | 450.0 | 115.089 | Todas empotradas |
| | | L8 | N104, N64, N62, N100, N68 y N66 | 650.0 | 31.360 | Todas empotradas |
| | | L9 | N95, N31, N99, N62, N64 y N103 | 450.0 | 26.367 | Todas empotradas |
| | | L10 | N48, N101, N68, N100, N62, N99, N96, N32, N97, N33, N105, N70, N72, N106 y N49 | 450.0 | 124.392 | Todas empotradas |
| | | L11 | N105, N34, N35, N107, N76 y N70 | 450.0 | 14.442 | Todas empotradas |
| | | L12 | N74, N72, N70 y N76 | 650.0 | 31.360 | Todas empotradas |
| | | L13 | N108, N106, N72 y N74 | 450.0 | 17.126 | Todas empotradas |
| | | L14 | N36, N37, N38, N109, N88, N82, N110, N108, N74, N76 y N107 | 450.0 | 168.537 | Todas empotradas |
| | | L15 | N111, N112, N84 y N86 | 450.0 | 49.626 | Todas empotradas |
| | | L16 | N84, N82, N88 y N86 | 650.0 | 31.360 | Todas empotradas |
| | | L17 | N50, N110, N82, N84, N112 y N51 | 450.0 | 15.876 | Todas empotradas |
| | | L18 | N39, N40, N41, N113, N90, N92, N114, N111, N86, N88 y N109 | 450.0 | 130.874 | Todas empotradas |
| | | L19 | N52, N114, N92, N90, N113 y N42 | 450.0 | 18.756 | Todas empotradas |
| | | L20 | N115, N43, N27, N116, N78 y N80 | 450.0 | 6.770 | Todas empotradas |
| | | L21 | N44, N115, N80, N78, N116, N28, N93, N54, N56, N94 y N45 | 450.0 | 131.825 | Todas empotradas |

| | |
|--|----------------|
| JESUS JIMENEZ CAÑAS & ASOCIADOS | |
| REORDENACIÓN DEL PASEO DE LAS CANTERAS PROYECTO DE ESTRUCTURA. ANEJO DE CÁLCULO. | DICIEMBRE 2015 |



| | |
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1.- SISMO

Norma utilizada: NCSE-02

Norma de Construcción Sismorresistente NCSE-02

Método de cálculo: Análisis mediante espectros de respuesta (NCSE-02, 3.6.2)

1.1.- Datos generales de sismo

Caracterización del emplazamiento

a_b : Aceleración básica (NCSE-02, 2.1 y Anejo 1)

a_b : 0.040 g

K: Coeficiente de contribución (NCSE-02, 2.1 y Anejo 1)

K : 1.00

Tipo de suelo (NCSE-02, 2.4): Tipo III

Sistema estructural

Ductilidad (NCSE-02, Tabla 3.1): Ductilidad baja

W: Amortiguamiento (NCSE-02, Tabla 3.1)

W : 4.00 %

Tipo de construcción (NCSE-02, 2.2): Construcciones de importancia especial

Parámetros de cálculo

Número de modos de vibración que intervienen en el análisis: Automático, hasta alcanzar un porcentaje exigido de masa desplazada (99 %)

Fracción de sobrecarga de uso

: 0.60

Fracción de sobrecarga de nieve

: 0.50

Se realiza análisis de los efectos de 2º orden

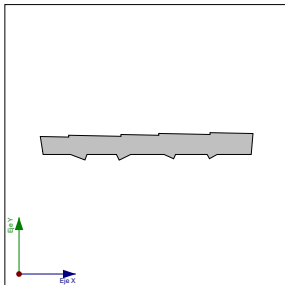
Valor para multiplicar los desplazamientos 1.20

Criterio de armado a aplicar por ductilidad: Ninguno

Direcciones de análisis

Acción sísmica según X

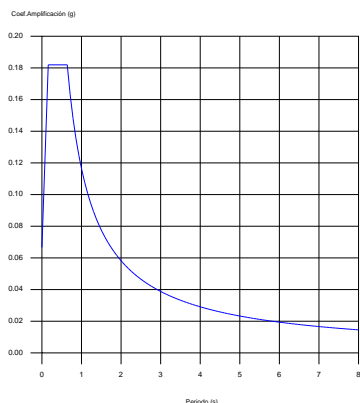
Acción sísmica según Y



Proyección en planta de la obra

1.2.- Espectro de cálculo

1.2.1.- Espectro elástico de aceleraciones



Coef. Amplificación:

$$S_{ae} = a_c \cdot \alpha(T)$$

Donde:

$$\alpha(T) = 1 + (2,5 \cdot v - 1) \cdot \frac{T}{T_A}$$

$$T < T_A$$

$$\alpha(T) = 2,5 \cdot v$$

$$T_A \leq T \leq T_B$$

$$\alpha(T) = \frac{K \cdot C}{T} \cdot v$$

$$T > T_B$$

es el espectro normalizado de respuesta elástica.

El valor máximo de las ordenadas espectrales es 0.182 g.

NCSE-02 (2.2, 2.3 y 2.4)

Parámetros necesarios para la definición del espectro

a_c : Aceleración sísmica de cálculo (NCSE-02, 2.2)

a_c : 0.067 g



Justificación de la acción sísmica

CALCULADA CON REFUERZOS

Fecha: 29/11/15

$$a_c = S \cdot \rho \cdot a_b$$

a_b : Aceleración básica (NCSE-02, 2.1 y Anejo 1)

$$a_b : 0.040 \text{ g}$$

r : Coeficiente adimensional de riesgo

$$r : 1.30$$

Tipo de construcción: Construcciones de importancia especial

S : Coeficiente de amplificación del terreno (NCSE-02, 2.2)

$$S : 1.28$$

$$S = \frac{C}{1.25}$$

$$\rho \cdot a_b \leq 0.1g$$

$$S = \frac{C}{1.25} + 3.33 \cdot \left(\rho \cdot \frac{a_b}{g} - 0.1 \right) \cdot \left(1 - \frac{C}{1.25} \right)$$

$$0.1g < \rho \cdot a_b < 0.4g$$

$$S = 1.0$$

$$0.4g \leq \rho \cdot a_b$$

C : Coeficiente del terreno (NCSE-02, 2.4)

$$C : 1.60$$

Tipo de suelo (NCSE-02, 2.4): Tipo III

a_b : Aceleración básica (NCSE-02, 2.1 y Anejo 1)

$$a_b : 0.040 \text{ g}$$

r : Coeficiente adimensional de riesgo

$$r : 1.30$$

n : Coeficiente dependiente del amortiguamiento (NCSE-02, 2.5)

$$n : 1.09$$

$$v = \left(\frac{5}{\Omega} \right)^{0.4}$$

W : Amortiguamiento (NCSE-02, Tabla 3.1)

$$W : 4.00 \%$$

T_A : Periodo característico del espectro (NCSE-02, 2.3)

$$T_A : 0.16 \text{ s}$$

$$T_A = \frac{K \cdot C}{10}$$

K : Coeficiente de contribución (NCSE-02, 2.1 y Anejo 1)

$$K : 1.00$$

C : Coeficiente del terreno (NCSE-02, 2.4)

$$C : 1.60$$

Tipo de suelo (NCSE-02, 2.4): Tipo III

T_B : Periodo característico del espectro (NCSE-02, 2.3)

$$T_B : 0.64 \text{ s}$$

$$T_B = \frac{K \cdot C}{2.5}$$

K : Coeficiente de contribución (NCSE-02, 2.1 y Anejo 1)

$$K : 1.00$$

C : Coeficiente del terreno (NCSE-02, 2.4)

$$C : 1.60$$

Tipo de suelo (NCSE-02, 2.4): Tipo III

1.2.2.- Espectro de diseño de aceleraciones

El espectro de diseño sísmico se obtiene reduciendo el espectro elástico por el coeficiente (μ) correspondiente a cada dirección de análisis.

$$S_a = a_c \cdot \left(1 + \left(2.5 \cdot \frac{v}{\mu} - 1 \right) \cdot \frac{T}{T_A} \right) \quad T < T_A$$

$$S_a = a_c \cdot 2.5 \cdot \frac{v}{\mu} \quad T_A \leq T \leq T_B$$

$$S_a = a_c \cdot \frac{K \cdot C}{T} \cdot \frac{v}{\mu} \quad T > T_B$$

b : Coeficiente de respuesta

$$b : 0.55$$

$$\beta = \frac{v}{\mu}$$

n : Coeficiente dependiente del amortiguamiento (NCSE-02, 2.5)

$$n : 1.09$$

$$v = \left(\frac{5}{\Omega} \right)^{0.4}$$

W : Amortiguamiento (NCSE-02, Tabla 3.1)

$$W : 4.00 \%$$

m : Coeficiente de comportamiento por ductilidad (NCSE-02, 3.7.3.1)

$$m : 2.00$$

Ductilidad (NCSE-02, Tabla 3.1): Ductilidad baja

a_c : Aceleración sísmica de cálculo (NCSE-02, 2.2)

$$a_c : 0.067 \text{ g}$$

K : Coeficiente de contribución (NCSE-02, 2.1 y Anejo 1)

$$K : 1.00$$

C : Coeficiente del terreno (NCSE-02, 2.4)

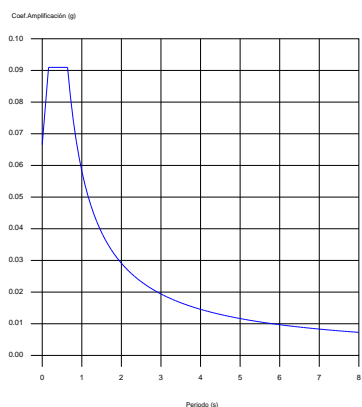
$$C : 1.60$$

T_A : Periodo característico del espectro (NCSE-02, 2.3)

$$T_A : 0.16 \text{ s}$$

T_B : Periodo característico del espectro (NCSE-02, 2.3)

$$T_B : 0.64 \text{ s}$$



1.3.- Coeficientes de participación

| Modo | T | L _x | L _y | L _{gz} | M _x | M _y | Hipótesis X(1) | Hipótesis Y(1) |
|--------|-------|----------------|----------------|-----------------|----------------|----------------|---|---|
| Modo 1 | 0.573 | 0.0844 | 0.0527 | 0.995 | 65.86 % | 25.73 % | R = 2 A = 0.892 m/s ² D = 7.42591 mm | R = 2 A = 0.892 m/s ² D = 7.42591 mm |
| Modo 2 | 0.570 | 0.0636 | 0.0845 | 0.9944 | 33.42 % | 59.09 % | R = 2 A = 0.892 m/s ² D = 7.33855 mm | R = 2 A = 0.892 m/s ² D = 7.33855 mm |
| Modo 3 | 0.531 | 0.0028 | 0.0128 | 0.9999 | 0.7 % | 15.18 % | R = 2 A = 0.892 m/s ² D = 6.37787 mm | R = 2 A = 0.892 m/s ² D = 6.37787 mm |
| Total | | | | | 99.98 % | 100 % | | |

T: Periodo de vibración en segundos.

L_x, L_y: Coeficientes de participación normalizados en cada dirección del análisis.

L_{gz}: Coeficiente de participación normalizado correspondiente al grado de libertad rotacional.

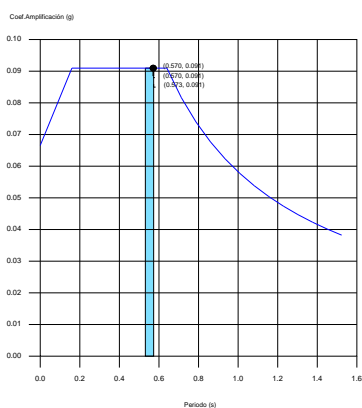
M_x, M_y: Porcentaje de masa desplazada por cada modo en cada dirección del análisis.

R: Relación entre la aceleración de cálculo usando la ductilidad asignada a la estructura y la aceleración de cálculo obtenida sin ductilidad.

A: Aceleración de cálculo, incluyendo la ductilidad.

D: Coeficiente del modo. Equivale al desplazamiento máximo del grado de libertad dinámico.

Representación de los periodos modales



Se representa el rango de periodos abarcado por los modos estudiados, con indicación de los modos en los que se desplaza más del 30% de la masa:

| Hipótesis Sismo 1 | | |
|-------------------|-------|-------|
| Hipótesis modal | T (s) | A (g) |
| Modo 1 | 0.573 | 0.091 |
| Modo 2 | 0.570 | 0.091 |
| Modo 2 | 0.570 | 0.091 |



1.4.- Centro de masas, centro de rigidez y excentricidades de cada planta

| Planta | c.d.m. (m) | c.d.r. (m) | e_x (m) | e_y (m) |
|-----------|-----------------|-----------------|--------------|--------------|
| Forjado 1 | (124.32, 15.14) | (122.42, 14.69) | 1.89 | 0.45 |

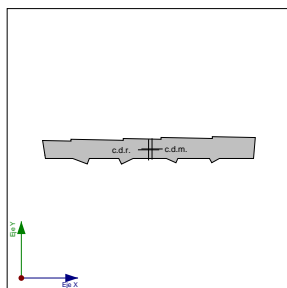
c.d.m.: Coordenadas del centro de masas de la planta (X,Y)

c.d.r.: Coordenadas del centro de rigidez de la planta (X,Y)

e_x : Excentricidad del centro de masas respecto al centro de rigidez (X)

e_y : Excentricidad del centro de masas respecto al centro de rigidez (Y)

Representación gráfica del centro de masas y del centro de rigidez por planta



Forjado 1

1.5.- Cortante sísmico combinado por planta

El valor máximo del cortante por planta en una hipótesis sísmica dada se obtiene mediante la Combinación Cuadrática Completa (CQC) de los correspondientes cortantes modales.

Si la obra tiene vigas con vinculación exterior o estructuras 3D integradas, los esfuerzos de dichos elementos no se muestran en el siguiente listado.

1.5.1.- Cortante sísmico combinado y fuerza sísmica equivalente por planta

Los valores que se muestran en las siguientes tablas no están ajustados por el factor de modificación calculado en el apartado 'Corrección por cortante basal'.

Hipótesis sísmica: Sismo X1

| Planta | Q_x (kN) | $F_{eq,x}$ (kN) | Q_y (kN) | $F_{eq,y}$ (kN) |
|-----------|---------------|--------------------|---------------|--------------------|
| Forjado 1 | 2265.125 | 2265.125 | 1983.405 | 1983.405 |

Hipótesis sísmica: Sismo Y1

| Planta | Q_x (kN) | $F_{eq,x}$ (kN) | Q_y (kN) | $F_{eq,y}$ (kN) |
|-----------|---------------|--------------------|---------------|--------------------|
| Forjado 1 | 1983.752 | 1983.752 | 2131.100 | 2131.100 |

Distorsiones de pilares

Nombre Obra: 3DR_pasarela-v18

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▪ h: Altura del nivel respecto al inmediato inferior

▪ Distorsión:

Absoluta: Diferencia entre los desplazamientos de un nivel y los del inmediatamente inferior

Relativa: Relación entre la altura y la distorsión absoluta

▪ Origen:

G: Sólo gravitatorias

GV: Gravitatorias + viento

▪ Nota:

Las diferentes normas suelen limitar el valor de la distorsión relativa entre plantas y de la distorsión total (desplome) del edificio.

El valor absoluto se utilizará para definir las juntas sísmicas. El valor relativo suele limitarse en función de la altura de la planta 'h'. Se comprueba el valor 'Total' tomando en ese caso como valor de 'h' la altura total.

| Situaciones persistentes o transitorias | | | | | | | | | |
|---|-------------|----------|-------|--------------|----------|--------|--------------|----------|--------|
| Pilar | Planta | Cota (m) | h (m) | Distorsión X | | | Distorsión Y | | |
| | | | | Absoluta (m) | Relativa | Origen | Absoluta (m) | Relativa | Origen |
| P-P01 | Forjado 1 | 6.78 | 6.78 | 0.0002 | ---- | GV | 0.0031 | h / 2186 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.78 | 0.0002 | ---- | GV | 0.0031 | h / 2186 | GV |
| P-P02 | Forjado 1 | 6.78 | 6.78 | 0.0002 | ---- | GV | 0.0031 | h / 2186 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.78 | 0.0002 | ---- | GV | 0.0031 | h / 2186 | GV |
| P-P03 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0029 | h / 2302 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0029 | h / 2302 | GV |
| P-P04 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0029 | h / 2302 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0029 | h / 2302 | GV |
| P-P05 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0029 | h / 2302 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0029 | h / 2302 | GV |
| P-P06 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0029 | h / 2302 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0029 | h / 2302 | GV |
| P-P07 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0027 | h / 2473 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0027 | h / 2473 | GV |
| P-P08 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0027 | h / 2473 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0027 | h / 2473 | GV |
| P-P09 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0027 | h / 2473 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0027 | h / 2473 | GV |
| P-P10 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0027 | h / 2473 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0027 | h / 2473 | GV |
| P-P11 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0027 | h / 2473 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0027 | h / 2473 | GV |
| P-P12 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0028 | h / 2384 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0028 | h / 2384 | GV |
| P-P13 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0027 | h / 2473 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0027 | h / 2473 | GV |
| P-P14 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0028 | h / 2384 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0028 | h / 2384 | GV |
| P-P15 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0030 | h / 2225 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0030 | h / 2225 | GV |
| P-P16 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0031 | h / 2154 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0031 | h / 2154 | GV |

Distorsiones de pilares

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| Situaciones persistentes o transitorias | | | | | | | | | |
|---|-------------|----------|-------|--------------|----------|--------|--------------|----------|--------|
| Pilar | Planta | Cota (m) | h (m) | Distorsión X | | | Distorsión Y | | |
| | | | | Absoluta (m) | Relativa | Origen | Absoluta (m) | Relativa | Origen |
| P-P17 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0031 | h / 2154 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0031 | h / 2154 | GV |
| P-P18 | Forjado 1 | 6.67 | 6.67 | 0.0002 | ---- | GV | 0.0031 | h / 2154 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0002 | ---- | GV | 0.0031 | h / 2154 | GV |
| P-P19 | Forjado 1 | 6.78 | 6.78 | 0.0002 | ---- | GV | 0.0033 | h / 2054 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.78 | 0.0002 | ---- | GV | 0.0033 | h / 2054 | GV |
| P-P20 | Forjado 1 | 6.78 | 6.78 | 0.0002 | ---- | GV | 0.0033 | h / 2054 | GV |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.78 | 0.0002 | ---- | GV | 0.0033 | h / 2054 | GV |

| Situaciones sísmicas ⁽¹⁾ | | | | | | | | | |
|-------------------------------------|-------------|----------|-------|--------------|----------|--------|--------------|----------|--------|
| Pilar | Planta | Cota (m) | h (m) | Distorsión X | | | Distorsión Y | | |
| | | | | Absoluta (m) | Relativa | Origen | Absoluta (m) | Relativa | Origen |
| P-P01 | Forjado 1 | 6.78 | 6.78 | 0.0150 | h / 452 | ---- | 0.0124 | h / 547 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.78 | 0.0150 | h / 452 | ---- | 0.0124 | h / 547 | ---- |
| P-P02 | Forjado 1 | 6.78 | 6.78 | 0.0149 | h / 455 | ---- | 0.0124 | h / 547 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.78 | 0.0149 | h / 455 | ---- | 0.0124 | h / 547 | ---- |
| P-P03 | Forjado 1 | 6.67 | 6.67 | 0.0150 | h / 445 | ---- | 0.0124 | h / 539 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0150 | h / 445 | ---- | 0.0124 | h / 539 | ---- |
| P-P04 | Forjado 1 | 6.67 | 6.67 | 0.0150 | h / 445 | ---- | 0.0125 | h / 534 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0150 | h / 445 | ---- | 0.0125 | h / 534 | ---- |
| P-P05 | Forjado 1 | 6.67 | 6.67 | 0.0150 | h / 445 | ---- | 0.0123 | h / 543 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0150 | h / 445 | ---- | 0.0123 | h / 543 | ---- |
| P-P06 | Forjado 1 | 6.67 | 6.67 | 0.0149 | h / 448 | ---- | 0.0124 | h / 539 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0149 | h / 448 | ---- | 0.0124 | h / 539 | ---- |
| P-P07 | Forjado 1 | 6.67 | 6.67 | 0.0150 | h / 445 | ---- | 0.0131 | h / 510 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0150 | h / 445 | ---- | 0.0131 | h / 510 | ---- |
| P-P08 | Forjado 1 | 6.67 | 6.67 | 0.0151 | h / 443 | ---- | 0.0134 | h / 499 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0151 | h / 443 | ---- | 0.0134 | h / 499 | ---- |
| P-P09 | Forjado 1 | 6.67 | 6.67 | 0.0149 | h / 448 | ---- | 0.0133 | h / 502 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0149 | h / 448 | ---- | 0.0133 | h / 502 | ---- |
| P-P10 | Forjado 1 | 6.67 | 6.67 | 0.0150 | h / 445 | ---- | 0.0135 | h / 495 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0150 | h / 445 | ---- | 0.0135 | h / 495 | ---- |
| P-P11 | Forjado 1 | 6.67 | 6.67 | 0.0151 | h / 443 | ---- | 0.0149 | h / 448 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0151 | h / 443 | ---- | 0.0149 | h / 448 | ---- |
| P-P12 | Forjado 1 | 6.67 | 6.67 | 0.0150 | h / 445 | ---- | 0.0158 | h / 423 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0150 | h / 445 | ---- | 0.0158 | h / 423 | ---- |
| P-P13 | Forjado 1 | 6.67 | 6.67 | 0.0150 | h / 445 | ---- | 0.0148 | h / 452 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0150 | h / 445 | ---- | 0.0148 | h / 452 | ---- |
| P-P14 | Forjado 1 | 6.67 | 6.67 | 0.0149 | h / 448 | ---- | 0.0154 | h / 434 | ---- |
| | Cimentación | 0.00 | | | | | | | |

Distorsiones de pilares

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| Situaciones sísmicas ⁽¹⁾ | | | | | | | | | |
|--|-------------|----------|-------|--------------|----------|--------|--------------|----------|--------|
| Pilar | Planta | Cota (m) | h (m) | Distorsión X | | | Distorsión Y | | |
| | | | | Absoluta (m) | Relativa | Origen | Absoluta (m) | Relativa | Origen |
| | Total | | 6.67 | 0.0149 | h / 448 | ---- | 0.0154 | h / 434 | ---- |
| P-P15 | Forjado 1 | 6.67 | 6.67 | 0.0150 | h / 445 | ---- | 0.0196 | h / 341 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0150 | h / 445 | ---- | 0.0196 | h / 341 | ---- |
| P-P16 | Forjado 1 | 6.67 | 6.67 | 0.0151 | h / 443 | ---- | 0.0208 | h / 321 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0151 | h / 443 | ---- | 0.0208 | h / 321 | ---- |
| P-P17 | Forjado 1 | 6.67 | 6.67 | 0.0149 | h / 448 | ---- | 0.0203 | h / 329 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0149 | h / 448 | ---- | 0.0203 | h / 329 | ---- |
| P-P18 | Forjado 1 | 6.67 | 6.67 | 0.0150 | h / 445 | ---- | 0.0215 | h / 311 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.67 | 0.0150 | h / 445 | ---- | 0.0215 | h / 311 | ---- |
| P-P19 | Forjado 1 | 6.78 | 6.78 | 0.0151 | h / 449 | ---- | 0.0255 | h / 266 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.78 | 0.0151 | h / 449 | ---- | 0.0255 | h / 266 | ---- |
| P-P20 | Forjado 1 | 6.78 | 6.78 | 0.0149 | h / 455 | ---- | 0.0255 | h / 266 | ---- |
| | Cimentación | 0.00 | | | | | | | |
| | Total | | 6.78 | 0.0149 | h / 455 | ---- | 0.0255 | h / 266 | ---- |
| Notas: ⁽¹⁾ Las distorsiones están mayoradas por la ductilidad. | | | | | | | | | |

Los valores indicados tienen en cuenta los factores de desplazamientos definidos para los efectos multiplicadores de segundo orden.
Valores máximos

| Desplome local máximo de los pilares (d / h) | | | | |
|---|---|-------------|-------------------------------------|-------------|
| Planta | Situaciones persistentes o transitorias | | Situaciones sísmicas ⁽¹⁾ | |
| | Dirección X | Dirección Y | Dirección X | Dirección Y |
| Forjado 1 | ---- | 1 / 2054 | 1 / 443 | 1 / 266 |
| Notas: ⁽¹⁾ Los desplazamientos están mayorados por la ductilidad. | | | | |

| Desplome total máximo de los pilares (D / H) | | | |
|---|-------------|-------------------------------------|-------------|
| Situaciones persistentes o transitorias | | Situaciones sísmicas ⁽¹⁾ | |
| Dirección X | Dirección Y | Dirección X | Dirección Y |
| ---- | 1 / 2054 | 1 / 443 | 1 / 266 |
| Notas: ⁽¹⁾ Los desplazamientos están mayorados por la ductilidad. | | | |

Los valores indicados tienen en cuenta los factores de desplazamientos definidos para los efectos multiplicadores de segundo orden.



1.- ESTRUCTURA

1.1.- Resultados

1.1.1.- Nudos

1.1.1.1.- Desplazamientos

Referencias:

Dx, Dy, Dz: Desplazamientos de los nudos en ejes globales.

Gx, Gy, Gz: Giros de los nudos en ejes globales.

1.1.1.1.1.- Envolventes

| Envolvente de los desplazamientos en nudos | | | | | | | | |
|--|-----------------|-------------------------------|----------------------------------|---------|---------|-----------|-----------|-----------|
| Referencia | Combinación | | Desplazamientos en ejes globales | | | | | |
| | Tipo | Descripción | Dx (mm) | Dy (mm) | Dz (mm) | Gx (mRad) | Gy (mRad) | Gz (mRad) |
| N1 | Desplazamientos | Valor mínimo de la envolvente | -11.620 | -24.529 | -1.192 | -0.499 | 2.630 | 0.000 |
| | | Valor máximo de la envolvente | 40.257 | 29.335 | 1.671 | 0.622 | 8.332 | 0.000 |
| N2 | Desplazamientos | Valor mínimo de la envolvente | -17.296 | -21.147 | -4.261 | -1.125 | -4.338 | 0.000 |
| | | Valor máximo de la envolvente | 35.013 | 25.854 | -0.691 | -0.257 | -2.198 | 0.000 |
| N3 | Desplazamientos | Valor mínimo de la envolvente | -18.102 | -20.535 | -5.850 | -0.261 | 0.912 | 0.000 |
| | | Valor máximo de la envolvente | 33.592 | 25.877 | -1.017 | 0.560 | 2.744 | 0.000 |
| N4 | Desplazamientos | Valor mínimo de la envolvente | -17.751 | -21.289 | -9.540 | -0.545 | 2.596 | 0.000 |
| | | Valor máximo de la envolvente | 33.832 | 25.061 | -3.789 | 0.014 | 5.145 | 0.000 |
| N5 | Desplazamientos | Valor mínimo de la envolvente | -23.415 | -21.641 | -8.607 | -0.281 | -4.717 | 0.000 |
| | | Valor máximo de la envolvente | 28.891 | 25.115 | -3.206 | 0.224 | -2.360 | 0.000 |
| N6 | Desplazamientos | Valor mínimo de la envolvente | -23.012 | -21.294 | -6.009 | -0.567 | -2.320 | 0.000 |
| | | Valor máximo de la envolvente | 28.798 | 26.387 | -0.068 | 1.282 | -0.616 | 0.000 |
| N7 | Desplazamientos | Valor mínimo de la envolvente | -23.893 | -21.806 | -0.581 | -0.846 | 0.992 | 0.000 |
| | | Valor máximo de la envolvente | 27.679 | 26.017 | 0.988 | -0.222 | 2.296 | 0.000 |
| N8 | Desplazamientos | Valor mínimo de la envolvente | -29.159 | -23.349 | 0.069 | -0.551 | -1.016 | 0.000 |
| | | Valor máximo de la envolvente | 22.795 | 27.268 | 2.502 | 0.048 | -0.315 | 0.000 |
| N9 | Desplazamientos | Valor mínimo de la envolvente | -29.807 | -24.036 | -6.855 | -0.194 | 1.042 | 0.000 |
| | | Valor máximo de la envolvente | 21.783 | 28.577 | -1.144 | 0.852 | 3.041 | 0.000 |
| N10 | Desplazamientos | Valor mínimo de la envolvente | -29.523 | -24.920 | -9.450 | -0.268 | 2.552 | 0.000 |
| | | Valor máximo de la envolvente | 21.930 | 28.182 | -3.592 | 0.394 | 5.193 | 0.000 |
| N11 | Desplazamientos | Valor mínimo de la envolvente | -35.517 | -31.347 | -10.053 | -0.169 | -4.927 | 0.000 |
| | | Valor máximo de la envolvente | 16.693 | 34.310 | -3.593 | 0.918 | -2.414 | 0.000 |
| N12 | Desplazamientos | Valor mínimo de la envolvente | -35.197 | -31.524 | -8.218 | -0.870 | -2.969 | 0.000 |
| | | Valor máximo de la envolvente | 16.609 | 35.787 | -0.528 | 1.924 | -1.056 | 0.000 |
| N13 | Desplazamientos | Valor mínimo de la envolvente | -35.728 | -34.021 | -0.437 | -0.502 | 0.211 | 0.000 |
| | | Valor máximo de la envolvente | 15.884 | 37.489 | 1.874 | 0.494 | 0.826 | 0.000 |
| N14 | Desplazamientos | Valor mínimo de la envolvente | -40.959 | -42.330 | -26.525 | 0.346 | -6.447 | 0.000 |
| | | Valor máximo de la envolvente | 11.621 | 45.120 | -9.121 | 3.601 | -2.417 | 0.000 |
| N15 | Desplazamientos | Valor mínimo de la envolvente | -41.296 | -41.831 | -38.402 | 0.671 | -7.808 | 0.000 |
| | | Valor máximo de la envolvente | 11.425 | 46.094 | -10.291 | 4.353 | -2.284 | 0.000 |
| N16 | Desplazamientos | Valor mínimo de la envolvente | -42.196 | -43.973 | -12.594 | 0.640 | -7.854 | 0.000 |
| | | Valor máximo de la envolvente | 10.545 | 47.957 | 2.149 | 4.259 | -2.196 | 0.000 |
| N17 | Desplazamientos | Valor mínimo de la envolvente | -11.598 | -27.666 | 2.000 | -1.042 | 1.533 | 0.000 |
| | | Valor máximo de la envolvente | 41.104 | 27.517 | 12.462 | 0.992 | 7.680 | 0.000 |
| N18 | Desplazamientos | Valor mínimo de la envolvente | -17.487 | -23.505 | -20.508 | -1.055 | -6.784 | 0.000 |
| | | Valor máximo de la envolvente | 35.386 | 23.575 | -9.690 | -0.162 | -3.079 | 0.000 |
| N19 | Desplazamientos | Valor mínimo de la envolvente | -17.402 | -23.856 | -21.206 | -0.957 | -6.316 | 0.000 |
| | | Valor máximo de la envolvente | 35.620 | 23.431 | -9.782 | -0.093 | -2.977 | 0.000 |
| N20 | Desplazamientos | Valor mínimo de la envolvente | -23.535 | -24.162 | -0.117 | -0.265 | -0.677 | 0.000 |
| | | Valor máximo de la envolvente | 28.982 | 22.964 | 1.497 | 0.287 | -0.260 | 0.000 |
| N21 | Desplazamientos | Valor mínimo de la envolvente | -23.441 | -24.401 | -0.251 | -0.465 | 0.027 | 0.000 |
| | | Valor máximo de la envolvente | 29.250 | 22.744 | 1.599 | 0.224 | 0.235 | 0.000 |
| N22 | Desplazamientos | Valor mínimo de la envolvente | -29.894 | -25.540 | -22.836 | -1.452 | -7.429 | 0.000 |
| | | Valor máximo de la envolvente | 23.396 | 24.771 | -10.318 | -0.346 | -3.813 | 0.000 |
| N23 | Desplazamientos | Valor mínimo de la envolvente | -29.772 | -25.793 | -24.025 | -1.308 | -6.918 | 0.000 |
| | | Valor máximo de la envolvente | 23.687 | 24.526 | -10.579 | -0.234 | -3.461 | 0.000 |
| N24 | Desplazamientos | Valor mínimo de la envolvente | -35.649 | -34.661 | -1.930 | -0.688 | -1.251 | 0.000 |
| | | Valor máximo de la envolvente | 17.072 | 32.737 | 0.683 | 0.177 | -0.524 | 0.000 |
| N25 | Desplazamientos | Valor mínimo de la envolvente | -35.555 | -34.915 | -2.637 | -0.853 | -0.513 | 0.000 |



| Envolvente de los desplazamientos en nudos | | | | | | | | |
|--|-----------------|-------------------------------|----------------------------------|------------|------------|--------------|--------------|--------------|
| Referencia | Combinación | | Desplazamientos en ejes globales | | | | | |
| | Tipo | Descripción | Dx (mm) | Dy (mm) | Dz (mm) | Gx (mRad) | Gy (mRad) | Gz (mRad) |
| N26 | Desplazamientos | Valor máximo de la envolvente | 17.319 | 32.521 | 0.893 | 0.157 | -0.134 | 0.000 |
| | | Valor mínimo de la envolvente | -42.835 | -47.282 | -1.429 | -3.122 | -8.282 | 0.000 |
| | | Valor máximo de la envolvente | 10.922 | 45.686 | 8.047 | -0.089 | -2.409 | 0.000 |
| N27 | Desplazamientos | Valor mínimo de la envolvente | -11.661 | -25.096 | -0.265 | -0.699 | 2.443 | 0.000 |
| | | Valor máximo de la envolvente | 40.404 | 29.431 | 2.412 | 0.511 | 8.122 | 0.000 |
| N28 | Desplazamientos | Valor mínimo de la envolvente | -17.403 | -21.415 | -3.916 | -0.925 | -4.073 | 0.000 |
| | | Valor máximo de la envolvente | 34.998 | 25.568 | -1.012 | -0.134 | -2.091 | 0.000 |
| N29 | Desplazamientos | Valor mínimo de la envolvente | -17.906 | -20.834 | -3.746 | -0.283 | 0.837 | 0.000 |
| | | Valor máximo de la envolvente | 33.864 | 25.622 | -0.600 | 0.464 | 2.578 | 0.000 |
| N30 | Desplazamientos | Valor mínimo de la envolvente | -17.674 | -21.533 | -6.097 | -0.022 | 1.844 | 0.000 |
| | | Valor máximo de la envolvente | 33.992 | 24.811 | -2.449 | 0.550 | 3.938 | 0.000 |
| N31 | Desplazamientos | Valor mínimo de la envolvente | -23.519 | -21.908 | -5.482 | 0.092 | -3.581 | 0.000 |
| | | Valor máximo de la envolvente | 28.807 | 24.876 | -1.999 | 0.742 | -1.671 | 0.000 |
| N32 | Desplazamientos | Valor mínimo de la envolvente | -23.266 | -21.701 | -3.589 | -0.262 | -2.189 | 0.000 |
| | | Valor máximo de la envolvente | 28.699 | 26.181 | -0.177 | 0.810 | -0.558 | 0.000 |
| N33 | Desplazamientos | Valor mínimo de la envolvente | -23.902 | -22.060 | -0.431 | -0.656 | 0.921 | 0.000 |
| | | Valor máximo de la envolvente | 27.750 | 25.714 | 0.724 | -0.104 | 2.138 | 0.000 |
| N34 | Desplazamientos | Valor mínimo de la envolvente | -29.175 | -23.632 | 0.274 | -0.424 | -0.874 | 0.000 |
| | | Valor máximo de la envolvente | 22.788 | 27.008 | 2.200 | 0.105 | -0.235 | 0.000 |
| N35 | Desplazamientos | Valor mínimo de la envolvente | -29.636 | -24.219 | -4.398 | -0.203 | 0.926 | 0.000 |
| | | Valor máximo de la envolvente | 22.024 | 28.168 | -0.647 | 0.784 | 2.813 | 0.000 |
| N36 | Desplazamientos | Valor mínimo de la envolvente | -29.462 | -24.992 | -5.876 | 0.046 | 1.862 | 0.000 |
| | | Valor máximo de la envolvente | 22.084 | 27.774 | -2.143 | 0.886 | 3.963 | 0.000 |
| N37 | Desplazamientos | Valor mínimo de la envolvente | -35.621 | -31.844 | -6.335 | 0.114 | -3.800 | 0.000 |
| | | Valor máximo de la envolvente | 16.611 | 34.316 | -2.313 | 1.316 | -1.796 | 0.000 |
| N38 | Desplazamientos | Valor mínimo de la envolvente | -35.446 | -31.962 | -5.295 | -0.217 | -2.782 | 0.000 |
| | | Valor máximo de la envolvente | 16.515 | 35.594 | -0.422 | 1.152 | -0.959 | 0.000 |
| N39 | Desplazamientos | Valor mínimo de la envolvente | -35.721 | -34.127 | 0.051 | -0.314 | 0.004 | 0.000 |
| | | Valor máximo de la envolvente | 15.946 | 37.071 | 1.736 | 0.483 | 0.617 | 0.000 |
| N40 | Desplazamientos | Valor mínimo de la envolvente | -41.317 | -42.902 | -19.059 | 0.071 | -7.418 | 0.000 |
| | | Valor máximo de la envolvente | 11.422 | 45.327 | -6.408 | 2.731 | -2.634 | 0.000 |
| N41 | Desplazamientos | Valor mínimo de la envolvente | -41.460 | -42.630 | -29.781 | 0.633 | -7.756 | 0.000 |
| | | Valor máximo de la envolvente | 11.281 | 46.437 | -7.439 | 4.254 | -2.260 | 0.000 |
| N42 | Desplazamientos | Valor mínimo de la envolvente | -42.230 | -44.175 | -9.114 | 0.619 | -7.913 | 0.000 |
| | | Valor máximo de la envolvente | 10.588 | 47.779 | 2.732 | 4.184 | -2.132 | 0.000 |
| N43 | Desplazamientos | Valor mínimo de la envolvente | -11.710 | -27.363 | 2.096 | -0.929 | 1.560 | 0.000 |
| | | Valor máximo de la envolvente | 41.051 | 27.691 | 10.939 | 0.972 | 7.657 | 0.000 |
| N44 | Desplazamientos | Valor mínimo de la envolvente | -17.715 | -23.263 | -13.312 | -1.146 | -5.644 | 0.000 |
| | | Valor máximo de la envolvente | 35.130 | 23.723 | -6.338 | -0.277 | -2.670 | 0.000 |
| N45 | Desplazamientos | Valor mínimo de la envolvente | -17.629 | -23.531 | -14.228 | -0.998 | -5.470 | 0.000 |
| | | Valor máximo de la envolvente | 35.244 | 23.454 | -6.453 | -0.140 | -2.652 | 0.000 |
| N46 | Desplazamientos | Valor mínimo de la envolvente | -23.546 | -23.954 | 0.182 | -0.522 | 0.186 | 0.000 |
| | | Valor máximo de la envolvente | 28.782 | 23.278 | 1.592 | 0.159 | 0.495 | 0.000 |
| N47 | Desplazamientos | Valor mínimo de la envolvente | -23.553 | -24.207 | -0.083 | -0.606 | 0.321 | 0.000 |
| | | Valor máximo de la envolvente | 28.877 | 23.037 | 1.417 | 0.149 | 0.956 | 0.000 |
| N48 | Desplazamientos | Valor mínimo de la envolvente | -29.954 | -25.411 | -14.497 | -1.623 | -6.032 | 0.000 |
| | | Valor máximo de la envolvente | 23.062 | 25.028 | -6.395 | -0.479 | -2.999 | 0.000 |
| N49 | Desplazamientos | Valor mínimo de la envolvente | -29.954 | -25.688 | -15.883 | -1.407 | -5.955 | 0.000 |
| | | Valor máximo de la envolvente | 23.266 | 24.749 | -6.822 | -0.301 | -2.909 | 0.000 |
| N50 | Desplazamientos | Valor mínimo de la envolvente | -35.563 | -34.937 | -0.456 | -0.925 | -0.122 | 0.000 |
| | | Valor máximo de la envolvente | 16.793 | 33.532 | 0.923 | 0.084 | 0.053 | 0.000 |
| N51 | Desplazamientos | Valor mínimo de la envolvente | -35.662 | -35.207 | -1.315 | -0.968 | 0.024 | 0.000 |
| | | Valor máximo de la envolvente | 16.948 | 33.292 | 0.922 | 0.116 | 0.334 | 0.000 |
| N52 | Desplazamientos | Valor mínimo de la envolvente | -42.725 | -46.912 | 0.349 | -2.977 | -8.213 | 0.000 |
| | | Valor máximo de la envolvente | 10.826 | 45.793 | 9.044 | 0.013 | -2.349 | 0.000 |
| N53 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -4.140 | -2.562 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 3.972 | 6.878 | 0.000 |
| N54 | Desplazamientos | Valor mínimo de la envolvente | -17.333 | -22.015 | -0.956 | -1.765 | -2.136 | 0.000 |
| | | Valor máximo de la envolvente | 35.473 | 25.346 | -0.348 | 0.765 | 0.628 | 0.000 |



| Envolvente de los desplazamientos en nudos | | | | | | | | |
|--|-----------------|-------------------------------|----------------------------------|------------|------------|--------------|--------------|--------------|
| Referencia | Combinación | | Desplazamientos en ejes globales | | | | | |
| | Tipo | Descripción | Dx (mm) | Dy (mm) | Dz (mm) | Gx (mRad) | Gy (mRad) | Gz (mRad) |
| N55 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -4.178 | -2.680 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 4.228 | 6.591 | 0.000 |
| N56 | Desplazamientos | Valor mínimo de la envolvente | -17.791 | -23.616 | -0.592 | -1.265 | -1.957 | 0.000 |
| | | Valor máximo de la envolvente | 35.303 | 23.937 | -0.120 | 1.034 | 1.025 | 0.000 |
| N57 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -4.510 | -3.584 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 3.819 | 5.731 | 0.000 |
| N58 | Desplazamientos | Valor mínimo de la envolvente | -17.989 | -21.737 | -0.377 | -1.086 | -0.344 | 0.000 |
| | | Valor máximo de la envolvente | 34.473 | 25.514 | -0.031 | 0.975 | 2.603 | 0.000 |
| N59 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -4.239 | -4.037 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 3.952 | 5.648 | 0.000 |
| N60 | Desplazamientos | Valor mínimo de la envolvente | -18.316 | -22.958 | -1.291 | -0.989 | 0.117 | 0.000 |
| | | Valor máximo de la envolvente | 34.252 | 23.921 | -0.546 | 1.188 | 3.014 | 0.000 |
| N61 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -4.587 | -3.760 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 3.846 | 5.325 | 0.000 |
| N62 | Desplazamientos | Valor mínimo de la envolvente | -23.667 | -22.473 | -0.303 | -1.002 | -2.037 | 0.000 |
| | | Valor máximo de la envolvente | 28.891 | 25.874 | 0.036 | 1.145 | 0.945 | 0.000 |
| N63 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -4.289 | -3.585 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 3.993 | 5.911 | 0.000 |
| N64 | Desplazamientos | Valor mínimo de la envolvente | -23.429 | -23.268 | -1.220 | -0.987 | -2.627 | 0.000 |
| | | Valor máximo de la envolvente | 29.488 | 24.040 | -0.478 | 1.281 | 0.318 | 0.000 |
| N65 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -4.067 | -4.809 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 4.313 | 4.669 | 0.000 |
| N66 | Desplazamientos | Valor mínimo de la envolvente | -24.005 | -24.332 | -0.670 | -1.324 | -0.418 | 0.000 |
| | | Valor máximo de la envolvente | 28.731 | 24.186 | -0.164 | 0.881 | 2.611 | 0.000 |
| N67 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -4.140 | -5.071 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 4.186 | 4.553 | 0.000 |
| N68 | Desplazamientos | Valor mínimo de la envolvente | -24.332 | -22.790 | -1.122 | -1.914 | -0.171 | 0.000 |
| | | Valor máximo de la envolvente | 28.017 | 25.505 | -0.440 | 0.726 | 2.714 | 0.000 |
| N69 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -4.381 | -4.651 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 4.392 | 4.814 | 0.000 |
| N70 | Desplazamientos | Valor mínimo de la envolvente | -29.408 | -24.328 | -1.147 | -1.816 | -2.874 | 0.000 |
| | | Valor máximo de la envolvente | 23.364 | 26.603 | -0.455 | 0.878 | 0.104 | 0.000 |
| N71 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -4.339 | -4.797 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 4.625 | 4.481 | 0.000 |
| N72 | Desplazamientos | Valor mínimo de la envolvente | -29.939 | -25.919 | -0.621 | -1.370 | -2.597 | 0.000 |
| | | Valor máximo de la envolvente | 23.088 | 25.328 | -0.122 | 1.023 | 0.481 | 0.000 |
| N73 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -4.755 | -6.225 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 4.609 | 3.472 | 0.000 |
| N74 | Desplazamientos | Valor mínimo de la envolvente | -30.353 | -26.719 | -1.311 | -1.171 | -0.316 | 0.000 |
| | | Valor máximo de la envolvente | 22.100 | 26.934 | -0.537 | 1.381 | 2.614 | 0.000 |
| N75 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -4.972 | -5.701 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 4.305 | 3.588 | 0.000 |
| N76 | Desplazamientos | Valor mínimo de la envolvente | -29.980 | -24.755 | -0.385 | -1.111 | -0.913 | 0.000 |
| | | Valor máximo de la envolvente | 22.456 | 27.642 | 0.008 | 1.308 | 2.198 | 0.000 |
| N77 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -4.642 | -3.377 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 4.142 | 5.348 | 0.000 |
| N78 | Desplazamientos | Valor mínimo de la envolvente | -12.482 | -25.458 | -0.450 | -2.260 | 0.493 | 0.000 |
| | | Valor máximo de la envolvente | 40.423 | 29.297 | -0.096 | 1.734 | 6.743 | 0.000 |
| N79 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -4.238 | -2.102 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 4.027 | 5.376 | 0.000 |
| N80 | Desplazamientos | Valor mínimo de la envolvente | -13.165 | -26.924 | -0.289 | -2.515 | -1.203 | 0.000 |
| | | Valor máximo de la envolvente | 40.636 | 27.720 | -0.100 | 2.624 | 5.638 | 0.000 |
| N81 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -5.868 | -5.727 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 5.662 | 3.805 | 0.000 |
| N82 | Desplazamientos | Valor mínimo de la envolvente | -35.516 | -32.965 | -1.375 | -1.398 | -3.203 | 0.000 |
| | | Valor máximo de la envolvente | 17.301 | 33.027 | -0.604 | 1.795 | -0.212 | 0.000 |
| N83 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -6.050 | -6.797 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 6.554 | 2.621 | 0.000 |
| N84 | Desplazamientos | Valor mínimo de la envolvente | -36.101 | -36.151 | -0.612 | -1.935 | -1.107 | 0.000 |



| Envolvente de los desplazamientos en nudos | | | | | | | | |
|--|-----------------|-------------------------------|----------------------------------|---------|---------|-----------|-----------|-----------|
| Referencia | Combinación | | Desplazamientos en ejes globales | | | | | |
| | Tipo | Descripción | Dx (mm) | Dy (mm) | Dz (mm) | Gx (mRad) | Gy (mRad) | Gz (mRad) |
| N85 | Desplazamientos | Valor máximo de la envolvente | 16.538 | 35.203 | -0.014 | 1.287 | 1.754 | 0.000 |
| | | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -6.445 | -7.312 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 6.431 | 2.416 | 0.000 |
| N86 | Desplazamientos | Valor mínimo de la envolvente | -36.386 | -36.398 | -1.164 | -2.202 | -0.466 | 0.000 |
| | | Valor máximo de la envolvente | 15.790 | 37.992 | -0.531 | 1.587 | 2.167 | 0.000 |
| N87 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -6.456 | -5.878 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 5.784 | 3.216 | 0.000 |
| N88 | Desplazamientos | Valor mínimo de la envolvente | -35.860 | -33.198 | -0.449 | -1.397 | -2.664 | 0.000 |
| | | Valor máximo de la envolvente | 16.637 | 35.772 | 0.063 | 1.733 | 0.354 | 0.000 |
| N89 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -7.664 | -5.453 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 6.920 | 2.268 | 0.000 |
| N90 | Desplazamientos | Valor mínimo de la envolvente | -41.631 | -44.790 | -0.502 | -3.569 | -6.162 | 0.000 |
| | | Valor máximo de la envolvente | 11.614 | 47.082 | -0.094 | 4.165 | 0.530 | 0.000 |
| N91 | Desplazamientos | Valor mínimo de la envolvente | 0.000 | 0.000 | 0.000 | -6.832 | -5.463 | 0.000 |
| | | Valor máximo de la envolvente | 0.000 | 0.000 | 0.000 | 7.112 | 1.804 | 0.000 |
| N92 | Desplazamientos | Valor mínimo de la envolvente | -41.683 | -46.323 | -0.379 | -4.624 | -5.776 | 0.000 |
| | | Valor máximo de la envolvente | 11.881 | 45.989 | -0.086 | 4.187 | 1.188 | 0.000 |
| N93 | Desplazamientos | Valor mínimo de la envolvente | -17.360 | -21.386 | -2.798 | -0.884 | -3.389 | 0.000 |
| | | Valor máximo de la envolvente | 34.997 | 25.575 | -0.372 | -0.123 | -1.725 | 0.000 |
| N94 | Desplazamientos | Valor mínimo de la envolvente | -17.788 | -23.743 | -0.968 | -0.590 | -1.514 | 0.000 |
| | | Valor máximo de la envolvente | 34.855 | 23.241 | 0.550 | 0.166 | -0.513 | 0.000 |
| N95 | Desplazamientos | Valor mínimo de la envolvente | -22.645 | -21.869 | -31.638 | 0.670 | -5.415 | 0.000 |
| | | Valor máximo de la envolvente | 29.758 | 24.524 | -15.914 | 1.671 | -2.752 | 0.000 |
| N96 | Desplazamientos | Valor mínimo de la envolvente | -23.284 | -21.403 | -3.652 | -0.231 | -2.267 | 0.000 |
| | | Valor máximo de la envolvente | 28.751 | 25.611 | -0.542 | 0.750 | -0.614 | 0.000 |
| N97 | Desplazamientos | Valor mínimo de la envolvente | -23.388 | -21.545 | -2.534 | -0.233 | -2.084 | 0.000 |
| | | Valor máximo de la envolvente | 28.594 | 25.944 | 0.205 | 0.770 | -0.501 | 0.000 |
| N98 | Desplazamientos | Valor mínimo de la envolvente | -17.824 | -21.256 | -5.004 | -0.265 | 1.292 | 0.000 |
| | | Valor máximo de la envolvente | 33.959 | 25.168 | -1.605 | 0.367 | 3.139 | 0.000 |
| N99 | Desplazamientos | Valor mínimo de la envolvente | -23.382 | -21.642 | -4.260 | -0.197 | -2.705 | 0.000 |
| | | Valor máximo de la envolvente | 28.801 | 25.286 | -1.193 | 0.641 | -0.999 | 0.000 |
| N100 | Desplazamientos | Valor mínimo de la envolvente | -23.957 | -22.393 | 0.155 | -0.865 | 0.404 | 0.000 |
| | | Valor máximo de la envolvente | 27.842 | 25.289 | 0.828 | -0.188 | 0.989 | 0.000 |
| N101 | Desplazamientos | Valor mínimo de la envolvente | -29.299 | -24.981 | -35.608 | -2.856 | -6.675 | 0.000 |
| | | Valor máximo de la envolvente | 23.701 | 25.072 | -17.361 | -1.227 | -3.449 | 0.000 |
| N102 | Desplazamientos | Valor mínimo de la envolvente | -23.619 | -24.219 | -1.053 | -0.812 | 0.661 | 0.000 |
| | | Valor máximo de la envolvente | 28.752 | 23.173 | 0.595 | 0.046 | 1.856 | 0.000 |
| N103 | Desplazamientos | Valor mínimo de la envolvente | -21.258 | -22.326 | -40.643 | 0.555 | -2.048 | 0.000 |
| | | Valor máximo de la envolvente | 30.857 | 24.539 | -21.096 | 1.507 | -0.885 | 0.000 |
| N104 | Desplazamientos | Valor mínimo de la envolvente | -23.390 | -23.399 | 0.557 | -0.038 | -0.270 | 0.000 |
| | | Valor máximo de la envolvente | 28.796 | 23.649 | 1.490 | 0.227 | 0.002 | 0.000 |
| N105 | Desplazamientos | Valor mínimo de la envolvente | -29.313 | -23.343 | -6.276 | -0.588 | -4.633 | 0.000 |
| | | Valor máximo de la envolvente | 23.065 | 26.887 | -1.908 | -0.012 | -2.296 | 0.000 |
| N106 | Desplazamientos | Valor mínimo de la envolvente | -29.934 | -26.217 | -1.255 | -0.827 | -1.547 | 0.000 |
| | | Valor máximo de la envolvente | 22.852 | 24.800 | 0.690 | 0.104 | -0.441 | 0.000 |
| N107 | Desplazamientos | Valor mínimo de la envolvente | -29.519 | -24.836 | -5.434 | -0.083 | 1.539 | 0.000 |
| | | Valor máximo de la envolvente | 22.073 | 27.873 | -1.841 | 0.825 | 3.567 | 0.000 |
| N108 | Desplazamientos | Valor mínimo de la envolvente | -30.046 | -27.798 | -15.164 | -1.449 | 2.858 | 0.000 |
| | | Valor máximo de la envolvente | 22.125 | 26.460 | -5.759 | -0.205 | 5.444 | 0.000 |
| N109 | Desplazamientos | Valor mínimo de la envolvente | -35.681 | -32.984 | -0.919 | -0.334 | -1.595 | 0.000 |
| | | Valor máximo de la envolvente | 16.231 | 36.306 | 1.144 | 0.933 | -0.413 | 0.000 |
| N110 | Desplazamientos | Valor mínimo de la envolvente | -35.582 | -32.333 | -16.583 | -1.282 | -5.951 | 0.000 |
| | | Valor máximo de la envolvente | 17.460 | 30.955 | -6.932 | -0.171 | -2.904 | 0.000 |
| N111 | Desplazamientos | Valor mínimo de la envolvente | -40.639 | -43.468 | -40.344 | -3.162 | -5.527 | 0.000 |
| | | Valor máximo de la envolvente | 12.330 | 42.608 | -15.890 | -0.750 | -2.734 | 0.000 |
| N112 | Desplazamientos | Valor mínimo de la envolvente | -35.739 | -35.717 | -1.846 | -1.109 | 0.329 | 0.000 |
| | | Valor máximo de la envolvente | 16.798 | 33.890 | 0.656 | 0.068 | 1.095 | 0.000 |
| N113 | Desplazamientos | Valor mínimo de la envolvente | -41.890 | -43.505 | -17.780 | 0.622 | -7.807 | 0.000 |
| | | Valor máximo de la envolvente | 10.872 | 47.188 | -1.663 | 4.205 | -2.222 | 0.000 |



Listados

CALCULADO DATOS OK

Fecha: 30/11/15

| Envolvente de los desplazamientos en nudos | | | | | | | | |
|--|-----------------|-------------------------------|----------------------------------|------------|------------|--------------|--------------|--------------|
| Referencia | Combinación | | Desplazamientos en ejes globales | | | | | |
| | Tipo | Descripción | Dx (mm) | Dy (mm) | Dz (mm) | Gx (mRad) | Gy (mRad) | Gz (mRad) |
| N114 | Desplazamientos | Valor mínimo de la envolvente | -42.331 | -45.982 | -8.579 | -3.103 | -8.333 | 0.000 |
| | | Valor máximo de la envolvente | 11.204 | 44.923 | 0.005 | -0.165 | -2.593 | 0.000 |
| N115 | Desplazamientos | Valor mínimo de la envolvente | -12.019 | -26.869 | -1.567 | -0.985 | 1.785 | 0.000 |
| | | Valor máximo de la envolvente | 40.693 | 27.140 | 0.858 | 0.913 | 7.874 | 0.000 |
| N116 | Desplazamientos | Valor mínimo de la envolvente | -11.716 | -24.747 | -1.188 | -0.665 | 2.467 | 0.000 |
| | | Valor máximo de la envolvente | 40.341 | 29.067 | 0.701 | 0.504 | 8.133 | 0.000 |



1.- ESTRUCTURA

1.1.- Resultados

1.1.1.- Pilares

1.1.1.1.- Esfuerzos

Referencias:

N: Esfuerzo axil (kN)

Vy: Esfuerzo cortante según el eje local Y de la barra. (kN)

Vz: Esfuerzo cortante según el eje local Z de la barra. (kN)

Mt: Momento torsor (kN·m)

My: Momento flector en el plano 'XZ' (giro de la sección respecto al eje local 'Y' de la barra). (kN·m)

Mz: Momento flector en el plano 'XY' (giro de la sección respecto al eje local 'Z' de la barra). (kN·m)

1.1.1.1.1.- Hipótesis

| Barra | Hipótesis | Esfuerzo | Esfuerzos en barras, por hipótesis | | | | | | | | |
|---------|-----------------|----------|------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| | | | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N53/N54 | Peso propio | N | -983.942 | -970.923 | -957.904 | -944.884 | -931.865 | -918.846 | -905.826 | -892.807 | -879.788 |
| | | Vy | -0.251 | -0.251 | -0.251 | -0.251 | -0.251 | -0.251 | -0.251 | -0.251 | -0.251 |
| | | Vz | -27.699 | -27.699 | -27.699 | -27.699 | -27.699 | -27.699 | -27.699 | -27.699 | -27.699 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 26.14 | 52.28 | 78.42 | 104.57 | 130.71 | 156.85 | 182.99 | 209.13 |
| | | Mz | 0.00 | 0.24 | 0.47 | 0.71 | 0.95 | 1.19 | 1.42 | 1.66 | 1.90 |
| | CM 1 | N | -151.295 | -151.295 | -151.295 | -151.295 | -151.295 | -151.295 | -151.295 | -151.295 | -151.295 |
| | | Vy | 0.389 | 0.389 | 0.389 | 0.389 | 0.389 | 0.389 | 0.389 | 0.389 | 0.389 |
| | | Vz | -5.251 | -5.251 | -5.251 | -5.251 | -5.251 | -5.251 | -5.251 | -5.251 | -5.251 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 4.96 | 9.91 | 14.87 | 19.82 | 24.78 | 29.74 | 34.69 | 39.65 |
| | | Mz | 0.00 | -0.37 | -0.73 | -1.10 | -1.47 | -1.83 | -2.20 | -2.57 | -2.93 |
| | Q 1 | N | -840.528 | -840.528 | -840.528 | -840.528 | -840.528 | -840.528 | -840.528 | -840.528 | -840.528 |
| | | Vy | 2.159 | 2.159 | 2.159 | 2.159 | 2.159 | 2.159 | 2.159 | 2.159 | 2.159 |
| | | Vz | -29.174 | -29.174 | -29.174 | -29.174 | -29.174 | -29.174 | -29.174 | -29.174 | -29.174 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 27.53 | 55.07 | 82.60 | 110.13 | 137.67 | 165.20 | 192.73 | 220.27 |
| | | Mz | 0.00 | -2.04 | -4.07 | -6.11 | -8.15 | -10.19 | -12.22 | -14.26 | -16.30 |
| | T 1 | N | -43.519 | -43.519 | -43.519 | -43.519 | -43.519 | -43.519 | -43.519 | -43.519 | -43.519 |
| | | Vy | -12.870 | -12.870 | -12.870 | -12.870 | -12.870 | -12.870 | -12.870 | -12.870 | -12.870 |
| | | Vz | 30.157 | 30.157 | 30.157 | 30.157 | 30.157 | 30.157 | 30.157 | 30.157 | 30.157 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -28.46 | -56.92 | -85.38 | -113.84 | -142.30 | -170.76 | -199.23 | -227.69 |
| | | Mz | 0.00 | 12.15 | 24.29 | 36.44 | 48.59 | 60.73 | 72.88 | 85.02 | 97.17 |
| | T 2 | N | 82.893 | 82.893 | 82.893 | 82.893 | 82.893 | 82.893 | 82.893 | 82.893 | 82.893 |
| | | Vy | 24.515 | 24.515 | 24.515 | 24.515 | 24.515 | 24.515 | 24.515 | 24.515 | 24.515 |
| | | Vz | -57.442 | -57.442 | -57.442 | -57.442 | -57.442 | -57.442 | -57.442 | -57.442 | -57.442 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 54.21 | 108.42 | 162.63 | 216.84 | 271.06 | 325.27 | 379.48 | 433.69 |
| | | Mz | 0.00 | -23.14 | -46.27 | -69.41 | -92.54 | -115.68 | -138.82 | -161.95 | -185.09 |
| | V 1 | N | 0.373 | 0.373 | 0.373 | 0.373 | 0.373 | 0.373 | 0.373 | 0.373 | 0.373 |
| | | Vy | 0.204 | 0.204 | 0.204 | 0.204 | 0.204 | 0.204 | 0.204 | 0.204 | 0.204 |
| | | Vz | 0.036 | 0.036 | 0.036 | 0.036 | 0.036 | 0.036 | 0.036 | 0.036 | 0.036 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.03 | -0.07 | -0.10 | -0.13 | -0.17 | -0.20 | -0.24 | -0.27 |
| | | Mz | 0.00 | -0.19 | -0.38 | -0.58 | -0.77 | -0.96 | -1.15 | -1.35 | -1.54 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | 51.808 | 51.808 | 51.808 | 51.808 | 51.808 | 51.808 | 51.808 | 51.808 | 51.808 |
| | | Vy | 15.322 | 15.322 | 15.322 | 15.322 | 15.322 | 15.322 | 15.322 | 15.322 | 15.322 |
| | | Vz | -35.901 | -35.901 | -35.901 | -35.901 | -35.901 | -35.901 | -35.901 | -35.901 | -35.901 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 33.88 | 67.76 | 101.65 | 135.53 | 169.41 | 203.29 | 237.17 | 271.06 |
| | | Mz | 0.00 | -14.46 | -28.92 | -43.38 | -57.84 | -72.30 | -86.76 | -101.22 | -115.68 |
| | Sismo X: Modo 1 | N | 42.089 | 42.089 | 42.089 | 42.089 | 42.089 | 42.089 | 42.089 | 42.089 | 42.089 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | | Vy | 6.288 | 6.288 | 6.288 | 6.288 | 6.288 | 6.288 | 6.288 | 6.288 | 6.288 |
| | | Vz | -22.919 | -22.919 | -22.919 | -22.919 | -22.919 | -22.919 | -22.919 | -22.919 | -22.919 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 21.63 | 43.26 | 64.89 | 86.52 | 108.15 | 129.78 | 151.41 | 173.04 |
| | | Mz | 0.00 | -5.93 | -11.87 | -17.80 | -23.74 | -29.67 | -35.61 | -41.54 | -47.48 |
| | | | | | | | | | | | |
| | Sismo X: Modo 2 | N | 66.474 | 66.474 | 66.474 | 66.474 | 66.474 | 66.474 | 66.474 | 66.474 | 66.474 |
| | | Vy | 18.335 | 18.335 | 18.335 | 18.335 | 18.335 | 18.335 | 18.335 | 18.335 | 18.335 |
| | | Vz | -20.408 | -20.408 | -20.408 | -20.408 | -20.408 | -20.408 | -20.408 | -20.408 | -20.408 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 19.26 | 38.52 | 57.78 | 77.04 | 96.30 | 115.56 | 134.82 | 154.08 |
| | | Mz | 0.00 | -17.30 | -34.61 | -51.91 | -69.22 | -86.52 | -103.82 | -121.13 | -138.43 |
| | Sismo X: Modo 3 | N | 11.002 | 11.002 | 11.002 | 11.002 | 11.002 | 11.002 | 11.002 | 11.002 | 11.002 |
| | | Vy | 6.741 | 6.741 | 6.741 | 6.741 | 6.741 | 6.741 | 6.741 | 6.741 | 6.741 |
| | | Vz | 3.229 | 3.229 | 3.229 | 3.229 | 3.229 | 3.229 | 3.229 | 3.229 | 3.229 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -3.05 | -6.09 | -9.14 | -12.19 | -15.24 | -18.28 | -21.33 | -24.38 |
| | | Mz | 0.00 | -6.36 | -12.72 | -19.09 | -25.45 | -31.81 | -38.17 | -44.54 | -50.90 |
| | Sismo Y: Modo 1 | N | 34.901 | 34.901 | 34.901 | 34.901 | 34.901 | 34.901 | 34.901 | 34.901 | 34.901 |
| | | Vy | 5.214 | 5.214 | 5.214 | 5.214 | 5.214 | 5.214 | 5.214 | 5.214 | 5.214 |
| | | Vz | -19.005 | -19.005 | -19.005 | -19.005 | -19.005 | -19.005 | -19.005 | -19.005 | -19.005 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 17.94 | 35.87 | 53.81 | 71.74 | 89.68 | 107.62 | 125.55 | 143.49 |
| | | Mz | 0.00 | -4.92 | -9.84 | -14.76 | -19.68 | -24.60 | -29.53 | -34.45 | -39.37 |
| | Sismo Y: Modo 2 | N | 62.511 | 62.511 | 62.511 | 62.511 | 62.511 | 62.511 | 62.511 | 62.511 | 62.511 |
| | | Vy | 17.242 | 17.242 | 17.242 | 17.242 | 17.242 | 17.242 | 17.242 | 17.242 | 17.242 |
| | | Vz | -19.191 | -19.191 | -19.191 | -19.191 | -19.191 | -19.191 | -19.191 | -19.191 | -19.191 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 18.11 | 36.22 | 54.34 | 72.45 | 90.56 | 108.67 | 126.78 | 144.89 |
| | | Mz | 0.00 | -16.27 | -32.54 | -48.82 | -65.09 | -81.36 | -97.63 | -113.90 | -130.18 |
| | Sismo Y: Modo 3 | N | 47.120 | 47.120 | 47.120 | 47.120 | 47.120 | 47.120 | 47.120 | 47.120 | 47.120 |
| | | Vy | 28.871 | 28.871 | 28.871 | 28.871 | 28.871 | 28.871 | 28.871 | 28.871 | 28.871 |
| | | Vz | 13.829 | 13.829 | 13.829 | 13.829 | 13.829 | 13.829 | 13.829 | 13.829 | 13.829 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -13.05 | -26.10 | -39.15 | -52.20 | -65.25 | -78.30 | -91.36 | -104.41 |
| | | Mz | 0.00 | -27.25 | -54.49 | -81.74 | -108.99 | -136.24 | -163.48 | -190.73 | -217.98 |

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N55/N56 | Peso propio | N | -547.104 | -534.084 | -521.065 | -508.046 | -495.026 | -482.007 | -468.988 | -455.968 | -442.949 |
| | | Vy | 7.027 | 7.027 | 7.027 | 7.027 | 7.027 | 7.027 | 7.027 | 7.027 | 7.027 |
| | | Vz | -18.768 | -18.768 | -18.768 | -18.768 | -18.768 | -18.768 | -18.768 | -18.768 | -18.768 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 17.71 | 35.42 | 53.14 | 70.85 | 88.56 | 106.27 | 123.98 | 141.70 |
| | | Mz | 0.00 | -6.63 | -13.26 | -19.89 | -26.53 | -33.16 | -39.79 | -46.42 | -53.05 |
| | CM 1 | N | -77.534 | -77.534 | -77.534 | -77.534 | -77.534 | -77.534 | -77.534 | -77.534 | -77.534 |
| | | Vy | 0.826 | 0.826 | 0.826 | 0.826 | 0.826 | 0.826 | 0.826 | 0.826 | 0.826 |
| | | Vz | -3.724 | -3.724 | -3.724 | -3.724 | -3.724 | -3.724 | -3.724 | -3.724 | -3.724 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 3.51 | 7.03 | 10.54 | 14.06 | 17.57 | 21.09 | 24.60 | 28.12 |
| | | Mz | 0.00 | -0.78 | -1.56 | -2.34 | -3.12 | -3.90 | -4.68 | -5.46 | -6.24 |
| | Q 1 | N | -430.747 | -430.747 | -430.747 | -430.747 | -430.747 | -430.747 | -430.747 | -430.747 | -430.747 |
| | | Vy | 4.591 | 4.591 | 4.591 | 4.591 | 4.591 | 4.591 | 4.591 | 4.591 | 4.591 |
| | | Vz | -20.689 | -20.689 | -20.689 | -20.689 | -20.689 | -20.689 | -20.689 | -20.689 | -20.689 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 19.53 | 39.05 | 58.58 | 78.10 | 97.63 | 117.15 | 136.68 | 156.21 |
| | | Mz | 0.00 | -4.33 | -8.67 | -13.00 | -17.33 | -21.66 | -26.00 | -30.33 | -34.66 |
| | T 1 | N | -20.336 | -20.336 | -20.336 | -20.336 | -20.336 | -20.336 | -20.336 | -20.336 | -20.336 |
| | | Vy | -7.503 | -7.503 | -7.503 | -7.503 | -7.503 | -7.503 | -7.503 | -7.503 | -7.503 |
| | | Vz | 28.252 | 28.252 | 28.252 | 28.252 | 28.252 | 28.252 | 28.252 | 28.252 | 28.252 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -26.66 | -53.33 | -79.99 | -106.65 | -133.31 | -159.98 | -186.64 | -213.30 |
| | | Mz | 0.00 | 7.08 | 14.16 | 21.24 | 28.32 | 35.40 | 42.48 | 49.56 | 56.64 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | T 2 | N | 38.735 | 38.735 | 38.735 | 38.735 | 38.735 | 38.735 | 38.735 | 38.735 | 38.735 |
| | | Vy | 14.291 | 14.291 | 14.291 | 14.291 | 14.291 | 14.291 | 14.291 | 14.291 | 14.291 |
| | | Vz | -53.814 | -53.814 | -53.814 | -53.814 | -53.814 | -53.814 | -53.814 | -53.814 | -53.814 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 50.79 | 101.57 | 152.36 | 203.15 | 253.93 | 304.72 | 355.51 | 406.29 |
| | | Mz | 0.00 | -13.49 | -26.97 | -40.46 | -53.95 | -67.43 | -80.92 | -94.41 | -107.89 |
| | V 1 | N | -0.634 | -0.634 | -0.634 | -0.634 | -0.634 | -0.634 | -0.634 | -0.634 | -0.634 |
| | | Vy | 0.215 | 0.215 | 0.215 | 0.215 | 0.215 | 0.215 | 0.215 | 0.215 | 0.215 |
| | | Vz | 0.034 | 0.034 | 0.034 | 0.034 | 0.034 | 0.034 | 0.034 | 0.034 | 0.034 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.03 | -0.06 | -0.10 | -0.13 | -0.16 | -0.19 | -0.22 | -0.25 |
| | | Mz | 0.00 | -0.20 | -0.41 | -0.61 | -0.81 | -1.02 | -1.22 | -1.42 | -1.62 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | 24.209 | 24.209 | 24.209 | 24.209 | 24.209 | 24.209 | 24.209 | 24.209 | 24.209 |
| | | Vy | 8.932 | 8.932 | 8.932 | 8.932 | 8.932 | 8.932 | 8.932 | 8.932 | 8.932 |
| | | Vz | -33.634 | -33.634 | -33.634 | -33.634 | -33.634 | -33.634 | -33.634 | -33.634 | -33.634 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 31.74 | 63.48 | 95.22 | 126.97 | 158.71 | 190.45 | 222.19 | 253.93 |
| | | Mz | 0.00 | -8.43 | -16.86 | -25.29 | -33.72 | -42.15 | -50.57 | -59.00 | -67.43 |
| | Sismo X: Modo 1 | N | 33.009 | 33.009 | 33.009 | 33.009 | 33.009 | 33.009 | 33.009 | 33.009 | 33.009 |
| | | Vy | 4.810 | 4.810 | 4.810 | 4.810 | 4.810 | 4.810 | 4.810 | 4.810 | 4.810 |
| | | Vz | -24.086 | -24.086 | -24.086 | -24.086 | -24.086 | -24.086 | -24.086 | -24.086 | -24.086 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 22.73 | 45.46 | 68.19 | 90.93 | 113.66 | 136.39 | 159.12 | 181.85 |
| | | Mz | 0.00 | -4.54 | -9.08 | -13.62 | -18.16 | -22.70 | -27.24 | -31.78 | -36.32 |
| | Sismo X: Modo 2 | N | -16.100 | -16.100 | -16.100 | -16.100 | -16.100 | -16.100 | -16.100 | -16.100 | -16.100 |
| | | Vy | 17.154 | 17.154 | 17.154 | 17.154 | 17.154 | 17.154 | 17.154 | 17.154 | 17.154 |
| | | Vz | -16.897 | -16.897 | -16.897 | -16.897 | -16.897 | -16.897 | -16.897 | -16.897 | -16.897 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 15.95 | 31.89 | 47.84 | 63.79 | 79.73 | 95.68 | 111.63 | 127.57 |
| | | Mz | 0.00 | -16.19 | -32.38 | -48.57 | -64.76 | -80.94 | -97.13 | -113.32 | -129.51 |
| | Sismo X: Modo 3 | N | -25.952 | -25.952 | -25.952 | -25.952 | -25.952 | -25.952 | -25.952 | -25.952 | -25.952 |
| | | Vy | 6.959 | 6.959 | 6.959 | 6.959 | 6.959 | 6.959 | 6.959 | 6.959 | 6.959 |
| | | Vz | 2.959 | 2.959 | 2.959 | 2.959 | 2.959 | 2.959 | 2.959 | 2.959 | 2.959 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -2.79 | -5.58 | -8.38 | -11.17 | -13.96 | -16.75 | -19.55 | -22.34 |
| | | Mz | 0.00 | -6.57 | -13.14 | -19.70 | -26.27 | -32.84 | -39.41 | -45.97 | -52.54 |
| | Sismo Y: Modo 1 | N | 27.372 | 27.372 | 27.372 | 27.372 | 27.372 | 27.372 | 27.372 | 27.372 | 27.372 |
| | | Vy | 3.989 | 3.989 | 3.989 | 3.989 | 3.989 | 3.989 | 3.989 | 3.989 | 3.989 |
| | | Vz | -19.973 | -19.973 | -19.973 | -19.973 | -19.973 | -19.973 | -19.973 | -19.973 | -19.973 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 18.85 | 37.70 | 56.55 | 75.40 | 94.25 | 113.10 | 131.95 | 150.80 |
| | | Mz | 0.00 | -3.76 | -7.53 | -11.29 | -15.06 | -18.82 | -22.59 | -26.35 | -30.12 |
| | Sismo Y: Modo 2 | N | -15.140 | -15.140 | -15.140 | -15.140 | -15.140 | -15.140 | -15.140 | -15.140 | -15.140 |
| | | Vy | 16.131 | 16.131 | 16.131 | 16.131 | 16.131 | 16.131 | 16.131 | 16.131 | 16.131 |
| | | Vz | -15.890 | -15.890 | -15.890 | -15.890 | -15.890 | -15.890 | -15.890 | -15.890 | -15.890 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 15.00 | 29.99 | 44.99 | 59.98 | 74.98 | 89.97 | 104.97 | 119.97 |
| | | Mz | 0.00 | -15.22 | -30.45 | -45.67 | -60.89 | -76.12 | -91.34 | -106.57 | -121.79 |
| | Sismo Y: Modo 3 | N | -111.147 | -111.147 | -111.147 | -111.147 | -111.147 | -111.147 | -111.147 | -111.147 | -111.147 |
| | | Vy | 29.804 | 29.804 | 29.804 | 29.804 | 29.804 | 29.804 | 29.804 | 29.804 | 29.804 |
| | | Vz | 12.672 | 12.672 | 12.672 | 12.672 | 12.672 | 12.672 | 12.672 | 12.672 | 12.672 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -11.96 | -23.92 | -35.88 | -47.84 | -59.80 | -71.75 | -83.71 | -95.67 |
| | | Mz | 0.00 | -28.13 | -56.26 | -84.38 | -112.51 | -140.64 | -168.77 | -196.89 | -225.02 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N57/N58 | Peso propio | N | -323.763 | -310.744 | -297.724 | -284.705 | -271.686 | -258.667 | -245.647 | -232.628 | -219.609 |
| | | Vy | -3.540 | -3.540 | -3.540 | -3.540 | -3.540 | -3.540 | -3.540 | -3.540 | -3.540 |
| | | Vz | 19.024 | 19.024 | 19.024 | 19.024 | 19.024 | 19.024 | 19.024 | 19.024 | 19.024 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -17.95 | -35.91 | -53.86 | -71.82 | -89.77 | -107.73 | -125.68 | -143.63 |
| | | Mz | 0.00 | 3.34 | 6.68 | 10.02 | 13.36 | 16.71 | 20.05 | 23.39 | 26.73 |
| | CM 1 | N | -37.903 | -37.903 | -37.903 | -37.903 | -37.903 | -37.903 | -37.903 | -37.903 | -37.903 |
| | | Vy | -0.146 | -0.146 | -0.146 | -0.146 | -0.146 | -0.146 | -0.146 | -0.146 | -0.146 |
| | | Vz | 3.809 | 3.809 | 3.809 | 3.809 | 3.809 | 3.809 | 3.809 | 3.809 | 3.809 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -3.59 | -7.19 | -10.78 | -14.38 | -17.97 | -21.57 | -25.16 | -28.76 |
| | | Mz | 0.00 | 0.14 | 0.28 | 0.41 | 0.55 | 0.69 | 0.83 | 0.97 | 1.10 |
| | Q 1 | N | -210.573 | -210.573 | -210.573 | -210.573 | -210.573 | -210.573 | -210.573 | -210.573 | -210.573 |
| | | Vy | -0.813 | -0.813 | -0.813 | -0.813 | -0.813 | -0.813 | -0.813 | -0.813 | -0.813 |
| | | Vz | 21.162 | 21.162 | 21.162 | 21.162 | 21.162 | 21.162 | 21.162 | 21.162 | 21.162 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -19.97 | -39.94 | -59.92 | -79.89 | -99.86 | -119.83 | -139.80 | -159.78 |
| | | Mz | 0.00 | 0.77 | 1.53 | 2.30 | 3.07 | 3.83 | 4.60 | 5.37 | 6.14 |
| | T 1 | N | 20.938 | 20.938 | 20.938 | 20.938 | 20.938 | 20.938 | 20.938 | 20.938 | 20.938 |
| | | Vy | -10.765 | -10.765 | -10.765 | -10.765 | -10.765 | -10.765 | -10.765 | -10.765 | -10.765 |
| | | Vz | 22.652 | 22.652 | 22.652 | 22.652 | 22.652 | 22.652 | 22.652 | 22.652 | 22.652 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -21.38 | -42.76 | -64.13 | -85.51 | -106.89 | -128.27 | -149.64 | -171.02 |
| | | Mz | 0.00 | 10.16 | 20.32 | 30.48 | 40.64 | 50.80 | 60.96 | 71.12 | 81.28 |
| | T 2 | N | -39.882 | -39.882 | -39.882 | -39.882 | -39.882 | -39.882 | -39.882 | -39.882 | -39.882 |
| | | Vy | 20.506 | 20.506 | 20.506 | 20.506 | 20.506 | 20.506 | 20.506 | 20.506 | 20.506 |
| | | Vz | -43.146 | -43.146 | -43.146 | -43.146 | -43.146 | -43.146 | -43.146 | -43.146 | -43.146 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 40.72 | 81.44 | 122.16 | 162.88 | 203.60 | 244.32 | 285.04 | 325.76 |
| | | Mz | 0.00 | -19.35 | -38.70 | -58.06 | -77.41 | -96.76 | -116.11 | -135.47 | -154.82 |
| | V 1 | N | 0.353 | 0.353 | 0.353 | 0.353 | 0.353 | 0.353 | 0.353 | 0.353 | 0.353 |
| | | Vy | 0.186 | 0.186 | 0.186 | 0.186 | 0.186 | 0.186 | 0.186 | 0.186 | 0.186 |
| | | Vz | 0.052 | 0.052 | 0.052 | 0.052 | 0.052 | 0.052 | 0.052 | 0.052 | 0.052 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.05 | -0.10 | -0.15 | -0.20 | -0.25 | -0.29 | -0.34 | -0.39 |
| | | Mz | 0.00 | -0.18 | -0.35 | -0.53 | -0.70 | -0.88 | -1.05 | -1.23 | -1.40 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | -24.927 | -24.927 | -24.927 | -24.927 | -24.927 | -24.927 | -24.927 | -24.927 | -24.927 |
| | | Vy | 12.816 | 12.816 | 12.816 | 12.816 | 12.816 | 12.816 | 12.816 | 12.816 | 12.816 |
| | | Vz | -26.967 | -26.967 | -26.967 | -26.967 | -26.967 | -26.967 | -26.967 | -26.967 | -26.967 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 25.45 | 50.90 | 76.35 | 101.80 | 127.25 | 152.70 | 178.15 | 203.60 |
| | | Mz | 0.00 | -12.10 | -24.19 | -36.29 | -48.38 | -60.48 | -72.57 | -84.67 | -96.76 |
| | Sismo X: Modo 1 | N | -36.483 | -36.483 | -36.483 | -36.483 | -36.483 | -36.483 | -36.483 | -36.483 | -36.483 |
| | | Vy | 2.290 | 2.290 | 2.290 | 2.290 | 2.290 | 2.290 | 2.290 | 2.290 | 2.290 |
| | | Vz | -20.862 | -20.862 | -20.862 | -20.862 | -20.862 | -20.862 | -20.862 | -20.862 | -20.862 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 19.69 | 39.38 | 59.07 | 78.76 | 98.44 | 118.13 | 137.82 | 157.51 |
| | | Mz | 0.00 | -2.16 | -4.32 | -6.48 | -8.65 | -10.81 | -12.97 | -15.13 | -17.29 |
| | Sismo X: Modo 2 | N | 15.339 | 15.339 | 15.339 | 15.339 | 15.339 | 15.339 | 15.339 | 15.339 | 15.339 |
| | | Vy | 18.292 | 18.292 | 18.292 | 18.292 | 18.292 | 18.292 | 18.292 | 18.292 | 18.292 |
| | | Vz | -17.501 | -17.501 | -17.501 | -17.501 | -17.501 | -17.501 | -17.501 | -17.501 | -17.501 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 16.52 | 33.03 | 49.55 | 66.07 | 82.58 | 99.10 | 115.62 | 132.13 |
| | | Mz | 0.00 | -17.26 | -34.53 | -51.79 | -69.05 | -86.32 | -103.58 | -120.84 | -138.11 |
| | Sismo X: Modo 3 | N | 25.075 | 25.075 | 25.075 | 25.075 | 25.075 | 25.075 | 25.075 | 25.075 | 25.075 |
| | | Vy | 6.310 | 6.310 | 6.310 | 6.310 | 6.310 | 6.310 | 6.310 | 6.310 | 6.310 |
| | | Vz | 3.618 | 3.618 | 3.618 | 3.618 | 3.618 | 3.618 | 3.618 | 3.618 | 3.618 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -3.41 | -6.83 | -10.24 | -13.66 | -17.07 | -20.49 | -23.90 | -27.31 |
| | | Mz | 0.00 | -5.95 | -11.91 | -17.86 | -23.82 | -29.77 | -35.73 | -41.68 | -47.64 |
| | Sismo Y: Modo 1 | N | -30.253 | -30.253 | -30.253 | -30.253 | -30.253 | -30.253 | -30.253 | -30.253 | -30.253 |
| | | Vy | 1.899 | 1.899 | 1.899 | 1.899 | 1.899 | 1.899 | 1.899 | 1.899 | 1.899 |
| | | Vz | -17.300 | -17.300 | -17.300 | -17.300 | -17.300 | -17.300 | -17.300 | -17.300 | -17.300 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 16.33 | 32.65 | 48.98 | 65.31 | 81.63 | 97.96 | 114.29 | 130.61 |
| | | Mz | 0.00 | -1.79 | -3.58 | -5.38 | -7.17 | -8.96 | -10.75 | -12.55 | -14.34 |
| | | | | | | | | | | | |
| | Sismo Y: Modo 2 | N | 14.425 | 14.425 | 14.425 | 14.425 | 14.425 | 14.425 | 14.425 | 14.425 | 14.425 |
| | | Vy | 17.202 | 17.202 | 17.202 | 17.202 | 17.202 | 17.202 | 17.202 | 17.202 | 17.202 |
| | | Vz | -16.458 | -16.458 | -16.458 | -16.458 | -16.458 | -16.458 | -16.458 | -16.458 | -16.458 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 15.53 | 31.06 | 46.60 | 62.13 | 77.66 | 93.19 | 108.72 | 124.25 |
| | | Mz | 0.00 | -16.23 | -32.47 | -48.70 | -64.94 | -81.17 | -97.41 | -113.64 | -129.87 |
| | | | | | | | | | | | |
| | Sismo Y: Modo 3 | N | 107.389 | 107.389 | 107.389 | 107.389 | 107.389 | 107.389 | 107.389 | 107.389 | 107.389 |
| | | Vy | 27.023 | 27.023 | 27.023 | 27.023 | 27.023 | 27.023 | 27.023 | 27.023 | 27.023 |
| | | Vz | 15.494 | 15.494 | 15.494 | 15.494 | 15.494 | 15.494 | 15.494 | 15.494 | 15.494 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -14.62 | -29.24 | -43.87 | -58.49 | -73.11 | -87.73 | -102.35 | -116.98 |
| | | Mz | 0.00 | -25.50 | -51.01 | -76.51 | -102.01 | -127.51 | -153.02 | -178.52 | -204.02 |
| | | | | | | | | | | | |

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-------------|----------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N59/N60 | Peso propio | N | -1267.240 | -1254.221 | -1241.201 | -1228.182 | -1215.163 | -1202.143 | -1189.124 | -1176.105 | -1163.085 |
| | | Vy | -7.220 | -7.220 | -7.220 | -7.220 | -7.220 | -7.220 | -7.220 | -7.220 | -7.220 |
| | | Vz | 32.710 | 32.710 | 32.710 | 32.710 | 32.710 | 32.710 | 32.710 | 32.710 | 32.710 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -30.87 | -61.74 | -92.61 | -123.48 | -154.35 | -185.22 | -216.09 | -246.96 |
| | | Mz | 0.00 | 6.81 | 13.63 | 20.44 | 27.25 | 34.07 | 40.88 | 47.70 | 54.51 |
| | CM 1 | N | -201.383 | -201.383 | -201.383 | -201.383 | -201.383 | -201.383 | -201.383 | -201.383 | -201.383 |
| | | Vy | -1.711 | -1.711 | -1.711 | -1.711 | -1.711 | -1.711 | -1.711 | -1.711 | -1.711 |
| | | Vz | 6.140 | 6.140 | 6.140 | 6.140 | 6.140 | 6.140 | 6.140 | 6.140 | 6.140 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -5.79 | -11.59 | -17.38 | -23.18 | -28.97 | -34.77 | -40.56 | -46.36 |
| | | Mz | 0.00 | 1.61 | 3.23 | 4.84 | 6.46 | 8.07 | 9.69 | 11.30 | 12.92 |
| | Q 1 | N | -1118.794 | -1118.794 | -1118.794 | -1118.794 | -1118.794 | -1118.794 | -1118.794 | -1118.794 | -1118.794 |
| | | Vy | -9.506 | -9.506 | -9.506 | -9.506 | -9.506 | -9.506 | -9.506 | -9.506 | -9.506 |
| | | Vz | 34.112 | 34.112 | 34.112 | 34.112 | 34.112 | 34.112 | 34.112 | 34.112 | 34.112 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -32.19 | -64.39 | -96.58 | -128.77 | -160.97 | -193.16 | -225.36 | -257.55 |
| | | Mz | 0.00 | 8.97 | 17.94 | 26.91 | 35.89 | 44.86 | 53.83 | 62.80 | 71.77 |
| | T 1 | N | 73.604 | 73.604 | 73.604 | 73.604 | 73.604 | 73.604 | 73.604 | 73.604 | 73.604 |
| | | Vy | -9.239 | -9.239 | -9.239 | -9.239 | -9.239 | -9.239 | -9.239 | -9.239 | -9.239 |
| | | Vz | 24.218 | 24.218 | 24.218 | 24.218 | 24.218 | 24.218 | 24.218 | 24.218 | 24.218 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -22.86 | -45.71 | -68.57 | -91.42 | -114.28 | -137.14 | -159.99 | -182.85 |
| | | Mz | 0.00 | 8.72 | 17.44 | 26.16 | 34.88 | 43.60 | 52.32 | 61.04 | 69.76 |
| | T 2 | N | -140.199 | -140.199 | -140.199 | -140.199 | -140.199 | -140.199 | -140.199 | -140.199 | -140.199 |
| | | Vy | 17.599 | 17.599 | 17.599 | 17.599 | 17.599 | 17.599 | 17.599 | 17.599 | 17.599 |
| | | Vz | -46.130 | -46.130 | -46.130 | -46.130 | -46.130 | -46.130 | -46.130 | -46.130 | -46.130 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 43.53 | 87.07 | 130.60 | 174.14 | 217.67 | 261.21 | 304.74 | 348.28 |
| | | Mz | 0.00 | -16.61 | -33.22 | -49.83 | -66.44 | -83.04 | -99.65 | -116.26 | -132.87 |
| | V 1 | N | -0.116 | -0.116 | -0.116 | -0.116 | -0.116 | -0.116 | -0.116 | -0.116 | -0.116 |
| | | Vy | 1.629 | 1.204 | 0.780 | 0.355 | -0.070 | -0.494 | -0.919 | -1.344 | -1.768 |
| | | Vz | 0.031 | 0.031 | 0.031 | 0.031 | 0.031 | 0.031 | 0.031 | 0.031 | 0.031 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.03 | -0.06 | -0.09 | -0.12 | -0.15 | -0.17 | -0.20 | -0.23 |
| | | Mz | 0.00 | -1.34 | -2.27 | -2.81 | -2.94 | -2.68 | -2.01 | -0.94 | 0.53 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | R 1 | N | -87.624 | -87.624 | -87.624 | -87.624 | -87.624 | -87.624 | -87.624 | -87.624 | -87.624 |
| | | Vy | 10.999 | 10.999 | 10.999 | 10.999 | 10.999 | 10.999 | 10.999 | 10.999 | 10.999 |
| | | Vz | -28.831 | -28.831 | -28.831 | -28.831 | -28.831 | -28.831 | -28.831 | -28.831 | -28.831 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 27.21 | 54.42 | 81.63 | 108.84 | 136.05 | 163.26 | 190.47 | 217.67 |
| | | Mz | 0.00 | -10.38 | -20.76 | -31.14 | -41.52 | -51.90 | -62.28 | -72.66 | -83.04 |
| | Sismo X: Modo 1 | N | -53.833 | -53.833 | -53.833 | -53.833 | -53.833 | -53.833 | -53.833 | -53.833 | -53.833 |
| | | Vy | 4.267 | 4.267 | 4.267 | 4.267 | 4.267 | 4.267 | 4.267 | 4.267 | 4.267 |
| | | Vz | -24.151 | -24.151 | -24.151 | -24.151 | -24.151 | -24.151 | -24.151 | -24.151 | -24.151 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 22.79 | 45.59 | 68.38 | 91.17 | 113.96 | 136.76 | 159.55 | 182.34 |
| | | Mz | 0.00 | -4.03 | -8.05 | -12.08 | -16.11 | -20.14 | -24.16 | -28.19 | -32.22 |
| | Sismo X: Modo 2 | N | -80.101 | -80.101 | -80.101 | -80.101 | -80.101 | -80.101 | -80.101 | -80.101 | -80.101 |
| | | Vy | 20.031 | 20.031 | 20.031 | 20.031 | 20.031 | 20.031 | 20.031 | 20.031 | 20.031 |
| | | Vz | -18.055 | -18.055 | -18.055 | -18.055 | -18.055 | -18.055 | -18.055 | -18.055 | -18.055 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 17.04 | 34.08 | 51.12 | 68.16 | 85.20 | 102.24 | 119.28 | 136.32 |
| | | Mz | 0.00 | -18.90 | -37.81 | -56.71 | -75.62 | -94.52 | -113.43 | -132.33 | -151.24 |
| | Sismo X: Modo 3 | N | -9.502 | -9.502 | -9.502 | -9.502 | -9.502 | -9.502 | -9.502 | -9.502 | -9.502 |
| | | Vy | 6.130 | 6.130 | 6.130 | 6.130 | 6.130 | 6.130 | 6.130 | 6.130 | 6.130 |
| | | Vz | 2.526 | 2.526 | 2.526 | 2.526 | 2.526 | 2.526 | 2.526 | 2.526 | 2.526 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -2.38 | -4.77 | -7.15 | -9.54 | -11.92 | -14.30 | -16.69 | -19.07 |
| | | Mz | 0.00 | -5.79 | -11.57 | -17.36 | -23.14 | -28.93 | -34.71 | -40.50 | -46.28 |
| | Sismo Y: Modo 1 | N | -44.640 | -44.640 | -44.640 | -44.640 | -44.640 | -44.640 | -44.640 | -44.640 | -44.640 |
| | | Vy | 3.538 | 3.538 | 3.538 | 3.538 | 3.538 | 3.538 | 3.538 | 3.538 | 3.538 |
| | | Vz | -20.027 | -20.027 | -20.027 | -20.027 | -20.027 | -20.027 | -20.027 | -20.027 | -20.027 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 18.90 | 37.80 | 56.70 | 75.60 | 94.50 | 113.40 | 132.30 | 151.20 |
| | | Mz | 0.00 | -3.34 | -6.68 | -10.02 | -13.36 | -16.70 | -20.04 | -23.38 | -26.72 |
| | Sismo Y: Modo 2 | N | -75.326 | -75.326 | -75.326 | -75.326 | -75.326 | -75.326 | -75.326 | -75.326 | -75.326 |
| | | Vy | 18.837 | 18.837 | 18.837 | 18.837 | 18.837 | 18.837 | 18.837 | 18.837 | 18.837 |
| | | Vz | -16.979 | -16.979 | -16.979 | -16.979 | -16.979 | -16.979 | -16.979 | -16.979 | -16.979 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 16.02 | 32.05 | 48.07 | 64.09 | 80.12 | 96.14 | 112.17 | 128.19 |
| | | Mz | 0.00 | -17.78 | -35.55 | -53.33 | -71.11 | -88.89 | -106.66 | -124.44 | -142.22 |
| | Sismo Y: Modo 3 | N | -40.693 | -40.693 | -40.693 | -40.693 | -40.693 | -40.693 | -40.693 | -40.693 | -40.693 |
| | | Vy | 26.252 | 26.252 | 26.252 | 26.252 | 26.252 | 26.252 | 26.252 | 26.252 | 26.252 |
| | | Vz | 10.819 | 10.819 | 10.819 | 10.819 | 10.819 | 10.819 | 10.819 | 10.819 | 10.819 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -10.21 | -20.42 | -30.63 | -40.84 | -51.05 | -61.26 | -71.47 | -81.68 |
| | | Mz | 0.00 | -24.78 | -49.55 | -74.33 | -99.10 | -123.88 | -148.65 | -173.43 | -198.21 |

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N61/N62 | Peso propio | N | -246.839 | -233.819 | -220.800 | -207.781 | -194.761 | -181.742 | -168.723 | -155.703 | -142.684 |
| | | Vy | 1.607 | 1.607 | 1.607 | 1.607 | 1.607 | 1.607 | 1.607 | 1.607 | 1.607 |
| | | Vz | 15.763 | 15.763 | 15.763 | 15.763 | 15.763 | 15.763 | 15.763 | 15.763 | 15.763 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -14.88 | -29.75 | -44.63 | -59.51 | -74.38 | -89.26 | -104.13 | -119.01 |
| | | Mz | 0.00 | -1.52 | -3.03 | -4.55 | -6.07 | -7.58 | -9.10 | -10.62 | -12.13 |
| | CM 1 | N | -24.893 | -24.893 | -24.893 | -24.893 | -24.893 | -24.893 | -24.893 | -24.893 | -24.893 |
| | | Vy | -0.184 | -0.184 | -0.184 | -0.184 | -0.184 | -0.184 | -0.184 | -0.184 | -0.184 |
| | | Vz | 3.203 | 3.203 | 3.203 | 3.203 | 3.203 | 3.203 | 3.203 | 3.203 | 3.203 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -3.02 | -6.05 | -9.07 | -12.09 | -15.11 | -18.14 | -21.16 | -24.18 |
| | | Mz | 0.00 | 0.17 | 0.35 | 0.52 | 0.69 | 0.87 | 1.04 | 1.22 | 1.39 |
| | Q 1 | N | -138.293 | -138.293 | -138.293 | -138.293 | -138.293 | -138.293 | -138.293 | -138.293 | -138.293 |
| | | Vy | -1.022 | -1.022 | -1.022 | -1.022 | -1.022 | -1.022 | -1.022 | -1.022 | -1.022 |
| | | Vz | 17.795 | 17.795 | 17.795 | 17.795 | 17.795 | 17.795 | 17.795 | 17.795 | 17.795 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -16.79 | -33.59 | -50.38 | -67.17 | -83.97 | -100.76 | -117.56 | -134.35 |
| | | Mz | 0.00 | 0.96 | 1.93 | 2.89 | 3.86 | 4.82 | 5.79 | 6.75 | 7.72 |
| | T 1 | N | -12.129 | -12.129 | -12.129 | -12.129 | -12.129 | -12.129 | -12.129 | -12.129 | -12.129 |
| | | Vy | -1.626 | -1.626 | -1.626 | -1.626 | -1.626 | -1.626 | -1.626 | -1.626 | -1.626 |
| | | Vz | -10.536 | -10.536 | -10.536 | -10.536 | -10.536 | -10.536 | -10.536 | -10.536 | -10.536 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 9.94 | 19.89 | 29.83 | 39.77 | 49.71 | 59.66 | 69.60 | 79.54 |
| | | Mz | 0.00 | 1.53 | 3.07 | 4.60 | 6.14 | 7.67 | 9.21 | 10.74 | 12.28 |
| | T 2 | N | 23.102 | 23.102 | 23.102 | 23.102 | 23.102 | 23.102 | 23.102 | 23.102 | 23.102 |
| | | Vy | 3.097 | 3.097 | 3.097 | 3.097 | 3.097 | 3.097 | 3.097 | 3.097 | 3.097 |
| | | Vz | 20.068 | 20.068 | 20.068 | 20.068 | 20.068 | 20.068 | 20.068 | 20.068 | 20.068 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -18.94 | -37.88 | -56.82 | -75.76 | -94.69 | -113.63 | -132.57 | -151.51 |
| | | Mz | 0.00 | -2.92 | -5.85 | -8.77 | -11.69 | -14.62 | -17.54 | -20.46 | -23.39 |
| | V 1 | N | 0.482 | 0.482 | 0.482 | 0.482 | 0.482 | 0.482 | 0.482 | 0.482 | 0.482 |
| | | Vy | -0.113 | -0.113 | -0.113 | -0.113 | -0.113 | -0.113 | -0.113 | -0.113 | -0.113 |
| | | Vz | 0.084 | 0.084 | 0.084 | 0.084 | 0.084 | 0.084 | 0.084 | 0.084 | 0.084 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.08 | -0.16 | -0.24 | -0.32 | -0.40 | -0.48 | -0.56 | -0.64 |
| | | Mz | 0.00 | 0.11 | 0.21 | 0.32 | 0.43 | 0.53 | 0.64 | 0.75 | 0.85 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | 14.439 | 14.439 | 14.439 | 14.439 | 14.439 | 14.439 | 14.439 | 14.439 | 14.439 |
| | | Vy | 1.936 | 1.936 | 1.936 | 1.936 | 1.936 | 1.936 | 1.936 | 1.936 | 1.936 |
| | | Vz | 12.542 | 12.542 | 12.542 | 12.542 | 12.542 | 12.542 | 12.542 | 12.542 | 12.542 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -11.84 | -23.67 | -35.51 | -47.35 | -59.18 | -71.02 | -82.86 | -94.69 |
| | | Mz | 0.00 | -1.83 | -3.65 | -5.48 | -7.31 | -9.14 | -10.96 | -12.79 | -14.62 |
| | Sismo X: Modo 1 | N | -23.815 | -23.815 | -23.815 | -23.815 | -23.815 | -23.815 | -23.815 | -23.815 | -23.815 |
| | | Vy | 20.132 | 20.132 | 20.132 | 20.132 | 20.132 | 20.132 | 20.132 | 20.132 | 20.132 |
| | | Vz | 12.427 | 12.427 | 12.427 | 12.427 | 12.427 | 12.427 | 12.427 | 12.427 | 12.427 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -11.73 | -23.46 | -35.18 | -46.91 | -58.64 | -70.37 | -82.10 | -93.83 |
| | | Mz | 0.00 | -19.00 | -38.00 | -57.00 | -76.00 | -95.00 | -114.00 | -133.00 | -152.00 |
| | Sismo X: Modo 2 | N | 85.576 | 85.576 | 85.576 | 85.576 | 85.576 | 85.576 | 85.576 | 85.576 | 85.576 |
| | | Vy | -6.312 | -6.312 | -6.312 | -6.312 | -6.312 | -6.312 | -6.312 | -6.312 | -6.312 |
| | | Vz | 29.003 | 29.003 | 29.003 | 29.003 | 29.003 | 29.003 | 29.003 | 29.003 | 29.003 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -27.37 | -54.74 | -82.12 | -109.49 | -136.86 | -164.23 | -191.60 | -218.98 |
| | | Mz | 0.00 | 5.96 | 11.91 | 17.87 | 23.83 | 29.78 | 35.74 | 41.70 | 47.65 |
| | Sismo X: Modo 3 | N | 14.501 | 14.501 | 14.501 | 14.501 | 14.501 | 14.501 | 14.501 | 14.501 | 14.501 |
| | | Vy | -4.423 | -4.423 | -4.423 | -4.423 | -4.423 | -4.423 | -4.423 | -4.423 | -4.423 |
| | | Vz | 1.076 | 1.076 | 1.076 | 1.076 | 1.076 | 1.076 | 1.076 | 1.076 | 1.076 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -1.02 | -2.03 | -3.05 | -4.06 | -5.08 | -6.09 | -7.11 | -8.13 |
| | | Mz | 0.00 | 4.17 | 8.35 | 12.52 | 16.70 | 20.87 | 25.04 | 29.22 | 33.39 |
| | Sismo Y: Modo 1 | N | -19.748 | -19.748 | -19.748 | -19.748 | -19.748 | -19.748 | -19.748 | -19.748 | -19.748 |
| | | Vy | 16.694 | 16.694 | 16.694 | 16.694 | 16.694 | 16.694 | 16.694 | 16.694 | 16.694 |
| | | Vz | 10.305 | 10.305 | 10.305 | 10.305 | 10.305 | 10.305 | 10.305 | 10.305 | 10.305 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -9.73 | -19.45 | -29.18 | -38.90 | -48.63 | -58.35 | -68.08 | -77.80 |
| | | Mz | 0.00 | -15.75 | -31.51 | -47.26 | -63.02 | -78.77 | -94.53 | -110.28 | -126.04 |
| | Sismo Y: Modo 2 | N | 80.474 | 80.474 | 80.474 | 80.474 | 80.474 | 80.474 | 80.474 | 80.474 | 80.474 |
| | | Vy | -5.935 | -5.935 | -5.935 | -5.935 | -5.935 | -5.935 | -5.935 | -5.935 | -5.935 |
| | | Vz | 27.274 | 27.274 | 27.274 | 27.274 | 27.274 | 27.274 | 27.274 | 27.274 | 27.274 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -25.74 | -51.48 | -77.22 | -102.96 | -128.70 | -154.44 | -180.18 | -205.92 |
| | | Mz | 0.00 | 5.60 | 11.20 | 16.80 | 22.41 | 28.01 | 33.61 | 39.21 | 44.81 |
| | Sismo Y: Modo 3 | N | 62.103 | 62.103 | 62.103 | 62.103 | 62.103 | 62.103 | 62.103 | 62.103 | 62.103 |
| | | Vy | -18.941 | -18.941 | -18.941 | -18.941 | -18.941 | -18.941 | -18.941 | -18.941 | -18.941 |
| | | Vz | 4.609 | 4.609 | 4.609 | 4.609 | 4.609 | 4.609 | 4.609 | 4.609 | 4.609 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -4.35 | -8.70 | -13.05 | -17.40 | -21.75 | -26.10 | -30.45 | -34.80 |
| | | Mz | 0.00 | 17.88 | 35.75 | 53.63 | 71.50 | 89.38 | 107.25 | 125.13 | 143.00 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N63/N64 | Peso propio | N | -1242.906 | -1229.887 | -1216.867 | -1203.848 | -1190.829 | -1177.809 | -1164.790 | -1151.771 | -1138.751 |
| | | Vy | 7.978 | 7.978 | 7.978 | 7.978 | 7.978 | 7.978 | 7.978 | 7.978 | 7.978 |
| | | Vz | 30.750 | 30.750 | 30.750 | 30.750 | 30.750 | 30.750 | 30.750 | 30.750 | 30.750 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -29.02 | -58.04 | -87.06 | -116.08 | -145.10 | -174.12 | -203.14 | -232.16 |
| | | Mz | 0.00 | -7.53 | -15.06 | -22.59 | -30.12 | -37.64 | -45.17 | -52.70 | -60.23 |
| | CM 1 | N | -197.767 | -197.767 | -197.767 | -197.767 | -197.767 | -197.767 | -197.767 | -197.767 | -197.767 |
| | | Vy | 1.845 | 1.845 | 1.845 | 1.845 | 1.845 | 1.845 | 1.845 | 1.845 | 1.845 |
| | | Vz | 5.760 | 5.760 | 5.760 | 5.760 | 5.760 | 5.760 | 5.760 | 5.760 | 5.760 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -5.44 | -10.87 | -16.31 | -21.74 | -27.18 | -32.62 | -38.05 | -43.49 |
| | | Mz | 0.00 | -1.74 | -3.48 | -5.22 | -6.97 | -8.71 | -10.45 | -12.19 | -13.93 |
| | Q 1 | N | -1098.706 | -1098.706 | -1098.706 | -1098.706 | -1098.706 | -1098.706 | -1098.706 | -1098.706 | -1098.706 |
| | | Vy | 10.251 | 10.251 | 10.251 | 10.251 | 10.251 | 10.251 | 10.251 | 10.251 | 10.251 |
| | | Vz | 31.999 | 31.999 | 31.999 | 31.999 | 31.999 | 31.999 | 31.999 | 31.999 | 31.999 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -30.20 | -60.40 | -90.60 | -120.80 | -151.00 | -181.20 | -211.40 | -241.60 |
| | | Mz | 0.00 | -9.67 | -19.35 | -29.02 | -38.70 | -48.37 | -58.04 | -67.72 | -77.39 |
| | T 1 | N | -25.387 | -25.387 | -25.387 | -25.387 | -25.387 | -25.387 | -25.387 | -25.387 | -25.387 |
| | | Vy | -6.272 | -6.272 | -6.272 | -6.272 | -6.272 | -6.272 | -6.272 | -6.272 | -6.272 |
| | | Vz | -11.296 | -11.296 | -11.296 | -11.296 | -11.296 | -11.296 | -11.296 | -11.296 | -11.296 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 10.66 | 21.32 | 31.98 | 42.64 | 53.30 | 63.96 | 74.62 | 85.28 |
| | | Mz | 0.00 | 5.92 | 11.84 | 17.76 | 23.68 | 29.60 | 35.51 | 41.43 | 47.35 |
| | T 2 | N | 48.356 | 48.356 | 48.356 | 48.356 | 48.356 | 48.356 | 48.356 | 48.356 | 48.356 |
| | | Vy | 11.947 | 11.947 | 11.947 | 11.947 | 11.947 | 11.947 | 11.947 | 11.947 | 11.947 |
| | | Vz | 21.516 | 21.516 | 21.516 | 21.516 | 21.516 | 21.516 | 21.516 | 21.516 | 21.516 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -20.31 | -40.61 | -60.92 | -81.22 | -101.53 | -121.84 | -142.14 | -162.45 |
| | | Mz | 0.00 | -11.27 | -22.55 | -33.82 | -45.10 | -56.37 | -67.65 | -78.92 | -90.20 |
| | V 1 | N | -0.037 | -0.037 | -0.037 | -0.037 | -0.037 | -0.037 | -0.037 | -0.037 | -0.037 |
| | | Vy | -0.109 | -0.109 | -0.109 | -0.109 | -0.109 | -0.109 | -0.109 | -0.109 | -0.109 |
| | | Vz | 0.095 | 0.095 | 0.095 | 0.095 | 0.095 | 0.095 | 0.095 | 0.095 | 0.095 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.09 | -0.18 | -0.27 | -0.36 | -0.45 | -0.54 | -0.63 | -0.72 |
| | | Mz | 0.00 | 0.10 | 0.21 | 0.31 | 0.41 | 0.52 | 0.62 | 0.72 | 0.83 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | 30.222 | 30.222 | 30.222 | 30.222 | 30.222 | 30.222 | 30.222 | 30.222 | 30.222 |
| | | Vy | 7.467 | 7.467 | 7.467 | 7.467 | 7.467 | 7.467 | 7.467 | 7.467 | 7.467 |
| | | Vz | 13.448 | 13.448 | 13.448 | 13.448 | 13.448 | 13.448 | 13.448 | 13.448 | 13.448 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -12.69 | -25.38 | -38.07 | -50.76 | -63.46 | -76.15 | -88.84 | -101.53 |
| | | Mz | 0.00 | -7.05 | -14.09 | -21.14 | -28.19 | -35.23 | -42.28 | -49.33 | -56.37 |
| | Sismo X: Modo 1 | N | 84.620 | 84.620 | 84.620 | 84.620 | 84.620 | 84.620 | 84.620 | 84.620 | 84.620 |
| | | Vy | 21.798 | 21.798 | 21.798 | 21.798 | 21.798 | 21.798 | 21.798 | 21.798 | 21.798 |
| | | Vz | 16.902 | 16.902 | 16.902 | 16.902 | 16.902 | 16.902 | 16.902 | 16.902 | 16.902 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -15.95 | -31.90 | -47.85 | -63.81 | -79.76 | -95.71 | -111.66 | -127.61 |
| | | Mz | 0.00 | -20.57 | -41.14 | -61.72 | -82.29 | -102.86 | -123.43 | -144.01 | -164.58 |
| | Sismo X: Modo 2 | N | 47.226 | 47.226 | 47.226 | 47.226 | 47.226 | 47.226 | 47.226 | 47.226 | 47.226 |
| | | Vy | -4.025 | -4.025 | -4.025 | -4.025 | -4.025 | -4.025 | -4.025 | -4.025 | -4.025 |
| | | Vz | 28.046 | 28.046 | 28.046 | 28.046 | 28.046 | 28.046 | 28.046 | 28.046 | 28.046 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -26.47 | -52.94 | -79.40 | -105.87 | -132.34 | -158.81 | -185.28 | -211.75 |
| | | Mz | 0.00 | 3.80 | 7.60 | 11.39 | 15.19 | 18.99 | 22.79 | 26.59 | 30.39 |
| | Sismo X: Modo 3 | N | -7.404 | -7.404 | -7.404 | -7.404 | -7.404 | -7.404 | -7.404 | -7.404 | -7.404 |
| | | Vy | -4.381 | -4.381 | -4.381 | -4.381 | -4.381 | -4.381 | -4.381 | -4.381 | -4.381 |
| | | Vz | 1.484 | 1.484 | 1.484 | 1.484 | 1.484 | 1.484 | 1.484 | 1.484 | 1.484 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -1.40 | -2.80 | -4.20 | -5.60 | -7.00 | -8.40 | -9.80 | -11.21 |
| | | Mz | 0.00 | 4.13 | 8.27 | 12.40 | 16.54 | 20.67 | 24.81 | 28.94 | 33.08 |
| | Sismo Y: Modo 1 | N | 70.169 | 70.169 | 70.169 | 70.169 | 70.169 | 70.169 | 70.169 | 70.169 | 70.169 |
| | | Vy | 18.076 | 18.076 | 18.076 | 18.076 | 18.076 | 18.076 | 18.076 | 18.076 | 18.076 |
| | | Vz | 14.016 | 14.016 | 14.016 | 14.016 | 14.016 | 14.016 | 14.016 | 14.016 | 14.016 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | Sismo Y: Modo 2 | My | 0.00 | -13.23 | -26.45 | -39.68 | -52.91 | -66.14 | -79.36 | -92.59 | -105.82 |
| | | Mz | 0.00 | -17.06 | -34.12 | -51.18 | -68.24 | -85.29 | -102.35 | -119.41 | -136.47 |
| | | N | 44.411 | 44.411 | 44.411 | 44.411 | 44.411 | 44.411 | 44.411 | 44.411 | 44.411 |
| | | Vy | -3.785 | -3.785 | -3.785 | -3.785 | -3.785 | -3.785 | -3.785 | -3.785 | -3.785 |
| | | Vz | 26.374 | 26.374 | 26.374 | 26.374 | 26.374 | 26.374 | 26.374 | 26.374 | 26.374 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | My | 0.00 | -24.89 | -49.78 | -74.67 | -99.56 | -124.45 | -149.34 | -174.23 | -199.12 |
| | | Mz | 0.00 | 3.57 | 7.14 | 10.72 | 14.29 | 17.86 | 21.43 | 25.00 | 28.57 |
| | | N | -31.708 | -31.708 | -31.708 | -31.708 | -31.708 | -31.708 | -31.708 | -31.708 | -31.708 |
| | | Vy | -18.764 | -18.764 | -18.764 | -18.764 | -18.764 | -18.764 | -18.764 | -18.764 | -18.764 |
| | | Vz | 6.356 | 6.356 | 6.356 | 6.356 | 6.356 | 6.356 | 6.356 | 6.356 | 6.356 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -6.00 | -12.00 | -18.00 | -23.99 | -29.99 | -35.99 | -41.99 | -47.99 |
| | | Mz | 0.00 | 17.71 | 35.42 | 53.12 | 70.83 | 88.54 | 106.25 | 123.96 | 141.66 |
| | | N | -31.708 | -31.708 | -31.708 | -31.708 | -31.708 | -31.708 | -31.708 | -31.708 | -31.708 |
| | | Vy | -18.764 | -18.764 | -18.764 | -18.764 | -18.764 | -18.764 | -18.764 | -18.764 | -18.764 |
| | | Vz | 6.356 | 6.356 | 6.356 | 6.356 | 6.356 | 6.356 | 6.356 | 6.356 | 6.356 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N65/N66 | Peso propio | N | -608.183 | -595.164 | -582.145 | -569.125 | -556.106 | -543.087 | -530.067 | -517.048 | -504.029 |
| | | Vy | -8.518 | -8.518 | -8.518 | -8.518 | -8.518 | -8.518 | -8.518 | -8.518 | -8.518 |
| | | Vz | -25.832 | -25.832 | -25.832 | -25.832 | -25.832 | -25.832 | -25.832 | -25.832 | -25.832 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 24.38 | 48.76 | 73.14 | 97.52 | 121.89 | 146.27 | 170.65 | 195.03 |
| | | Mz | 0.00 | 8.04 | 16.08 | 24.12 | 32.16 | 40.19 | 48.23 | 56.27 | 64.31 |
| | CM 1 | N | -88.216 | -88.216 | -88.216 | -88.216 | -88.216 | -88.216 | -88.216 | -88.216 | -88.216 |
| | | Vy | -1.047 | -1.047 | -1.047 | -1.047 | -1.047 | -1.047 | -1.047 | -1.047 | -1.047 |
| | | Vz | -4.963 | -4.963 | -4.963 | -4.963 | -4.963 | -4.963 | -4.963 | -4.963 | -4.963 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 4.68 | 9.37 | 14.05 | 18.73 | 23.42 | 28.10 | 32.78 | 37.47 |
| | | Mz | 0.00 | 0.99 | 1.98 | 2.96 | 3.95 | 4.94 | 5.93 | 6.92 | 7.91 |
| | Q 1 | N | -490.091 | -490.091 | -490.091 | -490.091 | -490.091 | -490.091 | -490.091 | -490.091 | -490.091 |
| | | Vy | -5.817 | -5.817 | -5.817 | -5.817 | -5.817 | -5.817 | -5.817 | -5.817 | -5.817 |
| | | Vz | -27.571 | -27.571 | -27.571 | -27.571 | -27.571 | -27.571 | -27.571 | -27.571 | -27.571 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 26.02 | 52.04 | 78.06 | 104.08 | 130.10 | 156.12 | 182.14 | 208.16 |
| | | Mz | 0.00 | 5.49 | 10.98 | 16.47 | 21.96 | 27.45 | 32.94 | 38.43 | 43.92 |
| | T 1 | N | 9.710 | 9.710 | 9.710 | 9.710 | 9.710 | 9.710 | 9.710 | 9.710 | 9.710 |
| | | Vy | -5.555 | -5.555 | -5.555 | -5.555 | -5.555 | -5.555 | -5.555 | -5.555 | -5.555 |
| | | Vz | -6.733 | -6.733 | -6.733 | -6.733 | -6.733 | -6.733 | -6.733 | -6.733 | -6.733 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 6.35 | 12.71 | 19.06 | 25.42 | 31.77 | 38.13 | 44.48 | 50.84 |
| | | Mz | 0.00 | 5.24 | 10.49 | 15.73 | 20.97 | 26.21 | 31.46 | 36.70 | 41.94 |
| | T 2 | N | -18.495 | -18.495 | -18.495 | -18.495 | -18.495 | -18.495 | -18.495 | -18.495 | -18.495 |
| | | Vy | 10.581 | 10.581 | 10.581 | 10.581 | 10.581 | 10.581 | 10.581 | 10.581 | 10.581 |
| | | Vz | 12.826 | 12.826 | 12.826 | 12.826 | 12.826 | 12.826 | 12.826 | 12.826 | 12.826 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -12.10 | -24.21 | -36.31 | -48.42 | -60.52 | -72.63 | -84.73 | -96.83 |
| | | Mz | 0.00 | -9.99 | -19.97 | -29.96 | -39.94 | -49.93 | -59.92 | -69.90 | -79.89 |
| | V 1 | N | -0.499 | -0.499 | -0.499 | -0.499 | -0.499 | -0.499 | -0.499 | -0.499 | -0.499 |
| | | Vy | -0.098 | -0.098 | -0.098 | -0.098 | -0.098 | -0.098 | -0.098 | -0.098 | -0.098 |
| | | Vz | 0.101 | 0.101 | 0.101 | 0.101 | 0.101 | 0.101 | 0.101 | 0.101 | 0.101 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.10 | -0.19 | -0.29 | -0.38 | -0.48 | -0.57 | -0.67 | -0.76 |
| | | Mz | 0.00 | 0.09 | 0.18 | 0.28 | 0.37 | 0.46 | 0.55 | 0.65 | 0.74 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | -11.559 | -11.559 | -11.559 | -11.559 | -11.559 | -11.559 | -11.559 | -11.559 | -11.559 |
| | | Vy | 6.613 | 6.613 | 6.613 | 6.613 | 6.613 | 6.613 | 6.613 | 6.613 | 6.613 |
| | | Vz | 8.016 | 8.016 | 8.016 | 8.016 | 8.016 | 8.016 | 8.016 | 8.016 | 8.016 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | Sismo X: Modo 1 | My | 0.00 | -7.57 | -15.13 | -22.70 | -30.26 | -37.83 | -45.39 | -52.96 | -60.52 |
| | | Mz | 0.00 | -6.24 | -12.48 | -18.72 | -24.97 | -31.21 | -37.45 | -43.69 | -49.93 |
| | | N | 27.220 | 27.220 | 27.220 | 27.220 | 27.220 | 27.220 | 27.220 | 27.220 | 27.220 |
| | | Vy | 22.802 | 22.802 | 22.802 | 22.802 | 22.802 | 22.802 | 22.802 | 22.802 | 22.802 |
| | | Vz | 15.094 | 15.094 | 15.094 | 15.094 | 15.094 | 15.094 | 15.094 | 15.094 | 15.094 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | My | 0.00 | -14.25 | -28.49 | -42.74 | -56.98 | -71.23 | -85.47 | -99.72 | -113.96 |
| | | Mz | 0.00 | -21.52 | -43.04 | -64.56 | -86.08 | -107.60 | -129.12 | -150.64 | -172.16 |
| | | N | -86.854 | -86.854 | -86.854 | -86.854 | -86.854 | -86.854 | -86.854 | -86.854 | -86.854 |
| | | Vy | -7.650 | -7.650 | -7.650 | -7.650 | -7.650 | -7.650 | -7.650 | -7.650 | -7.650 |
| | | Vz | 27.929 | 27.929 | 27.929 | 27.929 | 27.929 | 27.929 | 27.929 | 27.929 | 27.929 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | My | 0.00 | -26.36 | -52.72 | -79.07 | -105.43 | -131.79 | -158.15 | -184.51 | -210.86 |
| | | Mz | 0.00 | 7.22 | 14.44 | 21.66 | 28.88 | 36.10 | 43.32 | 50.54 | 57.76 |
| | | N | -14.309 | -14.309 | -14.309 | -14.309 | -14.309 | -14.309 | -14.309 | -14.309 | -14.309 |
| | | Vy | -3.776 | -3.776 | -3.776 | -3.776 | -3.776 | -3.776 | -3.776 | -3.776 | -3.776 |
| | | Vz | 1.769 | 1.769 | 1.769 | 1.769 | 1.769 | 1.769 | 1.769 | 1.769 | 1.769 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | My | 0.00 | -1.67 | -3.34 | -5.01 | -6.68 | -8.35 | -10.02 | -11.69 | -13.36 |
| | | Mz | 0.00 | 3.56 | 7.13 | 10.69 | 14.25 | 17.82 | 21.38 | 24.95 | 28.51 |
| | | N | 22.571 | 22.571 | 22.571 | 22.571 | 22.571 | 22.571 | 22.571 | 22.571 | 22.571 |
| | | Vy | 18.908 | 18.908 | 18.908 | 18.908 | 18.908 | 18.908 | 18.908 | 18.908 | 18.908 |
| | | Vz | 12.517 | 12.517 | 12.517 | 12.517 | 12.517 | 12.517 | 12.517 | 12.517 | 12.517 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | My | 0.00 | -11.81 | -23.62 | -35.44 | -47.25 | -59.06 | -70.87 | -82.69 | -94.50 |
| | | Mz | 0.00 | -17.84 | -35.69 | -53.53 | -71.38 | -89.22 | -107.07 | -124.91 | -142.76 |
| | | N | -81.676 | -81.676 | -81.676 | -81.676 | -81.676 | -81.676 | -81.676 | -81.676 | -81.676 |
| | | Vy | -7.194 | -7.194 | -7.194 | -7.194 | -7.194 | -7.194 | -7.194 | -7.194 | -7.194 |
| | | Vz | 26.264 | 26.264 | 26.264 | 26.264 | 26.264 | 26.264 | 26.264 | 26.264 | 26.264 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | My | 0.00 | -24.79 | -49.57 | -74.36 | -99.15 | -123.93 | -148.72 | -173.51 | -198.29 |
| | | Mz | 0.00 | 6.79 | 13.58 | 20.37 | 27.16 | 33.95 | 40.74 | 47.53 | 54.32 |
| | | N | -61.280 | -61.280 | -61.280 | -61.280 | -61.280 | -61.280 | -61.280 | -61.280 | -61.280 |
| | | Vy | -16.172 | -16.172 | -16.172 | -16.172 | -16.172 | -16.172 | -16.172 | -16.172 | -16.172 |
| | | Vz | 7.578 | 7.578 | 7.578 | 7.578 | 7.578 | 7.578 | 7.578 | 7.578 | 7.578 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-------------|----------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N67/N68 | Peso propio | N | -1114.853 | -1101.834 | -1088.815 | -1075.795 | -1062.776 | -1049.757 | -1036.737 | -1023.718 | -1010.699 |
| | | Vy | -3.107 | -3.107 | -3.107 | -3.107 | -3.107 | -3.107 | -3.107 | -3.107 | -3.107 |
| | | Vz | -34.724 | -34.724 | -34.724 | -34.724 | -34.724 | -34.724 | -34.724 | -34.724 | -34.724 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 32.77 | 65.54 | 98.31 | 131.08 | 163.85 | 196.62 | 229.40 | 262.17 |
| | | Mz | 0.00 | 2.93 | 5.86 | 8.80 | 11.73 | 14.66 | 17.59 | 20.52 | 23.46 |
| | CM 1 | N | -172.610 | -172.610 | -172.610 | -172.610 | -172.610 | -172.610 | -172.610 | -172.610 | -172.610 |
| | | Vy | -0.992 | -0.992 | -0.992 | -0.992 | -0.992 | -0.992 | -0.992 | -0.992 | -0.992 |
| | | Vz | -6.452 | -6.452 | -6.452 | -6.452 | -6.452 | -6.452 | -6.452 | -6.452 | -6.452 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 6.09 | 12.18 | 18.27 | 24.35 | 30.44 | 36.53 | 42.62 | 48.71 |
| | | Mz | 0.00 | 0.94 | 1.87 | 2.81 | 3.74 | 4.68 | 5.62 | 6.55 | 7.49 |
| | Q 1 | N | -958.943 | -958.943 | -958.943 | -958.943 | -958.943 | -958.943 | -958.943 | -958.943 | -958.943 |
| | | Vy | -5.509 | -5.509 | -5.509 | -5.509 | -5.509 | -5.509 | -5.509 | -5.509 | -5.509 |
| | | Vz | -35.842 | -35.842 | -35.842 | -35.842 | -35.842 | -35.842 | -35.842 | -35.842 | -35.842 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 33.83 | 67.65 | 101.48 | 135.30 | 169.13 | 202.96 | 236.78 | 270.61 |
| | | Mz | 0.00 | 5.20 | 10.40 | 15.60 | 20.80 | 26.00 | 31.20 | 36.40 | 41.59 |
| | T 1 | N | 31.615 | 31.615 | 31.615 | 31.615 | 31.615 | 31.615 | 31.615 | 31.615 | 31.615 |
| | | Vy | -2.360 | -2.360 | -2.360 | -2.360 | -2.360 | -2.360 | -2.360 | -2.360 | -2.360 |
| | | Vz | -7.020 | -7.020 | -7.020 | -7.020 | -7.020 | -7.020 | -7.020 | -7.020 | -7.020 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 6.63 | 13.25 | 19.88 | 26.50 | 33.13 | 39.75 | 46.38 | 53.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | T 2 | Mz | 0.00 | 2.23 | 4.45 | 6.68 | 8.91 | 11.14 | 13.36 | 15.59 | 17.82 |
| | | N | -60.219 | -60.219 | -60.219 | -60.219 | -60.219 | -60.219 | -60.219 | -60.219 | -60.219 |
| | | Vy | 4.495 | 4.495 | 4.495 | 4.495 | 4.495 | 4.495 | 4.495 | 4.495 | 4.495 |
| | | Vz | 13.372 | 13.372 | 13.372 | 13.372 | 13.372 | 13.372 | 13.372 | 13.372 | 13.372 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -12.62 | -25.24 | -37.86 | -50.48 | -63.10 | -75.72 | -88.34 | -100.96 |
| | | Mz | 0.00 | -4.24 | -8.48 | -12.73 | -16.97 | -21.21 | -25.45 | -29.70 | -33.94 |
| | V 1 | N | 0.064 | 0.064 | 0.064 | 0.064 | 0.064 | 0.064 | 0.064 | 0.064 | 0.064 |
| | | Vy | -0.090 | -0.090 | -0.090 | -0.090 | -0.090 | -0.090 | -0.090 | -0.090 | -0.090 |
| | | Vz | 0.077 | 0.077 | 0.077 | 0.077 | 0.077 | 0.077 | 0.077 | 0.077 | 0.077 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.07 | -0.15 | -0.22 | -0.29 | -0.37 | -0.44 | -0.51 | -0.58 |
| | | Mz | 0.00 | 0.08 | 0.17 | 0.25 | 0.34 | 0.42 | 0.51 | 0.59 | 0.68 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | -37.637 | -37.637 | -37.637 | -37.637 | -37.637 | -37.637 | -37.637 | -37.637 | -37.637 |
| | | Vy | 2.809 | 2.809 | 2.809 | 2.809 | 2.809 | 2.809 | 2.809 | 2.809 | 2.809 |
| | | Vz | 8.357 | 8.357 | 8.357 | 8.357 | 8.357 | 8.357 | 8.357 | 8.357 | 8.357 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -7.89 | -15.77 | -23.66 | -31.55 | -39.44 | -47.32 | -55.21 | -63.10 |
| | | Mz | 0.00 | -2.65 | -5.30 | -7.95 | -10.61 | -13.26 | -15.91 | -18.56 | -21.21 |
| | Sismo X: Modo 1 | N | -87.593 | -87.593 | -87.593 | -87.593 | -87.593 | -87.593 | -87.593 | -87.593 | -87.593 |
| | | Vy | 23.562 | 23.562 | 23.562 | 23.562 | 23.562 | 23.562 | 23.562 | 23.562 | 23.562 |
| | | Vz | 14.528 | 14.528 | 14.528 | 14.528 | 14.528 | 14.528 | 14.528 | 14.528 | 14.528 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -13.71 | -27.42 | -41.13 | -54.84 | -68.56 | -82.27 | -95.98 | -109.69 |
| | | Mz | 0.00 | -22.24 | -44.47 | -66.71 | -88.95 | -111.18 | -133.42 | -155.66 | -177.89 |
| | Sismo X: Modo 2 | N | -45.435 | -45.435 | -45.435 | -45.435 | -45.435 | -45.435 | -45.435 | -45.435 | -45.435 |
| | | Vy | -5.319 | -5.319 | -5.319 | -5.319 | -5.319 | -5.319 | -5.319 | -5.319 | -5.319 |
| | | Vz | 29.157 | 29.157 | 29.157 | 29.157 | 29.157 | 29.157 | 29.157 | 29.157 | 29.157 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -27.52 | -55.03 | -82.55 | -110.07 | -137.58 | -165.10 | -192.62 | -220.13 |
| | | Mz | 0.00 | 5.02 | 10.04 | 15.06 | 20.08 | 25.10 | 30.12 | 35.14 | 40.16 |
| | Sismo X: Modo 3 | N | 7.281 | 7.281 | 7.281 | 7.281 | 7.281 | 7.281 | 7.281 | 7.281 | 7.281 |
| | | Vy | -3.641 | -3.641 | -3.641 | -3.641 | -3.641 | -3.641 | -3.641 | -3.641 | -3.641 |
| | | Vz | 0.784 | 0.784 | 0.784 | 0.784 | 0.784 | 0.784 | 0.784 | 0.784 | 0.784 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.74 | -1.48 | -2.22 | -2.96 | -3.70 | -4.44 | -5.18 | -5.92 |
| | | Mz | 0.00 | 3.44 | 6.87 | 10.31 | 13.75 | 17.18 | 20.62 | 24.06 | 27.49 |
| | Sismo Y: Modo 1 | N | -72.634 | -72.634 | -72.634 | -72.634 | -72.634 | -72.634 | -72.634 | -72.634 | -72.634 |
| | | Vy | 19.538 | 19.538 | 19.538 | 19.538 | 19.538 | 19.538 | 19.538 | 19.538 | 19.538 |
| | | Vz | 12.047 | 12.047 | 12.047 | 12.047 | 12.047 | 12.047 | 12.047 | 12.047 | 12.047 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -11.37 | -22.74 | -34.11 | -45.48 | -56.85 | -68.22 | -79.59 | -90.96 |
| | | Mz | 0.00 | -18.44 | -36.88 | -55.32 | -73.76 | -92.20 | -110.64 | -129.07 | -147.51 |
| | Sismo Y: Modo 2 | N | -42.726 | -42.726 | -42.726 | -42.726 | -42.726 | -42.726 | -42.726 | -42.726 | -42.726 |
| | | Vy | -5.001 | -5.001 | -5.001 | -5.001 | -5.001 | -5.001 | -5.001 | -5.001 | -5.001 |
| | | Vz | 27.419 | 27.419 | 27.419 | 27.419 | 27.419 | 27.419 | 27.419 | 27.419 | 27.419 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -25.88 | -51.75 | -77.63 | -103.51 | -129.38 | -155.26 | -181.13 | -207.01 |
| | | Mz | 0.00 | 4.72 | 9.44 | 14.16 | 18.88 | 23.60 | 28.32 | 33.04 | 37.76 |
| | Sismo Y: Modo 3 | N | 31.180 | 31.180 | 31.180 | 31.180 | 31.180 | 31.180 | 31.180 | 31.180 | 31.180 |
| | | Vy | -15.595 | -15.595 | -15.595 | -15.595 | -15.595 | -15.595 | -15.595 | -15.595 | -15.595 |
| | | Vz | 3.356 | 3.356 | 3.356 | 3.356 | 3.356 | 3.356 | 3.356 | 3.356 | 3.356 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -3.17 | -6.33 | -9.50 | -12.67 | -15.83 | -19.00 | -22.17 | -25.34 |
| | | Mz | 0.00 | 14.72 | 29.43 | 44.15 | 58.87 | 73.59 | 88.30 | 103.02 | 117.74 |

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-------------|----------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N69/N70 | Peso propio | N | -1147.611 | -1134.592 | -1121.573 | -1108.553 | -1095.534 | -1082.515 | -1069.495 | -1056.476 | -1043.457 |
| | | Vy | 3.799 | 3.799 | 3.799 | 3.799 | 3.799 | 3.799 | 3.799 | 3.799 | 3.799 |
| | | Vz | -31.764 | -31.764 | -31.764 | -31.764 | -31.764 | -31.764 | -31.764 | -31.764 | -31.764 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | | My | 0.00 | 29.98 | 59.96 | 89.93 | 119.91 | 149.89 | 179.87 | 209.84 | 239.82 |
| | | Mz | 0.00 | -3.59 | -7.17 | -10.76 | -14.34 | -17.93 | -21.51 | -25.10 | -28.68 |
| | CM 1 | N | -178.792 | -178.792 | -178.792 | -178.792 | -178.792 | -178.792 | -178.792 | -178.792 | -178.792 |
| | | Vy | 1.089 | 1.089 | 1.089 | 1.089 | 1.089 | 1.089 | 1.089 | 1.089 | 1.089 |
| | | Vz | -5.917 | -5.917 | -5.917 | -5.917 | -5.917 | -5.917 | -5.917 | -5.917 | -5.917 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 5.58 | 11.17 | 16.75 | 22.34 | 27.92 | 33.51 | 39.09 | 44.68 |
| | | Mz | 0.00 | -1.03 | -2.06 | -3.08 | -4.11 | -5.14 | -6.17 | -7.19 | -8.22 |
| | Q 1 | N | -993.288 | -993.288 | -993.288 | -993.288 | -993.288 | -993.288 | -993.288 | -993.288 | -993.288 |
| | | Vy | 6.049 | 6.049 | 6.049 | 6.049 | 6.049 | 6.049 | 6.049 | 6.049 | 6.049 |
| | | Vz | -32.874 | -32.874 | -32.874 | -32.874 | -32.874 | -32.874 | -32.874 | -32.874 | -32.874 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 31.02 | 62.05 | 93.07 | 124.10 | 155.12 | 186.15 | 217.17 | 248.20 |
| | | Mz | 0.00 | -5.71 | -11.42 | -17.13 | -22.83 | -28.54 | -34.25 | -39.96 | -45.67 |
| | T 1 | N | 27.144 | 27.144 | 27.144 | 27.144 | 27.144 | 27.144 | 27.144 | 27.144 | 27.144 |
| | | Vy | 1.807 | 1.807 | 1.807 | 1.807 | 1.807 | 1.807 | 1.807 | 1.807 | 1.807 |
| | | Vz | -5.460 | -5.460 | -5.460 | -5.460 | -5.460 | -5.460 | -5.460 | -5.460 | -5.460 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 5.15 | 10.31 | 15.46 | 20.61 | 25.76 | 30.92 | 36.07 | 41.22 |
| | | Mz | 0.00 | -1.71 | -3.41 | -5.12 | -6.82 | -8.53 | -10.23 | -11.94 | -13.64 |
| | T 2 | N | -51.702 | -51.702 | -51.702 | -51.702 | -51.702 | -51.702 | -51.702 | -51.702 | -51.702 |
| | | Vy | -3.441 | -3.441 | -3.441 | -3.441 | -3.441 | -3.441 | -3.441 | -3.441 | -3.441 |
| | | Vz | 10.400 | 10.400 | 10.400 | 10.400 | 10.400 | 10.400 | 10.400 | 10.400 | 10.400 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -9.82 | -19.63 | -29.45 | -39.26 | -49.08 | -58.89 | -68.71 | -78.52 |
| | | Mz | 0.00 | 3.25 | 6.50 | 9.74 | 12.99 | 16.24 | 19.49 | 22.74 | 25.98 |
| | V 1 | N | 0.197 | 0.197 | 0.197 | 0.197 | 0.197 | 0.197 | 0.197 | 0.197 | 0.197 |
| | | Vy | 0.077 | 0.077 | 0.077 | 0.077 | 0.077 | 0.077 | 0.077 | 0.077 | 0.077 |
| | | Vz | -0.005 | -0.005 | -0.005 | -0.005 | -0.005 | -0.005 | -0.005 | -0.005 | -0.005 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 | 0.02 | 0.03 | 0.03 | 0.04 |
| | | Mz | 0.00 | -0.07 | -0.15 | -0.22 | -0.29 | -0.37 | -0.44 | -0.51 | -0.58 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | -32.314 | -32.314 | -32.314 | -32.314 | -32.314 | -32.314 | -32.314 | -32.314 | -32.314 |
| | | Vy | -2.151 | -2.151 | -2.151 | -2.151 | -2.151 | -2.151 | -2.151 | -2.151 | -2.151 |
| | | Vz | 6.500 | 6.500 | 6.500 | 6.500 | 6.500 | 6.500 | 6.500 | 6.500 | 6.500 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -6.13 | -12.27 | -18.40 | -24.54 | -30.67 | -36.81 | -42.94 | -49.08 |
| | | Mz | 0.00 | 2.03 | 4.06 | 6.09 | 8.12 | 10.15 | 12.18 | 14.21 | 16.24 |
| | Sismo X: Modo 1 | N | 36.945 | 36.945 | 36.945 | 36.945 | 36.945 | 36.945 | 36.945 | 36.945 | 36.945 |
| | | Vy | -9.249 | -9.249 | -9.249 | -9.249 | -9.249 | -9.249 | -9.249 | -9.249 | -9.249 |
| | | Vz | -29.160 | -29.160 | -29.160 | -29.160 | -29.160 | -29.160 | -29.160 | -29.160 | -29.160 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 27.52 | 55.04 | 82.56 | 110.08 | 137.60 | 165.12 | 192.64 | 220.16 |
| | | Mz | 0.00 | 8.73 | 17.46 | 26.19 | 34.91 | 43.64 | 52.37 | 61.10 | 69.83 |
| | Sismo X: Modo 2 | N | 100.437 | 100.437 | 100.437 | 100.437 | 100.437 | 100.437 | 100.437 | 100.437 | 100.437 |
| | | Vy | 30.900 | 30.900 | 30.900 | 30.900 | 30.900 | 30.900 | 30.900 | 30.900 | 30.900 |
| | | Vz | -13.234 | -13.234 | -13.234 | -13.234 | -13.234 | -13.234 | -13.234 | -13.234 | -13.234 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 12.49 | 24.98 | 37.47 | 49.96 | 62.45 | 74.94 | 87.43 | 99.92 |
| | | Mz | 0.00 | -29.16 | -58.32 | -87.49 | -116.65 | -145.81 | -174.97 | -204.13 | -233.29 |
| | Sismo X: Modo 3 | N | 0.110 | 0.110 | 0.110 | 0.110 | 0.110 | 0.110 | 0.110 | 0.110 | 0.110 |
| | | Vy | 1.089 | 1.089 | 1.089 | 1.089 | 1.089 | 1.089 | 1.089 | 1.089 | 1.089 |
| | | Vz | 1.274 | 1.274 | 1.274 | 1.274 | 1.274 | 1.274 | 1.274 | 1.274 | 1.274 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -1.20 | -2.41 | -3.61 | -4.81 | -6.01 | -7.22 | -8.42 | -9.62 |
| | | Mz | 0.00 | -1.03 | -2.06 | -3.08 | -4.11 | -5.14 | -6.17 | -7.20 | -8.23 |
| | Sismo Y: Modo 1 | N | 30.635 | 30.635 | 30.635 | 30.635 | 30.635 | 30.635 | 30.635 | 30.635 | 30.635 |
| | | Vy | -7.669 | -7.669 | -7.669 | -7.669 | -7.669 | -7.669 | -7.669 | -7.669 | -7.669 |
| | | Vz | -24.180 | -24.180 | -24.180 | -24.180 | -24.180 | -24.180 | -24.180 | -24.180 | -24.180 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 22.82 | 45.64 | 68.46 | 91.28 | 114.10 | 136.92 | 159.74 | 182.56 |
| | | Mz | 0.00 | 7.24 | 14.48 | 21.71 | 28.95 | 36.19 | 43.43 | 50.67 | 57.90 |
| | Sismo Y: Modo 2 | N | 94.449 | 94.449 | 94.449 | 94.449 | 94.449 | 94.449 | 94.449 | 94.449 | 94.449 |
| | | Vy | 29.058 | 29.058 | 29.058 | 29.058 | 29.058 | 29.058 | 29.058 | 29.058 | 29.058 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | | Vz | -12.445 | -12.445 | -12.445 | -12.445 | -12.445 | -12.445 | -12.445 | -12.445 | -12.445 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 11.75 | 23.49 | 35.24 | 46.98 | 58.73 | 70.47 | 82.22 | 93.96 |
| | | Mz | 0.00 | -27.42 | -54.85 | -82.27 | -109.69 | -137.12 | -164.54 | -191.96 | -219.39 |
| | Sismo Y: Modo 3 | N | 0.472 | 0.472 | 0.472 | 0.472 | 0.472 | 0.472 | 0.472 | 0.472 | 0.472 |
| | | Vy | 4.666 | 4.666 | 4.666 | 4.666 | 4.666 | 4.666 | 4.666 | 4.666 | 4.666 |
| | | Vz | 5.457 | 5.457 | 5.457 | 5.457 | 5.457 | 5.457 | 5.457 | 5.457 | 5.457 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -5.15 | -10.30 | -15.45 | -20.60 | -25.75 | -30.90 | -36.05 | -41.20 |
| | | Mz | 0.00 | -4.40 | -8.81 | -13.21 | -17.61 | -22.02 | -26.42 | -30.82 | -35.23 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
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| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N71/N72 | Peso propio | N | -546.417 | -533.398 | -520.378 | -507.359 | -494.340 | -481.320 | -468.301 | -455.282 | -442.262 |
| | | Vy | 5.987 | 5.987 | 5.987 | 5.987 | 5.987 | 5.987 | 5.987 | 5.987 | 5.987 |
| | | Vz | -20.437 | -20.437 | -20.437 | -20.437 | -20.437 | -20.437 | -20.437 | -20.437 | -20.437 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 19.29 | 38.57 | 57.86 | 77.15 | 96.44 | 115.72 | 135.01 | 154.30 |
| | | Mz | 0.00 | -5.65 | -11.30 | -16.95 | -22.60 | -28.25 | -33.90 | -39.55 | -45.20 |
| | CM 1 | N | -77.959 | -77.959 | -77.959 | -77.959 | -77.959 | -77.959 | -77.959 | -77.959 | -77.959 |
| | | Vy | 0.605 | 0.605 | 0.605 | 0.605 | 0.605 | 0.605 | 0.605 | 0.605 | 0.605 |
| | | Vz | -4.021 | -4.021 | -4.021 | -4.021 | -4.021 | -4.021 | -4.021 | -4.021 | -4.021 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 3.79 | 7.59 | 11.38 | 15.18 | 18.97 | 22.77 | 26.56 | 30.36 |
| | | Mz | 0.00 | -0.57 | -1.14 | -1.71 | -2.28 | -2.85 | -3.42 | -4.00 | -4.57 |
| | Q 1 | N | -433.104 | -433.104 | -433.104 | -433.104 | -433.104 | -433.104 | -433.104 | -433.104 | -433.104 |
| | | Vy | 3.360 | 3.360 | 3.360 | 3.360 | 3.360 | 3.360 | 3.360 | 3.360 | 3.360 |
| | | Vz | -22.336 | -22.336 | -22.336 | -22.336 | -22.336 | -22.336 | -22.336 | -22.336 | -22.336 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 21.08 | 42.16 | 63.24 | 84.32 | 105.40 | 126.48 | 147.56 | 168.64 |
| | | Mz | 0.00 | -3.17 | -6.34 | -9.51 | -12.68 | -15.85 | -19.03 | -22.20 | -25.37 |
| | T 1 | N | 7.241 | 7.241 | 7.241 | 7.241 | 7.241 | 7.241 | 7.241 | 7.241 | 7.241 |
| | | Vy | 5.059 | 5.059 | 5.059 | 5.059 | 5.059 | 5.059 | 5.059 | 5.059 | 5.059 |
| | | Vz | -5.212 | -5.212 | -5.212 | -5.212 | -5.212 | -5.212 | -5.212 | -5.212 | -5.212 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 4.92 | 9.84 | 14.76 | 19.68 | 24.59 | 29.51 | 34.43 | 39.35 |
| | | Mz | 0.00 | -4.77 | -9.55 | -14.32 | -19.10 | -23.87 | -28.65 | -33.42 | -38.20 |
| | T 2 | N | -13.792 | -13.792 | -13.792 | -13.792 | -13.792 | -13.792 | -13.792 | -13.792 | -13.792 |
| | | Vy | -9.637 | -9.637 | -9.637 | -9.637 | -9.637 | -9.637 | -9.637 | -9.637 | -9.637 |
| | | Vz | 9.928 | 9.928 | 9.928 | 9.928 | 9.928 | 9.928 | 9.928 | 9.928 | 9.928 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -9.37 | -18.74 | -28.11 | -37.48 | -46.85 | -56.22 | -65.58 | -74.95 |
| | | Mz | 0.00 | 9.10 | 18.19 | 27.29 | 36.38 | 45.48 | 54.57 | 63.67 | 72.76 |
| | V 1 | N | -0.180 | -0.180 | -0.180 | -0.180 | -0.180 | -0.180 | -0.180 | -0.180 | -0.180 |
| | | Vy | 0.077 | 0.077 | 0.077 | 0.077 | 0.077 | 0.077 | 0.077 | 0.077 | 0.077 |
| | | Vz | -0.015 | -0.015 | -0.015 | -0.015 | -0.015 | -0.015 | -0.015 | -0.015 | -0.015 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.01 | 0.03 | 0.04 | 0.06 | 0.07 | 0.09 | 0.10 | 0.11 |
| | | Mz | 0.00 | -0.07 | -0.15 | -0.22 | -0.29 | -0.37 | -0.44 | -0.51 | -0.58 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | -8.620 | -8.620 | -8.620 | -8.620 | -8.620 | -8.620 | -8.620 | -8.620 | -8.620 |
| | | Vy | -6.023 | -6.023 | -6.023 | -6.023 | -6.023 | -6.023 | -6.023 | -6.023 | -6.023 |
| | | Vz | 6.205 | 6.205 | 6.205 | 6.205 | 6.205 | 6.205 | 6.205 | 6.205 | 6.205 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -5.86 | -11.71 | -17.57 | -23.42 | -29.28 | -35.13 | -40.99 | -46.85 |
| | | Mz | 0.00 | 5.68 | 11.37 | 17.05 | 22.74 | 28.42 | 34.11 | 39.79 | 45.48 |
| | Sismo X: Modo 1 | N | 106.765 | 106.765 | 106.765 | 106.765 | 106.765 | 106.765 | 106.765 | 106.765 | 106.765 |
| | | Vy | -11.772 | -11.772 | -11.772 | -11.772 | -11.772 | -11.772 | -11.772 | -11.772 | -11.772 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | | Vz | -32.060 | -32.060 | -32.060 | -32.060 | -32.060 | -32.060 | -32.060 | -32.060 | -32.060 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 30.26 | 60.51 | 90.77 | 121.03 | 151.28 | 181.54 | 211.79 | 242.05 |
| | | Mz | 0.00 | 11.11 | 22.22 | 33.33 | 44.44 | 55.55 | 66.66 | 77.77 | 88.88 |
| | Sismo X: Modo 2 | N | -60.579 | -60.579 | -60.579 | -60.579 | -60.579 | -60.579 | -60.579 | -60.579 | -60.579 |
| | | Vy | 30.154 | 30.154 | 30.154 | 30.154 | 30.154 | 30.154 | 30.154 | 30.154 | 30.154 |
| | | Vz | -9.249 | -9.249 | -9.249 | -9.249 | -9.249 | -9.249 | -9.249 | -9.249 | -9.249 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 8.73 | 17.46 | 26.19 | 34.91 | 43.64 | 52.37 | 61.10 | 69.83 |
| | | Mz | 0.00 | -28.46 | -56.92 | -85.37 | -113.83 | -142.29 | -170.75 | -199.20 | -227.66 |
| | Sismo X: Modo 3 | N | -4.807 | -4.807 | -4.807 | -4.807 | -4.807 | -4.807 | -4.807 | -4.807 | -4.807 |
| | | Vy | 1.190 | 1.190 | 1.190 | 1.190 | 1.190 | 1.190 | 1.190 | 1.190 | 1.190 |
| | | Vz | 0.612 | 0.612 | 0.612 | 0.612 | 0.612 | 0.612 | 0.612 | 0.612 | 0.612 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.58 | -1.16 | -1.73 | -2.31 | -2.89 | -3.47 | -4.04 | -4.62 |
| | | Mz | 0.00 | -1.12 | -2.25 | -3.37 | -4.49 | -5.62 | -6.74 | -7.86 | -8.99 |
| | Sismo Y: Modo 1 | N | 88.532 | 88.532 | 88.532 | 88.532 | 88.532 | 88.532 | 88.532 | 88.532 | 88.532 |
| | | Vy | -9.762 | -9.762 | -9.762 | -9.762 | -9.762 | -9.762 | -9.762 | -9.762 | -9.762 |
| | | Vz | -26.585 | -26.585 | -26.585 | -26.585 | -26.585 | -26.585 | -26.585 | -26.585 | -26.585 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 25.09 | 50.18 | 75.27 | 100.36 | 125.45 | 150.54 | 175.63 | 200.71 |
| | | Mz | 0.00 | 9.21 | 18.43 | 27.64 | 36.85 | 46.06 | 55.28 | 64.49 | 73.70 |
| | Sismo Y: Modo 2 | N | -56.967 | -56.967 | -56.967 | -56.967 | -56.967 | -56.967 | -56.967 | -56.967 | -56.967 |
| | | Vy | 28.356 | 28.356 | 28.356 | 28.356 | 28.356 | 28.356 | 28.356 | 28.356 | 28.356 |
| | | Vz | -8.697 | -8.697 | -8.697 | -8.697 | -8.697 | -8.697 | -8.697 | -8.697 | -8.697 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 8.21 | 16.42 | 24.62 | 32.83 | 41.04 | 49.25 | 57.46 | 65.67 |
| | | Mz | 0.00 | -26.76 | -53.52 | -80.28 | -107.04 | -133.80 | -160.57 | -187.33 | -214.09 |
| | Sismo Y: Modo 3 | N | -20.589 | -20.589 | -20.589 | -20.589 | -20.589 | -20.589 | -20.589 | -20.589 | -20.589 |
| | | Vy | 5.097 | 5.097 | 5.097 | 5.097 | 5.097 | 5.097 | 5.097 | 5.097 | 5.097 |
| | | Vz | 2.622 | 2.622 | 2.622 | 2.622 | 2.622 | 2.622 | 2.622 | 2.622 | 2.622 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -2.47 | -4.95 | -7.42 | -9.90 | -12.37 | -14.85 | -17.32 | -19.79 |
| | | Mz | 0.00 | -4.81 | -9.62 | -14.43 | -19.24 | -24.05 | -28.86 | -33.67 | -38.48 |

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-------------|----------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N73/N74 | Peso propio | N | -1350.094 | -1337.075 | -1324.056 | -1311.036 | -1298.017 | -1284.998 | -1271.978 | -1258.959 | -1245.940 |
| | | Vy | -10.210 | -10.210 | -10.210 | -10.210 | -10.210 | -10.210 | -10.210 | -10.210 | -10.210 |
| | | Vz | 34.489 | 34.489 | 34.489 | 34.489 | 34.489 | 34.489 | 34.489 | 34.489 | 34.489 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -32.55 | -65.10 | -97.65 | -130.20 | -162.75 | -195.29 | -227.84 | -260.39 |
| | | Mz | 0.00 | 9.64 | 19.27 | 28.91 | 38.54 | 48.18 | 57.82 | 67.45 | 77.09 |
| | CM 1 | N | -213.572 | -213.572 | -213.572 | -213.572 | -213.572 | -213.572 | -213.572 | -213.572 | -213.572 |
| | | Vy | -2.245 | -2.245 | -2.245 | -2.245 | -2.245 | -2.245 | -2.245 | -2.245 | -2.245 |
| | | Vz | 6.383 | 6.383 | 6.383 | 6.383 | 6.383 | 6.383 | 6.383 | 6.383 | 6.383 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -6.02 | -12.05 | -18.07 | -24.10 | -30.12 | -36.15 | -42.17 | -48.20 |
| | | Mz | 0.00 | 2.12 | 4.24 | 6.36 | 8.48 | 10.59 | 12.71 | 14.83 | 16.95 |
| | Q 1 | N | -1186.512 | -1186.512 | -1186.512 | -1186.512 | -1186.512 | -1186.512 | -1186.512 | -1186.512 | -1186.512 |
| | | Vy | -12.474 | -12.474 | -12.474 | -12.474 | -12.474 | -12.474 | -12.474 | -12.474 | -12.474 |
| | | Vz | 35.464 | 35.464 | 35.464 | 35.464 | 35.464 | 35.464 | 35.464 | 35.464 | 35.464 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -33.47 | -66.94 | -100.41 | -133.88 | -167.34 | -200.81 | -234.28 | -267.75 |
| | | Mz | 0.00 | 11.77 | 23.54 | 35.32 | 47.09 | 58.86 | 70.63 | 82.40 | 94.18 |
| | T 1 | N | -21.071 | -21.071 | -21.071 | -21.071 | -21.071 | -21.071 | -21.071 | -21.071 | -21.071 |
| | | Vy | 5.665 | 5.665 | 5.665 | 5.665 | 5.665 | 5.665 | 5.665 | 5.665 | 5.665 |
| | | Vz | -9.703 | -9.703 | -9.703 | -9.703 | -9.703 | -9.703 | -9.703 | -9.703 | -9.703 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 9.16 | 18.31 | 27.47 | 36.63 | 45.79 | 54.94 | 64.10 | 73.26 |
| | | Mz | 0.00 | -5.35 | -10.69 | -16.04 | -21.39 | -26.73 | -32.08 | -37.43 | -42.77 |
| | T 2 | N | 40.134 | 40.134 | 40.134 | 40.134 | 40.134 | 40.134 | 40.134 | 40.134 | 40.134 |
| | | Vy | -10.791 | -10.791 | -10.791 | -10.791 | -10.791 | -10.791 | -10.791 | -10.791 | -10.791 |
| | | Vz | 18.482 | 18.482 | 18.482 | 18.482 | 18.482 | 18.482 | 18.482 | 18.482 | 18.482 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | | My | 0.00 | -17.44 | -34.88 | -52.33 | -69.77 | -87.21 | -104.65 | -122.09 | -139.54 |
| | | Mz | 0.00 | 10.18 | 20.37 | 30.55 | 40.73 | 50.92 | 61.10 | 71.29 | 81.47 |
| | V 1 | N | -0.187 | -0.187 | -0.187 | -0.187 | -0.187 | -0.187 | -0.187 | -0.187 | -0.187 |
| | | Vy | 0.063 | 0.063 | 0.063 | 0.063 | 0.063 | 0.063 | 0.063 | 0.063 | 0.063 |
| | | Vz | -0.020 | -0.020 | -0.020 | -0.020 | -0.020 | -0.020 | -0.020 | -0.020 | -0.020 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.02 | 0.04 | 0.06 | 0.08 | 0.09 | 0.11 | 0.13 | 0.15 |
| | | Mz | 0.00 | -0.06 | -0.12 | -0.18 | -0.24 | -0.30 | -0.36 | -0.42 | -0.48 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | 25.084 | 25.084 | 25.084 | 25.084 | 25.084 | 25.084 | 25.084 | 25.084 | 25.084 |
| | | Vy | -6.744 | -6.744 | -6.744 | -6.744 | -6.744 | -6.744 | -6.744 | -6.744 | -6.744 |
| | | Vz | 11.551 | 11.551 | 11.551 | 11.551 | 11.551 | 11.551 | 11.551 | 11.551 | 11.551 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -10.90 | -21.80 | -32.70 | -43.61 | -54.51 | -65.41 | -76.31 | -87.21 |
| | | Mz | 0.00 | 6.36 | 12.73 | 19.09 | 25.46 | 31.82 | 38.19 | 44.55 | 50.92 |
| | Sismo X: Modo 1 | N | -36.121 | -36.121 | -36.121 | -36.121 | -36.121 | -36.121 | -36.121 | -36.121 | -36.121 |
| | | Vy | -11.574 | -11.574 | -11.574 | -11.574 | -11.574 | -11.574 | -11.574 | -11.574 | -11.574 |
| | | Vz | -31.578 | -31.578 | -31.578 | -31.578 | -31.578 | -31.578 | -31.578 | -31.578 | -31.578 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 29.80 | 59.60 | 89.40 | 119.21 | 149.01 | 178.81 | 208.61 | 238.41 |
| | | Mz | 0.00 | 10.92 | 21.85 | 32.77 | 43.69 | 54.61 | 65.54 | 76.46 | 87.38 |
| | Sismo X: Modo 2 | N | -101.128 | -101.128 | -101.128 | -101.128 | -101.128 | -101.128 | -101.128 | -101.128 | -101.128 |
| | | Vy | 32.542 | 32.542 | 32.542 | 32.542 | 32.542 | 32.542 | 32.542 | 32.542 | 32.542 |
| | | Vz | -11.827 | -11.827 | -11.827 | -11.827 | -11.827 | -11.827 | -11.827 | -11.827 | -11.827 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 11.16 | 22.32 | 33.49 | 44.65 | 55.81 | 66.97 | 78.13 | 89.30 |
| | | Mz | 0.00 | -30.71 | -61.42 | -92.13 | -122.85 | -153.56 | -184.27 | -214.98 | -245.69 |
| | Sismo X: Modo 3 | N | 0.380 | 0.380 | 0.380 | 0.380 | 0.380 | 0.380 | 0.380 | 0.380 | 0.380 |
| | | Vy | 0.411 | 0.411 | 0.411 | 0.411 | 0.411 | 0.411 | 0.411 | 0.411 | 0.411 |
| | | Vz | 0.584 | 0.584 | 0.584 | 0.584 | 0.584 | 0.584 | 0.584 | 0.584 | 0.584 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.55 | -1.10 | -1.65 | -2.21 | -2.76 | -3.31 | -3.86 | -4.41 |
| | | Mz | 0.00 | -0.39 | -0.78 | -1.16 | -1.55 | -1.94 | -2.33 | -2.71 | -3.10 |
| | Sismo Y: Modo 1 | N | -29.953 | -29.953 | -29.953 | -29.953 | -29.953 | -29.953 | -29.953 | -29.953 | -29.953 |
| | | Vy | -9.597 | -9.597 | -9.597 | -9.597 | -9.597 | -9.597 | -9.597 | -9.597 | -9.597 |
| | | Vz | -26.185 | -26.185 | -26.185 | -26.185 | -26.185 | -26.185 | -26.185 | -26.185 | -26.185 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 24.71 | 49.42 | 74.14 | 98.85 | 123.56 | 148.27 | 172.98 | 197.70 |
| | | Mz | 0.00 | 9.06 | 18.11 | 27.17 | 36.23 | 45.29 | 54.34 | 63.40 | 72.46 |
| | Sismo Y: Modo 2 | N | -95.099 | -95.099 | -95.099 | -95.099 | -95.099 | -95.099 | -95.099 | -95.099 | -95.099 |
| | | Vy | 30.602 | 30.602 | 30.602 | 30.602 | 30.602 | 30.602 | 30.602 | 30.602 | 30.602 |
| | | Vz | -11.122 | -11.122 | -11.122 | -11.122 | -11.122 | -11.122 | -11.122 | -11.122 | -11.122 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 10.50 | 20.99 | 31.49 | 41.99 | 52.48 | 62.98 | 73.48 | 83.97 |
| | | Mz | 0.00 | -28.88 | -57.76 | -86.64 | -115.52 | -144.40 | -173.28 | -202.16 | -231.04 |
| | Sismo Y: Modo 3 | N | 1.628 | 1.628 | 1.628 | 1.628 | 1.628 | 1.628 | 1.628 | 1.628 | 1.628 |
| | | Vy | 1.759 | 1.759 | 1.759 | 1.759 | 1.759 | 1.759 | 1.759 | 1.759 | 1.759 |
| | | Vz | 2.502 | 2.502 | 2.502 | 2.502 | 2.502 | 2.502 | 2.502 | 2.502 | 2.502 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -2.36 | -4.72 | -7.08 | -9.44 | -11.81 | -14.17 | -16.53 | -18.89 |
| | | Mz | 0.00 | -1.66 | -3.32 | -4.98 | -6.64 | -8.30 | -9.96 | -11.62 | -13.28 |

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N75/N76 | Peso propio | N | -314.615 | -301.596 | -288.577 | -275.557 | -262.538 | -249.519 | -236.499 | -223.480 | -210.461 |
| | | Vy | -4.121 | -4.121 | -4.121 | -4.121 | -4.121 | -4.121 | -4.121 | -4.121 | -4.121 |
| | | Vz | 22.607 | 22.607 | 22.607 | 22.607 | 22.607 | 22.607 | 22.607 | 22.607 | 22.607 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -21.33 | -42.67 | -64.00 | -85.34 | -106.67 | -128.01 | -149.34 | -170.68 |
| | | Mz | 0.00 | 3.89 | 7.78 | 11.67 | 15.56 | 19.45 | 23.33 | 27.22 | 31.11 |
| | CM 1 | N | -36.565 | -36.565 | -36.565 | -36.565 | -36.565 | -36.565 | -36.565 | -36.565 | -36.565 |
| | | Vy | -0.266 | -0.266 | -0.266 | -0.266 | -0.266 | -0.266 | -0.266 | -0.266 | -0.266 |
| | | | | | | | | | | | |
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| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | | Vz | 4.421 | 4.421 | 4.421 | 4.421 | 4.421 | 4.421 | 4.421 | 4.421 | 4.421 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -4.17 | -8.34 | -12.52 | -16.69 | -20.86 | -25.03 | -29.20 | -33.38 |
| | | Mz | 0.00 | 0.25 | 0.50 | 0.75 | 1.01 | 1.26 | 1.51 | 1.76 | 2.01 |
| | Q 1 | N | -203.140 | -203.140 | -203.140 | -203.140 | -203.140 | -203.140 | -203.140 | -203.140 | -203.140 |
| | | Vy | -1.479 | -1.479 | -1.479 | -1.479 | -1.479 | -1.479 | -1.479 | -1.479 | -1.479 |
| | | Vz | 24.560 | 24.560 | 24.560 | 24.560 | 24.560 | 24.560 | 24.560 | 24.560 | 24.560 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -23.18 | -46.36 | -69.53 | -92.71 | -115.89 | -139.07 | -162.25 | -185.43 |
| | | Mz | 0.00 | 1.40 | 2.79 | 4.19 | 5.58 | 6.98 | 8.38 | 9.77 | 11.17 |
| | T 1 | N | -9.290 | -9.290 | -9.290 | -9.290 | -9.290 | -9.290 | -9.290 | -9.290 | -9.290 |
| | | Vy | 1.184 | 1.184 | 1.184 | 1.184 | 1.184 | 1.184 | 1.184 | 1.184 | 1.184 |
| | | Vz | -9.113 | -9.113 | -9.113 | -9.113 | -9.113 | -9.113 | -9.113 | -9.113 | -9.113 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 8.60 | 17.20 | 25.80 | 34.40 | 43.00 | 51.60 | 60.20 | 68.80 |
| | | Mz | 0.00 | -1.12 | -2.24 | -3.35 | -4.47 | -5.59 | -6.71 | -7.82 | -8.94 |
| | T 2 | N | 17.695 | 17.695 | 17.695 | 17.695 | 17.695 | 17.695 | 17.695 | 17.695 | 17.695 |
| | | Vy | -2.256 | -2.256 | -2.256 | -2.256 | -2.256 | -2.256 | -2.256 | -2.256 | -2.256 |
| | | Vz | 17.357 | 17.357 | 17.357 | 17.357 | 17.357 | 17.357 | 17.357 | 17.357 | 17.357 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -16.38 | -32.76 | -49.14 | -65.52 | -81.91 | -98.29 | -114.67 | -131.05 |
| | | Mz | 0.00 | 2.13 | 4.26 | 6.39 | 8.51 | 10.64 | 12.77 | 14.90 | 17.03 |
| | V 1 | N | 0.167 | 0.167 | 0.167 | 0.167 | 0.167 | 0.167 | 0.167 | 0.167 | 0.167 |
| | | Vy | 0.062 | 0.062 | 0.062 | 0.062 | 0.062 | 0.062 | 0.062 | 0.062 | 0.062 |
| | | Vz | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -0.01 | -0.01 | -0.01 |
| | | Mz | 0.00 | -0.06 | -0.12 | -0.17 | -0.23 | -0.29 | -0.35 | -0.41 | -0.47 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | 11.059 | 11.059 | 11.059 | 11.059 | 11.059 | 11.059 | 11.059 | 11.059 | 11.059 |
| | | Vy | -1.410 | -1.410 | -1.410 | -1.410 | -1.410 | -1.410 | -1.410 | -1.410 | -1.410 |
| | | Vz | 10.848 | 10.848 | 10.848 | 10.848 | 10.848 | 10.848 | 10.848 | 10.848 | 10.848 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -10.24 | -20.48 | -30.71 | -40.95 | -51.19 | -61.43 | -71.67 | -81.91 |
| | | Mz | 0.00 | 1.33 | 2.66 | 3.99 | 5.32 | 6.65 | 7.98 | 9.31 | 10.64 |
| | Sismo X: Modo 1 | N | -107.788 | -107.788 | -107.788 | -107.788 | -107.788 | -107.788 | -107.788 | -107.788 | -107.788 |
| | | Vy | -14.073 | -14.073 | -14.073 | -14.073 | -14.073 | -14.073 | -14.073 | -14.073 | -14.073 |
| | | Vz | -29.518 | -29.518 | -29.518 | -29.518 | -29.518 | -29.518 | -29.518 | -29.518 | -29.518 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 27.86 | 55.71 | 83.57 | 111.43 | 139.29 | 167.14 | 195.00 | 222.86 |
| | | Mz | 0.00 | 13.28 | 26.56 | 39.84 | 53.13 | 66.41 | 79.69 | 92.97 | 106.25 |
| | Sismo X: Modo 2 | N | 60.934 | 60.934 | 60.934 | 60.934 | 60.934 | 60.934 | 60.934 | 60.934 | 60.934 |
| | | Vy | 31.391 | 31.391 | 31.391 | 31.391 | 31.391 | 31.391 | 31.391 | 31.391 | 31.391 |
| | | Vz | -10.499 | -10.499 | -10.499 | -10.499 | -10.499 | -10.499 | -10.499 | -10.499 | -10.499 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 9.91 | 19.82 | 29.72 | 39.63 | 49.54 | 59.45 | 69.36 | 79.27 |
| | | Mz | 0.00 | -29.63 | -59.25 | -88.88 | -118.50 | -148.13 | -177.75 | -207.38 | -237.00 |
| | Sismo X: Modo 3 | N | 4.259 | 4.259 | 4.259 | 4.259 | 4.259 | 4.259 | 4.259 | 4.259 | 4.259 |
| | | Vy | 0.475 | 0.475 | 0.475 | 0.475 | 0.475 | 0.475 | 0.475 | 0.475 | 0.475 |
| | | Vz | 1.339 | 1.339 | 1.339 | 1.339 | 1.339 | 1.339 | 1.339 | 1.339 | 1.339 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -1.26 | -2.53 | -3.79 | -5.05 | -6.32 | -7.58 | -8.85 | -10.11 |
| | | Mz | 0.00 | -0.45 | -0.90 | -1.34 | -1.79 | -2.24 | -2.69 | -3.14 | -3.59 |
| | Sismo Y: Modo 1 | N | -89.380 | -89.380 | -89.380 | -89.380 | -89.380 | -89.380 | -89.380 | -89.380 | -89.380 |
| | | Vy | -11.670 | -11.670 | -11.670 | -11.670 | -11.670 | -11.670 | -11.670 | -11.670 | -11.670 |
| | | Vz | -24.477 | -24.477 | -24.477 | -24.477 | -24.477 | -24.477 | -24.477 | -24.477 | -24.477 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 23.10 | 46.20 | 69.30 | 92.40 | 115.50 | 138.60 | 161.70 | 184.80 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | Sismo Y: Modo 2 | Mz | 0.00 | 11.01 | 22.03 | 33.04 | 44.05 | 55.07 | 66.08 | 77.09 | 88.11 |
| | | N | 57.302 | 57.302 | 57.302 | 57.302 | 57.302 | 57.302 | 57.302 | 57.302 | 57.302 |
| | | Vy | 29.520 | 29.520 | 29.520 | 29.520 | 29.520 | 29.520 | 29.520 | 29.520 | 29.520 |
| | | Vz | -9.873 | -9.873 | -9.873 | -9.873 | -9.873 | -9.873 | -9.873 | -9.873 | -9.873 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 9.32 | 18.64 | 27.95 | 37.27 | 46.59 | 55.91 | 65.22 | 74.54 |
| | | Mz | 0.00 | -27.86 | -55.72 | -83.58 | -111.44 | -139.30 | -167.16 | -195.01 | -222.87 |
| | Sismo Y: Modo 3 | N | 18.239 | 18.239 | 18.239 | 18.239 | 18.239 | 18.239 | 18.239 | 18.239 | 18.239 |
| | | Vy | 2.034 | 2.034 | 2.034 | 2.034 | 2.034 | 2.034 | 2.034 | 2.034 | 2.034 |
| | | Vz | 5.735 | 5.735 | 5.735 | 5.735 | 5.735 | 5.735 | 5.735 | 5.735 | 5.735 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -5.41 | -10.82 | -16.24 | -21.65 | -27.06 | -32.47 | -37.89 | -43.30 |
| | | Mz | 0.00 | -1.92 | -3.84 | -5.76 | -7.68 | -9.60 | -11.52 | -13.44 | -15.36 |

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N77/N78 | Peso propio | N | -445.621 | -432.602 | -419.582 | -406.563 | -393.544 | -380.524 | -367.505 | -354.486 | -341.466 |
| | | Vy | -58.272 | -58.272 | -58.272 | -58.272 | -58.272 | -58.272 | -58.272 | -58.272 | -58.272 |
| | | Vz | -3.049 | -3.049 | -3.049 | -3.049 | -3.049 | -3.049 | -3.049 | -3.049 | -3.049 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 2.88 | 5.75 | 8.63 | 11.51 | 14.39 | 17.26 | 20.14 | 23.02 |
| | | Mz | 0.00 | 54.99 | 109.99 | 164.98 | 219.98 | 274.97 | 329.96 | 384.96 | 439.95 |
| | CM 1 | N | -62.278 | -62.278 | -62.278 | -62.278 | -62.278 | -62.278 | -62.278 | -62.278 | -62.278 |
| | | Vy | -10.838 | -10.838 | -10.838 | -10.838 | -10.838 | -10.838 | -10.838 | -10.838 | -10.838 |
| | | Vz | -0.240 | -0.240 | -0.240 | -0.240 | -0.240 | -0.240 | -0.240 | -0.240 | -0.240 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.23 | 0.45 | 0.68 | 0.91 | 1.13 | 1.36 | 1.59 | 1.81 |
| | | Mz | 0.00 | 10.23 | 20.46 | 30.69 | 40.92 | 51.14 | 61.37 | 71.60 | 81.83 |
| | Q 1 | N | -345.988 | -345.988 | -345.988 | -345.988 | -345.988 | -345.988 | -345.988 | -345.988 | -345.988 |
| | | Vy | -60.213 | -60.213 | -60.213 | -60.213 | -60.213 | -60.213 | -60.213 | -60.213 | -60.213 |
| | | Vz | -1.334 | -1.334 | -1.334 | -1.334 | -1.334 | -1.334 | -1.334 | -1.334 | -1.334 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 1.26 | 2.52 | 3.78 | 5.04 | 6.30 | 7.56 | 8.82 | 10.07 |
| | | Mz | 0.00 | 56.83 | 113.65 | 170.48 | 227.31 | 284.13 | 340.96 | 397.79 | 454.61 |
| | T 1 | N | -16.116 | -16.116 | -16.116 | -16.116 | -16.116 | -16.116 | -16.116 | -16.116 | -16.116 |
| | | Vy | -18.772 | -18.772 | -18.772 | -18.772 | -18.772 | -18.772 | -18.772 | -18.772 | -18.772 |
| | | Vz | -2.167 | -2.167 | -2.167 | -2.167 | -2.167 | -2.167 | -2.167 | -2.167 | -2.167 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 2.05 | 4.09 | 6.14 | 8.18 | 10.23 | 12.27 | 14.32 | 16.36 |
| | | Mz | 0.00 | 17.72 | 35.43 | 53.15 | 70.87 | 88.58 | 106.30 | 124.01 | 141.73 |
| | T 2 | N | 30.697 | 30.697 | 30.697 | 30.697 | 30.697 | 30.697 | 30.697 | 30.697 | 30.697 |
| | | Vy | 35.757 | 35.757 | 35.757 | 35.757 | 35.757 | 35.757 | 35.757 | 35.757 | 35.757 |
| | | Vz | 4.128 | 4.128 | 4.128 | 4.128 | 4.128 | 4.128 | 4.128 | 4.128 | 4.128 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -3.90 | -7.79 | -11.69 | -15.58 | -19.48 | -23.37 | -27.27 | -31.17 |
| | | Mz | 0.00 | -33.75 | -67.49 | -101.24 | -134.98 | -168.73 | -202.47 | -236.22 | -269.96 |
| | V 1 | N | 0.534 | 0.534 | 0.534 | 0.534 | 0.534 | 0.534 | 0.534 | 0.534 | 0.534 |
| | | Vy | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 |
| | | Vz | 0.171 | 0.171 | 0.171 | 0.171 | 0.171 | 0.171 | 0.171 | 0.171 | 0.171 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.16 | -0.32 | -0.48 | -0.65 | -0.81 | -0.97 | -1.13 | -1.29 |
| | | Mz | 0.00 | -0.02 | -0.04 | -0.06 | -0.08 | -0.11 | -0.13 | -0.15 | -0.17 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | 19.186 | 19.186 | 19.186 | 19.186 | 19.186 | 19.186 | 19.186 | 19.186 | 19.186 |
| | | Vy | 22.348 | 22.348 | 22.348 | 22.348 | 22.348 | 22.348 | 22.348 | 22.348 | 22.348 |
| | | Vz | 2.580 | 2.580 | 2.580 | 2.580 | 2.580 | 2.580 | 2.580 | 2.580 | 2.580 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | | My | 0.00 | -2.43 | -4.87 | -7.30 | -9.74 | -12.17 | -14.61 | -17.04 | -19.48 |
| | | Mz | 0.00 | -21.09 | -42.18 | -63.27 | -84.36 | -105.45 | -126.55 | -147.64 | -168.73 |
| | Sismo X: Modo 1 | N | 16.944 | 16.944 | 16.944 | 16.944 | 16.944 | 16.944 | 16.944 | 16.944 | 16.944 |
| | | Vy | 9.827 | 9.827 | 9.827 | 9.827 | 9.827 | 9.827 | 9.827 | 9.827 | 9.827 |
| | | Vz | 3.315 | 3.315 | 3.315 | 3.315 | 3.315 | 3.315 | 3.315 | 3.315 | 3.315 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -3.13 | -6.26 | -9.39 | -12.51 | -15.64 | -18.77 | -21.90 | -25.03 |
| | | Mz | 0.00 | -9.27 | -18.55 | -27.82 | -37.10 | -46.37 | -55.64 | -64.92 | -74.19 |
| | Sismo X: Modo 2 | N | 21.999 | 21.999 | 21.999 | 21.999 | 21.999 | 21.999 | 21.999 | 21.999 | 21.999 |
| | | Vy | 11.100 | 11.100 | 11.100 | 11.100 | 11.100 | 11.100 | 11.100 | 11.100 | 11.100 |
| | | Vz | 4.587 | 4.587 | 4.587 | 4.587 | 4.587 | 4.587 | 4.587 | 4.587 | 4.587 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -4.33 | -8.66 | -12.99 | -17.32 | -21.65 | -25.97 | -30.30 | -34.63 |
| | | Mz | 0.00 | -10.48 | -20.95 | -31.43 | -41.90 | -52.38 | -62.85 | -73.33 | -83.80 |
| | Sismo X: Modo 3 | N | 19.538 | 19.538 | 19.538 | 19.538 | 19.538 | 19.538 | 19.538 | 19.538 | 19.538 |
| | | Vy | -0.108 | -0.108 | -0.108 | -0.108 | -0.108 | -0.108 | -0.108 | -0.108 | -0.108 |
| | | Vz | 6.504 | 6.504 | 6.504 | 6.504 | 6.504 | 6.504 | 6.504 | 6.504 | 6.504 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -6.14 | -12.28 | -18.41 | -24.55 | -30.69 | -36.83 | -42.97 | -49.10 |
| | | Mz | 0.00 | 0.10 | 0.20 | 0.30 | 0.41 | 0.51 | 0.61 | 0.71 | 0.81 |
| | Sismo Y: Modo 1 | N | 14.050 | 14.050 | 14.050 | 14.050 | 14.050 | 14.050 | 14.050 | 14.050 | 14.050 |
| | | Vy | 8.148 | 8.148 | 8.148 | 8.148 | 8.148 | 8.148 | 8.148 | 8.148 | 8.148 |
| | | Vz | 2.749 | 2.749 | 2.749 | 2.749 | 2.749 | 2.749 | 2.749 | 2.749 | 2.749 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -2.59 | -5.19 | -7.78 | -10.38 | -12.97 | -15.57 | -18.16 | -20.75 |
| | | Mz | 0.00 | -7.69 | -15.38 | -23.07 | -30.76 | -38.45 | -46.14 | -53.83 | -61.52 |
| | Sismo Y: Modo 2 | N | 20.687 | 20.687 | 20.687 | 20.687 | 20.687 | 20.687 | 20.687 | 20.687 | 20.687 |
| | | Vy | 10.438 | 10.438 | 10.438 | 10.438 | 10.438 | 10.438 | 10.438 | 10.438 | 10.438 |
| | | Vz | 4.314 | 4.314 | 4.314 | 4.314 | 4.314 | 4.314 | 4.314 | 4.314 | 4.314 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -4.07 | -8.14 | -12.21 | -16.28 | -20.35 | -24.43 | -28.50 | -32.57 |
| | | Mz | 0.00 | -9.85 | -19.70 | -29.55 | -39.40 | -49.25 | -59.11 | -68.96 | -78.81 |
| | Sismo Y: Modo 3 | N | 83.676 | 83.676 | 83.676 | 83.676 | 83.676 | 83.676 | 83.676 | 83.676 | 83.676 |
| | | Vy | -0.461 | -0.461 | -0.461 | -0.461 | -0.461 | -0.461 | -0.461 | -0.461 | -0.461 |
| | | Vz | 27.855 | 27.855 | 27.855 | 27.855 | 27.855 | 27.855 | 27.855 | 27.855 | 27.855 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -26.29 | -52.58 | -78.86 | -105.15 | -131.44 | -157.73 | -184.02 | -210.30 |
| | | Mz | 0.00 | 0.43 | 0.87 | 1.30 | 1.74 | 2.17 | 2.61 | 3.04 | 3.48 |

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N79/N80 | Peso propio | N | -669.231 | -643.193 | -617.154 | -591.115 | -565.077 | -539.038 | -513.000 | -486.961 | -460.922 |
| | | Vy | -99.132 | -99.132 | -99.132 | -99.132 | -99.132 | -99.132 | -99.132 | -99.132 | -99.132 |
| | | Vz | 8.349 | 8.349 | 8.349 | 8.349 | 8.349 | 8.349 | 8.349 | 8.349 | 8.349 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -7.88 | -15.76 | -23.64 | -31.52 | -39.40 | -47.28 | -55.16 | -63.03 |
| | | Mz | 0.00 | 93.56 | 187.11 | 280.67 | 374.22 | 467.78 | 561.34 | 654.89 | 748.45 |
| | CM 1 | N | -85.613 | -85.613 | -85.613 | -85.613 | -85.613 | -85.613 | -85.613 | -85.613 | -85.613 |
| | | Vy | -18.392 | -18.392 | -18.392 | -18.392 | -18.392 | -18.392 | -18.392 | -18.392 | -18.392 |
| | | Vz | 1.120 | 1.120 | 1.120 | 1.120 | 1.120 | 1.120 | 1.120 | 1.120 | 1.120 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -1.06 | -2.11 | -3.17 | -4.23 | -5.29 | -6.34 | -7.40 | -8.46 |
| | | Mz | 0.00 | 17.36 | 34.71 | 52.07 | 69.43 | 86.79 | 104.14 | 121.50 | 138.86 |
| | Q 1 | N | -475.629 | -475.629 | -475.629 | -475.629 | -475.629 | -475.629 | -475.629 | -475.629 | -475.629 |
| | | Vy | -102.176 | -102.176 | -102.176 | -102.176 | -102.176 | -102.176 | -102.176 | -102.176 | -102.176 |
| | | Vz | 6.222 | 6.222 | 6.222 | 6.222 | 6.222 | 6.222 | 6.222 | 6.222 | 6.222 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -5.87 | -11.74 | -17.62 | -23.49 | -29.36 | -35.23 | -41.11 | -46.98 |
| | | Mz | 0.00 | 96.43 | 192.86 | 289.29 | 385.72 | 482.14 | 578.57 | 675.00 | 771.43 |
| | T 1 | N | -18.617 | -18.617 | -18.617 | -18.617 | -18.617 | -18.617 | -18.617 | -18.617 | -18.617 |
| | | Vy | -30.572 | -30.572 | -30.572 | -30.572 | -30.572 | -30.572 | -30.572 | -30.572 | -30.572 |
| | | Vz | 2.999 | 2.999 | 2.999 | 2.999 | 2.999 | 2.999 | 2.999 | 2.999 | 2.999 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -2.83 | -5.66 | -8.49 | -11.32 | -14.15 | -16.98 | -19.82 | -22.65 |
| | | Mz | 0.00 | 28.85 | 57.70 | 86.56 | 115.41 | 144.26 | 173.11 | 201.96 | 230.82 |
| | T 2 | N | 35.460 | 35.460 | 35.460 | 35.460 | 35.460 | 35.460 | 35.460 | 35.460 | 35.460 |
| | | Vy | 58.232 | 58.232 | 58.232 | 58.232 | 58.232 | 58.232 | 58.232 | 58.232 | 58.232 |
| | | Vz | -5.713 | -5.713 | -5.713 | -5.713 | -5.713 | -5.713 | -5.713 | -5.713 | -5.713 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 5.39 | 10.78 | 16.18 | 21.57 | 26.96 | 32.35 | 37.74 | 43.13 |
| | | Mz | 0.00 | -54.96 | -109.91 | -164.87 | -219.82 | -274.78 | -329.74 | -384.69 | -439.65 |
| | | | | | | | | | | | |
| | V 1 | N | -0.510 | -0.510 | -0.510 | -0.510 | -0.510 | -0.510 | -0.510 | -0.510 | -0.510 |
| | | Vy | 0.016 | 0.016 | 0.016 | 0.016 | 0.016 | 0.016 | 0.016 | 0.016 | 0.016 |
| | | Vz | 0.220 | 0.220 | 0.220 | 0.220 | 0.220 | 0.220 | 0.220 | 0.220 | 0.220 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.21 | -0.42 | -0.62 | -0.83 | -1.04 | -1.25 | -1.45 | -1.66 |
| | | Mz | 0.00 | -0.02 | -0.03 | -0.05 | -0.06 | -0.08 | -0.09 | -0.11 | -0.12 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | 22.163 | 22.163 | 22.163 | 22.163 | 22.163 | 22.163 | 22.163 | 22.163 | 22.163 |
| | | Vy | 36.395 | 36.395 | 36.395 | 36.395 | 36.395 | 36.395 | 36.395 | 36.395 | 36.395 |
| | | Vz | -3.571 | -3.571 | -3.571 | -3.571 | -3.571 | -3.571 | -3.571 | -3.571 | -3.571 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 3.37 | 6.74 | 10.11 | 13.48 | 16.85 | 20.22 | 23.59 | 26.96 |
| | | Mz | 0.00 | -34.35 | -68.70 | -103.04 | -137.39 | -171.74 | -206.09 | -240.43 | -274.78 |
| | Sismo X: Modo 1 | N | 2.910 | 2.910 | 2.910 | 2.910 | 2.910 | 2.910 | 2.910 | 2.910 | 2.910 |
| | | Vy | 17.822 | 17.822 | 17.822 | 17.822 | 17.822 | 17.822 | 17.822 | 17.822 | 17.822 |
| | | Vz | 2.733 | 2.733 | 2.733 | 2.733 | 2.733 | 2.733 | 2.733 | 2.733 | 2.733 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -2.58 | -5.16 | -7.74 | -10.32 | -12.90 | -15.48 | -18.06 | -20.64 |
| | | Mz | 0.00 | -16.82 | -33.64 | -50.46 | -67.28 | -84.10 | -100.91 | -117.73 | -134.55 |
| | Sismo X: Modo 2 | N | -2.862 | -2.862 | -2.862 | -2.862 | -2.862 | -2.862 | -2.862 | -2.862 | -2.862 |
| | | Vy | 15.693 | 15.693 | 15.693 | 15.693 | 15.693 | 15.693 | 15.693 | 15.693 | 15.693 |
| | | Vz | 4.452 | 4.452 | 4.452 | 4.452 | 4.452 | 4.452 | 4.452 | 4.452 | 4.452 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -4.20 | -8.40 | -12.60 | -16.81 | -21.01 | -25.21 | -29.41 | -33.61 |
| | | Mz | 0.00 | -14.81 | -29.62 | -44.43 | -59.24 | -74.05 | -88.86 | -103.67 | -118.48 |
| | Sismo X: Modo 3 | N | -20.299 | -20.299 | -20.299 | -20.299 | -20.299 | -20.299 | -20.299 | -20.299 | -20.299 |
| | | Vy | -0.756 | -0.756 | -0.756 | -0.756 | -0.756 | -0.756 | -0.756 | -0.756 | -0.756 |
| | | Vz | 8.499 | 8.499 | 8.499 | 8.499 | 8.499 | 8.499 | 8.499 | 8.499 | 8.499 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -8.02 | -16.04 | -24.06 | -32.09 | -40.11 | -48.13 | -56.15 | -64.17 |
| | | Mz | 0.00 | 0.71 | 1.43 | 2.14 | 2.85 | 3.57 | 4.28 | 4.99 | 5.71 |
| | Sismo Y: Modo 1 | N | 2.413 | 2.413 | 2.413 | 2.413 | 2.413 | 2.413 | 2.413 | 2.413 | 2.413 |
| | | Vy | 14.778 | 14.778 | 14.778 | 14.778 | 14.778 | 14.778 | 14.778 | 14.778 | 14.778 |
| | | Vz | 2.267 | 2.267 | 2.267 | 2.267 | 2.267 | 2.267 | 2.267 | 2.267 | 2.267 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -2.14 | -4.28 | -6.42 | -8.56 | -10.70 | -12.83 | -14.97 | -17.11 |
| | | Mz | 0.00 | -13.95 | -27.89 | -41.84 | -55.79 | -69.73 | -83.68 | -97.63 | -111.57 |
| | Sismo Y: Modo 2 | N | -2.692 | -2.692 | -2.692 | -2.692 | -2.692 | -2.692 | -2.692 | -2.692 | -2.692 |
| | | Vy | 14.758 | 14.758 | 14.758 | 14.758 | 14.758 | 14.758 | 14.758 | 14.758 | 14.758 |
| | | Vz | 4.187 | 4.187 | 4.187 | 4.187 | 4.187 | 4.187 | 4.187 | 4.187 | 4.187 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -3.95 | -7.90 | -11.85 | -15.80 | -19.76 | -23.71 | -27.66 | -31.61 |
| | | Mz | 0.00 | -13.93 | -27.86 | -41.78 | -55.71 | -69.64 | -83.57 | -97.49 | -111.42 |
| | Sismo Y: Modo 3 | N | -86.937 | -86.937 | -86.937 | -86.937 | -86.937 | -86.937 | -86.937 | -86.937 | -86.937 |
| | | Vy | -3.237 | -3.237 | -3.237 | -3.237 | -3.237 | -3.237 | -3.237 | -3.237 | -3.237 |
| | | Vz | 36.400 | 36.400 | 36.400 | 36.400 | 36.400 | 36.400 | 36.400 | 36.400 | 36.400 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -34.35 | -68.71 | -103.06 | -137.41 | -171.76 | -206.12 | -240.47 | -274.82 |
| | | Mz | 0.00 | 3.05 | 6.11 | 9.16 | 12.22 | 15.27 | 18.33 | 21.38 | 24.44 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N81/N82 | Peso propio | N | -1372.032 | -1359.013 | -1345.993 | -1332.974 | -1319.955 | -1306.935 | -1293.916 | -1280.897 | -1267.877 |
| | | Vy | 10.813 | 10.813 | 10.813 | 10.813 | 10.813 | 10.813 | 10.813 | 10.813 | 10.813 |
| | | Vz | 31.047 | 31.047 | 31.047 | 31.047 | 31.047 | 31.047 | 31.047 | 31.047 | 31.047 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -29.30 | -58.60 | -87.90 | -117.20 | -146.50 | -175.80 | -205.10 | -234.40 |
| | | Mz | 0.00 | -10.21 | -20.41 | -30.62 | -40.82 | -51.03 | -61.23 | -71.44 | -81.64 |
| | CM 1 | N | -218.262 | -218.262 | -218.262 | -218.262 | -218.262 | -218.262 | -218.262 | -218.262 | -218.262 |
| | | Vy | 2.344 | 2.344 | 2.344 | 2.344 | 2.344 | 2.344 | 2.344 | 2.344 | 2.344 |
| | | Vz | 5.736 | 5.736 | 5.736 | 5.736 | 5.736 | 5.736 | 5.736 | 5.736 | 5.736 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -5.41 | -10.83 | -16.24 | -21.65 | -27.07 | -32.48 | -37.89 | -43.31 |
| | | Mz | 0.00 | -2.21 | -4.42 | -6.64 | -8.85 | -11.06 | -13.27 | -15.48 | -17.70 |
| | Q 1 | N | -1212.569 | -1212.569 | -1212.569 | -1212.569 | -1212.569 | -1212.569 | -1212.569 | -1212.569 | -1212.569 |
| | | Vy | 13.021 | 13.021 | 13.021 | 13.021 | 13.021 | 13.021 | 13.021 | 13.021 | 13.021 |
| | | Vz | 31.866 | 31.866 | 31.866 | 31.866 | 31.866 | 31.866 | 31.866 | 31.866 | 31.866 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -30.07 | -60.15 | -90.22 | -120.30 | -150.37 | -180.44 | -210.52 | -240.59 |
| | | Mz | 0.00 | -12.29 | -24.58 | -36.87 | -49.15 | -61.44 | -73.73 | -86.02 | -98.31 |
| | T 1 | N | 73.540 | 73.540 | 73.540 | 73.540 | 73.540 | 73.540 | 73.540 | 73.540 | 73.540 |
| | | Vy | 11.912 | 11.912 | 11.912 | 11.912 | 11.912 | 11.912 | 11.912 | 11.912 | 11.912 |
| | | Vz | 21.324 | 21.324 | 21.324 | 21.324 | 21.324 | 21.324 | 21.324 | 21.324 | 21.324 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -20.12 | -40.25 | -60.37 | -80.50 | -100.62 | -120.75 | -140.87 | -161.00 |
| | | Mz | 0.00 | -11.24 | -22.48 | -33.73 | -44.97 | -56.21 | -67.45 | -78.70 | -89.94 |
| | T 2 | N | -140.076 | -140.076 | -140.076 | -140.076 | -140.076 | -140.076 | -140.076 | -140.076 | -140.076 |
| | | Vy | -22.690 | -22.690 | -22.690 | -22.690 | -22.690 | -22.690 | -22.690 | -22.690 | -22.690 |
| | | Vz | -40.617 | -40.617 | -40.617 | -40.617 | -40.617 | -40.617 | -40.617 | -40.617 | -40.617 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 38.33 | 76.67 | 115.00 | 153.33 | 191.66 | 230.00 | 268.33 | 306.66 |
| | | Mz | 0.00 | 21.41 | 42.83 | 64.24 | 85.66 | 107.07 | 128.48 | 149.90 | 171.31 |
| | V 1 | N | 0.107 | 0.107 | 0.107 | 0.107 | 0.107 | 0.107 | 0.107 | 0.107 | 0.107 |
| | | Vy | 0.018 | 0.018 | 0.018 | 0.018 | 0.018 | 0.018 | 0.018 | 0.018 | 0.018 |
| | | Vz | 0.039 | 0.039 | 0.039 | 0.039 | 0.039 | 0.039 | 0.039 | 0.039 | 0.039 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.04 | -0.07 | -0.11 | -0.15 | -0.18 | -0.22 | -0.26 | -0.29 |
| | | Mz | 0.00 | -0.02 | -0.03 | -0.05 | -0.07 | -0.08 | -0.10 | -0.12 | -0.13 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | -87.548 | -87.548 | -87.548 | -87.548 | -87.548 | -87.548 | -87.548 | -87.548 | -87.548 |
| | | Vy | -14.181 | -14.181 | -14.181 | -14.181 | -14.181 | -14.181 | -14.181 | -14.181 | -14.181 |
| | | Vz | -25.386 | -25.386 | -25.386 | -25.386 | -25.386 | -25.386 | -25.386 | -25.386 | -25.386 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 23.96 | 47.92 | 71.87 | 95.83 | 119.79 | 143.75 | 167.71 | 191.66 |
| | | Mz | 0.00 | 13.38 | 26.77 | 40.15 | 53.53 | 66.92 | 80.30 | 93.69 | 107.07 |
| | Sismo X: Modo 1 | N | 98.675 | 98.675 | 98.675 | 98.675 | 98.675 | 98.675 | 98.675 | 98.675 | 98.675 |
| | | Vy | 39.509 | 39.509 | 39.509 | 39.509 | 39.509 | 39.509 | 39.509 | 39.509 | 39.509 |
| | | Vz | 6.299 | 6.299 | 6.299 | 6.299 | 6.299 | 6.299 | 6.299 | 6.299 | 6.299 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -5.94 | -11.89 | -17.83 | -23.78 | -29.72 | -35.67 | -41.61 | -47.56 |
| | | Mz | 0.00 | -37.29 | -74.57 | -111.86 | -149.15 | -186.43 | -223.72 | -261.00 | -298.29 |
| | Sismo X: Modo 2 | N | 33.733 | 33.733 | 33.733 | 33.733 | 33.733 | 33.733 | 33.733 | 33.733 | 33.733 |
| | | Vy | -12.992 | -12.992 | -12.992 | -12.992 | -12.992 | -12.992 | -12.992 | -12.992 | -12.992 |
| | | Vz | 34.151 | 34.151 | 34.151 | 34.151 | 34.151 | 34.151 | 34.151 | 34.151 | 34.151 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -32.23 | -64.46 | -96.69 | -128.92 | -161.15 | -193.38 | -225.61 | -257.84 |
| | | Mz | 0.00 | 12.26 | 24.52 | 36.78 | 49.04 | 61.30 | 73.56 | 85.83 | 98.09 |
| | Sismo X: Modo 3 | N | 0.440 | 0.440 | 0.440 | 0.440 | 0.440 | 0.440 | 0.440 | 0.440 | 0.440 |
| | | Vy | 1.155 | 1.155 | 1.155 | 1.155 | 1.155 | 1.155 | 1.155 | 1.155 | 1.155 |
| | | Vz | -1.095 | -1.095 | -1.095 | -1.095 | -1.095 | -1.095 | -1.095 | -1.095 | -1.095 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 1.03 | 2.07 | 3.10 | 4.13 | 5.17 | 6.20 | 7.23 | 8.27 |
| | | Mz | 0.00 | -1.09 | -2.18 | -3.27 | -4.36 | -5.45 | -6.54 | -7.63 | -8.72 |
| | Sismo Y: Modo 1 | N | 81.824 | 81.824 | 81.824 | 81.824 | 81.824 | 81.824 | 81.824 | 81.824 | 81.824 |
| | | Vy | 32.762 | 32.762 | 32.762 | 32.762 | 32.762 | 32.762 | 32.762 | 32.762 | 32.762 |
| | | Vz | 5.223 | 5.223 | 5.223 | 5.223 | 5.223 | 5.223 | 5.223 | 5.223 | 5.223 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | Sismo Y: Modo 2 | My | 0.00 | -4.93 | -9.86 | -14.79 | -19.72 | -24.65 | -29.58 | -34.51 | -39.43 |
| | | Mz | 0.00 | -30.92 | -61.84 | -92.76 | -123.67 | -154.59 | -185.51 | -216.43 | -247.35 |
| | | N | 31.721 | 31.721 | 31.721 | 31.721 | 31.721 | 31.721 | 31.721 | 31.721 | 31.721 |
| | | Vy | -12.217 | -12.217 | -12.217 | -12.217 | -12.217 | -12.217 | -12.217 | -12.217 | -12.217 |
| | | Vz | 32.115 | 32.115 | 32.115 | 32.115 | 32.115 | 32.115 | 32.115 | 32.115 | 32.115 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | My | 0.00 | -30.31 | -60.62 | -90.93 | -121.23 | -151.54 | -181.85 | -212.16 | -242.47 |
| | | Mz | 0.00 | 11.53 | 23.06 | 34.59 | 46.12 | 57.65 | 69.18 | 80.71 | 92.24 |
| | | N | 1.884 | 1.884 | 1.884 | 1.884 | 1.884 | 1.884 | 1.884 | 1.884 | 1.884 |
| | | Vy | 4.948 | 4.948 | 4.948 | 4.948 | 4.948 | 4.948 | 4.948 | 4.948 | 4.948 |
| | | Vz | -4.689 | -4.689 | -4.689 | -4.689 | -4.689 | -4.689 | -4.689 | -4.689 | -4.689 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 4.43 | 8.85 | 13.28 | 17.70 | 22.13 | 26.55 | 30.98 | 35.40 |
| | | Mz | 0.00 | -4.67 | -9.34 | -14.01 | -18.68 | -23.35 | -28.02 | -32.69 | -37.36 |

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N83/N84 | Peso propio | N | -484.182 | -471.162 | -458.143 | -445.124 | -432.104 | -419.085 | -406.066 | -393.046 | -380.027 |
| | | Vy | -5.061 | -5.061 | -5.061 | -5.061 | -5.061 | -5.061 | -5.061 | -5.061 | -5.061 |
| | | Vz | -21.972 | -21.972 | -21.972 | -21.972 | -21.972 | -21.972 | -21.972 | -21.972 | -21.972 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 20.74 | 41.47 | 62.21 | 82.94 | 103.68 | 124.42 | 145.15 | 165.89 |
| | | Mz | 0.00 | 4.78 | 9.55 | 14.33 | 19.11 | 23.88 | 28.66 | 33.43 | 38.21 |
| | CM 1 | N | -66.606 | -66.606 | -66.606 | -66.606 | -66.606 | -66.606 | -66.606 | -66.606 | -66.606 |
| | | Vy | -0.399 | -0.399 | -0.399 | -0.399 | -0.399 | -0.399 | -0.399 | -0.399 | -0.399 |
| | | Vz | -4.267 | -4.267 | -4.267 | -4.267 | -4.267 | -4.267 | -4.267 | -4.267 | -4.267 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 4.03 | 8.05 | 12.08 | 16.11 | 20.13 | 24.16 | 28.19 | 32.22 |
| | | Mz | 0.00 | 0.38 | 0.75 | 1.13 | 1.51 | 1.88 | 2.26 | 2.64 | 3.01 |
| | Q 1 | N | -370.031 | -370.031 | -370.031 | -370.031 | -370.031 | -370.031 | -370.031 | -370.031 | -370.031 |
| | | Vy | -2.217 | -2.217 | -2.217 | -2.217 | -2.217 | -2.217 | -2.217 | -2.217 | -2.217 |
| | | Vz | -23.706 | -23.706 | -23.706 | -23.706 | -23.706 | -23.706 | -23.706 | -23.706 | -23.706 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 22.37 | 44.74 | 67.12 | 89.49 | 111.86 | 134.23 | 156.60 | 178.98 |
| | | Mz | 0.00 | 2.09 | 4.18 | 6.28 | 8.37 | 10.46 | 12.55 | 14.65 | 16.74 |
| | T 1 | N | -20.413 | -20.413 | -20.413 | -20.413 | -20.413 | -20.413 | -20.413 | -20.413 | -20.413 |
| | | Vy | 10.326 | 10.326 | 10.326 | 10.326 | 10.326 | 10.326 | 10.326 | 10.326 | 10.326 |
| | | Vz | 25.007 | 25.007 | 25.007 | 25.007 | 25.007 | 25.007 | 25.007 | 25.007 | 25.007 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -23.60 | -47.20 | -70.80 | -94.40 | -118.00 | -141.60 | -165.20 | -188.81 |
| | | Mz | 0.00 | -9.75 | -19.49 | -29.24 | -38.98 | -48.73 | -58.47 | -68.22 | -77.96 |
| | T 2 | N | 38.882 | 38.882 | 38.882 | 38.882 | 38.882 | 38.882 | 38.882 | 38.882 | 38.882 |
| | | Vy | -19.669 | -19.669 | -19.669 | -19.669 | -19.669 | -19.669 | -19.669 | -19.669 | -19.669 |
| | | Vz | -47.633 | -47.633 | -47.633 | -47.633 | -47.633 | -47.633 | -47.633 | -47.633 | -47.633 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 44.95 | 89.91 | 134.86 | 179.81 | 224.77 | 269.72 | 314.68 | 359.63 |
| | | Mz | 0.00 | 18.56 | 37.13 | 55.69 | 74.25 | 92.81 | 111.38 | 129.94 | 148.50 |
| | V 1 | N | -0.003 | -0.003 | -0.003 | -0.003 | -0.003 | -0.003 | -0.003 | -0.003 | -0.003 |
| | | Vy | 0.029 | 0.029 | 0.029 | 0.029 | 0.029 | 0.029 | 0.029 | 0.029 | 0.029 |
| | | Vz | 0.038 | 0.038 | 0.038 | 0.038 | 0.038 | 0.038 | 0.038 | 0.038 | 0.038 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.04 | -0.07 | -0.11 | -0.14 | -0.18 | -0.21 | -0.25 | -0.28 |
| | | Mz | 0.00 | -0.03 | -0.05 | -0.08 | -0.11 | -0.14 | -0.16 | -0.19 | -0.22 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | 24.301 | 24.301 | 24.301 | 24.301 | 24.301 | 24.301 | 24.301 | 24.301 | 24.301 |
| | | Vy | -12.293 | -12.293 | -12.293 | -12.293 | -12.293 | -12.293 | -12.293 | -12.293 | -12.293 |
| | | Vz | -29.771 | -29.771 | -29.771 | -29.771 | -29.771 | -29.771 | -29.771 | -29.771 | -29.771 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | | My | 0.00 | 28.10 | 56.19 | 84.29 | 112.38 | 140.48 | 168.58 | 196.67 | 224.77 |
| | | Mz | 0.00 | 11.60 | 23.20 | 34.80 | 46.41 | 58.01 | 69.61 | 81.21 | 92.81 |
| | | N | 105.324 | 105.324 | 105.324 | 105.324 | 105.324 | 105.324 | 105.324 | 105.324 | 105.324 |
| | | Vy | 41.097 | 41.097 | 41.097 | 41.097 | 41.097 | 41.097 | 41.097 | 41.097 | 41.097 |
| | | Vz | 3.772 | 3.772 | 3.772 | 3.772 | 3.772 | 3.772 | 3.772 | 3.772 | 3.772 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | My | 0.00 | -3.56 | -7.12 | -10.68 | -14.24 | -17.80 | -21.36 | -24.92 | -28.48 |
| | | Mz | 0.00 | -38.79 | -77.57 | -116.36 | -155.14 | -193.93 | -232.71 | -271.50 | -310.28 |
| | | N | -129.670 | -129.670 | -129.670 | -129.670 | -129.670 | -129.670 | -129.670 | -129.670 | -129.670 |
| | | Vy | -16.921 | -16.921 | -16.921 | -16.921 | -16.921 | -16.921 | -16.921 | -16.921 | -16.921 |
| | | Vz | 35.163 | 35.163 | 35.163 | 35.163 | 35.163 | 35.163 | 35.163 | 35.163 | 35.163 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | My | 0.00 | -33.19 | -66.37 | -99.56 | -132.74 | -165.93 | -199.11 | -232.30 | -265.48 |
| | | Mz | 0.00 | 15.97 | 31.94 | 47.91 | 63.88 | 79.85 | 95.82 | 111.78 | 127.75 |
| | | N | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 |
| | | Vy | 1.977 | 1.977 | 1.977 | 1.977 | 1.977 | 1.977 | 1.977 | 1.977 | 1.977 |
| | | Vz | -1.183 | -1.183 | -1.183 | -1.183 | -1.183 | -1.183 | -1.183 | -1.183 | -1.183 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | My | 0.00 | 1.12 | 2.23 | 3.35 | 4.47 | 5.58 | 6.70 | 7.81 | 8.93 |
| | | Mz | 0.00 | -1.87 | -3.73 | -5.60 | -7.46 | -9.33 | -11.19 | -13.06 | -14.92 |
| | Sismo Y: Modo 1 | N | 87.337 | 87.337 | 87.337 | 87.337 | 87.337 | 87.337 | 87.337 | 87.337 | 87.337 |
| | | Vy | 34.079 | 34.079 | 34.079 | 34.079 | 34.079 | 34.079 | 34.079 | 34.079 | 34.079 |
| | | Vz | 3.128 | 3.128 | 3.128 | 3.128 | 3.128 | 3.128 | 3.128 | 3.128 | 3.128 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -2.95 | -5.90 | -8.86 | -11.81 | -14.76 | -17.71 | -20.67 | -23.62 |
| | | Mz | 0.00 | -32.16 | -64.32 | -96.48 | -128.65 | -160.81 | -192.97 | -225.13 | -257.29 |
| | Sismo Y: Modo 2 | N | -121.939 | -121.939 | -121.939 | -121.939 | -121.939 | -121.939 | -121.939 | -121.939 | -121.939 |
| | | Vy | -15.912 | -15.912 | -15.912 | -15.912 | -15.912 | -15.912 | -15.912 | -15.912 | -15.912 |
| | | Vz | 33.067 | 33.067 | 33.067 | 33.067 | 33.067 | 33.067 | 33.067 | 33.067 | 33.067 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -31.21 | -62.41 | -93.62 | -124.83 | -156.03 | -187.24 | -218.45 | -249.65 |
| | | Mz | 0.00 | 15.02 | 30.03 | 45.05 | 60.07 | 75.09 | 90.10 | 105.12 | 120.14 |
| | Sismo Y: Modo 3 | N | 36.405 | 36.405 | 36.405 | 36.405 | 36.405 | 36.405 | 36.405 | 36.405 | 36.405 |
| | | Vy | 8.466 | 8.466 | 8.466 | 8.466 | 8.466 | 8.466 | 8.466 | 8.466 | 8.466 |
| | | Vz | -5.066 | -5.066 | -5.066 | -5.066 | -5.066 | -5.066 | -5.066 | -5.066 | -5.066 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 4.78 | 9.56 | 14.34 | 19.12 | 23.90 | 28.68 | 33.46 | 38.24 |
| | | Mz | 0.00 | -7.99 | -15.98 | -23.97 | -31.96 | -39.95 | -47.94 | -55.93 | -63.92 |

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-------------|----------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N85/N86 | Peso propio | N | -1244.662 | -1231.643 | -1218.624 | -1205.604 | -1192.585 | -1179.566 | -1166.546 | -1153.527 | -1140.508 |
| | | Vy | -10.757 | -10.757 | -10.757 | -10.757 | -10.757 | -10.757 | -10.757 | -10.757 | -10.757 |
| | | Vz | -32.014 | -32.014 | -32.014 | -32.014 | -32.014 | -32.014 | -32.014 | -32.014 | -32.014 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 30.21 | 60.43 | 90.64 | 120.85 | 151.07 | 181.28 | 211.49 | 241.71 |
| | | Mz | 0.00 | 10.15 | 20.30 | 30.45 | 40.61 | 50.76 | 60.91 | 71.06 | 81.21 |
| | CM 1 | N | -193.025 | -193.025 | -193.025 | -193.025 | -193.025 | -193.025 | -193.025 | -193.025 | -193.025 |
| | | Vy | -2.322 | -2.322 | -2.322 | -2.322 | -2.322 | -2.322 | -2.322 | -2.322 | -2.322 |
| | | Vz | -5.893 | -5.893 | -5.893 | -5.893 | -5.893 | -5.893 | -5.893 | -5.893 | -5.893 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 5.56 | 11.12 | 16.69 | 22.25 | 27.81 | 33.37 | 38.93 | 44.49 |
| | | Mz | 0.00 | 2.19 | 4.38 | 6.57 | 8.77 | 10.96 | 13.15 | 15.34 | 17.53 |
| | Q 1 | N | -1072.364 | -1072.364 | -1072.364 | -1072.364 | -1072.364 | -1072.364 | -1072.364 | -1072.364 | -1072.364 |
| | | Vy | -12.900 | -12.900 | -12.900 | -12.900 | -12.900 | -12.900 | -12.900 | -12.900 | -12.900 |
| | | Vz | -32.741 | -32.741 | -32.741 | -32.741 | -32.741 | -32.741 | -32.741 | -32.741 | -32.741 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 30.90 | 61.80 | 92.70 | 123.60 | 154.50 | 185.39 | 216.29 | 247.19 |
| | | Mz | 0.00 | 12.17 | 24.35 | 36.52 | 48.70 | 60.87 | 73.05 | 85.22 | 97.40 |
| | T 1 | N | -18.845 | -18.845 | -18.845 | -18.845 | -18.845 | -18.845 | -18.845 | -18.845 | -18.845 |
| | | Vy | 16.735 | 16.735 | 16.735 | 16.735 | 16.735 | 16.735 | 16.735 | 16.735 | 16.735 |
| | | Vz | 27.402 | 27.402 | 27.402 | 27.402 | 27.402 | 27.402 | 27.402 | 27.402 | 27.402 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -25.86 | -51.72 | -77.58 | -103.44 | -129.30 | -155.16 | -181.02 | -206.89 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | T 2 | Mz | 0.00 | -15.79 | -31.59 | -47.38 | -63.18 | -78.97 | -94.76 | -110.56 | -126.35 |
| | | N | 35.895 | 35.895 | 35.895 | 35.895 | 35.895 | 35.895 | 35.895 | 35.895 | 35.895 |
| | | Vy | -31.877 | -31.877 | -31.877 | -31.877 | -31.877 | -31.877 | -31.877 | -31.877 | -31.877 |
| | | Vz | -52.194 | -52.194 | -52.194 | -52.194 | -52.194 | -52.194 | -52.194 | -52.194 | -52.194 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 49.26 | 98.52 | 147.78 | 197.03 | 246.29 | 295.55 | 344.81 | 394.07 |
| | | Mz | 0.00 | 30.08 | 60.17 | 90.25 | 120.34 | 150.42 | 180.50 | 210.59 | 240.67 |
| | V 1 | N | -0.075 | -0.075 | -0.075 | -0.075 | -0.075 | -0.075 | -0.075 | -0.075 | -0.075 |
| | | Vy | 0.032 | 0.032 | 0.032 | 0.032 | 0.032 | 0.032 | 0.032 | 0.032 | 0.032 |
| | | Vz | 0.027 | 0.027 | 0.027 | 0.027 | 0.027 | 0.027 | 0.027 | 0.027 | 0.027 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.03 | -0.05 | -0.08 | -0.10 | -0.13 | -0.15 | -0.18 | -0.20 |
| | | Mz | 0.00 | -0.03 | -0.06 | -0.09 | -0.12 | -0.15 | -0.18 | -0.21 | -0.24 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | 22.434 | 22.434 | 22.434 | 22.434 | 22.434 | 22.434 | 22.434 | 22.434 | 22.434 |
| | | Vy | -19.923 | -19.923 | -19.923 | -19.923 | -19.923 | -19.923 | -19.923 | -19.923 | -19.923 |
| | | Vz | -32.622 | -32.622 | -32.622 | -32.622 | -32.622 | -32.622 | -32.622 | -32.622 | -32.622 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 30.79 | 61.57 | 92.36 | 123.15 | 153.93 | 184.72 | 215.51 | 246.29 |
| | | Mz | 0.00 | 18.80 | 37.60 | 56.41 | 75.21 | 94.01 | 112.81 | 131.62 | 150.42 |
| | Sismo X: Modo 1 | N | -76.079 | -76.079 | -76.079 | -76.079 | -76.079 | -76.079 | -76.079 | -76.079 | -76.079 |
| | | Vy | 41.667 | 41.667 | 41.667 | 41.667 | 41.667 | 41.667 | 41.667 | 41.667 | 41.667 |
| | | Vz | 5.510 | 5.510 | 5.510 | 5.510 | 5.510 | 5.510 | 5.510 | 5.510 | 5.510 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -5.20 | -10.40 | -15.60 | -20.80 | -26.00 | -31.20 | -36.40 | -41.60 |
| | | Mz | 0.00 | -39.32 | -78.65 | -117.97 | -157.29 | -196.62 | -235.94 | -275.26 | -314.59 |
| | Sismo X: Modo 2 | N | -2.411 | -2.411 | -2.411 | -2.411 | -2.411 | -2.411 | -2.411 | -2.411 | -2.411 |
| | | Vy | -13.562 | -13.562 | -13.562 | -13.562 | -13.562 | -13.562 | -13.562 | -13.562 | -13.562 |
| | | Vz | 36.375 | 36.375 | 36.375 | 36.375 | 36.375 | 36.375 | 36.375 | 36.375 | 36.375 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -34.33 | -68.66 | -102.99 | -137.32 | -171.64 | -205.97 | -240.30 | -274.63 |
| | | Mz | 0.00 | 12.80 | 25.60 | 38.40 | 51.20 | 63.99 | 76.79 | 89.59 | 102.39 |
| | Sismo X: Modo 3 | N | -1.923 | -1.923 | -1.923 | -1.923 | -1.923 | -1.923 | -1.923 | -1.923 | -1.923 |
| | | Vy | 1.809 | 1.809 | 1.809 | 1.809 | 1.809 | 1.809 | 1.809 | 1.809 | 1.809 |
| | | Vz | -1.821 | -1.821 | -1.821 | -1.821 | -1.821 | -1.821 | -1.821 | -1.821 | -1.821 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 1.72 | 3.44 | 5.15 | 6.87 | 8.59 | 10.31 | 12.03 | 13.75 |
| | | Mz | 0.00 | -1.71 | -3.41 | -5.12 | -6.83 | -8.54 | -10.24 | -11.95 | -13.66 |
| | Sismo Y: Modo 1 | N | -63.087 | -63.087 | -63.087 | -63.087 | -63.087 | -63.087 | -63.087 | -63.087 | -63.087 |
| | | Vy | 34.551 | 34.551 | 34.551 | 34.551 | 34.551 | 34.551 | 34.551 | 34.551 | 34.551 |
| | | Vz | 4.569 | 4.569 | 4.569 | 4.569 | 4.569 | 4.569 | 4.569 | 4.569 | 4.569 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -4.31 | -8.62 | -12.94 | -17.25 | -21.56 | -25.87 | -30.19 | -34.50 |
| | | Mz | 0.00 | -32.61 | -65.22 | -97.82 | -130.43 | -163.04 | -195.65 | -228.26 | -260.86 |
| | Sismo Y: Modo 2 | N | -2.267 | -2.267 | -2.267 | -2.267 | -2.267 | -2.267 | -2.267 | -2.267 | -2.267 |
| | | Vy | -12.753 | -12.753 | -12.753 | -12.753 | -12.753 | -12.753 | -12.753 | -12.753 | -12.753 |
| | | Vz | 34.206 | 34.206 | 34.206 | 34.206 | 34.206 | 34.206 | 34.206 | 34.206 | 34.206 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -32.28 | -64.56 | -96.85 | -129.13 | -161.41 | -193.69 | -225.98 | -258.26 |
| | | Mz | 0.00 | 12.04 | 24.07 | 36.11 | 48.14 | 60.18 | 72.21 | 84.25 | 96.29 |
| | Sismo Y: Modo 3 | N | -8.234 | -8.234 | -8.234 | -8.234 | -8.234 | -8.234 | -8.234 | -8.234 | -8.234 |
| | | Vy | 7.747 | 7.747 | 7.747 | 7.747 | 7.747 | 7.747 | 7.747 | 7.747 | 7.747 |
| | | Vz | -7.798 | -7.798 | -7.798 | -7.798 | -7.798 | -7.798 | -7.798 | -7.798 | -7.798 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 7.36 | 14.72 | 22.08 | 29.44 | 36.79 | 44.15 | 51.51 | 58.87 |
| | | Mz | 0.00 | -7.31 | -14.62 | -21.93 | -29.25 | -36.56 | -43.87 | -51.18 | -58.49 |

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N87/N88 | Peso propio | N | -308.056 | -295.037 | -282.017 | -268.998 | -255.979 | -242.959 | -229.940 | -216.921 | -203.901 |
| | | Vy | 1.520 | 1.520 | 1.520 | 1.520 | 1.520 | 1.520 | 1.520 | 1.520 | 1.520 |
| | | Vz | 16.509 | 16.509 | 16.509 | 16.509 | 16.509 | 16.509 | 16.509 | 16.509 | 16.509 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | | My | 0.00 | -15.58 | -31.16 | -46.74 | -62.32 | -77.90 | -93.48 | -109.07 | -124.65 |
| | | Mz | 0.00 | -1.43 | -2.87 | -4.30 | -5.74 | -7.17 | -8.61 | -10.04 | -11.48 |
| | CM 1 | N | -36.465 | -36.465 | -36.465 | -36.465 | -36.465 | -36.465 | -36.465 | -36.465 | -36.465 |
| | | Vy | -0.185 | -0.185 | -0.185 | -0.185 | -0.185 | -0.185 | -0.185 | -0.185 | -0.185 |
| | | Vz | 3.308 | 3.308 | 3.308 | 3.308 | 3.308 | 3.308 | 3.308 | 3.308 | 3.308 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -3.12 | -6.24 | -9.37 | -12.49 | -15.61 | -18.73 | -21.85 | -24.98 |
| | | Mz | 0.00 | 0.17 | 0.35 | 0.52 | 0.70 | 0.87 | 1.05 | 1.22 | 1.40 |
| | Q 1 | N | -202.582 | -202.582 | -202.582 | -202.582 | -202.582 | -202.582 | -202.582 | -202.582 | -202.582 |
| | | Vy | -1.029 | -1.029 | -1.029 | -1.029 | -1.029 | -1.029 | -1.029 | -1.029 | -1.029 |
| | | Vz | 18.378 | 18.378 | 18.378 | 18.378 | 18.378 | 18.378 | 18.378 | 18.378 | 18.378 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -17.34 | -34.69 | -52.03 | -69.38 | -86.72 | -104.07 | -121.41 | -138.76 |
| | | Mz | 0.00 | 0.97 | 1.94 | 2.91 | 3.88 | 4.86 | 5.83 | 6.80 | 7.77 |
| | T 1 | N | 5.185 | 5.185 | 5.185 | 5.185 | 5.185 | 5.185 | 5.185 | 5.185 | 5.185 |
| | | Vy | 13.743 | 13.743 | 13.743 | 13.743 | 13.743 | 13.743 | 13.743 | 13.743 | 13.743 |
| | | Vz | 19.455 | 19.455 | 19.455 | 19.455 | 19.455 | 19.455 | 19.455 | 19.455 | 19.455 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -18.36 | -36.72 | -55.08 | -73.44 | -91.80 | -110.16 | -128.52 | -146.88 |
| | | Mz | 0.00 | -12.97 | -25.94 | -38.91 | -51.88 | -64.85 | -77.82 | -90.79 | -103.76 |
| | T 2 | N | -9.876 | -9.876 | -9.876 | -9.876 | -9.876 | -9.876 | -9.876 | -9.876 | -9.876 |
| | | Vy | -26.177 | -26.177 | -26.177 | -26.177 | -26.177 | -26.177 | -26.177 | -26.177 | -26.177 |
| | | Vz | -37.057 | -37.057 | -37.057 | -37.057 | -37.057 | -37.057 | -37.057 | -37.057 | -37.057 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 34.97 | 69.95 | 104.92 | 139.89 | 174.86 | 209.84 | 244.81 | 279.78 |
| | | Mz | 0.00 | 24.70 | 49.41 | 74.11 | 98.82 | 123.52 | 148.23 | 172.93 | 197.64 |
| | V 1 | N | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 |
| | | Vy | 0.014 | 0.014 | 0.014 | 0.014 | 0.014 | 0.014 | 0.014 | 0.014 | 0.014 |
| | | Vz | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 | 0.022 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.02 | -0.04 | -0.06 | -0.08 | -0.10 | -0.12 | -0.14 | -0.16 |
| | | Mz | 0.00 | -0.01 | -0.03 | -0.04 | -0.05 | -0.07 | -0.08 | -0.09 | -0.11 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | -6.172 | -6.172 | -6.172 | -6.172 | -6.172 | -6.172 | -6.172 | -6.172 | -6.172 |
| | | Vy | -16.361 | -16.361 | -16.361 | -16.361 | -16.361 | -16.361 | -16.361 | -16.361 | -16.361 |
| | | Vz | -23.161 | -23.161 | -23.161 | -23.161 | -23.161 | -23.161 | -23.161 | -23.161 | -23.161 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 21.86 | 43.72 | 65.57 | 87.43 | 109.29 | 131.15 | 153.00 | 174.86 |
| | | Mz | 0.00 | 15.44 | 30.88 | 46.32 | 61.76 | 77.20 | 92.64 | 108.08 | 123.52 |
| | Sismo X: Modo 1 | N | -108.499 | -108.499 | -108.499 | -108.499 | -108.499 | -108.499 | -108.499 | -108.499 | -108.499 |
| | | Vy | 38.437 | 38.437 | 38.437 | 38.437 | 38.437 | 38.437 | 38.437 | 38.437 | 38.437 |
| | | Vz | 0.752 | 0.752 | 0.752 | 0.752 | 0.752 | 0.752 | 0.752 | 0.752 | 0.752 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.71 | -1.42 | -2.13 | -2.84 | -3.55 | -4.26 | -4.96 | -5.67 |
| | | Mz | 0.00 | -36.27 | -72.55 | -108.82 | -145.10 | -181.37 | -217.65 | -253.92 | -290.20 |
| | Sismo X: Modo 2 | N | 119.576 | 119.576 | 119.576 | 119.576 | 119.576 | 119.576 | 119.576 | 119.576 | 119.576 |
| | | Vy | -15.546 | -15.546 | -15.546 | -15.546 | -15.546 | -15.546 | -15.546 | -15.546 | -15.546 |
| | | Vz | 35.516 | 35.516 | 35.516 | 35.516 | 35.516 | 35.516 | 35.516 | 35.516 | 35.516 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -33.52 | -67.04 | -100.56 | -134.07 | -167.59 | -201.11 | -234.63 | -268.15 |
| | | Mz | 0.00 | 14.67 | 29.34 | 44.02 | 58.69 | 73.36 | 88.03 | 102.70 | 117.38 |
| | Sismo X: Modo 3 | N | -7.579 | -7.579 | -7.579 | -7.579 | -7.579 | -7.579 | -7.579 | -7.579 | -7.579 |
| | | Vy | 1.232 | 1.232 | 1.232 | 1.232 | 1.232 | 1.232 | 1.232 | 1.232 | 1.232 |
| | | Vz | -1.892 | -1.892 | -1.892 | -1.892 | -1.892 | -1.892 | -1.892 | -1.892 | -1.892 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 1.79 | 3.57 | 5.36 | 7.14 | 8.93 | 10.72 | 12.50 | 14.29 |
| | | Mz | 0.00 | -1.16 | -2.33 | -3.49 | -4.65 | -5.82 | -6.98 | -8.14 | -9.31 |
| | Sismo Y: Modo 1 | N | -89.970 | -89.970 | -89.970 | -89.970 | -89.970 | -89.970 | -89.970 | -89.970 | -89.970 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | | Vy | 31.873 | 31.873 | 31.873 | 31.873 | 31.873 | 31.873 | 31.873 | 31.873 | 31.873 |
| | | Vz | 0.623 | 0.623 | 0.623 | 0.623 | 0.623 | 0.623 | 0.623 | 0.623 | 0.623 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -0.59 | -1.18 | -1.76 | -2.35 | -2.94 | -3.53 | -4.12 | -4.71 |
| | | Mz | 0.00 | -30.08 | -60.16 | -90.24 | -120.32 | -150.40 | -180.48 | -210.56 | -240.64 |
| | | | | | | | | | | | |
| | Sismo Y: Modo 2 | N | 112.447 | 112.447 | 112.447 | 112.447 | 112.447 | 112.447 | 112.447 | 112.447 | 112.447 |
| | | Vy | -14.620 | -14.620 | -14.620 | -14.620 | -14.620 | -14.620 | -14.620 | -14.620 | -14.620 |
| | | Vz | 33.399 | 33.399 | 33.399 | 33.399 | 33.399 | 33.399 | 33.399 | 33.399 | 33.399 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -31.52 | -63.04 | -94.56 | -126.08 | -157.60 | -189.12 | -220.64 | -252.16 |
| | | Mz | 0.00 | 13.80 | 27.59 | 41.39 | 55.19 | 68.99 | 82.78 | 96.58 | 110.38 |
| | Sismo Y: Modo 3 | N | -32.459 | -32.459 | -32.459 | -32.459 | -32.459 | -32.459 | -32.459 | -32.459 | -32.459 |
| | | Vy | 5.278 | 5.278 | 5.278 | 5.278 | 5.278 | 5.278 | 5.278 | 5.278 | 5.278 |
| | | Vz | -8.105 | -8.105 | -8.105 | -8.105 | -8.105 | -8.105 | -8.105 | -8.105 | -8.105 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 7.65 | 15.30 | 22.95 | 30.60 | 38.24 | 45.89 | 53.54 | 61.19 |
| | | Mz | 0.00 | -4.98 | -9.96 | -14.94 | -19.93 | -24.91 | -29.89 | -34.87 | -39.85 |

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N89/N90 | Peso propio | N | -696.127 | -677.032 | -657.937 | -638.842 | -619.747 | -600.652 | -581.557 | -562.462 | -543.367 |
| | | Vy | 83.960 | 83.960 | 83.960 | 83.960 | 83.960 | 83.960 | 83.960 | 83.960 | 83.960 |
| | | Vz | 12.150 | 12.150 | 12.150 | 12.150 | 12.150 | 12.150 | 12.150 | 12.150 | 12.150 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -11.47 | -22.93 | -34.40 | -45.87 | -57.33 | -68.80 | -80.26 | -91.73 |
| | | Mz | 0.00 | -79.24 | -158.47 | -237.71 | -316.95 | -396.19 | -475.42 | -554.66 | -633.90 |
| | CM 1 | N | -99.031 | -99.031 | -99.031 | -99.031 | -99.031 | -99.031 | -99.031 | -99.031 | -99.031 |
| | | Vy | 15.618 | 15.618 | 15.618 | 15.618 | 15.618 | 15.618 | 15.618 | 15.618 | 15.618 |
| | | Vz | 2.867 | 2.867 | 2.867 | 2.867 | 2.867 | 2.867 | 2.867 | 2.867 | 2.867 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -2.71 | -5.41 | -8.12 | -10.82 | -13.53 | -16.24 | -18.94 | -21.65 |
| | | Mz | 0.00 | -14.74 | -29.48 | -44.22 | -58.96 | -73.70 | -88.44 | -103.18 | -117.92 |
| | Q 1 | N | -550.170 | -550.170 | -550.170 | -550.170 | -550.170 | -550.170 | -550.170 | -550.170 | -550.170 |
| | | Vy | 86.769 | 86.769 | 86.769 | 86.769 | 86.769 | 86.769 | 86.769 | 86.769 | 86.769 |
| | | Vz | 15.929 | 15.929 | 15.929 | 15.929 | 15.929 | 15.929 | 15.929 | 15.929 | 15.929 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -15.03 | -30.07 | -45.10 | -60.13 | -75.16 | -90.20 | -105.23 | -120.26 |
| | | Mz | 0.00 | -81.89 | -163.78 | -245.67 | -327.55 | -409.44 | -491.33 | -573.22 | -655.11 |
| | T 1 | N | -18.114 | -18.114 | -18.114 | -18.114 | -18.114 | -18.114 | -18.114 | -18.114 | -18.114 |
| | | Vy | 27.592 | 27.592 | 27.592 | 27.592 | 27.592 | 27.592 | 27.592 | 27.592 | 27.592 |
| | | Vz | -2.365 | -2.365 | -2.365 | -2.365 | -2.365 | -2.365 | -2.365 | -2.365 | -2.365 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 2.23 | 4.46 | 6.70 | 8.93 | 11.16 | 13.39 | 15.62 | 17.86 |
| | | Mz | 0.00 | -26.04 | -52.08 | -78.12 | -104.16 | -130.20 | -156.24 | -182.28 | -208.32 |
| | T 2 | N | 34.503 | 34.503 | 34.503 | 34.503 | 34.503 | 34.503 | 34.503 | 34.503 | 34.503 |
| | | Vy | -52.556 | -52.556 | -52.556 | -52.556 | -52.556 | -52.556 | -52.556 | -52.556 | -52.556 |
| | | Vz | 4.505 | 4.505 | 4.505 | 4.505 | 4.505 | 4.505 | 4.505 | 4.505 | 4.505 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -4.25 | -8.50 | -12.75 | -17.01 | -21.26 | -25.51 | -29.76 | -34.01 |
| | | Mz | 0.00 | 49.60 | 99.20 | 148.80 | 198.40 | 248.00 | 297.60 | 347.20 | 396.80 |
| | V 1 | N | -0.140 | -0.140 | -0.140 | -0.140 | -0.140 | -0.140 | -0.140 | -0.140 | -0.140 |
| | | Vy | 0.020 | 0.020 | 0.020 | 0.020 | 0.020 | 0.020 | 0.020 | 0.020 | 0.020 |
| | | Vz | -0.047 | -0.047 | -0.047 | -0.047 | -0.047 | -0.047 | -0.047 | -0.047 | -0.047 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.04 | 0.09 | 0.13 | 0.18 | 0.22 | 0.26 | 0.31 | 0.35 |
| | | Mz | 0.00 | -0.02 | -0.04 | -0.06 | -0.08 | -0.09 | -0.11 | -0.13 | -0.15 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | R 1 | N | 21.565 | 21.565 | 21.565 | 21.565 | 21.565 | 21.565 | 21.565 | 21.565 | 21.565 |
| | | Vy | -32.847 | -32.847 | -32.847 | -32.847 | -32.847 | -32.847 | -32.847 | -32.847 | -32.847 |
| | | Vz | 2.815 | 2.815 | 2.815 | 2.815 | 2.815 | 2.815 | 2.815 | 2.815 | 2.815 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -2.66 | -5.31 | -7.97 | -10.63 | -13.29 | -15.94 | -18.60 | -21.26 |
| | | Mz | 0.00 | 31.00 | 62.00 | 93.00 | 124.00 | 155.00 | 186.00 | 217.00 | 248.00 |
| | Sismo X: Modo 1 | N | -108.332 | -108.332 | -108.332 | -108.332 | -108.332 | -108.332 | -108.332 | -108.332 | -108.332 |
| | | Vy | 16.095 | 16.095 | 16.095 | 16.095 | 16.095 | 16.095 | 16.095 | 16.095 | 16.095 |
| | | Vz | -35.409 | -35.409 | -35.409 | -35.409 | -35.409 | -35.409 | -35.409 | -35.409 | -35.409 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 33.42 | 66.84 | 100.25 | 133.67 | 167.09 | 200.51 | 233.92 | 267.34 |
| | | Mz | 0.00 | -15.19 | -30.38 | -45.57 | -60.76 | -75.95 | -91.14 | -106.33 | -121.52 |
| | Sismo X: Modo 2 | N | 75.748 | 75.748 | 75.748 | 75.748 | 75.748 | 75.748 | 75.748 | 75.748 | 75.748 |
| | | Vy | 15.394 | 15.394 | 15.394 | 15.394 | 15.394 | 15.394 | 15.394 | 15.394 | 15.394 |
| | | Vz | 30.170 | 30.170 | 30.170 | 30.170 | 30.170 | 30.170 | 30.170 | 30.170 | 30.170 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -28.47 | -56.95 | -85.42 | -113.89 | -142.36 | -170.84 | -199.31 | -227.78 |
| | | Mz | 0.00 | -14.53 | -29.06 | -43.58 | -58.11 | -72.64 | -87.17 | -101.69 | -116.22 |
| | Sismo X: Modo 3 | N | -10.726 | -10.726 | -10.726 | -10.726 | -10.726 | -10.726 | -10.726 | -10.726 | -10.726 |
| | | Vy | -0.619 | -0.619 | -0.619 | -0.619 | -0.619 | -0.619 | -0.619 | -0.619 | -0.619 |
| | | Vz | -3.997 | -3.997 | -3.997 | -3.997 | -3.997 | -3.997 | -3.997 | -3.997 | -3.997 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 3.77 | 7.54 | 11.32 | 15.09 | 18.86 | 22.63 | 26.41 | 30.18 |
| | | Mz | 0.00 | 0.58 | 1.17 | 1.75 | 2.34 | 2.92 | 3.51 | 4.09 | 4.67 |
| | Sismo Y: Modo 1 | N | -89.831 | -89.831 | -89.831 | -89.831 | -89.831 | -89.831 | -89.831 | -89.831 | -89.831 |
| | | Vy | 13.347 | 13.347 | 13.347 | 13.347 | 13.347 | 13.347 | 13.347 | 13.347 | 13.347 |
| | | Vz | -29.362 | -29.362 | -29.362 | -29.362 | -29.362 | -29.362 | -29.362 | -29.362 | -29.362 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 27.71 | 55.42 | 83.13 | 110.84 | 138.55 | 166.26 | 193.98 | 221.69 |
| | | Mz | 0.00 | -12.60 | -25.19 | -37.79 | -50.38 | -62.98 | -75.57 | -88.17 | -100.77 |
| | Sismo Y: Modo 2 | N | 71.232 | 71.232 | 71.232 | 71.232 | 71.232 | 71.232 | 71.232 | 71.232 | 71.232 |
| | | Vy | 14.476 | 14.476 | 14.476 | 14.476 | 14.476 | 14.476 | 14.476 | 14.476 | 14.476 |
| | | Vz | 28.371 | 28.371 | 28.371 | 28.371 | 28.371 | 28.371 | 28.371 | 28.371 | 28.371 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -26.78 | -53.55 | -80.33 | -107.10 | -133.88 | -160.65 | -187.43 | -214.20 |
| | | Mz | 0.00 | -13.66 | -27.32 | -40.99 | -54.65 | -68.31 | -81.97 | -95.63 | -109.29 |
| | Sismo Y: Modo 3 | N | -45.935 | -45.935 | -45.935 | -45.935 | -45.935 | -45.935 | -45.935 | -45.935 | -45.935 |
| | | Vy | -2.651 | -2.651 | -2.651 | -2.651 | -2.651 | -2.651 | -2.651 | -2.651 | -2.651 |
| | | Vz | -17.118 | -17.118 | -17.118 | -17.118 | -17.118 | -17.118 | -17.118 | -17.118 | -17.118 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 16.16 | 32.31 | 48.47 | 64.62 | 80.78 | 96.93 | 113.09 | 129.24 |
| | | Mz | 0.00 | 2.50 | 5.00 | 7.51 | 10.01 | 12.51 | 15.01 | 17.51 | 20.02 |

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| N91/N92 | Peso propio | N | -860.152 | -831.510 | -802.867 | -774.225 | -745.582 | -716.940 | -688.297 | -659.655 | -631.012 |
| | | Vy | 106.904 | 106.904 | 106.904 | 106.904 | 106.904 | 106.904 | 106.904 | 106.904 | 106.904 |
| | | Vz | -8.826 | -8.826 | -8.826 | -8.826 | -8.826 | -8.826 | -8.826 | -8.826 | -8.826 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 8.33 | 16.66 | 24.99 | 33.32 | 41.65 | 49.98 | 58.30 | 66.63 |
| | | Mz | 0.00 | -100.89 | -201.78 | -302.67 | -403.56 | -504.45 | -605.34 | -706.23 | -807.12 |
| | CM 1 | N | -112.288 | -112.288 | -112.288 | -112.288 | -112.288 | -112.288 | -112.288 | -112.288 | -112.288 |
| | | Vy | 19.488 | 19.488 | 19.488 | 19.488 | 19.488 | 19.488 | 19.488 | 19.488 | 19.488 |
| | | Vz | -2.276 | -2.276 | -2.276 | -2.276 | -2.276 | -2.276 | -2.276 | -2.276 | -2.276 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 2.15 | 4.30 | 6.44 | 8.59 | 10.74 | 12.89 | 15.03 | 17.18 |
| | | Mz | 0.00 | -18.39 | -36.78 | -55.17 | -73.57 | -91.96 | -110.35 | -128.74 | -147.13 |
| | Q 1 | N | -623.825 | -623.825 | -623.825 | -623.825 | -623.825 | -623.825 | -623.825 | -623.825 | -623.825 |
| | | Vy | 108.265 | 108.265 | 108.265 | 108.265 | 108.265 | 108.265 | 108.265 | 108.265 | 108.265 |
| | | Vz | -12.642 | -12.642 | -12.642 | -12.642 | -12.642 | -12.642 | -12.642 | -12.642 | -12.642 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 11.93 | 23.86 | 35.79 | 47.72 | 59.65 | 71.59 | 83.52 | 95.45 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |



| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | T 1 | Mz | 0.00 | -102.18 | -204.35 | -306.53 | -408.70 | -510.88 | -613.05 | -715.23 | -817.40 |
| | | N | -25.142 | -25.142 | -25.142 | -25.142 | -25.142 | -25.142 | -25.142 | -25.142 | -25.142 |
| | | Vy | 33.829 | 33.829 | 33.829 | 33.829 | 33.829 | 33.829 | 33.829 | 33.829 | 33.829 |
| | | Vz | 3.378 | 3.378 | 3.378 | 3.378 | 3.378 | 3.378 | 3.378 | 3.378 | 3.378 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -3.19 | -6.38 | -9.56 | -12.75 | -15.94 | -19.13 | -22.32 | -25.51 |
| | | Mz | 0.00 | -31.93 | -63.85 | -95.78 | -127.71 | -159.63 | -191.56 | -223.49 | -255.41 |
| | T 2 | N | 47.889 | 47.889 | 47.889 | 47.889 | 47.889 | 47.889 | 47.889 | 47.889 | 47.889 |
| | | Vy | -64.437 | -64.437 | -64.437 | -64.437 | -64.437 | -64.437 | -64.437 | -64.437 | -64.437 |
| | | Vz | -6.435 | -6.435 | -6.435 | -6.435 | -6.435 | -6.435 | -6.435 | -6.435 | -6.435 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 6.07 | 12.15 | 18.22 | 24.29 | 30.36 | 36.44 | 42.51 | 48.58 |
| | | Mz | 0.00 | 60.81 | 121.62 | 182.44 | 243.25 | 304.06 | 364.87 | 425.69 | 486.50 |
| | V 1 | N | 0.099 | 0.099 | 0.099 | 0.099 | 0.099 | 0.099 | 0.099 | 0.099 | 0.099 |
| | | Vy | 0.037 | 0.037 | 0.037 | 0.037 | 0.037 | 0.037 | 0.037 | 0.037 | 0.037 |
| | | Vz | -0.050 | -0.050 | -0.050 | -0.050 | -0.050 | -0.050 | -0.050 | -0.050 | -0.050 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.05 | 0.09 | 0.14 | 0.19 | 0.24 | 0.28 | 0.33 | 0.38 |
| | | Mz | 0.00 | -0.03 | -0.07 | -0.10 | -0.14 | -0.17 | -0.21 | -0.24 | -0.28 |
| | V 2 | N | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vy | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Vz | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | Mz | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | R 1 | N | 29.930 | 29.930 | 29.930 | 29.930 | 29.930 | 29.930 | 29.930 | 29.930 | 29.930 |
| | | Vy | -40.273 | -40.273 | -40.273 | -40.273 | -40.273 | -40.273 | -40.273 | -40.273 | -40.273 |
| | | Vz | -4.022 | -4.022 | -4.022 | -4.022 | -4.022 | -4.022 | -4.022 | -4.022 | -4.022 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 3.80 | 7.59 | 11.39 | 15.18 | 18.98 | 22.77 | 26.57 | 30.36 |
| | | Mz | 0.00 | 38.01 | 76.02 | 114.02 | 152.03 | 190.04 | 228.05 | 266.05 | 304.06 |
| | Sismo X: Modo 1 | N | 84.044 | 84.044 | 84.044 | 84.044 | 84.044 | 84.044 | 84.044 | 84.044 | 84.044 |
| | | Vy | 18.260 | 18.260 | 18.260 | 18.260 | 18.260 | 18.260 | 18.260 | 18.260 | 18.260 |
| | | Vz | -38.230 | -38.230 | -38.230 | -38.230 | -38.230 | -38.230 | -38.230 | -38.230 | -38.230 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 36.08 | 72.16 | 108.24 | 144.32 | 180.40 | 216.48 | 252.56 | 288.64 |
| | | Mz | 0.00 | -17.23 | -34.47 | -51.70 | -68.93 | -86.16 | -103.40 | -120.63 | -137.86 |
| | Sismo X: Modo 2 | N | -101.902 | -101.902 | -101.902 | -101.902 | -101.902 | -101.902 | -101.902 | -101.902 | -101.902 |
| | | Vy | 20.731 | 20.731 | 20.731 | 20.731 | 20.731 | 20.731 | 20.731 | 20.731 | 20.731 |
| | | Vz | 35.365 | 35.365 | 35.365 | 35.365 | 35.365 | 35.365 | 35.365 | 35.365 | 35.365 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -33.38 | -66.75 | -100.13 | -133.50 | -166.88 | -200.25 | -233.63 | -267.00 |
| | | Mz | 0.00 | -19.56 | -39.13 | -58.69 | -78.26 | -97.82 | -117.39 | -136.95 | -156.52 |
| | Sismo X: Modo 3 | N | 11.414 | 11.414 | 11.414 | 11.414 | 11.414 | 11.414 | 11.414 | 11.414 | 11.414 |
| | | Vy | -0.308 | -0.308 | -0.308 | -0.308 | -0.308 | -0.308 | -0.308 | -0.308 | -0.308 |
| | | Vz | -4.515 | -4.515 | -4.515 | -4.515 | -4.515 | -4.515 | -4.515 | -4.515 | -4.515 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 4.26 | 8.52 | 12.78 | 17.05 | 21.31 | 25.57 | 29.83 | 34.09 |
| | | Mz | 0.00 | 0.29 | 0.58 | 0.87 | 1.16 | 1.45 | 1.74 | 2.03 | 2.32 |
| | Sismo Y: Modo 1 | N | 69.691 | 69.691 | 69.691 | 69.691 | 69.691 | 69.691 | 69.691 | 69.691 | 69.691 |
| | | Vy | 15.141 | 15.141 | 15.141 | 15.141 | 15.141 | 15.141 | 15.141 | 15.141 | 15.141 |
| | | Vz | -31.702 | -31.702 | -31.702 | -31.702 | -31.702 | -31.702 | -31.702 | -31.702 | -31.702 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 29.92 | 59.84 | 89.76 | 119.67 | 149.59 | 179.51 | 209.43 | 239.35 |
| | | Mz | 0.00 | -14.29 | -28.58 | -42.87 | -57.16 | -71.45 | -85.74 | -100.03 | -114.32 |
| | Sismo Y: Modo 2 | N | -95.826 | -95.826 | -95.826 | -95.826 | -95.826 | -95.826 | -95.826 | -95.826 | -95.826 |
| | | Vy | 19.495 | 19.495 | 19.495 | 19.495 | 19.495 | 19.495 | 19.495 | 19.495 | 19.495 |
| | | Vz | 33.256 | 33.256 | 33.256 | 33.256 | 33.256 | 33.256 | 33.256 | 33.256 | 33.256 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | -31.39 | -62.77 | -94.16 | -125.54 | -156.93 | -188.31 | -219.70 | -251.08 |
| | | Mz | 0.00 | -18.40 | -36.80 | -55.19 | -73.59 | -91.99 | -110.39 | -128.79 | -147.19 |
| | Sismo Y: Modo 3 | N | 48.885 | 48.885 | 48.885 | 48.885 | 48.885 | 48.885 | 48.885 | 48.885 | 48.885 |
| | | Vy | -1.319 | -1.319 | -1.319 | -1.319 | -1.319 | -1.319 | -1.319 | -1.319 | -1.319 |



Listados

CALCULADO DATOS OK

Fecha: 29/11/15

| Esfuerzos en barras, por hipótesis | | | | | | | | | | | |
|------------------------------------|-----------|----------|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Barra | Hipótesis | Esfuerzo | Posiciones en la barra | | | | | | | | |
| | | | 0.000 m | 0.944 m | 1.888 m | 2.831 m | 3.775 m | 4.719 m | 5.663 m | 6.606 m | 7.550 m |
| | | Vz | -19.338 | -19.338 | -19.338 | -19.338 | -19.338 | -19.338 | -19.338 | -19.338 | -19.338 |
| | | Mt | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | | My | 0.00 | 18.25 | 36.50 | 54.75 | 73.00 | 91.25 | 109.50 | 127.75 | 146.00 |
| | | Mz | 0.00 | 1.24 | 2.49 | 3.73 | 4.98 | 6.22 | 7.47 | 8.71 | 9.96 |

| | |
|-----------------------|---|
| 1.- ESTRUCTURA..... | 2 |
| 1.1.- Resultados..... | 2 |
| 1.1.1.- Pilares..... | 2 |



1.- ESTRUCTURA

1.1.- Resultados

1.1.1.- Pilares

1.1.1.1.- Comprobaciones E.L.U. y E.L.S.

En las tablas de comprobación de pilares de acero no se muestran las comprobaciones con coeficiente de aprovechamiento inferior al 10%.

Disp.: Disposiciones relativas a las armaduras

Arm.: Armadura mínima y máxima

Q: Estado límite de agotamiento frente a cortante

N,M: Estado límite de agotamiento frente a sollicitaciones normales

Disp. S.: Criterios de diseño por sismo

Cap.: Diseño por capacidad

1.1.1.1.1.- PP6

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|---|----------------|----------|---------------------|---------------------|-------|---------|---------------------|--------|------------|-------------------------------|-------|--------|------------|------------|---------|---------|--------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos p _s imos | | | | | | | Estado |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | Qx (kN) | Qy (kN) | |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 29.8 | 75.5 | N.P. ⁽²⁾ | Cumple | 75.5 | G, T, V, R ⁽³⁾ | Q,N,M | 355.2 | 565.3 | -321.8 | 44.5 | -78.2 | Cumple |
| | | Pie | Cumple | Cumple | 28.7 | 6.6 | N.P. ⁽²⁾ | Cumple | 28.7 | G, T, V, R ⁽³⁾ | Q | 454.8 | 0.0 | 0.0 | 44.5 | -78.2 | Cumple |
| CIMENTACIÓN | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 3.4 | 6.7 | N.P. ⁽¹⁾ | Cumple | 6.7 | G, T, V, R ⁽³⁾ | Q | 454.8 | 0.0 | 0.0 | 44.5 | -78.2 | Cumple |
| | | | | | | | | | | G, Q, T, R ⁽⁴⁾ | N,M | 873.7 | 0.0 | 0.0 | 29.6 | -12.7 | |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ PP+CM1+1.5.T2+0.9.V1+1.35.R1 ⁽⁴⁾ 1.35.PP+1.35.CM1+1.5.Q1+0.9.T2+1.35.R1 | | | | | | | | | | | | | | | | | |

1.1.1.1.2.- PP5

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|---|----------------|----------|---------------------|---------------------|-------|---------|---------------------|--------|------------|-------------------------------|-------|--------|------------------------|------------------------|---------------------|---------------------|--------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos p _s imos | | | | | | | Estado |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | M _{xx} (kN-m) | M _{yy} (kN-m) | Q _x (kN) | Q _y (kN) | |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 45.2 | 90.7 | N.P. ⁽²⁾ | Cumple | 90.7 | G, T, V, R ⁽³⁾ | Q | 841.0 | 1210.5 | -417.4 | 57.8 | -167.5 | Cumple |
| | | Pie | Cumple | Cumple | 44.0 | 18.6 | N.P. ⁽²⁾ | Cumple | 44.0 | G, Q, T, V, R ⁽⁴⁾ | N,M | 2086.0 | 1515.2 | -434.2 | 60.1 | -209.7 | |
| | | | | | | | | | | G, T, V, R ⁽³⁾ | Q | 940.6 | 0.0 | 0.0 | 57.8 | -167.5 | Cumple |
| CIMENTACIÓN | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 7.3 | 18.6 | N.P. ⁽¹⁾ | Cumple | 18.6 | G, Q, T, V, R ⁽⁴⁾ | Q | 2220.5 | 0.0 | 0.0 | 60.1 | -209.7 | |
| | | | | | | | | | | G, Q, T, R ⁽³⁾ | N,M | 2780.7 | 0.0 | 0.0 | 7.2 | -97.0 | |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ PP+CM1+1.5.T2+0.9.V1+1.35.R1 ⁽⁴⁾ 1.35.PP+1.35.CM1+1.05.Q1+1.5.T2+0.9.V1+1.35.R1 ⁽⁵⁾ 1.35.PP+1.35.CM1+1.5.Q1+0.9.T1+R1 | | | | | | | | | | | | | | | | | |

1.1.1.1.3.- PP3

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|--|----------------|----------|------------------------------|---------------------|--------|---------|---------------------|--------|------------|-------------------------------|-------|--------|------------------------|------------------------|---------------------|---------------------|--------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos p _s imos | | | | | | | Estado |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | M _{xx} (kN-m) | M _{yy} (kN-m) | O _x (kN) | O _y (kN) | |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 44.6 | 84.1 | N.P. ⁽²⁾ | Cumple | 84.1 | G, T, R ⁽³⁾ | Q | 434.2 | 1073.8 | -298.7 | 41.3 | -148.6 | Cumple |
| | | | G, Q, T, V, R ⁽⁴⁾ | N,M | 1070.8 | 1287.4 | -354.8 | 49.1 | -178.2 | | | | | | | | |
| | | Pie | Cumple | Cumple | 43.2 | 9.9 | N.P. ⁽²⁾ | Cumple | 43.2 | G, Q, T, R ⁽³⁾ | Q | 1013.3 | 0.0 | 0.0 | 46.5 | -171.6 | Cumple |
| | | | G, Q, T, V, R ⁽⁴⁾ | N,M | 1484.0 | 0.0 | 0.0 | 19.9 | -69.6 | | | | | | | | |
| CIMENTACIÓN | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 6.2 | 9.9 | N.P. ⁽¹⁾ | Cumple | 9.9 | G, Q, T, V, R ⁽⁴⁾ | Q | 1205.3 | 0.0 | 0.0 | 49.1 | -178.2 | Cumple |
| | | | G, Q, T, V, R ⁽⁴⁾ | N,M | 1484.0 | 0.0 | 0.0 | 19.9 | -69.6 | | | | | | | | |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ PP+CM1+1.5.T2+1.35.R1 ⁽⁴⁾ 1.35.PP+1.35.CM1+1.05.Q1+1.5.T2+0.9.V1+1.35.R1 ⁽⁵⁾ PP+1.35.CM1+1.05.Q1+1.5.T2+1.35.R1 ⁽⁶⁾ 1.35.PP+1.35.CM1+1.5.Q1+0.9.T1+0.9.V1+R1 | | | | | | | | | | | | | | | | | |



Listados

CALCULADO DATOS OK

Fecha: 29/11/15

1.1.1.1.4.- PP4

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|--|----------------|----------|---------------------|---------------------|-------|---------|---------------------|--------|------------------------------|------------------------------|-------|--------|------------|------------|---------|--------|---------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | Esfuerzos p ^{simos} | | | | | | | Estado | |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | Ox (kN) | | Oy (kN) |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 19.1 | 47.9 | N.P. ⁽²⁾ | Cumple | 47.9 | G, Q, R, S ⁽³⁾ | Q S. | 1943.3 | -575.6 | 319.9 | -44.3 | 79.7 | Cumple |
| | | | | | | | | | | G, Q, T, V, R ⁽⁴⁾ | N,M | 3547.8 | -698.0 | 170.7 | -25.1 | 96.6 | |
| | | Pie | Cumple | Cumple | 18.7 | 29.4 | N.P. ⁽²⁾ | Cumple | 29.4 | G, Q, R, S ⁽³⁾ | Q S. | 2043.0 | 0.0 | 0.0 | -44.3 | 79.7 | Cumple |
| | | | | | | | | | | G, Q, T, V, R ⁽⁴⁾ | N,M | 3905.4 | 0.0 | 0.0 | 5.8 | 23.2 | |
| CIMENTACIÓN | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 3.4 | 30.1 | N.P. ⁽¹⁾ | Cumple | 30.1 | G, Q, T, R ⁽⁵⁾ | Q | 3134.6 | 0.0 | 0.0 | -24.9 | 95.8 | Cumple |
| | | | | | | | | | | G, Q, T, V, R ⁽⁵⁾ | N,M | 3905.4 | 0.0 | 0.0 | 5.8 | 23.2 | |
| Notas: | | | | | | | | | | | | | | | | | |
| ⁽¹⁾ La comprobación no procede | | | | | | | | | | | | | | | | | |
| ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. | | | | | | | | | | | | | | | | | |
| ⁽³⁾ PP+CM1+0.6-Q1+R1-SX-0.3-SY | | | | | | | | | | | | | | | | | |
| ⁽⁴⁾ 1.35-PP+1.35-CM1+1.5-Q1+0.9-T1+0.9-V1+R1 | | | | | | | | | | | | | | | | | |
| ⁽⁵⁾ 1.35-PP+1.35-CM1+1.5-Q1+0.9-T2+0.9-V1+1.35-R1 | | | | | | | | | | | | | | | | | |
| ⁽⁶⁾ 1.35-PP+1.35-CM1+1.05-Q1+1.5-T1-R1 | | | | | | | | | | | | | | | | | |

1.1.1.1.5.- PP2

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|---|----------------|----------|---------------------|---------------------|-------|----------|---------------------|--------|------------|------------------------------|-------|--------|------------|------------|---------|--------|---------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos p ^{simos} | | | | | | Estado | |
| | | | Disp. | Arm. | Q (%) | N, M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | Qx (kN) | | Qy (kN) |
| PASARELA (70.9 - 848.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 42.7 | 79.2 | N.P. ⁽²⁾ | Cumple | 79.2 | G, Q, T, R ⁽³⁾ | Q,N,M | 1063.5 | 42.6 | 1305.1 | -178.2 | -5.8 | Cumple |
| | | Pie | Cumple | Cumple | 41.2 | 8.0 | N.P. ⁽²⁾ | Cumple | 41.2 | G, Q, T, R ⁽³⁾ | Q,N,M | 1200.0 | 0.0 | 0.0 | -178.2 | -5.8 | Cumple |
| CIMENTACIÓN | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 6.0 | 8.0 | N.P. ⁽¹⁾ | Cumple | 8.0 | G, Q, T, R ⁽³⁾ | Q,N,M | 1200.0 | 0.0 | 0.0 | -178.2 | -5.8 | Cumple |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ 1.35-PP+1.35-CM1+1.5-Q1+0.9-T1+R1 | | | | | | | | | | | | | | | | | |

1.1.1.1.6.- PP1

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|--|----------------|----------|---------------------|---------------------|--------|---------|---------------------|---------------------|------------|------------------------------|---------------------------|--------|------------|------------|---------|---------|--------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos p ^{simos} | | | | | | | Estado |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | Qx (kN) | Qy (kN) | |
| | | | Cabeza | Cumple | Cumple | 50.2 | 49.0 | N.P. ⁽²⁾ | Cumple | 50.2 | G, Q, T, R ⁽³⁾ | Q,N,M | 1454.2 | -155.6 | 2219.8 | -303.0 | |
| PASARELA (70.9 - 848.4 cm) | 150x75 | Pie | Cumple | Cumple | 47.9 | 6.3 | N.P. ⁽²⁾ | Cumple | 47.9 | G, Q, T, R ⁽³⁾ | Q | 1727.1 | 0.0 | 0.0 | -303.0 | 21.2 | Cumple |
| | | | | | | | | | | G, Q, T, V, R ⁽⁴⁾ | N,M | 1727.5 | 0.0 | 0.0 | -303.0 | 21.4 | |
| CIMENTACION | 150x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 5.5 | 6.4 | N.P. ⁽¹⁾ | Cumple | 6.4 | G, Q, T, R ⁽³⁾ | Q | 1727.1 | 0.0 | 0.0 | -303.0 | 21.2 | Cumple |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ 1.35-PP+1.35-CM1+1.5-Q1+0.9-T1+R1 ⁽⁴⁾ 1.35-PP+1.35-CM1+1.5-Q1+0.9-T1+0.9-V1+R1 | | | | | | | | | | | | | | | | | |

1.1.1.1.7.- PP9

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|---|----------------|----------|---------------------|---------------------|-------|---------|---------------------|--------|------------|------------------------------|-------------|--------|------------|------------|---------|---------|--------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos pésimos | | | | | | | Estado |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | Qx (kN) | Qy (kN) | |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 33.6 | 81.9 | N.P. ⁽²⁾ | Cumple | 81.9 | G, Q, R, S ⁽³⁾ | Q S.,N,M S. | 138.1 | -696.9 | -92.7 | 12.8 | 96.5 | Cumple |
| | | Pie | Cumple | Cumple | 32.4 | 4.3 | N.P. ⁽²⁾ | Cumple | 32.4 | G, Q, R, S ⁽³⁾ | Q S. | 237.8 | 0.0 | 0.0 | 12.8 | 96.5 | Cumple |
| CIMENTACION | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 3.5 | 4.4 | N.P. ⁽¹⁾ | Cumple | 4.4 | G, Q, T, V, R ⁽⁵⁾ | Q | 457.5 | 0.0 | 0.0 | 8.0 | 91.4 | Cumple |
| | | | | | | | | | | G, Q, T, R ⁽⁴⁾ | N,M | 570.8 | 0.0 | 0.0 | 0.9 | 55.4 | |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ PP+CM1+0.6-Q1+R1-SX+0.3-SY ⁽⁴⁾ 1.35-PP+1.35-CM1+1.5-Q1+0.9-T1+R1 ⁽⁵⁾ 1.35-PP+1.35-CM1+1.05-Q1+1.5-T2+0.9-V1+1.35-R1 | | | | | | | | | | | | | | | | | |

1.1.1.1.8.- PP7

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|--|----------------|----------|---------------------|---------------------|-------|---------|---------------------|--------|-------------------|------------------------------|-------|--------|------------|------------|--------|---------|---------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | Esfuerzos pésimos | | | | | | Estado | | |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | | Qx (kN) | Qy (kN) |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 29.1 | 70.9 | N.P. ⁽²⁾ | Cumple | 70.9 | G, Q, R, S ⁽³⁾ | Q S. | 1792.8 | -894.1 | -377.4 | 52.2 | 123.8 | Cumple |
| | | | | | | | | | | G, Q, T, V, R ⁽⁴⁾ | N,M | 2850.7 | -963.8 | -375.2 | 51.9 | 133.4 | |
| | | Pie | Cumple | Cumple | 28.4 | 27.0 | N.P. ⁽²⁾ | Cumple | 28.4 | G, Q, R, S ⁽³⁾ | Q S. | 1892.4 | 0.0 | 0.0 | 52.2 | 123.8 | Cumple |
| | | | | | | | | | | G, Q, T, V, R ⁽⁵⁾ | N,M | 3585.6 | 0.0 | 0.0 | 30.4 | 100.7 | |
| CIMENTACIÓN | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 5.0 | 27.6 | N.P. ⁽¹⁾ | Cumple | 27.6 | G, Q, T, V, R ⁽⁶⁾ | Q | 2985.2 | 0.0 | 0.0 | 51.9 | 133.4 | Cumple |
| | | | | | | | | | | G, Q, T, V, R ⁽⁵⁾ | N,M | 3585.6 | 0.0 | 0.0 | 30.4 | 100.7 | |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ PP+CM1+0.6-Q1+R1+SX+0.3-SY ⁽⁴⁾ 1.35-PP+1.35-CM1+1.05-Q1+1.5-T2+0.9-V1+1.35-R1 ⁽⁵⁾ 1.35-PP+1.35-CM1+1.5-Q1+0.9-T1+0.9-V1+R1 | | | | | | | | | | | | | | | | | |



1.1.1.1.9.- PP8

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|--|----------------|----------|------------------------------|---------------------|--------|---------|---------------------|--------|-------------------|------------------------------|-------|--------|------------|------------|--------|---------|---------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | Esfuerzos pésimos | | | | | | Estado | | |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN·m) | Myy (kN·m) | | Qx (kN) | Oy (kN) |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 27.4 | 60.3 | N.P. ⁽²⁾ | Cumple | 60.3 | G, Q, R, S ⁽³⁾ | Q S. | 802.6 | 698.1 | 138.0 | -19.1 | -96.6 | Cumple |
| | | | G, Q, R, S ⁽³⁾ | N,M S. | 802.6 | 698.1 | 138.0 | -19.1 | -96.6 | Cumple | | | | | | | |
| | | Pie | Cumple | Cumple | 26.7 | 12.8 | N.P. ⁽²⁾ | Cumple | 26.7 | G, Q, R, S ⁽³⁾ | Q S. | 902.3 | 0.0 | 0.0 | -19.1 | -96.6 | Cumple |
| | | | G, Q, T, V, R ⁽⁴⁾ | N,M | 1708.0 | 0.0 | 0.0 | -3.3 | -60.5 | Cumple | | | | | | | |
| CIMENTACIÓN | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 3.3 | 13.1 | N.P. ⁽¹⁾ | Cumple | 13.1 | G, Q, R, S ⁽³⁾ | Q S. | 902.3 | 0.0 | 0.0 | -19.1 | -96.6 | Cumple |
| | | | | | | | | | | G, Q, T, V, R ⁽⁴⁾ | N,M | 1708.0 | 0.0 | 0.0 | -3.3 | -60.5 | Cumple |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ PP+CM1+0.6-Q1+R1-SX-0.3-SY ⁽⁴⁾ 1.35-PP+1.35-CM1+1.5-Q1+0.9-T2+0.9-V1+1.35-R1 | | | | | | | | | | | | | | | | | |

1.1.1.1.10.- PP10

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|---|----------------|----------|---------------------|---------------------|-------|---------|---------------------|--------|------------|-------------------------------|-------------|--------|------------|------------|---------|--------|---------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos p _s imos | | | | | | Estado | |
| | | | Disp. | Arm. | Q (%) | N M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | Ox (kN) | | Oy (kN) |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 25.5 | 55.2 | N.P. ⁽²⁾ | Cumple | 55.2 | G, Q, R, S ⁽³⁾ | Q S.,N,M S. | 1622.4 | 783.5 | 237.0 | -32.8 | -108.4 | Cumple |
| | | Pie | Cumple | Cumple | 24.9 | 24.7 | N.P. ⁽²⁾ | Cumple | 24.9 | G, Q, R, S ⁽³⁾ | Q S. | 1722.0 | 0.0 | 0.0 | -32.8 | -108.4 | Cumple |
| | | | | | | | | | | G, Q, T, R ⁽⁴⁾ | N,M | 3281.5 | 0.0 | 0.0 | -6.0 | -86.0 | |
| CIMENTACIÓN | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 3.8 | 25.3 | N.P. ⁽¹⁾ | Cumple | 25.3 | G, Q, R, S ⁽³⁾ | Q S. | 1722.0 | 0.0 | 0.0 | -32.8 | -108.4 | Cumple |
| | | | | | | | | | | G, Q, T, R ⁽⁴⁾ | N,M | 3281.5 | 0.0 | 0.0 | -6.0 | -86.0 | |
| Notas: (1) La comprobación no procede (2) Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. (3) PP+CM1+0.6-Q1+R1-SX-0.3-SY (4) 1.35-PP+1.35-CM1+1.5-Q1+0.9-T2+1.35-R1 | | | | | | | | | | | | | | | | | |

1.1.1.1.11.- PP13

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|---|----------------|----------|---------------------|---------------------|-------|---------|---------------------|--------|------------|---------------------------|-------------|--------|------------|------------|---------|--------|---------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos pésimos | | | | | | Estado | |
| | | | Disp. | Arm. | Q (%) | N.M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | Qx (kN) | | Qy (kN) |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 24.6 | 53.2 | N.P. ⁽²⁾ | Cumple | 53.2 | G, Q, R, S ⁽³⁾ | Q S.,N,M S. | 1681.0 | 766.6 | -235.4 | 32.6 | -106.1 | Cumple |
| | | Pie | Cumple | Cumple | 24.1 | 25.4 | N.P. ⁽²⁾ | Cumple | 25.4 | G, Q, R, S ⁽³⁾ | Q S. | 1780.7 | 0.0 | 0.0 | 32.6 | -106.1 | Cumple |
| CIMENTACION | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 3.7 | 25.9 | N.P. ⁽¹⁾ | Cumple | 25.9 | G, Q, R, S ⁽³⁾ | Q S. | 1780.7 | 0.0 | 0.0 | 32.6 | -106.1 | Cumple |
| | | | | | | | | | | G, Q, T, R ⁽⁴⁾ | N,M | 3370.7 | 0.0 | 0.0 | 9.7 | -82.0 | |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ PP+CM1+0.6-Q1+R1+5X+0.3-SY ⁽⁴⁾ 1.35-PP+1.35-CM1+1.5-Q1+0.9-T2+1.35-R1 | | | | | | | | | | | | | | | | | |

1.1.1.1.12.- PP11

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|--|----------------|----------|---------------------|---------------------|-------|---------|---------------------|--------|------------|------------------------------|-------------|--------|------------|------------|---------|--------|---------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos pésimos | | | | | | Estado | |
| | | | Disp. | Arm. | Q (%) | N.M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | Ox (kN) | | Oy (kN) |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 25.0 | 53.8 | N.P. ⁽²⁾ | Cumple | 53.8 | G, Q, R, S ⁽³⁾ | Q S.,N,M S. | 730.0 | 609.6 | -177.4 | 24.5 | -84.4 | Cumple |
| | | Pie | Cumple | Cumple | 24.3 | 11.4 | N.P. ⁽²⁾ | Cumple | 24.3 | G, Q, R, S ⁽³⁾ | Q S. | 829.6 | 0.0 | 0.0 | 24.5 | -84.4 | Cumple |
| | | | | | | | | | | G, Q, T, V, R ⁽⁴⁾ | N,M | 1516.8 | 0.0 | 0.0 | -2.8 | -49.2 | |
| CIMENTACION | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 2.9 | 11.7 | N.P. ⁽¹⁾ | Cumple | 11.7 | G, Q, R, S ⁽³⁾ | Q S. | 829.6 | 0.0 | 0.0 | 24.5 | -84.4 | Cumple |
| | | | | | | | | | | G, Q, T, V, R ⁽⁴⁾ | N,M | 1516.8 | 0.0 | 0.0 | -2.8 | -49.2 | |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ PP+CM1+0.6-Q1+R1-SX+0.3-SY ⁽⁴⁾ 1.35-PP+1.35-CM1+1.5-Q1+0.9-T2+0.9-V1+1.35-R1 | | | | | | | | | | | | | | | | | |

1.1.1.1.13.- PP12

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|--|----------------|----------|---------------------|---------------------|-------|---------|---------------------|--------|------------|------------------------------|------------------------------|--------|------------|------------|---------|--------|---------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos pésimos | | | | | | Estado | |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | Qx (kN) | | Oy (kN) |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 29.0 | 72.6 | N.P. ⁽²⁾ | Cumple | 72.6 | G, Q, R, S ⁽³⁾ | Q S. | 1975.8 | -931.6 | 386.0 | -53.4 | 128.9 | Cumple |
| | | | | | | | | | | | G, Q, T, R ⁽⁴⁾ | N,M | 3686.2 | -1015.8 | 392.6 | -54.3 | |
| | | Pie | Cumple | Cumple | 28.4 | 29.2 | N.P. ⁽²⁾ | Cumple | 29.2 | G, Q, R, S ⁽³⁾ | Q S. | 2075.4 | 0.0 | 0.0 | -53.4 | 128.9 | Cumple |
| | | | | | | | | | | | G, Q, T, V, R ⁽⁵⁾ | N,M | 3884.8 | 0.0 | 0.0 | -37.1 | |
| CIMENTACIÓN | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 5.0 | 29.9 | N.P. ⁽¹⁾ | Cumple | 29.9 | G, Q, T, R ⁽⁴⁾ | Q | 3262.7 | 0.0 | 0.0 | -55.2 | 135.7 | Cumple |
| | | | | | | | | | | G, Q, T, V, R ⁽⁵⁾ | N,M | 3884.8 | 0.0 | 0.0 | -37.1 | 111.2 | |
| Notas: | | | | | | | | | | | | | | | | | |
| ⁽¹⁾ La comprobación no procede | | | | | | | | | | | | | | | | | |
| ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. | | | | | | | | | | | | | | | | | |
| ⁽³⁾ PP+CM1+0.6-Q1+R1-SX-0.3-SY | | | | | | | | | | | | | | | | | |
| ⁽⁴⁾ 1.35-PP+1.35-CM1+1.5-Q1+0.9-T2+1.35-R1 | | | | | | | | | | | | | | | | | |
| ⁽⁵⁾ 1.35-PP+1.35-CM1+1.5-Q1+0.9-T1+0.9-V1+R1 | | | | | | | | | | | | | | | | | |
| ⁽⁶⁾ 1.35-PP+1.35-CM1+1.05-Q1+1.5-T2+1.35-R1 | | | | | | | | | | | | | | | | | |



1.1.1.1.14.- PP14

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|---|----------------|----------|---------------------|---------------------|-------|---------|---------------------|--------|------------|--|-------------|----------------|------------|------------|---------------|---------------|---------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos pésimos | | | | | | Estado | |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | Ox (kN) | | Oy (kN) |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 35.5 | 85.8 | N.P. ⁽²⁾ | Cumple | 85.8 | G, Q, R, S ⁽³⁾ | Q S.,N,M S. | 299.0 | -757.6 | 205.2 | -28.4 | 104.9 | Cumple |
| | | Pie | Cumple | Cumple | 34.3 | 5.8 | N.P. ⁽²⁾ | Cumple | 34.3 | G, Q, R, S ⁽³⁾ G, Q, T, R ⁽⁴⁾ | Q S. N,M | 398.7 776.1 | 0.0 0.0 | 0.0 0.0 | -28.4 -8.5 | 104.9 76.0 | Cumple |
| CIMENTACIÓN | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 4.0 | 6.0 | N.P. ⁽¹⁾ | Cumple | 6.0 | G, Q, T, R ⁽⁵⁾ | Q | 747.9 | 0.0 | 0.0 | -12.1 | 103.6 | Cumple |
| | | | | | | | | | | G, Q, T, R ⁽⁴⁾ | N,M | 776.1 | 0.0 | 0.0 | -8.5 | 76.0 | |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ PP+CM1+0.6 Q1+R1-SX-0.3 SY ⁽⁴⁾ 1.35 PP+1.35 CM1+1.5 Q1+0.9 T1+R1 ⁽⁵⁾ 1.35 PP+1.35 CM1+1.5 Q1+0.9 T2+1.35 R1 | | | | | | | | | | | | | | | | | |

1.1.1.1.15.- PP15

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|---|----------------|----------|---------------------|---------------------|-------|---------|---------------------|--------|------------------------------|------------------------------|-------|--------|------------|------------|---------|--------|---------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | Esfuerzos p ^{simos} | | | | | | | Estado | |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | Ox (kN) | | Oy (kN) |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 18.8 | 49.2 | N.P. ⁽²⁾ | Cumple | 49.2 | G, R, S ⁽³⁾ | Q S. | 1659.1 | -351.6 | 495.8 | -68.6 | 48.7 | Cumple |
| | | | | | | | | | | | | | | | | | |
| | | Pie | Cumple | Cumple | 18.3 | 31.7 | N.P. ⁽²⁾ | Cumple | 31.7 | G, R, S ⁽³⁾ | Q S. | 1758.7 | 0.0 | 0.0 | -68.6 | 48.7 | Cumple |
| | | | | | | | | | | | | | | | | | |
| CIMENTACIÓN | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 3.3 | 32.4 | N.P. ⁽¹⁾ | Cumple | 32.4 | G, Q, T, V, R ⁽⁴⁾ | Q | 3397.2 | 0.0 | 0.0 | 35.1 | 89.8 | Cumple |
| | | | | | | | | | | | | | | | | | |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ PP+CM1+R1-SX-0.3-SY ⁽⁴⁾ 1.35 PP+1.35 CM1+1.5-Q1+0.9-T1+0.9-V1+R1 ⁽⁵⁾ 1.35 PP+1.35 CM1+1.5-Q1+0.9-T2+1.35-R1 ⁽⁶⁾ 1.35 PP+1.35 CM1+1.05-Q1+1.5-T1+0.9-V1+R1 | | | | | | | | | | | | | | | | | |

1.1.1.1.16.- PP16

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|---|----------------|----------|---------------------|---------------------|-------|---------|---------------------|--------|------------|---|----------|-----------------|------------|------------|----------------|-----------------|--------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos pésimos | | | | | | | Estado |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | Qx (kN) | Qy (kN) | |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 45.3 | 85.0 | N.P. ⁽²⁾ | Cumple | 85.0 | G, Q, T, R ⁽³⁾ | Q,N,M | 906.4 | 1242.4 | 403.1 | -55.8 | -172.0 | Cumple |
| | | Pie | Cumple | Cumple | 43.7 | 8.6 | N.P. ⁽²⁾ | Cumple | 43.7 | G, Q, T, R ⁽⁴⁾ G, Q, T, V, R ⁽⁵⁾ | Q N,M | 871.5 1292.7 | 0.0 0.0 | 0.0 0.0 | -54.0 -13.7 | -164.3 -78.2 | Cumple |
| CIMENTACIÓN | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 6.1 | 8.6 | N.P. ⁽¹⁾ | Cumple | 8.6 | G, Q, T, R ⁽⁵⁾ | Q | 1041.0 | 0.0 | 0.0 | -55.8 | -172.0 | Cumple |
| | | | | | | | | | | G, Q, T, V, R ⁽⁵⁾ | N,M | 1292.7 | 0.0 | 0.0 | -13.7 | -78.2 | |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ 1.35 PP+1.35 CM1+1.05 Q1+1.5 T2+1.35 R1 ⁽⁴⁾ PP+1.35 CM1+1.05 Q1+1.5 T2+1.35 R1 ⁽⁵⁾ 1.35 PP+1.35 CM1+1.5 Q1+0.9 T1+0.9 V1+R1 | | | | | | | | | | | | | | | | | |

1.1.1.1.17.- PP18

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|--|----------------|----------|---------------------|---------------------|-------|---------|---------------------|--------|------------|------------------------------|-------|--------|------------|------------|---------|--------|---------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos p ^{simos} | | | | | | Estado | |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | Qx (kN) | | Qy (kN) |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 41.7 | 95.7 | N.P. ⁽²⁾ | Cumple | 95.7 | G, T, R ⁽³⁾ | Q | 1253.9 | 1157.7 | 634.3 | -87.8 | -160.2 | Cumple |
| | | | | | | | | | | | | | | | | | |
| | | Pie | Cumple | Cumple | 40.6 | 23.7 | N.P. ⁽²⁾ | Cumple | 40.6 | G, T, R ⁽³⁾ | Q | 1353.6 | 0.0 | 0.0 | -87.8 | -160.2 | Cumple |
| | | | | | | | | | | | | | | | | | |
| CIMENTACIÓN | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 7.8 | 23.7 | N.P. ⁽¹⁾ | Cumple | 23.7 | G, Q, T, R ⁽⁴⁾ | Q | 2982.7 | 0.0 | 0.0 | -105.9 | -207.9 | Cumple |
| | | | | | | | | | | | | | | | | | |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ PP+CM1+1.5-T2+1.35-R1 ⁽⁴⁾ 1.35-PP+1.35-CM1+1.05-Q1+1.5-T2+1.35-R1 ⁽⁵⁾ 1.35-PP+1.35-CM1+1.5-Q1+0.9-T1+0.9-V1+R1 | | | | | | | | | | | | | | | | | |

1.1.1.1.18.- PP17

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|---|----------------|----------|---------------------|---------------------|-------|---------|---------------------|--------|------------|--|-------------|----------------|------------|------------|----------------|----------------|--------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos p ^{simos} | | | | | | | Estado |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | Qx (kN) | Oy (kN) | |
| PASARELA (70.9 - 858.4 cm) | 75x75 | Cabeza | Cumple | Cumple | 35.9 | 85.1 | N.P. ⁽²⁾ | Cumple | 85.1 | G, Q, R, S ⁽³⁾ | Q S.,N,M S. | 72.8 | -398.6 | 615.9 | -85.2 | 55.2 | Cumple |
| | | Pie | Cumple | Cumple | 34.6 | 5.9 | N.P. ⁽²⁾ | Cumple | 34.6 | G, Q, R, S ⁽³⁾ G, Q, T, R ⁽⁴⁾ | Q S. N,M | 172.5 786.2 | 0.0 0.0 | 0.0 0.0 | -85.2 -45.4 | 55.2 -10.3 | Cumple |
| CIMENTACIÓN | 75x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 3.4 | 6.1 | N.P. ⁽¹⁾ | Cumple | 6.1 | G, T, R ⁽⁵⁾ G, Q, T, R ⁽⁴⁾ | Q N,M | 367.7 786.2 | 0.0 0.0 | 0.0 0.0 | -60.0 -45.4 | -67.0 -10.3 | Cumple |
| | | | | | | | | | | | | | | | | | |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ PP+CM1+0.6-Q1+R1+5X+0.3-SY ⁽⁴⁾ 1.35 PP+1.35 CM1+1.5-Q1+0.9-T2+1.35-R1 ⁽⁵⁾ PP+CM1+1.5-T2+1.35-R1 | | | | | | | | | | | | | | | | | |



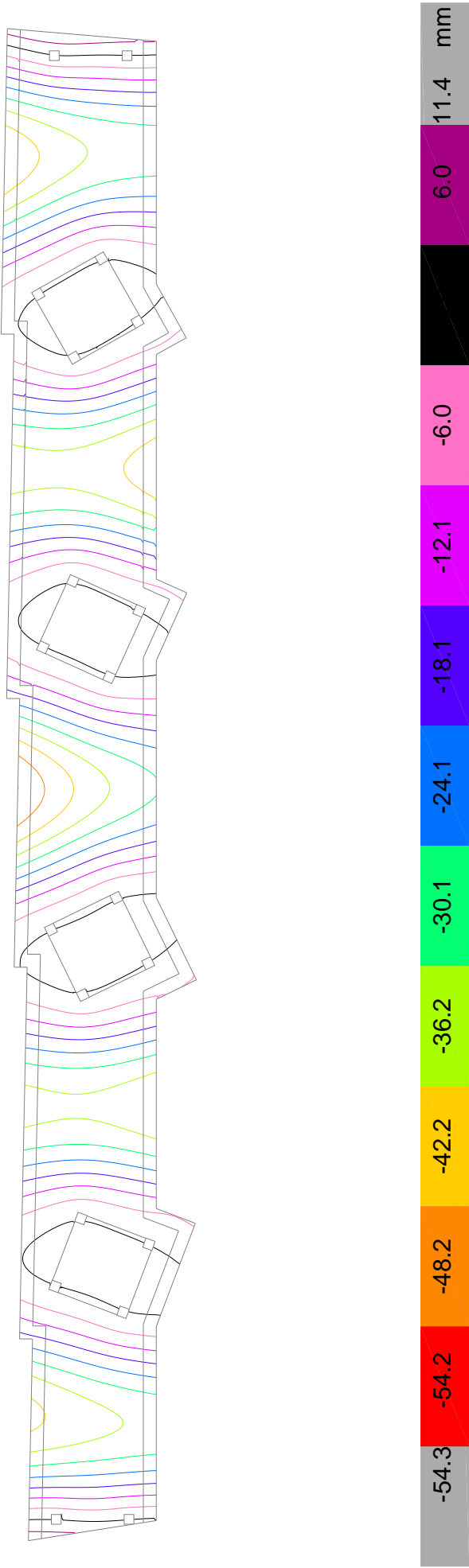
1.1.1.1.19.- PP20

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|--|----------------|----------|---------------------|---------------------|-------|---------|---------------------|--------|------------|------------------------------|-------|--------|------------|------------|---------|---------|--------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos pésimos | | | | | | | Estado |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN·m) | Myy (kN·m) | Qx (kN) | Qy (kN) | |
| PASARELA (70.9 - 848.4 cm) | 110x75 | Cabeza | Cumple | Cumple | 46.6 | 62.4 | N.P. ⁽²⁾ | Cumple | 62.4 | G, Q, T, V, R ⁽³⁾ | Q | 1693.5 | -328.2 | -1879.5 | 256.6 | 44.8 | Cumple |
| | | | | | | | | | | G, Q, T, R ⁽⁴⁾ | N,M | 1693.4 | -328.5 | -1879.4 | 256.6 | 44.9 | |
| | | Pie | Cumple | Cumple | 44.8 | 9.1 | N.P. ⁽²⁾ | Cumple | 44.8 | G, Q, T, V, R ⁽³⁾ | Q,N,M | 1893.6 | 0.0 | 0.0 | 256.6 | 44.8 | |
| CIMENTACIÓN | 110x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 6.1 | 9.1 | N.P. ⁽¹⁾ | Cumple | 9.1 | G, Q, T, V, R ⁽³⁾ | Q,N,M | 1893.6 | 0.0 | 0.0 | 256.6 | 44.8 | Cumple |
| Notas: ⁽¹⁾ La comprobación no procede ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. ⁽³⁾ 1.35 PP+1.35 CM1+1.5 Q1+0.9 T1+0.9 V1+R1 ⁽⁴⁾ 1.35 PP+1.35 CM1+1.5 Q1+0.9 T1+R1 | | | | | | | | | | | | | | | | | |

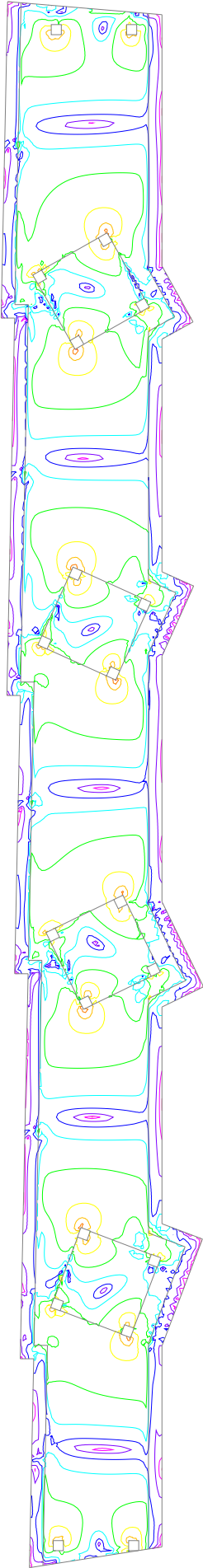
1.1.1.1.20.- PP19

| Sección de hormigón | | | | | | | | | | | | | | | | | |
|--|----------------|----------|---------------------------|---------------------|--------|---------|---------------------|--------|------------|------------------------------|-------|--------|------------|------------|---------|---------|--------|
| Tramo | Dimensión (cm) | Posición | Comprobaciones | | | | | | | Esfuerzos pésimos | | | | | | | Estado |
| | | | Disp. | Arm. | Q (%) | N,M (%) | Disp. S. | Cap. | Aprov. (%) | Naturaleza | Comp. | N (kN) | Mxx (kN-m) | Myy (kN-m) | Qx (kN) | Qy (kN) | |
| PASARELA (70.9 - 848.4 cm) | 165x75 | Cabeza | Cumple | Cumple | 46.4 | 38.3 | N.P. ⁽²⁾ | Cumple | 46.4 | G, Q, T, V, R ⁽³⁾ | Q | 1941.0 | 256.2 | -2367.7 | 323.2 | -35.0 | Cumple |
| | | | G, Q, R, S ⁽⁴⁾ | N,M S. | 836.4 | 910.4 | -1061.2 | 144.9 | -124.3 | Cumple | | | | | | | |
| | | Pie | Cumple | Cumple | 44.2 | 7.5 | N.P. ⁽²⁾ | Cumple | 44.2 | G, Q, T, V, R ⁽³⁾ | Q | 2241.1 | 0.0 | 0.0 | 323.2 | -35.0 | Cumple |
| | | | G, Q, T, R ⁽⁵⁾ | N,M | 2241.2 | 0.0 | 0.0 | 323.2 | -34.9 | Cumple | | | | | | | |
| CIMENTACIÓN | 165x75 | Arranque | N.P. ⁽¹⁾ | N.P. ⁽¹⁾ | 5.0 | 7.5 | N.P. ⁽¹⁾ | Cumple | 7.5 | G, Q, T, V, R ⁽³⁾ | Q | 2241.1 | 0.0 | 0.0 | 323.2 | -35.0 | Cumple |
| | | | | | | | | | | G, Q, T, R ⁽⁵⁾ | N,M | 2241.2 | 0.0 | 0.0 | 323.2 | -34.9 | |
| Notas: | | | | | | | | | | | | | | | | | |
| ⁽¹⁾ La comprobación no procede | | | | | | | | | | | | | | | | | |
| ⁽²⁾ Debido a las características de aceleración sísmica de la zona, no se realiza ninguna comprobación en cuanto a criterios de diseño por sismo para estructuras de hormigón armado. | | | | | | | | | | | | | | | | | |
| ⁽³⁾ 1.35 PP+1.35 CM1+1.5 Q1+0.9 T1+0.9 V1+R1 | | | | | | | | | | | | | | | | | |
| ⁽⁴⁾ PP+CM1+0.6 Q1+R1-0.3 SX-SY | | | | | | | | | | | | | | | | | |
| ⁽⁵⁾ 1.35 PP+1.35 CM1+1.5 Q1+0.9 T1+R1 | | | | | | | | | | | | | | | | | |

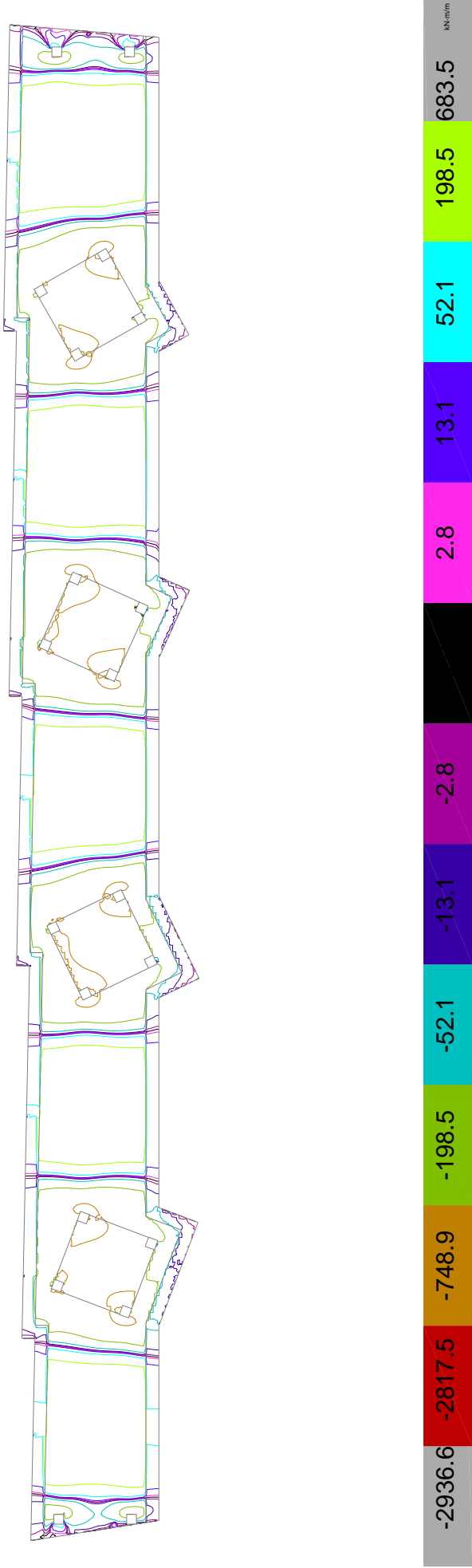
Planta 1, Desplazamiento Z (mm), PP+CM+Qa



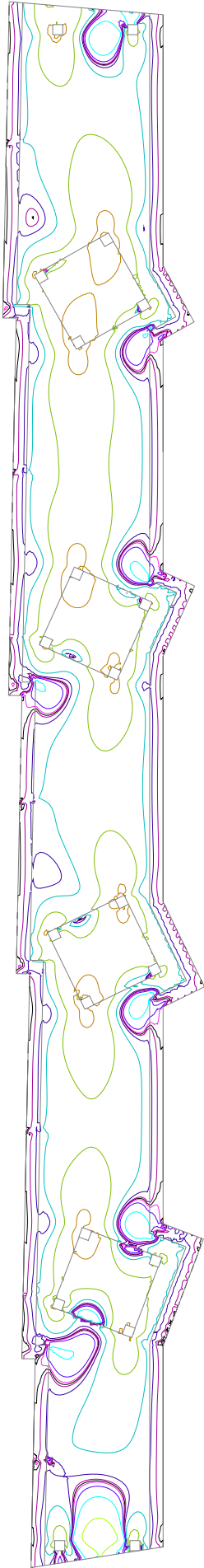
Planta 1, Cortante total (kN/m) , 1.35·PP+1.35·CM+1.5·Qa



Planta 1, Momento X (kN·m/m), 1.35·PP+1.35·CM+1.5·Qa



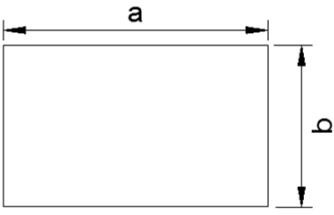
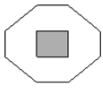

Planta 1, Momento Y (kN·m/m) , 1.35·PP+1.35·CM+1.5·Qa



| NB35 INGENIERÍA | | Refuerzo de punzonamiento en pilar cuadrado o rectangular de esquina | |
|---------------------|------------------------------|---|--------------------------|
| DATOS | | COMPROBACIONES | RESULTADOS |
| $F_{sd} =$ | 255,00 t | | |
| $\beta =$ | 1,5 | $F_{sd,ef} =$ | 382,50 t |
| $c_1 =$ | 0,85 m | | |
| $c_2 =$ | 0,85 m | | |
| $d =$ | 0,39 m | [1] $V_{u1} > F_{sd,ef}$ | $u_0 =$ 1,17 m |
| $f_{ck} =$ | 45 MPa | $V_{u1} =$ | 410,67 t |
| $f_{yd,d} =$ | 4 t/cm ² | | VALE |
| $\rho =$ | 3 ‰ | [2] $\tau_{rd} \cdot u_1 \cdot d < F_{sd,ef}$ | $\xi =$ 1,72 |
| $\alpha =$ | 90 ° | $\tau_{rd} \cdot u_1 \cdot d =$ | 57,34 t |
| $\theta =$ | 45 ° | | ARMAR |
| $s =$ | 0,15 m < 0,293 m | $V_{cu} =$ | 57,34 t |
| $S_{cara\ pilar} =$ | 0,10 m < 0,195 m | $V_{su} =$ | 325 t |
| $n =$ | 28 ramas/1ª fila | $u_{n,ef} =$ | 9,23 m |
| | | $A_a =$ | 232 cm ² /m |
| | | $A_{sw} =$ | 35 cm ² /fila |
| | | $\rho_{critico} =$ | 15,64 ‰ |
| | $L =$ | 4,54 m | |
| | $Sup =$ | 1,24 cm ² | |
| | $\phi_{ramas} =$ | Ø16 | |
| | 31 filas Ø16 a cara de pilar | | |
| | $L =$ | 2,98 m | |
| | $Sup =$ | 1,24 cm ² | |
| | $\phi_{ramas} =$ | Ø16 | |
| | 21 filas Ø16 a cara de pilar | | |

| DATOS | | COMPROBACIONES | | RESULTADOS | |
|---------------------|---------------------|---|---------------------------------|--------------------|--------------------------|
| $F_{sd} =$ | 176,00 t | | | | |
| $\beta =$ | 1,5 | $F_{sd,ef} =$ | 264,00 t | | |
| $c_1 =$ | 0,85 m | | | $u_0 =$ | 1,185 m |
| $c_2 =$ | 0,85 m | | | $\xi =$ | 1,71 |
| $d =$ | 0,395 m | [1] $V_{u1} > F_{sd,ef}$ | $V_{u1} =$ | 421,27 t | VALE |
| $f_{ck} =$ | 45 MPa | | | | |
| $f_{yd,d} =$ | 4 t/cm ² | | | $u_1 =$ | 2,09 m |
| $\rho =$ | 3 ‰ | [2] $\tau_{rd} \cdot u_1 \cdot d < F_{sd,ef}$ | $\tau_{rd} \cdot u_1 \cdot d =$ | 58,51 t | ARMAR |
| $\alpha =$ | 90 ° | | | $V_{cu} =$ | 58,51 t |
| $\theta =$ | 45 ° | | | $V_{su} =$ | 205 t |
| $s =$ | 0,15 m < 0,296 m | | | $u_{n,ef} =$ | 6,29 m |
| $S_{cara\ pilar} =$ | 0,10 m < 0,198 m | | | $A_a =$ | 145 cm ² /m |
| $n =$ | 28 ramas/1ª fila | | | $A_{sw} =$ | 22 cm ² /fila |
| | | | | $\rho_{critico} =$ | 15,76 ‰ |
| | | $L =$ | 2,45 m | | |
| | | $Sup =$ | 0,77 cm ² | | |
| | | $\phi_{ramas} =$ | Ø10 | | |
| | | 17 filas Ø10 a cara de pilar | | | |
| | | $L =$ | 1,50 m | | |
| | | $Sup =$ | 0,77 cm ² | | |
| | | $\phi_{ramas} =$ | Ø10 | | |
| | | 11 filas Ø10 a cara de pilar | | | |

| DATOS | | COMPROBACIONES | | RESULTADOS | |
|---------------------|---------------------|--|---|--------------------|--------------------------|
| $F_{sd} =$ | 155,00 t | | | | |
| $\beta =$ | 1,5 | $F_{sd,ef} =$ | 232,50 t | | |
| $c_1 =$ | 0,85 m | | | $u_0 =$ | 1,17 m |
| $c_2 =$ | 0,85 m | | | $\xi =$ | 1,72 |
| $d =$ | 0,39 m | [1] $V_{u1} > F_{sd,ef}$ | $V_{u1} =$ 410,67 t | VALE | ↙ |
| $f_{ck} =$ | 45 MPa | | | $u_1 =$ | 2,08 m |
| $f_{yd,d} =$ | 4 t/cm ² | [2] $\tau_{rd} \cdot u_1 \cdot d < F_{sd,ef}$ | $\tau_{rd} \cdot u_1 \cdot d =$ 57,34 t | ARMAR | ↙ |
| $\rho =$ | 3 ‰ | | | $\tau_{rd} =$ | 70,85 t/m ² |
| $\alpha =$ | 90 ° | | | $V_{cu} =$ | 57,34 t |
| $\theta =$ | 45 ° | | | $V_{su} =$ | 175 t |
| $s =$ | 0,15 m < 0,293 m | | | $u_{n,ef} =$ | 5,61 m |
| $S_{cara\ pilar} =$ | 0,10 m < 0,195 m | | | $A_a =$ | 125 cm ² /m |
| $n =$ | 28 ramas/1ª fila | | | $A_{sw} =$ | 19 cm ² /fila |
| | | | | $\rho_{critico} =$ | 15,64 ‰ |
| | | | | | |
| | | $L =$ 1,98 m $Sup =$ 0,67 cm ² $\phi_{ramas} =$ Ø10 ↙ 14 filas Ø10 a cara de pilar | | | |
| | | | | | |
| | | $L =$ 1,17 m $Sup =$ 0,67 cm ² $\phi_{ramas} =$ Ø10 ↙ 9 filas Ø10 a cara de pilar | | | |

| DATOS | | COMPROBACIONES | | RESULTADOS | |
|--|---------------------|---|---|--------------------|-------------------------|
| $F_{sd} =$ | 215,00 t | | | | |
| $\beta =$ | 1,15 | $F_{sd,ef} =$ | 247,25 t | → | ↘ |
| $a =$ | 0,85 m | | | | |
| $b =$ | 0,85 m | | | $u_0 =$ | 3,40 m |
| $d =$ | 0,395 m | [1] | $V_{u1} > F_{sd,ef}$ | $\xi =$ | 1,71 |
| $f_{ck} =$ | 45 MPa | $V_{u1} =$ | 1208,7 t | VALE | ↘ |
| $f_{y\alpha,d} =$ | 4 t/cm ² | | | $u_1 =$ | 8,36 m |
| $\rho =$ | 3,00 ‰ | [2] | $\tau_{rd}^* \cdot u_1 \cdot d < F_{sd,ef}$ | $\tau_{rd}^* =$ | 70,85 t/m ² |
| $\alpha =$ | 90 ° | $\tau_{rd}^* \cdot u_1 \cdot d =$ | 234,06 t | ARMAR | ↘ |
| $\theta =$ | 45 ° | | | $V_{cu} =$ | 234,06 t |
| $s =$ | 0,20 m < 0,296 m | | | $V_{su} =$ | 13 t |
| $s_{cara\ pilar} =$ | 0,10 m < 0,198 m | | | $u_{n,ef} =$ | 7,68 m |
| $n =$ | 28 ramas/1ª fila | | | $A_v =$ | 9 cm ² /m |
| | | | | $A_{sw} =$ | 2 cm ² /fila |
| | | | | $\rho_{critico} =$ | 15,76 ‰ |
|  | |  | | | |
| | | $L =$ 0,00 m $Sup =$ 0,07 cm ² $\emptyset_{ramas} =$ Ø8 ↘ 1 fila Ø8 a cara de pilar | | | |
| | |  | | | |
| | | $L =$ 0,00 m $Sup =$ 0,07 cm ² $\emptyset_{ramas} =$ Ø8 ↘ 1 fila Ø8 a cara de pilar | | | |

| DATOS | | COMPROBACIONES | | RESULTADOS | |
|-------------------|---------------------|---|--|--------------------|-------------------------|
| $F_{sd} =$ | 106,00 t | $F_{sd,ef} =$ | 148,40 t | | |
| $\beta =$ | 1,4 | | | | |
| $c_1 =$ | 0,85 m | | | $u_o =$ | 2,04 m |
| $c_2 =$ | 0,85 m | | | $\xi =$ | 1,71 |
| $d =$ | 0,40 m | [1] $V_{u1} > F_{sd,ef}$ | $V_{u1} =$ 726,3432 t | VALE | ↙ |
| $f_{ck} =$ | 45 MPa | | | $u_1 =$ | 4,19 m |
| $f_{y\alpha,d} =$ | 4 t/cm ² | | | $\tau_{rd}^* =$ | 70,85 t/m ² |
| $\rho =$ | 3,00 ‰ | [2] $\tau_{rd}^* \cdot u_1 \cdot d < F_{sd,ef}$ | $\tau_{rd} \cdot u_1 \cdot d =$ 117,50 t | ARMAR | ↙ |
| $\alpha =$ | 90 ° | | | $V_{cu} =$ | 117,50 t |
| $\theta =$ | 45 ° | | | $V_{su} =$ | 30,90 t |
| $s =$ | 0,15 m < 0,297 m | | | $u_{n,ef} =$ | 3,78 m |
| $Scara\ pilar =$ | 0,10 m < 0,198 m | | | $A_\alpha =$ | 22 cm ² /m |
| $n =$ | 19 ramas/1ª fila | | | $A_{sw} =$ | 3 cm ² /fila |
| | | | | $\rho_{crítico} =$ | 15,79 ‰ |
| | | | | | |
| | | $L =$ 0,00 m $Sup =$ 0,17 cm ² $\emptyset_{ramas} =$ Ø8 ↙ 1 fila Ø8 a cara de pilar | | | |
| | | $L =$ 0,00 m $Sup =$ 0,17 cm ² $\emptyset_{ramas} =$ Ø8 ↙ 1 fila Ø8 a cara de pilar | | | |
| | | $L =$ 0,00 m $Sup =$ 0,17 cm ² $\emptyset_{ramas} =$ Ø8 ↙ 1 fila Ø8 a cara de pilar | | | |



PRONTUARIO INFORMÁTICO DEL HORMIGÓN ESTRUCTURAL 3.1.6 SEGÚN EHE-08

Cátedra de Hormigón Estructural ETSICCPM - IECA

Obra:
Fecha: 26/11/2015
Hora: 15:00:00

Comprobación del Estado Límite de Servicio de fisuración debido a solicitaciones normales

1 Datos

- Materiales

Tipo de hormigón: HA-45
Tipo de acero: B-500-S
 f_{ck} [MPa] = 45.00
 f_{yk} [MPa] = 500.00

- Ambiente

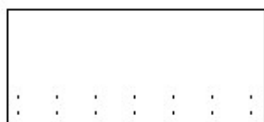
Clase general de exposición : IIIa
Clases específicas de exposición :

- Geometría de la sección

Sección : LOSA45_HA45
 b [m] = 1.00
 h [m] = 0.45

- Armado de la sección

ϕ [mm] = 20



| capa | nº barras | Separación [mm] |
|------|-----------|--------------------|
| 1 | 7 | 45.0 |
| 2 | 7 | 65 |

A_s [cm²] = 44.0
 $A_{c,ef}$ [cm²] = 1125.0

2 Resultados

M_k [kN · m]

= 288

Separación media entre fisuras s_m [mm] = 127.0
 Deformación media de las armaduras ϵ_{sm} [$\cdot 10^{-3}$] = 0.92
 Tensión en las armaduras en el instante de fisuración σ_{sr} [MPa] = 125.5
 Tensión en las armaduras en servicio σ_s [MPa] = 219.0
 Abertura característica de fisura w_k [mm] = 0.20

| Clase de exposición | w_k max [mm] | |
|---------------------|----------------|--------------|
| | Armado | Pretensado |
| I | 0.4 | 0.2 |
| IIa, IIb, H | 0.3 | 0.2 |
| IIIa, IIIb, IV, F | 0.2 | Decompresión |
| IIIc, Qa, Qb, Qc | 0.1 | |

| | |
|-----------------------|---|
| 1.- ESTRUCTURA..... | 2 |
| 1.1.- Resultados..... | 2 |
| 1.1.1.- Nudos..... | 2 |



1.- ESTRUCTURA

1.1.- Resultados

1.1.1.- Nudos

1.1.1.1.- Reacciones

Referencias:

Rx, Ry, Rz: Reacciones en nudos con desplazamientos coaccionados (fuerzas).

Mx, My, Mz: Reacciones en nudos con giros coaccionados (momentos).

1.1.1.1.1.- Hipótesis

| Reacciones en los nudos, por hipótesis | | | | | | | |
|--|-----------------|-----------------------------|------------|------------|--------------|--------------|--------------|
| Referencia | Descripción | Reacciones en ejes globales | | | | | |
| | | Rx (kN) | Ry (kN) | Rz (kN) | Mx (kN·m) | My (kN·m) | Mz (kN·m) |
| N53 | Peso propio | -22.795 | 8.898 | 980.098 | 0.00 | 0.00 | 0.00 |
| | CM 1 | -4.462 | 1.287 | 150.522 | 0.00 | 0.00 | 0.00 |
| | Q 1 | -24.790 | 7.151 | 836.236 | 0.00 | 0.00 | 0.00 |
| | T 1 | 34.087 | 1.932 | 42.094 | 0.00 | 0.00 | 0.00 |
| | T 2 | -64.927 | -3.680 | -80.179 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.037 | -0.208 | -0.361 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | -40.580 | -2.300 | -50.112 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -15.017 | 2.601 | -23.074 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -34.098 | -11.422 | -87.755 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 0.849 | -7.799 | -12.714 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -18.338 | 3.176 | -28.177 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -22.663 | -7.592 | -58.326 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 3.494 | -32.108 | -52.344 | 0.00 | 0.00 | 0.00 |
| N55 | Peso propio | -17.862 | -0.810 | 562.123 | 0.00 | 0.00 | 0.00 |
| | CM 1 | -3.362 | 0.358 | 80.396 | 0.00 | 0.00 | 0.00 |
| | Q 1 | -18.676 | 1.991 | 446.646 | 0.00 | 0.00 | 0.00 |
| | T 1 | 30.373 | -2.797 | 20.231 | 0.00 | 0.00 | 0.00 |
| | T 2 | -57.853 | 5.327 | -38.535 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.042 | -0.217 | 0.624 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | -36.158 | 3.329 | -24.085 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -15.830 | 3.967 | -26.778 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -30.252 | -10.999 | 16.781 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 0.340 | -7.884 | 28.442 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -19.331 | 4.844 | -32.700 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -20.107 | -7.310 | 11.154 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 1.401 | -32.456 | 117.093 | 0.00 | 0.00 | 0.00 |
| N57 | Peso propio | 18.913 | -1.771 | 331.791 | 0.00 | 0.00 | 0.00 |
| | CM 1 | 3.585 | -0.876 | 39.449 | 0.00 | 0.00 | 0.00 |
| | Q 1 | 19.918 | -4.869 | 219.161 | 0.00 | 0.00 | 0.00 |
| | T 1 | 25.955 | 2.427 | -20.104 | 0.00 | 0.00 | 0.00 |
| | T 2 | -49.438 | -4.622 | 38.293 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.017 | -0.199 | -0.388 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | -30.899 | -2.889 | 23.933 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -12.948 | 5.383 | 29.335 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -30.820 | -11.984 | -7.425 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 1.364 | -7.668 | -25.470 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -15.812 | 6.573 | 35.823 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -20.484 | -7.965 | -4.935 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 5.614 | -31.568 | -104.858 | 0.00 | 0.00 | 0.00 |
| N59 | Peso propio | 30.746 | -4.307 | 1251.243 | 0.00 | 0.00 | 0.00 |
| | CM 1 | 5.885 | -0.489 | 198.348 | 0.00 | 0.00 | 0.00 |
| | Q 1 | 32.696 | -2.715 | 1101.931 | 0.00 | 0.00 | 0.00 |
| | T 1 | 26.915 | 0.458 | -74.439 | 0.00 | 0.00 | 0.00 |
| | T 2 | -51.267 | -0.872 | 141.788 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.518 | -1.513 | 0.148 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |



| Reacciones en los nudos, por hipótesis | | | | | | | |
|--|-----------------|-----------------------------|------------|------------|--------------|--------------|--------------|
| Referencia | Descripción | Reacciones en ejes globales | | | | | |
| | | Rx (kN) | Ry (kN) | Rz (kN) | Mx (kN·m) | My (kN·m) | Mz (kN·m) |
| | R 1 | -32.042 | -0.545 | 88.617 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -15.817 | 4.966 | 31.427 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -32.899 | -13.860 | 100.151 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 0.332 | -7.047 | 8.982 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -19.315 | 6.065 | 38.377 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -21.866 | -9.212 | 66.565 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 1.365 | -29.010 | 36.977 | 0.00 | 0.00 | 0.00 |
| N61 | Peso propio | -13.942 | -3.639 | 260.855 | 0.00 | 0.00 | 0.00 |
| | CM 1 | -2.614 | -1.202 | 27.546 | 0.00 | 0.00 | 0.00 |
| | Q 1 | -14.523 | -6.677 | 153.032 | 0.00 | 0.00 | 0.00 |
| | T 1 | 10.739 | 3.348 | 13.794 | 0.00 | 0.00 | 0.00 |
| | T 2 | -20.455 | -6.377 | -26.274 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.026 | -0.141 | -0.482 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | -12.785 | -3.986 | -16.421 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -12.440 | 12.606 | 31.045 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -31.377 | -18.707 | -92.160 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 1.052 | -4.723 | -15.220 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -15.191 | 15.394 | 37.910 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -20.854 | -12.433 | -61.254 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 4.332 | -19.443 | -62.659 | 0.00 | 0.00 | 0.00 |
| N63 | Peso propio | -27.617 | -5.928 | 1228.004 | 0.00 | 0.00 | 0.00 |
| | CM 1 | -5.318 | -0.807 | 194.948 | 0.00 | 0.00 | 0.00 |
| | Q 1 | -29.545 | -4.485 | 1083.043 | 0.00 | 0.00 | 0.00 |
| | T 1 | 13.557 | -0.711 | 24.169 | 0.00 | 0.00 | 0.00 |
| | T 2 | -25.823 | 1.355 | -46.037 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.038 | -0.141 | 0.044 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | -16.139 | 0.847 | -28.773 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -16.263 | 11.895 | -58.402 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -32.425 | -15.865 | -70.197 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 0.661 | -4.873 | 7.817 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -19.860 | 14.525 | -71.317 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -21.551 | -10.544 | -46.656 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 2.720 | -20.060 | 32.180 | 0.00 | 0.00 | 0.00 |
| N65 | Peso propio | 25.233 | 2.869 | 623.182 | 0.00 | 0.00 | 0.00 |
| | CM 1 | 4.590 | 1.063 | 91.042 | 0.00 | 0.00 | 0.00 |
| | Q 1 | 25.500 | 5.907 | 505.788 | 0.00 | 0.00 | 0.00 |
| | T 1 | 8.760 | -2.182 | -8.274 | 0.00 | 0.00 | 0.00 |
| | T 2 | -16.686 | 4.156 | 15.760 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.049 | -0.135 | 0.488 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | -10.429 | 2.598 | 9.850 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -15.644 | 13.727 | -34.366 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -30.245 | -19.368 | 93.066 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 0.113 | -4.447 | 15.046 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -19.104 | 16.762 | -41.966 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -20.102 | -12.873 | 61.856 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 0.466 | -18.307 | 61.944 | 0.00 | 0.00 | 0.00 |
| N67 | Peso propio | 29.663 | 11.474 | 1101.529 | 0.00 | 0.00 | 0.00 |
| | CM 1 | 5.681 | 1.769 | 170.096 | 0.00 | 0.00 | 0.00 |
| | Q 1 | 31.560 | 9.829 | 944.979 | 0.00 | 0.00 | 0.00 |
| | T 1 | 7.537 | 0.978 | -33.559 | 0.00 | 0.00 | 0.00 |
| | T 2 | -14.356 | -1.862 | 63.921 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.030 | -0.117 | -0.058 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | -8.973 | -1.164 | 39.951 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -15.148 | 14.250 | 61.007 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -32.778 | -17.221 | 67.628 | 0.00 | 0.00 | 0.00 |



| Reacciones en los nudos, por hipótesis | | | | | | | |
|--|-----------------|-----------------------------|------------|------------|--------------|--------------|--------------|
| Referencia | Descripción | Reacciones en ejes globales | | | | | |
| | | Rx (kN) | Ry (kN) | Rz (kN) | Mx (kN·m) | My (kN·m) | Mz (kN·m) |
| | Sismo X: Modo 3 | 0.977 | -3.844 | -7.688 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -18.498 | 17.401 | 74.498 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -21.786 | -11.446 | 44.949 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 4.021 | -15.825 | -31.650 | 0.00 | 0.00 | 0.00 |
| N69 | Peso propio | -27.451 | 8.822 | 1131.091 | 0.00 | 0.00 | 0.00 |
| | CM 1 | -5.260 | 1.304 | 175.667 | 0.00 | 0.00 | 0.00 |
| | Q 1 | -29.224 | 7.247 | 975.930 | 0.00 | 0.00 | 0.00 |
| | T 1 | -5.826 | 0.574 | -28.831 | 0.00 | 0.00 | 0.00 |
| | T 2 | 11.098 | -1.093 | 54.915 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.037 | -0.070 | -0.192 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | 6.936 | -0.683 | 34.322 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -14.548 | 19.560 | -14.932 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -33.457 | -22.345 | -125.084 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 0.800 | -1.633 | -0.302 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -17.765 | 23.886 | -18.234 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -22.237 | -14.851 | -83.137 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 3.295 | -6.721 | -1.242 | 0.00 | 0.00 | 0.00 |
| N71 | Peso propio | -19.493 | 2.076 | 562.864 | 0.00 | 0.00 | 0.00 |
| | CM 1 | -3.610 | 0.921 | 81.054 | 0.00 | 0.00 | 0.00 |
| | Q 1 | -20.058 | 5.117 | 450.299 | 0.00 | 0.00 | 0.00 |
| | T 1 | -7.004 | -2.662 | -6.005 | 0.00 | 0.00 | 0.00 |
| | T 2 | 13.340 | 5.070 | 11.438 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.045 | -0.065 | 0.175 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | 8.338 | 3.169 | 7.149 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -16.434 | 22.577 | -94.349 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -29.084 | -22.575 | 49.571 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 0.107 | -1.460 | 5.506 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -20.068 | 27.570 | -115.214 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -19.331 | -15.005 | 32.947 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 0.442 | -6.010 | 22.669 | 0.00 | 0.00 | 0.00 |
| N73 | Peso propio | 32.441 | -4.475 | 1332.131 | 0.00 | 0.00 | 0.00 |
| | CM 1 | 6.137 | -0.514 | 210.202 | 0.00 | 0.00 | 0.00 |
| | Q 1 | 34.095 | -2.858 | 1167.787 | 0.00 | 0.00 | 0.00 |
| | T 1 | -11.726 | -1.276 | 20.101 | 0.00 | 0.00 | 0.00 |
| | T 2 | 22.335 | 2.431 | -38.288 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.045 | -0.050 | 0.184 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | 13.959 | 1.519 | -23.930 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -15.745 | 22.369 | 13.030 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -33.165 | -23.878 | 124.235 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 0.421 | -0.686 | -0.470 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -19.226 | 27.315 | 15.911 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -22.043 | -15.870 | 82.572 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 1.735 | -2.826 | -1.934 | 0.00 | 0.00 | 0.00 |
| N75 | Peso propio | 21.034 | -3.885 | 332.044 | 0.00 | 0.00 | 0.00 |
| | CM 1 | 3.894 | -1.244 | 39.852 | 0.00 | 0.00 | 0.00 |
| | Q 1 | 21.631 | -6.910 | 221.402 | 0.00 | 0.00 | 0.00 |
| | T 1 | -9.282 | 2.786 | 10.725 | 0.00 | 0.00 | 0.00 |
| | T 2 | 17.679 | -5.307 | -20.429 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.024 | -0.057 | -0.165 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | 11.049 | -3.317 | -12.768 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -13.324 | 23.578 | 96.176 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -29.755 | -23.058 | -48.656 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 1.083 | -1.081 | -4.666 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -16.271 | 28.792 | 117.444 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -19.776 | -15.325 | -32.339 | 0.00 | 0.00 | 0.00 |



| Reacciones en los nudos, por hipótesis | | | | | | | |
|--|-----------------|-----------------------------|------------|------------|--------------|--------------|--------------|
| Referencia | Descripción | Reacciones en ejes globales | | | | | |
| | | Rx (kN) | Ry (kN) | Rz (kN) | Mx (kN·m) | My (kN·m) | Mz (kN·m) |
| | Sismo Y: Modo 3 | 4.458 | -4.450 | -19.211 | 0.00 | 0.00 | 0.00 |
| N77 | Peso propio | 56.593 | 2.547 | 443.824 | 0.00 | 0.00 | 0.00 |
| | CM 1 | 10.527 | 0.142 | 61.946 | 0.00 | 0.00 | 0.00 |
| | Q 1 | 58.482 | 0.792 | 344.144 | 0.00 | 0.00 | 0.00 |
| | T 1 | 20.022 | 2.294 | 16.721 | 0.00 | 0.00 | 0.00 |
| | T 2 | -38.138 | -4.369 | -31.850 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.023 | -0.172 | -0.523 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | -23.836 | -2.731 | -19.906 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -6.248 | -2.304 | -11.075 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -15.095 | -6.113 | -29.542 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 0.111 | -6.848 | -20.646 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -7.630 | -2.813 | -13.524 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -10.033 | -4.063 | -19.635 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 0.459 | -28.193 | -84.997 | 0.00 | 0.00 | 0.00 |
| N79 | Peso propio | 98.619 | -8.345 | 667.392 | 0.00 | 0.00 | 0.00 |
| | CM 1 | 18.295 | -1.115 | 85.269 | 0.00 | 0.00 | 0.00 |
| | Q 1 | 101.638 | -6.194 | 473.718 | 0.00 | 0.00 | 0.00 |
| | T 1 | 33.392 | -3.163 | 19.603 | 0.00 | 0.00 | 0.00 |
| | T 2 | -63.604 | 6.024 | -37.338 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.018 | -0.224 | 0.498 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | -39.752 | 3.765 | -23.337 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -12.438 | -1.952 | -2.745 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -23.044 | -5.825 | 1.488 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 0.886 | -9.002 | 21.546 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -15.189 | -2.384 | -3.352 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -15.316 | -3.871 | 0.989 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 3.647 | -37.060 | 88.700 | 0.00 | 0.00 | 0.00 |
| N81 | Peso propio | -29.523 | -5.775 | 1350.600 | 0.00 | 0.00 | 0.00 |
| | CM 1 | -5.620 | -0.778 | 214.226 | 0.00 | 0.00 | 0.00 |
| | Q 1 | -31.221 | -4.320 | 1190.142 | 0.00 | 0.00 | 0.00 |
| | T 1 | -25.357 | -0.331 | -74.401 | 0.00 | 0.00 | 0.00 |
| | T 2 | 48.299 | 0.630 | 141.715 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.043 | -0.004 | -0.106 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | 30.187 | 0.394 | 88.572 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -16.668 | 29.099 | -73.999 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -32.036 | -26.196 | -56.075 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 0.427 | 1.604 | -0.495 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -20.354 | 35.534 | -90.363 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -21.292 | -17.411 | -37.270 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 1.759 | 6.605 | -2.036 | 0.00 | 0.00 | 0.00 |
| N83 | Peso propio | 19.772 | 5.489 | 504.877 | 0.00 | 0.00 | 0.00 |
| | CM 1 | 3.554 | 1.558 | 70.498 | 0.00 | 0.00 | 0.00 |
| | Q 1 | 19.745 | 8.657 | 391.656 | 0.00 | 0.00 | 0.00 |
| | T 1 | -27.926 | -3.772 | 20.641 | 0.00 | 0.00 | 0.00 |
| | T 2 | 53.193 | 7.186 | -39.316 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.047 | 0.007 | 0.003 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | 33.246 | 4.491 | -24.573 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -15.763 | 31.912 | -102.003 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -30.599 | -30.349 | 126.724 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 0.067 | 2.408 | -8.827 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -19.249 | 38.970 | -124.561 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -20.338 | -20.171 | 84.226 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 0.274 | 9.915 | -36.341 | 0.00 | 0.00 | 0.00 |
| N85 | Peso propio | 29.861 | 6.151 | 1232.366 | 0.00 | 0.00 | 0.00 |
| | CM 1 | 5.652 | 0.843 | 190.711 | 0.00 | 0.00 | 0.00 |



| Reacciones en los nudos, por hipótesis | | | | | | | |
|--|-----------------|-----------------------------|------------|------------|--------------|--------------|--------------|
| Referencia | Descripción | Reacciones en ejes globales | | | | | |
| | | Rx (kN) | Ry (kN) | Rz (kN) | Mx (kN·m) | My (kN·m) | Mz (kN·m) |
| | Q 1 | 31.400 | 4.681 | 1059.507 | 0.00 | 0.00 | 0.00 |
| | T 1 | -33.321 | 0.876 | 16.880 | 0.00 | 0.00 | 0.00 |
| | T 2 | 63.469 | -1.669 | -32.153 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.039 | 0.014 | 0.071 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | 39.668 | -1.043 | -20.096 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -16.717 | 31.040 | 57.479 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -34.063 | -27.431 | 16.224 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 0.750 | 2.565 | 2.009 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -20.414 | 37.905 | 70.190 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -22.640 | -18.232 | 10.783 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 3.087 | 10.558 | 8.270 | 0.00 | 0.00 | 0.00 |
| N87 | Peso propio | -14.496 | -5.477 | 324.739 | 0.00 | 0.00 | 0.00 |
| | CM 1 | -2.661 | -1.522 | 39.597 | 0.00 | 0.00 | 0.00 |
| | Q 1 | -14.783 | -8.455 | 219.981 | 0.00 | 0.00 | 0.00 |
| | T 1 | -24.696 | 2.236 | -4.375 | 0.00 | 0.00 | 0.00 |
| | T 2 | 47.040 | -4.259 | 8.333 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.026 | 0.002 | -0.001 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | 29.400 | -2.662 | 5.208 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -12.370 | 30.971 | 106.567 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -31.003 | -29.208 | -115.025 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 1.128 | 2.087 | 7.950 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -15.106 | 37.820 | 130.134 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -20.606 | -19.413 | -76.451 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 4.643 | 8.591 | 32.730 | 0.00 | 0.00 | 0.00 |
| N89 | Peso propio | -83.162 | -12.769 | 695.334 | 0.00 | 0.00 | 0.00 |
| | CM 1 | -15.477 | -2.987 | 98.886 | 0.00 | 0.00 | 0.00 |
| | Q 1 | -85.981 | -16.596 | 549.367 | 0.00 | 0.00 | 0.00 |
| | T 1 | -29.632 | 2.545 | 18.761 | 0.00 | 0.00 | 0.00 |
| | T 2 | 56.442 | -4.848 | -35.736 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.021 | 0.047 | 0.137 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | 35.276 | -3.030 | -22.335 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -11.184 | 32.557 | 97.742 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -21.533 | -27.163 | -63.525 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 0.645 | 4.156 | 11.140 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -13.658 | 39.757 | 119.358 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -14.312 | -18.053 | -42.221 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 2.654 | 17.110 | 45.861 | 0.00 | 0.00 | 0.00 |
| N91 | Peso propio | -106.534 | 8.855 | 857.546 | 0.00 | 0.00 | 0.00 |
| | CM 1 | -19.415 | 2.288 | 111.803 | 0.00 | 0.00 | 0.00 |
| | Q 1 | -107.863 | 12.709 | 621.127 | 0.00 | 0.00 | 0.00 |
| | T 1 | -36.569 | -3.560 | 26.264 | 0.00 | 0.00 | 0.00 |
| | T 2 | 69.654 | 6.780 | -50.027 | 0.00 | 0.00 | 0.00 |
| | V 1 | -0.038 | 0.051 | -0.096 | 0.00 | 0.00 | 0.00 |
| | V 2 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.00 |
| | R 1 | 43.534 | 4.238 | -31.267 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 1 | -11.848 | 35.992 | -82.085 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 2 | -28.896 | -32.943 | 99.574 | 0.00 | 0.00 | 0.00 |
| | Sismo X: Modo 3 | 0.371 | 4.754 | -11.940 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 1 | -14.468 | 43.952 | -100.237 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 2 | -19.206 | -21.895 | 66.182 | 0.00 | 0.00 | 0.00 |
| | Sismo Y: Modo 3 | 1.529 | 19.574 | -49.154 | 0.00 | 0.00 | 0.00 |

1.1.1.1.2.- Envoltentes



| Envoltentes de las reacciones en nudos | | | | | | | | |
|--|----------------------------|-------------------------------|-----------------------------|------------|------------|--------------|--------------|--------------|
| Referencia | Combinación | | Reacciones en ejes globales | | | | | |
| | Tipo | Descripción | Rx (kN) | Ry (kN) | Rz (kN) | Mx (kN·m) | My (kN·m) | Mz (kN·m) |
| N53 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -240.223 | -38.065 | 917.542 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | -5.249 | 58.125 | 3137.268 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | -157.591 | -32.304 | 952.783 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | -18.239 | 55.224 | 2044.471 | 0.00 | 0.00 | 0.00 |
| N55 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -205.333 | -45.178 | 448.425 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 0.922 | 52.128 | 1738.600 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | -133.953 | -39.027 | 468.116 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | -11.165 | 46.773 | 1215.398 | 0.00 | 0.00 | 0.00 |
| N57 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -106.058 | -58.132 | 241.255 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 68.935 | 44.139 | 1019.695 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | -57.856 | -53.352 | 258.718 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 56.138 | 37.412 | 750.789 | 0.00 | 0.00 | 0.00 |
| N59 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -97.161 | -54.744 | 1361.158 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 106.252 | 42.434 | 4360.481 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | -47.196 | -48.912 | 1400.566 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 86.128 | 35.516 | 2782.075 | 0.00 | 0.00 | 0.00 |
| N61 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -95.964 | -66.182 | 82.512 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 26.803 | 44.522 | 703.114 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | -88.320 | -59.388 | 122.149 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 15.116 | 35.058 | 574.843 | 0.00 | 0.00 | 0.00 |
| N63 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -152.961 | -58.843 | 1213.240 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 12.959 | 44.375 | 4004.064 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | -127.678 | -51.514 | 1253.125 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | -0.015 | 35.252 | 2618.276 | 0.00 | 0.00 | 0.00 |
| N65 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -38.303 | -48.018 | 531.138 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 92.392 | 64.621 | 1983.376 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | -26.476 | -37.918 | 570.017 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 90.765 | 56.885 | 1383.918 | 0.00 | 0.00 | 0.00 |
| N67 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -35.012 | -38.985 | 1129.636 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 106.690 | 69.041 | 3671.852 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | -22.150 | -28.918 | 1169.512 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 106.452 | 62.905 | 2398.618 | 0.00 | 0.00 | 0.00 |
| N69 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -104.418 | -46.785 | 1170.354 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 35.333 | 70.019 | 3759.935 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | -103.457 | -33.939 | 1200.979 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 22.683 | 60.073 | 2457.111 | 0.00 | 0.00 | 0.00 |
| N71 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -84.174 | -54.282 | 443.213 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 42.606 | 69.684 | 1773.336 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | -80.318 | -40.493 | 487.360 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 30.727 | 57.942 | 1265.074 | 0.00 | 0.00 | 0.00 |
| N73 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -9.265 | -65.283 | 1350.985 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 160.052 | 56.628 | 4331.734 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | 3.440 | -52.929 | 1380.900 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 135.729 | 43.131 | 2823.691 | 0.00 | 0.00 | 0.00 |
| N75 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -19.471 | -73.957 | 152.110 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 110.077 | 52.919 | 946.806 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | -7.758 | -62.611 | 196.391 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 101.344 | 38.809 | 743.267 | 0.00 | 0.00 | 0.00 |
| N77 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -32.062 | -37.551 | 359.647 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 196.347 | 37.944 | 1356.008 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | 5.122 | -33.421 | 375.857 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 123.143 | 34.131 | 940.015 | 0.00 | 0.00 | 0.00 |
| N79 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -48.474 | -55.402 | 630.419 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 341.987 | 40.297 | 1958.168 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | 13.539 | -53.413 | 637.748 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 214.812 | 35.830 | 1294.620 | 0.00 | 0.00 | 0.00 |
| N81 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -101.622 | -82.994 | 1484.675 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 90.435 | 68.084 | 4685.710 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | -85.070 | -67.868 | 1523.290 | 0.00 | 0.00 | 0.00 |
| | | | | | | | | |



Listados

CALCULADO DATOS OK

Fecha: 30/11/15

| Envoltentes de las reacciones en nudos | | | | | | | | |
|--|----------------------------|-------------------------------|-----------------------------|------------|------------|--------------|--------------|--------------|
| Referencia | Combinación | | Reacciones en ejes globales | | | | | |
| | Tipo | Descripción | Rx (kN) | Ry (kN) | Rz (kN) | Mx (kN·m) | My (kN·m) | Mz (kN·m) |
| N83 | Hormigón en cimentaciones | Valor máximo de la envoltente | 43.937 | 51.230 | 2985.255 | 0.00 | 0.00 | 0.00 |
| | | Valor mínimo de la envoltente | -1.642 | -73.569 | 246.572 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 197.738 | 101.840 | 1542.495 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | 10.261 | -54.481 | 316.590 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 129.510 | 86.215 | 1176.670 | 0.00 | 0.00 | 0.00 |
| N85 | Hormigón en cimentaciones | Valor mínimo de la envoltente | 10.477 | -75.476 | 1294.085 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 257.007 | 90.186 | 3968.312 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | 23.995 | -57.503 | 1316.537 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 170.050 | 74.085 | 2548.932 | 0.00 | 0.00 | 0.00 |
| N87 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -54.147 | -96.268 | 72.700 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 105.147 | 71.874 | 951.238 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | -46.606 | -81.246 | 140.509 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 59.283 | 53.469 | 818.558 | 0.00 | 0.00 | 0.00 |
| N89 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -288.582 | -117.466 | 527.039 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 48.110 | 69.936 | 2145.546 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | -182.432 | -105.493 | 577.299 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | -6.920 | 51.324 | 1515.838 | 0.00 | 0.00 | 0.00 |
| N91 | Hormigón en cimentaciones | Valor mínimo de la envoltente | -365.708 | -86.113 | 679.670 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | 55.152 | 124.498 | 2538.708 | 0.00 | 0.00 | 0.00 |
| | Tensiones sobre el terreno | Valor mínimo de la envoltente | -231.197 | -64.631 | 736.155 | 0.00 | 0.00 | 0.00 |
| | | Valor máximo de la envoltente | -12.761 | 108.100 | 1761.135 | 0.00 | 0.00 | 0.00 |

Nota: Las combinaciones de hormigón indicadas son las mismas que se utilizan para comprobar el estado límite de equilibrio en la cimentación.



1.- CIMENTACIÓN

1.1.- Elementos de cimentación aislados

1.1.1.- Descripción

| Referencias | Geometría | Armado |
|---|---|--|
| (PP9 - PP7 - PP8 - PP10) | Zapata rectangular excéntrica Ancho inicial X: 400.0 cm Ancho inicial Y: 400.0 cm Ancho final X: 400.0 cm Ancho final Y: 400.0 cm Ancho zapata X: 800.0 cm Ancho zapata Y: 800.0 cm Canto: 90.0 cm | Sup X: 53Ø20c/15 Sup Y: 53Ø20c/15 Inf X: 40Ø16c/20 Inf Y: 40Ø16c/20 |
| (PP13 - PP11 - PP12 - PP14) | Zapata rectangular excéntrica Ancho inicial X: 400.0 cm Ancho inicial Y: 400.0 cm Ancho final X: 400.0 cm Ancho final Y: 400.0 cm Ancho zapata X: 800.0 cm Ancho zapata Y: 800.0 cm Canto: 90.0 cm | Sup X: 53Ø20c/15 Sup Y: 53Ø20c/15 Inf X: 40Ø16c/20 Inf Y: 40Ø16c/20 |
| (PP15 - PP16 - PP18 - PP17) y (PP5 - PP3 - PP6 - PP4) | Zapata rectangular excéntrica Ancho inicial X: 400.0 cm Ancho inicial Y: 400.0 cm Ancho final X: 400.0 cm Ancho final Y: 400.0 cm Ancho zapata X: 800.0 cm Ancho zapata Y: 800.0 cm Canto: 90.0 cm | Sup X: 53Ø20c/15 Sup Y: 53Ø20c/15 Inf X: 40Ø16c/20 Inf Y: 40Ø16c/20 |

1.1.2.- Comprobación

| Referencia: (PP9 - PP7 - PP8 - PP10) Dimensiones: 800 x 800 x 90 Armados: Xi:Ø16c/20 Yi:Ø16c/20 Xs:Ø20c/15 Ys:Ø20c/15 | | |
|--|---|--------|
| Comprobación | Valores | Estado |
| Tensiones sobre el terreno: Criterio de CYPE Ingenieros | | |
| - Tensión media en situaciones persistentes: | Máximo: 0.15 MPa Calculado: 0.121938 MPa | Cumple |
| - Tensión media en situaciones accidentales sísmicas: | Máximo: 0.18 MPa Calculado: 0.12184 MPa | Cumple |
| - Tensión máxima en situaciones persistentes sin viento: | Máximo: 0.187469 MPa Calculado: 0.177659 MPa | Cumple |
| - Tensión máxima en situaciones persistentes con viento: | Máximo: 0.187469 MPa Calculado: 0.177757 MPa | Cumple |
| - Tensión máxima en situaciones accidentales sísmicas: | Máximo: 0.224943 MPa Calculado: 0.1962 MPa | Cumple |
| Vuelco de la zapata: Si el % de reserva de seguridad es mayor que cero, quiere decir que los coeficientes de seguridad al vuelco son mayores que los valores estrictos exigidos para todas las combinaciones de equilibrio. | | |
| - En dirección X: | Reserva seguridad: 569.8 % | Cumple |
| - En dirección Y: | Reserva seguridad: 661.0 % | Cumple |
| Flexión en la zapata: | | |
| - En dirección X: | Momento: -4077.41 kN·m | Cumple |
| - En dirección Y: | Momento: -3907.70 kN·m | Cumple |
| Cortante en la zapata: | | |
| - En dirección X: | Cortante: 2131.22 kN | Cumple |
| - En dirección Y: | Cortante: 2081.58 kN | Cumple |
| Compresión oblicua en la zapata: Criterio de CYPE Ingenieros | | |
| - Situaciones persistentes: | Máximo: 6000 kN/m ² Calculado: 1864.8 kN/m ² | Cumple |
| - Situaciones accidentales sísmicas: | Máximo: 6923 kN/m ² Calculado: 1022.1 kN/m ² | Cumple |
| Canto mínimo: Artículo 58.8.1 de la norma EHE-08 | Mínimo: 25 cm Calculado: 90 cm | Cumple |
| Espacio para anclar arranques en cimentación: | Mínimo: 48 cm | |
| - PP9: | Calculado: 82 cm | Cumple |
| - PP7: | Calculado: 82 cm | Cumple |
| - PP8: | Calculado: 82 cm | Cumple |
| - PP10: | Calculado: 82 cm | Cumple |



| Referencia: (PP9 - PP7 - PP8 - PP10) Dimensiones: 800 x 800 x 90 Armados: Xi: Ø16c/20 Yi: Ø16c/20 Xs: Ø20c/15 Ys: Ø20c/15 | | |
|---|--|--|
| Comprobación | Valores | Estado |
| Cuantía geométrica mínima: Artículo 42.3.5 de la norma EHE-08 - Armado inferior dirección X: - Armado superior dirección X: - Armado inferior dirección Y: - Armado superior dirección Y: | Mínimo: 0.0009 Calculado: 0.0011 Calculado: 0.0023 Calculado: 0.0011 Calculado: 0.0023 | Cumple Cumple Cumple Cumple |
| Cuantía mínima necesaria por flexión: Artículo 42.3.2 de la norma EHE-08 - Armado inferior dirección X: - Armado inferior dirección Y: - Armado superior dirección X: - Armado superior dirección Y: | Mínimo: 0.0005 Calculado: 0.0012 Mínimo: 0.0005 Calculado: 0.0012 Mínimo: 0.0019 Calculado: 0.0024 Mínimo: 0.0018 Calculado: 0.0024 | Cumple Cumple Cumple Cumple |
| Diámetro mínimo de las barras: Recomendación del Artículo 58.8.2 (norma EHE-08) - Parrilla inferior: - Parrilla superior: | Mínimo: 12 mm Calculado: 16 mm Calculado: 20 mm | Cumple Cumple |
| Separación máxima entre barras: Artículo 58.8.2 de la norma EHE-08 - Armado inferior dirección X: - Armado inferior dirección Y: - Armado superior dirección X: - Armado superior dirección Y: | Máximo: 30 cm Calculado: 20 cm Calculado: 20 cm Calculado: 15 cm Calculado: 15 cm | Cumple Cumple Cumple Cumple |
| Separación mínima entre barras: Criterio de CYPE Ingenieros, basado en: J. Calavera. "Cálculo de Estructuras de Cimentación". Capítulo 3.16 - Armado inferior dirección X: - Armado inferior dirección Y: - Armado superior dirección X: - Armado superior dirección Y: | Mínimo: 10 cm Calculado: 20 cm Calculado: 20 cm Calculado: 15 cm Calculado: 15 cm | Cumple Cumple Cumple Cumple |
| Longitud de anclaje: Criterio del libro "Cálculo de estructuras de cimentación", J. Calavera. Ed. INTEMAC, 1991 - Armado inf. dirección X hacia der: - Armado inf. dirección X hacia izq: - Armado inf. dirección Y hacia arriba: - Armado inf. dirección Y hacia abajo: - Armado sup. dirección X hacia der: - Armado sup. dirección X hacia izq: - Armado sup. dirección Y hacia arriba: - Armado sup. dirección Y hacia abajo: | Mínimo: 29 cm Calculado: 32 cm Mínimo: 29 cm Calculado: 32 cm Mínimo: 29 cm Calculado: 32 cm Mínimo: 29 cm Calculado: 32 cm Mínimo: 71 cm Calculado: 344 cm Mínimo: 71 cm Calculado: 344 cm Mínimo: 68 cm Calculado: 366 cm Mínimo: 68 cm Calculado: 366 cm | Cumple Cumple Cumple Cumple Cumple Cumple Cumple Cumple |
| Longitud mínima de las patillas: - Armado inf. dirección X hacia der: - Armado inf. dirección X hacia izq: - Armado inf. dirección Y hacia arriba: - Armado inf. dirección Y hacia abajo: - Armado sup. dirección X hacia der: - Armado sup. dirección X hacia izq: - Armado sup. dirección Y hacia arriba: - Armado sup. dirección Y hacia abajo: | Mínimo: 16 cm Calculado: 19 cm Mínimo: 16 cm Calculado: 19 cm Mínimo: 16 cm Calculado: 19 cm Mínimo: 16 cm Calculado: 19 cm Mínimo: 20 cm Calculado: 24 cm Mínimo: 20 cm Calculado: 24 cm Mínimo: 20 cm Calculado: 46 cm Mínimo: 20 cm Calculado: 46 cm | Cumple Cumple Cumple Cumple Cumple Cumple Cumple Cumple |



| | | |
|--|---|--------|
| Referencia: (PP9 - PP7 - PP8 - PP10) | | |
| Dimensiones: 800 x 800 x 90 | | |
| Armados: Xi: Ø16c/20 Yi: Ø16c/20 Xs: Ø20c/15 Ys: Ø20c/15 | | |
| Comprobación | Valores | Estado |
| Se cumplen todas las comprobaciones | | |
| Referencia: (PP13 - PP11 - PP12 - PP14) | | |
| Dimensiones: 800 x 800 x 90 | | |
| Armados: Xi: Ø16c/20 Yi: Ø16c/20 Xs: Ø20c/15 Ys: Ø20c/15 | | |
| Comprobación | Valores | Estado |
| Tensiones sobre el terreno: Criterio de CYPE Ingenieros | | |
| - Tensión media en situaciones persistentes: | Máximo: 0.15 MPa Calculado: 0.126647 MPa | Cumple |
| - Tensión media en situaciones accidentales sísmicas: | Máximo: 0.18 MPa Calculado: 0.126549 MPa | Cumple |
| - Tensión máxima en situaciones persistentes sin viento: | Máximo: 0.187469 MPa Calculado: 0.163435 MPa | Cumple |
| - Tensión máxima en situaciones persistentes con viento: | Máximo: 0.187469 MPa Calculado: 0.163435 MPa | Cumple |
| - Tensión máxima en situaciones accidentales sísmicas: | Máximo: 0.224943 MPa Calculado: 0.1859 MPa | Cumple |
| Vuelco de la zapata: Si el % de reserva de seguridad es mayor que cero, quiere decir que los coeficientes de seguridad al vuelco son mayores que los valores estrictos exigidos para todas las combinaciones de equilibrio. | | |
| - En dirección X: | Reserva seguridad: 560.6 % | Cumple |
| - En dirección Y: | Reserva seguridad: 1027.5 % | Cumple |
| Flexión en la zapata: | | |
| - En dirección X: | Momento: -4226.75 kN·m | Cumple |
| - En dirección Y: | Momento: -4133.56 kN·m | Cumple |
| Cortante en la zapata: | | |
| - En dirección X: | Cortante: 2199.30 kN | Cumple |
| - En dirección Y: | Cortante: 2117.39 kN | Cumple |
| Compresión oblicua en la zapata: Criterio de CYPE Ingenieros | | |
| - Situaciones persistentes: | Máximo: 6000 kN/m ² Calculado: 2020.3 kN/m ² | Cumple |
| - Situaciones accidentales sísmicas: | Máximo: 6923 kN/m ² Calculado: 1114.6 kN/m ² | Cumple |
| Canto mínimo: Artículo 58.8.1 de la norma EHE-08 | Mínimo: 25 cm Calculado: 90 cm | Cumple |
| Espacio para anclar arranques en cimentación: | Mínimo: 48 cm | |
| - PP13: | Calculado: 82 cm | Cumple |
| - PP11: | Calculado: 82 cm | Cumple |
| - PP12: | Calculado: 82 cm | Cumple |
| - PP14: | Calculado: 82 cm | Cumple |
| Cuantía geométrica mínima: Artículo 42.3.5 de la norma EHE-08 | Mínimo: 0.0009 | |
| - Armado inferior dirección X: | Calculado: 0.0011 | Cumple |
| - Armado superior dirección X: | Calculado: 0.0023 | Cumple |
| - Armado inferior dirección Y: | Calculado: 0.0011 | Cumple |
| - Armado superior dirección Y: | Calculado: 0.0023 | Cumple |
| Cuantía mínima necesaria por flexión: Artículo 42.3.2 de la norma EHE-08 | | |
| - Armado inferior dirección X: | Mínimo: 0.0005 Calculado: 0.0012 | Cumple |
| - Armado inferior dirección Y: | Mínimo: 0.0004 Calculado: 0.0012 | Cumple |
| - Armado superior dirección X: | Mínimo: 0.0019 Calculado: 0.0024 | Cumple |
| - Armado superior dirección Y: | Mínimo: 0.0019 Calculado: 0.0024 | Cumple |
| Diámetro mínimo de las barras: Recomendación del Artículo 58.8.2 (norma EHE-08) | Mínimo: 12 mm | |
| - Parrilla inferior: | Calculado: 16 mm | Cumple |
| - Parrilla superior: | Calculado: 20 mm | Cumple |
| Separación máxima entre barras: Artículo 58.8.2 de la norma EHE-08 | Máximo: 30 cm | |
| - Armado inferior dirección X: | Calculado: 20 cm | Cumple |
| - Armado inferior dirección Y: | Calculado: 20 cm | Cumple |



| Referencia: (PP13 - PP11 - PP12 - PP14) | | |
|--|---|--------|
| Dimensiones: 800 x 800 x 90 | | |
| Armados: Xi:Ø16c/20 Yi:Ø16c/20 Xs:Ø20c/15 Ys:Ø20c/15 | | |
| Comprobación | Valores | Estado |
| - Armado superior dirección X: | Calculado: 15 cm | Cumple |
| - Armado superior dirección Y: | Calculado: 15 cm | Cumple |
| Separación mínima entre barras: Criterio de CYPE Ingenieros, basado en: J. Calavera. "Cálculo de Estructuras de Cimentación". Capítulo 3.16 | | |
| - Armado inferior dirección X: | Mínimo: 10 cm Calculado: 20 cm | Cumple |
| - Armado inferior dirección Y: | Calculado: 20 cm | Cumple |
| - Armado superior dirección X: | Calculado: 15 cm | Cumple |
| - Armado superior dirección Y: | Calculado: 15 cm | Cumple |
| Longitud de anclaje: Criterio del libro "Cálculo de estructuras de cimentación", J. Calavera. Ed. INTEMAC, 1991 | | |
| - Armado inf. dirección X hacia der: | Mínimo: 28 cm Calculado: 31 cm | Cumple |
| - Armado inf. dirección X hacia izq: | Mínimo: 28 cm Calculado: 31 cm | Cumple |
| - Armado inf. dirección Y hacia arriba: | Mínimo: 28 cm Calculado: 31 cm | Cumple |
| - Armado inf. dirección Y hacia abajo: | Mínimo: 28 cm Calculado: 31 cm | Cumple |
| - Armado sup. dirección X hacia der: | Mínimo: 73 cm Calculado: 366 cm | Cumple |
| - Armado sup. dirección X hacia izq: | Mínimo: 73 cm Calculado: 366 cm | Cumple |
| - Armado sup. dirección Y hacia arriba: | Mínimo: 72 cm Calculado: 366 cm | Cumple |
| - Armado sup. dirección Y hacia abajo: | Mínimo: 72 cm Calculado: 366 cm | Cumple |
| Longitud mínima de las patillas: | | |
| - Armado inf. dirección X hacia der: | Mínimo: 16 cm Calculado: 19 cm | Cumple |
| - Armado inf. dirección X hacia izq: | Mínimo: 16 cm Calculado: 19 cm | Cumple |
| - Armado inf. dirección Y hacia arriba: | Mínimo: 16 cm Calculado: 19 cm | Cumple |
| - Armado inf. dirección Y hacia abajo: | Mínimo: 16 cm Calculado: 19 cm | Cumple |
| - Armado sup. dirección X hacia der: | Mínimo: 20 cm Calculado: 46 cm | Cumple |
| - Armado sup. dirección X hacia izq: | Mínimo: 20 cm Calculado: 46 cm | Cumple |
| - Armado sup. dirección Y hacia arriba: | Mínimo: 20 cm Calculado: 46 cm | Cumple |
| - Armado sup. dirección Y hacia abajo: | Mínimo: 20 cm Calculado: 46 cm | Cumple |
| Se cumplen todas las comprobaciones | | |
| Referencia: (PP15 - PP16 - PP18 - PP17) | | |
| Dimensiones: 800 x 800 x 90 | | |
| Armados: Xi:Ø16c/20 Yi:Ø16c/20 Xs:Ø20c/15 Ys:Ø20c/15 | | |
| Comprobación | Valores | Estado |
| Tensiones sobre el terreno: Criterio de CYPE Ingenieros | | |
| - Tensión media en situaciones persistentes: | Máximo: 0.15 MPa Calculado: 0.129884 MPa | Cumple |
| - Tensión media en situaciones accidentales sísmicas: | Máximo: 0.18 MPa Calculado: 0.129394 MPa | Cumple |
| - Tensión máxima en situaciones persistentes sin viento: | Máximo: 0.187469 MPa Calculado: 0.172754 MPa | Cumple |
| - Tensión máxima en situaciones persistentes con viento: | Máximo: 0.187469 MPa Calculado: 0.172754 MPa | Cumple |
| - Tensión máxima en situaciones accidentales sísmicas: | Máximo: 0.224943 MPa Calculado: 0.185605 MPa | Cumple |
| Vuelco de la zapata: Si el % de reserva de seguridad es mayor que cero, quiere decir que los coeficientes de seguridad al vuelco son mayores que los valores estrictos exigidos para todas las combinaciones de equilibrio. | | |
| - En dirección X: | Reserva seguridad: 474.7 % | Cumple |
| - En dirección Y: | Reserva seguridad: 1066.7 % | Cumple |
| Flexión en la zapata: | | |



| | | |
|--|---|--------|
| Referencia: (PP15 - PP16 - PP18 - PP17) Dimensiones: 800 x 800 x 90 Armados: Xi: Ø16c/20 Yi: Ø16c/20 Xs: Ø20c/15 Ys: Ø20c/15 | | |
| Comprobación | Valores | Estado |
| - En dirección X: | Momento: -4405.76 kN·m | Cumple |
| - En dirección Y: | Momento: -4162.10 kN·m | Cumple |
| Cortante en la zapata: | | |
| - En dirección X: | Cortante: 2207.84 kN | Cumple |
| - En dirección Y: | Cortante: 2195.97 kN | Cumple |
| Compresión oblicua en la zapata: Criterio de CYPE Ingenieros | | |
| - Situaciones persistentes: | Máximo: 6000 kN/m² Calculado: 2187.4 kN/m² | Cumple |
| - Situaciones accidentales sísmicas: | Máximo: 6923 kN/m² Calculado: 1027.4 kN/m² | Cumple |
| Canto mínimo: Artículo 58.8.1 de la norma EHE-08 | Mínimo: 25 cm Calculado: 90 cm | Cumple |
| Espacio para anclar arranques en cimentación: | Calculado: 82 cm | |
| - PP15: | Mínimo: 48 cm | Cumple |
| - PP16: | Mínimo: 71 cm | Cumple |
| - PP18: | Mínimo: 71 cm | Cumple |
| - PP17: | Mínimo: 48 cm | Cumple |
| Cuántía geométrica mínima: Artículo 42.3.5 de la norma EHE-08 | Mínimo: 0.0009 | |
| - Armado inferior dirección X: | Calculado: 0.0011 | Cumple |
| - Armado superior dirección X: | Calculado: 0.0023 | Cumple |
| - Armado inferior dirección Y: | Calculado: 0.0011 | Cumple |
| - Armado superior dirección Y: | Calculado: 0.0023 | Cumple |
| Cuántía mínima necesaria por flexión: Artículo 42.3.2 de la norma EHE-08 | | |
| - Armado inferior dirección X: | Mínimo: 0.0005 Calculado: 0.0012 | Cumple |
| - Armado inferior dirección Y: | Mínimo: 0.0004 Calculado: 0.0012 | Cumple |
| - Armado superior dirección X: | Mínimo: 0.0019 Calculado: 0.0024 | Cumple |
| - Armado superior dirección Y: | Mínimo: 0.0019 Calculado: 0.0024 | Cumple |
| Diámetro mínimo de las barras: Recomendación del Artículo 58.8.2 (norma EHE-08) | Mínimo: 12 mm | |
| - Parrilla inferior: | Calculado: 16 mm | Cumple |
| - Parrilla superior: | Calculado: 20 mm | Cumple |
| Separación máxima entre barras: Artículo 58.8.2 de la norma EHE-08 | Máximo: 30 cm | |
| - Armado inferior dirección X: | Calculado: 20 cm | Cumple |
| - Armado inferior dirección Y: | Calculado: 20 cm | Cumple |
| - Armado superior dirección X: | Calculado: 15 cm | Cumple |
| - Armado superior dirección Y: | Calculado: 15 cm | Cumple |
| Separación mínima entre barras: Criterio de CYPE Ingenieros, basado en: J. Calavera. "Cálculo de Estructuras de Cimentación". Capítulo 3.16 | Mínimo: 10 cm | |
| - Armado inferior dirección X: | Calculado: 20 cm | Cumple |
| - Armado inferior dirección Y: | Calculado: 20 cm | Cumple |
| - Armado superior dirección X: | Calculado: 15 cm | Cumple |
| - Armado superior dirección Y: | Calculado: 15 cm | Cumple |
| Longitud de anclaje: Criterio del libro "Cálculo de estructuras de cimentación", J. Calavera. Ed. INTEMAC, 1991 | | |
| - Armado inf. dirección X hacia der: | Mínimo: 28 cm Calculado: 31 cm | Cumple |
| - Armado inf. dirección X hacia izq: | Mínimo: 28 cm Calculado: 31 cm | Cumple |
| - Armado inf. dirección Y hacia arriba: | Mínimo: 28 cm Calculado: 31 cm | Cumple |
| - Armado inf. dirección Y hacia abajo: | Mínimo: 28 cm Calculado: 31 cm | Cumple |
| - Armado sup. dirección X hacia der: | Mínimo: 76 cm Calculado: 351 cm | Cumple |
| - Armado sup. dirección X hacia izq: | Mínimo: 76 cm Calculado: 351 cm | Cumple |
| - Armado sup. dirección Y hacia arriba: | Mínimo: 72 cm Calculado: 351 cm | Cumple |



| Referencia: (PP5 - PP3 - PP6 - PP4) Dimensiones: 800 x 800 x 90 Armados: Xi: Ø16c/20 Yi: Ø16c/20 Xs: Ø20c/15 Ys: Ø20c/15 | | |
|--|-------------------------------------|--------|
| Comprobación | Valores | Estado |
| - Armado superior dirección Y: | Calculado: 0.0023 | Cumple |
| Cuantía mínima necesaria por flexión: Artículo 42.3.2 de la norma EHE-08 | | |
| - Armado inferior dirección X: | Mínimo: 0.0005 Calculado: 0.0012 | Cumple |
| - Armado inferior dirección Y: | Mínimo: 0.0004 Calculado: 0.0012 | Cumple |
| - Armado superior dirección X: | Mínimo: 0.0018 Calculado: 0.0024 | Cumple |
| - Armado superior dirección Y: | Mínimo: 0.0018 Calculado: 0.0024 | Cumple |
| Diámetro mínimo de las barras: Recomendación del Artículo 58.8.2 (norma EHE-08) | | |
| - Parrilla inferior: | Mínimo: 12 mm Calculado: 16 mm | Cumple |
| - Parrilla superior: | Calculado: 20 mm | Cumple |
| Separación máxima entre barras: Artículo 58.8.2 de la norma EHE-08 | | |
| - Armado inferior dirección X: | Máximo: 30 cm Calculado: 20 cm | Cumple |
| - Armado inferior dirección Y: | Calculado: 20 cm | Cumple |
| - Armado superior dirección X: | Calculado: 15 cm | Cumple |
| - Armado superior dirección Y: | Calculado: 15 cm | Cumple |
| Separación mínima entre barras: Criterio de CYPE Ingenieros, basado en: J. Calavera. "Cálculo de Estructuras de Cimentación". Capítulo 3.16 | | |
| - Armado inferior dirección X: | Mínimo: 10 cm Calculado: 20 cm | Cumple |
| - Armado inferior dirección Y: | Calculado: 20 cm | Cumple |
| - Armado superior dirección X: | Calculado: 15 cm | Cumple |
| - Armado superior dirección Y: | Calculado: 15 cm | Cumple |
| Longitud de anclaje: Criterio del libro "Cálculo de estructuras de cimentación", J. Calavera. Ed. INTEMAC, 1991 | | |
| - Armado inf. dirección X hacia der: | Mínimo: 26 cm Calculado: 29 cm | Cumple |
| - Armado inf. dirección X hacia izq: | Mínimo: 26 cm Calculado: 29 cm | Cumple |
| - Armado inf. dirección Y hacia arriba: | Mínimo: 26 cm Calculado: 29 cm | Cumple |
| - Armado inf. dirección Y hacia abajo: | Mínimo: 26 cm Calculado: 29 cm | Cumple |
| - Armado sup. dirección X hacia der: | Mínimo: 68 cm Calculado: 351 cm | Cumple |
| - Armado sup. dirección X hacia izq: | Mínimo: 68 cm Calculado: 351 cm | Cumple |
| - Armado sup. dirección Y hacia arriba: | Mínimo: 68 cm Calculado: 351 cm | Cumple |
| - Armado sup. dirección Y hacia abajo: | Mínimo: 68 cm Calculado: 351 cm | Cumple |
| Longitud mínima de las patillas: | | |
| - Armado inf. dirección X hacia der: | Mínimo: 16 cm Calculado: 19 cm | Cumple |
| - Armado inf. dirección X hacia izq: | Mínimo: 16 cm Calculado: 19 cm | Cumple |
| - Armado inf. dirección Y hacia arriba: | Mínimo: 16 cm Calculado: 19 cm | Cumple |
| - Armado inf. dirección Y hacia abajo: | Mínimo: 16 cm Calculado: 19 cm | Cumple |
| - Armado sup. dirección X hacia der: | Mínimo: 20 cm Calculado: 31 cm | Cumple |
| - Armado sup. dirección X hacia izq: | Mínimo: 20 cm Calculado: 31 cm | Cumple |
| - Armado sup. dirección Y hacia arriba: | Mínimo: 20 cm Calculado: 31 cm | Cumple |
| - Armado sup. dirección Y hacia abajo: | Mínimo: 20 cm Calculado: 31 cm | Cumple |
| Hay comprobaciones que no se cumplen | | |