

RF-LAMINATE

Proyecto: TFM Modelo: TFM\_FINAL\_v01  
TFM Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

### 1.1.1 DATOS GENERALES

Superficies para el cálculo	1-9,26-34,46,52-61,78,81-83,89-106,188-196,237-245,286-294
Cálculo según la norma	EN 1995-1-1:2004-11/UNE
Modelo de material:	Ortótropo
<b>Estado límite último</b>	
Combinaciones de resultados para el cálculo	CR1 ELU (STR/GEO) - Permanente / transitoria - Ec. 6.10 Persistente/transit.

### 1.1.2 DETALLES

Teoría de flexión de placas:	Mindlin
<b>1 - Forjado CLT 220</b>	
Superficies asignadas a la composición:	172-186,221-236,270-285,295,296
Capa de unión	<input checked="" type="checkbox"/>
Madera contralaminada sin cola en el lado estrecho	<input checked="" type="checkbox"/>
Fallo por cortante en la superficie de contacto encolada	<input type="checkbox"/>
Efecto de la rigidez a torsión $D_{33}$	$k_{33} = 0.65$
Efecto de la rigidez a cortante $D_{44}$	$k_{44} = 1.00$
Efecto de la rigidez a cortante $D_{55}$	$k_{55} = 1.00$
Efecto de la rigidez de la membrana $D_{88}$	$k_{88} = 0.70$
Plano de referencia relativo a:	Centro de la composición
Desplazamiento del plano de referencia:	0.0 mm
<b>2 - Pared CLT 140</b>	
Superficies asignadas a la composición:	1-9,26-34,46,52-61,78,81-83,89-106,188-196,237-245,286-294
Capa de unión	<input checked="" type="checkbox"/>
Madera contralaminada sin cola en el lado estrecho	<input checked="" type="checkbox"/>
Fallo por cortante en la superficie de contacto encolada	<input type="checkbox"/>
Efecto de la rigidez a torsión $D_{33}$	$k_{33} = 0.65$
Efecto de la rigidez a cortante $D_{44}$	$k_{44} = 1.00$
Efecto de la rigidez a cortante $D_{55}$	$k_{55} = 1.00$
Efecto de la rigidez de la membrana $D_{88}$	$k_{88} = 0.70$
Plano de referencia relativo a:	Centro de la composición
Desplazamiento del plano de referencia:	0.0 mm
<b>3 - Viga CLT 140</b>	
Superficies asignadas a la composición:	22,25,48,51,74,77,148-171,197-220,246-269
Capa de unión	<input checked="" type="checkbox"/>
Madera contralaminada sin cola en el lado estrecho	<input checked="" type="checkbox"/>
Fallo por cortante en la superficie de contacto encolada	<input type="checkbox"/>
Efecto de la rigidez a torsión $D_{33}$	$k_{33} = 0.65$
Efecto de la rigidez a cortante $D_{44}$	$k_{44} = 1.00$
Efecto de la rigidez a cortante $D_{55}$	$k_{55} = 1.00$
Efecto de la rigidez de la membrana $D_{88}$	$k_{88} = 0.70$
Plano de referencia relativo a:	Centro de la composición
Desplazamiento del plano de referencia:	0.0 mm

### 1.1.3 DATOS PARA LA NORMA

<b>Madera laminada encolada</b>			
Coefficiente parcial $\gamma_M$			
Persistente/transit.	1.25		
Accidental	1.00		
Factor de modificación $k_{mod}$			
	Clase de servicio 1	Clase de servicio 2	Clase de servicio 3
Permanente	0.60	0.60	0.50
Larga	0.70	0.70	0.55
Media	0.80	0.80	0.65
Corta	0.90	0.90	0.70
Instantánea	1.10	1.10	0.90
<b>Límites de servicio (flechas)</b>			

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### 1.1.3 DATOS PARA LA NORMA

Combinación de acciones:		Voladizos
Característica 1 - Integridad	L / 500	L <sub>c</sub> / 150
Característica 2 - Confort	L / 350	L <sub>c</sub> / 175
Cuasipermanente - Apariencia	L / 300	L <sub>c</sub> / 150

### 1.2.1 CARACTERÍSTICAS DEL MATERIAL - A

Comp. núm.	Capa núm.	Descripción del material	Categoría del factor	Espesor t [mm]	Coef. de Poisson [-]		Módulo de cortante [N/mm <sup>2</sup> ]		
					$\nu_{xy}$	$\nu_{yx}$	$G_{xz}$	$G_{yz}$	$G_{xy}$
1	<b>Forjado CLT 220</b>								
	1	C24	A	30.0	0.200	0.007	690.0	50.0	690.0
	CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)								
	2	C24	A	30.0	0.200	0.007	690.0	50.0	690.0
	CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)								
	3	C24	A	30.0	0.200	0.007	690.0	50.0	690.0
	CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)								
	4	C24	A	40.0	0.200	0.007	690.0	50.0	690.0
	CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)								
	5	C24	A	30.0	0.200	0.007	690.0	50.0	690.0
	CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)								
	6	C24	A	30.0	0.200	0.007	690.0	50.0	690.0
	CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)								
	7	C24	A	30.0	0.200	0.007	690.0	50.0	690.0
	CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)								
2	<b>Pared CLT 140</b>								
	1	C24	A	40.0	0.200	0.007	690.0	50.0	690.0
	CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)								
	2	C24	A	20.0	0.200	0.007	690.0	50.0	690.0
	CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)								
	3	C24	A	20.0	0.200	0.007	690.0	50.0	690.0
	CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)								
	4	C24	A	20.0	0.200	0.007	690.0	50.0	690.0
	CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)								
	5	C24	A	40.0	0.200	0.007	690.0	50.0	690.0
	CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)								
3	<b>Viga CLT 140</b>								
	1	C24	A	40.0	0.200	0.007	690.0	50.0	690.0
	CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)								
	2	C24	A	20.0	0.200	0.007	690.0	50.0	690.0
	CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)								
	3	C24	A	20.0	0.200	0.007	690.0	50.0	690.0
	CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)								
	4	C24	A	20.0	0.200	0.007	690.0	50.0	690.0
	CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)								
	5	C24	A	40.0	0.200	0.007	690.0	50.0	690.0
	CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)								
		Categoría de factor							
		A - Madera laminada encolada							

### 1.2.2 CARACTERÍSTICAS DEL MATERIAL - B

Comp. núm.	Capa núm.	Descripción del material	Ángulo $\beta$ [°]	Módulo de elasticidad [N/mm <sup>2</sup> ]		Peso específico $\gamma$ [kN/m <sup>3</sup> ]	Coef. de dilat. térm. $\alpha_T$ [1/K]
				$E_x$	$E_y$		
1	<b>Forjado CLT 220</b>						
	1	C24	0.00	12000.0	0.0	5.00	5.0E-06
	CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)						
	2	C24	0.00	12000.0	0.0	5.00	5.0E-06
	CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)						
	3	C24	90.00	12000.0	0.0	5.00	5.0E-06
	CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)						
	4	C24	0.00	12000.0	0.0	5.00	5.0E-06
	CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)						
	5	C24	90.00	12000.0	0.0	5.00	5.0E-06
	CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)						
	6	C24	0.00	12000.0	0.0	5.00	5.0E-06

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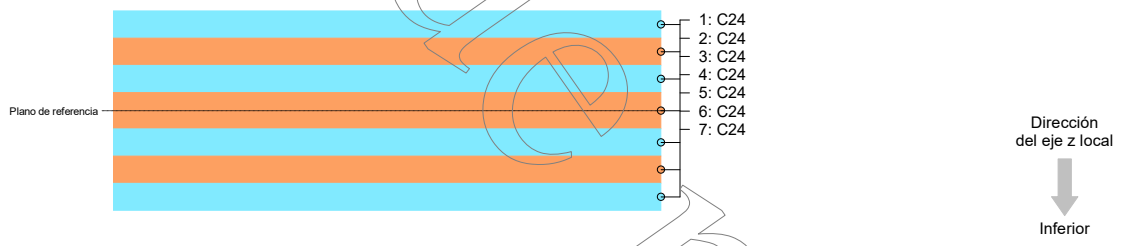
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## 1.2.2 CARACTERÍSTICAS DEL MATERIAL - B

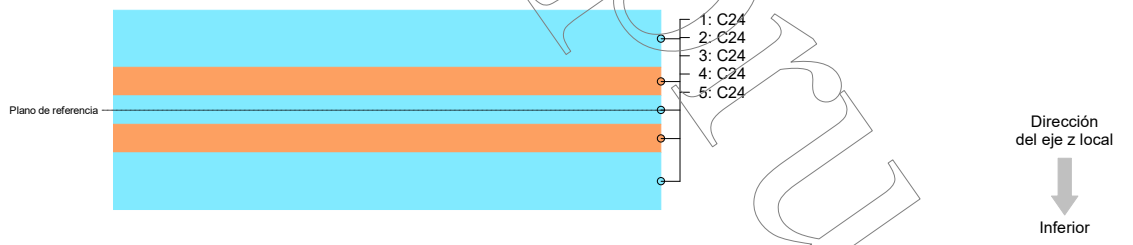
Comp. núm.	Capa núm.	Descripción del material	Ángulo $\beta$ [°]	Módulo de elasticidad [N/mm <sup>2</sup> ]		Peso específico $\gamma$ [kN/m <sup>3</sup> ]	Coef. de dilat. térm. $\alpha_T$ [1/K]
		CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)					
	7	C24	0.00	12000.0	0.0	5.00	5.0E-06
		CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)					
2		<b>Pared CLT 140</b>					
	1	C24	90.00	12000.0	0.0	5.00	5.0E-06
		CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)					
	2	C24	0.00	12000.0	0.0	5.00	5.0E-06
		CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)					
3	3	C24	90.00	12000.0	0.0	5.00	5.0E-06
		CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)					
	4	C24	0.00	12000.0	0.0	5.00	5.0E-06
		CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)					
	5	C24	90.00	12000.0	0.0	5.00	5.0E-06
		CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)					
		<b>Viga CLT 140</b>					
	1	C24	0.00	12000.0	0.0	5.00	5.0E-06
		CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)					
	2	C24	90.00	12000.0	0.0	5.00	5.0E-06
		CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)					
	3	C24	0.00	12000.0	0.0	5.00	5.0E-06
		CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)					
	4	C24	90.00	12000.0	0.0	5.00	5.0E-06
		CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)					
	5	C24	0.00	12000.0	0.0	5.00	5.0E-06
		CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)					

## 1.2.4 DIAGRAMAS DE CAPAS

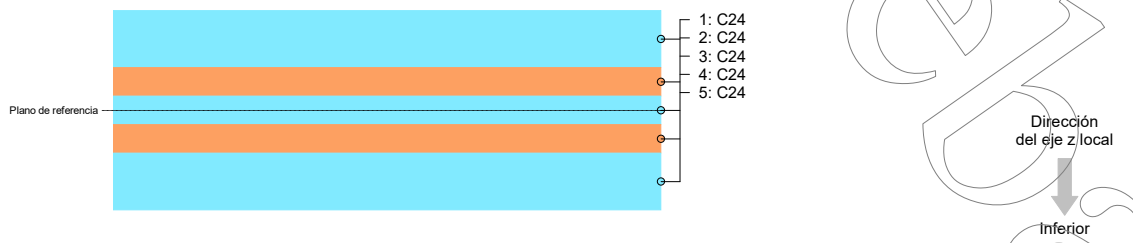
1 | Forjado CLT 220



2 | Pared CLT 140



3 | Viga CLT 140



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### 1.3.1 RESISTENCIAS DEL MATERIAL - A

Comp. núm.	Capa núm.	Descripción del material	Resistencia para flex. /tracc. / compr. [N/mm <sup>2</sup> ]					
			$f_{b,0,k}$	$f_{b,90,k}$	$f_{t,0,k}$	$f_{t,90,k}$	$f_{c,0,k}$	$f_{c,90,k}$
1	<b>Forjado CLT 220</b>							
	1	C24 CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
	2	C24 CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
	3	C24 CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
	4	C24 CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
	5	C24 CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
	6	C24 CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
2	<b>Pared CLT 140</b>							
	1	C24 CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
	2	C24 CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
	3	C24 CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
	4	C24 CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
	5	C24 CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
	6	C24 CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
3	<b>Viga CLT 140</b>							
	1	C24 CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
	2	C24 CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
	3	C24 CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
	4	C24 CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
	5	C24 CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5
	6	C24 CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)	24.0	0.0	24.0	0.4	24.0	2.5

### 1.3.2 RESISTENCIAS DEL MATERIAL - B

Comp. núm.	Capa núm.	Descripción del material	Resistencias a cortante [N/mm <sup>2</sup> ]			Torsión [N/mm <sup>2</sup> ]
			$f_{xy,k}$	$f_{vk}$	$f_{R,k}$	$f_{v,tor,k}$
1	<b>Forjado CLT 220</b>					
	1	C24 CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)	4.0	4.0	1.0	-
	2	C24 CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)	4.0	4.0	1.0	-
	3	C24 CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)	4.0	4.0	1.0	-
	4	C24 CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)	4.0	4.0	1.0	-
	5	C24 CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)	4.0	4.0	1.0	-
	6	C24 CLT 220 L7s-2, Panel del piso(picea), Stora Enso (ETA-14/0349)	4.0	4.0	1.0	-
2	<b>Pared CLT 140</b>					
	1	C24 CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)	4.0	4.0	1.0	-
	2	C24 CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)	4.0	4.0	1.0	-
	3	C24 CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)	4.0	4.0	1.0	-

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### 1.3.2 RESISTENCIAS DEL MATERIAL - B

Comp. núm.	Capa núm.	Descripción del material	Resistencias a cortante [N/mm <sup>2</sup> ]			Torsión [N/mm <sup>2</sup> ]
			$f_{xy,k}$	$f_{y,k}$	$f_{R,k}$	
3	4	C24	4.0	4.0	1.0	-
	CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)					
	5	C24	4.0	4.0	1.0	-
	CLT 140 C5s, Elemento de pared(picea), Stora Enso (ETA-14/0349)					
	<b>Viga CLT 140</b>					
	1	C24	4.0	4.0	1.0	-
	CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)					
	2	C24	4.0	4.0	1.0	-
	CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)					
	3	C24	4.0	4.0	1.0	-
	CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)					
	4	C24	4.0	4.0	1.0	-
	CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)					
	5	C24	4.0	4.0	1.0	-
	CLT 140 L5s, Panel del piso(picea), Stora Enso (ETA-14/0349)					

### 1.4 CLASE DE DURACIÓN DE CARGA Y SERVICIO

Carga	Descripción	Tipo de carga	Clase de duración de carga CDC
CC1	Peso Propio		Permanente
CC2	Cargas Muertas		Permanente
CC3	Sobrecarga de uso		Media
CR1	ELU (STR/GEO) - Permanente / transitoria - Ec. 6.10		Permanente
Clase de servicio CLSE			
Clase de servicio 1			

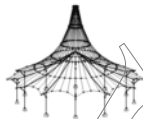
Idéntica para todas las superficies

### 2.1 RAZÓN MÁX. DE TENSIONES POR CARGA

Carga	Superf.	Punto	Coordenadas del punto [m]			Capa		Tensiones [N/mm <sup>2</sup> ]			Razón	
	núm.	núm.	X	Y	Z	núm.	z [mm]	Lado	Símbolo	Existente		Límite
CR1	ELU (STR/GEO) - Permanente / transitoria - Ec. 6.10											
	104	8262	32.400	0.000	10.000	5	140.0	Inferior	$\sigma_{b,0}$	-1.14	11.52	0.10
	104	8260	35.100	0.000	9.500	5	120.0	Intermedio	$\sigma_{b,c,0}$	-5.56	11.52	0.48
	104	8260	35.100	0.000	9.500	5	100.0	Superior	$\sigma_{b+tlc,0}$	-4.49		0.57
	103	8234	24.840	0.000	12.000	2	50.0	Intermedio	$\tau_{yz}$	0.11	0.50	0.23
	103	8234	24.840	0.000	12.000	3	70.0	Intermedio	$\tau_{xz}$	0.12	1.92	0.06
	4	1062	48.600	16.200	0.000	5	140.0	Inferior	$\tau_{xy}$	1.66	1.92	0.86
	Razón máxima 0.86											

### 2.2 RAZÓN MÁX. DE TENSIONES POR SUPERFICIE

Superf. núm.	Punto núm.	Coordenadas del punto [m]			Carga	Núm.	Capa z [mm]	Lado	Tensiones [N/mm <sup>2</sup> ]			Razón [-]
		X	Y	Z					Símbolo	Existente	Límite	
1	332	18.900	18.900	1.000	CR1	2	40.0	Superior	$\sigma_{b,0}$	-0.14	11.52	0.01
	1023	18.900	13.500	0.000	CR1	4	90.0	Intermedio	$\sigma_{b,c,0}$	-1.93	11.52	0.17
	1023	18.900	13.500	0.000	CR1	4	80.0	Superior	$\sigma_{b+tlc,0}$	-1.86		0.17
	1023	18.900	13.500	0.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	0.02	0.50	0.04
	1023	18.900	13.500	0.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	0.02	1.92	0.01
	1023	18.900	13.500	0.000	CR1	5	140.0	Inferior	$\tau_{xy}$	-0.69	1.92	0.36
2	7465	24.300	13.500	1.500	CR1	1	40.0	Inferior	$\sigma_{b,0}$	0.08	11.52	0.01
	1028	24.300	13.500	0.000	CR1	4	90.0	Intermedio	$\sigma_{b,c,0}$	-1.60	11.52	0.14
	1028	24.300	13.500	0.000	CR1	4	80.0	Superior	$\sigma_{b+tlc,0}$	-1.55		0.14
	1028	24.300	13.500	0.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	-0.02	0.50	0.04
	1028	24.300	13.500	0.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.02	1.92	0.01
	1028	24.300	13.500	0.000	CR1	5	140.0	Inferior	$\tau_{xy}$	0.66	1.92	0.34
3	23806	43.200	16.200	1.500	CR1	1	0.0	Superior	$\sigma_{b,0}$	-0.12	11.52	0.01
	1057	43.200	16.200	0.000	CR1	4	90.0	Intermedio	$\sigma_{b,c,0}$	-3.94	11.52	0.34
	1057	43.200	16.200	0.000	CR1	4	80.0	Superior	$\sigma_{b+tlc,0}$	-3.87		0.35
	1057	43.200	16.200	0.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.05
	1057	43.200	16.200	0.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	0.03	1.92	0.01
	1057	43.200	16.200	0.000	CR1	5	140.0	Inferior	$\tau_{xy}$	-1.42	1.92	0.74
4	13905	48.600	16.200	1.500	CR1	5	100.0	Superior	$\sigma_{b,0}$	-0.11	11.52	0.01
	1062	48.600	16.200	0.000	CR1	4	90.0	Intermedio	$\sigma_{b,c,0}$	-4.75	11.52	0.41
	1062	48.600	16.200	0.000	CR1	4	80.0	Superior	$\sigma_{b+tlc,0}$	-4.69		0.42
	1062	48.600	16.200	0.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	-0.03	0.50	0.06
	1062	48.600	16.200	0.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.03	1.92	0.02
	1062	48.600	16.200	0.000	CR1	5	140.0	Inferior	$\tau_{xy}$	1.66	1.92	0.86

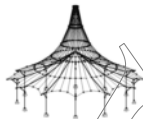


Proyecto: TFM  
TFM  
Modelo: TFM\_FINAL\_v01  
Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.2 RAZÓN MÁX. DE TENSIONES POR SUPERFICIE

Superf. núm.	Punto núm.	Coordenadas del punto [m]			Carga	Núm.	Capa		Lado	Tensiones [N/mm <sup>2</sup> ]			Razón [-]
		X	Y	Z			z [mm]			Símbolo	Existente	Límite	
5	23670	67.500	16.740	2.000	CR1	1	0.0		Superior	$\sigma_{b,0}$	0.21	11.52	0.02
	19124	67.500	21.600	2.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-0.74	11.52	0.06
	19124	67.500	21.600	2.000	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-0.53		0.08
	1088	67.500	13.500	1.000	CR1	3	70.0		Intermedio	$\tau_{yz}$	0.03	0.50	0.06
	1088	67.500	13.500	1.000	CR1	2	60.0		Inferior	$\tau_{xz}$	-0.03	1.92	0.02
	336	67.500	24.300	1.000	CR1	5	140.0		Inferior	$\tau_{xy}$	0.16	1.92	0.09
6	338	59.400	13.500	1.000	CR1	2	40.0		Superior	$\sigma_{b,0}$	-0.09	11.52	0.01
	1099	59.400	13.500	0.000	CR1	4	90.0		Intermedio	$\sigma_{b,c,0}$	-3.06	11.52	0.27
	1099	59.400	13.500	0.000	CR1	4	80.0		Superior	$\sigma_{b+tlc,0}$	-3.03		0.27
	22428	59.400	13.500	0.500	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.02	0.50	0.04
	22428	59.400	13.500	0.500	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.02	1.92	0.01
	1099	59.400	13.500	0.000	CR1	5	140.0		Inferior	$\tau_{xy}$	1.07	1.92	0.56
7	18194	62.100	3.240	2.000	CR1	1	0.0		Superior	$\sigma_{b,0}$	0.21	11.52	0.02
	18155	62.100	2.700	2.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-0.80	11.52	0.07
	18155	62.100	2.700	2.000	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-0.58		0.09
	1110	62.100	0.000	1.000	CR1	3	70.0		Intermedio	$\tau_{yz}$	0.03	0.50	0.06
	1110	62.100	0.000	1.000	CR1	2	60.0		Inferior	$\tau_{xz}$	-0.03	1.92	0.02
	1110	62.100	0.000	1.000	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.19	1.92	0.10
8	1176	0.000	10.800	1.000	CR1	2	40.0		Superior	$\sigma_{b,0}$	-0.62	11.52	0.05
	1176	0.000	10.800	1.000	CR1	4	90.0		Intermedio	$\sigma_{b,c,0}$	1.25	11.52	0.11
	1176	0.000	10.800	1.000	CR1	4	80.0		Superior	$\sigma_{b+tlc,0}$	0.63		0.16
	23889	0.000	0.000	1.500	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.07	0.50	0.15
	23889	0.000	0.000	1.500	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.08	1.92	0.04
	23834	0.000	0.000	0.500	CR1	5	140.0		Inferior	$\tau_{xy}$	0.38	1.92	0.20
9	346	0.000	13.500	1.000	CR1	4	80.0		Superior	$\sigma_{b,0}$	-0.75	11.52	0.07
	346	0.000	13.500	1.000	CR1	4	90.0		Intermedio	$\sigma_{b,c,0}$	1.51	11.52	0.13
	346	0.000	13.500	1.000	CR1	4	80.0		Superior	$\sigma_{b+tlc,0}$	0.76		0.20
	24047	0.000	18.900	1.500	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.07	0.50	0.14
	24047	0.000	18.900	1.500	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.07	1.92	0.04
	25538	0.000	18.900	0.500	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.38	1.92	0.20
26	558	18.900	18.900	5.000	CR1	2	60.0		Inferior	$\sigma_{b,0}$	0.10	11.52	0.01
	1319	18.900	13.500	4.000	CR1	4	90.0		Intermedio	$\sigma_{b,c,0}$	-1.60	11.52	0.14
	1319	18.900	13.500	4.000	CR1	4	80.0		Superior	$\sigma_{b+tlc,0}$	-1.55		0.14
	1319	18.900	13.500	4.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.02	0.50	0.04
	1319	18.900	13.500	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.02	1.92	0.01
	1319	18.900	13.500	4.000	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.53	1.92	0.27
27	2630	24.300	13.500	5.500	CR1	5	100.0		Superior	$\sigma_{b,0}$	-0.08	11.52	0.01
	1327	24.300	13.500	4.000	CR1	4	90.0		Intermedio	$\sigma_{b,c,0}$	-1.71	11.52	0.15
	1327	24.300	13.500	4.000	CR1	4	80.0		Superior	$\sigma_{b+tlc,0}$	-1.67		0.15
	1327	24.300	13.500	4.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	-0.02	0.50	0.04
	1327	24.300	13.500	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	-0.02	1.92	0.01
	1327	24.300	13.500	4.000	CR1	5	140.0		Inferior	$\tau_{xy}$	0.53	1.92	0.28
28	2781	43.200	16.200	5.500	CR1	5	140.0		Inferior	$\sigma_{b,0}$	0.10	11.52	0.01
	1371	43.200	16.200	4.000	CR1	4	90.0		Intermedio	$\sigma_{b,c,0}$	-2.90	11.52	0.25
	1371	43.200	16.200	4.000	CR1	4	80.0		Superior	$\sigma_{b+tlc,0}$	-2.84		0.26
	1371	43.200	16.200	4.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.02	0.50	0.05
	1371	43.200	16.200	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.03	1.92	0.01
	1371	43.200	16.200	4.000	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.97	1.92	0.51
29	2846	48.600	16.200	5.500	CR1	1	40.0		Inferior	$\sigma_{b,0}$	0.10	11.52	0.01
	1379	48.600	16.200	4.000	CR1	4	90.0		Intermedio	$\sigma_{b,c,0}$	-3.50	11.52	0.30
	1379	48.600	16.200	4.000	CR1	4	80.0		Superior	$\sigma_{b+tlc,0}$	-3.45		0.31
	1379	48.600	16.200	4.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	-0.03	0.50	0.06
	1379	48.600	16.200	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	-0.03	1.92	0.02
	1379	48.600	16.200	4.000	CR1	5	140.0		Inferior	$\tau_{xy}$	1.15	1.92	0.60
30	3039	67.500	21.060	6.000	CR1	5	100.0		Superior	$\sigma_{b,0}$	0.22	11.52	0.02
	3040	67.500	21.600	6.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-0.98	11.52	0.09
	3040	67.500	21.600	6.000	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-0.76		0.10
	1414	67.500	13.500	5.000	CR1	3	70.0		Intermedio	$\tau_{yz}$	0.03	0.50	0.06
	1414	67.500	13.500	5.000	CR1	2	60.0		Inferior	$\tau_{xz}$	-0.03	1.92	0.02
	26032	67.500	23.760	4.000	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.18	1.92	0.09
31	1436	59.400	10.800	8.000	CR1	2	60.0		Inferior	$\sigma_{b,0}$	-0.10	11.52	0.01
	1433	59.400	13.500	4.000	CR1	4	90.0		Intermedio	$\sigma_{b,c,0}$	-2.33	11.52	0.20
	1433	59.400	13.500	4.000	CR1	4	80.0		Superior	$\sigma_{b+tlc,0}$	-2.31		0.21
	3156	59.400	13.500	4.500	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.02	0.50	0.04
	3156	59.400	13.500	4.500	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.02	1.92	0.01
	1433	59.400	13.500	4.000	CR1	5	140.0		Inferior	$\tau_{xy}$	0.75	1.92	0.39
32	3247	62.100	3.240	6.000	CR1	5	100.0		Superior	$\sigma_{b,0}$	0.22	11.52	0.02
	3247	62.100	3.240	6.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-1.08	11.52	0.09
	3247	62.100	3.240	6.000	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-0.86		0.11
	1446	62.100	0.000	5.000	CR1	3	70.0		Intermedio	$\tau_{yz}$	0.03	0.50	0.06
	1446	62.100	0.000	5.000	CR1	2	60.0		Inferior	$\tau_{xz}$	-0.03	1.92	0.02
	26105	62.100	0.540	4.000	CR1	5	140.0		Inferior	$\tau_{xy}$	0.20	1.92	0.10



Proyecto: TFM  
TFM

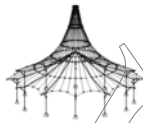
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.2 RAZÓN MÁX. DE TENSIONES POR SUPERFICIE

Superf. núm.	Punto núm.	Coordenadas del punto [m]			Carga	Núm.	Capa z [mm]	Lado	Tensiones [N/mm <sup>2</sup> ]			Razón [-]
		X	Y	Z					Símbolo	Existente	Límite	
33	1272	0.000	10.800	5.000	CR1	2	40.0	Superior	$\sigma_{b,0}$	-0.61	11.52	0.05
	3402	0.000	7.560	6.000	CR1	1	20.0	Intermedio	$\sigma_{b,c,0}$	-1.31	11.52	0.11
	1272	0.000	10.800	5.000	CR1	2	40.0	Superior	$\sigma_{b+tlc,0}$	-1.83		0.16
	3368	0.000	0.000	5.500	CR1	2	50.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.15
	3368	0.000	0.000	5.500	CR1	3	70.0	Intermedio	$\tau_{xz}$	0.08	1.92	0.04
	3326	0.000	0.000	4.500	CR1	5	140.0	Inferior	$\tau_{xy}$	0.42	1.92	0.22
34	1289	0.000	18.900	5.000	CR1	4	80.0	Superior	$\sigma_{b,0}$	-0.63	11.52	0.05
	3531	0.000	16.200	6.000	CR1	1	20.0	Intermedio	$\sigma_{b,c,0}$	-1.33	11.52	0.12
	1289	0.000	18.900	5.000	CR1	4	80.0	Superior	$\sigma_{b+tlc,0}$	0.64		0.16
	3525	0.000	18.900	5.500	CR1	2	50.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.15
	3525	0.000	18.900	5.500	CR1	3	70.0	Intermedio	$\tau_{xz}$	0.08	1.92	0.04
	25769	0.000	18.900	4.500	CR1	5	140.0	Inferior	$\tau_{xy}$	-0.41	1.92	0.21
46	344	2.700	10.800	1.000	CR1	2	40.0	Superior	$\sigma_{b,0}$	-0.03	11.52	0.00
	1182	2.700	13.500	1.000	CR1	5	120.0	Intermedio	$\sigma_{b,c,0}$	-0.89	11.52	0.08
	1182	2.700	13.500	1.000	CR1	5	100.0	Superior	$\sigma_{b+tlc,0}$	-0.86		0.08
	1181	2.700	13.500	0.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	-0.01	0.50	0.02
	1181	2.700	13.500	0.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.01	1.92	0.00
	1181	2.700	13.500	0.000	CR1	5	140.0	Inferior	$\tau_{xy}$	-0.33	1.92	0.17
52	570	2.700	10.800	5.000	CR1	2	60.0	Inferior	$\sigma_{b,0}$	0.02	11.52	0.00
	25759	2.700	12.960	8.000	CR1	5	120.0	Intermedio	$\sigma_{b,c,0}$	-0.90	11.52	0.08
	25759	2.700	12.960	8.000	CR1	5	100.0	Superior	$\sigma_{b+tlc,0}$	-0.90		0.08
	1282	2.700	13.500	4.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	-0.01	0.50	0.01
	1282	2.700	13.500	4.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.01	1.92	0.00
	1282	2.700	13.500	4.000	CR1	5	140.0	Inferior	$\tau_{xy}$	-0.27	1.92	0.14
53	4903	18.900	13.500	9.500	CR1	5	100.0	Superior	$\sigma_{b,0}$	-0.08	11.52	0.01
	673	18.900	13.500	12.000	CR1	2	50.0	Intermedio	$\sigma_{b,c,0}$	-2.24	11.52	0.19
	673	18.900	13.500	12.000	CR1	2	40.0	Superior	$\sigma_{b+tlc,0}$	-2.24		0.19
	1628	18.900	13.500	8.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	0.02	0.50	0.04
	1628	18.900	13.500	8.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	0.02	1.92	0.01
	1628	18.900	13.500	8.000	CR1	5	140.0	Inferior	$\tau_{xy}$	-0.57	1.92	0.29
54	4968	24.300	13.500	9.500	CR1	1	40.0	Inferior	$\sigma_{b,0}$	0.08	11.52	0.01
	674	24.300	13.500	12.000	CR1	2	50.0	Intermedio	$\sigma_{b,c,0}$	-2.23	11.52	0.19
	674	24.300	13.500	12.000	CR1	2	40.0	Superior	$\sigma_{b+tlc,0}$	-2.23		0.19
	1633	24.300	13.500	8.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	-0.02	0.50	0.04
	1633	24.300	13.500	8.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.02	1.92	0.01
	1633	24.300	13.500	8.000	CR1	5	140.0	Inferior	$\tau_{xy}$	0.58	1.92	0.30
55	5119	43.200	16.200	9.500	CR1	1	0.0	Superior	$\sigma_{b,0}$	-0.11	11.52	0.01
	677	43.200	16.200	12.000	CR1	2	50.0	Intermedio	$\sigma_{b,c,0}$	-3.32	11.52	0.29
	677	43.200	16.200	12.000	CR1	2	40.0	Superior	$\sigma_{b+tlc,0}$	-3.32		0.29
	1664	43.200	16.200	8.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.05
	1664	43.200	16.200	8.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	0.03	1.92	0.01
	1664	43.200	16.200	8.000	CR1	5	140.0	Inferior	$\tau_{xy}$	-1.01	1.92	0.53
56	5184	48.600	16.200	9.500	CR1	5	140.0	Inferior	$\sigma_{b,0}$	0.11	11.52	0.01
	678	48.600	16.200	12.000	CR1	2	50.0	Intermedio	$\sigma_{b,c,0}$	-3.92	11.52	0.34
	678	48.600	16.200	12.000	CR1	2	40.0	Superior	$\sigma_{b+tlc,0}$	-3.92		0.34
	1669	48.600	16.200	8.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	-0.03	0.50	0.06
	1669	48.600	16.200	8.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.03	1.92	0.02
	1669	48.600	16.200	8.000	CR1	5	140.0	Inferior	$\tau_{xy}$	1.19	1.92	0.62
57	5377	67.500	21.060	10.000	CR1	5	100.0	Superior	$\sigma_{b,0}$	0.22	11.52	0.02
	680	67.500	24.300	12.000	CR1	4	90.0	Intermedio	$\sigma_{b,c,0}$	-1.52	11.52	0.13
	680	67.500	24.300	12.000	CR1	4	80.0	Superior	$\sigma_{b+tlc,0}$	-1.42		0.14
	1695	67.500	13.500	9.000	CR1	3	70.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.06
	1695	67.500	13.500	9.000	CR1	2	60.0	Inferior	$\tau_{xz}$	-0.03	1.92	0.02
	26612	67.500	23.760	8.000	CR1	5	140.0	Inferior	$\tau_{xy}$	-0.24	1.92	0.13
58	5494	59.400	13.500	8.500	CR1	1	40.0	Inferior	$\sigma_{b,0}$	-0.04	11.52	0.00
	682	59.400	13.500	12.000	CR1	2	50.0	Intermedio	$\sigma_{b,c,0}$	-3.37	11.52	0.29
	682	59.400	13.500	12.000	CR1	2	40.0	Superior	$\sigma_{b+tlc,0}$	-3.37		0.29
	5494	59.400	13.500	8.500	CR1	2	50.0	Intermedio	$\tau_{yz}$	0.02	0.50	0.04
	5494	59.400	13.500	8.500	CR1	3	70.0	Intermedio	$\tau_{xz}$	0.02	1.92	0.01
	1706	59.400	13.500	8.000	CR1	5	140.0	Inferior	$\tau_{xy}$	0.79	1.92	0.41
59	5585	62.100	3.240	10.000	CR1	1	40.0	Inferior	$\sigma_{b,0}$	-0.22	11.52	0.02
	5584	62.100	2.700	10.000	CR1	5	120.0	Intermedio	$\sigma_{b,c,0}$	-1.37	11.52	0.12
	5584	62.100	2.700	10.000	CR1	5	100.0	Superior	$\sigma_{b+tlc,0}$	-1.15		0.14
	868	62.100	10.800	9.000	CR1	3	70.0	Intermedio	$\tau_{yz}$	-0.03	0.50	0.06
	868	62.100	10.800	9.000	CR1	2	60.0	Inferior	$\tau_{xz}$	0.03	1.92	0.02
	26661	62.100	0.540	8.000	CR1	5	140.0	Inferior	$\tau_{xy}$	0.25	1.92	0.13
60	1596	0.000	10.800	9.000	CR1	4	100.0	Inferior	$\sigma_{b,0}$	0.80	11.52	0.07
	1596	0.000	10.800	9.000	CR1	2	50.0	Intermedio	$\sigma_{b,c,0}$	-1.60	11.52	0.14
	1596	0.000	10.800	9.000	CR1	2	40.0	Superior	$\sigma_{b+tlc,0}$	-2.40		0.21
	5706	0.000	0.000	9.500	CR1	2	50.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.15
	5706	0.000	0.000	9.500	CR1	3	70.0	Intermedio	$\tau_{xz}$	0.08	1.92	0.04
	5664	0.000	0.000	8.500	CR1	5	140.0	Inferior	$\tau_{xy}$	0.45	1.92	0.23



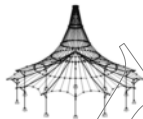
Proyecto: TFM Modelo: TFM\_FINAL\_v01  
TFM Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.2 RAZÓN MÁX. DE TENSIONES POR SUPERFICIE

Superf. núm.	Punto núm.	Coordenadas del punto [m]			Carga	Núm.	Capa z [mm]	Lado	Tensiones [N/mm <sup>2</sup> ]			Razón [-]
		X	Y	Z					Símbolo	Existente	Límite	
61	874	0.000	13.500	9.000	CR1	2	40.0	Superior	$\sigma_{b,0}$	-0.81	11.52	0.07
	874	0.000	13.500	9.000	CR1	2	50.0	Intermedio	$\sigma_{b,c,0}$	-1.62	11.52	0.14
	874	0.000	13.500	9.000	CR1	2	40.0	Superior	$\sigma_{b+tlc,0}$	-2.43		0.21
	5863	0.000	18.900	9.500	CR1	2	50.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.15
	5863	0.000	18.900	9.500	CR1	3	70.0	Intermedio	$\tau_{xz}$	0.08	1.92	0.04
	26436	0.000	18.900	8.500	CR1	5	140.0	Inferior	$\tau_{xy}$	-0.45	1.92	0.24
78	26421	2.700	12.960	8.000	CR1	2	60.0	Inferior	$\sigma_{b,0}$	-0.02	11.52	0.00
	705	2.700	13.500	12.000	CR1	4	90.0	Intermedio	$\sigma_{b,c,0}$	-1.97	11.52	0.17
	705	2.700	13.500	12.000	CR1	4	80.0	Superior	$\sigma_{b+tlc,0}$	-1.97		0.17
	1601	2.700	13.500	8.000	CR1	2	50.0	Superior	$\tau_{yz}$	-0.01	0.50	0.01
	1601	2.700	13.500	8.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.01	1.92	0.00
	1601	2.700	13.500	8.000	CR1	5	140.0	Inferior	$\tau_{xy}$	-0.31	1.92	0.16
81	7180	10.800	18.900	2.000	CR1	5	100.0	Superior	$\sigma_{b,0}$	0.54	11.52	0.05
	347	10.800	18.900	1.000	CR1	5	120.0	Intermedio	$\sigma_{b,c,0}$	-2.83	11.52	0.25
	7171	10.800	18.900	1.500	CR1	5	100.0	Superior	$\sigma_{b+tlc,0}$	-2.30		0.29
	25174	11.306	18.900	0.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.11
	25174	11.306	18.900	0.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
	1016	14.850	18.900	0.000	CR1	5	140.0	Inferior	$\tau_{xy}$	-1.04	1.92	0.54
82	7252	10.800	18.900	6.000	CR1	5	100.0	Superior	$\sigma_{b,0}$	0.56	11.52	0.05
	7243	10.800	18.900	5.500	CR1	5	120.0	Intermedio	$\sigma_{b,c,0}$	-2.68	11.52	0.23
	7243	10.800	18.900	5.500	CR1	5	100.0	Superior	$\sigma_{b+tlc,0}$	-2.15		0.28
	25808	11.306	18.900	4.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.11
	25808	11.306	18.900	4.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
	1310	14.850	18.900	4.000	CR1	5	140.0	Inferior	$\tau_{xy}$	-0.77	1.92	0.40
83	7324	10.800	18.900	10.000	CR1	1	0.0	Superior	$\sigma_{b,0}$	0.59	11.52	0.05
	7315	10.800	18.900	9.500	CR1	5	120.0	Intermedio	$\sigma_{b,c,0}$	-3.35	11.52	0.29
	7315	10.800	18.900	9.500	CR1	5	100.0	Superior	$\sigma_{b+tlc,0}$	-2.80		0.34
	26458	11.306	18.900	8.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
	26458	11.306	18.900	8.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
	1621	14.850	18.900	8.000	CR1	5	140.0	Inferior	$\tau_{xy}$	-0.78	1.92	0.41
89	7429	59.400	24.300	2.000	CR1	5	140.0	Inferior	$\sigma_{b,0}$	-0.54	11.52	0.05
	7420	59.400	24.300	1.500	CR1	5	120.0	Intermedio	$\sigma_{b,c,0}$	-2.56	11.52	0.22
	7420	59.400	24.300	1.500	CR1	5	100.0	Superior	$\sigma_{b+tlc,0}$	-2.06		0.27
	25311	59.906	24.300	0.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.11
	25311	59.906	24.300	0.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
	1079	59.400	24.300	0.000	CR1	5	140.0	Inferior	$\tau_{xy}$	0.94	1.92	0.49
90	7501	59.400	24.300	6.000	CR1	5	100.0	Superior	$\sigma_{b,0}$	0.56	11.52	0.05
	7492	59.400	24.300	5.500	CR1	5	120.0	Intermedio	$\sigma_{b,c,0}$	-2.59	11.52	0.22
	7492	59.400	24.300	5.500	CR1	5	100.0	Superior	$\sigma_{b+tlc,0}$	-2.07		0.27
	26009	59.906	24.300	4.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.11
	26009	59.906	24.300	4.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
	1401	59.400	24.300	4.000	CR1	5	140.0	Inferior	$\tau_{xy}$	0.68	1.92	0.35
91	7574	18.900	0.000	2.000	CR1	1	40.0	Inferior	$\sigma_{b,0}$	-0.98	11.52	0.09
	7568	18.900	0.000	1.500	CR1	5	120.0	Intermedio	$\sigma_{b,c,0}$	-4.09	11.52	0.36
	7568	18.900	0.000	1.500	CR1	5	100.0	Superior	$\sigma_{b+tlc,0}$	-3.16		0.44
	25466	18.360	0.000	0.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	-0.10	0.50	0.20
	25466	18.360	0.000	0.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.10	1.92	0.05
	7556	18.900	0.000	0.500	CR1	5	140.0	Inferior	$\tau_{xy}$	-0.52	1.92	0.27
92	7628	27.000	0.000	2.000	CR1	1	40.0	Inferior	$\sigma_{b,0}$	-0.99	11.52	0.09
	7622	27.000	0.000	1.500	CR1	5	120.0	Intermedio	$\sigma_{b,c,0}$	-4.02	11.52	0.35
	7622	27.000	0.000	1.500	CR1	5	100.0	Superior	$\sigma_{b+tlc,0}$	-3.09		0.43
	25448	24.840	0.000	0.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	-0.10	0.50	0.20
	25448	24.840	0.000	0.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.10	1.92	0.05
	25452	24.300	0.000	0.500	CR1	5	140.0	Inferior	$\tau_{xy}$	0.53	1.92	0.28
93	7687	35.100	0.000	2.000	CR1	1	0.0	Superior	$\sigma_{b,0}$	0.99	11.52	0.09
	7680	35.100	0.000	1.500	CR1	5	120.0	Intermedio	$\sigma_{b,c,0}$	-4.23	11.52	0.37
	7680	35.100	0.000	1.500	CR1	5	100.0	Superior	$\sigma_{b+tlc,0}$	-3.30		0.45
	25552	33.300	0.000	4.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	0.10	0.50	0.20
	25552	33.300	0.000	4.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	0.10	1.92	0.05
	7666	35.100	0.000	0.500	CR1	5	140.0	Inferior	$\tau_{xy}$	-0.55	1.92	0.28
94	7745	43.200	0.000	2.000	CR1	1	0.0	Superior	$\sigma_{b,0}$	0.99	11.52	0.09
	7739	43.200	0.000	1.500	CR1	5	120.0	Intermedio	$\sigma_{b,c,0}$	-4.02	11.52	0.35
	7739	43.200	0.000	1.500	CR1	5	100.0	Superior	$\sigma_{b+tlc,0}$	-3.09		0.43
	25423	42.660	0.000	0.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	-0.10	0.50	0.20
	25423	42.660	0.000	0.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.10	1.92	0.05
	7727	43.200	0.000	0.500	CR1	5	140.0	Inferior	$\tau_{xy}$	-0.55	1.92	0.28
95	7795	48.600	0.000	2.000	CR1	5	100.0	Superior	$\sigma_{b,0}$	0.98	11.52	0.09
	7789	48.600	0.000	1.500	CR1	5	120.0	Intermedio	$\sigma_{b,c,0}$	-4.08	11.52	0.35
	7789	48.600	0.000	1.500	CR1	5	100.0	Superior	$\sigma_{b+tlc,0}$	-3.15		0.43
	25405	49.140	0.000	0.000	CR1	2	50.0	Intermedio	$\tau_{yz}$	-0.10	0.50	0.20
	25405	49.140	0.000	0.000	CR1	3	70.0	Intermedio	$\tau_{xz}$	-0.10	1.92	0.05
	25409	48.600	0.000	0.500	CR1	5	140.0	Inferior	$\tau_{xy}$	0.52	1.92	0.27





Proyecto: TFM  
TFM

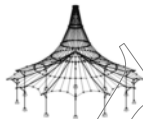
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.2 RAZÓN MÁX. DE TENSIONES POR SUPERFICIE

Superf. núm.	Punto núm.	Coordenadas del punto [m]			Carga	Núm.	Capa		Lado	Tensiones [N/mm <sup>2</sup> ]			Razón [-]
		X	Y	Z			z [mm]			Símbolo	Existente	Límite	
96	7847	18.900	0.000	6.000	CR1	1	40.0		Inferior	$\sigma_{b,0}$	-1.04	11.52	0.09
	7841	18.900	0.000	5.500	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-4.31	11.52	0.37
	7841	18.900	0.000	5.500	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-3.33		0.46
	26236	18.360	0.000	4.000	CR1	2	50.0		Superior	$\tau_{yz}$	-0.11	0.50	0.21
	26236	18.360	0.000	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	-0.11	1.92	0.06
	26240	18.360	0.000	8.000	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.52	1.92	0.27
97	7895	27.000	0.000	6.000	CR1	5	140.0		Inferior	$\sigma_{b,0}$	-1.05	11.52	0.09
	7889	27.000	0.000	5.500	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-4.31	11.52	0.37
	7889	27.000	0.000	5.500	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-3.32		0.46
	26217	26.460	0.000	4.000	CR1	2	50.0		Superior	$\tau_{yz}$	-0.11	0.50	0.21
	26217	26.460	0.000	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	-0.11	1.92	0.06
	26221	26.460	0.000	8.000	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.55	1.92	0.29
98	7947	35.100	0.000	6.000	CR1	1	40.0		Inferior	$\sigma_{b,0}$	-1.06	11.52	0.09
	7940	35.100	0.000	5.500	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-4.55	11.52	0.39
	7940	35.100	0.000	5.500	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-3.55		0.48
	26200	33.300	0.000	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.11	0.50	0.21
	26200	33.300	0.000	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.11	1.92	0.06
	26203	34.650	0.000	8.000	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.52	1.92	0.27
99	7995	40.500	0.000	6.000	CR1	1	40.0		Inferior	$\sigma_{b,0}$	-1.05	11.52	0.09
	7989	40.500	0.000	5.500	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-4.31	11.52	0.37
	7989	40.500	0.000	5.500	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-3.32		0.46
	26174	41.040	0.000	4.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	-0.11	0.50	0.21
	26174	41.040	0.000	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	-0.11	1.92	0.06
	26178	41.040	0.000	8.000	CR1	5	140.0		Inferior	$\tau_{xy}$	0.55	1.92	0.29
100	8043	48.600	0.000	6.000	CR1	1	0.0		Superior	$\sigma_{b,0}$	1.04	11.52	0.09
	8037	48.600	0.000	5.500	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-4.30	11.52	0.37
	8037	48.600	0.000	5.500	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-3.31		0.46
	26155	49.140	0.000	4.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	-0.11	0.50	0.21
	26155	49.140	0.000	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	-0.11	1.92	0.06
	26159	49.140	0.000	8.000	CR1	5	140.0		Inferior	$\tau_{xy}$	0.52	1.92	0.27
101	8100	59.400	24.300	10.000	CR1	5	100.0		Superior	$\sigma_{b,0}$	0.58	11.52	0.05
	8091	59.400	24.300	9.500	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-3.26	11.52	0.28
	8091	59.400	24.300	9.500	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-2.71		0.33
	26596	59.906	24.300	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
	26596	59.906	24.300	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
	1684	59.400	24.300	8.000	CR1	5	140.0		Inferior	$\tau_{xy}$	0.71	1.92	0.37
102	8167	18.900	0.000	10.000	CR1	5	140.0		Inferior	$\sigma_{b,0}$	-1.12	11.52	0.10
	8161	18.900	0.000	9.500	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-5.26	11.52	0.46
	8161	18.900	0.000	9.500	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-4.21		0.55
	8190	18.360	0.000	12.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.11	0.50	0.22
	8190	18.360	0.000	12.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.12	1.92	0.06
	8149	18.900	0.000	8.500	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.53	1.92	0.27
103	8211	24.300	0.000	10.000	CR1	5	140.0		Inferior	$\sigma_{b,0}$	-1.13	11.52	0.10
	8205	24.300	0.000	9.500	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-5.31	11.52	0.46
	8205	24.300	0.000	9.500	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-4.25		0.55
	8234	24.840	0.000	12.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.11	0.50	0.23
	8234	24.840	0.000	12.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.12	1.92	0.06
	8197	27.000	0.000	8.500	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.57	1.92	0.30
104	8262	32.400	0.000	10.000	CR1	5	140.0		Inferior	$\sigma_{b,0}$	-1.14	11.52	0.10
	8260	35.100	0.000	9.500	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-5.56	11.52	0.48
	8260	35.100	0.000	9.500	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-4.49		0.57
	8289	32.850	0.000	12.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.11	0.50	0.22
	8289	32.850	0.000	12.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.11	1.92	0.06
	8246	35.100	0.000	8.500	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.55	1.92	0.29
105	8319	43.200	0.000	10.000	CR1	1	0.0		Superior	$\sigma_{b,0}$	1.13	11.52	0.10
	8313	43.200	0.000	9.500	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-5.31	11.52	0.46
	8313	43.200	0.000	9.500	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-4.25		0.55
	8342	42.660	0.000	12.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.11	0.50	0.23
	8342	42.660	0.000	12.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.12	1.92	0.06
	26319	40.500	0.000	8.500	CR1	5	140.0		Inferior	$\tau_{xy}$	0.66	1.92	0.29
106	8363	48.600	0.000	10.000	CR1	5	100.0		Superior	$\sigma_{b,0}$	1.12	11.52	0.10
	8357	48.600	0.000	9.500	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-5.26	11.52	0.46
	8357	48.600	0.000	9.500	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-4.21		0.55
	8386	49.140	0.000	12.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.11	0.50	0.22
	8386	49.140	0.000	12.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.12	1.92	0.06
	26304	48.600	0.000	8.500	CR1	5	140.0		Inferior	$\tau_{xy}$	0.52	1.92	0.27
188	12201	6.750	18.900	2.000	CR1	1	0.0		Superior	$\sigma_{b,0}$	-0.54	11.52	0.05
	1007	5.400	18.900	0.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-2.47	11.52	0.21
	1007	5.400	18.900	0.000	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-2.46		0.21
	1220	5.400	18.900	4.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.06	0.50	0.11
	1220	5.400	18.900	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.06	1.92	0.03
	1006	4.050	18.900	0.000	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.21	1.92	0.11



Proyecto: TFM  
TFM

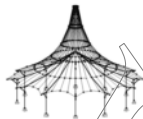
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.2 RAZÓN MÁX. DE TENSIONES POR SUPERFICIE

Superf. núm.	Punto núm.	Coordenadas del punto [m]			Carga	Núm.	Capa		Lado	Tensiones [N/mm <sup>2</sup> ]			Razón [-]
		X	Y	Z			z [mm]			Símbolo	Existente	Límite	
189	12242	29.700	21.600	2.000	CR1	1	0.0		Superior	$\sigma_{b,0}$	-0.53	11.52	0.05
	1011	28.350	21.600	0.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-2.03	11.52	0.18
	1011	28.350	21.600	0.000	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-2.03		0.18
	1232	28.350	21.600	4.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.06	0.50	0.11
	1232	28.350	21.600	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.06	1.92	0.03
	1010	27.000	21.600	0.000	CR1	1	0.0		Superior	$\tau_{xy}$	-0.15	1.92	0.08
190	12300	32.400	21.600	2.000	CR1	1	40.0		Inferior	$\sigma_{b,0}$	0.53	11.52	0.05
	1042	33.750	21.600	0.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-2.27	11.52	0.20
	1042	33.750	21.600	0.000	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-2.27		0.20
	1235	33.750	21.600	4.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.06	0.50	0.11
	1235	33.750	21.600	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.06	1.92	0.03
	1043	35.100	21.600	0.000	CR1	5	140.0		Inferior	$\tau_{xy}$	0.15	1.92	0.08
191	12352	37.800	21.600	2.000	CR1	5	140.0		Inferior	$\sigma_{b,0}$	0.53	11.52	0.05
	1049	39.150	21.600	0.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-2.02	11.52	0.18
	1049	39.150	21.600	0.000	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-2.02		0.18
	1238	39.150	21.600	4.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.06	0.50	0.11
	1238	39.150	21.600	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.06	1.92	0.03
	1050	40.500	21.600	0.000	CR1	1	0.0		Superior	$\tau_{xy}$	0.16	1.92	0.08
192	12409	55.350	24.300	2.000	CR1	1	0.0		Superior	$\sigma_{b,0}$	-0.54	11.52	0.05
	1071	54.000	24.300	0.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-2.44	11.52	0.21
	1071	54.000	24.300	0.000	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-2.44		0.21
	1248	54.000	24.300	4.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.06	0.50	0.11
	1248	54.000	24.300	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.06	1.92	0.03
	1070	52.650	24.300	0.000	CR1	1	0.0		Superior	$\tau_{xy}$	-0.25	1.92	0.13
193	1257	62.100	13.500	4.000	CR1	2	40.0		Superior	$\sigma_{b,0}$	0.02	11.52	0.00
	1093	63.450	13.500	0.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-1.81	11.52	0.16
	1093	63.450	13.500	0.000	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-1.81		0.16
	25690	62.550	13.500	4.000	CR1	3	70.0		Intermedio	$\tau_{yz}$	0.01	0.50	0.01
	25690	62.550	13.500	4.000	CR1	2	60.0		Inferior	$\tau_{xz}$	-0.01	1.92	0.00
	25690	62.550	13.500	4.000	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.17	1.92	0.09
194	12498	55.350	0.000	2.000	CR1	1	40.0		Inferior	$\sigma_{b,0}$	0.99	11.52	0.09
	12498	55.350	0.000	2.000	CR1	1	20.0		Intermedio	$\sigma_{b,c,0}$	-2.69	11.52	0.23
	12498	55.350	0.000	2.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-3.67		0.32
	1191	56.700	0.000	4.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.10	0.50	0.20
	1191	56.700	0.000	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.10	1.92	0.05
	25397	55.350	0.000	0.500	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.39	1.92	0.20
195	12558	12.150	0.000	2.000	CR1	5	100.0		Superior	$\sigma_{b,0}$	-0.98	11.52	0.09
	12558	12.150	0.000	2.000	CR1	1	20.0		Intermedio	$\sigma_{b,c,0}$	-2.66	11.52	0.23
	12558	12.150	0.000	2.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-3.65		0.32
	1204	10.800	0.000	4.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.10	0.50	0.20
	1204	10.800	0.000	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.10	1.92	0.05
	8759	12.150	0.000	0.500	CR1	5	140.0		Inferior	$\tau_{xy}$	0.39	1.92	0.20
196	12610	6.750	0.000	2.000	CR1	1	40.0		Inferior	$\sigma_{b,0}$	0.96	11.52	0.08
	12607	5.400	0.000	2.000	CR1	1	20.0		Intermedio	$\sigma_{b,c,0}$	-2.51	11.52	0.22
	12607	5.400	0.000	2.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-3.47		0.30
	1207	5.400	0.000	4.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.10	0.50	0.20
	1207	5.400	0.000	4.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.10	1.92	0.05
	1164	4.050	0.000	0.000	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.22	1.92	0.11
237	17285	6.750	18.900	6.000	CR1	1	40.0		Inferior	$\sigma_{b,0}$	0.56	11.52	0.05
	1300	5.400	18.900	4.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-2.11	11.52	0.18
	17283	5.850	18.900	6.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-2.22		0.19
	1303	5.400	18.900	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.06	0.50	0.11
	1303	5.400	18.900	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.06	1.92	0.03
	25798	6.300	18.900	8.000	CR1	1	0.0		Superior	$\tau_{xy}$	0.29	1.92	0.15
238	17326	29.700	21.600	6.000	CR1	1	40.0		Inferior	$\sigma_{b,0}$	0.55	11.52	0.05
	1340	28.350	21.600	4.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-1.68	11.52	0.15
	17324	28.800	21.600	6.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-2.14		0.19
	1343	28.350	21.600	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.06	0.50	0.11
	1343	28.350	21.600	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.06	1.92	0.03
	25896	29.250	21.600	8.000	CR1	1	0.0		Superior	$\tau_{xy}$	0.21	1.92	0.11
239	17389	35.100	21.600	6.000	CR1	1	0.0		Superior	$\sigma_{b,0}$	-0.55	11.52	0.05
	1350	33.750	21.600	4.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-1.89	11.52	0.16
	17386	33.750	21.600	6.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-2.18		0.19
	1353	33.750	21.600	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.06	0.50	0.11
	1353	33.750	21.600	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.06	1.92	0.03
	25910	34.650	21.600	8.000	CR1	1	0.0		Superior	$\tau_{xy}$	0.22	1.92	0.12
240	17436	37.800	21.600	6.000	CR1	1	0.0		Superior	$\sigma_{b,0}$	-0.55	11.52	0.05
	1360	39.150	21.600	4.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-1.68	11.52	0.15
	17437	38.700	21.600	6.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-2.14		0.19
	1363	39.150	21.600	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.06	0.50	0.11
	1363	39.150	21.600	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.06	1.92	0.03
	25921	38.250	21.600	8.000	CR1	1	0.0		Superior	$\tau_{xy}$	-0.20	1.92	0.10



Proyecto: TFM  
TFM

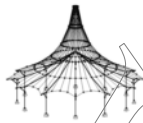
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.2 RAZÓN MÁX. DE TENSIONES POR SUPERFICIE

Superf. núm.	Punto núm.	Coordenadas del punto [m]			Carga	Núm.	Capa		Lado	Tensiones [N/mm <sup>2</sup> ]			Razón [-]
		X	Y	Z			z [mm]			Símbolo	Existente	Límite	
241	17493	55.350	24.300	6.000	CR1	1	0.0		Superior	$\sigma_{b,0}$	-0.56	11.52	0.05
	1392	54.000	24.300	4.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-2.09	11.52	0.18
	17490	54.000	24.300	6.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-2.23		0.19
	1395	54.000	24.300	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.06	0.50	0.11
	1395	54.000	24.300	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.06	1.92	0.03
	25999	54.900	24.300	8.000	CR1	1	0.0		Superior	$\tau_{xy}$	0.27	1.92	0.14
242	1426	62.100	13.500	8.000	CR1	4	80.0		Superior	$\sigma_{b,0}$	0.03	11.52	0.00
	1424	63.450	13.500	4.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-1.56	11.52	0.14
	1424	63.450	13.500	4.000	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-1.56		0.14
	26071	63.000	13.500	4.000	CR1	3	70.0		Intermedio	$\tau_{yz}$	0.01	0.50	0.02
	26071	63.000	13.500	4.000	CR1	2	60.0		Inferior	$\tau_{xz}$	-0.01	1.92	0.00
	26074	62.550	13.500	8.000	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.25	1.92	0.13
243	17580	55.350	0.000	6.000	CR1	5	100.0		Superior	$\sigma_{b,0}$	-1.03	11.52	0.09
	17580	55.350	0.000	6.000	CR1	1	20.0		Intermedio	$\sigma_{b,c,0}$	-2.89	11.52	0.25
	17580	55.350	0.000	6.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-3.92		0.34
	1459	56.700	0.000	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.11	0.50	0.21
	1459	56.700	0.000	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.11	1.92	0.06
	26143	55.800	0.000	8.000	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.43	1.92	0.22
244	17638	12.150	0.000	6.000	CR1	5	140.0		Inferior	$\sigma_{b,0}$	1.03	11.52	0.09
	17638	12.150	0.000	6.000	CR1	1	20.0		Intermedio	$\sigma_{b,c,0}$	-2.86	11.52	0.25
	17638	12.150	0.000	6.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-3.89		0.34
	1515	10.800	0.000	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.11	0.50	0.21
	1515	10.800	0.000	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.11	1.92	0.06
	26256	11.700	0.000	8.000	CR1	5	140.0		Inferior	$\tau_{xy}$	0.42	1.92	0.22
245	17690	6.750	0.000	6.000	CR1	1	0.0		Superior	$\sigma_{b,0}$	-1.00	11.52	0.09
	17688	5.850	0.000	6.000	CR1	1	20.0		Intermedio	$\sigma_{b,c,0}$	-2.73	11.52	0.24
	17688	5.850	0.000	6.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-3.72		0.32
	1526	5.400	0.000	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	0.10	0.50	0.20
	1526	5.400	0.000	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	0.11	1.92	0.06
	26271	6.300	0.000	8.000	CR1	5	140.0		Inferior	$\tau_{xy}$	0.26	1.92	0.13
286	22365	6.750	18.900	10.000	CR1	1	0.0		Superior	$\sigma_{b,0}$	-0.59	11.52	0.05
	1614	5.400	18.900	8.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-2.63	11.52	0.23
	1614	5.400	18.900	8.000	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-2.63		0.23
	1614	5.400	18.900	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
	1614	5.400	18.900	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
	26448	6.300	18.900	8.000	CR1	1	0.0		Superior	$\tau_{xy}$	-0.28	1.92	0.14
287	22406	29.700	21.600	10.000	CR1	5	100.0		Superior	$\sigma_{b,0}$	-0.57	11.52	0.05
	1642	28.350	21.600	8.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-2.07	11.52	0.18
	22403	28.350	21.600	10.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-2.33		0.20
	1642	28.350	21.600	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
	1642	28.350	21.600	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
	26515	29.250	21.600	8.000	CR1	1	0.0		Superior	$\tau_{xy}$	-0.21	1.92	0.11
288	22469	35.100	21.600	10.000	CR1	1	40.0		Inferior	$\sigma_{b,0}$	0.57	11.52	0.05
	1649	33.750	21.600	8.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-2.33	11.52	0.20
	22466	33.750	21.600	10.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-2.40		0.21
	1649	33.750	21.600	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
	1649	33.750	21.600	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
	26525	34.650	21.600	8.000	CR1	1	0.0		Superior	$\tau_{xy}$	-0.21	1.92	0.11
289	22516	37.800	21.600	10.000	CR1	1	40.0		Inferior	$\sigma_{b,0}$	0.57	11.52	0.05
	1656	39.150	21.600	8.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-2.07	11.52	0.18
	22518	39.150	21.600	10.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-2.34		0.20
	1656	39.150	21.600	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
	1656	39.150	21.600	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
	26532	38.250	21.600	8.000	CR1	1	0.0		Superior	$\tau_{xy}$	0.20	1.92	0.11
290	22573	55.350	24.300	10.000	CR1	1	0.0		Superior	$\sigma_{b,0}$	-0.59	11.52	0.05
	1678	54.000	24.300	8.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-2.62	11.52	0.23
	1678	54.000	24.300	8.000	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-2.62		0.23
	1678	54.000	24.300	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
	1678	54.000	24.300	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
	18110	52.650	24.300	8.500	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.27	1.92	0.14
291	1701	64.800	13.500	8.000	CR1	2	40.0		Superior	$\sigma_{b,0}$	0.01	11.52	0.00
	1700	63.450	13.500	8.000	CR1	5	120.0		Intermedio	$\sigma_{b,c,0}$	-1.95	11.52	0.17
	1700	63.450	13.500	8.000	CR1	5	100.0		Superior	$\sigma_{b+tlc,0}$	-1.95		0.17
	26635	63.000	13.500	8.000	CR1	3	70.0		Intermedio	$\tau_{yz}$	0.01	0.50	0.02
	26635	63.000	13.500	8.000	CR1	2	60.0		Inferior	$\tau_{xz}$	-0.01	1.92	0.00
	26634	62.550	13.500	8.000	CR1	5	140.0		Inferior	$\tau_{xy}$	0.25	1.92	0.13
292	22660	55.350	0.000	10.000	CR1	1	0.0		Superior	$\sigma_{b,0}$	-1.10	11.52	0.10
	22660	55.350	0.000	10.000	CR1	1	20.0		Intermedio	$\sigma_{b,c,0}$	-3.25	11.52	0.28
	22660	55.350	0.000	10.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-4.35		0.38
	1535	56.700	0.000	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	-0.11	0.50	0.22
	1535	56.700	0.000	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	-0.11	1.92	0.06
	26292	55.350	0.000	8.500	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.41	1.92	0.21



Proyecto: TFM Modelo: TFM\_FINAL\_v01  
TFM Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

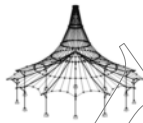
## 2.2 RAZÓN MÁX. DE TENSIONES POR SUPERFICIE

Superf. núm.	Punto núm.	Coordenadas del punto [m]			Carga	Núm.	Capa		Lado	Tensiones [N/mm <sup>2</sup> ]			Razón [-]
		X	Y	Z			z [mm]			Símbolo	Existente	Límite	
293	22718	12.150	0.000	10.000	CR1	1	0.0		Superior	$\sigma_{b,0}$	-1.09	11.52	0.09
	22718	12.150	0.000	10.000	CR1	1	20.0		Intermedio	$\sigma_{b,c,0}$	-3.21	11.52	0.28
	22718	12.150	0.000	10.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-4.31		0.37
	1578	10.800	0.000	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	-0.11	0.50	0.22
	1578	10.800	0.000	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	-0.11	1.92	0.06
	17916	12.150	0.000	8.500	CR1	5	140.0		Inferior	$\tau_{xy}$	0.40	1.92	0.21
294	22770	6.750	0.000	10.000	CR1	5	100.0		Superior	$\sigma_{b,0}$	-1.04	11.52	0.09
	22767	5.400	0.000	10.000	CR1	1	20.0		Intermedio	$\sigma_{b,c,0}$	-2.98	11.52	0.26
	22767	5.400	0.000	10.000	CR1	1	0.0		Superior	$\sigma_{b+tlc,0}$	-4.01		0.35
	1585	5.400	0.000	8.000	CR1	2	50.0		Intermedio	$\tau_{yz}$	-0.11	0.50	0.21
	1585	5.400	0.000	8.000	CR1	3	70.0		Intermedio	$\tau_{xz}$	-0.11	1.92	0.06
	26386	6.300	0.000	8.000	CR1	5	140.0		Inferior	$\tau_{xy}$	-0.26	1.92	0.13

Razón máxima 0.86

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superficie núm.	Capa núm.	Punto núm.	Coordenadas del punto [m]			Carga	Capa		Lado	Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]			Símbolo	Existente	Límite	
2	1	1	15489	18.900	13.500	1.500	CR1	0.0		Superior	$\sigma_{b,0}$	-0.08	11.52	0.01
			1024	18.900	13.500	1.000	CR1	20.0		Intermedio	$\sigma_{b,c,0}$	-1.41	11.52	0.12
			1024	18.900	13.500	1.000	CR1	0.0		Superior	$\sigma_{b+tlc,0}$	-1.42		0.12
			1023	18.900	13.500	0.000	CR1	40.0		Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1023	18.900	13.500	0.000	CR1	40.0		Inferior	$\tau_{xz}$	0.02	1.92	0.01
			1023	18.900	13.500	0.000	CR1	40.0		Inferior	$\tau_{xy}$	-0.67	1.92	0.35
		2	332	18.900	18.900	1.000	CR1	40.0		Superior	$\sigma_{b,0}$	-0.14	11.52	0.01
			1023	18.900	13.500	0.000	CR1	50.0		Intermedio	$\sigma_{b,c,0}$	-1.68	11.52	0.15
			1023	18.900	13.500	0.000	CR1	40.0		Superior	$\sigma_{b+tlc,0}$	-1.62		0.15
			1023	18.900	13.500	0.000	CR1	50.0		Intermedio	$\tau_{yz}$	0.02	0.50	0.04
			1021	18.900	18.900	0.000	CR1	60.0		Inferior	$\tau_{xz}$	0.01	1.92	0.00
			1023	18.900	13.500	0.000	CR1	60.0		Inferior	$\tau_{xy}$	0.68	1.92	0.35
		3	15489	18.900	13.500	1.500	CR1	60.0		Superior	$\sigma_{b,0}$	-0.04	11.52	0.00
			1024	18.900	13.500	1.000	CR1	70.0		Intermedio	$\sigma_{b,c,0}$	-1.40	11.52	0.12
			1024	18.900	13.500	1.000	CR1	60.0		Superior	$\sigma_{b+tlc,0}$	-1.41		0.12
			1021	18.900	18.900	0.000	CR1	70.0		Intermedio	$\tau_{yz}$	-0.01	0.50	0.02
			1023	18.900	13.500	0.000	CR1	70.0		Intermedio	$\tau_{xz}$	0.02	1.92	0.01
			1023	18.900	13.500	0.000	CR1	80.0		Inferior	$\tau_{xy}$	-0.68	1.92	0.35
		4	332	18.900	18.900	1.000	CR1	80.0		Superior	$\sigma_{b,0}$	-0.14	11.52	0.01
			1023	18.900	13.500	0.000	CR1	90.0		Intermedio	$\sigma_{b,c,0}$	-1.93	11.52	0.17
			1023	18.900	13.500	0.000	CR1	80.0		Superior	$\sigma_{b+tlc,0}$	-1.86		0.17
			1023	18.900	13.500	0.000	CR1	90.0		Intermedio	$\tau_{yz}$	0.02	0.50	0.04
			1021	18.900	18.900	0.000	CR1	80.0		Superior	$\tau_{xz}$	0.01	1.92	0.00
			1023	18.900	13.500	0.000	CR1	100.0		Inferior	$\tau_{xy}$	0.68	1.92	0.36
		5	15489	18.900	13.500	1.500	CR1	140.0		Inferior	$\sigma_{b,0}$	0.08	11.52	0.01
			25194	18.900	13.500	0.500	CR1	120.0		Intermedio	$\sigma_{b,c,0}$	-1.41	11.52	0.12
			25194	18.900	13.500	0.500	CR1	100.0		Superior	$\sigma_{b+tlc,0}$	-1.37		0.13
			1023	18.900	13.500	0.000	CR1	100.0		Superior	$\tau_{yz}$	0.00	0.50	0.00
			1023	18.900	13.500	0.000	CR1	100.0		Superior	$\tau_{xz}$	0.02	1.92	0.01
			1023	18.900	13.500	0.000	CR1	140.0		Inferior	$\tau_{xy}$	-0.69	1.92	0.36
	2	1	7465	24.300	13.500	1.500	CR1	40.0		Inferior	$\sigma_{b,0}$	0.08	11.52	0.01
			105	24.300	13.500	1.000	CR1	20.0		Intermedio	$\sigma_{b,c,0}$	-1.49	11.52	0.13
			105	24.300	13.500	1.000	CR1	0.0		Superior	$\sigma_{b+tlc,0}$	-1.50		0.13
			1028	24.300	13.500	0.000	CR1	40.0		Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1028	24.300	13.500	0.000	CR1	40.0		Inferior	$\tau_{xz}$	-0.02	1.92	0.01
			1028	24.300	13.500	0.000	CR1	40.0		Inferior	$\tau_{xy}$	0.64	1.92	0.33
		2	8425	24.300	13.500	0.500	CR1	40.0		Superior	$\sigma_{b,0}$	-0.07	11.52	0.01
			1028	24.300	13.500	0.000	CR1	50.0		Intermedio	$\sigma_{b,c,0}$	-1.40	11.52	0.12
			1028	24.300	13.500	0.000	CR1	40.0		Superior	$\sigma_{b+tlc,0}$	-1.35		0.13
			1028	24.300	13.500	0.000	CR1	50.0		Intermedio	$\tau_{yz}$	-0.02	0.50	0.04
			7465	24.300	13.500	1.500	CR1	60.0		Inferior	$\tau_{xz}$	-0.01	1.92	0.00
			1028	24.300	13.500	0.000	CR1	60.0		Inferior	$\tau_{xy}$	-0.65	1.92	0.34
		3	7465	24.300	13.500	1.500	CR1	80.0		Inferior	$\sigma_{b,0}$	0.04	11.52	0.00
			105	24.300	13.500	1.000	CR1	70.0		Intermedio	$\sigma_{b,c,0}$	-1.48	11.52	0.13
			105	24.300	13.500	1.000	CR1	60.0		Superior	$\sigma_{b+tlc,0}$	-1.48		0.13
			7465	24.300	13.500	1.500	CR1	70.0		Intermedio	$\tau_{yz}$	0.01	0.50	0.02
			1028	24.300	13.500	0.000	CR1	70.0		Intermedio	$\tau_{xz}$	-0.02	1.92	0.01
			1028	24.300	13.500	0.000	CR1	80.0		Inferior	$\tau_{xy}$	0.65	1.92	0.34
		4	8425	24.300	13.500	0.500	CR1	100.0		Inferior	$\sigma_{b,0}$	0.07	11.52	0.01
			1028	24.300	13.500	0.000	CR1	90.0		Intermedio	$\sigma_{b,c,0}$	-1.60	11.52	0.14
			1028	24.300	13.500	0.000	CR1	80.0		Superior	$\sigma_{b+tlc,0}$	-1.55		0.14
			1028	24.300	13.500	0.000	CR1	90.0		Intermedio	$\tau_{yz}$	-0.02	0.50	0.04
			7465	24.300	13.500	1.500	CR1	80.0		Superior	$\tau_{xz}$	-0.01	1.92	0.00
			1028	24.300	13.500	0.000	CR1	100.0		Inferior	$\tau_{xy}$	-0.65	1.92	0.34
		5	7465	24.300	13.500	1.500	CR1	100.0		Superior	$\sigma_{b,0}$	-0.08	11.52	0.01
			8425	24.300	13.500	0.500	CR1	120.0		Intermedio	$\sigma_{b,c,0}$	-1.47	11.52	0.13
			8425	24.300	13.500	0.500	CR1	100.0		Superior	$\sigma_{b+tlc,0}$	-1.43		0.13
			1028	24.300	13.500	0.000	CR1	100.0		Superior	$\tau_{yz}$	0.00	0.50	0.00
			1028	24.300	13.500	0.000	CR1	100.0		Superior	$\tau_{xz}$	-0.02	1.92	0.01
			1028	24.300	13.500	0.000	CR1	140.0		Inferior	$\tau_{xy}$	0.66	1.92	0.34
	3	1	23806	43.200	16.200	1.500	CR1	0.0		Superior	$\sigma_{b,0}$	-0.12	11.52	0.01



Proyecto: TFM  
TFM

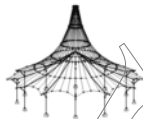
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
			1057	43.200	16.200	0.000	CR1	20.0	Intermedio	$\sigma_{lc,0}$	-3.08	11.52	0.27
			1057	43.200	16.200	0.000	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	-3.08		0.27
			1057	43.200	16.200	0.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1057	43.200	16.200	0.000	CR1	40.0	Inferior	$\tau_{xz}$	0.03	1.92	0.01
			1057	43.200	16.200	0.000	CR1	40.0	Inferior	$\tau_{xy}$	-1.40	1.92	0.73
		2	25260	43.200	16.200	0.500	CR1	40.0	Superior	$\sigma_{b,0}$	-0.10	11.52	0.01
			1057	43.200	16.200	0.000	CR1	50.0	Intermedio	$\sigma_{lc,0}$	-3.68	11.52	0.32
			1057	43.200	16.200	0.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-3.61		0.32
			1057	43.200	16.200	0.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.05
			23806	43.200	16.200	1.500	CR1	60.0	Inferior	$\tau_{xz}$	-0.01	1.92	0.01
			1057	43.200	16.200	0.000	CR1	60.0	Inferior	$\tau_{xy}$	1.40	1.92	0.73
		3	23806	43.200	16.200	1.500	CR1	80.0	Inferior	$\sigma_{b,0}$	0.06	11.52	0.01
			1057	43.200	16.200	0.000	CR1	70.0	Intermedio	$\sigma_{lc,0}$	-3.07	11.52	0.27
			1057	43.200	16.200	0.000	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-3.07		0.27
			23806	43.200	16.200	1.500	CR1	70.0	Intermedio	$\tau_{yz}$	0.01	0.50	0.02
			1057	43.200	16.200	0.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.03	1.92	0.01
			1057	43.200	16.200	0.000	CR1	80.0	Inferior	$\tau_{xy}$	-1.41	1.92	0.73
		4	25260	43.200	16.200	0.500	CR1	100.0	Inferior	$\sigma_{b,0}$	0.10	11.52	0.01
			1057	43.200	16.200	0.000	CR1	90.0	Intermedio	$\sigma_{lc,0}$	-3.94	11.52	0.34
			1057	43.200	16.200	0.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	-3.87		0.35
			1057	43.200	16.200	0.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.05
			23806	43.200	16.200	1.500	CR1	80.0	Superior	$\tau_{xz}$	-0.01	1.92	0.01
			1057	43.200	16.200	0.000	CR1	100.0	Inferior	$\tau_{xy}$	1.41	1.92	0.74
		5	23806	43.200	16.200	1.500	CR1	100.0	Superior	$\sigma_{b,0}$	-0.12	11.52	0.01
			1057	43.200	16.200	0.000	CR1	120.0	Intermedio	$\sigma_{lc,0}$	-3.06	11.52	0.27
			1057	43.200	16.200	0.000	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	-3.06		0.27
			1057	43.200	16.200	0.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1057	43.200	16.200	0.000	CR1	100.0	Superior	$\tau_{xz}$	0.03	1.92	0.01
			1057	43.200	16.200	0.000	CR1	140.0	Inferior	$\tau_{xy}$	-1.42	1.92	0.74
	4	1	13905	48.600	16.200	1.500	CR1	0.0	Superior	$\sigma_{b,0}$	-0.11	11.52	0.01
			1062	48.600	16.200	0.000	CR1	20.0	Intermedio	$\sigma_{lc,0}$	-3.59	11.52	0.31
			1062	48.600	16.200	0.000	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	-3.59		0.31
			1062	48.600	16.200	0.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1062	48.600	16.200	0.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.03	1.92	0.02
			1062	48.600	16.200	0.000	CR1	40.0	Inferior	$\tau_{xy}$	1.62	1.92	0.85
		2	25288	48.600	24.300	0.500	CR1	40.0	Superior	$\sigma_{b,0}$	0.10	11.52	0.01
			1062	48.600	16.200	0.000	CR1	50.0	Intermedio	$\sigma_{lc,0}$	-4.52	11.52	0.39
			1062	48.600	16.200	0.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-4.46		0.40
			1062	48.600	16.200	0.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.03	0.50	0.06
			19992	48.600	16.200	0.500	CR1	60.0	Inferior	$\tau_{xz}$	0.01	1.92	0.01
			1062	48.600	16.200	0.000	CR1	60.0	Inferior	$\tau_{xy}$	-1.63	1.92	0.85
		3	13905	48.600	16.200	1.500	CR1	60.0	Superior	$\sigma_{b,0}$	-0.05	11.52	0.00
			1062	48.600	16.200	0.000	CR1	70.0	Intermedio	$\sigma_{lc,0}$	-3.58	11.52	0.31
			1062	48.600	16.200	0.000	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-3.58		0.31
			19992	48.600	16.200	0.500	CR1	70.0	Intermedio	$\tau_{yz}$	-0.01	0.50	0.02
			1062	48.600	16.200	0.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.03	1.92	0.02
			1062	48.600	16.200	0.000	CR1	80.0	Inferior	$\tau_{xy}$	1.64	1.92	0.85
		4	25288	48.600	24.300	0.500	CR1	80.0	Superior	$\sigma_{b,0}$	0.10	11.52	0.01
			1062	48.600	16.200	0.000	CR1	90.0	Intermedio	$\sigma_{lc,0}$	-4.75	11.52	0.41
			1062	48.600	16.200	0.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	-4.69		0.42
			1062	48.600	16.200	0.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.03	0.50	0.06
			19992	48.600	16.200	0.500	CR1	80.0	Superior	$\tau_{xz}$	0.01	1.92	0.01
			1062	48.600	16.200	0.000	CR1	100.0	Inferior	$\tau_{xy}$	-1.64	1.92	0.86
		5	13905	48.600	16.200	1.500	CR1	100.0	Superior	$\sigma_{b,0}$	-0.11	11.52	0.01
			1062	48.600	16.200	0.000	CR1	120.0	Intermedio	$\sigma_{lc,0}$	-3.57	11.52	0.31
			1062	48.600	16.200	0.000	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	-3.58		0.31
			1062	48.600	16.200	0.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1062	48.600	16.200	0.000	CR1	100.0	Superior	$\tau_{xz}$	-0.03	1.92	0.02
			1062	48.600	16.200	0.000	CR1	140.0	Inferior	$\tau_{xy}$	1.66	1.92	0.86
	5	1	23670	67.500	16.740	2.000	CR1	0.0	Superior	$\sigma_{b,0}$	0.21	11.52	0.02
			3487	67.500	18.900	2.000	CR1	20.0	Intermedio	$\sigma_{lc,0}$	0.34	11.52	0.03
			23670	67.500	16.740	2.000	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	0.55		0.05
			4159	67.500	13.500	1.500	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			4159	67.500	13.500	1.500	CR1	40.0	Inferior	$\tau_{xz}$	0.03	1.92	0.01
			654	67.500	24.300	0.500	CR1	0.0	Superior	$\tau_{xy}$	0.09	1.92	0.04
		2	1086	67.500	13.500	0.000	CR1	60.0	Inferior	$\sigma_{b,0}$	-0.17	11.52	0.02
			1083	67.500	24.300	0.000	CR1	50.0	Intermedio	$\sigma_{lc,0}$	0.36	11.52	0.03
			1083	67.500	24.300	0.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	0.53		0.05
			4159	67.500	13.500	1.500	CR1	50.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.06
			1088	67.500	13.500	1.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.03	1.92	0.02
			654	67.500	24.300	0.500	CR1	60.0	Inferior	$\tau_{xy}$	-0.08	1.92	0.04
		3	23670	67.500	16.740	2.000	CR1	60.0	Superior	$\sigma_{b,0}$	0.11	11.52	0.01
			23822	67.500	24.300	1.500	CR1	70.0	Intermedio	$\sigma_{lc,0}$	-0.28	11.52	0.02
			23822	67.500	24.300	1.500	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-0.23		0.03
			1088	67.500	13.500	1.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.06
			4159	67.500	13.500	1.500	CR1	70.0	Intermedio	$\tau_{xz}$	0.03	1.92	0.01
			654	67.500	24.300	0.500	CR1	80.0	Inferior	$\tau_{xy}$	0.09	1.92	0.05
		4	1086	67.500	13.500	0.000	CR1	80.0	Superior	$\sigma_{b,0}$	0.17	11.52	0.02
			654	67.500	24.300	0.500	CR1	90.0	Intermedio	$\sigma_{lc,0}$	-0.36	11.52	0.03
			1086	67.500	13.500	0.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	-0.17		0.04
			4159	67.500	13.500	1.500	CR1	90.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.06
			1088	67.500	13.500	1.000	CR1	80.0	Superior	$\tau_{xz}$	-0.03	1.92	0.02
			654	67.500	24.300	0.500	CR1	100.0	Inferior	$\tau_{xy}$	-0.10	1.92	0.05



Proyecto: TFM  
TFM

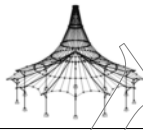
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
6	1	5	23670	67.500	16.740	2.000	CR1	140.0	Inferior	$\sigma_{b,0}$	-0.21	11.52	0.02
			19124	67.500	21.600	2.000	CR1	120.0	Intermedio	$\sigma_{b,c,0}$	-0.74	11.52	0.06
			19124	67.500	21.600	2.000	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-0.53		0.08
			4159	67.500	13.500	1.500	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			4159	67.500	13.500	1.500	CR1	100.0	Superior	$\tau_{xz}$	0.03	1.92	0.01
			336	67.500	24.300	1.000	CR1	140.0	Inferior	$\tau_{xy}$	0.16	1.92	0.09
			338	59.400	13.500	1.000	CR1	0.0	Superior	$\sigma_{b,0}$	0.04	11.52	0.00
			1099	59.400	13.500	0.000	CR1	20.0	Intermedio	$\sigma_{b,c,0}$	-2.43	11.52	0.21
			1099	59.400	13.500	0.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-2.43		0.21
			22428	59.400	13.500	0.500	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			22428	59.400	13.500	0.500	CR1	40.0	Inferior	$\tau_{xz}$	0.02	1.92	0.01
			1099	59.400	13.500	0.000	CR1	40.0	Inferior	$\tau_{xy}$	1.03	1.92	0.54
			338	59.400	13.500	1.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.09	11.52	0.01
			1099	59.400	13.500	0.000	CR1	50.0	Intermedio	$\sigma_{b,c,0}$	-2.94	11.52	0.26
			1099	59.400	13.500	0.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-2.92		0.26
			22428	59.400	13.500	0.500	CR1	50.0	Intermedio	$\tau_{yz}$	0.02	0.50	0.04
			1261	59.400	10.800	4.000	CR1	60.0	Inferior	$\tau_{xz}$	0.02	1.92	0.01
			1099	59.400	13.500	0.000	CR1	60.0	Inferior	$\tau_{xy}$	-1.04	1.92	0.54
			338	59.400	13.500	1.000	CR1	60.0	Superior	$\sigma_{b,0}$	0.02	11.52	0.00
			1099	59.400	13.500	0.000	CR1	70.0	Intermedio	$\sigma_{b,c,0}$	-2.43	11.52	0.21
			1099	59.400	13.500	0.000	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-2.43		0.21
			1261	59.400	10.800	4.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.02	0.50	0.03
			22428	59.400	13.500	0.500	CR1	70.0	Intermedio	$\tau_{xz}$	0.02	1.92	0.01
			1099	59.400	13.500	0.000	CR1	80.0	Inferior	$\tau_{xy}$	1.05	1.92	0.55
			338	59.400	13.500	1.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.09	11.52	0.01
			1099	59.400	13.500	0.000	CR1	90.0	Intermedio	$\sigma_{b,c,0}$	-3.06	11.52	0.27
			1099	59.400	13.500	0.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-3.03		0.27
			22428	59.400	13.500	0.500	CR1	90.0	Intermedio	$\tau_{yz}$	0.02	0.50	0.04
			1261	59.400	10.800	4.000	CR1	80.0	Superior	$\tau_{xz}$	0.02	1.92	0.01
			1099	59.400	13.500	0.000	CR1	100.0	Inferior	$\tau_{xy}$	-1.06	1.92	0.55
			338	59.400	13.500	1.000	CR1	140.0	Inferior	$\sigma_{b,0}$	-0.04	11.52	0.00
			1099	59.400	13.500	0.000	CR1	120.0	Intermedio	$\sigma_{b,c,0}$	-2.43	11.52	0.21
			1099	59.400	13.500	0.000	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-2.43		0.21
			22428	59.400	13.500	0.500	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			22428	59.400	13.500	0.500	CR1	100.0	Superior	$\tau_{xz}$	0.02	1.92	0.01
			1099	59.400	13.500	0.000	CR1	140.0	Inferior	$\tau_{xy}$	1.07	1.92	0.56
			18194	62.100	3.240	2.000	CR1	0.0	Superior	$\sigma_{b,0}$	0.21	11.52	0.02
			1107	62.100	2.700	0.000	CR1	20.0	Intermedio	$\sigma_{b,c,0}$	-0.29	11.52	0.02
			8199	62.100	5.400	2.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	0.50		0.04
			23690	62.100	10.800	1.500	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			23690	62.100	10.800	1.500	CR1	40.0	Inferior	$\tau_{xz}$	0.03	1.92	0.01
			1110	62.100	0.000	1.000	CR1	0.0	Superior	$\tau_{xy}$	0.09	1.92	0.05
			23730	62.100	10.800	0.500	CR1	40.0	Superior	$\sigma_{b,0}$	0.17	11.52	0.02
			1108	62.100	0.000	0.000	CR1	50.0	Intermedio	$\sigma_{b,c,0}$	0.37	11.52	0.03
			1108	62.100	0.000	0.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	0.54		0.05
			23690	62.100	10.800	1.500	CR1	50.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.05
			1110	62.100	0.000	1.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.03	1.92	0.02
			25384	62.100	0.000	0.500	CR1	60.0	Inferior	$\tau_{xy}$	0.07	1.92	0.04
			18194	62.100	3.240	2.000	CR1	60.0	Superior	$\sigma_{b,0}$	0.11	11.52	0.01
			1107	62.100	2.700	0.000	CR1	70.0	Intermedio	$\sigma_{b,c,0}$	-0.29	11.52	0.02
			18155	62.100	2.700	2.000	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-0.16		0.03
			1110	62.100	0.000	1.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.06
			23690	62.100	10.800	1.500	CR1	70.0	Intermedio	$\tau_{xz}$	0.03	1.92	0.01
			25384	62.100	0.000	0.500	CR1	80.0	Inferior	$\tau_{xy}$	-0.09	1.92	0.05
			23730	62.100	10.800	0.500	CR1	100.0	Inferior	$\sigma_{b,0}$	-0.17	11.52	0.02
			23730	62.100	10.800	0.500	CR1	90.0	Intermedio	$\sigma_{b,c,0}$	-0.39	11.52	0.03
			23730	62.100	10.800	0.500	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-0.21		0.05
			23690	62.100	10.800	1.500	CR1	90.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.05
			1110	62.100	0.000	1.000	CR1	80.0	Superior	$\tau_{xz}$	-0.03	1.92	0.02
			1110	62.100	0.000	1.000	CR1	100.0	Inferior	$\tau_{xy}$	0.11	1.92	0.06
			18194	62.100	3.240	2.000	CR1	140.0	Inferior	$\sigma_{b,0}$	-0.21	11.52	0.02
			18155	62.100	2.700	2.000	CR1	120.0	Intermedio	$\sigma_{b,c,0}$	-0.80	11.52	0.07
			18155	62.100	2.700	2.000	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-0.58		0.09
			23690	62.100	10.800	1.500	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			23690	62.100	10.800	1.500	CR1	100.0	Superior	$\tau_{xz}$	0.03	1.92	0.01
			1110	62.100	0.000	1.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.19	1.92	0.10
8	1	1	23915	0.000	3.240	2.000	CR1	0.0	Superior	$\sigma_{b,0}$	-0.46	11.52	0.04
			23923	0.000	7.560	2.000	CR1	20.0	Intermedio	$\sigma_{b,c,0}$	-1.21	11.52	0.10
			23923	0.000	7.560	2.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-1.67		0.14
			23889	0.000	0.000	1.500	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			23889	0.000	0.000	1.500	CR1	40.0	Inferior	$\tau_{xz}$	0.07	1.92	0.04
			25514	0.000	10.800	0.500	CR1	0.0	Superior	$\tau_{xy}$	0.26	1.92	0.14
			1176	0.000	10.800	1.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.62	11.52	0.05
			1176	0.000	10.800	1.000	CR1	50.0	Intermedio	$\sigma_{b,c,0}$	-1.23	11.52	0.11
			1176	0.000	10.800	1.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-1.85		0.16
			23889	0.000	0.000	1.500	CR1	50.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.15
			342	0.000	0.000	1.000	CR1	60.0	Inferior	$\tau_{xz}$	0.07	1.92	0.04
			23833	0.000	0.540	0.500	CR1	40.0	Superior	$\tau_{xy}$	0.09	1.92	0.05
			23915	0.000	3.240	2.000	CR1	80.0	Inferior	$\sigma_{b,0}$	0.23	11.52	0.02
			1172	0.000	2.700	0.000	CR1	70.0	Intermedio	$\sigma_{b,c,0}$	-0.29	11.52	0.02
			23889	0.000	0.000	1.500	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-0.25		0.03
			342	0.000	0.000	1.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.07	0.50	0.13
			23889	0.000	0.000	1.500	CR1	70.0	Intermedio	$\tau_{xz}$	0.08	1.92	0.04



Proyecto: TFM  
TFM

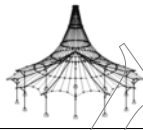
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superfici núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
9	4		23834	0.000	0.000	0.500	CR1	80.0	Inferior	$\tau_{xy}$	0.13	1.92	0.07
			1176	0.000	10.800	1.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.62	11.52	0.05
			1176	0.000	10.800	1.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	1.25	11.52	0.11
			1176	0.000	10.800	1.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	0.63		0.16
			23889	0.000	0.000	1.500	CR1	90.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.15
			342	0.000	0.000	1.000	CR1	80.0	Superior	$\tau_{xz}$	0.07	1.92	0.04
			23834	0.000	0.000	0.500	CR1	100.0	Inferior	$\tau_{xy}$	-0.21	1.92	0.11
			23915	0.000	3.240	2.000	CR1	100.0	Superior	$\sigma_{b,0}$	-0.46	11.52	0.04
			23915	0.000	3.240	2.000	CR1	120.0	Intermedio	$\sigma_{b,0}$	1.09	11.52	0.09
			23915	0.000	3.240	2.000	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	0.63		0.13
			23889	0.000	0.000	1.500	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			23889	0.000	0.000	1.500	CR1	100.0	Superior	$\tau_{xz}$	0.07	1.92	0.04
	1		23834	0.000	0.000	0.500	CR1	140.0	Inferior	$\tau_{xy}$	0.38	1.92	0.20
			24053	0.000	16.200	2.000	CR1	40.0	Inferior	$\sigma_{b,0}$	0.46	11.52	0.04
			24053	0.000	16.200	2.000	CR1	20.0	Intermedio	$\sigma_{b,0}$	-1.22	11.52	0.11
			24053	0.000	16.200	2.000	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	-1.69		0.15
			24047	0.000	18.900	1.500	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			24047	0.000	18.900	1.500	CR1	40.0	Inferior	$\tau_{xz}$	0.07	1.92	0.04
			24038	0.000	13.500	1.500	CR1	0.0	Superior	$\tau_{xy}$	0.26	1.92	0.14
			346	0.000	13.500	1.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.75	11.52	0.07
			346	0.000	13.500	1.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-1.49	11.52	0.13
			346	0.000	13.500	1.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-2.24		0.19
			24047	0.000	18.900	1.500	CR1	50.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.14
			1189	0.000	18.900	1.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.07	1.92	0.03
	3		24038	0.000	13.500	1.500	CR1	40.0	Superior	$\tau_{xy}$	-0.12	1.92	0.06
			24053	0.000	16.200	2.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.23	11.52	0.02
			1187	0.000	16.200	0.000	CR1	70.0	Intermedio	$\sigma_{b,0}$	-0.33	11.52	0.03
			1187	0.000	16.200	0.000	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-0.33		0.03
			1189	0.000	18.900	1.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.13
			24047	0.000	18.900	1.500	CR1	70.0	Intermedio	$\tau_{xz}$	0.07	1.92	0.04
			25538	0.000	18.900	0.500	CR1	80.0	Inferior	$\tau_{xy}$	-0.12	1.92	0.06
			346	0.000	13.500	1.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.75	11.52	0.07
			346	0.000	13.500	1.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	1.51	11.52	0.13
			346	0.000	13.500	1.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	0.76		0.20
			24047	0.000	18.900	1.500	CR1	90.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.14
			1189	0.000	18.900	1.000	CR1	80.0	Superior	$\tau_{xz}$	-0.07	1.92	0.03
	5		25538	0.000	18.900	0.500	CR1	100.0	Inferior	$\tau_{xy}$	0.21	1.92	0.11
			24053	0.000	16.200	2.000	CR1	140.0	Inferior	$\sigma_{b,0}$	0.46	11.52	0.04
			24053	0.000	16.200	2.000	CR1	120.0	Intermedio	$\sigma_{b,0}$	1.10	11.52	0.10
			24053	0.000	16.200	2.000	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	0.63		0.14
			24047	0.000	18.900	1.500	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			24047	0.000	18.900	1.500	CR1	100.0	Superior	$\tau_{xz}$	0.07	1.92	0.04
			25538	0.000	18.900	0.500	CR1	140.0	Inferior	$\tau_{xy}$	-0.38	1.92	0.20
			2565	18.900	13.500	5.500	CR1	0.0	Superior	$\sigma_{b,0}$	-0.08	11.52	0.01
			2565	18.900	13.500	5.500	CR1	20.0	Intermedio	$\sigma_{b,0}$	-1.28	11.52	0.11
			2565	18.900	13.500	5.500	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	-1.29		0.11
			1319	18.900	13.500	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1319	18.900	13.500	4.000	CR1	40.0	Inferior	$\tau_{xz}$	0.02	1.92	0.01
	2		1319	18.900	13.500	4.000	CR1	40.0	Inferior	$\tau_{xy}$	-0.51	1.92	0.26
			558	18.900	18.900	5.000	CR1	60.0	Inferior	$\sigma_{b,0}$	0.10	11.52	0.01
			1319	18.900	13.500	4.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-1.40	11.52	0.12
			1319	18.900	13.500	4.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-1.35		0.13
			1319	18.900	13.500	4.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.02	0.50	0.04
			1319	18.900	13.500	4.000	CR1	60.0	Inferior	$\tau_{xz}$	0.01	1.92	0.00
			1319	18.900	13.500	4.000	CR1	60.0	Inferior	$\tau_{xy}$	0.51	1.92	0.27
			2565	18.900	13.500	5.500	CR1	60.0	Superior	$\sigma_{b,0}$	-0.04	11.52	0.00
			25847	18.900	14.040	8.000	CR1	70.0	Intermedio	$\sigma_{b,0}$	-1.24	11.52	0.11
			2565	18.900	13.500	5.500	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-1.24		0.11
			1319	18.900	13.500	4.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.01	0.50	0.02
			1319	18.900	13.500	4.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.02	1.92	0.01
	4		1319	18.900	13.500	4.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.52	1.92	0.27
			558	18.900	18.900	5.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.10	11.52	0.01
			1319	18.900	13.500	4.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	-1.60	11.52	0.14
			1319	18.900	13.500	4.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	-1.55		0.14
			1319	18.900	13.500	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.02	0.50	0.04
			1319	18.900	13.500	4.000	CR1	80.0	Superior	$\tau_{xz}$	0.01	1.92	0.00
			1319	18.900	13.500	4.000	CR1	100.0	Inferior	$\tau_{xy}$	0.52	1.92	0.27
			2565	18.900	13.500	5.500	CR1	100.0	Superior	$\sigma_{b,0}$	-0.08	11.52	0.01
			25847	18.900	14.040	8.000	CR1	120.0	Intermedio	$\sigma_{b,0}$	-1.24	11.52	0.11
			25847	18.900	14.040	8.000	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	-1.24		0.11
			1319	18.900	13.500	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1319	18.900	13.500	4.000	CR1	100.0	Superior	$\tau_{xz}$	0.02	1.92	0.01
	27		1319	18.900	13.500	4.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.53	1.92	0.27
			2630	24.300	13.500	5.500	CR1	0.0	Superior	$\sigma_{b,0}$	-0.08	11.52	0.01
			2630	24.300	13.500	5.500	CR1	20.0	Intermedio	$\sigma_{b,0}$	-1.24	11.52	0.11
			2630	24.300	13.500	5.500	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	-1.25		0.11
			1327	24.300	13.500	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1327	24.300	13.500	4.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.02	1.92	0.01
			1327	24.300	13.500	4.000	CR1	40.0	Inferior	$\tau_{xy}$	0.52	1.92	0.27
			2598	24.300	13.500	4.500	CR1	40.0	Superior	$\sigma_{b,0}$	-0.07	11.52	0.01
			1327	24.300	13.500	4.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-1.53	11.52	0.13
			1327	24.300	13.500	4.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-1.48		0.14
			1327	24.300	13.500	4.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.02	0.50	0.04



Proyecto: TFM  
TFM

Modelo: TFM\_FINAL\_v01

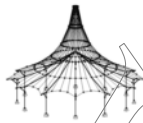
Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
28	1	3	1327	24.300	13.500	4.000	CR1	60.0	Inferior	$\tau_{xy}$	0.01	1.92	0.00
			1327	24.300	13.500	4.000	CR1	60.0	Inferior	$\tau_{xy}$	-0.52	1.92	0.27
			2630	24.300	13.500	5.500	CR1	60.0	Superior	$\sigma_{b,0}$	-0.04	11.52	0.00
			25872	24.300	14.040	8.000	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-1.22	11.52	0.11
			25872	24.300	14.040	8.000	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-1.22		0.11
			1327	24.300	13.500	4.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.01	0.50	0.02
			1327	24.300	13.500	4.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.02	1.92	0.01
			1327	24.300	13.500	4.000	CR1	80.0	Inferior	$\tau_{xy}$	0.52	1.92	0.27
			2598	24.300	13.500	4.500	CR1	80.0	Superior	$\sigma_{b,0}$	-0.07	11.52	0.01
			1327	24.300	13.500	4.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-1.71	11.52	0.15
			1327	24.300	13.500	4.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-1.67		0.15
			1327	24.300	13.500	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.02	0.50	0.04
			1327	24.300	13.500	4.000	CR1	80.0	Superior	$\tau_{xz}$	0.01	1.92	0.00
			1327	24.300	13.500	4.000	CR1	100.0	Superior	$\tau_{xy}$	-0.53	1.92	0.27
			2630	24.300	13.500	5.500	CR1	100.0	Superior	$\sigma_{b,0}$	-0.08	11.52	0.01
			25872	24.300	14.040	8.000	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-1.22	11.52	0.11
			25872	24.300	14.040	8.000	CR1	100.0	Superior	$\sigma_{b+bc,0}$	-1.22		0.11
			1327	24.300	13.500	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1327	24.300	13.500	4.000	CR1	100.0	Superior	$\tau_{xz}$	-0.02	1.92	0.01
			1327	24.300	13.500	4.000	CR1	140.0	Inferior	$\tau_{xy}$	0.53	1.92	0.28
			2781	43.200	16.200	5.500	CR1	0.0	Superior	$\sigma_{b,0}$	-0.10	11.52	0.01
			25947	43.200	16.740	8.000	CR1	20.0	Intermedio	$\sigma_{bc,0}$	-2.14	11.52	0.19
			25947	43.200	16.740	8.000	CR1	0.0	Superior	$\sigma_{b+bc,0}$	-2.14		0.19
			1371	43.200	16.200	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1371	43.200	16.200	4.000	CR1	40.0	Inferior	$\tau_{xz}$	0.02	1.92	0.01
			1371	43.200	16.200	4.000	CR1	40.0	Inferior	$\tau_{xy}$	-0.95	1.92	0.49
			25935	43.200	16.200	4.500	CR1	60.0	Inferior	$\sigma_{b,0}$	0.08	11.52	0.01
			1371	43.200	16.200	4.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-2.67	11.52	0.23
			1371	43.200	16.200	4.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-2.61		0.24
			1371	43.200	16.200	4.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.02	0.50	0.05
			2781	43.200	16.200	5.500	CR1	60.0	Inferior	$\tau_{xz}$	-0.01	1.92	0.01
			1371	43.200	16.200	4.000	CR1	60.0	Inferior	$\tau_{xy}$	0.95	1.92	0.50
			2781	43.200	16.200	5.500	CR1	60.0	Superior	$\sigma_{b,0}$	-0.05	11.52	0.00
			25947	43.200	16.740	8.000	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-2.14	11.52	0.19
			25947	43.200	16.740	8.000	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-2.14		0.19
			2781	43.200	16.200	5.500	CR1	70.0	Intermedio	$\tau_{yz}$	0.01	0.50	0.02
			1371	43.200	16.200	4.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.03	1.92	0.01
			1371	43.200	16.200	4.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.96	1.92	0.50
			25935	43.200	16.200	4.500	CR1	80.0	Superior	$\sigma_{b,0}$	-0.08	11.52	0.01
			1371	43.200	16.200	4.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-2.90	11.52	0.25
			1371	43.200	16.200	4.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-2.84		0.26
			1371	43.200	16.200	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.02	0.50	0.05
			2781	43.200	16.200	5.500	CR1	80.0	Superior	$\tau_{xz}$	-0.01	1.92	0.01
			1371	43.200	16.200	4.000	CR1	100.0	Inferior	$\tau_{xy}$	0.96	1.92	0.50
			2781	43.200	16.200	5.500	CR1	140.0	Inferior	$\sigma_{b,0}$	0.10	11.52	0.01
			25947	43.200	16.740	8.000	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-2.14	11.52	0.19
			25947	43.200	16.740	8.000	CR1	100.0	Superior	$\sigma_{b+bc,0}$	-2.14		0.19
			1371	43.200	16.200	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1371	43.200	16.200	4.000	CR1	100.0	Superior	$\tau_{xz}$	0.02	1.92	0.01
			1371	43.200	16.200	4.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.97	1.92	0.51
29	1	1	2846	48.600	16.200	5.500	CR1	40.0	Inferior	$\sigma_{b,0}$	0.10	11.52	0.01
			25972	48.600	16.740	8.000	CR1	20.0	Intermedio	$\sigma_{bc,0}$	-2.47	11.52	0.21
			25972	48.600	16.740	8.000	CR1	0.0	Superior	$\sigma_{b+bc,0}$	-2.47		0.21
			1379	48.600	16.200	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1379	48.600	16.200	4.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.03	1.92	0.02
			1379	48.600	16.200	4.000	CR1	40.0	Inferior	$\tau_{xy}$	1.11	1.92	0.58
			25971	48.600	24.300	4.500	CR1	40.0	Superior	$\sigma_{b,0}$	0.09	11.52	0.01
			1379	48.600	16.200	4.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-3.30	11.52	0.29
			1379	48.600	16.200	4.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-3.25		0.29
			1379	48.600	16.200	4.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.03	0.50	0.06
			1379	48.600	16.200	4.000	CR1	60.0	Inferior	$\tau_{xz}$	0.01	1.92	0.01
			1379	48.600	16.200	4.000	CR1	60.0	Inferior	$\tau_{xy}$	-1.12	1.92	0.58
			2846	48.600	16.200	5.500	CR1	60.0	Superior	$\sigma_{b,0}$	-0.05	11.52	0.00
			25972	48.600	16.740	8.000	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-2.47	11.52	0.21
			25972	48.600	16.740	8.000	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-2.47		0.21
			1379	48.600	16.200	4.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.01	0.50	0.02
			1379	48.600	16.200	4.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.03	1.92	0.02
			1379	48.600	16.200	4.000	CR1	80.0	Inferior	$\tau_{xy}$	1.13	1.92	0.59
			25971	48.600	24.300	4.500	CR1	80.0	Superior	$\sigma_{b,0}$	0.09	11.52	0.01
			1379	48.600	16.200	4.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-3.50	11.52	0.30
			1379	48.600	16.200	4.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-3.45		0.31
			1379	48.600	16.200	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.03	0.50	0.06
			1379	48.600	16.200	4.000	CR1	80.0	Superior	$\tau_{xz}$	0.01	1.92	0.01
			1379	48.600	16.200	4.000	CR1	100.0	Inferior	$\tau_{xy}$	-1.13	1.92	0.59
			2846	48.600	16.200	5.500	CR1	100.0	Superior	$\sigma_{b,0}$	-0.10	11.52	0.01
			25972	48.600	16.740	8.000	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-2.47	11.52	0.21
			25972	48.600	16.740	8.000	CR1	100.0	Superior	$\sigma_{b+bc,0}$	-2.47		0.21
			1379	48.600	16.200	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1379	48.600	16.200	4.000	CR1	100.0	Superior	$\tau_{xz}$	-0.03	1.92	0.02
			1379	48.600	16.200	4.000	CR1	140.0	Inferior	$\tau_{xy}$	1.15	1.92	0.60
30	1	1	3039	67.500	21.060	6.000	CR1	0.0	Superior	$\sigma_{b,0}$	0.22	11.52	0.02
			26051	67.500	22.680	8.000	CR1	20.0	Intermedio	$\sigma_{bc,0}$	-0.49	11.52	0.04
			26051	67.500	22.680	8.000	CR1	0.0	Superior	$\sigma_{b+bc,0}$	-0.49		0.04





Proyecto: TFM  
TFM

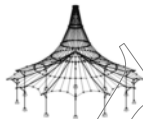
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
31	2	2	3047	67.500	13.500	5.500	CR1	40.0	Inferior	Ty'z'	0.00	0.50	0.00
			3047	67.500	13.500	5.500	CR1	40.0	Inferior	Tx'z'	0.03	1.92	0.01
			26049	67.500	23.760	8.000	CR1	40.0	Inferior	Tx'y'	0.11	1.92	0.06
			1412	67.500	13.500	4.000	CR1	40.0	Superior	σ <sub>b,0</sub>	0.18	11.52	0.02
			1409	67.500	24.300	4.000	CR1	50.0	Intermedio	σ <sub>bc,0</sub>	0.31	11.52	0.03
			1409	67.500	24.300	4.000	CR1	40.0	Superior	σ <sub>b+bc,0</sub>	0.48		0.04
			3047	67.500	13.500	5.500	CR1	50.0	Intermedio	Ty'z'	0.03	0.50	0.06
			1414	67.500	13.500	5.000	CR1	60.0	Inferior	Tx'z'	-0.03	1.92	0.02
			26049	67.500	23.760	8.000	CR1	60.0	Inferior	Tx'y'	-0.12	1.92	0.06
			3039	67.500	21.060	6.000	CR1	60.0	Superior	σ <sub>b,0</sub>	0.11	11.52	0.01
			3001	67.500	23.220	7.000	CR1	70.0	Intermedio	σ <sub>bc,0</sub>	-0.50	11.52	0.04
			3022	67.500	23.220	6.500	CR1	60.0	Superior	σ <sub>b+bc,0</sub>	-0.40		0.05
			1414	67.500	13.500	5.000	CR1	70.0	Intermedio	Ty'z'	0.03	0.50	0.06
			3047	67.500	13.500	5.500	CR1	70.0	Intermedio	Tx'z'	0.03	1.92	0.01
			26049	67.500	23.760	8.000	CR1	80.0	Inferior	Tx'y'	0.12	1.92	0.06
		4	1412	67.500	13.500	4.000	CR1	100.0	Inferior	σ <sub>b,0</sub>	-0.18	11.52	0.02
			1415	67.500	24.300	8.000	CR1	90.0	Intermedio	σ <sub>bc,0</sub>	-0.47	11.52	0.04
			1412	67.500	13.500	4.000	CR1	80.0	Superior	σ <sub>b+bc,0</sub>	-0.24		0.05
			3047	67.500	13.500	5.500	CR1	90.0	Intermedio	Ty'z'	0.03	0.50	0.06
			1414	67.500	13.500	5.000	CR1	80.0	Superior	Tx'z'	-0.03	1.92	0.02
			26049	67.500	23.760	8.000	CR1	100.0	Inferior	Tx'y'	-0.13	1.92	0.07
		5	3039	67.500	21.060	6.000	CR1	100.0	Superior	σ <sub>b,0</sub>	0.22	11.52	0.02
			3040	67.500	21.600	6.000	CR1	120.0	Intermedio	σ <sub>bc,0</sub>	-0.98	11.52	0.09
			3040	67.500	21.600	6.000	CR1	100.0	Superior	σ <sub>b+bc,0</sub>	-0.76		0.10
			3047	67.500	13.500	5.500	CR1	100.0	Superior	Ty'z'	0.00	0.50	0.00
			3047	67.500	13.500	5.500	CR1	100.0	Superior	Tx'z'	0.03	1.92	0.01
		1	26032	67.500	23.760	4.000	CR1	140.0	Inferior	Tx'y'	-0.18	1.92	0.09
			3156	59.400	13.500	4.500	CR1	40.0	Inferior	σ <sub>b,0</sub>	-0.04	11.52	0.00
			26088	59.400	12.960	8.000	CR1	20.0	Intermedio	σ <sub>bc,0</sub>	-1.86	11.52	0.16
			26088	59.400	12.960	8.000	CR1	0.0	Superior	σ <sub>b+bc,0</sub>	-1.86		0.16
			3156	59.400	13.500	4.500	CR1	40.0	Inferior	Ty'z'	0.00	0.50	0.00
			3156	59.400	13.500	4.500	CR1	40.0	Inferior	Tx'z'	0.02	1.92	0.01
		2	1433	59.400	13.500	4.000	CR1	40.0	Inferior	Tx'y'	0.71	1.92	0.37
			1436	59.400	10.800	8.000	CR1	60.0	Inferior	σ <sub>b,0</sub>	-0.10	11.52	0.01
			1433	59.400	13.500	4.000	CR1	50.0	Intermedio	σ <sub>bc,0</sub>	-2.23	11.52	0.19
			1433	59.400	13.500	4.000	CR1	40.0	Superior	σ <sub>b+bc,0</sub>	-2.20		0.20
			3156	59.400	13.500	4.500	CR1	50.0	Intermedio	Ty'z'	0.02	0.50	0.04
			1436	59.400	10.800	8.000	CR1	60.0	Inferior	Tx'z'	0.02	1.92	0.01
			1433	59.400	13.500	4.000	CR1	60.0	Inferior	Tx'y'	-0.72	1.92	0.37
		3	3156	59.400	13.500	4.500	CR1	60.0	Superior	σ <sub>b,0</sub>	0.02	11.52	0.00
			26088	59.400	12.960	8.000	CR1	70.0	Intermedio	σ <sub>bc,0</sub>	-1.86	11.52	0.16
			26088	59.400	12.960	8.000	CR1	60.0	Superior	σ <sub>b+bc,0</sub>	-1.86		0.16
			1436	59.400	10.800	8.000	CR1	70.0	Intermedio	Ty'z'	-0.02	0.50	0.03
			3156	59.400	13.500	4.500	CR1	70.0	Intermedio	Tx'z'	0.02	1.92	0.01
			1433	59.400	13.500	4.000	CR1	80.0	Inferior	Tx'y'	0.73	1.92	0.38
		4	1436	59.400	10.800	8.000	CR1	100.0	Inferior	σ <sub>b,0</sub>	-0.10	11.52	0.01
			1433	59.400	13.500	4.000	CR1	90.0	Intermedio	σ <sub>bc,0</sub>	-2.33	11.52	0.20
			1433	59.400	13.500	4.000	CR1	80.0	Superior	σ <sub>b+bc,0</sub>	-2.31		0.21
			3156	59.400	13.500	4.500	CR1	90.0	Intermedio	Ty'z'	0.02	0.50	0.04
			1436	59.400	10.800	8.000	CR1	80.0	Superior	Tx'z'	0.02	1.92	0.01
			1433	59.400	13.500	4.000	CR1	100.0	Inferior	Tx'y'	-0.73	1.92	0.38
		5	3156	59.400	13.500	4.500	CR1	140.0	Inferior	σ <sub>b,0</sub>	-0.04	11.52	0.00
			26088	59.400	12.960	8.000	CR1	120.0	Intermedio	σ <sub>bc,0</sub>	-1.86	11.52	0.16
			26088	59.400	12.960	8.000	CR1	100.0	Superior	σ <sub>b+bc,0</sub>	-1.86		0.16
			3156	59.400	13.500	4.500	CR1	100.0	Superior	Ty'z'	0.00	0.50	0.00
			3156	59.400	13.500	4.500	CR1	100.0	Superior	Tx'z'	0.02	1.92	0.01
			1433	59.400	13.500	4.000	CR1	140.0	Inferior	Tx'y'	0.75	1.92	0.39
32	1	1	3247	62.100	3.240	6.000	CR1	0.0	Superior	σ <sub>b,0</sub>	0.22	11.52	0.02
			26119	62.100	2.160	8.000	CR1	20.0	Intermedio	σ <sub>bc,0</sub>	-0.56	11.52	0.05
			26119	62.100	2.160	8.000	CR1	0.0	Superior	σ <sub>b+bc,0</sub>	-0.56		0.05
			26114	62.100	0.000	4.500	CR1	40.0	Inferior	Ty'z'	0.00	0.50	0.00
			26114	62.100	0.000	4.500	CR1	40.0	Inferior	Tx'z'	-0.03	1.92	0.01
			26122	62.100	0.540	8.000	CR1	40.0	Inferior	Tx'y'	-0.12	1.92	0.06
		2	1441	62.100	10.800	4.000	CR1	40.0	Superior	σ <sub>b,0</sub>	0.17	11.52	0.02
			566	62.100	10.800	5.000	CR1	50.0	Intermedio	σ <sub>bc,0</sub>	0.30	11.52	0.03
			1444	62.100	0.000	4.000	CR1	40.0	Superior	σ <sub>b+bc,0</sub>	0.46		0.04
			26114	62.100	0.000	4.500	CR1	50.0	Intermedio	Ty'z'	-0.03	0.50	0.05
			1446	62.100	0.000	5.000	CR1	60.0	Inferior	Tx'z'	-0.03	1.92	0.02
			26122	62.100	0.540	8.000	CR1	60.0	Inferior	Tx'y'	0.12	1.92	0.06
		3	3247	62.100	3.240	6.000	CR1	80.0	Inferior	σ <sub>b,0</sub>	-0.11	11.52	0.01
			26119	62.100	2.160	8.000	CR1	70.0	Intermedio	σ <sub>bc,0</sub>	-0.56	11.52	0.05
			3247	62.100	3.240	6.000	CR1	60.0	Superior	σ <sub>b+bc,0</sub>	-0.42		0.06
			1446	62.100	0.000	5.000	CR1	70.0	Intermedio	Ty'z'	0.03	0.50	0.06
			26114	62.100	0.000	4.500	CR1	70.0	Intermedio	Tx'z'	-0.03	1.92	0.01
			26122	62.100	0.540	8.000	CR1	80.0	Inferior	Tx'y'	-0.13	1.92	0.07
		4	1441	62.100	10.800	4.000	CR1	80.0	Superior	σ <sub>b,0</sub>	0.17	11.52	0.02
			1447	62.100	10.800	8.000	CR1	90.0	Intermedio	σ <sub>bc,0</sub>	-0.53	11.52	0.05
			1447	62.100	10.800	8.000	CR1	80.0	Superior	σ <sub>b+bc,0</sub>	-0.43		0.05
			26114	62.100	0.000	4.500	CR1	90.0	Intermedio	Ty'z'	-0.03	0.50	0.05
			1446	62.100	0.000	5.000	CR1	80.0	Superior	Tx'z'	-0.03	1.92	0.02
			26105	62.100	0.540	4.000	CR1	100.0	Inferior	Tx'y'	-0.14	1.92	0.07
		5	3247	62.100	3.240	6.000	CR1	100.0	Superior	σ <sub>b,0</sub>	0.22	11.52	0.02
			3247	62.100	3.240	6.000	CR1	120.0	Intermedio	σ <sub>bc,0</sub>	-1.08	11.52	0.09



Proyecto: TFM  
TFM

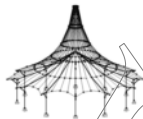
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

EVALUACIÓN DE LA RESISTENCIA POR COMPRESIÓN															
Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]				Razón [-]	
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite			
33	1	1	3247	62.100	3.240	6.000	CR1	100.0	Superior	$\sigma_{b+hc,0}$	-0.86		0.11		
			26114	62.100	0.000	4.500	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00		
			26114	62.100	0.000	4.500	CR1	100.0	Superior	$\tau_{xz}$	-0.03	1.92	0.01		
			26105	62.100	0.540	4.000	CR1	140.0	Inferior	$\tau_{xy}$	0.20	1.92	0.10		
			3394	0.000	3.240	6.000	CR1	0.0	Superior	$\sigma_{b,0}$	-0.47	11.52	0.04		
			3402	0.000	7.560	6.000	CR1	20.0	Intermedio	$\sigma_{b,0}$	-1.31	11.52	0.11		
			3402	0.000	7.560	6.000	CR1	0.0	Superior	$\sigma_{b+hc,0}$	-1.78		0.15		
			3368	0.000	0.000	5.500	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00		
			3368	0.000	0.000	5.500	CR1	40.0	Inferior	$\tau_{xz}$	0.07	1.92	0.04		
			25730	0.000	10.800	4.500	CR1	0.0	Superior	$\tau_{xy}$	0.23	1.92	0.12		
		2	1272	0.000	10.800	5.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.61	11.52	0.05		
			1272	0.000	10.800	5.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-1.22	11.52	0.11		
			1272	0.000	10.800	5.000	CR1	40.0	Superior	$\sigma_{b+hc,0}$	-1.83		0.16		
			3368	0.000	0.000	5.500	CR1	50.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.15		
		3	568	0.000	0.000	5.000	CR1	60.0	Inferior	$\tau_{xz}$	0.07	1.92	0.04		
			25731	0.000	0.540	8.000	CR1	40.0	Superior	$\tau_{xy}$	-0.13	1.92	0.07		
			3394	0.000	3.240	6.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.23	11.52	0.02		
			25734	0.000	2.160	8.000	CR1	70.0	Intermedio	$\sigma_{b,0}$	-0.55	11.52	0.05		
		4	25734	0.000	2.160	8.000	CR1	60.0	Superior	$\sigma_{b+hc,0}$	-0.55		0.05		
			568	0.000	0.000	5.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.07	0.50	0.13		
			3368	0.000	0.000	5.500	CR1	70.0	Intermedio	$\tau_{xz}$	0.08	1.92	0.04		
			3326	0.000	0.000	4.500	CR1	80.0	Inferior	$\tau_{xy}$	0.15	1.92	0.08		
			1272	0.000	10.800	5.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.61	11.52	0.05		
			1272	0.000	10.800	5.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	1.22	11.52	0.11		
			1272	0.000	10.800	5.000	CR1	80.0	Superior	$\sigma_{b+hc,0}$	0.61		0.16		
			3368	0.000	0.000	5.500	CR1	90.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.15		
			568	0.000	0.000	5.000	CR1	80.0	Superior	$\tau_{xz}$	0.07	1.92	0.04		
			3326	0.000	0.000	4.500	CR1	100.0	Inferior	$\tau_{xy}$	-0.24	1.92	0.12		
			5	3394	0.000	3.240	6.000	CR1	100.0	Superior	$\sigma_{b,0}$	-0.47	11.52	0.04	
				3393	0.000	2.700	6.000	CR1	120.0	Intermedio	$\sigma_{b,0}$	1.05	11.52	0.09	
		3393		0.000	2.700	6.000	CR1	100.0	Superior	$\sigma_{b+hc,0}$	0.58		0.13		
		3368		0.000	0.000	5.500	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00		
		34	1	1	3368	0.000	0.000	5.500	CR1	100.0	Superior	$\tau_{xz}$	0.07	1.92	0.04
					3326	0.000	0.000	4.500	CR1	140.0	Inferior	$\tau_{xy}$	0.42	1.92	0.22
					3531	0.000	16.200	6.000	CR1	40.0	Inferior	$\sigma_{b,0}$	0.47	11.52	0.04
					3531	0.000	16.200	6.000	CR1	20.0	Intermedio	$\sigma_{b,0}$	-1.33	11.52	0.12
					3531	0.000	16.200	6.000	CR1	0.0	Superior	$\sigma_{b+hc,0}$	-1.80		0.16
					3525	0.000	18.900	5.500	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
					3525	0.000	18.900	5.500	CR1	40.0	Inferior	$\tau_{xz}$	0.07	1.92	0.04
					3494	0.000	13.500	4.500	CR1	0.0	Superior	$\tau_{xy}$	-0.24	1.92	0.12
1289	0.000				18.900	5.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.63	11.52	0.05		
1289	0.000				18.900	5.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-1.25	11.52	0.11		
2	1289			0.000	18.900	5.000	CR1	40.0	Superior	$\sigma_{b+hc,0}$	-1.88		0.16		
	3525			0.000	18.900	5.500	CR1	50.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.15		
	1289			0.000	18.900	5.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.07	1.92	0.03		
	25777			0.000	18.360	8.000	CR1	60.0	Inferior	$\tau_{xy}$	0.13	1.92	0.07		
	3531			0.000	16.200	6.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.24	11.52	0.02		
	3556			0.000	17.820	7.000	CR1	70.0	Intermedio	$\sigma_{b,0}$	-0.56	11.52	0.05		
	3556			0.000	17.820	7.000	CR1	60.0	Superior	$\sigma_{b+hc,0}$	-0.56		0.05		
	1289			0.000	18.900	5.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.13		
	3525			0.000	18.900	5.500	CR1	70.0	Intermedio	$\tau_{xz}$	0.08	1.92	0.04		
	25769			0.000	18.900	4.500	CR1	80.0	Inferior	$\tau_{xy}$	-0.15	1.92	0.08		
3	1289	0.000	18.900	5.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.63	11.52	0.05				
	1289	0.000	18.900	5.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	1.26	11.52	0.11				
	1289	0.000	18.900	5.000	CR1	80.0	Superior	$\sigma_{b+hc,0}$	0.64		0.16				
	3525	0.000	18.900	5.500	CR1	90.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.15				
	1289	0.000	18.900	5.000	CR1	80.0	Superior	$\tau_{xz}$	-0.07	1.92	0.03				
	25769	0.000	18.900	4.500	CR1	100.0	Inferior	$\tau_{xy}$	0.24	1.92	0.12				
	3531	0.000	16.200	6.000	CR1	100.0	Superior	$\sigma_{b,0}$	-0.47	11.52	0.04				
	3531	0.000	16.200	6.000	CR1	120.0	Intermedio	$\sigma_{b,0}$	1.04	11.52	0.09				
	3531	0.000	16.200	6.000	CR1	100.0	Superior	$\sigma_{b+hc,0}$	0.57		0.13				
	3525	0.000	18.900	5.500	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00				
46	1	1	3525	0.000	18.900	5.500	CR1	100.0	Superior	$\tau_{xz}$	0.07	1.92	0.04		
			25769	0.000	18.900	4.500	CR1	140.0	Inferior	$\tau_{xy}$	-0.41	1.92	0.21		
			4524	2.700	13.500	1.500	CR1	0.0	Superior	$\sigma_{b,0}$	0.02	11.52	0.00		
			1181	2.700	13.500	0.000	CR1	20.0	Intermedio	$\sigma_{b,0}$	-0.84	11.52	0.07		
			1181	2.700	13.500	0.000	CR1	0.0	Superior	$\sigma_{b+hc,0}$	-0.84		0.07		
			1181	2.700	13.500	0.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00		
			1181	2.700	13.500	0.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.01	1.92	0.00		
			1181	2.700	13.500	0.000	CR1	40.0	Inferior	$\tau_{xy}$	-0.31	1.92	0.16		
			344	2.700	10.800	1.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.03	11.52	0.00		
			1181	2.700	13.500	0.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-0.75	11.52	0.07		
		2	1181	2.700	13.500	0.000	CR1	40.0	Superior	$\sigma_{b+hc,0}$	-0.75		0.07		
			1181	2.700	13.500	0.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.01	0.50	0.02		
			1182	2.700	13.500	1.000	CR1	60.0	Inferior	$\tau_{xz}$	0.00	1.92	0.00		
			1181	2.700	13.500	0.000	CR1	60.0	Inferior	$\tau_{xy}$	0.32	1.92	0.17		
			4524	2.700	13.500	1.500	CR1	60.0	Superior	$\sigma_{b,0}$	0.01	11.52	0.00		
			25524	2.700	13.500	0.500	CR1	70.0	Intermedio	$\sigma_{b,0}$	-0.85	11.52	0.07		
			25524	2.700	13.500	0.500	CR1	60.0	Superior	$\sigma_{b+hc,0}$	-0.85		0.07		
			1182	2.700	13.500	1.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.00	0.50	0.01		
			1181	2.700	13.500	0.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.01	1.92	0.00		
			1181	2.700	13.500	0.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.32	1.92	0.17		
3	344	2.700	10.800	1.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.03	11.52	0.00				



Proyecto: TFM  
TFM

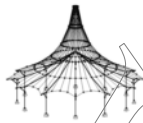
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
52	1	5	1181	2.700	13.500	0.000	CR1	90.0	Intermedio	$\sigma_{xc,0}$	-0.75	11.52	0.07
			1181	2.700	13.500	0.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-0.75		0.07
			1181	2.700	13.500	0.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.01	0.50	0.02
			1182	2.700	13.500	1.000	CR1	80.0	Superior	$\tau_{xz}$	0.00	1.92	0.00
			1181	2.700	13.500	0.000	CR1	100.0	Inferior	$\tau_{xy}$	0.32	1.92	0.17
			4524	2.700	13.500	1.500	CR1	100.0	Superior	$\sigma_{b,0}$	0.02	11.52	0.00
			1182	2.700	13.500	1.000	CR1	120.0	Intermedio	$\sigma_{tc,0}$	-0.89	11.52	0.08
			1182	2.700	13.500	1.000	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-0.86		0.08
			1181	2.700	13.500	0.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1181	2.700	13.500	0.000	CR1	100.0	Superior	$\tau_{xz}$	-0.01	1.92	0.00
			1181	2.700	13.500	0.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.33	1.92	0.17
			4816	2.700	13.500	5.500	CR1	40.0	Inferior	$\sigma_{b,0}$	-0.02	11.52	0.00
			25759	2.700	12.960	8.000	CR1	20.0	Intermedio	$\sigma_{tc,0}$	-0.89	11.52	0.08
			25759	2.700	12.960	8.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-0.89		0.08
			1282	2.700	13.500	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1282	2.700	13.500	4.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.01	1.92	0.00
			1282	2.700	13.500	4.000	CR1	40.0	Inferior	$\tau_{xy}$	-0.26	1.92	0.14
			570	2.700	10.800	5.000	CR1	60.0	Inferior	$\sigma_{b,0}$	0.02	11.52	0.00
			1282	2.700	13.500	4.000	CR1	50.0	Intermedio	$\sigma_{tc,0}$	-0.73	11.52	0.06
			1282	2.700	13.500	4.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-0.73		0.06
			1282	2.700	13.500	4.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.01	0.50	0.01
			25759	2.700	12.960	8.000	CR1	60.0	Inferior	$\tau_{xz}$	0.00	1.92	0.00
			1282	2.700	13.500	4.000	CR1	60.0	Inferior	$\tau_{xy}$	0.26	1.92	0.14
			4816	2.700	13.500	5.500	CR1	80.0	Inferior	$\sigma_{b,0}$	-0.01	11.52	0.00
			25759	2.700	12.960	8.000	CR1	70.0	Intermedio	$\sigma_{tc,0}$	-0.90	11.52	0.08
			25759	2.700	12.960	8.000	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-0.89		0.08
			25759	2.700	12.960	8.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.00	0.50	0.01
			1282	2.700	13.500	4.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.01	1.92	0.00
			1282	2.700	13.500	4.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.27	1.92	0.14
			570	2.700	10.800	5.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.02	11.52	0.00
			1282	2.700	13.500	4.000	CR1	90.0	Intermedio	$\sigma_{tc,0}$	-0.75	11.52	0.06
			1282	2.700	13.500	4.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-0.74		0.07
			1282	2.700	13.500	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.01	0.50	0.01
			25759	2.700	12.960	8.000	CR1	80.0	Superior	$\tau_{xz}$	0.00	1.92	0.00
			1282	2.700	13.500	4.000	CR1	100.0	Inferior	$\tau_{xy}$	0.27	1.92	0.14
			4816	2.700	13.500	5.500	CR1	100.0	Superior	$\sigma_{b,0}$	0.02	11.52	0.00
			25759	2.700	12.960	8.000	CR1	120.0	Intermedio	$\sigma_{tc,0}$	-0.90	11.52	0.08
			25759	2.700	12.960	8.000	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-0.90		0.08
			1282	2.700	13.500	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1282	2.700	13.500	4.000	CR1	100.0	Superior	$\tau_{xz}$	-0.01	1.92	0.00
			1282	2.700	13.500	4.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.27	1.92	0.14
53	1	5	4903	18.900	13.500	9.500	CR1	40.0	Inferior	$\sigma_{b,0}$	0.08	11.52	0.01
			4903	18.900	13.500	9.500	CR1	20.0	Intermedio	$\sigma_{tc,0}$	-1.82	11.52	0.16
			4903	18.900	13.500	9.500	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-1.84		0.16
			1628	18.900	13.500	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1628	18.900	13.500	8.000	CR1	40.0	Inferior	$\tau_{xz}$	0.02	1.92	0.01
			1628	18.900	13.500	8.000	CR1	40.0	Inferior	$\tau_{xy}$	-0.54	1.92	0.28
			4934	18.900	18.900	8.500	CR1	40.0	Superior	$\sigma_{b,0}$	0.08	11.52	0.01
			673	18.900	13.500	12.000	CR1	50.0	Intermedio	$\sigma_{tc,0}$	-2.24	11.52	0.19
			673	18.900	13.500	12.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-2.24		0.19
			1628	18.900	13.500	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.02	0.50	0.04
			1628	18.900	13.500	8.000	CR1	60.0	Inferior	$\tau_{xz}$	0.01	1.92	0.00
			1628	18.900	13.500	8.000	CR1	60.0	Inferior	$\tau_{xy}$	0.55	1.92	0.29
			4903	18.900	13.500	9.500	CR1	60.0	Superior	$\sigma_{b,0}$	-0.04	11.52	0.00
			4903	18.900	13.500	9.500	CR1	70.0	Intermedio	$\sigma_{tc,0}$	-1.77	11.52	0.15
			4903	18.900	13.500	9.500	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-1.78		0.15
			1628	18.900	13.500	8.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.01	0.50	0.02
			1628	18.900	13.500	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.02	1.92	0.01
			1628	18.900	13.500	8.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.55	1.92	0.29
			4934	18.900	18.900	8.500	CR1	80.0	Superior	$\sigma_{b,0}$	0.08	11.52	0.01
			673	18.900	13.500	12.000	CR1	90.0	Intermedio	$\sigma_{tc,0}$	-2.24	11.52	0.19
			673	18.900	13.500	12.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-2.24		0.19
			1628	18.900	13.500	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.02	0.50	0.04
			1628	18.900	13.500	8.000	CR1	80.0	Superior	$\tau_{xz}$	0.01	1.92	0.00
			1628	18.900	13.500	8.000	CR1	100.0	Inferior	$\tau_{xy}$	0.56	1.92	0.29
			4903	18.900	13.500	9.500	CR1	100.0	Superior	$\sigma_{b,0}$	-0.08	11.52	0.01
			4903	18.900	13.500	9.500	CR1	120.0	Intermedio	$\sigma_{tc,0}$	-1.73	11.52	0.15
			4903	18.900	13.500	9.500	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-1.75		0.15
			1628	18.900	13.500	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1628	18.900	13.500	8.000	CR1	100.0	Superior	$\tau_{xz}$	0.02	1.92	0.01
			1628	18.900	13.500	8.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.57	1.92	0.29
54	1	5	4968	24.300	13.500	9.500	CR1	40.0	Inferior	$\sigma_{b,0}$	0.08	11.52	0.01
			4968	24.300	13.500	9.500	CR1	20.0	Intermedio	$\sigma_{tc,0}$	-1.80	11.52	0.16
			4968	24.300	13.500	9.500	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-1.82		0.16
			1633	24.300	13.500	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1633	24.300	13.500	8.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.02	1.92	0.01
			1633	24.300	13.500	8.000	CR1	40.0	Inferior	$\tau_{xy}$	0.56	1.92	0.29
			4936	24.300	13.500	8.500	CR1	40.0	Superior	$\sigma_{b,0}$	-0.06	11.52	0.01
			674	24.300	13.500	12.000	CR1	50.0	Intermedio	$\sigma_{tc,0}$	-2.23	11.52	0.19
			674	24.300	13.500	12.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-2.23		0.19
			1633	24.300	13.500	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.02	0.50	0.04
			4968	24.300	13.500	9.500	CR1	60.0	Inferior	$\tau_{xz}$	-0.01	1.92	0.00
			1633	24.300	13.500	8.000	CR1	60.0	Inferior	$\tau_{xy}$	-0.57	1.92	0.30



Proyecto: TFM  
TFM

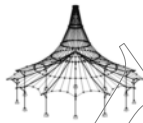
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
55		3	4968	24.300	13.500	9.500	CR1	60.0	Superior	$\sigma_{b,0}$	-0.04	11.52	0.00
			4968	24.300	13.500	9.500	CR1	70.0	Intermedio	$\sigma_{b,c,0}$	-1.75	11.52	0.15
			4968	24.300	13.500	9.500	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-1.76		0.15
			4968	24.300	13.500	9.500	CR1	70.0	Intermedio	$\tau_{yz}$	0.01	0.50	0.02
			1633	24.300	13.500	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.02	1.92	0.01
		4	1633	24.300	13.500	8.000	CR1	80.0	Inferior	$\tau_{xy}$	0.57	1.92	0.30
			4936	24.300	13.500	8.500	CR1	100.0	Inferior	$\sigma_{b,0}$	0.06	11.52	0.01
			674	24.300	13.500	12.000	CR1	90.0	Intermedio	$\sigma_{b,c,0}$	-2.22	11.52	0.19
			674	24.300	13.500	12.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-2.22		0.19
			1633	24.300	13.500	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.02	0.50	0.04
			4968	24.300	13.500	9.500	CR1	80.0	Superior	$\tau_{xz}$	-0.01	1.92	0.00
			1633	24.300	13.500	8.000	CR1	100.0	Inferior	$\tau_{xy}$	-0.58	1.92	0.30
			4968	24.300	13.500	9.500	CR1	140.0	Inferior	$\sigma_{b,0}$	0.08	11.52	0.01
			4968	24.300	13.500	9.500	CR1	120.0	Intermedio	$\sigma_{b,c,0}$	-1.70	11.52	0.15
			4968	24.300	13.500	9.500	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-1.72		0.15
		5	1633	24.300	13.500	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1633	24.300	13.500	8.000	CR1	100.0	Superior	$\tau_{xz}$	-0.02	1.92	0.01
			1633	24.300	13.500	8.000	CR1	140.0	Inferior	$\tau_{xy}$	0.58	1.92	0.30
		1	5119	43.200	16.200	9.500	CR1	0.0	Superior	$\sigma_{b,0}$	-0.11	11.52	0.01
			5119	43.200	16.200	9.500	CR1	20.0	Intermedio	$\sigma_{b,c,0}$	-2.93	11.52	0.25
			5119	43.200	16.200	9.500	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-2.95		0.26
			1664	43.200	16.200	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1664	43.200	16.200	8.000	CR1	40.0	Inferior	$\tau_{xz}$	0.03	1.92	0.01
			1664	43.200	16.200	8.000	CR1	40.0	Inferior	$\tau_{xy}$	-0.98	1.92	0.51
		2	26546	43.200	16.200	8.500	CR1	60.0	Inferior	$\sigma_{b,0}$	0.07	11.52	0.01
			677	43.200	16.200	12.000	CR1	50.0	Intermedio	$\sigma_{b,c,0}$	-3.32	11.52	0.29
			677	43.200	16.200	12.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-3.32		0.29
			1664	43.200	16.200	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.05
			5119	43.200	16.200	9.500	CR1	60.0	Inferior	$\tau_{xz}$	-0.01	1.92	0.01
			1664	43.200	16.200	8.000	CR1	60.0	Inferior	$\tau_{xy}$	0.99	1.92	0.52
		3	5119	43.200	16.200	9.500	CR1	60.0	Superior	$\sigma_{b,0}$	-0.05	11.52	0.00
			5119	43.200	16.200	9.500	CR1	70.0	Intermedio	$\sigma_{b,c,0}$	-2.88	11.52	0.25
			5119	43.200	16.200	9.500	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-2.89		0.25
			5119	43.200	16.200	9.500	CR1	70.0	Intermedio	$\tau_{yz}$	0.01	0.50	0.02
			1664	43.200	16.200	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.03	1.92	0.01
			1664	43.200	16.200	8.000	CR1	80.0	Inferior	$\tau_{xy}$	-1.00	1.92	0.52
		4	26546	43.200	16.200	8.500	CR1	100.0	Inferior	$\sigma_{b,0}$	0.07	11.52	0.01
			677	43.200	16.200	12.000	CR1	90.0	Intermedio	$\sigma_{b,c,0}$	-3.32	11.52	0.29
			677	43.200	16.200	12.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-3.32		0.29
			1664	43.200	16.200	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.05
			5119	43.200	16.200	9.500	CR1	80.0	Superior	$\tau_{xz}$	-0.01	1.92	0.01
			1664	43.200	16.200	8.000	CR1	100.0	Inferior	$\tau_{xy}$	1.00	1.92	0.52
		5	5119	43.200	16.200	9.500	CR1	100.0	Superior	$\sigma_{b,0}$	-0.11	11.52	0.01
			5119	43.200	16.200	9.500	CR1	120.0	Intermedio	$\sigma_{b,c,0}$	-2.82	11.52	0.25
			5119	43.200	16.200	9.500	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-2.85		0.25
			1664	43.200	16.200	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1664	43.200	16.200	8.000	CR1	100.0	Superior	$\tau_{xz}$	0.03	1.92	0.01
			1664	43.200	16.200	8.000	CR1	140.0	Inferior	$\tau_{xy}$	-1.01	1.92	0.53
	56	1	5184	48.600	16.200	9.500	CR1	0.0	Superior	$\sigma_{b,0}$	-0.11	11.52	0.01
			5184	48.600	16.200	9.500	CR1	20.0	Intermedio	$\sigma_{b,c,0}$	-3.37	11.52	0.29
			5184	48.600	16.200	9.500	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-3.40		0.30
			1669	48.600	16.200	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1669	48.600	16.200	8.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.03	1.92	0.02
			1669	48.600	16.200	8.000	CR1	40.0	Inferior	$\tau_{xy}$	1.15	1.92	0.60
		2	1669	48.600	16.200	8.000	CR1	60.0	Inferior	$\sigma_{b,0}$	-0.06	11.52	0.01
			678	48.600	16.200	12.000	CR1	50.0	Intermedio	$\sigma_{b,c,0}$	-3.92	11.52	0.34
			678	48.600	16.200	12.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-3.92		0.34
			1669	48.600	16.200	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.03	0.50	0.06
			5152	48.600	16.200	8.500	CR1	60.0	Inferior	$\tau_{xz}$	0.01	1.92	0.01
			1669	48.600	16.200	8.000	CR1	60.0	Inferior	$\tau_{xy}$	-1.16	1.92	0.60
		3		5184	48.600	16.200	9.500	CR1	60.0	Superior	$\sigma_{b,0}$	-0.05	11.52	0.00
			5184	48.600	16.200	9.500	CR1	70.0	Intermedio	$\sigma_{b,c,0}$	-3.31	11.52	0.29
			5184	48.600	16.200	9.500	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-3.33		0.29
			5152	48.600	16.200	8.500	CR1	70.0	Intermedio	$\tau_{yz}$	-0.01	0.50	0.02
			1669	48.600	16.200	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.03	1.92	0.02
			1669	48.600	16.200	8.000	CR1	80.0	Inferior	$\tau_{xy}$	1.17	1.92	0.61
		4		1669	48.600	16.200	8.000	CR1	80.0	Superior	$\sigma_{b,0}$	0.06	11.52	0.01
			678	48.600	16.200	12.000	CR1	90.0	Intermedio	$\sigma_{b,c,0}$	-3.91	11.52	0.34
			678	48.600	16.200	12.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-3.92		0.34
			1669	48.600	16.200	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.03	0.50	0.06
			5152	48.600	16.200	8.500	CR1	80.0	Superior	$\tau_{xz}$	0.01	1.92	0.01
			1669	48.600	16.200	8.000	CR1	100.0	Inferior	$\tau_{xy}$	-1.17	1.92	0.61
		5		5184	48.600	16.200	9.500	CR1	140.0	Inferior	$\sigma_{b,0}$	0.11	11.52	0.01
			5184	48.600	16.200	9.500	CR1	120.0	Intermedio	$\sigma_{b,c,0}$	-3.25	11.52	0.28
			5184	48.600	16.200	9.500	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-3.28		0.28
			1669	48.600	16.200	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1669	48.600	16.200	8.000	CR1	100.0	Superior	$\tau_{xz}$	-0.03	1.92	0.02
			1669	48.600	16.200	8.000	CR1	140.0	Inferior	$\tau_{xy}$	1.19	1.92	0.62
	57	1	5377	67.500	21.060	10.000	CR1	0.0	Superior	$\sigma_{b,0}$	0.22	11.52	0.02
			5313	67.500	22.680	12.000	CR1	20.0	Intermedio	$\sigma_{b,c,0}$	-0.71	11.52	0.06
			5313	67.500	22.680	12.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-0.71		0.06
			5385	67.500	13.500	9.500	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			5385	67.500	13.500	9.500	CR1	40.0	Inferior	$\tau_{xz}$	0.03	1.92	0.01



Proyecto: TFM  
TFM

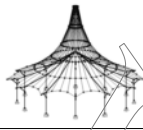
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
58	2	2	5446	67.500	24.300	8.500	CR1	40.0	Inferior	$\tau_{xy}$	0.11	1.92	0.06
			1693	67.500	13.500	8.000	CR1	40.0	Superior	$\sigma_{b,0}$	0.18	11.52	0.02
			680	67.500	24.300	12.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-1.12	11.52	0.10
			680	67.500	24.300	12.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-1.02		0.11
			5385	67.500	13.500	9.500	CR1	50.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.05
			1695	67.500	13.500	9.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.03	1.92	0.02
		3	5446	67.500	24.300	8.500	CR1	60.0	Inferior	$\tau_{xy}$	-0.12	1.92	0.06
			5377	67.500	21.060	10.000	CR1	80.0	Inferior	$\sigma_{b,0}$	-0.11	11.52	0.01
			5339	67.500	23.220	11.000	CR1	70.0	Intermedio	$\sigma_{b,0}$	-0.72	11.52	0.06
			5360	67.500	23.220	10.500	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-0.62		0.07
			1695	67.500	13.500	9.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.06
			5385	67.500	13.500	9.500	CR1	70.0	Intermedio	$\tau_{xz}$	0.03	1.92	0.01
	4	4	26612	67.500	23.760	8.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.15	1.92	0.08
			1693	67.500	13.500	8.000	CR1	100.0	Inferior	$\sigma_{b,0}$	-0.18	11.52	0.02
			680	67.500	24.300	12.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	-1.52	11.52	0.13
			680	67.500	24.300	12.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	-1.42		0.14
			5385	67.500	13.500	9.500	CR1	90.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.05
			1695	67.500	13.500	9.000	CR1	80.0	Superior	$\tau_{xz}$	-0.03	1.92	0.02
		5	26612	67.500	23.760	8.000	CR1	100.0	Inferior	$\tau_{xy}$	0.18	1.92	0.09
			5377	67.500	21.060	10.000	CR1	100.0	Superior	$\sigma_{b,0}$	0.22	11.52	0.02
			5379	67.500	22.140	10.000	CR1	120.0	Intermedio	$\sigma_{b,0}$	-1.23	11.52	0.11
			5378	67.500	21.600	10.000	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	-1.00		0.13
			5385	67.500	13.500	9.500	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			5385	67.500	13.500	9.500	CR1	100.0	Superior	$\tau_{xz}$	0.03	1.92	0.01
59	1	1	26612	67.500	23.760	8.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.24	1.92	0.13
			5494	59.400	13.500	8.500	CR1	40.0	Inferior	$\sigma_{b,0}$	-0.04	11.52	0.00
			5482	59.400	13.500	9.500	CR1	20.0	Intermedio	$\sigma_{b,0}$	-2.45	11.52	0.21
			5482	59.400	13.500	9.500	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	-2.46		0.21
			5494	59.400	13.500	8.500	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			5494	59.400	13.500	8.500	CR1	40.0	Inferior	$\tau_{xz}$	0.02	1.92	0.01
		2	1706	59.400	13.500	8.000	CR1	40.0	Inferior	$\tau_{xy}$	0.76	1.92	0.40
			1706	59.400	13.500	8.000	CR1	40.0	Superior	$\sigma_{b,0}$	0.04	11.52	0.00
			682	59.400	13.500	12.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-3.37	11.52	0.29
			682	59.400	13.500	12.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-3.37		0.29
			5494	59.400	13.500	8.500	CR1	50.0	Intermedio	$\tau_{yz}$	0.02	0.50	0.04
			26645	59.400	12.420	8.000	CR1	60.0	Inferior	$\tau_{xz}$	0.01	1.92	0.00
		3	1706	59.400	13.500	8.000	CR1	60.0	Inferior	$\tau_{xy}$	-0.77	1.92	0.40
			5494	59.400	13.500	8.500	CR1	60.0	Superior	$\sigma_{b,0}$	0.02	11.52	0.00
			5482	59.400	13.500	9.500	CR1	70.0	Intermedio	$\sigma_{b,0}$	-2.43	11.52	0.21
			5482	59.400	13.500	9.500	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-2.44		0.21
			26645	59.400	12.420	8.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.01	0.50	0.02
			5494	59.400	13.500	8.500	CR1	70.0	Intermedio	$\tau_{xz}$	0.02	1.92	0.01
	2	4	1706	59.400	13.500	8.000	CR1	80.0	Inferior	$\tau_{xy}$	0.78	1.92	0.40
			1706	59.400	13.500	8.000	CR1	100.0	Inferior	$\sigma_{b,0}$	-0.04	11.52	0.00
			682	59.400	13.500	12.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	-3.37	11.52	0.29
			682	59.400	13.500	12.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	-3.37		0.29
			5494	59.400	13.500	8.500	CR1	90.0	Intermedio	$\tau_{yz}$	0.02	0.50	0.04
			26645	59.400	12.420	8.000	CR1	80.0	Superior	$\tau_{xz}$	0.01	1.92	0.00
		5	1706	59.400	13.500	8.000	CR1	100.0	Inferior	$\tau_{xy}$	-0.78	1.92	0.41
			5494	59.400	13.500	8.500	CR1	100.0	Superior	$\sigma_{b,0}$	0.04	11.52	0.00
			5482	59.400	13.500	9.500	CR1	120.0	Intermedio	$\sigma_{b,0}$	-2.42	11.52	0.21
			5482	59.400	13.500	9.500	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	-2.42		0.21
			5494	59.400	13.500	8.500	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			5494	59.400	13.500	8.500	CR1	100.0	Superior	$\tau_{xz}$	0.02	1.92	0.01
	3	1	1706	59.400	13.500	8.000	CR1	140.0	Inferior	$\tau_{xy}$	0.79	1.92	0.41
			5585	62.100	3.240	10.000	CR1	40.0	Inferior	$\sigma_{b,0}$	-0.22	11.52	0.02
			5505	62.100	2.700	12.000	CR1	20.0	Intermedio	$\sigma_{b,0}$	-0.83	11.52	0.07
			5505	62.100	2.700	12.000	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	-0.83		0.07
			26670	62.100	0.000	8.500	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			26670	62.100	0.000	8.500	CR1	40.0	Inferior	$\tau_{xz}$	-0.03	1.92	0.01
		2	26670	62.100	0.000	8.500	CR1	40.0	Inferior	$\tau_{xy}$	-0.12	1.92	0.06
			1712	62.100	10.800	8.000	CR1	40.0	Superior	$\sigma_{b,0}$	0.17	11.52	0.02
			684	62.100	10.800	12.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-0.90	11.52	0.08
			684	62.100	10.800	12.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-0.80		0.09
			26670	62.100	0.000	8.500	CR1	50.0	Intermedio	$\tau_{yz}$	-0.03	0.50	0.06
			868	62.100	10.800	9.000	CR1	60.0	Inferior	$\tau_{xz}$	0.03	1.92	0.02
		3	26670	62.100	0.000	8.500	CR1	60.0	Inferior	$\tau_{xy}$	0.13	1.92	0.07
			5585	62.100	3.240	10.000	CR1	60.0	Superior	$\sigma_{b,0}$	0.11	11.52	0.01
			5505	62.100	2.700	12.000	CR1	70.0	Intermedio	$\sigma_{b,0}$	-0.83	11.52	0.07
			5584	62.100	2.700	10.000	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-0.70		0.08
			868	62.100	10.800	9.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.03	0.50	0.06
			26670	62.100	0.000	8.500	CR1	70.0	Intermedio	$\tau_{xz}$	-0.03	1.92	0.02
	4	4	26661	62.100	0.540	8.000	CR1	80.0	Inferior	$\tau_{xy}$	0.16	1.92	0.08
			1712	62.100	10.800	8.000	CR1	80.0	Superior	$\sigma_{b,0}$	0.17	11.52	0.02
			684	62.100	10.800	12.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	-1.30	11.52	0.11
			684	62.100	10.800	12.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	-1.20		0.12
			26670	62.100	0.000	8.500	CR1	90.0	Intermedio	$\tau_{yz}$	-0.03	0.50	0.06
			868	62.100	10.800	9.000	CR1	80.0	Superior	$\tau_{xz}$	0.03	1.92	0.02
		5	26661	62.100	0.540	8.000	CR1	100.0	Inferior	$\tau_{xy}$	-0.19	1.92	0.10
			5585	62.100	3.240	10.000	CR1	100.0	Superior	$\sigma_{b,0}$	0.22	11.52	0.02
			5584	62.100	2.700	10.000	CR1	120.0	Intermedio	$\sigma_{b,0}$	-1.37	11.52	0.12
			5584	62.100	2.700	10.000	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	-1.15		0.14
			26670	62.100	0.000	8.500	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00



Proyecto: TFM  
TFM

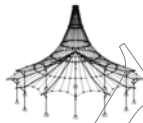
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
60	1	1	26670	62.100	0.000	8.500	CR1	100.0	Superior	$\tau_{xz}$	-0.03	1.92	0.01
			26661	62.100	0.540	8.000	CR1	140.0	Inferior	$\tau_{xy}$	0.25	1.92	0.13
			5732	0.000	3.240	10.000	CR1	0.0	Superior	$\sigma_{b,0}$	-0.48	11.52	0.04
			5740	0.000	7.560	10.000	CR1	20.0	Intermedio	$\sigma_{bc,0}$	-1.42	11.52	0.12
			5740	0.000	7.560	10.000	CR1	0.0	Superior	$\sigma_{b+bc,0}$	-1.90		0.16
			5706	0.000	0.000	9.500	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			5706	0.000	0.000	9.500	CR1	40.0	Inferior	$\tau_{xz}$	0.07	1.92	0.04
			5725	0.000	10.800	9.500	CR1	0.0	Superior	$\tau_{xy}$	-0.27	1.92	0.14
			1596	0.000	10.800	9.000	CR1	60.0	Inferior	$\sigma_{b,0}$	0.80	11.52	0.07
			1596	0.000	10.800	9.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-1.60	11.52	0.14
			1596	0.000	10.800	9.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-2.40		0.21
			5706	0.000	0.000	9.500	CR1	50.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.15
			870	0.000	0.000	9.000	CR1	60.0	Inferior	$\tau_{xz}$	0.07	1.92	0.04
			26403	0.000	10.260	8.000	CR1	60.0	Inferior	$\tau_{xy}$	-0.14	1.92	0.07
		3	5732	0.000	3.240	10.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.24	11.52	0.02
			5815	0.000	2.700	12.000	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-0.82	11.52	0.07
			5815	0.000	2.700	12.000	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-0.82		0.07
			870	0.000	0.000	9.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.07	0.50	0.13
			5706	0.000	0.000	9.500	CR1	70.0	Intermedio	$\tau_{xz}$	0.08	1.92	0.04
			5664	0.000	0.000	8.500	CR1	80.0	Inferior	$\tau_{xy}$	0.18	1.92	0.09
		4	1596	0.000	10.800	9.000	CR1	100.0	Inferior	$\sigma_{b,0}$	0.80	11.52	0.07
			1596	0.000	10.800	9.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	1.58	11.52	0.14
			1596	0.000	10.800	9.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	0.79		0.21
			5706	0.000	0.000	9.500	CR1	90.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.15
			870	0.000	0.000	9.000	CR1	80.0	Superior	$\tau_{xz}$	0.07	1.92	0.04
			5664	0.000	0.000	8.500	CR1	100.0	Inferior	$\tau_{xy}$	-0.27	1.92	0.14
		5	5732	0.000	3.240	10.000	CR1	140.0	Inferior	$\sigma_{b,0}$	0.48	11.52	0.04
			5731	0.000	2.700	10.000	CR1	120.0	Intermedio	$\sigma_{bc,0}$	1.00	11.52	0.09
			5731	0.000	2.700	10.000	CR1	100.0	Superior	$\sigma_{b+bc,0}$	0.52		0.13
			5706	0.000	0.000	9.500	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			5706	0.000	0.000	9.500	CR1	100.0	Superior	$\tau_{xz}$	0.07	1.92	0.04
			5664	0.000	0.000	8.500	CR1	140.0	Inferior	$\tau_{xy}$	0.45	1.92	0.23
	61	1	5869	0.000	16.200	10.000	CR1	0.0	Superior	$\sigma_{b,0}$	-0.48	11.52	0.04
			5869	0.000	16.200	10.000	CR1	20.0	Intermedio	$\sigma_{bc,0}$	-1.44	11.52	0.13
			5869	0.000	16.200	10.000	CR1	0.0	Superior	$\sigma_{b+bc,0}$	-1.93		0.17
			5863	0.000	18.900	9.500	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			5863	0.000	18.900	9.500	CR1	40.0	Inferior	$\tau_{xz}$	0.07	1.92	0.04
			5854	0.000	13.500	9.500	CR1	0.0	Superior	$\tau_{xy}$	0.27	1.92	0.14
		2	874	0.000	13.500	9.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.81	11.52	0.07
			874	0.000	13.500	9.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-1.62	11.52	0.14
			874	0.000	13.500	9.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-2.43		0.21
			5863	0.000	18.900	9.500	CR1	50.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.15
			1609	0.000	18.900	9.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.07	1.92	0.03
			26435	0.000	18.360	8.000	CR1	60.0	Inferior	$\tau_{xy}$	-0.16	1.92	0.08
		3	5869	0.000	16.200	10.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.24	11.52	0.02
			5914	0.000	16.740	12.000	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-0.81	11.52	0.07
			5914	0.000	16.740	12.000	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-0.81		0.07
			1609	0.000	18.900	9.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.13
			5863	0.000	18.900	9.500	CR1	70.0	Intermedio	$\tau_{xz}$	0.08	1.92	0.04
			26436	0.000	18.900	8.500	CR1	80.0	Inferior	$\tau_{xy}$	-0.18	1.92	0.10
		4	874	0.000	13.500	9.000	CR1	100.0	Inferior	$\sigma_{b,0}$	0.81	11.52	0.07
			874	0.000	13.500	9.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	1.60	11.52	0.14
			874	0.000	13.500	9.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	0.80		0.21
			5863	0.000	18.900	9.500	CR1	90.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.15
			1609	0.000	18.900	9.000	CR1	80.0	Superior	$\tau_{xz}$	-0.07	1.92	0.03
			26436	0.000	18.900	8.500	CR1	100.0	Inferior	$\tau_{xy}$	0.27	1.92	0.14
		5	5869	0.000	16.200	10.000	CR1	100.0	Superior	$\sigma_{b,0}$	-0.48	11.52	0.04
			5868	0.000	15.660	10.000	CR1	120.0	Intermedio	$\sigma_{bc,0}$	0.98	11.52	0.09
			5869	0.000	16.200	10.000	CR1	100.0	Superior	$\sigma_{b+bc,0}$	0.50		0.13
			5863	0.000	18.900	9.500	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			5863			0.000	18.900	9.500	CR1	100.0	Superior	$\tau_{xz}$	0.07	1.92	0.04
			26436			0.000	18.900	8.500	CR1	140.0	Inferior	$\tau_{xy}$	-0.45	1.92	0.24
	78	1	26422	2.700	13.500	8.500	CR1	40.0	Inferior	$\sigma_{b,0}$	-0.01	11.52	0.00
			7100	2.700	13.500	9.500	CR1	20.0	Intermedio	$\sigma_{bc,0}$	-1.14	11.52	0.10
			7100	2.700	13.500	9.500	CR1	0.0	Superior	$\sigma_{b+bc,0}$	-1.14		0.10
			1601	2.700	13.500	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1601	2.700	13.500	8.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.01	1.92	0.00
			1601	2.700	13.500	8.000	CR1	40.0	Inferior	$\tau_{xy}$	-0.29	1.92	0.15
		2	26421	2.700	12.960	8.000	CR1	60.0	Inferior	$\sigma_{b,0}$	-0.02	11.52	0.00
			705	2.700	13.500	12.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-1.97	11.52	0.17
			705	2.700	13.500	12.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-1.97		0.17
			1601	2.700	13.500	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.01	0.50	0.01
			26421	2.700	12.960	8.000	CR1	60.0	Inferior	$\tau_{xz}$	0.00	1.92	0.00
			1601	2.700	13.500	8.000	CR1	60.0	Inferior	$\tau_{xy}$	0.29	1.92	0.15
		3	26422	2.700	13.500	8.500	CR1	80.0	Inferior	$\sigma_{b,0}$	0.00	11.52	0.00
			7100	2.700	13.500	9.500	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-1.15	11.52	0.10
			7100	2.700	13.500	9.500	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-1.15		0.10
			26421	2.700	12.960	8.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.00	0.50	0.01
			1601	2.700	13.500	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.01	1.92	0.00
			1601	2.700	13.500	8.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.30	1.92	0.16
	4		26421	2.700	12.960	8.000	CR1	100.0	Inferior	$\sigma_{b,0}$	-0.02	11.52	0.00
			705	2.700	13.500	12.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-1.97	11.52	0.17
			705	2.700	13.500	12.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-1.97		0.17



Proyecto: TFM  
TFM

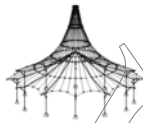
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
81	1	5	1601	2.700	13.500	8.000	CR1	90.0	Intermedio	T <sub>yz</sub>	-0.01	0.50	0.01
			26421	2.700	12.960	8.000	CR1	80.0	Superior	T <sub>xz</sub>	0.00	1.92	0.00
			1601	2.700	13.500	8.000	CR1	100.0	Inferior	T <sub>xy</sub>	0.30	1.92	0.16
			26422	2.700	13.500	8.500	CR1	140.0	Inferior	σ <sub>b,0</sub>	-0.01	11.52	0.00
			7100	2.700	13.500	9.500	CR1	120.0	Intermedio	σ <sub>bc,0</sub>	-1.16	11.52	0.10
			7100	2.700	13.500	9.500	CR1	100.0	Superior	σ <sub>b+bc,0</sub>	-1.16		0.10
			1601	2.700	13.500	8.000	CR1	100.0	Superior	T <sub>yz</sub>	0.00	0.50	0.00
			1601	2.700	13.500	8.000	CR1	100.0	Superior	T <sub>xz</sub>	-0.01	1.92	0.00
			1601	2.700	13.500	8.000	CR1	140.0	Inferior	T <sub>xy</sub>	-0.31	1.92	0.16
			7180	10.800	18.900	2.000	CR1	0.0	Superior	σ <sub>b,0</sub>	0.54	11.52	0.05
			1015	10.800	18.900	0.000	CR1	20.0	Intermedio	σ <sub>bc,0</sub>	-1.99	11.52	0.17
			1015	10.800	18.900	0.000	CR1	0.0	Superior	σ <sub>b+bc,0</sub>	-1.98		0.17
			25174	11.306	18.900	0.000	CR1	40.0	Inferior	T <sub>yz</sub>	0.00	0.50	0.00
			25174	11.306	18.900	0.000	CR1	40.0	Inferior	T <sub>xz</sub>	-0.06	1.92	0.03
			1016	14.850	18.900	0.000	CR1	40.0	Inferior	T <sub>xy</sub>	-0.96	1.92	0.50
			1222	10.800	18.900	4.000	CR1	60.0	Inferior	σ <sub>b,0</sub>	-0.22	11.52	0.02
			1015	10.800	18.900	0.000	CR1	50.0	Intermedio	σ <sub>bc,0</sub>	-1.94	11.52	0.17
			1015	10.800	18.900	0.000	CR1	40.0	Superior	σ <sub>b+bc,0</sub>	-1.73		0.19
			25174	11.306	18.900	0.000	CR1	50.0	Intermedio	T <sub>yz</sub>	-0.06	0.50	0.11
			1015	10.800	18.900	0.000	CR1	60.0	Inferior	T <sub>xz</sub>	0.04	1.92	0.02
			1016	14.850	18.900	0.000	CR1	60.0	Inferior	T <sub>xy</sub>	0.97	1.92	0.51
			7180	10.800	18.900	2.000	CR1	60.0	Superior	σ <sub>b,0</sub>	0.27	11.52	0.02
			1015	10.800	18.900	0.000	CR1	70.0	Intermedio	σ <sub>bc,0</sub>	-2.00	11.52	0.17
			347	10.800	18.900	1.000	CR1	60.0	Superior	σ <sub>b+bc,0</sub>	-1.66		0.18
			1015	10.800	18.900	0.000	CR1	70.0	Intermedio	T <sub>yz</sub>	-0.04	0.50	0.08
			25174	11.306	18.900	0.000	CR1	70.0	Intermedio	T <sub>xz</sub>	-0.06	1.92	0.03
			1016	14.850	18.900	0.000	CR1	80.0	Inferior	T <sub>xy</sub>	-0.99	1.92	0.51
			1222	10.800	18.900	4.000	CR1	100.0	Inferior	σ <sub>b,0</sub>	-0.22	11.52	0.02
			1015	10.800	18.900	0.000	CR1	90.0	Intermedio	σ <sub>bc,0</sub>	-2.79	11.52	0.24
			1015	10.800	18.900	0.000	CR1	80.0	Superior	σ <sub>b+bc,0</sub>	-2.57		0.26
			25174	11.306	18.900	0.000	CR1	90.0	Intermedio	T <sub>yz</sub>	-0.06	0.50	0.11
			1015	10.800	18.900	0.000	CR1	80.0	Superior	T <sub>xz</sub>	0.04	1.92	0.02
			1016	14.850	18.900	0.000	CR1	100.0	Inferior	T <sub>xy</sub>	1.00	1.92	0.52
			7180	10.800	18.900	2.000	CR1	100.0	Superior	σ <sub>b,0</sub>	0.54	11.52	0.05
			347	10.800	18.900	1.000	CR1	120.0	Intermedio	σ <sub>bc,0</sub>	-2.83	11.52	0.25
			7171	10.800	18.900	1.500	CR1	100.0	Superior	σ <sub>b+bc,0</sub>	-2.30		0.29
			25174	11.306	18.900	0.000	CR1	100.0	Superior	T <sub>yz</sub>	0.00	0.50	0.00
			25174	11.306	18.900	0.000	CR1	100.0	Superior	T <sub>xz</sub>	-0.06	1.92	0.03
			1016	14.850	18.900	0.000	CR1	140.0	Inferior	T <sub>xy</sub>	-1.04	1.92	0.54
			7252	10.800	18.900	6.000	CR1	0.0	Superior	σ <sub>b,0</sub>	0.56	11.52	0.05
			25815	11.306	18.900	8.000	CR1	20.0	Intermedio	σ <sub>bc,0</sub>	-1.53	11.52	0.13
			25815	11.306	18.900	8.000	CR1	0.0	Superior	σ <sub>b+bc,0</sub>	-1.53		0.13
			25808	11.306	18.900	4.000	CR1	40.0	Inferior	T <sub>yz</sub>	0.00	0.50	0.00
			25808	11.306	18.900	4.000	CR1	40.0	Inferior	T <sub>xz</sub>	-0.06	1.92	0.03
			1310	14.850	18.900	4.000	CR1	40.0	Inferior	T <sub>xy</sub>	-0.68	1.92	0.35
			1311	10.800	18.900	8.000	CR1	40.0	Superior	σ <sub>b,0</sub>	0.23	11.52	0.02
			1310	14.850	18.900	4.000	CR1	50.0	Intermedio	σ <sub>bc,0</sub>	-1.58	11.52	0.14
			1310	14.850	18.900	4.000	CR1	40.0	Superior	σ <sub>b+bc,0</sub>	-1.36		0.16
			25808	11.306	18.900	4.000	CR1	50.0	Intermedio	T <sub>yz</sub>	-0.06	0.50	0.11
			1312	14.850	18.900	8.000	CR1	60.0	Inferior	T <sub>xz</sub>	-0.04	1.92	0.02
			1310	14.850	18.900	4.000	CR1	60.0	Inferior	T <sub>xy</sub>	0.70	1.92	0.36
			7252	10.800	18.900	6.000	CR1	80.0	Inferior	σ <sub>b,0</sub>	-0.28	11.52	0.02
			25815	11.306	18.900	8.000	CR1	70.0	Intermedio	σ <sub>bc,0</sub>	-1.53	11.52	0.13
			573	10.800	18.900	5.000	CR1	60.0	Superior	σ <sub>b+bc,0</sub>	-1.25		0.14
			1312	14.850	18.900	8.000	CR1	70.0	Intermedio	T <sub>yz</sub>	0.04	0.50	0.08
			25808	11.306	18.900	4.000	CR1	70.0	Intermedio	T <sub>xz</sub>	-0.06	1.92	0.03
			1310	14.850	18.900	4.000	CR1	80.0	Inferior	T <sub>xy</sub>	-0.71	1.92	0.37
			1311	10.800	18.900	8.000	CR1	80.0	Superior	σ <sub>b,0</sub>	0.23	11.52	0.02
			1310	14.850	18.900	4.000	CR1	90.0	Intermedio	σ <sub>bc,0</sub>	-2.47	11.52	0.21
			1309	10.800	18.900	4.000	CR1	80.0	Superior	σ <sub>b+bc,0</sub>	-2.24		0.23
			25808	11.306	18.900	4.000	CR1	90.0	Intermedio	T <sub>yz</sub>	-0.06	0.50	0.11
			1312	14.850	18.900	8.000	CR1	80.0	Superior	T <sub>xz</sub>	-0.04	1.92	0.02
			1310	14.850	18.900	4.000	CR1	100.0	Inferior	T <sub>xy</sub>	0.73	1.92	0.38
			7252	10.800	18.900	6.000	CR1	100.0	Superior	σ <sub>b,0</sub>	0.56	11.52	0.05
			7243	10.800	18.900	5.500	CR1	120.0	Intermedio	σ <sub>bc,0</sub>	-2.68	11.52	0.23
			7243	10.800	18.900	5.500	CR1	100.0	Superior	σ <sub>b+bc,0</sub>	-2.15		0.28
			25808	11.306	18.900	4.000	CR1	100.0	Superior	T <sub>yz</sub>	0.00	0.50	0.00
			25808	11.306	18.900	4.000	CR1	100.0	Superior	T <sub>xz</sub>	-0.06	1.92	0.03
			1310	14.850	18.900	4.000	CR1	140.0	Inferior	T <sub>xy</sub>	-0.77	1.92	0.40
83	1	2	7324	10.800	18.900	10.000	CR1	0.0	Superior	σ <sub>b,0</sub>	0.59	11.52	0.05
			7366	14.344	18.900	12.000	CR1	20.0	Intermedio	σ <sub>bc,0</sub>	-1.40	11.52	0.12
			7366	14.344	18.900	12.000	CR1	0.0	Superior	σ <sub>b+bc,0</sub>	-1.40		0.12
			26458	11.306	18.900	8.000	CR1	40.0	Inferior	T <sub>yz</sub>	0.00	0.50	0.00
			26458	11.306	18.900	8.000	CR1	40.0	Inferior	T <sub>xz</sub>	-0.06	1.92	0.03
			1621	14.850	18.900	8.000	CR1	40.0	Inferior	T <sub>xy</sub>	-0.69	1.92	0.36
			815	10.800	18.900	12.000	CR1	40.0	Superior	σ <sub>b,0</sub>	0.24	11.52	0.02
			825	14.850	18.900	12.000	CR1	50.0	Intermedio	σ <sub>bc,0</sub>	-2.20	11.52	0.19
			825	14.850	18.900	12.000	CR1	40.0	Superior	σ <sub>b+bc,0</sub>	-1.97		0.21
			26458	11.306	18.900	8.000	CR1	50.0	Intermedio	T <sub>yz</sub>	-0.06	0.50	0.12
			825	14.850	18.900	12.000	CR1	60.0	Inferior	T <sub>xz</sub>	-0.04	1.92	0.02
			1621	14.850	18.900	8.000	CR1	60.0	Inferior	T <sub>xy</sub>	0.71	1.92	0.37
	3	2	7324	10.800	18.900	10.000	CR1	80.0	Inferior	σ <sub>b,0</sub>	-0.29	11.52	0.03
			7315	10.800	18.900	9.500	CR1	70.0	Intermedio	σ <sub>bc,0</sub>	-1.97	11.52	0.17



Proyecto: TFM  
TFM

Modelo: TFM\_FINAL\_v01

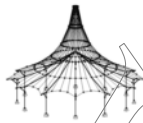
Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superfici núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
89	1	4	7315	10.800	18.900	9.500	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-1.70		0.20
			825	14.850	18.900	12.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.04	0.50	0.09
			26458	11.306	18.900	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
			1621	14.850	18.900	8.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.72	1.92	0.38
			815	10.800	18.900	12.000	CR1	80.0	Superior	$\sigma_{b,0}$	0.24	11.52	0.02
			825	14.850	18.900	12.000	CR1	90.0	Intermedio	$\sigma_{tc,0}$	-3.15	11.52	0.27
			825	14.850	18.900	12.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-2.91		0.29
			26458	11.306	18.900	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
			825	14.850	18.900	12.000	CR1	80.0	Superior	$\tau_{xz}$	-0.04	1.92	0.02
			1621	14.850	18.900	8.000	CR1	100.0	Inferior	$\tau_{xy}$	0.74	1.92	0.39
			7324	10.800	18.900	10.000	CR1	100.0	Superior	$\sigma_{b,0}$	0.59	11.52	0.05
			7315	10.800	18.900	9.500	CR1	120.0	Intermedio	$\sigma_{tc,0}$	-3.35	11.52	0.29
			7315	10.800	18.900	9.500	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-2.80		0.34
			26458	11.306	18.900	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			26458	11.306	18.900	8.000	CR1	100.0	Superior	$\tau_{xz}$	-0.06	1.92	0.03
			1621	14.850	18.900	8.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.78	1.92	0.41
			7429	59.400	24.300	2.000	CR1	0.0	Superior	$\sigma_{b,0}$	0.54	11.52	0.05
			1079	59.400	24.300	0.000	CR1	20.0	Intermedio	$\sigma_{tc,0}$	-1.69	11.52	0.15
			1079	59.400	24.300	0.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-1.68		0.15
			25311	59.906	24.300	0.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			25311	59.906	24.300	0.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.06	1.92	0.03
			1079	59.400	24.300	0.000	CR1	40.0	Inferior	$\tau_{xy}$	0.83	1.92	0.43
			1250	59.400	24.300	4.000	CR1	60.0	Inferior	$\sigma_{b,0}$	-0.22	11.52	0.02
			1079	59.400	24.300	0.000	CR1	50.0	Intermedio	$\sigma_{tc,0}$	-1.63	11.52	0.14
			1079	59.400	24.300	0.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-1.42		0.16
			25311	59.906	24.300	0.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.11
			1077	63.450	24.300	0.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.04	1.92	0.02
			1079	59.400	24.300	0.000	CR1	60.0	Inferior	$\tau_{xy}$	-0.85	1.92	0.44
			7429	59.400	24.300	2.000	CR1	60.0	Superior	$\sigma_{b,0}$	0.27	11.52	0.02
			1079	59.400	24.300	0.000	CR1	70.0	Intermedio	$\sigma_{tc,0}$	-1.70	11.52	0.15
			349	59.400	24.300	1.000	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-1.36		0.15
			1077	63.450	24.300	0.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.04	0.50	0.08
			25311	59.906	24.300	0.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
			1079	59.400	24.300	0.000	CR1	80.0	Inferior	$\tau_{xy}$	0.87	1.92	0.45
			1250	59.400	24.300	4.000	CR1	80.0	Superior	$\sigma_{b,0}$	0.22	11.52	0.02
			1079	59.400	24.300	0.000	CR1	90.0	Intermedio	$\sigma_{tc,0}$	-2.47	11.52	0.21
			1079	59.400	24.300	0.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-2.26		0.23
			25311	59.906	24.300	0.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.11
			1077	63.450	24.300	0.000	CR1	80.0	Superior	$\tau_{xz}$	-0.04	1.92	0.02
			1079	59.400	24.300	0.000	CR1	100.0	Inferior	$\tau_{xy}$	-0.89	1.92	0.47
			7429	59.400	24.300	2.000	CR1	140.0	Inferior	$\sigma_{b,0}$	-0.54	11.52	0.05
			7420	59.400	24.300	1.500	CR1	120.0	Intermedio	$\sigma_{tc,0}$	-2.56	11.52	0.22
			7420	59.400	24.300	1.500	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-2.06		0.27
			25311	59.906	24.300	0.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			25311	59.906	24.300	0.000	CR1	100.0	Superior	$\tau_{xz}$	-0.06	1.92	0.03
			1079	59.400	24.300	0.000	CR1	140.0	Inferior	$\tau_{xy}$	0.94	1.92	0.49
90	1	1	7501	59.400	24.300	6.000	CR1	40.0	Inferior	$\sigma_{b,0}$	-0.56	11.52	0.05
			26016	59.906	24.300	8.000	CR1	20.0	Intermedio	$\sigma_{tc,0}$	-1.43	11.52	0.12
			26016	59.906	24.300	8.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-1.43		0.12
			26009	59.906	24.300	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			26009	59.906	24.300	4.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.06	1.92	0.03
			1401	59.400	24.300	4.000	CR1	40.0	Inferior	$\tau_{xy}$	0.56	1.92	0.29
			1403	59.400	24.300	8.000	CR1	60.0	Inferior	$\sigma_{b,0}$	-0.23	11.52	0.02
			1401	59.400	24.300	4.000	CR1	50.0	Intermedio	$\sigma_{tc,0}$	-1.42	11.52	0.12
			1401	59.400	24.300	4.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-1.19		0.14
			26009	59.906	24.300	4.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.11
			1404	63.450	24.300	8.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.04	1.92	0.02
			1401	59.400	24.300	4.000	CR1	60.0	Inferior	$\tau_{xy}$	-0.59	1.92	0.31
			7501	59.400	24.300	6.000	CR1	60.0	Superior	$\sigma_{b,0}$	0.28	11.52	0.02
			26016	59.906	24.300	8.000	CR1	70.0	Intermedio	$\sigma_{tc,0}$	-1.43	11.52	0.12
			7492	59.400	24.300	5.500	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-1.02		0.13
			1404	63.450	24.300	8.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.04	0.50	0.08
			26009	59.906	24.300	4.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
			1401	59.400	24.300	4.000	CR1	80.0	Inferior	$\tau_{xy}$	0.61	1.92	0.32
			1403	59.400	24.300	8.000	CR1	100.0	Inferior	$\sigma_{b,0}$	-0.23	11.52	0.02
			1401	59.400	24.300	4.000	CR1	90.0	Intermedio	$\sigma_{tc,0}$	-2.32	11.52	0.20
			1401	59.400	24.300	4.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-2.10		0.22
			26009	59.906	24.300	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.11
			1404	63.450	24.300	8.000	CR1	80.0	Superior	$\tau_{xz}$	-0.04	1.92	0.02
			1401	59.400	24.300	4.000	CR1	100.0	Inferior	$\tau_{xy}$	-0.63	1.92	0.33
			7501	59.400	24.300	6.000	CR1	100.0	Superior	$\sigma_{b,0}$	0.56	11.52	0.05
			7492	59.400	24.300	5.500	CR1	120.0	Intermedio	$\sigma_{tc,0}$	-2.59	11.52	0.22
			7492	59.400	24.300	5.500	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-2.07		0.27
			26009	59.906	24.300	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			26009	59.906	24.300	4.000	CR1	100.0	Superior	$\tau_{xz}$	-0.06	1.92	0.03
			1401	59.400	24.300	4.000	CR1	140.0	Inferior	$\tau_{xy}$	0.68	1.92	0.35
91	1	1	7574	18.900	0.000	2.000	CR1	40.0	Inferior	$\sigma_{b,0}$	-0.98	11.52	0.09
			7567	18.360	0.000	1.500	CR1	20.0	Intermedio	$\sigma_{tc,0}$	1.93	11.52	0.17
			7567	18.360	0.000	1.500	CR1	0.0	Superior	$\sigma_{b+tc,0}$	2.85		0.25
			25466	18.360	0.000	0.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			25466	18.360	0.000	0.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.10	1.92	0.05
			7556	18.900	0.000	0.500	CR1	40.0	Inferior	$\tau_{xy}$	-0.48	1.92	0.25
			1201	16.200	0.000	4.000	CR1	40.0	Superior	$\sigma_{b,0}$	0.44	11.52	0.04





Proyecto: TFM  
TFM

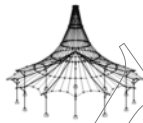
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superfici núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]																	
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite																		
92		3	364	18.900	0.000	1.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-2.66	11.52	0.23																	
			364	18.900	0.000	1.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-2.66		0.23																	
			25466	18.360	0.000	0.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.10	0.50	0.20																	
			1202	18.900	0.000	4.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.08	1.92	0.04																	
			7556	18.900	0.000	0.500	CR1	60.0	Inferior	$\tau_{xy}$	0.49	1.92	0.25																	
			7574	18.900	0.000	2.000	CR1	80.0	Inferior	$\sigma_{b,0}$	-0.49	11.52	0.04																	
			364	18.900	0.000	1.000	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-1.80	11.52	0.16																	
			7568	18.900	0.000	1.500	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-1.31		0.19																	
			1202	18.900	0.000	4.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.08	0.50	0.16																	
			25466	18.360	0.000	0.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.10	1.92	0.05																	
			93		4	7556	18.900	0.000	0.500	CR1	80.0	Inferior	$\tau_{xy}$	-0.50	1.92	0.26														
						1201	16.200	0.000	4.000	CR1	100.0	Inferior	$\sigma_{b,0}$	-0.44	11.52	0.04														
						364	18.900	0.000	1.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-2.67	11.52	0.23														
						364	18.900	0.000	1.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-2.66		0.23														
						25466	18.360	0.000	0.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.10	0.50	0.20														
						1202	18.900	0.000	4.000	CR1	80.0	Superior	$\tau_{xz}$	-0.08	1.92	0.04														
						7556	18.900	0.000	0.500	CR1	100.0	Inferior	$\tau_{xy}$	0.51	1.92	0.26														
						7574	18.900	0.000	2.000	CR1	100.0	Superior	$\sigma_{b,0}$	0.98	11.52	0.09														
						7568	18.900	0.000	1.500	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-4.09	11.52	0.36														
						7568	18.900	0.000	1.500	CR1	100.0	Superior	$\sigma_{b+bc,0}$	-3.16		0.44														
						25466	18.360	0.000	0.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00														
						25466	18.360	0.000	0.000	CR1	100.0	Superior	$\tau_{xz}$	-0.10	1.92	0.05														
						7556	18.900	0.000	0.500	CR1	140.0	Inferior	$\tau_{xy}$	-0.52	1.92	0.27														
						92	1	7628	27.000	0.000	2.000	CR1	40.0	Inferior	$\sigma_{b,0}$	-0.99	11.52	0.09												
								7617	24.840	0.000	1.500	CR1	20.0	Intermedio	$\sigma_{bc,0}$	1.92	11.52	0.17												
								7617	24.840	0.000	1.500	CR1	0.0	Superior	$\sigma_{b+bc,0}$	2.84		0.25												
								25448	24.840	0.000	0.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00												
								25448	24.840	0.000	0.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.10	1.92	0.05												
								25452	24.300	0.000	0.500	CR1	40.0	Inferior	$\tau_{xy}$	0.49	1.92	0.26												
								1199	24.300	0.000	4.000	CR1	40.0	Superior	$\sigma_{b,0}$	0.44	11.52	0.04												
								1145	24.300	0.000	1.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-2.79	11.52	0.24												
								1145	24.300	0.000	1.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-2.79		0.24												
								25448	24.840	0.000	0.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.10	0.50	0.20												
								1200	27.000	0.000	4.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.08	1.92	0.04												
								25452	24.300	0.000	0.500	CR1	60.0	Inferior	$\tau_{xy}$	-0.50	1.92	0.26												
								93	3	7628	27.000	0.000	2.000	CR1	60.0	Superior	$\sigma_{b,0}$	0.49	11.52	0.04										
										1145	24.300	0.000	1.000	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-1.74	11.52	0.15										
										7622	27.000	0.000	1.500	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-1.24		0.19										
										1200	27.000	0.000	4.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.08	0.50	0.16										
										25448	24.840	0.000	0.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.10	1.92	0.05										
										25452	24.300	0.000	0.500	CR1	80.0	Inferior	$\tau_{xy}$	0.51	1.92	0.27										
										92	4	1199	24.300	0.000	4.000	CR1	100.0	Inferior	$\sigma_{b,0}$	-0.44	11.52	0.04								
												1145	24.300	0.000	1.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-2.79	11.52	0.24								
												1145	24.300	0.000	1.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-2.79		0.24								
												25448	24.840	0.000	0.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.10	0.50	0.20								
												1200	27.000	0.000	4.000	CR1	80.0	Superior	$\tau_{xz}$	-0.08	1.92	0.04								
												25452	24.300	0.000	0.500	CR1	100.0	Inferior	$\tau_{xy}$	-0.52	1.92	0.27								
												7628	27.000	0.000	2.000	CR1	100.0	Superior	$\sigma_{b,0}$	0.99	11.52	0.09								
												7622	27.000	0.000	1.500	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-4.02	11.52	0.35								
												7622	27.000	0.000	1.500	CR1	100.0	Superior	$\sigma_{b+bc,0}$	-3.09		0.43								
												25448	24.840	0.000	0.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00								
												25448	24.840	0.000	0.000	CR1	100.0	Superior	$\tau_{xz}$	-0.10	1.92	0.05								
												25452	24.300	0.000	0.500	CR1	140.0	Inferior	$\tau_{xy}$	0.53	1.92	0.28								
												93	1	7687	35.100	0.000	2.000	CR1	0.0	Superior	$\sigma_{b,0}$	0.99	11.52	0.09						
														7684	33.750	0.000	2.000	CR1	20.0	Intermedio	$\sigma_{bc,0}$	1.89	11.52	0.16						
														7684	33.750	0.000	2.000	CR1	0.0	Superior	$\sigma_{b+bc,0}$	2.87		0.25						
														25552	33.300	0.000	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00						
														25552	33.300	0.000	4.000	CR1	40.0	Inferior	$\tau_{xz}$	0.10	1.92	0.05						
														7666	35.100	0.000	0.500	CR1	40.0	Inferior	$\tau_{xy}$	-0.51	1.92	0.27						
														93	2	1198	35.100	0.000	4.000	CR1	40.0	Superior	$\sigma_{b,0}$	0.33	11.52	0.03				
																1138	32.400	0.000														1.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-3.09	11.52	0.27
																1138	32.400	0.000														1.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-3.09		0.27
																25552	33.300	0.000														4.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.10	0.50	0.20
																1197	32.400	0.000														4.000	CR1	60.0	Inferior	$\tau_{xz}$	0.06	1.92	0.03
																7666	35.100	0.000														0.500	CR1	60.0	Inferior	$\tau_{xy}$	0.52	1.92	0.27
																93	3	7687	35.100	0.000	2.000	CR1	80.0	Inferior	$\sigma_{b,0}$	-0.49	11.52	0.04		
																		368	35.100	0.000	1.000	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-1.97	11.52	0.17		
																		7680	35.100	0.000	1.500	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-1.44		0.21		
																		1197	32.400	0.000	4.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12		
																		25552	33.300	0.000	4.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.10	1.92	0.05		
																		7666	35.100	0.000	0.500											CR1	80.0	Inferior	$\tau_{xy}$	-0.52	1.92	0.27
																		93	4	1198	35.100											0.000	4.000	CR1	100.0	Inferior	$\sigma_{b,0}$	-0.33	11.52	0.03
																				1138	32.400											0.000	1.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-3.09	11.52	0.27
																				1138	32.400											0.000	1.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-3.09		0.27
																				25552	33.300											0.000	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.10	0.50	0.20
																				1197	32.400											0.000	4.000	CR1	80.0	Superior	$\tau_{xz}$	0.06	1.92	0.03
																				7666	35.100											0.000	0.500	CR1	100.0	Inferior	$\tau_{xy}$	0.53	1.92	0.28
																				7687	35.100											0.000	2.000	CR1	100.0	Superior	$\sigma_{b,0}$	0.99	11.52	0.09
																				7680	35.100											0.000	1.500	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-4.23	11.52	0.37
																				7680	35.100											0.000	1.500	CR1	100.0	Superior	$\sigma_{b+bc,0}$	-3.30		0.45
																				25552	33.300											0.000	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
																				25552	33.300	0.000	4.000	CR1	100.0	Superior	$\tau_{xz}$	0.10	1.92	0.05
																				7666	35.100	0.000	0.500	CR1	140.0	Inferior	$\tau_{xy}$	-0.55	1.92	0.28



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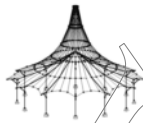
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

EVALUACIÓN DE LA RESISTENCIA POR COMPRESIÓN														
Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]	
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite		
94	1	1	7745	43.200	0.000	2.000	CR1	0.0	Superior	$\sigma_{b,0}$	0.99	11.52	0.09	
			7738	42.660	0.000	1.500	CR1	20.0	Intermedio	$\sigma_{b,c,0}$	1.93	11.52	0.17	
			7738	42.660	0.000	1.500	CR1	0.0	Superior	$\sigma_{b+tc,0}$	2.85		0.25	
			25423	42.660	0.000	0.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00	
		2	25423	42.660	0.000	0.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.10	1.92	0.05	
			7727	43.200	0.000	0.500	CR1	40.0	Inferior	$\tau_{xy}$	-0.50	1.92	0.26	
			1196	43.200	0.000	4.000	CR1	40.0	Superior	$\sigma_{b,0}$	0.44	11.52	0.04	
			370	43.200	0.000	1.000	CR1	50.0	Intermedio	$\sigma_{b,c,0}$	-2.76	11.52	0.24	
		3	370	43.200	0.000	1.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-2.76		0.24	
			25423	42.660	0.000	0.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.10	0.50	0.20	
			1195	40.500	0.000	4.000	CR1	60.0	Inferior	$\tau_{xz}$	0.08	1.92	0.04	
			7727	43.200	0.000	0.500	CR1	60.0	Inferior	$\tau_{xy}$	0.51	1.92	0.27	
	2	1	7745	43.200	0.000	2.000	CR1	80.0	Inferior	$\sigma_{b,0}$	-0.49	11.52	0.04	
			370	43.200	0.000	1.000	CR1	70.0	Intermedio	$\sigma_{b,c,0}$	-1.74	11.52	0.15	
			7739	43.200	0.000	1.500	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-1.24		0.19	
			1195	40.500	0.000	4.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.08	0.50	0.16	
		2	25423	42.660	0.000	0.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.10	1.92	0.05	
			7727	43.200	0.000	0.500	CR1	80.0	Inferior	$\tau_{xy}$	-0.52	1.92	0.27	
			1196	43.200	0.000	4.000	CR1	80.0	Superior	$\sigma_{b,0}$	0.44	11.52	0.04	
			370	43.200	0.000	1.000	CR1	90.0	Intermedio	$\sigma_{b,c,0}$	-2.76	11.52	0.24	
		3	370	43.200	0.000	1.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-2.76		0.24	
			25423	42.660	0.000	0.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.10	0.50	0.20	
			1195	40.500	0.000	4.000	CR1	80.0	Superior	$\tau_{xz}$	0.08	1.92	0.04	
			7727	43.200	0.000	0.500	CR1	100.0	Inferior	$\tau_{xy}$	0.53	1.92	0.28	
	3	1	7745	43.200	0.000	2.000	CR1	100.0	Superior	$\sigma_{b,0}$	0.99	11.52	0.09	
			7739	43.200	0.000	1.500	CR1	120.0	Intermedio	$\sigma_{b,c,0}$	-4.02	11.52	0.35	
			7739	43.200	0.000	1.500	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-3.09		0.43	
			25423	42.660	0.000	0.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00	
		2	25423	42.660	0.000	0.000	CR1	100.0	Superior	$\tau_{xz}$	-0.10	1.92	0.05	
			7727	43.200	0.000	0.500	CR1	140.0	Inferior	$\tau_{xy}$	-0.55	1.92	0.28	
			7795	48.600	0.000	2.000	CR1	0.0	Superior	$\sigma_{b,0}$	0.98	11.52	0.09	
			7788	49.140	0.000	1.500	CR1	20.0	Intermedio	$\sigma_{b,c,0}$	1.93	11.52	0.17	
		3	7798	50.760	0.000	2.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	2.85		0.25	
			25405	49.140	0.000	0.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00	
			25405	49.140	0.000	0.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.10	1.92	0.05	
			25409	48.600	0.000	0.500	CR1	40.0	Inferior	$\tau_{xy}$	0.48	1.92	0.25	
	4	1	1194	51.300	0.000	4.000	CR1	40.0	Superior	$\sigma_{b,0}$	0.44	11.52	0.04	
			1124	48.600	0.000	1.000	CR1	50.0	Intermedio	$\sigma_{b,c,0}$	-2.62	11.52	0.23	
			1124	48.600	0.000	1.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-2.62		0.23	
			25405	49.140	0.000	0.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.10	0.50	0.20	
		2	1193	48.600	0.000	4.000	CR1	60.0	Inferior	$\tau_{xz}$	0.08	1.92	0.04	
			25409	48.600	0.000	0.500	CR1	60.0	Inferior	$\tau_{xy}$	-0.49	1.92	0.26	
			7795	48.600	0.000	2.000	CR1	80.0	Inferior	$\sigma_{b,0}$	-0.49	11.52	0.04	
			1124	48.600	0.000	1.000	CR1	70.0	Intermedio	$\sigma_{b,c,0}$	-1.79	11.52	0.16	
		3	7789	48.600	0.000	1.500	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-1.30		0.19	
			1193	48.600	0.000	4.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.08	0.50	0.16	
			25405	49.140	0.000	0.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.10	1.92	0.05	
			25409	48.600	0.000	0.500	CR1	80.0	Inferior	$\tau_{xy}$	0.50	1.92	0.26	
5	1	1194	51.300	0.000	4.000	CR1	80.0	Superior	$\sigma_{b,0}$	0.44	11.52	0.04		
		1124	48.600	0.000	1.000	CR1	90.0	Intermedio	$\sigma_{b,c,0}$	-2.62	11.52	0.23		
		1124	48.600	0.000	1.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-2.62		0.23		
		25405	49.140	0.000	0.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.10	0.50	0.20		
	2	1193	48.600	0.000	4.000	CR1	80.0	Superior	$\tau_{xz}$	0.08	1.92	0.04		
		25409	48.600	0.000	0.500	CR1	100.0	Inferior	$\tau_{xy}$	-0.51	1.92	0.26		
		7795	48.600	0.000	2.000	CR1	100.0	Superior	$\sigma_{b,0}$	0.98	11.52	0.09		
		7789	48.600	0.000	1.500	CR1	120.0	Intermedio	$\sigma_{b,c,0}$	-4.08	11.52	0.35		
	3	7789	48.600	0.000	1.500	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-3.15		0.43		
		25405	49.140	0.000	0.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00		
		25405	49.140	0.000	0.000	CR1	100.0	Superior	$\tau_{xz}$	-0.10	1.92	0.05		
		25409	48.600	0.000	0.500	CR1	140.0	Inferior	$\tau_{xy}$	0.52	1.92	0.27		
96	1	1	7847	18.900	0.000	6.000	CR1	40.0	Inferior	$\sigma_{b,0}$	-1.04	11.52	0.09	
			26240	18.360	0.000	8.000	CR1	20.0	Intermedio	$\sigma_{b,c,0}$	-1.70	11.52	0.15	
			7843	16.200	0.000	6.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	2.47		0.21	
			26236	18.360	0.000	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00	
		2	26236	18.360	0.000	4.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.11	1.92	0.06	
			26240	18.360	0.000	8.000	CR1	40.0	Inferior	$\tau_{xy}$	-0.48	1.92	0.25	
			1504	16.200	0.000	8.000	CR1	40.0	Superior	$\sigma_{b,0}$	0.46	11.52	0.04	
			590	18.900	0.000	5.000	CR1	50.0	Intermedio	$\sigma_{b,c,0}$	-2.69	11.52	0.23	
		3	590	18.900	0.000	5.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-2.69		0.23	
			26236	18.360	0.000	4.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.11	0.50	0.21	
			1505	18.900	0.000	8.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.08	1.92	0.04	
			26240	18.360	0.000	8.000	CR1	60.0	Inferior	$\tau_{xy}$	0.49	1.92	0.25	
	2	1	7847	18.900	0.000	6.000	CR1	60.0	Superior	$\sigma_{b,0}$	0.52	11.52	0.05	
			7841	18.900	0.000	5.500	CR1	70.0	Intermedio	$\sigma_{b,c,0}$	-1.86	11.52	0.16	
			7841	18.900	0.000	5.500	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-1.36		0.20	
			1505	18.900	0.000	8.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.08	0.50	0.17	
		2	26236	18.360	0.000	4.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.11	1.92	0.06	
			26240	18.360	0.000	8.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.50	1.92	0.26	
			1504	16.200	0.000	8.000	CR1	80.0	Superior	$\sigma_{b,0}$	0.46	11.52	0.04	
			590	18.900	0.000	5.000	CR1	90.0	Intermedio	$\sigma_{b,c,0}$	-2.69	11.52	0.23	
		3	590	18.900	0.000	5.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-2.69		0.23	
			26236	18.360	0.000	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.11	0.50	0.21	
			1505	18.900	0.000	8.000	CR1	80.0	Superior	$\tau_{xz}$	-0.08	1.92	0.04	
			26236	18.360	0.000	4.000	CR1	80.0	Superior	$\tau_{xy}$	-0.48	1.92	0.25	



Proyecto: TFM  
TFM

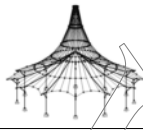
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
97		5	26240	18.360	0.000	8.000	CR1	100.0	Inferior	$\tau_{xy}$	0.51	1.92	0.26
			7847	18.900	0.000	6.000	CR1	140.0	Inferior	$\sigma_{b,0}$	-1.04	11.52	0.09
			7841	18.900	0.000	5.500	CR1	120.0	Intermedio	$\sigma_{b,0}$	-4.31	11.52	0.37
			7841	18.900	0.000	5.500	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	-3.33		0.46
		1	26236	18.360	0.000	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			26236	18.360	0.000	4.000	CR1	100.0	Superior	$\tau_{xz}$	-0.11	1.92	0.06
			26240	18.360	0.000	8.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.52	1.92	0.27
			7895	27.000	0.000	6.000	CR1	0.0	Superior	$\sigma_{b,0}$	1.05	11.52	0.09
			26221	26.460	0.000	8.000	CR1	20.0	Intermedio	$\sigma_{b,0}$	-1.78	11.52	0.15
			7897	24.300	0.000	6.500	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	2.34		0.20
			26217	26.460	0.000	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			26217	26.460	0.000	4.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.11	1.92	0.06
			26221	26.460	0.000	8.000	CR1	40.0	Inferior	$\tau_{xy}$	-0.51	1.92	0.27
			1495	24.300	0.000	8.000	CR1	40.0	Superior	$\sigma_{b,0}$	0.46	11.52	0.04
			1497	24.300	0.000	5.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-2.77	11.52	0.24
			1497	24.300	0.000	5.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-2.77		0.24
			26217	26.460	0.000	4.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.11	0.50	0.21
			1496	27.000	0.000	8.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.09	1.92	0.04
			26221	26.460	0.000	8.000	CR1	60.0	Inferior	$\tau_{xy}$	0.52	1.92	0.27
		3	7895	27.000	0.000	6.000	CR1	60.0	Superior	$\sigma_{b,0}$	0.53	11.52	0.05
			7889	27.000	0.000	5.500	CR1	70.0	Intermedio	$\sigma_{b,0}$	-1.84	11.52	0.16
			7889	27.000	0.000	5.500	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-1.35		0.20
			1496	27.000	0.000	8.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.09	0.50	0.17
			26217	26.460	0.000	4.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.11	1.92	0.06
			26221	26.460	0.000	8.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.53	1.92	0.27
			1495	24.300	0.000	8.000	CR1	80.0	Superior	$\sigma_{b,0}$	0.46	11.52	0.04
			1497	24.300	0.000	5.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	-2.77	11.52	0.24
		5	1497	24.300	0.000	5.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	-2.77		0.24
			26217	26.460	0.000	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.11	0.50	0.21
			1496	27.000	0.000	8.000	CR1	80.0	Superior	$\tau_{xz}$	-0.09	1.92	0.04
			26221	26.460	0.000	8.000	CR1	100.0	Inferior	$\tau_{xy}$	0.53	1.92	0.28
			7895	27.000	0.000	6.000	CR1	140.0	Inferior	$\sigma_{b,0}$	-1.05	11.52	0.09
			7889	27.000	0.000	5.500	CR1	120.0	Intermedio	$\sigma_{b,0}$	-4.31	11.52	0.37
			7889	27.000	0.000	5.500	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	-3.32		0.46
			26217	26.460	0.000	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
98		1	26217	26.460	0.000	4.000	CR1	100.0	Superior	$\tau_{xz}$	-0.11	1.92	0.06
			26221	26.460	0.000	8.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.55	1.92	0.29
			7947	35.100	0.000	6.000	CR1	40.0	Inferior	$\sigma_{b,0}$	-1.06	11.52	0.09
			26201	33.750	0.000	8.000	CR1	20.0	Intermedio	$\sigma_{b,0}$	-1.79	11.52	0.16
			7946	34.650	0.000	6.000	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	2.27		0.20
			26200	33.300	0.000	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			26200	33.300	0.000	8.000	CR1	40.0	Inferior	$\tau_{xz}$	0.11	1.92	0.05
			26199	32.850	0.000	8.000	CR1	40.0	Inferior	$\tau_{xy}$	0.48	1.92	0.25
		2	1488	35.100	0.000	8.000	CR1	60.0	Inferior	$\sigma_{b,0}$	-0.35	11.52	0.03
			1486	32.400	0.000	5.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-2.96	11.52	0.26
			1486	32.400	0.000	5.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-2.96		0.26
			26200	33.300	0.000	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.11	0.50	0.21
			1487	32.400	0.000	8.000	CR1	60.0	Inferior	$\tau_{xz}$	0.07	1.92	0.03
			26203	34.650	0.000	8.000	CR1	60.0	Inferior	$\tau_{xy}$	0.49	1.92	0.26
			7947	35.100	0.000	6.000	CR1	80.0	Inferior	$\sigma_{b,0}$	-0.53	11.52	0.05
			7935	32.400	0.000	5.500	CR1	70.0	Intermedio	$\sigma_{b,0}$	-2.06	11.52	0.18
		3	7935	32.400	0.000	5.500	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-1.57		0.22
			1487	32.400	0.000	8.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.07	0.50	0.13
			26200	33.300	0.000	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.11	1.92	0.06
			26203	34.650	0.000	8.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.50	1.92	0.26
			1488	35.100	0.000	8.000	CR1	80.0	Superior	$\sigma_{b,0}$	0.35	11.52	0.03
			1486	32.400	0.000	5.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	-2.96	11.52	0.26
			1486	32.400	0.000	5.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	-2.96		0.26
			26200	33.300	0.000	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.11	0.50	0.21
		5	1487	32.400	0.000	8.000	CR1	80.0	Superior	$\tau_{xz}$	0.07	1.92	0.03
			26203	34.650	0.000	8.000	CR1	100.0	Inferior	$\tau_{xy}$	0.50	1.92	0.26
			7947	35.100	0.000	6.000	CR1	100.0	Superior	$\sigma_{b,0}$	1.06	11.52	0.09
			7940	35.100	0.000	5.500	CR1	120.0	Intermedio	$\sigma_{b,0}$	-4.55	11.52	0.39
			7940	35.100	0.000	5.500	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	-3.55		0.48
			26200	33.300	0.000	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			26200	33.300	0.000	8.000	CR1	100.0	Superior	$\tau_{xz}$	0.11	1.92	0.05
			26203	34.650	0.000	8.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.52	1.92	0.27
99		1	7995	40.500	0.000	6.000	CR1	40.0	Inferior	$\sigma_{b,0}$	-1.05	11.52	0.09
			26178	41.040	0.000	8.000	CR1	20.0	Intermedio	$\sigma_{b,0}$	-1.77	11.52	0.15
			8005	43.200	0.000	6.500	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	2.34		0.20
			26174	41.040	0.000	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			26174	41.040	0.000	4.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.11	1.92	0.06
			26178	41.040	0.000	8.000	CR1	40.0	Inferior	$\tau_{xy}$	0.51	1.92	0.27
		2	1478	43.200	0.000	8.000	CR1	40.0	Superior	$\sigma_{b,0}$	0.46	11.52	0.04
			596	43.200	0.000	5.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-2.76	11.52	0.24
			596	43.200	0.000	5.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-2.76		0.24
			26174	41.040	0.000	4.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.11	0.50	0.21
			1477	40.500	0.000	8.000	CR1	60.0	Inferior	$\tau_{xz}$	0.09	1.92	0.04
			26178	41.040	0.000	8.000	CR1	60.0	Inferior	$\tau_{xy}$	-0.52	1.92	0.27
		3	7995	40.500	0.000	6.000	CR1	80.0	Inferior	$\sigma_{b,0}$	-0.53	11.52	0.05
			7989	40.500	0.000	5.500	CR1	70.0	Intermedio	$\sigma_{b,0}$	-1.84	11.52	0.16
			7989	40.500	0.000	5.500	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-1.35		0.20
			1477	40.500	0.000	8.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.09	0.50	0.17



Proyecto: TFM  
TFM

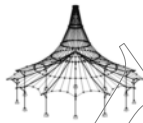
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
100	1	4	26174	41.040	0.000	4.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.11	1.92	0.06
			26178	41.040	0.000	8.000	CR1	80.0	Inferior	$\tau_{xy}$	0.53	1.92	0.27
			1478	43.200	0.000	8.000	CR1	80.0	Superior	$\sigma_{b,0}$	0.46	11.52	0.04
			596	43.200	0.000	5.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-2.76	11.52	0.24
			596	43.200	0.000	5.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-2.76		0.24
			26174	41.040	0.000	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.11	0.50	0.21
			1477	40.500	0.000	8.000	CR1	80.0	Superior	$\tau_{xz}$	0.09	1.92	0.04
			26178	41.040	0.000	8.000	CR1	100.0	Inferior	$\tau_{xy}$	-0.53	1.92	0.28
			7995	40.500	0.000	6.000	CR1	100.0	Superior	$\sigma_{b,0}$	1.05	11.52	0.09
			7989	40.500	0.000	5.500	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-4.31	11.52	0.37
			7989	40.500	0.000	5.500	CR1	100.0	Superior	$\sigma_{b+bc,0}$	-3.32		0.46
			26174	41.040	0.000	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			26174	41.040	0.000	4.000	CR1	100.0	Superior	$\tau_{xz}$	-0.11	1.92	0.06
			26178	41.040	0.000	8.000	CR1	140.0	Inferior	$\tau_{xy}$	0.55	1.92	0.29
			8043	48.600	0.000	6.000	CR1	0.0	Superior	$\sigma_{b,0}$	1.04	11.52	0.09
			26159	49.140	0.000	8.000	CR1	20.0	Intermedio	$\sigma_{bc,0}$	-1.70	11.52	0.15
			8047	51.300	0.000	6.000	CR1	0.0	Superior	$\sigma_{b+bc,0}$	2.47		0.21
			26155	49.140	0.000	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			26155	49.140	0.000	4.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.11	1.92	0.06
			26159	49.140	0.000	8.000	CR1	40.0	Inferior	$\tau_{xy}$	0.48	1.92	0.25
			1469	51.300	0.000	8.000	CR1	60.0	Inferior	$\sigma_{b,0}$	-0.46	11.52	0.04
			1470	48.600	0.000	5.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-2.70	11.52	0.23
			1470	48.600	0.000	5.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-2.70		0.23
			26155	49.140	0.000	4.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.11	0.50	0.21
			1468	48.600	0.000	8.000	CR1	60.0	Inferior	$\tau_{xz}$	0.08	1.92	0.04
			26159	49.140	0.000	8.000	CR1	60.0	Inferior	$\tau_{xy}$	-0.49	1.92	0.25
			8043	48.600	0.000	6.000	CR1	60.0	Superior	$\sigma_{b,0}$	0.52	11.52	0.05
			8037	48.600	0.000	5.500	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-1.84	11.52	0.16
			8037	48.600	0.000	5.500	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-1.35		0.20
			1468	48.600	0.000	8.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.08	0.50	0.17
			26155	49.140	0.000	4.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.11	1.92	0.06
			26159	49.140	0.000	8.000	CR1	80.0	Inferior	$\tau_{xy}$	0.50	1.92	0.26
			1469	51.300	0.000	8.000	CR1	100.0	Inferior	$\sigma_{b,0}$	-0.46	11.52	0.04
			1470	48.600	0.000	5.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-2.70	11.52	0.23
			1470	48.600	0.000	5.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-2.70		0.23
			26155	49.140	0.000	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.11	0.50	0.21
			1468	48.600	0.000	8.000	CR1	80.0	Superior	$\tau_{xz}$	0.08	1.92	0.04
			26159	49.140	0.000	8.000	CR1	100.0	Inferior	$\tau_{xy}$	-0.51	1.92	0.26
			8043	48.600	0.000	6.000	CR1	100.0	Superior	$\sigma_{b,0}$	1.04	11.52	0.09
			8037	48.600	0.000	5.500	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-4.30	11.52	0.37
			8037	48.600	0.000	5.500	CR1	100.0	Superior	$\sigma_{b+bc,0}$	-3.31		0.46
			26155	49.140	0.000	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			26155	49.140	0.000	4.000	CR1	100.0	Superior	$\tau_{xz}$	-0.11	1.92	0.06
			26159	49.140	0.000	8.000	CR1	140.0	Inferior	$\tau_{xy}$	0.52	1.92	0.27
			8100	59.400	24.300	10.000	CR1	0.0	Superior	$\sigma_{b,0}$	0.58	11.52	0.05
			8135	59.906	24.300	12.000	CR1	20.0	Intermedio	$\sigma_{bc,0}$	-1.33	11.52	0.12
			8135	59.906	24.300	12.000	CR1	0.0	Superior	$\sigma_{b+bc,0}$	-1.33		0.12
			26596	59.906	24.300	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			26596	59.906	24.300	8.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.06	1.92	0.03
			1685	63.450	24.300	8.000	CR1	40.0	Inferior	$\tau_{xy}$	-0.59	1.92	0.30
			821	59.400	24.300	12.000	CR1	40.0	Superior	$\sigma_{b,0}$	0.24	11.52	0.02
			821	59.400	24.300	12.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-1.89	11.52	0.16
			821	59.400	24.300	12.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-1.66		0.18
			26596	59.906	24.300	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
			823	63.450	24.300	12.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.04	1.92	0.02
			1684	59.400	24.300	8.000	CR1	60.0	Inferior	$\tau_{xy}$	-0.61	1.92	0.32
			8100	59.400	24.300	10.000	CR1	60.0	Superior	$\sigma_{b,0}$	0.29	11.52	0.03
			8091	59.400	24.300	9.500	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-1.89	11.52	0.16
			8091	59.400	24.300	9.500	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-1.62		0.19
			823	63.450	24.300	12.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.04	0.50	0.09
			26596	59.906	24.300	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
			1684	59.400	24.300	8.000	CR1	80.0	Inferior	$\tau_{xy}$	0.63	1.92	0.33
			821	59.400	24.300	12.000	CR1	80.0	Superior	$\sigma_{b,0}$	0.24	11.52	0.02
			821	59.400	24.300	12.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-2.84	11.52	0.25
			821	59.400	24.300	12.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-2.60		0.27
			26596	59.906	24.300	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
			823	63.450	24.300	12.000	CR1	80.0	Superior	$\tau_{xz}$	-0.04	1.92	0.02
			1684	59.400	24.300	8.000	CR1	100.0	Inferior	$\tau_{xy}$	-0.66	1.92	0.34
			8100	59.400	24.300	10.000	CR1	100.0	Superior	$\sigma_{b,0}$	0.58	11.52	0.05
			8091	59.400	24.300	9.500	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-3.26	11.52	0.28
			8091	59.400	24.300	9.500	CR1	100.0	Superior	$\sigma_{b+bc,0}$	-2.71		0.33
			26596	59.906	24.300	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			26596	59.906	24.300	8.000	CR1	100.0	Superior	$\tau_{xz}$	-0.06	1.92	0.03
			1684	59.400	24.300	8.000	CR1	140.0	Inferior	$\tau_{xy}$	0.71	1.92	0.37
			8167	18.900	0.000	10.000	CR1	0.0	Superior	$\sigma_{b,0}$	1.12	11.52	0.10
			26364	18.360	0.000	8.000	CR1	20.0	Intermedio	$\sigma_{bc,0}$	-2.03	11.52	0.18
			26364	18.360	0.000	8.000	CR1	0.0	Superior	$\sigma_{b+bc,0}$	-2.03		0.18
			8190	18.360	0.000	12.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			8190	18.360	0.000	12.000	CR1	40.0	Inferior	$\tau_{xz}$	0.11	1.92	0.06
			8149	18.900	0.000	8.500	CR1	40.0	Inferior	$\tau_{xy}$	-0.48	1.92	0.25
			838	18.900	0.000	12.000	CR1	60.0	Inferior	$\sigma_{b,0}$	-0.50	11.52	0.04
			892	18.900	0.000	9.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-2.87	11.52	0.25
			838	18.900	0.000	12.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-1.97		0.26



Proyecto: TFM  
TFM

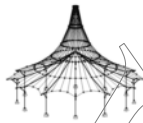
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
		3	8190	18.360	0.000	12.000	CR1	50.0	Intermedio	Ty'z'	0.11	0.50	0.22
			837	16.200	0.000	12.000	CR1	60.0	Inferior	Tx'z'	0.09	1.92	0.05
			8149	18.900	0.000	8.500	CR1	60.0	Inferior	Tx'y'	0.49	1.92	0.25
			8167	18.900	0.000	10.000	CR1	60.0	Superior	σ <sub>b,0</sub>	0.56	11.52	0.05
			8161	18.900	0.000	9.500	CR1	70.0	Intermedio	σ <sub>bc,0</sub>	-2.64	11.52	0.23
			8161	18.900	0.000	9.500	CR1	60.0	Superior	σ <sub>b+bc,0</sub>	-2.11		0.27
			837	16.200	0.000	12.000	CR1	70.0	Intermedio	Ty'z'	-0.09	0.50	0.18
			8190	18.360	0.000	12.000	CR1	70.0	Intermedio	Tx'z'	0.12	1.92	0.06
			8149	18.900	0.000	8.500	CR1	80.0	Inferior	Tx'y'	-0.50	1.92	0.26
			838	18.900	0.000	12.000	CR1	80.0	Superior	σ <sub>b,0</sub>	0.50	11.52	0.04
	4		838	18.900	0.000	12.000	CR1	90.0	Intermedio	σ <sub>bc,0</sub>	-4.45	11.52	0.39
			838	18.900	0.000	12.000	CR1	80.0	Superior	σ <sub>b+bc,0</sub>	-3.95		0.43
			8190	18.360	0.000	12.000	CR1	90.0	Intermedio	Ty'z'	0.11	0.50	0.22
			837	16.200	0.000	12.000	CR1	80.0	Superior	Tx'z'	0.09	1.92	0.05
			8149	18.900	0.000	8.500	CR1	100.0	Inferior	Tx'y'	0.51	1.92	0.26
			8167	18.900	0.000	10.000	CR1	140.0	Inferior	σ <sub>b,0</sub>	-1.12	11.52	0.10
			8161	18.900	0.000	9.500	CR1	120.0	Intermedio	σ <sub>bc,0</sub>	-5.26	11.52	0.46
			8161	18.900	0.000	9.500	CR1	100.0	Superior	σ <sub>b+bc,0</sub>	-4.21		0.55
			8190	18.360	0.000	12.000	CR1	100.0	Superior	Ty'z'	0.00	0.50	0.00
			8190	18.360	0.000	12.000	CR1	100.0	Superior	Tx'z'	0.11	1.92	0.06
	5		8149	18.900	0.000	8.500	CR1	140.0	Inferior	Tx'y'	-0.53	1.92	0.27
			8211	24.300	0.000	10.000	CR1	40.0	Inferior	σ <sub>b,0</sub>	-1.13	11.52	0.10
			8237	25.920	0.000	12.000	CR1	20.0	Intermedio	σ <sub>bc,0</sub>	-2.15	11.52	0.19
			8237	25.920	0.000	12.000	CR1	0.0	Superior	σ <sub>b+bc,0</sub>	-2.14		0.19
			8234	24.840	0.000	12.000	CR1	40.0	Inferior	Ty'z'	0.00	0.50	0.00
			8234	24.840	0.000	12.000	CR1	40.0	Inferior	Tx'z'	0.11	1.92	0.06
			8197	27.000	0.000	8.500	CR1	40.0	Inferior	Tx'y'	-0.52	1.92	0.27
			840	27.000	0.000	12.000	CR1	60.0	Inferior	σ <sub>b,0</sub>	-0.50	11.52	0.04
			1565	24.300	0.000	9.000	CR1	50.0	Intermedio	σ <sub>bc,0</sub>	-2.96	11.52	0.26
			839	24.300	0.000	12.000	CR1	40.0	Superior	σ <sub>b+bc,0</sub>	-2.25		0.28
	2		8234	24.840	0.000	12.000	CR1	50.0	Intermedio	Ty'z'	0.11	0.50	0.23
			840	27.000	0.000	12.000	CR1	60.0	Inferior	Tx'z'	-0.09	1.92	0.05
			8197	27.000	0.000	8.500	CR1	60.0	Inferior	Tx'y'	0.53	1.92	0.28
			8211	24.300	0.000	10.000	CR1	80.0	Inferior	σ <sub>b,0</sub>	-0.57	11.52	0.05
			8205	24.300	0.000	9.500	CR1	70.0	Intermedio	σ <sub>bc,0</sub>	-2.66	11.52	0.23
			8205	24.300	0.000	9.500	CR1	60.0	Superior	σ <sub>b+bc,0</sub>	-2.13		0.28
			840	27.000	0.000	12.000	CR1	70.0	Intermedio	Ty'z'	0.09	0.50	0.18
			8234	24.840	0.000	12.000	CR1	70.0	Intermedio	Tx'z'	0.12	1.92	0.06
			8197	27.000	0.000	8.500	CR1	80.0	Inferior	Tx'y'	-0.54	1.92	0.28
			840	27.000	0.000	12.000	CR1	100.0	Inferior	σ <sub>b,0</sub>	-0.50	11.52	0.04
	4		839	24.300	0.000	12.000	CR1	90.0	Intermedio	σ <sub>bc,0</sub>	-4.75	11.52	0.41
			839	24.300	0.000	12.000	CR1	80.0	Superior	σ <sub>b+bc,0</sub>	-4.25		0.46
			8234	24.840	0.000	12.000	CR1	90.0	Intermedio	Ty'z'	0.11	0.50	0.23
			840	27.000	0.000	12.000	CR1	80.0	Superior	Tx'z'	-0.09	1.92	0.05
			8197	27.000	0.000	8.500	CR1	100.0	Inferior	Tx'y'	0.55	1.92	0.29
			8211	24.300	0.000	10.000	CR1	140.0	Inferior	σ <sub>b,0</sub>	-1.13	11.52	0.10
			8205	24.300	0.000	9.500	CR1	120.0	Intermedio	σ <sub>bc,0</sub>	-5.31	11.52	0.46
			8205	24.300	0.000	9.500	CR1	100.0	Superior	σ <sub>b+bc,0</sub>	-4.25		0.55
			8234	24.840	0.000	12.000	CR1	100.0	Superior	Ty'z'	0.00	0.50	0.00
			8234	24.840	0.000	12.000	CR1	100.0	Superior	Tx'z'	0.11	1.92	0.06
	104	1	8197	27.000	0.000	8.500	CR1	140.0	Inferior	Tx'y'	-0.57	1.92	0.30
			8262	32.400	0.000	10.000	CR1	0.0	Superior	σ <sub>b,0</sub>	1.14	11.52	0.10
			8292	33.750	0.000	12.000	CR1	20.0	Intermedio	σ <sub>bc,0</sub>	-2.26	11.52	0.20
			8292	33.750	0.000	12.000	CR1	0.0	Superior	σ <sub>b+bc,0</sub>	-2.26		0.20
			8289	32.850	0.000	12.000	CR1	40.0	Inferior	Ty'z'	0.00	0.50	0.00
			8289	32.850	0.000	12.000	CR1	40.0	Inferior	Tx'z'	0.11	1.92	0.06
			8246	35.100	0.000	8.500	CR1	40.0	Inferior	Tx'y'	-0.51	1.92	0.27
			841	32.400	0.000	12.000	CR1	40.0	Superior	σ <sub>b,0</sub>	0.38	11.52	0.03
			1558	32.400	0.000	9.000	CR1	50.0	Intermedio	σ <sub>bc,0</sub>	-3.10	11.52	0.27
			842	35.100	0.000	12.000	CR1	40.0	Superior	σ <sub>b+bc,0</sub>	-2.36		0.27
	2		8289	32.850	0.000	12.000	CR1	50.0	Intermedio	Ty'z'	0.11	0.50	0.22
			841	32.400	0.000	12.000	CR1	60.0	Inferior	Tx'z'	0.07	1.92	0.04
			8246	35.100	0.000	8.500	CR1	60.0	Inferior	Tx'y'	0.52	1.92	0.27
			8262	32.400	0.000	10.000	CR1	60.0	Superior	σ <sub>b,0</sub>	0.57	11.52	0.05
			8260	35.100	0.000	9.500	CR1	70.0	Intermedio	σ <sub>bc,0</sub>	-2.89	11.52	0.25
			8260	35.100	0.000	9.500	CR1	60.0	Superior	σ <sub>b+bc,0</sub>	-2.35		0.30
			841	32.400	0.000	12.000	CR1	70.0	Intermedio	Ty'z'	-0.07	0.50	0.14
			8289	32.850	0.000	12.000	CR1	70.0	Intermedio	Tx'z'	0.11	1.92	0.06
			8246	35.100	0.000	8.500	CR1	80.0	Inferior	Tx'y'	-0.53	1.92	0.27
			841	32.400	0.000	12.000	CR1	80.0	Superior	σ <sub>b,0</sub>	0.38	11.52	0.03
	4		842	35.100	0.000	12.000	CR1	90.0	Intermedio	σ <sub>bc,0</sub>	-4.26	11.52	0.37
			842	35.100	0.000	12.000	CR1	80.0	Superior	σ <sub>b+bc,0</sub>	-3.88		0.40
			8289	32.850	0.000	12.000	CR1	90.0	Intermedio	Ty'z'	0.11	0.50	0.22
			841	32.400	0.000	12.000	CR1	80.0	Superior	Tx'z'	0.07	1.92	0.04
			8246	35.100	0.000	8.500	CR1	100.0	Inferior	Tx'y'	0.53	1.92	0.28
			8262	32.400	0.000	10.000	CR1	140.0	Inferior	σ <sub>b,0</sub>	-1.14	11.52	0.10
			8260	35.100	0.000	9.500	CR1	120.0	Intermedio	σ <sub>bc,0</sub>	-5.56	11.52	0.48
			8260	35.100	0.000	9.500	CR1	100.0	Superior	σ <sub>b+bc,0</sub>	-4.49		0.57
			8289	32.850	0.000	12.000	CR1	100.0	Superior	Ty'z'	0.00	0.50	0.00
			8289	32.850	0.000	12.000	CR1	100.0	Superior	Tx'z'	0.11	1.92	0.06
	105	1	8246	35.100	0.000	8.500	CR1	140.0	Inferior	Tx'y'	-0.55	1.92	0.29
			8319	43.200	0.000	10.000	CR1	0.0	Superior	σ <sub>b,0</sub>	1.13	11.52	0.10
			8341	42.120	0.000	12.000	CR1	20.0	Intermedio	σ <sub>bc,0</sub>	-2.15	11.52	0.19



Proyecto: TFM  
TFM

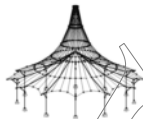
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]	
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite		
106		2	8341	42.120	0.000	12.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-2.14		0.19	
			8342	42.660	0.000	12.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00	
			8342	42.660	0.000	12.000	CR1	40.0	Inferior	$\tau_{xz}$	0.11	1.92	0.06	
			26319	40.500	0.000	8.500	CR1	40.0	Inferior	$\tau_{xy}$	0.52	1.92	0.27	
			843	40.500	0.000	12.000	CR1	40.0	Superior	$\sigma_{b,0}$	0.50	11.52	0.04	
			898	43.200	0.000	9.000	CR1	50.0	Intermedio	$\sigma_{tc,0}$	-2.93	11.52	0.25	
			844	43.200	0.000	12.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-2.27		0.28	
			8342	42.660	0.000	12.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.11	0.50	0.23	
			843	40.500	0.000	12.000	CR1	60.0	Inferior	$\tau_{xz}$	0.09	1.92	0.05	
			26319	40.500	0.000	8.500	CR1	60.0	Inferior	$\tau_{xy}$	-0.53	1.92	0.28	
		3	8319	43.200	0.000	10.000	CR1	60.0	Superior	$\sigma_{b,0}$	0.57	11.52	0.05	
			8313	43.200	0.000	9.500	CR1	70.0	Intermedio	$\sigma_{tc,0}$	-2.66	11.52	0.23	
			8313	43.200	0.000	9.500	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-2.13		0.28	
			843	40.500	0.000	12.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.09	0.50	0.18	
			8342	42.660	0.000	12.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.12	1.92	0.06	
		4	26319	40.500	0.000	8.500	CR1	80.0	Inferior	$\tau_{xy}$	0.54	1.92	0.28	
			843	40.500	0.000	12.000	CR1	80.0	Superior	$\sigma_{b,0}$	0.50	11.52	0.04	
			844	43.200	0.000	12.000	CR1	90.0	Intermedio	$\sigma_{tc,0}$	-4.77	11.52	0.41	
			844	43.200	0.000	12.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-4.27		0.46	
			8342	42.660	0.000	12.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.11	0.50	0.23	
		5	843	40.500	0.000	12.000	CR1	80.0	Superior	$\tau_{xz}$	0.09	1.92	0.05	
			26319	40.500	0.000	8.500	CR1	100.0	Inferior	$\tau_{xy}$	-0.55	1.92	0.28	
			8319	43.200	0.000	10.000	CR1	100.0	Superior	$\sigma_{b,0}$	1.13	11.52	0.10	
			8313	43.200	0.000	9.500	CR1	120.0	Intermedio	$\sigma_{tc,0}$	-5.31	11.52	0.46	
			8313	43.200	0.000	9.500	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-4.25		0.55	
			8342	42.660	0.000	12.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00	
			8342	42.660	0.000	12.000	CR1	100.0	Superior	$\tau_{xz}$	0.11	1.92	0.06	
			26319	40.500	0.000	8.500	CR1	140.0	Inferior	$\tau_{xy}$	0.56	1.92	0.29	
		1	8363	48.600	0.000	10.000	CR1	0.0	Superior	$\sigma_{b,0}$	1.12	11.52	0.10	
			26300	49.140	0.000	8.000	CR1	20.0	Intermedio	$\sigma_{tc,0}$	-2.03	11.52	0.18	
			26300	49.140	0.000	8.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-2.03		0.18	
			8386	49.140	0.000	12.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00	
			8386	49.140	0.000	12.000	CR1	40.0	Inferior	$\tau_{xz}$	0.11	1.92	0.06	
			8349	51.300	0.000	8.500	CR1	40.0	Inferior	$\tau_{xy}$	-0.47	1.92	0.25	
			845	48.600	0.000	12.000	CR1	60.0	Inferior	$\sigma_{b,0}$	-0.50	11.52	0.04	
			1544	48.600	0.000	9.000	CR1	50.0	Intermedio	$\sigma_{tc,0}$	-2.87	11.52	0.25	
			846	51.300	0.000	12.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-1.98		0.26	
			8386	49.140	0.000	12.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.11	0.50	0.22	
			846	51.300	0.000	12.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.09	1.92	0.05	
			26304	48.600	0.000	8.500	CR1	60.0	Inferior	$\tau_{xy}$	-0.48	1.92	0.25	
			8363	48.600	0.000	10.000	CR1	80.0	Inferior	$\sigma_{b,0}$	-0.56	11.52	0.05	
			8357	48.600	0.000	9.500	CR1	70.0	Intermedio	$\sigma_{tc,0}$	-2.63	11.52	0.23	
			8357	48.600	0.000	9.500	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-2.11		0.27	
			846	51.300	0.000	12.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.09	0.50	0.18	
			8386	49.140	0.000	12.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.12	1.92	0.06	
			26304	48.600	0.000	8.500	CR1	80.0	Inferior	$\tau_{xy}$	0.49	1.92	0.26	
			4	845	48.600	0.000	12.000	CR1	100.0	Inferior	$\sigma_{b,0}$	-0.50	11.52	0.04
				846	51.300	0.000	12.000	CR1	90.0	Intermedio	$\sigma_{tc,0}$	-4.45	11.52	0.39
		846		51.300	0.000	12.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-3.95		0.43	
		8386		49.140	0.000	12.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.11	0.50	0.22	
		846		51.300	0.000	12.000	CR1	80.0	Superior	$\tau_{xz}$	-0.09	1.92	0.05	
		26304		48.600	0.000	8.500	CR1	100.0	Inferior	$\tau_{xy}$	-0.50	1.92	0.26	
		8363		48.600	0.000	10.000	CR1	100.0	Superior	$\sigma_{b,0}$	1.12	11.52	0.10	
		8357		48.600	0.000	9.500	CR1	120.0	Intermedio	$\sigma_{tc,0}$	-5.26	11.52	0.46	
		8357		48.600	0.000	9.500	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-4.21		0.55	
		8386		49.140	0.000	12.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00	
		5	8386	49.140	0.000	12.000	CR1	100.0	Superior	$\tau_{xz}$	0.11	1.92	0.06	
			26304	48.600	0.000	8.500	CR1	140.0	Inferior	$\tau_{xy}$	0.52	1.92	0.27	
			188	12201	6.750	18.900	2.000	CR1	0.0	Superior	$\sigma_{b,0}$	-0.54	11.52	0.05
				1007	5.400	18.900	0.000	CR1	20.0	Intermedio	$\sigma_{tc,0}$	-2.46	11.52	0.21
				1007	5.400			18.900	0.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-2.46		0.21
				1220	5.400			18.900	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
				1220	5.400			18.900	4.000	CR1	40.0	Inferior	$\tau_{xz}$	0.06	1.92	0.03
				1006	4.050			18.900	0.000	CR1	40.0	Inferior	$\tau_{xy}$	-0.21	1.92	0.11
				1221	6.750			18.900	4.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.19	11.52	0.02
				1009	6.750			18.900	1.000	CR1	50.0	Intermedio	$\sigma_{tc,0}$	-0.73	11.52	0.06
		1009		6.750	18.900		1.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-0.72		0.06
		1220		5.400	18.900		4.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.06	0.50	0.11
		2	1006	4.050	18.900	0.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.03	1.92	0.02	
			1006	4.050	18.900	0.000	CR1	60.0	Inferior	$\tau_{xy}$	0.21	1.92	0.11	
			12201	6.750	18.900	2.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.27	11.52	0.02	
			1007	5.400	18.900	0.000	CR1	70.0	Intermedio	$\sigma_{tc,0}$	-2.46	11.52	0.21	
			1007	5.400	18.900	0.000	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-2.46		0.21	
		3	1006	4.050	18.900	0.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.07	
			1220	5.400	18.900	4.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.06	1.92	0.03	
			1006	4.050	18.900	0.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.21	1.92	0.11	
			1221	6.750	18.900	4.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.19	11.52	0.02	
			1009	6.750	18.900	1.000	CR1	90.0	Intermedio	$\sigma_{tc,0}$	-0.76	11.52	0.07	
		4	1009	6.750	18.900	1.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-0.75		0.07	
			1220	5.400	18.900	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.06	0.50	0.11	
			1006	4.050	18.900	0.000	CR1	80.0	Superior	$\tau_{xz}$	-0.03	1.92	0.02	
			1006	4.050	18.900	0.000	CR1	100.0	Inferior	$\tau_{xy}$	0.21	1.92	0.11	
			12201	6.750	18.900	2.000	CR1	100.0	Superior	$\sigma_{b,0}$	-0.54	11.52	0.05	



Proyecto: TFM  
TFM

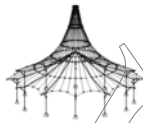
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
189	1		1007	5.400	18.900	0.000	CR1	120.0	Intermedio	$\sigma_{\theta,0}$	-2.47	11.52	0.21
			1007	5.400	18.900	0.000	CR1	100.0	Superior	$\sigma_{\theta+\theta c,0}$	-2.46		0.21
			1220	5.400	18.900	4.000	CR1	100.0	Superior	$\tau_{y,z}$	0.00	0.50	0.00
			1220	5.400	18.900	4.000	CR1	100.0	Superior	$\tau_{x,z}$	0.06	1.92	0.03
			1006	4.050	18.900	0.000	CR1	140.0	Inferior	$\tau_{x,y}$	-0.21	1.92	0.11
			12242	29.700	21.600	2.000	CR1	0.0	Superior	$\sigma_{\theta,0}$	-0.53	11.52	0.05
			1011	28.350	21.600	0.000	CR1	20.0	Intermedio	$\sigma_{\theta,0}$	-2.02	11.52	0.18
			1011	28.350	21.600	0.000	CR1	0.0	Superior	$\sigma_{\theta+\theta c,0}$	-2.02		0.18
			1232	28.350	21.600	4.000	CR1	40.0	Inferior	$\tau_{y,z}$	0.00	0.50	0.00
			1232	28.350	21.600	4.000	CR1	40.0	Inferior	$\tau_{x,z}$	0.06	1.92	0.03
			1010	27.000	21.600	0.000	CR1	0.0	Superior	$\tau_{x,y}$	-0.15	1.92	0.08
			1233	29.700	21.600	4.000	CR1	40.0	Superior	$\sigma_{\theta,0}$	-0.19	11.52	0.02
			1231	27.000	21.600	4.000	CR1	50.0	Intermedio	$\sigma_{\theta,0}$	-0.52	11.52	0.05
			1231	27.000	21.600	4.000	CR1	40.0	Superior	$\sigma_{\theta+\theta c,0}$	-0.66		0.06
			1232	28.350	21.600	4.000	CR1	50.0	Intermedio	$\tau_{y,z}$	0.06	0.50	0.11
			1010	27.000	21.600	0.000	CR1	60.0	Inferior	$\tau_{x,z}$	-0.03	1.92	0.02
			1010	27.000	21.600	0.000	CR1	40.0	Superior	$\tau_{x,y}$	0.15	1.92	0.08
			12242	29.700	21.600	2.000	CR1	60.0	Superior	$\sigma_{\theta,0}$	-0.27	11.52	0.02
			1011	28.350	21.600	0.000	CR1	70.0	Intermedio	$\sigma_{\theta,0}$	-2.02	11.52	0.18
			1011	28.350	21.600	0.000	CR1	60.0	Superior	$\sigma_{\theta+\theta c,0}$	-2.02		0.18
			1010	27.000	21.600	0.000	CR1	70.0	Intermedio	$\tau_{y,z}$	0.03	0.50	0.07
			1232	28.350	21.600	4.000	CR1	70.0	Intermedio	$\tau_{x,z}$	0.06	1.92	0.03
			1010	27.000	21.600	0.000	CR1	60.0	Superior	$\tau_{x,y}$	-0.15	1.92	0.08
			1233	29.700	21.600	4.000	CR1	80.0	Superior	$\sigma_{\theta,0}$	-0.19	11.52	0.02
			1231	27.000	21.600	4.000	CR1	90.0	Intermedio	$\sigma_{\theta,0}$	-0.52	11.52	0.04
			1231	27.000	21.600	4.000	CR1	80.0	Superior	$\sigma_{\theta+\theta c,0}$	-0.52		0.04
			1232	28.350	21.600	4.000	CR1	90.0	Intermedio	$\tau_{y,z}$	0.06	0.50	0.11
			1010	27.000	21.600	0.000	CR1	80.0	Superior	$\tau_{x,z}$	-0.03	1.92	0.02
			1010	27.000	21.600	0.000	CR1	80.0	Superior	$\tau_{x,y}$	0.15	1.92	0.08
			12242	29.700	21.600	2.000	CR1	140.0	Inferior	$\sigma_{\theta,0}$	0.53	11.52	0.05
			1011	28.350	21.600	0.000	CR1	120.0	Intermedio	$\sigma_{\theta,0}$	-2.03	11.52	0.18
			1011	28.350	21.600	0.000	CR1	100.0	Superior	$\sigma_{\theta+\theta c,0}$	-2.03		0.18
			1232	28.350	21.600	4.000	CR1	100.0	Superior	$\tau_{y,z}$	0.00	0.50	0.00
			1232	28.350	21.600	4.000	CR1	100.0	Superior	$\tau_{x,z}$	0.06	1.92	0.03
			1010	27.000	21.600	0.000	CR1	100.0	Superior	$\tau_{x,y}$	-0.15	1.92	0.08
190	1		12300	32.400	21.600	2.000	CR1	40.0	Inferior	$\sigma_{\theta,0}$	0.53	11.52	0.05
			1042	33.750	21.600	0.000	CR1	20.0	Intermedio	$\sigma_{\theta,0}$	-2.27	11.52	0.20
			1042	33.750	21.600	0.000	CR1	0.0	Superior	$\sigma_{\theta+\theta c,0}$	-2.26		0.20
			1235	33.750	21.600	4.000	CR1	40.0	Inferior	$\tau_{y,z}$	0.00	0.50	0.00
			1235	33.750	21.600	4.000	CR1	40.0	Inferior	$\tau_{x,z}$	0.06	1.92	0.03
			1043	35.100	21.600	0.000	CR1	40.0	Inferior	$\tau_{x,y}$	0.15	1.92	0.08
		2	1234	32.400	21.600	4.000	CR1	40.0	Superior	$\sigma_{\theta,0}$	-0.19	11.52	0.02
			1236	35.100	21.600	4.000	CR1	50.0	Intermedio	$\sigma_{\theta,0}$	-0.50	11.52	0.04
			1236	35.100	21.600	4.000	CR1	40.0	Superior	$\sigma_{\theta+\theta c,0}$	-0.68		0.06
			1235	33.750	21.600	4.000	CR1	50.0	Intermedio	$\tau_{y,z}$	0.06	0.50	0.11
		3	1043	35.100	21.600	0.000	CR1	60.0	Inferior	$\tau_{x,z}$	0.03	1.92	0.02
			1043	35.100	21.600	0.000	CR1	60.0	Inferior	$\tau_{x,y}$	-0.15	1.92	0.08
			12300	32.400	21.600	2.000	CR1	60.0	Superior	$\sigma_{\theta,0}$	-0.27	11.52	0.02
			1042	33.750	21.600	0.000	CR1	70.0	Intermedio	$\sigma_{\theta,0}$	-2.27	11.52	0.20
		4	1042	33.750	21.600	0.000	CR1	60.0	Superior	$\sigma_{\theta+\theta c,0}$	-2.27		0.20
			1043	35.100	21.600	0.000	CR1	70.0	Intermedio	$\tau_{y,z}$	-0.03	0.50	0.06
			1235	33.750	21.600	4.000	CR1	70.0	Intermedio	$\tau_{x,z}$	0.06	1.92	0.03
			1043	35.100	21.600	0.000	CR1	80.0	Inferior	$\tau_{x,y}$	0.15	1.92	0.08
		5	1234	32.400	21.600	4.000	CR1	80.0	Superior	$\sigma_{\theta,0}$	-0.19	11.52	0.02
			1236	35.100	21.600	4.000	CR1	90.0	Intermedio	$\sigma_{\theta,0}$	-0.49	11.52	0.04
			1041	32.400	21.600	0.000	CR1	80.0	Superior	$\sigma_{\theta+\theta c,0}$	0.16		0.05
			1235	33.750	21.600	4.000	CR1	90.0	Intermedio	$\tau_{y,z}$	0.06	0.50	0.11
		6	1043	35.100	21.600	0.000	CR1	80.0	Superior	$\tau_{x,z}$	0.03	1.92	0.02
			1043	35.100	21.600	0.000	CR1	100.0	Inferior	$\tau_{x,y}$	-0.15	1.92	0.08
			12300	32.400	21.600	2.000	CR1	100.0	Superior	$\sigma_{\theta,0}$	-0.53	11.52	0.05
			1042	33.750	21.600	0.000	CR1	120.0	Intermedio	$\sigma_{\theta,0}$	-2.27	11.52	0.20
		7	1042	33.750	21.600	0.000	CR1	100.0	Superior	$\sigma_{\theta+\theta c,0}$	-2.27		0.20
			1235	33.750	21.600	4.000	CR1	100.0	Superior	$\tau_{y,z}$	0.00	0.50	0.00
			1235	33.750	21.600	4.000	CR1	100.0	Superior	$\tau_{x,z}$	0.06	1.92	0.03
			1043	35.100	21.600	0.000	CR1	140.0	Inferior	$\tau_{x,y}$	0.15	1.92	0.08
191	1		12352	37.800	21.600	2.000	CR1	40.0	Inferior	$\sigma_{\theta,0}$	0.53	11.52	0.05
			1049	39.150	21.600	0.000	CR1	20.0	Intermedio	$\sigma_{\theta,0}$	-2.01	11.52	0.17
			1049	39.150	21.600	0.000	CR1	0.0	Superior	$\sigma_{\theta+\theta c,0}$	-2.01		0.17
			1238	39.150	21.600	4.000	CR1	40.0	Inferior	$\tau_{y,z}$	0.00	0.50	0.00
			1238	39.150	21.600	4.000	CR1	40.0	Inferior	$\tau_{x,z}$	0.06	1.92	0.03
			1050	40.500	21.600	0.000	CR1	0.0	Superior	$\tau_{x,y}$	0.16	1.92	0.08
		2	1237	37.800	21.600	4.000	CR1	40.0	Superior	$\sigma_{\theta,0}$	-0.19	11.52	0.02
			1239	40.500	21.600	4.000	CR1	50.0	Intermedio	$\sigma_{\theta,0}$	-0.56	11.52	0.05
			1239	40.500	21.600	4.000	CR1	40.0	Superior	$\sigma_{\theta+\theta c,0}$	-0.68		0.06
			1238	39.150	21.600	4.000	CR1	50.0	Intermedio	$\tau_{y,z}$	0.06	0.50	0.11
		3	1050	40.500	21.600	0.000	CR1	60.0	Inferior	$\tau_{x,z}$	0.03	1.92	0.02
			1050	40.500	21.600	0.000	CR1	40.0	Superior	$\tau_{x,y}$	-0.16	1.92	0.08
			12352	37.800	21.600	2.000	CR1	80.0	Inferior	$\sigma_{\theta,0}$	0.27	11.52	0.02
			1049	39.150	21.600	0.000	CR1	70.0	Intermedio	$\sigma_{\theta,0}$	-2.02	11.52	0.18
		4	1049	39.150	21.600	0.000	CR1	60.0	Superior	$\sigma_{\theta+\theta c,0}$	-2.02		0.18
			1050	40.500	21.600	0.000	CR1	70.0	Intermedio	$\tau_{y,z}$	-0.03	0.50	0.07
			1238	39.150	21.600	4.000	CR1	70.0	Intermedio	$\tau_{x,z}$	0.06	1.92	0.03
			1050	40.500	21.600	0.000	CR1	60.0	Superior	$\tau_{x,y}$	0.16	1.92	0.08



Proyecto: TFM  
TFM

Modelo: TFM\_FINAL\_v01

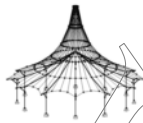
Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

2.5. TENSIONES [N/mm²] POR COM. CARGA															
Comp. núm.	Superfici núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm²]			Razón [-]		
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite			
192	1	4	1237	37.800	21.600	4.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.19	11.52	0.02		
			1239	40.500	21.600	4.000	CR1	90.0	Intermedio	$\sigma_{b,c,0}$	-0.56	11.52	0.05		
			1239	40.500	21.600	4.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-0.56		0.05		
		5	1238	39.150	21.600	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.06	0.50	0.11		
			1050	40.500	21.600	0.000	CR1	80.0	Superior	$\tau_{xz}$	0.03	1.92	0.02		
			1050	40.500	21.600	0.000	CR1	80.0	Superior	$\tau_{xy}$	-0.16	1.92	0.08		
		1	12352	37.800	21.600	2.000	CR1	140.0	Inferior	$\sigma_{b,0}$	0.53	11.52	0.05		
			1049	39.150	21.600	0.000	CR1	120.0	Intermedio	$\sigma_{b,c,0}$	-2.02	11.52	0.18		
			1049	39.150	21.600	0.000	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-2.02		0.18		
		2	1238	39.150	21.600	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00		
			1238	39.150	21.600	4.000	CR1	100.0	Superior	$\tau_{xz}$	0.06	1.92	0.03		
			1050	40.500	21.600	0.000	CR1	100.0	Superior	$\tau_{xy}$	0.16	1.92	0.08		
		3	12409	55.350	24.300	2.000	CR1	0.0	Superior	$\sigma_{b,0}$	-0.54	11.52	0.05		
			1071	54.000	24.300	0.000	CR1	20.0	Intermedio	$\sigma_{b,c,0}$	-2.43	11.52	0.21		
			1071	54.000	24.300	0.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-2.43		0.21		
		4	1248	54.000	24.300	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00		
			1248	54.000	24.300	4.000	CR1	40.0	Inferior	$\tau_{xz}$	0.06	1.92	0.03		
			1070	52.650	24.300	0.000	CR1	0.0	Superior	$\tau_{xy}$	-0.25	1.92	0.13		
		5	1249	55.350	24.300	4.000	CR1	60.0	Inferior	$\sigma_{b,0}$	0.19	11.52	0.02		
			1073	55.350	24.300	1.000	CR1	50.0	Intermedio	$\sigma_{b,c,0}$	-0.94	11.52	0.08		
			1073	55.350	24.300	1.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-0.94		0.08		
		6	1248	54.000	24.300	4.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.06	0.50	0.11		
			1070	52.650	24.300	0.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.03	1.92	0.02		
			1070	52.650	24.300	0.000	CR1	40.0	Superior	$\tau_{xy}$	0.25	1.92	0.13		
		7	1249	55.350	24.300	4.000	CR1	60.0	Inferior	$\sigma_{b,0}$	0.19	11.52	0.02		
			1073	55.350	24.300	1.000	CR1	50.0	Intermedio	$\sigma_{b,c,0}$	-0.97	11.52	0.08		
			1073	55.350	24.300	1.000	CR1	90.0	Superior	$\sigma_{b+tc,0}$	-0.96		0.08		
		8	1248	54.000	24.300	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.06	0.50	0.11		
			1070	52.650	24.300	0.000	CR1	80.0	Superior	$\tau_{xz}$	-0.03	1.92	0.02		
			1070	52.650	24.300	0.000	CR1	80.0	Superior	$\tau_{xy}$	0.25	1.92	0.13		
		9	12409	55.350	24.300	2.000	CR1	140.0	Inferior	$\sigma_{b,0}$	0.54	11.52	0.05		
			1071	54.000	24.300	0.000	CR1	120.0	Intermedio	$\sigma_{b,c,0}$	-2.44	11.52	0.21		
			1071	54.000	24.300	0.000	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-2.44		0.21		
		10	1248	54.000	24.300	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00		
			1248	54.000	24.300	4.000	CR1	100.0	Superior	$\tau_{xz}$	0.06	1.92	0.03		
			1070	52.650	24.300	0.000	CR1	100.0	Superior	$\tau_{xy}$	-0.25	1.92	0.13		
		193	1	4	1095	62.100	13.500	1.000	CR1	0.0	Superior	$\sigma_{b,0}$	0.00	11.52	0.00
					1093	63.450	13.500	0.000	CR1	20.0	Intermedio	$\sigma_{b,c,0}$	-1.80	11.52	0.16
					1093	63.450	13.500	0.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-1.80		0.16
				5	1092	62.100	13.500	0.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
					1092	62.100	13.500	0.000	CR1	40.0	Inferior	$\tau_{xz}$	0.00	1.92	0.00
					25690	62.550	13.500	4.000	CR1	40.0	Inferior	$\tau_{xy}$	-0.15	1.92	0.08
				6	1257	62.100	13.500	4.000	CR1	40.0	Superior	$\sigma_{b,0}$	0.02	11.52	0.00
					1095	62.100	13.500	1.000	CR1	50.0	Intermedio	$\sigma_{b,c,0}$	-1.26	11.52	0.11
					1095	62.100	13.500	1.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-1.26		0.11
			7	1092	62.100	13.500	0.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.00	0.50	0.00	
				25690	62.550	13.500	4.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.01	1.92	0.00	
				25690	62.550	13.500	4.000	CR1	60.0	Inferior	$\tau_{xy}$	0.15	1.92	0.08	
			8	1095	62.100	13.500	1.000	CR1	60.0	Superior	$\sigma_{b,0}$	0.00	11.52	0.00	
				1093	63.450	13.500	0.000	CR1	70.0	Intermedio	$\sigma_{b,c,0}$	-1.81	11.52	0.16	
				1093	63.450	13.500	0.000	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-1.80		0.16	
			9	25690	62.550	13.500	4.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.01	0.50	0.01	
				1092	62.100	13.500	0.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.00	1.92	0.00	
				25690	62.550	13.500	4.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.16	1.92	0.08	
			10	1257	62.100	13.500	4.000	CR1	100.0	Inferior	$\sigma_{b,0}$	-0.02	11.52	0.00	
				1095	62.100	13.500	1.000	CR1	90.0	Intermedio	$\sigma_{b,c,0}$	-1.26	11.52	0.11	
				1095	62.100	13.500	1.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-1.26		0.11	
		11	1092	62.100	13.500	0.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.00	0.50	0.00		
			25690	62.550	13.500	4.000	CR1	80.0	Superior	$\tau_{xz}$	-0.01	1.92	0.00		
25690	62.550		13.500	4.000	CR1	100.0	Inferior	$\tau_{xy}$	0.16	1.92	0.08				
12	1095	62.100	13.500	1.000	CR1	100.0	Superior	$\sigma_{b,0}$	0.00	11.52	0.00				
	1093	63.450	13.500	0.000	CR1	120.0	Intermedio	$\sigma_{b,c,0}$	-1.81	11.52	0.16				
	1093	63.450	13.500	0.000	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-1.81		0.16				
13	1092	62.100	13.500	0.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00				
	1092	62.100	13.500	0.000	CR1	100.0	Superior	$\tau_{xz}$	0.00	1.92	0.00				
	25690	62.550	13.500	4.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.17	1.92	0.09				
194	1	4	12498	55.350	0.000	2.000	CR1	40.0	Inferior	$\sigma_{b,0}$	0.99	11.52	0.09		
			12498	55.350	0.000	2.000	CR1	20.0	Intermedio	$\sigma_{b,c,0}$	-2.69	11.52	0.23		
			12498	55.350	0.000	2.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-3.67		0.32		
		5	1191	56.700	0.000	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00		
			1191	56.700	0.000	4.000	CR1	40.0	Inferior	$\tau_{xz}$	0.10	1.92	0.05		
	2	25397	55.350	0.000	0.500	CR1	40.0	Inferior	$\tau_{xy}$	-0.39	1.92	0.20			
		1192	58.050	0.000	4.000	CR1	60.0	Inferior	$\sigma_{b,0}$	0.33	11.52	0.03			
		1117	55.350	0.000	1.000	CR1	50.0	Intermedio	$\sigma_{b,c,0}$	-1.58	11.52	0.14			
	3	1117	55.350	0.000	1.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-1.57		0.14			
		1191	56.700	0.000	4.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.10	0.50	0.20			
		1190	55.350	0.000	4.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.06	1.92	0.03			





Proyecto: TFM  
TFM

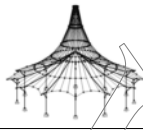
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
195		3	25397	55.350	0.000	0.500	CR1	60.0	Inferior	$\tau_{xy}$	0.39	1.92	0.20
			12498	55.350	0.000	2.000	CR1	80.0	Inferior	$\sigma_{b,0}$	0.49	11.52	0.04
			1115	56.700	0.000	0.000	CR1	70.0	Intermedio	$\sigma_{b,0}$	-1.88	11.52	0.16
			1115	56.700	0.000	0.000	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-1.88		0.16
			1190	55.350	0.000	4.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.06	0.50	0.12
			1191	56.700	0.000	4.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.10	1.92	0.05
		4	25397	55.350	0.000	0.500	CR1	80.0	Inferior	$\tau_{xy}$	-0.39	1.92	0.20
			1192	58.050	0.000	4.000	CR1	100.0	Inferior	$\sigma_{b,0}$	0.33	11.52	0.03
			1117	55.350	0.000	1.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	-1.63	11.52	0.14
			1117	55.350	0.000	1.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	-1.62		0.14
			1191	56.700	0.000	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.10	0.50	0.20
			1190	55.350	0.000	4.000	CR1	80.0	Superior	$\tau_{xz}$	-0.06	1.92	0.03
		5	25397	55.350	0.000	0.500	CR1	100.0	Inferior	$\tau_{xy}$	0.39	1.92	0.20
			12498	55.350	0.000	2.000	CR1	100.0	Superior	$\sigma_{b,0}$	-0.99	11.52	0.09
			12499	55.800	0.000	2.000	CR1	120.0	Intermedio	$\sigma_{b,0}$	2.31	11.52	0.20
			12499	55.800	0.000	2.000	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	1.33		0.29
			1191	56.700	0.000	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1191	56.700	0.000	4.000	CR1	100.0	Superior	$\tau_{xz}$	0.10	1.92	0.05
	196	1	25397	55.350	0.000	0.500	CR1	140.0	Inferior	$\tau_{xy}$	-0.39	1.92	0.20
			12558	12.150	0.000	2.000	CR1	0.0	Superior	$\sigma_{b,0}$	-0.98	11.52	0.09
			12558	12.150	0.000	2.000	CR1	20.0	Intermedio	$\sigma_{b,0}$	-2.66	11.52	0.23
			12558	12.150	0.000	2.000	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	-3.65		0.32
			1204	10.800	0.000	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1204	10.800	0.000	4.000	CR1	40.0	Inferior	$\tau_{xz}$	0.10	1.92	0.05
		2	8759	12.150	0.000	0.500	CR1	40.0	Inferior	$\tau_{xy}$	0.39	1.92	0.20
			1203	9.450	0.000	4.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.33	11.52	0.03
			376	12.150	0.000	1.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-1.61	11.52	0.14
			376	12.150	0.000	1.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-1.60		0.14
			1204	10.800	0.000	4.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.10	0.50	0.20
			1205	12.150	0.000	4.000	CR1	60.0	Inferior	$\tau_{xz}$	0.06	1.92	0.03
		3	8759	12.150	0.000	0.500	CR1	60.0	Inferior	$\tau_{xy}$	-0.39	1.92	0.20
			12558	12.150	0.000	2.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.49	11.52	0.04
			1158	10.800	0.000	0.000	CR1	70.0	Intermedio	$\sigma_{b,0}$	-1.85	11.52	0.16
			1158	10.800	0.000	0.000	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-1.85		0.16
			1205	12.150	0.000	4.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
			1204	10.800	0.000	4.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.10	1.92	0.05
		4	8759	12.150	0.000	0.500	CR1	80.0	Inferior	$\tau_{xy}$	0.39	1.92	0.20
			1203	9.450	0.000	4.000	CR1	100.0	Inferior	$\sigma_{b,0}$	0.33	11.52	0.03
			376	12.150	0.000	1.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	-1.66	11.52	0.14
			376	12.150	0.000	1.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	-1.65		0.15
			1204	10.800	0.000	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.10	0.50	0.20
			1205	12.150	0.000	4.000	CR1	80.0	Superior	$\tau_{xz}$	0.06	1.92	0.03
		5	8759	12.150	0.000	0.500	CR1	100.0	Inferior	$\tau_{xy}$	-0.39	1.92	0.20
			12558	12.150	0.000	2.000	CR1	100.0	Superior	$\sigma_{b,0}$	-0.98	11.52	0.09
			12552	9.450	0.000	2.000	CR1	120.0	Intermedio	$\sigma_{b,0}$	2.31	11.52	0.20
			12557	11.700	0.000	2.000	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	1.33		0.28
			1204	10.800	0.000	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1204	10.800	0.000	4.000	CR1	100.0	Superior	$\tau_{xz}$	0.10	1.92	0.05
	237	1	8759	12.150	0.000	0.500	CR1	140.0	Inferior	$\tau_{xy}$	0.39	1.92	0.20
			12610	6.750	0.000	2.000	CR1	40.0	Inferior	$\sigma_{b,0}$	0.96	11.52	0.08
			12607	5.400	0.000	2.000	CR1	20.0	Intermedio	$\sigma_{b,0}$	-2.51	11.52	0.22
			12607	5.400	0.000	2.000	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	-3.47		0.30
			1207	5.400	0.000	4.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1207	5.400	0.000	4.000	CR1	40.0	Inferior	$\tau_{xz}$	0.10	1.92	0.05
		2	1164	4.050	0.000	0.000	CR1	40.0	Inferior	$\tau_{xy}$	-0.22	1.92	0.11
			1206	4.050	0.000	4.000	CR1	60.0	Inferior	$\sigma_{b,0}$	0.33	11.52	0.03
			1208	6.750	0.000	4.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-0.78	11.52	0.07
			1208	6.750	0.000	4.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-1.11		0.10
			1207	5.400	0.000	4.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.10	0.50	0.20
			1206	4.050	0.000	4.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.06	1.92	0.03
		3		1164	4.050	0.000	0.000	CR1	60.0	Inferior	$\tau_{xy}$	0.22	1.92	0.11
			12610	6.750	0.000	2.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.48	11.52	0.04
			1165	5.400	0.000	0.000	CR1	70.0	Intermedio	$\sigma_{b,0}$	-2.26	11.52	0.20
			1165	5.400	0.000	0.000	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-2.26		0.20
			1206	4.050	0.000	4.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.06	0.50	0.12
			1207	5.400	0.000	4.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.10	1.92	0.05
		4		1164	4.050	0.000	0.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.22	1.92	0.11
			1206	4.050	0.000	4.000	CR1	100.0	Inferior	$\sigma_{b,0}$	0.33	11.52	0.03
			1166	6.750	0.000	0.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	0.62	11.52	0.05
			1166	6.750	0.000	0.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	0.30		0.08
			1207	5.400	0.000	4.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.10	0.50	0.20
			1206	4.050	0.000	4.000	CR1	80.0	Superior	$\tau_{xz}$	-0.06	1.92	0.03
		5		1164	4.050	0.000	0.000	CR1	100.0	Inferior	$\tau_{xy}$	0.22	1.92	0.11
			12610	6.750	0.000	2.000	CR1	140.0	Inferior	$\sigma_{b,0}$	0.96	11.52	0.08
			12610	6.750	0.000	2.000	CR1	120.0	Intermedio	$\sigma_{b,0}$	2.31	11.52	0.20
			12610	6.750	0.000	2.000	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	1.35		0.28
			1207	5.400	0.000	4.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1207	5.400	0.000	4.000	CR1	100.0	Superior	$\tau_{xz}$	0.10	1.92	0.05
	237	1	1164	4.050	0.000	0.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.22	1.92	0.11
			17285	6.750	18.900	6.000	CR1	40.0	Inferior	$\sigma_{b,0}$	0.56	11.52	0.05
			17283	5.850	18.900	6.000	CR1	20.0	Intermedio	$\sigma_{b,0}$	-2.10	11.52	0.18
			1303	5.400	18.900	8.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-2.22		0.19
									Inferior	$\tau_{yz}$	0.00	0.50	0.00



Proyecto: TFM  
TFM

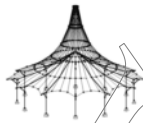
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm²]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
238	2	2	1303	5.400	18.900	8.000	CR1	40.0	Inferior	$\tau_{xz}$	0.06	1.92	0.03
			25798	6.300	18.900	8.000	CR1	0.0	Superior	$\tau_{xy}$	0.29	1.92	0.15
			1304	6.750	18.900	8.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.20	11.52	0.02
			1304	6.750	18.900	8.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-1.11	11.52	0.10
			1304	6.750	18.900	8.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-1.11		0.10
			1303	5.400	18.900	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.06	0.50	0.11
			1299	4.050	18.900	4.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.03	1.92	0.02
			25798	6.300	18.900	8.000	CR1	40.0	Superior	$\tau_{xy}$	-0.29	1.92	0.15
			17285	6.750	18.900	6.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.28	11.52	0.02
			1300	5.400	18.900	4.000	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-2.10	11.52	0.18
			1300	5.400	18.900	4.000	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-2.10		0.18
			1299	4.050	18.900	4.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.06
			1303	5.400	18.900	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.06	1.92	0.03
			25798	6.300	18.900	8.000	CR1	60.0	Superior	$\tau_{xy}$	0.29	1.92	0.15
			1304	6.750	18.900	8.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.20	11.52	0.02
			1304	6.750	18.900	8.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-1.09	11.52	0.09
			1304	6.750	18.900	8.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-1.09		0.10
			1303	5.400	18.900	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.06	0.50	0.11
			1299	4.050	18.900	4.000	CR1	80.0	Superior	$\tau_{xz}$	-0.03	1.92	0.02
			25798	6.300	18.900	8.000	CR1	80.0	Superior	$\tau_{xy}$	-0.29	1.92	0.15
			17285	6.750	18.900	6.000	CR1	100.0	Superior	$\sigma_{b,0}$	-0.56	11.52	0.05
			1300	5.400	18.900	4.000	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-2.11	11.52	0.18
			1300	5.400	18.900	4.000	CR1	100.0	Superior	$\sigma_{b+bc,0}$	-2.11		0.18
			1303	5.400	18.900	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1303	5.400	18.900	8.000	CR1	100.0	Superior	$\tau_{xz}$	0.06	1.92	0.03
			25798	6.300	18.900	8.000	CR1	100.0	Superior	$\tau_{xy}$	0.29	1.92	0.15
	1	1	17326	29.700	21.600	6.000	CR1	40.0	Inferior	$\sigma_{b,0}$	0.55	11.52	0.05
			1340	28.350	21.600	4.000	CR1	20.0	Intermedio	$\sigma_{bc,0}$	-1.67	11.52	0.14
			17324	28.800	21.600	6.000	CR1	0.0	Superior	$\sigma_{b+bc,0}$	-2.14		0.19
			1343	28.350	21.600	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1343	28.350	21.600	8.000	CR1	40.0	Inferior	$\tau_{xz}$	0.06	1.92	0.03
			25896	29.250	21.600	8.000	CR1	0.0	Superior	$\tau_{xy}$	0.21	1.92	0.11
			1344	29.700	21.600	8.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.19	11.52	0.02
			1342	27.000	21.600	8.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-1.01	11.52	0.09
			1342	27.000	21.600	8.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-1.01		0.09
			1343	28.350	21.600	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.06	0.50	0.11
			1339	27.000	21.600	4.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.03	1.92	0.02
			25896	29.250	21.600	8.000	CR1	40.0	Superior	$\tau_{xy}$	-0.20	1.92	0.11
			17326	29.700	21.600	6.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.28	11.52	0.02
			1340	28.350	21.600	4.000	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-1.67	11.52	0.15
			1340	28.350	21.600	4.000	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-1.67		0.15
			1339	27.000	21.600	4.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.06
			1343	28.350	21.600	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.06	1.92	0.03
			25896	29.250	21.600	8.000	CR1	60.0	Superior	$\tau_{xy}$	0.20	1.92	0.11
			1344	29.700	21.600	8.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.19	11.52	0.02
			1342	27.000	21.600	8.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-0.99	11.52	0.09
			1342	27.000	21.600	8.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-0.99		0.09
			1343	28.350	21.600	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.06	0.50	0.11
			1339	27.000	21.600	4.000	CR1	80.0	Superior	$\tau_{xz}$	-0.03	1.92	0.02
			25896	29.250	21.600	8.000	CR1	80.0	Superior	$\tau_{xy}$	-0.20	1.92	0.10
			17326	29.700	21.600	6.000	CR1	140.0	Inferior	$\sigma_{b,0}$	0.55	11.52	0.05
			1340	28.350	21.600	4.000	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-1.68	11.52	0.15
			17326	29.700	21.600	6.000	CR1	100.0	Superior	$\sigma_{b+bc,0}$	0.64		0.15
			1343	28.350	21.600	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1343	28.350	21.600	8.000	CR1	100.0	Superior	$\tau_{xz}$	0.06	1.92	0.03
			25896	29.250	21.600	8.000	CR1	100.0	Superior	$\tau_{xy}$	0.20	1.92	0.10
239	1	1	17389	35.100	21.600	6.000	CR1	0.0	Superior	$\sigma_{b,0}$	-0.55	11.52	0.05
			1350	33.750	21.600	4.000	CR1	20.0	Intermedio	$\sigma_{bc,0}$	-1.88	11.52	0.16
			17386	33.750	21.600	6.000	CR1	0.0	Superior	$\sigma_{b+bc,0}$	-2.18		0.19
			1353	33.750	21.600	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1353	33.750	21.600	8.000	CR1	40.0	Inferior	$\tau_{xz}$	0.06	1.92	0.03
			25910	34.650	21.600	8.000	CR1	0.0	Superior	$\tau_{xy}$	0.22	1.92	0.12
			1352	32.400	21.600	8.000	CR1	60.0	Inferior	$\sigma_{b,0}$	0.20	11.52	0.02
			1354	35.100	21.600	8.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-1.10	11.52	0.10
			1354	35.100	21.600	8.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-1.11		0.10
			1353	33.750	21.600	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.06	0.50	0.11
			1352	32.400	21.600	8.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.03	1.92	0.02
			25910	34.650	21.600	8.000	CR1	40.0	Superior	$\tau_{xy}$	-0.22	1.92	0.11
			17389	35.100	21.600	6.000	CR1	80.0	Inferior	$\sigma_{b,0}$	0.28	11.52	0.02
			1350	33.750	21.600	4.000	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-1.88	11.52	0.16
			1350	33.750	21.600	4.000	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-1.88		0.16
			1352	32.400	21.600	8.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.03	0.50	0.06
			1353	33.750	21.600	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.06	1.92	0.03
			25910	34.650	21.600	8.000	CR1	60.0	Superior	$\tau_{xy}$	0.22	1.92	0.11
			1352	32.400	21.600	8.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.20	11.52	0.02
			1354	35.100	21.600	8.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-1.08	11.52	0.09
			1354	35.100	21.600	8.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-1.09		0.09
			1353	33.750	21.600	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.06	0.50	0.11
			1352	32.400	21.600	8.000	CR1	80.0	Superior	$\tau_{xz}$	-0.03	1.92	0.02
			25910	34.650	21.600	8.000	CR1	80.0	Superior	$\tau_{xy}$	-0.22	1.92	0.11
	2	2	17389	35.100	21.600	6.000	CR1	100.0	Superior	$\sigma_{b,0}$	-0.55	11.52	0.05
			1350	33.750	21.600	4.000	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-1.89	11.52	0.16
			1350	33.750	21.600	4.000	CR1	100.0	Superior	$\sigma_{b+bc,0}$	-1.89		0.16
			1352	32.400	21.600	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.06	0.50	0.11
			1353	33.750	21.600	8.000	CR1	100.0	Superior	$\tau_{xz}$	0.06	1.92	0.03
			25910	34.650	21.600	8.000	CR1	100.0	Superior	$\tau_{xy}$	0.22	1.92	0.11
		3	1352	32.400	21.600	8.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.20	11.52	0.02
			1354	35.100	21.600	8.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-1.09	11.52	0.09



Proyecto: TFM  
TFM

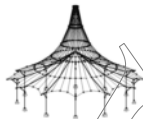
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
240	1	1	1353	33.750	21.600	8.000	CR1	100.0	Superior	T <sub>y'z'</sub>	0.00	0.50	0.00
			1353	33.750	21.600	8.000	CR1	100.0	Superior	T <sub>x'z'</sub>	0.06	1.92	0.03
			25910	34.650	21.600	8.000	CR1	100.0	Superior	T <sub>x'y'</sub>	0.22	1.92	0.11
			17436	37.800	21.600	6.000	CR1	0.0	Superior	σ <sub>b,0</sub>	-0.55	11.52	0.05
			1360	39.150	21.600	4.000	CR1	20.0	Intermedio	σ <sub>bc,0</sub>	-1.66	11.52	0.14
			17437	38.700	21.600	6.000	CR1	0.0	Superior	σ <sub>b+bc,0</sub>	-2.14		0.19
			1363	39.150	21.600	8.000	CR1	40.0	Inferior	T <sub>y'z'</sub>	0.00	0.50	0.00
			1363	39.150	21.600	8.000	CR1	40.0	Inferior	T <sub>x'z'</sub>	0.06	1.92	0.03
	2	1	25921	38.250	21.600	8.000	CR1	0.0	Superior	T <sub>x'y'</sub>	-0.20	1.92	0.10
			1362	37.800	21.600	8.000	CR1	60.0	Inferior	σ <sub>b,0</sub>	0.19	11.52	0.02
			1364	40.500	21.600	8.000	CR1	50.0	Intermedio	σ <sub>bc,0</sub>	-1.05	11.52	0.09
			1364	40.500	21.600	8.000	CR1	40.0	Superior	σ <sub>b+bc,0</sub>	-1.05		0.09
			1363	39.150	21.600	8.000	CR1	50.0	Intermedio	T <sub>y'z'</sub>	0.06	0.50	0.11
			1361	40.500	21.600	4.000	CR1	60.0	Inferior	T <sub>x'z'</sub>	0.03	1.92	0.02
			25921	38.250	21.600	8.000	CR1	40.0	Superior	T <sub>x'y'</sub>	0.19	1.92	0.10
			17436	37.800	21.600	6.000	CR1	60.0	Superior	σ <sub>b,0</sub>	-0.28	11.52	0.02
	3	1	1360	39.150	21.600	4.000	CR1	70.0	Intermedio	σ <sub>bc,0</sub>	-1.67	11.52	0.14
			1360	39.150	21.600	4.000	CR1	60.0	Superior	σ <sub>b+bc,0</sub>	-1.67		0.15
			1361	40.500	21.600	4.000	CR1	70.0	Intermedio	T <sub>y'z'</sub>	-0.03	0.50	0.06
			1363	39.150	21.600	8.000	CR1	70.0	Intermedio	T <sub>x'z'</sub>	0.06	1.92	0.03
			25921	38.250	21.600	8.000	CR1	60.0	Superior	T <sub>x'y'</sub>	-0.19	1.92	0.10
			1362	37.800	21.600	8.000	CR1	100.0	Inferior	σ <sub>b,0</sub>	0.19	11.52	0.02
			1364	40.500	21.600	8.000	CR1	90.0	Intermedio	σ <sub>bc,0</sub>	-1.03	11.52	0.09
			1364	40.500	21.600	8.000	CR1	80.0	Superior	σ <sub>b+bc,0</sub>	-1.04		0.09
	4	1	1363	39.150	21.600	8.000	CR1	90.0	Intermedio	T <sub>y'z'</sub>	0.06	0.50	0.11
			1361	40.500	21.600	4.000	CR1	80.0	Superior	T <sub>x'z'</sub>	0.03	1.92	0.02
			25921	38.250	21.600	8.000	CR1	80.0	Superior	T <sub>x'y'</sub>	0.19	1.92	0.10
			17436	37.800	21.600	6.000	CR1	100.0	Superior	σ <sub>b,0</sub>	-0.55	11.52	0.05
			1360	39.150	21.600	4.000	CR1	120.0	Intermedio	σ <sub>bc,0</sub>	-1.68	11.52	0.15
			17436	37.800	21.600	6.000	CR1	100.0	Superior	σ <sub>b+bc,0</sub>	0.64		0.15
			1363	39.150	21.600	8.000	CR1	100.0	Superior	T <sub>y'z'</sub>	0.00	0.50	0.00
			1363	39.150	21.600	8.000	CR1	100.0	Superior	T <sub>x'z'</sub>	0.06	1.92	0.03
241	1	1	25921	38.250	21.600	8.000	CR1	100.0	Superior	T <sub>x'y'</sub>	-0.19	1.92	0.10
			17493	55.350	24.300	6.000	CR1	0.0	Superior	σ <sub>b,0</sub>	-0.56	11.52	0.05
			1392	54.000	24.300	4.000	CR1	20.0	Intermedio	σ <sub>bc,0</sub>	-2.08	11.52	0.18
			17490	54.000	24.300	6.000	CR1	0.0	Superior	σ <sub>b+bc,0</sub>	-2.23		0.19
			1395	54.000	24.300	8.000	CR1	40.0	Inferior	T <sub>y'z'</sub>	0.00	0.50	0.00
			1395	54.000	24.300	8.000	CR1	40.0	Inferior	T <sub>x'z'</sub>	0.06	1.92	0.03
			25999	54.900	24.300	8.000	CR1	0.0	Superior	T <sub>x'y'</sub>	0.27	1.92	0.14
			1396	55.350	24.300	8.000	CR1	40.0	Superior	σ <sub>b,0</sub>	-0.20	11.52	0.02
	2	1	1394	52.650	24.300	8.000	CR1	50.0	Intermedio	σ <sub>bc,0</sub>	-1.29	11.52	0.11
			1394	52.650	24.300	8.000	CR1	40.0	Superior	σ <sub>b+bc,0</sub>	-1.30		0.11
			1395	54.000	24.300	8.000	CR1	50.0	Intermedio	T <sub>y'z'</sub>	0.06	0.50	0.11
			1391	52.650	24.300	4.000	CR1	60.0	Inferior	T <sub>x'z'</sub>	-0.03	1.92	0.02
			25999	54.900	24.300	8.000	CR1	40.0	Superior	T <sub>x'y'</sub>	-0.27	1.92	0.14
			17493	55.350	24.300	6.000	CR1	60.0	Superior	σ <sub>b,0</sub>	-0.28	11.52	0.02
			1392	54.000	24.300	4.000	CR1	70.0	Intermedio	σ <sub>bc,0</sub>	-2.09	11.52	0.18
			1392	54.000	24.300	4.000	CR1	60.0	Superior	σ <sub>b+bc,0</sub>	-2.08		0.18
	3	1	1391	52.650	24.300	4.000	CR1	70.0	Intermedio	T <sub>y'z'</sub>	0.03	0.50	0.06
			1395	54.000	24.300	8.000	CR1	70.0	Intermedio	T <sub>x'z'</sub>	0.06	1.92	0.03
			25999	54.900	24.300	8.000	CR1	60.0	Superior	T <sub>x'y'</sub>	0.27	1.92	0.14
			1396	55.350	24.300	8.000	CR1	100.0	Inferior	σ <sub>b,0</sub>	0.20	11.52	0.02
			1394	52.650	24.300	8.000	CR1	90.0	Intermedio	σ <sub>bc,0</sub>	-1.27	11.52	0.11
			1394	52.650	24.300	8.000	CR1	80.0	Superior	σ <sub>b+bc,0</sub>	-1.27		0.11
			1395	54.000	24.300	8.000	CR1	90.0	Intermedio	T <sub>y'z'</sub>	0.06	0.50	0.11
			1391	52.650	24.300	4.000	CR1	80.0	Superior	T <sub>x'z'</sub>	-0.03	1.92	0.02
	5	1	25999	54.900	24.300	8.000	CR1	80.0	Superior	T <sub>x'y'</sub>	-0.27	1.92	0.14
			17493	55.350	24.300	6.000	CR1	140.0	Inferior	σ <sub>b,0</sub>	0.56	11.52	0.05
			1392	54.000	24.300	4.000	CR1	120.0	Intermedio	σ <sub>bc,0</sub>	-2.09	11.52	0.18
			1392	54.000	24.300	4.000	CR1	100.0	Superior	σ <sub>b+bc,0</sub>	-2.09		0.18
			1395	54.000	24.300	8.000	CR1	100.0	Superior	T <sub>y'z'</sub>	0.00	0.50	0.00
			1395	54.000	24.300	8.000	CR1	100.0	Superior	T <sub>x'z'</sub>	0.06	1.92	0.03
			25999	54.900	24.300	8.000	CR1	100.0	Superior	T <sub>x'y'</sub>	0.27	1.92	0.14
			1429	62.100	13.500	5.000	CR1	0.0	Superior	σ <sub>b,0</sub>	0.00	11.52	0.00
242	1	1	1424	63.450	13.500	4.000	CR1	20.0	Intermedio	σ <sub>bc,0</sub>	-1.56	11.52	0.14
			1424	63.450	13.500	4.000	CR1	0.0	Superior	σ <sub>b+bc,0</sub>	-1.56		0.14
			26075	63.000	13.500	8.000	CR1	40.0	Inferior	T <sub>y'z'</sub>	0.00	0.50	0.00
			26075	63.000	13.500	8.000	CR1	40.0	Inferior	T <sub>x'z'</sub>	0.00	1.92	0.00
			26074	62.550	13.500	8.000	CR1	40.0	Inferior	T <sub>x'y'</sub>	-0.22	1.92	0.11
			1426	62.100	13.500	8.000	CR1	40.0	Superior	σ <sub>b,0</sub>	0.03	11.52	0.00
			1429	62.100	13.500	5.000	CR1	50.0	Intermedio	σ <sub>bc,0</sub>	-1.05	11.52	0.09
			1429	62.100	13.500	5.000	CR1	40.0	Superior	σ <sub>b+bc,0</sub>	-1.05		0.09
	2	1	26075	63.000	13.500	8.000	CR1	50.0	Intermedio	T <sub>y'z'</sub>	0.00	0.50	0.00
			26071	63.000	13.500	4.000	CR1	60.0	Inferior	T <sub>x'z'</sub>	-0.01	1.92	0.00
			26074	62.550	13.500	8.000	CR1	60.0	Inferior	T <sub>x'y'</sub>	0.23	1.92	0.12
			1429	62.100	13.500	5.000	CR1	60.0	Superior	σ <sub>b,0</sub>	0.00	11.52	0.00
			1424	63.450	13.500	4.000	CR1	70.0	Intermedio	σ <sub>bc,0</sub>	-1.56	11.52	0.14
			1424	63.450	13.500	4.000	CR1	60.0	Superior	σ <sub>b+bc,0</sub>	-1.56		0.14
			26071	63.000	13.500	4.000	CR1	70.0	Intermedio	T <sub>y'z'</sub>	0.01	0.50	0.02
			26075	63.000	13.500	8.000	CR1	70.0	Intermedio	T <sub>x'z'</sub>	0.00	1.92	0.00
	3	1	26074	62.550	13.500	8.000	CR1	80.0	Inferior	T <sub>x'y'</sub>	-0.23	1.92	0.12
			1426	62.100	13.500	8.000	CR1	80.0	Superior	σ <sub>b,0</sub>	0.03	11.52	0.00
			1429	62.100	13.500	5.000	CR1	90.0	Intermedio	σ <sub>bc,0</sub>	-1.05	11.52	0.09
			1429	62.100	13.500	5.000	CR1	90.0	Intermedio	σ <sub>bc,0</sub>	-1.05		0.09



Proyecto: TFM  
TFM

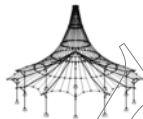
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superfici núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
243		5	1429	62.100	13.500	5.000	CR1	80.0	Superior	$\sigma_{b+hc,0}$	-1.05		0.09
			26075	63.000	13.500	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.00	0.50	0.00
			26071	63.000	13.500	4.000	CR1	80.0	Superior	$\tau_{xz}$	-0.01	1.92	0.00
			26074	62.550	13.500	8.000	CR1	100.0	Inferior	$\tau_{xy}$	0.24	1.92	0.12
			1429	62.100	13.500	5.000	CR1	100.0	Superior	$\sigma_{b,0}$	0.00	11.52	0.00
			1424	63.450	13.500	4.000	CR1	120.0	Intermedio	$\sigma_{hc,0}$	-1.56	11.52	0.14
			1424	63.450	13.500	4.000	CR1	100.0	Superior	$\sigma_{b+hc,0}$	-1.56		0.14
			26075	63.000	13.500	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			26075	63.000	13.500	8.000	CR1	100.0	Superior	$\tau_{xz}$	0.00	1.92	0.00
			26074	62.550	13.500	8.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.25	1.92	0.13
		1	17580	55.350	0.000	6.000	CR1	0.0	Superior	$\sigma_{b,0}$	-1.03	11.52	0.09
			17580	55.350	0.000	6.000	CR1	20.0	Intermedio	$\sigma_{hc,0}$	-2.89	11.52	0.25
			17580	55.350	0.000	6.000	CR1	0.0	Superior	$\sigma_{b+hc,0}$	-3.92		0.34
			1459	56.700	0.000	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
		2	1459	56.700	0.000	8.000	CR1	40.0	Inferior	$\tau_{xz}$	0.11	1.92	0.06
			26143	55.800	0.000	8.000	CR1	40.0	Inferior	$\tau_{xy}$	-0.40	1.92	0.21
			1458	55.350	0.000	8.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.34	11.52	0.03
			1461	55.350	0.000	5.000	CR1	50.0	Intermedio	$\sigma_{hc,0}$	-1.55	11.52	0.13
		3	1461	55.350	0.000	5.000	CR1	40.0	Superior	$\sigma_{b+hc,0}$	-1.54		0.14
			1459	56.700	0.000	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.11	0.50	0.21
			1458	55.350	0.000	8.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.07	1.92	0.03
			26143	55.800	0.000	8.000	CR1	60.0	Inferior	$\tau_{xy}$	0.41	1.92	0.21
		4	17580	55.350	0.000	6.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.52	11.52	0.04
			1456	56.700	0.000	4.000	CR1	70.0	Intermedio	$\sigma_{hc,0}$	-1.92	11.52	0.17
			1456	56.700	0.000	4.000	CR1	60.0	Superior	$\sigma_{b+hc,0}$	-1.92		0.17
			1458	55.350	0.000	8.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.13
		5	1459	56.700	0.000	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.11	1.92	0.06
			26143	55.800	0.000	8.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.41	1.92	0.21
			1458	55.350	0.000	8.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.34	11.52	0.03
			1461	55.350	0.000	5.000	CR1	90.0	Intermedio	$\sigma_{hc,0}$	-1.61	11.52	0.14
244		1	1461	55.350	0.000	5.000	CR1	80.0	Superior	$\sigma_{b+hc,0}$	-1.59		0.14
			1459	56.700	0.000	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.11	0.50	0.21
			1458	55.350	0.000	8.000	CR1	80.0	Superior	$\tau_{xz}$	-0.07	1.92	0.03
			26143	55.800	0.000	8.000	CR1	100.0	Inferior	$\tau_{xy}$	0.42	1.92	0.22
		2	17580	55.350	0.000	6.000	CR1	100.0	Superior	$\sigma_{b,0}$	-1.03	11.52	0.09
			17581	55.800	0.000	6.000	CR1	120.0	Intermedio	$\sigma_{hc,0}$	2.29	11.52	0.20
			17581	55.800	0.000	6.000	CR1	100.0	Superior	$\sigma_{b+hc,0}$	1.26		0.29
			1459	56.700	0.000	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
		3	1459	56.700	0.000	8.000	CR1	100.0	Superior	$\tau_{xz}$	0.11	1.92	0.06
			26143	55.800	0.000	8.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.43	1.92	0.22
			17638	12.150	0.000	6.000	CR1	40.0	Inferior	$\sigma_{b,0}$	1.03	11.52	0.09
			17638	12.150	0.000	6.000	CR1	20.0	Intermedio	$\sigma_{hc,0}$	-2.86	11.52	0.25
		4	17638	12.150	0.000	6.000	CR1	0.0	Superior	$\sigma_{b+hc,0}$	-3.89		0.34
			1515	10.800	0.000	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1515	10.800	0.000	8.000	CR1	40.0	Inferior	$\tau_{xz}$	0.11	1.92	0.06
			26256	11.700	0.000	8.000	CR1	40.0	Inferior	$\tau_{xy}$	0.39	1.92	0.20
		5	1516	12.150	0.000	8.000	CR1	60.0	Inferior	$\sigma_{b,0}$	0.34	11.52	0.03
			602	12.150	0.000	5.000	CR1	50.0	Intermedio	$\sigma_{hc,0}$	-1.60	11.52	0.14
			602	12.150	0.000	5.000	CR1	40.0	Superior	$\sigma_{b+hc,0}$	-1.58		0.14
			1515	10.800	0.000	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.11	0.50	0.21
		6	1516	12.150	0.000	8.000	CR1	60.0	Inferior	$\tau_{xz}$	0.07	1.92	0.03
			26256	11.700	0.000	8.000	CR1	60.0	Inferior	$\tau_{xy}$	-0.40	1.92	0.21
			17638	12.150	0.000	6.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.51	11.52	0.04
			1512	10.800	0.000	4.000	CR1	70.0	Intermedio	$\sigma_{hc,0}$	-1.87	11.52	0.16
		7	1512	10.800	0.000	4.000	CR1	60.0	Superior	$\sigma_{b+hc,0}$	-1.87		0.16
			1516	12.150	0.000	8.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.07	0.50	0.13
			1515	10.800	0.000	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.11	1.92	0.06
			26256	11.700	0.000	8.000	CR1	80.0	Inferior	$\tau_{xy}$	0.40	1.92	0.21
		8	1516	12.150	0.000	8.000	CR1	100.0	Inferior	$\sigma_{b,0}$	0.34	11.52	0.03
			602	12.150	0.000	5.000	CR1	90.0	Intermedio	$\sigma_{hc,0}$	-1.65	11.52	0.14
			602	12.150	0.000	5.000	CR1	80.0	Superior	$\sigma_{b+hc,0}$	-1.64		0.14
			1515	10.800	0.000	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.11	0.50	0.21
		9	1516	12.150	0.000	8.000	CR1	80.0	Superior	$\tau_{xz}$	0.07	1.92	0.03
			26256	11.700	0.000	8.000	CR1	100.0	Inferior	$\tau_{xy}$	-0.41	1.92	0.21
			17638	12.150	0.000	6.000	CR1	140.0	Inferior	$\sigma_{b,0}$	1.03	11.52	0.09
			17632	9.450	0.000	6.000	CR1	120.0	Intermedio	$\sigma_{hc,0}$	2.31	11.52	0.20
		10	17632	9.450	0.000	6.000	CR1	100.0	Superior	$\sigma_{b+hc,0}$	1.30		0.29
			1515	10.800	0.000	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1515	10.800	0.000	8.000	CR1	100.0	Superior	$\tau_{xz}$	0.11	1.92	0.06
			26256	11.700	0.000	8.000	CR1	140.0	Inferior	$\tau_{xy}$	0.42	1.92	0.22
		11	17690	6.750	0.000	6.000	CR1	0.0	Superior	$\sigma_{b,0}$	-1.00	11.52	0.09
			17688	5.850	0.000	6.000	CR1	20.0	Intermedio	$\sigma_{hc,0}$	-2.73	11.52	0.24
			17688	5.850	0.000	6.000	CR1	0.0	Superior	$\sigma_{b+hc,0}$	-3.72		0.32
			1526	5.400	0.000	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
		12	1526	5.400	0.000	8.000	CR1	40.0	Inferior	$\tau_{xz}$	0.10	1.92	0.05
			26271	6.300	0.000	8.000	CR1	40.0	Inferior	$\tau_{xy}$	0.23	1.92	0.12
			1527	6.750	0.000	8.000	CR1	60.0	Inferior	$\sigma_{b,0}$	0.33	11.52	0.03
			1527	6.750	0.000	8.000	CR1	50.0	Intermedio	$\sigma_{hc,0}$	-1.09	11.52	0.09
		13	1527	6.750	0.000	8.000	CR1	40.0	Superior	$\sigma_{b+hc,0}$	-1.32		0.11
			1526	5.400	0.000	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.10	0.50	0.20
			1525	4.050	0.000	8.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.06	1.92	0.03
			26271	6.300	0.000	8.000	CR1	60.0	Inferior	$\tau_{xy}$	-0.23	1.92	0.12
		14	17690	6.750	0.000	6.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.50	11.52	0.04



Proyecto: TFM  
TFM

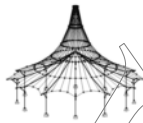
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
			1522	5.400	0.000	4.000	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-1.91	11.52	0.17
			1522	5.400	0.000	4.000	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-1.90		0.17
			1525	4.050	0.000	8.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.06	0.50	0.13
			1526	5.400	0.000	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.11	1.92	0.06
			26271	6.300	0.000	8.000	CR1	80.0	Inferior	$\tau_{xy}$	0.24	1.92	0.12
		4	1527	6.750	0.000	8.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.33	11.52	0.03
			1527	6.750	0.000	8.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-1.19	11.52	0.10
			1527	6.750	0.000	8.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-1.17		0.11
			1526	5.400	0.000	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.10	0.50	0.20
			1525	4.050	0.000	8.000	CR1	80.0	Superior	$\tau_{xz}$	-0.06	1.92	0.03
			26271	6.300	0.000	8.000	CR1	100.0	Inferior	$\tau_{xy}$	-0.24	1.92	0.13
		5	17690	6.750	0.000	6.000	CR1	100.0	Superior	$\sigma_{b,0}$	-1.00	11.52	0.09
			17690	6.750	0.000	6.000	CR1	120.0	Intermedio	$\sigma_{bc,0}$	2.31	11.52	0.20
			17690	6.750	0.000	6.000	CR1	100.0	Superior	$\sigma_{b+bc,0}$	1.31		0.29
			1526	5.400	0.000	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1526	5.400	0.000	8.000	CR1	100.0	Superior	$\tau_{xz}$	0.10	1.92	0.05
			26271	6.300	0.000	8.000	CR1	140.0	Inferior	$\tau_{xy}$	0.26	1.92	0.13
	286	1	22365	6.750	18.900	10.000	CR1	0.0	Superior	$\sigma_{b,0}$	-0.59	11.52	0.05
			1614	5.400	18.900	8.000	CR1	20.0	Intermedio	$\sigma_{bc,0}$	-2.63	11.52	0.23
			1614	5.400	18.900	8.000	CR1	0.0	Superior	$\sigma_{b+bc,0}$	-2.62		0.23
			1614	5.400	18.900	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1614	5.400	18.900	8.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.06	1.92	0.03
			26448	6.300	18.900	8.000	CR1	0.0	Superior	$\tau_{xy}$	-0.28	1.92	0.14
		2	1615	6.750	18.900	8.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.20	11.52	0.02
			826	6.750	18.900	12.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-2.32	11.52	0.20
			826	6.750	18.900	12.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-2.32		0.20
			1614	5.400	18.900	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
			816	4.050	18.900	12.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.04	1.92	0.02
			26448	6.300	18.900	8.000	CR1	40.0	Superior	$\tau_{xy}$	0.27	1.92	0.14
		3	22365	6.750	18.900	10.000	CR1	80.0	Inferior	$\sigma_{b,0}$	0.29	11.52	0.03
			1614	5.400	18.900	8.000	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-2.63	11.52	0.23
			1614	5.400	18.900	8.000	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-2.63		0.23
			816	4.050	18.900	12.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.04	0.50	0.08
			1614	5.400	18.900	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
			26448	6.300	18.900	8.000	CR1	60.0	Superior	$\tau_{xy}$	-0.27	1.92	0.14
		4	1615	6.750	18.900	8.000	CR1	100.0	Inferior	$\sigma_{b,0}$	0.20	11.52	0.02
			826	6.750	18.900	12.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-2.33	11.52	0.20
			826	6.750	18.900	12.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-2.32		0.20
			1614	5.400	18.900	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
			816	4.050	18.900	12.000	CR1	80.0	Superior	$\tau_{xz}$	-0.04	1.92	0.02
			26448	6.300	18.900	8.000	CR1	80.0	Superior	$\tau_{xy}$	0.27	1.92	0.14
		5	22365	6.750	18.900	10.000	CR1	100.0	Superior	$\sigma_{b,0}$	-0.59	11.52	0.05
			1614	5.400	18.900	8.000	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-2.63	11.52	0.23
			1614	5.400	18.900	8.000	CR1	100.0	Superior	$\sigma_{b+bc,0}$	-2.63		0.23
			1614	5.400	18.900	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1614	5.400	18.900	8.000	CR1	100.0	Superior	$\tau_{xz}$	-0.06	1.92	0.03
			26448	6.300	18.900	8.000	CR1	100.0	Superior	$\tau_{xy}$	-0.27	1.92	0.14
	287	1	22406	29.700	21.600	10.000	CR1	0.0	Superior	$\sigma_{b,0}$	-0.57	11.52	0.05
			1642	28.350	21.600	8.000	CR1	20.0	Intermedio	$\sigma_{bc,0}$	-2.06	11.52	0.18
			22403	28.350	21.600	10.000	CR1	0.0	Superior	$\sigma_{b+bc,0}$	-2.33		0.20
			1642	28.350	21.600	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1642	28.350	21.600	8.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.06	1.92	0.03
			26515	29.250	21.600	8.000	CR1	0.0	Superior	$\tau_{xy}$	-0.21	1.92	0.11
		2	1643	29.700	21.600	8.000	CR1	60.0	Inferior	$\sigma_{b,0}$	0.19	11.52	0.02
			827	27.000	21.600	12.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-1.67	11.52	0.14
			827	27.000	21.600	12.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-1.67		0.14
			1642	28.350	21.600	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
			827	27.000	21.600	12.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.04	1.92	0.02
			26515	29.250	21.600	8.000	CR1	40.0	Superior	$\tau_{xy}$	0.21	1.92	0.11
		3	22406	29.700	21.600	10.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.29	11.52	0.02
			1642	28.350	21.600	8.000	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-2.06	11.52	0.18
			1642	28.350	21.600	8.000	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-2.06		0.18
			827	27.000	21.600	12.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.04	0.50	0.08
			1642	28.350	21.600	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
			26515	29.250	21.600	8.000	CR1	60.0	Superior	$\tau_{xy}$	-0.21	1.92	0.11
		4	1643	29.700	21.600	8.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.19	11.52	0.02
			827	27.000	21.600	12.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-1.67	11.52	0.15
			827	27.000	21.600	12.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-1.67		0.15
			1642	28.350	21.600	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
			827	27.000	21.600	12.000	CR1	80.0	Superior	$\tau_{xz}$	-0.04	1.92	0.02
			26515	29.250	21.600	8.000	CR1	80.0	Superior	$\tau_{xy}$	0.20	1.92	0.11
		5	22406	29.700	21.600	10.000	CR1	100.0	Superior	$\sigma_{b,0}$	-0.57	11.52	0.05
			1642	28.350	21.600	8.000	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-2.07	11.52	0.18
			1642	28.350	21.600	8.000	CR1	100.0	Superior	$\sigma_{b+bc,0}$	-2.07		0.18
			1642	28.350	21.600	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1642	28.350	21.600	8.000	CR1	100.0	Superior	$\tau_{xz}$	-0.06	1.92	0.03
			26515	29.250	21.600	8.000	CR1	100.0	Superior	$\tau_{xy}$	-0.20	1.92	0.11
	288	1	22469	35.100	21.600	10.000	CR1	40.0	Inferior	$\sigma_{b,0}$	0.57	11.52	0.05
			1649	33.750	21.600	8.000	CR1	20.0	Intermedio	$\sigma_{bc,0}$	-2.32	11.52	0.20
			22466	33.750	21.600	10.000	CR1	0.0	Superior	$\sigma_{b+bc,0}$	-2.40		0.21
			1649	33.750	21.600	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1649	33.750	21.600	8.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.06	1.92	0.03
			26525	34.650	21.600	8.000	CR1	0.0	Superior	$\tau_{xy}$	-0.21	1.92	0.11



Proyecto: TFM  
TFM

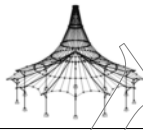
Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

2.8. TENSIONES [N/mm²] - DEFLEXIONES POR CARGA													
Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm²]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
289	2	2	1648	32.400	21.600	8.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.20	11.52	0.02
			829	32.400	21.600	12.000	CR1	50.0	Intermedio	$\sigma_{b,c,0}$	-1.83	11.52	0.16
			829	32.400	21.600	12.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-1.83		0.16
			1649	33.750	21.600	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
			829	32.400	21.600	12.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.04	1.92	0.02
			26525	34.650	21.600	8.000	CR1	40.0	Superior	$\tau_{xy}$	0.21	1.92	0.11
			22469	35.100	21.600	10.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.29	11.52	0.02
		3	1649	33.750	21.600	8.000	CR1	70.0	Intermedio	$\sigma_{b,c,0}$	-2.33	11.52	0.20
			1649	33.750	21.600	8.000	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-2.33		0.20
			829	32.400	21.600	12.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.04	0.50	0.07
			1649	33.750	21.600	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
			26525	34.650	21.600	8.000	CR1	60.0	Superior	$\tau_{xy}$	-0.21	1.92	0.11
		4	1648	32.400	21.600	8.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.20	11.52	0.02
			829	32.400	21.600	12.000	CR1	90.0	Intermedio	$\sigma_{b,c,0}$	-1.84	11.52	0.16
			829	32.400	21.600	12.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-1.84		0.16
			1649	33.750	21.600	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
			829	32.400	21.600	12.000	CR1	80.0	Superior	$\tau_{xz}$	-0.04	1.92	0.02
			26525	34.650	21.600	8.000	CR1	80.0	Superior	$\tau_{xy}$	0.21	1.92	0.11
			22469	35.100	21.600	10.000	CR1	100.0	Superior	$\sigma_{b,0}$	-0.57	11.52	0.05
	1	5	1649	33.750	21.600	8.000	CR1	120.0	Intermedio	$\sigma_{b,c,0}$	-2.33	11.52	0.20
			1649	33.750	21.600	8.000	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-2.33		0.20
			1649	33.750	21.600	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1649	33.750	21.600	8.000	CR1	100.0	Superior	$\tau_{xz}$	-0.06	1.92	0.03
			26525	34.650	21.600	8.000	CR1	100.0	Superior	$\tau_{xy}$	-0.21	1.92	0.11
		2	22516	37.800	21.600	10.000	CR1	40.0	Inferior	$\sigma_{b,0}$	0.57	11.52	0.05
			1656	39.150	21.600	8.000	CR1	20.0	Intermedio	$\sigma_{b,c,0}$	-2.05	11.52	0.18
			22518	39.150	21.600	10.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-2.34		0.20
			1656	39.150	21.600	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1656	39.150	21.600	8.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.06	1.92	0.03
			26532	38.250	21.600	8.000	CR1	0.0	Superior	$\tau_{xy}$	0.20	1.92	0.11
			831	37.800	21.600	12.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.19	11.52	0.02
	3	2	832	40.500	21.600	12.000	CR1	50.0	Intermedio	$\sigma_{b,c,0}$	-1.67	11.52	0.14
			832	40.500	21.600	12.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-1.67		0.14
			1656	39.150	21.600	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
			832	40.500	21.600	12.000	CR1	60.0	Inferior	$\tau_{xz}$	0.04	1.92	0.02
			26532	38.250	21.600	8.000	CR1	40.0	Superior	$\tau_{xy}$	-0.20	1.92	0.10
		4	22516	37.800	21.600	10.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.29	11.52	0.02
			1656	39.150	21.600	8.000	CR1	70.0	Intermedio	$\sigma_{b,c,0}$	-2.06	11.52	0.18
			1656	39.150	21.600	8.000	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-2.06		0.18
			832	40.500	21.600	12.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.04	0.50	0.08
			1656	39.150	21.600	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
			26532	38.250	21.600	8.000	CR1	60.0	Superior	$\tau_{xy}$	0.20	1.92	0.10
			831	37.800	21.600	12.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.19	11.52	0.02
	5	4	832	40.500	21.600	12.000	CR1	90.0	Intermedio	$\sigma_{b,c,0}$	-1.67	11.52	0.14
			832	40.500	21.600	12.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-1.67		0.14
			1656	39.150	21.600	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
			832	40.500	21.600	12.000	CR1	80.0	Superior	$\tau_{xz}$	0.04	1.92	0.02
			26532	38.250	21.600	8.000	CR1	80.0	Superior	$\tau_{xy}$	-0.20	1.92	0.10
		5	22516	37.800	21.600	10.000	CR1	140.0	Inferior	$\sigma_{b,0}$	0.57	11.52	0.05
			1656	39.150	21.600	8.000	CR1	120.0	Intermedio	$\sigma_{b,c,0}$	-2.07	11.52	0.18
			1656	39.150	21.600	8.000	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-2.06		0.18
			1656	39.150	21.600	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1656	39.150	21.600	8.000	CR1	100.0	Superior	$\tau_{xz}$	-0.06	1.92	0.03
			26532	38.250	21.600	8.000	CR1	100.0	Superior	$\tau_{xy}$	0.20	1.92	0.10
			22573	55.350	24.300	10.000	CR1	0.0	Superior	$\sigma_{b,0}$	-0.59	11.52	0.05
290	1	1	1678	54.000	24.300	8.000	CR1	20.0	Intermedio	$\sigma_{b,c,0}$	-2.61	11.52	0.23
			1678	54.000	24.300	8.000	CR1	0.0	Superior	$\sigma_{b+tc,0}$	-2.61		0.23
			1678	54.000	24.300	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1678	54.000	24.300	8.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.06	1.92	0.03
			1677	52.650	24.300	8.000	CR1	40.0	Inferior	$\tau_{xy}$	-0.27	1.92	0.14
		2	1679	55.350	24.300	8.000	CR1	60.0	Inferior	$\sigma_{b,0}$	0.20	11.52	0.02
			833	52.650	24.300	12.000	CR1	50.0	Intermedio	$\sigma_{b,c,0}$	-2.26	11.52	0.20
			833	52.650	24.300	12.000	CR1	40.0	Superior	$\sigma_{b+tc,0}$	-2.26		0.20
			1678	54.000	24.300	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
			833	52.650	24.300	12.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.04	1.92	0.02
			1677	52.650	24.300	8.000	CR1	60.0	Inferior	$\tau_{xy}$	0.27	1.92	0.14
		3	22573	55.350	24.300	10.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.29	11.52	0.03
			1678	54.000	24.300	8.000	CR1	70.0	Intermedio	$\sigma_{b,c,0}$	-2.62	11.52	0.23
			1678	54.000	24.300	8.000	CR1	60.0	Superior	$\sigma_{b+tc,0}$	-2.62		0.23
			833	52.650	24.300	12.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.04	0.50	0.08
			1678	54.000	24.300	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.06	1.92	0.03
			1677	52.650	24.300	8.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.27	1.92	0.14
			1679	55.350	24.300	8.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.20	11.52	0.02
	2	4	833	52.650	24.300	12.000	CR1	90.0	Intermedio	$\sigma_{b,c,0}$	-2.26	11.52	0.20
			833	52.650	24.300	12.000	CR1	80.0	Superior	$\sigma_{b+tc,0}$	-2.26		0.20
			1678	54.000	24.300	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.06	0.50	0.12
			833	52.650	24.300	12.000	CR1	80.0	Superior	$\tau_{xz}$	-0.04	1.92	0.02
			18110	52.650	24.300	8.500	CR1	100.0	Inferior	$\tau_{xy}$	0.27	1.92	0.14
		5	22573	55.350	24.300	10.000	CR1	100.0	Superior	$\sigma_{b,0}$	-0.59	11.52	0.05
			1678	54.000	24.300	8.000	CR1	120.0	Intermedio	$\sigma_{b,c,0}$	-2.62	11.52	0.23
			1678	54.000	24.300	8.000	CR1	100.0	Superior	$\sigma_{b+tc,0}$	-2.62		0.23
			1678	54.000	24.300	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1678	54.000	24.300	8.000	CR1	100.0	Superior	$\tau_{xz}$	-0.06	1.92	0.03



Proyecto: TFM  
TFM

Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
291	1	1	18110	52.650	24.300	8.500	CR1	140.0	Inferior	$\tau_{xy}$	-0.27	1.92	0.14
			1702	62.100	13.500	9.000	CR1	40.0	Inferior	$\sigma_{b,0}$	0.00	11.52	0.00
			1700	63.450	13.500	8.000	CR1	20.0	Intermedio	$\sigma_{b,0}$	-1.95	11.52	0.17
			1700	63.450	13.500	8.000	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	-1.95		0.17
			26636	63.900	13.500	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
		2	26636	63.900	13.500	8.000	CR1	40.0	Inferior	$\tau_{xz}$	0.00	1.92	0.00
			26634	62.550	13.500	8.000	CR1	40.0	Inferior	$\tau_{xy}$	0.22	1.92	0.12
			1701	64.800	13.500	8.000	CR1	40.0	Superior	$\sigma_{b,0}$	0.01	11.52	0.00
			836	64.800	13.500	12.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-1.77	11.52	0.15
			836	64.800	13.500	12.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-1.77		0.15
	3	2	26636	63.900	13.500	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	0.00	0.50	0.00
			26635	63.000	13.500	8.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.01	1.92	0.00
			26634	62.550	13.500	8.000	CR1	60.0	Inferior	$\tau_{xy}$	-0.23	1.92	0.12
			1702	62.100	13.500	9.000	CR1	60.0	Superior	$\sigma_{b,0}$	0.00	11.52	0.00
			1700	63.450	13.500	8.000	CR1	70.0	Intermedio	$\sigma_{b,0}$	-1.95	11.52	0.17
		3	1700	63.450	13.500	8.000	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-1.95		0.17
			26635	63.000	13.500	8.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.01	0.50	0.02
			26636	63.900	13.500	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	0.00	1.92	0.00
			26634	62.550	13.500	8.000	CR1	80.0	Inferior	$\tau_{xy}$	0.23	1.92	0.12
			1701	64.800	13.500	8.000	CR1	100.0	Inferior	$\sigma_{b,0}$	-0.01	11.52	0.00
	4	3	836	64.800	13.500	12.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	-1.77	11.52	0.15
			836	64.800	13.500	12.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	-1.77		0.15
			26636	63.900	13.500	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	0.00	0.50	0.00
			26635	63.000	13.500	8.000	CR1	80.0	Superior	$\tau_{xz}$	-0.01	1.92	0.00
			26634	62.550	13.500	8.000	CR1	100.0	Inferior	$\tau_{xy}$	-0.24	1.92	0.12
		5	1702	62.100	13.500	9.000	CR1	100.0	Superior	$\sigma_{b,0}$	0.00	11.52	0.00
			1700	63.450	13.500	8.000	CR1	120.0	Intermedio	$\sigma_{b,0}$	-1.95	11.52	0.17
			1700	63.450	13.500	8.000	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	-1.95		0.17
			26636	63.900	13.500	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			26636	63.900	13.500	8.000	CR1	100.0	Superior	$\tau_{xz}$	0.00	1.92	0.00
292	1	1	26634	62.550	13.500	8.000	CR1	140.0	Inferior	$\tau_{xy}$	0.25	1.92	0.13
			22660	55.350	0.000	10.000	CR1	0.0	Superior	$\sigma_{b,0}$	-1.10	11.52	0.10
			22660	55.350	0.000	10.000	CR1	20.0	Intermedio	$\sigma_{b,0}$	-3.25	11.52	0.28
			22660	55.350	0.000	10.000	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	-4.35		0.38
			1535	56.700	0.000	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
		2	1535	56.700	0.000	8.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.11	1.92	0.06
			26292	55.350	0.000	8.500	CR1	40.0	Inferior	$\tau_{xy}$	-0.41	1.92	0.21
			851	55.350	0.000	12.000	CR1	60.0	Inferior	$\sigma_{b,0}$	0.37	11.52	0.03
			851	55.350	0.000	12.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-2.73	11.52	0.24
			851	55.350	0.000	12.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-2.73		0.24
	2	3	1535	56.700	0.000	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.11	0.50	0.22
			852	58.050	0.000	12.000	CR1	60.0	Inferior	$\tau_{xz}$	0.07	1.92	0.04
			26292	55.350	0.000	8.500	CR1	60.0	Inferior	$\tau_{xy}$	0.41	1.92	0.21
			22660	55.350	0.000	10.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.55	11.52	0.05
			1535	56.700	0.000	8.000	CR1	70.0	Intermedio	$\sigma_{b,0}$	-2.57	11.52	0.22
		4	1535	56.700	0.000	8.000	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-2.57		0.22
			852	58.050	0.000	12.000	CR1	70.0	Intermedio	$\tau_{yz}$	-0.07	0.50	0.14
			1535	56.700	0.000	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.11	1.92	0.06
			26292	55.350	0.000	8.500	CR1	80.0	Inferior	$\tau_{xy}$	-0.41	1.92	0.21
			851	55.350	0.000	12.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.37	11.52	0.03
	3	4	851	55.350	0.000	12.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	-2.73	11.52	0.24
			851	55.350	0.000	12.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	-2.73		0.24
			1535	56.700	0.000	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.11	0.50	0.22
			852	58.050	0.000	12.000	CR1	80.0	Superior	$\tau_{xz}$	0.07	1.92	0.04
			26292	55.350	0.000	8.500	CR1	100.0	Inferior	$\tau_{xy}$	0.41	1.92	0.21
		5	22660	55.350	0.000	10.000	CR1	140.0	Inferior	$\sigma_{b,0}$	1.10	11.52	0.10
			1535	56.700	0.000	8.000	CR1	120.0	Intermedio	$\sigma_{b,0}$	-2.58	11.52	0.22
			22661	55.800	0.000	10.000	CR1	100.0	Superior	$\sigma_{b+tlc,0}$	1.20		0.29
			1535	56.700	0.000	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1535	56.700	0.000	8.000	CR1	100.0	Superior	$\tau_{xz}$	-0.11	1.92	0.06
	4	1	26292	55.350	0.000	8.500	CR1	140.0	Inferior	$\tau_{xy}$	-0.41	1.92	0.21
			22718	12.150	0.000	10.000	CR1	0.0	Superior	$\sigma_{b,0}$	-1.09	11.52	0.09
			22718	12.150	0.000	10.000	CR1	20.0	Intermedio	$\sigma_{b,0}$	-3.21	11.52	0.28
			22718	12.150	0.000	10.000	CR1	0.0	Superior	$\sigma_{b+tlc,0}$	-4.31		0.37
			1578	10.800	0.000	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
		2	1578	10.800	0.000	8.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.11	1.92	0.06
			17916	12.150	0.000	8.500	CR1	40.0	Inferior	$\tau_{xy}$	0.40	1.92	0.21
			850	12.150	0.000	12.000	CR1	40.0	Superior	$\sigma_{b,0}$	-0.37	11.52	0.03
			850	12.150	0.000	12.000	CR1	50.0	Intermedio	$\sigma_{b,0}$	-2.71	11.52	0.24
			850	12.150	0.000	12.000	CR1	40.0	Superior	$\sigma_{b+tlc,0}$	-2.71		0.24
	5	3	1578	10.800	0.000	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.11	0.50	0.22
			849	9.450	0.000	12.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.07	1.92	0.04
			17916	12.150	0.000	8.500	CR1	60.0	Inferior	$\tau_{xy}$	-0.40	1.92	0.21
			22718	12.150	0.000	10.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.55	11.52	0.05
			1578	10.800	0.000	8.000	CR1	70.0	Intermedio	$\sigma_{b,0}$	-2.49	11.52	0.22
		4	1578	10.800	0.000	8.000	CR1	60.0	Superior	$\sigma_{b+tlc,0}$	-2.49		0.22
			849	9.450	0.000	12.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.14
			1578	10.800	0.000	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.11	1.92	0.06
			17916	12.150	0.000	8.500	CR1	80.0	Inferior	$\tau_{xy}$	0.40	1.92	0.21
			850	12.150	0.000	12.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.37	11.52	0.03
			850	12.150	0.000	12.000	CR1	90.0	Intermedio	$\sigma_{b,0}$	-2.71	11.52	0.24
	6	4	850	12.150	0.000	12.000	CR1	80.0	Superior	$\sigma_{b+tlc,0}$	-2.71		0.24
			1578	10.800	0.000	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.11	0.50	0.22

Proyecto: TFM Modelo: TFM\_FINAL\_v01  
TFM Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 2.3 RAZÓN MÁX. DE TENSIONES POR COMPOSICIÓN

Comp. núm.	Superf. núm.	Capa núm.	Punto núm.	Coordenadas del punto [			Carga	Capa		Tensiones [N/mm <sup>2</sup> ]			Razón [-]
				X	Y	Z		z [mm]	Lado	Símbolo	Existente	Límite	
			849	9.450	0.000	12.000	CR1	80.0	Superior	$\tau_{xz}$	-0.07	1.92	0.04
			17916	12.150	0.000	8.500	CR1	100.0	Inferior	$\tau_{xy}$	-0.40	1.92	0.21
		5	22718	12.150	0.000	10.000	CR1	140.0	Inferior	$\sigma_{b,0}$	1.09	11.52	0.09
			1578	10.800	0.000	8.000	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-2.51	11.52	0.22
			22717	11.700	0.000	10.000	CR1	100.0	Superior	$\sigma_{b+bc,0}$	1.20		0.29
			1578	10.800	0.000	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1578	10.800	0.000	8.000	CR1	100.0	Superior	$\tau_{xz}$	-0.11	1.92	0.06
			17916	12.150	0.000	8.500	CR1	140.0	Inferior	$\tau_{xy}$	0.40	1.92	0.21
	294	1	22770	6.750	0.000	10.000	CR1	0.0	Superior	$\sigma_{b,0}$	-1.04	11.52	0.09
			22767	5.400	0.000	10.000	CR1	20.0	Intermedio	$\sigma_{bc,0}$	-2.98	11.52	0.26
			22767	5.400	0.000	10.000	CR1	0.0	Superior	$\sigma_{b+bc,0}$	-4.01		0.35
			1585	5.400	0.000	8.000	CR1	40.0	Inferior	$\tau_{yz}$	0.00	0.50	0.00
			1585	5.400	0.000	8.000	CR1	40.0	Inferior	$\tau_{xz}$	-0.11	1.92	0.06
			1584	4.050	0.000	8.000	CR1	0.0	Superior	$\tau_{xy}$	-0.23	1.92	0.12
		2	848	6.750	0.000	12.000	CR1	60.0	Inferior	$\sigma_{b,0}$	0.36	11.52	0.03
			847	4.050	0.000	12.000	CR1	50.0	Intermedio	$\sigma_{bc,0}$	-2.07	11.52	0.18
			847	4.050	0.000	12.000	CR1	40.0	Superior	$\sigma_{b+bc,0}$	-2.07		0.18
			1585	5.400	0.000	8.000	CR1	50.0	Intermedio	$\tau_{yz}$	-0.11	0.50	0.21
			847	4.050	0.000	12.000	CR1	60.0	Inferior	$\tau_{xz}$	-0.07	1.92	0.04
			1584	4.050	0.000	8.000	CR1	40.0	Superior	$\tau_{xy}$	0.23	1.92	0.12
		3	22770	6.750	0.000	10.000	CR1	60.0	Superior	$\sigma_{b,0}$	-0.52	11.52	0.05
			1585	5.400	0.000	8.000	CR1	70.0	Intermedio	$\sigma_{bc,0}$	-2.37	11.52	0.21
			1585	5.400	0.000	8.000	CR1	60.0	Superior	$\sigma_{b+bc,0}$	-2.36		0.21
			847	4.050	0.000	12.000	CR1	70.0	Intermedio	$\tau_{yz}$	0.07	0.50	0.14
			1585	5.400	0.000	8.000	CR1	70.0	Intermedio	$\tau_{xz}$	-0.11	1.92	0.06
			26386	6.300	0.000	8.000	CR1	80.0	Inferior	$\tau_{xy}$	-0.24	1.92	0.12
		4	848	6.750	0.000	12.000	CR1	80.0	Superior	$\sigma_{b,0}$	-0.36	11.52	0.03
			847	4.050	0.000	12.000	CR1	90.0	Intermedio	$\sigma_{bc,0}$	-2.07	11.52	0.18
			847	4.050	0.000	12.000	CR1	80.0	Superior	$\sigma_{b+bc,0}$	-2.07		0.18
			1585	5.400	0.000	8.000	CR1	90.0	Intermedio	$\tau_{yz}$	-0.11	0.50	0.21
			847	4.050	0.000	12.000	CR1	80.0	Superior	$\tau_{xz}$	-0.07	1.92	0.04
			26386	6.300	0.000	8.000	CR1	100.0	Inferior	$\tau_{xy}$	0.24	1.92	0.13
		5	22770	6.750	0.000	10.000	CR1	100.0	Superior	$\sigma_{b,0}$	-1.04	11.52	0.09
			1585	5.400	0.000	8.000	CR1	120.0	Intermedio	$\sigma_{bc,0}$	-2.38	11.52	0.21
			22770	6.750	0.000	10.000	CR1	100.0	Superior	$\sigma_{b+bc,0}$	1.23		0.29
			1585	5.400	0.000	8.000	CR1	100.0	Superior	$\tau_{yz}$	0.00	0.50	0.00
			1585	5.400	0.000	8.000	CR1	100.0	Superior	$\tau_{xz}$	-0.11	1.92	0.06
			26386	6.300	0.000	8.000	CR1	140.0	Inferior	$\tau_{xy}$	-0.26	1.92	0.13

Razón máxima 0.86

## 4.1 LISTA DE PIEZAS

Superf. núm.	Descripción del material	Espesor t [mm]	Núm. de capas	Área [m <sup>2</sup> ]	Revestim. [m <sup>2</sup> ]	Volumen [m <sup>3</sup> ]	Peso [t]
1	C24	40.0	2	21.600	43.200	1.728	0.864
	C24	20.0	3	21.600	0.000	1.296	0.648
$\Sigma$		140.0	5	21.600	43.200	3.024	1.512
2	C24	40.0	2	32.400	64.800	2.592	1.296
	C24	20.0	3	32.400	0.000	1.944	0.972
$\Sigma$		140.0	5	32.400	64.800	4.536	2.268
3	C24	40.0	2	21.600	43.200	1.728	0.864
	C24	20.0	3	21.600	0.000	1.296	0.648
$\Sigma$		140.0	5	21.600	43.200	3.024	1.512
4	C24	40.0	2	32.400	64.800	2.592	1.296
	C24	20.0	3	32.400	0.000	1.944	0.972
$\Sigma$		140.0	5	32.400	64.800	4.536	2.268
5	C24	40.0	2	43.200	86.400	3.456	1.728
	C24	20.0	3	43.200	0.000	2.592	1.296
$\Sigma$		140.0	5	43.200	86.400	6.048	3.024
6	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
$\Sigma$		140.0	5	10.800	21.600	1.512	0.756
7	C24	40.0	2	43.200	86.400	3.456	1.728
	C24	20.0	3	43.200	0.000	2.592	1.296
$\Sigma$		140.0	5	43.200	86.400	6.048	3.024
8	C24	40.0	2	43.200	86.400	3.456	1.728
	C24	20.0	3	43.200	0.000	2.592	1.296
$\Sigma$		140.0	5	43.200	86.400	6.048	3.024
9	C24	40.0	2	21.600	43.200	1.728	0.864
	C24	20.0	3	21.600	0.000	1.296	0.648
$\Sigma$		140.0	5	21.600	43.200	3.024	1.512
26	C24	40.0	2	21.600	43.200	1.728	0.864
	C24	20.0	3	21.600	0.000	1.296	0.648
$\Sigma$		140.0	5	21.600	43.200	3.024	1.512

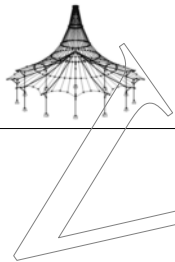


Proyecto: TFM Modelo: TFM\_FINAL\_v01  
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#### 4.1 LISTA DE PIEZAS

Superf. núm.	Descripción del material	Espesor t [mm]	Núm. de capas	Área [m²]	Revestim. [m²]	Volumen [m³]	Peso [t]
27	C24	40.0	2	32.400	64.800	2.592	1.296
Σ	C24	20.0	3	32.400	0.000	1.944	0.972
		140.0	5	32.400	64.800	4.536	2.268
28	C24	40.0	2	21.600	43.200	1.728	0.864
Σ	C24	20.0	3	21.600	0.000	1.296	0.648
		140.0	5	21.600	43.200	3.024	1.512
29	C24	40.0	2	32.400	64.800	2.592	1.296
Σ	C24	20.0	3	32.400	0.000	1.944	0.972
		140.0	5	32.400	64.800	4.536	2.268
30	C24	40.0	2	43.200	86.400	3.456	1.728
Σ	C24	20.0	3	43.200	0.000	2.592	1.296
		140.0	5	43.200	86.400	6.048	3.024
31	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
32	C24	40.0	2	43.200	86.400	3.456	1.728
Σ	C24	20.0	3	43.200	0.000	2.592	1.296
		140.0	5	43.200	86.400	6.048	3.024
33	C24	40.0	2	43.200	86.400	3.456	1.728
Σ	C24	20.0	3	43.200	0.000	2.592	1.296
		140.0	5	43.200	86.400	6.048	3.024
34	C24	40.0	2	21.600	43.200	1.728	0.864
Σ	C24	20.0	3	21.600	0.000	1.296	0.648
		140.0	5	21.600	43.200	3.024	1.512
46	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
52	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
53	C24	40.0	2	21.600	43.200	1.728	0.864
Σ	C24	20.0	3	21.600	0.000	1.296	0.648
		140.0	5	21.600	43.200	3.024	1.512
54	C24	40.0	2	32.400	64.800	2.592	1.296
Σ	C24	20.0	3	32.400	0.000	1.944	0.972
		140.0	5	32.400	64.800	4.536	2.268
55	C24	40.0	2	21.600	43.200	1.728	0.864
Σ	C24	20.0	3	21.600	0.000	1.296	0.648
		140.0	5	21.600	43.200	3.024	1.512
56	C24	40.0	2	32.400	64.800	2.592	1.296
Σ	C24	20.0	3	32.400	0.000	1.944	0.972
		140.0	5	32.400	64.800	4.536	2.268
57	C24	40.0	2	43.200	86.400	3.456	1.728
Σ	C24	20.0	3	43.200	0.000	2.592	1.296
		140.0	5	43.200	86.400	6.048	3.024
58	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
59	C24	40.0	2	43.200	86.400	3.456	1.728
Σ	C24	20.0	3	43.200	0.000	2.592	1.296
		140.0	5	43.200	86.400	6.048	3.024
60	C24	40.0	2	43.200	86.400	3.456	1.728
Σ	C24	20.0	3	43.200	0.000	2.592	1.296
		140.0	5	43.200	86.400	6.048	3.024
61	C24	40.0	2	21.600	43.200	1.728	0.864
Σ	C24	20.0	3	21.600	0.000	1.296	0.648
		140.0	5	21.600	43.200	3.024	1.512
78	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
81	C24	40.0	2	16.200	32.400	1.296	0.648
Σ	C24	20.0	3	16.200	0.000	0.972	0.486
		140.0	5	16.200	32.400	2.268	1.134
82	C24	40.0	2	16.200	32.400	1.296	0.648
Σ	C24	20.0	3	16.200	0.000	0.972	0.486
		140.0	5	16.200	32.400	2.268	1.134
83	C24	40.0	2	16.200	32.400	1.296	0.648
Σ	C24	20.0	3	16.200	0.000	0.972	0.486
		140.0	5	16.200	32.400	2.268	1.134



Proyecto: TFM Modelo: TFM\_FINAL\_v01  
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Fecha: 05/07/2020

#### 4.1 LISTA DE PIEZAS

Superf. núm.	Descripción del material	Espesor t [mm]	Núm. de capas	Área [m²]	Revestim. [m²]	Volumen [m³]	Peso [t]
89	C24	40.0	2	16.200	32.400	1.296	0.648
Σ	C24	20.0	3	16.200	0.000	0.972	0.486
		140.0	5	16.200	32.400	2.268	1.134
90	C24	40.0	2	16.200	32.400	1.296	0.648
Σ	C24	20.0	3	16.200	0.000	0.972	0.486
		140.0	5	16.200	32.400	2.268	1.134
91	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
92	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
93	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
94	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
95	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
96	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
97	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
98	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
99	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
100	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
101	C24	40.0	2	16.200	32.400	1.296	0.648
Σ	C24	20.0	3	16.200	0.000	0.972	0.486
		140.0	5	16.200	32.400	2.268	1.134
102	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
103	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
104	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
105	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
106	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
188	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
189	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
190	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
191	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756
192	C24	40.0	2	10.800	21.600	0.864	0.432
Σ	C24	20.0	3	10.800	0.000	0.648	0.324
		140.0	5	10.800	21.600	1.512	0.756

Proyecto: TFM Modelo: TFM\_FINAL\_v01  
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Fecha: 05/07/2020

#### 4.1 LISTA DE PIEZAS

Superf. núm.	Descripción del material	Espesor t [mm]	Núm. de capas	Área [m²]	Revestim. [m²]	Volumen [m³]	Peso [t]
193	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
194	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
195	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
196	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
237	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
238	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
239	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
240	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
241	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
242	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
243	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
244	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
245	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
286	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
287	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
288	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
289	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
290	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
291	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
292	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
293	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
294	C24	40.0	2	10.800	21.600	0.864	0.432
	C24	20.0	3	10.800	0.000	0.648	0.324
Σ		140.0	5	10.800	21.600	1.512	0.756
Σ Total				1393.200	2786.400	195.048	97.524

Proyecto: TFM  
TFM

Modelo: TFM\_FINAL\_v01

Estructura Consellería - Primera Prueba

Fecha: 05/07/2020

## 4.2 DIAGRAMAS DE TENSIONES

Tensión -  $\sigma_{y/c,0}$

Superficie núm. 104

CR1

X: 35.100 m

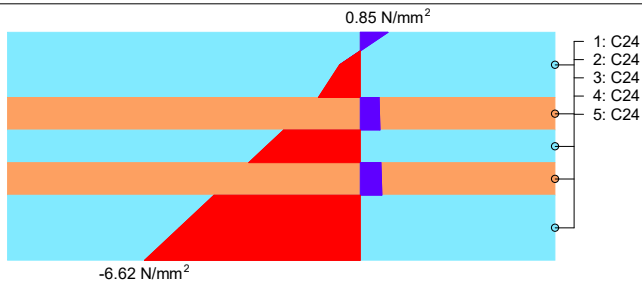
Y: 0.000 m

Z: 9.500 m

Extremos de superficie

Min: -6.62 N/mm<sup>2</sup>

Max: 0.85 N/mm<sup>2</sup>



Dirección  
del eje z local



Inferior

Tensión -  $\tau_{xy}$

Superficie núm. 4

CR1

X: 48.600 m

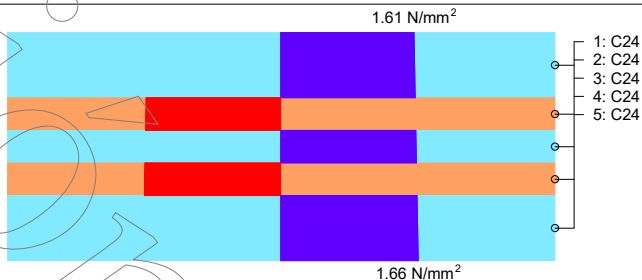
Y: 16.200 m

Z: 0.000 m

Extremos de superficie

Min: -1.64 N/mm<sup>2</sup>

Max: 1.66 N/mm<sup>2</sup>



Dirección  
del eje z local



Inferior