

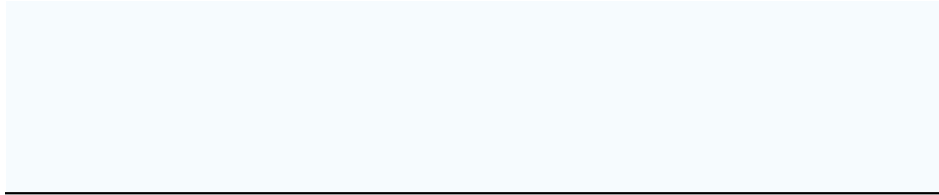


**MODELO**

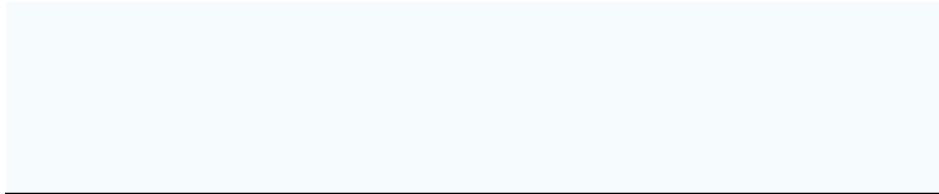


# Análisis de la sección

## CLIENTE



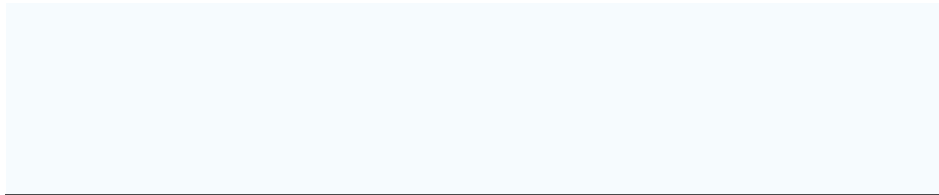
## CREADO POR



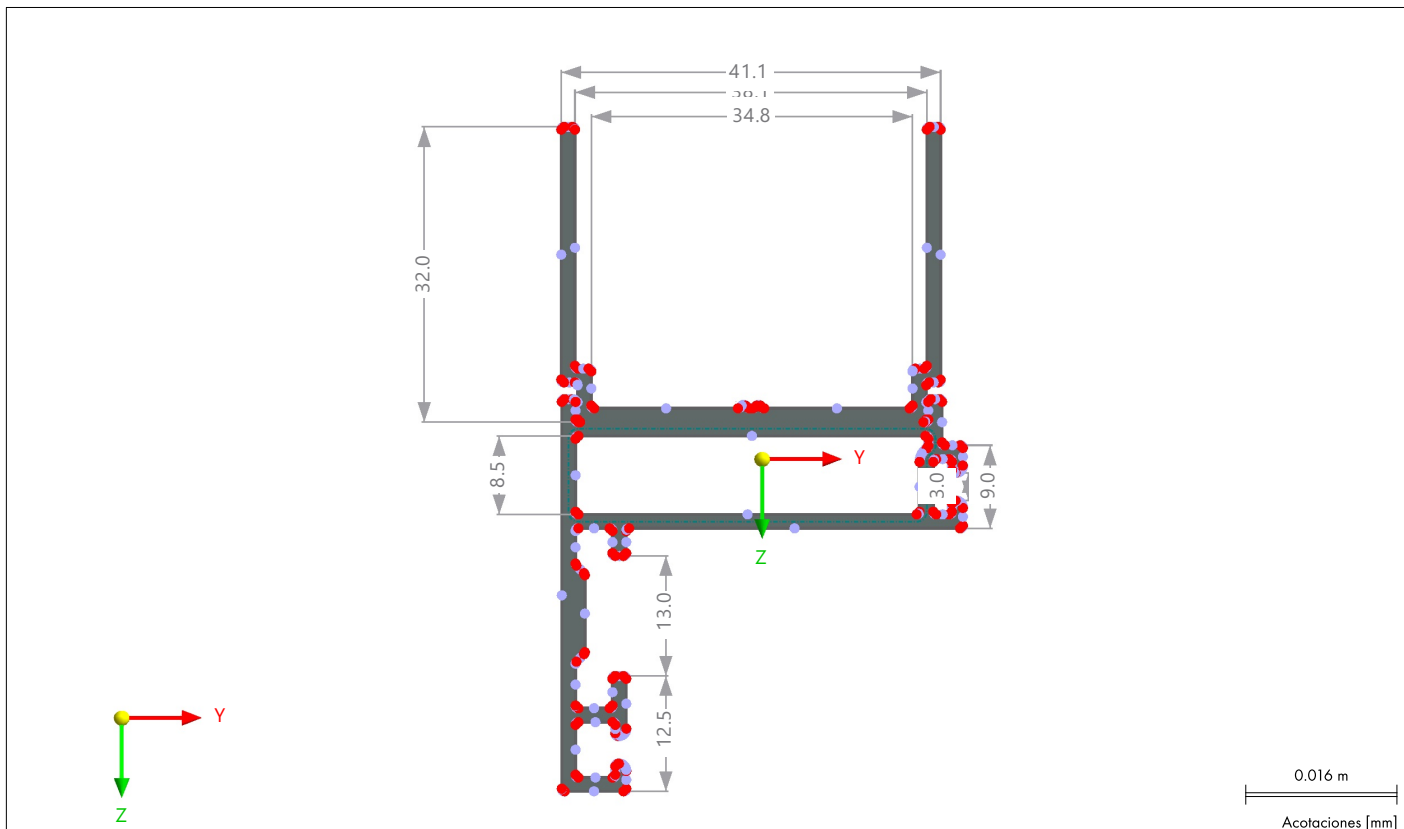
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## PROYECTO



## MODELO





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**MODELO**

**1 Objetos básicos**

**1.1 MATERIALES**

Material núm.	Nombre	Propiedades	Símbolo	Valor	Unidad
1	6063-T5-B221 (Extrusion)   Isótropo   Elástico lineal Aluminio	Módulo de elasticidad Módulo de cortante Coeficiente de Poisson Peso específico Densidad de la masa Coeficiente de dilatación térmica	E G ν γ ρ α	69637.0 26200.1 0.330 27.00 2700.00 0.000023	N/mm <sup>2</sup> N/mm <sup>2</sup> – kN/m <sup>3</sup> kg/m <sup>3</sup> 1/°C

**1.2 PARTES**

Leyenda  
Objetos integrados

Parte núm.	Contorno Líneas núm.	Geometría Tipo	Material núm.	Integrada Aberturas núm.	Área A [cm <sup>2</sup> ]	Masa M [kg/m]	Centro de gravedad Y <sub>c</sub> [mm] Z <sub>c</sub> [mm]	Opciones
1	1-36,122-45,126-124,38-44	Líneas de contorno	1	1	4.03	1.1	-4.3 -0.2	

**2 Tensiones**

**2.1 CONFIGURACIÓN DE TENSIÓN**

Activada	Tipo de tensión	Tensión límite	Tensión límite definida por el usuario [N/mm <sup>2</sup> ]
<input type="checkbox"/>	σ <sub>x</sub> (N)	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N <sub>c</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N <sub>t</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>y</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>y,c</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>y,t</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>z</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>z,c</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>z,t</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>u</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>u,c</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>u,t</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>v</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>v,c</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>v,t</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (ρ <sub>i</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>u</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N + M <sub>y</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N <sub>c</sub> + M <sub>y,c</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N <sub>t</sub> + M <sub>y,t</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N + M <sub>z</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N <sub>c</sub> + M <sub>z,c</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N <sub>t</sub> + M <sub>z,t</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N + M <sub>u</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N <sub>c</sub> + M <sub>u,c</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N <sub>t</sub> + M <sub>u,t</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N + M <sub>v</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N <sub>c</sub> + M <sub>v,c</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N <sub>t</sub> + M <sub>v,t</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>y</sub> + M <sub>z</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>y,c</sub> + M <sub>z,c</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>y,t</sub> + M <sub>z,t</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>u</sub> + M <sub>v</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>u,c</sub> + M <sub>v,c</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (M <sub>u,t</sub> + M <sub>v,t</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N + M <sub>y</sub> + M <sub>z</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N <sub>c</sub> + M <sub>y,c</sub> + M <sub>z,c</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N <sub>t</sub> + M <sub>y,t</sub> + M <sub>z,t</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N + M <sub>u</sub> + M <sub>v</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N <sub>c</sub> + M <sub>u,c</sub> + M <sub>v,c</sub> )	Tensión normal límite	
<input type="checkbox"/>	σ <sub>x</sub> (N <sub>t</sub> + M <sub>u,t</sub> + M <sub>v,t</sub> )	Tensión normal límite	
<input checked="" type="checkbox"/>	σ <sub>x,tot</sub>	Tensión normal límite	
<input type="checkbox"/>	σ <sub>t</sub> (ρ <sub>i</sub> )	Tensión normal límite	
<input type="checkbox"/>	τ (V <sub>y</sub> )	Tensión tangencial límite	
<input type="checkbox"/>	τ (V <sub>z</sub> )	Tensión tangencial límite	
<input type="checkbox"/>	τ (V <sub>u</sub> )	Tensión tangencial límite	
<input type="checkbox"/>	τ (V <sub>v</sub> )	Tensión tangencial límite	
<input type="checkbox"/>	TSt.Venant (M <sub>tr</sub> )	Tensión tangencial límite	





**MODELO**

2.1 **CONFIGURACIÓN DE TENSIÓN**

Activada	Tipo de tensión	Tensión límite	Tensión límite definida por el usuario [N/mm²]
<input type="checkbox"/>	T <sub>Bredt</sub> (M <sub>T</sub> )	Tensión tangencial límite	
<input type="checkbox"/>	T (M <sub>T,pr</sub> )	Tensión tangencial límite	
<input type="checkbox"/>	T (M <sub>T,sec</sub> )	Tensión tangencial límite	
<input type="checkbox"/>	T (M <sub>T</sub> )	Tensión tangencial límite	
<input type="checkbox"/>	T (V <sub>y</sub> + V <sub>z</sub> )	Tensión tangencial límite	
<input type="checkbox"/>	T (V <sub>u</sub> + V <sub>v</sub> )	Tensión tangencial límite	
<input type="checkbox"/>	T (V <sub>y</sub> + V <sub>z</sub> + M <sub>T</sub> )	Tensión tangencial límite	
<input type="checkbox"/>	T (V <sub>u</sub> + V <sub>v</sub> + M <sub>T</sub> )	Tensión tangencial límite	
<input checked="" type="checkbox"/>	T <sub>tot</sub>	Tensión tangencial límite	
<input checked="" type="checkbox"/>	σ <sub>eqv,von Mises</sub>	Tensión equivalente límite	
<input type="checkbox"/>	σ <sub>eqv,von Mises,mod</sub>	Tensión equivalente límite	
<input type="checkbox"/>	σ <sub>eqv,Tresca</sub>	Tensión equivalente límite	
<input type="checkbox"/>	σ <sub>eqv,Rankine</sub>	Tensión equivalente límite	

2.2 **CONFIGURACIÓN DE CÁLCULO DE TENSIONES**

Descripción	Símbolo	Valor	Unidad
Modificar la tensión equivalente de von Mises			
Factor para σ <sub>x</sub>	k <sub>σ,x</sub>	1.00	—
Factor para τ	k <sub>τ</sub>	3.00	—

**3 Resultados**

3.1 **PROPIEDADES DE LA SECCIÓN**

**Análisis por elementos finitos**

Descripción	Símbolo	Valor	Unidad	Comentario
<b>Área de la sección</b>				
Área de la sección	A	4.03	cm²	
Área de la sección geométrica	A <sub>geom</sub>	4.03	cm²	
<b>Flexión</b>				
Posición de la fibra que pasa por el centro de gravedad en dirección y	e <sub>y</sub>	-4.3	mm	Relativa al punto cero
Posición de la fibra que pasa por el centro de gravedad en dirección z	e <sub>z</sub>	-0.2	mm	Relativa al punto cero
Area moment of inertia about y-axis	I <sub>y</sub>	10.15	cm⁴	
Momento de inercia respecto al eje z	I <sub>z</sub>	10.24	cm⁴	
Producto de inercia respecto a los ejes y,z	I <sub>yz</sub>	-3.32	cm⁴	
Momento de inercia respecto al eje u	I <sub>u</sub>	6.87	cm⁴	
Momento de inercia respecto al eje v	I <sub>v</sub>	13.51	cm⁴	
Momento de inercia polar	I <sub>p</sub>	20.38	cm⁴	
Momento de inercia polar con respecto al centro de cortante	I <sub>p,SC</sub>	23.50	cm⁴	
Inclinación de los ejes principales	α	-44.62	deg	
Radio de giro respecto al eje y	i <sub>y</sub>	15.9	mm	
Radio de giro respecto al eje z	i <sub>z</sub>	15.9	mm	
Radio de giro respecto a los ejes y,z	i <sub>yz</sub>	9.1	mm	
Radio de giro respecto al eje u	i <sub>u</sub>	13.1	mm	
Radio de giro respecto al eje v	i <sub>v</sub>	18.3	mm	
Radio de giro polar	i <sub>p</sub>	22.5	mm	
Radio de giro polar respecto al centro de cortante	i <sub>p,SC</sub>	24.2	mm	
Módulo resistente elástico respecto al eje y	W <sub>y,min.</sub>	-2.19	cm³	
Módulo resistente elástico respecto al eje y	W <sub>y,máx.</sub>	2.78	cm³	
Módulo resistente elástico respecto al eje z	W <sub>z,min.</sub>	-3.14	cm³	
Módulo resistente elástico respecto al eje z	W <sub>z,máx.</sub>	3.22	cm³	
Módulo resistente elástico respecto al eje u	W <sub>u,min.</sub>	-1.82	cm³	
Módulo resistente elástico respecto al eje u	W <sub>u,máx.</sub>	2.91	cm³	
Módulo resistente elástico respecto al eje v	W <sub>v,min.</sub>	-3.23	cm³	
Módulo resistente elástico respecto al eje v	W <sub>v,máx.</sub>	3.58	cm³	
Módulo resistente elástico respecto al eje y	W <sub>y</sub>	2.19	cm³	
Módulo resistente elástico respecto al eje z	W <sub>z</sub>	3.14	cm³	
Módulo resistente elástico respecto al eje u	W <sub>u</sub>	1.82	cm³	
Módulo resistente elástico respecto al eje v	W <sub>v</sub>	3.23	cm³	
<b>Cortante</b>				
Área de cortante en dirección y	A <sub>y</sub>	1.38	cm²	
Área de cortante en dirección z	A <sub>z</sub>	1.38	cm²	
Área de cortante en dirección u	A <sub>u</sub>	1.41	cm²	
Área de cortante en dirección v	A <sub>v</sub>	1.35	cm²	
Coordenada del centro de cortante con respecto al centro de gravedad en dirección y	y <sub>SC</sub>	-7.7	mm	
Coordenada del centro de cortante con respecto al centro de	z <sub>SC</sub>	4.3	mm	





**RESULTADOS**

3.1 PROPIEDADES DE LA SECCIÓN

Análisis por elementos finitos

	Descripción	Símbolo	Valor	Unidad	Comentario
	gravedad en dirección z				
	Coordenada del centro de cortante con respecto al centro de gravedad en dirección u	U <sub>SC</sub>	-8.5	mm	
	Coordenada del centro de cortante con respecto al centro de gravedad en dirección v	V <sub>SC</sub>	-2.3	mm	
	Torsión				
	Módulo de torsión	I <sub>t</sub>	1.42	cm <sup>4</sup>	
	Módulo resistente para torsión	W <sub>t</sub>	0.49	cm <sup>3</sup>	
	Alabeo				
	Ordenada del alabeo con respecto al centro de cortante	max ω	8.57	cm <sup>2</sup>	
	Módulo de alabeo con respecto al centro de cortante	I <sub>ω</sub>	17.94	cm <sup>6</sup>	
	Radio de giro de alabeo respecto al centro de cortante	i <sub>ω</sub>	8.7	mm	
	Módulo resistente de alabeo respecto al centro de cortante	W <sub>ω</sub>	2.09	cm <sup>4</sup>	
	Estabilidad				
	Parámetro de asimetría de sección con respecto al centro de gravedad	r <sub>y</sub>	-1.0	mm	
	Parámetro de asimetría de sección con respecto al centro de gravedad	r <sub>z</sub>	-0.1	mm	
	Parámetro de asimetría de sección con respecto al centro de gravedad	r <sub>u</sub>	-0.5	mm	
	Parámetro de asimetría de sección con respecto al centro de gravedad	r <sub>v</sub>	-1.1	mm	
	Parámetro de asimetría de sección con respecto al centro de cortante	r <sub>y,SC</sub>	15.2	mm	
	Parámetro de asimetría de sección con respecto al centro de cortante	r <sub>z,SC</sub>	-9.7	mm	
	Parámetro de asimetría de sección con respecto al centro de cortante	r <sub>u,SC</sub>	3.6	mm	
	Parámetro de asimetría de sección con respecto al centro de cortante	r <sub>v,SC</sub>	-17.4	mm	
	Parámetro auxiliar para el alabeo con respecto al centro de cortante	r <sub>ω,SC</sub>	0.941	—	
	Plasticidad				
	Módulo resistente plástico respecto al eje y	W <sub>pl,y</sub>	4.71	cm <sup>3</sup>	
	Módulo resistente plástico respecto al eje z	W <sub>pl,z</sub>	5.78	cm <sup>3</sup>	
	Módulo resistente plástico respecto al eje u	W <sub>pl,u</sub>	4.13	cm <sup>3</sup>	
	Módulo resistente plástico respecto al eje v	W <sub>pl,v</sub>	5.95	cm <sup>3</sup>	
	Factor de forma plástica respecto al eje y	α <sub>pl,y</sub>	2.151	—	
	Factor de forma plástica respecto al eje z	α <sub>pl,z</sub>	1.843	—	
	Factor de forma plástica respecto al eje u	α <sub>pl,u</sub>	2.264	—	
	Factor de forma plástica respecto al eje v	α <sub>pl,v</sub>	1.843	—	
	Distancia desde el centro de gravedad hasta la fibra neutra plástica en dirección u	U <sub>pl</sub>	-0.9	mm	
	Distancia desde el centro de gravedad hasta la fibra neutra plástica en dirección v	V <sub>pl</sub>	1.5	mm	
	Otros				
	Peso	G	1.1	kg/m	
	Área de la superficie por unidad de longitud	A <sub>m</sub>	0.356	m <sup>2</sup> /m	
	Volumen	V	402.69	cm <sup>3</sup> /m	
	Factor de sección	A <sub>m</sub> /V	884.631	1/m	

3.2 TENSIONES NORMALES UNITARIAS

Análisis por elementos finitos

Punto de tens. núm.	σ <sub>x</sub> (N = 1 kN) [N/mm <sup>2</sup> ]	σ <sub>x</sub> (M <sub>y</sub> = 1 kNm) [N/mm <sup>2</sup> ]	σ <sub>x</sub> (M <sub>z</sub> = 1 kNm) [N/mm <sup>2</sup> ]	σ <sub>x</sub> (M <sub>u</sub> = 1 kNm) [N/mm <sup>2</sup> ]	σ <sub>x</sub> (M <sub>v</sub> = 1 kNm) [N/mm <sup>2</sup> ]	σ <sub>x</sub> (M <sub>ω</sub> = 1 kNm <sup>2</sup> ) [N/mm <sup>2</sup> ]
1	2.483	-456.841	316.431	-547.456	-95.520	-0.014
2	2.483	-455.203	311.427	-542.776	-97.932	-0.015
3	2.483	-453.564	306.423	-538.096	-100.344	-0.016
4	2.483	-314.940	-116.884	-142.144	-304.374	0.047
5	2.483	-313.301	-121.888	-137.464	-306.786	0.046
6	2.483	-311.662	-126.891	-132.784	-309.198	0.045
7	2.483	-311.488	-127.156	-132.474	-309.264	0.045
8	2.483	-456.822	316.590	-547.554	-95.393	-0.014
9	2.483	-314.919	-116.714	-142.249	-304.239	0.047
10	2.483	-310.969	-127.945	-131.550	-309.461	0.045
11	2.483	-453.301	306.065	-537.657	-100.414	-0.016
12	2.483	-456.747	317.204	-547.932	-94.903	-0.013
13	2.483	-314.841	-116.075	-142.642	-303.729	0.048
14	2.483	-310.629	-128.462	-130.945	-309.591	0.045
15	2.483	-452.518	304.999	-536.350	-100.623	-0.016
16	2.483	-456.690	317.667	-548.217	-94.534	-0.013
17	2.483	-314.784	-115.613	-142.927	-303.360	0.048





**RESULTADOS**

3.2 TENSIONES NORMALES UNITARIAS

Análisis por elementos finitos

Punto de tens. núm.	$\sigma_x$ (N = 1 kN) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>y</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>z</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>u</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>v</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>w</sub> = 1 kNm <sup>2</sup> ) [N/mm <sup>2</sup> ]
18	2.483	-310.297	-128.967	-130.354	-309.717	0.045
19	2.483	-452.071	304.391	-535.606	-100.743	-0.016
20	2.483	-456.633	318.136	-548.506	-94.160	-0.013
21	2.483	-314.729	-115.160	-143.205	-302.999	0.048
22	2.483	-309.948	-129.498	-129.733	-309.850	0.045
23	2.483	-451.744	303.945	-535.060	-100.830	-0.016
24	2.483	-456.596	318.438	-548.691	-93.919	-0.013
25	2.483	-314.695	-114.877	-143.380	-302.773	0.048
26	2.483	-309.622	-129.682	-129.371	-309.752	0.045
27	2.483	-451.147	303.564	-534.367	-100.683	-0.016
28	2.483	-456.123	318.493	-548.393	-93.548	-0.013
29	2.483	-314.222	-114.822	-143.082	-302.402	0.048
30	2.483	-309.151	-129.948	-128.849	-309.610	0.045
31	2.483	-450.522	303.164	-533.641	-100.528	-0.016
32	2.483	-455.644	318.549	-548.091	-93.172	-0.013
33	2.483	-313.742	-114.766	-142.780	-302.026	0.048
34	2.483	-308.593	-130.263	-128.231	-309.443	0.045
35	2.483	-449.551	302.543	-532.513	-100.288	-0.016
36	2.483	-454.837	318.643	-547.582	-92.538	-0.013
37	2.483	-312.935	-114.672	-142.271	-301.392	0.048
38	2.483	-307.654	-130.793	-127.190	-309.161	0.044
39	2.483	-307.313	-130.986	-126.812	-309.059	0.044
40	2.483	-449.215	302.329	-532.124	-100.205	-0.016
41	2.483	-454.568	318.674	-547.413	-92.327	-0.013
42	2.483	-449.215	302.329	-532.124	-100.205	-0.016
43	2.483	-312.666	-114.640	-142.101	-301.181	0.048
44	2.483	-307.313	-130.986	-126.812	-309.059	0.044
45	2.483	-308.103	256.530	-399.497	-33.719	-0.009
46	2.483	-171.554	-160.439	-9.475	-234.695	0.025
47	2.483	-305.209	270.199	-407.036	-21.955	-0.007
48	2.483	-157.955	-179.461	13.565	-238.688	0.022
49	2.483	-166.991	210.732	-266.871	32.767	-0.002
50	2.483	-30.442	-206.238	123.152	-168.209	0.003
51	2.483	-30.442	-206.238	123.152	-168.209	0.003
52	2.483	-166.650	210.508	-266.471	32.847	-0.002
53	2.483	-30.195	-206.217	123.313	-168.021	0.003
54	2.483	-165.665	209.860	-265.315	33.077	-0.002
55	2.483	-29.466	-206.155	123.788	-167.466	0.003
56	2.483	-164.596	209.331	-264.182	33.451	-0.002
57	2.483	-28.560	-206.292	124.530	-166.926	0.003
58	2.483	-164.307	208.966	-263.720	33.395	-0.002
59	2.483	-28.495	-206.074	124.422	-166.725	0.003
60	2.483	-164.229	208.850	-263.584	33.366	-0.002
61	2.483	-28.286	-206.022	124.535	-166.541	0.003
62	2.483	-163.995	208.498	-263.170	33.281	-0.002
63	2.483	-28.296	-205.278	124.005	-166.019	0.003
64	2.483	-163.267	207.406	-261.885	33.014	-0.002
65	2.483	-28.121	-204.577	123.638	-165.397	0.003
66	2.483	-162.686	206.535	-260.859	32.801	-0.002
67	2.483	-162.532	206.304	-260.587	32.745	-0.002
68	2.483	-160.457	199.966	-254.659	29.690	-0.002
69	2.483	-158.381	193.628	-248.731	26.635	-0.003
70	2.483	-31.555	-193.653	113.523	-160.031	0.003
71	2.483	-29.807	-198.991	118.515	-162.603	0.003
72	2.483	-28.059	-204.328	123.507	-165.176	0.003
73	2.483	-31.555	-193.653	113.523	-160.031	0.003
74	2.483	-158.147	193.272	-248.314	26.546	-0.003
75	2.483	-31.484	-192.982	113.101	-159.504	0.003
76	2.483	-157.447	192.206	-247.067	26.279	-0.003
77	2.483	-31.434	-192.510	112.805	-159.133	0.003
78	2.483	-157.038	191.582	-246.338	26.122	-0.003
79	2.483	-31.386	-192.047	112.515	-158.769	0.003
80	2.483	-156.683	191.042	-245.706	25.987	-0.003
81	2.483	-31.348	-191.686	112.288	-158.485	0.003
82	2.483	-156.208	190.714	-245.137	26.087	-0.003
83	2.483	-30.951	-191.617	112.522	-158.158	0.003
84	2.483	-155.597	190.293	-244.407	26.216	-0.003
85	2.483	-30.494	-191.537	112.792	-157.780	0.003
86	2.483	-154.976	189.864	-243.663	26.347	-0.003
87	2.483	-29.711	-191.401	113.253	-157.133	0.003
88	2.483	-154.091	189.254	-242.605	26.534	-0.003
89	2.483	-154.091	189.254	-242.605	26.534	-0.003
90	2.483	-29.449	-191.355	113.408	-156.917	0.003
91	2.483	-155.851	221.724	-266.659	48.416	0.000
92	2.483	-8.596	-227.935	153.942	-168.317	-0.001
93	2.483	-155.624	221.575	-266.392	48.469	0.000
94	2.483	-8.376	-227.943	154.104	-168.167	-0.001





**RESULTADOS**

3.2 TENSIONES NORMALES UNITARIAS

Análisis por elementos finitos

Punto de tens. núm.	$\sigma_x (N = 1 \text{ kN})$ [N/mm <sup>2</sup> ]	$\sigma_x (M_y = 1 \text{ kNm})$ [N/mm <sup>2</sup> ]	$\sigma_x (M_z = 1 \text{ kNm})$ [N/mm <sup>2</sup> ]	$\sigma_x (M_u = 1 \text{ kNm})$ [N/mm <sup>2</sup> ]	$\sigma_x (M_v = 1 \text{ kNm})$ [N/mm <sup>2</sup> ]	$\sigma_x (M_w = 1 \text{ kNm}^2)$ [N/mm <sup>2</sup> ]
95	2.483	-7.718	-227.964	154.587	-167.721	-0.001
96	2.483	-154.770	-221.013	-265.390	48.669	0.000
97	2.483	-7.288	-227.979	154.904	-167.428	-0.001
98	2.483	-154.151	220.606	-264.664	48.813	0.000
99	2.483	-6.867	-227.993	155.213	-167.143	-0.001
100	2.483	-153.545	220.208	-263.953	48.955	0.000
101	2.483	-6.425	-228.007	155.538	-166.843	-0.001
102	2.483	-153.167	219.959	-263.509	49.044	0.000
103	2.483	-6.399	-227.762	155.384	-166.650	-0.001
104	2.483	-152.754	219.339	-262.779	48.892	0.000
105	2.483	-6.361	-227.410	155.163	-166.373	-0.001
106	2.483	-152.335	218.711	-262.040	48.739	0.000
107	2.483	-6.317	-226.992	154.902	-166.044	-0.001
108	2.483	-151.628	217.650	-260.792	48.480	0.000
109	2.483	-6.241	-226.284	154.459	-165.487	-0.001
110	2.483	-151.392	217.296	-260.375	48.394	0.000
111	2.483	-149.317	210.958	-254.447	45.339	-0.001
112	2.483	-147.241	204.620	-248.519	42.284	-0.001
113	2.483	-9.709	-215.351	144.312	-160.139	0.000
114	2.483	-7.961	-220.688	149.305	-162.711	-0.001
115	2.483	-6.214	-226.026	154.297	-165.284	-0.001
116	2.483	-6.214	-226.026	154.297	-165.284	-0.001
117	2.483	-147.100	204.409	-248.270	42.233	-0.001
118	2.483	-9.681	-215.116	144.167	-159.951	0.000
119	2.483	-146.558	203.595	-247.312	42.034	-0.001
120	2.483	-9.595	-214.413	143.735	-159.390	0.000
121	2.483	-145.808	202.469	-245.987	41.759	-0.001
122	2.483	-9.696	-213.460	142.994	-158.783	0.000
123	2.483	-145.556	202.091	-245.542	41.667	-0.001
124	2.483	-9.464	-213.344	143.077	-158.537	0.000
125	2.483	-145.467	201.958	-245.386	41.635	-0.001
126	2.483	-9.435	-213.202	142.998	-158.416	0.000
127	2.483	-145.176	201.593	-244.922	41.579	-0.001
128	2.483	-9.111	-213.303	143.300	-158.260	0.000
129	2.483	-144.116	201.069	-243.799	41.951	-0.001
130	2.483	-8.283	-213.206	143.821	-157.610	0.000
131	2.483	-143.127	200.418	-242.638	42.182	-0.001
132	2.483	-7.614	-213.129	144.243	-157.085	0.000
133	2.483	-142.783	200.192	-242.235	42.262	-0.001
134	2.483	-7.436	-213.108	144.355	-156.945	0.000
135	2.483	-133.644	182.618	-223.387	36.168	-0.002
136	2.483	-9.002	-197.992	132.625	-147.283	0.000
137	2.483	-131.316	210.184	-241.087	57.429	-0.002
138	2.483	-129.732	205.347	-236.563	55.097	-0.002
139	2.483	-128.148	200.510	-232.039	52.766	-0.002
140	2.483	10.804	-223.798	164.849	-151.747	-0.001
141	2.483	12.443	-228.801	169.529	-154.159	-0.002
142	2.483	14.082	-233.805	174.209	-156.570	-0.002
143	2.483	10.825	-223.603	164.726	-151.593	-0.001
144	2.483	-127.979	200.257	-231.741	52.704	-0.002
145	2.483	14.232	-234.030	174.474	-156.625	-0.002
146	2.483	-131.287	210.420	-241.232	57.617	-0.002
147	2.483	10.894	-222.962	164.325	-151.089	-0.002
148	2.483	-127.334	199.289	-230.602	52.468	-0.002
149	2.483	14.796	-234.877	175.471	-156.832	-0.002
150	2.483	-131.201	211.123	-241.665	58.177	-0.001
151	2.483	10.941	-222.515	164.046	-150.738	-0.002
152	2.483	-126.896	198.632	-229.828	52.308	-0.002
153	2.483	15.205	-235.491	176.193	-156.982	-0.002
154	2.483	-131.145	211.583	-241.948	58.545	-0.001
155	2.483	10.983	-222.126	163.802	-150.431	-0.002
156	2.483	-126.373	197.848	-228.906	52.116	-0.002
157	2.483	15.606	-236.092	176.900	-157.128	-0.002
158	2.483	-131.071	212.191	-242.322	59.030	-0.001
159	2.483	11.016	-221.816	163.608	-150.188	-0.002
160	2.483	-126.373	197.848	-228.906	52.116	-0.002
161	2.483	15.856	-236.468	177.342	-157.220	-0.002
162	2.483	-131.071	212.191	-242.322	59.030	-0.001
163	2.483	11.387	-221.828	163.880	-149.936	-0.002
164	2.483	-125.560	197.312	-227.951	52.307	-0.002
165	2.483	16.481	-236.879	178.076	-157.074	-0.002
166	2.483	11.806	-221.842	164.188	-149.652	-0.002
167	2.483	-130.472	212.261	-241.945	59.500	-0.001
168	2.483	-124.944	196.908	-227.228	52.451	-0.002
169	2.483	17.114	-237.295	178.819	-156.926	-0.002
170	2.483	12.235	-221.857	164.504	-149.360	-0.002
171	2.483	-129.971	212.319	-241.629	59.893	-0.001





**RESULTADOS**

3.2 TENSIONES NORMALES UNITARIAS

Análisis por elementos finitos

Punto de tens. núm.	$\sigma_x$ (N = 1 kN) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>y</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>z</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>y</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>z</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>0</sub> = 1 kNm <sup>2</sup> ) [N/mm <sup>2</sup> ]
172	2.483	-124.004	196.289	-226.125	52.670	-0.002
173	2.483	18.183	-237.998	180.074	-156.676	-0.003
174	2.483	12.929	-221.879	165.014	-148.889	-0.002
175	2.483	-129.235	212.405	-241.165	60.471	-0.001
176	2.483	13.187	-221.888	165.204	-148.714	-0.002
177	2.483	-129.042	212.427	-241.044	60.622	-0.001
178	2.483	-123.689	196.082	-225.755	52.744	-0.002
179	2.483	13.187	-221.888	165.204	-148.714	-0.002
180	2.483	18.540	-238.233	180.493	-156.592	-0.003
181	2.483	-122.420	193.583	-223.096	51.857	-0.001
182	2.483	12.927	-219.717	163.494	-147.351	-0.003
183	2.483	-54.940	-4.209	-36.159	-41.577	-0.002
184	2.483	-49.150	-21.889	-19.622	-50.098	-0.002
185	2.483	-54.923	-4.077	-36.240	-41.471	-0.002
186	2.483	-49.134	-21.757	-19.703	-49.993	-0.002
187	2.483	-54.468	-4.714	-35.468	-41.605	-0.002
188	2.483	-48.616	-22.689	-18.680	-50.294	-0.002
189	2.483	-54.856	-3.521	-36.582	-41.028	-0.002
190	2.483	-49.066	-21.201	-20.045	-49.549	-0.002
191	2.483	-54.018	-5.592	-34.532	-41.914	-0.002
192	2.483	-48.229	-23.271	-17.995	-50.436	-0.002
193	2.483	-54.803	-3.087	-36.849	-40.681	-0.002
194	2.483	-49.013	-20.767	-20.312	-49.203	-0.002
195	2.483	-53.401	-6.518	-33.442	-42.140	-0.002
196	2.483	-47.612	-24.197	-16.905	-50.661	-0.002
197	2.483	-54.722	-2.424	-37.257	-40.153	-0.002
198	2.483	-48.932	-20.104	-20.720	-48.674	-0.002
199	2.483	-113.196	175.982	-204.170	45.802	-0.001
200	2.483	11.445	-204.628	151.843	-137.649	-0.003
201	2.483	-53.165	-6.872	-33.025	-42.227	-0.002
202	2.483	-47.375	-24.552	-16.488	-50.748	-0.002
203	2.483	-54.695	-2.202	-37.394	-39.976	-0.002
204	2.483	-53.165	-6.872	-33.025	-42.227	-0.002
205	2.483	-48.905	-19.882	-20.857	-48.497	-0.002
206	2.483	-47.375	-24.552	-16.488	-50.748	-0.002
207	2.483	11.626	-204.607	151.957	-137.507	-0.003
208	2.483	-112.882	175.775	-203.800	45.876	-0.001
209	2.483	12.301	-204.528	152.382	-136.977	-0.003
210	2.483	-111.942	175.156	-202.697	46.095	-0.001
211	2.483	-53.928	-1.556	-37.302	-38.978	-0.002
212	2.483	-51.689	-8.395	-30.905	-42.274	-0.002
213	2.483	-48.193	-19.069	-20.921	-47.419	-0.002
214	2.483	-45.954	-25.907	-14.524	-50.715	-0.002
215	2.483	12.775	-204.473	152.681	-136.605	-0.003
216	2.483	-110.829	174.586	-201.504	46.470	-0.001
217	2.483	13.388	-204.402	153.067	-136.124	-0.003
218	2.483	-110.513	174.216	-201.019	46.430	-0.001
219	2.483	-53.162	-0.911	-37.210	-37.980	-0.002
220	2.483	-50.213	-9.917	-28.785	-42.321	-0.002
221	2.483	-47.482	-18.257	-20.985	-46.341	-0.002
222	2.483	-44.532	-27.263	-12.560	-50.682	-0.002
223	2.483	13.474	-204.392	153.122	-136.056	-0.003
224	2.483	-110.302	174.058	-200.758	46.465	-0.001
225	2.483	-47.308	-17.839	-21.154	-45.921	-0.002
226	2.483	-49.677	-10.577	-27.940	-42.415	-0.002
227	2.483	-44.005	-27.913	-11.728	-50.775	-0.002
228	2.483	-52.969	-0.078	-37.657	-37.252	-0.002
229	2.483	13.511	-204.088	152.934	-135.814	-0.003
230	2.483	-110.172	173.705	-200.418	46.305	-0.001
231	2.483	-47.127	-17.406	-21.329	-45.486	-0.002
232	2.483	-49.150	-11.228	-27.108	-42.508	-0.002
233	2.483	-43.469	-28.574	-10.883	-50.869	-0.003
234	2.483	13.604	-203.323	152.464	-135.204	-0.004
235	2.483	-109.422	172.579	-199.093	46.030	-0.001
236	2.483	-47.181	-16.832	-21.771	-45.115	-0.002
237	2.483	-48.787	-11.917	-26.366	-42.744	-0.002
238	2.483	-43.005	-29.318	-10.030	-51.072	-0.003
239	2.483	13.690	-202.620	152.031	-134.643	-0.004
240	2.483	-108.879	171.765	-198.135	45.832	-0.001
241	2.483	-108.738	171.554	-197.886	45.780	-0.001
242	2.483	-80.828	86.325	-118.165	4.701	-0.002
243	2.483	-52.917	1.097	-38.445	-36.379	-0.002
244	2.483	-48.438	-12.580	-25.652	-42.971	-0.002
245	2.483	-47.837	-14.415	-23.936	-43.855	-0.002
246	2.483	-47.237	-16.249	-22.220	-44.740	-0.002
247	2.483	-42.758	-29.926	-9.427	-51.332	-0.003
248	2.483	-14.520	-116.155	71.230	-92.893	-0.003







**RESULTADOS**

3.2 TENSIONES NORMALES UNITARIAS

Análisis por elementos finitos

Punto de tens. núm.	$\sigma_x$ (N = 1 kN) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>y</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>z</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>y</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>z</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>xy</sub> = 1 kNm <sup>2</sup> ) [N/mm <sup>2</sup> ]
249	2.483	13.719	-202.385	151.886	-134.455	-0.004
250	2.483	-113.255	192.696	-215.948	57.660	-0.002
251	2.483	23.621	-225.274	175.010	-143.798	-0.004
252	2.483	-102.821	189.309	-206.142	62.576	-0.001
253	2.483	-102.057	186.974	-203.958	61.451	0.000
254	2.483	33.291	-226.326	182.633	-137.757	-0.006
255	2.483	34.055	-228.661	184.817	-138.882	-0.005
256	2.483	-102.057	186.974	-203.958	61.451	0.000
257	2.483	-102.567	189.142	-205.843	62.636	-0.001
258	2.483	-101.719	186.784	-203.583	61.552	0.000
259	2.483	33.529	-226.298	182.783	-137.570	-0.006
260	2.483	34.426	-228.820	185.193	-138.735	-0.005
261	2.483	-101.651	188.539	-204.768	62.850	-0.001
262	2.483	-100.784	186.255	-202.546	61.833	0.000
263	2.483	34.239	-226.215	183.231	-137.012	-0.006
264	2.483	34.967	-228.555	185.391	-138.166	-0.005
265	2.483	-100.587	187.840	-203.519	63.099	-0.001
266	2.483	-100.223	185.939	-201.925	62.001	0.000
267	2.483	34.704	-226.161	183.524	-136.647	-0.006
268	2.483	36.001	-228.731	186.252	-137.566	-0.006
269	2.483	-99.749	185.671	-201.400	62.143	0.000
270	2.483	-100.249	187.617	-203.123	63.178	-0.001
271	2.483	35.319	-226.090	183.911	-136.164	-0.006
272	2.483	36.084	-228.425	186.095	-137.290	-0.006
273	2.483	-99.422	185.486	-201.037	62.242	0.000
274	2.483	-100.138	187.544	-202.991	63.204	-0.001
275	2.483	35.337	-225.939	183.818	-136.044	-0.006
276	2.483	36.095	-228.330	186.037	-137.214	-0.006
277	2.483	-98.600	184.906	-200.044	62.406	0.000
278	2.483	-99.713	187.245	-202.479	63.289	-0.001
279	2.483	35.752	-225.505	183.809	-135.444	-0.006
280	2.483	36.129	-228.057	185.869	-136.996	-0.006
281	2.483	-98.429	184.553	-199.674	62.275	0.000
282	2.483	-99.217	186.163	-201.367	62.867	-0.001
283	2.483	35.684	-224.981	183.393	-135.118	-0.006
284	2.483	36.230	-227.226	185.358	-136.333	-0.006
285	2.483	-98.215	183.898	-199.063	61.958	0.000
286	2.483	-98.577	185.203	-200.237	62.633	-0.001
287	2.483	35.589	-224.270	182.826	-134.678	-0.006
288	2.483	36.308	-226.587	184.965	-135.824	-0.006
289	2.483	-97.836	183.137	-198.258	61.683	0.000
290	2.483	-98.363	184.881	-199.858	62.554	-0.001
291	2.483	-98.217	183.905	-199.069	61.962	0.000
292	2.483	-97.708	182.880	-197.986	61.590	0.000
293	2.483	35.564	-224.082	182.676	-134.563	-0.006
294	2.483	35.707	-225.062	183.466	-135.160	-0.006
295	2.483	35.992	-226.308	184.544	-135.847	-0.006
296	2.483	42.774	-246.098	203.269	-145.174	-0.006
297	2.483	67.008	-253.964	226.046	-133.756	-0.009
298	2.483	67.248	-254.121	226.328	-133.700	-0.009
299	2.483	68.145	-254.711	227.381	-133.491	-0.009
300	2.483	69.232	-255.427	228.657	-133.236	-0.009
301	2.483	69.579	-255.655	229.064	-133.155	-0.009
302	2.483	69.692	-255.729	229.196	-133.129	-0.009
303	2.483	70.110	-256.016	229.696	-133.039	-0.009
304	2.483	70.591	-257.079	230.785	-133.458	-0.009
305	2.483	71.240	-258.053	231.931	-133.696	-0.009
306	2.483	77.365	-276.405	249.179	-142.461	-0.010
307	2.483	71.466	-258.392	232.330	-133.778	-0.009
308	2.483	74.415	-267.398	240.754	-138.119	-0.010
309	2.483	77.365	-276.405	249.179	-142.461	-0.010
310	2.483	77.874	-277.226	250.118	-142.688	-0.010
311	2.483	78.226	-277.794	250.767	-142.845	-0.010
312	2.483	78.572	-278.351	251.404	-142.999	-0.010
313	2.483	79.002	-279.045	252.198	-143.190	-0.010
314	2.483	79.002	-279.045	252.198	-143.190	-0.010
315	2.483	79.761	-279.541	253.086	-143.011	-0.010
316	2.483	80.362	-279.933	253.790	-142.868	-0.010
317	2.483	81.334	-280.569	254.929	-142.638	-0.010
318	2.483	81.655	-280.778	255.304	-142.562	-0.010
319	2.483	92.173	-284.192	265.190	-137.606	-0.012
320	2.483	84.572	-253.404	238.158	-121.024	-0.011
321	2.483	87.085	-261.076	245.334	-124.722	-0.012
322	2.483	89.597	-268.748	252.511	-128.420	-0.012
323	2.483	84.594	-253.224	238.047	-120.880	-0.011
324	2.483	89.814	-269.073	252.893	-128.499	-0.012
325	2.483	84.675	-252.562	237.640	-120.352	-0.011





**RESULTADOS**

3.2 TENSIONES NORMALES UNITARIAS

Análisis por elementos finitos

Punto de tens. núm.	$\sigma_x$ (N = 1 kN) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>y</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>z</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>y</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>z</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>y</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>z</sub> = 1 kNm) [N/mm <sup>2</sup> ]
326	2.483	90.458	-270.040	254.030	-128.735	-0.012	
327	2.483	84.774	-251.749	237.140	-119.704	-0.011	
328	2.483	90.944	-271.105	255.125	-129.151	-0.012	
329	2.483	84.806	-251.485	236.978	-119.493	-0.011	
330	2.483	91.372	-271.411	255.644	-129.069	-0.012	
331	2.483	84.817	-251.396	236.923	-119.422	-0.011	
332	2.483	91.482	-271.484	255.774	-129.043	-0.012	
333	2.483	84.922	-251.095	236.786	-119.134	-0.011	
334	2.483	91.817	-271.704	256.167	-128.965	-0.012	
335	2.483	85.934	-251.266	237.627	-118.545	-0.011	
336	2.483	92.872	-272.398	257.405	-128.718	-0.013	
337	2.483	86.621	-251.186	238.059	-118.007	-0.011	
338	2.483	93.796	-273.006	258.490	-128.502	-0.013	
339	2.483	86.846	-251.160	238.201	-117.830	-0.011	
340	2.483	94.055	-273.176	258.794	-128.442	-0.013	
341	2.483	102.691	-287.606	275.075	-132.650	-0.014	
342	2.483	99.020	-274.788	263.460	-126.102	-0.014	
343	2.483	103.437	-287.735	275.697	-132.219	-0.014	
344	2.483	104.796	-287.970	276.830	-131.432	-0.014	
345	2.483	105.925	-288.166	277.771	-130.778	-0.014	
346	2.483	107.042	-287.712	278.248	-129.670	-0.015	
347	2.483	103.985	-276.399	268.126	-123.763	-0.015	
348	2.483	108.211	-287.236	278.746	-128.511	-0.015	
349	2.483	104.478	-276.783	268.748	-123.691	-0.015	
350	2.483	105.362	-277.485	269.870	-123.569	-0.015	
351	2.483	108.504	-286.536	278.463	-127.806	-0.015	
352	2.483	106.269	-277.892	270.801	-123.222	-0.015	
353	2.483	106.637	-278.133	271.233	-123.135	-0.015	
354	2.483	108.905	-285.580	278.076	-126.845	-0.015	
355	2.483	106.637	-278.133	271.233	-123.135	-0.015	
356	2.483	106.637	-278.133	271.233	-123.135	-0.015	
357	2.483	109.112	-284.715	277.617	-126.084	-0.015	
358	2.483	107.039	-278.780	271.973	-123.314	-0.015	
359	2.483	108.833	-283.106	276.289	-125.134	-0.015	
360	2.483	107.601	-279.843	273.120	-123.676	-0.015	
361	2.483	108.274	-280.772	274.252	-123.865	-0.015	
362	2.483	108.438	-281.273	274.720	-124.106	-0.015	
363	2.483	108.493	-281.440	274.876	-124.186	-0.015	
364	2.483	108.139	-280.554	274.002	-123.804	-0.015	
365	2.483	116.633	-260.828	266.197	-103.795	-0.014	
366	2.483	141.428	-291.532	305.411	-108.244	-0.014	
367	2.483	141.592	-292.033	305.880	-108.485	-0.014	
368	2.483	141.756	-292.533	306.348	-108.727	-0.014	
369	2.483	141.947	-292.944	306.772	-108.885	-0.014	
370	2.483	141.457	-291.297	305.267	-108.056	-0.014	
371	2.483	142.836	-294.852	308.745	-109.618	-0.014	
372	2.483	141.542	-290.594	304.834	-107.496	-0.014	
373	2.483	141.599	-290.134	304.551	-107.128	-0.014	
374	2.483	143.416	-296.096	310.032	-110.097	-0.014	
375	2.483	141.673	-289.525	304.176	-106.643	-0.014	
376	2.483	141.673	-289.525	304.176	-106.643	-0.014	
377	2.483	144.805	-297.807	312.222	-110.340	-0.014	
378	2.483	142.275	-289.455	304.556	-106.170	-0.014	
379	2.483	146.244	-299.580	314.491	-110.592	-0.014	
380	2.483	142.780	-289.396	304.874	-105.774	-0.014	
381	2.483	143.512	-289.311	305.335	-105.199	-0.014	
382	2.483	147.388	-300.497	315.950	-110.441	-0.014	
383	2.483	143.701	-289.289	305.455	-105.051	-0.014	
384	2.483	148.860	-301.675	317.826	-110.246	-0.014	
385	2.483	150.047	-302.526	319.268	-110.018	-0.014	
386	2.483	151.852	-303.357	321.136	-109.343	-0.015	
387	2.483	148.666	-290.900	310.121	-102.711	-0.015	
388	2.483	153.347	-304.046	322.685	-108.784	-0.015	
389	2.483	146.421	-270.496	294.194	-89.761	-0.017	
390	2.483	153.630	-292.512	314.787	-100.372	-0.016	
391	2.483	146.551	-270.585	294.349	-89.733	-0.017	
392	2.483	153.849	-292.473	314.916	-100.191	-0.016	
393	2.483	147.309	-271.109	295.257	-89.573	-0.017	
394	2.483	154.517	-292.357	315.310	-99.640	-0.016	
395	2.483	147.924	-271.533	295.992	-89.443	-0.017	
396	2.483	155.370	-292.432	315.969	-99.094	-0.016	
397	2.483	148.852	-272.173	297.102	-89.247	-0.017	
398	2.483	155.529	-292.181	315.906	-98.804	-0.016	
399	2.483	149.013	-272.284	297.295	-89.214	-0.017	
400	2.483	155.540	-292.077	315.841	-98.722	-0.016	
401	2.483	149.428	-272.559	297.784	-89.118	-0.017	
402	2.483	155.569	-291.803	315.669	-98.507	-0.016	





**RESULTADOS**

3.2 TENSIONES NORMALES UNITARIAS

Análisis por elementos finitos

Punto de tens. núm.	$\sigma_x$ (N = 1 kN) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>y</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>z</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>u</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>v</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>w</sub> = 1 kNm <sup>2</sup> ) [N/mm <sup>2</sup> ]
403	2.483	149.865	-273.581	298.813	-89.539	-0.017
404	2.483	155.659	-290.940	315.128	-97.829	-0.016
405	2.483	150.498	-274.546	299.941	-89.781	-0.017
406	2.483	155.724	-290.320	314.739	-97.342	-0.016
407	2.483	150.711	-274.869	300.319	-89.862	-0.017
408	2.483	153.223	-282.541	307.495	-93.560	-0.017
409	2.483	155.736	-290.214	314.672	-97.258	-0.016
410	2.483	163.865	-307.460	332.571	-103.828	-0.017
411	2.483	174.383	-310.874	342.456	-98.872	-0.018
412	2.483	174.574	-310.852	342.577	-98.722	-0.018
413	2.483	175.308	-310.766	343.039	-98.146	-0.019
414	2.483	175.812	-310.708	343.356	-97.751	-0.019
415	2.483	176.412	-310.638	343.735	-97.280	-0.019
416	2.483	176.412	-310.638	343.735	-97.280	-0.019
417	2.483	176.486	-310.029	343.360	-96.794	-0.019
418	2.483	176.542	-309.569	343.077	-96.427	-0.019
419	2.483	176.628	-308.866	342.644	-95.866	-0.019
420	2.483	28.529	143.698	-80.597	122.340	-0.001
421	2.483	48.197	83.769	-24.511	93.485	-0.003
422	2.483	28.529	143.698	-80.597	122.340	-0.001
423	2.483	34.591	125.185	-63.280	113.417	-0.002
424	2.483	40.654	106.671	-45.963	104.493	-0.003
425	2.483	48.192	83.654	-24.434	93.400	-0.003
426	2.483	112.424	-112.488	159.033	-1.140	-0.012
427	2.483	176.657	-308.630	342.500	-95.679	-0.019
428	2.483	40.821	106.402	-45.656	104.419	-0.003
429	2.483	28.557	144.345	-81.031	122.821	-0.001
430	2.483	48.224	84.398	-24.933	93.952	-0.003
431	2.483	41.330	105.580	-44.716	104.192	-0.003
432	2.483	28.577	144.792	-81.331	123.153	-0.001
433	2.483	48.245	84.873	-25.251	94.305	-0.003
434	2.483	41.986	104.523	-43.507	103.900	-0.003
435	2.483	28.410	145.680	-82.073	123.668	-0.001
436	2.483	48.087	85.632	-25.897	94.734	-0.003
437	2.483	42.077	104.204	-43.217	103.736	-0.003
438	2.483	28.620	145.777	-81.992	123.884	-0.001
439	2.483	48.283	85.733	-25.828	94.944	-0.003
440	2.483	42.291	104.031	-42.944	103.764	-0.003
441	2.483	28.713	145.787	-81.933	123.957	-0.001
442	2.483	48.308	85.882	-25.915	95.067	-0.003
443	2.483	42.532	103.737	-42.566	103.723	-0.003
444	2.483	28.967	145.815	-81.771	124.155	-0.001
445	2.483	48.659	85.774	-25.590	95.237	-0.003
446	2.483	43.479	103.255	-41.552	104.045	-0.003
447	2.483	29.752	145.900	-81.273	124.767	-0.001
448	2.483	49.168	86.454	-25.705	96.078	-0.003
449	2.483	44.059	102.876	-40.874	104.182	-0.003
450	2.483	30.415	145.972	-80.851	125.284	0.000
451	2.483	49.952	86.077	-24.882	96.361	-0.003
452	2.483	44.808	102.387	-39.997	104.360	-0.003
453	2.483	30.634	145.996	-80.712	125.454	0.000
454	2.483	44.944	102.298	-39.838	104.392	-0.003
455	2.483	50.297	85.952	-24.549	96.514	-0.003
456	2.483	58.155	98.010	-27.421	110.617	-0.003
457	2.483	63.508	81.665	-12.132	102.738	-0.002
458	2.483	50.071	139.687	-62.443	134.613	0.001
459	2.483	71.366	93.722	-15.005	116.841	-0.003
460	2.483	76.718	77.377	0.284	108.963	-0.002
461	2.483	76.911	77.400	0.406	109.114	-0.002
462	2.483	71.681	93.515	-14.635	116.915	-0.003
463	2.483	77.648	77.485	0.870	109.692	-0.002
464	2.483	72.621	92.897	-13.532	117.134	-0.003
465	2.483	78.149	77.544	1.186	110.086	-0.002
466	2.483	73.236	92.492	-12.809	117.278	-0.003
467	2.483	78.747	77.613	1.562	110.555	-0.002
468	2.483	74.050	91.957	-11.854	117.469	-0.003
469	2.483	78.747	77.613	1.562	110.555	-0.002
470	2.483	74.050	91.957	-11.854	117.469	-0.003
471	2.483	78.821	78.222	1.188	111.040	-0.002
472	2.483	74.572	91.173	-10.932	117.277	-0.003
473	2.483	78.877	78.682	0.905	111.408	-0.002
474	2.483	75.010	90.516	-10.158	117.117	-0.002
475	2.483	78.963	79.385	0.472	111.968	-0.002
476	2.483	75.655	89.548	-9.020	116.881	-0.002
477	2.483	75.824	89.294	-8.721	116.819	-0.002
478	2.483	77.408	84.457	-4.197	114.488	-0.002
479	2.483	78.992	79.620	0.327	112.156	-0.002





**RESULTADOS**

3.2 TENSIONES NORMALES UNITARIAS

Análisis por elementos finitos

Punto de tens. núm.	$\sigma_x$ (N = 1 kN) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>y</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>z</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>y</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>z</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>y</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>z</sub> = 1 kNm) [N/mm <sup>2</sup> ]
480	2.483	69.509	133.379	-44.175	143.771		0.002
481	2.483	70.179	133.030	-43.452	143.993		0.002
482	2.483	70.872	132.670	-42.706	144.223		0.002
483	2.483	71.529	132.144	-41.869	144.310		0.002
484	2.483	72.193	131.613	-41.024	144.398		0.002
485	2.483	78.211	125.635	-32.541	144.369		0.002
486	2.483	84.230	119.657	-24.058	144.339		0.003
487	2.483	84.596	119.381	-23.603	144.399		0.003
488	2.483	85.819	118.506	-22.118	144.636		0.003
489	2.483	86.914	117.892	-20.908	144.967		0.003
490	2.483	102.022	137.435	-23.875	169.490		0.002
491	2.483	132.941	102.954	22.352	166.653		0.005
492	2.483	178.969	88.015	65.612	188.339		0.007
493	2.483	179.247	87.988	65.828	188.515		0.007
494	2.483	180.137	87.903	66.522	189.079		0.007
495	2.483	180.748	88.150	66.784	189.685		0.007
496	2.483	180.997	88.251	66.890	189.932		0.007
497	2.483	184.067	91.280	66.948	194.243		0.007
498	2.483	187.136	94.308	67.007	198.555		0.007
499	2.483	187.605	94.453	67.239	198.987		0.007
500	2.483	188.197	94.582	67.571	199.495		0.007
501	2.483	189.164	94.544	68.285	200.147		0.007
502	2.483	219.208	42.758	126.041	184.375		0.015
503	2.483	220.792	37.921	130.565	182.044		0.015
504	2.483	222.376	33.085	135.089	179.713		0.016
505	2.483	222.526	32.859	135.354	179.658		0.016
506	2.483	219.238	43.005	125.889	184.572		0.015
507	2.483	223.091	32.012	136.351	179.451		0.016
508	2.483	219.334	43.787	125.408	185.196		0.015
509	2.483	223.500	31.398	137.073	179.301		0.016
510	2.483	219.394	44.282	125.103	185.591		0.015
511	2.483	223.900	30.797	137.780	179.155		0.016
512	2.483	219.453	44.766	124.806	185.976		0.015
513	2.483	224.150	30.422	138.222	179.063		0.016
514	2.483	219.739	44.799	124.986	186.201		0.015
515	2.483	224.799	29.995	138.983	179.215		0.016
516	2.483	220.197	44.852	125.274	186.560		0.015
517	2.483	225.464	29.558	139.764	179.370		0.016
518	2.483	220.665	44.907	125.569	186.928		0.015
519	2.483	226.507	28.872	140.989	179.614		0.016
520	2.483	221.310	44.982	125.976	187.434		0.015
521	2.483	221.482	45.002	126.084	187.569		0.015
522	2.483	226.834	28.656	141.373	179.691		0.016
523	2.483	214.155	86.433	91.774	211.922		0.008
524	2.483	237.469	39.813	141.110	195.102		0.015
525	2.483	256.622	18.989	169.369	193.725		0.017
526	2.483	239.147	78.322	115.262	223.697		0.009
527	2.483	253.457	34.624	156.136	202.634		0.015
528	2.483	239.147	78.322	115.262	223.697		0.009
529	2.483	253.821	34.469	156.504	202.779		0.015
530	2.483	239.972	77.783	116.228	223.892		0.010
531	2.483	254.549	34.164	157.237	203.073		0.015
532	2.483	240.542	77.410	116.896	224.027		0.010
533	2.483	255.095	34.802	157.177	203.912		0.015
534	2.483	241.531	76.909	117.952	224.365		0.010
535	2.483	255.446	34.695	157.503	204.082		0.015
536	2.483	241.799	76.589	118.368	224.325		0.010
537	2.483	255.470	34.843	157.416	204.204		0.015
538	2.483	242.010	76.425	118.633	224.357		0.010
539	2.483	255.688	34.947	157.498	204.431		0.015
540	2.483	242.105	76.097	118.931	224.189		0.010
541	2.483	255.514	35.828	156.755	204.936		0.015
542	2.483	242.760	75.039	120.140	223.897		0.010
543	2.483	255.533	36.275	156.455	205.268		0.015
544	2.483	243.270	74.217	121.080	223.670		0.010
545	2.483	243.436	73.949	121.387	223.595		0.010
546	2.483	249.499	55.435	138.704	214.672		0.012
547	2.483	255.562	36.922	156.021	205.749		0.015
548	2.483	255.562	36.922	156.021	205.749		0.015
549	2.483	260.097	68.541	137.046	231.445		0.011
550	2.483	266.706	48.360	155.923	221.718		0.013
551	2.483	273.315	28.179	174.801	211.991		0.015
552	2.483	260.097	68.541	137.046	231.445		0.011
553	2.483	273.533	27.847	175.189	211.907		0.015
554	2.483	260.168	69.213	136.625	231.973		0.011
555	2.483	274.177	26.867	176.335	211.662		0.016
556	2.483	260.217	69.685	136.329	232.343		0.011





**RESULTADOS**

3.2 TENSIONES NORMALES UNITARIAS

Análisis por elementos finitos

Punto de tens. núm.	$\sigma_x$ (N = 1 kN) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>y</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>z</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>u</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>v</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>w</sub> = 1 kNm <sup>2</sup> ) [N/mm <sup>2</sup> ]
557	2.483	274.631	25.878	177.353	211.277	0.016
558	2.483	260.291	70.389	135.887	232.897	0.011
559	2.483	275.013	25.593	177.825	211.342	0.016
560	2.483	260.304	70.509	135.812	232.991	0.011
561	2.483	275.186	25.376	178.101	211.309	0.016
562	2.483	260.369	70.791	135.660	233.237	0.010
563	2.483	275.556	25.219	178.475	211.457	0.016
564	2.483	261.315	70.685	136.408	233.827	0.011
565	2.483	276.882	23.997	180.276	211.518	0.016
566	2.483	261.984	70.801	136.802	234.379	0.011
567	2.483	277.605	23.805	180.926	211.889	0.016
568	2.483	262.202	70.839	136.931	234.560	0.011
569	2.483	277.605	23.805	180.926	211.889	0.016
570	2.483	286.409	9.321	197.365	207.760	0.018
571	2.483	282.570	22.194	185.592	214.229	0.016
572	2.483	287.155	9.192	197.987	208.192	0.018
573	2.483	288.514	8.957	199.120	208.978	0.018
574	2.483	289.644	8.761	200.061	209.632	0.018
575	2.483	290.806	9.234	200.557	210.785	0.017
576	2.483	287.534	20.583	190.258	216.568	0.016
577	2.483	287.987	20.222	190.833	216.629	0.016
578	2.483	291.929	9.691	201.036	211.899	0.017
579	2.483	288.845	19.533	191.928	216.740	0.016
580	2.483	292.238	10.428	200.738	212.640	0.017
581	2.483	289.624	19.208	192.711	217.056	0.016
582	2.483	290.218	18.817	193.409	217.195	0.016
583	2.483	292.634	11.375	200.355	213.594	0.017
584	2.483	290.468	18.442	193.850	217.104	0.016
585	2.483	290.869	17.841	194.558	216.957	0.016
586	2.483	292.830	12.212	199.907	214.326	0.017
587	2.483	291.260	17.064	195.382	216.678	0.016
588	2.483	292.551	13.821	198.579	215.276	0.017
589	2.483	291.842	16.380	196.277	216.601	0.016
590	2.483	291.993	16.155	196.542	216.546	0.016
591	2.483	291.989	15.820	196.774	216.305	0.017
592	2.483	291.877	15.820	196.694	216.226	0.017
593	2.483	291.990	61.172	164.928	248.594	0.012
594	2.483	325.146	5.395	227.701	232.166	0.022
595	2.483	325.310	4.894	228.169	231.925	0.022
596	2.483	325.365	4.727	228.325	231.845	0.022
597	2.483	325.857	3.572	229.487	231.368	0.022
598	2.483	325.158	5.676	227.512	232.375	0.022
599	2.483	325.170	5.932	227.341	232.565	0.021
600	2.483	326.555	2.075	231.035	230.792	0.022
601	2.483	325.213	6.911	226.684	233.293	0.021
602	2.483	325.238	7.473	226.307	233.710	0.021
603	2.483	327.134	0.831	232.322	230.314	0.022
604	2.483	325.238	7.473	226.307	233.710	0.021
605	2.483	328.516	-0.872	234.501	230.071	0.022
606	2.483	325.767	7.531	226.643	234.123	0.021
607	2.483	326.192	7.577	226.913	234.454	0.021
608	2.483	329.962	-2.653	236.781	229.818	0.023
609	2.483	326.681	7.378	227.401	234.656	0.021
610	2.483	327.251	7.693	227.587	235.280	0.021
611	2.483	327.251	7.693	227.587	235.280	0.021
612	2.483	331.044	-3.520	238.160	229.961	0.023
613	2.483	332.530	-4.709	240.054	230.158	0.023
614	2.483	333.765	-5.599	241.558	230.392	0.023
615	2.483	335.570	-6.430	243.426	231.067	0.023
616	2.483	332.216	6.081	232.253	237.619	0.021
617	2.483	337.065	-7.119	244.975	231.627	0.023
618	2.483	321.778	51.504	192.924	262.629	0.013
619	2.483	337.180	4.470	236.919	239.959	0.021
620	2.483	322.025	51.342	193.214	262.686	0.014
621	2.483	337.560	4.305	237.305	240.108	0.021
622	2.483	322.926	50.749	194.272	262.897	0.014
623	2.483	338.092	4.576	237.493	240.674	0.021
624	2.483	324.002	50.041	195.535	263.149	0.014
625	2.483	338.885	4.668	237.993	241.297	0.021
626	2.483	324.347	49.814	195.940	263.230	0.014
627	2.483	339.209	4.706	238.197	241.551	0.021
628	2.483	324.461	49.739	196.074	263.256	0.014
629	2.483	339.220	4.800	238.139	241.626	0.021
630	2.483	324.889	49.433	196.593	263.339	0.014
631	2.483	339.299	5.442	237.744	242.138	0.021
632	2.483	325.376	48.367	197.689	262.922	0.014
633	2.483	339.355	5.905	237.459	242.507	0.021





**RESULTADOS**

3.2 TENSIONES NORMALES UNITARIAS

Análisis por elementos finitos

Punto de tens. núm.	$\sigma_x$ (N = 1 kN) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>y</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>z</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>u</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>v</sub> = 1 kNm) [N/mm <sup>2</sup> ]	$\sigma_x$ (M <sub>w</sub> = 1 kNm <sup>2</sup> ) [N/mm <sup>2</sup> ]
634	2.483	326.019	47.401	198.826	262.686	0.014
635	2.483	339.433	6.544	237.066	243.017	0.021
636	2.483	326.236	47.076	199.208	262.607	0.014
637	2.483	332.845	26.895	218.085	252.879	0.017
638	2.483	339.454	6.713	236.962	243.152	0.021
639	2.483	347.583	-10.533	254.861	236.582	0.023
640	2.483	333.086	62.442	193.294	278.357	0.012
641	2.483	358.101	-13.947	264.746	241.538	0.024
642	2.483	358.204	-13.936	264.812	241.618	0.024
643	2.483	333.375	62.253	193.632	278.425	0.012
644	2.483	358.803	-13.870	265.192	242.085	0.024
645	2.483	334.238	61.689	194.643	278.630	0.012
646	2.483	359.287	-13.818	265.500	242.463	0.024
647	2.483	334.803	61.320	195.304	278.764	0.012
648	2.483	359.712	-13.771	265.770	242.794	0.024
649	2.483	335.354	60.959	195.950	278.894	0.012
650	2.483	360.115	-13.728	266.026	243.108	0.024
651	2.483	335.739	60.708	196.400	278.985	0.012
652	2.483	360.128	-13.427	265.824	243.332	0.023
653	2.483	336.066	60.180	197.005	278.839	0.012
654	2.483	360.147	-12.994	265.534	243.653	0.023
655	2.483	336.412	59.622	197.643	278.685	0.012
656	2.483	360.167	-12.551	265.237	243.982	0.023
657	2.483	336.806	58.987	198.369	278.509	0.012
658	2.483	360.197	-11.875	264.783	244.484	0.023
659	2.483	337.376	58.068	199.419	278.256	0.012
660	2.483	348.791	23.210	232.025	261.454	0.018
661	2.483	360.207	-11.649	264.631	244.652	0.023
662	2.483	337.292	58.203	199.266	278.293	0.012
663	2.483	-81.871	179.528	-184.357	70.325	0.000
664	2.483	-14.525	-26.121	8.002	-28.796	-0.004
665	2.483	52.821	-231.770	200.361	-127.918	-0.008
666	2.483	52.979	-232.008	200.640	-127.976	-0.008
667	2.483	-81.839	179.786	-184.516	70.530	0.000
668	2.483	53.571	-232.896	201.685	-128.192	-0.008
669	2.483	-81.747	180.537	-184.978	71.129	0.000
670	2.483	53.987	-233.519	202.419	-128.344	-0.008
671	2.483	-81.876	181.456	-185.715	71.693	0.000
672	2.483	54.521	-234.321	203.362	-128.540	-0.008
673	2.483	-81.626	181.536	-185.593	71.926	0.000
674	2.483	54.596	-234.433	203.494	-128.567	-0.008
675	2.483	-81.537	181.546	-185.537	71.996	0.000
676	2.483	54.981	-234.686	203.947	-128.477	-0.008
677	2.483	-81.272	181.577	-185.370	72.203	0.000
678	2.483	55.986	-235.348	205.127	-128.242	-0.008
679	2.483	-80.453	181.672	-184.853	72.847	0.000
680	2.483	56.955	-235.985	206.264	-128.016	-0.008
681	2.483	-79.780	181.750	-184.430	73.375	0.000
682	2.483	-79.597	181.772	-184.314	73.518	0.000
683	2.483	57.279	-236.198	206.645	-127.940	-0.008
684	2.483	61.487	-237.564	210.599	-125.957	-0.009
685	2.483	65.694	-238.929	214.553	-123.975	-0.009
686	2.483	65.822	-238.913	214.633	-123.874	-0.009
687	2.483	66.826	-238.784	215.257	-123.077	-0.009
688	2.483	67.130	-238.642	215.374	-122.762	-0.009
689	2.483	67.841	-238.135	215.524	-121.903	-0.009
690	2.483	69.015	-237.140	215.661	-120.370	-0.009
691	2.483	70.282	-235.289	215.264	-118.162	-0.009
692	2.483	72.683	-234.160	216.180	-115.672	-0.010
693	2.483	75.287	-233.793	217.776	-113.582	-0.010
694	2.483	78.349	-234.021	220.117	-111.594	-0.010
695	2.483	81.493	-234.815	222.912	-109.952	-0.011
696	2.483	-36.010	167.625	-143.348	94.055	-0.001
697	2.483	111.280	-244.483	250.908	-95.917	-0.014
698	2.483	7.578	153.479	-102.382	114.591	-0.001
699	2.483	141.068	-254.150	278.905	-81.883	-0.017
700	2.483	141.068	-254.150	278.905	-81.883	-0.017
701	2.483	7.935	153.233	-101.955	114.667	-0.001
702	2.483	141.508	-254.304	279.326	-81.683	-0.017
703	2.483	8.941	152.538	-100.751	114.879	-0.001
704	2.483	142.553	-253.892	279.780	-80.656	-0.017
705	2.483	9.908	152.018	-99.697	115.188	-0.001
706	2.483	142.912	-254.005	280.116	-80.484	-0.017
707	2.483	10.170	151.691	-99.281	115.139	-0.001
708	2.483	142.966	-253.820	280.024	-80.314	-0.017
709	2.483	10.431	151.495	-98.957	115.183	-0.001
710	2.483	143.152	-253.725	280.090	-80.116	-0.017





RESULTADOS

3.2 TENSIONES NORMALES UNITARIAS

Análisis por elementos finitos

Table with 7 columns: Punto de tens. núm., sigma\_x (N = 1 kN), sigma\_x (My = 1 kNm), sigma\_x (Mz = 1 kNm), sigma\_x (Muy = 1 kNm), sigma\_x (Muz = 1 kNm), and sigma\_x (M0 = 1 kNm^2).

3.3 TENSIONES TANGENCIALES UNITARIAS

Análisis por elementos finitos

Large table with 14 columns: Punto de tens. núm., V\_y = 1 kN (Txy, Txz), V\_z = 1 kN (Txy, Tsz), V\_u = 1 kN (Txu, Txv), V\_v = 1 kN (Txu, Txv), M\_xp = 1 kNm (Txy, Tsz), and M\_xs = 1 kNm (Txy, Tsz).





RESULTADOS

3.3 TENSIONES TANGENCIALES UNITARIAS

Análisis por elementos finitos

Table with 14 columns: Punto de tens. núm., Vy = 1 kN (Txy, Txz), Vz = 1 kN (Txy, Txz), Vx = 1 kN (Txu, Txy), Vy = 1 kN (Txu, Txy), Mx,p = 1 kNm (Txy, Txz), and Mx,s = 1 kNm (Txy, Txz). Rows 64-140.







RESULTADOS

3.3 TENSIONES TANGENCIALES UNITARIAS

Análisis por elementos finitos

Table with columns: Punto de tens. núm., Vy = 1 kN (Txy, Txz), Vz = 1 kN (Txy, Txz), Vu = 1 kN (Txy, Txz), Vv = 1 kN (Txy, Txz), Mx,p = 1 kNm (Txy, Txz), Mx,s = 1 kNm (Txy, Txz). Rows 141-217.





RESULTADOS

3.3 TENSIONES TANGENCIALES UNITARIAS

Análisis por elementos finitos

Table with 14 columns: Punto de tens. núm., Vy = 1 kN (Txy, Txz), Vz = 1 kN (Txy, Txz), Vx = 1 kN (Txu, Tvx), Vy = 1 kN (Txu, Tvx), Mx,p = 1 kNm (Txy, Txz), and Mx,s = 1 kNm (Txy, Txz). Rows 218-294.





**RESULTADOS**

**3.3 TENSIONES TANGENCIALES UNITARIAS**

**Análisis por elementos finitos**

Punto de tens. núm.	V <sub>y</sub> = 1 kN		V <sub>z</sub> = 1 kN		V <sub>y</sub> = 1 kN		V <sub>z</sub> = 1 kN		M <sub>x,p</sub> = 1 kNm		M <sub>x,s</sub> = 1 kNm	
	τ <sub>xy</sub> [N/mm <sup>2</sup> ]	τ <sub>xz</sub> [N/mm <sup>2</sup> ]	τ <sub>xy</sub> [N/mm <sup>2</sup> ]	τ <sub>xz</sub> [N/mm <sup>2</sup> ]	τ <sub>xu</sub> [N/mm <sup>2</sup> ]	τ <sub>xv</sub> [N/mm <sup>2</sup> ]	τ <sub>xu</sub> [N/mm <sup>2</sup> ]	τ <sub>xv</sub> [N/mm <sup>2</sup> ]	τ <sub>xy</sub> [N/mm <sup>2</sup> ]	τ <sub>xz</sub> [N/mm <sup>2</sup> ]	τ <sub>xy</sub> [N/mm <sup>2</sup> ]	τ <sub>xz</sub> [N/mm <sup>2</sup> ]
295	1.998	-0.558	5.528	0.744	-1.105	-2.382	3.704	3.847	554.179	626.238	237.228	353.557
296	-0.005	-0.040	-0.013	1.126	0.579	-0.579	-0.553	0.541	-197.506	197.721	-53.161	52.477
297	0.412	1.720	1.101	5.571	1.546	-2.251	-2.869	4.438	-523.618	789.926	-210.308	321.312
298	0.489	1.688	1.251	5.429	1.456	-2.231	-2.668	4.462	-487.856	793.197	-196.004	322.259
299	0.779	1.566	1.812	4.898	1.121	-2.159	-1.913	4.556	-354.192	805.427	-142.541	325.798
300	1.130	1.419	2.492	4.253	0.715	-2.071	-0.998	4.668	-192.110	820.256	-77.712	330.089
301	1.242	1.372	2.709	4.048	0.586	-2.043	-0.706	4.704	-140.455	824.982	-57.051	331.457
302	1.279	1.357	2.779	3.981	0.544	-2.034	-0.611	4.716	-123.659	826.519	-50.333	331.902
303	1.267	1.221	2.642	3.591	0.481	-1.846	-0.425	4.377	-91.677	762.421	-37.667	306.942
304	1.377	0.848	2.776	2.410	0.075	-1.455	0.472	3.712	73.328	646.257	26.011	257.512
305	1.448	0.481	2.773	1.277	-0.264	-1.039	1.254	2.988	215.360	516.285	81.056	203.876
306	0.140	0.016	0.075	0.011	0.031	0.035	0.094	0.120	37.473	50.407	4.816	6.319
307	1.472	0.354	2.772	0.883	-0.381	-0.893	1.525	2.737	264.751	471.088	100.198	185.224
308	0.550	0.004	0.418	0.019	0.077	0.061	0.475	0.492	100.161	103.247	26.287	27.701
309	0.140	0.016	0.075	0.011	0.031	0.035	0.094	0.120	37.473	50.407	4.816	6.319
310	0.101	0.016	0.054	0.011	0.022	0.022	0.064	0.091	25.959	46.583	3.259	4.788
311	0.075	0.016	0.039	0.011	0.015	0.020	0.044	0.070	17.999	43.940	2.184	3.729
312	0.048	0.017	0.025	0.011	0.009	0.015	0.023	0.050	10.189	41.346	1.128	2.690
313	0.016	0.017	0.007	0.011	0.002	0.007	-0.002	0.025	0.463	38.116	-0.187	1.397
314	0.016	0.017	0.007	0.011	0.002	0.007	-0.002	0.025	0.463	38.116	-0.187	1.397
315	0.015	0.029	0.007	0.021	0.000	0.008	-0.014	0.036	-9.568	41.115	-0.879	2.030
316	0.014	0.039	0.007	0.028	-0.002	0.009	-0.023	0.044	-17.516	43.492	-1.428	2.531
317	0.013	0.054	0.006	0.040	-0.004	0.011	-0.037	0.057	-30.374	47.336	-2.316	3.343
318	0.012	0.060	0.006	0.044	-0.005	0.011	-0.042	0.061	-34.609	48.602	-2.609	3.610
319	-0.002	0.186	0.001	0.108	-0.041	0.038	-0.146	0.147	-72.441	75.294	-8.405	8.536
320	0.565	-0.098	-5.420	1.426	3.748	2.193	-3.129	-1.757	-902.307	-535.644	-280.377	-159.630
321	0.634	0.000	-1.257	0.029	0.964	0.923	-0.335	-0.302	-250.367	-241.213	-44.100	-41.066
322	0.892	0.178	-0.141	0.016	0.441	0.597	0.279	0.466	-130.446	-174.337	5.943	13.507
323	0.549	-0.120	-5.366	1.837	3.926	1.941	-3.305	-1.541	-944.453	-475.094	-295.268	-140.463
324	0.864	0.226	-0.120	0.026	0.398	0.593	0.247	0.492	-116.655	-176.441	5.020	15.224
325	0.487	-0.201	-5.166	3.346	4.580	1.016	-3.949	-0.747	-1099.437	-252.432	-350.028	-69.982
326	0.782	0.369	-0.061	0.056	0.270	0.580	0.151	0.568	-75.633	-182.702	2.272	20.330
327	0.411	-0.301	-4.921	5.201	5.384	-0.121	-4.741	0.228	-1289.825	21.094	-417.297	16.599
328	0.679	0.516	0.006	0.097	0.131	0.549	0.039	0.645	-29.936	-180.966	-1.122	25.919
329	0.386	-0.333	-4.842	5.802	5.644	-0.489	-4.998	0.544	-1351.518	109.728	-439.095	44.655
330	0.666	0.572	0.024	0.099	0.088	0.562	0.014	0.676	-17.431	-191.585	-1.627	27.573
331	0.378	-0.344	-4.815	6.006	5.732	-0.614	-5.084	0.651	-1372.382	139.703	-446.467	54.144
332	0.644	0.573	0.024	0.100	0.077	0.550	0.001	0.667	-13.543	-188.329	-2.114	27.286
333	0.335	-0.338	-4.338	6.106	5.518	-0.918	-4.918	0.923	-1315.485	210.994	-431.160	77.909
334	0.577	0.577	0.024	0.105	0.044	0.516	-0.036	0.638	-1.778	-178.474	-3.589	26.415
335	0.221	-0.376	-3.054	6.867	5.213	-2.007	-4.685	1.875	-1237.616	472.094	-409.609	161.924
336	0.366	0.589	0.025	0.120	-0.062	0.409	-0.155	0.548	35.311	-147.409	-8.237	23.672
337	0.125	-0.396	-1.971	7.396	4.894	-2.864	-4.439	2.627	-1154.786	676.390	-386.955	228.168
338	0.180	0.599	0.026	0.133	-0.155	0.315	-0.259	0.469	67.805	-120.192	-12.310	21.268
339	0.093	-0.403	-1.616	7.569	4.789	-3.145	-4.359	2.873	-1127.659	743.297	-379.536	249.862
340	0.129	0.602	0.026	0.137	-0.181	0.288	-0.288	0.447	76.907	-112.568	-13.451	20.594
341	-0.005	0.125	-0.003	0.057	-0.036	0.034	-0.094	0.087	-53.594	47.887	-5.263	4.813
342	-0.005	0.256	-0.002	0.079	-0.091	0.089	-0.169	0.165	66.453	-51.370	-8.498	8.255
343	-0.010	0.116	-0.005	0.052	-0.035	0.030	-0.091	0.076	-51.423	44.987	-5.066	4.223
344	-0.019	0.098	-0.009	0.043	-0.033	0.023	-0.084	0.057	-47.467	39.703	-4.706	3.150
345	-0.026	0.084	-0.012	0.036	-0.031	0.017	-0.079	0.041	-44.180	35.311	-4.407	2.258
346	-0.020	0.057	-0.010	0.025	-0.021	0.011	-0.056	0.027	-44.891	10.138	-3.170	1.464
347	0.014	0.052	0.004	0.018	-0.012	0.022	-0.025	0.044	6.022	-39.707	-1.369	2.308
348	-0.013	0.030	-0.007	0.013	-0.011	0.006	-0.032	0.012	-45.635	-16.195	-1.876	0.632
349	0.016	0.045	0.005	0.016	-0.009	0.020	-0.019	0.041	4.199	-38.841	-1.026	2.128
350	0.020	0.032	0.007	0.011	-0.004	0.017	-0.008	0.035	1.009	-37.109	-0.444	1.832
351	-0.013	0.023	-0.007	0.011	-0.009	0.004	-0.027	0.007	-43.851	-18.745	-1.618	0.373
352	0.025	-0.001	0.009	-0.001	0.008	0.008	0.019	0.016	-4.262	-39.966	1.006	0.859
353	0.027	-0.010	0.010	-0.004	0.012	0.005	0.026	0.011	-5.922	-40.008	1.390	0.625
354	-0.013	0.014	-0.007	0.007	-0.007	0.001	-0.021	0.001	-41.417	-22.226	-1.266	0.020
355	0.027	-0.010	0.010	-0.004	0.012	0.005	0.026	0.011	-5.922	-40.008	1.390	0.625
356	0.027	-0.010	0.010	-0.004	0.012	0.005	0.026	0.011	-5.922	-40.008	1.390	0.625
357	-0.011	0.009	-0.006	0.004	-0.005	0.000	-0.016	-0.002	-40.002	-25.148	-0.998	-0.124
358	0.027	0.007	0.010	0.002	0.007	0.011	0.014	0.023	-5.265	-34.346	0.756	1.196
359	-0.001	0.012	-0.003	0.006	-0.002	0.004	-0.010	0.007	-40.736	-29.630	-0.710	0.359
360	0.027	0.041	0.008	0.014	-0.004	0.023	-0.010	0.045	-3.343	-24.105	-0.558	2.330
361	0.028	0.059	0.008	0.021	-0.009	0.029	-0.021	0.057	-3.244	-16.932	-1.192	2.951
362	0.018	0.036	0.004	0.014	-0.005	0.018	-0.014	0.036	-22.294	-25.139	-0.832	1.856
363	0.014	0.029	0.003	0.011	-0.003	0.015	-0.011	0.029	-28.644	-27.874	-0.712	1.491
364	0.028	0.053	0.008	0.019	-0.007	0.027	-0.017	0.054	-3.466	-18.844	-0.978	2.759
365	0.001	-0.898	0.000	4.702	2.768	-2.805	-1.908	1.935	-613.198	621.535	-181.949	184.436
366	0.002	-0.017	0.001	-0.008	0.005	-0.004	0.014	-0.010	33.974	22.400	0.591	-0.437
367	-0.001	-0.016	0.000	-0.007	0.004	-0.005	0.011	-0.012	38.533	22.721	0.441	-0.524
368	-0.005	-0.014	-0.002	-0.007	0.002	-0.005	0.007	-0.014	43.092	23.042	0.291	-0.612
369	-0.007	-0.014	-0.003	-0.007	0.002	-0.006	0.005	-0.015	39.211	26.233	0.220	-0.664
370	0.005	-0.015	0.003	-0.007	0.005	-0.003	0.015	-0.007	33.878	20.417	0.631	-0.291
371	-0.016	-0.013	-0.007	-0.006	-0.001	-0.008	-0.002	-0.021	21.189	41.047	-0.111	-0.902





RESULTADOS

3.3 TENSIONES TANGENCIALES UNITARIAS

Análisis por elementos finitos

Punto de tens. núm.	V <sub>y</sub> = 1 kN		V <sub>z</sub> = 1 kN		V <sub>y</sub> = 1 kN		V <sub>z</sub> = 1 kN		M <sub>x,p</sub> = 1 kNm		M <sub>x,s</sub> = 1 kNm	
	τ <sub>xy</sub> [N/mm <sup>2</sup> ]	τ <sub>xz</sub> [N/mm <sup>2</sup> ]	τ <sub>xy</sub> [N/mm <sup>2</sup> ]	τ <sub>xz</sub> [N/mm <sup>2</sup> ]	τ <sub>xu</sub> [N/mm <sup>2</sup> ]	τ <sub>xv</sub> [N/mm <sup>2</sup> ]	τ <sub>xu</sub> [N/mm <sup>2</sup> ]	τ <sub>xv</sub> [N/mm <sup>2</sup> ]	τ <sub>xy</sub> [N/mm <sup>2</sup> ]	τ <sub>xz</sub> [N/mm <sup>2</sup> ]	τ <sub>xy</sub> [N/mm <sup>2</sup> ]	τ <sub>xz</sub> [N/mm <sup>2</sup> ]
372	0.014	-0.010	0.007	-0.005	0.006	0.001	0.018	0.003	33.591	14.497	0.751	0.145
373	0.019	-0.007	0.009	-0.003	0.007	0.003	0.019	0.009	33.403	10.620	0.829	0.430
374	-0.021	-0.012	-0.010	-0.006	-0.003	-0.009	-0.007	-0.024	9.435	50.708	-0.327	-1.058
375	0.026	-0.003	0.013	-0.001	0.008	0.006	0.022	0.017	33.155	5.496	0.932	0.806
376	0.026	-0.003	0.013	-0.001	0.008	0.006	0.022	0.017	33.155	5.496	0.932	0.806
377	-0.018	-0.023	-0.008	-0.011	0.001	-0.011	0.003	-0.030	13.164	48.987	0.141	-1.288
378	0.020	-0.028	0.010	-0.014	0.012	-0.002	0.036	-0.006	34.274	-2.746	1.603	-0.276
379	-0.014	-0.033	-0.006	-0.016	0.005	-0.013	0.014	-0.035	17.028	47.203	0.626	-1.526
380	0.015	-0.049	0.007	-0.024	0.016	-0.009	0.048	-0.026	35.213	-9.662	2.166	-1.183
381	0.008	-0.080	0.004	-0.040	0.022	-0.019	0.065	-0.054	36.574	-19.685	2.982	-2.499
382	-0.017	-0.050	-0.008	-0.024	0.009	-0.018	0.025	-0.050	-0.006	46.394	1.093	-2.193
383	0.006	-0.088	0.003	-0.044	0.024	-0.021	0.070	-0.062	36.927	-22.278	3.194	-2.839
384	-0.021	-0.072	-0.010	-0.035	0.013	-0.025	0.038	-0.069	-21.905	45.355	1.693	-3.051
385	-0.021	-0.089	-0.010	-0.043	0.018	-0.029	0.050	-0.082	-36.138	45.464	2.220	-3.632
386	-0.012	-0.110	-0.005	-0.053	0.026	-0.033	0.072	-0.090	-41.911	50.017	3.217	-4.003
387	0.010	-0.284	0.005	-0.145	0.072	-0.069	0.220	-0.208	58.711	-56.166	10.469	-9.853
388	-0.004	-0.127	-0.002	-0.061	0.032	-0.035	0.090	-0.097	-46.695	53.791	4.043	-4.312
389	0.098	-0.535	0.939	4.513	2.073	-2.941	-1.468	2.537	-489.698	738.182	-137.721	222.926
390	0.307	-0.645	1.166	-0.341	0.227	-0.085	0.726	-0.261	136.137	-35.214	35.695	-12.539
391	0.123	-0.511	1.002	4.438	2.006	-2.911	-1.397	2.556	-470.793	736.193	-131.865	223.310
392	0.356	-0.649	0.194	-0.343	0.239	-0.075	0.768	-0.226	137.981	-32.479	37.871	-10.791
393	0.273	-0.373	1.372	4.004	1.613	-2.731	-0.985	2.663	-360.532	724.594	-97.710	225.550
394	0.506	-0.661	0.278	-0.351	0.275	-0.043	0.896	-0.120	143.608	-24.136	44.508	-5.457
395	0.395	-0.262	1.672	3.652	1.295	-2.585	-0.652	2.751	-271.187	715.196	-70.034	227.365
396	0.663	-0.659	0.366	-0.352	0.309	-0.007	1.018	0.003	144.490	-13.699	50.877	0.688
397	0.578	-0.093	2.125	3.120	0.815	-2.366	-0.148	2.882	-136.289	701.005	-28.246	230.104
398	0.734	-0.679	0.406	-0.363	0.329	0.005	1.089	0.041	152.126	-11.505	54.555	2.617
399	0.609	-0.063	2.203	3.028	0.732	-2.328	-0.061	2.905	-112.940	698.548	-21.013	230.579
400	0.752	-0.653	0.417	-0.350	0.327	0.014	1.085	0.075	150.741	-6.237	54.395	4.358
401	0.667	-0.055	2.128	2.722	0.644	-2.105	0.078	2.746	-84.950	642.736	-10.525	215.659
402	0.800	-0.587	0.447	-0.315	0.320	0.039	1.073	0.165	147.110	7.570	53.977	8.920
403	0.790	0.030	2.304	1.836	0.138	-1.644	0.630	2.487	58.766	545.316	34.684	189.047
404	0.950	-0.377	0.540	-0.203	0.300	0.119	1.036	0.447	135.645	51.167	52.658	23.324
405	0.923	0.100	2.379	0.950	-0.303	-1.136	1.144	2.176	186.392	431.421	76.083	158.176
406	1.058	-0.227	0.607	-0.122	0.286	0.176	1.010	0.650	127.407	82.491	51.710	33.673
407	0.968	0.123	2.404	0.653	-0.451	-0.965	1.316	2.072	229.179	393.238	89.962	147.827
408	0.986	-0.004	0.761	0.013	0.128	0.109	0.874	0.871	104.046	105.903	48.937	49.266
409	1.076	-0.201	0.618	-0.109	0.283	0.186	1.005	0.684	125.995	87.863	51.547	35.448
410	-0.001	-0.183	-0.001	-0.085	0.049	-0.050	0.131	-0.136	-70.213	69.661	5.773	-6.010
411	0.015	-0.060	0.007	-0.027	0.021	-0.013	0.054	-0.033	-46.840	33.102	2.385	-1.385
412	0.016	-0.057	0.008	-0.025	0.020	-0.012	0.052	-0.030	-46.167	29.960	2.306	-1.257
413	0.018	-0.043	0.009	-0.020	0.017	-0.007	0.045	-0.018	-43.577	17.880	2.001	-0.765
414	0.020	-0.034	0.010	-0.016	0.014	-0.004	0.039	-0.010	-41.802	9.597	1.791	-0.427
415	0.022	-0.022	0.011	-0.011	0.012	0.000	0.033	-0.001	-39.685	-0.278	1.542	-0.024
416	0.022	-0.022	0.011	-0.011	0.012	0.000	0.033	-0.001	-39.685	-0.278	1.542	-0.024
417	0.057	-0.021	0.029	-0.010	0.020	0.009	0.059	0.027	-42.206	-10.091	2.842	1.356
418	0.084	-0.020	0.043	-0.010	0.026	0.015	0.078	0.048	-44.114	-17.517	3.826	2.400
419	0.124	-0.019	0.063	-0.009	0.036	0.026	0.108	0.079	-47.027	-28.856	5.328	3.994
420	7.601	-1.424	-7.240	1.940	9.141	5.679	-0.137	0.399	-712.971	-523.702	475.684	302.809
421	7.816	-1.352	-0.456	0.086	4.908	3.404	4.301	2.994	-951.256	-658.912	240.588	167.795
422	7.601	-1.424	-7.240	1.940	9.141	5.679	-0.137	0.399	-712.971	-523.702	475.684	302.809
423	5.387	0.000	-0.160	0.008	2.814	2.768	2.608	2.580	-615.693	-607.842	178.157	175.438
424	7.086	1.102	-0.024	0.002	3.054	4.112	2.986	4.034	-686.815	-929.484	187.859	254.075
425	7.935	-1.192	-0.462	0.074	4.885	3.554	4.284	3.123	-945.396	-688.835	239.758	174.974
426	5.806	0.000	-1.604	0.000	3.745	3.693	2.090	2.061	-616.664	-608.235	64.458	63.613
427	0.138	-0.018	0.070	-0.009	0.039	0.029	0.118	0.090	-48.003	-32.655	5.831	4.529
428	6.908	1.364	-0.021	0.007	2.834	4.152	2.766	4.082	-634.151	-945.402	173.918	257.276
429	7.218	-2.773	-7.401	4.425	10.927	3.641	-0.988	0.715	-727.330	-407.983	556.743	200.903
430	7.167	-2.233	-0.423	0.152	5.036	2.584	4.394	2.283	-983.403	-494.753	245.144	128.411
431	6.364	2.167	-0.012	0.023	2.160	4.275	2.095	4.227	-473.021	-994.104	131.262	267.068
432	6.953	-3.705	-7.513	6.142	12.162	2.232	-1.576	0.934	-737.255	-327.997	612.772	130.464
433	6.678	-2.898	-0.399	0.203	5.133	1.965	4.464	1.747	-1007.651	-370.928	248.579	98.704
434	5.664	3.199	-0.001	0.043	1.293	4.433	1.232	4.414	-265.795	-1056.737	76.403	279.661
435	6.385	-5.232	-7.473	9.058	14.055	-0.303	-2.544	1.388	-740.326	-193.063	697.692	4.713
436	5.936	-3.791	-0.359	0.271	5.217	1.088	4.519	0.990	-1029.385	-194.263	251.079	56.807
437	5.420	-3.478	0.001	0.049	1.032	4.448	0.971	4.437	-201.699	-1065.689	59.724	281.295
438	6.370	-5.759	-7.758	9.927	14.881	-0.872	-2.871	1.415	-759.123	-151.758	736.224	-24.738
439	5.790	-4.103	-0.354	0.294	5.308	0.843	4.591	0.776	-1051.609	-146.458	254.808	44.851
440	5.338	3.680	0.004	0.052	0.890	4.506	0.831	4.500	-169.346	-1085.889	50.870	285.522
441	6.154	-5.822	-7.527	10.117	14.782	-2.206	-2.926	1.489	-742.248	-134.747	730.234	-41.961
442	5.532	-4.052	-0.338	0.294	5.144	0.731	4.446	0.682	-1019.256	-125.057	246.633	39.782
443	4.903	3.584	0.003	0.057	0.720	4.238	0.657	4.240	-125.980	-1024.754	39.662	269.169
444	5.559	-5.996	-6.892	10.641	14.509	-2.181	-3.077	1.691	-695.894	-88.018	713.779	-89.275
445	5.206	-4.116	-0.320	0.303	5.006	0.523	4.319	0.503	-997.273	-84.878	239.290	29.846
446	3.403	3.713	0.007	0.071	-0.100	3.544	-0.162	3.575	73.288	-879.312	-12.322	227.867
447	3.728	-6.532	-4.938	12.253	13.666	-5.139	-3.544	2.315	-553.087	55.944	663.086	-235.037
448	3.473	-3.914	-0.212	0.312	3.977	-0.299	3.403	-0.192	-800.549	72.769	187.660	-7.942





RESULTADOS

3.3 TENSIONES TANGENCIALES UNITARIAS

Análisis por elementos finitos

Punto de tens. núm.	V <sub>y</sub> = 1 kN		V <sub>z</sub> = 1 kN		V <sub>x</sub> = 1 kN		V <sub>y</sub> = 1 kN		M <sub>k,p</sub> = 1 kNm		M <sub>k,s</sub> = 1 kNm	
	T <sub>xy</sub> [N/mm²]	T <sub>xz</sub> [N/mm²]	T <sub>xy</sub> [N/mm²]	T <sub>xz</sub> [N/mm²]	T <sub>xu</sub> [N/mm²]	T <sub>xv</sub> [N/mm²]	T <sub>xu</sub> [N/mm²]	T <sub>xv</sub> [N/mm²]	T <sub>xy</sub> [N/mm²]	T <sub>xz</sub> [N/mm²]	T <sub>xy</sub> [N/mm²]	T <sub>xz</sub> [N/mm²]
449	2.459	3.730	0.008	0.081	-0.582	3.076	-0.646	3.123	191.597	-778.584	-43.135	199.754
450	2.179	-6.986	-3.284	13.617	12.954	-7.640	-3.939	2.842	-432.296	177.712	620.207	-358.329
451	2.948	-4.105	-0.186	0.332	3.804	-0.682	3.238	-0.523	-777.982	146.634	177.846	-26.401
452	1.240	3.751	0.010	0.093	-1.206	2.470	-1.271	2.540	344.469	-648.429	-82.949	163.428
453	1.667	-7.135	-2.739	14.068	12.719	-8.466	-4.069	3.016	-392.409	217.921	606.048	-399.041
454	1.018	3.755	0.011	0.096	-1.320	2.359	-1.385	2.433	372.310	-624.725	-90.200	156.812
455	2.656	-4.175	-0.170	0.341	3.687	-0.875	3.130	-0.690	-760.090	183.930	171.549	-35.652
456	0.012	0.095	0.000	0.094	0.005	0.007	-0.088	0.101	92.429	-96.396	-8.552	9.313
457	0.013	-0.350	0.000	0.108	0.235	-0.225	0.125	-0.114	-94.848	93.486	4.088	-3.461
458	0.001	-3.878	0.001	10.871	7.300	-7.401	-3.521	3.572	-76.596	77.465	340.480	-345.188
459	0.001	-0.011	0.002	0.020	0.014	-0.016	-0.003	0.006	30.271	-45.649	-0.663	0.922
460	0.006	-0.035	-0.002	0.021	0.032	-0.024	0.009	-0.005	-45.171	30.876	-0.086	0.134
461	0.006	-0.032	-0.002	0.019	0.030	-0.022	0.008	-0.005	-44.580	27.879	-0.077	0.124
462	0.001	-0.010	0.002	0.018	0.013	-0.015	-0.003	0.006	26.576	-44.868	-0.576	0.840
463	0.006	-0.021	-0.003	0.012	0.021	-0.012	0.006	-0.002	-42.324	16.430	-0.044	0.085
464	0.001	-0.006	0.003	0.012	0.008	-0.010	-0.001	0.005	15.546	-42.539	-0.316	0.593
465	0.007	-0.013	-0.003	0.008	0.015	-0.006	0.005	-0.001	-40.789	8.643	-0.022	0.059
466	0.000	-0.004	0.003	0.008	0.004	-0.007	0.000	0.004	8.324	-41.013	-0.146	0.432
467	0.007	-0.004	-0.003	0.002	0.008	0.002	0.003	0.001	-38.959	-0.643	0.005	0.027
468	0.000	-0.001	0.003	0.002	0.000	-0.003	0.001	0.003	-1.222	-38.997	0.078	0.219
469	0.007	-0.004	-0.003	0.002	0.008	0.002	0.003	0.001	-38.959	-0.643	0.005	0.027
470	0.000	-0.001	0.003	0.002	0.000	-0.003	0.001	0.003	-1.222	-38.997	0.078	0.219
471	0.009	-0.003	-0.003	0.002	0.008	0.003	0.004	0.002	-40.313	-9.480	0.055	0.078
472	0.003	-0.001	0.003	0.002	0.001	-0.001	0.002	0.004	-9.828	-40.182	0.120	0.241
473	0.010	-0.003	-0.002	0.002	0.009	0.003	0.004	0.003	-41.338	-16.166	0.094	0.116
474	0.005	-0.001	0.003	0.002	0.002	0.002	0.003	0.004	-17.045	-41.175	0.154	0.261
475	0.012	-0.003	-0.002	0.002	0.009	0.004	0.005	0.005	-42.903	-26.376	0.152	0.174
476	0.008	-0.001	0.002	0.002	0.004	0.002	0.004	0.005	-27.669	-42.638	0.205	0.289
477	0.008	-0.001	0.002	0.002	0.004	0.002	0.005	0.006	-30.452	-43.021	0.218	0.296
478	0.015	0.000	0.000	0.000	0.008	0.008	0.008	0.008	-51.066	-50.320	0.335	0.318
479	0.012	-0.002	-0.001	0.002	0.009	0.005	0.006	0.005	-43.427	-29.797	0.172	0.193
480	-0.572	-4.613	1.727	13.824	7.970	-10.387	-4.047	5.282	-89.794	124.887	379.919	-495.513
481	-1.205	-4.618	3.640	13.873	6.720	-11.674	-3.416	5.949	-76.892	149.870	320.507	-557.488
482	-1.859	-4.623	5.616	13.925	5.428	-13.004	-2.764	6.638	-63.559	176.100	259.112	-621.532
483	-2.247	-3.903	6.799	11.785	3.225	-12.346	-1.644	6.313	-30.787	173.886	154.004	-590.578
484	-2.638	-3.177	7.992	9.624	1.001	-11.682	-0.513	5.985	2.291	171.650	47.914	-559.336
485	-1.469	-1.657	4.555	5.118	0.330	-6.380	-0.167	3.318	2.380	146.007	15.713	-307.784
486	-0.560	-0.890	1.762	2.798	0.660	-2.999	-0.347	1.578	-11.492	107.435	31.989	-145.545
487	-0.505	-0.819	1.588	2.585	0.635	-2.743	-0.336	1.446	-13.285	95.094	30.880	-133.227
488	-0.344	-0.687	1.079	2.206	0.717	-2.156	-0.389	1.145	-27.836	66.974	35.329	-105.093
489	-0.274	-0.910	0.867	2.957	1.341	-2.504	-0.727	1.343	-68.914	84.849	66.050	-122.664
490	0.000	-1.765	0.001	6.236	3.957	-4.013	-2.247	2.279	121.859	-123.440	199.824	-202.671
491	0.000	-1.481	0.000	5.863	3.632	-3.682	-2.201	2.232	-123.241	124.944	190.445	-193.125
492	0.141	-0.509	-0.712	2.506	1.917	-1.090	-1.292	0.729	-82.828	69.715	107.859	-60.991
493	0.147	-0.466	-0.749	2.302	1.817	-0.944	-1.222	0.632	-77.123	57.325	102.359	-52.865
494	0.169	-0.328	-0.869	1.648	1.497	-0.477	-1.018	0.320	-58.826	17.590	84.722	-26.805
495	0.252	-0.412	-1.289	2.100	2.014	-0.497	-1.374	0.338	-93.180	14.098	114.309	-28.153
496	0.286	-0.446	-1.461	2.284	2.224	-0.505	-1.519	0.345	-107.164	12.676	126.353	-28.701
497	0.737	-0.809	-3.843	4.232	4.786	-0.262	-3.296	0.183	-147.470	-0.545	273.658	-15.144
498	1.142	-1.384	-6.125	7.420	7.992	-0.820	-5.560	0.570	-156.152	-5.410	460.714	-47.246
499	1.034	-1.740	-5.554	9.377	8.794	-2.314	-6.129	1.616	-171.782	25.575	507.664	-133.852
500	0.845	-2.064	-4.549	11.173	9.244	-3.967	-6.452	2.774	-178.255	59.310	534.287	-229.695
501	0.296	-2.018	-1.594	10.982	7.372	-5.579	-5.155	3.907	-127.541	89.371	426.797	-323.388
502	0.001	0.001	0.006	-0.007	-0.007	0.001	0.006	0.000	52.382	13.556	-0.707	-0.022
503	0.003	0.002	0.000	-0.009	-0.004	0.007	0.005	-0.002	39.691	59.159	-0.642	0.305
504	0.003	0.002	-0.006	-0.010	-0.002	0.011	0.002	-0.006	34.557	45.797	-0.288	0.699
505	0.003	0.003	-0.006	-0.012	-0.003	0.011	0.003	-0.006	30.282	43.854	-0.382	0.756
506	0.001	0.001	0.005	-0.006	-0.006	0.002	0.005	0.000	48.941	14.009	-0.630	0.031
507	0.002	0.003	-0.004	-0.017	-0.007	0.013	0.006	-0.008	14.204	36.548	-0.737	0.971
508	0.001	0.001	0.001	-0.006	-0.003	0.004	0.003	-0.001	38.037	15.442	-0.385	0.199
509	0.002	0.004	-0.002	-0.022	-0.011	0.015	0.009	-0.009	2.556	31.254	-0.995	1.127
510	0.001	0.001	-0.002	-0.005	-0.001	0.005	0.002	-0.002	31.131	16.349	-0.230	0.306
511	0.001	0.004	-0.001	-0.026	-0.014	0.016	0.011	-0.011	-8.848	26.072	-1.247	1.280
512	0.002	0.001	-0.004	-0.004	0.001	0.005	0.001	-0.003	24.392	17.235	-0.079	0.410
513	0.001	0.005	0.000	-0.028	-0.016	0.017	0.012	-0.012	-15.976	22.833	-1.404	1.375
514	0.001	0.002	-0.002	-0.014	-0.006	0.009	0.005	-0.006	28.157	9.946	-0.642	0.736
515	0.001	0.005	-0.001	-0.032	-0.018	0.020	0.013	-0.014	-15.094	30.266	-1.558	1.609
516	0.001	0.005	0.002	-0.028	-0.017	0.016	0.013	-0.011	34.181	-1.717	-1.542	1.259
517	0.001	0.006	-0.002	-0.036	-0.020	0.023	0.015	-0.016	-14.189	37.892	-1.715	1.849
518	0.000	0.007	0.006	-0.043	-0.028	0.022	0.021	-0.015	-40.333	-13.629	-2.461	1.793
519	0.001	0.007	-0.003	-0.043	-0.023	0.027	0.017	-0.019	-12.770	49.851	-1.961	2.225
520	-0.001	0.010	0.012	-0.064	-0.043	0.031	0.032	-0.022	48.826	-30.071	-3.730	2.530
521	-0.001	0.011	0.013	-0.069	-0.047	0.033	0.035	-0.024	51.084	-34.443	-4.067	2.726
522	0.001	0.008	-0.003	-0.045	-0.024	0.029	0.017	-0.020	-12.325	53.603	-2.039	2.343
523	0.000	-1.333	0.000	8.052	4.637	-4.701	-3.368	3.415	-74.047	75.081	277.521	-281.441
524	0.000	0.062	0.002	-0.414	-0.236	0.238	0.178	-0.178	73.294	-73.922	-19.654	19.693
525	0.000	0.074	0.006	-0.502	-0.288	0.286	0.217	-0.215	-79.466	80.794	-23.891	23.665





RESULTADOS

3.3 TENSIONES TANGENCIALES UNITARIAS

Análisis por elementos finitos

Table with 14 columns: Punto de tens. núm., Vy = 1 kN (Txy, Txz), Vz = 1 kN (Txy, Txz), Vu = 1 kN (Txu, Tvu), Vv = 1 kN (Txu, Tvu), Mx,p = 1 kNm (Txy, Txz), Mx,s = 1 kNm (Txy, Txz). Rows 526-602.





RESULTADOS

3.3 TENSIONES TANGENCIALES UNITARIAS

Análisis por elementos finitos

Table with 14 columns: Punto de tens. núm., Vy = 1 kN (Txy, Txz), Vz = 1 kN (Txy, Txz), Vx = 1 kN (Txu, Txy), Vy = 1 kN (Txu, Txy), Mk,p = 1 kNm (Txy, Txz), and Mk,s = 1 kNm (Txy, Txz). Rows 603-679.





RESULTADOS

3.3 TENSIONES TANGENCIALES UNITARIAS

Análisis por elementos finitos

Table with columns for 'Punto de tens. núm.', 'Vy = 1 kN', 'Vz = 1 kN', 'Vx = 1 kN', 'Vy = 1 kN', 'Mx,p = 1 kNm', and 'Mx,s = 1 kNm'. It contains a grid of numerical stress values for various points.

3.4 TENSIONES POR CARGA

Análisis por elementos finitos

Table with columns: 'Carga núm.', 'Barra núm.', 'Posición x [mm]', 'Punto núm.', 'Tensión Tipo', 'Tensiones [N/mm²] Existente', 'Límite', 'Tensión tensiones η [-]'. Note: No hay resultados: no se encuentran disponibles los esfuerzos internos para el caso de carga/la barra/la posición que se ha seleccionado.

3.5 TENSIONES POR MATERIAL

Análisis por elementos finitos

Table with columns: 'Material núm.', 'Barra núm.', 'Posición x [mm]', 'Punto de tens. núm.', 'Carga núm.', 'Tipo de tensiones', 'Tensiones [N/mm²] Existente', 'Límite', 'Tensión tensiones η [-]'. Note: No hay resultados: no se encuentran disponibles los esfuerzos internos para el caso de carga/la barra/la posición que se ha seleccionado.

3.6 TENSIONES POR BARRA

Análisis por elementos finitos

Table with columns: 'Barra núm.', 'Posición x [mm]', 'Punto de tens. núm.', 'Carga núm.', 'Tipo de tensiones', 'Tensiones [N/mm²] Existente', 'Límite', 'Tensión tensiones η [-]'. Note: No hay resultados: no se encuentran disponibles los esfuerzos internos para el caso de carga/la barra/la posición que se ha seleccionado.

3.7 TENSIONES POR POSICIÓN

Análisis por elementos finitos

Table with columns: 'Barra núm.', 'Posición x [mm]', 'Punto de tens. núm.', 'Carga núm.', 'Tipo de tensiones', 'Tensiones [N/mm²] Existente', 'Límite', 'Tensión tensiones η [-]'. Note: No hay resultados: no se encuentran disponibles los esfuerzos internos para el caso de carga/la barra/la posición que se ha seleccionado.

3.8 TENSIONES POR PUNTOS DE TENSION

Análisis por elementos finitos

Table with columns: 'Punto de tens. núm.', 'Barra núm.', 'Posición x [mm]', 'Carga núm.', 'Tipo de tensiones', 'Tensiones [N/mm²] Existente', 'Límite', 'Tensión tensiones η [-]'. Note: No hay resultados: no se encuentran disponibles los esfuerzos internos para el caso de carga/la barra/la posición que se ha seleccionado.






**RESULTADOS**

3.9

**TODAS LAS TENSIONES POR PUNTOS DE TENSION**
**Análisis por elementos finitos**

Punto de tens. núm.	Barra núm.	Posición x [mm]	Carga núm.	Tipo de tensiones	Tensiones [N/mm <sup>2</sup> ]		Tensión tensiones $\eta$ [-]
					Existente	Límite	
No hay resultados: no se encuentran disponibles los esfuerzos internos para el caso de carga/la barra/la posición que se ha seleccionado.							





MODELO

3.10 : Y

Análisis por elementos finitos

