

00:06:51, 24/04/2008
Fichero: C:\CYPE Ingenieros\Nave de Almacenamiento y Venta de Puertas de Madera\Estructura Nave.EM3
Descripción: Proyecto Final de Carrera
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Nudos	Coordenadas(m)			Coacciones							Vínculos	
	X	Y	Z	DX	DY	DZ	GX	GY	GZ	V0	EP	DX/DY/DZ Dep.
1	0.000	0.000	0.000	X	X	X	-	-	-	-	-	Articulado
2	0.000	0.000	8.000	-	-	-	-	-	-	-	-	Empotrado
3	0.000	6.000	0.000	X	X	X	-	-	-	-	-	Articulado
4	0.000	6.000	9.333	X	-	-	-	-	-	-	-	Empotrado
5	0.000	9.000	10.000	-	-	-	-	-	-	-	-	Empotrado
6	0.000	12.000	0.000	X	X	X	-	-	-	-	-	Articulado
7	0.000	12.000	9.333	X	-	-	-	-	-	-	-	Empotrado
8	0.000	18.000	0.000	X	X	X	-	-	-	-	-	Articulado
9	0.000	18.000	8.000	-	-	-	-	-	-	-	-	Empotrado
10	5.000	0.000	0.000	X	X	X	-	-	-	-	-	Articulado
11	5.000	0.000	8.000	-	-	-	-	-	-	-	-	Empotrado
12	5.000	9.000	10.000	-	-	-	-	-	-	-	-	Empotrado
13	5.000	18.000	0.000	X	X	X	-	-	-	-	-	Articulado
14	5.000	18.000	8.000	-	-	-	-	-	-	-	-	Empotrado
15	10.000	0.000	0.000	X	X	X	-	-	-	-	-	Articulado
16	10.000	0.000	5.100	-	-	-	-	-	-	-	-	Empotrado
17	10.000	0.000	8.000	-	-	-	-	-	-	-	-	Empotrado
18	10.000	9.000	10.000	-	-	-	-	-	-	-	-	Empotrado
19	10.000	18.000	0.000	X	X	X	-	-	-	-	-	Articulado
20	10.000	18.000	8.000	-	-	-	-	-	-	-	-	Empotrado
21	15.000	0.000	0.000	X	X	X	-	-	-	-	-	Articulado
22	15.000	0.000	5.100	-	-	-	-	-	-	-	-	Empotrado
23	15.000	0.000	8.000	-	-	-	-	-	-	-	-	Empotrado
24	15.000	9.000	10.000	-	-	-	-	-	-	-	-	Empotrado

25	15.000	18.000	0.000	X	X	X	-	-	-	-	-	-	-	-	-	Articulado
26	15.000	18.000	8.000	-	-	-	-	-	-	-	-	-	-	-	-	Empotrado
27	20.000	0.000	0.000	X	X	X	-	-	-	-	-	-	-	-	-	Articulado
28	20.000	0.000	8.000	-	-	-	-	-	-	-	-	-	-	-	-	Empotrado
29	20.000	9.000	10.000	-	-	-	-	-	-	-	-	-	-	-	-	Empotrado
30	20.000	18.000	0.000	X	X	X	-	-	-	-	-	-	-	-	-	Articulado
31	20.000	18.000	8.000	-	-	-	-	-	-	-	-	-	-	-	-	Empotrado
32	25.000	0.000	0.000	X	X	X	-	-	-	-	-	-	-	-	-	Articulado
33	25.000	0.000	8.000	-	-	-	-	-	-	-	-	-	-	-	-	Empotrado
34	25.000	6.000	0.000	X	X	X	-	-	-	-	-	-	-	-	-	Articulado
35	25.000	6.000	5.100	-	-	-	-	-	-	-	-	-	-	-	-	Empotrado
36	25.000	6.000	9.333	X	-	-	-	-	-	-	-	-	-	-	-	Empotrado
37	25.000	9.000	10.000	-	-	-	-	-	-	-	-	-	-	-	-	Empotrado
38	25.000	12.000	0.000	X	X	X	-	-	-	-	-	-	-	-	-	Articulado
39	25.000	12.000	5.100	-	-	-	-	-	-	-	-	-	-	-	-	Empotrado
40	25.000	12.000	9.333	X	-	-	-	-	-	-	-	-	-	-	-	Empotrado
41	25.000	18.000	0.000	X	X	X	-	-	-	-	-	-	-	-	-	Articulado
42	25.000	18.000	8.000	-	-	-	-	-	-	-	-	-	-	-	-	Empotrado

Características mecánicas de las barras					
Inerc.Tor. cm4	Inerc.y cm4	Inerc.z cm4	Sección cm2		
15.400	5790.000	420.000	45.900	Acero, IPE-270, Perfil simple (IPE)	
192.000	25166.000	8563.000	149.100	Acero, HEB-300, Perfil simple (HEB)	
192.000	25166.000	8563.000	149.100	Acero, HEB-300, Simple con cartelas (HEB)	

Materiales utilizados					
Mód.elást. (Kp/cm2)	Mód.el.trans. (Kp/cm2)	Lím.elás.\Fck (Kp/cm2)	Co.dilat. (m/m°C)	Peso espec. (Kg/dm3)	Material

2100000.00	807692.31	2600.00	1.2e-005	7.85	Acero (A42)		
Resumen medición(Acero)							
Peso(Kp)			Longitud(m)				
Perfil		Serie	Acero	Perfil	Serie	Acero	
IPE-270, Perfil simple		396.35		11.00			
IPE		396.35		11.00			
HEB-300, Perfil simple		4369.62		37.32			
HEB		4369.62		37.32			
HEB-300, Simple con c...		26303.64		206.64			
HEB		26303.64		206.64			
Acero (A42)			31069.61	254.96			
			-----	-----			
			31069.61 Kp	254.96 m			

Barras		Descripción					
	Peso	Volumen	Longitud	Co.pand.xy	Co.pand.xz	Dist.arr.sup.	Dist.arr.inf.
	(Kp)	(m3)	(m)		(m)	(m)	
1/2	Acero (A42), HEB-300 (HEB) + cart. sup. 0.750 m						
	978.35	0.125	8.00	0.00	0.89	8.00	6.80
2/4	Acero (A42), HEB-300 (HEB) + cart. inf. 1.200 m						
	786.72	0.100	6.15	0.00	0.83	1.84	-
3/4	Acero (A42), HEB-300 (HEB)						
	1092.41	0.139	9.33	1.00	0.00	9.33	9.33
4/5	Acero (A42), HEB-300 (HEB) + cart. inf. 1.200 m						
	426.90	0.054	3.07	0.00	0.83	1.84	-

7/5	Acero (A42), HEB-300 (HEB) + cart. inf. 1.200 m						
	426.90	0.054	3.07	0.00	0.83	1.84	-
6/7	Acero (A42), HEB-300 (HEB)						
	1092.41	0.139	9.33	1.00	0.00	9.33	9.33
9/7	Acero (A42), HEB-300 (HEB) + cart. inf. 1.200 m						
	786.72	0.100	6.15	0.00	0.83	1.84	-
8/9	Acero (A42), HEB-300 (HEB) + cart. inf. 0.750 m						
	978.35	0.125	8.00	0.00	0.89	6.80	8.00
10/11	Acero (A42), HEB-300 (HEB) + cart. sup. 0.750 m						
	978.35	0.125	8.00	0.00	0.89	8.00	6.80
11/12	Acero (A42), HEB-300 (HEB) + carts. inf. 1.200 m y 1.200 m						
	1213.62	0.155	9.22	0.00	0.83	1.84	-
14/12	Acero (A42), HEB-300 (HEB) + carts. inf. 1.200 m y 1.200 m						
	1213.62	0.155	9.22	0.00	0.83	1.84	-
13/14	Acero (A42), HEB-300 (HEB) + cart. inf. 0.750 m						
	978.35	0.125	8.00	0.00	0.89	6.80	8.00
15/16	Acero (A42), HEB-300 (HEB)						
	596.92	0.076	5.10	0.00	0.89	5.10	6.80
16/17	Acero (A42), HEB-300 (HEB) + cart. sup. 0.750 m						
	381.43	0.049	2.90	0.00	0.89	2.90	6.80
16/22	Acero (A42), IPE-270 (IPE)						
	180.16	0.023	5.00	1.00	1.00	-	5.00
17/18	Acero (A42), HEB-300 (HEB) + carts. inf. 1.200 m y 1.200 m						
	1213.62	0.155	9.22	0.00	0.83	1.84	-
20/18	Acero (A42), HEB-300 (HEB) + carts. inf. 1.200 m y 1.200 m						
	1213.62	0.155	9.22	0.00	0.83	1.84	-
19/20	Acero (A42), HEB-300 (HEB) + cart. inf. 0.750 m						
	978.35	0.125	8.00	0.00	0.89	6.80	8.00
21/22	Acero (A42), HEB-300 (HEB)						
	596.92	0.076	5.10	0.00	0.89	5.10	6.80
22/23	Acero (A42), HEB-300 (HEB) + cart. sup. 0.750 m						
	381.43	0.049	2.90	0.00	0.89	2.90	6.80
23/24	Acero (A42), HEB-300 (HEB) + carts. inf. 1.200 m y 1.200 m						
	1213.62	0.155	9.22	0.00	0.83	1.84	-
26/24	Acero (A42), HEB-300 (HEB) + carts. inf. 1.200 m y 1.200 m						
	1213.62	0.155	9.22	0.00	0.83	1.84	-
25/26	Acero (A42), HEB-300 (HEB) + cart. inf. 0.750 m						
	978.35	0.125	8.00	0.00	0.89	6.80	8.00

27/28	Acero (A42), HEB-300 (HEB) + cart. sup. 0.750 m						
	978.35	0.125	8.00	0.00	0.89	8.00	6.80
28/29	Acero (A42), HEB-300 (HEB) + carts. inf. 1.200 m y 1.200 m						
	1213.62	0.155	9.22	0.00	0.83	1.84	-
31/29	Acero (A42), HEB-300 (HEB) + carts. inf. 1.200 m y 1.200 m						
	1213.62	0.155	9.22	0.00	0.83	1.84	-
30/31	Acero (A42), HEB-300 (HEB) + cart. inf. 0.750 m						
	978.35	0.125	8.00	0.00	0.89	6.80	8.00
32/33	Acero (A42), HEB-300 (HEB) + cart. sup. 0.750 m						
	978.35	0.125	8.00	0.00	0.89	8.00	6.80
33/36	Acero (A42), HEB-300 (HEB) + cart. inf. 1.200 m						
	786.72	0.100	6.15	0.00	0.83	1.84	-
34/35	Acero (A42), HEB-300 (HEB)						
	596.92	0.076	5.10	1.00	0.00	5.10	5.10
35/36	Acero (A42), HEB-300 (HEB)						
	495.48	0.063	4.23	1.00	0.00	4.23	4.23
35/39	Acero (A42), IPE-270 (IPE)						
	216.19	0.028	6.00	1.00	1.00	-	6.00
36/37	Acero (A42), HEB-300 (HEB) + cart. inf. 1.200 m						
	426.90	0.054	3.07	0.00	0.83	1.84	-
40/37	Acero (A42), HEB-300 (HEB) + cart. inf. 1.200 m						
	426.90	0.054	3.07	0.00	0.83	1.84	-
38/39	Acero (A42), HEB-300 (HEB)						
	596.92	0.076	5.10	1.00	0.00	5.10	5.10
39/40	Acero (A42), HEB-300 (HEB)						
	495.48	0.063	4.23	1.00	0.00	4.23	4.23
42/40	Acero (A42), HEB-300 (HEB) + cart. inf. 1.200 m						
	786.72	0.100	6.15	0.00	0.83	1.84	-
41/42	Acero (A42), HEB-300 (HEB) + cart. inf. 0.750 m						
	978.35	0.125	8.00	0.00	0.89	6.80	8.00

Barras	TENSION MÁXIMA							
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TENS.(Tn/cm2)	APROV.(%)	Pos.(m)	N(Tn)	Ty(Tn)	Tz(Tn)	Mt(Tn·m)	My(Tn·m)	Mz(Tn·m)
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1/2	0.2608	10.03	5.800	0.3005	0.0000	0.0417	0.0000	-4.3412	0.0000
2/4	0.7318	28.14	6.146	0.2728	-0.5836	1.6698	0.0591	-1.6774	3.5461
3/4	0.3914	15.05	9.333	-4.2300	0.1909	0.0000	0.0000	0.0000	-1.7822
4/5	1.3464	51.79	0.000	-0.4245	0.0000	-1.5998	0.6724	-1.6328	3.4021
7/5	1.3464	51.79	0.000	-0.4245	0.0000	-1.5998	-0.6724	-1.6328	-3.4021
6/7	0.3352	12.89	9.333	-1.8450	0.1839	0.0000	0.0000	0.0000	-1.7165
9/7	0.7318	28.14	6.146	0.2728	0.5836	1.6698	-0.0591	-1.6774	-3.5461
8/9	0.3323	12.78	7.250	-2.7206	0.0000	-0.0258	0.0000	-5.2167	0.0000
10/11	1.5865	61.02	7.250	-12.7697	0.0000	-2.0096	0.0000	24.9376	0.0000
11/12	1.2392	47.66	8.020	-3.7957	0.0000	-0.8598	0.0000	20.2739	0.0000
14/12	1.4138	54.38	1.200	-6.4232	0.0000	-8.9681	0.0000	-22.8473	0.0000
13/14	2.0066	77.18	7.250	-12.4096	0.0000	2.2497	0.0000	-32.0339	0.0000
15/16	1.1809	45.42	5.100	-12.9839	-0.0234	-3.5139	0.0000	17.9208	0.1195
16/17	1.5723	60.47	2.150	-12.7700	0.0000	-2.0047	-0.0001	24.9196	0.0000
16/22	0.0358	1.38	0.000	-0.0234	0.0000	-0.2096	0.0000	-0.1195	0.0001
17/18	1.2414	47.74	8.020	-3.7911	0.0000	-0.8618	-0.0001	20.3113	0.0000
20/18	1.4118	54.30	1.200	-6.4189	0.0000	-8.9684	0.0000	-22.8142	0.0000
19/20	2.0048	77.11	7.250	-12.4081	0.0000	2.2457	0.0000	-32.0037	0.0000
21/22	1.2057	46.37	5.100	-16.2960	0.0234	-3.5186	0.0000	17.9450	-0.1195
22/23	1.5690	60.35	2.150	-12.7657	0.0000	-2.0099	0.0000	24.8653	0.0000
23/24	1.2416	47.76	8.020	-3.7947	0.0000	-0.8560	0.0000	20.3158	0.0000
26/24	1.4138	54.38	1.200	-6.4248	0.0000	-8.9717	0.0000	-22.8470	0.0000
25/26	2.0069	77.19	7.250	-12.4136	0.0000	2.2498	0.0000	-32.0376	0.0000
27/28	1.5619	60.07	7.250	-12.7343	0.0000	-2.0596	0.0000	24.5299	0.0000
28/29	1.2381	47.62	8.020	-3.8311	0.0000	-0.8099	0.0000	20.2505	0.0000
31/29	1.4336	55.14	1.200	-6.4785	0.0000	-8.9942	0.0000	-23.1721	0.0000
30/31	2.0265	77.94	7.250	-12.4558	0.0000	2.2899	0.0000	-32.3614	0.0000
32/33	0.5323	20.47	2.900	-18.0443	-0.3303	-0.0451	0.0000	0.1269	2.1879
33/36	1.3539	52.07	6.146	0.2271	-1.1614	1.6673	0.1153	-1.6412	7.0582
34/35	0.5420	20.85	3.060	-20.1437	-0.0045	1.0985	0.0000	-6.1002	0.0139
35/36	0.5676	21.83	0.000	-7.2803	-0.0039	-0.0949	-0.1560	-7.1239	-0.1064
35/39	0.5008	19.26	6.000	0.0318	0.0000	0.8772	0.0000	-2.1451	0.0000
36/37	2.5693	98.82	0.000	-0.4716	0.0000	-1.5671	1.3080	-1.5512	6.6182
40/37	2.5734	98.98	0.000	-0.4805	0.0000	-1.6121	-1.3080	-1.6888	-6.6182
38/39	0.4918	18.92	5.100	-4.2586	0.0336	-0.0949	0.0000	-7.1239	-0.1714
39/40	0.5472	21.05	0.000	-3.9975	0.0329	-0.0949	0.1560	-7.1239	0.1195
42/40	1.3557	52.14	6.146	0.2528	1.1614	1.6493	-0.1153	-1.6689	-7.0582
41/42	0.4590	17.65	4.350	-2.1750	0.0938	0.1126	0.0000	-0.4809	2.3593

Barras	Flecha máxima Absoluta y		Flecha máxima Absoluta z		Flecha activa Absoluta y		Flecha activa Absoluta z	
	Flecha máxima Relativa y		Flecha máxima Relativa z		Flecha activa Relativa y		Flecha activa Relativa z	
	Pos.(m)	Flecha(mm)	Pos.(m)	Flecha(mm)	Pos.(m)	Flecha(mm)	Pos.(m)	Flecha(mm)
1/2	8.000	3.31	4.350	3.54	8.000	3.31	4.350	4.13
	8.000	L/252	8.000	L/600	----	L/(>1000)	8.000	L/554
2/4	4.168	7.08	1.200	2.26	4.168	7.08	1.200	2.10
	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)
3/4	5.600	3.74	4.667	4.26	5.600	3.69	4.667	4.26
	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)
4/5	3.073	9.63	2.473	1.44	3.073	9.63	2.473	1.46
	3.073	L/136	----	L/(>1000)	3.073	L/957	----	L/(>1000)
7/5	3.073	9.63	2.473	1.46	3.073	9.63	2.473	1.46
	3.073	L/136	----	L/(>1000)	3.073	L/957	----	L/(>1000)
6/7	5.600	3.62	4.667	4.26	5.600	3.77	4.667	4.26
	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)
9/7	4.168	7.08	1.200	1.91	4.168	7.08	1.200	2.30
	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)
8/9	8.000	3.31	4.350	3.76	8.000	3.31	4.350	3.52
	8.000	L/252	8.000	L/545	----	L/(>1000)	8.000	L/567
10/11	----	0.00	4.350	14.51	----	0.00	4.350	22.28
	----	L/(>1000)	8.000	L/274	----	L/(>1000)	4.350	L/359
11/12	----	0.00	5.292	18.90	----	0.00	5.292	14.67
	----	L/(>1000)	9.220	L/120	----	L/(>1000)	5.292	L/628
14/12	----	0.00	5.974	12.53	----	0.00	5.292	18.90
	----	L/(>1000)	8.620	L/263	----	L/(>1000)	5.292	L/487
13/14	----	0.00	4.350	21.49	----	0.00	4.350	16.44
	----	L/(>1000)	8.000	L/84	----	L/(>1000)	4.350	L/486
15/16	3.825	0.19	4.590	14.83	----	0.00	4.590	22.53
	----	L/(>1000)	4.590	L/537	----	L/(>1000)	4.590	L/355
16/17	0.000	0.16	0.000	14.53	----	0.00	0.000	21.92
	----	L/(>1000)	2.900	L/266	----	L/(>1000)	0.000	L/364
16/22	----	0.00	2.500	0.21	----	0.00	----	0.00

	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)
17/18	0.000	0.01	5.292	18.94	----	0.00	5.292	14.69
	----	L/(>1000)	9.220	L/120	----	L/(>1000)	5.292	L/627
20/18	9.220	0.01	5.974	12.58	----	0.00	5.292	18.95
	----	L/(>1000)	8.620	L/268	----	L/(>1000)	5.292	L/486
19/20	----	0.00	4.350	21.47	----	0.00	4.350	16.43
	----	L/(>1000)	8.000	L/84	----	L/(>1000)	4.350	L/486
21/22	3.825	0.19	4.590	14.83	----	0.00	4.590	22.53
	----	L/(>1000)	4.590	L/537	----	L/(>1000)	4.590	L/355
22/23	0.000	0.16	0.000	14.53	----	0.00	0.000	21.92
	----	L/(>1000)	2.900	L/224	----	L/(>1000)	0.000	L/364
23/24	0.000	0.01	5.292	18.97	----	0.00	5.292	14.69
	----	L/(>1000)	9.220	L/120	----	L/(>1000)	5.292	L/627
26/24	9.220	0.01	5.974	12.56	----	0.00	5.292	18.95
	----	L/(>1000)	8.620	L/263	----	L/(>1000)	5.292	L/486
25/26	----	0.00	4.350	21.49	----	0.00	4.350	16.43
	----	L/(>1000)	8.000	L/84	----	L/(>1000)	4.350	L/486
27/28	----	0.00	4.350	14.04	----	0.00	4.350	22.28
	----	L/(>1000)	8.000	L/251	----	L/(>1000)	4.350	L/359
28/29	----	0.00	5.292	19.09	----	0.00	5.292	14.67
	----	L/(>1000)	9.220	L/121	----	L/(>1000)	5.292	L/628
31/29	----	0.00	5.974	12.26	----	0.00	5.292	18.90
	----	L/(>1000)	8.620	L/213	----	L/(>1000)	5.292	L/487
30/31	----	0.00	4.350	21.70	----	0.00	4.350	16.44
	----	L/(>1000)	8.000	L/83	----	L/(>1000)	4.350	L/486
32/33	8.000	6.47	4.350	3.03	8.000	6.47	4.350	3.48
	8.000	L/127	8.000	L/470	----	L/(>1000)	8.000	L/357
33/36	4.168	14.08	1.200	1.81	4.168	14.08	1.200	1.60
	4.168	L/562	----	L/(>1000)	4.168	L/655	----	L/(>1000)
34/35	4.335	3.68	4.845	8.51	4.335	3.55	4.845	8.51
	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)
35/36	0.000	3.54	0.000	8.46	0.000	3.38	0.000	8.46
	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)
35/39	3.000	5.31	1.500	0.79	3.000	5.31	4.800	0.60
	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)
36/37	3.073	18.75	3.073	1.13	3.073	18.75	2.473	1.11
	3.073	L/69	----	L/(>1000)	3.073	L/491	----	L/(>1000)
40/37	3.073	18.75	2.713	1.14	3.073	18.75	2.473	1.11

	3.073	L/69	----	L/(>1000)	3.073	L/491	----	L/(>1000)
38/39	4.335	3.73	4.845	8.51	4.335	3.55	4.845	8.51
	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)
39/40	0.000	3.52	0.000	8.46	0.000	3.39	0.000	8.46
	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)	----	L/(>1000)
42/40	4.168	14.08	1.200	1.47	4.168	14.08	1.200	1.80
	4.168	L/562	----	L/(>1000)	4.168	L/655	----	L/(>1000)
41/42	8.000	6.47	4.350	3.18	8.000	6.47	4.350	2.87
	8.000	L/127	8.000	L/339	----	L/(>1000)	8.000	L/735