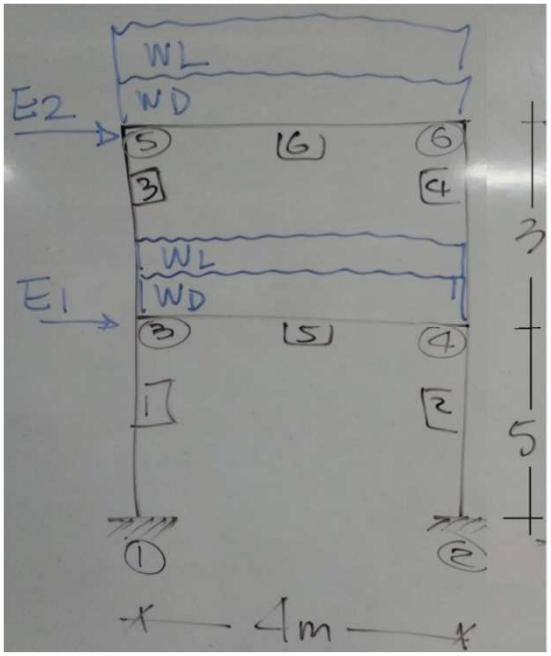
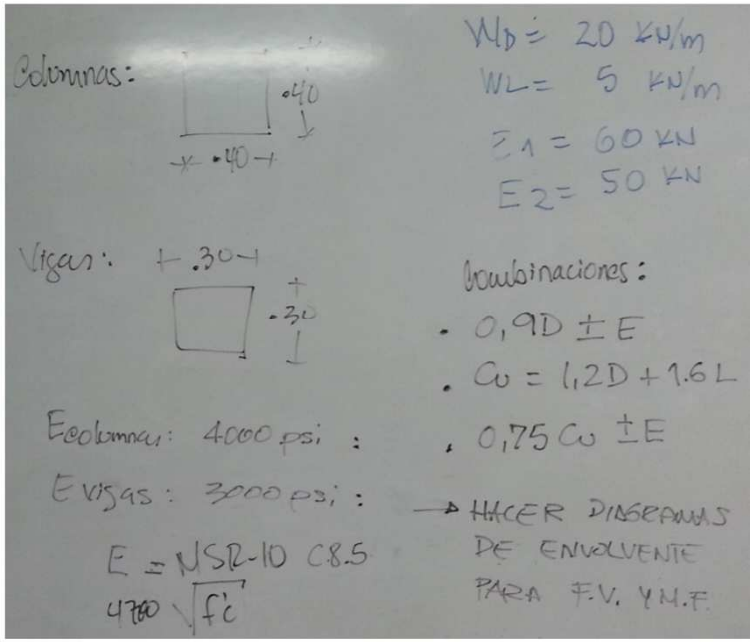
Estructura sometida a esfuerzos combinados de flexión - tensión





Módulos de elasticidad (kPa)				
#	1	2	3	4
E	24 870 062.32	21 538 105.77	-	-

Denominación de los estados de carga				
#	1	2	3	4
Nombre	D	L	E	-

Chequeo equilibrio estático				
Sumatoria de fuerzas en:				
∑	D	L	E	-
X	0.00	0.00	0.00	0.00
Y	0.00	0.00	0.00	0.00
$M^z_{(1)}$	0.00	0.00	0.00	0.00
Chequeo=?	ok	ok	ok	ok

Ecuaciones matriciales del elemento 1 sometido a σ combinado de flexo - tensión entre los nudos 1 y 3

Ecuación matricial local en coordenadas locales

{r'}	D	L	E	-	+ {p'}	D	L	E	-	= [k']	u'1	v'1	Θ'1	u'3	v'3	Θ'3	* {d'}	D	L	E	-	+ {emp'}	D	L	E	-
rx'13	80.00	20.00	-81.91	0.00		0	0	0	0		795 841.99	0	0	-795 841.99	0	0		u'1	0.000E+00	0.000E+00	0.000E+00	0.000E+00		0	0	0	0
ry'13	-1.89	-0.47	55.12	0.00		0	0	0	0		0	5 093.39	12 733.47	0	-5 093.39	12 733.47		v'1	0.000E+00	0.000E+00	0.000E+00	0.000E+00		0	0	0	0
mz'13	-3.21	-0.80	186.51	0.00		0	0	0	0		0	12 733.47	42 444.91	0	-12 733.47	21 222.45		Θ'1	0.000E+00	0.000E+00	0.000E+00	0.000E+00		0	0	0	0
rx'31	-80.00	-20.00	81.91	0.00		0	0	0	0		-795 841.99	0	0	795 841.99	0	0		u'3	-1.005E-04	-2.513E-05	1.029E-04	0.000E+00		0	0	0	0
ry'31	1.89	0.47	-55.12	0.00		0	0	0	0		0	-5 093.39	-12 733.47	0	5 093.39	-12 733.47		v'3	1.316E-05	3.290E-06	-2.230E-02	0.000E+00		0	0	0	0
mz'31	-6.25	-1.56	89.09	0.00		0	0	0	0		0	12 733.47	21 222.45	0	-12 733.47	42 444.91		Θ'3	-1.432E-04	-3.581E-05	-4.591E-03	0.000E+00		0	0	0	0

Ecuación matricial local en coordenadas globales

{r}	D	L	E	-	+ {p}	D	L	E	-	= [k]	u1	v1	Θ1	u3	v3	Θ3	* {d}	D	L	E	-	+ {emp}	D	L	E	-
Rx13	1.89	0.47	-55.12	0.00		0	0	0	0		5 093.39	0.00	-12 733.47	-5 093.39	0.00	-12 733.47		u1	0.000E+00	0.000E+00	0.000E+00	0.000E+00		0	0	0	0
Ry13	80.00	20.00	-81.91	0.00		0	0	0	0		0.00	795 841.99	0.00	0.00	-795 841.99	0.00		v1	0.000E+00	0.000E+00	0.000E+00	0.000E+00		0	0	0	0
Mz13	-3.21	-0.80	186.51	0.00		0	0	0	0		-12 733.47	0.00	42 444.91	12 733.47	0.00	21 222.45		Θ1	0.000E+00	0.000E+00	0.000E+00	0.000E+00		0	0	0	0
Rx31	-1.89	-0.47	55.12	0.00		0	0	0	0		-5 093.39	0.00	12 733.47	5 093.39	0.00	12 733.47		u3	-1.316E-05	-3.290E-06	2.230E-02	0.000E+00		0	0	0	0
Ry31	-80.00	-20.00	81.91	0.00		0	0	0	0		0.00	-795 841.99	0.00	0.00	795 841.99	0.00		v3	-1.005E-04	-2.513E-05	1.029E-04	0.000E+00		0	0	0	0
Mz31	-6.25	-1.56	89.09	0.00		0	0	0	0		-12 733.47	0.00	21 222.45	12 733.47	0.00	42 444.91		Θ3	-1.432E-04	-3.581E-05	-4.591E-03	0.000E+00		0	0	0	0

Esfuerzo axial (ecuaciones)

D	-500+0*x
L	-125+0*x
E	511.93+0*x
-	0+0*x

0.9D+E	61.93+0*x
0.9D-E	-961.93+0*x
Cu=1.2D+1.6L	-800+0*x
0.75Cu+E	-858.38+0*x
0.75Cu-E	-341.62+0*x

x (m)	σ (kN/m²) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-500.00	-125.00	511.93	0.00	61.93	-961.93	-800.00	-88.07	-1 111.93
1	-500.00	-125.00	511.93	0.00	61.93	-961.93	-800.00	-88.07	-1 111.93
2	-500.00	-125.00	511.93	0.00	61.93	-961.93	-800.00	-88.07	-1 111.93
3	-500.00	-125.00	511.93	0.00	61.93	-961.93	-800.00	-88.07	-1 111.93
4	-500.00	-125.00	511.93	0.00	61.93	-961.93	-800.00	-88.07	-1 111.93
5	-500.00	-125.00	511.93	0.00	61.93	-961.93	-800.00	-88.07	-1 111.93

Esfuerzo axial combinado

σ (kN/m²)

	Fibra superior					Fibra inferior				
x (m)	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	17 277.04	-18 718.23	-1 281.06	17 036.84	-18 958.43	-17 153.18	16 794.38	-318.94	-17 212.98	16 734.57
1	12 269.04	-13 391.18	-997.45	12 082.02	-13 578.20	-12 145.19	11 467.32	-602.55	-12 258.17	11 354.35
2	7 261.05	-8 064.12	-713.84	7 127.21	-8 197.97	-7 137.20	6 140.27	-886.16	-7 303.35	5 974.12
3	2 253.06	-2 737.07	-430.23	2 172.39	-2 817.74	-2 129.20	813.22	-1 169.77	-2 348.54	593.89
4	-2 754.93	2 589.98	-146.63	-2 782.43	2 562.49	2 878.79	-4 513.83	-1 453.37	2 606.28	-4 786.34
5	-7 762.93	7 917.03	136.98	-7 737.24	7 942.72	7 886.78	-9 840.89	-1 736.98	7 561.10	-10 166.57

Fuerza cortante

D	-1.89+0*x
L	-0.47+0*x
E	55.12+0*x
-	0+0*x

0.9D+E	53.42+0*x
0.9D-E	-56.82+0*x
Cu=1.2D+1.6L	-3.03+0*x
0.75Cu+E	52.85+0*x
0.75Cu-E	-57.39+0*x

x (m)	FV (kN) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-1.89	-0.47	55.12	0.00	53.42	-56.82	-3.03	52.85	-57.39
1	-1.89	-0.47	55.12	0.00	53.42	-56.82	-3.03	52.85	-57.39
2	-1.89	-0.47	55.12	0.00	53.42	-56.82	-3.03	52.85	-57.39
3	-1.89	-0.47	55.12	0.00	53.42	-56.82	-3.03	52.85	-57.39
4	-1.89	-0.47	55.12	0.00	53.42	-56.82	-3.03	52.85	-57.39
5	-1.89	-0.47	55.12	0.00	53.42	-56.82	-3.03	52.85	-57.39

Esfuerzo cortante máximo

Válido para sección rectangular

x (m)	τ (kN/m²) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-17.73	-4.43	516.75	0.00	500.80	-532.71	-28.36	495.48	-538.02
1	-17.73	-4.43	516.75	0.00	500.80	-532.71	-28.36	495.48	-538.02
2	-17.73	-4.43	516.75	0.00	500.80	-532.71	-28.36	495.48	-538.02
3	-17.73	-4.43	516.75	0.00	500.80	-532.71	-28.36	495.48	-538.02
4	-17.73	-4.43	516.75	0.00	500.80	-532.71	-28.36	495.48	-538.02
5	-17.73	-4.43	516.75	0.00	500.80	-532.71	-28.36	495.48	-538.02

Momento flector (ecuaciones)

D	3.21+-1.89*x+0*x^2
L	0.8+-0.47*x+0*x^2
E	-186.51+55.12*x+0*x^2
-	0+0*x+0*x^2

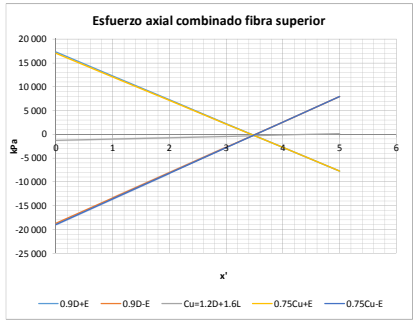
0.9D+E	-183.63+53.42*x+0*x^2
0.9D-E	189.4+-56.82*x+0*x^2
Cu=1.2D+1.6L	5.13+-3.03*x+0*x^2
0.75Cu+E	-182.67+52.85*x+0*x^2
0.75Cu-E	190.36+-57.39*x+0*x^2

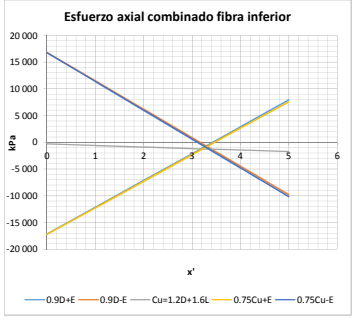
x (m)	MF (kN.m) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	3.21	0.80	-186.51	0.00	-183.63	189.40	5.13	-182.67	190.36
1	1.32	0.33	-131.39	0.00	-130.21	132.58	2.11	-129.81	132.97
2	-0.57	-0.14	-76.27	0.00	-76.79	75.76	-0.92	-76.96	75.58
3	-2.47	-0.62	-21.15	0.00	-23.37	18.93	-3.94	-24.11	18.20
4	-4.36	-1.09	33.97	0.00	30.05	-37.89	-6.97	28.74	-39.19
5	-6.25	-1.56	89.09	0.00	83.47	-94.71	-9.99	81.59	-96.58

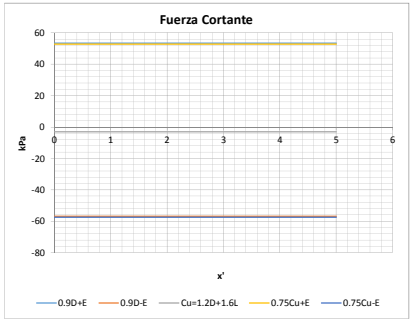
Esfuerzo axial por flexión

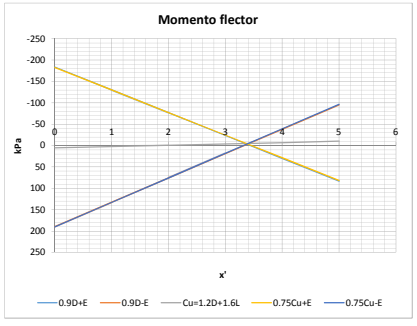
σ (kN/m²)

	Fibra superior					Fibra inferior				
x (m)	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	17 215.11	-17 756.30	-481.06	17 124.91	-17 846.50	-17 215.11	17 756.30	481.06	-17 124.91	17 846.50
1	12 207.12	-12 429.25	-197.45	12 170.09	-12 466.27	-12 207.12	12 429.25	197.45	-12 170.09	12 466.27
2	7 199.12	-7 102.20	86.16	7 215.28	-7 086.04	-7 199.12	7 102.20	-86.16	-7 215.28	7 086.04
3	2 191.13	-1 775.15	369.77	2 260.46	-1 705.81	-2 191.13	1 775.15	-369.77	-2 260.46	1 705.81
4	-2 816.86	3 551.91	653.37	-2 694.35	3 674.41	2 816.86	-3 551.91	-653.37	2 694.35	-3 674.41
5	-7 824.85	8 878.96	936.98	-7 649.17	9 054.64	7 824.85	-8 878.96	-936.98	7 649.17	-9 054.64









Ecuaciones matriciales del elemento 2 sometido a σ combinado de flexo - tensión entre los nudos 2 y 4

Ecuación matricial local en coordenadas locales

	{r'} D	L	E	-	+ {p'} D	L	E	-	= [k'] u'2	v'2	Θ'2	u'4	v'4	Θ'4	* {d'} D	L	E	-	+ {emp'} D	L	E	-
rx'24	80.00	20.00	81.91	0.00	0	0	0	0	795 841.99	0	0	-795 841.99	0	0	u'2	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0	0	0	0
ry'24	1.89	0.47	54.88	0.00	0	0	0	0	0	5 093.39	12 733.47	0	-5 093.39	12 733.47	v'2	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0	0	0	0
mz'24	3.21	0.80	185.85	0.00	0	0	0	0	0	12 733.47	42 444.91	0	-12 733.47	21 222.45	Θ'2	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0	0	0	0
rx'42	-80.00	-20.00	-81.91	0.00	0	0	0	0	-795 841.99	0	0	795 841.99	0	0	u'4	-1.005E-04	-2.513E-05	-1.029E-04	0.000E+00	0	0	0	0
ry'42	-1.89	-0.47	-54.88	0.00	0	0	0	0	0	-5 093.39	-12 733.47	0	5 093.39	-12 733.47	v'4	-1.316E-05	-3.290E-06	-2.224E-02	0.000E+00	0	0	0	0
mz'42	6.25	1.56	88.55	0.00	0	0	0	0	0	12 733.47	21 222.45	0	-12 733.47	42 444.91	Θ'4	1.432E-04	3.581E-05	-4.585E-03	0.000E+00	0	0	0	0

Ecuación matricial local en coordenadas globales

	{r} D	L	E	-	+ {p} D	L	E	-	= [k] u2	v2	Θ2	u4	v4	Θ4	* {d} D	L	E	-	+ {emp} D	L	E	-
Rx24	-1.89	-0.47	-54.88	0.00	0	0	0	0	5 093.39	0.00	-12 733.47	-5 093.39	0.00	-12 733.47	u2	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0	0	0	0
Ry24	80.00	20.00	81.91	0.00	0	0	0	0	0.00	795 841.99	0.00	0.00	-795 841.99	0.00	v2	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0	0	0	0
Mz24	3.21	0.80	185.85	0.00	0	0	0	0	-12 733.47	0.00	42 444.91	12 733.47	0.00	21 222.45	Θ2	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0	0	0	0
Rx42	1.89	0.47	54.88	0.00	0	0	0	0	-5 093.39	0.00	12 733.47	5 093.39	0.00	12 733.47	u4	1.316E-05	3.290E-06	2.224E-02	0.000E+00	0	0	0	0
Ry42	-80.00	-20.00	-81.91	0.00	0	0	0	0	0.00	-795 841.99	0.00	0.00	795 841.99	0.00	v4	-1.005E-04	-2.513E-05	-1.029E-04	0.000E+00	0	0	0	0
Mz42	6.25	1.56	88.55	0.00	0	0	0	0	-12 733.47	0.00	21 222.45	12 733.47	0.00	42 444.91	Θ4	1.432E-04	3.581E-05	-4.585E-03	0.000E+00	0	0	0	0

Esfuerzo axial (ecuaciones)

D	-500+0*x
L	-125+0*x
E	-511.93+0*x
-	0+0*x

0.9D+E	-961.93+0*x
0.9D-E	61.93+0*x
Cu=1.2D+1.6L	-800+0*x
0.75Cu+E	-857.25+0*x
0.75Cu-E	-342.75+0*x

x (m)	σ (kN/m²) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-500.00	-125.00	-511.93	0.00	-961.93	61.93	-800.00	-1 111.93	-88.07
1	-500.00	-125.00	-511.93	0.00	-961.93	61.93	-800.00	-1 111.93	-88.07
2	-500.00	-125.00	-511.93	0.00	-961.93	61.93	-800.00	-1 111.93	-88.07
3	-500.00	-125.00	-511.93	0.00	-961.93	61.93	-800.00	-1 111.93	-88.07
4	-500.00	-125.00	-511.93	0.00	-961.93	61.93	-800.00	-1 111.93	-88.07
5	-500.00	-125.00	-511.93	0.00	-961.93	61.93	-800.00	-1 111.93	-88.07

Esfuerzo axial combinado

σ (kN/m²)

Fibra superior 0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E	Fibra inferior 0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
16 732.34	-17 091.15	-318.94	16 672.54	-17 150.95	-18 656.19	17 215.00	-1 281.06	-18 896.39	16 974.80
11 427.83	-12 105.70	-602.55	11 314.86	-12 218.68	-13 351.69	12 229.55	-997.45	-13 538.71	12 042.53
6 123.33	-7 120.25	-886.16	5 957.17	-7 286.41	-8 047.18	7 244.11	-713.84	-8 181.03	7 110.26
818.82	-2 134.80	-1 169.77	599.49	-2 354.14	-2 742.67	2 258.66	-430.23	-2 823.34	2 177.99
-4 485.69	2 850.64	-1 453.37	-4 758.20	2 578.14	2 561.83	-2 726.79	-146.63	2 534.34	-2 754.28
-9 790.20	7 836.09	-1 736.98	-10 115.88	7 510.41	7 866.34	-7 712.24	136.98	7 892.03	-7 686.55

Fuerza cortante

D	1.89+0*x
L	0.47+0*x
E	54.88+0*x
-	0+0*x

0.9D+E	56.58+0*x
0.9D-E	-53.18+0*x
Cu=1.2D+1.6L	3.03+0*x
0.75Cu+E	57.15+0*x
0.75Cu-E	-52.61+0*x

x (m)	FV (kN) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	1.89	0.47	54.88	0.00	56.58	-53.18	3.03	57.15	-52.61
1	1.89	0.47	54.88	0.00	56.58	-53.18	3.03	57.15	-52.61
2	1.89	0.47	54.88	0.00	56.58	-53.18	3.03	57.15	-52.61
3	1.89	0.47	54.88	0.00	56.58	-53.18	3.03	57.15	-52.61
4	1.89	0.47	54.88	0.00	56.58	-53.18	3.03	57.15	-52.61
5	1.89	0.47	54.88	0.00	56.58	-53.18	3.03	57.15	-52.61

Esfuerzo cortante máximo

Válido para sección rectangular

x (m)	τ (kN/m²) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	17.73	4.43	514.50	0.00	530.45	-498.54	28.36	535.77	-493.23
1	17.73	4.43	514.50	0.00	530.45	-498.54	28.36	535.77	-493.23
2	17.73	4.43	514.50	0.00	530.45	-498.54	28.36	535.77	-493.23
3	17.73	4.43	514.50	0.00	530.45	-498.54	28.36	535.77	-493.23
4	17.73	4.43	514.50	0.00	530.45	-498.54	28.36	535.77	-493.23
5	17.73	4.43	514.50	0.00	530.45	-498.54	28.36	535.77	-493.23

Momento flector (ecuaciones)

D	-3.21+1.89*x+0*x^2
L	-0.8+0.47*x+0*x^2
E	-185.85+54.88*x+0*x^2
-	0+0*x+0*x^2

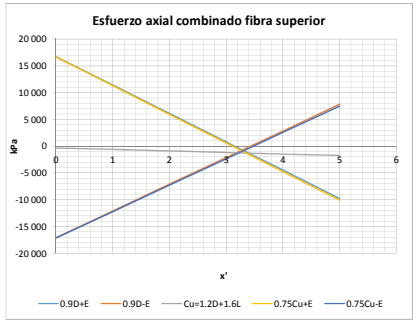
0.9D+E	-188.74+56.58*x+0*x^2
0.9D-E	182.97+-53.18*x+0*x^2
Cu=1.2D+1.6L	-5.13+3.03*x+0*x^2
0.75Cu+E	-189.7+57.15*x+0*x^2
0.75Cu-E	182+-52.61*x+0*x^2

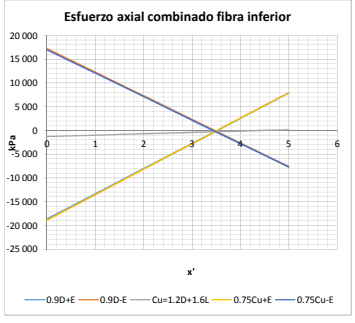
x (m)	MF (kN.m) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-3.21	-0.80	-185.85	0.00	-188.74	182.97	-5.13	-189.70	182.00
1	-1.32	-0.33	-130.97	0.00	-132.16	129.79	-2.11	-132.55	129.39
2	0.57	0.14	-76.09	0.00	-75.58	76.61	0.92	-75.40	76.78
3	2.47	0.62	-21.21	0.00	-18.99	23.43	3.94	-18.26	24.17
4	4.36	1.09	33.67	0.00	37.59	-29.75	6.97	38.89	-28.44
5	6.25	1.56	88.55	0.00	94.17	-82.92	9.99	96.04	-81.05

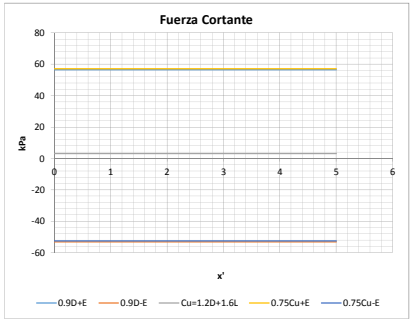
Esfuerzo axial por flexión

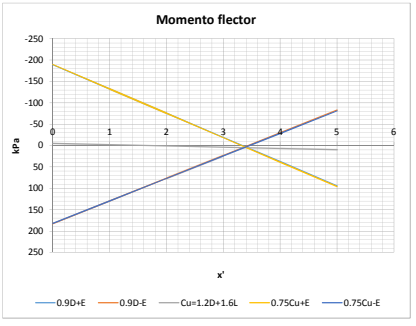
σ (kN/m²)

Fibra superior 0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E	Fibra inferior 0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
17 694.27	-17 153.07	481.06	17 784.47	-17 062.88	-17 694.27	17 153.07	-481.06	-17 784.47	17 062.88
12 389.76	-12 167.63	197.45	12 426.78	-12 130.61	-12 389.76	12 167.63	-197.45	-12 426.78	12 130.61
7 085.25	-7 182.18	-86.16	7 069.10	-7 198.33	-7 085.25	7 182.18	86.16	-7 069.10	7 198.33
1 780.75	-2 196.73	-369.77	1 711.41	-2 266.06	-1 780.75	2 196.73	369.77	-1 711.41	2 266.06
-3 523.76	2 788.72	-653.37	-3 646.27	2 666.21	3 523.76	-2 788.72	653.37	3 646.27	-2 666.21
-8 828.27	7 774.16	-936.98	-9 003.95	7 598.48	8 828.27	-7 774.16	936.98	9 003.95	-7 598.48









Ecuaciones matriciales del elemento 3 sometido a σ combinado de flexo - tensión entre los nudos 3 y 5

Ecuación matricial local en coordenadas locales

{r'}	D	L	E	-	+	{p'}	D	L	E	-	=	[k']	u'3	v'3	Θ'3	u'5	v'5	Θ'5	*	{d'}	D	L	E	-	+	{emp'}	D	L	E	-
rx'35	40.00	10.00	-32.44	0.00			0	0	3.6754E-15	0			1 326 403.32	0	0	-1 326 403.32	0	0		u'3	-1.005E-04	-2.513E-05	1.029E-04	0.000E+00			0	0	0	0
ry'35	-14.65	-3.66	84.91	0.00			0	0	-60	0			0	23 580.50	35 370.76	0	-23 580.50	35 370.76		v'3	1.316E-05	3.290E-06	-2.230E-02	0.000E+00			0	0	0	0
mz'35	-19.38	-4.84	9.86	0.00			0	0	0	0			0	35 370.76	70 741.51	0	-35 370.76	35 370.76		Θ'3	-1.432E-04	-3.581E-05	-4.591E-03	0.000E+00			0	0	0	0
rx'53	-40.00	-10.00	32.44	0.00			0	0	3.0629E-15	0			-1 326 403.32	0	0	1 326 403.32	0	0		u'5	-1.307E-04	-3.267E-05	1.274E-04	0.000E+00			0	0	0	0
ry'53	14.65	3.66	25.09	0.00			0	0	-50	0			0	-23 580.50	-35 370.76	0	23 580.50	-35 370.76		v'5	-1.511E-05	-3.778E-06	-3.479E-02	0.000E+00			0	0	0	0
mz'53	-24.56	-6.14	64.86	0.00			0	0	0	0			0	35 370.76	35 370.76	0	-35 370.76	70 741.51		Θ'5	-2.897E-04	-7.243E-05	-3.036E-03	0.000E+00			0	0	0	0

Ecuación matricial local en coordenadas globales

{r}	D	L	E	-	+	{p}	D	L	E	-	=	[k]	u3	v3	Θ3	u5	v5	Θ5	*	{d}	D	L	E	-	+	{emp}	D	L	E	-
Rx35	14.65	3.66	-84.91	0.00			0	0	60	0			23 580.50	0.00	-35 370.76	-23 580.50	0.00	-35 370.76		u3	-1.316E-05	-3.290E-06	2.230E-02	0.000E+00			0	0	0	0
Ry35	40.00	10.00	-32.44	0.00			0	0	0	0			0.00	1 326 403.32	0.00	0.00	-1 326 403.32	0.00		v3	-1.005E-04	-2.513E-05	1.029E-04	0.000E+00			0	0	0	0
Mz35	-19.38	-4.84	9.86	0.00			0	0	0	0			-35 370.76	0.00	70 741.51	35 370.76	0.00	35 370.76		Θ3	-1.432E-04	-3.581E-05	-4.591E-03	0.000E+00			0	0	0	0
Rx53	-14.65	-3.66	-25.09	0.00			0	0	50	0			-23 580.50	0.00	35 370.76	23 580.50	0.00	35 370.76		u5	1.511E-05	3.778E-06	3.479E-02	0.000E+00			0	0	0	0
Ry53	-40.00	-10.00	32.44	0.00			0	0	0	0			0.00	-1 326 403.32	0.00	0.00	1 326 403.32	0.00		v5	-1.307E-04	-3.267E-05	1.274E-04	0.000E+00			0	0	0	0
Mz53	-24.56	-6.14	64.86	0.00			0	0	0	0			-35 370.76	0.00	35 370.76	35 370.76	0.00	70 741.51		Θ5	-2.897E-04	-7.243E-05	-3.036E-03	0.000E+00			0	0	0	0

Esfuerzo axial (ecuaciones)

D	-250+0*x
L	-62.5+0*x
E	202.78+0*x
-	0+0*x

0.9D+E	-22.22+0*x
0.9D-E	-427.78+0*x
Cu=1.2D+1.6L	-400+0*x
0.75Cu+E	-416.76+0*x
0.75Cu-E	-183.24+0*x

x (m)	σ (kN/m²) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-250.00	-62.50	202.78	0.00	-22.22	-427.78	-400.00	-97.22	-502.78
0.6	-250.00	-62.50	202.78	0.00	-22.22	-427.78	-400.00	-97.22	-502.78
1.2	-250.00	-62.50	202.78	0.00	-22.22	-427.78	-400.00	-97.22	-502.78
1.8	-250.00	-62.50	202.78	0.00	-22.22	-427.78	-400.00	-97.22	-502.78
2.4	-250.00	-62.50	202.78	0.00	-22.22	-427.78	-400.00	-97.22	-502.78
3	-250.00	-62.50	202.78	0.00	-22.22	-427.78	-400.00	-97.22	-502.78

Esfuerzo axial combinado

σ (kN/m²)

	Fibra superior					Fibra inferior				
	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
	-732.81	-2 987.41	-3 306.86	-1 352.84	-3 607.44	688.36	2 131.85	2 506.86	1 158.40	2 601.89
	-1 392.42	-844.83	-1 988.66	-1 765.29	-1 217.70	1 347.97	-10.73	1 188.66	1 570.85	212.15
	-2 052.03	1 297.75	-670.47	-2 177.74	1 172.03	2 007.58	-2 153.30	-129.53	1 983.30	-2 177.59
	-2 711.64	3 440.32	647.72	-2 590.19	3 561.77	2 667.19	-4 295.88	-1 447.72	2 395.75	-4 567.33
	-3 371.25	5 582.90	1 965.91	-3 002.64	5 951.51	3 326.81	-6 438.46	-2 765.91	2 808.20	-6 957.06
	-4 030.86	7 725.48	3 284.10	-3 415.09	8 341.25	3 986.42	-8 581.03	-4 084.10	3 220.65	-9 346.80

Fuerza cortante

D	-14.65+0*x
L	-3.66+0*x
E	24.91+0*x
-	0+0*x

0.9D+E	11.73+0*x
0.9D-E	-38.09+0*x
Cu=1.2D+1.6L	-23.43+0*x
0.75Cu+E	7.33+0*x
0.75Cu-E	-42.48+0*x

x (m)	FV (kN) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-14.65	-3.66	24.91	0.00	11.73	-38.09	-23.43	7.33	-42.48
0.6	-14.65	-3.66	24.91	0.00	11.73	-38.09	-23.43	7.33	-42.48
1.2	-14.65	-3.66	24.91	0.00	11.73	-38.09	-23.43	7.33	-42.48
1.8	-14.65	-3.66	24.91	0.00	11.73	-38.09	-23.43	7.33	-42.48
2.4	-14.65	-3.66	24.91	0.00	11.73	-38.09	-23.43	7.33	-42.48
3	-14.65	-3.66	24.91	0.00	11.73	-38.09	-23.43	7.33	-42.48

Esfuerzo cortante máximo

Válido para sección rectangular

x (m)	τ (kN/m²) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-137.31	-34.33	233.52	0.00	109.94	-357.10	-219.70	68.74	-398.29
0.6	-137.31	-34.33	233.52	0.00	109.94	-357.10	-219.70	68.74	-398.29
1.2	-137.31	-34.33	233.52	0.00	109.94	-357.10	-219.70	68.74	-398.29
1.8	-137.31	-34.33	233.52	0.00	109.94	-357.10	-219.70	68.74	-398.29
2.4	-137.31	-34.33	233.52	0.00	109.94	-357.10	-219.70	68.74	-398.29
3	-137.31	-34.33	233.52	0.00	109.94	-357.10	-219.70	68.74	-398.29

Momento flector (ecuaciones)

D	19.38+-14.65*x+0*x^2
L	4.84+-3.66*x+0*x^2
E	-9.86+24.91*x+0*x^2
-	0+0*x+0*x^2

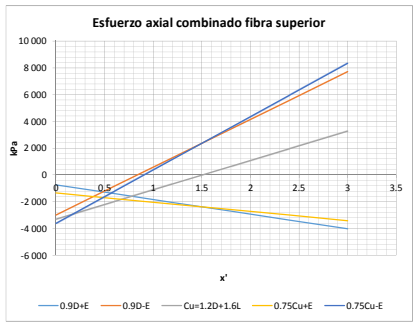
0.9D+E	7.58+11.73*x+0*x^2
0.9D-E	27.3+-38.09*x+0*x^2
Cu=1.2D+1.6L	31.01+-23.43*x+0*x^2
0.75Cu+E	13.39+7.33*x+0*x^2
0.75Cu-E	33.12+-42.48*x+0*x^2

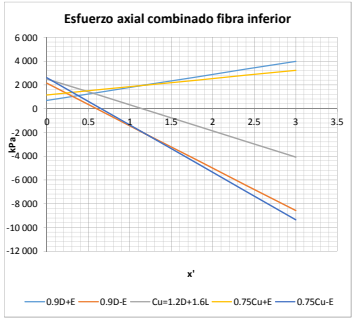
x (m)	MF (kN.m) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	19.38	4.84	-9.86	0.00	7.58	27.30	31.01	13.39	33.12
0.6	10.59	2.65	5.08	0.00	14.62	4.45	16.95	17.79	7.63
1.2	1.80	0.45	20.03	0.00	21.65	-18.41	2.89	22.19	-17.86
1.8	-6.98	-1.75	34.97	0.00	28.69	-41.26	-11.18	26.59	-43.36
2.4	-15.77	-3.94	49.92	0.00	35.72	-64.11	-25.24	30.99	-68.85
3	-24.56	-6.14	64.86	0.00	42.76	-86.97	-39.30	35.39	-94.34

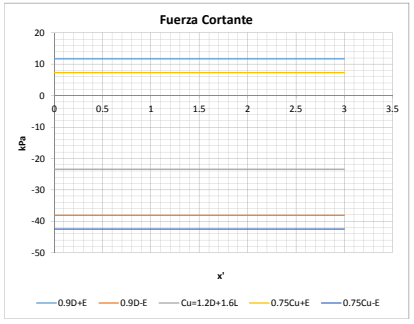
Esfuerzo axial por flexión

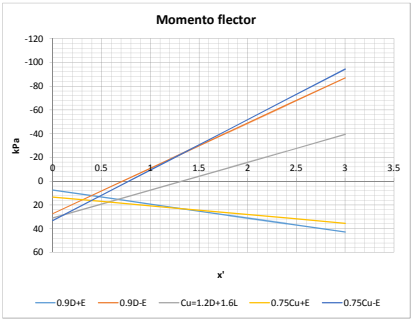
σ (kN/m²)

	Fibra superior					Fibra inferior				
	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
	-710.58	-2 559.63	-2 906.86	-1 255.62	-3 104.66	710.58	2 559.63	2 906.86	1 255.62	3 104.66
	-1 370.19	-417.05	-1 588.66	-1 668.07	-714.93	1 370.19	417.05	1 588.66	1 668.07	714.93
	-2 029.81	1 725.53	-270.47	-2 080.52	1 674.81	2 029.81	-1 725.53	270.47	2 080.52	-1 674.81
	-2 689.42	3 868.10	1 047.72	-2 492.97	4 064.55	2 689.42	-3 868.10	-1 047.72	2 492.97	-4 064.55
	-3 349.03	6 010.68	2 365.91	-2 905.42	6 454.29	3 349.03	-6 010.68	-2 365.91	2 905.42	-6 454.29
	-4 008.64	8 153.26	3 684.10	-3 317.87	8 844.02	4 008.64	-8 153.26	-3 684.10	3 317.87	-8 844.02









Ecuaciones matriciales del elemento 4 sometido a σ combinado de flexo - tensión entre los nudos 4 y 6

Ecuación matricial local en coordenadas locales

	{r'} D	L	E	-	+ {p'} D	L	E	-	= [k'] u'4	v'4	Θ'4	u'6	v'6	Θ'6	* {d'} D	L	E	-	+ {emp'} D	L	E	-
rx'46	40.00	10.00	32.44	0.00	0	0	0	0	1 326 403.32	0	0	-1 326 403.32	0	0	u'4	-1.005E-04	-2.513E-05	-1.029E-04	0.000E+00	0	0	0	0
ry'46	14.65	3.66	25.09	0.00	0	0	0	0	0	23 580.50	35 370.76	0	-23 580.50	35 370.76	v'4	-1.316E-05	-3.290E-06	-2.224E-02	0.000E+00	0	0	0	0
mz'46	19.38	4.84	10.36	0.00	0	0	0	0	0	35 370.76	70 741.51	0	-35 370.76	35 370.76	Θ'4	1.432E-04	3.581E-05	-4.585E-03	0.000E+00	0	0	0	0
rx'64	-40.00	-10.00	-32.44	0.00	0	0	0	0	-1 326 403.32	0	0	1 326 403.32	0	0	u'6	-1.307E-04	-3.267E-05	-1.274E-04	0.000E+00	0	0	0	0
ry'64	-14.65	-3.66	-25.09	0.00	0	0	0	0	0	-23 580.50	-35 370.76	0	23 580.50	-35 370.76	v'6	1.511E-05	3.778E-06	-3.474E-02	0.000E+00	0	0	0	0
mz'64	24.56	6.14	64.91	0.00	0	0	0	0	0	35 370.76	35 370.76	0	-35 370.76	70 741.51	Θ'6	2.897E-04	7.243E-05	-3.043E-03	0.000E+00	0	0	0	0

Ecuación matricial local en coordenadas globales

	{r} D	L	E	-	+ {p} D	L	E	-	= [k] u4	v4	Θ4	u6	v6	Θ6	* {d} D	L	E	-	+ {emp} D	L	E	-
Rx46	-14.65	-3.66	-25.09	0.00	0	0	0	0	23 580.50	0.00	-35 370.76	-23 580.50	0.00	-35 370.76	u4	1.316E-05	3.290E-06	2.224E-02	0.000E+00	0	0	0	0
Ry46	40.00	10.00	32.44	0.00	0	0	0	0	0.00	1 326 403.32	0.00	0.00	-1 326 403.32	0.00	v4	-1.005E-04	-2.513E-05	-1.029E-04	0.000E+00	0	0	0	0
Mz46	19.38	4.84	10.36	0.00	0	0	0	0	-35 370.76	0.00	70 741.51	35 370.76	0.00	35 370.76	Θ4	1.432E-04	3.581E-05	-4.585E-03	0.000E+00	0	0	0	0
Rx64	14.65	3.66	25.09	0.00	0	0	0	0	-23 580.50	0.00	35 370.76	23 580.50	0.00	35 370.76	u6	-1.511E-05	-3.778E-06	3.474E-02	0.000E+00	0	0	0	0
Ry64	-40.00	-10.00	-32.44	0.00	0	0	0	0	0.00	-1 326 403.32	0.00	0.00	1 326 403.32	0.00	v6	-1.307E-04	-3.267E-05	-1.274E-04	0.000E+00	0	0	0	0
Mz64	24.56	6.14	64.91	0.00	0	0	0	0	-35 370.76	0.00	35 370.76	35 370.76	0.00	70 741.51	Θ6	2.897E-04	7.243E-05	-3.043E-03	0.000E+00	0	0	0	0

Esfuerzo axial (ecuaciones)

D	-250+0*x
L	-62.5+0*x
E	-202.78+0*x
-	0+0*x

0.9D+E	-427.78+0*x
0.9D-E	-22.22+0*x
Cu=1.2D+1.6L	-400+0*x
0.75Cu+E	-417.62+0*x
0.75Cu-E	-182.38+0*x

x (m)	σ (kN/m²) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-250.00	-62.50	-202.78	0.00	-427.78	-22.22	-400.00	-502.78	-97.22
0.6	-250.00	-62.50	-202.78	0.00	-427.78	-22.22	-400.00	-502.78	-97.22
1.2	-250.00	-62.50	-202.78	0.00	-427.78	-22.22	-400.00	-502.78	-97.22
1.8	-250.00	-62.50	-202.78	0.00	-427.78	-22.22	-400.00	-502.78	-97.22
2.4	-250.00	-62.50	-202.78	0.00	-427.78	-22.22	-400.00	-502.78	-97.22
3	-250.00	-62.50	-202.78	0.00	-427.78	-22.22	-400.00	-502.78	-97.22

Esfuerzo axial combinado

σ (kN/m²)

	Fibra superior 0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E	Fibra inferior 0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	2 178.66	641.56	2 506.86	2 648.69	1 111.59	-3 034.21	-686.00	-3 306.86	-3 654.25	-1 306.04
0.6	25.77	1 311.48	1 188.66	248.64	1 534.35	-881.32	-1 355.92	-1 988.66	-1 254.20	-1 728.80
1.2	-2 127.12	1 981.40	-129.53	-2 151.41	1 957.12	1 271.57	-2 025.85	-670.47	1 145.85	-2 151.56
1.8	-4 280.01	2 651.33	-1 447.72	-4 551.46	2 379.88	3 424.46	-2 695.77	647.72	3 545.90	-2 574.32
2.4	-6 432.90	3 321.25	-2 765.91	-6 951.51	2 802.64	5 577.34	-3 365.69	1 965.91	5 945.95	-2 997.09
3	-8 585.79	3 991.17	-4 084.10	-9 351.56	3 225.40	7 730.23	-4 035.62	3 284.10	8 346.00	-3 419.85

Fuerza cortante

D	14.65+0*x
L	3.66+0*x
E	25.09+0*x
-	0+0*x

0.9D+E	38.27+0*x
0.9D-E	-11.91+0*x
Cu=1.2D+1.6L	23.43+0*x
0.75Cu+E	42.67+0*x
0.75Cu-E	-7.52+0*x

x (m)	FV (kN) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	14.65	3.66	25.09	0.00	38.27	-11.91	23.43	42.67	-7.52
0.6	14.65	3.66	25.09	0.00	38.27	-11.91	23.43	42.67	-7.52
1.2	14.65	3.66	25.09	0.00	38.27	-11.91	23.43	42.67	-7.52
1.8	14.65	3.66	25.09	0.00	38.27	-11.91	23.43	42.67	-7.52
2.4	14.65	3.66	25.09	0.00	38.27	-11.91	23.43	42.67	-7.52
3	14.65	3.66	25.09	0.00	38.27	-11.91	23.43	42.67	-7.52

Esfuerzo cortante máximo

Válido para sección rectangular

x (m)	τ (kN/m²) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	137.31	34.33	235.23	0.00	358.81	-111.65	219.70	400.01	-70.46
0.6	137.31	34.33	235.23	0.00	358.81	-111.65	219.70	400.01	-70.46
1.2	137.31	34.33	235.23	0.00	358.81	-111.65	219.70	400.01	-70.46
1.8	137.31	34.33	235.23	0.00	358.81	-111.65	219.70	400.01	-70.46
2.4	137.31	34.33	235.23	0.00	358.81	-111.65	219.70	400.01	-70.46
3	137.31	34.33	235.23	0.00	358.81	-111.65	219.70	400.01	-70.46

Momento flector (ecuaciones)

D	-19.38+14.65*x+0*x^2
L	-4.84+3.66*x+0*x^2
E	-10.36+25.09*x+0*x^2
-	0+0*x+0*x^2

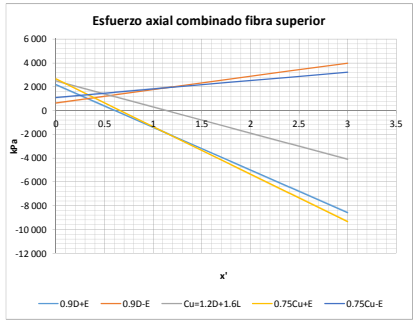
0.9D+E	-27.8+38.27*x+0*x^2
0.9D-E	-7.08+-11.91*x+0*x^2
Cu=1.2D+1.6L	-31.01+23.43*x+0*x^2
0.75Cu+E	-33.62+42.67*x+0*x^2
0.75Cu-E	-12.89+-7.52*x+0*x^2

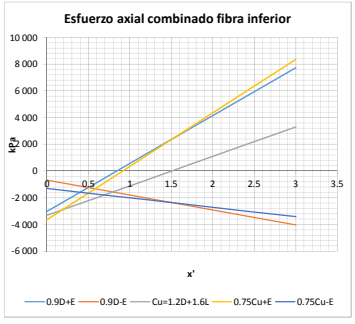
x (m)	MF (kN.m) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-19.38	-4.84	-10.36	0.00	-27.80	-7.08	-31.01	-33.62	-12.89
0.6	-10.59	-2.65	4.69	0.00	-4.84	-14.23	-16.95	-8.02	-17.40
1.2	-1.80	-0.45	19.75	0.00	18.13	-21.37	-2.89	17.59	-21.91
1.8	6.98	1.75	34.80	0.00	41.09	-28.52	11.18	43.19	-26.42
2.4	15.77	3.94	49.86	0.00	64.05	-35.66	25.24	68.79	-30.93
3	24.56	6.14	64.91	0.00	87.02	-42.81	39.30	94.39	-35.44

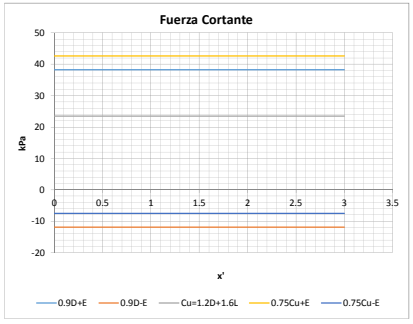
Esfuerzo axial por flexión

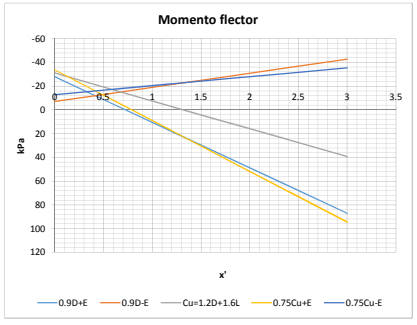
σ (kN/m²)

	Fibra superior 0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E	Fibra inferior 0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	2 606.43	663.78	2 906.86	3 151.47	1 208.81	-2 606.43	-663.78	-2 906.86	-3 151.47	-1 208.81
0.6	453.54	1 333.70	1 588.66	751.42	1 631.58	-453.54	-1 333.70	-1 588.66	-751.42	-1 631.58
1.2	-1 699.34	2 003.62	270.47	-1 648.63	2 054.34	1 699.34	-2 003.62	-270.47	1 648.63	-2 054.34
1.8	-3 852.23	2 673.55	-1 047.72	-4 048.68	2 477.10	3 852.23	-2 673.55	1 047.72	4 048.68	-2 477.10
2.4	-6 005.12	3 343.47	-2 365.91	-6 448.73	2 899.86	6 005.12	-3 343.47	2 365.91	6 448.73	-2 899.86
3	-8 158.01	4 013.39	-3 684.10	-8 848.78	3 322.63	8 158.01	-4 013.39	3 684.10	8 848.78	-3 322.63









Ecuaciones matriciales del elemento 5 sometido a σ combinado de flexo - tensión entre los nudos 3 y 4

Ecuación matricial local en coordenadas locales

	{r'} D	L	E	-	+ {p'} D	L	E	-	= [k'] u'3	v'3	Θ'3	u'4	v'4	Θ'4	* {d'} D	L	E	-	+ {emp'} D	L	E	-
rx'34	-12.76	-3.19	29.79	0.00	0	0	0	0	484 607.38	0	0	-484 607.38	0	0	u'3	-1.316E-05	-3.290E-06	2.230E-02	0.000E+00	0	0	0	0
ry'34	40.00	10.00	-49.46	0.00	0	0	0	0	0	2 725.92	5 451.83	0	-2 725.92	5 451.83	v'3	-1.005E-04	-2.513E-05	1.029E-04	0.000E+00	40	10	0	0
mz'34	25.63	6.41	-98.95	0.00	0	0	0	0	0	5 451.83	14 538.22	0	-5 451.83	7 269.11	Θ'3	-1.432E-04	-3.581E-05	-4.591E-03	0.000E+00	26.6666667	6.66666667	0	0
rx'43	12.76	3.19	-29.79	0.00	0	0	0	0	-484 607.38	0	0	484 607.38	0	0	u'4	1.316E-05	3.290E-06	2.224E-02	0.000E+00	0	0	0	0
ry'43	40.00	10.00	49.46	0.00	0	0	0	0	0	-2 725.92	-5 451.83	0	2 725.92	-5 451.83	v'4	-1.005E-04	-2.513E-05	-1.029E-04	0.000E+00	40	10	0	0
mz'43	-25.63	-6.41	-98.91	0.00	0	0	0	0	0	5 451.83	7 269.11	0	-5 451.83	14 538.22	Θ'4	1.432E-04	3.581E-05	-4.585E-03	0.000E+00	-26.6666667	-6.66666667	0	0

Ecuación matricial local en coordenadas globales

	{r} D	L	E	-	+ {p} D	L	E	-	= [k] u3	v3	Θ3	u4	v4	Θ4	* {d} D	L	E	-	+ {emp} D	L	E	-
Rx34	-12.76	-3.19	29.79	0.00	0	0	0	0	484 607.38	0.00	0.00	-484 607.38	0.00	0.00	u3	-1.316E-05	-3.290E-06	2.230E-02	0.000E+00	0	0	0	0
Ry34	40.00	10.00	-49.46	0.00	0	0	0	0	0.00	2 725.92	5 451.83	0.00	-2 725.92	5 451.83	v3	-1.005E-04	-2.513E-05	1.029E-04	0.000E+00	40	10	0	0
Mz34	25.63	6.41	-98.95	0.00	0	0	0	0	0.00	5 451.83	14 538.22	0.00	-5 451.83	7 269.11	Θ3	-1.432E-04	-3.581E-05	-4.591E-03	0.000E+00	26.6666667	6.66666667	0	0
Rx43	12.76	3.19	-29.79	0.00	0	0	0	0	-484 607.38	0.00	0.00	484 607.38	0.00	0.00	u4	1.316E-05	3.290E-06	2.224E-02	0.000E+00	0	0	0	0
Ry43	40.00	10.00	49.46	0.00	0	0	0	0	0.00	-2 725.92	-5 451.83	0.00	2 725.92	-5 451.83	v4	-1.005E-04	-2.513E-05	-1.029E-04	0.000E+00	40	10	0	0
Mz43	-25.63	-6.41	-98.91	0.00	0	0	0	0	0.00	5 451.83	7 269.11	0.00	-5 451.83	14 538.22	Θ4	1.432E-04	3.581E-05	-4.585E-03	0.000E+00	-26.6666667	-6.66666667	0	0

Esfuerzo axial (ecuaciones)

D	141.73+0*x
L	35.43+0*x
E	-330.98+0*x
-	0+0*x

0.9D+E	-203.42+0*x
0.9D-E	458.54+0*x
Cu=1.2D+1.6L	226.77+0*x
0.75Cu+E	582.28+0*x
0.75Cu-E	-242.12+0*x

x (m)	σ (kN/m²) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	141.73	35.43	-330.98	0.00	-203.42	458.54	226.77	-160.90	501.06
0.8	141.73	35.43	-330.98	0.00	-203.42	458.54	226.77	-160.90	501.06
1.6	141.73	35.43	-330.98	0.00	-203.42	458.54	226.77	-160.90	501.06
2.4	141.73	35.43	-330.98	0.00	-203.42	458.54	226.77	-160.90	501.06
3.2	141.73	35.43	-330.98	0.00	-203.42	458.54	226.77	-160.90	501.06
4	141.73	35.43	-330.98	0.00	-203.42	458.54	226.77	-160.90	501.06

Esfuerzo axial combinado

σ (kN/m²)

x (m)	Fibra superior 0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E	Fibra inferior 0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-17 066.88	27 572.23	9 338.09	-15 315.98	29 323.12	16 660.04	-26 655.15	-8 884.55	14 994.18	-28 321.00
0.8	-13 393.29	13 658.64	235.87	-13 349.06	13 702.86	12 986.45	-12 741.56	217.67	13 027.26	-12 700.75
1.6	-7 159.70	2 305.05	-4 315.24	-7 968.81	1 495.94	6 752.86	-1 387.98	4 768.79	7 647.01	-493.83
2.4	1 633.88	-6 488.53	-4 315.24	824.78	-7 297.64	-2 040.73	7 405.61	4 768.79	-1 146.58	8 299.76
3.2	12 987.47	-12 722.12	235.87	13 031.70	-12 677.90	-13 394.31	13 639.20	217.67	-13 353.50	13 680.01
4	26 901.06	-16 395.71	9 338.09	28 651.95	-14 644.82	-27 307.90	17 312.78	-8 884.55	-28 973.75	15 646.93

Fuerza cortante

D	40+-20*x
L	10+-5*x
E	-49.46+0*x
-	0+0*x

0.9D+E	-13.46+-18*x
0.9D-E	85.46+-18*x
Cu=1.2D+1.6L	64+-32*x
0.75Cu+E	-1.46+-24*x
0.75Cu-E	97.46+-24*x

x (m)	FV (kN) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	40.00	10.00	-49.46	0.00	-13.46	85.46	64.00	-1.46	97.46
0.8	24.00	6.00	-49.46	0.00	-27.86	71.06	38.40	-20.66	78.26
1.6	8.00	2.00	-49.46	0.00	-42.26	56.66	12.80	-39.86	59.06
2.4	-8.00	-2.00	-49.46	0.00	-56.66	42.26	-12.80	-59.06	39.86
3.2	-24.00	-6.00	-49.46	0.00	-71.06	27.86	-38.40	-78.26	20.66
4	-40.00	-10.00	-49.46	0.00	-85.46	13.46	-64.00	-97.46	1.46

Esfuerzo cortante máximo

Válido para sección rectangular

x (m)	τ (kN/m²) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	666.67	166.67	-824.40	0.00	-224.40	1 424.40	1 066.67	-24.40	1 624.40
0.8	400.00	100.00	-824.40	0.00	-464.40	1 184.40	640.00	-344.40	1 304.40
1.6	133.33	33.33	-824.40	0.00	-704.40	944.40	213.33	-664.40	984.40
2.4	-133.33	-33.33	-824.40	0.00	-944.40	704.40	-213.33	-984.40	664.40
3.2	-400.00	-100.00	-824.40	0.00	-1 184.40	464.40	-640.00	-1 304.40	344.40
4	-666.67	-166.67	-824.40	0.00	-1 424.40	224.40	-1 066.67	-1 624.40	24.40

Momento flector (ecuaciones)

D	-25.63+40*x+-10*x^2
L	-6.41+10*x+-2.5*x^2
E	98.95+-49.46*x+0*x^2
-	0+0*x+0*x^2

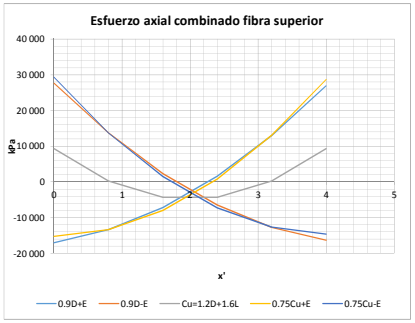
0.9D+E	75.89+-13.46*x+-9*x^2
0.9D-E	-122.01+85.46*x+-9*x^2
Cu=1.2D+1.6L	-41+64*x+-16*x^2
0.75Cu+E	68.2+-1.46*x+-12*x^2
0.75Cu-E	-129.7+97.46*x+-12*x^2

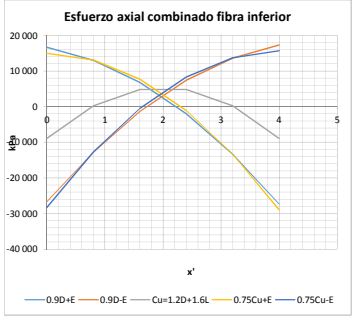
x (m)	MF (kN.m) D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-25.63	-6.41	98.95	0.00	75.89	-122.01	-41.00	68.20	-129.70
0.8	-0.03	-0.01	59.38	0.00	59.35	-59.40	-0.04	59.35	-59.41
1.6	12.77	3.19	19.81	0.00	31.30	-8.31	20.44	35.14	-4.48
2.4	12.77	3.19	-19.76	0.00	-8.27	31.26	20.44	-4.44	35.09
3.2	-0.03	-0.01	-59.34	0.00	-59.36	59.31	-0.04	-59.37	59.31
4	-25.63	-6.41	-98.91	0.00	-121.97	75.84	-41.00	-129.66	68.16

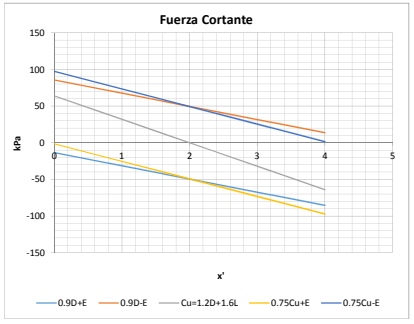
Esfuerzo axial por flexión

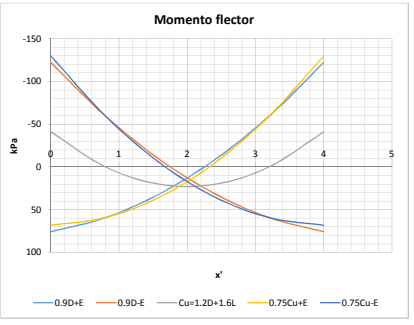
σ (kN/m²)

x (m)	Fibra superior 0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E	Fibra inferior 0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-16 863.46	27 113.69	9 111.32	-15 155.08	28 822.06	16 863.46	-27 113.69	-9 111.32	15 155.08	-28 822.06
0.8	-13 189.87	13 200.10	9.10	-13 188.16	13 201.81	13 189.87	-13 200.10	-9.10	13 188.16	-13 201.81
1.6	-6 956.28	1 846.52	-4 542.01	-7 807.91	994.89	6 956.28	-1 846.52	4 542.01	7 807.91	-994.89
2.4	1 837.31	-6 947.07	-4 542.01	985.68	-7 798.70	-1 837.31	6 947.07	4 542.01	-985.68	7 798.70
3.2	13 190.89	-13 180.66	9.10	13 192.60	-13 178.95	-13 190.89	13 180.66	-9.10	-13 192.60	13 178.95
4	27 104.48	-16 854.25	9 111.32	28 812.85	-15 145.87	-27 104.48	16 854.25	-9 111.32	-28 812.85	15 145.87









Ecuaciones matriciales del elemento 6 sometido a σ combinado de flexo - tensión entre los nudos 5 y 6

Ecuación matricial local en coordenadas locales

	{r'}				+	{p'}				=	[k']						*	{d'}					+	{emp'}			
	D	L	E	-		D	L	E	-		u'5	v'5	Θ'5	u'6	v'6	Θ'6		D	L	E	-		D	L	E	-
rx'56	14.65	3.66	25.09	0.00		0	0	0	0		484 607.38	0	0	-484 607.38	0	0	u'5	1.511E-05	3.778E-06	3.479E-02	0.000E+00		0	0	0	0
ry'56	40.00	10.00	-32.44	0.00		0	0	0	0		0	2 725.92	5 451.83	0	-2 725.92	5 451.83	v'5	-1.307E-04	-3.267E-05	1.274E-04	0.000E+00		40	10	0	0
mz'56	24.56	6.14	-64.86	0.00		0	0	0	0		0	5 451.83	14 538.22	0	-5 451.83	7 269.11	Θ'5	-2.897E-04	-7.243E-05	-3.036E-03	0.000E+00		26.6666667	6.66666667	0	0
rx'65	-14.65	-3.66	-25.09	0.00		0	0	0	0		-484 607.38	0	0	484 607.38	0	0	u'6	-1.511E-05	-3.778E-06	3.474E-02	0.000E+00		0	0	0	0
ry'65	40.00	10.00	32.44	0.00		0	0	0	0		0	-2 725.92	-5 451.83	0	2 725.92	-5 451.83	v'6	-1.307E-04	-3.267E-05	-1.274E-04	0.000E+00		40	10	0	0
mz'65	-24.56	-6.14	-64.91	0.00		0	0	0	0		0	5 451.83	7 269.11	0	-5 451.83	14 538.22	Θ'6	2.897E-04	7.243E-05	-3.043E-03	0.000E+00		-26.6666667	-6.66666667	0	0

Ecuación matricial local en coordenadas globales

	{r}				+	{p}				=	[k]						*	{d}					+	{emp}			
	D	L	E	-		D	L	E	-		u5	v5	Θ5	u6	v6	Θ6		D	L	E	-		D	L	E	-
Rx56	14.65	3.66	25.09	0.00		0	0	0	0		484 607.38	0.00	0.00	-484 607.38	0.00	0.00	u5	1.511E-05	3.778E-06	3.479E-02	0.000E+00		0	0	0	0
Ry56	40.00	10.00	-32.44	0.00		0	0	0	0		0.00	2 725.92	5 451.83	0.00	-2 725.92	5 451.83	v5	-1.307E-04	-3.267E-05	1.274E-04	0.000E+00		40	10	0	0
Mz56	24.56	6.14	-64.86	0.00		0	0	0	0		0.00	5 451.83	14 538.22	0.00	-5 451.83	7 269.11	Θ5	-2.897E-04	-7.243E-05	-3.036E-03	0.000E+00		26.6666667	6.66666667	0	0
Rx65	-14.65	-3.66	-25.09	0.00		0	0	0	0		-484 607.38	0.00	0.00	484 607.38	0.00	0.00	u6	-1.511E-05	-3.778E-06	3.474E-02	0.000E+00		0	0	0	0
Ry65	40.00	10.00	32.44	0.00		0	0	0	0		0.00	-2 725.92	-5 451.83	0.00	2 725.92	-5 451.83	v6	-1.307E-04	-3.267E-05	-1.274E-04	0.000E+00		40	10	0	0
Mz65	-24.56	-6.14	-64.91	0.00		0	0	0	0		0.00	5 451.83	7 269.11	0.00	-5 451.83	14 538.22	Θ6	2.897E-04	7.243E-05	-3.043E-03	0.000E+00		-26.6666667	-6.66666667	0	0

Esfuerzo axial (ecuaciones)

D	-162.74+0*x
L	-40.68+0*x
E	-278.8+0*x
-	0+0*x

0.9D+E	-425.26+0*x
0.9D-E	132.33+0*x
Cu=1.2D+1.6L	-260.38+0*x
0.75Cu+E	75.08+0*x
0.75Cu-E	-465.66+0*x

x (m)	σ (kN/m²)								
	D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-162.74	-40.68	-278.80	0.00	-425.26	132.33	-260.38	-474.08	83.51
0.8	-162.74	-40.68	-278.80	0.00	-425.26	132.33	-260.38	-474.08	83.51
1.6	-162.74	-40.68	-278.80	0.00	-425.26	132.33	-260.38	-474.08	83.51
2.4	-162.74	-40.68	-278.80	0.00	-425.26	132.33	-260.38	-474.08	83.51
3.2	-162.74	-40.68	-278.80	0.00	-425.26	132.33	-260.38	-474.08	83.51
4	-162.74	-40.68	-278.80	0.00	-425.26	132.33	-260.38	-474.08	83.51

Esfuerzo axial combinado

σ (kN/m²)

	Fibra superior					Fibra inferior				
	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-9 927.22	19 458.57	8 472.31	-8 338.66	21 047.12	9 076.70	-19 193.90	-8 993.07	7 390.49	-20 880.11
0.8	-9 279.33	8 570.67	-629.92	-9 397.44	8 452.56	8 428.80	-8 306.01	109.15	8 449.27	-8 285.55
1.6	-6 071.43	242.78	-5 181.03	-7 042.88	-728.66	5 220.91	21.88	4 660.26	6 094.71	895.68
2.4	-303.54	-5 525.11	-5 181.03	-1 274.98	-6 496.56	-546.98	5 789.78	4 660.26	326.81	6 663.57
3.2	8 024.35	-8 733.01	-629.92	7 906.24	-8 851.12	-8 874.88	8 997.67	109.15	-8 854.41	9 018.13
4	18 912.25	-9 380.90	8 472.31	20 500.80	-7 792.34	-19 762.77	9 645.56	-8 993.07	-21 448.97	7 959.36

Fuerza cortante

D	40+-20*x
L	10+-5*x
E	-32.44+0*x
-	0+0*x

0.9D+E	3.56+-18*x
0.9D-E	68.44+-18*x
Cu=1.2D+1.6L	64+-32*x
0.75Cu+E	15.56+-24*x
0.75Cu-E	80.44+-24*x

x (m)	FV (kN)								
	D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	40.00	10.00	-32.44	0.00	3.56	68.44	64.00	15.56	80.44
0.8	24.00	6.00	-32.44	0.00	-10.84	54.04	38.40	-3.64	61.24
1.6	8.00	2.00	-32.44	0.00	-25.24	39.64	12.80	-22.84	42.04
2.4	-8.00	-2.00	-32.44	0.00	-39.64	25.24	-12.80	-42.04	22.84
3.2	-24.00	-6.00	-32.44	0.00	-54.04	10.84	-38.40	-61.24	3.64
4	-40.00	-10.00	-32.44	0.00	-68.44	-3.56	-64.00	-80.44	-15.56

Esfuerzo cortante máximo

Válido para sección rectangular

x (m)	τ (kN/m²)								
	D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	666.67	166.67	-540.74	0.00	59.26	1 140.74	1 066.67	259.26	1 340.74
0.8	400.00	100.00	-540.74	0.00	-180.74	900.74	640.00	-60.74	1 020.74
1.6	133.33	33.33	-540.74	0.00	-420.74	660.74	213.33	-380.74	700.74
2.4	-133.33	-33.33	-540.74	0.00	-660.74	420.74	-213.33	-700.74	380.74
3.2	-400.00	-100.00	-540.74	0.00	-900.74	180.74	-640.00	-1 020.74	60.74
4	-666.67	-166.67	-540.74	0.00	-1 140.74	-59.26	-1 066.67	-1 340.74	-259.26

Momento flector (ecuaciones)

D	-24.56+40*x+-10*x^2
L	-6.14+10*x+-2.5*x^2
E	64.86+-32.44*x+0*x^2
-	0+0*x+0*x^2

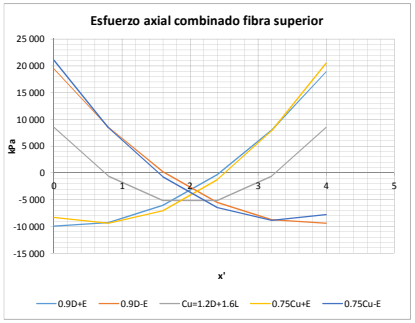
0.9D+E	42.76+3.56*x+-9*x^2
0.9D-E	-86.97+68.44*x+-9*x^2
Cu=1.2D+1.6L	-39.3+64*x+-16*x^2
0.75Cu+E	35.39+15.56*x+-12*x^2
0.75Cu-E	-94.34+80.44*x+-12*x^2

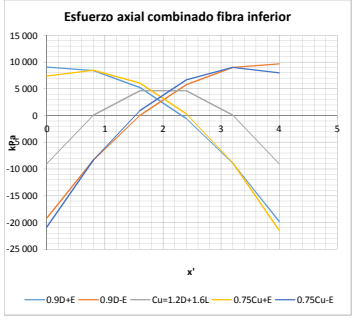
x (m)	MF (kN.m)								
	D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-24.56	-6.14	64.86	0.00	42.76	-86.97	-39.30	35.39	-94.34
0.8	1.04	0.26	38.91	0.00	39.84	-37.97	1.66	40.16	-37.66
1.6	13.84	3.46	12.95	0.00	25.41	-0.50	22.14	29.56	3.65
2.4	13.84	3.46	-13.00	0.00	-0.55	25.46	22.14	3.60	29.61
3.2	1.04	0.26	-38.96	0.00	-38.02	39.89	1.66	-37.71	40.21
4	-24.56	-6.14	-64.91	0.00	-87.02	42.81	-39.30	-94.39	35.44

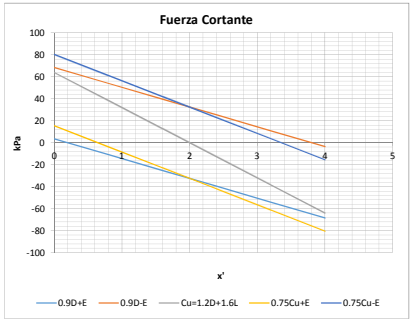
Esfuerzo axial por flexión

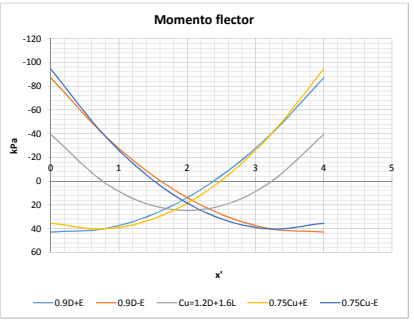
σ (kN/m²)

	Fibra superior					Fibra inferior				
	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
0	-9 501.96	19 326.23	8 732.69	-7 864.58	20 963.61	9 501.96	-19 326.23	-8 732.69	7 864.58	-20 963.61
0.8	-8 854.06	8 438.34	-369.53	-8 923.35	8 369.05	8 854.06	-8 438.34	369.53	8 923.35	-8 369.05
1.6	-5 646.17	110.45	-4 920.64	-6 568.79	-812.17	5 646.17	-110.45	4 920.64	6 568.79	812.17
2.4	121.72	-5 657.45	-4 920.64	-800.90	-6 580.07	-121.72	5 657.45	4 920.64	800.90	6 580.07
3.2	8 449.62	-8 865.34	-369.53	8 380.33	-8 934.63	-8 449.62	8 865.34	369.53	-8 380.33	8 934.63
4	19 337.51	-9 513.23	8 732.69	20 974.89	-7 875.85	-19 337.51	9 513.23	-8 732.69	-20 974.89	7 875.85









ECUACIÓN MATRICIAL GLOBAL DE LA ESTRUCTURA

nudo		{Reacciones}			+	{P}			=	[K]																*	{Deformación}				-	+	{EMP}		
		D	L	E		D	L	E		u1	v1	θ1	u2	v2	θ2	u3	v3	θ3	u4	v4	θ4	u5	v5	θ5	u6	v6	θ6		D	L	E			D	L	E
	X1	1.89	0.47	-55.12		0.00	0.00	0.00		5093.388764	4.84392E-11	-12733.47191	0	0	0	-5093.388764	-4.84392E-11	-12733.47191	0	0	0	0	0	0	0	0	0	u1	0	0	0	0		0.00	0.00	0.00
1	Y1	80.00	20.00	-81.91		0.00	0.00	0.00		4.84392E-11	795841.9944	7.8002E-13	0	0	0	-4.84392E-11	-795841.9944	7.8002E-13	0	0	0	0	0	0	0	0	0	v1	0	0	0	0		0.00	0.00	0.00
	M1	-3.21	-0.80	186.51		0.00	0.00	0.00		-12733.47191	7.8002E-13	42444.90637	0	0	0	12733.47191	-7.8002E-13	21222.45318	0	0	0	0	0	0	0	0	0	θ1	0	0	0	0		0.00	0.00	0.00
	X2	-1.89	-0.47	-54.88		0.00	0.00	0.00		0	0	0	5093.388764	4.84392E-11	-12733.47191	0	0	0	-5093.388764	-4.84392E-11	-12733.47191	0	0	0	0	0	0	u2	0	0	0	0		0.00	0.00	0.00
2	Y2	80.00	20.00	81.91		0.00	0.00	0.00		0	0	0	4.84392E-11	795841.9944	7.8002E-13	0	0	0	-4.84392E-11	-795841.9944	7.8002E-13	0	0	0	0	0	0	v2	0	0	0	0		0.00	0.00	0.00
	M2	3.21	0.80	185.85		0.00	0.00	0.00		0	0	0	-12733.47191	7.8002E-13	42444.90637	0	0	0	12733.47191	-7.8002E-13	21222.45318	0	0	0	0	0	0	θ2	0	0	0	0		0.00	0.00	0.00
	X3	0.00	0.00	0.00		0.00	0.00	60.00		-5093.388764	-4.84392E-11	12733.47191	0	0	0	513281.272	1.28247E-10	-22637.2834	-484607.3797	0	0	-23580.50354	-7.98076E-11	-35370.75531	0	0	0	u3	-1.316E-05	-3.290E-06	2.230E-02	0.000E+00		0.00	0.00	0.00
3	Y3	0.00	0.00	0.00		0.00	0.00	0.00		-4.84392E-11	-795841.9944	-7.8002E-13	0	0	0	1.28247E-10	2124971.235	5451.833022	0	-2725.916511	5451.833022	-7.98076E-11	-1326403.324	2.16672E-12	0	0	0	v3	-1.005E-04	-2.513E-05	1.029E-04	0.000E+00		40.00	10.00	0.00
	M3	0.00	0.00	0.00		0.00	0.00	0.00		-12733.47191	7.8002E-13	21222.45318	0	0	0	-22637.2834	5451.833022	127724.6384	0	-5451.833022	7269.110696	35370.75531	-2.16672E-12	35370.75531	0	0	0	θ3	-1.432E-04	-3.581E-05	-4.591E-03	0.000E+00		26.67	6.67	0.00
	X4	0.00	0.00	0.00		0.00	0.00	0.00		0	0	0	-5093.388764	-4.84392E-11	12733.47191	-484607.3797	0	0	513281.272	1.28247E-10	-22637.2834	0	0	0	-23580.50354	-7.98076E-11	-35370.75531	u4	1.316E-05	3.290E-06	2.224E-02	0.000E+00		0.00	0.00	0.00
4	Y4	0.00	0.00	0.00		0.00	0.00	0.00		0	0	0	-4.84392E-11	-795841.9944	-7.8002E-13	0	-2725.916511	-5451.833022	1.28247E-10	2124971.235	-5451.833022	0	0	0	-7.98076E-11	-1326403.324	2.16672E-12	v4	-1.005E-04	-2.513E-05	-1.029E-04	0.000E+00		40.00	10.00	0.00
	M4	0.00	0.00	0.00		0.00	0.00	0.00		0	0	0	-12733.47191	7.8002E-13	21222.45318	0	5451.833022	7269.110696	-22637.2834	-5451.833022	127724.6384	0	0	0	35370.75531	-2.16672E-12	35370.75531	θ4	1.432E-04	3.581E-05	-4.585E-03	0.000E+00		-26.67	-6.67	0.00
	X5	0.00	0.00	0.00		0.00	0.00	50.00		0	0	0	0	0	0	-23580.50354	-7.98076E-11	35370.75531	0	0	0	508187.8833	7.98076E-11	35370.75531	-484607.3797	0	0	u5	1.511E-05	3.778E-06	3.479E-02	0.000E+00		0.00	0.00	0.00
5	Y5	0.00	0.00	0.00		0.00	0.00	0.00		0	0	0	0	0	0	-7.98076E-11	-1326403.324	-2.16672E-12	0	0	0	7.98076E-11	1329129.24	5451.833022	0	-2725.916511	5451.833022	v5	-1.307E-04	-3.267E-05	1.274E-04	0.000E+00		40.00	10.00	0.00
	M5	0.00	0.00	0.00		0.00	0.00	0.00		0	0	0	0	0	0	-35370.75531	2.16672E-12	35370.75531	0	0	0	35370.75531	5451.833022	85279.732	0	-5451.833022	7269.110696	θ5	-2.897E-04	-7.243E-05	-3.036E-03	0.000E+00		26.67	6.67	0.00
	X6	0.00	0.00	0.00		0.00	0.00	0.00		0	0	0	0	0	0	0	0	0	-23580.50354	-7.98076E-11	35370.75531	-484607.3797	0	0	508187.8833	7.98076E-11	35370.75531	u6	-1.511E-05	-3.778E-06	3.474E-02	0.000E+00		0.00	0.00	0.00
6	Y6	0.00	0.00	0.00		0.00	0.00	0.00		0	0	0	0	0	0	0	0	0	-7.98076E-11	-1326403.324	-2.16672E-12	0	-2725.916511	-5451.833022	7.98076E-11	1329129.24	-5451.833022	v6	-1.307E-04	-3.267E-05	-1.274E-04	0.000E+00		40.00	10.00	0.00
	M6	0.00	0.00	0.00		0.00	0.00	0.00		0	0	0	0	0	0	0	0	0	-35370.75531	2.16672E-12	35370.75531	0	5451.833022	7269.110696	35370.75531	-5451.833022	85279.732	θ6	2.897E-04	7.243E-05	-3.043E-03	0.000E+00		-26.67	-6.67	0.00

ECUACIÓN MATRICIAL GLOBAL DE LA ESTRUCTURA REDUCIDA POR CONDICIONES DE BORDE

nudo		{Reacciones}			+	{P}			=	[K]										*	{Deformación}				+	{EMP}		
		D	L	E		D	L	E		u3	v3	Θ3	u4	v4	Θ4	u5	v5	Θ5	u6	v6	Θ6		D	L	E		D	L	E
	X3	0.00	0.00	0.00		0.00	0.00	60.00		513281.272	1.28247E-10	-22637.2834	-484607.3797	0	0	-23580.50354	-7.98076E-11	-35370.75531	0	0	0		u3	-0.000013	-0.000003	0.022299		0.00	0.00	0.00
3	Y3	0.00	0.00	0.00		0.00	0.00	0.00		1.28247E-10	2124971.235	5451.833022	0	-2725.916511	5451.833022	-7.98076E-11	-1326403.324	2.16672E-12	0	0	0		v3	-0.000101	-0.000025	0.000103		40.00	10.00	0.00
	M3	0.00	0.00	0.00		0.00	0.00	0.00		-22637.2834	5451.833022	127724.6384	0	-5451.833022	7269.110696	35370.75531	-2.16672E-12	35370.75531	0	0	0		Θ3	-0.000143	-0.000036	-0.004591		26.67	6.67	0.00
	X4	0.00	0.00	0.00		0.00	0.00	0.00		-484607.3797	0	0	513281.272	1.28247E-10	-22637.2834	0	0	0	-23580.5035	-7.9808E-11	-35370.7553		u4	0.000013	0.000003	0.022237		0.00	0.00	0.00
4	Y4	0.00	0.00	0.00		0.00	0.00	0.00		0	-2725.916511	-5451.833022	1.28247E-10	2124971.235	-5451.833022	0	0	0	-7.9808E-11	-1326403.32	2.1667E-12		v4	-0.000101	-0.000025	-0.000103		40.00	10.00	0.00
	M4	0.00	0.00	0.00		0.00	0.00	0.00		0	5451.833022	7269.110696	-22637.2834	-5451.833022	127724.6384	0	0	0	35370.7553	-2.1667E-12	35370.7553		Θ4	0.000143	0.000036	-0.004585		-26.67	-6.67	0.00
	X5	0.00	0.00	0.00		0.00	0.00	50.00		-23580.50354	-7.98076E-11	35370.75531	0	0	0	508187.8833	7.98076E-11	35370.75531	-484607.38	0	0		u5	0.000015	0.000004	0.034795		0.00	0.00	0.00
5	Y5	0.00	0.00	0.00		0.00	0.00	0.00		-7.98076E-11	-1326403.324	-2.16672E-12	0	0	0	7.98076E-11	1329129.24	5451.833022	0	-2725.91651	5451.83302		v5	-0.000131	-0.000033	0.000127		40.00	10.00	0.00
	M5	0.00	0.00	0.00		0.00	0.00	0.00		-35370.75531	2.16672E-12	35370.75531	0	0	0	35370.75531	5451.833022	85279.732	0	-5451.83302	7269.1107		Θ5	-0.000290	-0.000072	-0.003036		26.67	6.67	0.00
	X6	0.00	0.00	0.00		0.00	0.00	0.00		0	0	0	-23580.50354	-7.98076E-11	35370.75531	-484607.3797	0	0	508187.883	7.9808E-11	35370.7553		u6	-0.000015	-0.000004	0.034743		0.00	0.00	0.00
6	Y6	0.00	0.00	0.00		0.00	0.00	0.00		0	0	0	-7.98076E-11	-1326403.324	-2.16672E-12	0	-2725.916511	-5451.833022	7.9808E-11	1329129.24	-5451.83302		v6	-0.000131	-0.000033	-0.000127		40.00	10.00	0.00
	M6	0.00	0.00	0.00		0.00	0.00	0.00		0	0	0	-35370.75531	2.16672E-12	35370.75531	0	5451.833022	7269.110696	35370.7553	-5451.83302	85279.732		Θ6	0.000290	0.000072	-0.003043		-26.67	-6.67	0.00

Estructura sometida a esfuerzos combinados de flexión - tensión

Datos de nudos y niveles			Desplazamento del nudo (u)								
			Nudo inferior								
inferior	superior	h	D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
1	3	5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
2	4	5	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
3	5	3	-1.316E-05	-3.290E-06	2.230E-02	0.000E+00	2.229E-02	-2.231E-02	-2.106E-05	2.228E-02	-2.231E-02
4	6	3	1.316E-05	3.290E-06	2.224E-02	0.000E+00	2.225E-02	-2.223E-02	2.106E-05	2.225E-02	-2.222E-02

Datos de nudos y niveles			Desplazamento del nudo (u)								
			Nudo superior								
inferior	superior	h	D	L	E	-	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E
1	3	5	-1.316E-05	-3.290E-06	2.230E-02	0.000E+00	2.229E-02	-2.231E-02	-2.106E-05	2.228E-02	-2.231E-02
2	4	5	1.316E-05	3.290E-06	2.224E-02	0.000E+00	2.225E-02	-2.223E-02	2.106E-05	2.225E-02	-2.222E-02
3	5	3	1.511E-05	3.778E-06	3.479E-02	0.000E+00	3.481E-02	-3.478E-02	2.418E-05	3.481E-02	-3.478E-02
4	6	3	-1.511E-05	-3.778E-06	3.474E-02	0.000E+00	3.473E-02	-3.476E-02	-2.418E-05	3.472E-02	-3.476E-02

Datos de nudos y niveles			Deriva						
			Desplazamiento relativo $\lvert u_s-u_i \rvert / h*100$					max	máxima estructura
inferior	superior	h	0.9D+E	0.9D-E	Cu=1.2D+1.6L	0.75Cu+E	0.75Cu-E		
1	3	5	0.45%	0.45%	0.00%	0.45%	0.45%	0.45%	0.45%
2	4	5	0.44%	0.44%	0.00%	0.45%	0.44%	0.45%	
3	5	3	0.42%	0.42%	0.00%	0.42%	0.42%	0.42%	
4	6	3	0.42%	0.42%	0.00%	0.42%	0.42%	0.42%	

Estructura sometida a esfuerzos combinados de flexión - tensión

Reacciones globales en los nudos de cimentación								
Nudo	**R**	**D+L**	**D+0.7E**	**D-0.7E**	**D+0.75 (L+0.7E)**	**D+0.75(L-0.7E)**	**0.6D+0.7E**	**0.6D-0.7E**
1	X1	2.36	-36.69	40.47	-26.69	31.18	-37.45	39.72
	Y1	100.00	22.66	137.34	52.00	138.00	-9.34	105.34
	M1	-4.01	127.35	-133.77	94.11	-101.73	128.64	-132.48
2	X2	-2.36	-40.31	36.53	-31.06	26.57	-39.55	37.28
	Y2	100.00	137.34	22.66	138.00	52.00	105.34	-9.34
	M2	4.01	133.30	-126.89	101.38	-93.76	132.02	-128.17

Esfuerzos bajo las zapatas		**Zapatas aisladas 2x2**						
		D+L	**D+0.7E**	**D-0.7E**	**D+0.75 (L+0.7E)**	**D+0.75(L-0.7E)**	**0.6D+0.7E**	**0.6D-0.7E**
1	**L izq:**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
	L der:	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
	σ izq	28.01	-89.85	134.66	-57.58	110.80	-98.81	125.70
	σ der	21.99	101.18	-65.99	83.58	-41.80	94.14	-73.03
2	**L izq:**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
	L der:	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
	σ izq	21.99	-65.64	100.83	-41.54	83.32	-72.68	93.80
	σ der	28.01	134.31	-89.50	110.54	-57.32	125.35	-98.46

Nota: Todas las combinación que incluyen sismo están en volcamiento, resultando en una estructura insegura para la ocurrencia del sismo