Ce calcul a été effectué avec le logiciel Freelem version 9.2.0, conformément au Eurocode3.
NF EN 1993-1-1 de octobre 2005 - Calcul des structures en acier (+annexe de mai 2007)
Les hypothèses de calculs sont :
1 - Pas d'étude de torsion spécifique (torsion intégrée au cisaillement dû aux efforts tranchants)
2 - Pas de calculs des caractéristiques efficaces des profilés de classe 4 (valeurs élastiques en lieu et place)
3 - Simplification pénalisante de l'écriture flexion+axial+cisaillement pour les profilés de classe 1 ou 2
soit : N/A + Mfy/Wply + Mfz/Wplz <= (1-ρ)fy (pour classe 3 et 4 : idem avec Wel au lieu de Wpl), avec ρ≤0.9
4 - Abus de notation en raisonnant directement sur contraintes et non sur efforts/moments (résultats inchangés)
σ flexion calculée avec Wpl pour sections classe 1 et 2, Wel sinon
5 - Seul le flambement par flexion est étudié, suivant §6.3.1.1, §6.3.1.2 et §6.3.1.3
le flambement par flexion-torsion peut être dominant pour les U, les T et les cornières
le flambement par torsion peut être dominant pour les profilés cruciformes
les sections creuses (rond ou rec) sont considérées formées à froid, et les I/H laminés (non soudés)
6 - Déversement suivant §6.3.2.1 et §6.3.2.2_Cas général
charge considérée au niveau des ailes, vers centre de cisaillement, donc zg=+h/2 (déstabilisant)
Mcr calculé avec longueur = Max(Ldev_inf, Ldev_sup), k = kw = 1 et zj = 0
coef de réduction de déversement calculé uniquement sur I/H considérés laminés (non soudés), et sur U
pour les autres profilés, le coefficient de réduction déversement est égal à 1
traverses : modèle conseillé = poutre bi-appuyée sous charge linéique
poteaux : modèle conseillé = moments aux extrémités
attention au modèle de moments : résultats de déversement fonction du maillage car Mcr dépend de C1 qui lui-même dépend du quotient des contraintes aux noeuds de la barre traitée
7 - Interactions flambement/déversement §6.3.3 (6.61) et (6.62), kij selon annexe A

Récapitulatif des données de calcul

Tableau des noeuds

N°	X (mm)	Y (mm)	Z (mm)	Appui
1	0	0	0	Rotule
2	0	0	3500	Libre
3	1400	0	3500	Libre
4	2350	0	3500	Libre
5	3300	0	3500	Libre
6	4700	0	3500	Libre
7	4700	0	0	Rotule
8	0	940	3500	Libre
9	0	1880	3500	Libre
10	0	2820	3500	Libre
11	0	3760	3500	Libre
12	1400	940	3500	Libre
13	1400	1880	3500	Libre
14	1400	2820	3500	Libre
15	1400	3760	3500	Libre
16	0	4700	3500	Libre
17	0	4700	0	Rotule
18	1400	4700	3500	Libre
19	2350	1600	3500	Libre
20	2350	3500	3500	Libre
21	2350	4700	3500	Libre
24	1400	1600	3500	Libre
25	1400	3500	3500	Libre
26	3300	940	3500	Libre
27	3300	1600	3500	Libre

N°	X (mm)	Y (mm)	Z (mm)	Appui
28	3300	1880	3500	Libre
29	3300	2820	3500	Libre
30	3300	3500	3500	Libre
31	3300	3760	3500	Libre
32	3300	4700	3500	Libre
33	4700	940	3500	Libre
34	4700	1880	3500	Libre
35	4700	2820	3500	Libre
36	4700	3760	3500	Libre
37	4700	4700	3500	Libre
38	5700	4700	3500	Libre
39	5700	4700	0	Rotule
40	0	0	2347	Libre
41	0	4700	2347	Libre
42	4700	0	2347	Libre
43	867	0	3500	Libre
44	0	867	3500	Libre
45	0	3833	3500	Libre
46	867	4700	3500	Libre
47	3833	0	3500	Libre
48	4700	867	3500	Libre
49	5700	4700	2300	Libre
50	4500	4700	3500	Libre
51	700	940	3500	Libre
52	700	1880	3500	Libre
53	700	2820	3500	Libre
54	700	3760	3500	Libre
55	4000	940	3500	Libre
56	4000	1880	3500	Libre
57	4000	2820	3500	Libre
58	4000	3760	3500	Libre
59	2350	800	3500	Libre
60	2350	4100	3500	Libre

Tableau des barres

N°	Noeud 1	Noeud 2	Profilé	Liaisons	Matériau	Angle (°)	Ky	Lfy(mm)	Kz	Lfz(mm)	Ldev_sup (mm)	Ldev_inf (mm)	Modèle dévers.
1	1	40	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	3500	1	3500	3500	3500	Moments
2	17	41	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	3500	1	3500	3500	3500	Moments
3	7	42	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	3500	1	3500	3500	3500	Moments
4	39	49	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	3500	1	3500	3500	3500	Moments
5	2	44	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
6	8	9	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
7	9	10	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
8	10	11	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
9	11	45	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
10	2	43	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
11	3	4	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	950	1	950	950	950	Moments
12	4	5	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	950	1	950	950	950	Moments
13	5	47	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
14	16	46	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
15	18	21	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	950	1	950	950	950	Moments
16	21	32	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	950	1	950	950	950	Moments
17	32	50	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
18	37	38	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	1000	1	1000	1000	1000	Moments
19	3	12	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
20	12	24	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	660	1	660	660	660	Moments

N°	Noeud 1	Noeud 2	Profilé	Liaisons	Matériau	Angle (°)	Ky	Lfy(mm)	Kz	Lfz(mm)	Ldev_sup (mm)	Ldev_inf (mm)	Modèle dévers.
21	24	13	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	280	1	280	280	280	Moments
22	13	14	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
23	14	25	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	680	1	680	680	680	Moments
24	25	15	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	260	1	260	260	260	Moments
25	15	18	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
26	6	48	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
27	33	34	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
28	34	35	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
29	35	36	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
30	5	26	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
31	26	27	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	660	1	660	660	660	Moments
32	27	28	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	280	1	280	280	280	Moments
33	28	29	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
34	29	30	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	680	1	680	680	680	Moments
35	30	31	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	260	1	260	260	260	Moments
36	31	32	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
37	51	12	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
38	52	13	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
39	53	14	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
40	54	15	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
41	59	19	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1600	1	1600	1600	1600	Moments
42	19	24	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	950	1	950	950	950	Moments
43	19	27	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	950	1	950	950	950	Moments
44	60	20	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1200	1	1200	1200	1200	Moments
45	20	25	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	950	1	950	950	950	Moments
46	20	30	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	950	1	950	950	950	Moments
47	55	33	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
48	56	34	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
49	57	35	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
50	58	36	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
51	36	37	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
52	40	2	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	3500	1	3500	3500	3500	Moments
53	41	16	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	3500	1	3500	3500	3500	Moments
54	42	6	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	3500	1	3500	3500	3500	Moments
55	43	3	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
56	44	8	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
57	45	16	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
58	46	18	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
59	47	6	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
60	48	33	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
61	40	43	TUCAC 120 x 5	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
62	40	44	TUCAC 120 x 5	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
63	42	47	TUCAC 120 x 5	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
64	42	48	TUCAC 120 x 5	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
65	41	45	TUCAC 120 x 5	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
66	41	46	TUCAC 120 x 5	Enc-Enc	ACIER	0	1	940	1	940	940	940	Moments
67	49	38	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	3500	1	3500	3500	3500	Moments
68	50	37	TUCAC 160 x 6.3	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
69	49	50	TUCAC 120 x 5	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
70	8	51	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
71	9	52	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
72	10	53	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
73	11	54	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
74	26	55	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
75	28	56	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
76	29	57	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
77	31	58	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1400	1	1400	1400	1400	Moments
78	4	59	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1600	1	1600	1600	1600	Moments
79	21	60	TUCAC 060 x 4	Enc-Enc	ACIER	0	1	1200	1	1200	1200	1200	Moments

Tableau des chargements

N°	Nom	Type	Localisation			
1	Charge uniforme1	Linéique	55/10/14/58/13/59/17/68/19/20/30/31/24/25/35/36/30/31	0 N/mm	0 N/mm	-.75 N/mm
2	Charge uniforme2	Linéique	70/37/38/71/39/72/40/73/47/74/48/75/49/76/50/77/41/78/44/79	0 N/mm	0 N/mm	-1.5 N/mm
3	Charges nodales	Nodal	24/25/27/30	0 N	0 N	-2500 N
4	Charge horizontale	Nodal	4	0 N	1500 N	0 N
5	Poids propre	Accélération	tout	0 g	0 g	-1 g

Tableau des combinaisons

N°	Nom	Cas	Coef	Cas	Coef	Règle
301	Charge uniforme	1	1	2	1	Linéaire
101	ELU	301	1.5	3	1.5	Linéaire

Caractéristiques matériaux

Matériau	E (MPa)	ρ(kg/m3)	G (MPa)	Re (MPa)	Rm (MPa)
ACIER	210000	7850	80769	235	340

Caractéristiques profilés

Profilé	Ax (mm²)	Ay (mm²)	Az (mm²)	Wy (mm²)	Wz (mm²)	It (cm4)	Wt (cm3)	Iy (cm4)	Wfy (cm3)	Iz (cm4)	Wfz (cm3)	Classe	Wply (cm3)	Wplz (cm3)	Iw (cm6)
TUCAC 160 x 6.3	3830	2016	2016	1680	1680	2333	275	1498	187	1498	187	1	220	220	0
TUCAC 060 x 4	879	480	480	400	400	72.5	22	45.3	15.1	45.3	15.1	1	18.3	18.3	0
TUCAC 120 x 5	2270	1200	1200	1000	1000	777	122	497	82.9	497	82.9	1	97.6	97.6	0

Résultats de calcul

Résultats intermédiaires

Barre	Noeud	Cas	ρ	Co_flambY	Co_flambZ	Ncry (N)	Ncrz (N)	χy	χz	Co_dev	C1	C2	Mcr (N.m)	χLT	kyy	kyz	kzy	kzz
1	1	101	0	c	c	2534514	2534514	.79	.79		1.75	0	3833411	1	.79	.47	.47	.79
1	40	101	0	c	c	2534514	2534514	.79	.79		1.75	0	3833411	1	.79	.47	.47	.79
2	17	101	0	c	c	2534514	2534514	.79	.79		1.75	0	3833411	1	.79	.48	.48	.79
2	41	101	0	c	c	2534514	2534514	.79	.79		1.75	0	3833411	1	.79	.48	.48	.79
3	7	101	0	c	c	2534514	2534514	.79	.79		1.75	0	3833411	1	.79	.48	.48	.79
3	42	101	0	c	c	2534514	2534514	.79	.79		1.75	0	3833411	1	.79	.48	.48	.79
4	39	101	0	c	c	2534514	2534514	.79	.79		1.75	0	3833411	1	.79	.47	.47	.79
4	49	101	0	c	c	2534514	2534514	.79	.79		1.75	0	3833411	1	.79	.47	.47	.79
5	2	101	0	c	c	35137847	35137847	1	1		1.38	0	11237504	1	.87	.46	.52	.76
5	44	101	0	c	c	35137847	35137847	1	1		1.38	0	11237504	1	.87	.46	.52	.76
6	8	101	0	c	c	35137847	35137847	1	1		1.29	0	10457490	1	.9	.49	.54	.82
6	9	101	0	c	c	35137847	35137847	1	1		1.29	0	10457490	1	.9	.49	.54	.82
7	9	101	0	c	c	35137847	35137847	1	1		1.09	0	8900553	1	.96	.4	.58	.67
7	10	101	0	c	c	35137847	35137847	1	1		1.09	0	8900553	1	.96	.4	.58	.67
8	10	101	0	c	c	35137847	35137847	1	1		1.83	0	14928601	1	.78	.47	.47	.78
8	11	101	0	c	c	35137847	35137847	1	1		1.83	0	14928601	1	.78	.47	.47	.78
9	11	101	0	c	c	35137847	35137847	1	1		1.37	0	11130073	1	.87	.6	.52	1
9	45	101	0	c	c	35137847	35137847	1	1		1.37	0	11130073	1	.87	.6	.52	1
10	2	101	0	c	c	15840715	15840715	.98	.98		2.58	0	14069904	1	.64	.35	.38	.59
10	43	101	0	c	c	15840715	15840715	.98	.98		2.58	0	14069904	1	.64	.35	.38	.59
11	3	101	0	c	c	34401996	34401996	1	1		1.08	0	8726954	1	.96	.46	.58	.77
11	4	101	0	c	c	34401996	34401996	1	1		1.08	0	8726954	1	.96	.46	.58	.77
12	4	101	0	c	c	34401996	34401996	1	1		1.1	0	8843068	1	.96	.47	.57	.78
12	5	101	0	c	c	34401996	34401996	1	1		1.1	0	8843068	1	.96	.47	.57	.78
13	5	101	0	c	c	15840715	15840715	.98	.98		2.07	0	11318388	1	.74	.59	.44	.98
13	47	101	0	c	c	15840715	15840715	.98	.98		2.07	0	11318388	1	.74	.59	.44	.98
14	16	101	0	c	c	15840715	15840715	.98	.98		2.57	0	14021292	1	.64	.47	.38	.78
14	46	101	0	c	c	15840715	15840715	.98	.98		2.57	0	14021292	1	.64	.47	.38	.78
15	18	101	0	c	c	34401996	34401996	1	1		1.34	0	10764714	1	.88	.46	.53	.76
15	21	101	0	c	c	34401996	34401996	1	1		1.34	0	10764714	1	.88	.46	.53	.76
16	21	101	0	c	c	34401996	34401996	1	1		1.12	0	9001855	1	.95	.47	.57	.78
16	32	101	0	c	c	34401996	34401996	1	1		1.12	0	9001855	1	.95	.47	.57	.78
17	32	101	0	c	c	15840715	15840715	.98	.98		1.79	0	9803227	1	.78	.44	.47	.73
17	50	101	0	c	c	15840715	15840715	.98	.98		1.79	0	9803227	1	.78	.44	.47	.73
18	37	101	0	c	c	31047802	31047802	1	1		2.37	0	18151380	1	.68	.53	.41	.88
18	38	101	0	c	c	31047802	31047802	1	1		2.37	0	18151380	1	.68	.53	.41	.88
19	3	101	0	c	c	35137847	35137847	1	1		2.51	0	20437421	1	.66	.52	.39	.87
19	12	101	0	c	c	35137847	35137847	1	1		2.51	0	20437421	1	.66	.52	.39	.87
20	12	101	0	c	c	71275945	71275945	1	1		1.26	0	14613186	1	.9	.5	.54	.83
20	24	101	0	c	c	71275945	71275945	1	1		1.26	0	14613186	1	.9	.5	.54	.83
21	24	101	0	c	c	396017877	396017877	1	1		1	0	27347661	1	1	.56	.6	.94
21	13	101	0	c	c	396017877	396017877	1	1		1	0	27347661	1	1	.56	.6	.94
22	13	101	0	c	c	35137847	35137847	1	1		1.04	0	8488219	1	.98	.4	.59	.67
22	14	101	0	c	c	35137847	35137847	1	1		1.04	0	8488219	1	.98	.4	.59	.67
23	14	101	0	c	c	67144899	67144899	1	1		1.07	0	12061011	1	.97	.49	.58	.82
23	25	101	0	c	c	67144899	67144899	1	1		1.07	0	12061011	1	.97	.49	.58	.82
24	25	101	0	c	c	459287005	459287005	1	1		1.14	0	33648280	1	.94	.49	.57	.81
24	15	101	0	c	c	459287005	459287005	1	1		1.14	0	33648280	1	.94	.49	.57	.81
25	15	101	0	c	c	35137847	35137847	1	1		2.58	0	20968757	1	.64	.48	.38	.81
25	18	101	0	c	c	35137847	35137847	1	1		2.58	0	20968757	1	.64	.48	.38	.81
26	6	101	0	c	c	35137847	35137847	1	1		1.79	0	14547448	1	.78	.44	.47	.74
26	48	101	0	c	c	35137847	35137847	1	1		1.79	0	14547448	1	.78	.44	.47	.74
27	33	101	0	c	c	35137847	35137847	1	1		1.47	0	11923301	1	.85	.52	.51	.87

Barre	Noeud	Cas	ρ	Co_flambY	Co_flambZ	Ncry (N)	Ncrz (N)	χy	χz	Co_dev	C1	C2	Mcr (N.m)	χLT	kyy	kyz	kzy	kzz
27	34	101	0	c	c	35137847	35137847	1	1		1.47	0	11923301	1	.85	.52	.51	.87
28	34	101	0	c	c	35137847	35137847	1	1		1.05	0	8552738	1	.98	.35	.59	.59
28	35	101	0	c	c	35137847	35137847	1	1		1.05	0	8552738	1	.98	.35	.59	.59
29	35	101	0	c	c	35137847	35137847	1	1		1.24	0	10060191	1	.91	.5	.55	.84
29	36	101	0	c	c	35137847	35137847	1	1		1.24	0	10060191	1	.91	.5	.55	.84
30	5	101	0	c	c	35137847	35137847	1	1		2.59	0	21037705	1	.63	.5	.38	.83
30	26	101	0	c	c	35137847	35137847	1	1		2.59	0	21037705	1	.63	.5	.38	.83
31	26	101	0	c	c	71275945	71275945	1	1		1.26	0	14564231	1	.91	.55	.54	.92
31	27	101	0	c	c	71275945	71275945	1	1		1.26	0	14564231	1	.91	.55	.54	.92
32	27	101	0	c	c	396017877	396017877	1	1		1	0	27384086	1	1	.52	.6	.87
32	28	101	0	c	c	396017877	396017877	1	1		1	0	27384086	1	1	.52	.6	.87
33	28	101	0	c	c	35137847	35137847	1	1		1.04	0	8429101	1	.98	.36	.59	.59
33	29	101	0	c	c	35137847	35137847	1	1		1.04	0	8429101	1	.98	.36	.59	.59
34	29	101	0	c	c	67144899	67144899	1	1		1.07	0	11987626	1	.97	.51	.58	.85
34	30	101	0	c	c	67144899	67144899	1	1		1.07	0	11987626	1	.97	.51	.58	.85
35	30	101	0	c	c	459287005	459287005	1	1		1.12	0	33076496	1	.95	.52	.57	.87
35	31	101	0	c	c	459287005	459287005	1	1		1.12	0	33076496	1	.95	.52	.57	.87
36	31	101	0	c	c	35137847	35137847	1	1		2.35	0	19117743	1	.69	.48	.41	.8
36	32	101	0	c	c	35137847	35137847	1	1		2.35	0	19117743	1	.69	.48	.41	.8
37	51	101	0	c	c	479028	479028	.75	.75		1.52	0	254267	1	.84	.48	.5	.79
37	12	101	0	c	c	479028	479028	.75	.75		1.52	0	254267	1	.84	.48	.5	.79
38	52	101	0	c	c	479028	479028	.75	.75		1.06	0	177326	1	.97	.47	.58	.79
38	13	101	0	c	c	479028	479028	.75	.75		1.06	0	177326	1	.97	.47	.58	.79
39	53	101	0	c	c	479028	479028	.75	.75		1.09	0	181877	1	.96	.47	.58	.79
39	14	101	0	c	c	479028	479028	.75	.75		1.09	0	181877	1	.96	.47	.58	.79
40	54	101	0	c	c	479028	479028	.75	.75		1.5	0	250715	1	.84	.48	.51	.8
40	15	101	0	c	c	479028	479028	.75	.75		1.5	0	250715	1	.84	.48	.51	.8
41	59	101	0	c	c	366756	366756	.69	.69		1.87	0	274662	1	.77	.47	.46	.79
41	19	101	0	c	c	366756	366756	.69	.69		1.87	0	274662	1	.77	.47	.46	.79
42	19	101	0	c	c	1040327	1040327	.87	.87		2.23	0	549413	1	.71	.42	.43	.7
42	24	101	0	c	c	1040327	1040327	.87	.87		2.23	0	549413	1	.71	.42	.43	.7
43	19	101	0	c	c	1040327	1040327	.87	.87		1.87	0	462246	1	.77	.42	.46	.71
43	27	101	0	c	c	1040327	1040327	.87	.87		1.87	0	462246	1	.77	.42	.46	.71
44	60	101	0	c	c	652011	652011	.81	.81		1.64	0	319824	1	.81	.47	.49	.79
44	20	101	0	c	c	652011	652011	.81	.81		1.64	0	319824	1	.81	.47	.49	.79
45	20	101	0	c	c	1040327	1040327	.87	.87		2.13	0	526135	1	.73	.41	.44	.68
45	25	101	0	c	c	1040327	1040327	.87	.87		2.13	0	526135	1	.73	.41	.44	.68
46	20	101	0	c	c	1040327	1040327	.87	.87		1.57	0	386428	1	.83	.42	.5	.69
46	30	101	0	c	c	1040327	1040327	.87	.87		1.57	0	386428	1	.83	.42	.5	.69
47	55	101	0	c	c	479028	479028	.75	.75		2.17	0	362845	1	.72	.47	.43	.79
47	33	101	0	c	c	479028	479028	.75	.75		2.17	0	362845	1	.72	.47	.43	.79
48	56	101	0	c	c	479028	479028	.75	.75		2.16	0	361285	1	.72	.47	.43	.79
48	34	101	0	c	c	479028	479028	.75	.75		2.16	0	361285	1	.72	.47	.43	.79
49	57	101	0	c	c	479028	479028	.75	.75		2.21	0	370426	1	.71	.47	.43	.79
49	35	101	0	c	c	479028	479028	.75	.75		2.21	0	370426	1	.71	.47	.43	.79
50	58	101	0	c	c	479028	479028	.75	.75		2.33	0	390537	1	.69	.46	.42	.77
50	36	101	0	c	c	479028	479028	.75	.75		2.33	0	390537	1	.69	.46	.42	.77
51	36	101	0	c	c	35137847	35137847	1	1		2.47	0	20128788	1	.67	.39	.4	.65
51	37	101	0	c	c	35137847	35137847	1	1		2.47	0	20128788	1	.67	.39	.4	.65
52	40	101	0	c	c	2534514	2534514	.79	.79		1.98	0	4324490	1	.75	.49	.45	.82
52	2	101	0	c	c	2534514	2534514	.79	.79		1.98	0	4324490	1	.75	.49	.45	.82
53	41	101	0	c	c	2534514	2534514	.79	.79		2.09	0	4559938	1	.73	.46	.44	.77
53	16	101	0	c	c	2534514	2534514	.79	.79		2.09	0	4559938	1	.73	.46	.44	.77
54	42	101	0	c	c	2534514	2534514	.79	.79		2	0	4364304	1	.75	.47	.45	.79
54	6	101	0	c	c	2534514	2534514	.79	.79		2	0	4364304	1	.75	.47	.45	.79
55	43	101	0	c	c	15840715	15840715	.98	.98		1.97	0	10777962	1	.75	.46	.45	.77
55	3	101	0	c	c	15840715	15840715	.98	.98		1.97	0	10777962	1	.75	.46	.45	.77
56	44	101	0	c	c	35137847	35137847	1	1		1.09	0	8848659	1	.96	.59	.58	.99
56	8	101	0	c	c	35137847	35137847	1	1		1.09	0	8848659	1	.96	.59	.58	.99
57	45	101	0	c	c	35137847	35137847	1	1		2.45	0	19940970	1	.67	.52	.4	.87
57	16	101	0	c	c	35137847	35137847	1	1		2.45	0	19940970	1	.67	.52	.4	.87

Barre	Noeud	Cas	ρ	Co_flambY	Co_flambZ	Ncry (N)	Ncrz (N)	χy	χz	Co_dev	C1	C2	Mcr (N.m)	χLT	kyy	kyz	kzy	kzz
58	46	101	0	c	c	15840715	15840715	.98	.98		2.57	0	14041681	1	.64	.53	.38	.89
58	18	101	0	c	c	15840715	15840715	.98	.98		2.57	0	14041681	1	.64	.53	.38	.89
59	47	101	0	c	c	15840715	15840715	.98	.98		2.6	0	14225676	1	.61	.41	.37	.69
59	6	101	0	c	c	15840715	15840715	.98	.98		2.6	0	14225676	1	.61	.41	.37	.69
60	48	101	0	c	c	35137847	35137847	1	1		1.2	0	9761957	1	.92	.58	.55	.97
60	33	101	0	c	c	35137847	35137847	1	1		1.2	0	9761957	1	.92	.58	.55	.97
61	40	101	0	c	c	11657884	11657884	.99	.99		2.25	0	6087591	1	.7	.46	.42	.77
61	43	101	0	c	c	11657884	11657884	.99	.99		2.25	0	6087591	1	.7	.46	.42	.77
62	40	101	0	c	c	11657884	11657884	.99	.99		2.56	0	6921457	1	.64	.53	.39	.88
62	44	101	0	c	c	11657884	11657884	.99	.99		2.56	0	6921457	1	.64	.53	.39	.88
63	42	101	0	c	c	11657884	11657884	.99	.99		2.21	0	5972686	1	.71	.47	.42	.79
63	47	101	0	c	c	11657884	11657884	.99	.99		2.21	0	5972686	1	.71	.47	.42	.79
64	42	101	0	c	c	11657884	11657884	.99	.99		2.46	0	6643159	1	.67	.55	.4	.92
64	48	101	0	c	c	11657884	11657884	.99	.99		2.46	0	6643159	1	.67	.55	.4	.92
65	41	101	0	c	c	11657884	11657884	.99	.99		2.26	0	6110717	1	.7	.55	.42	.91
65	45	101	0	c	c	11657884	11657884	.99	.99		2.26	0	6110717	1	.7	.55	.42	.91
66	41	101	0	c	c	11657884	11657884	.99	.99		1.95	0	5287484	1	.75	.49	.45	.81
66	46	101	0	c	c	11657884	11657884	.99	.99		1.95	0	5287484	1	.75	.49	.45	.81
67	49	101	0	c	c	2534514	2534514	.79	.79		2.06	0	4504678	1	.74	.59	.44	.98
67	38	101	0	c	c	2534514	2534514	.79	.79		2.06	0	4504678	1	.74	.59	.44	.98
68	50	101	0	c	c	15840715	15840715	.98	.98		1.98	0	10807738	1	.75	.5	.45	.84
68	37	101	0	c	c	15840715	15840715	.98	.98		1.98	0	10807738	1	.75	.5	.45	.84
69	49	101	0	c	c	5255564	5255564	.94	.94		2.31	0	4186512	1	.69	.46	.42	.77
69	50	101	0	c	c	5255564	5255564	.94	.94		2.31	0	4186512	1	.69	.46	.42	.77
70	8	101	0	c	c	479028	479028	.75	.75		2.12	0	355054	1	.73	.47	.44	.79
70	51	101	0	c	c	479028	479028	.75	.75		2.12	0	355054	1	.73	.47	.44	.79
71	9	101	0	c	c	479028	479028	.75	.75		2.06	0	345001	1	.74	.47	.44	.79
71	52	101	0	c	c	479028	479028	.75	.75		2.06	0	345001	1	.74	.47	.44	.79
72	10	101	0	c	c	479028	479028	.75	.75		2.05	0	342624	1	.74	.47	.44	.79
72	53	101	0	c	c	479028	479028	.75	.75		2.05	0	342624	1	.74	.47	.44	.79
73	11	101	0	c	c	479028	479028	.75	.75		2.07	0	346203	1	.74	.47	.44	.78
73	54	101	0	c	c	479028	479028	.75	.75		2.07	0	346203	1	.74	.47	.44	.78
74	26	101	0	c	c	479028	479028	.75	.75		1.38	0	230483	1	.87	.48	.52	.79
74	55	101	0	c	c	479028	479028	.75	.75		1.38	0	230483	1	.87	.48	.52	.79
75	28	101	0	c	c	479028	479028	.75	.75		1.04	0	174433	1	.98	.47	.59	.79
75	56	101	0	c	c	479028	479028	.75	.75		1.04	0	174433	1	.98	.47	.59	.79
76	29	101	0	c	c	479028	479028	.75	.75		1.01	0	168398	1	1	.47	.6	.79
76	57	101	0	c	c	479028	479028	.75	.75		1.01	0	168398	1	1	.47	.6	.79
77	31	101	0	c	c	479028	479028	.75	.75		1.31	0	220097	1	.89	.48	.53	.8
77	58	101	0	c	c	479028	479028	.75	.75		1.31	0	220097	1	.89	.48	.53	.8
78	4	101	0	c	c	366756	366756	.69	.69		2.39	0	349573	1	.68	.47	.41	.79
78	59	101	0	c	c	366756	366756	.69	.69		2.39	0	349573	1	.68	.47	.41	.79
79	21	101	0	c	c	652011	652011	.81	.81		2.27	0	444353	1	.7	.48	.42	.79
79	60	101	0	c	c	652011	652011	.81	.81		2.27	0	444353	1	.7	.48	.42	.79

Résultats contraintes

Barre	Noeud	Cas	σax (MPa)	σfy (MPa)	σfz (MPa)	σvy (MPa)	σvz (MPa)	σT (MPa)	Ratio axial	Ratio cisaillement	Ratio flex.+ax.+cisai.	Ratio flamb Y	Ratio flamb Z	Ratio déversement	Ratio (6.61)	Ratio (6.62)	Ratio max
1	1	101	3.63	0	0	.93	-1.84	0	.02	.02	.02	.02	.02	0	.02	.02	.02
1	40	101	3.63	-32.95	-16.64	.93	-1.84	0	.02	.02	.23	.02	.02	.14	.16	.14	.23
2	17	101	4.87	0	0	-1.43	-2.8	0	.02	.02	.02	.03	.03	0	.03	.03	.03
2	41	101	4.87	-50.14	25.59	-1.43	-2.8	0	.02	.02	.34	.03	.03	.21	.25	.21	.34
3	7	101	4.41	0	0	1.16	2.2	0	.02	.02	.02	.02	.02	0	.02	.02	.02
3	42	101	4.41	39.38	-20.72	1.16	2.2	0	.02	.02	.27	.02	.02	.17	.2	.17	.27
4	39	101	3	0	0	-.66	2.44	0	.01	.02	.01	.02	.02	0	.02	.02	.02
4	49	101	3	42.83	11.55	-.66	2.44	0	.01	.02	.24	.02	.02	.18	.18	.14	.24
5	2	101	-.07	6.74	1.91	.33	-.63	-3.31	0	.03	.04	0	0	.03	.03	.02	.04
5	44	101	-.07	2.58	-.25	.33	-.63	-3.31	0	.03	.01	0	0	.01	.01	.01	.03
6	8	101	.49	7.7	1.02	.12	1.04	-4.04	0	.04	.04	0	0	.03	.03	.02	.04
6	9	101	.49	15.13	.13	.12	1.04	-4.04	0	.04	.07	0	0	.06	.06	.04	.07
7	9	101	.51	15.28	.34	.07	-.4	-.73	0	.01	.07	0	0	.07	.07	.04	.07
7	10	101	.51	12.43	-.19	.07	-.4	-.73	0	.01	.06	0	0	.05	.05	.03	.06
8	10	101	.53	12.37	.03	.13	-1.84	2.64	0	.03	.06	0	0	.05	.04	.03	.06
8	11	101	.53	-.85	-.9	.13	-1.84	2.64	0	.03	.01	0	0	0	.01	.01	.03
9	11	101	.54	-1.16	-.72	-.03	-3.13	5.42	0	.06	.01	0	0	0	.01	.01	.06
9	45	101	.54	-2.9	-.7	-.03	-3.13	5.42	0	.06	.02	0	0	.01	.01	.01	.06
10	2	101	-1.23	8.45	-3.06	-.95	-1.91	6.64	.01	.06	.05	0	0	.04	.03	.02	.06
10	43	101	-1.23	-6.12	3.2	-.95	-2.49	6.64	.01	.07	.04	0	0	.03	.02	.02	.07
11	3	101	.91	21.86	-1.47	-.22	.61	3.41	0	.03	.1	0	0	.09	.1	.06	.1
11	4	101	.91	26.28	.12	-.22	.61	3.41	0	.03	.12	0	0	.11	.11	.07	.12
12	4	101	.93	26.39	-.05	-.22	-.71	.87	0	.01	.12	0	0	.11	.11	.07	.12
12	5	101	.93	21.25	1.54	-.22	-.71	.87	0	.01	.1	0	0	.09	.09	.06	.1
13	5	101	1.02	20.39	-.28	.01	-6.12	-11.18	0	.13	.09	0	0	.09	.07	.04	.13
13	47	101	1.02	-5.24	-.31	.01	-6.48	-11.18	0	.13	.03	0	0	.02	.02	.02	.13
14	16	101	-2.33	13.25	.07	.36	-4.54	-6.35	.01	.08	.07	0	0	.06	.04	.02	.08
14	46	101	-2.33	-18.71	-2.29	.36	-5.12	-6.35	.01	.08	.1	0	0	.08	.06	.04	.1
15	18	101	1.08	12.64	-1.22	-.19	2.23	-.77	0	.02	.06	0	0	.05	.05	.04	.06
15	21	101	1.08	28.79	.17	-.19	2.23	-.77	0	.02	.13	0	0	.12	.11	.07	.13
16	21	101	1.06	28.77	-.05	-.2	1.19	.89	0	.02	.13	0	0	.12	.12	.07	.13
16	32	101	1.06	37.38	1.4	-.2	1.19	.89	0	.02	.17	0	0	.16	.16	.1	.17
17	32	101	.93	34.56	-.84	-.42	-3.5	8.96	0	.09	.15	0	0	.15	.12	.08	.15
17	50	101	.93	-1.2	3.03	-.42	-4.3	8.96	0	.1	.02	0	0	.01	.01	.02	.1
18	37	101	-2	-4.12	.81	-.13	1.63	7.48	.01	.07	.03	0	0	.02	.01	.01	.07
18	38	101	-2	8.34	1.77	-.13	1.63	7.48	.01	.07	.05	0	0	.04	.03	.02	.07
19	3	101	.02	-11.38	1.52	.13	4.42	-3.13	0	.06	.06	0	0	.05	.04	.02	.06
19	12	101	.02	18.06	.59	.13	3.79	-3.13	0	.05	.08	0	0	.08	.05	.03	.08
20	12	101	.01	17.7	.74	.12	3.18	-2.96	0	.05	.08	0	0	.08	.07	.04	.08
20	24	101	.01	32.6	.14	.12	2.74	-2.96	0	.04	.14	0	0	.14	.13	.08	.14
21	24	101	.03	32.6	.35	.05	.04	-2.22	0	.02	.14	0	0	.14	.14	.08	.14
21	13	101	.03	32.68	.24	.05	.04	-2.22	0	.02	.14	0	0	.14	.14	.08	.14
22	13	101	.01	32.52	.45	.1	-.41	-1.29	0	.01	.14	0	0	.14	.14	.08	.14
22	14	101	.01	29.61	-.26	.1	-.41	-1.29	0	.01	.13	0	0	.13	.12	.07	.13
23	14	101	0	29.67	-.04	.04	-.84	-.32	0	.01	.13	0	0	.13	.12	.07	.13
23	25	101	0	25.33	-.27	.04	-.84	-.32	0	.01	.11	0	0	.11	.11	.06	.11
24	25	101	.02	25.32	-.04	.2	-3.42	.15	0	.03	.11	0	0	.11	.1	.06	.11
24	15	101	.02	18.36	-.43	.2	-3.59	.15	0	.03	.08	0	0	.08	.07	.05	.08
25	15	101	0	18.67	-.24	.35	-4.18	.32	0	.03	.08	0	0	.08	.05	.03	.08
25	18	101	0	-13.6	-2.76	.35	-4.81	.32	0	.04	.07	0	0	.06	.04	.03	.07
26	6	101	-.43	7.39	-.33	-.25	-1.15	3.55	0	.03	.03	0	0	.03	.03	.02	.03
26	48	101	-.43	-.22	1.32	-.25	-1.15	3.55	0	.03	.01	0	0	0	0	0	.03
27	33	101	.5	4.88	.6	.05	1.71	4.33	0	.04	.03	0	0	.02	.02	.01	.04
27	34	101	.5	17.17	.22	.05	1.71	4.33	0	.04	.08	0	0	.07	.06	.04	.08

Barre	Noeud	Cas	σax (MPa)	σfy (MPa)	σfz (MPa)	σvy (MPa)	σvz (MPa)	σT (MPa)	Ratio axial	Ratio cisaillement	Ratio flex.+ax.+cisai.	Ratio flamb Y	Ratio flamb Z	Ratio déversement	Ratio (6.61)	Ratio (6.62)	Ratio max
28	34	101	.49	17.26	.36	.1	.28	1.23	0	.01	.08	0	0	.07	.07	.05	.08
28	35	101	.49	19.29	-.35	.1	.28	1.23	0	.01	.09	0	0	.08	.08	.05	.09
29	35	101	.48	19.19	-.21	.11	-1.13	-1.72	0	.02	.08	0	0	.08	.08	.05	.08
29	36	101	.48	11.11	-.98	.11	-1.13	-1.72	0	.02	.05	0	0	.05	.05	.03	.05
30	5	101	-.1	-14.68	1.83	.21	5.1	.68	0	.04	.07	0	0	.06	.04	.03	.07
30	26	101	-.1	19.63	.34	.21	4.47	.68	0	.04	.09	0	0	.08	.05	.03	.09
31	26	101	-.09	19.13	.44	.03	3.34	.35	0	.03	.08	0	0	.08	.07	.05	.08
31	27	101	-.09	34.84	.26	.03	2.9	.35	0	.02	.15	0	0	.15	.13	.08	.15
32	27	101	-.11	34.49	.47	.13	.09	.16	0	0	.15	0	0	.15	.15	.09	.15
32	28	101	-.11	34.67	.19	.13	.09	.16	0	0	.15	0	0	.15	.15	.09	.15
33	28	101	-.1	34.58	.32	.09	-.36	-.94	0	.01	.15	0	0	.15	.15	.09	.15
33	29	101	-.1	31.99	-.3	.09	-.36	-.94	0	.01	.14	0	0	.14	.13	.08	.14
34	29	101	-.09	32.09	-.16	.08	-.83	-2.02	0	.02	.14	0	0	.14	.13	.08	.14
34	30	101	-.09	27.8	-.57	.08	-.83	-2.02	0	.02	.12	0	0	.12	.12	.07	.12
35	30	101	-.1	27.71	-.37	-.12	-3.28	-1.75	0	.04	.12	0	0	.12	.11	.07	.12
35	31	101	-.1	21.03	-.14	-.12	-3.45	-1.75	0	.04	.09	0	0	.09	.09	.05	.09
36	31	101	-.1	21.29	-.06	.3	-4.06	-2.25	0	.05	.09	0	0	.09	.06	.04	.09
36	32	101	-.1	-10.09	-2.24	.3	-4.69	-2.25	0	.05	.05	0	0	.04	.03	.03	.05
37	51	101	.02	11.63	.03	-.11	1.38	3.58	0	.04	.05	0	0	.05	.04	.03	.05
37	12	101	.02	2.64	1.78	-.11	-2.56	3.58	0	.05	.02	0	0	.01	.01	.01	.05
38	52	101	-.09	12.3	-.01	-.16	2.08	1.57	0	.03	.05	0	0	.05	.05	.03	.05
38	13	101	-.09	13.98	2.48	-.16	-1.86	1.57	0	.03	.07	0	0	.06	.06	.04	.07
39	53	101	.1	12.01	-.01	-.17	2.13	-.58	0	.02	.05	0	0	.05	.05	.03	.05
39	14	101	.1	14.51	2.65	-.17	-1.81	-.58	0	.02	.07	0	0	.06	.07	.05	.07
40	54	101	-.3	10.57	.06	-.15	1.45	-3.1	0	.03	.05	0	0	.04	.04	.02	.05
40	15	101	-.3	2.64	2.3	-.15	-2.49	-3.1	0	.04	.02	0	0	.01	.01	.01	.04
41	59	101	0	19.27	0	.12	1.04	-1.04	0	.02	.08	0	0	.08	.06	.04	.08
41	19	101	0	-1.95	-2.04	.12	-3.46	-1.04	0	.03	.02	0	0	.01	.01	.01	.03
42	19	101	-.13	29.61	-1.04	-.17	-1.96	-.02	0	.01	.13	0	0	.13	.09	.06	.13
42	24	101	-.13	-11.1	2.51	-.17	-1.96	-.02	0	.01	.06	0	0	.05	.04	.03	.06
43	19	101	-.19	28.36	-1	-.17	-1.5	1.6	0	.02	.13	0	0	.12	.09	.06	.13
43	27	101	-.19	-2.85	2.5	-.17	-1.5	1.6	0	.02	.02	0	0	.01	.01	.01	.02
44	60	101	-.02	10.25	.04	.19	.99	-.12	0	.01	.04	0	0	.04	.04	.02	.04
44	20	101	-.02	1.1	-2.51	.19	-2.39	-.12	0	.02	.02	0	0	0	.01	.01	.02
45	20	101	.29	23.25	-1.4	-.2	-1.46	-.09	0	.01	.11	0	0	.1	.08	.05	.11
45	25	101	.29	-7.04	2.8	-.2	-1.46	-.09	0	.01	.04	0	0	.03	.03	.02	.04
46	20	101	.38	23.4	-1.1	-.17	-.93	.83	0	.01	.11	0	0	.1	.09	.05	.11
46	30	101	.38	4.15	2.36	-.17	-.93	.83	0	.01	.03	0	0	.02	.02	.02	.03
47	55	101	-.33	12.96	-.02	-.07	-1.45	-3.18	0	.03	.06	0	0	.06	.04	.02	.06
47	33	101	-.33	-39.37	1.13	-.07	-5.39	-3.18	0	.06	.17	0	0	.17	.12	.08	.17
48	56	101	-.09	15.02	0	-.11	-2.06	-.89	0	.02	.06	0	0	.06	.05	.03	.06
48	34	101	-.09	-46.64	1.65	-.11	-6	-.89	0	.05	.21	0	0	.2	.15	.09	.21
49	57	101	-.02	16.13	0	-.11	-1.98	.99	0	.02	.07	0	0	.07	.05	.03	.07
49	35	101	-.02	-44.31	1.62	-.11	-5.92	.99	0	.05	.2	0	0	.19	.14	.09	.2
50	58	101	.81	16.24	-.07	-.06	-1.41	2.65	0	.03	.07	0	0	.07	.05	.03	.07
50	36	101	.81	-35.38	.83	-.06	-5.34	2.65	0	.06	.16	0	0	.15	.11	.07	.16
51	36	101	.47	10.84	-.91	-.32	-2.4	-4.07	0	.05	.05	0	0	.05	.03	.02	.05
51	37	101	.47	-6.37	1.35	-.32	-2.4	-4.07	0	.05	.03	0	0	.03	.02	.02	.05
52	40	101	-1.11	-23.28	-11.19	-1.09	3.13	-.92	0	.03	.15	0	0	.1	.1	.08	.15
52	2	101	-1.11	4.31	-1.56	-1.09	3.13	-.92	0	.03	.03	0	0	.02	.02	.01	.03
53	41	101	-2.96	-36.07	17.87	2.19	5.19	1.12	.01	.05	.24	0	0	.15	.15	.13	.24
53	16	101	-2.96	9.67	-1.42	2.19	5.19	1.12	.01	.05	.06	0	0	.04	.03	.02	.06
54	42	101	-1.59	27.76	-14.18	-1.6	-3.78	.8	.01	.04	.19	0	0	.12	.12	.1	.19
54	6	101	-1.59	-5.53	-.07	-1.6	-3.78	.8	.01	.04	.03	0	0	.02	.02	.01	.04
55	43	101	.86	-3.23	-.61	-.16	5.38	12.51	0	.13	.02	0	0	.01	.02	.01	.13
55	3	101	.86	17.95	.06	-.16	5.03	12.51	0	.13	.08	0	0	.08	.06	.04	.13
56	44	101	.48	6.05	.94	.11	2.3	-6.67	0	.07	.03	0	0	.03	.03	.02	.07
56	8	101	.48	7.34	.88	.11	2.3	-6.67	0	.07	.04	0	0	.03	.03	.02	.07
57	45	101	-.8	-5.28	-.5	.12	2.21	2.86	0	.04	.03	0	0	.02	.02	.01	.04

Barre	Noeud	Cas	σax (MPa)	σfy (MPa)	σfz (MPa)	σvy (MPa)	σvz (MPa)	σT (MPa)	Ratio axial	Ratio cisaillement	Ratio flex.+ax.+cisai.	Ratio flamb Y	Ratio flamb Z	Ratio déversement	Ratio (6.61)	Ratio (6.62)	Ratio max
57	16	101	-.8	9.35	-1.32	.12	2.21	2.86	0	.04	.05	0	0	.04	.03	.02	.05
58	46	101	1.24	-17.12	.75	-.19	7.39	-11.65	.01	.14	.08	.01	.01	.07	.05	.04	.14
58	18	101	1.24	12.24	1.54	-.19	7.04	-11.65	.01	.14	.06	.01	.01	.05	.04	.03	.14
59	47	101	-1.55	-8.31	2.8	.62	3.05	-5.96	.01	.07	.05	0	0	.04	.03	.02	.07
59	6	101	-1.55	9.97	-1.33	.62	2.47	-5.96	.01	.06	.05	0	0	.04	.03	.02	.06
60	48	101	.51	2.9	.44	-.12	2.99	6.95	0	.07	.02	0	0	.01	.01	.01	.07
60	33	101	.51	4.57	.51	-.12	2.99	6.95	0	.07	.02	0	0	.02	.02	.02	.07
61	40	101	6.77	-16.52	1.01	1.31	1.56	2.47	.03	.03	.1	.03	.03	.07	.08	.06	.1
61	43	101	6.77	6.51	-18.39	1.31	1.56	2.47	.03	.03	.13	.03	.03	.03	.08	.1	.13
62	40	101	2.28	-11.25	3.91	-.36	1.29	-2.84	.01	.03	.07	.01	.01	.05	.05	.04	.07
62	44	101	2.28	7.82	9.19	-.36	1.29	-2.84	.01	.03	.08	.01	.01	.03	.05	.06	.08
63	42	101	8.24	-19.18	.6	-1.04	1.77	-2.59	.04	.03	.12	.04	.04	.08	.09	.07	.12
63	47	101	8.24	6.93	15.96	-1.04	1.77	-2.59	.04	.03	.13	.04	.04	.03	.09	.1	.13
64	42	101	3.4	-12.31	-5.62	.22	1.31	3.35	.01	.03	.09	.01	.01	.05	.06	.06	.09
64	48	101	3.4	7.02	-8.85	.22	1.31	3.35	.01	.03	.08	.01	.01	.03	.06	.06	.08
65	41	101	4.52	-13.36	-9.23	-.25	1.27	3.75	.02	.04	.12	.02	.02	.06	.08	.08	.12
65	45	101	4.52	5.36	-5.5	-.25	1.27	3.75	.02	.04	.07	.02	.02	.02	.05	.05	.07
66	41	101	11.02	-21.52	2.4	-.92	1.7	-2.8	.05	.03	.15	.05	.05	.09	.12	.1	.15
66	46	101	11.02	3.57	16.06	-.92	1.7	-2.8	.05	.03	.13	.05	.05	.02	.09	.11	.13
67	49	101	-.72	33.5	10.49	.13	-4.57	-1.41	0	.04	.19	0	0	.14	.13	.11	.19
67	38	101	-.72	-8.34	9.35	.13	-4.57	-1.41	0	.04	.08	0	0	.04	.05	.05	.08
68	50	101	-2.14	-5.28	-2.38	-1.2	4.16	2.38	.01	.05	.04	0	0	.02	.02	.02	.05
68	37	101	-2.14	.97	-.54	-1.2	4.03	2.38	.01	.05	.02	0	0	0	0	0	.05
69	49	101	8.1	-21.02	1.14	1.31	1.74	3.59	.03	.04	.13	.04	.04	.09	.1	.08	.13
69	50	101	8.1	9.2	-21.73	1.31	1.74	3.59	.03	.04	.17	.04	.04	.04	.11	.12	.17
70	8	101	.02	-39.62	-1.71	-.11	5.32	3.58	0	.07	.18	0	0	.17	.13	.08	.18
70	51	101	.02	11.63	.03	-.11	1.38	3.58	0	.04	.05	0	0	.05	.04	.02	.05
71	9	101	-.09	-49.63	-2.51	-.16	6.02	1.57	0	.06	.22	0	0	.21	.16	.1	.22
71	52	101	-.09	12.3	-.01	-.16	2.08	1.57	0	.03	.05	0	0	.05	.04	.02	.05
72	10	101	.1	-50.73	-2.66	-.17	6.07	-.58	0	.05	.23	0	0	.22	.17	.11	.23
72	53	101	.1	12.01	-.01	-.17	2.13	-.58	0	.02	.05	0	0	.05	.04	.02	.05
73	11	101	-.3	-41.74	-2.18	-.15	5.39	-3.1	0	.06	.19	0	0	.18	.14	.09	.19
73	54	101	-.3	10.57	.06	-.15	1.45	-3.1	0	.03	.05	0	0	.04	.03	.02	.05
74	26	101	-.33	5.05	-1.17	-.07	2.49	-3.18	0	.04	.03	0	0	.02	.02	.02	.04
74	55	101	-.33	12.96	-.02	-.07	-1.45	-3.18	0	.03	.06	0	0	.06	.05	.03	.06
75	28	101	-.09	16.44	-1.66	-.11	1.88	-.89	0	.02	.08	0	0	.07	.07	.05	.08
75	56	101	-.09	15.02	0	-.11	-2.06	-.89	0	.02	.06	0	0	.06	.06	.04	.06
76	29	101	-.02	16.32	-1.63	-.11	1.96	.99	0	.02	.08	0	0	.07	.07	.05	.08
76	57	101	-.02	16.13	0	-.11	-1.98	.99	0	.02	.07	0	0	.07	.07	.04	.07
77	31	101	.81	7.62	-.97	-.06	2.53	2.65	0	.04	.04	0	0	.03	.04	.03	.04
77	58	101	.81	16.24	-.07	-.06	-1.41	2.65	0	.03	.07	0	0	.07	.07	.04	.07
78	4	101	0	-38.2	2.05	.12	5.54	-1.04	0	.05	.17	0	0	.16	.12	.07	.17
78	59	101	0	19.27	0	.12	1.04	-1.04	0	.02	.08	0	0	.08	.06	.03	.08
79	21	101	-.02	-24.85	2.59	.19	4.36	-.12	0	.03	.12	0	0	.11	.08	.05	.12
79	60	101	-.02	10.25	.04	.19	.99	-.12	0	.01	.04	0	0	.04	.03	.02	.04

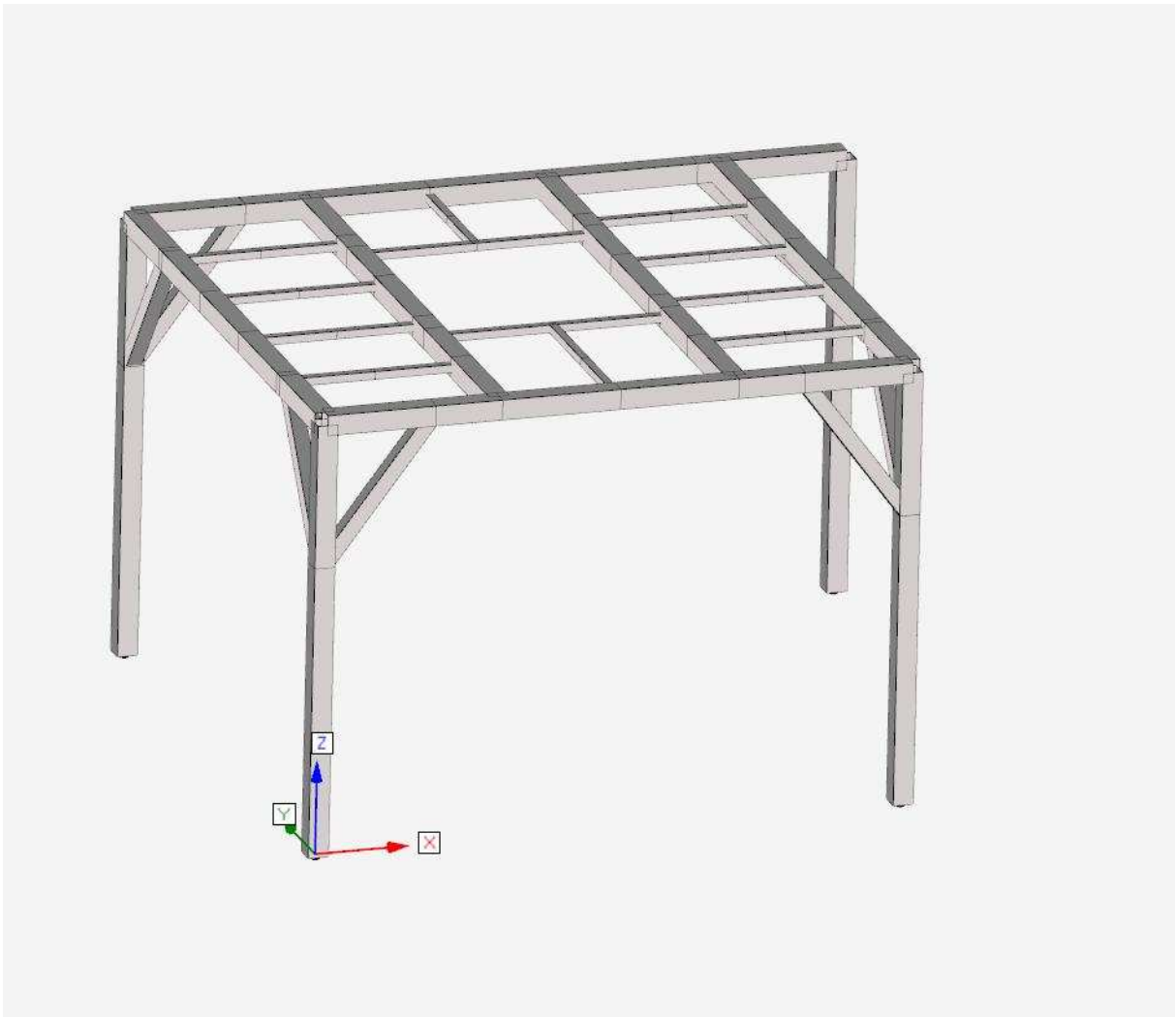
Résultats réactions

N°	Cas	Fx (N)	Fy (N)	Fz (N)	Mx (N.m)	My (N.m)	Mz (N.m)
1	101	3088	1560	13884	0	0	0
7	101	-3691	1942	16885	0	0	0
17	101	4700	-2398	18646	0	0	0
39	101	-4097	-1104	11485	0	0	0

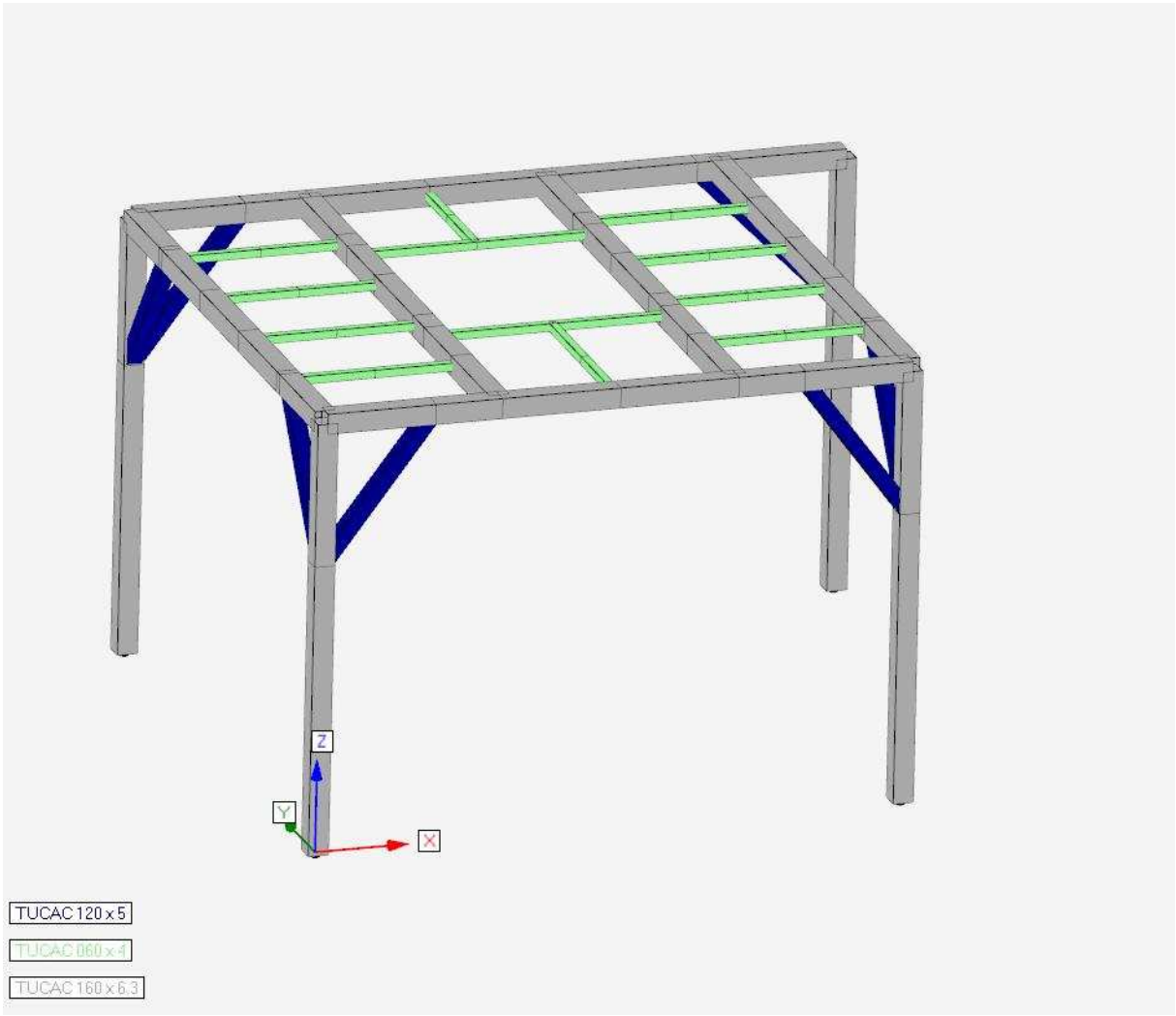
Synthèse des résultats de calculs : conclusion

Ce calcul a été effectué conformément Eurocode3.
Le ratio maximal dans les profilés est égal à .34.

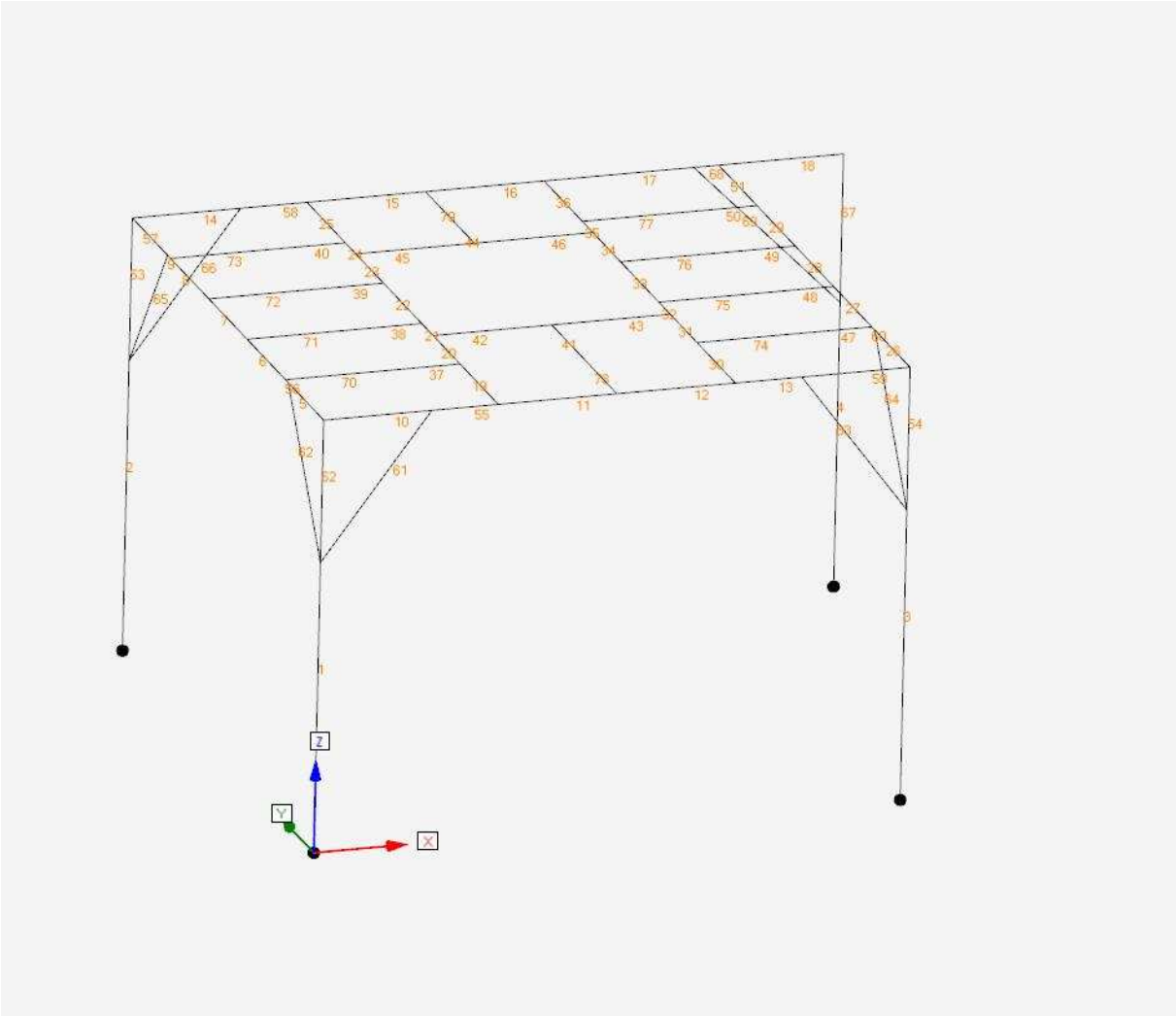
Captures d'écran de la modélisation



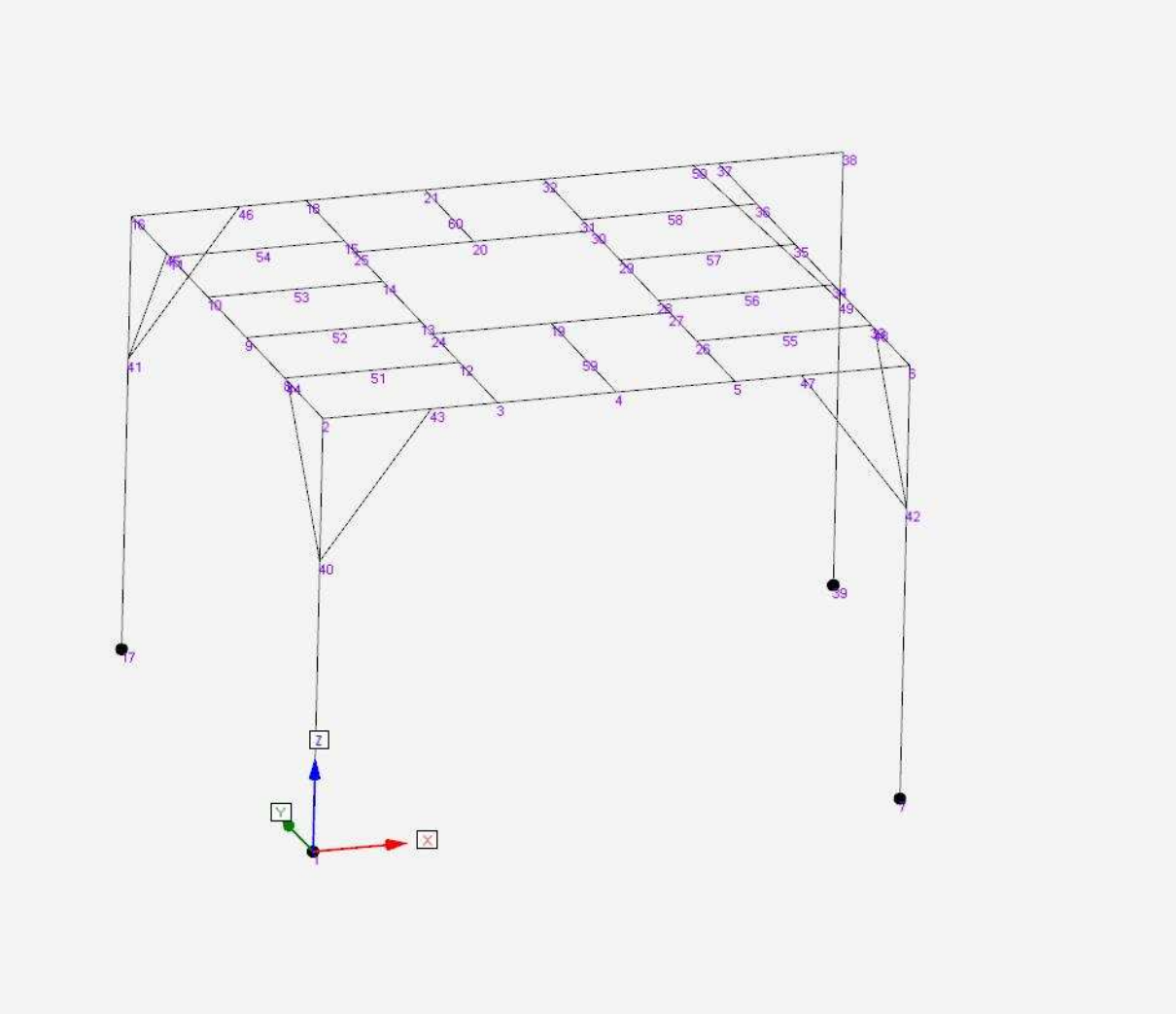
Visualisation 3D



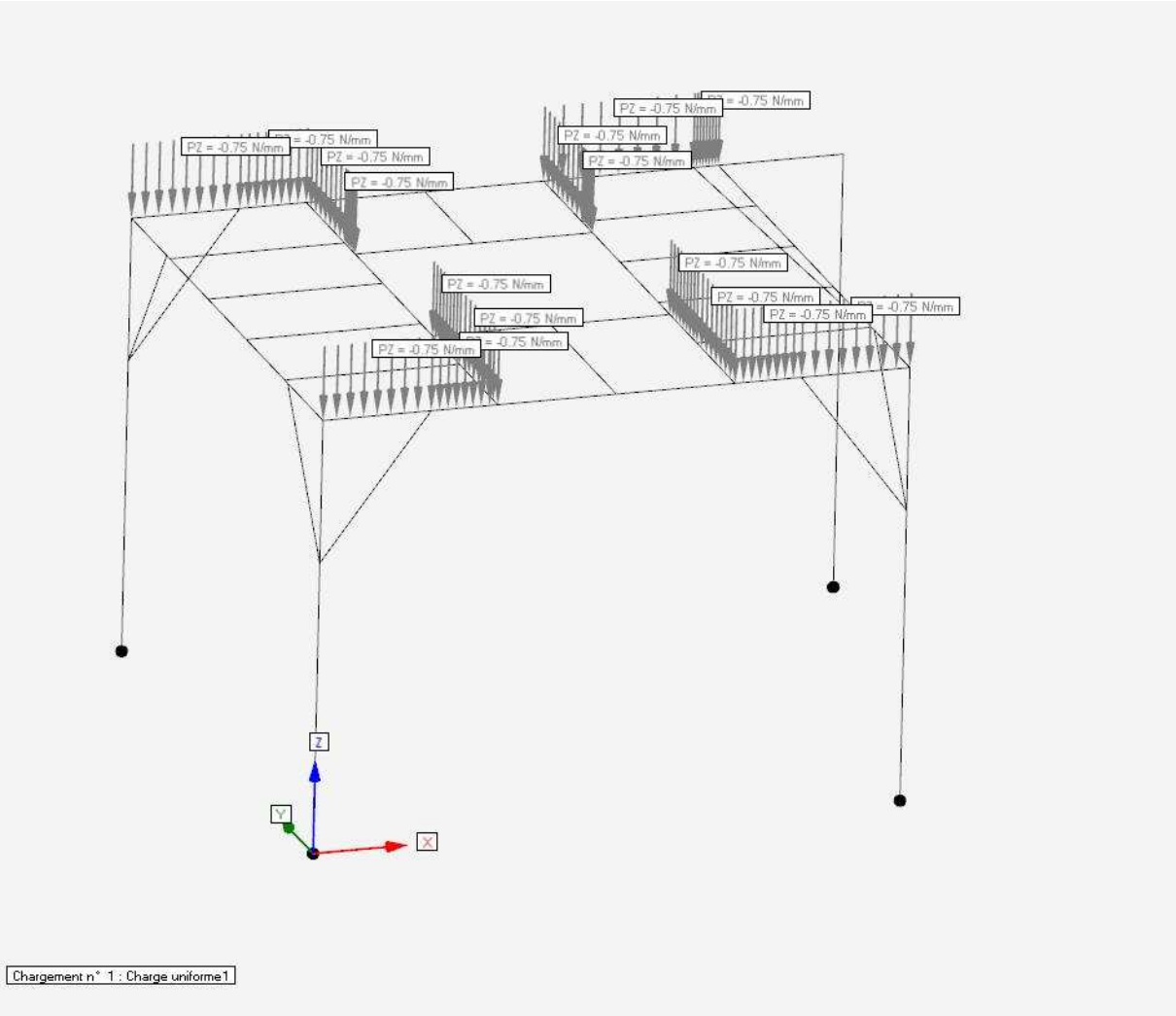
Visualisation 3D par type de section



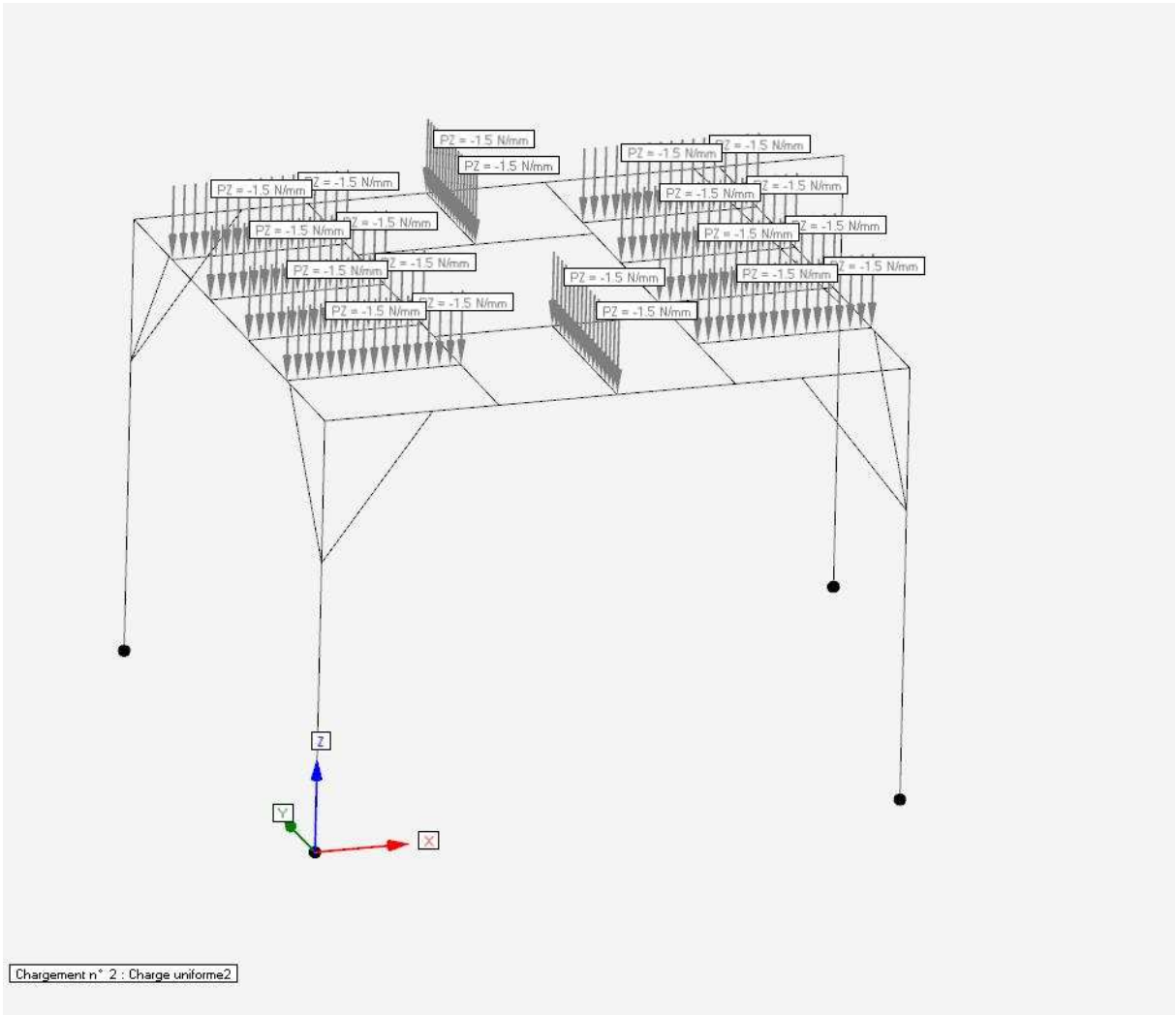
Numérotation des barres



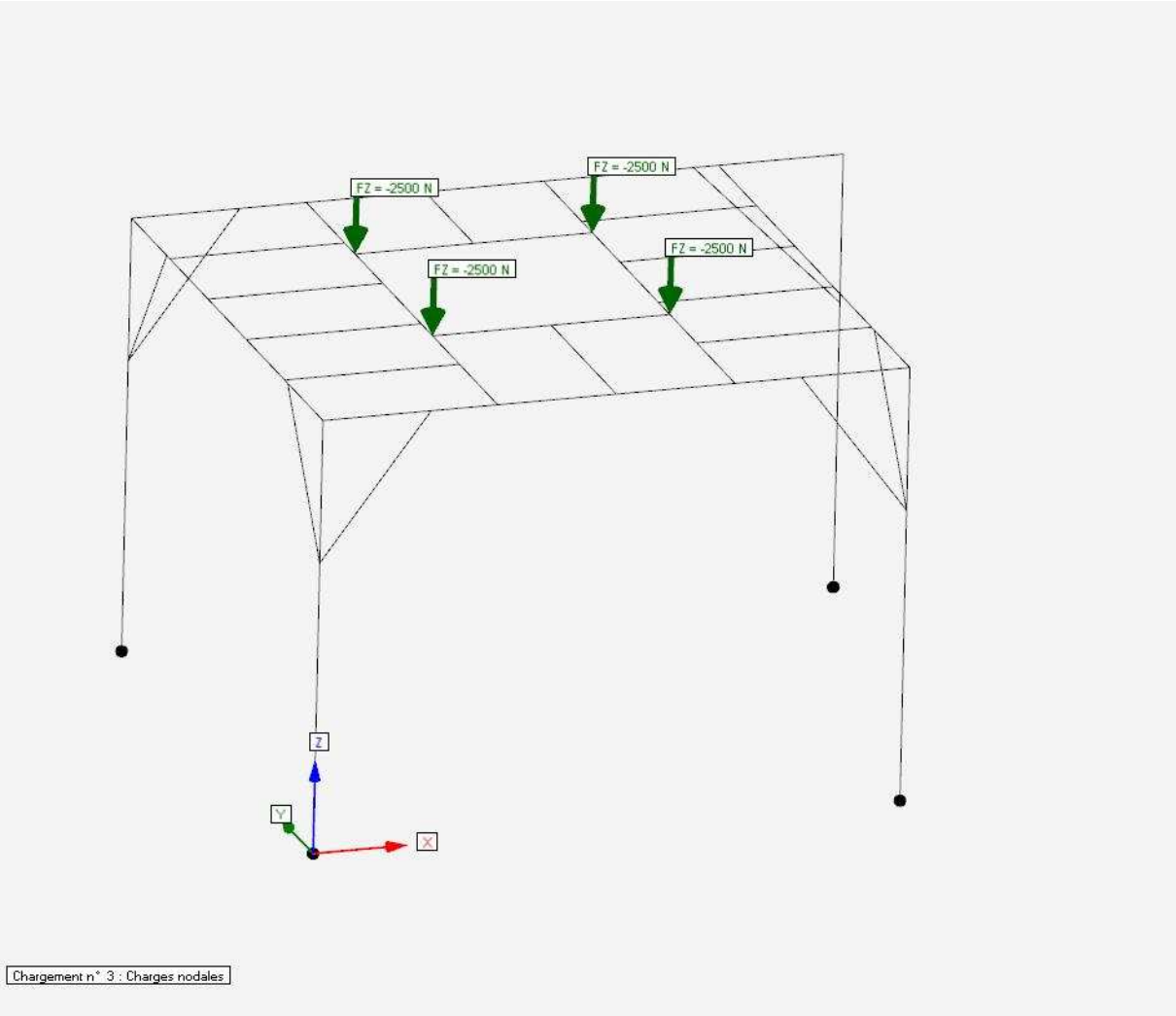
Numérotation des noeuds



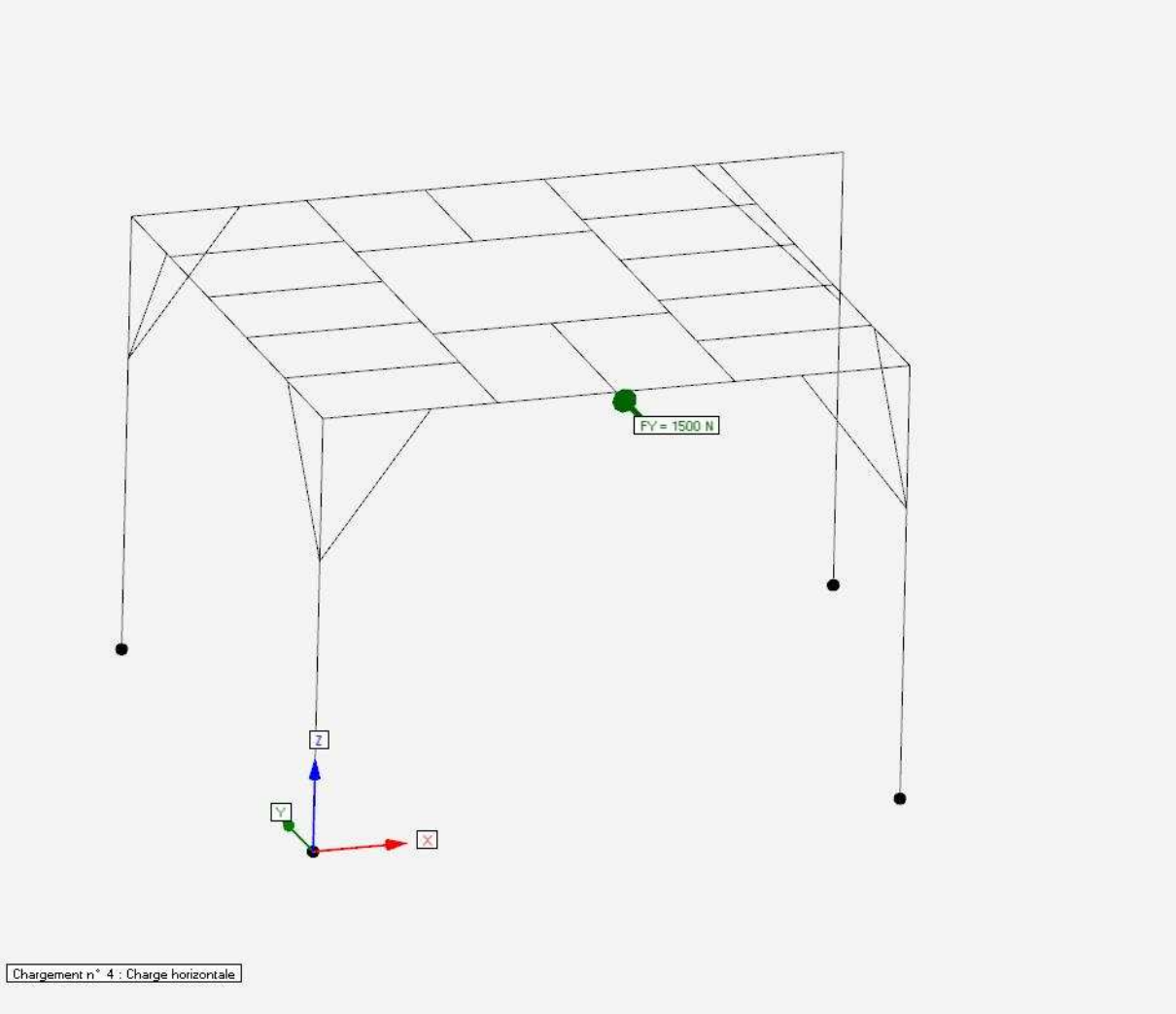
<u>Surcharge 150 daN/m² sur solives de rive</u>



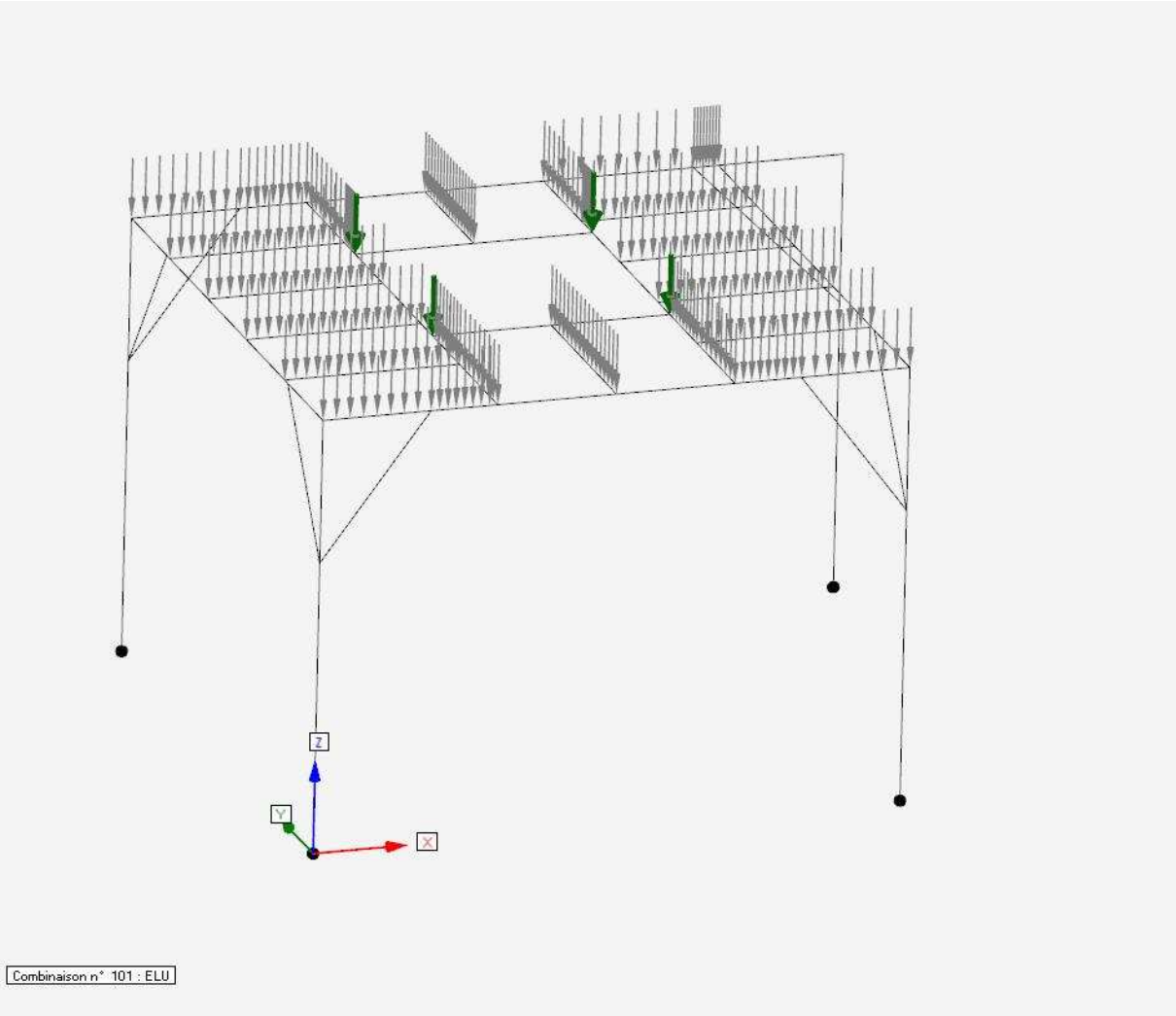
<u>Surcharge 150 daN/m² sur solives intermédiaires</u>



<u>Masse de 1000 kg répartie sur 4 points</u>



Effort horizontal



Combinaison ELU (surcharge plancher + machine, avec pondération de 1.5)