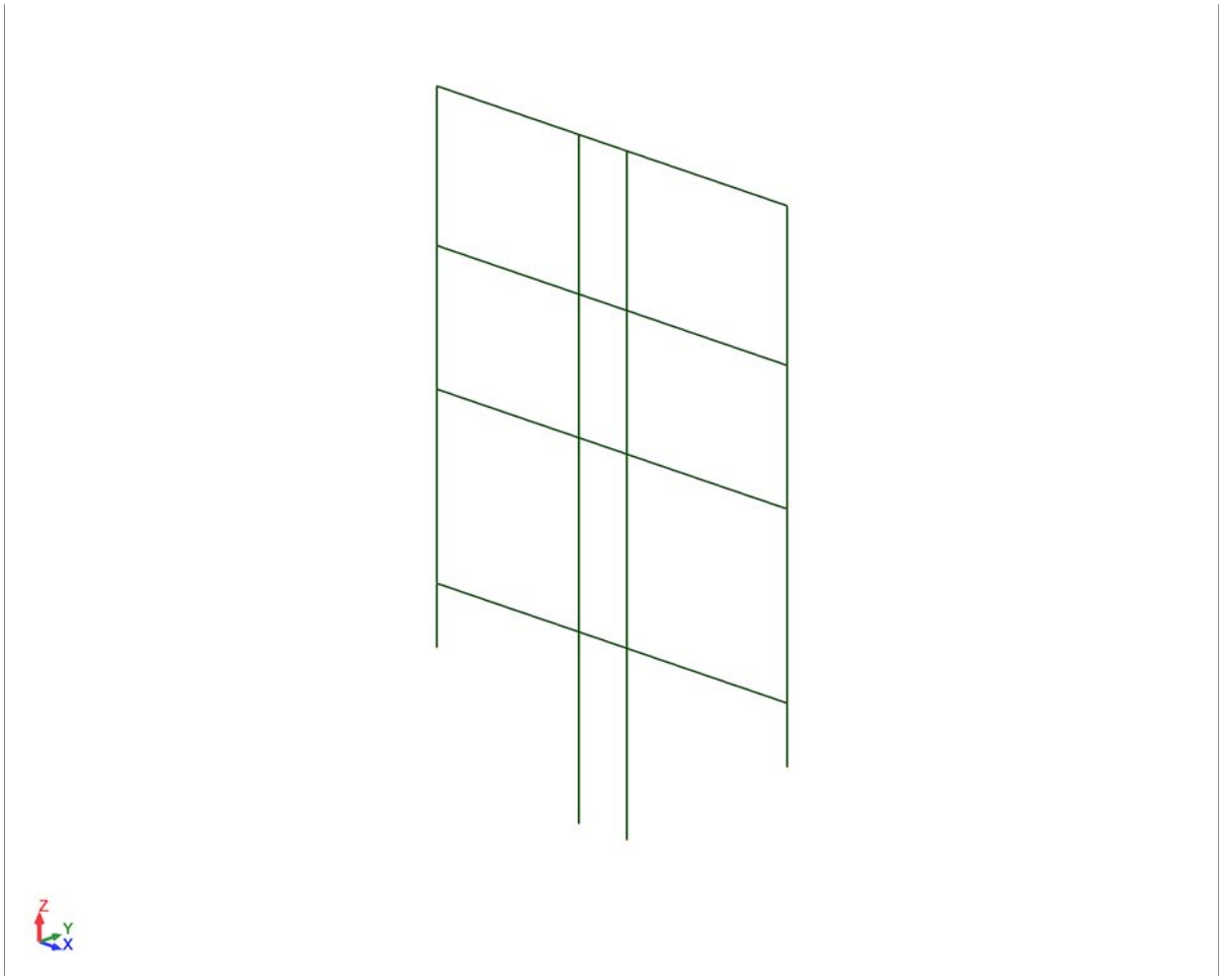
Frame to resist horizontal forces

Project: 163 Sumatra Road

RP DESIGNS

Author : RN

Structure View



Data - Nodes

Node	X (m)	Z (m)	Support code	Support
1	0.0	2.40	xxx	Fixed
2	0.0	3.60		
3	0.0	7.25		
4	0.0	9.95		
5	0.0	12.95		
6	3.55	0.0	xxx	Fixed
7	3.55	3.60		
8	3.55	7.25		
9	3.55	9.95		
10	3.55	12.95		
11	4.75	0.0	xxx	Fixed
12	4.75	3.60		
13	4.75	7.25		
14	4.75	9.95		

Node	X (m)	Z (m)	Support code	Support
15	4.75	12.95		
16	8.75	2.40	xxx	Fixed
17	8.75	3.60		
18	8.75	7.25		
19	8.75	9.95		
20	8.75	12.95		

Data - Bars

Bar	Node 1	Node 2	Section	Material	Length (m)	Gamma (Deg)	Type
1	1	2	UC 203x203x71	S355	1.20	0.0	Column
2	3	2	UC 203x203x71	S355	3.65	0.0	Column
3	3	4	UC 203x203x71	S355	2.70	0.0	Column
5	6	7	UC 203x203x71	S355	3.60	0.0	Column
6	7	8	UC 203x203x71	S355	3.65	0.0	Column
7	8	9	UC 203x203x71	S355	2.70	0.0	Column
8	9	10	UC 203x203x71	S355	3.00	0.0	Column
9	11	12	UC 203x203x71	S355	3.60	0.0	Column
12	14	15	UC 203x203x71	S355	3.00	0.0	Column
13	16	17	UC 203x203x71	S355	1.20	0.0	Column
15	18	19	UC 203x203x71	S355	2.70	0.0	Column
16	19	20	UC 203x203x71	S355	3.00	0.0	Column
17	4	5	UC 203x203x71	S355	3.00	0.0	Column
18	12	13	UC 203x203x71	S355	3.65	0.0	Column
19	13	14	UC 203x203x71	S355	2.70	0.0	Column
21	17	18	UC 203x203x71	S355	3.65	0.0	Column
22	5	10	UC 203x203x46	S355	3.55	0.0	Beam
23	10	15	UC 203x203x46	S355	1.20	0.0	Beam
24	15	20	UC 203x203x46	S355	4.00	0.0	Beam
27	4	9	UC 203x203x46	S355	3.55	0.0	Beam
28	9	14	UC 203x203x46	S355	1.20	0.0	Beam
29	14	19	UC 203x203x46	S355	4.00	0.0	Beam
30	3	8	UC 203x203x71	S355	3.55	0.0	Beam
31	8	13	UC 203x203x71	S355	1.20	0.0	Beam
32	13	18	UC 203x203x71	S355	4.00	0.0	Beam
33	2	7	UC 203x203x71	S355	3.55	0.0	Beam
34	7	12	UC 203x203x71	S355	1.20	0.0	Beam
35	12	17	UC 203x203x71	S355	4.00	0.0	Beam

Data - Sections

Section name	Bar list	AX (mm2)	AY (mm2)	AZ (mm2)	IX (mm4)	IY (mm4)	IZ (mm4)
UC 203x203x71	1to3 5to9 12 1-3 15to19 21 3-0to35	9040	7135	2224	802000	76180000	25370000
UC 203x203x46	22to24 27to29	5870	4470	1483	222000	45680000	15480000

Data - Materials

	Material	E (MPa)	G (MPa)	Nl	LX (1/° C)	RO (kN/m3)	Re (MPa)
1	S-3-5-5	205000.00	80000.00	0.30	0.00	77.01	355.00

Data - Supports

Support name	List of nodes	List of edges	List of objects	Support conditions
Fixed	1to16By5			UX UZ RY

Loads - Cases

Case	Label	Case name	Nature	Analysis type
1	DL1	DL1	Structu-ral	Static - Linear
2	DL2	DL2	Structu-ral	Static - Linear
3	LL1	LL1	Categor-y A	Static - Linear
4	WIND1	WIND1	w ind	Static - Linear
5		ULS		Static - Linear
6		ULS+		Static - Linear
7		ULS-		Static - Linear
8		SLS		Static - Linear
9		SLS+		Static - Linear
10		SLS-		Static - Linear
11		FIRE		Static - Linear
12		FIRE+		Static - Linear
13		FIRE-		Static - Linear

Loads - Values

Case	Load type	List	Load values
1	self-weight	1to3 5to9 12 13 15to19 21to24 27to35	PZ Negative Factor=1.00
1	self-weight	1to3 5to9 12 13 15to19 21to24 27to35	PZ Negative Factor=1.00
1	uniform load	2	PX=2.50(kN/m)
2	uniform load	2 3 17	PX=7.00(kN/m)
2	uniform load	15 16 21	PX=-7.00(kN/m)
3	uniform load	15 16 21	PX=-3.00(kN/m)
3	uniform load	2 3 16 17	PX=3.00(kN/m)

Reactions - Values

Node/Case	FX (kN)	FZ (kN)	MY (kNm)
1/ 1	-2.32	21.19	-3.91
1/ 2	4.32	0.21	0.91
1/ 3	-2.73	-7.07	-4.57
1/ 4	0.0	0.0	0.0
1/ ULS+	2.70	28.88	-3.00
1/ ULS-	-2.09	10.79	-10.91
1/ SLS+	2.00	21.39	-3.00
1/ SLS-	-0.72	14.33	-7.58
1/ FIRE+	2.00	21.39	-3.00
1/ FIRE-	0.64	17.86	-5.29
6/ 1	-0.46	25.83	-0.87
6/ 2	-0.13	-0.21	-0.17
6/ 3	-0.14	-12.03	-0.54
6/ 4	0.0	0.0	0.0
6/ ULS+	-0.59	34.59	-1.04
6/ ULS-	-1.01	7.58	-2.21
6/ SLS+	-0.59	25.62	-1.04
6/ SLS-	-0.73	13.60	-1.58
6/ FIRE+	-0.59	25.62	-1.04
6/ FIRE-	-0.66	19.61	-1.31
11/ 1	-0.14	32.95	-0.48
11/ 2	0.13	-0.21	0.17
11/ 3	-0.01	13.31	-0.37
11/ 4	0.0	0.0	0.0
11/ ULS+	-0.01	64.17	-0.32
11/ ULS-	-0.03	32.75	-0.98
11/ SLS+	-0.01	46.06	-0.32
11/ SLS-	-0.02	32.75	-0.68
11/ FIRE+	-0.01	39.40	-0.32
11/ FIRE-	-0.02	32.75	-0.50
16/ 1	-6.20	25.66	-5.06
16/ 2	-4.32	0.21	-0.82
16/ 3	-6.12	5.79	-5.19

Node/Case	FX (kN)	FZ (kN)	MY (kNm)
16/ 4	0.0	0.0	0.0
16/ ULS+	-10.52	43.59	-5.88
16/ ULS-	-23.39	25.86	-15.72
16/ SLS+	-10.52	31.65	-5.88
16/ SLS-	-16.65	25.86	-11.07
16/ FIRE+	-10.52	28.76	-5.88
16/ FIRE-	-13.59	25.86	-8.48
Case 1	DL1		
Sum of val.	-9.13	105.63	-10.32
Sum of reac.	-9.13	105.63	-503.51
Sum of forc.	9.13	-105.63	503.51
Check val.	-0.00	0.00	-0.00
Precision	7.26525e-015	9.74251e-030	
Case 2	DL2		
Sum of val.	0.0	-0.00	0.08
Sum of reac.	0.0	-0.00	-0.00
Sum of forc.	-0.00	0.0	-0.00
Check val.	-0.00	-0.00	-0.00
Precision	4.91066e-016	1.32349e-021	
Case 3	LL1		
Sum of val.	-9.00	-0.00	-10.67
Sum of reac.	-9.00	-0.00	-103.05
Sum of forc.	9.00	0.0	103.05
Check val.	-0.00	-0.00	-0.00
Precision	7.02692e-014	3.31944e-027	
Case 4	WIND1		
Sum of val.	0.0	0.0	0.0
Sum of reac.	0.0	0.0	0.0
Sum of forc.	0.0	0.0	0.0
Check val.	0.0	0.0	0.0
Precision	0.0	0.0	
Case ULS+	ULS+		
Sum of val.	-8.42	171.24	-10.24
Sum of reac.	-12.32	142.60	-679.74
Sum of forc.	12.32	-142.60	679.74
Check val.	-0.00	0.0	-0.00
Precision	1.04710e-014	1.78671e-021	
Case ULS-	ULS-		
Sum of val.	-26.52	76.99	-29.82
Sum of reac.	-12.32	142.60	-679.74
Sum of forc.	12.32	-142.60	679.74

Node/Case	FX (kN)	FZ (kN)	MY (kNm)
Check val.	-0.00	0.0	-0.00
Precision	1.04710e-014	1.78671e-021	
Case SLS+	SLS+		
Sum of val.	-9.13	124.72	-10.24
Sum of reac.	-18.13	105.63	-606.56
Sum of forc.	18.13	-105.63	606.56
Check val.	-0.00	0.0	-0.00
Precision	7.80255e-014	1.32349e-021	
Case SLS-	SLS-		
Sum of val.	-18.13	86.54	-20.91
Sum of reac.	-18.13	105.63	-606.56
Sum of forc.	18.13	-105.63	606.56
Check val.	-0.00	0.0	-0.00
Precision	7.80255e-014	1.32349e-021	
Case FIRE+	FIRE+		
Sum of val.	-9.13	115.17	-10.24
Sum of reac.	-13.63	105.63	-555.04
Sum of forc.	13.63	-105.63	555.04
Check val.	-0.00	0.00	-0.00
Precision	4.28909e-014	1.32349e-021	
Case FIRE-	FIRE-		
Sum of val.	-13.63	96.08	-15.57
Sum of reac.	-13.63	105.63	-555.04
Sum of forc.	13.63	-105.63	555.04
Check val.	-0.00	0.00	-0.00
Precision	4.28909e-014	1.32349e-021	

Reactions ULS: global extremes

	FX (kN)	FZ (kN)	MY (kNm)
MAX	4.32	64.17	0.91
Node	1	11	1
Case	2	ULS/2	2
MIN	-23.39	-12.03	-15.72
Node	16	6	16
Case	ULS/2	3	ULS/2

Displacements - Values

Node/Case	UX (mm)	UZ (mm)	RY (Rad)
1/ 1	0.0	0.0	0.0
1/ 2	0.0	0.0	0.0
1/ 3	0.0	0.0	0.0
1/ 4	0.0	0.0	0.0
1/ ULS+	0.0	0.0	0.0
1/ ULS-	0.0	0.0	0.0
1/ SLS+	0.0	0.0	0.0
1/ SLS-	0.0	0.0	0.0
1/ FIRE+	0.0	0.0	0.0
1/ FIRE-	0.0	0.0	0.0
2/ 1	0	-0	0.000
2/ 2	0	-0	0.000
2/ 3	0	0	0.000
2/ 4	0.0	0.0	0.0
2/ ULS+	0	-0	0.001
2/ ULS-	0	-0	0.000
2/ SLS+	0	-0	0.001
2/ SLS-	0	-0	0.000
2/ FIRE+	0	-0	0.000
2/ FIRE-	0	-0	0.000
3/ 1	1	-0	0.000
3/ 2	0	-0	-0.000
3/ 3	1	0	0.000
3/ 4	0.0	0.0	0.0
3/ ULS+	3	-0	0.000
3/ ULS-	1	-0	-0.000
3/ SLS+	2	-0	0.000
3/ SLS-	1	-0	-0.000
3/ FIRE+	1	-0	0.000
3/ FIRE-	1	-0	-0.000
4/ 1	1	-0	0.000
4/ 2	0	-0	0.000
4/ 3	2	0	0.000
4/ 4	0.0	0.0	0.0
4/ ULS+	4	-0	0.000
4/ ULS-	1	-0	0.000
4/ SLS+	3	-0	0.000
4/ SLS-	1	-0	0.000
4/ FIRE+	2	-0	0.000
4/ FIRE-	1	-0	0.000
5/ 1	1	-0	0.000
5/ 2	0	-0	-0.000
5/ 3	3	0	0.000
5/ 4	0.0	0.0	0.0
5/ ULS+	5	-0	-0.000
5/ ULS-	1	-0	-0.000
5/ SLS+	3	-0	-0.000

Node/Case	UX (mm)	UZ (mm)	RY (Rad)
5/ SLS-	1	-0	-0.000
5/ FIRE+	2	-0	-0.000
5/ FIRE-	1	-0	-0.000
6/ 1	0.0	0.0	0.0
6/ 2	0.0	0.0	0.0
6/ 3	0.0	0.0	0.0
6/ 4	0.0	0.0	0.0
6/ ULS+	0.0	0.0	0.0
6/ ULS-	0.0	0.0	0.0
6/ SLS+	0.0	0.0	0.0
6/ SLS-	0.0	0.0	0.0
6/ FIRE+	0.0	0.0	0.0
6/ FIRE-	0.0	0.0	0.0
7/ 1	0	-0	0.000
7/ 2	0	0	-0.000
7/ 3	0	0	0.000
7/ 4	0.0	0.0	0.0
7/ ULS+	0	-0	0.000
7/ ULS-	0	-0	-0.000
7/ SLS+	0	-0	0.000
7/ SLS-	0	-0	-0.000
7/ FIRE+	0	-0	0.000
7/ FIRE-	0	-0	-0.000
8/ 1	1	-0	0.000
8/ 2	0	0	0.000
8/ 3	1	0	0.000
8/ 4	0.0	0.0	0.0
8/ ULS+	3	-0	0.000
8/ ULS-	1	-0	0.000
8/ SLS+	2	-0	0.000
8/ SLS-	1	-0	0.000
8/ FIRE+	1	-0	0.000
8/ FIRE-	1	-0	0.000
9/ 1	1	-0	0.000
9/ 2	0	0	-0.000
9/ 3	2	0	0.000
9/ 4	0.0	0.0	0.0
9/ ULS+	4	-0	0.000
9/ ULS-	1	-0	-0.000
9/ SLS+	3	-0	0.000
9/ SLS-	1	-0	-0.000
9/ FIRE+	2	-0	0.000
9/ FIRE-	1	-0	-0.000
10/ 1	1	-0	-0.000
10/ 2	0	0	0.000
10/ 3	3	0	0.000
10/ 4	0.0	0.0	0.0

Node/Case	UX (mm)	UZ (mm)	RY (Rad)
10/ ULS+	5	-0	0.000
10/ ULS-	1	-0	0.000
10/ SLS+	3	-0	0.000
10/ SLS-	1	-0	0.000
10/ FIRE+	2	-0	0.000
10/ FIRE-	1	-0	0.000
11/ 1	0.0	0.0	0.0
11/ 2	0.0	0.0	0.0
11/ 3	0.0	0.0	0.0
11/ 4	0.0	0.0	0.0
11/ ULS+	0.0	0.0	0.0
11/ ULS-	0.0	0.0	0.0
11/ SLS+	0.0	0.0	0.0
11/ SLS-	0.0	0.0	0.0
11/ FIRE+	0.0	0.0	0.0
11/ FIRE-	0.0	0.0	0.0
12/ 1	0	-0	0.000
12/ 2	-0	0	0.000
12/ 3	0	-0	0.000
12/ 4	0.0	0.0	0.0
12/ ULS+	0	-0	0.000
12/ ULS-	0	-0	0.000
12/ SLS+	0	-0	0.000
12/ SLS-	0	-0	0.000
12/ FIRE+	0	-0	0.000
12/ FIRE-	0	-0	0.000
13/ 1	1	-0	0.000
13/ 2	-0	0	-0.000
13/ 3	1	-0	0.000
13/ 4	0.0	0.0	0.0
13/ ULS+	3	-0	0.000
13/ ULS-	1	-0	0.000
13/ SLS+	2	-0	0.000
13/ SLS-	1	-0	0.000
13/ FIRE+	1	-0	0.000
13/ FIRE-	1	-0	0.000
14/ 1	1	-0	0.000
14/ 2	-0	0	0.000
14/ 3	2	-0	0.000
14/ 4	0.0	0.0	0.0
14/ ULS+	4	-0	0.000
14/ ULS-	1	-0	0.000
14/ SLS+	3	-0	0.000
14/ SLS-	1	-0	0.000
14/ FIRE+	2	-0	0.000
14/ FIRE-	1	-0	0.000
15/ 1	1	-0	0.000

Node/Case	UX (mm)	UZ (mm)	RY (Rad)
15/ 2	0	0	-0.000
15/ 3	3	-0	0.000
15/ 4	0.0	0.0	0.0
15/ ULS+	5	-0	0.000
15/ ULS-	1	-0	0.000
15/ SLS+	3	-0	0.000
15/ SLS-	1	-0	0.000
15/ FIRE+	2	-0	0.000
15/ FIRE-	1	-0	0.000
16/ 1	0.0	0.0	0.0
16/ 2	0.0	0.0	0.0
16/ 3	0.0	0.0	0.0
16/ 4	0.0	0.0	0.0
16/ ULS+	0.0	0.0	0.0
16/ ULS-	0.0	0.0	0.0
16/ SLS+	0.0	0.0	0.0
16/ SLS-	0.0	0.0	0.0
16/ FIRE+	0.0	0.0	0.0
16/ FIRE-	0.0	0.0	0.0
17/ 1	0	-0	0.000
17/ 2	-0	-0	-0.000
17/ 3	0	-0	0.000
17/ 4	0.0	0.0	0.0
17/ ULS+	0	-0	0.000
17/ ULS-	0	-0	-0.000
17/ SLS+	0	-0	0.000
17/ SLS-	0	-0	-0.000
17/ FIRE+	0	-0	0.000
17/ FIRE-	0	-0	-0.000
18/ 1	1	-0	0.000
18/ 2	-0	-0	0.000
18/ 3	1	-0	0.000
18/ 4	0.0	0.0	0.0
18/ ULS+	3	-0	0.001
18/ ULS-	1	-0	0.000
18/ SLS+	2	-0	0.000
18/ SLS-	1	-0	0.000
18/ FIRE+	1	-0	0.000
18/ FIRE-	1	-0	0.000
19/ 1	1	-0	-0.000
19/ 2	-0	-0	-0.000
19/ 3	2	-0	0.000
19/ 4	0.0	0.0	0.0
19/ ULS+	4	-0	0.000
19/ ULS-	1	-0	-0.000
19/ SLS+	3	-0	0.000
19/ SLS-	1	-0	-0.000

Node/Case	UX (mm)	UZ (mm)	RY (Rad)
19/ FIRE+	2	-0	0.000
19/ FIRE-	1	-0	-0.000
20/ 1	1	-0	-0.000
20/ 2	-0	-0	0.000
20/ 3	3	-0	0.000
20/ 4	0.0	0.0	0.0
20/ ULS+	5	-0	0.000
20/ ULS-	1	-0	0.000
20/ SLS+	3	-0	0.000
20/ SLS-	1	-0	0.000
20/ FIRE+	2	-0	0.000
20/ FIRE-	1	-0	0.000

Displacements SLS: global extremes

	UX (mm)	UZ (mm)	RY (Rad)
MAX	3	0	0.001
Node	5	10	2
Case	SLS/2	3	SLS/2
MIN	-0	-0	-0.000
Node	19	15	5
Case	2	SLS/2	2

Forces - Envelope

Bar/Node/Case	FX (kN)	FZ (kN)	MY (kNm)
1/ 1/ ULS/1	21.39->>	-2.00	-3.00
1/ 1/ 3	-7.07-<<	2.73	-4.57
1/ 1/ 3	-7.07	2.73>->	-4.57
1/ 1/ 2	0.21	-4.32-<<	0.91
1/ 1/ 2	0.21	-4.32	0.91->>
1/ 1/ ULS/2	18.28	1.39	-10.-91<<
2/ 2/ ULS/1	19.48->>	17.62	9.35
2/ 3/ 3	-4.83-<<	-3.89	0.20
2/ 2/ ULS/2	19.06	34.37->>	21.60

Bar/Node/Case	FX (kN)	FZ (kN)	MY (kNm)
2/ 3/ ULS/2	12.20	-28.86<<	11.55
2/ 2/ ULS/2	19.06	34.37	21.60>>
2/ 3/ 4	0.0	0.0	0.0<<
3/ 3/ ULS/4	15.59>>	13.16	-7.68
3/ 3/ 3	-2.39<<	5.88	-4.65
3/ 3/ ULS/2	12.01	21.98>>	-14.65
3/ 4/ ULS/2	6.93	-15.69<<	-6.16
3/ 4/ 3	-2.39	-2.22	0.29>>
3/ 3/ ULS/2	12.01	21.98	-14.65<<
5/ 6/ ULS/4	34.59>>	0.80	-1.40
5/ 6/ 3	-12.03<<	0.14	-0.54
5/ 6/ ULS/2	16.55	1.01>>	-2.21
5/ 6/ 4	0.0	0.0<<	0.0
5/ 7/ ULS/4	27.82	0.80	1.46>>
5/ 6/ ULS/2	16.55	1.01	-2.21<<
6/ 7/ 1	18.70>>	1.69	-3.16
6/ 7/ 3	-10.12<<	2.88	-5.58
6/ 7/ ULS/2	8.60	6.63>>	-12.85
6/ 7/ 4	0.0	0.0<<	0.0
6/ 8/ ULS/2	1.74	6.63	11.34>>
6/ 7/ ULS/2	8.60	6.63	-12.85<<
7/ 8/ ULS/4	16.73>>	0.17	0.14
7/ 8/ 3	-4.16<<	3.21	-4.37
7/ 8/ ULS/2	10.49	4.98>>	-6.42
7/ 8/ 4	0.0	0.0<<	0.0
7/ 9/ ULS/2	5.41	4.98	7.03>>
7/ 8/ ULS/3	6.15	4.94	-6.45<<
8/ 9/ ULS/4	7.80>>	0.06	-0.28

Bar/Node/Case	FX (kN)	FZ (kN)	MY (kNm)
8/ 9/ 2	-0.83-<<	-0.15	0.04
8/ 9/ ULS/2	6.75	2.02>->	-2.88
8/ 9/ 2	-0.83	-0.15-<<	0.04
8/ 10/ ULS-/3	0.56	2.00	3.20->>
8/ 9/ ULS/2	6.75	2.02	-2.8-8<<
9/ 11/ ULS-/2	64.17->>	0.03	-0.98
9/ 11/ 2	-0.21-<<	-0.13	0.17
9/ 11/ 1	32.95	0.14>->	-0.48
9/ 11/ 2	-0.21	-0.13-<<	0.17
9/ 11/ 2	-0.21	-0.13	0.17->>
9/ 11/ ULS-/2	64.17	0.03	-0.9-8<<
12/ 14/ UL-S/2	8.34>->	1.71	-1.98
12/ 14/ 2	-0.66-<<	0.17	-0.07
12/ 14/ UL-S/3	6.39	1.78>->	-2.13
12/ 14/ 1	6.24	-0.38-<<	0.50
12/ 15/ UL-S/3	2.21	1.78	3.22->>
12/ 14/ UL-S/3	6.39	1.78	-2.1-3<<
13/ 16/ UL-S/2	43.59->>	23.39	-15.72
13/ 16/ 4	0.0<<	0.0	0.0
13/ 16/ UL-S/2	43.59	23.39->>	-15.72
13/ 16/ 4	0.0	0.0<<	0.0
13/ 17/ UL-S/2	41.34	23.39	12.3-5>>
13/ 16/ UL-S/2	43.59	23.39	-15.-72<<
15/ 18/ UL-S/2	19.78->>	-17.68	8.57
15/ 18/ 4	0.0<<	0.0	0.0
15/ 19/ UL-S/2	14.70	19.98->>	11.67
15/ 18/ UL-S/2	19.78	-17.6-8<<	8.57

Bar/Node/Case	FX (kN)	FZ (kN)	MY (kNm)
15/ 19/ ULS/2	14.70	19.98	11.67>>
15/ 18/ 1	11.75	0.38	-0.38<<
16/ 19/ ULS/2	10.24>>	-14.04	6.09
16/ 19/ 4	0.0<<	0.0	0.0
16/ 20/ ULS/2	4.60	14.31>>	6.49
16/ 19/ ULS/4	9.08	-14.88<<	6.28
16/ 20/ ULS/2	4.60	14.31	6.49>>
16/ 19/ 1	6.04	0.64	-0.77<<
17/ 4/ ULS/4	8.83>>	15.10	-6.54
17/ 4/ 3	-0.62<<	5.81	-3.08
17/ 4/ ULS/2	7.90	23.81>>	-11.16
17/ 5/ ULS/2	2.26	-18.04<<	-2.50
17/ 5/ 3	-0.62	-3.19	0.85>>
17/ 4/ ULS/2	7.90	23.81	-11.16<<
18/ 12/ ULS/2	45.13>>	5.81	-10.80
18/ 12/ 2	-0.88<<	-0.03	0.16
18/ 12/ ULS/2	45.13	5.81>>	-10.80
18/ 12/ 2	-0.88	-0.03<<	0.16
18/ 13/ ULS/2	38.27	5.81	10.40>>
18/ 12/ ULS/2	45.13	5.81	-10.80<<
19/ 13/ ULS/3	17.94>>	4.37	-6.02
19/ 13/ 2	-0.41<<	-0.01	-0.13
19/ 13/ ULS/3	17.94	4.37>>	-6.02
19/ 13/ ULS/4	15.44	-0.55<<	0.79
19/ 14/ ULS/3	14.18	4.37	5.77>>
19/ 13/ ULS/3	17.94	4.37	-6.02<<

Bar/Node/Case	FX (kN)	FZ (kN)	MY (kNm)
21/ 17/ ULS/2	35.31->>	-20.99	5.63
21/ 17/ 4	0.0<<	0.0	0.0
21/ 18/ ULS/2	28.45	29.93->>	21.96
21/ 17/ ULS/2	35.31	-20.99<<	5.63
21/ 18/ ULS/2	28.45	29.93	21.96>>
21/ 17/ 1	20.17	1.15	-1.73<<
22/ 5/ ULS/2	18.04->>	2.26	-2.50
22/ 5/ 4	0.0<<	0.0	0.0
22/ 5/ ULS/4	13.25	3.19>>	-3.78
22/ 10/ ULS/2	18.04	-2.07-<<	-2.16
22/ 5/ 3	3.19	-0.62	0.85->>
22/ 5/ ULS/4	13.25	3.19	-3.78<<
23/ 10/ ULS/2	16.02->>	-0.95	1.02
23/ 10/ 4	0.0<<	0.0	0.0
23/ 10/ ULS/4	13.19	1.02>>	-0.23
23/ 15/ ULS/2	16.02	-2.42-<<	-1.00
23/ 10/ ULS/3	12.60	-1.22	1.08->>
23/ 15/ ULS/3	12.60	-2.30	-1.03<<
24/ 15/ ULS/2	14.31->>	0.28	2.15
24/ 15/ 4	0.0<<	0.0	0.0
24/ 15/ 1	0.64	1.75>>	-0.92
24/ 20/ ULS/2	14.31	-4.60-<<	-6.49
24/ 15/ ULS/3	10.82	-0.09	2.19->>
24/ 20/ ULS/2	14.31	-4.60	-6.49<<
27/ 4/ ULS/2	39.50->>	-0.97	5.00
27/ 4/ 1	-0.36-<<	1.56	-0.81
27/ 4/ ULS/4	27.45	1.69>>	-0.05
27/ 9/ ULS/2	39.50	-5.30-<<	-6.13

Bar/Node/Case	FX (kN)	FZ (kN)	MY (kNm)
27/ 4/ ULS-/3	32.38	-1.41	5.02->>
27/ 9/ ULS-/2	39.50	-5.30	-6.1-3<<
28/ 9/ ULS-/2	36.54->>	-6.65	3.78
28/ 9/ 1	-0.27-<<	0.90	-0.45
28/ 9/ ULS-/4	27.34	1.21>->	-0.85
28/ 14/ ULS/2	36.54	-8.11-<<	-5.07
28/ 9/ ULS-/3	29.45	-6.96	4.00->>
28/ 14/ ULS/2	36.54	-8.11	-5.0-7<<
29/ 14/ ULS/2	34.02->>	0.42	2.50
29/ 14/ 1	-0.25-<<	1.67	-0.87
29/ 14/ ULS/4	27.60	2.58>->	-1.54
29/ 19/ ULS/2	34.02	-4.46-<<	-5.59
29/ 14/ ULS/3	26.87	-0.25	2.90->>
29/ 19/ ULS/2	34.02	-4.46	-5.5-9<<
30/ 3/ ULS-/2	50.84->>	0.19	3.10
30/ 3/ 4	0.0<<	0.0	0.0
30/ 3/ ULS-/4	36.19	3.85>->	-3.57
30/ 8/ ULS-/2	50.84	-6.48-<<	-8.06
30/ 3/ 3	9.77	-2.44	4.45->>
30/ 8/ ULS-/2	50.84	-6.48	-8.0-6<<
31/ 8/ ULS-/2	49.20->>	-15.23	9.70
31/ 8/ 4	0.0<<	0.0	0.0
31/ 8/ 4	0.0	0.0>>	0.0
31/ 13/ ULS/2	49.20	-17.4-8<<	-9.93
31/ 8/ ULS-/2	49.20	-15.23	9.70->>
31/ 13/ ULS/2	49.20	-17.48	-9.9-3<<
32/ 13/ ULS/2	47.62->>	-1.16	6.28
32/ 13/ 4	0.0<<	0.0	0.0

Bar/Node/Case	FX (kN)	FZ (kN)	MY (kNm)
32/ 13/ ULS/4	31.88	2.37>>	-0.12
32/ 18/ ULS/2	47.62	-8.68<<	-13.39
32/ 13/ ULS/3	39.35	-1.77	6.32>>
32/ 18/ ULS/2	47.62	-8.68	-13.39<<
33/ 2/ ULS/2	32.99>>	-3.04	12.35
33/ 2/ 4	0.0<<	0.0	0.0
33/ 2/ 1	2.74	1.09>>	1.79
33/ 7/ ULS/2	32.99	-9.71<<	-10.28
33/ 2/ ULS/2	32.99	-3.04	12.35>>
33/ 7/ ULS/2	32.99	-9.71	-10.28<<
34/ 7/ ULS/2	38.60>>	-8.52	3.99
34/ 7/ 4	0.0<<	0.0	0.0
34/ 7/ 2	16.77	0.03>>	-0.41
34/ 12/ ULS/2	38.60	-10.78<<	-7.59
34/ 7/ ULS/2	38.60	-8.52	3.99>>
34/ 12/ ULS/2	38.60	-10.78	-7.59<<
35/ 12/ ULS/2	44.38>>	1.49	2.35
35/ 12/ 4	0.0<<	0.0	0.0
35/ 12/ ULS/4	29.60	3.32>>	-1.11
35/ 17/ ULS/2	44.38	-6.03<<	-6.72
35/ 12/ ULS/3	36.70	0.63	2.63>>
35/ 17/ ULS/2	44.38	-6.03	-6.72<<

Member Forces ULS: envelope

Bar	FX (kN)	FZ (kN)	MY (kNm)
1 / MAX	21.39	2.73	0.91
Node	1	1	1
Case	ULS/1	3	2
1 / MIN	-7.07	-4.32	-10.91

Bar	FX (kN)	FZ (kN)	MY (kNm)
Node	1	1	1
Case	3	2	ULS/-2
2 / MAX	19.48	34.37	21.60
Node	2	2	2
Case	ULS/1	ULS/2	ULS/-2
2 / MIN	-4.83	-28.86	0.0
Node	3	3	3
Case	3	ULS/2	4
3 / MAX	15.59	21.98	0.29
Node	3	3	4
Case	ULS/4	ULS/2	3
3 / MIN	-2.39	-15.69	-14.65
Node	3	4	3
Case	3	ULS/2	ULS/-2
5 / MAX	34.59	1.01	1.46
Node	6	6	7
Case	ULS/4	ULS/2	ULS/-4
5 / MIN	-12.03	0.0	-2.21
Node	6	6	6
Case	3	4	ULS/-2
6 / MAX	18.70	6.63	11.34
Node	7	7	8
Case	1	ULS/2	ULS/-2
6 / MIN	-10.12	0.0	-12.85
Node	7	7	7
Case	3	4	ULS/-2
7 / MAX	16.73	4.98	7.03
Node	8	8	9
Case	ULS/4	ULS/2	ULS/-2
7 / MIN	-4.16	0.0	-6.45
Node	8	8	8
Case	3	4	ULS/-3
8 / MAX	7.80	2.02	3.20
Node	9	9	10
Case	ULS/4	ULS/2	ULS/-3
8 / MIN	-0.83	-0.15	-2.88
Node	9	9	9

Bar	FX (kN)	FZ (kN)	MY (kNm)
Case	2	2	ULS/-2
9 / MAX	64.17	0.14	0.17
Node	11	11	11
Case	ULS/2	1	2
9 / MIN	-0.21	-0.13	-0.98
Node	11	11	11
Case	2	2	ULS/-2
12 / MAX	8.34	1.78	3.22
Node	14	14	15
Case	ULS/2	ULS/3	ULS/-3
12 / MIN	-0.66	-0.38	-2.13
Node	14	14	14
Case	2	1	ULS/-3
13 / MAX	43.59	23.39	12.35
Node	16	16	17
Case	ULS/2	ULS/2	ULS/-2
13 / MIN	0.0	0.0	-15.72
Node	16	16	16
Case	4	4	ULS/-2
15 / MAX	19.78	19.98	11.67
Node	18	19	19
Case	ULS/2	ULS/2	ULS/-2
15 / MIN	0.0	-17.68	-0.38
Node	18	18	18
Case	4	ULS/2	1
16 / MAX	10.24	14.31	6.49
Node	19	20	20
Case	ULS/2	ULS/2	ULS/-2
16 / MIN	0.0	-14.88	-0.77
Node	19	19	19
Case	4	ULS/4	1
17 / MAX	8.83	23.81	0.85
Node	4	4	5
Case	ULS/4	ULS/2	3
17 / MIN	-0.62	-18.04	-11.16
Node	4	5	4
Case	3	ULS/2	ULS/-2
18 / MAX	45.13	5.81	10.40

Bar	FX (kN)	FZ (kN)	MY (kNm)
Node	12	12	13
Case	ULS/2	ULS/2	ULS/-2
18 / MIN	-0.88	-0.03	-10.80
Node	12	12	12
Case	2	2	ULS/-2
19 / MAX	17.94	4.37	5.77
Node	13	13	14
Case	ULS/3	ULS/3	ULS/-3
19 / MIN	-0.41	-0.55	-6.02
Node	13	13	13
Case	2	ULS/4	ULS/-3
21 / MAX	35.31	29.93	21.96
Node	17	18	18
Case	ULS/2	ULS/2	ULS/-2
21 / MIN	0.0	-20.99	-1.73
Node	17	17	17
Case	4	ULS/2	1
22 / MAX	18.04	3.19	0.85
Node	5	5	5
Case	ULS/2	ULS/4	3
22 / MIN	0.0	-2.07	-3.78
Node	5	10	5
Case	4	ULS/2	ULS/-4
23 / MAX	16.02	1.02	1.08
Node	10	10	10
Case	ULS/2	ULS/4	ULS/-3
23 / MIN	0.0	-2.42	-1.03
Node	10	15	15
Case	4	ULS/2	ULS/-3
24 / MAX	14.31	1.75	2.19
Node	15	15	15
Case	ULS/2	1	ULS/-3
24 / MIN	0.0	-4.60	-6.49
Node	15	20	20
Case	4	ULS/2	ULS/-2
27 / MAX	39.50	1.69	5.02
Node	4	4	4

Bar	FX (kN)	FZ (kN)	MY (kNm)
Case	ULS/2	ULS/4	ULS/-3
27 / MIN	-0.36	-5.30	-6.13
Node	4	9	9
Case	1	ULS/2	ULS/-2
28 / MAX	36.54	1.21	4.00
Node	9	9	9
Case	ULS/2	ULS/4	ULS/-3
28 / MIN	-0.27	-8.11	-5.07
Node	9	14	14
Case	1	ULS/2	ULS/-2
29 / MAX	34.02	2.58	2.90
Node	14	14	14
Case	ULS/2	ULS/4	ULS/-3
29 / MIN	-0.25	-4.46	-5.59
Node	14	19	19
Case	1	ULS/2	ULS/-2
30 / MAX	50.84	3.85	4.45
Node	3	3	3
Case	ULS/2	ULS/4	3
30 / MIN	0.0	-6.48	-8.06
Node	3	8	8
Case	4	ULS/2	ULS/-2
31 / MAX	49.20	0.0	9.70
Node	8	8	8
Case	ULS/2	4	ULS/-2
31 / MIN	0.0	-17.48	-9.93
Node	8	13	13
Case	4	ULS/2	ULS/-2
32 / MAX	47.62	2.37	6.32
Node	13	13	13
Case	ULS/2	ULS/4	ULS/-3
32 / MIN	0.0	-8.68	-13.39
Node	13	18	18
Case	4	ULS/2	ULS/-2
33 / MAX	32.99	1.09	12.35
Node	2	2	2

Bar	FX (kN)	FZ (kN)	MY (kNm)
Case	ULS/2	1	ULS/-2
33 / MIN	0.0	-9.71	-10.28
Node	2	7	7
Case	4	ULS/2	ULS/-2
34 / MAX	38.60	0.03	3.99
Node	7	7	7
Case	ULS/2	2	ULS/-2
34 / MIN	0.0	-10.78	-7.59
Node	7	12	12
Case	4	ULS/2	ULS/-2
35 / MAX	44.38	3.32	2.63
Node	12	12	12
Case	ULS/2	ULS/4	ULS/-3
35 / MIN	0.0	-6.03	-6.72
Node	12	17	17
Case	4	ULS/2	ULS/-2

Stresses - Global extremes

	S max (MPa)	S min (MPa)	S max (My) (MPa)	S min (My) (MPa)	Fx/Ax (MPa)
MAX	34.25	5.71	31.10	0.0	7.10
Bar	21	9	21	1	9
Node	18	11	18	1	11
Case	ULS/2	ULS/2	ULS/2	4	ULS/2
MIN	-1.29	-28.48	0.0	-31.10	-1.33
Bar	5	2	1	21	5
Node	7	2	1	18	6
Case	3	ULS/2	4	ULS/2	3

Members - Definition

Member	Name	Components	Code group	Section	Type	Ly (m)	Lz (m)
1	Column_1	1	(N/A)	UC 203x203x71	Column	1.20	1.20
2	Column_2	2	(N/A)	UC 203x203x71	Column	3.65	3.65
3	Column_3	3	(N/A)	UC 203x203x71	Column	2.70	2.70
5	Column_5	5	(N/A)	UC 203x203x71	Column	3.60	3.60
6	Column_6	6	(N/A)	UC 203x203x71	Column	3.65	3.65
7	Column_7	7	(N/A)	UC 203x203x71	Column	2.70	2.70
8	Column_8	8	(N/A)	UC 203x203x71	Column	3.00	3.00
9	Column_9	9	(N/A)	UC 203x203x71	Column	3.60	3.60
12	Column_12	12	(N/A)	UC 203x203x71	Column	3.00	3.00
13	Column_13	13	(N/A)	UC 203x203x71	Column	1.20	1.20
15	Column_15	15	(N/A)	UC 203x203x71	Column	2.70	2.70
16	Column_16	16	(N/A)	UC 203x203x71	Column	3.00	3.00
17	Column_17	17	(N/A)	UC 203x203x71	Column	3.00	3.00
18	Column_18	18	(N/A)	UC 203x203x71	Column	3.65	3.65
19	Column_19	19	(N/A)	UC 203x203x71	Column	2.70	2.70
21	Column_21	21	(N/A)	UC 203x203x71	Column	3.65	3.65
22	Beam_22	22	(N/A)	UC 203x203x46	Beam	3.55	3.55
23	Beam_23	23	(N/A)	UC 203x203x46	Beam	1.20	1.20
24	Beam_24	24	(N/A)	UC 203x203x46	Beam	4.00	4.00
27	Beam_27	27	(N/A)	UC 203x203x46	Beam	3.55	3.55
28	Beam_28	28	(N/A)	UC 203x203x46	Beam	1.20	1.20
29	Beam_29	29	(N/A)	UC 203x203x46	Beam	4.00	4.00
30	Beam_30	30	(N/A)	UC 203x203x71	Beam	3.55	3.55
31	Beam_31	31	(N/A)	UC 203x203x71	Beam	1.20	1.20
32	Beam_32	32	(N/A)	UC 203x203x71	Beam	4.00	4.00
33	Beam_33	33	(N/A)	UC 203x203x71	Beam	3.55	3.55
34	Beam_34	34	(N/A)	UC 203x203x71	Beam	1.20	1.20
35	Beam_35	35	(N/A)	UC 203x203x71	Beam	4.00	4.00

Member Verification

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 1 Column_1 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 18.28 kN	My,Ed = -10.91 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = -10.91 kN*m	
Nb,Rd = 2966.89 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = 1.39 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About y axis:

About z axis:

Ly = 1.20 m	Lam_y = 0.17	Lz = 1.20 m	Lam_z = 0.30
Lcr,y = 1.20 m	Xy = 1.00	Lcr,z = 1.20 m	Xz = 0.95
Lamy = 13.07	kyy = 0.97	Lamz = 22.65	kzy = 0.50

VERIFICATION FORMULAS:

Section strength check:
N,Ed/Nc,Rd = 0.01 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.04 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.00 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 13.07 < Lambda,max = 210.00 Lambda,z = 22.65 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.04 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.03 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0 mm < vx max = L/300.00 = 4 mm Verified
Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00
vy = 0 mm < vy max = L/300.00 = 4 mm Verified
Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 2 Column_2 **POINT:** 3 **COORDINATE:** x = 1.00 L = 3.65 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 19.06 kN	My,Ed = 21.60 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = 21.60 kN*m	
Nb,Rd = 1871.32 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = 34.37 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:


About y axis:


About z axis:

Ly = 3.65 m	Lam_y = 0.52	Lz = 3.65 m	Lam_z = 0.90
Lcr,y = 3.65 m	Xy = 0.88	Lcr,z = 3.65 m	Xz = 0.60
Lamy = 39.76	kyy = 0.90	Lamz = 68.90	kzy = 0.47

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.01 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.08 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.07 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 39.76 < Lambda,max = 210.00 Lambda,z = 68.90 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.08 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.05 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS


Deflections *Not analyzed*


Displacements
vx = 2 mm < vx max = L/300.00 = 12 mm Verified
Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

vy = 0 mm < vy max = L/300.00 = 12 mm Verified

Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 3 Column_3 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 12.01 kN	My,Ed = -14.65 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = -14.65 kN*m	
Nb,Rd = 2326.31 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = 21.98 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:


About y axis:


About z axis:

Ly = 2.70 m	Lam_y = 0.38	Lz = 2.70 m	Lam_z = 0.67
Lcr,y = 2.70 m	Xy = 0.93	Lcr,z = 2.70 m	Xz = 0.75
Lamy = 29.41	kyy = 0.88	Lamz = 50.97	kzy = 0.46

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.00 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.05 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.05 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 29.41 < Lambda,max = 210.00 Lambda,z = 50.97 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.05 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.03 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS


Deflections *Not analyzed*


Displacements
vx = 1 mm < vx max = L/300.00 = 9 mm Verified
Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

vy = 0 mm < vy max = L/300.00 = 9 mm Verified

Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 5 Column_5 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

---

LOADS:
Governing Load Case: 5 ULS /4/ 1*1.35 + 2*1.35

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 34.59 kN	My,Ed = -1.40 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = 1.46 kN*m	
Nb,Rd = 1895.00 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = 0.80 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About y axis:

About z axis:

Ly = 3.60 m	Lam_y = 0.51	Lz = 3.60 m	Lam_z = 0.89
Lcr,y = 3.60 m	Xy = 0.88	Lcr,z = 3.60 m	Xz = 0.61
Lamy = 39.22	kyy = 0.59	Lamz = 67.96	kzy = 0.31

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.01 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.01 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.00 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 39.22 < Lambda,max = 210.00 Lambda,z = 67.96 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.02 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.02 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0 mm < vx max = L/300.00 = 12 mm Verified
Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

vy = 0 mm < vy max = L/300.00 = 12 mm Verified

Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 6 Column_6 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 8.60 kN	My,Ed = -12.85 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = -12.85 kN*m	
Nb,Rd = 1871.32 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = 6.63 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:


About y axis:


About z axis:

Ly = 3.65 m	Lam_y = 0.52	Lz = 3.65 m	Lam_z = 0.90
Lcr,y = 3.65 m	Xy = 0.88	Lcr,z = 3.65 m	Xz = 0.60
Lamy = 39.76	kyy = 0.60	Lamz = 68.90	kzy = 0.31

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.00 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.05 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.01 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 39.76 < Lambda,max = 210.00 Lambda,z = 68.90 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.03 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.02 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS


Deflections *Not analyzed*


Displacements
vx = 2 mm < vx max = L/300.00 = 12 mm Verified
Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

vy = 0 mm < vy max = L/300.00 = 12 mm Verified

Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 7 Column_7 **POINT:** 3 **COORDINATE:** x = 1.00 L = 2.70 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 5.41 kN	My,Ed = 7.03 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = 7.03 kN*m	
Nb,Rd = 2326.31 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = 4.98 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About y axis:

About z axis:

Ly = 2.70 m	Lam_y = 0.38	Lz = 2.70 m	Lam_z = 0.67
Lcr,y = 2.70 m	Xy = 0.93	Lcr,z = 2.70 m	Xz = 0.75
Lamy = 29.41	kyy = 0.60	Lamz = 50.97	kzy = 0.31

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.00 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.03 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.01 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 29.41 < Lambda,max = 210.00 Lambda,z = 50.97 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.02 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.01 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 1 mm < vx max = L/300.00 = 9 mm Verified
Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

vy = 0 mm < vy max = L/300.00 = 9 mm Verified

Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 8 Column_8 **POINT:** 3 **COORDINATE:** x = 1.00 L = 3.00 m

---

LOADS:
Governing Load Case: 5 ULS /3/ 1*1.00 + 2*1.00 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 0.56 kN	My,Ed = 3.20 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = 3.20 kN*m	
Nb,Rd = 2183.52 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = 2.00 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About y axis:

About z axis:

Ly = 3.00 m	Lam_y = 0.43	Lz = 3.00 m	Lam_z = 0.74
Lcr,y = 3.00 m	Xy = 0.92	Lcr,z = 3.00 m	Xz = 0.70
Lamy = 32.68	kyy = 0.61	Lamz = 56.63	kzy = 0.32

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.00 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.01 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.00 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 32.68 < Lambda,max = 210.00 Lambda,z = 56.63 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.01 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.00 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 1 mm < vx max = L/300.00 = 10 mm Verified
Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

vy = 0 mm < vy max = L/300.00 = 10 mm Verified

Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 9 Column_9 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 64.17 kN	My,Ed = -0.98 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = -0.98 kN*m	
Nb,Rd = 1895.00 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = 0.03 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About y axis:

About z axis:

Ly = 3.60 m	Lam_y = 0.51	Lz = 3.60 m	Lam_z = 0.89
Lcr,y = 3.60 m	Xy = 0.88	Lcr,z = 3.60 m	Xz = 0.61
Lamy = 39.22	kyy = 0.98	Lamz = 67.96	kzy = 0.51

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.02 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.00 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.00 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 39.22 < Lambda,max = 210.00 Lambda,z = 67.96 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.03 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.04 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0 mm < vx max = L/300.00 = 12 mm Verified
Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

vy = 0 mm < vy max = L/300.00 = 12 mm Verified

Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 12 Column_12 **POINT:** 3 **COORDINATE:** x = 1.00 L = 3.00 m

---

LOADS:
Governing Load Case: 5 ULS /3/ 1*1.00 + 2*1.00 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 2.21 kN	My,Ed = 3.22 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = 3.22 kN*m	
Nb,Rd = 2183.52 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = 1.78 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About y axis:

About z axis:

Ly = 3.00 m	Lam_y = 0.43	Lz = 3.00 m	Lam_z = 0.74
Lcr,y = 3.00 m	Xy = 0.92	Lcr,z = 3.00 m	Xz = 0.70
Lamy = 32.68	kyy = 0.65	Lamz = 56.63	kzy = 0.34

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.00 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.01 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.00 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 32.68 < Lambda,max = 210.00 Lambda,z = 56.63 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.01 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.00 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 1 mm < vx max = L/300.00 = 10 mm Verified
Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

vy = 0 mm < vy max = L/300.00 = 10 mm Verified

Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 13 Column_13 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 43.59 kN	My,Ed = -15.72 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = -15.72 kN*m	
Nb,Rd = 2966.89 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = 23.39 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About y axis:

About z axis:

Ly = 1.20 m	Lam_y = 0.17	Lz = 1.20 m	Lam_z = 0.30
Lcr,y = 1.20 m	Xy = 1.00	Lcr,z = 1.20 m	Xz = 0.95
Lamy = 13.07	kyy = 0.62	Lamz = 22.65	kzy = 0.32

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.01 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.06 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.05 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 13.07 < Lambda,max = 210.00 Lambda,z = 22.65 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.05 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.03 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0 mm < vx max = L/300.00 = 4 mm Verified
Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

vy = 0 mm < vy max = L/300.00 = 4 mm Verified

Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 15 Column_15 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 19.78 kN	My,Ed = 8.57 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = 11.67 kN*m	
Nb,Rd = 2326.31 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = -17.68 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About y axis:

About z axis:

Ly = 2.70 m	Lam_y = 0.38	Lz = 2.70 m	Lam_z = 0.67
Lcr,y = 2.70 m	Xy = 0.93	Lcr,z = 2.70 m	Xz = 0.75
Lamy = 29.41	kyy = 0.94	Lamz = 50.97	kzy = 0.49

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.01 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.03 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.04 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 29.41 < Lambda,max = 210.00 Lambda,z = 50.97 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.05 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.03 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 1 mm < vx max = L/300.00 = 9 mm Verified
Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

vy = 0 mm < vy max = L/300.00 = 9 mm Verified

Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 16 Column_16 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

---

LOADS:
Governing Load Case: 5 ULS /4/ 1*1.35 + 2*1.35

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 9.08 kN	My,Ed = 6.28 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = 6.28 kN*m	
Nb,Rd = 2183.52 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = -14.88 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About y axis:

About z axis:

Ly = 3.00 m	Lam_y = 0.43	Lz = 3.00 m	Lam_z = 0.74
Lcr,y = 3.00 m	Xy = 0.92	Lcr,z = 3.00 m	Xz = 0.70
Lamy = 32.68	kyy = 0.93	Lamz = 56.63	kzy = 0.48

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.00 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.02 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.03 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 32.68 < Lambda,max = 210.00 Lambda,z = 56.63 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.02 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.02 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 1 mm < vx max = L/300.00 = 10 mm Verified
Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

vy = 0 mm < vy max = L/300.00 = 10 mm Verified

Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 17 Column_17 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 7.90 kN	My,Ed = -11.16 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = -11.16 kN*m	
Nb,Rd = 2183.52 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = 23.81 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About y axis:

About z axis:

Ly = 3.00 m	Lam_y = 0.43	Lz = 3.00 m	Lam_z = 0.74
Lcr,y = 3.00 m	Xy = 0.92	Lcr,z = 3.00 m	Xz = 0.70
Lamy = 32.68	kyy = 0.84	Lamz = 56.63	kzy = 0.44

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.00 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.04 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.05 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 32.68 < Lambda,max = 210.00 Lambda,z = 56.63 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.04 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.02 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 1 mm < vx max = L/300.00 = 10 mm Verified
Governing Load Case: 3 LL1

vy = 0 mm < vy max = L/300.00 = 10 mm Verified

Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 18 Column_18 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 45.13 kN	My,Ed = -10.80 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = -10.80 kN*m	
Nb,Rd = 1871.32 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = 5.81 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About y axis:

About z axis:

Ly = 3.65 m	Lam_y = 0.52	Lz = 3.65 m	Lam_z = 0.90
Lcr,y = 3.65 m	Xy = 0.88	Lcr,z = 3.65 m	Xz = 0.60
Lamy = 39.76	kyy = 0.59	Lamz = 68.90	kzy = 0.31

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.01 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.04 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.01 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 39.76 < Lambda,max = 210.00 Lambda,z = 68.90 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.04 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.04 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 2 mm < vx max = L/300.00 = 12 mm Verified
Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

vy = 0 mm < vy max = L/300.00 = 12 mm Verified

Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 19 Column_19 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

---

LOADS:
Governing Load Case: 5 ULS /3/ 1*1.00 + 2*1.00 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 17.94 kN	My,Ed = -6.02 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = -6.02 kN*m	
Nb,Rd = 2326.31 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = 4.37 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About y axis:

About z axis:

Ly = 2.70 m	Lam_y = 0.38	Lz = 2.70 m	Lam_z = 0.67
Lcr,y = 2.70 m	Xy = 0.93	Lcr,z = 2.70 m	Xz = 0.75
Lamy = 29.41	kyy = 0.59	Lamz = 50.97	kzy = 0.31

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.01 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.02 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.01 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 29.41 < Lambda,max = 210.00 Lambda,z = 50.97 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.02 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.01 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 1 mm < vx max = L/300.00 = 9 mm Verified
Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

vy = 0 mm < vy max = L/300.00 = 9 mm Verified

Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 21 Column_21 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 35.31 kN	My,Ed = 5.63 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = 21.96 kN*m	
Nb,Rd = 1871.32 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = -20.99 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About y axis:

About z axis:

Ly = 3.65 m	Lam_y = 0.52	Lz = 3.65 m	Lam_z = 0.90
Lcr,y = 3.65 m	Xy = 0.88	Lcr,z = 3.65 m	Xz = 0.60
Lamy = 39.76	kyy = 0.85	Lamz = 68.90	kzy = 0.44

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.01 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.02 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.04 < 1.00 (6.2.6.(1))
Global stability check of member:
Lambda,y = 39.76 < Lambda,max = 210.00 Lambda,z = 68.90 < Lambda,max = 210.00 STABLE
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.08 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.05 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 2 mm < vx max = L/300.00 = 12 mm Verified
Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

vy = 0 mm < vy max = L/300.00 = 12 mm Verified

Governing Load Case: 1 DL1

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 22 Beam_22 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

---

LOADS:
Governing Load Case: 5 ULS /4/ 1*1.35 + 2*1.35

MATERIAL:
S355 (S355) fy = 355.00 MPa

SECTION PARAMETERS: UC 203x203x46

h=203 mm	gM0=1.00	gM1=1.00	
b=204 mm	Ay=4712 mm2	Az=1694 mm2	Ax=5870 mm2
tw=7 mm	Iy=45680000 mm4	Iz=15480000 mm4	Ix=222000 mm4
tf=11 mm	Wply=497000 mm3	Wplz=231000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 13.25 kN	My,Ed = -3.78 kN*m	
Nc,Rd = 2083.85 kN	My,Ed,max = -3.78 kN*m	
Nb,Rd = 2083.85 kN	My,c,Rd = 176.44 kN*m	Vz,Ed = 3.19 kN
	MN,y,Rd = 176.44 kN*m	Vz,c,Rd = 347.28 kN
	Mb,Rd = 144.53 kN*m	
		Class of section = 2

LATERAL BUCKLING PARAMETERS:

z = 1.00	Mcr = 250.80 kN*m	Curve,LT - b	XLT = 0.80
Lcr,low=3.55 m	Lam_LT = 0.84	fi,LT = 0.84	XLT,mod = 0.82

BUCKLING PARAMETERS:

About y axis: kyy = 1.00

About z axis: kzy = 1.00

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.01 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.02 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.01 < 1.00 (6.2.6.(1))
Global stability check of member:
My,Ed,max/Mb,Rd = 0.03 < 1.00 (6.3.2.1.(1))
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.03 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.03 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections

uy = 0 mm < uy max = L/200.00 = 18 mm	Verified
Governing Load Case: 1 DL1	
uz = 0 mm < uz max = L/200.00 = 18 mm	Verified

Governing Load Case: 2 DL2

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 23 Beam_23 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 355.00 MPa

SECTION PARAMETERS: UC 203x203x46

h=203 mm	gM0=1.00	gM1=1.00	
b=204 mm	Ay=4712 mm2	Az=1694 mm2	Ax=5870 mm2
tw=7 mm	Iy=45680000 mm4	Iz=15480000 mm4	Ix=222000 mm4
tf=11 mm	Wply=497000 mm3	Wplz=231000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 16.02 kN	My,Ed = 1.02 kN*m	
Nc,Rd = 2083.85 kN	My,Ed,max = 1.02 kN*m	
Nb,Rd = 2083.85 kN	My,c,Rd = 176.44 kN*m	Vz,Ed = -0.95 kN
	MN,y,Rd = 176.44 kN*m	Vz,c,Rd = 347.28 kN
	Mb,Rd = 176.44 kN*m	
		Class of section = 2


LATERAL BUCKLING PARAMETERS:

z = 1.00	Mcr = 1573.22 kN*m	Curve,LT - b	XLT = 1.00
Lcr,upp=1.20 m	Lam_LT = 0.33	fi,LT = 0.53	XLT,mod = 1.00

BUCKLING PARAMETERS:


About y axis: kyy = 1.00


About z axis: kzy = 1.00

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.01 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.01 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.00 < 1.00 (6.2.6.(1))
Global stability check of member:
My,Ed,max/Mb,Rd = 0.01 < 1.00 (6.3.2.1.(1))
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.01 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.01 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS


Deflections

uy = 0 mm < uy max = L/200.00 = 6 mm	Verified
Governing Load Case: 1 DL1	
uz = 0 mm < uz max = L/200.00 = 6 mm	Verified

Governing Load Case: 2 DL2

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 24 Beam_24 **POINT:** 3 **COORDINATE:** x = 1.00 L = 4.00 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 355.00 MPa

SECTION PARAMETERS: UC 203x203x46

h=203 mm	gM0=1.00	gM1=1.00	
b=204 mm	Ay=4712 mm2	Az=1694 mm2	Ax=5870 mm2
tw=7 mm	Iy=45680000 mm4	Iz=15480000 mm4	Ix=222000 mm4
tf=11 mm	Wply=497000 mm3	Wplz=231000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 14.31 kN	My,Ed = -6.49 kN*m	
Nc,Rd = 2083.85 kN	My,Ed,max = -6.49 kN*m	
Nb,Rd = 2083.85 kN	My,c,Rd = 176.44 kN*m	Vz,Ed = -4.60 kN
	MN,y,Rd = 176.44 kN*m	Vz,c,Rd = 347.28 kN
	Mb,Rd = 136.81 kN*m	
		Class of section = 2

LATERAL BUCKLING PARAMETERS:

z = 1.00	Mcr = 212.60 kN*m	Curve,LT - b	XLT = 0.75
Lcr,low=4.00 m	Lam_LT = 0.91	fi,LT = 0.90	XLT,mod = 0.78

BUCKLING PARAMETERS:

About y axis: kyy = 1.00

About z axis: kzy = 1.00

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.01 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.04 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.01 < 1.00 (6.2.6.(1))
Global stability check of member:
My,Ed,max/Mb,Rd = 0.05 < 1.00 (6.3.2.1.(1))
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.05 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.05 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections

uy = 0 mm < uy max = L/200.00 = 20 mm	Verified
Governing Load Case: 1 DL1	
uz = 0 mm < uz max = L/200.00 = 20 mm	Verified

Governing Load Case: 2 DL2

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 27 Beam_27 **POINT:** 3 **COORDINATE:** x = 1.00 L = 3.55 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 355.00 MPa

SECTION PARAMETERS: UC 203x203x46

h=203 mm	gM0=1.00	gM1=1.00	
b=204 mm	Ay=4712 mm2	Az=1694 mm2	Ax=5870 mm2
tw=7 mm	Iy=45680000 mm4	Iz=15480000 mm4	Ix=222000 mm4
tf=11 mm	Wply=497000 mm3	Wplz=231000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 39.50 kN	My,Ed = -6.13 kN*m	
Nc,Rd = 2083.85 kN	My,Ed,max = -6.13 kN*m	
Nb,Rd = 2083.85 kN	My,c,Rd = 176.44 kN*m	Vz,Ed = -5.30 kN
	MN,y,Rd = 176.44 kN*m	Vz,c,Rd = 347.28 kN
	Mb,Rd = 144.53 kN*m	
		Class of section = 2

LATERAL BUCKLING PARAMETERS:

z = 1.00	Mcr = 250.80 kN*m	Curve,LT - b	XLT = 0.80
Lcr,low=3.55 m	Lam_LT = 0.84	fi,LT = 0.84	XLT,mod = 0.82

BUCKLING PARAMETERS:

About y axis: kyy = 1.00

About z axis: kzy = 1.00

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.02 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.03 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.02 < 1.00 (6.2.6.(1))
Global stability check of member:
My,Ed,max/Mb,Rd = 0.04 < 1.00 (6.3.2.1.(1))
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.06 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.06 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections

uy = 0 mm < uy max = L/200.00 = 18 mm	Verified
Governing Load Case: 1 DL1	
uz = 0 mm < uz max = L/200.00 = 18 mm	Verified

Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 28 Beam_28 **POINT:** 3 **COORDINATE:** x = 1.00 L = 1.20 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 355.00 MPa

SECTION PARAMETERS: UC 203x203x46

h=203 mm	gM0=1.00	gM1=1.00	
b=204 mm	Ay=4712 mm2	Az=1694 mm2	Ax=5870 mm2
tw=7 mm	Iy=45680000 mm4	Iz=15480000 mm4	Ix=222000 mm4
tf=11 mm	Wply=497000 mm3	Wplz=231000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 36.54 kN	My,Ed = -5.07 kN*m	
Nc,Rd = 2083.85 kN	My,Ed,max = -5.07 kN*m	
Nb,Rd = 2083.85 kN	My,c,Rd = 176.44 kN*m	Vz,Ed = -8.11 kN
	MN,y,Rd = 176.44 kN*m	Vz,c,Rd = 347.28 kN
	Mb,Rd = 176.44 kN*m	
		Class of section = 2

LATERAL BUCKLING PARAMETERS:

z = 1.00	Mcr = 1573.22 kN*m	Curve,LT - b	XLT = 1.00
Lcr,low=1.20 m	Lam_LT = 0.33	fi,LT = 0.53	XLT,mod = 1.00

BUCKLING PARAMETERS:

About y axis: kyy = 1.00

About z axis: kzy = 1.00

VERIFICATION FORMULAS:

Section strength check:
N,Ed/Nc,Rd = 0.02 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.03 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.02 < 1.00 (6.2.6.(1))
Global stability check of member:
My,Ed,max/Mb,Rd = 0.03 < 1.00 (6.3.2.1.(1))
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.05 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.05 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections

uy = 0 mm < uy max = L/200.00 = 6 mm	Verified
Governing Load Case: 1 DL1	
uz = 0 mm < uz max = L/200.00 = 6 mm	Verified

Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 29 Beam_29 **POINT:** 3 **COORDINATE:** x = 1.00 L = 4.00 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 355.00 MPa

SECTION PARAMETERS: UC 203x203x46

h=203 mm	gM0=1.00	gM1=1.00	
b=204 mm	Ay=4712 mm2	Az=1694 mm2	Ax=5870 mm2
tw=7 mm	Iy=45680000 mm4	Iz=15480000 mm4	Ix=222000 mm4
tf=11 mm	Wply=497000 mm3	Wplz=231000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 34.02 kN	My,Ed = -5.59 kN*m	
Nc,Rd = 2083.85 kN	My,Ed,max = -5.59 kN*m	
Nb,Rd = 2083.85 kN	My,c,Rd = 176.44 kN*m	Vz,Ed = -4.46 kN
	MN,y,Rd = 176.44 kN*m	Vz,c,Rd = 347.28 kN
	Mb,Rd = 136.81 kN*m	
		Class of section = 2

LATERAL BUCKLING PARAMETERS:

z = 1.00	Mcr = 212.60 kN*m	Curve,LT - b	XLT = 0.75
Lcr,low=4.00 m	Lam_LT = 0.91	fi,LT = 0.90	XLT,mod = 0.78

BUCKLING PARAMETERS:

About y axis: kyy = 1.00

About z axis: kzy = 1.00

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.02 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.03 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.01 < 1.00 (6.2.6.(1))
Global stability check of member:
My,Ed,max/Mb,Rd = 0.04 < 1.00 (6.3.2.1.(1))
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.06 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.06 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections

uy = 0 mm < uy max = L/200.00 = 20 mm	Verified
Governing Load Case: 1 DL1	
uz = 0 mm < uz max = L/200.00 = 20 mm	Verified

Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 30 Beam_30 **POINT:** 3 **COORDINATE:** x = 1.00 L = 3.55 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 50.84 kN	My,Ed = -8.06 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = -8.06 kN*m	
Nb,Rd = 3118.80 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = -6.48 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
	Mb,Rd = 244.72 kN*m	
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

z = 1.00	Mcr = 540.16 kN*m	Curve,LT - b	XLT = 0.86
Lcr,low=3.55 m	Lam_LT = 0.71	fi,LT = 0.74	XLT,mod = 0.89

BUCKLING PARAMETERS:

About y axis: kyy = 1.00

About z axis: kzy = 1.00

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.02 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.03 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.01 < 1.00 (6.2.6.(1))
Global stability check of member:
My,Ed,max/Mb,Rd = 0.03 < 1.00 (6.3.2.1.(1))
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.05 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.05 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections

uy = 0 mm < uy max = L/200.00 = 18 mm	Verified
Governing Load Case: 1 DL1	
uz = 0 mm < uz max = L/200.00 = 18 mm	Verified

Governing Load Case: 3 LL1

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 31 Beam_31 **POINT:** 3 **COORDINATE:** x = 1.00 L = 1.20 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 49.20 kN	My,Ed = -9.93 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = -9.93 kN*m	
Nb,Rd = 3118.80 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = -17.48 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
	Mb,Rd = 275.65 kN*m	
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

z = 1.00	Mcr = 2789.51 kN*m	Curve,LT - b	XLT = 1.00
Lcr,low=1.20 m	Lam_LT = 0.31	fi,LT = 0.52	XLT,mod = 1.00

BUCKLING PARAMETERS:

About y axis: kyy = 1.00

About z axis: kzy = 1.00

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.02 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.04 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.04 < 1.00 (6.2.6.(1))
Global stability check of member:
My,Ed,max/Mb,Rd = 0.04 < 1.00 (6.3.2.1.(1))
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.05 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.05 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections
uy = 0 mm < uy max = L/200.00 = 6 mm Verified
Governing Load Case: 1 DL1
uz = 0 mm < uz max = L/200.00 = 6 mm Verified

Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 32 Beam_32 **POINT:** 3 **COORDINATE:** x = 1.00 L = 4.00 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 47.62 kN	My,Ed = -13.39 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = -13.39 kN*m	
Nb,Rd = 3118.80 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = -8.68 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
	Mb,Rd = 237.13 kN*m	
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

z = 1.00	Mcr = 469.26 kN*m	Curve,LT - b	XLT = 0.84
Lcr,low=4.00 m	Lam_LT = 0.77	fi,LT = 0.78	XLT,mod = 0.86

BUCKLING PARAMETERS:

About y axis: kyy = 1.00

About z axis: kzy = 1.00

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.02 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.05 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.02 < 1.00 (6.2.6.(1))
Global stability check of member:
My,Ed,max/Mb,Rd = 0.06 < 1.00 (6.3.2.1.(1))
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.07 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.07 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections
uy = 0 mm < uy max = L/200.00 = 20 mm Verified
Governing Load Case: 1 DL1
uz = 0 mm < uz max = L/200.00 = 20 mm Verified

Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 33 Beam_33 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 32.99 kN	My,Ed = 12.35 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = 12.35 kN*m	
Nb,Rd = 3118.80 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = -3.04 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
	Mb,Rd = 244.72 kN*m	
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

z = 1.00	Mcr = 540.16 kN*m	Curve,LT - b	XLT = 0.86
Lcr,upp=3.55 m	Lam_LT = 0.71	fi,LT = 0.74	XLT,mod = 0.89

BUCKLING PARAMETERS:

About y axis: kyy = 1.00

About z axis: kzy = 1.00

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.01 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.04 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.01 < 1.00 (6.2.6.(1))
Global stability check of member:
My,Ed,max/Mb,Rd = 0.05 < 1.00 (6.3.2.1.(1))
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.06 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.06 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections

uy = 0 mm < uy max = L/200.00 = 18 mm	Verified
Governing Load Case: 1 DL1	
uz = 0 mm < uz max = L/200.00 = 18 mm	Verified

Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 34 Beam_34 **POINT:** 3 **COORDINATE:** x = 1.00 L = 1.20 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 38.60 kN	My,Ed = -7.59 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = -7.59 kN*m	
Nb,Rd = 3118.80 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = -10.78 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
	Mb,Rd = 275.65 kN*m	
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

z = 1.00	Mcr = 2789.51 kN*m	Curve,LT - b	XLT = 1.00
Lcr,low=1.20 m	Lam_LT = 0.31	fi,LT = 0.52	XLT,mod = 1.00

BUCKLING PARAMETERS:

About y axis: kyy = 1.00

About z axis: kzy = 1.00

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.01 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.03 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.02 < 1.00 (6.2.6.(1))
Global stability check of member:
My,Ed,max/Mb,Rd = 0.03 < 1.00 (6.3.2.1.(1))
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.04 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.04 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections

uy = 0 mm < uy max = L/200.00 = 6 mm	Verified
Governing Load Case: 1 DL1	
uz = 0 mm < uz max = L/200.00 = 6 mm	Verified

Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *BS-EN 1993-1:2005/NA:2008/AC:2009, Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 35 Beam_35 **POINT:** 3 **COORDINATE:** x = 1.00 L = 4.00 m

---

LOADS:
Governing Load Case: 5 ULS /2/ 1*1.35 + 2*1.35 + 3*1.50

MATERIAL:
S355 (S355) fy = 345.00 MPa

SECTION PARAMETERS: UC 203x203x71

h=216 mm	gM0=1.00	gM1=1.00	
b=206 mm	Ay=7432 mm2	Az=2424 mm2	Ax=9040 mm2
tw=10 mm	Iy=76180000 mm4	Iz=25370000 mm4	Ix=802000 mm4
tf=17 mm	Wply=799000 mm3	Wplz=374000 mm3	

INTERNAL FORCES AND CAPACITIES:

N,Ed = 44.38 kN	My,Ed = -6.72 kN*m	
Nc,Rd = 3118.80 kN	My,Ed,max = -6.72 kN*m	
Nb,Rd = 3118.80 kN	My,c,Rd = 275.65 kN*m	Vz,Ed = -6.03 kN
	MN,y,Rd = 275.65 kN*m	Vz,c,Rd = 482.92 kN
	Mb,Rd = 237.13 kN*m	
		Class of section = 1

LATERAL BUCKLING PARAMETERS:

z = 1.00	Mcr = 469.26 kN*m	Curve,LT - b	XLT = 0.84
Lcr,low=4.00 m	Lam_LT = 0.77	fi,LT = 0.78	XLT,mod = 0.86

BUCKLING PARAMETERS:

About y axis: kyy = 1.00

About z axis: kzy = 1.00

VERIFICATION FORMULAS:
Section strength check:
N,Ed/Nc,Rd = 0.01 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd = 0.02 < 1.00 (6.2.5.(1))
Vz,Ed/Vz,c,Rd = 0.01 < 1.00 (6.2.6.(1))
Global stability check of member:
My,Ed,max/Mb,Rd = 0.03 < 1.00 (6.3.2.1.(1))
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed,max/(XLT*My,Rk/gM1) = 0.04 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed,max/(XLT*My,Rk/gM1) = 0.04 < 1.00 (6.3.3.(4))

LIMIT DISPLACEMENTS

Deflections

uy = 0 mm < uy max = L/200.00 = 20 mm	Verified
Governing Load Case: 1 DL1	
uz = 0 mm < uz max = L/200.00 = 20 mm	Verified

Governing Load Case: 8 SLS /2/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

Member Group Design

Connection Verification