

Design Calculation for Secondary Steel System Supporting Refrigeration System at Cold Box Ski Slope Building

Doc. No. 1NHDA15-RUDN-08-CCC-ST-DEC-00226

Comments (by consultant)	Response (By Orientals)	Code
Calculations are based on 3 generic cases. Contractor to ensure that neither the pipe weights on page 7 nor the beam spans on page 15 for the 3 generic cases are exceeded anywhere within the building layout.	Implemented a diversified approach comprising 11 different system types, ensuring comprehensive resolution of the issue.	
Design shall be checked & certified by an independent third party as per IFC general notes approval is subject to comply with all the comments & to resubmit with third party designer approval prior to execution of further works.	Noted.	
add coordinated drawings showing the cross sections & all scenarios (maximum length, slopes) to ensure the member arrangement is coordinated & clash free.	Coordinated drawings have been submitted, including cross sections and all possible cases (maximum lengths and slopes), to confirm that the member arrangement is accurate, well-coordinated, and free of any clashes.	
attach coordinated load details to ensure the loads are coordinated, also please check the lateral loads if any to be considered for framing design	Noted. Load details provided and Lateral loads reviewed.	
referring page - 2, consider eccentric load for the member & connection verification	Noted. The connection between the refrigeration ties and the supporting system has been considered to transfer only axial force. Even if the refrigeration load is not symmetric on the two supporting beams, it will not cause any moment.	
verify the framing design & it's connection accordingly, if the beam layout is sloped to match roof slope. also verify the arrangement at expansion joint areas	"Implemented. The framing design and connections have been verified, taking into account the sloped beam layout to match the roof slope. All main beams have been released for axial force.	

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1. Scope

This document covers the engineering design & computation of proposed Steel Structure for Secondary Steel Supporting Refrigeration System for Cold Box Area for Ski Building.

2. Normative References

S/N	Reference	Reference Title
1	AISC 360-16 – LRFD	Minimum Design Loads for Buildings and Other Structures
2	SBC-03 – 2018	Saudi Building Code
3	COLD BOX SERVICES PACKAGE	1NHDA15-CCC-SD-600-SM-SHD-80077-A To 1NHDA15-CCC-SD-600-SM-SHD-80084-A

3. Analysis Software

S/N	Software	Scope	Version
1	CSI SAP2000	Structural Analysis	Vr.21

4. Steel Material Properties

- i) All structural steel sections & plates shall confirm Steel grade S355 Or Equivalent.
- ii) Bolts of primary connections are of grade 8.8 Or Equivalent and shall be galvanized unless noted otherwise.
- iii) All connections are bearing type connection unless noted otherwise.

5. Constructability

Consideration is given to ease and economic construction when choosing structural systems, elements and materials.

6. Design Criteria

6.1 Applied Loads

6.1.1 Dead Loads (DL)

Description	Value
Steel Self Weight	Calculated by Prog. +15% for connections
Utilities Load (Pipes Load)	2.50 Kn/m ⁻ 2.75 Kn/m ⁻ 3.50 Kn/m ⁻ 2.00 Kn/m ⁻

References:

1NHDA15-CCC-SD-600-SM-SHD-80077-A
to
1NHDA15-CCC-SD-600-SM-SHD-80084-A

6.1.2 Temperature Loads (T)

Description	Value
Temperature Load	-30 °C / +30 °C

6.2 Load Combinations

CHAPTER 2 —COMBINATIONS OF LOADS

2.1 —General

2.1.1 Buildings and other structures shall be designed using the provisions of either Section 2.3 or 2.4. Where elements of a structure are designed by a particular material standard or specification, they shall be designed exclusively by either Section 2.3 or 2.4.

2.2 —Symbols

A_k	Load or load effect arising from extraordinary event A
D	Dead load
E	Earthquake load
F	Load due to fluids with well-defined pressures and maximum heights
F_a	Flood load
H	Load due to lateral earth pressure, ground water pressure, or pressure of bulk materials
L	greater than 1 kN/m ² and floor live load
L_r	Roof live load of 1 kN/m ² or less
R	Rain load
T	Self-straining load
W	Wind load

Self-straining forces can be caused by differential settlement of foundations, creep in concrete members, shrinkage in members after placement, expansion of shrinkage-compensating concrete, and changes in temperature of members during the service life of the structure. In some cases, these forces may be a significant design consideration. In concrete or masonry structures, the reduction in stiffness that occurs upon cracking may relieve these self-straining forces, and the assessment of loads should consider this reduced stiffness. Some permanent loads, such as landscaping loads on plaza areas, may be more appropriately considered as live loads for purposes of design.

2.3 —Combining factored loads using strength design

2.3.1 Applicability. The load combinations and load factors given in Section 2.3.2 shall be used only in those cases in which they are specifically

authorized by the applicable material design standard.

2.3.2 Basic Combinations. Structures, components, and foundations shall be designed so that their design strength equals or exceeds the effects of the factored loads in the following combinations:

$1.4D$	1
$1.4D + 1.7L + 0.5(L_r \text{ or } R)$	2*
$1.2D + 1.6(L_r \text{ or } R) + (L \text{ or } 0.5W)$	3
$1.2D + 1.0W + L + 0.5(L_r \text{ or } R)$	4 (2-1)
$1.2D + 1.0E + L$	5
$0.9D + 1.0W$	6
$0.9D + 1.0E$	7

Further load combinations involving seismic loads are described in Sections 12.4.2.3 and 12.14.

Exception:

1. In Combination 2* of Equation (2-1), the load factor on D and L may be reduced to 1.2D and 1.6L respectively, when special inspection professional is employed and approved by the Building Official.
2. The load factor on L in combinations 3, 4, and 5 of Equation (2-1) is permitted to equal 0.5 for all occupancies in which L_o in Table 4-1 is less than or equal to 5 kN/m², with the exception of garages or areas occupied as places of public assembly.

2.3.2.1 Where fluid loads F are present, they shall be included with the same load factor as dead load D in combinations 1 through 5 and 7.

2.3.2.2 Where loads H are present, they shall be included as follows:

1. where the effect of H adds to the primary variable load effect, include H with a load factor of 1.6;
2. where the effect of H resists the primary variable load effect, include H with a load

CHAPTER 2-COMBINATIONS OF LOADS

factor of 0.9 where the load is permanent or a load factor of 0 for all other conditions.

2.3.2.3 Effects of one or more loads not acting shall be investigated. The most unfavorable effects from both wind and earthquake loads E (note on E : The same E from Section 12.4 is used for both Sections 2.3.2 and 2.4.1. Refer to CHAPTER 11 Commentary for the Seismic Provisions.) shall be investigated, where appropriate, but they need not be considered to act simultaneously.

2.3.2.4 Each relevant strength limit state shall be investigated.

2.3.3 Load Combinations Including Flood Load. When a structure is located in a flood zone (Section 5.3.1), the following load combinations shall be considered in addition to the basic combinations in Section 2.3.2:

1. In V-Zones or Coastal A-Zones, $1.0W$ in combinations 4 and 6 shall be replaced by $1.0W + 2.0Fa$.
2. In non-coastal A-Zones, $1.0W$ in combinations 4 and 6 shall be replaced by $0.5W + 1.0Fa$.

2.3.4 Load Combinations Including Atmospheric Ice Loads (Not applicable to KSA)

2.3.5 Load Combinations Including Self-Straining Loads.

2.3.5.1 Where applicable, the structural effects of load T shall be considered in combination with other loads. The load factor on load T shall be established considering the uncertainty associated with the likely magnitude of the load, the probability that the maximum effect of T will occur simultaneously with other applied loadings, and the potential adverse consequences if the effect of T is greater than assumed.

2.3.5.2 The load factor on T shall not have a value less than 1.0.

2.3.5.3 When checking the capacity of a structure or structural element to withstand the effects of self-straining loads, the following load combinations should be considered, when using strength design:

$$\begin{array}{l|l} 1.2D + 1.2T + 0.5L & a \\ 1.2D + 1.6L + 1.0T & b \end{array} \quad (2-2)$$

2.3.6 Load Combinations for Non-specified Loads. Where approved by the Building Official, the Registered Design Professional is permitted to

determine the combined load effect for strength design using a method that is consistent with the method on which the load combination requirements in Section 2.3.2 are based. Such a method must be probability-based and must be accompanied by documentation regarding the analysis and collection of supporting data that is acceptable to the Building Official.

2.4 —Combining nominal loads using allowable stress design

2.4.1 Basic Combinations. Loads listed herein shall be considered to act in the following combinations; whichever produces the most unfavorable effect in the building, foundation, or structural member being considered. Effects of one or more loads not acting shall be considered.

D	1
$D + L$	2
$D + (L_r \text{ or } R)$	3
$D + 0.75L + 0.75(L_r \text{ or } R)$	4
$D + (0.6W \text{ or } 0.7E)$	5
$D + 0.75L + 0.75(0.6W) + 0.75(L_r \text{ or } R)$	6a
$D + 0.75L + 0.75(0.7E)$	6b
$0.6D + 0.6W$	7
$0.6D + 0.7E$	8

(2-3)

Exceptions:

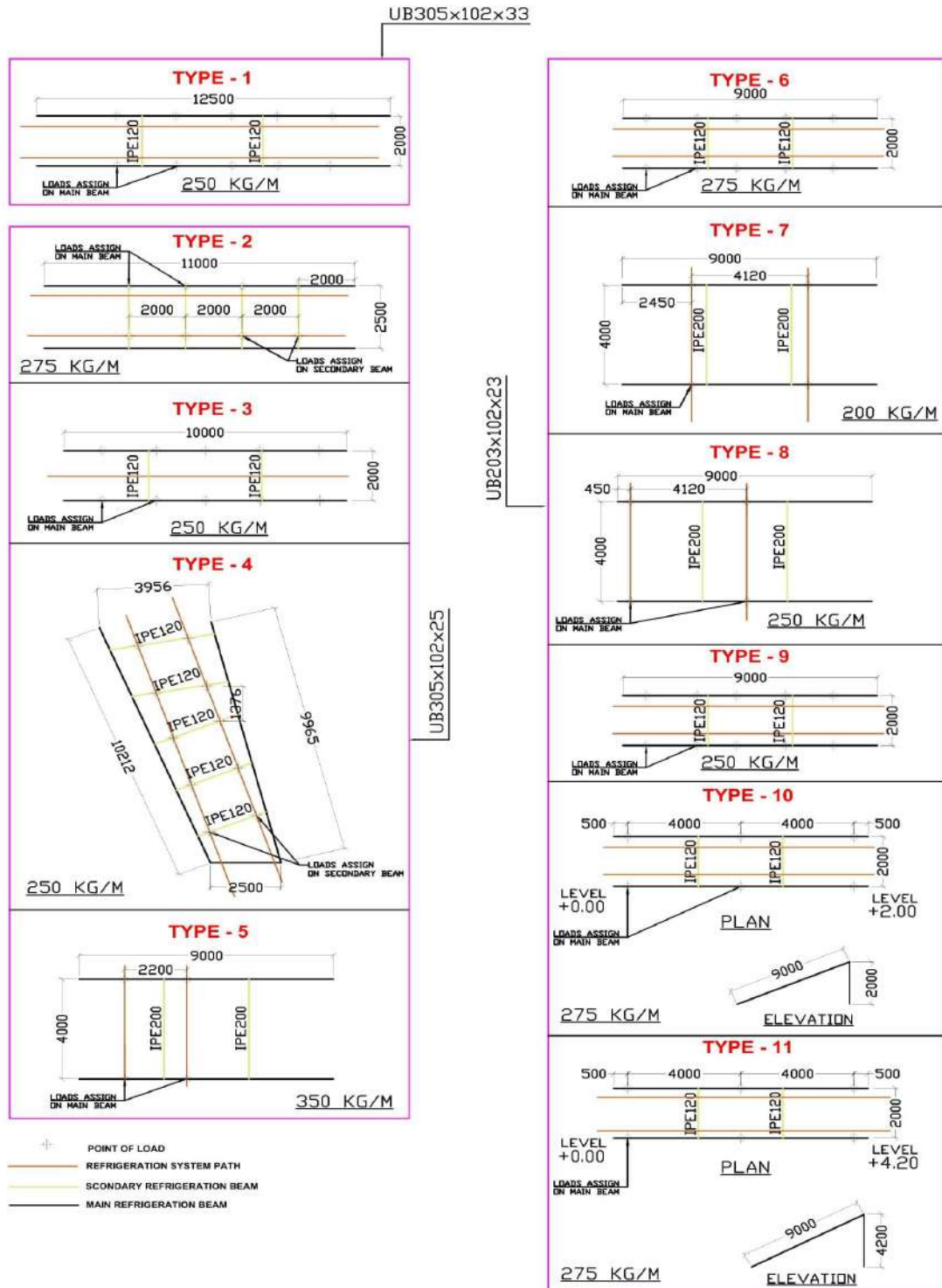
1. For nonbuilding structures, in which the wind load is determined from force coefficients, C_f , identified in Figure 29-2, Figure 29-3 and Figure 29-4 and the projected area contributing wind force to a foundation element exceeds 90 m^2 on either a vertical or a horizontal plane. It shall be permitted to replace W with $0.9W$ in combination 7 for design of the foundation, excluding anchorage of the structure to the foundation.
2. It shall be permitted to replace $0.6D$ with $0.9D$ in combination 8 for the design of Special Reinforced Masonry Shear Walls, where the walls satisfy the requirement of Section 14.5.
3. Where fluid loads F are present, they shall be included in combinations 1 through 6 and 8 with the same factor as that used for dead load D .
4. Where loads H is present, it shall be included as follows:

7. Section Properties

Section Name	Material	Shape	t3	t2	tf	tw	t2b	tfb	Area
Text	Text	Text	m	m	m	m	m	m	m2
IPE120	S355	I/Wide Flange	0.12	0.064	0.0063	0.0044	0.064	0.0063	0.00132
IPE200	S355	I/Wide Flange	0.2	0.1	0.0085	0.0056	0.1	0.0085	0.00285
UB203x102x23	S355	I/Wide Flange	0.2032	0.1018	0.0093	0.0054	0.1018	0.0093	0.00294
UB305x102x25	S355	I/Wide Flange	0.3051	0.1016	0.007	0.0058	0.1016	0.007	0.00316
UB305x102x33	S555	I/Wide Flange	0.3127	0.1024	0.0108	0.0066	0.1024	0.0108	0.00418

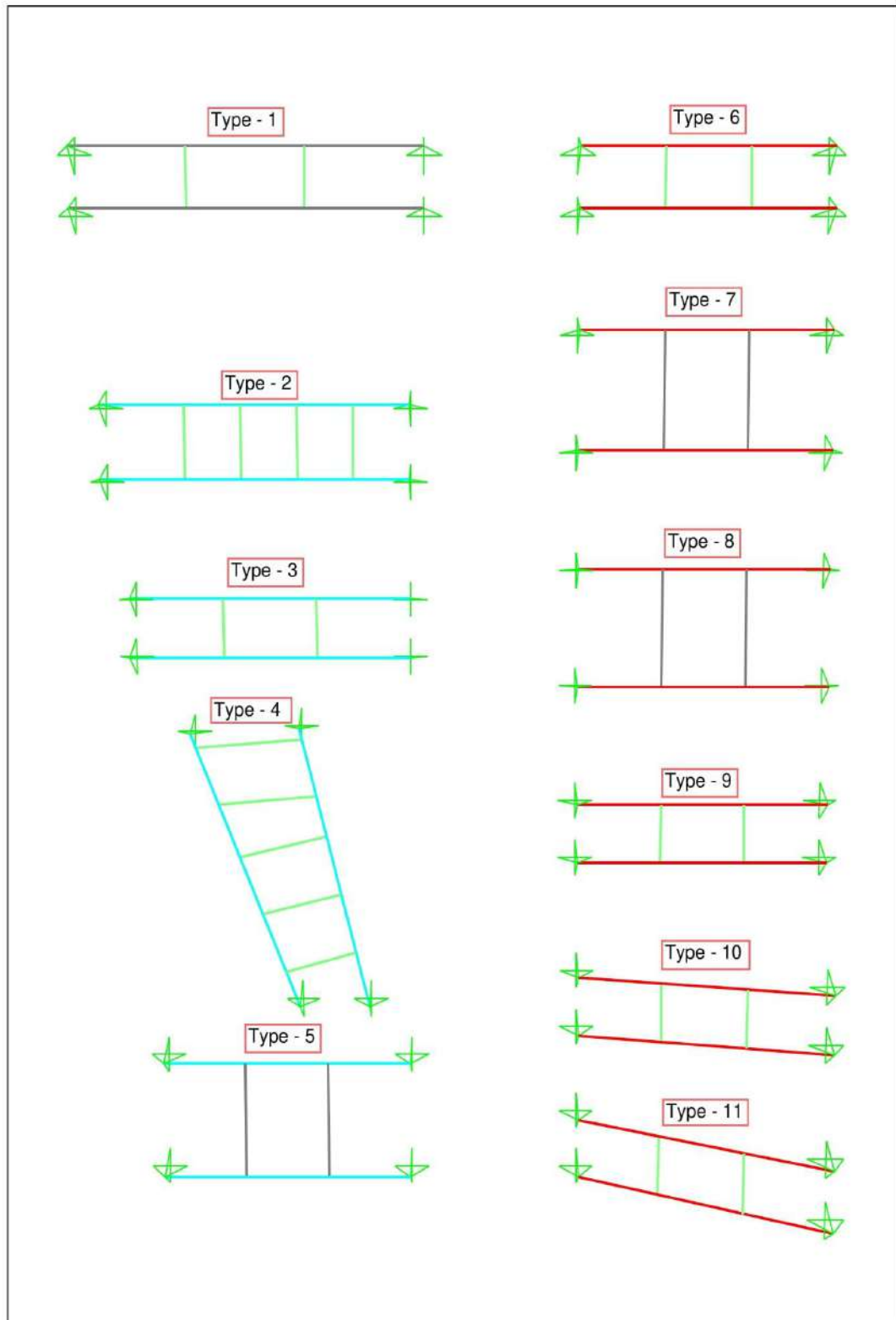
8. SAP Assigns

8.1 System Types



Ski slope 1- cold box - Segement - WALL.sdb

5/6/2025



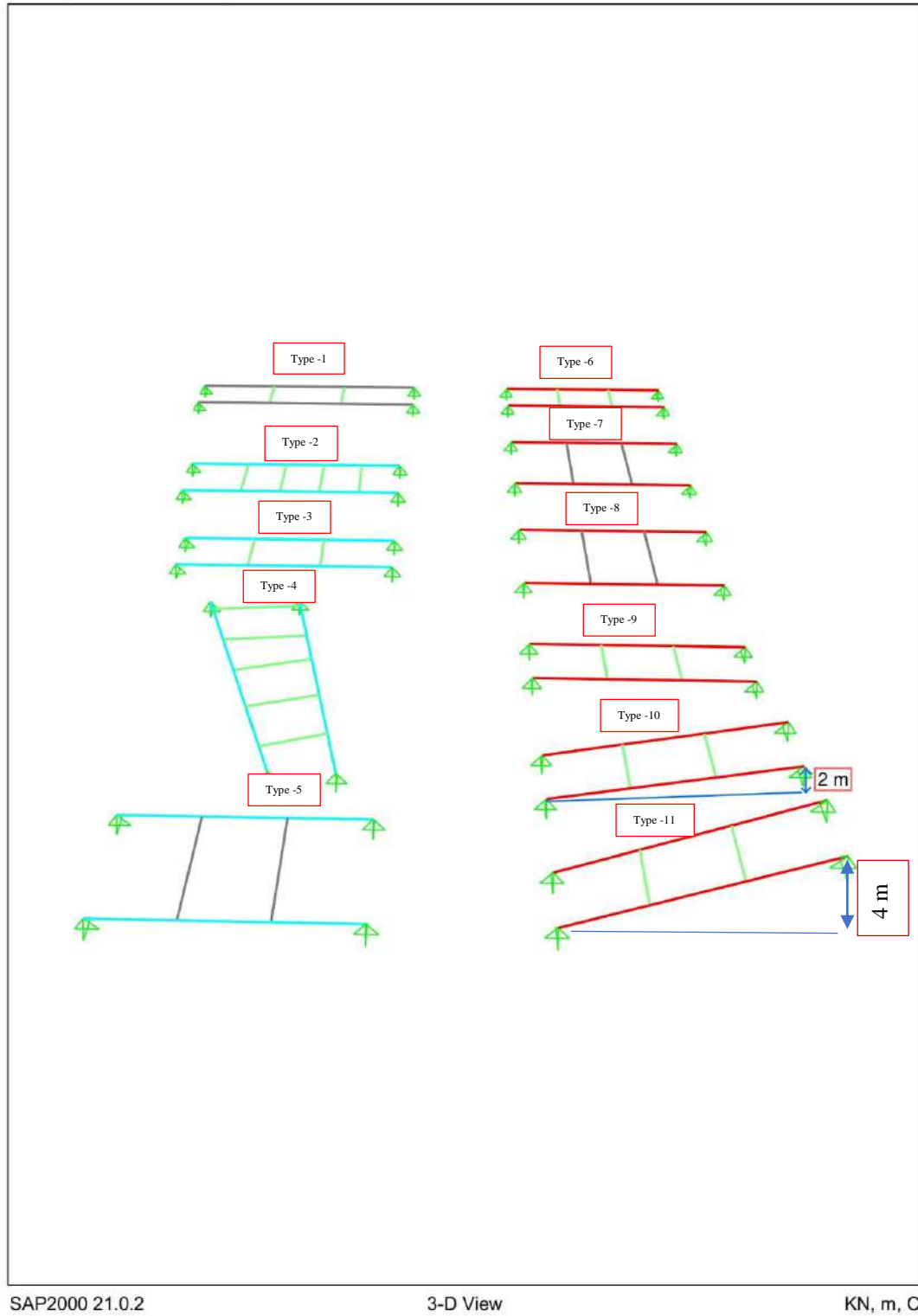
SAP2000 21.0.2

3-D View

KN, m, C

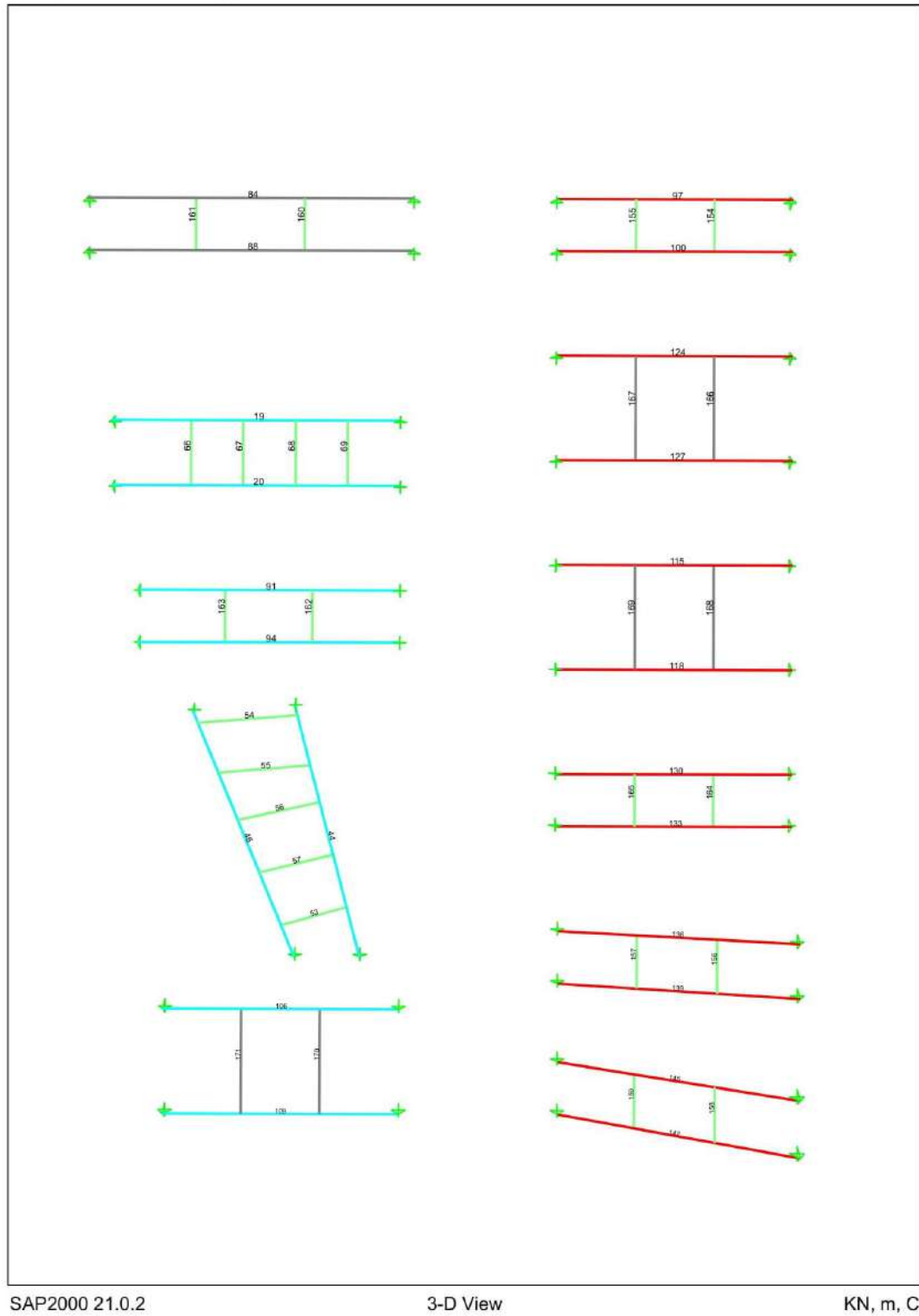
Ski slope 1- cold box - Segement - WALL.sdb

5/6/2025



Ski slope 1- cold box - Segement - WALL.sdb

5/6/2025

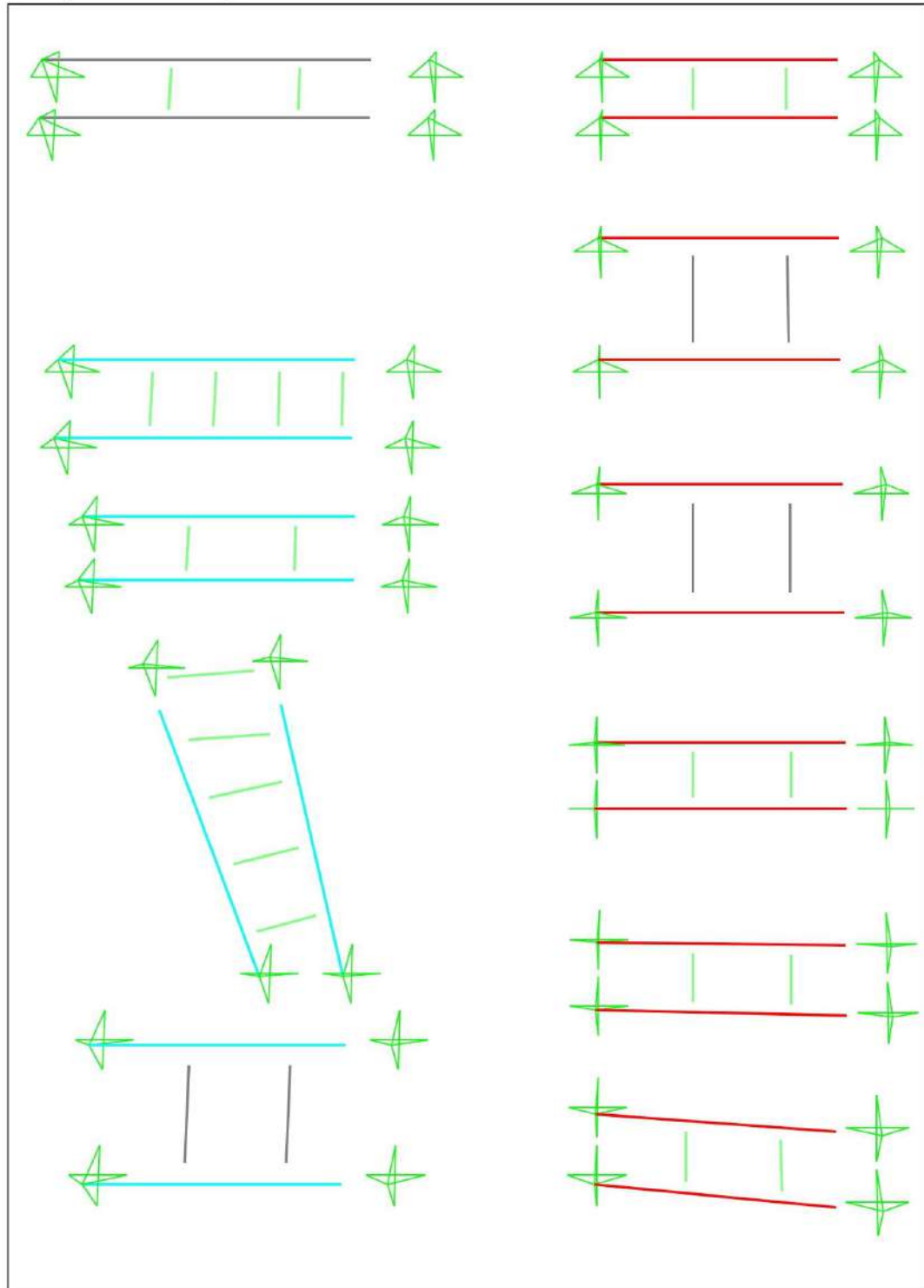


Releases in Frames

-All main beams members only released in axial direction to prevent temperature effect.

Ski slope 1- cold box - Segement - WALL.sdb

5/4/2025



SAP2000 21.0.2

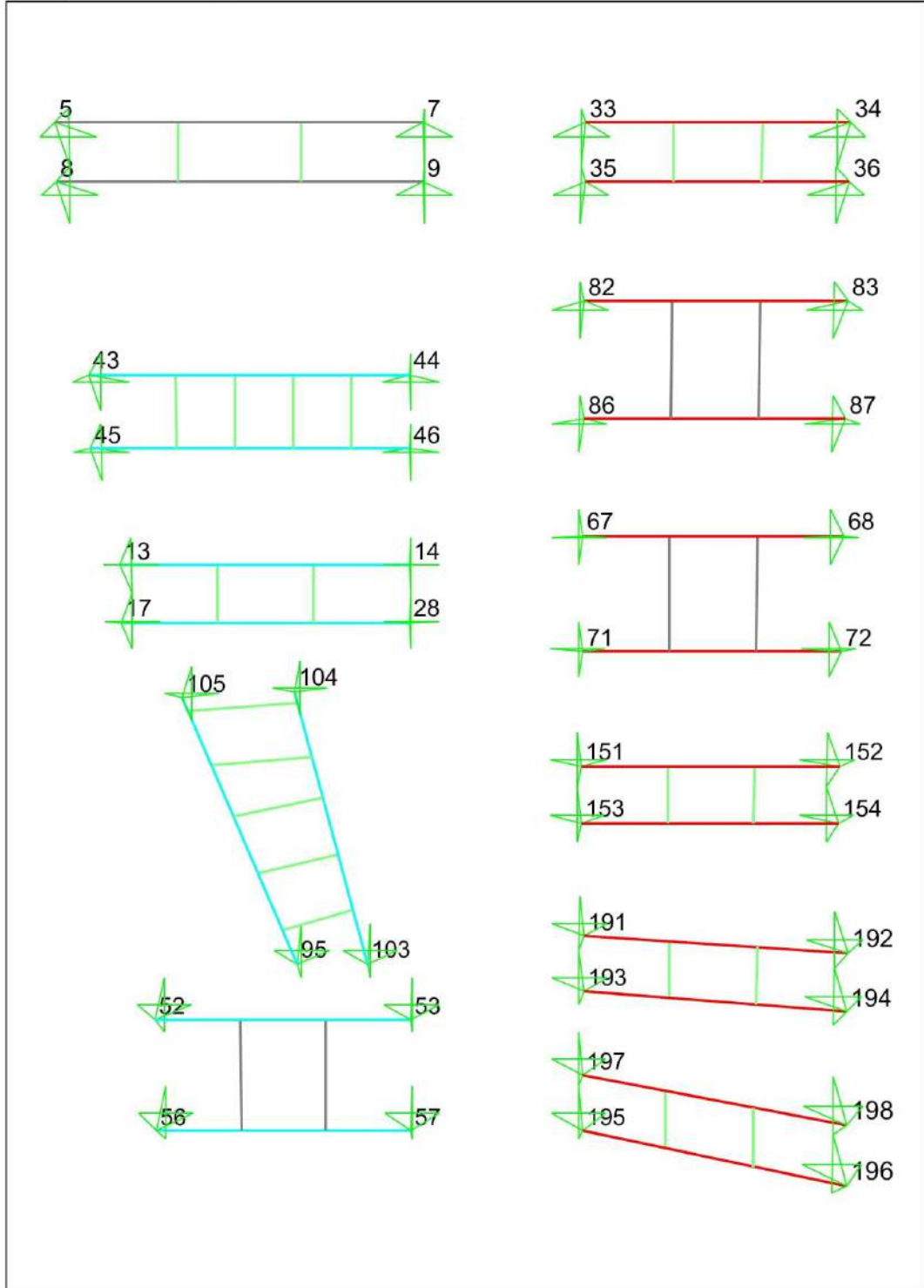
3-D View

KN, m, C

8.3 Support Assigns

Ski slope 1- cold box - Segement - WALL.sdb

5/7/2025



SAP2000 21.0.2

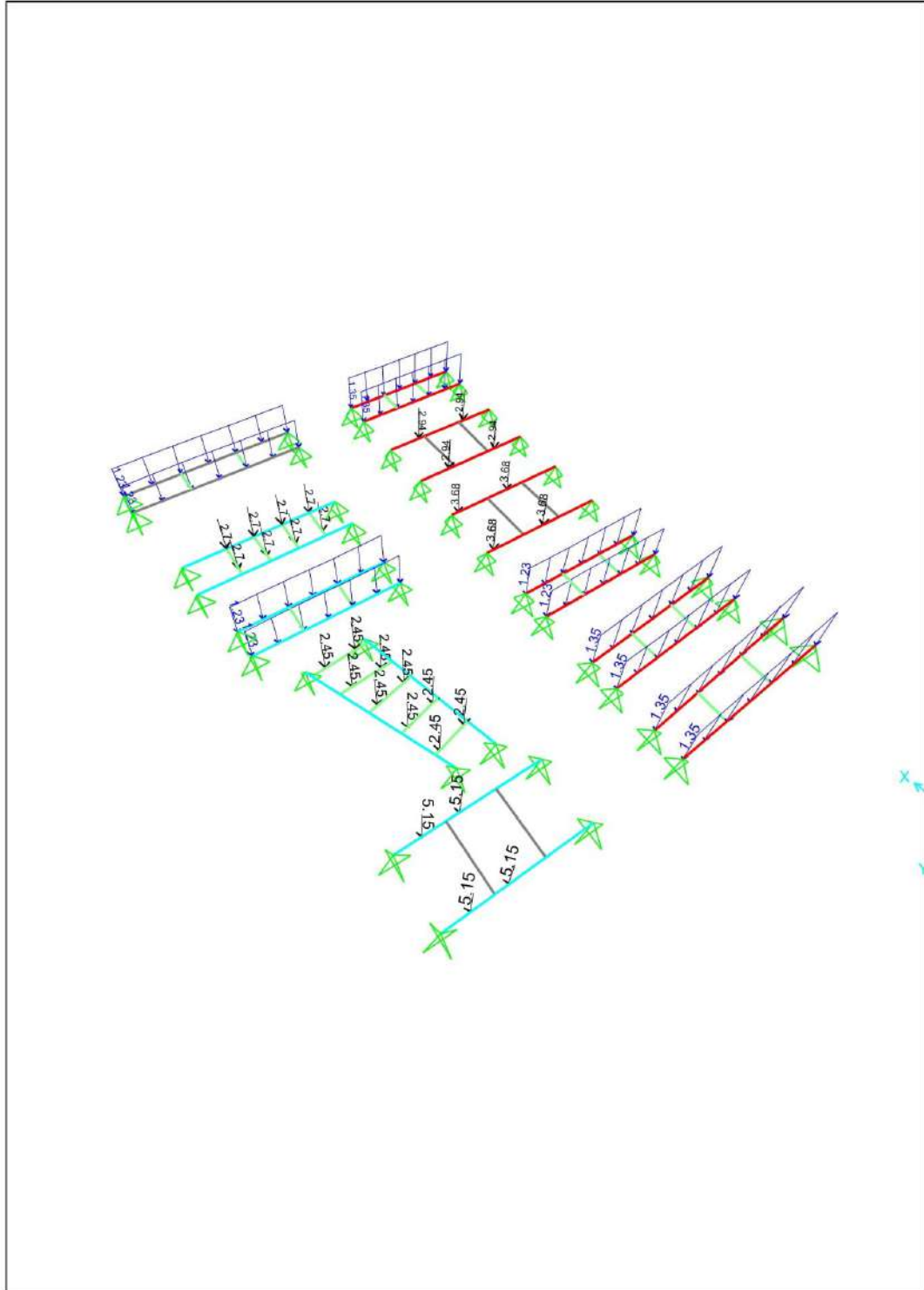
3-D View

KN, m, C

8.4 Load Assigns

Ski slope 1- cold box - Segement - WALL.sdb

5/6/2025



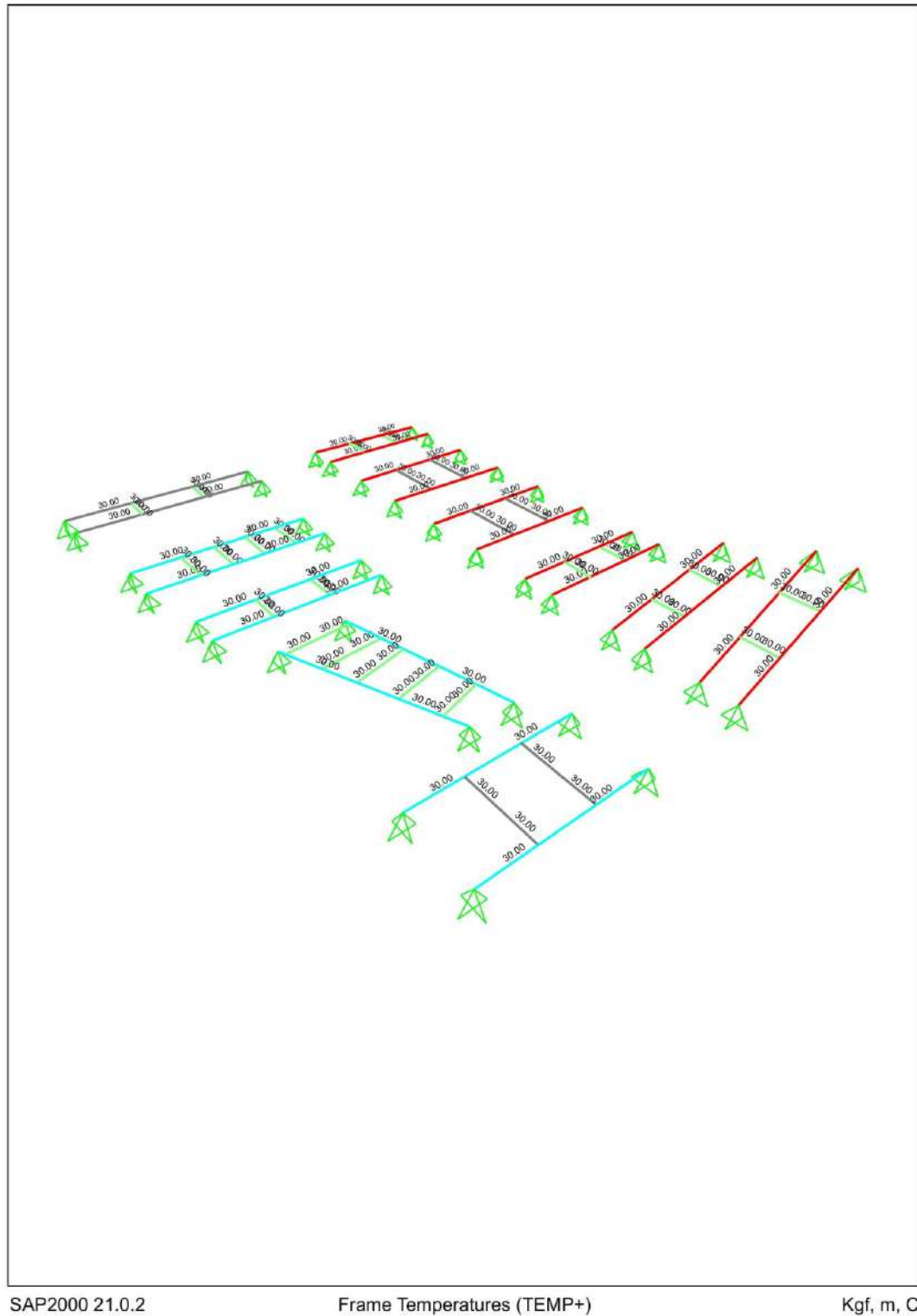
SAP2000 21.0.2

Frame Span Loads (Utilities) (GLOBAL CSys)

KN, m, C

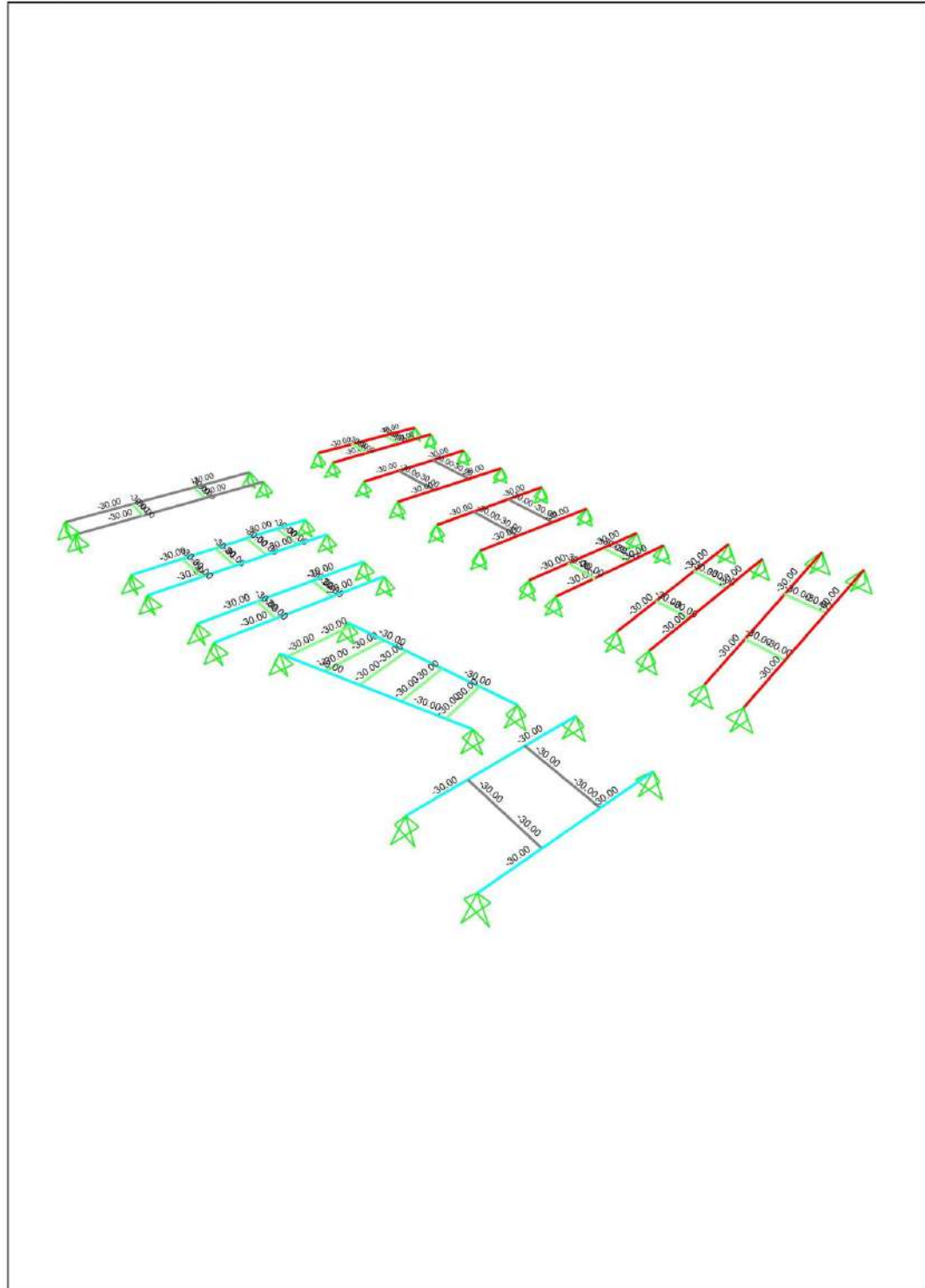
Ski slope 1- cold box - Segement - WALL.sdb

5/4/2025



Ski slope 1- cold box - Segement - WALL.sdb

5/4/2025



SAP2000 21.0.2

Frame Temperatures (TEMP-)

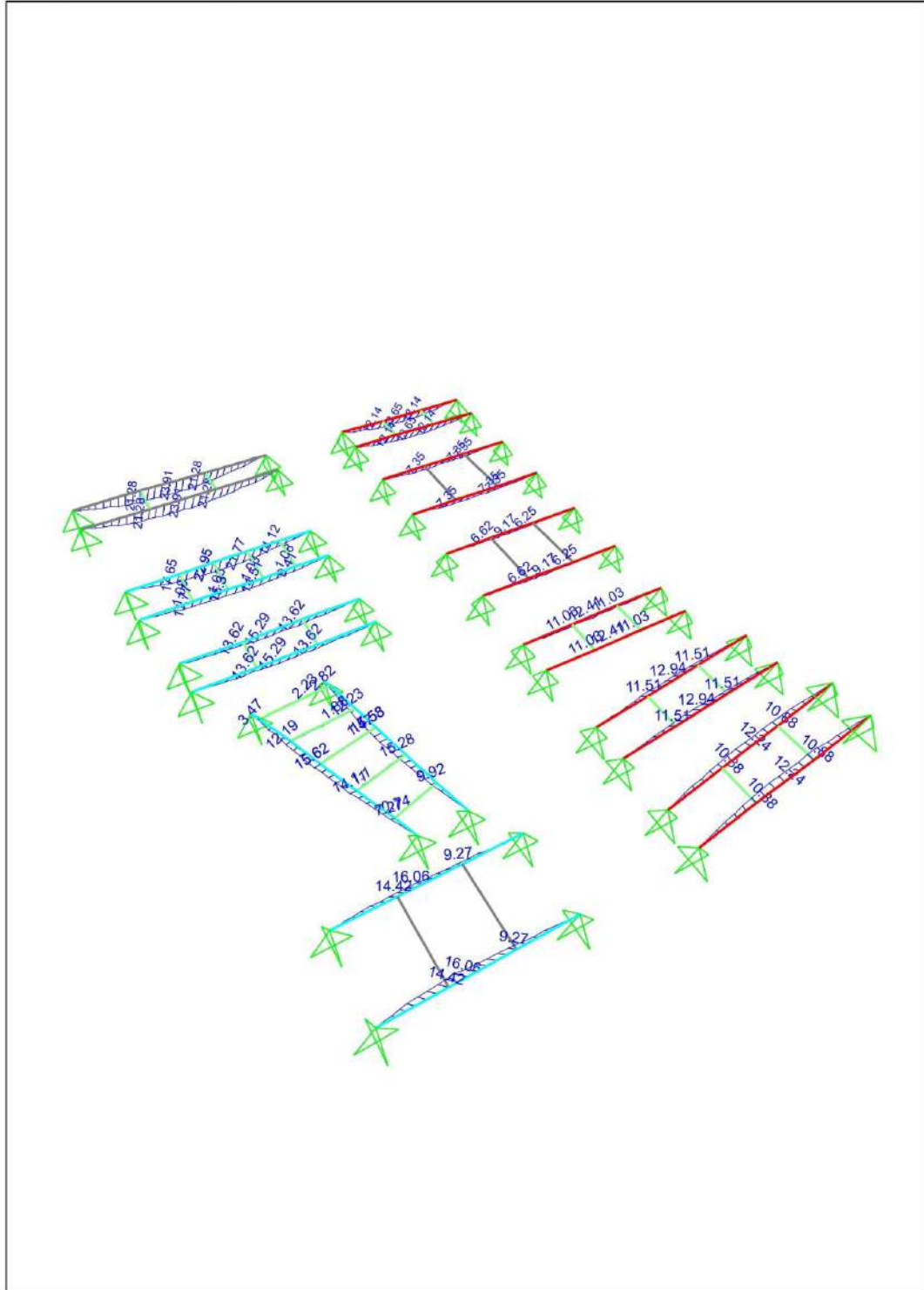
Kgf, m, C

9. SAP Output

9.1 Straining Actions

Ski slope 1- cold box - Segement - WALL.sdb

5/6/2025



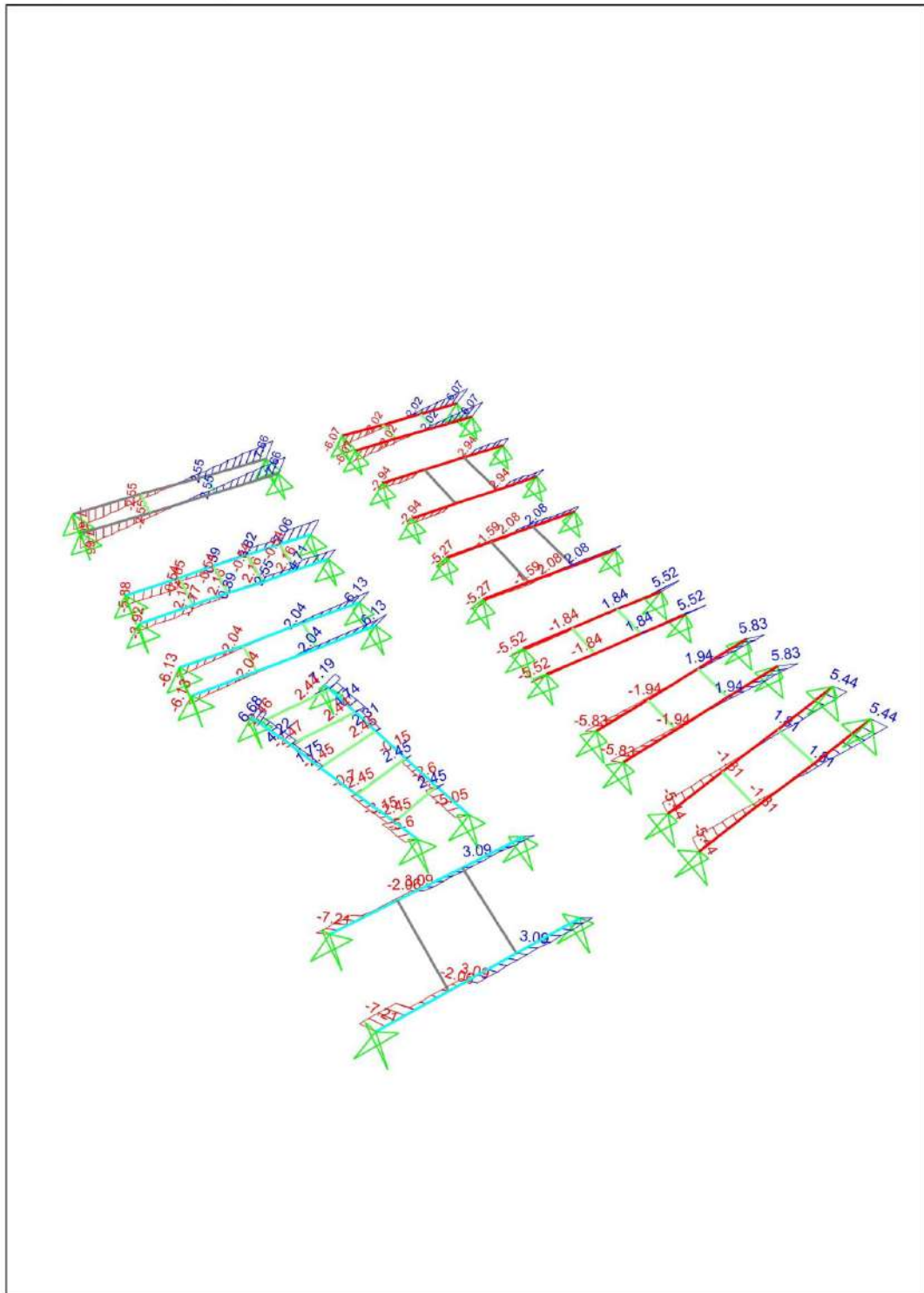
SAP2000 21.0.2

Moment 3-3 Diagram (Utilities)

KN, m, C

Ski slope 1- cold box - Segement - WALL.sdb

5/6/2025



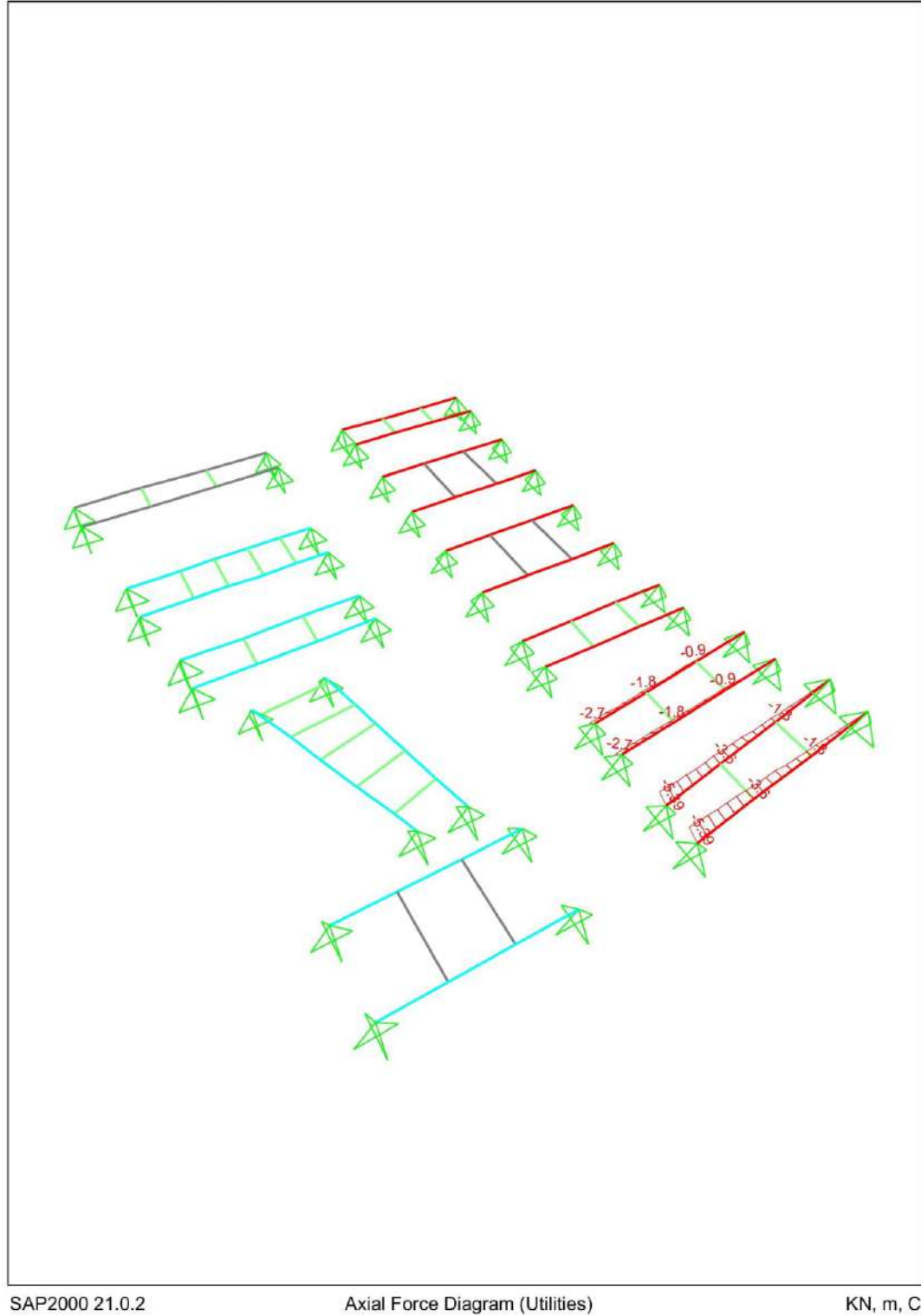
SAP2000 21.0.2

Shear Force 2-2 Diagram (Utilities)

KN, m, C

Ski slope 1- cold box - Segement - WALL.sdb

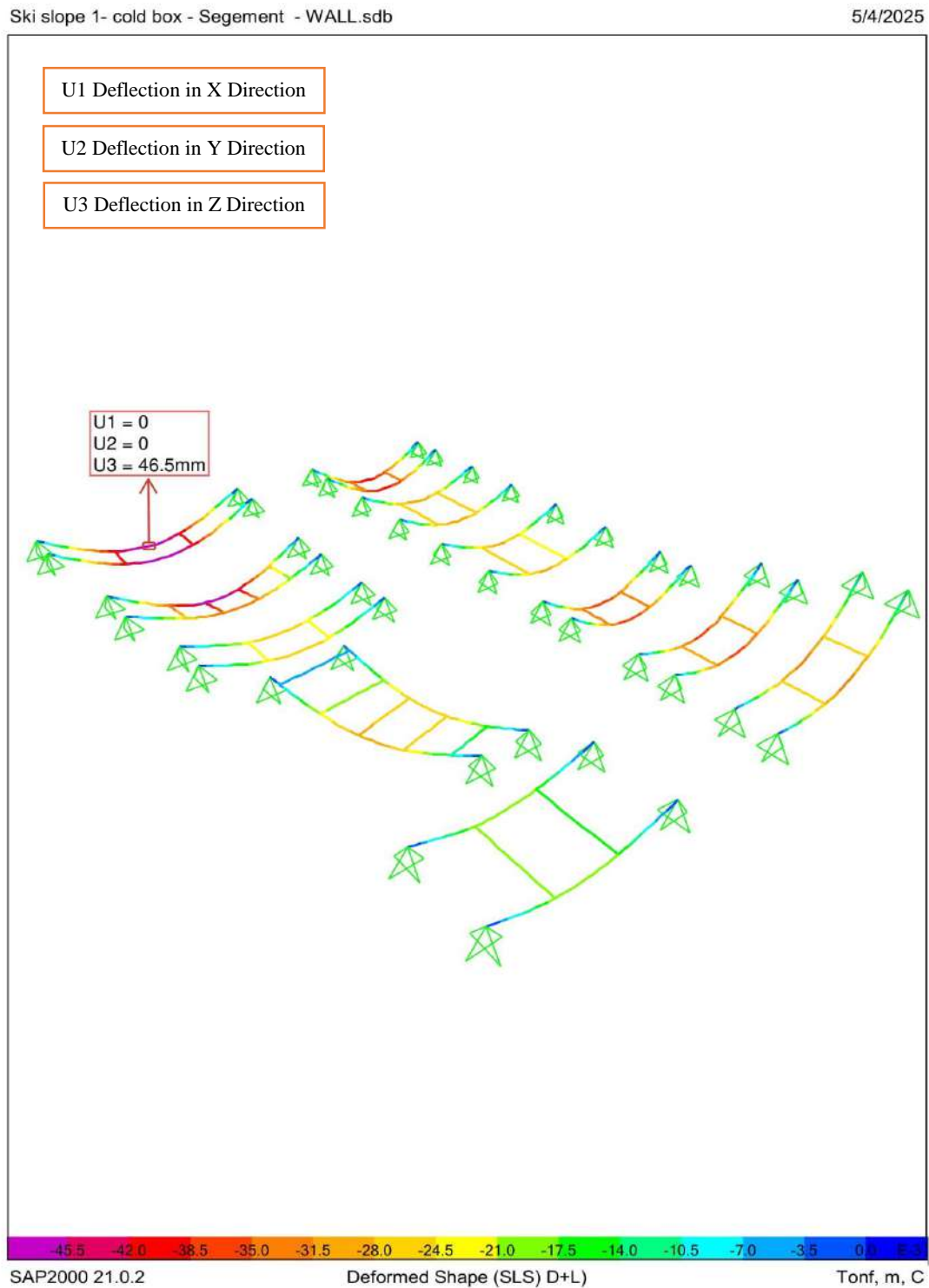
5/6/2025



9.2 Deflection Limits

Def. Limit = $12.5/240 = 0.052$ m

Actual deflection = 0.046 m **safe**



9.3 Steel Design Summary

Ski slope 1- cold box - Segment - WALL.sdb

5/4/2025

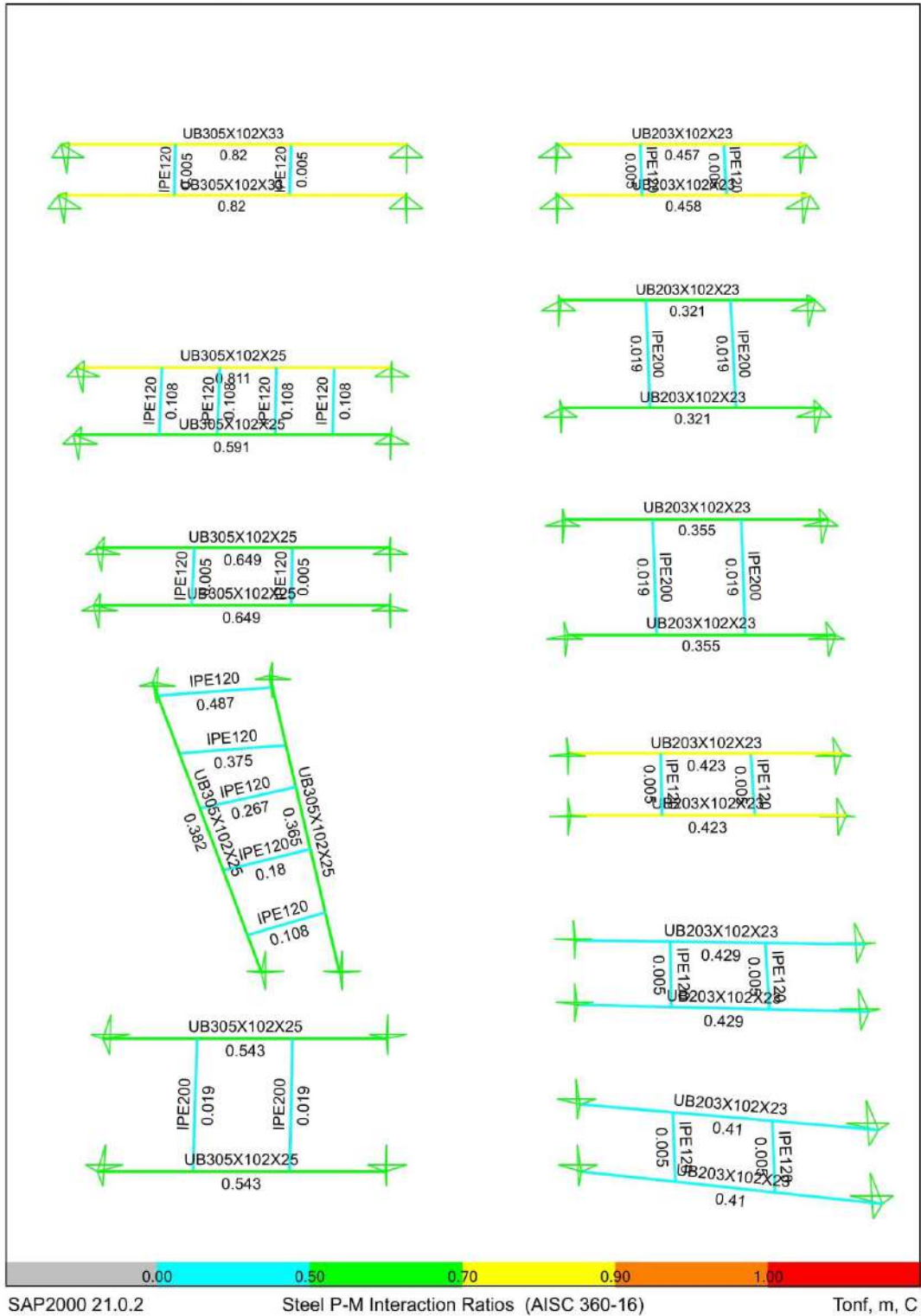


TABLE: Steel Design 1 - Summary Data - AISC 360-16

Frame	DesignSect	Status	Ratio	Combo	WarnMsg
Text	Text	Text	Unitless	Text	Text
19	UB305X102X25	No Messages	0.810645	ULS) 1.4D+TEMP-	No Messages
20	UB305X102X25	No Messages	0.590621	ULS) 1.4D+TEMP-	No Messages
44	UB305X102X25	No Messages	0.365144	ULS) 1.4D+TEMP+	No Messages
46	UB305X102X25	No Messages	0.382567	ULS) 1.4D+TEMP-	No Messages
53	IPE120	No Messages	0.108057	ULS) 1.4D+TEMP-	No Messages
54	IPE120	No Messages	0.487416	ULS) 1.4D+TEMP+	No Messages
55	IPE120	No Messages	0.374879	ULS) 1.4D+TEMP-	No Messages
56	IPE120	No Messages	0.26747	ULS) 1.4D+TEMP+	No Messages
57	IPE120	No Messages	0.180482	ULS) 1.4D+TEMP+	No Messages
66	IPE120	No Messages	0.108229	ULS) 1.4D+TEMP-	No Messages
67	IPE120	No Messages	0.108223	ULS) 1.4D+TEMP+	No Messages
68	IPE120	No Messages	0.108236	ULS) 1.4D+TEMP+	No Messages
69	IPE120	No Messages	0.108247	ULS) 1.4D+TEMP-	No Messages
84	UB305X102X33	No Messages	0.820218	ULS) 1.4D+TEMP+	No Messages
88	UB305X102X33	No Messages	0.819702	ULS) 1.4D+TEMP+	No Messages
91	UB305X102X25	No Messages	0.649382	ULS) 1.4D+TEMP+	No Messages
94	UB305X102X25	No Messages	0.649382	ULS) 1.4D+TEMP+	No Messages
97	UB203X102X23	No Messages	0.457706	ULS) 1.4D+TEMP+	No Messages
100	UB203X102X23	No Messages	0.457706	ULS) 1.4D+TEMP+	No Messages
106	UB305X102X25	No Messages	0.542894	ULS) 1.4D+TEMP+	No Messages
109	UB305X102X25	No Messages	0.542894	ULS) 1.4D+TEMP+	No Messages
115	UB203X102X23	No Messages	0.35575	ULS) 1.4D+TEMP+	No Messages
118	UB203X102X23	No Messages	0.35575	ULS) 1.4D+TEMP-	No Messages
124	UB203X102X23	No Messages	0.321342	ULS) 1.4D+TEMP+	No Messages
127	UB203X102X23	No Messages	0.321342	ULS) 1.4D+TEMP-	No Messages
130	UB203X102X23	No Messages	0.423649	ULS) 1.4D+TEMP+	No Messages
133	UB203X102X23	No Messages	0.423649	ULS) 1.4D+TEMP+	No Messages
136	UB203X102X23	No Messages	0.433631	ULS) 1.4D+TEMP-	No Messages
139	UB203X102X23	No Messages	0.433631	ULS) 1.4D+TEMP+	No Messages
142	UB203X102X23	No Messages	0.418285	ULS) 1.4D+TEMP-	No Messages
145	UB203X102X23	No Messages	0.418285	ULS) 1.4D+TEMP-	No Messages
154	IPE120	No Messages	0.005357	ULS) 1.4D+TEMP-	No Messages
155	IPE120	No Messages	0.005357	ULS) 1.4D+TEMP-	No Messages
156	IPE120	No Messages	0.005357	ULS) 1.4D+TEMP-	No Messages
157	IPE120	No Messages	0.005357	ULS) 1.4D+TEMP-	No Messages
158	IPE120	No Messages	0.005357	ULS) 1.4D+TEMP-	No Messages
159	IPE120	No Messages	0.005357	ULS) 1.4D+TEMP-	No Messages
160	IPE120	No Messages	0.005354	ULS) 1.4D+TEMP-	No Messages
161	IPE120	No Messages	0.005354	ULS) 1.4D+TEMP-	No Messages
162	IPE120	No Messages	0.005354	ULS) 1.4D+TEMP-	No Messages
163	IPE120	No Messages	0.005354	ULS) 1.4D+TEMP-	No Messages
164	IPE120	No Messages	0.005357	ULS) 1.4D+TEMP-	No Messages
165	IPE120	No Messages	0.005357	ULS) 1.4D+TEMP-	No Messages

TABLE: Steel Design 1 - Summary Data - AISC 360-16

Frame	DesignSect	Status	Ratio	Combo	WarnMsg
Text	Text	Text	Unitless	Text	Text
19	UB305X102X25	No Messages	0.810645	ULS) 1.4D+TEMP-	No Messages
166	IPE200	No Messages	0.01888	ULS) 1.4D+TEMP-	No Messages
167	IPE200	No Messages	0.01888	ULS) 1.4D+TEMP-	No Messages
168	IPE200	No Messages	0.01888	ULS) 1.4D+TEMP-	No Messages
169	IPE200	No Messages	0.01888	ULS) 1.4D+TEMP-	No Messages
170	IPE200	No Messages	0.018878	ULS) 1.4D+TEMP-	No Messages
171	IPE200	No Messages	0.018878	ULS) 1.4D+TEMP-	No Messages

9.4 Supports Reactions

- **Max. Reactions for Connection Design**

Joint	Output Case	Case Type	F1	F2	F3
Text	Text	Text	Tonf	Tonf	Tonf
3	ULS) 1.4D+TEMP-	Combination	0.00	0.00	1.5

• All Joint Reactions

Joint	Output Case	Case Type	F1	F2	F3
Text	Text	Text	Tonf	Tonf	Tonf
5	ULS) 1.4D+TEMP+	Combination	0	0	1.4406
5	ULS) 1.4D+TEMP-	Combination	0	0	1.4406
5	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	1.2348
5	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	1.2348
5	ULS) 1.2D + WX1+L	Combination	0	0	1.2348
5	ULS) 0.9D + Wx1	Combination	0	0	0.9261
7	ULS) 1.4D+TEMP+	Combination	0	0	1.4406
7	ULS) 1.4D+TEMP-	Combination	0	0	1.4406
7	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	1.2348
7	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	1.2348
7	ULS) 1.2D + WX1+L	Combination	0	0	1.2348
7	ULS) 0.9D + Wx1	Combination	0	0	0.9261
8	ULS) 1.4D+TEMP+	Combination	0	0	1.4406
8	ULS) 1.4D+TEMP-	Combination	0	0	1.4406
8	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	1.2348
8	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	1.2348
8	ULS) 1.2D + WX1+L	Combination	0	0	1.2348
8	ULS) 0.9D + Wx1	Combination	0	0	0.9261
9	ULS) 1.4D+TEMP+	Combination	0	0	1.4406
9	ULS) 1.4D+TEMP-	Combination	0	0	1.4406
9	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	1.2348
9	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	1.2348
9	ULS) 1.2D + WX1+L	Combination	0	0	1.2348
9	ULS) 0.9D + Wx1	Combination	0	0	0.9261
13	ULS) 1.4D+TEMP+	Combination	0	0	1.0913
13	ULS) 1.4D+TEMP-	Combination	0	0	1.0913
13	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.9354
13	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.9354
13	ULS) 1.2D + WX1+L	Combination	0	0	0.9354
13	ULS) 0.9D + Wx1	Combination	0	0	0.7016
14	ULS) 1.4D+TEMP+	Combination	0	0	1.0913
14	ULS) 1.4D+TEMP-	Combination	0	0	1.0913
14	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.9354
14	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.9354
14	ULS) 1.2D + WX1+L	Combination	0	0	0.9354
14	ULS) 0.9D + Wx1	Combination	0	0	0.7016
17	ULS) 1.4D+TEMP+	Combination	0	0	1.0913
17	ULS) 1.4D+TEMP-	Combination	0	0	1.0913
17	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.9354
17	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.9354
17	ULS) 1.2D + WX1+L	Combination	0	0	0.9354
17	ULS) 0.9D + Wx1	Combination	0	0	0.7016

Joint	Output Case	Case Type	F1	F2	F3
Text	Text	Text	Tonf	Tonf	Tonf
28	ULS) 1.4D+TEMP+	Combination	0	0	1.0913
28	ULS) 1.4D+TEMP-	Combination	0	0	1.0913
28	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.9354
28	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.9354
28	ULS) 1.2D + WX1+L	Combination	0	0	0.9354
28	ULS) 0.9D + Wx1	Combination	0	0	0.7016
33	ULS) 1.4D+TEMP+	Combination	0	0	1.0501
33	ULS) 1.4D+TEMP-	Combination	0	0	1.0501
33	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.9001
33	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.9001
33	ULS) 1.2D + WX1+L	Combination	0	0	0.9001
33	ULS) 0.9D + Wx1	Combination	0	0	0.6751
34	ULS) 1.4D+TEMP+	Combination	0	0	1.0501
34	ULS) 1.4D+TEMP-	Combination	0	0	1.0501
34	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.9001
34	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.9001
34	ULS) 1.2D + WX1+L	Combination	0	0	0.9001
34	ULS) 0.9D + Wx1	Combination	0	0	0.6751
35	ULS) 1.4D+TEMP+	Combination	0	0	1.0501
35	ULS) 1.4D+TEMP-	Combination	0	0	1.0501
35	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.9001
35	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.9001
35	ULS) 1.2D + WX1+L	Combination	0	0	0.9001
35	ULS) 0.9D + Wx1	Combination	0	0	0.6751
36	ULS) 1.4D+TEMP+	Combination	0	0	1.0501
36	ULS) 1.4D+TEMP-	Combination	0	0	1.0501
36	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.9001
36	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.9001
36	ULS) 1.2D + WX1+L	Combination	0	0	0.9001
36	ULS) 0.9D + Wx1	Combination	0	0	0.6751
43	ULS) 1.4D+TEMP+	Combination	0	0	1.0975
43	ULS) 1.4D+TEMP-	Combination	0	0	1.0975
43	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.9407
43	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.9407
43	ULS) 1.2D + WX1+L	Combination	0	0	0.9407
43	ULS) 0.9D + Wx1	Combination	0	0	0.7056
44	ULS) 1.4D+TEMP+	Combination	0	0	1.2731
44	ULS) 1.4D+TEMP-	Combination	0	0	1.2731
44	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	1.0912
44	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	1.0912
44	ULS) 1.2D + WX1+L	Combination	0	0	1.0912
44	ULS) 0.9D + Wx1	Combination	0	0	0.8184
45	ULS) 1.4D+TEMP+	Combination	0	0	0.8175
45	ULS) 1.4D+TEMP-	Combination	0	0	0.8175

Joint	Output Case	Case Type	F1	F2	F3
Text	Text	Text	Tonf	Tonf	Tonf
45	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.7007
45	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.7007
45	ULS) 1.2D + WX1+L	Combination	0	0	0.7007
45	ULS) 0.9D + Wx1	Combination	0	0	0.5256
46	ULS) 1.4D+TEMP+	Combination	0	0	0.9371
46	ULS) 1.4D+TEMP-	Combination	0	0	0.9371
46	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.8032
46	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.8032
46	ULS) 1.2D + WX1+L	Combination	0	0	0.8032
46	ULS) 0.9D + Wx1	Combination	0	0	0.6024
52	ULS) 1.4D+TEMP+	Combination	0	0	1.2807
52	ULS) 1.4D+TEMP-	Combination	0	0	1.2807
52	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	1.0978
52	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	1.0978
52	ULS) 1.2D + WX1+L	Combination	0	0	1.0978
52	ULS) 0.9D + Wx1	Combination	0	0	0.8233
53	ULS) 1.4D+TEMP+	Combination	0	0	0.6927
53	ULS) 1.4D+TEMP-	Combination	0	0	0.6927
53	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.5938
53	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.5938
53	ULS) 1.2D + WX1+L	Combination	0	0	0.5938
53	ULS) 0.9D + Wx1	Combination	0	0	0.4453
56	ULS) 1.4D+TEMP+	Combination	0	0	1.2807
56	ULS) 1.4D+TEMP-	Combination	0	0	1.2807
56	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	1.0978
56	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	1.0978
56	ULS) 1.2D + WX1+L	Combination	0	0	1.0978
56	ULS) 0.9D + Wx1	Combination	0	0	0.8233
57	ULS) 1.4D+TEMP+	Combination	0	0	0.6927
57	ULS) 1.4D+TEMP-	Combination	0	0	0.6927
57	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.5938
57	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.5938
57	ULS) 1.2D + WX1+L	Combination	0	0	0.5938
57	ULS) 0.9D + Wx1	Combination	0	0	0.4453
67	ULS) 1.4D+TEMP+	Combination	0	0	0.9917
67	ULS) 1.4D+TEMP-	Combination	0	0	0.9917
67	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.85
67	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.85
67	ULS) 1.2D + WX1+L	Combination	0	0	0.85
67	ULS) 0.9D + Wx1	Combination	0	0	0.6375
68	ULS) 1.4D+TEMP+	Combination	0	0	0.5367
68	ULS) 1.4D+TEMP-	Combination	0	0	0.5367
68	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.46
68	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.46

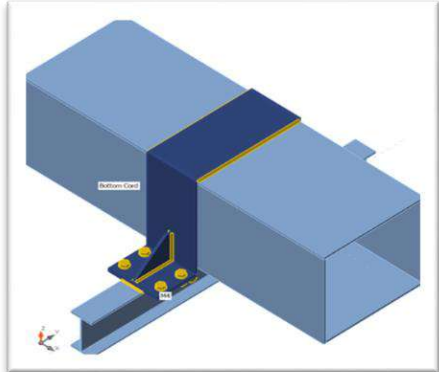
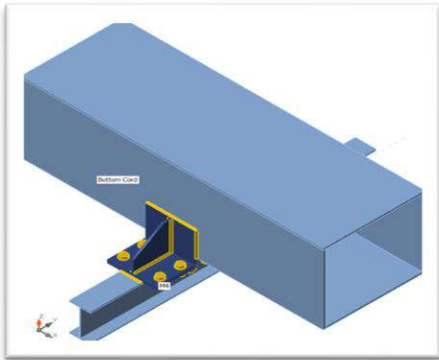
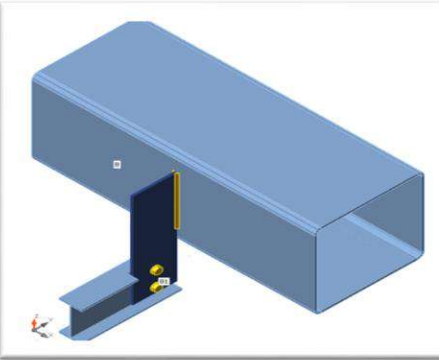
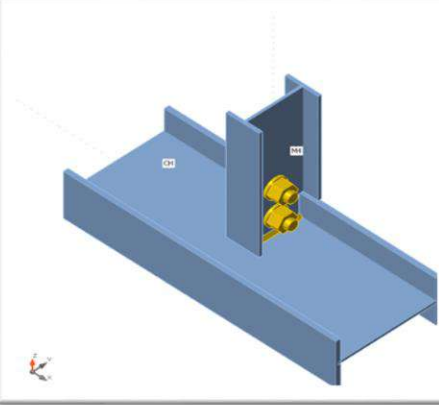
Joint	Output Case	Case Type	F1	F2	F3
Text	Text	Text	Tonf	Tonf	Tonf
68	ULS) 1.2D + WX1+L	Combination	0	0	0.46
68	ULS) 0.9D + Wx1	Combination	0	0	0.345
71	ULS) 1.4D+TEMP+	Combination	0	0	0.9917
71	ULS) 1.4D+TEMP-	Combination	0	0	0.9917
71	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.85
71	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.85
71	ULS) 1.2D + WX1+L	Combination	0	0	0.85
71	ULS) 0.9D + Wx1	Combination	0	0	0.6375
72	ULS) 1.4D+TEMP+	Combination	0	0	0.5367
72	ULS) 1.4D+TEMP-	Combination	0	0	0.5367
72	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.46
72	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.46
72	ULS) 1.2D + WX1+L	Combination	0	0	0.46
72	ULS) 0.9D + Wx1	Combination	0	0	0.345
82	ULS) 1.4D+TEMP+	Combination	0	0	0.6592
82	ULS) 1.4D+TEMP-	Combination	0	0	0.6592
82	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.565
82	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.565
82	ULS) 1.2D + WX1+L	Combination	0	0	0.565
82	ULS) 0.9D + Wx1	Combination	0	0	0.4238
83	ULS) 1.4D+TEMP+	Combination	0	0	0.6592
83	ULS) 1.4D+TEMP-	Combination	0	0	0.6592
83	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.565
83	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.565
83	ULS) 1.2D + WX1+L	Combination	0	0	0.565
83	ULS) 0.9D + Wx1	Combination	0	0	0.4238
86	ULS) 1.4D+TEMP+	Combination	0	0	0.6592
86	ULS) 1.4D+TEMP-	Combination	0	0	0.6592
86	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.565
86	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.565
86	ULS) 1.2D + WX1+L	Combination	0	0	0.565
86	ULS) 0.9D + Wx1	Combination	0	0	0.4238
87	ULS) 1.4D+TEMP+	Combination	0	0	0.6592
87	ULS) 1.4D+TEMP-	Combination	0	0	0.6592
87	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.565
87	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.565
87	ULS) 1.2D + WX1+L	Combination	0	0	0.565
87	ULS) 0.9D + Wx1	Combination	0	0	0.4238
95	ULS) 1.4D+TEMP+	Combination	0	0	1.0582
95	ULS) 1.4D+TEMP-	Combination	0	0	1.0582
95	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.9071
95	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.9071
95	ULS) 1.2D + WX1+L	Combination	0	0	0.9071
95	ULS) 0.9D + Wx1	Combination	0	0	0.6803

Joint	Output Case	Case Type	F1	F2	F3
Text	Text	Text	Tonf	Tonf	Tonf
103	ULS) 1.4D+TEMP+	Combination	0	0	0.9695
103	ULS) 1.4D+TEMP-	Combination	0	0	0.9695
103	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.831
103	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.831
103	ULS) 1.2D + WX1+L	Combination	0	0	0.831
103	ULS) 0.9D + Wx1	Combination	0	0	0.6233
104	ULS) 1.4D+TEMP+	Combination	0	0	1.3075
104	ULS) 1.4D+TEMP-	Combination	0	0	1.3075
104	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	1.1207
104	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	1.1207
104	ULS) 1.2D + WX1+L	Combination	0	0	1.1207
104	ULS) 0.9D + Wx1	Combination	0	0	0.8406
105	ULS) 1.4D+TEMP+	Combination	0	0	1.2346
105	ULS) 1.4D+TEMP-	Combination	0	0	1.2346
105	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	1.0582
105	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	1.0582
105	ULS) 1.2D + WX1+L	Combination	0	0	1.0582
105	ULS) 0.9D + Wx1	Combination	0	0	0.7937
151	ULS) 1.4D+TEMP+	Combination	0	0	0.9714
151	ULS) 1.4D+TEMP-	Combination	0	0	0.9714
151	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.8326
151	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.8326
151	ULS) 1.2D + WX1+L	Combination	0	0	0.8326
151	ULS) 0.9D + Wx1	Combination	0	0	0.6245
152	ULS) 1.4D+TEMP+	Combination	0	0	0.9714
152	ULS) 1.4D+TEMP-	Combination	0	0	0.9714
152	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.8326
152	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.8326
152	ULS) 1.2D + WX1+L	Combination	0	0	0.8326
152	ULS) 0.9D + Wx1	Combination	0	0	0.6245
153	ULS) 1.4D+TEMP+	Combination	0	0	0.9714
153	ULS) 1.4D+TEMP-	Combination	0	0	0.9714
153	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.8326
153	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.8326
153	ULS) 1.2D + WX1+L	Combination	0	0	0.8326
153	ULS) 0.9D + Wx1	Combination	0	0	0.6245
154	ULS) 1.4D+TEMP+	Combination	0	0	0.9714
154	ULS) 1.4D+TEMP-	Combination	0	0	0.9714
154	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.8326
154	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.8326
154	ULS) 1.2D + WX1+L	Combination	0	0	0.8326
154	ULS) 0.9D + Wx1	Combination	0	0	0.6245
191	ULS) 1.4D+TEMP+	Combination	0	0	1.0887
191	ULS) 1.4D+TEMP-	Combination	0	0	1.0887

Joint	Output Case	Case Type	F1	F2	F3
Text	Text	Text	Tonf	Tonf	Tonf
191	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.9332
191	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.9332
191	ULS) 1.2D + WX1+L	Combination	0	0	0.9332
191	ULS) 0.9D + Wx1	Combination	0	0	0.6999
192	ULS) 1.4D+TEMP+	Combination	0	0	0.9836
192	ULS) 1.4D+TEMP-	Combination	0	0	0.9836
192	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.843
192	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.843
192	ULS) 1.2D + WX1+L	Combination	0	0	0.843
192	ULS) 0.9D + Wx1	Combination	0	0	0.6323
193	ULS) 1.4D+TEMP+	Combination	0	0	1.0887
193	ULS) 1.4D+TEMP-	Combination	0	0	1.0887
193	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.9332
193	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.9332
193	ULS) 1.2D + WX1+L	Combination	0	0	0.9332
193	ULS) 0.9D + Wx1	Combination	0	0	0.6999
194	ULS) 1.4D+TEMP+	Combination	0	0	0.9836
194	ULS) 1.4D+TEMP-	Combination	0	0	0.9836
194	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.843
194	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.843
194	ULS) 1.2D + WX1+L	Combination	0	0	0.843
194	ULS) 0.9D + Wx1	Combination	0	0	0.6323
195	ULS) 1.4D+TEMP+	Combination	0	0	1.2579
195	ULS) 1.4D+TEMP-	Combination	0	0	1.2579
195	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	1.0782
195	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	1.0782
195	ULS) 1.2D + WX1+L	Combination	0	0	1.0782
195	ULS) 0.9D + Wx1	Combination	0	0	0.8087
196	ULS) 1.4D+TEMP+	Combination	0	0	0.8431
196	ULS) 1.4D+TEMP-	Combination	0	0	0.8431
196	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.7227
196	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.7227
196	ULS) 1.2D + WX1+L	Combination	0	0	0.7227
196	ULS) 0.9D + Wx1	Combination	0	0	0.542
197	ULS) 1.4D+TEMP+	Combination	0	0	1.2579
197	ULS) 1.4D+TEMP-	Combination	0	0	1.2579
197	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	1.0782
197	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	1.0782
197	ULS) 1.2D + WX1+L	Combination	0	0	1.0782
197	ULS) 0.9D + Wx1	Combination	0	0	0.8087
198	ULS) 1.4D+TEMP+	Combination	0	0	0.8431
198	ULS) 1.4D+TEMP-	Combination	0	0	0.8431
198	ULS) 1.2D +1.7L+TEMP+	Combination	0	0	0.7227
198	ULS) 1.2D +1.7L+TEMP-	Combination	0	0	0.7227

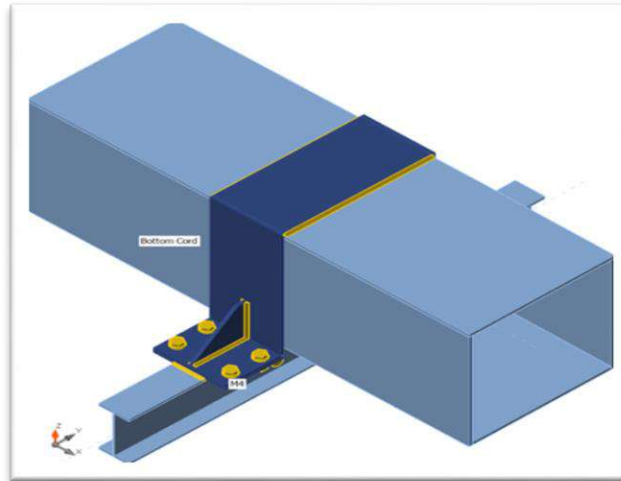
Joint	Output Case	Case Type	F1	F2	F3
Text	Text	Text	Tonf	Tonf	Tonf
198	ULS) 1.2D + WX1+L	Combination	0	0	0.7227
198	ULS) 0.9D + Wx1	Combination	0	0	0.542

10. Design Connections

Refrigeration		
No.	Connection	Picture
1	All around Plate Main beam with top chord	
2	L-Plate Main beam with top chord at bracing joint	
3	Main beam with top chord at truss splice point	
4	Secondary beam with Main beam	

10.1 Connection all around Plate Main beam with top chord (two sides) Detail - 01

Joint	Output Case	Case Type	F1	F2	F3
Text	Text	Text	Tonf	Tonf	Tonf
3	ULS) 1.4D+TEMP-	Combination	0.00	0.00	1.5



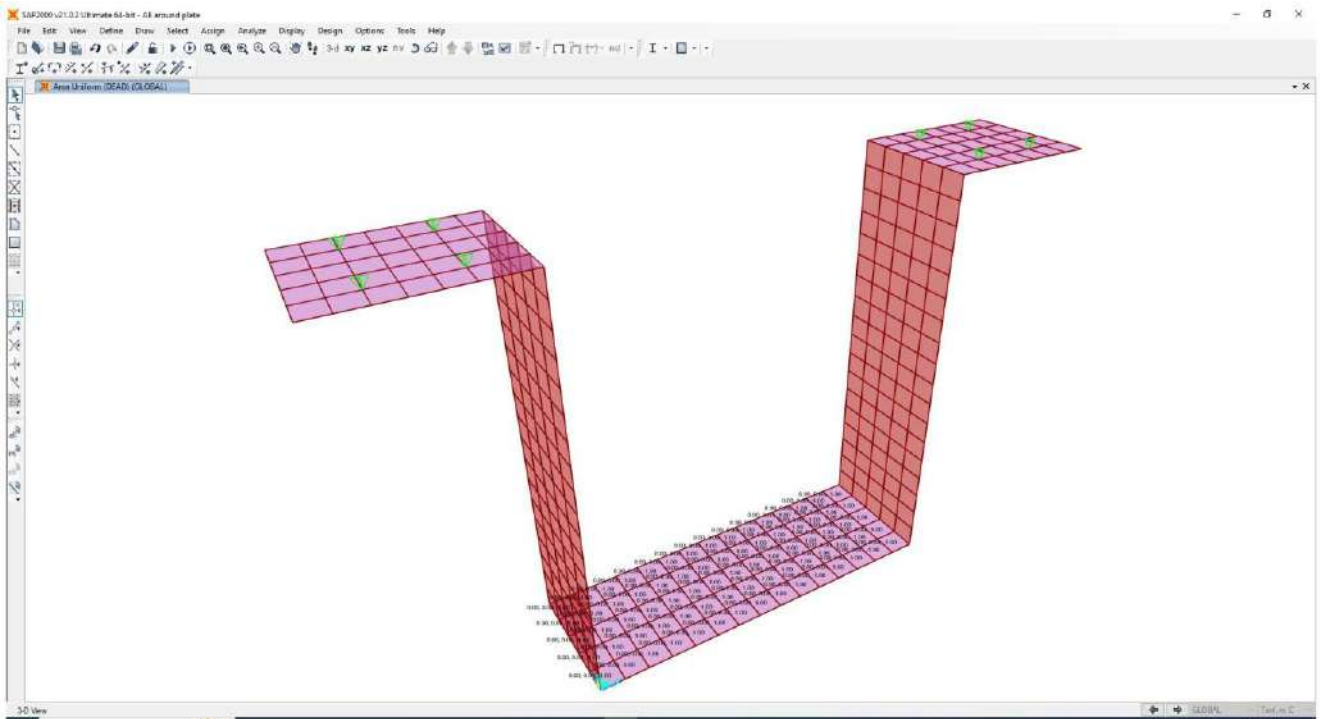
10.1.1 Load Calculation

Gravity Loads= 1.5 ton (twice) ~ 3 ton by using the smallest friction factor for the sliding material ($\mu=0.04$) to check sliding of the plates and its effect. for example, Teflon used for sliding connections ($\mu=0.04$)

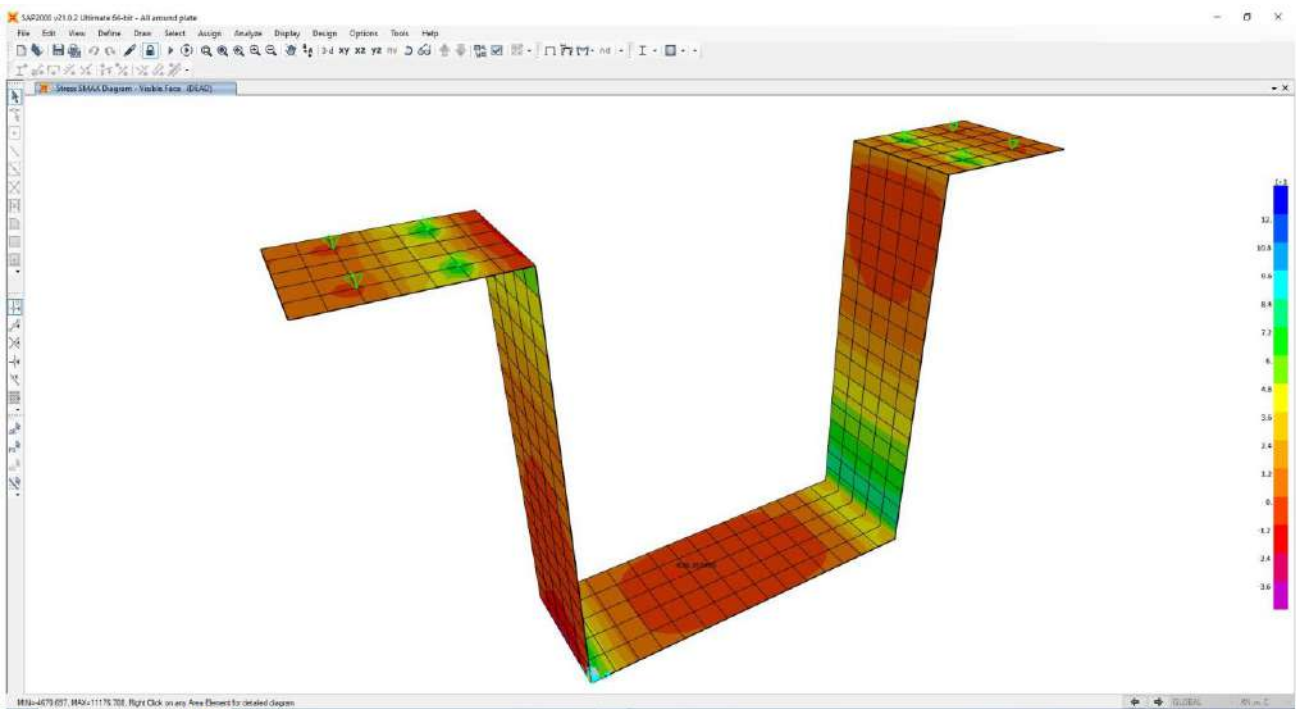
friction Sliding force = Gravity load* μ = $3*0.04 = 0.12$ ton by distributing this force on the bearing surface of the plate, also by distributing the shear reaction =0.00

force will distribute on it will be:

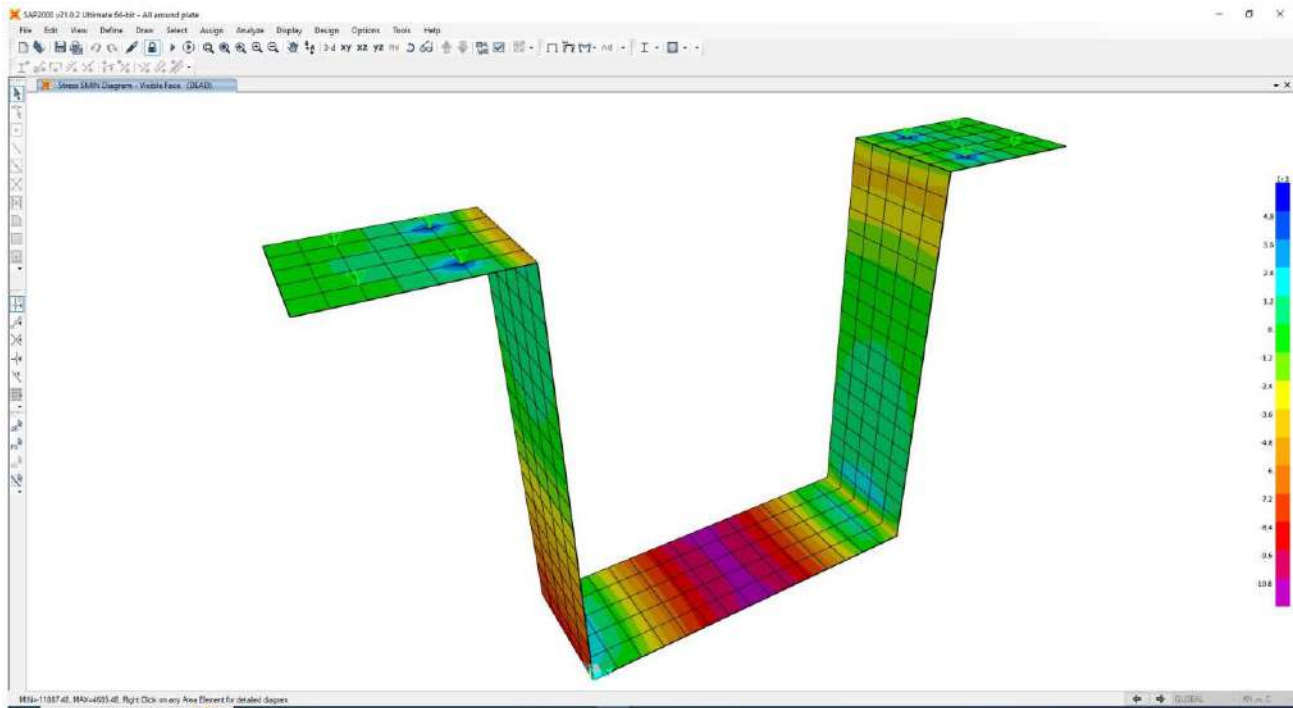
$$0.12 * (\text{area of the bearing surface}) = 0.12 / (0.24 * 0.5) = 1 \text{ ton/m}^2$$



10.1.2 Sap Stress analysis



SMAX



SMIN

10.1.3 Critical Design of elements

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$										
Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
71	71	LinStatic	69.89	0%	-90.2	0%	90.53	0%	-70.44	0%
71	71	LinStatic	281.5	0%	-70.57	0%	78.98	0%	-273.47	0%
71	71	LinStatic	452.44	0%	-141.17	0%	137.92	0%	-444.07	0%
71	71	LinStatic	252.64	0%	6.28	0%	-13.23	0%	-257.21	0%
72	72	LinStatic	252.16	0%	14.28	0%	-20.35	0%	-255.45	0%
72	72	LinStatic	411.35	0%	-122.71	0%	116.56	0%	-413.85	0%
72	72	LinStatic	159.54	0%	-31.55	0%	32.59	0%	-155.55	0%
72	72	LinStatic	206.89	0%	-3.8	0%	7.55	0%	-206.34	0%
73	73	LinStatic	193.5	0%	-7.14	0%	9.11	0%	-199.94	0%
73	73	LinStatic	127.16	0%	-26.55	0%	28.62	0%	-132.75	0%
73	73	LinStatic	127.16	0%	-26.55	0%	28.62	0%	-132.75	0%
73	73	LinStatic	193.5	0%	-7.14	0%	9.11	0%	-199.94	0%
74	74	LinStatic	206.89	0%	-3.8	0%	7.55	0%	-206.34	0%
74	74	LinStatic	159.54	0%	-31.55	0%	32.59	0%	-155.55	0%
74	74	LinStatic	411.35	0%	-122.71	0%	116.56	0%	-413.85	0%
74	74	LinStatic	252.16	0%	14.28	0%	-20.35	0%	-255.45	0%
75	75	LinStatic	252.64	0%	6.28	0%	-13.23	0%	-257.21	0%
75	75	LinStatic	452.44	0%	-141.17	0%	137.92	0%	-444.07	0%
75	75	LinStatic	281.5	0%	-70.57	0%	78.98	0%	-273.47	0%
75	75	LinStatic	69.89	0%	-90.2	0%	90.53	0%	-70.44	0%
76	76	LinStatic	460.68	0%	-196.19	0%	208.96	0%	-427.56	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
76	76	LinStatic	183.3	0%	-501.78	0%	503.01	0%	-167.56	0%
76	76	LinStatic	1100.19	0%	425.34	0%	-457.47	0%	-1122.22	0%
76	76	LinStatic	467.54	0%	-209.43	0%	187.88	0%	-471.24	0%
77	77	LinStatic	400.68	0%	-165.21	0%	134.85	0%	-409.34	0%
77	77	LinStatic	1068.9	0%	483.31	0%	-507.97	0%	-1076.35	0%
77	77	LinStatic	-166.41	0%	-536.22	0%	553.26	0%	177.71	0%
77	77	LinStatic	202.57	0%	-47.82	0%	59.18	0%	-192.51	0%
78	78	LinStatic	135.86	0%	-8.49	0%	23.31	0%	-137.81	0%
78	78	LinStatic	-127.14	0%	-522.93	0%	537.68	0%	123.62	0%
78	78	LinStatic	-127.14	0%	-522.93	0%	537.68	0%	123.62	0%
78	78	LinStatic	135.86	0%	-8.49	0%	23.31	0%	-137.81	0%
79	79	LinStatic	202.57	0%	-47.82	0%	59.18	0%	-192.51	0%
79	79	LinStatic	-166.41	0%	-536.22	0%	553.26	0%	177.71	0%
79	79	LinStatic	1068.9	0%	483.31	0%	-507.97	0%	-1076.35	0%
79	79	LinStatic	400.68	0%	-165.21	0%	134.85	0%	-409.34	0%
80	80	LinStatic	467.54	0%	-209.43	0%	187.88	0%	-471.24	0%
80	80	LinStatic	1100.19	0%	425.34	0%	-457.47	0%	-1122.22	0%
80	80	LinStatic	183.3	0%	-501.78	0%	503.01	0%	-167.56	0%
80	80	LinStatic	460.68	0%	-196.19	0%	208.96	0%	-427.56	0%
81	81	LinStatic	37.09	0%	-352.04	0%	341.83	0%	-52.16	0%
81	81	LinStatic	5.35	0%	-1721.19	1%	1713.71	1%	-12.54	0%
81	81	LinStatic	-21.65	0%	-1797.17	1%	1848.24	1%	33.4	0%
81	81	LinStatic	1086.28	0%	474.43	0%	-431.16	0%	-1077.35	0%
82	82	LinStatic	1124.32	0%	463.07	0%	-405.98	0%	-1107.16	0%
82	82	LinStatic	-4.18	0%	-1839.06	1%	1888	1%	0.49	0%
82	82	LinStatic	-100.8	0%	-1803.39	1%	1820.6	1%	81.09	0%
82	82	LinStatic	-100.96	0%	-596.91	0%	630.05	0%	94.32	0%
83	83	LinStatic	-112.71	0%	-532.6	0%	549.67	0%	105.04	0%
83	83	LinStatic	-129.43	0%	-1762.93	1%	1780.05	1%	133.08	0%
83	83	LinStatic	-129.43	0%	-1762.93	1%	1780.05	1%	133.08	0%
83	83	LinStatic	-112.71	0%	-532.6	0%	549.67	0%	105.04	0%
84	84	LinStatic	-100.96	0%	-596.91	0%	630.05	0%	94.32	0%
84	84	LinStatic	-100.8	0%	-1803.39	1%	1820.6	1%	81.09	0%
84	84	LinStatic	-4.18	0%	-1839.06	1%	1888	1%	0.49	0%
84	84	LinStatic	1124.32	0%	463.07	0%	-405.98	0%	-1107.16	0%
85	85	LinStatic	1086.28	0%	474.43	0%	-431.16	0%	-1077.35	0%
85	85	LinStatic	-21.65	0%	-1797.17	1%	1848.24	1%	33.4	0%
85	85	LinStatic	5.35	0%	-1721.19	1%	1713.71	1%	-12.54	0%
85	85	LinStatic	37.09	0%	-352.04	0%	341.83	0%	-52.16	0%
86	86	LinStatic	21.05	0%	-1654.36	1%	1663.91	1%	-21.32	0%
86	86	LinStatic	-57.09	0%	-4313.25	1%	4331.23	1%	75.12	0%
86	86	LinStatic	-1381.14	0%	-3121.46	1%	3136.84	1%	1403.3	0%
86	86	LinStatic	-37.39	0%	-1854.21	1%	1867.2	1%	35.22	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500$ KN/M2

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
87	87	LinStatic	-31.5	0%	-1884.51	1%	1898.65	1%	10.62	0%
87	87	LinStatic	-1299.83	0%	-3167.63	1%	3188.77	1%	1291.51	0%
87	87	LinStatic	-18.39	0%	-3568.22	1%	3614.06	1%	27.97	0%
87	87	LinStatic	-73.83	0%	-1799.7	1%	1841.5	1%	67.85	0%
88	88	LinStatic	-111.65	0%	-1750.03	1%	1794.8	1%	126	0%
88	88	LinStatic	-0.83	0%	-3502.25	1%	3537.14	1%	-19.48	0%
88	88	LinStatic	-0.83	0%	-3502.25	1%	3537.14	1%	-19.48	0%
88	88	LinStatic	-111.65	0%	-1750.03	1%	1794.8	1%	126	0%
89	89	LinStatic	-73.83	0%	-1799.7	1%	1841.5	1%	67.85	0%
89	89	LinStatic	-18.39	0%	-3568.22	1%	3614.06	1%	27.97	0%
89	89	LinStatic	-1299.83	0%	-3167.63	1%	3188.77	1%	1291.51	0%
89	89	LinStatic	-31.5	0%	-1884.51	1%	1898.65	1%	10.62	0%
90	90	LinStatic	-37.39	0%	-1854.21	1%	1867.2	1%	35.22	0%
90	90	LinStatic	-1381.14	0%	-3121.46	1%	3136.84	1%	1403.3	0%
90	90	LinStatic	-57.09	0%	-4313.25	1%	4331.23	1%	75.12	0%
90	90	LinStatic	21.05	0%	-1654.36	1%	1663.91	1%	-21.32	0%
91	91	LinStatic	39.14	0%	-4509.1	1%	4593.95	1%	6.98	0%
91	91	LinStatic	259.12	0%	-4373.87	1%	4442.47	1%	-288.43	0%
91	91	LinStatic	-4668.86	1%	-7865.01	2%	7790.94	2%	4587.16	1%
91	91	LinStatic	-1293.37	0%	-3112.38	1%	3061.77	1%	1279.88	0%
92	92	LinStatic	-1222.55	0%	-3148.06	1%	3081.14	1%	1200.65	0%
92	92	LinStatic	-4670.7	1%	-7832.74	2%	7780.66	2%	4671.73	1%
92	92	LinStatic	1132.77	0%	-3236.28	1%	3349.48	1%	-1092.37	0%
92	92	LinStatic	31.98	0%	-3662.51	1%	3761.09	1%	-14.75	0%
93	93	LinStatic	-8.78	0%	-3538.22	1%	3621.51	1%	0.47	0%
93	93	LinStatic	864.52	0%	-3297.13	1%	3374.75	1%	-890.7	0%
93	93	LinStatic	864.52	0%	-3297.13	1%	3374.75	1%	-890.7	0%
93	93	LinStatic	-8.78	0%	-3538.22	1%	3621.51	1%	0.47	0%
94	94	LinStatic	31.98	0%	-3662.51	1%	3761.09	1%	-14.75	0%
94	94	LinStatic	1132.77	0%	-3236.28	1%	3349.48	1%	-1092.37	0%
94	94	LinStatic	-4670.7	1%	-7832.74	2%	7780.66	2%	4671.73	1%
94	94	LinStatic	-1222.55	0%	-3148.06	1%	3081.14	1%	1200.65	0%
95	95	LinStatic	-1293.37	0%	-3112.38	1%	3061.77	1%	1279.88	0%
95	95	LinStatic	-4668.86	1%	-7865.01	2%	7790.94	2%	4587.16	1%
95	95	LinStatic	259.12	0%	-4373.87	1%	4442.47	1%	-288.43	0%
95	95	LinStatic	39.14	0%	-4509.1	1%	4593.95	1%	6.98	0%
96	96	LinStatic	112.73	0%	-4390.95	1%	4269.96	1%	-199.2	0%
96	96	LinStatic	-349.68	0%	-728.95	0%	636.08	0%	160.49	0%
96	96	LinStatic	532.09	0%	-491.57	0%	471.11	0%	-380.18	0%
96	96	LinStatic	-4649.12	1%	-7677.01	2%	7871.02	2%	4661.15	1%
97	97	LinStatic	-4559.49	1%	-7736.2	2%	7920.99	2%	4685.48	1%
97	97	LinStatic	874.7	0%	-926.79	0%	859.85	0%	-737.48	0%
97	97	LinStatic	1189.49	0%	-549.88	0%	556.95	0%	-1277.41	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
97	97	LinStatic	1174.15	0%	-3281.43	1%	3365.04	1%	-1098.13	0%
98	98	LinStatic	870.24	0%	-3306.61	1%	3384.39	1%	-890.53	0%
98	98	LinStatic	959.84	0%	-35.12	0%	133.17	0%	-866.73	0%
98	98	LinStatic	959.84	0%	-35.12	0%	133.17	0%	-866.73	0%
98	98	LinStatic	870.24	0%	-3306.61	1%	3384.39	1%	-890.53	0%
99	99	LinStatic	1174.15	0%	-3281.43	1%	3365.04	1%	-1098.13	0%
99	99	LinStatic	1189.49	0%	-549.88	0%	556.95	0%	-1277.41	0%
99	99	LinStatic	874.7	0%	-926.79	0%	859.85	0%	-737.48	0%
99	99	LinStatic	-4559.49	1%	-7736.2	2%	7920.99	2%	4685.48	1%
100	100	LinStatic	-4649.12	1%	-7677.01	2%	7871.02	2%	4661.15	1%
100	100	LinStatic	532.09	0%	-491.57	0%	471.11	0%	-380.18	0%
100	100	LinStatic	-349.68	0%	-728.95	0%	636.08	0%	160.49	0%
100	100	LinStatic	112.73	0%	-4390.95	1%	4269.96	1%	-199.2	0%
101	101	LinStatic	-187.73	0%	-967.12	0%	236	0%	84.32	0%
101	101	LinStatic	4628.91	1%	806.79	0%	-889.99	0%	-5104.94	2%
101	101	LinStatic	5944.87	2%	1764.36	1%	-1505.06	0%	-5512.69	2%
101	101	LinStatic	544.64	0%	-554.89	0%	533.94	0%	-107.51	0%
102	102	LinStatic	737.48	0%	-840.34	0%	901.53	0%	-443.67	0%
102	102	LinStatic	6001.45	2%	1873.97	1%	-1758.2	1%	-5563.59	2%
102	102	LinStatic	5259.27	2%	1613.82	1%	-1588.76	0%	-5191.19	2%
102	102	LinStatic	1027.55	0%	-307.13	0%	370.85	0%	-1196.77	0%
103	103	LinStatic	956.44	0%	49.1	0%	66.38	0%	-905.39	0%
103	103	LinStatic	5145.32	2%	1400.75	0%	-1501.96	0%	-5113.57	2%
103	103	LinStatic	5145.32	2%	1400.75	0%	-1501.96	0%	-5113.57	2%
103	103	LinStatic	956.44	0%	49.1	0%	66.38	0%	-905.39	0%
104	104	LinStatic	1027.55	0%	-307.13	0%	370.85	0%	-1196.77	0%
104	104	LinStatic	5259.27	2%	1613.82	1%	-1588.76	0%	-5191.19	2%
104	104	LinStatic	6001.45	2%	1873.97	1%	-1758.2	1%	-5563.59	2%
104	104	LinStatic	737.48	0%	-840.34	0%	901.53	0%	-443.67	0%
105	105	LinStatic	544.64	0%	-554.89	0%	533.94	0%	-107.51	0%
105	105	LinStatic	5944.87	2%	1764.36	1%	-1505.06	0%	-5512.69	2%
105	105	LinStatic	4628.91	1%	806.79	0%	-889.99	0%	-5104.94	2%
105	105	LinStatic	-187.73	0%	-967.12	0%	236	0%	84.32	0%
106	106	LinStatic	4628.91	1%	806.79	0%	-889.99	0%	-5104.94	2%
106	106	LinStatic	-187.73	0%	-967.12	0%	236	0%	84.32	0%
106	106	LinStatic	544.64	0%	-554.89	0%	533.94	0%	-107.51	0%
106	106	LinStatic	5944.87	2%	1764.36	1%	-1505.06	0%	-5512.69	2%
107	107	LinStatic	6001.45	2%	1873.97	1%	-1758.2	1%	-5563.59	2%
107	107	LinStatic	737.48	0%	-840.34	0%	901.53	0%	-443.67	0%
107	107	LinStatic	1027.55	0%	-307.13	0%	370.85	0%	-1196.77	0%
107	107	LinStatic	5259.27	2%	1613.82	1%	-1588.76	0%	-5191.19	2%
108	108	LinStatic	5145.32	2%	1400.75	0%	-1501.96	0%	-5113.57	2%
108	108	LinStatic	956.44	0%	49.1	0%	66.38	0%	-905.39	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
108	108	LinStatic	956.44	0%	49.1	0%	66.38	0%	-905.39	0%
108	108	LinStatic	5145.32	2%	1400.75	0%	-1501.96	0%	-5113.57	2%
109	109	LinStatic	5259.27	2%	1613.82	1%	-1588.76	0%	-5191.19	2%
109	109	LinStatic	1027.55	0%	-307.13	0%	370.85	0%	-1196.77	0%
109	109	LinStatic	737.48	0%	-840.34	0%	901.53	0%	-443.67	0%
109	109	LinStatic	6001.45	2%	1873.97	1%	-1758.2	1%	-5563.59	2%
110	110	LinStatic	5944.87	2%	1764.36	1%	-1505.06	0%	-5512.69	2%
110	110	LinStatic	544.64	0%	-554.89	0%	533.94	0%	-107.51	0%
110	110	LinStatic	-187.73	0%	-967.12	0%	236	0%	84.32	0%
110	110	LinStatic	4628.91	1%	806.79	0%	-889.99	0%	-5104.94	2%
111	111	LinStatic	-349.68	0%	-728.95	0%	636.08	0%	160.49	0%
111	111	LinStatic	112.73	0%	-4390.95	1%	4269.96	1%	-199.2	0%
111	111	LinStatic	-4649.12	1%	-7677.01	2%	7871.02	2%	4661.15	1%
111	111	LinStatic	532.09	0%	-491.57	0%	471.11	0%	-380.18	0%
112	112	LinStatic	874.7	0%	-926.79	0%	859.85	0%	-737.48	0%
112	112	LinStatic	-4559.49	1%	-7736.2	2%	7920.99	2%	4685.48	1%
112	112	LinStatic	1174.15	0%	-3281.43	1%	3365.04	1%	-1098.13	0%
112	112	LinStatic	1189.49	0%	-549.88	0%	556.95	0%	-1277.41	0%
113	113	LinStatic	959.84	0%	-35.12	0%	133.17	0%	-866.73	0%
113	113	LinStatic	870.24	0%	-3306.61	1%	3384.39	1%	-890.53	0%
113	113	LinStatic	870.24	0%	-3306.61	1%	3384.39	1%	-890.53	0%
113	113	LinStatic	959.84	0%	-35.12	0%	133.17	0%	-866.73	0%
114	114	LinStatic	1189.49	0%	-549.88	0%	556.95	0%	-1277.41	0%
114	114	LinStatic	1174.15	0%	-3281.43	1%	3365.04	1%	-1098.13	0%
114	114	LinStatic	-4559.49	1%	-7736.2	2%	7920.99	2%	4685.48	1%
114	114	LinStatic	874.7	0%	-926.79	0%	859.85	0%	-737.48	0%
115	115	LinStatic	532.09	0%	-491.57	0%	471.11	0%	-380.18	0%
115	115	LinStatic	-4649.12	1%	-7677.01	2%	7871.02	2%	4661.15	1%
115	115	LinStatic	112.73	0%	-4390.95	1%	4269.96	1%	-199.2	0%
115	115	LinStatic	-349.68	0%	-728.95	0%	636.08	0%	160.49	0%
116	116	LinStatic	259.12	0%	-4373.87	1%	4442.47	1%	-288.43	0%
116	116	LinStatic	39.14	0%	-4509.1	1%	4593.95	1%	6.98	0%
116	116	LinStatic	-1293.37	0%	-3112.38	1%	3061.77	1%	1279.88	0%
116	116	LinStatic	-4668.86	1%	-7865.01	2%	7790.94	2%	4587.16	1%
117	117	LinStatic	-4670.7	1%	-7832.74	2%	7780.66	2%	4671.73	1%
117	117	LinStatic	-1222.55	0%	-3148.06	1%	3081.14	1%	1200.65	0%
117	117	LinStatic	31.98	0%	-3662.51	1%	3761.09	1%	-14.75	0%
117	117	LinStatic	1132.77	0%	-3236.28	1%	3349.48	1%	-1092.37	0%
118	118	LinStatic	864.52	0%	-3297.13	1%	3374.75	1%	-890.7	0%
118	118	LinStatic	-8.78	0%	-3538.22	1%	3621.51	1%	0.47	0%
118	118	LinStatic	-8.78	0%	-3538.22	1%	3621.51	1%	0.47	0%
118	118	LinStatic	864.52	0%	-3297.13	1%	3374.75	1%	-890.7	0%
119	119	LinStatic	1132.77	0%	-3236.28	1%	3349.48	1%	-1092.37	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
119	119	LinStatic	31.98	0%	-3662.51	1%	3761.09	1%	-14.75	0%
119	119	LinStatic	-1222.55	0%	-3148.06	1%	3081.14	1%	1200.65	0%
119	119	LinStatic	-4670.7	1%	-7832.74	2%	7780.66	2%	4671.73	1%
120	120	LinStatic	-4668.86	1%	-7865.01	2%	7790.94	2%	4587.16	1%
120	120	LinStatic	-1293.37	0%	-3112.38	1%	3061.77	1%	1279.88	0%
120	120	LinStatic	39.14	0%	-4509.1	1%	4593.95	1%	6.98	0%
120	120	LinStatic	259.12	0%	-4373.87	1%	4442.47	1%	-288.43	0%
121	121	LinStatic	-57.09	0%	-4313.25	1%	4331.23	1%	75.12	0%
121	121	LinStatic	21.05	0%	-1654.36	1%	1663.91	1%	-21.32	0%
121	121	LinStatic	-37.39	0%	-1854.21	1%	1867.2	1%	35.22	0%
121	121	LinStatic	-1381.14	0%	-3121.46	1%	3136.84	1%	1403.3	0%
122	122	LinStatic	-1299.83	0%	-3167.63	1%	3188.77	1%	1291.51	0%
122	122	LinStatic	-31.5	0%	-1884.51	1%	1898.65	1%	10.62	0%
122	122	LinStatic	-73.83	0%	-1799.7	1%	1841.5	1%	67.85	0%
122	122	LinStatic	-18.39	0%	-3568.22	1%	3614.06	1%	27.97	0%
123	123	LinStatic	-0.83	0%	-3502.25	1%	3537.14	1%	-19.48	0%
123	123	LinStatic	-111.65	0%	-1750.03	1%	1794.8	1%	126	0%
123	123	LinStatic	-111.65	0%	-1750.03	1%	1794.8	1%	126	0%
123	123	LinStatic	-0.83	0%	-3502.25	1%	3537.14	1%	-19.48	0%
124	124	LinStatic	-18.39	0%	-3568.22	1%	3614.06	1%	27.97	0%
124	124	LinStatic	-73.83	0%	-1799.7	1%	1841.5	1%	67.85	0%
124	124	LinStatic	-31.5	0%	-1884.51	1%	1898.65	1%	10.62	0%
124	124	LinStatic	-1299.83	0%	-3167.63	1%	3188.77	1%	1291.51	0%
125	125	LinStatic	-1381.14	0%	-3121.46	1%	3136.84	1%	1403.3	0%
125	125	LinStatic	-37.39	0%	-1854.21	1%	1867.2	1%	35.22	0%
125	125	LinStatic	21.05	0%	-1654.36	1%	1663.91	1%	-21.32	0%
125	125	LinStatic	-57.09	0%	-4313.25	1%	4331.23	1%	75.12	0%
126	126	LinStatic	5.35	0%	-1721.19	1%	1713.71	1%	-12.54	0%
126	126	LinStatic	37.09	0%	-352.04	0%	341.83	0%	-52.16	0%
126	126	LinStatic	1086.28	0%	474.43	0%	-431.16	0%	-1077.35	0%
126	126	LinStatic	-21.65	0%	-1797.17	1%	1848.24	1%	33.4	0%
127	127	LinStatic	-4.18	0%	-1839.06	1%	1888	1%	0.49	0%
127	127	LinStatic	1124.32	0%	463.07	0%	-405.98	0%	-1107.16	0%
127	127	LinStatic	-100.96	0%	-596.91	0%	630.05	0%	94.32	0%
127	127	LinStatic	-100.8	0%	-1803.39	1%	1820.6	1%	81.09	0%
128	128	LinStatic	-129.43	0%	-1762.93	1%	1780.05	1%	133.08	0%
128	128	LinStatic	-112.71	0%	-532.6	0%	549.67	0%	105.04	0%
128	128	LinStatic	-112.71	0%	-532.6	0%	549.67	0%	105.04	0%
128	128	LinStatic	-129.43	0%	-1762.93	1%	1780.05	1%	133.08	0%
129	129	LinStatic	-100.8	0%	-1803.39	1%	1820.6	1%	81.09	0%
129	129	LinStatic	-100.96	0%	-596.91	0%	630.05	0%	94.32	0%
129	129	LinStatic	1124.32	0%	463.07	0%	-405.98	0%	-1107.16	0%
129	129	LinStatic	-4.18	0%	-1839.06	1%	1888	1%	0.49	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
130	130	LinStatic	-21.65	0%	-1797.17	1%	1848.24	1%	33.4	0%
130	130	LinStatic	1086.28	0%	474.43	0%	-431.16	0%	-1077.35	0%
130	130	LinStatic	37.09	0%	-352.04	0%	341.83	0%	-52.16	0%
130	130	LinStatic	5.35	0%	-1721.19	1%	1713.71	1%	-12.54	0%
131	131	LinStatic	183.3	0%	-501.78	0%	503.01	0%	-167.56	0%
131	131	LinStatic	460.68	0%	-196.19	0%	208.96	0%	-427.56	0%
131	131	LinStatic	467.54	0%	-209.43	0%	187.88	0%	-471.24	0%
131	131	LinStatic	1100.19	0%	425.34	0%	-457.47	0%	-1122.22	0%
132	132	LinStatic	1068.9	0%	483.31	0%	-507.97	0%	-1076.35	0%
132	132	LinStatic	400.68	0%	-165.21	0%	134.85	0%	-409.34	0%
132	132	LinStatic	202.57	0%	-47.82	0%	59.18	0%	-192.51	0%
132	132	LinStatic	-166.41	0%	-536.22	0%	553.26	0%	177.71	0%
133	133	LinStatic	-127.14	0%	-522.93	0%	537.68	0%	123.62	0%
133	133	LinStatic	135.86	0%	-8.49	0%	23.31	0%	-137.81	0%
133	133	LinStatic	135.86	0%	-8.49	0%	23.31	0%	-137.81	0%
133	133	LinStatic	-127.14	0%	-522.93	0%	537.68	0%	123.62	0%
134	134	LinStatic	-166.41	0%	-536.22	0%	553.26	0%	177.71	0%
134	134	LinStatic	202.57	0%	-47.82	0%	59.18	0%	-192.51	0%
134	134	LinStatic	400.68	0%	-165.21	0%	134.85	0%	-409.34	0%
134	134	LinStatic	1068.9	0%	483.31	0%	-507.97	0%	-1076.35	0%
135	135	LinStatic	1100.19	0%	425.34	0%	-457.47	0%	-1122.22	0%
135	135	LinStatic	467.54	0%	-209.43	0%	187.88	0%	-471.24	0%
135	135	LinStatic	460.68	0%	-196.19	0%	208.96	0%	-427.56	0%
135	135	LinStatic	183.3	0%	-501.78	0%	503.01	0%	-167.56	0%
136	136	LinStatic	281.5	0%	-70.57	0%	78.98	0%	-273.47	0%
136	136	LinStatic	69.89	0%	-90.2	0%	90.53	0%	-70.44	0%
136	136	LinStatic	252.64	0%	6.28	0%	-13.23	0%	-257.21	0%
136	136	LinStatic	452.44	0%	-141.17	0%	137.92	0%	-444.07	0%
137	137	LinStatic	411.35	0%	-122.71	0%	116.56	0%	-413.85	0%
137	137	LinStatic	252.16	0%	14.28	0%	-20.35	0%	-255.45	0%
137	137	LinStatic	206.89	0%	-3.8	0%	7.55	0%	-206.34	0%
137	137	LinStatic	159.54	0%	-31.55	0%	32.59	0%	-155.55	0%
138	138	LinStatic	127.16	0%	-26.55	0%	28.62	0%	-132.75	0%
138	138	LinStatic	193.5	0%	-7.14	0%	9.11	0%	-199.94	0%
138	138	LinStatic	193.5	0%	-7.14	0%	9.11	0%	-199.94	0%
138	138	LinStatic	127.16	0%	-26.55	0%	28.62	0%	-132.75	0%
139	139	LinStatic	159.54	0%	-31.55	0%	32.59	0%	-155.55	0%
139	139	LinStatic	206.89	0%	-3.8	0%	7.55	0%	-206.34	0%
139	139	LinStatic	252.16	0%	14.28	0%	-20.35	0%	-255.45	0%
139	139	LinStatic	411.35	0%	-122.71	0%	116.56	0%	-413.85	0%
140	140	LinStatic	452.44	0%	-141.17	0%	137.92	0%	-444.07	0%
140	140	LinStatic	252.64	0%	6.28	0%	-13.23	0%	-257.21	0%
140	140	LinStatic	69.89	0%	-90.2	0%	90.53	0%	-70.44	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
140	140	LinStatic	281.5	0%	-70.57	0%	78.98	0%	-273.47	0%
141	141	LinStatic	5193.77	2%	853.52	0%	-603.79	0%	-4575.65	1%
141	141	LinStatic	5193.51	2%	-304.29	0%	243.04	0%	-4773.23	1%
141	141	LinStatic	4803.73	2%	989.74	0%	-1029.71	0%	-4111.38	1%
141	141	LinStatic	6202.23	2%	1613.54	1%	-1329.18	0%	-5325.37	2%
142	142	LinStatic	6257.08	2%	2014.38	1%	-1783.26	1%	-5464.82	2%
142	142	LinStatic	4758.57	1%	953.47	0%	-883.07	0%	-3997.12	1%
142	142	LinStatic	4722.6	1%	1123.51	0%	-1125.36	0%	-4245.62	1%
142	142	LinStatic	5427.74	2%	1742.18	1%	-1594.65	0%	-4908.61	2%
143	143	LinStatic	5321.86	2%	1420.81	0%	-1396.54	0%	-4842.07	2%
143	143	LinStatic	4748.97	1%	1227.89	0%	-1121.5	0%	-4244.51	1%
143	143	LinStatic	4748.97	1%	1227.89	0%	-1121.5	0%	-4244.51	1%
143	143	LinStatic	5321.86	2%	1420.81	0%	-1396.54	0%	-4842.07	2%
144	144	LinStatic	5427.74	2%	1742.18	1%	-1594.65	0%	-4908.61	2%
144	144	LinStatic	4722.6	1%	1123.51	0%	-1125.36	0%	-4245.62	1%
144	144	LinStatic	4758.57	1%	953.47	0%	-883.07	0%	-3997.12	1%
144	144	LinStatic	6257.08	2%	2014.38	1%	-1783.26	1%	-5464.82	2%
145	145	LinStatic	6202.23	2%	1613.54	1%	-1329.18	0%	-5325.37	2%
145	145	LinStatic	4803.73	2%	989.74	0%	-1029.71	0%	-4111.38	1%
145	145	LinStatic	5193.51	2%	-304.29	0%	243.04	0%	-4773.23	1%
145	145	LinStatic	5193.77	2%	853.52	0%	-603.79	0%	-4575.65	1%
146	146	LinStatic	5122.87	2%	-267.88	0%	169.3	0%	-4580.76	1%
146	146	LinStatic	4196.76	1%	58.64	0%	-34.44	0%	-3609.93	1%
146	146	LinStatic	4085.7	1%	494.61	0%	-439.85	0%	-3422.56	1%
146	146	LinStatic	4783.81	1%	1015.7	0%	-1071.28	0%	-4177.85	1%
147	147	LinStatic	4749.22	1%	968.86	0%	-912.26	0%	-4075.98	1%
147	147	LinStatic	4089.41	1%	516.58	0%	-501.84	0%	-3439.34	1%
147	147	LinStatic	3939.33	1%	769.71	0%	-786.37	0%	-3375.22	1%
147	147	LinStatic	4763.77	1%	1132.22	0%	-1104.2	0%	-4179.31	1%
148	148	LinStatic	4787.56	1%	1239.19	0%	-1101.22	0%	-4177.32	1%
148	148	LinStatic	3938.66	1%	775.06	0%	-753.52	0%	-3363.29	1%
148	148	LinStatic	3938.66	1%	775.06	0%	-753.52	0%	-3363.29	1%
148	148	LinStatic	4787.56	1%	1239.19	0%	-1101.22	0%	-4177.32	1%
149	149	LinStatic	4763.77	1%	1132.22	0%	-1104.2	0%	-4179.31	1%
149	149	LinStatic	3939.33	1%	769.71	0%	-786.37	0%	-3375.22	1%
149	149	LinStatic	4089.41	1%	516.58	0%	-501.84	0%	-3439.34	1%
149	149	LinStatic	4749.22	1%	968.86	0%	-912.26	0%	-4075.98	1%
150	150	LinStatic	4783.81	1%	1015.7	0%	-1071.28	0%	-4177.85	1%
150	150	LinStatic	4085.7	1%	494.61	0%	-439.85	0%	-3422.56	1%
150	150	LinStatic	4196.76	1%	58.64	0%	-34.44	0%	-3609.93	1%
150	150	LinStatic	5122.87	2%	-267.88	0%	169.3	0%	-4580.76	1%
151	151	LinStatic	4227.33	1%	76.58	0%	-45.94	0%	-3632.74	1%
151	151	LinStatic	3356.74	1%	-28.08	0%	4.64	0%	-2776.64	1%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
151	151	LinStatic	3264.12	1%	305.09	0%	-322.06	0%	-2669.97	1%
151	151	LinStatic	4030.32	1%	485.21	0%	-451.06	0%	-3418.72	1%
152	152	LinStatic	4035.95	1%	505.26	0%	-511.41	0%	-3437.15	1%
152	152	LinStatic	3267.41	1%	315.09	0%	-295.29	0%	-2661.18	1%
152	152	LinStatic	3201.86	1%	495.51	0%	-472.84	0%	-2588.07	1%
152	152	LinStatic	3965.05	1%	779.81	0%	-781.62	0%	-3360.16	1%
153	153	LinStatic	3965.55	1%	783.98	0%	-748.93	0%	-3348.07	1%
153	153	LinStatic	3197.39	1%	480.63	0%	-494.2	0%	-2594.55	1%
153	153	LinStatic	3197.39	1%	480.63	0%	-494.2	0%	-2594.55	1%
153	153	LinStatic	3965.55	1%	783.98	0%	-748.93	0%	-3348.07	1%
154	154	LinStatic	3965.05	1%	779.81	0%	-781.62	0%	-3360.16	1%
154	154	LinStatic	3201.86	1%	495.51	0%	-472.84	0%	-2588.07	1%
154	154	LinStatic	3267.41	1%	315.09	0%	-295.29	0%	-2661.18	1%
154	154	LinStatic	4035.95	1%	505.26	0%	-511.41	0%	-3437.15	1%
155	155	LinStatic	4030.32	1%	485.21	0%	-451.06	0%	-3418.72	1%
155	155	LinStatic	3264.12	1%	305.09	0%	-322.06	0%	-2669.97	1%
155	155	LinStatic	3356.74	1%	-28.08	0%	4.64	0%	-2776.64	1%
155	155	LinStatic	4227.33	1%	76.58	0%	-45.94	0%	-3632.74	1%
156	156	LinStatic	3371.17	1%	-29.34	0%	11.04	0%	-2796.21	1%
156	156	LinStatic	2555.24	1%	-6.36	0%	32.36	0%	-1974.84	1%
156	156	LinStatic	2490.11	1%	183.5	0%	-164.15	0%	-1885.63	1%
156	156	LinStatic	3261.48	1%	300.03	0%	-319.37	0%	-2668.05	1%
157	157	LinStatic	3262.37	1%	312.43	0%	-293.73	0%	-2658.11	1%
157	157	LinStatic	2478.81	1%	175.05	0%	-195.35	0%	-1885.59	1%
157	157	LinStatic	2433.17	1%	290.57	0%	-306.32	0%	-1836.39	1%
157	157	LinStatic	3199.45	1%	494.79	0%	-473.28	0%	-2589.9	1%
158	158	LinStatic	3194.99	1%	479.9	0%	-494.77	0%	-2596.25	1%
158	158	LinStatic	2437.67	1%	308.23	0%	-291.21	0%	-1829.44	1%
158	158	LinStatic	2437.67	1%	308.23	0%	-291.21	0%	-1829.44	1%
158	158	LinStatic	3194.99	1%	479.9	0%	-494.77	0%	-2596.25	1%
159	159	LinStatic	3199.45	1%	494.79	0%	-473.28	0%	-2589.9	1%
159	159	LinStatic	2433.17	1%	290.57	0%	-306.32	0%	-1836.39	1%
159	159	LinStatic	2478.81	1%	175.05	0%	-195.35	0%	-1885.59	1%
159	159	LinStatic	3262.37	1%	312.43	0%	-293.73	0%	-2658.11	1%
160	160	LinStatic	3261.48	1%	300.03	0%	-319.37	0%	-2668.05	1%
160	160	LinStatic	2490.11	1%	183.5	0%	-164.15	0%	-1885.63	1%
160	160	LinStatic	2555.24	1%	-6.36	0%	32.36	0%	-1974.84	1%
160	160	LinStatic	3371.17	1%	-29.34	0%	11.04	0%	-2796.21	1%
161	161	LinStatic	2575.55	1%	-17.83	0%	36.45	0%	-1986.58	1%
161	161	LinStatic	1777.86	1%	-66.37	0%	63.01	0%	-1211.88	0%
161	161	LinStatic	1713.33	1%	78.44	0%	-70.6	0%	-1149.71	0%
161	161	LinStatic	2487.22	1%	179.4	0%	-152.29	0%	-1897.89	1%
162	162	LinStatic	2474.87	1%	172	0%	-188.16	0%	-1893.18	1%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
162	162	LinStatic	1702.12	1%	110.45	0%	-82.85	0%	-1116.8	0%
162	162	LinStatic	1672.12	1%	183.88	0%	-167.14	0%	-1069.3	0%
162	162	LinStatic	2431.12	1%	287.36	0%	-307.63	0%	-1838.68	1%
163	163	LinStatic	2434.2	1%	306.42	0%	-292.19	0%	-1832.06	1%
163	163	LinStatic	1661.56	1%	172.12	0%	-190.75	0%	-1069.04	0%
163	163	LinStatic	1661.56	1%	172.12	0%	-190.75	0%	-1069.04	0%
163	163	LinStatic	2434.2	1%	306.42	0%	-292.19	0%	-1832.06	1%
164	164	LinStatic	2431.12	1%	287.36	0%	-307.63	0%	-1838.68	1%
164	164	LinStatic	1672.12	1%	183.88	0%	-167.14	0%	-1069.3	0%
164	164	LinStatic	1702.12	1%	110.45	0%	-82.85	0%	-1116.8	0%
164	164	LinStatic	2474.87	1%	172	0%	-188.16	0%	-1893.18	1%
165	165	LinStatic	2487.22	1%	179.4	0%	-152.29	0%	-1897.89	1%
165	165	LinStatic	1713.33	1%	78.44	0%	-70.6	0%	-1149.71	0%
165	165	LinStatic	1777.86	1%	-66.37	0%	63.01	0%	-1211.88	0%
165	165	LinStatic	2575.55	1%	-17.83	0%	36.45	0%	-1986.58	1%
166	166	LinStatic	1783.79	1%	-67.69	0%	87.02	0%	-1241.42	0%
166	166	LinStatic	1040.04	0%	-106.83	0%	240.81	0%	-566.77	0%
166	166	LinStatic	986.65	0%	-9.11	0%	99.21	0%	-466.44	0%
166	166	LinStatic	1722.36	1%	64.18	0%	-69.96	0%	-1151.81	0%
167	167	LinStatic	1707.12	1%	100.22	0%	-82.46	0%	-1118.65	0%
167	167	LinStatic	940.03	0%	16.16	0%	11.75	0%	-402.24	0%
167	167	LinStatic	895.27	0%	85.58	0%	-56.57	0%	-354.98	0%
167	167	LinStatic	1666.34	1%	184.14	0%	-162	0%	-1078.66	0%
168	168	LinStatic	1656.8	1%	171.35	0%	-189.73	0%	-1074.28	0%
168	168	LinStatic	889.19	0%	113.02	0%	-88.12	0%	-302.57	0%
168	168	LinStatic	889.19	0%	113.02	0%	-88.12	0%	-302.57	0%
168	168	LinStatic	1656.8	1%	171.35	0%	-189.73	0%	-1074.28	0%
169	169	LinStatic	1666.34	1%	184.14	0%	-162	0%	-1078.66	0%
169	169	LinStatic	895.27	0%	85.58	0%	-56.57	0%	-354.98	0%
169	169	LinStatic	940.03	0%	16.16	0%	11.75	0%	-402.24	0%
169	169	LinStatic	1707.12	1%	100.22	0%	-82.46	0%	-1118.65	0%
170	170	LinStatic	1722.36	1%	64.18	0%	-69.96	0%	-1151.81	0%
170	170	LinStatic	986.65	0%	-9.11	0%	99.21	0%	-466.44	0%
170	170	LinStatic	1040.04	0%	-106.83	0%	240.81	0%	-566.77	0%
170	170	LinStatic	1783.79	1%	-67.69	0%	87.02	0%	-1241.42	0%
171	171	LinStatic	1064.81	0%	-130.41	0%	234.62	0%	-566.16	0%
171	171	LinStatic	457.02	0%	-343.07	0%	663.07	0%	-215.06	0%
171	171	LinStatic	351.33	0%	-214.35	0%	606.61	0%	-180.74	0%
171	171	LinStatic	979.24	0%	-6.24	0%	131.05	0%	-500.31	0%
172	172	LinStatic	933.53	0%	18.12	0%	41.13	0%	-433.65	0%
172	172	LinStatic	273.54	0%	-115.27	0%	549.86	0%	-103.21	0%
172	172	LinStatic	217.99	0%	-47.41	0%	502.5	0%	-66.74	0%
172	172	LinStatic	898.92	0%	77.12	0%	-69.94	0%	-345.55	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
173	173	LinStatic	887.96	0%	109.43	0%	-94.56	0%	-300.08	0%
173	173	LinStatic	131.73	0%	17.52	0%	477.31	0%	-63.13	0%
173	173	LinStatic	131.73	0%	17.52	0%	477.31	0%	-63.13	0%
173	173	LinStatic	887.96	0%	109.43	0%	-94.56	0%	-300.08	0%
174	174	LinStatic	898.92	0%	77.12	0%	-69.94	0%	-345.55	0%
174	174	LinStatic	217.99	0%	-47.41	0%	502.5	0%	-66.74	0%
174	174	LinStatic	273.54	0%	-115.27	0%	549.86	0%	-103.21	0%
174	174	LinStatic	933.53	0%	18.12	0%	41.13	0%	-433.65	0%
175	175	LinStatic	979.24	0%	-6.24	0%	131.05	0%	-500.31	0%
175	175	LinStatic	351.33	0%	-214.35	0%	606.61	0%	-180.74	0%
175	175	LinStatic	457.02	0%	-343.07	0%	663.07	0%	-215.06	0%
175	175	LinStatic	1064.81	0%	-130.41	0%	234.62	0%	-566.16	0%
176	176	LinStatic	444.27	0%	-330.7	0%	685.61	0%	-242.8	0%
176	176	LinStatic	184.03	0%	-843.99	0%	1374.21	0%	-113.15	0%
176	176	LinStatic	138.55	0%	-791.74	0%	1318.86	0%	-64.76	0%
176	176	LinStatic	377.27	0%	-244.52	0%	594.35	0%	-170.92	0%
177	177	LinStatic	299.26	0%	-145.22	0%	539.2	0%	-94.99	0%
177	177	LinStatic	67.66	0%	-742.09	0%	1280.55	0%	-47.9	0%
177	177	LinStatic	25.26	0%	-696.68	0%	1266.31	0%	-36.44	0%
177	177	LinStatic	197.41	0%	-31.08	0%	509.93	0%	-77.79	0%
178	178	LinStatic	113.83	0%	31.17	0%	478.07	0%	-67.51	0%
178	178	LinStatic	24.19	0%	-674.23	0%	1258.95	0%	-7.77	0%
178	178	LinStatic	24.19	0%	-674.23	0%	1258.95	0%	-7.77	0%
178	178	LinStatic	113.83	0%	31.17	0%	478.07	0%	-67.51	0%
179	179	LinStatic	197.41	0%	-31.08	0%	509.93	0%	-77.79	0%
179	179	LinStatic	25.26	0%	-696.68	0%	1266.31	0%	-36.44	0%
179	179	LinStatic	67.66	0%	-742.09	0%	1280.55	0%	-47.9	0%
179	179	LinStatic	299.26	0%	-145.22	0%	539.2	0%	-94.99	0%
180	180	LinStatic	377.27	0%	-244.52	0%	594.35	0%	-170.92	0%
180	180	LinStatic	138.55	0%	-791.74	0%	1318.86	0%	-64.76	0%
180	180	LinStatic	184.03	0%	-843.99	0%	1374.21	0%	-113.15	0%
180	180	LinStatic	444.27	0%	-330.7	0%	685.61	0%	-242.8	0%
181	181	LinStatic	201.78	0%	-862.74	0%	1360.25	0%	-104.2	0%
181	181	LinStatic	99.09	0%	-1575.61	0%	2109.36	1%	-78.88	0%
181	181	LinStatic	35.73	0%	-1519.82	0%	2079.26	1%	-42.15	0%
181	181	LinStatic	124.43	0%	-781.74	0%	1327.07	0%	-75.61	0%
182	182	LinStatic	56.17	0%	-734.71	0%	1285.99	0%	-55.97	0%
182	182	LinStatic	22.91	0%	-1485.2	0%	2061.27	1%	-2.1	0%
182	182	LinStatic	-0.15	0%	-1467.43	0%	2040.03	1%	24.03	0%
182	182	LinStatic	31.94	0%	-707.32	0%	1259.69	0%	-33.25	0%
183	183	LinStatic	25.9	0%	-679.89	0%	1254.96	0%	-7.21	0%
183	183	LinStatic	-27.83	0%	-1461.49	0%	2028.91	1%	13.52	0%
183	183	LinStatic	-27.83	0%	-1461.49	0%	2028.91	1%	13.52	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
183	183	LinStatic	25.9	0%	-679.89	0%	1254.96	0%	-7.21	0%
184	184	LinStatic	31.94	0%	-707.32	0%	1259.69	0%	-33.25	0%
184	184	LinStatic	-0.15	0%	-1467.43	0%	2040.03	1%	24.03	0%
184	184	LinStatic	22.91	0%	-1485.2	0%	2061.27	1%	-2.1	0%
184	184	LinStatic	56.17	0%	-734.71	0%	1285.99	0%	-55.97	0%
185	185	LinStatic	124.43	0%	-781.74	0%	1327.07	0%	-75.61	0%
185	185	LinStatic	35.73	0%	-1519.82	0%	2079.26	1%	-42.15	0%
185	185	LinStatic	99.09	0%	-1575.61	0%	2109.36	1%	-78.88	0%
185	185	LinStatic	201.78	0%	-862.74	0%	1360.25	0%	-104.2	0%
186	186	LinStatic	86.68	0%	-1564.33	0%	2112.04	1%	-86.8	0%
186	186	LinStatic	70.13	0%	-2321.27	1%	2890.95	1%	-46.11	0%
186	186	LinStatic	11.28	0%	-2285.72	1%	2847.57	1%	19.33	0%
186	186	LinStatic	41.99	0%	-1530.18	0%	2070.22	1%	-35.69	0%
187	187	LinStatic	27.2	0%	-1493.59	0%	2054.21	1%	2.38	0%
187	187	LinStatic	-26.33	0%	-2270.83	1%	2827.47	1%	17.57	0%
187	187	LinStatic	-65.71	0%	-2246.14	1%	2810.49	1%	48.33	0%
187	187	LinStatic	-4.99	0%	-1466.44	0%	2040.05	1%	20.69	0%
188	188	LinStatic	-30.04	0%	-1463.13	0%	2027.21	1%	11.9	0%
188	188	LinStatic	-53.68	0%	-2235.81	1%	2810.38	1%	71.1	0%
188	188	LinStatic	-53.68	0%	-2235.81	1%	2810.38	1%	71.1	0%
188	188	LinStatic	-30.04	0%	-1463.13	0%	2027.21	1%	11.9	0%
189	189	LinStatic	-4.99	0%	-1466.44	0%	2040.05	1%	20.69	0%
189	189	LinStatic	-65.71	0%	-2246.14	1%	2810.49	1%	48.33	0%
189	189	LinStatic	-26.33	0%	-2270.83	1%	2827.47	1%	17.57	0%
189	189	LinStatic	27.2	0%	-1493.59	0%	2054.21	1%	2.38	0%
190	190	LinStatic	41.99	0%	-1530.18	0%	2070.22	1%	-35.69	0%
190	190	LinStatic	11.28	0%	-2285.72	1%	2847.57	1%	19.33	0%
190	190	LinStatic	70.13	0%	-2321.27	1%	2890.95	1%	-46.11	0%
190	190	LinStatic	86.68	0%	-1564.33	0%	2112.04	1%	-86.8	0%
191	191	LinStatic	74.05	0%	-2325.36	1%	2878.33	1%	-38.8	0%
191	191	LinStatic	36.76	0%	-3111.05	1%	3660.42	1%	-42.28	0%
191	191	LinStatic	-59.77	0%	-3059.71	1%	3618.46	1%	42.1	0%
191	191	LinStatic	2.34	0%	-2281.23	1%	2848.5	1%	15.84	0%
192	192	LinStatic	-32.98	0%	-2268.64	1%	2827.54	1%	14.94	0%
192	192	LinStatic	-54.56	0%	-3042.2	1%	3612.73	1%	71.8	0%
192	192	LinStatic	-104.72	0%	-3019.09	1%	3586.16	1%	124.89	0%
192	192	LinStatic	-64.46	0%	-2251.05	1%	2805.96	1%	49.87	0%
193	193	LinStatic	-53.83	0%	-2239.33	1%	2807.34	1%	71.14	0%
193	193	LinStatic	-127.4	0%	-3020.46	1%	3578.17	1%	109.39	0%
193	193	LinStatic	-127.4	0%	-3020.46	1%	3578.17	1%	109.39	0%
193	193	LinStatic	-53.83	0%	-2239.33	1%	2807.34	1%	71.14	0%
194	194	LinStatic	-64.46	0%	-2251.05	1%	2805.96	1%	49.87	0%
194	194	LinStatic	-104.72	0%	-3019.09	1%	3586.16	1%	124.89	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
194	194	LinStatic	-54.56	0%	-3042.2	1%	3612.73	1%	71.8	0%
194	194	LinStatic	-32.98	0%	-2268.64	1%	2827.54	1%	14.94	0%
195	195	LinStatic	2.34	0%	-2281.23	1%	2848.5	1%	15.84	0%
195	195	LinStatic	-59.77	0%	-3059.71	1%	3618.46	1%	42.1	0%
195	195	LinStatic	36.76	0%	-3111.05	1%	3660.42	1%	-42.28	0%
195	195	LinStatic	74.05	0%	-2325.36	1%	2878.33	1%	-38.8	0%
196	196	LinStatic	26.99	0%	-3101.35	1%	3655.61	1%	-44.89	0%
196	196	LinStatic	33.14	0%	-3892.15	1%	4459.55	1%	-14.18	0%
196	196	LinStatic	-99.41	0%	-3834.63	1%	4395.16	1%	123.02	0%
196	196	LinStatic	-59.61	0%	-3064.7	1%	3610.99	1%	47.45	0%
197	197	LinStatic	-54.78	0%	-3046.8	1%	3607.07	1%	75.35	0%
197	197	LinStatic	-129.42	0%	-3832.87	1%	4383.03	1%	110.37	0%
197	197	LinStatic	-211.05	0%	-3795.97	1%	4350.72	1%	188.68	0%
197	197	LinStatic	-107.6	0%	-3019.26	1%	3585.63	1%	123.33	0%
198	198	LinStatic	-128.81	0%	-3022.11	1%	3576.91	1%	108.55	0%
198	198	LinStatic	-194.61	0%	-3789.11	1%	4354.33	1%	209.35	0%
198	198	LinStatic	-194.61	0%	-3789.11	1%	4354.33	1%	209.35	0%
198	198	LinStatic	-128.81	0%	-3022.11	1%	3576.91	1%	108.55	0%
199	199	LinStatic	-107.6	0%	-3019.26	1%	3585.63	1%	123.33	0%
199	199	LinStatic	-211.05	0%	-3795.97	1%	4350.72	1%	188.68	0%
199	199	LinStatic	-129.42	0%	-3832.87	1%	4383.03	1%	110.37	0%
199	199	LinStatic	-54.78	0%	-3046.8	1%	3607.07	1%	75.35	0%
200	200	LinStatic	-59.61	0%	-3064.7	1%	3610.99	1%	47.45	0%
200	200	LinStatic	-99.41	0%	-3834.63	1%	4395.16	1%	123.02	0%
200	200	LinStatic	33.14	0%	-3892.15	1%	4459.55	1%	-14.18	0%
200	200	LinStatic	26.99	0%	-3101.35	1%	3655.61	1%	-44.89	0%
201	201	LinStatic	32.05	0%	-3890.4	1%	4443.56	1%	-8.78	0%
201	201	LinStatic	3.65	0%	-4708.18	1%	5251.96	2%	-21.45	0%
201	201	LinStatic	-212.22	0%	-4618.28	1%	5167.12	2%	189.25	0%
201	201	LinStatic	-107.01	0%	-3833.02	1%	4393.58	1%	122.77	0%
202	202	LinStatic	-134.91	0%	-3833.37	1%	4381.52	1%	110.04	0%
202	202	LinStatic	-199.04	0%	-4609.97	1%	5168.68	2%	209.96	0%
202	202	LinStatic	-324.05	0%	-4556.7	1%	5119.99	2%	338.56	0%
202	202	LinStatic	-210.69	0%	-3797.53	1%	4349.52	1%	190.16	0%
203	203	LinStatic	-194.68	0%	-3790.23	1%	4354.1	1%	209.86	0%
203	203	LinStatic	-348.35	0%	-4563.08	1%	5112.96	2%	316.71	0%
203	203	LinStatic	-348.35	0%	-4563.08	1%	5112.96	2%	316.71	0%
203	203	LinStatic	-194.68	0%	-3790.23	1%	4354.1	1%	209.86	0%
204	204	LinStatic	-210.69	0%	-3797.53	1%	4349.52	1%	190.16	0%
204	204	LinStatic	-324.05	0%	-4556.7	1%	5119.99	2%	338.56	0%
204	204	LinStatic	-199.04	0%	-4609.97	1%	5168.68	2%	209.96	0%
204	204	LinStatic	-134.91	0%	-3833.37	1%	4381.52	1%	110.04	0%
205	205	LinStatic	-107.01	0%	-3833.02	1%	4393.58	1%	122.77	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
205	205	LinStatic	-212.22	0%	-4618.28	1%	5167.12	2%	189.25	0%
205	205	LinStatic	3.65	0%	-4708.18	1%	5251.96	2%	-21.45	0%
205	205	LinStatic	32.05	0%	-3890.4	1%	4443.56	1%	-8.78	0%
206	206	LinStatic	-4.77	0%	-4702.72	1%	5234.14	2%	-23.93	0%
206	206	LinStatic	4.01	0%	-5532.95	2%	6077.75	2%	13.64	0%
206	206	LinStatic	-316.97	0%	-5394.62	2%	5949.07	2%	339.91	0%
206	206	LinStatic	-215.14	0%	-4622.66	1%	5162.29	2%	193.14	0%
207	207	LinStatic	-201.44	0%	-4614.87	1%	5165.49	2%	212.22	0%
207	207	LinStatic	-356.7	0%	-5405.56	2%	5941.35	2%	315.89	0%
207	207	LinStatic	-556.79	0%	-5317.75	2%	5872.26	2%	521.51	0%
207	207	LinStatic	-324.29	0%	-4553.69	1%	5124.09	2%	339.53	0%
208	208	LinStatic	-347.95	0%	-4560.71	1%	5116.93	2%	317.82	0%
208	208	LinStatic	-540.4	0%	-5312.71	2%	5877.46	2%	538.73	0%
208	208	LinStatic	-540.4	0%	-5312.71	2%	5877.46	2%	538.73	0%
208	208	LinStatic	-347.95	0%	-4560.71	1%	5116.93	2%	317.82	0%
209	209	LinStatic	-324.29	0%	-4553.69	1%	5124.09	2%	339.53	0%
209	209	LinStatic	-556.79	0%	-5317.75	2%	5872.26	2%	521.51	0%
209	209	LinStatic	-356.7	0%	-5405.56	2%	5941.35	2%	315.89	0%
209	209	LinStatic	-201.44	0%	-4614.87	1%	5165.49	2%	212.22	0%
210	210	LinStatic	-215.14	0%	-4622.66	1%	5162.29	2%	193.14	0%
210	210	LinStatic	-316.97	0%	-5394.62	2%	5949.07	2%	339.91	0%
210	210	LinStatic	4.01	0%	-5532.95	2%	6077.75	2%	13.64	0%
210	210	LinStatic	-4.77	0%	-4702.72	1%	5234.14	2%	-23.93	0%
211	211	LinStatic	0.14	0%	-5537.93	2%	6046.11	2%	8.77	0%
211	211	LinStatic	-0.73	0%	-6407.24	2%	6902.71	2%	-35.13	0%
211	211	LinStatic	-558.47	0%	-6196.06	2%	6728.97	2%	536.94	0%
211	211	LinStatic	-319.88	0%	-5401.33	2%	5949.49	2%	340.58	0%
212	212	LinStatic	-358.06	0%	-5413.81	2%	5942.24	2%	316.09	0%
212	212	LinStatic	-536.72	0%	-6189.3	2%	6727.4	2%	532.33	0%
212	212	LinStatic	-863.98	0%	-6052.8	2%	6634.99	2%	869.74	0%
212	212	LinStatic	-554.65	0%	-5310.71	2%	5881.97	2%	524.1	0%
213	213	LinStatic	-538.27	0%	-5305.65	2%	5887.07	2%	541.41	0%
213	213	LinStatic	-902.26	0%	-6062.31	2%	6625.47	2%	844.57	0%
213	213	LinStatic	-902.26	0%	-6062.31	2%	6625.47	2%	844.57	0%
213	213	LinStatic	-538.27	0%	-5305.65	2%	5887.07	2%	541.41	0%
214	214	LinStatic	-554.65	0%	-5310.71	2%	5881.97	2%	524.1	0%
214	214	LinStatic	-863.98	0%	-6052.8	2%	6634.99	2%	869.74	0%
214	214	LinStatic	-536.72	0%	-6189.3	2%	6727.4	2%	532.33	0%
214	214	LinStatic	-358.06	0%	-5413.81	2%	5942.24	2%	316.09	0%
215	215	LinStatic	-319.88	0%	-5401.33	2%	5949.49	2%	340.58	0%
215	215	LinStatic	-558.47	0%	-6196.06	2%	6728.97	2%	536.94	0%
215	215	LinStatic	-0.73	0%	-6407.24	2%	6902.71	2%	-35.13	0%
215	215	LinStatic	0.14	0%	-5537.93	2%	6046.11	2%	8.77	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
216	216	LinStatic	1.74	0%	-6432.55	2%	6857.38	2%	-53.16	0%
216	216	LinStatic	-59.54	0%	-7321.58	2%	7769.87	2%	94.19	0%
216	216	LinStatic	-764.99	0%	-6954.2	2%	7501.83	2%	821.63	0%
216	216	LinStatic	-557.65	0%	-6214.39	2%	6736.31	2%	530.48	0%
217	217	LinStatic	-535.53	0%	-6208	2%	6734.94	2%	525.66	0%
217	217	LinStatic	-890.65	0%	-6985.16	2%	7495.97	2%	839.12	0%
217	217	LinStatic	-1404.38	0%	-6823.48	2%	7416.51	2%	1382.02	0%
217	217	LinStatic	-856.16	0%	-6041.31	2%	6651.53	2%	874.39	0%
218	218	LinStatic	-896.62	0%	-6048.64	2%	6641.82	2%	849.41	0%
218	218	LinStatic	-1385.75	0%	-6803.54	2%	7407.6	2%	1374.59	0%
218	218	LinStatic	-1385.75	0%	-6803.54	2%	7407.6	2%	1374.59	0%
218	218	LinStatic	-896.62	0%	-6048.64	2%	6641.82	2%	849.41	0%
219	219	LinStatic	-856.16	0%	-6041.31	2%	6651.53	2%	874.39	0%
219	219	LinStatic	-1404.38	0%	-6823.48	2%	7416.51	2%	1382.02	0%
219	219	LinStatic	-890.65	0%	-6985.16	2%	7495.97	2%	839.12	0%
219	219	LinStatic	-535.53	0%	-6208	2%	6734.94	2%	525.66	0%
220	220	LinStatic	-557.65	0%	-6214.39	2%	6736.31	2%	530.48	0%
220	220	LinStatic	-764.99	0%	-6954.2	2%	7501.83	2%	821.63	0%
220	220	LinStatic	-59.54	0%	-7321.58	2%	7769.87	2%	94.19	0%
220	220	LinStatic	1.74	0%	-6432.55	2%	6857.38	2%	-53.16	0%
221	221	LinStatic	-45.7	0%	-7366.63	2%	7688.79	2%	29.51	0%
221	221	LinStatic	300.02	0%	-8293.77	3%	8548.91	3%	-458.43	0%
221	221	LinStatic	-1676.9	1%	-7702.65	2%	8219.93	3%	1644.3	1%
221	221	LinStatic	-734.55	0%	-6983.05	2%	7586.1	2%	825.4	0%
222	222	LinStatic	-867.39	0%	-7006.83	2%	7573.88	2%	849.25	0%
222	222	LinStatic	-1495.84	0%	-7520.18	2%	8126.35	3%	1531.01	0%
222	222	LinStatic	-2028.23	1%	-7759.95	2%	8366.82	3%	2054.46	1%
222	222	LinStatic	-1403.25	0%	-6825.03	2%	7398.41	2%	1370.53	0%
223	223	LinStatic	-1385.52	0%	-6804.17	2%	7386.33	2%	1366.28	0%
223	223	LinStatic	-2029.33	1%	-7748.92	2%	8391.61	3%	2211.69	1%
223	223	LinStatic	-2029.33	1%	-7748.92	2%	8391.61	3%	2211.69	1%
223	223	LinStatic	-1385.52	0%	-6804.17	2%	7386.33	2%	1366.28	0%
224	224	LinStatic	-1403.25	0%	-6825.03	2%	7398.41	2%	1370.53	0%
224	224	LinStatic	-2028.23	1%	-7759.95	2%	8366.82	3%	2054.46	1%
224	224	LinStatic	-1495.84	0%	-7520.18	2%	8126.35	3%	1531.01	0%
224	224	LinStatic	-867.39	0%	-7006.83	2%	7573.88	2%	849.25	0%
225	225	LinStatic	-734.55	0%	-6983.05	2%	7586.1	2%	825.4	0%
225	225	LinStatic	-1676.9	1%	-7702.65	2%	8219.93	3%	1644.3	1%
225	225	LinStatic	300.02	0%	-8293.77	3%	8548.91	3%	-458.43	0%
225	225	LinStatic	-45.7	0%	-7366.63	2%	7688.79	2%	29.51	0%
226	226	LinStatic	396.53	0%	-8753.77	3%	8619.36	3%	-546.46	0%
226	226	LinStatic	-867.59	0%	-6953.54	2%	7148.45	2%	1178.34	0%
226	226	LinStatic	-2077.87	1%	-8843.13	3%	9807.18	3%	2571.37	1%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
226	226	LinStatic	-1621.84	1%	-7566.26	2%	8242.59	3%	1613.05	1%
227	227	LinStatic	-1452.24	0%	-7372.33	2%	8133.65	3%	1515.11	0%
227	227	LinStatic	-2796.43	1%	-9049.49	3%	9894.66	3%	3224.16	1%
227	227	LinStatic	-2811.17	1%	-9066.71	3%	9615.47	3%	3143.73	1%
227	227	LinStatic	-2062.54	1%	-7839.41	2%	8292.87	3%	2041.72	1%
228	228	LinStatic	-2056.96	1%	-7835.07	2%	8323.79	3%	2192.82	1%
228	228	LinStatic	-2488.47	1%	-8964.88	3%	9468.21	3%	2673.26	1%
228	228	LinStatic	-2488.47	1%	-8964.88	3%	9468.21	3%	2673.26	1%
228	228	LinStatic	-2056.96	1%	-7835.07	2%	8323.79	3%	2192.82	1%
229	229	LinStatic	-2062.54	1%	-7839.41	2%	8292.87	3%	2041.72	1%
229	229	LinStatic	-2811.17	1%	-9066.71	3%	9615.47	3%	3143.73	1%
229	229	LinStatic	-2796.43	1%	-9049.49	3%	9894.66	3%	3224.16	1%
229	229	LinStatic	-1452.24	0%	-7372.33	2%	8133.65	3%	1515.11	0%
230	230	LinStatic	-1621.84	1%	-7566.26	2%	8242.59	3%	1613.05	1%
230	230	LinStatic	-2077.87	1%	-8843.13	3%	9807.18	3%	2571.37	1%
230	230	LinStatic	-867.59	0%	-6953.54	2%	7148.45	2%	1178.34	0%
230	230	LinStatic	396.53	0%	-8753.77	3%	8619.36	3%	-546.46	0%
323	323	LinStatic	-1152.76	0%	-7284.3	2%	6337.75	2%	1120.15	0%
323	323	LinStatic	4.53	0%	-4862.59	2%	3798.05	1%	-526.43	0%
323	323	LinStatic	-1317.65	0%	-3363.23	1%	3932.97	1%	1314.94	0%
323	323	LinStatic	-2374.12	1%	-8986.57	3%	9640.91	3%	2894.08	1%
324	324	LinStatic	-2860.25	1%	-9101.08	3%	9736.89	3%	3214.08	1%
324	324	LinStatic	-1183.19	0%	-3361.94	1%	3854.54	1%	1137.96	0%
324	324	LinStatic	-1656.42	1%	-3934.34	1%	3985.01	1%	1507.18	0%
324	324	LinStatic	-2805.66	1%	-9242.29	3%	9446.61	3%	3045.04	1%
325	325	LinStatic	-2566.87	1%	-9151.26	3%	9314.28	3%	2654.37	1%
325	325	LinStatic	-1649.06	1%	-3878.65	1%	4017.56	1%	1683.96	1%
325	325	LinStatic	-1649.06	1%	-3878.65	1%	4017.56	1%	1683.96	1%
325	325	LinStatic	-2566.87	1%	-9151.26	3%	9314.28	3%	2654.37	1%
326	326	LinStatic	-2805.66	1%	-9242.29	3%	9446.61	3%	3045.04	1%
326	326	LinStatic	-1656.42	1%	-3934.34	1%	3985.01	1%	1507.18	0%
326	326	LinStatic	-1183.19	0%	-3361.94	1%	3854.54	1%	1137.96	0%
326	326	LinStatic	-2860.25	1%	-9101.08	3%	9736.89	3%	3214.08	1%
327	327	LinStatic	-2374.12	1%	-8986.57	3%	9640.91	3%	2894.08	1%
327	327	LinStatic	-1317.65	0%	-3363.23	1%	3932.97	1%	1314.94	0%
327	327	LinStatic	4.53	0%	-4862.59	2%	3798.05	1%	-526.43	0%
327	327	LinStatic	-1152.76	0%	-7284.3	2%	6337.75	2%	1120.15	0%
328	328	LinStatic	260.85	0%	-4410.49	1%	4159.43	1%	-517.7	0%
328	328	LinStatic	967.35	0%	-906.31	0%	765.55	0%	-1141.35	0%
328	328	LinStatic	679.04	0%	-572.73	0%	735.36	0%	-651.7	0%
328	328	LinStatic	-1399.44	0%	-3664.8	1%	3824.85	1%	1236.21	0%
329	329	LinStatic	-1284.5	0%	-3643.99	1%	3718	1%	1087.65	0%
329	329	LinStatic	435.28	0%	-487.02	0%	534.54	0%	-476.84	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
329	329	LinStatic	578.08	0%	-704.83	0%	703.46	0%	-366.57	0%
329	329	LinStatic	-1669.87	1%	-3817.26	1%	4036.26	1%	1532.2	0%
330	330	LinStatic	-1637.1	1%	-3786.99	1%	4075.23	1%	1702.56	1%
330	330	LinStatic	557.67	0%	-715.56	0%	591.15	0%	-333.65	0%
330	330	LinStatic	557.67	0%	-715.56	0%	591.15	0%	-333.65	0%
330	330	LinStatic	-1637.1	1%	-3786.99	1%	4075.23	1%	1702.56	1%
331	331	LinStatic	-1669.87	1%	-3817.26	1%	4036.26	1%	1532.2	0%
331	331	LinStatic	578.08	0%	-704.83	0%	703.46	0%	-366.57	0%
331	331	LinStatic	435.28	0%	-487.02	0%	534.54	0%	-476.84	0%
331	331	LinStatic	-1284.5	0%	-3643.99	1%	3718	1%	1087.65	0%
332	332	LinStatic	-1399.44	0%	-3664.8	1%	3824.85	1%	1236.21	0%
332	332	LinStatic	679.04	0%	-572.73	0%	735.36	0%	-651.7	0%
332	332	LinStatic	967.35	0%	-906.31	0%	765.55	0%	-1141.35	0%
332	332	LinStatic	260.85	0%	-4410.49	1%	4159.43	1%	-517.7	0%
333	333	LinStatic	1050.87	0%	-915.68	0%	973.85	0%	-1108.31	0%
333	333	LinStatic	4134.34	1%	-241.96	0%	222.82	0%	-4187.5	1%
333	333	LinStatic	4016.29	1%	-89.96	0%	73.87	0%	-3972.53	1%
333	333	LinStatic	808.77	0%	-690.37	0%	748.2	0%	-765.9	0%
334	334	LinStatic	520.23	0%	-559.87	0%	532.94	0%	-576.61	0%
334	334	LinStatic	3940.79	1%	-21.55	0%	-24.6	0%	-3902.86	1%
334	334	LinStatic	4008.19	1%	-7.35	0%	4.32	0%	-3827.6	1%
334	334	LinStatic	530.51	0%	-726.03	0%	705.18	0%	-407.2	0%
335	335	LinStatic	506.1	0%	-732.75	0%	585.62	0%	-367.03	0%
335	335	LinStatic	3988.36	1%	-23.72	0%	-29.33	0%	-3814.65	1%
335	335	LinStatic	3988.36	1%	-23.72	0%	-29.33	0%	-3814.65	1%
335	335	LinStatic	506.1	0%	-732.75	0%	585.62	0%	-367.03	0%
336	336	LinStatic	530.51	0%	-726.03	0%	705.18	0%	-407.2	0%
336	336	LinStatic	4008.19	1%	-7.35	0%	4.32	0%	-3827.6	1%
336	336	LinStatic	3940.79	1%	-21.55	0%	-24.6	0%	-3902.86	1%
336	336	LinStatic	520.23	0%	-559.87	0%	532.94	0%	-576.61	0%
337	337	LinStatic	808.77	0%	-690.37	0%	748.2	0%	-765.9	0%
337	337	LinStatic	4016.29	1%	-89.96	0%	73.87	0%	-3972.53	1%
337	337	LinStatic	4134.34	1%	-241.96	0%	222.82	0%	-4187.5	1%
337	337	LinStatic	1050.87	0%	-915.68	0%	973.85	0%	-1108.31	0%
338	338	LinStatic	4152.25	1%	-237.01	0%	218.77	0%	-4100.96	1%
338	338	LinStatic	6972.4	2%	-134.79	0%	131.75	0%	-6907.23	2%
338	338	LinStatic	6807.47	2%	237.86	0%	-228.14	0%	-6732.92	2%
338	338	LinStatic	4037.28	1%	-85.11	0%	82.68	0%	-3979.65	1%
339	339	LinStatic	3962.73	1%	-17.66	0%	-17.12	0%	-3908.64	1%
339	339	LinStatic	6762.39	2%	252.59	0%	-277.76	0%	-6696.33	2%
339	339	LinStatic	6739.44	2%	386.9	0%	-404.85	0%	-6626.48	2%
339	339	LinStatic	3974.45	1%	-22.84	0%	-9.82	0%	-3868.36	1%
340	340	LinStatic	3951.63	1%	-36.21	0%	-42.57	0%	-3856.3	1%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
340	340	LinStatic	6730.8	2%	398.16	0%	-411.84	0%	-6616.04	2%
340	340	LinStatic	6730.8	2%	398.16	0%	-411.84	0%	-6616.04	2%
340	340	LinStatic	3951.63	1%	-36.21	0%	-42.57	0%	-3856.3	1%
341	341	LinStatic	3974.45	1%	-22.84	0%	-9.82	0%	-3868.36	1%
341	341	LinStatic	6739.44	2%	386.9	0%	-404.85	0%	-6626.48	2%
341	341	LinStatic	6762.39	2%	252.59	0%	-277.76	0%	-6696.33	2%
341	341	LinStatic	3962.73	1%	-17.66	0%	-17.12	0%	-3908.64	1%
342	342	LinStatic	4037.28	1%	-85.11	0%	82.68	0%	-3979.65	1%
342	342	LinStatic	6807.47	2%	237.86	0%	-228.14	0%	-6732.92	2%
342	342	LinStatic	6972.4	2%	-134.79	0%	131.75	0%	-6907.23	2%
342	342	LinStatic	4152.25	1%	-237.01	0%	218.77	0%	-4100.96	1%
343	343	LinStatic	6941.28	2%	-105.97	0%	116.67	0%	-6856.17	2%
343	343	LinStatic	9081.11	3%	-61.48	0%	57.06	0%	-8997.58	3%
343	343	LinStatic	8894.54	3%	401.48	0%	-411.65	0%	-8813.65	3%
343	343	LinStatic	6810.91	2%	243.19	0%	-240.21	0%	-6726.48	2%
344	344	LinStatic	6766.74	2%	257.01	0%	-286.62	0%	-6693.11	2%
344	344	LinStatic	8876.53	3%	424.5	0%	-425.08	0%	-8793.05	3%
344	344	LinStatic	8809.15	3%	634.08	0%	-630.32	0%	-8717.31	3%
344	344	LinStatic	6725.25	2%	384.33	0%	-409.42	0%	-6643.42	2%
345	345	LinStatic	6717.46	2%	394.74	0%	-416.71	0%	-6632.69	2%
345	345	LinStatic	8801.84	3%	630.73	0%	-642.2	0%	-8713.82	3%
345	345	LinStatic	8801.84	3%	630.73	0%	-642.2	0%	-8713.82	3%
345	345	LinStatic	6717.46	2%	394.74	0%	-416.71	0%	-6632.69	2%
346	346	LinStatic	6725.25	2%	384.33	0%	-409.42	0%	-6643.42	2%
346	346	LinStatic	8809.15	3%	634.08	0%	-630.32	0%	-8717.31	3%
346	346	LinStatic	8876.53	3%	424.5	0%	-425.08	0%	-8793.05	3%
346	346	LinStatic	6766.74	2%	257.01	0%	-286.62	0%	-6693.11	2%
347	347	LinStatic	6810.91	2%	243.19	0%	-240.21	0%	-6726.48	2%
347	347	LinStatic	8894.54	3%	401.48	0%	-411.65	0%	-8813.65	3%
347	347	LinStatic	9081.11	3%	-61.48	0%	57.06	0%	-8997.58	3%
347	347	LinStatic	6941.28	2%	-105.97	0%	116.67	0%	-6856.17	2%
348	348	LinStatic	9054.72	3%	-43.18	0%	36.42	0%	-8963.33	3%
348	348	LinStatic	10484.15	3%	-17.69	0%	22.27	0%	-10389.32	3%
348	348	LinStatic	10286.46	3%	510.29	0%	-507.16	0%	-10202.13	3%
348	348	LinStatic	8888.81	3%	412.17	0%	-419.87	0%	-8808.43	3%
349	349	LinStatic	8873.85	3%	432.13	0%	-430.9	0%	-8790.23	3%
349	349	LinStatic	10278.22	3%	512.64	0%	-515.7	0%	-10195.47	3%
349	349	LinStatic	10194.07	3%	759.7	0%	-763.81	0%	-10111.81	3%
349	349	LinStatic	8805.07	3%	633.46	0%	-633.63	0%	-8721.59	3%
350	350	LinStatic	8798.07	3%	629.8	0%	-644.47	0%	-8719.14	3%
350	350	LinStatic	10193.01	3%	765.03	0%	-761.54	0%	-10108.64	3%
350	350	LinStatic	10193.01	3%	765.03	0%	-761.54	0%	-10108.64	3%
350	350	LinStatic	8798.07	3%	629.8	0%	-644.47	0%	-8719.14	3%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
351	351	LinStatic	8805.07	3%	633.46	0%	-633.63	0%	-8721.59	3%
351	351	LinStatic	10194.07	3%	759.7	0%	-763.81	0%	-10111.81	3%
351	351	LinStatic	10278.22	3%	512.64	0%	-515.7	0%	-10195.47	3%
351	351	LinStatic	8873.85	3%	432.13	0%	-430.9	0%	-8790.23	3%
352	352	LinStatic	8888.81	3%	412.17	0%	-419.87	0%	-8808.43	3%
352	352	LinStatic	10286.46	3%	510.29	0%	-507.16	0%	-10202.13	3%
352	352	LinStatic	10484.15	3%	-17.69	0%	22.27	0%	-10389.32	3%
352	352	LinStatic	9054.72	3%	-43.18	0%	36.42	0%	-8963.33	3%
353	353	LinStatic	10463.65	3%	-5.12	0%	9.58	0%	-10373.32	3%
353	353	LinStatic	11176.71	3%	1.93	0%	-1.77	0%	-11087.48	3%
353	353	LinStatic	10980.88	3%	554.41	0%	-555.98	0%	-10896.12	3%
353	353	LinStatic	10282.99	3%	516.4	0%	-513.89	0%	-10196.9	3%
354	354	LinStatic	10276.47	3%	517.04	0%	-520.45	0%	-10192.23	3%
354	354	LinStatic	10980.28	3%	556.72	0%	-553.78	0%	-10894.19	3%
354	354	LinStatic	10889.78	3%	820.17	0%	-818.22	0%	-10807.6	3%
354	354	LinStatic	10192.86	3%	760.54	0%	-764.84	0%	-10112.63	3%
355	355	LinStatic	10192.41	3%	765.25	0%	-762.16	0%	-10109.86	3%
355	355	LinStatic	10889.18	3%	819.35	0%	-818.85	0%	-10807.41	3%
355	355	LinStatic	10889.18	3%	819.35	0%	-818.85	0%	-10807.41	3%
355	355	LinStatic	10192.41	3%	765.25	0%	-762.16	0%	-10109.86	3%
356	356	LinStatic	10192.86	3%	760.54	0%	-764.84	0%	-10112.63	3%
356	356	LinStatic	10889.78	3%	820.17	0%	-818.22	0%	-10807.6	3%
356	356	LinStatic	10980.28	3%	556.72	0%	-553.78	0%	-10894.19	3%
356	356	LinStatic	10276.47	3%	517.04	0%	-520.45	0%	-10192.23	3%
357	357	LinStatic	10282.99	3%	516.4	0%	-513.89	0%	-10196.9	3%
357	357	LinStatic	10980.88	3%	554.41	0%	-555.98	0%	-10896.12	3%
357	357	LinStatic	11176.71	3%	1.93	0%	-1.77	0%	-11087.48	3%
357	357	LinStatic	10463.65	3%	-5.12	0%	9.58	0%	-10373.32	3%
358	358	LinStatic	11170.82	3%	6.17	0%	-6.16	0%	-11081.31	3%
358	358	LinStatic	11170.82	3%	6.17	0%	-6.16	0%	-11081.31	3%
358	358	LinStatic	10979.1	3%	556.66	0%	-558.19	0%	-10894.7	3%
358	358	LinStatic	10979.1	3%	556.66	0%	-558.19	0%	-10894.7	3%
359	359	LinStatic	10979.16	3%	558.31	0%	-555.35	0%	-10893.42	3%
359	359	LinStatic	10979.16	3%	558.31	0%	-555.35	0%	-10893.42	3%
359	359	LinStatic	10889.73	3%	820.48	0%	-818.56	0%	-10807.44	3%
359	359	LinStatic	10889.73	3%	820.48	0%	-818.56	0%	-10807.44	3%
360	360	LinStatic	10889.31	3%	819.49	0%	-818.99	0%	-10807.44	3%
360	360	LinStatic	10889.31	3%	819.49	0%	-818.99	0%	-10807.44	3%
360	360	LinStatic	10889.31	3%	819.49	0%	-818.99	0%	-10807.44	3%
360	360	LinStatic	10889.31	3%	819.49	0%	-818.99	0%	-10807.44	3%
361	361	LinStatic	10889.73	3%	820.48	0%	-818.56	0%	-10807.44	3%
361	361	LinStatic	10889.73	3%	820.48	0%	-818.56	0%	-10807.44	3%
361	361	LinStatic	10979.16	3%	558.31	0%	-555.35	0%	-10893.42	3%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
361	361	LinStatic	10979.16	3%	558.31	0%	-555.35	0%	-10893.42	3%
362	362	LinStatic	10979.1	3%	556.66	0%	-558.19	0%	-10894.7	3%
362	362	LinStatic	10979.1	3%	556.66	0%	-558.19	0%	-10894.7	3%
362	362	LinStatic	11170.82	3%	6.17	0%	-6.16	0%	-11081.31	3%
362	362	LinStatic	11170.82	3%	6.17	0%	-6.16	0%	-11081.31	3%
363	363	LinStatic	11176.71	3%	1.93	0%	-1.77	0%	-11087.48	3%
363	363	LinStatic	10463.65	3%	-5.12	0%	9.58	0%	-10373.32	3%
363	363	LinStatic	10282.99	3%	516.4	0%	-513.89	0%	-10196.9	3%
363	363	LinStatic	10980.88	3%	554.41	0%	-555.98	0%	-10896.12	3%
364	364	LinStatic	10980.28	3%	556.72	0%	-553.78	0%	-10894.19	3%
364	364	LinStatic	10276.47	3%	517.04	0%	-520.45	0%	-10192.23	3%
364	364	LinStatic	10192.86	3%	760.54	0%	-764.84	0%	-10112.63	3%
364	364	LinStatic	10889.78	3%	820.17	0%	-818.22	0%	-10807.6	3%
365	365	LinStatic	10889.18	3%	819.35	0%	-818.85	0%	-10807.41	3%
365	365	LinStatic	10192.41	3%	765.25	0%	-762.16	0%	-10109.86	3%
365	365	LinStatic	10192.41	3%	765.25	0%	-762.16	0%	-10109.86	3%
365	365	LinStatic	10889.18	3%	819.35	0%	-818.85	0%	-10807.41	3%
366	366	LinStatic	10889.78	3%	820.17	0%	-818.22	0%	-10807.6	3%
366	366	LinStatic	10192.86	3%	760.54	0%	-764.84	0%	-10112.63	3%
366	366	LinStatic	10276.47	3%	517.04	0%	-520.45	0%	-10192.23	3%
366	366	LinStatic	10980.28	3%	556.72	0%	-553.78	0%	-10894.19	3%
367	367	LinStatic	10980.88	3%	554.41	0%	-555.98	0%	-10896.12	3%
367	367	LinStatic	10282.99	3%	516.4	0%	-513.89	0%	-10196.9	3%
367	367	LinStatic	10463.65	3%	-5.12	0%	9.58	0%	-10373.32	3%
367	367	LinStatic	11176.71	3%	1.93	0%	-1.77	0%	-11087.48	3%
368	368	LinStatic	10484.15	3%	-17.69	0%	22.27	0%	-10389.32	3%
368	368	LinStatic	9054.72	3%	-43.18	0%	36.42	0%	-8963.33	3%
368	368	LinStatic	8888.81	3%	412.17	0%	-419.87	0%	-8808.43	3%
368	368	LinStatic	10286.46	3%	510.29	0%	-507.16	0%	-10202.13	3%
369	369	LinStatic	10278.22	3%	512.64	0%	-515.7	0%	-10195.47	3%
369	369	LinStatic	8873.85	3%	432.13	0%	-430.9	0%	-8790.23	3%
369	369	LinStatic	8805.07	3%	633.46	0%	-633.63	0%	-8721.59	3%
369	369	LinStatic	10194.07	3%	759.7	0%	-763.81	0%	-10111.81	3%
370	370	LinStatic	10193.01	3%	765.03	0%	-761.54	0%	-10108.64	3%
370	370	LinStatic	8798.07	3%	629.8	0%	-644.47	0%	-8719.14	3%
370	370	LinStatic	8798.07	3%	629.8	0%	-644.47	0%	-8719.14	3%
370	370	LinStatic	10193.01	3%	765.03	0%	-761.54	0%	-10108.64	3%
371	371	LinStatic	10194.07	3%	759.7	0%	-763.81	0%	-10111.81	3%
371	371	LinStatic	8805.07	3%	633.46	0%	-633.63	0%	-8721.59	3%
371	371	LinStatic	8873.85	3%	432.13	0%	-430.9	0%	-8790.23	3%
371	371	LinStatic	10278.22	3%	512.64	0%	-515.7	0%	-10195.47	3%
372	372	LinStatic	10286.46	3%	510.29	0%	-507.16	0%	-10202.13	3%
372	372	LinStatic	8888.81	3%	412.17	0%	-419.87	0%	-8808.43	3%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500$ KN/M2

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
372	372	LinStatic	9054.72	3%	-43.18	0%	36.42	0%	-8963.33	3%
372	372	LinStatic	10484.15	3%	-17.69	0%	22.27	0%	-10389.32	3%
373	373	LinStatic	9081.11	3%	-61.48	0%	57.06	0%	-8997.58	3%
373	373	LinStatic	6941.28	2%	-105.97	0%	116.67	0%	-6856.17	2%
373	373	LinStatic	6810.91	2%	243.19	0%	-240.21	0%	-6726.48	2%
373	373	LinStatic	8894.54	3%	401.48	0%	-411.65	0%	-8813.65	3%
374	374	LinStatic	8876.53	3%	424.5	0%	-425.08	0%	-8793.05	3%
374	374	LinStatic	6766.74	2%	257.01	0%	-286.62	0%	-6693.11	2%
374	374	LinStatic	6725.25	2%	384.33	0%	-409.42	0%	-6643.42	2%
374	374	LinStatic	8809.15	3%	634.08	0%	-630.32	0%	-8717.31	3%
375	375	LinStatic	8801.84	3%	630.73	0%	-642.2	0%	-8713.82	3%
375	375	LinStatic	6717.46	2%	394.74	0%	-416.71	0%	-6632.69	2%
375	375	LinStatic	6717.46	2%	394.74	0%	-416.71	0%	-6632.69	2%
375	375	LinStatic	8801.84	3%	630.73	0%	-642.2	0%	-8713.82	3%
376	376	LinStatic	8809.15	3%	634.08	0%	-630.32	0%	-8717.31	3%
376	376	LinStatic	6725.25	2%	384.33	0%	-409.42	0%	-6643.42	2%
376	376	LinStatic	6766.74	2%	257.01	0%	-286.62	0%	-6693.11	2%
376	376	LinStatic	8876.53	3%	424.5	0%	-425.08	0%	-8793.05	3%
377	377	LinStatic	8894.54	3%	401.48	0%	-411.65	0%	-8813.65	3%
377	377	LinStatic	6810.91	2%	243.19	0%	-240.21	0%	-6726.48	2%
377	377	LinStatic	6941.28	2%	-105.97	0%	116.67	0%	-6856.17	2%
377	377	LinStatic	9081.11	3%	-61.48	0%	57.06	0%	-8997.58	3%
378	378	LinStatic	6972.4	2%	-134.79	0%	131.75	0%	-6907.23	2%
378	378	LinStatic	4152.25	1%	-237.01	0%	218.77	0%	-4100.96	1%
378	378	LinStatic	4037.28	1%	-85.11	0%	82.68	0%	-3979.65	1%
378	378	LinStatic	6807.47	2%	237.86	0%	-228.14	0%	-6732.92	2%
379	379	LinStatic	6762.39	2%	252.59	0%	-277.76	0%	-6696.33	2%
379	379	LinStatic	3962.73	1%	-17.66	0%	-17.12	0%	-3908.64	1%
379	379	LinStatic	3974.45	1%	-22.84	0%	-9.82	0%	-3868.36	1%
379	379	LinStatic	6739.44	2%	386.9	0%	-404.85	0%	-6626.48	2%
380	380	LinStatic	6730.8	2%	398.16	0%	-411.84	0%	-6616.04	2%
380	380	LinStatic	3951.63	1%	-36.21	0%	-42.57	0%	-3856.3	1%
380	380	LinStatic	3951.63	1%	-36.21	0%	-42.57	0%	-3856.3	1%
380	380	LinStatic	6730.8	2%	398.16	0%	-411.84	0%	-6616.04	2%
381	381	LinStatic	6739.44	2%	386.9	0%	-404.85	0%	-6626.48	2%
381	381	LinStatic	3974.45	1%	-22.84	0%	-9.82	0%	-3868.36	1%
381	381	LinStatic	3962.73	1%	-17.66	0%	-17.12	0%	-3908.64	1%
381	381	LinStatic	6762.39	2%	252.59	0%	-277.76	0%	-6696.33	2%
382	382	LinStatic	6807.47	2%	237.86	0%	-228.14	0%	-6732.92	2%
382	382	LinStatic	4037.28	1%	-85.11	0%	82.68	0%	-3979.65	1%
382	382	LinStatic	4152.25	1%	-237.01	0%	218.77	0%	-4100.96	1%
382	382	LinStatic	6972.4	2%	-134.79	0%	131.75	0%	-6907.23	2%
383	383	LinStatic	4134.34	1%	-241.96	0%	222.82	0%	-4187.5	1%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
383	383	LinStatic	1050.87	0%	-915.68	0%	973.85	0%	-1108.31	0%
383	383	LinStatic	808.77	0%	-690.37	0%	748.2	0%	-765.9	0%
383	383	LinStatic	4016.29	1%	-89.96	0%	73.87	0%	-3972.53	1%
384	384	LinStatic	3940.79	1%	-21.55	0%	-24.6	0%	-3902.86	1%
384	384	LinStatic	520.23	0%	-559.87	0%	532.94	0%	-576.61	0%
384	384	LinStatic	530.51	0%	-726.03	0%	705.18	0%	-407.2	0%
384	384	LinStatic	4008.19	1%	-7.35	0%	4.32	0%	-3827.6	1%
385	385	LinStatic	3988.36	1%	-23.72	0%	-29.33	0%	-3814.65	1%
385	385	LinStatic	506.1	0%	-732.75	0%	585.62	0%	-367.03	0%
385	385	LinStatic	506.1	0%	-732.75	0%	585.62	0%	-367.03	0%
385	385	LinStatic	3988.36	1%	-23.72	0%	-29.33	0%	-3814.65	1%
386	386	LinStatic	4008.19	1%	-7.35	0%	4.32	0%	-3827.6	1%
386	386	LinStatic	530.51	0%	-726.03	0%	705.18	0%	-407.2	0%
386	386	LinStatic	520.23	0%	-559.87	0%	532.94	0%	-576.61	0%
386	386	LinStatic	3940.79	1%	-21.55	0%	-24.6	0%	-3902.86	1%
387	387	LinStatic	4016.29	1%	-89.96	0%	73.87	0%	-3972.53	1%
387	387	LinStatic	808.77	0%	-690.37	0%	748.2	0%	-765.9	0%
387	387	LinStatic	1050.87	0%	-915.68	0%	973.85	0%	-1108.31	0%
387	387	LinStatic	4134.34	1%	-241.96	0%	222.82	0%	-4187.5	1%
388	388	LinStatic	967.35	0%	-906.31	0%	765.55	0%	-1141.35	0%
388	388	LinStatic	260.85	0%	-4410.49	1%	4159.43	1%	-517.7	0%
388	388	LinStatic	-1399.44	0%	-3664.8	1%	3824.85	1%	1236.21	0%
388	388	LinStatic	679.04	0%	-572.73	0%	735.36	0%	-651.7	0%
389	389	LinStatic	435.28	0%	-487.02	0%	534.54	0%	-476.84	0%
389	389	LinStatic	-1284.5	0%	-3643.99	1%	3718	1%	1087.65	0%
389	389	LinStatic	-1669.87	1%	-3817.26	1%	4036.26	1%	1532.2	0%
389	389	LinStatic	578.08	0%	-704.83	0%	703.46	0%	-366.57	0%
390	390	LinStatic	557.67	0%	-715.56	0%	591.15	0%	-333.65	0%
390	390	LinStatic	-1637.1	1%	-3786.99	1%	4075.23	1%	1702.56	1%
390	390	LinStatic	-1637.1	1%	-3786.99	1%	4075.23	1%	1702.56	1%
390	390	LinStatic	557.67	0%	-715.56	0%	591.15	0%	-333.65	0%
391	391	LinStatic	578.08	0%	-704.83	0%	703.46	0%	-366.57	0%
391	391	LinStatic	-1669.87	1%	-3817.26	1%	4036.26	1%	1532.2	0%
391	391	LinStatic	-1284.5	0%	-3643.99	1%	3718	1%	1087.65	0%
391	391	LinStatic	435.28	0%	-487.02	0%	534.54	0%	-476.84	0%
392	392	LinStatic	679.04	0%	-572.73	0%	735.36	0%	-651.7	0%
392	392	LinStatic	-1399.44	0%	-3664.8	1%	3824.85	1%	1236.21	0%
392	392	LinStatic	260.85	0%	-4410.49	1%	4159.43	1%	-517.7	0%
392	392	LinStatic	967.35	0%	-906.31	0%	765.55	0%	-1141.35	0%
393	393	LinStatic	4.53	0%	-4862.59	2%	3798.05	1%	-526.43	0%
393	393	LinStatic	-1152.76	0%	-7284.3	2%	6337.75	2%	1120.15	0%
393	393	LinStatic	-2374.12	1%	-8986.57	3%	9640.91	3%	2894.08	1%
393	393	LinStatic	-1317.65	0%	-3363.23	1%	3932.97	1%	1314.94	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
394	394	LinStatic	-1183.19	0%	-3361.94	1%	3854.54	1%	1137.96	0%
394	394	LinStatic	-2860.25	1%	-9101.08	3%	9736.89	3%	3214.08	1%
394	394	LinStatic	-2805.66	1%	-9242.29	3%	9446.61	3%	3045.04	1%
394	394	LinStatic	-1656.42	1%	-3934.34	1%	3985.01	1%	1507.18	0%
395	395	LinStatic	-1649.06	1%	-3878.65	1%	4017.56	1%	1683.96	1%
395	395	LinStatic	-2566.87	1%	-9151.26	3%	9314.28	3%	2654.37	1%
395	395	LinStatic	-2566.87	1%	-9151.26	3%	9314.28	3%	2654.37	1%
395	395	LinStatic	-1649.06	1%	-3878.65	1%	4017.56	1%	1683.96	1%
396	396	LinStatic	-1656.42	1%	-3934.34	1%	3985.01	1%	1507.18	0%
396	396	LinStatic	-2805.66	1%	-9242.29	3%	9446.61	3%	3045.04	1%
396	396	LinStatic	-2860.25	1%	-9101.08	3%	9736.89	3%	3214.08	1%
396	396	LinStatic	-1183.19	0%	-3361.94	1%	3854.54	1%	1137.96	0%
397	397	LinStatic	-1317.65	0%	-3363.23	1%	3932.97	1%	1314.94	0%
397	397	LinStatic	-2374.12	1%	-8986.57	3%	9640.91	3%	2894.08	1%
397	397	LinStatic	-1152.76	0%	-7284.3	2%	6337.75	2%	1120.15	0%
397	397	LinStatic	4.53	0%	-4862.59	2%	3798.05	1%	-526.43	0%
488	488	LinStatic	7148.45	2%	1178.34	0%	-867.59	0%	-6953.54	2%
488	488	LinStatic	9807.18	3%	2571.37	1%	-2077.87	1%	-8843.13	3%
488	488	LinStatic	8242.59	3%	1613.05	1%	-1621.84	1%	-7566.26	2%
488	488	LinStatic	8619.36	3%	-546.46	0%	396.53	0%	-8753.77	3%
489	489	LinStatic	8548.91	3%	-458.43	0%	300.02	0%	-8293.77	3%
489	489	LinStatic	8219.93	3%	1644.3	1%	-1676.9	1%	-7702.65	2%
489	489	LinStatic	7586.1	2%	825.4	0%	-734.55	0%	-6983.05	2%
489	489	LinStatic	7688.79	2%	29.51	0%	-45.7	0%	-7366.63	2%
490	490	LinStatic	7769.87	2%	94.19	0%	-59.54	0%	-7321.58	2%
490	490	LinStatic	7501.83	2%	821.63	0%	-764.99	0%	-6954.2	2%
490	490	LinStatic	6736.31	2%	530.48	0%	-557.65	0%	-6214.39	2%
490	490	LinStatic	6857.38	2%	-53.16	0%	1.74	0%	-6432.55	2%
491	491	LinStatic	6902.71	2%	-35.13	0%	-0.73	0%	-6407.24	2%
491	491	LinStatic	6728.97	2%	536.94	0%	-558.47	0%	-6196.06	2%
491	491	LinStatic	5949.49	2%	340.58	0%	-319.88	0%	-5401.33	2%
491	491	LinStatic	6046.11	2%	8.77	0%	0.14	0%	-5537.93	2%
492	492	LinStatic	6077.75	2%	13.64	0%	4.01	0%	-5532.95	2%
492	492	LinStatic	5949.07	2%	339.91	0%	-316.97	0%	-5394.62	2%
492	492	LinStatic	5162.29	2%	193.14	0%	-215.14	0%	-4622.66	1%
492	492	LinStatic	5234.14	2%	-23.93	0%	-4.77	0%	-4702.72	1%
493	493	LinStatic	5251.96	2%	-21.45	0%	3.65	0%	-4708.18	1%
493	493	LinStatic	5167.12	2%	189.25	0%	-212.22	0%	-4618.28	1%
493	493	LinStatic	4393.58	1%	122.77	0%	-107.01	0%	-3833.02	1%
493	493	LinStatic	4443.56	1%	-8.78	0%	32.05	0%	-3890.4	1%
494	494	LinStatic	4459.55	1%	-14.18	0%	33.14	0%	-3892.15	1%
494	494	LinStatic	4395.16	1%	123.02	0%	-99.41	0%	-3834.63	1%
494	494	LinStatic	3610.99	1%	47.45	0%	-59.61	0%	-3064.7	1%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
494	494	LinStatic	3655.61	1%	-44.89	0%	26.99	0%	-3101.35	1%
495	495	LinStatic	3660.42	1%	-42.28	0%	36.76	0%	-3111.05	1%
495	495	LinStatic	3618.46	1%	42.1	0%	-59.77	0%	-3059.71	1%
495	495	LinStatic	2848.5	1%	15.84	0%	2.34	0%	-2281.23	1%
495	495	LinStatic	2878.33	1%	-38.8	0%	74.05	0%	-2325.36	1%
496	496	LinStatic	2890.95	1%	-46.11	0%	70.13	0%	-2321.27	1%
496	496	LinStatic	2847.57	1%	19.33	0%	11.28	0%	-2285.72	1%
496	496	LinStatic	2070.22	1%	-35.69	0%	41.99	0%	-1530.18	0%
496	496	LinStatic	2112.04	1%	-86.8	0%	86.68	0%	-1564.33	0%
497	497	LinStatic	2109.36	1%	-78.88	0%	99.09	0%	-1575.61	0%
497	497	LinStatic	2079.26	1%	-42.15	0%	35.73	0%	-1519.82	0%
497	497	LinStatic	1327.07	0%	-75.61	0%	124.43	0%	-781.74	0%
497	497	LinStatic	1360.25	0%	-104.2	0%	201.78	0%	-862.74	0%
498	498	LinStatic	1374.21	0%	-113.15	0%	184.03	0%	-843.99	0%
498	498	LinStatic	1318.86	0%	-64.76	0%	138.55	0%	-791.74	0%
498	498	LinStatic	594.35	0%	-170.92	0%	377.27	0%	-244.52	0%
498	498	LinStatic	685.61	0%	-242.8	0%	444.27	0%	-330.7	0%
499	499	LinStatic	663.07	0%	-215.06	0%	457.02	0%	-343.07	0%
499	499	LinStatic	606.61	0%	-180.74	0%	351.33	0%	-214.35	0%
499	499	LinStatic	131.05	0%	-500.31	0%	979.24	0%	-6.24	0%
499	499	LinStatic	234.62	0%	-566.16	0%	1064.81	0%	-130.41	0%
500	500	LinStatic	240.81	0%	-566.77	0%	1040.04	0%	-106.83	0%
500	500	LinStatic	99.21	0%	-466.44	0%	986.65	0%	-9.11	0%
500	500	LinStatic	-69.96	0%	-1151.81	0%	1722.36	1%	64.18	0%
500	500	LinStatic	87.02	0%	-1241.42	0%	1783.79	1%	-67.69	0%
501	501	LinStatic	63.01	0%	-1211.88	0%	1777.86	1%	-66.37	0%
501	501	LinStatic	-70.6	0%	-1149.71	0%	1713.33	1%	78.44	0%
501	501	LinStatic	-152.29	0%	-1897.89	1%	2487.22	1%	179.4	0%
501	501	LinStatic	36.45	0%	-1986.58	1%	2575.55	1%	-17.83	0%
502	502	LinStatic	32.36	0%	-1974.84	1%	2555.24	1%	-6.36	0%
502	502	LinStatic	-164.15	0%	-1885.63	1%	2490.11	1%	183.5	0%
502	502	LinStatic	-319.37	0%	-2668.05	1%	3261.48	1%	300.03	0%
502	502	LinStatic	11.04	0%	-2796.21	1%	3371.17	1%	-29.34	0%
503	503	LinStatic	4.64	0%	-2776.64	1%	3356.74	1%	-28.08	0%
503	503	LinStatic	-322.06	0%	-2669.97	1%	3264.12	1%	305.09	0%
503	503	LinStatic	-451.06	0%	-3418.72	1%	4030.32	1%	485.21	0%
503	503	LinStatic	-45.94	0%	-3632.74	1%	4227.33	1%	76.58	0%
504	504	LinStatic	-34.44	0%	-3609.93	1%	4196.76	1%	58.64	0%
504	504	LinStatic	-439.85	0%	-3422.56	1%	4085.7	1%	494.61	0%
504	504	LinStatic	-1071.28	0%	-4177.85	1%	4783.81	1%	1015.7	0%
504	504	LinStatic	169.3	0%	-4580.76	1%	5122.87	2%	-267.88	0%
505	505	LinStatic	243.04	0%	-4773.23	1%	5193.51	2%	-304.29	0%
505	505	LinStatic	-1029.71	0%	-4111.38	1%	4803.73	2%	989.74	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
505	505	LinStatic	-1329.18	0%	-5325.37	2%	6202.23	2%	1613.54	1%
505	505	LinStatic	-603.79	0%	-4575.65	1%	5193.77	2%	853.52	0%
506	506	LinStatic	9894.66	3%	3224.16	1%	-2796.43	1%	-9049.49	3%
506	506	LinStatic	9615.47	3%	3143.73	1%	-2811.17	1%	-9066.71	3%
506	506	LinStatic	8292.87	3%	2041.72	1%	-2062.54	1%	-7839.41	2%
506	506	LinStatic	8133.65	3%	1515.11	0%	-1452.24	0%	-7372.33	2%
507	507	LinStatic	8126.35	3%	1531.01	0%	-1495.84	0%	-7520.18	2%
507	507	LinStatic	8366.82	3%	2054.46	1%	-2028.23	1%	-7759.95	2%
507	507	LinStatic	7398.41	2%	1370.53	0%	-1403.25	0%	-6825.03	2%
507	507	LinStatic	7573.88	2%	849.25	0%	-867.39	0%	-7006.83	2%
508	508	LinStatic	7495.97	2%	839.12	0%	-890.65	0%	-6985.16	2%
508	508	LinStatic	7416.51	2%	1382.02	0%	-1404.38	0%	-6823.48	2%
508	508	LinStatic	6651.53	2%	874.39	0%	-856.16	0%	-6041.31	2%
508	508	LinStatic	6734.94	2%	525.66	0%	-535.53	0%	-6208	2%
509	509	LinStatic	6727.4	2%	532.33	0%	-536.72	0%	-6189.3	2%
509	509	LinStatic	6634.99	2%	869.74	0%	-863.98	0%	-6052.8	2%
509	509	LinStatic	5881.97	2%	524.1	0%	-554.65	0%	-5310.71	2%
509	509	LinStatic	5942.24	2%	316.09	0%	-358.06	0%	-5413.81	2%
510	510	LinStatic	5941.35	2%	315.89	0%	-356.7	0%	-5405.56	2%
510	510	LinStatic	5872.26	2%	521.51	0%	-556.79	0%	-5317.75	2%
510	510	LinStatic	5124.09	2%	339.53	0%	-324.29	0%	-4553.69	1%
510	510	LinStatic	5165.49	2%	212.22	0%	-201.44	0%	-4614.87	1%
511	511	LinStatic	5168.68	2%	209.96	0%	-199.04	0%	-4609.97	1%
511	511	LinStatic	5119.99	2%	338.56	0%	-324.05	0%	-4556.7	1%
511	511	LinStatic	4349.52	1%	190.16	0%	-210.69	0%	-3797.53	1%
511	511	LinStatic	4381.52	1%	110.04	0%	-134.91	0%	-3833.37	1%
512	512	LinStatic	4383.03	1%	110.37	0%	-129.42	0%	-3832.87	1%
512	512	LinStatic	4350.72	1%	188.68	0%	-211.05	0%	-3795.97	1%
512	512	LinStatic	3585.63	1%	123.33	0%	-107.6	0%	-3019.26	1%
512	512	LinStatic	3607.07	1%	75.35	0%	-54.78	0%	-3046.8	1%
513	513	LinStatic	3612.73	1%	71.8	0%	-54.56	0%	-3042.2	1%
513	513	LinStatic	3586.16	1%	124.89	0%	-104.72	0%	-3019.09	1%
513	513	LinStatic	2805.96	1%	49.87	0%	-64.46	0%	-2251.05	1%
513	513	LinStatic	2827.54	1%	14.94	0%	-32.98	0%	-2268.64	1%
514	514	LinStatic	2827.47	1%	17.57	0%	-26.33	0%	-2270.83	1%
514	514	LinStatic	2810.49	1%	48.33	0%	-65.71	0%	-2246.14	1%
514	514	LinStatic	2040.05	1%	20.69	0%	-4.99	0%	-1466.44	0%
514	514	LinStatic	2054.21	1%	2.38	0%	27.2	0%	-1493.59	0%
515	515	LinStatic	2061.27	1%	-2.1	0%	22.91	0%	-1485.2	0%
515	515	LinStatic	2040.03	1%	24.03	0%	-0.15	0%	-1467.43	0%
515	515	LinStatic	1259.69	0%	-33.25	0%	31.94	0%	-707.32	0%
515	515	LinStatic	1285.99	0%	-55.97	0%	56.17	0%	-734.71	0%
516	516	LinStatic	1280.55	0%	-47.9	0%	67.66	0%	-742.09	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
516	516	LinStatic	1266.31	0%	-36.44	0%	25.26	0%	-696.68	0%
516	516	LinStatic	509.93	0%	-77.79	0%	197.41	0%	-31.08	0%
516	516	LinStatic	539.2	0%	-94.99	0%	299.26	0%	-145.22	0%
517	517	LinStatic	549.86	0%	-103.21	0%	273.54	0%	-115.27	0%
517	517	LinStatic	502.5	0%	-66.74	0%	217.99	0%	-47.41	0%
517	517	LinStatic	-69.94	0%	-345.55	0%	898.92	0%	77.12	0%
517	517	LinStatic	41.13	0%	-433.65	0%	933.53	0%	18.12	0%
518	518	LinStatic	11.75	0%	-402.24	0%	940.03	0%	16.16	0%
518	518	LinStatic	-56.57	0%	-354.98	0%	895.27	0%	85.58	0%
518	518	LinStatic	-162	0%	-1078.66	0%	1666.34	1%	184.14	0%
518	518	LinStatic	-82.46	0%	-1118.65	0%	1707.12	1%	100.22	0%
519	519	LinStatic	-82.85	0%	-1116.8	0%	1702.12	1%	110.45	0%
519	519	LinStatic	-167.14	0%	-1069.3	0%	1672.12	1%	183.88	0%
519	519	LinStatic	-307.63	0%	-1838.68	1%	2431.12	1%	287.36	0%
519	519	LinStatic	-188.16	0%	-1893.18	1%	2474.87	1%	172	0%
520	520	LinStatic	-195.35	0%	-1885.59	1%	2478.81	1%	175.05	0%
520	520	LinStatic	-306.32	0%	-1836.39	1%	2433.17	1%	290.57	0%
520	520	LinStatic	-473.28	0%	-2589.9	1%	3199.45	1%	494.79	0%
520	520	LinStatic	-293.73	0%	-2658.11	1%	3262.37	1%	312.43	0%
521	521	LinStatic	-295.29	0%	-2661.18	1%	3267.41	1%	315.09	0%
521	521	LinStatic	-472.84	0%	-2588.07	1%	3201.86	1%	495.51	0%
521	521	LinStatic	-781.62	0%	-3360.16	1%	3965.05	1%	779.81	0%
521	521	LinStatic	-511.41	0%	-3437.15	1%	4035.95	1%	505.26	0%
522	522	LinStatic	-501.84	0%	-3439.34	1%	4089.41	1%	516.58	0%
522	522	LinStatic	-786.37	0%	-3375.22	1%	3939.33	1%	769.71	0%
522	522	LinStatic	-1104.2	0%	-4179.31	1%	4763.77	1%	1132.22	0%
522	522	LinStatic	-912.26	0%	-4075.98	1%	4749.22	1%	968.86	0%
523	523	LinStatic	-883.07	0%	-3997.12	1%	4758.57	1%	953.47	0%
523	523	LinStatic	-1125.36	0%	-4245.62	1%	4722.6	1%	1123.51	0%
523	523	LinStatic	-1594.65	0%	-4908.61	2%	5427.74	2%	1742.18	1%
523	523	LinStatic	-1783.26	1%	-5464.82	2%	6257.08	2%	2014.38	1%
524	524	LinStatic	9468.21	3%	2673.26	1%	-2488.47	1%	-8964.88	3%
524	524	LinStatic	9468.21	3%	2673.26	1%	-2488.47	1%	-8964.88	3%
524	524	LinStatic	8323.79	3%	2192.82	1%	-2056.96	1%	-7835.07	2%
524	524	LinStatic	8323.79	3%	2192.82	1%	-2056.96	1%	-7835.07	2%
525	525	LinStatic	8391.61	3%	2211.69	1%	-2029.33	1%	-7748.92	2%
525	525	LinStatic	8391.61	3%	2211.69	1%	-2029.33	1%	-7748.92	2%
525	525	LinStatic	7386.33	2%	1366.28	0%	-1385.52	0%	-6804.17	2%
525	525	LinStatic	7386.33	2%	1366.28	0%	-1385.52	0%	-6804.17	2%
526	526	LinStatic	7407.6	2%	1374.59	0%	-1385.75	0%	-6803.54	2%
526	526	LinStatic	7407.6	2%	1374.59	0%	-1385.75	0%	-6803.54	2%
526	526	LinStatic	6641.82	2%	849.41	0%	-896.62	0%	-6048.64	2%
526	526	LinStatic	6641.82	2%	849.41	0%	-896.62	0%	-6048.64	2%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
527	527	LinStatic	6625.47	2%	844.57	0%	-902.26	0%	-6062.31	2%
527	527	LinStatic	6625.47	2%	844.57	0%	-902.26	0%	-6062.31	2%
527	527	LinStatic	5887.07	2%	541.41	0%	-538.27	0%	-5305.65	2%
527	527	LinStatic	5887.07	2%	541.41	0%	-538.27	0%	-5305.65	2%
528	528	LinStatic	5877.46	2%	538.73	0%	-540.4	0%	-5312.71	2%
528	528	LinStatic	5877.46	2%	538.73	0%	-540.4	0%	-5312.71	2%
528	528	LinStatic	5116.93	2%	317.82	0%	-347.95	0%	-4560.71	1%
528	528	LinStatic	5116.93	2%	317.82	0%	-347.95	0%	-4560.71	1%
529	529	LinStatic	5112.96	2%	316.71	0%	-348.35	0%	-4563.08	1%
529	529	LinStatic	5112.96	2%	316.71	0%	-348.35	0%	-4563.08	1%
529	529	LinStatic	4354.1	1%	209.86	0%	-194.68	0%	-3790.23	1%
529	529	LinStatic	4354.1	1%	209.86	0%	-194.68	0%	-3790.23	1%
530	530	LinStatic	4354.33	1%	209.35	0%	-194.61	0%	-3789.11	1%
530	530	LinStatic	4354.33	1%	209.35	0%	-194.61	0%	-3789.11	1%
530	530	LinStatic	3576.91	1%	108.55	0%	-128.81	0%	-3022.11	1%
530	530	LinStatic	3576.91	1%	108.55	0%	-128.81	0%	-3022.11	1%
531	531	LinStatic	3578.17	1%	109.39	0%	-127.4	0%	-3020.46	1%
531	531	LinStatic	3578.17	1%	109.39	0%	-127.4	0%	-3020.46	1%
531	531	LinStatic	2807.34	1%	71.14	0%	-53.83	0%	-2239.33	1%
531	531	LinStatic	2807.34	1%	71.14	0%	-53.83	0%	-2239.33	1%
532	532	LinStatic	2810.38	1%	71.1	0%	-53.68	0%	-2235.81	1%
532	532	LinStatic	2810.38	1%	71.1	0%	-53.68	0%	-2235.81	1%
532	532	LinStatic	2027.21	1%	11.9	0%	-30.04	0%	-1463.13	0%
532	532	LinStatic	2027.21	1%	11.9	0%	-30.04	0%	-1463.13	0%
533	533	LinStatic	2028.91	1%	13.52	0%	-27.83	0%	-1461.49	0%
533	533	LinStatic	2028.91	1%	13.52	0%	-27.83	0%	-1461.49	0%
533	533	LinStatic	1254.96	0%	-7.21	0%	25.9	0%	-679.89	0%
533	533	LinStatic	1254.96	0%	-7.21	0%	25.9	0%	-679.89	0%
534	534	LinStatic	1258.95	0%	-7.77	0%	24.19	0%	-674.23	0%
534	534	LinStatic	1258.95	0%	-7.77	0%	24.19	0%	-674.23	0%
534	534	LinStatic	478.07	0%	-67.51	0%	113.83	0%	31.17	0%
534	534	LinStatic	478.07	0%	-67.51	0%	113.83	0%	31.17	0%
535	535	LinStatic	477.31	0%	-63.13	0%	131.73	0%	17.52	0%
535	535	LinStatic	477.31	0%	-63.13	0%	131.73	0%	17.52	0%
535	535	LinStatic	-94.56	0%	-300.08	0%	887.96	0%	109.43	0%
535	535	LinStatic	-94.56	0%	-300.08	0%	887.96	0%	109.43	0%
536	536	LinStatic	-88.12	0%	-302.57	0%	889.19	0%	113.02	0%
536	536	LinStatic	-88.12	0%	-302.57	0%	889.19	0%	113.02	0%
536	536	LinStatic	-189.73	0%	-1074.28	0%	1656.8	1%	171.35	0%
536	536	LinStatic	-189.73	0%	-1074.28	0%	1656.8	1%	171.35	0%
537	537	LinStatic	-190.75	0%	-1069.04	0%	1661.56	1%	172.12	0%
537	537	LinStatic	-190.75	0%	-1069.04	0%	1661.56	1%	172.12	0%
537	537	LinStatic	-292.19	0%	-1832.06	1%	2434.2	1%	306.42	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
537	537	LinStatic	-292.19	0%	-1832.06	1%	2434.2	1%	306.42	0%
538	538	LinStatic	-291.21	0%	-1829.44	1%	2437.67	1%	308.23	0%
538	538	LinStatic	-291.21	0%	-1829.44	1%	2437.67	1%	308.23	0%
538	538	LinStatic	-494.77	0%	-2596.25	1%	3194.99	1%	479.9	0%
538	538	LinStatic	-494.77	0%	-2596.25	1%	3194.99	1%	479.9	0%
539	539	LinStatic	-494.2	0%	-2594.55	1%	3197.39	1%	480.63	0%
539	539	LinStatic	-494.2	0%	-2594.55	1%	3197.39	1%	480.63	0%
539	539	LinStatic	-748.93	0%	-3348.07	1%	3965.55	1%	783.98	0%
539	539	LinStatic	-748.93	0%	-3348.07	1%	3965.55	1%	783.98	0%
540	540	LinStatic	-753.52	0%	-3363.29	1%	3938.66	1%	775.06	0%
540	540	LinStatic	-753.52	0%	-3363.29	1%	3938.66	1%	775.06	0%
540	540	LinStatic	-1101.22	0%	-4177.32	1%	4787.56	1%	1239.19	0%
540	540	LinStatic	-1101.22	0%	-4177.32	1%	4787.56	1%	1239.19	0%
541	541	LinStatic	-1121.5	0%	-4244.51	1%	4748.97	1%	1227.89	0%
541	541	LinStatic	-1121.5	0%	-4244.51	1%	4748.97	1%	1227.89	0%
541	541	LinStatic	-1396.54	0%	-4842.07	2%	5321.86	2%	1420.81	0%
541	541	LinStatic	-1396.54	0%	-4842.07	2%	5321.86	2%	1420.81	0%
542	542	LinStatic	9615.47	3%	3143.73	1%	-2811.17	1%	-9066.71	3%
542	542	LinStatic	9894.66	3%	3224.16	1%	-2796.43	1%	-9049.49	3%
542	542	LinStatic	8133.65	3%	1515.11	0%	-1452.24	0%	-7372.33	2%
542	542	LinStatic	8292.87	3%	2041.72	1%	-2062.54	1%	-7839.41	2%
543	543	LinStatic	8366.82	3%	2054.46	1%	-2028.23	1%	-7759.95	2%
543	543	LinStatic	8126.35	3%	1531.01	0%	-1495.84	0%	-7520.18	2%
543	543	LinStatic	7573.88	2%	849.25	0%	-867.39	0%	-7006.83	2%
543	543	LinStatic	7398.41	2%	1370.53	0%	-1403.25	0%	-6825.03	2%
544	544	LinStatic	7416.51	2%	1382.02	0%	-1404.38	0%	-6823.48	2%
544	544	LinStatic	7495.97	2%	839.12	0%	-890.65	0%	-6985.16	2%
544	544	LinStatic	6734.94	2%	525.66	0%	-535.53	0%	-6208	2%
544	544	LinStatic	6651.53	2%	874.39	0%	-856.16	0%	-6041.31	2%
545	545	LinStatic	6634.99	2%	869.74	0%	-863.98	0%	-6052.8	2%
545	545	LinStatic	6727.4	2%	532.33	0%	-536.72	0%	-6189.3	2%
545	545	LinStatic	5942.24	2%	316.09	0%	-358.06	0%	-5413.81	2%
545	545	LinStatic	5881.97	2%	524.1	0%	-554.65	0%	-5310.71	2%
546	546	LinStatic	5872.26	2%	521.51	0%	-556.79	0%	-5317.75	2%
546	546	LinStatic	5941.35	2%	315.89	0%	-356.7	0%	-5405.56	2%
546	546	LinStatic	5165.49	2%	212.22	0%	-201.44	0%	-4614.87	1%
546	546	LinStatic	5124.09	2%	339.53	0%	-324.29	0%	-4553.69	1%
547	547	LinStatic	5119.99	2%	338.56	0%	-324.05	0%	-4556.7	1%
547	547	LinStatic	5168.68	2%	209.96	0%	-199.04	0%	-4609.97	1%
547	547	LinStatic	4381.52	1%	110.04	0%	-134.91	0%	-3833.37	1%
547	547	LinStatic	4349.52	1%	190.16	0%	-210.69	0%	-3797.53	1%
548	548	LinStatic	4350.72	1%	188.68	0%	-211.05	0%	-3795.97	1%
548	548	LinStatic	4383.03	1%	110.37	0%	-129.42	0%	-3832.87	1%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
548	548	LinStatic	3607.07	1%	75.35	0%	-54.78	0%	-3046.8	1%
548	548	LinStatic	3585.63	1%	123.33	0%	-107.6	0%	-3019.26	1%
549	549	LinStatic	3586.16	1%	124.89	0%	-104.72	0%	-3019.09	1%
549	549	LinStatic	3612.73	1%	71.8	0%	-54.56	0%	-3042.2	1%
549	549	LinStatic	2827.54	1%	14.94	0%	-32.98	0%	-2268.64	1%
549	549	LinStatic	2805.96	1%	49.87	0%	-64.46	0%	-2251.05	1%
550	550	LinStatic	2810.49	1%	48.33	0%	-65.71	0%	-2246.14	1%
550	550	LinStatic	2827.47	1%	17.57	0%	-26.33	0%	-2270.83	1%
550	550	LinStatic	2054.21	1%	2.38	0%	27.2	0%	-1493.59	0%
550	550	LinStatic	2040.05	1%	20.69	0%	-4.99	0%	-1466.44	0%
551	551	LinStatic	2040.03	1%	24.03	0%	-0.15	0%	-1467.43	0%
551	551	LinStatic	2061.27	1%	-2.1	0%	22.91	0%	-1485.2	0%
551	551	LinStatic	1285.99	0%	-55.97	0%	56.17	0%	-734.71	0%
551	551	LinStatic	1259.69	0%	-33.25	0%	31.94	0%	-707.32	0%
552	552	LinStatic	1266.31	0%	-36.44	0%	25.26	0%	-696.68	0%
552	552	LinStatic	1280.55	0%	-47.9	0%	67.66	0%	-742.09	0%
552	552	LinStatic	539.2	0%	-94.99	0%	299.26	0%	-145.22	0%
552	552	LinStatic	509.93	0%	-77.79	0%	197.41	0%	-31.08	0%
553	553	LinStatic	502.5	0%	-66.74	0%	217.99	0%	-47.41	0%
553	553	LinStatic	549.86	0%	-103.21	0%	273.54	0%	-115.27	0%
553	553	LinStatic	41.13	0%	-433.65	0%	933.53	0%	18.12	0%
553	553	LinStatic	-69.94	0%	-345.55	0%	898.92	0%	77.12	0%
554	554	LinStatic	-56.57	0%	-354.98	0%	895.27	0%	85.58	0%
554	554	LinStatic	11.75	0%	-402.24	0%	940.03	0%	16.16	0%
554	554	LinStatic	-82.46	0%	-1118.65	0%	1707.12	1%	100.22	0%
554	554	LinStatic	-162	0%	-1078.66	0%	1666.34	1%	184.14	0%
555	555	LinStatic	-167.14	0%	-1069.3	0%	1672.12	1%	183.88	0%
555	555	LinStatic	-82.85	0%	-1116.8	0%	1702.12	1%	110.45	0%
555	555	LinStatic	-188.16	0%	-1893.18	1%	2474.87	1%	172	0%
555	555	LinStatic	-307.63	0%	-1838.68	1%	2431.12	1%	287.36	0%
556	556	LinStatic	-306.32	0%	-1836.39	1%	2433.17	1%	290.57	0%
556	556	LinStatic	-195.35	0%	-1885.59	1%	2478.81	1%	175.05	0%
556	556	LinStatic	-293.73	0%	-2658.11	1%	3262.37	1%	312.43	0%
556	556	LinStatic	-473.28	0%	-2589.9	1%	3199.45	1%	494.79	0%
557	557	LinStatic	-472.84	0%	-2588.07	1%	3201.86	1%	495.51	0%
557	557	LinStatic	-295.29	0%	-2661.18	1%	3267.41	1%	315.09	0%
557	557	LinStatic	-511.41	0%	-3437.15	1%	4035.95	1%	505.26	0%
557	557	LinStatic	-781.62	0%	-3360.16	1%	3965.05	1%	779.81	0%
558	558	LinStatic	-786.37	0%	-3375.22	1%	3939.33	1%	769.71	0%
558	558	LinStatic	-501.84	0%	-3439.34	1%	4089.41	1%	516.58	0%
558	558	LinStatic	-912.26	0%	-4075.98	1%	4749.22	1%	968.86	0%
558	558	LinStatic	-1104.2	0%	-4179.31	1%	4763.77	1%	1132.22	0%
559	559	LinStatic	-1125.36	0%	-4245.62	1%	4722.6	1%	1123.51	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
559	559	LinStatic	-883.07	0%	-3997.12	1%	4758.57	1%	953.47	0%
559	559	LinStatic	-1783.26	1%	-5464.82	2%	6257.08	2%	2014.38	1%
559	559	LinStatic	-1594.65	0%	-4908.61	2%	5427.74	2%	1742.18	1%
560	560	LinStatic	9807.18	3%	2571.37	1%	-2077.87	1%	-8843.13	3%
560	560	LinStatic	7148.45	2%	1178.34	0%	-867.59	0%	-6953.54	2%
560	560	LinStatic	8619.36	3%	-546.46	0%	396.53	0%	-8753.77	3%
560	560	LinStatic	8242.59	3%	1613.05	1%	-1621.84	1%	-7566.26	2%
561	561	LinStatic	8219.93	3%	1644.3	1%	-1676.9	1%	-7702.65	2%
561	561	LinStatic	8548.91	3%	-458.43	0%	300.02	0%	-8293.77	3%
561	561	LinStatic	7688.79	2%	29.51	0%	-45.7	0%	-7366.63	2%
561	561	LinStatic	7586.1	2%	825.4	0%	-734.55	0%	-6983.05	2%
562	562	LinStatic	7501.83	2%	821.63	0%	-764.99	0%	-6954.2	2%
562	562	LinStatic	7769.87	2%	94.19	0%	-59.54	0%	-7321.58	2%
562	562	LinStatic	6857.38	2%	-53.16	0%	1.74	0%	-6432.55	2%
562	562	LinStatic	6736.31	2%	530.48	0%	-557.65	0%	-6214.39	2%
563	563	LinStatic	6728.97	2%	536.94	0%	-558.47	0%	-6196.06	2%
563	563	LinStatic	6902.71	2%	-35.13	0%	-0.73	0%	-6407.24	2%
563	563	LinStatic	6046.11	2%	8.77	0%	0.14	0%	-5537.93	2%
563	563	LinStatic	5949.49	2%	340.58	0%	-319.88	0%	-5401.33	2%
564	564	LinStatic	5949.07	2%	339.91	0%	-316.97	0%	-5394.62	2%
564	564	LinStatic	6077.75	2%	13.64	0%	4.01	0%	-5532.95	2%
564	564	LinStatic	5234.14	2%	-23.93	0%	-4.77	0%	-4702.72	1%
564	564	LinStatic	5162.29	2%	193.14	0%	-215.14	0%	-4622.66	1%
565	565	LinStatic	5167.12	2%	189.25	0%	-212.22	0%	-4618.28	1%
565	565	LinStatic	5251.96	2%	-21.45	0%	3.65	0%	-4708.18	1%
565	565	LinStatic	4443.56	1%	-8.78	0%	32.05	0%	-3890.4	1%
565	565	LinStatic	4393.58	1%	122.77	0%	-107.01	0%	-3833.02	1%
566	566	LinStatic	4395.16	1%	123.02	0%	-99.41	0%	-3834.63	1%
566	566	LinStatic	4459.55	1%	-14.18	0%	33.14	0%	-3892.15	1%
566	566	LinStatic	3655.61	1%	-44.89	0%	26.99	0%	-3101.35	1%
566	566	LinStatic	3610.99	1%	47.45	0%	-59.61	0%	-3064.7	1%
567	567	LinStatic	3618.46	1%	42.1	0%	-59.77	0%	-3059.71	1%
567	567	LinStatic	3660.42	1%	-42.28	0%	36.76	0%	-3111.05	1%
567	567	LinStatic	2878.33	1%	-38.8	0%	74.05	0%	-2325.36	1%
567	567	LinStatic	2848.5	1%	15.84	0%	2.34	0%	-2281.23	1%
568	568	LinStatic	2847.57	1%	19.33	0%	11.28	0%	-2285.72	1%
568	568	LinStatic	2890.95	1%	-46.11	0%	70.13	0%	-2321.27	1%
568	568	LinStatic	2112.04	1%	-86.8	0%	86.68	0%	-1564.33	0%
568	568	LinStatic	2070.22	1%	-35.69	0%	41.99	0%	-1530.18	0%
569	569	LinStatic	2079.26	1%	-42.15	0%	35.73	0%	-1519.82	0%
569	569	LinStatic	2109.36	1%	-78.88	0%	99.09	0%	-1575.61	0%
569	569	LinStatic	1360.25	0%	-104.2	0%	201.78	0%	-862.74	0%
569	569	LinStatic	1327.07	0%	-75.61	0%	124.43	0%	-781.74	0%

TABLE: Element Stresses - Area Shells/Allowable Stress = $0.9F_y = 0.9 \times 355000 = 319500 \text{ KN/M}^2$

Area	AreaElem	CaseType	SMaxTop	Ratio	SMinTop	Ratio	SMaxBot	Ratio	SMinBot	Ratio
Text	Text	Text	KN/m2	-	KN/m2	-	KN/m2	-	KN/m2	-
570	570	LinStatic	1318.86	0%	-64.76	0%	138.55	0%	-791.74	0%
570	570	LinStatic	1374.21	0%	-113.15	0%	184.03	0%	-843.99	0%
570	570	LinStatic	685.61	0%	-242.8	0%	444.27	0%	-330.7	0%
570	570	LinStatic	594.35	0%	-170.92	0%	377.27	0%	-244.52	0%
571	571	LinStatic	606.61	0%	-180.74	0%	351.33	0%	-214.35	0%
571	571	LinStatic	663.07	0%	-215.06	0%	457.02	0%	-343.07	0%
571	571	LinStatic	234.62	0%	-566.16	0%	1064.81	0%	-130.41	0%
571	571	LinStatic	131.05	0%	-500.31	0%	979.24	0%	-6.24	0%
572	572	LinStatic	99.21	0%	-466.44	0%	986.65	0%	-9.11	0%
572	572	LinStatic	240.81	0%	-566.77	0%	1040.04	0%	-106.83	0%
572	572	LinStatic	87.02	0%	-1241.42	0%	1783.79	1%	-67.69	0%
572	572	LinStatic	-69.96	0%	-1151.81	0%	1722.36	1%	64.18	0%
573	573	LinStatic	-70.6	0%	-1149.71	0%	1713.33	1%	78.44	0%
573	573	LinStatic	63.01	0%	-1211.88	0%	1777.86	1%	-66.37	0%
573	573	LinStatic	36.45	0%	-1986.58	1%	2575.55	1%	-17.83	0%
573	573	LinStatic	-152.29	0%	-1897.89	1%	2487.22	1%	179.4	0%
574	574	LinStatic	-164.15	0%	-1885.63	1%	2490.11	1%	183.5	0%
574	574	LinStatic	32.36	0%	-1974.84	1%	2555.24	1%	-6.36	0%
574	574	LinStatic	11.04	0%	-2796.21	1%	3371.17	1%	-29.34	0%
574	574	LinStatic	-319.37	0%	-2668.05	1%	3261.48	1%	300.03	0%
575	575	LinStatic	-322.06	0%	-2669.97	1%	3264.12	1%	305.09	0%
575	575	LinStatic	4.64	0%	-2776.64	1%	3356.74	1%	-28.08	0%
575	575	LinStatic	-45.94	0%	-3632.74	1%	4227.33	1%	76.58	0%
575	575	LinStatic	-451.06	0%	-3418.72	1%	4030.32	1%	485.21	0%
576	576	LinStatic	-439.85	0%	-3422.56	1%	4085.7	1%	494.61	0%
576	576	LinStatic	-34.44	0%	-3609.93	1%	4196.76	1%	58.64	0%
576	576	LinStatic	169.3	0%	-4580.76	1%	5122.87	2%	-267.88	0%
576	576	LinStatic	-1071.28	0%	-4177.85	1%	4783.81	1%	1015.7	0%
577	577	LinStatic	-1029.71	0%	-4111.38	1%	4803.73	2%	989.74	0%
577	577	LinStatic	243.04	0%	-4773.23	1%	5193.51	2%	-304.29	0%
577	577	LinStatic	-603.79	0%	-4575.65	1%	5193.77	2%	853.52	0%
577	577	LinStatic	-1329.18	0%	-5325.37	2%	6202.23	2%	1613.54	1%

10.1.4 Critical Design of bolts

Design bolts at fixation (Every support in the model represent a bolt)

Reactions of the supports is the forces every bolt carry:

Joint Reactions								
Joint	OutputCase	CaseType	F1	F2	F3	M1	M2	M3
Text	Text	Text	KN	KN	KN	KN-m	KN-m	KN-m
112	DEAD	LinStatic	0.01	0.001476	0.08	0	0	0
115	DEAD	LinStatic	0.01	-0.001476	0.08	0	0	0
130	DEAD	LinStatic	0.026	0.019	-0.354	0	0	0
133	DEAD	LinStatic	0.026	-0.019	-0.354	0	0	0
156	DEAD	LinStatic	-0.026	0.019	-0.354	0	0	0
159	DEAD	LinStatic	-0.026	-0.019	-0.354	0	0	0
174	DEAD	LinStatic	-0.01	0.001476	0.08	0	0	0
177	DEAD	LinStatic	-0.01	-0.001476	0.08	0	0	0

Max Allowable Tension (Ft) for M20 = $0.75 \cdot F_n \cdot A_b$

$$F_n = 0.75 \times 800 = 600 \text{ MPA}$$

$$F_t = 0.75 \times 600 \times 245 = 110.25 \text{ KN} > \text{Max tension} - \text{Safe}$$

Max Allowable Shear (Fv) for M20 = $0.45 \cdot F_n \cdot A_b$

$$F_n = 0.75 \times 800 = 600 \text{ MPA}$$

$$F_t = 0.45 \times 600 \times 245 = 66.15 \text{ KN} > \text{Max Shear} - \text{Safe}$$

10.2 Connection L-Plate Main beam with top chord at bracing joint (two sides)

Joint	Output Case	Case Type	F1	F2	F3
Text	Text	Text	Tonf	Tonf	Tonf
3	ULS) 1.4D+TEMP-	Combination	0.00	0.00	1.5

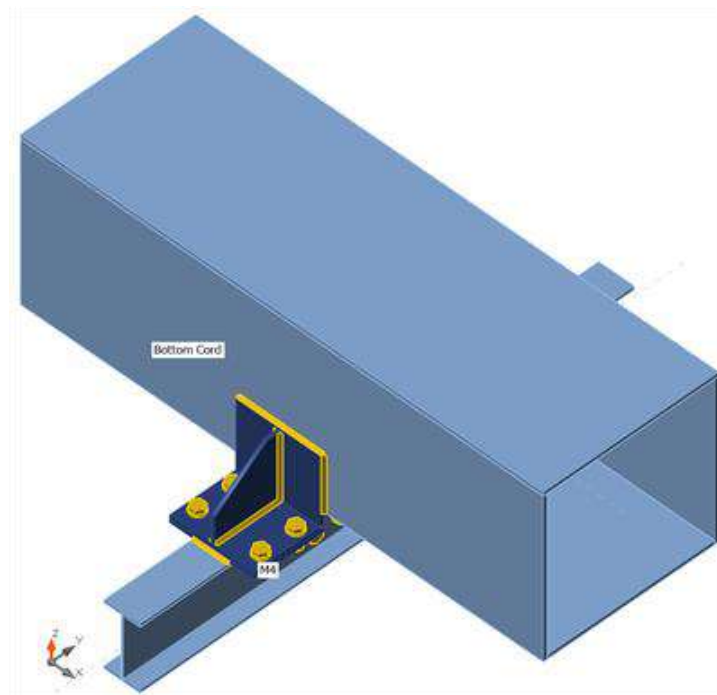
Project item Detail-02

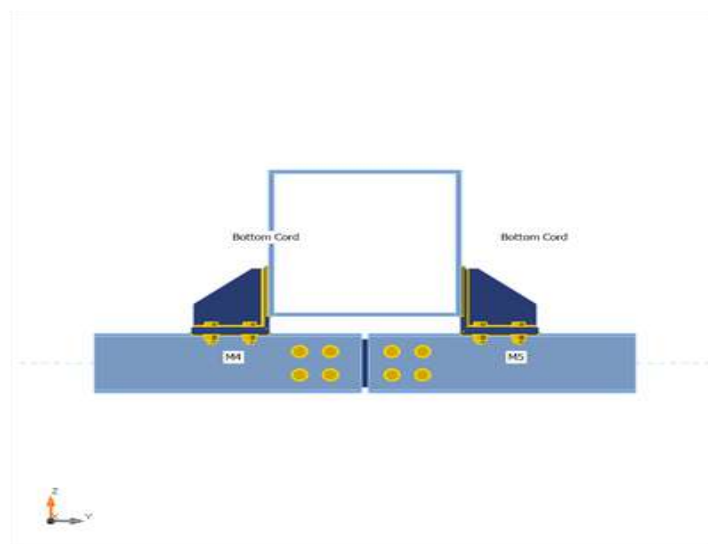
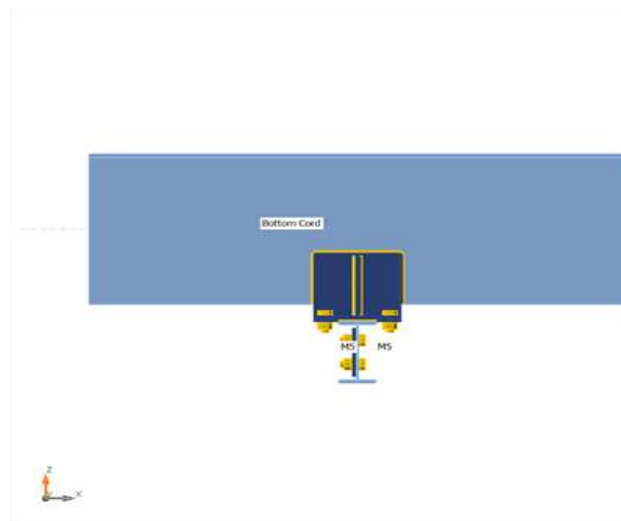
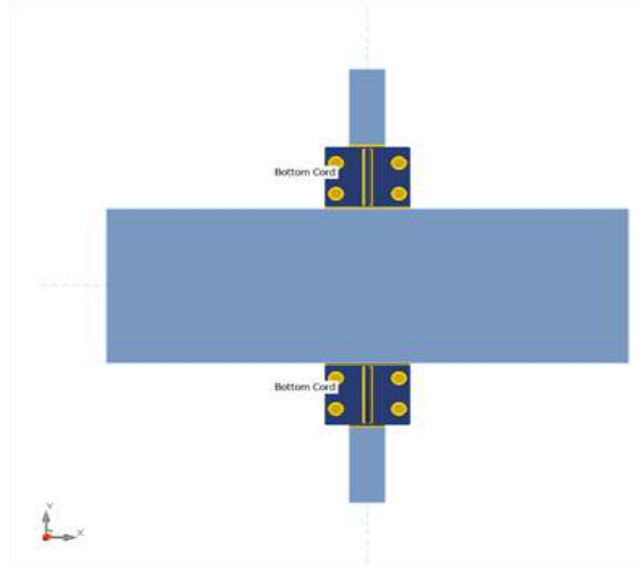
Design

Name	Detail-02
Description	Main beam with L Plate at bracing joint
Analysis	Stress, strain/ loads in equilibrium
Design code	AISC - LRFD 2016

Beams and columns

Name	Cross-section	β - Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]	Forces in
Bottom Cord	BoxWeb500x(500/502)(BoxWeb500x(500/500))	0.0	0.0	0.0	0	0	480	Position
M4	UB 203 x 102 x 23	-90.0	0.0	0.0	10	0	70	Position
M5	UB 203 x 102 x 23	90.0	0.0	0.0	10	0	70	Position

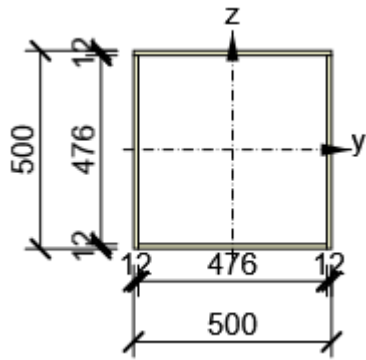
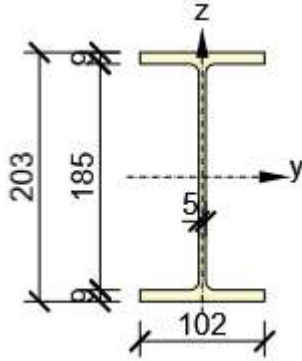




Cross-sections

Name	Material
6 - BoxWeb500x(500/502)(BoxWeb500x(500/500))	S355
10 - UB 203 x 102 x 23	S355

Cross-sections

Name	Material	Drawing
6 - BoxWeb500x(500/502)(BoxWeb500x(500/500))	S355	
10 - UB 203 x 102 x 23	S355	

Bolts

Name	Bolt assembly	Diameter [mm]	f_u [MPa]	Gross area [mm ²]
20 A325M	20 A325M	20	830.0	314

Load effects (forces in equilibrium)

Name	Member	N [kN]	V _y [kN]	V _z [kN]	M _x [kNm]	M _y [kNm]	M _z [kNm]
Case 1	Bottom Cord	0.0	0.0	0.0	0.0	0.0	0.0
	Bottom Cord	0.0	0.0	0.0	0.0	0.0	0.0
	M4	0.0	0.0	-15.0	0.0	0.0	0.0
	M5	0.0	0.0	-15.0	0.0	0.0	0.0

Check

Summary

Name	Value	Check status
Analysis	100.0%	OK

Plates	$0.0 < 5.0\%$	OK
Bolts	$13.5 < 100\%$	OK
Welds	$36.0 < 100\%$	OK
Buckling	Not calculated	

Plates

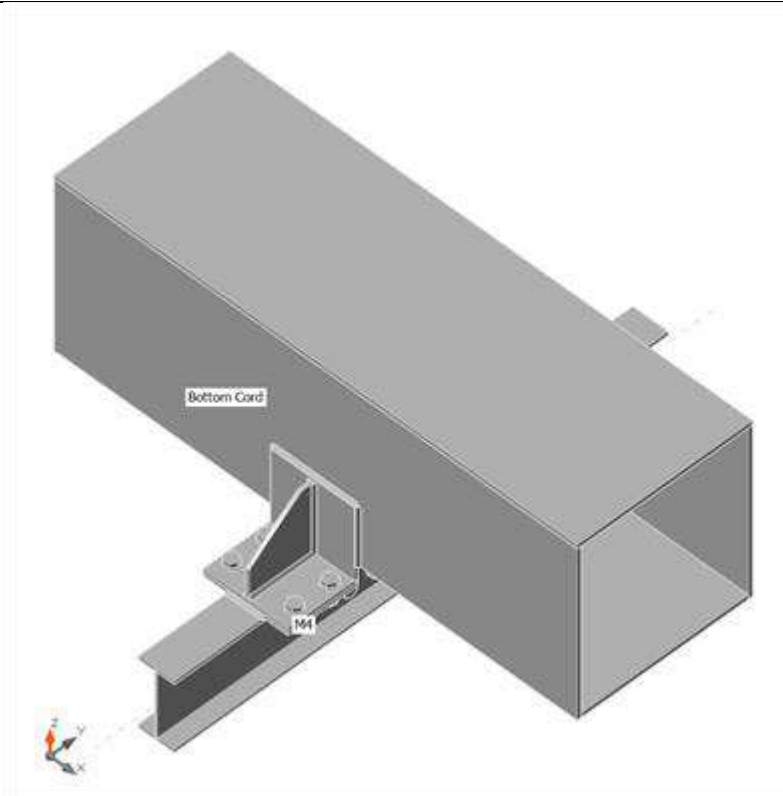
Name	f_y [MPa]	Thickness [mm]	Loads	σ_{Ed} [MPa]	ϵ_{Pl} [%]	σ_{CEd} [MPa]	Check status
Bottom Cord-tfl 1	355.0	12.0	Case 1	7.1	0.0	0.0	OK
Bottom Cord-bfl 1	355.0	12.0	Case 1	28.1	0.0	0.0	OK
Bottom Cord-w 1	355.0	12.0	Case 1	13.9	0.0	2.5	OK
Bottom Cord-w 2	355.0	12.0	Case 1	18.8	0.0	1.2	OK
M4-bfl 1	355.0	9.3	Case 1	50.6	0.0	0.0	OK
M4-tfl 1	355.0	9.3	Case 1	105.2	0.0	1.6	OK
M4-w 1	355.0	5.4	Case 1	73.7	0.0	4.4	OK
M5-bfl 1	355.0	9.3	Case 1	50.5	0.0	0.0	OK
M5-tfl 1	355.0	9.3	Case 1	51.2	0.0	3.4	OK
M5-w 1	355.0	5.4	Case 1	74.7	0.0	3.5	OK
SP8	355.0	10.0	Case 1	51.4	0.0	4.4	OK
SP9	355.0	10.0	Case 1	54.7	0.0	2.4	OK
SP10	355.0	10.0	Case 1	68.1	0.0	1.5	OK
SP11	355.0	10.0	Case 1	147.9	0.0	25.7	OK
SP12	355.0	10.0	Case 1	121.9	0.0	25.7	OK
SP13	355.0	10.0	Case 1	45.9	0.0	0.0	OK
SP14	355.0	10.0	Case 1	19.4	0.0	7.1	OK
SP15	355.0	10.0	Case 1	12.2	0.0	7.1	OK
SP16	355.0	10.0	Case 1	56.3	0.0	0.0	OK

Design data

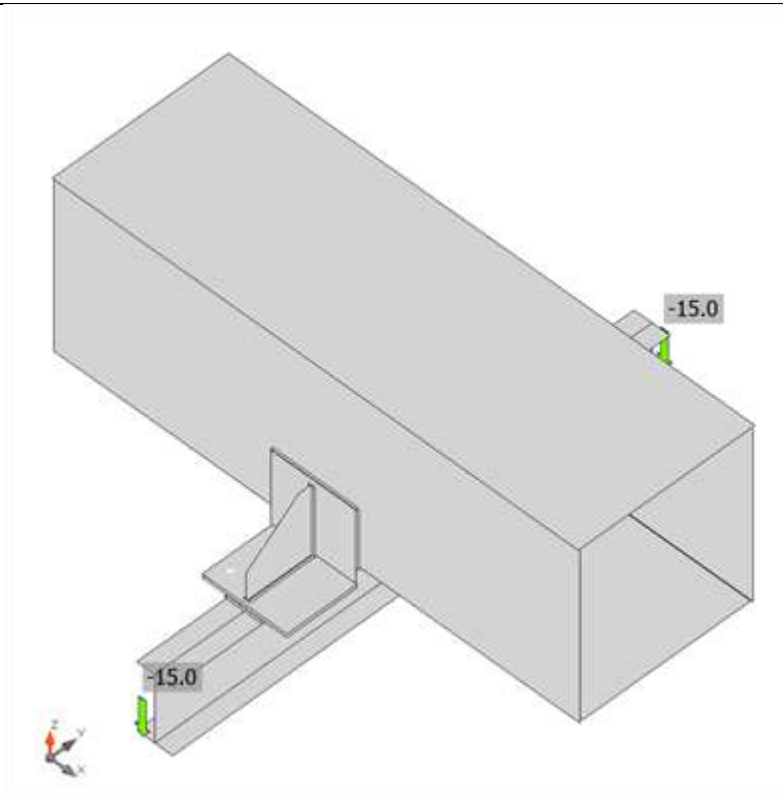
Material	f_y [MPa]	ϵ_{lim} [%]
S355	355.0	5.0

Symbol explanation

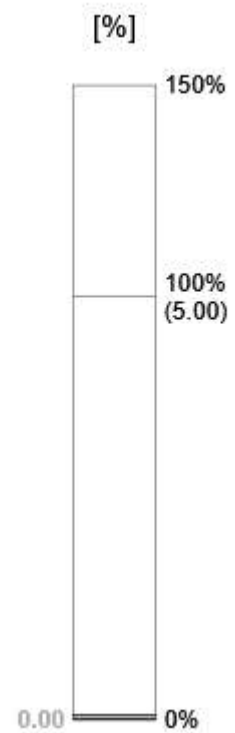
ϵ_{Pl}	Plastic strain
σ_{CEd}	Contact stress
σ_{Ed}	Eq. stress
f_y	Yield strength
ϵ_{lim}	Limit of plastic strain



Overall check, Case 1



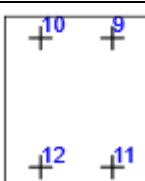
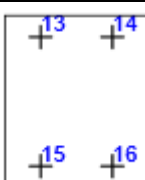


Strain check, Case 1





Bolts

Shape	Item	Grade	Loads	F_t [kN]	V [kN]	$\phi R_{n,bearing}$ [kN]	U_{t_t} [%]	U_{t_s} [%]	$U_{t_{ts}}$ [%]	Status
	B1	20 A325M - 1	Case 1	0.5	2.8	99.1	0.3	3.2	-	OK
	B2	20 A325M - 1	Case 1	1.6	3.4	99.1	1.1	3.8	-	OK
	B3	20 A325M - 1	Case 1	1.1	5.8	99.1	0.8	6.6	-	OK
	B4	20 A325M - 1	Case 1	1.1	5.9	99.1	0.8	6.8	-	OK
	B5	20 A325M - 1	Case 1	1.4	8.4	99.1	0.9	9.5	-	OK
	B6	20 A325M - 1	Case 1	1.4	7.7	99.1	1.0	8.8	-	OK
	B7	20 A325M - 1	Case 1	0.4	3.8	99.1	0.3	4.4	-	OK
	B8	20 A325M - 1	Case 1	1.3	2.7	99.1	0.9	3.1	-	OK
	B9	20 A325M - 1	Case 1	2.0	4.6	179.3	1.4	5.3	-	OK
	B10	20 A325M - 1	Case 1	19.7	4.3	183.6	13.5	4.9	-	OK
	B11	20 A325M - 1	Case 1	2.0	4.1	179.0	1.4	4.7	-	OK
	B12	20 A325M - 1	Case 1	19.4	3.8	183.6	13.3	4.3	-	OK
	B13	20 A325M - 1	Case 1	0.2	1.1	179.5	0.2	1.3	-	OK
	B14	20 A325M - 1	Case 1	0.0	1.3	179.6	0.0	1.5	-	OK
	B15	20 A325M - 1	Case 1	0.5	1.1	180.9	0.3	1.2	-	OK
	B16	20 A325M - 1	Case 1	0.0	1.3	180.7	0.0	1.5	-	OK

Design data

Grade	$\phi R_{n,tension}$ [kN]	$\phi R_{n,shear}$ [kN]
20 A325M - 1	146.0	87.6

Symbol explanation

F_t	Tension force
V	Resultant of shear forces V_y, V_z in bolt
$\phi R_{n,bearing}$	Bolt bearing resistance
U_t	Utilization in tension
U_s	Utilization in shear
U_{ts}	Utilization in tension and shear
$\phi R_{n,tension}$	Bolt tension resistance AISC 360-16 J3.6
$\phi R_{n,shear}$	Bolt shear resistance AISC 360-16 – J3.8

Detailed result for B10

Tension resistance check (AISC 360-16: J3-1)

$\phi R_n = \phi \cdot F_{nt} \cdot$	146.0	kN	\geq	$F_t =$	19.7	kN
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Where:

$F_{nt} = 620.0 \text{ MPa}$	– nominal tensile stress from AISC 360-16 Table J3.2
$A_b = 314 \text{ mm}^2$	– gross bolt cross-sectional area
$\phi = 0.75$	– resistance factor

Shear resistance check (AISC 360-16: J3-1)

$\phi R_n = \phi \cdot F_{nv} \cdot A_b =$	87.6	kN	\geq	$V =$	4.3	kN
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Where:

$F_{nv} = 372.0 \text{ MPa}$	– nominal shear stress from AISC 360-16 Table J3.2
$A_b = 314 \text{ mm}^2$	– gross bolt cross-sectional area
$\phi = 0.75$	– resistance factor

Bearing resistance check (AISC 360-16: J3-6)

$R_n = 1.20 \cdot l_c \cdot t \cdot F_u$			\leq	$2.40 \cdot d \cdot t \cdot F_u$		
$\phi R_n =$	183.6	kN	\geq	$V =$	4.3	kN

Where:

$l_c = 41 \text{ mm}$	– clear distance, in the direction of the force, between the edge of the hole and the edge of the adjacent hole or edge of the material
$t = 10 \text{ mm}$	– thickness of the plate
$d = 20 \text{ mm}$	– diameter of a bolt
$F_u = 510.0 \text{ MPa}$	– tensile strength of the connected material
$\phi = 0.75$	– resistance factor for bearing at bolt holes

Interaction of tension and shear check (AISC 360-16: J3-2)

The required stress, in either shear or tension, is less than or equal to 30% of the corresponding available stress and the effects of combined stresses need not to be investigated.

Weld sections

Item	Edge	Xu	T _h [mm]	L _s [mm]	L [mm]	L _c [mm]	Loads	F _n [kN]	φR _n [kN]	Ut [%]	Status
Bottom Cord-w 2	SP9	E70xx	▲5.7	▲8.0	239	30	Case 1	5.4	39.8	13.6	OK
Bottom Cord-w 2	SP9	E70xx	▲5.7	▲8.0	170	28	Case 1	2.6	43.3	6.1	OK
Bottom Cord-w 2	SP9	E70xx	▲5.7	▲8.0	169	28	Case 1	2.4	41.0	5.9	OK
SP9	Bottom Cord-w 2	E70xx	▲5.7	▲8.0	239	30	Case 1	4.1	55.0	7.5	OK
Bottom Cord-w 1	SP10	E70xx	▲5.7	▲8.0	170	28	Case 1	2.3	37.2	6.1	OK
Bottom Cord-w 1	SP10	E70xx	▲5.7	▲8.0	239	30	Case 1	2.6	43.8	6.0	OK
Bottom Cord-w 1	SP10	E70xx	▲5.7	▲8.0	170	28	Case 1	3.0	37.7	8.0	OK
SP10	Bottom Cord-w 1	E70xx	▲5.7	▲8.0	239	30	Case 1	9.4	48.2	19.6	OK
M4-tfl 1	SP11	E70xx	▲5.7	▲8.0	101	25	Case 1	6.2	46.2	13.5	OK
M4-tfl 1	SP11	E70xx	▲5.7	▲8.0	101	25	Case 1	7.8	36.0	21.7	OK
SP11	M4-tfl 1	E70xx	▲5.7	▲8.0	200	25	Case 1	9.0	41.9	21.5	OK
SP11	M4-tfl 1	E70xx	▲5.7	▲8.0	200	25	Case 1	8.8	42.5	20.7	OK
M5-tfl 1	SP14	E70xx	▲5.7	▲8.0	101	25	Case 1	4.7	44.5	10.6	OK
M5-tfl 1	SP14	E70xx	▲5.7	▲8.0	101	25	Case 1	15.1	42.1	36.0	OK
SP14	M5-tfl 1	E70xx	▲5.7	▲8.0	200	25	Case 1	1.9	32.9	5.9	OK
SP14	M5-tfl 1	E70xx	▲5.7	▲8.0	200	25	Case 1	2.2	32.7	6.9	OK
SP12	SP13	E70xx	▲5.7▲	▲8.0▲	184	12	Case 1	3.4	21.8	15.7	OK
		E70xx	▲5.7▲	▲8.0▲	184	12	Case 1	3.4	21.8	15.5	OK
SP10	SP13	E70xx	▲5.7▲	▲8.0▲	198	12	Case 1	3.3	22.7	14.4	OK
		E70xx	▲5.7▲	▲8.0▲	198	12	Case 1	3.4	22.8	14.7	OK
SP12	SP10	E70xx	-	-	240	-	-	-	-	-	OK
SP14	SP9	E70xx	-	-	240	-	-	-	-	-	OK
SP15	SP16	E70xx	▲5.7▲	▲8.0▲	184	12	Case 1	2.4	21.2	11.2	OK
		E70xx	▲5.7▲	▲8.0▲	184	12	Case 1	2.4	21.2	11.4	OK
SP9	SP16	E70xx	▲5.7▲	▲8.0▲	199	12	Case 1	5.1	22.0	23.1	OK
		E70xx	▲5.7▲	▲8.0▲	199	12	Case 1	5.1	22.1	23.3	OK

Symbol explanation

T_h	Throat thickness of weld
L_s	Leg size of weld
L	Length of weld
L_c	Length of weld critical element
F_n	Force in weld critical element
ϕR_n	Weld resistance AISC 360-16 J2.4
U_t	Utilization

Detailed result for M5-tfl 1 / SP14

Weld resistance check (AISC 360-16: J2-4)

$\phi R_n = \phi \cdot F_{nw}$	42.1	kN	\geq	$F_n =$	15.1	kN
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Where:



$F_{nw} = 391.2 \text{ MPa}$	– nominal stress of weld material:
$F_{nw} = 0.6 \cdot F_{EXX} \cdot (1 + 0.5 \cdot \sin^{1.5} \theta)$, where: $F_{EXX} =$ 482.6 MPa – electrode classification number, i.e. minimum specified tensile strength $\theta =$ 52.2° – angle of loading measured from the weld longitudinal axis	
$A_{we} = 143 \text{ mm}^2$	– effective area of weld critical element
$\phi = 0.75$	– resistance factor for welded connections


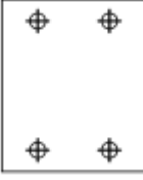
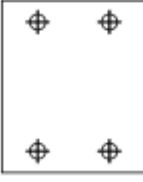
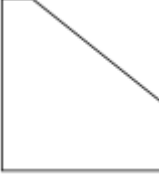
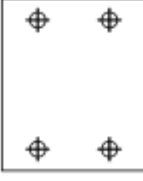
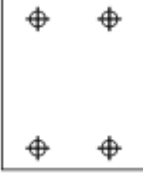
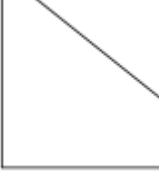
Buckling

Buckling analysis was not calculated.

Bill of material

Manufacturing operations

Name	Plates [mm]	Shape	Nr.	Welds [mm]	Length [mm]	Bolts	Nr.
SP8	P10.0x400.0-160.0 (S355)		1			20 A325M	8
SP9	P10.0x240.0-218.4 (S355)		1	Fillet: a = 5.7	820.0		

SP10	P10.0x240.0-208.4 (S355)		1	Fillet: a = 5.7	820.0		
SP11	P10.0x200.0-240.0 (S355)		1	Fillet: a = 5.7	603.6	20 A325M	4
SP12	P10.0x200.0-240.0 (S355)		1			20 A325M	4
SP13	P10.0x185.0-200.0 (S355)		1	Double fillet: a = 5.7	185.0		
SP14	P10.0x200.0-240.0 (S355)		1	Fillet: a = 5.7	603.6	20 A325M	4
SP15	P10.0x200.0-240.0 (S355)		1			20 A325M	4
SP16	P10.0x185.0-200.0 (S355)		1	Double fillet: a = 5.7	185.0		

Welds

Type	Material	Throat thickness [mm]	Leg size [mm]	Length [mm]
Fillet	E70xx	5.7	8.0	2847.2
Double fillet	E70xx	5.7	8.0	770.0
Butt	E70xx	-	-	480.0

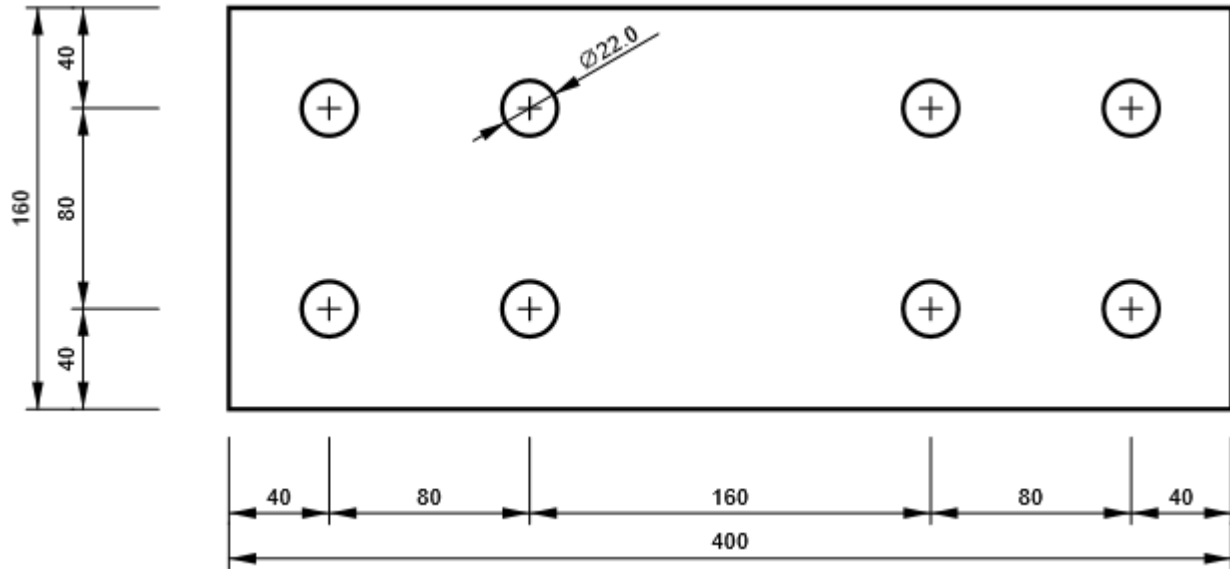
Bolts

Name	Grip length [mm]	Count
20 A325M	15	8
20 A325M	20	8

Drawing

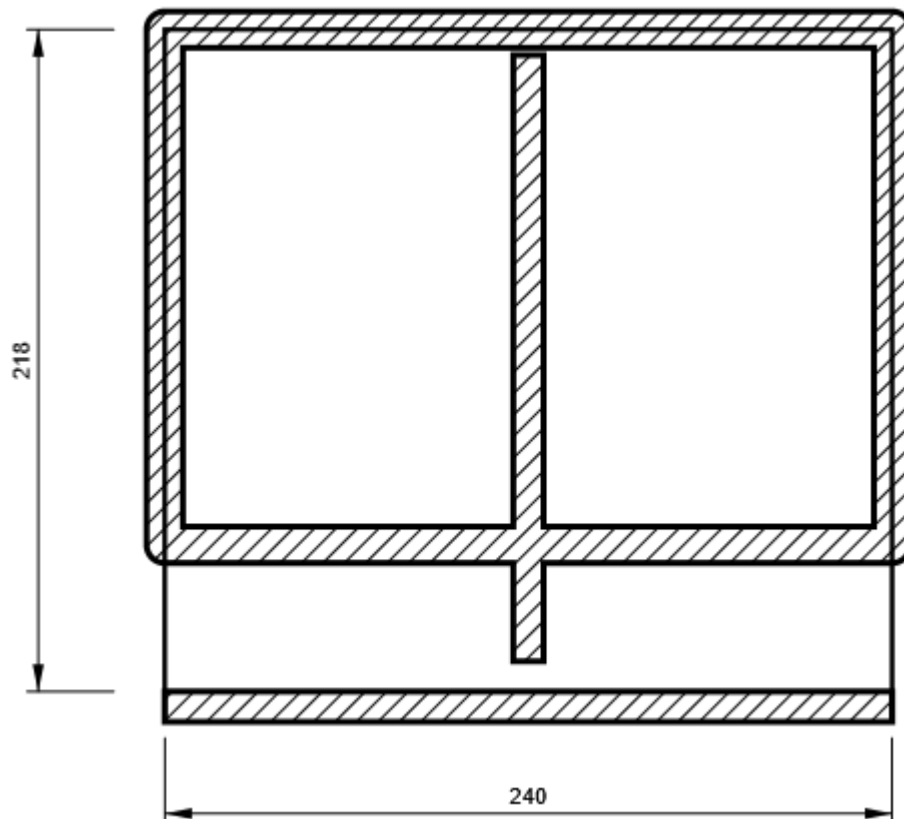
SP8

P10.0x160-400 (S355)



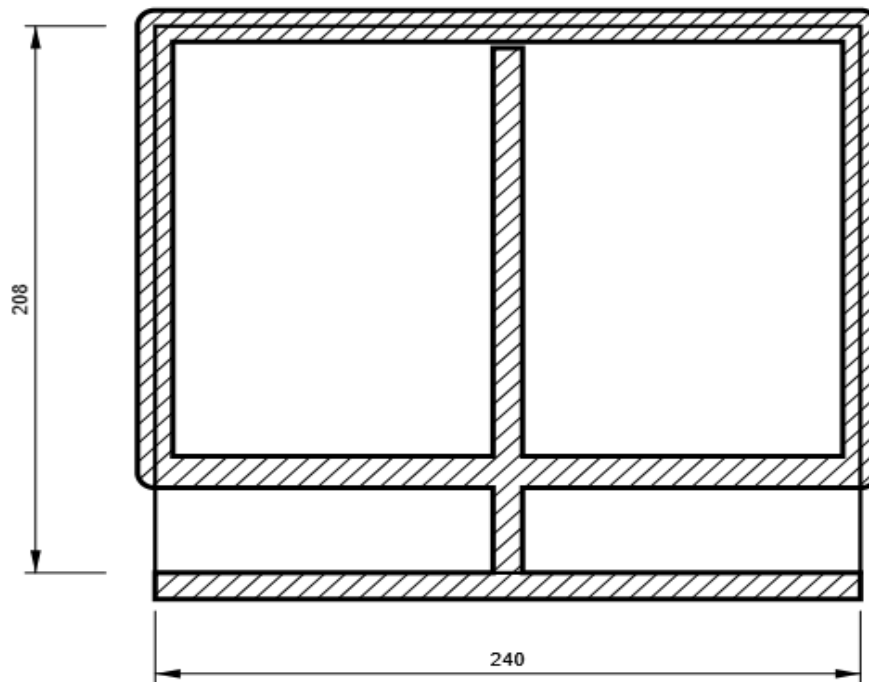
SP9

P10.0x218-240 (S355)



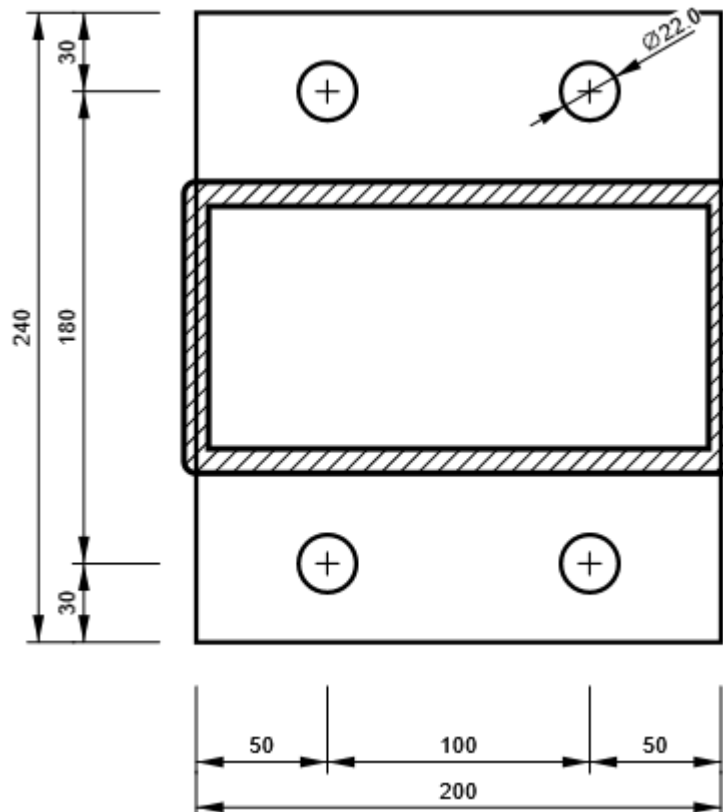
SP10

P10.0x208-240 (S355)



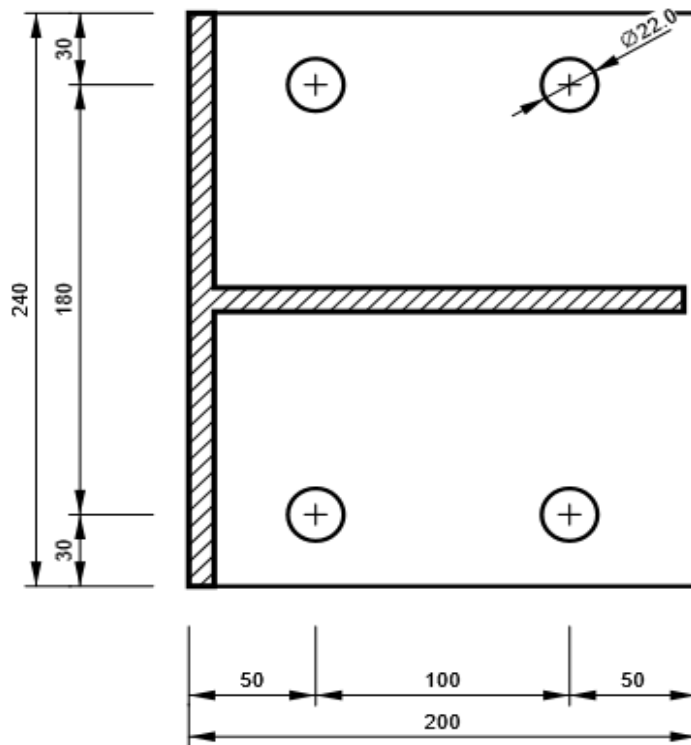
SP11

P10.0x240-200 (S355)



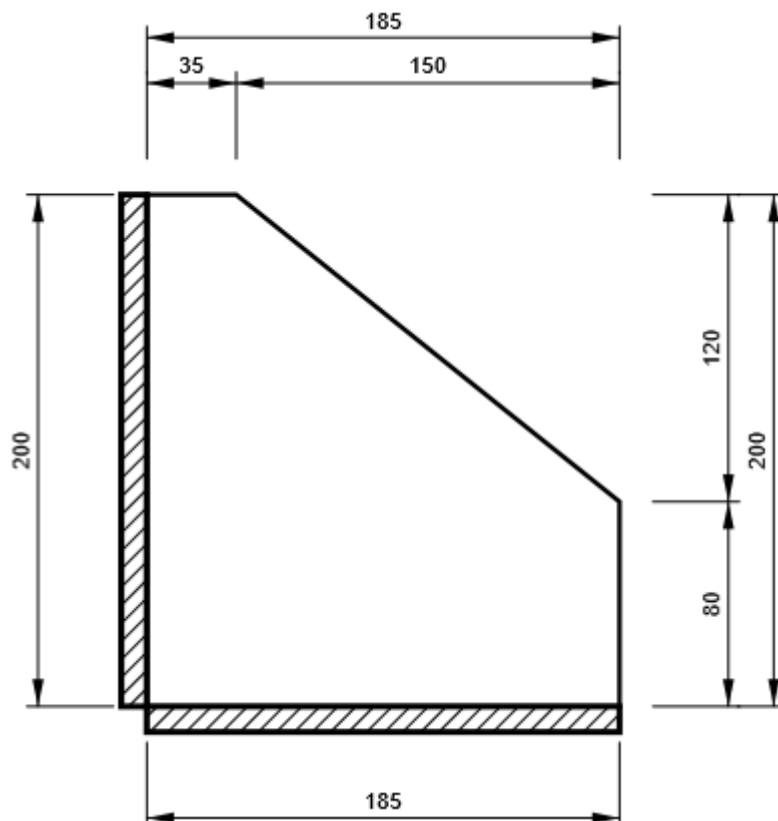
SP12

P10.0x240-200 (S355)



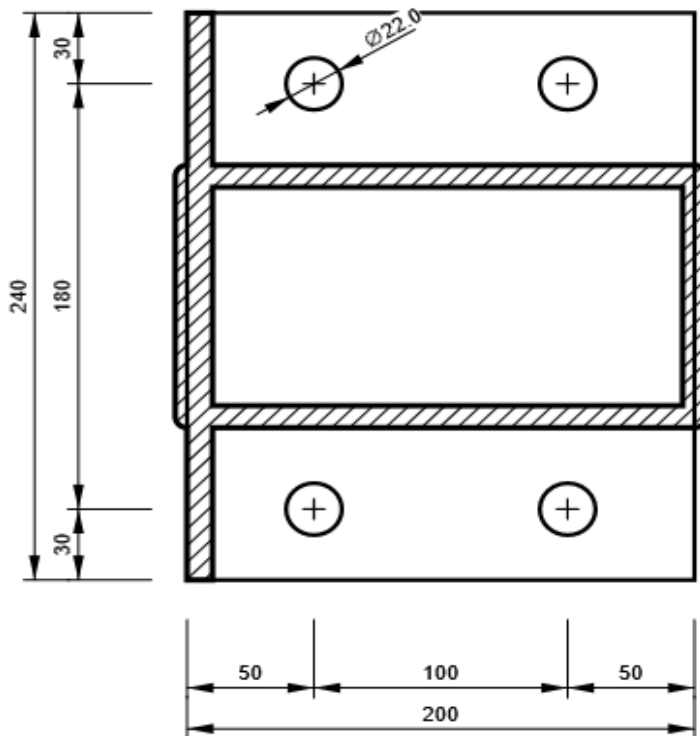
SP13

P10.0x200-185 (S355)



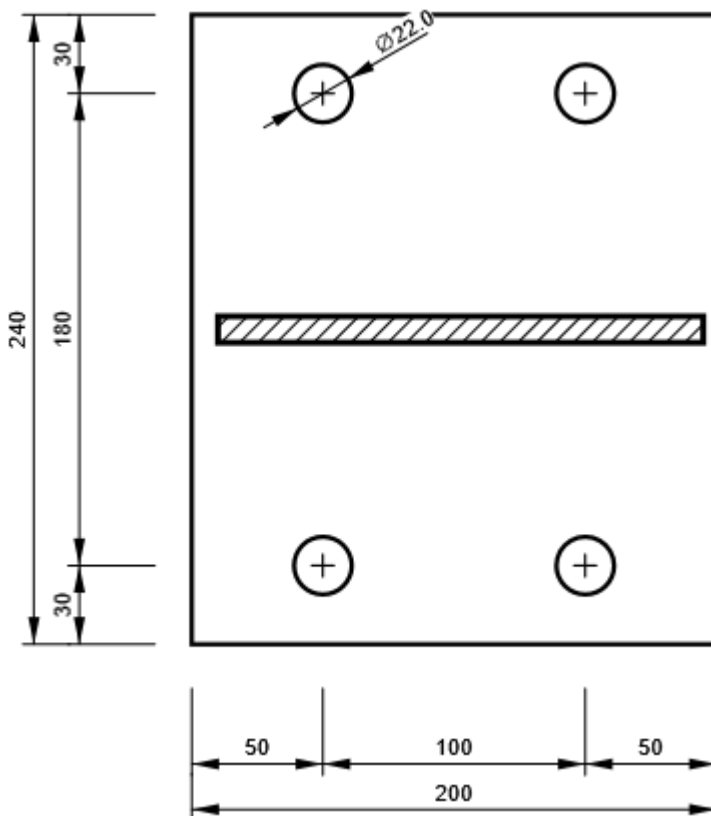
SP14

P10.0x240-200 (S355)



SP15

P10.0x240-200 (S355)



10.3 Connection L-Plate Main beam with top chord at bracing joint (one side)

Joint	Output Case	Case Type	F1	F2	F3
Text	Text	Text	Tonf	Tonf	Tonf
3	ULS) 1.4D+TEMP-	Combination	0.00	0.00	1.5

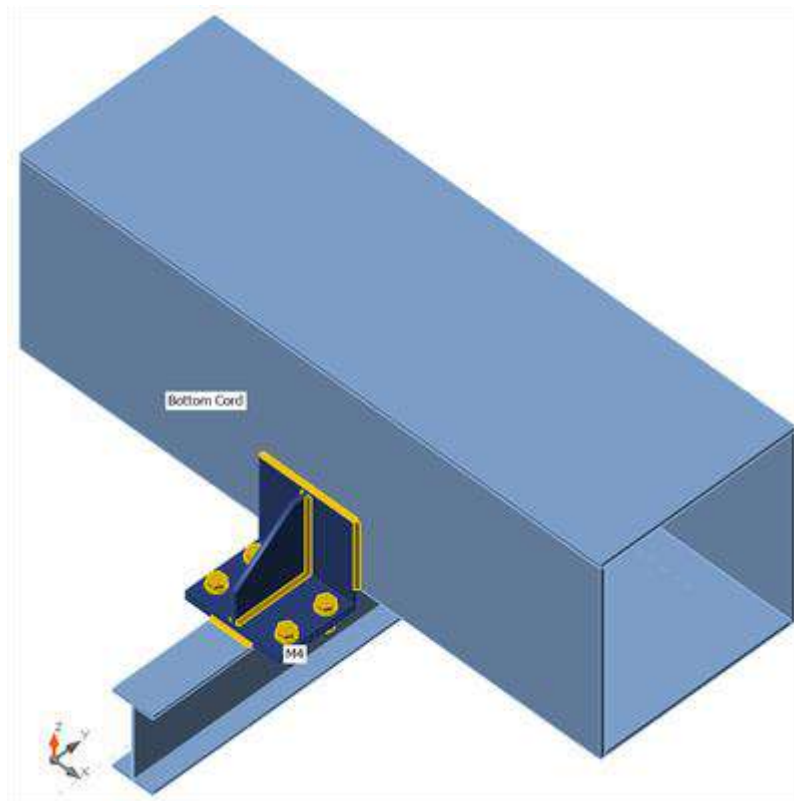
Project item Detail-03

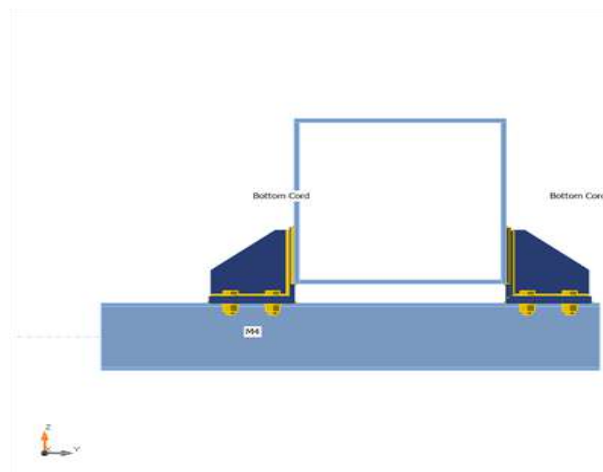
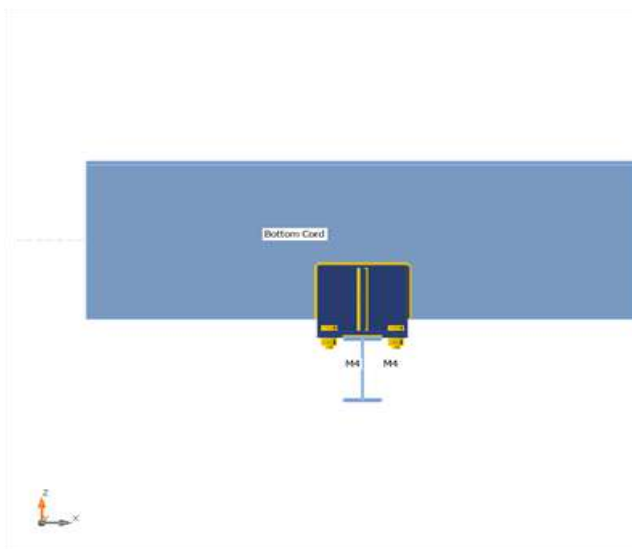
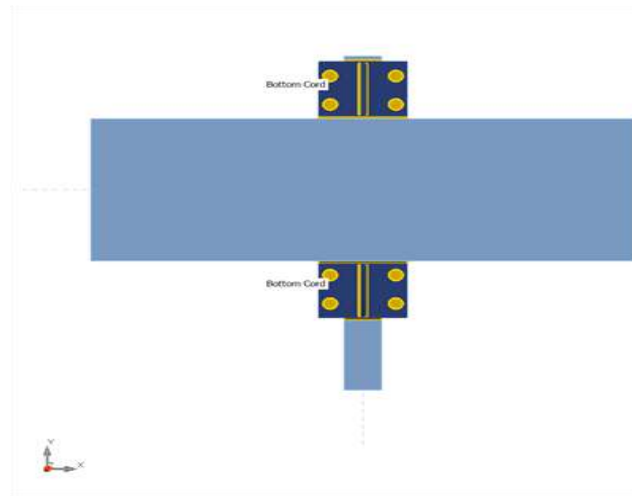
Design

Name	Detail-03
Description	Main beam Only with L Plate at bracing joint
Analysis	Stress, strain/ loads in equilibrium
Design code	AISC - LRFD 2016

Beams and columns

Name	Cross-section	β - Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]	Forces in
Bottom Cord	BoxWeb500x(500/502)(BoxWeb500x(500/500))	0.0	0.0	0.0	0	0	480	Position
M4	UB 203 x 102 x 23	-90.0	0.0	0.0	10	0	70	Position

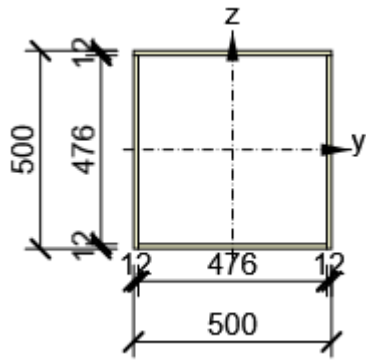
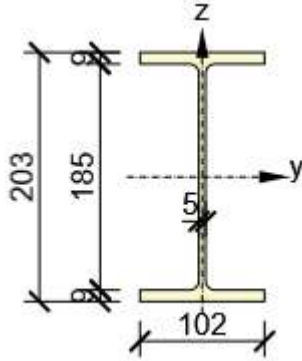




Cross-sections

Name	Material
BoxWeb500x(500/502)(BoxWeb500x(500/500))	S355
UB 203 x 102 x 23	S355

Cross-sections

Name	Material	Drawing
6 - BoxWeb500x(500/502)(BoxWeb500x(500/500))	S355	
10 - UB 203 x 102 x 23	S355	

Bolts

Name	Bolt assembly	Diameter [mm]	f_u [MPa]	Gross area [mm ²]
20 A325M	20 A325M	20	830.0	314

Load effects (forces in equilibrium)

Name	Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Case 1	Bottom Cord	0.0	0.0	0.0	0.0	0.0	0.0
	Bottom Cord	0.0	0.0	0.0	0.0	0.0	0.0
	M4	0.0	0.0	-15.0	0.0	0.0	0.0

Check

Summary

Name	Value	Check status
Analysis	100.0%	OK
Plates	0.0 < 5.0%	OK

Bolts	$6.6 < 100\%$	OK
Welds	$18.5 < 100\%$	OK
Buckling	Not calculated	

Plates

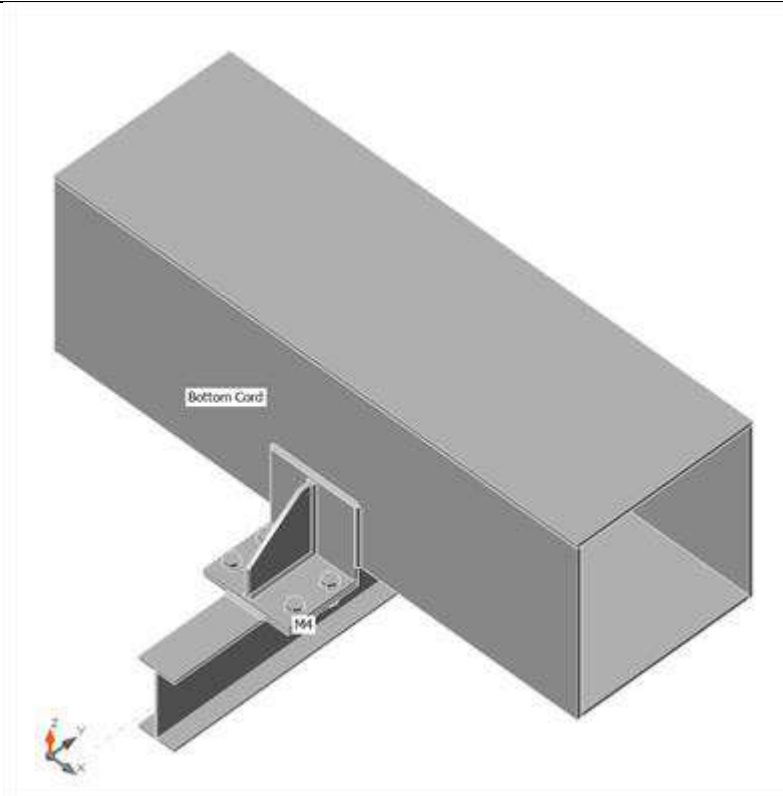
Name	f_y [MPa]	Thickness [mm]	Loads	σ_{Ed} [MPa]	ϵ_{Pl} [%]	σ_{Ced} [MPa]	Check status
Bottom Cord-tfl 1	355.0	12.0	Case 1	4.0	0.0	0.0	OK
Bottom Cord-bfl 1	355.0	12.0	Case 1	6.3	0.0	0.0	OK
Bottom Cord-w 1	355.0	12.0	Case 1	15.2	0.0	0.2	OK
Bottom Cord-w 2	355.0	12.0	Case 1	10.9	0.0	0.2	OK
M4-bfl 1	355.0	9.3	Case 1	49.5	0.0	0.0	OK
M4-tfl 1	355.0	9.3	Case 1	49.5	0.0	0.0	OK
M4-w 1	355.0	5.4	Case 1	46.9	0.0	0.0	OK
SP10	355.0	10.0	Case 1	11.3	0.0	0.3	OK
SP11	355.0	10.0	Case 1	86.9	0.0	12.5	OK
SP12	355.0	10.0	Case 1	46.8	0.0	12.5	OK
SP13	355.0	10.0	Case 1	13.6	0.0	0.0	OK
SP14	355.0	10.0	Case 1	78.8	0.0	13.3	OK
SP15	355.0	10.0	Case 1	62.3	0.0	13.3	OK
SP16	355.0	10.0	Case 1	21.1	0.0	0.0	OK
SP9	355.0	10.0	Case 1	20.8	0.0	0.2	OK

Design data

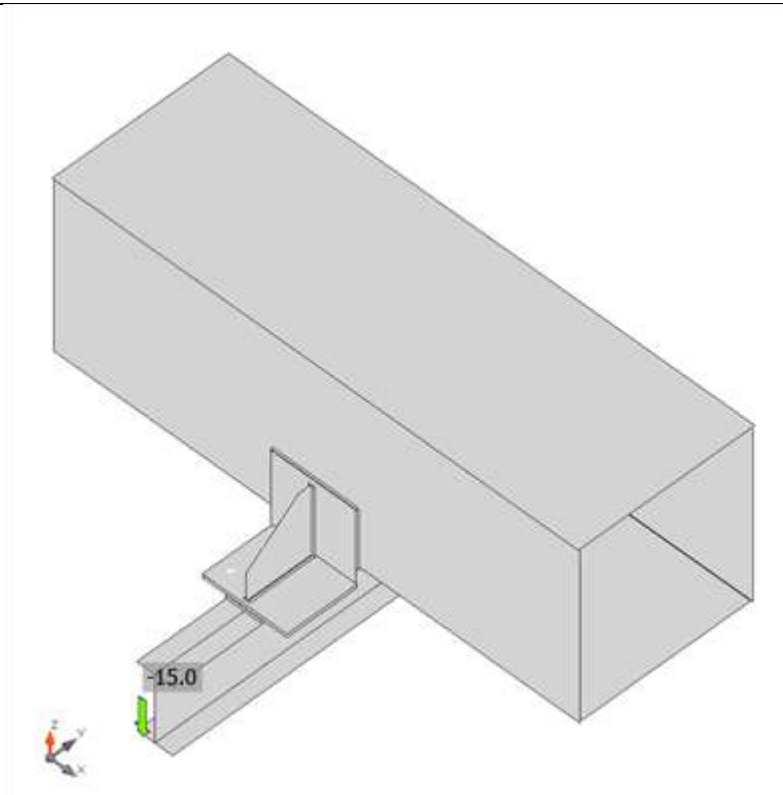
Material	f_y [MPa]	ϵ_{lim} [%]
S355	355.0	5.0

Symbol explanation

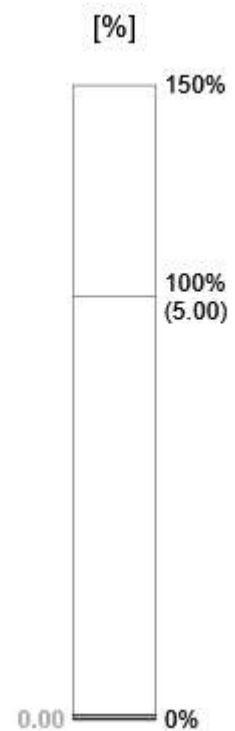
ϵ_{Pl}	Plastic strain
σ_{Ced}	Contact stress
σ_{Ed}	Eq. stress
f_y	Yield strength
ϵ_{lim}	Limit of plastic strain



Overall check, Case 1

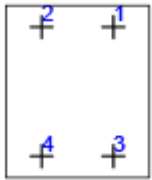
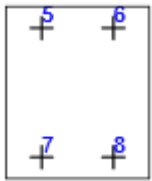


Strain check, Case 1





Bolts

Shape	Item	Grade	Loads	F_t [kN]	V [kN]	$\phi R_{n,bearing}$ [kN]	U_{t_t} [%]	U_{t_s} [%]	$U_{t_{ts}}$ [%]	Status
	B1	20 A325M - 1	Case 1	2.5	1.0	183.6	1.7	1.2	-	OK
	B2	20 A325M - 1	Case 1	9.6	0.6	100.1	6.6	0.7	-	OK
	B3	20 A325M - 1	Case 1	2.5	1.0	183.6	1.7	1.2	-	OK
	B4	20 A325M - 1	Case 1	9.6	0.6	100.7	6.6	0.7	-	OK
	B5	20 A325M - 1	Case 1	9.1	0.2	95.6	6.2	0.2	-	OK
	B6	20 A325M - 1	Case 1	4.4	1.2	180.0	3.0	1.3	-	OK
	B7	20 A325M - 1	Case 1	9.1	0.2	96.2	6.2	0.2	-	OK
	B8	20 A325M - 1	Case 1	4.4	1.2	180.0	3.0	1.3	-	OK

Design data

Grade	$\phi R_{n,tension}$ [kN]	$\phi R_{n,shear}$ [kN]
20 A325M - 1	146.0	87.6

Symbol explanation

F_t	Tension force
V	Resultant of shear forces V_y , V_z in bolt
$\phi R_{n,bearing}$	Bolt bearing resistance
U_{t_t}	Utilization in tension

U_{ts}	Utilization in shear
U_{ts}	Utilization in tension and shear
$\phi R_{n,tension}$	Bolt tension resistance AISC 360-16 J3.6
$\phi R_{n,shear}$	Bolt shear resistance AISC 360-16 – J3.8

Detailed result for B2

Tension resistance check (AISC 360-16: J3-1)

$\phi R_n = \phi \cdot F_{nt} \cdot$	146.0	kN	\geq	$F_t =$	9.6	kN
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Where:

$F_{nt} = 620.0 \text{ MPa}$	– nominal tensile stress from AISC 360-16 Table J3.2
$A_b = 314 \text{ mm}^2$	– gross bolt cross-sectional area
$\phi = 0.75$	– resistance factor

Shear resistance check (AISC 360-16: J3-1)

$\phi R_n = \phi \cdot F_{nv} \cdot A_b =$	87.6	kN	\geq	$V =$	0.6	kN
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Where:

$F_{nv} = 372.0 \text{ MPa}$	– nominal shear stress from AISC 360-16 Table J3.2
$A_b = 314 \text{ mm}^2$	– gross bolt cross-sectional area
$\phi = 0.75$	– resistance factor

Bearing resistance check (AISC 360-16: J3-6)

$R_n = 1.20 \cdot l_c \cdot t \cdot F_u$			\leq	$2.40 \cdot d \cdot t \cdot F_u$		
$\phi R_n =$	100.1	kN	\geq	$V =$	0.6	kN

Where:

$l_c = 22 \text{ mm}$	– clear distance, in the direction of the force, between the edge of the hole and the edge of the adjacent hole or edge of the material
$t = 10 \text{ mm}$	– thickness of the plate
$d = 20 \text{ mm}$	– diameter of a bolt
$F_u = 510.0 \text{ MPa}$	– tensile strength of the connected material
$\phi = 0.75$	– resistance factor for bearing at bolt holes

Interaction of tension and shear check (AISC 360-16: J3-2)

The required stress, in either shear or tension, is less than or equal to 30% of the corresponding available stress and the effects of combined stresses need not to be investigated.

Weld sections

Item	Edge	Xu	T _h [mm]	L _s [mm]	L [mm]	L _c [mm]	Loads	F _n [kN]	φR _n [kN]	Ut [%]	Status
Bottom Cord- w 1	SP10	E70xx	▲5.7	▲8.0	239	30	Case 1	3.3	42.4	7.9	OK
Bottom Cord- w 1	SP10	E70xx	▲5.7	▲8.0	170	28	Case 1	2.1	39.7	5.2	OK
Bottom Cord- w 1	SP10	E70xx	▲5.7	▲8.0	170	28	Case 1	2.3	39.2	5.8	OK
SP10	Bottom Cord- w 1	E70xx	▲5.7	▲8.0	240	30	Case 1	0.4	38.3	1.0	OK
M4-tfl 1	SP11	E70xx	▲5.7	▲8.0	101	25	Case 1	2.9	42.9	6.7	OK
M4-tfl 1	SP11	E70xx	▲5.7	▲8.0	102	25	Case 1	5.9	32.1	18.5	OK
M4-tfl 1	SP14	E70xx	▲5.7	▲8.0	102	25	Case 1	2.3	36.0	6.5	OK
M4-tfl 1	SP14	E70xx	▲5.7	▲8.0	102	25	Case 1	4.5	35.5	12.7	OK
Bottom Cord- w 2	SP9	E70xx	▲5.7	▲8.0	170	28	Case 1	1.5	39.6	3.7	OK
SP12	SP13	E70xx	▲5.7▲	▲8.0▲	184	12	Case 1	0.1	20.3	0.7	OK
		E70xx	▲5.7▲	▲8.0▲	184	12	Case 1	0.1	20.2	0.7	OK
Bottom Cord- w 2	SP9	E70xx	▲5.7	▲8.0	170	28	Case 1	1.7	38.9	4.3	OK
SP9	Bottom Cord- w 2	E70xx	▲5.7	▲8.0	239	30	Case 1	1.2	55.0	2.1	OK
SP15	SP16	E70xx	▲5.7▲	▲8.0▲	184	12	Case 1	1.0	21.9	4.5	OK
		E70xx	▲5.7▲	▲8.0▲	184	12	Case 1	1.0	21.9	4.5	OK
SP10	SP16	E70xx	▲5.7▲	▲8.0▲	199	12	Case 1	1.5	22.0	6.8	OK
		E70xx	▲5.7▲	▲8.0▲	199	12	Case 1	1.5	22.0	6.7	OK
Bottom Cord- w 2	SP9	E70xx	▲5.7	▲8.0	239	30	Case 1	2.1	43.0	5.0	OK
SP9	SP13	E70xx	▲5.7▲	▲8.0▲	199	12	Case 1	1.0	21.8	4.5	OK
		E70xx	▲5.7▲	▲8.0▲	199	12	Case 1	1.0	21.8	4.6	OK
SP12	SP9	E70xx	-	-	240	-	-	-	-	-	OK

Symbol explanation

T _h	Throat thickness of weld
L _s	Leg size of weld
L	Length of weld
L _c	Length of weld critical element
F _n	Force in weld critical element
φR _n	Weld resistance AISC 360-16 J2.4
Ut	Utilization

Detailed result for M4-tfl 1 / SP11

Weld resistance check (AISC 360-16: J2-4)

$\phi R_n = \phi \cdot F_{nw}$	32.1	kN	\geq	$F_n =$	5.9	kN
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Where:


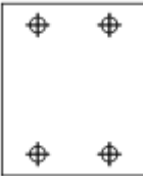
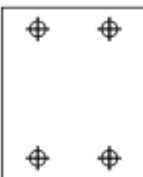
$F_{nw} = 297.7 \text{ MPa}$	– nominal stress of weld material:
$F_{nw} = 0.6 \cdot F_{EXX} \cdot (1 + 0.5 \cdot \sin^{1.5} \theta)$, where: $F_{EXX} =$ 482.6 MPa – electrode classification number, i.e. minimum specified tensile strength $\theta =$ 8.4° – angle of loading measured from the weld longitudinal axis	
$A_{we} = 144 \text{ mm}^2$	– effective area of weld critical element
$\phi = 0.75$	– resistance factor for welded connections


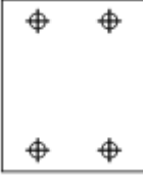
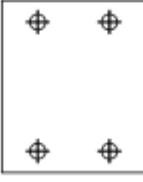
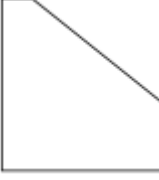

Buckling

Buckling analysis was not calculated.

Bill of material

Manufacturing operations

Name	Plates [mm]	Shape	Nr.	Welds [mm]	Length [mm]	Bolts	Nr.
SP10	P10.0x240.0-208.4 (S355)		1	Fillet: a = 5.7	820.0		
SP11	P10.0x200.0-240.0 (S355)		1	Fillet: a = 5.7	203.6	20 A325M	4
SP12	P10.0x200.0-240.0 (S355)		1			20 A325M	4

SP13	P10.0x185.0-200.0 (S355)		1	Double fillet: a = 5.7	185.0		
SP14	P10.0x200.0-240.0 (S355)		1	Fillet: a = 5.7	203.6	20 A325M	4
SP15	P10.0x200.0-240.0 (S355)		1			20 A325M	4
SP16	P10.0x185.0-200.0 (S355)		1	Double fillet: a = 5.7	185.0		
SP9	P10.0x240.0-208.4 (S355)		1	Fillet: a = 5.7	820.0		
CUT2							

Welds

Type	Material	Throat thickness [mm]	Leg size [mm]	Length [mm]
Fillet	E70xx	5.7	8.0	2047.2
Double fillet	E70xx	5.7	8.0	770.0
Butt	E70xx	-	-	240.0

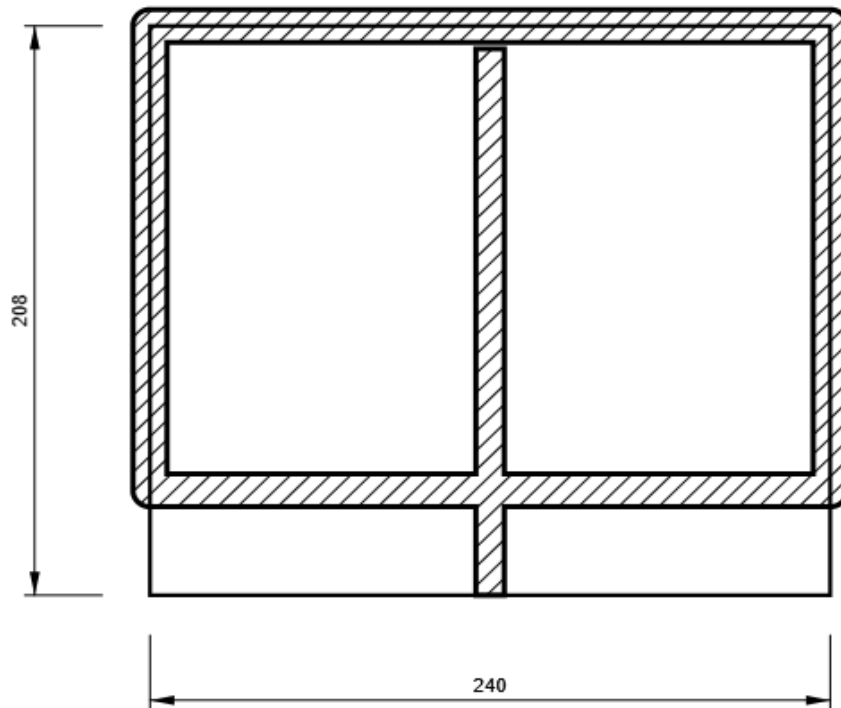
Bolts

Name	Grip length [mm]	Count
20 A325M	20	8

Drawing

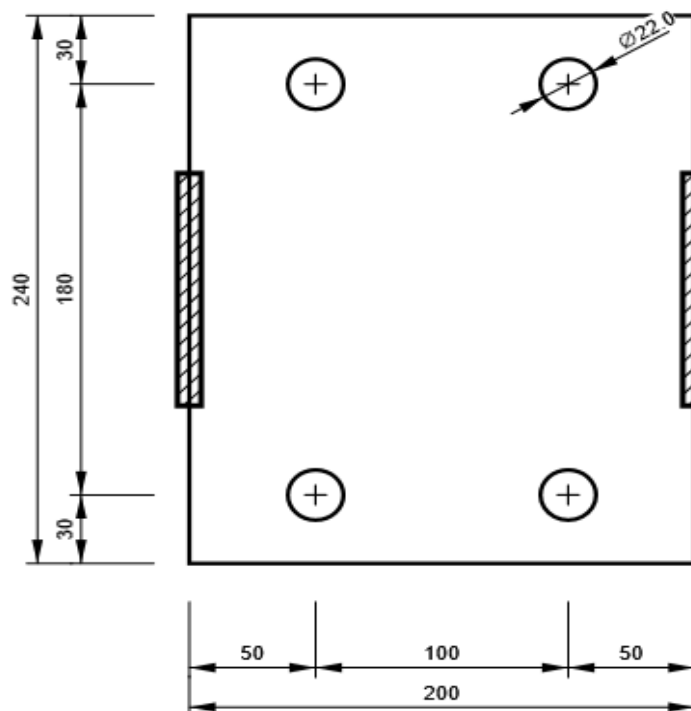
SP10

P10.0x208-240 (S355)



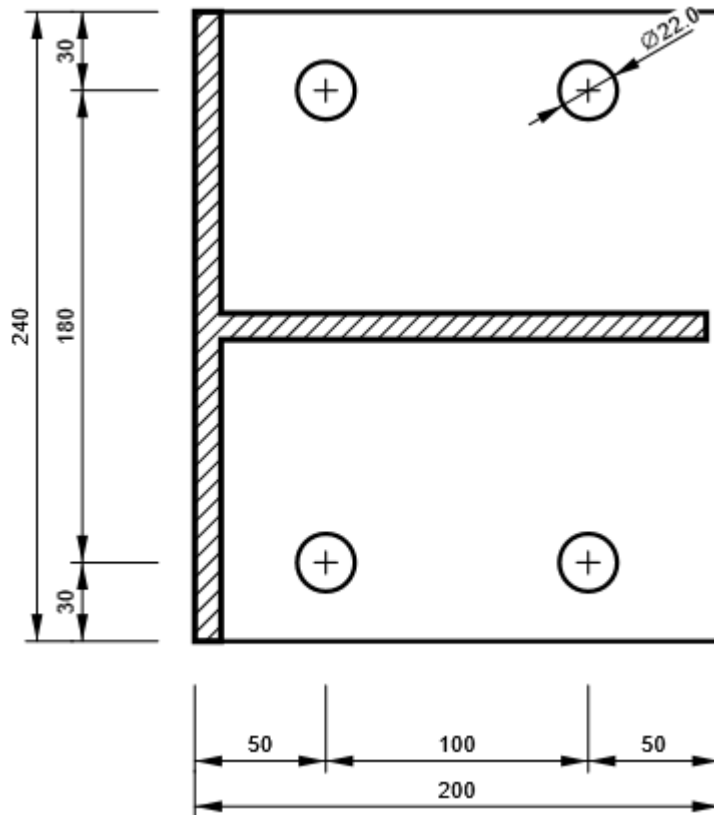
SP11

P10.0x240-200 (S355)



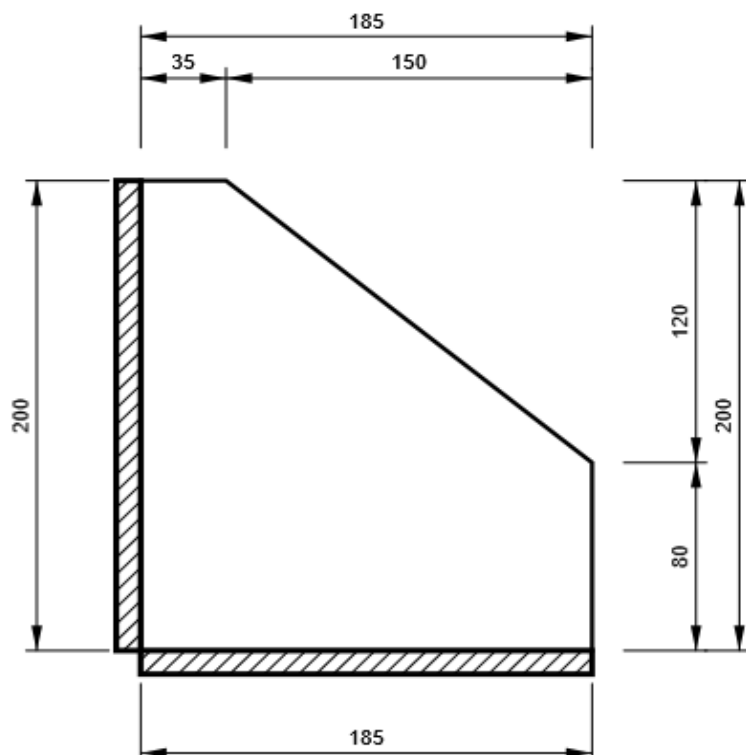
SP12

P10.0x240-200 (S355)



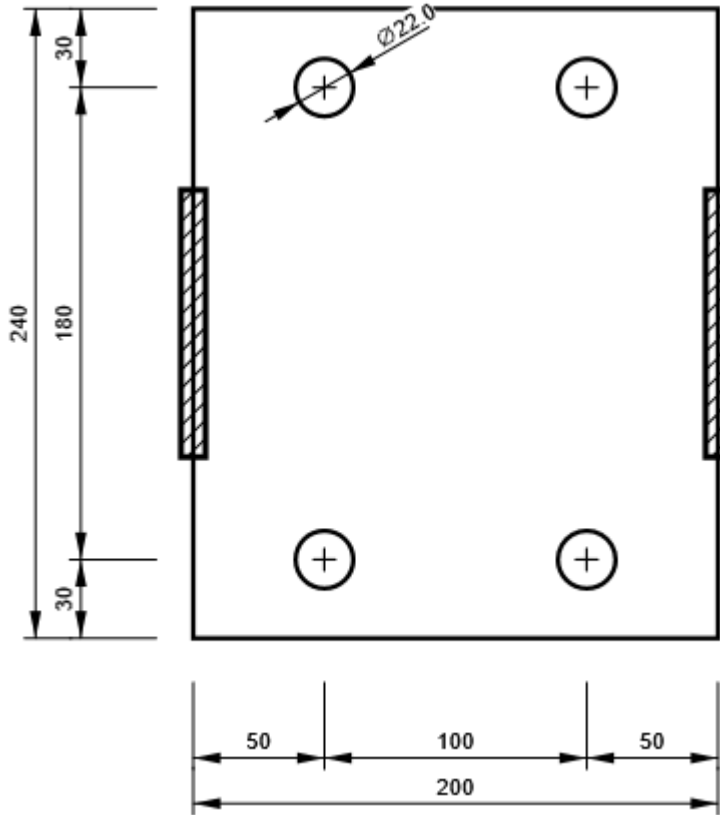
SP13

P10.0x200-185 (S355)



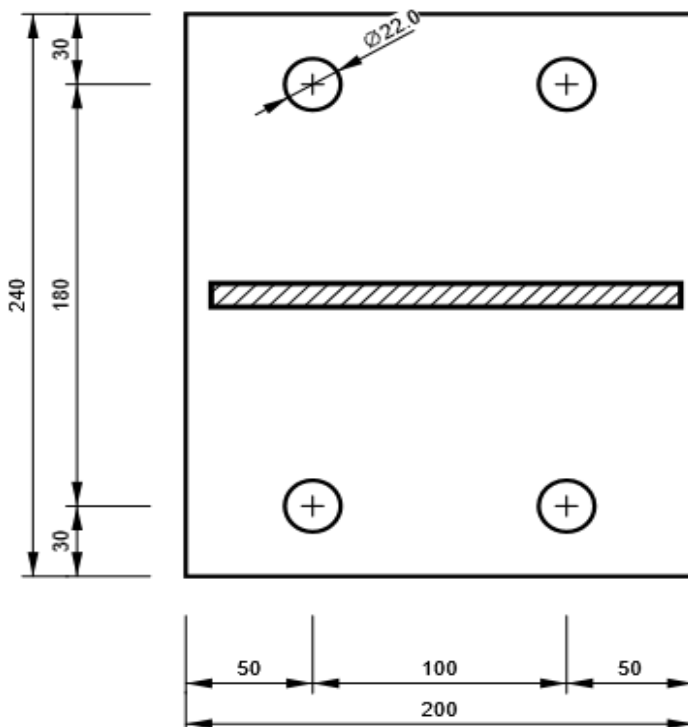
SP14

P10.0x240-200 (S355)



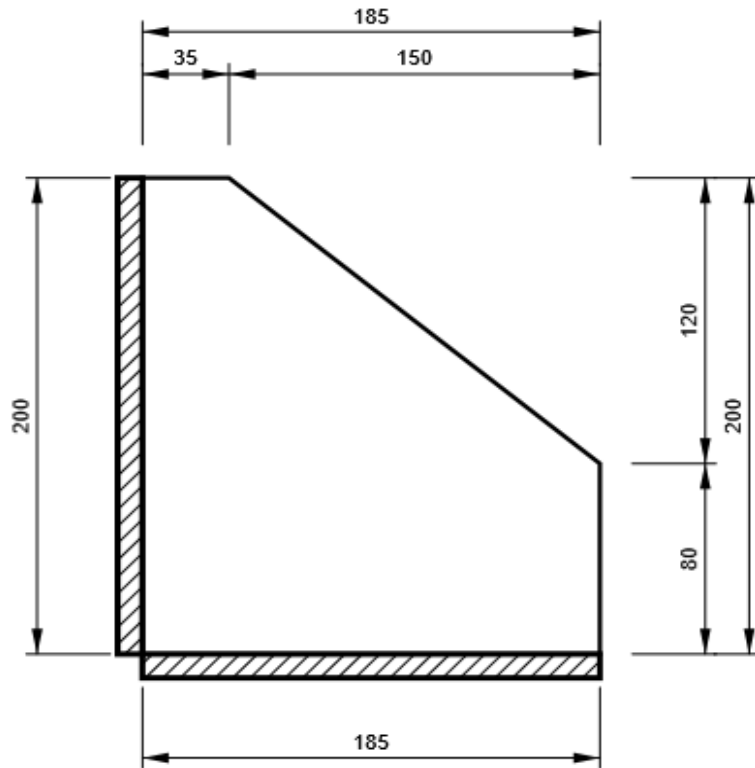
SP15

P10.0x240-200 (S355)



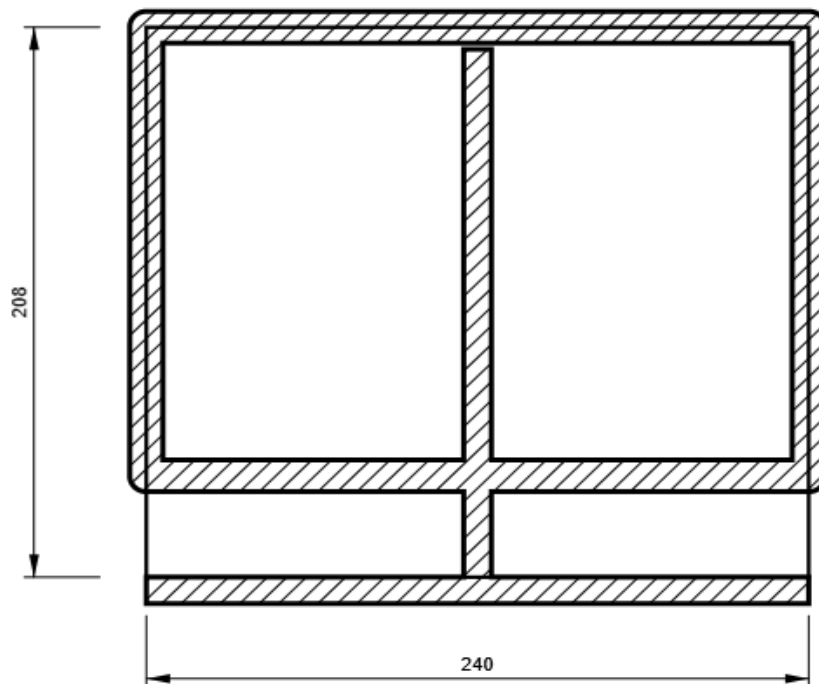
SP16

P10.0x200-185 (S355)



SP9

P10.0x208-240 (S355)



10.4 Connection Main beam with top chord at truss splice point

Joint	Output Case	Case Type	F1	F2	F3
Text	Text	Text	Tonf	Tonf	Tonf
3	ULS) 1.4D+TEMP-	Combination	0.00	0.00	1.5

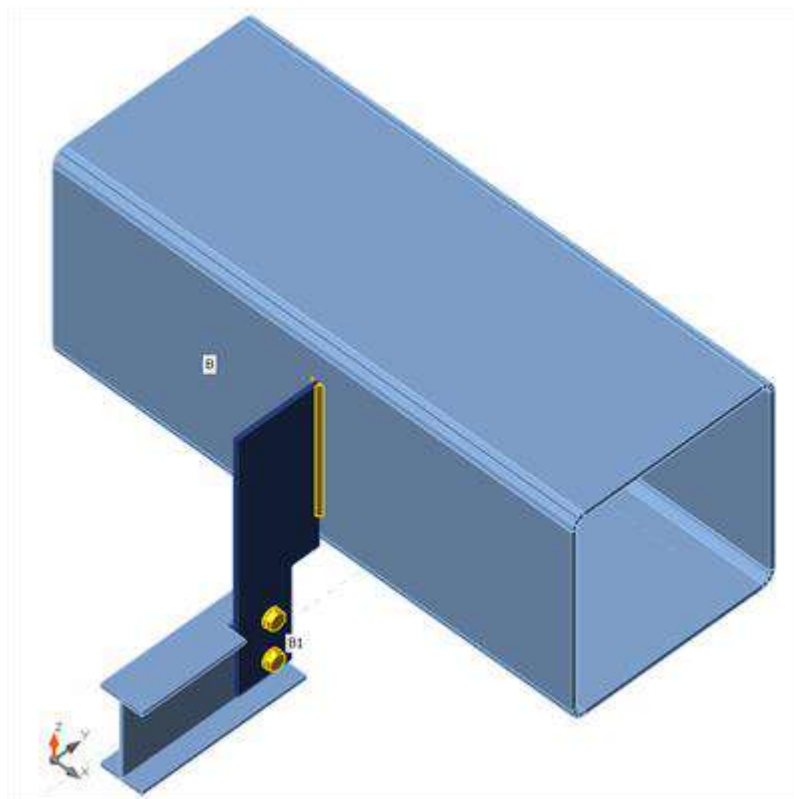
Project item Detail – 04

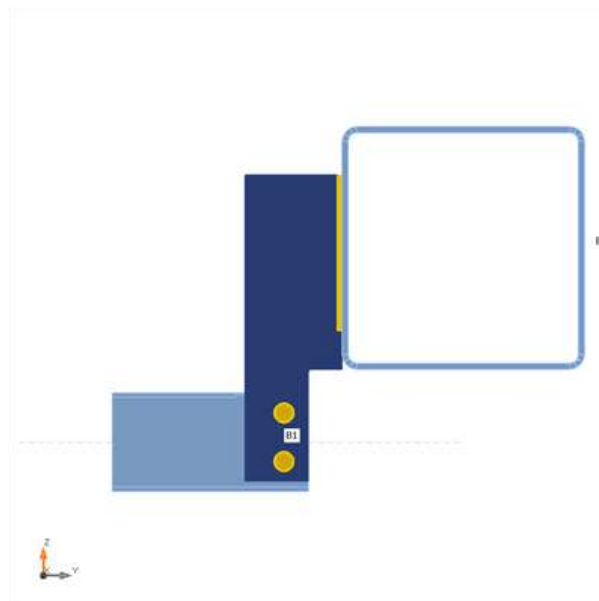
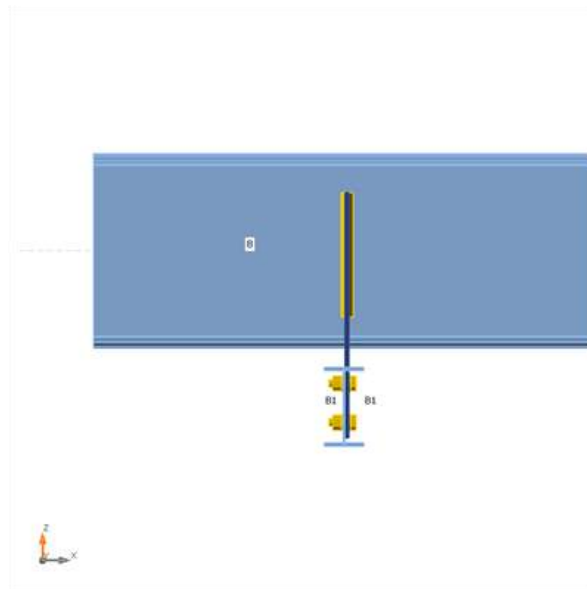
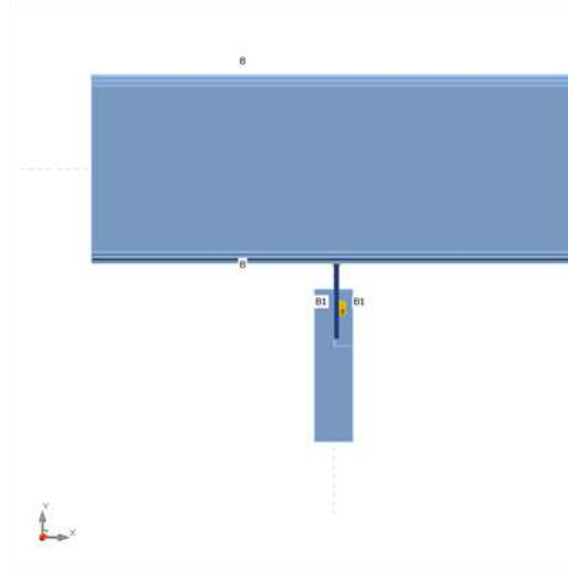
Design

Name	Detail - 04
Description	Connection Between Main beam and Truss Lower Chord (Bottom Level)
Analysis	Stress, strain/ simplified loading
Design code	AISC - LRFD 2016

Beams and columns

Name	Cross-section	β – Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]	Forces in	X [mm]
B	5 - SHS500/500/12.0	0.0	0.0	0.0	0	0	0	Node	0
B1	9 - UB 203 x 102 x 23	-90.0	0.0	0.0	0	5	-400	Bolts	370

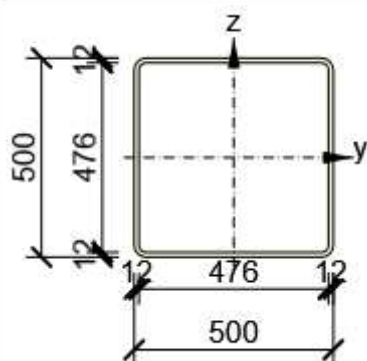
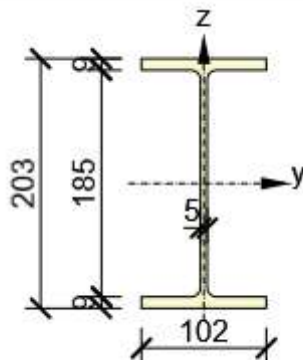




Cross-sections

Name	Material
5 - SHS500/500/12.0	S355
9 - UB 203 x 102 x 23	A36

Cross-sections

Name	Material	Drawing
5 - SHS500/500/12.0	S355	
9 - UB 203 x 102 x 23	A36	

Bolts

Name	Bolt assembly	Diameter [mm]	f_u [MPa]	Gross area [mm ²]
20 A325M	20 A325M	20	830.0	314

Load effects (equilibrium not required)

Name	Member	N [kN]	V _y [kN]	V _z [kN]	M _x [kNm]	M _y [kNm]	M _z [kNm]
LE1	B1	0.0	0.0	-15.0	0.0	0.0	0.0

Check

Summary

Name	Value	Check status
Analysis	100.0%	OK
Plates	0.0 < 5.0%	OK
Bolts	14.9 < 100%	OK
Welds	14.4 < 100%	OK

Buckling	Not calculated	
GMNA	Calculated	

Plates

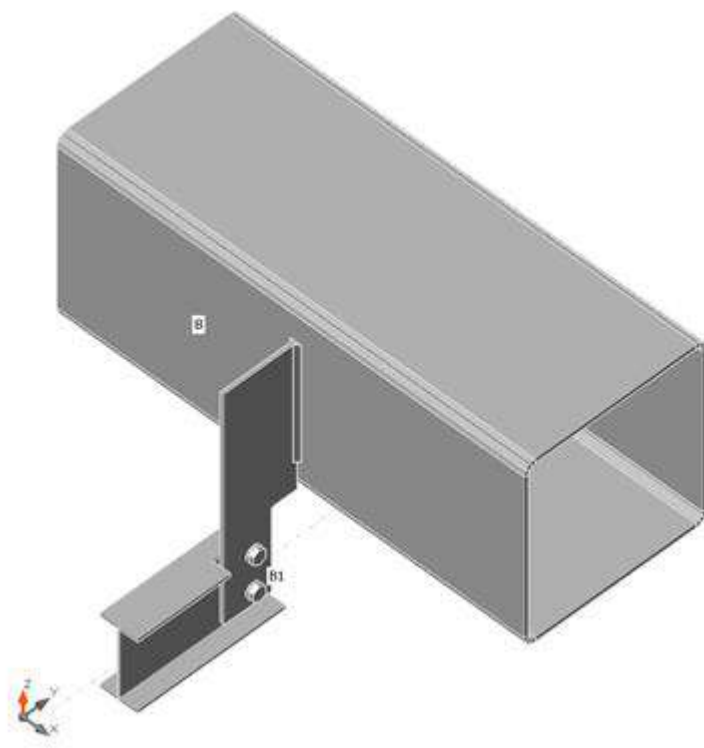
Name	Material	f_y [MPa]	Thickness [mm]	Loads	σ_{Ed} [MPa]	ϵ_{Pl} [%]	σ_{CEd} [MPa]	Check status
B	S355	360.0	12.0	LE1	56.8	0.0	0.0	OK
B1-bfl 1	A36	248.2	9.3	LE1	27.5	0.0	0.0	OK
B1-tfl 1	A36	248.2	9.3	LE1	27.0	0.0	0.0	OK
B1-w 1	A36	248.2	5.4	LE1	75.6	0.0	4.1	OK
SP1	S355	360.0	10.0	LE1	79.3	0.0	4.1	OK

Design data

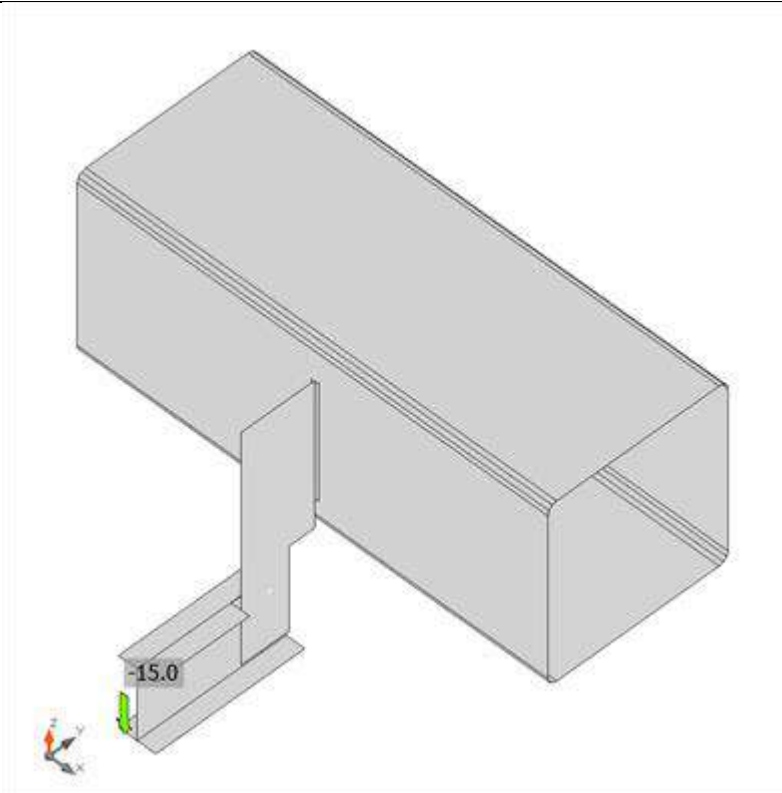
Material	f_y [MPa]	ϵ_{lim} [%]
S355	360.0	5.0
A36	248.2	5.0

Symbol explanation

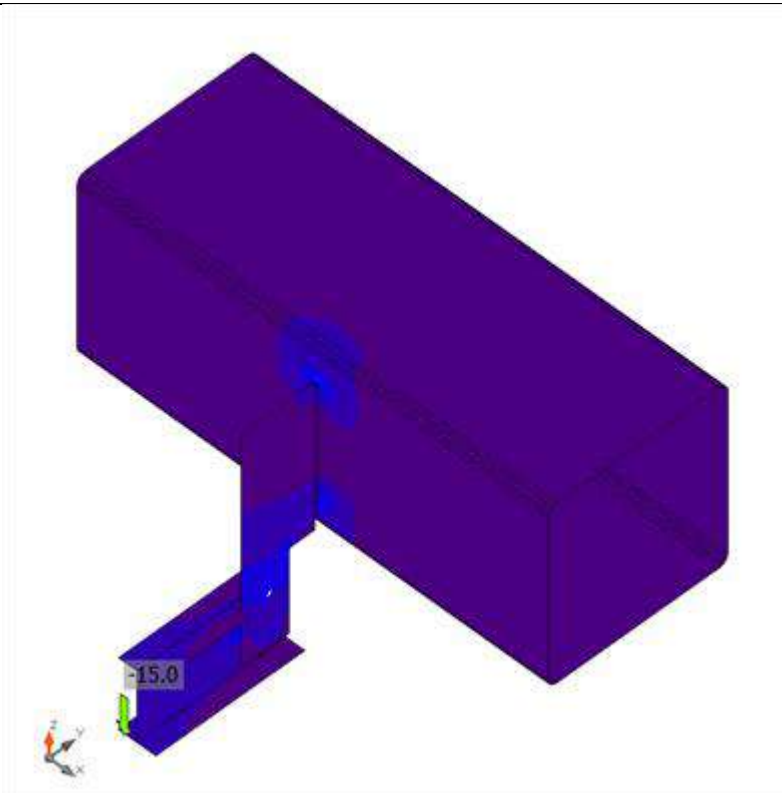
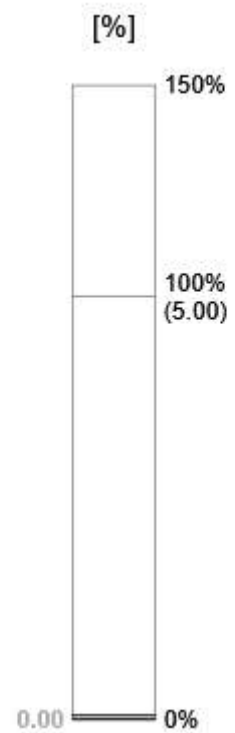
ϵ_{Pl}	Plastic strain
σ_{CEd}	Contact stress
σ_{Ed}	Eq. stress
f_y	Yield strength
ϵ_{lim}	Limit of plastic strain



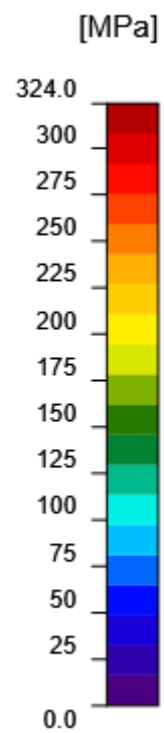
Overall check, LE1



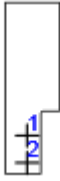
Strain check, LE1



Equivalent stress, LE1



Bolts

Shape	Item	Grade	Loads	F_t [kN]	V [kN]	$\phi R_{n,bearing}$ [kN]	U_t [%]	U_s [%]	U_{ts} [%]	Status
	B1	20 A325M - 1	LE1	1.4	8.0	53.8	1.0	14.9	-	OK
	B2	20 A325M - 1	LE1	1.4	7.7	77.8	0.9	9.9	-	OK

Design data

Grade	$\phi R_{n,tension}$ [kN]	$\phi R_{n,shear}$ [kN]
20 A325M - 1	146.0	87.6

Symbol explanation

F_t	Tension force
V	Resultant of shear forces V_y, V_z in bolt
$\phi R_{n,bearing}$	Bolt bearing resistance
U_t	Utilization in tension
U_s	Utilization in shear
U_{ts}	Utilization in tension and shear
$\phi R_{n,tension}$	Bolt tension resistance AISC 360-16 J3.6
$\phi R_{n,shear}$	Bolt shear resistance AISC 360-16 – J3.8

Detailed result for B1

Tension resistance check (AISC 360-16: J3-1)

$\phi R_n = \phi \cdot F_{nt} \cdot A_b$	146.0	kN	\geq	$F_t =$	1.4	kN
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Where:

$F_{nt} = 620.0 \text{ MPa}$	– nominal tensile stress from AISC 360-16 Table J3.2
$A_b = 314 \text{ mm}^2$	– gross bolt cross-sectional area
$\phi = 0.75$	– resistance factor

Shear resistance check (AISC 360-16: J3-1)

$\phi R_n = \phi \cdot F_{nv} \cdot A_b$	87.6	kN	\geq	$V =$	8.0	kN
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Where:

$F_{nv} = 372.0 \text{ MPa}$	– nominal shear stress from AISC 360-16 Table J3.2
$A_b = 314 \text{ mm}^2$	– gross bolt cross-sectional area
$\phi = 0.75$	– resistance factor

Bearing resistance check (AISC 360-16: J3-6)

$R_n = 1.20 \cdot l_c \cdot t \cdot F_u$			\leq	$2.40 \cdot d \cdot t \cdot F_u$			
$\phi R_n =$	53.8	kN	\geq	$V =$	8.0	kN	

Where:

$l_c = 28 \text{ mm}$	– clear distance, in the direction of the force, between the edge of the hole and the edge of the adjacent hole or edge of the material
$t = 5 \text{ mm}$	– thickness of the plate
$d = 20 \text{ mm}$	– diameter of a bolt
$F_u = 400.0 \text{ MPa}$	– tensile strength of the connected material
$\phi = 0.75$	– resistance factor for bearing at bolt holes

Interaction of tension and shear check (AISC 360-16: J3-2)

The required stress, in either shear or tension, is less than or equal to 30% of the corresponding available stress and the effects of combined stresses need not to be investigated.

Weld sections

Item	Edge	Xu	T_h [mm]	L_s [mm]	L [mm]	L_c [mm]	Loads	F_n [kN]	ϕR_n [kN]	Ut [%]	Status
B-w 4	B	E70xx	7.1	10.0	320	32	LE1	10.4	72.2	14.4	OK
		E70xx	7.1	10.0	320	32	LE1	8.6	66.6	12.9	OK

Symbol explanation

T_h	Throat thickness of weld
L_s	Leg size of weld
L	Length of weld
L_c	Length of weld critical element
F_n	Force in weld critical element
ϕR_n	Weld resistance AISC 360-16 J2.4
Ut	Utilization

Detailed result for B-w 4 / B

Weld resistance check (AISC 360-16: J2-4)

$\phi R_n = \phi \cdot F_{nw}$	72.2	kN	\geq	$F_n =$	10.4	kN
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Where:



$F_{nw} = 425.8 \text{ MPa}$	– nominal stress of weld material:
$F_{nw} = 0.6 \cdot F_{EXX} \cdot (1 + 0.5 \cdot \sin^{1.5} \theta)$, where: $F_{EXX} =$ 482.6 MPa – electrode classification number, i.e. minimum specified tensile strength $\theta =$ 73.8° – angle of loading measured from the weld longitudinal axis	
$A_{we} = 226 \text{ mm}^2$	– effective area of weld critical element
$\phi = 0.75$	– resistance factor for welded connections

Buckling

Buckling analysis was not calculated.

Bill of material

Manufacturing operations

Name	Plates [mm]	Shape	Nr.	Welds [mm]	Length [mm]	Bolts	Nr.
SP1	P10.0x200.0-630.0 (S355)		1			20 A325M	2
CUT1							
OPN1	P9.3x404.0-101.8 (A36)		1				

Welds

Type	Material	Throat thickness [mm]	Leg size [mm]	Length [mm]
Double fillet	E70xx	7.1	10.0	320.0

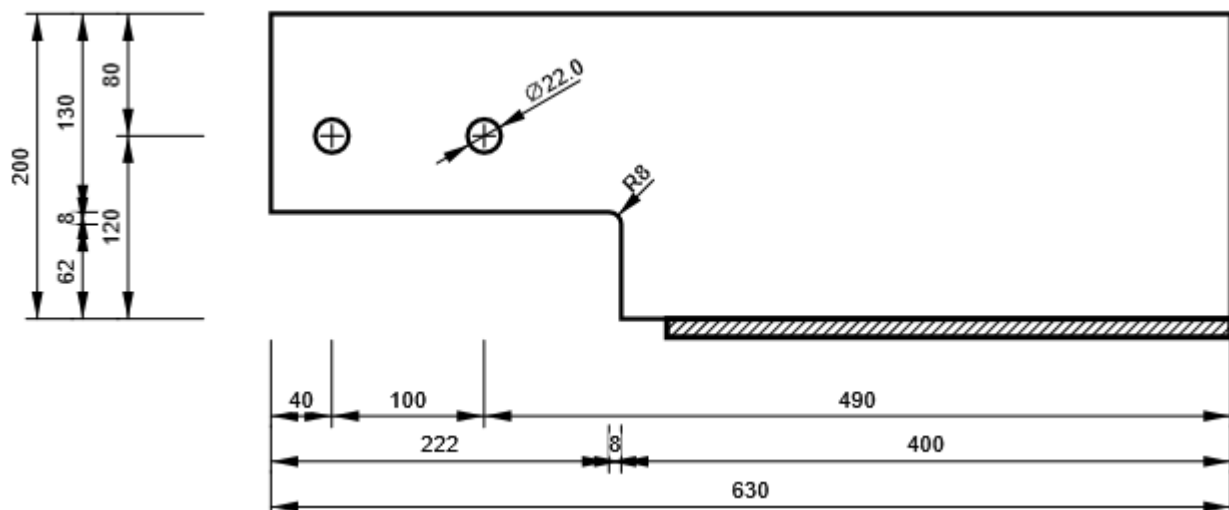
Bolts

Name	Grip length [mm]	Count
20 A325M	16	2

Drawing

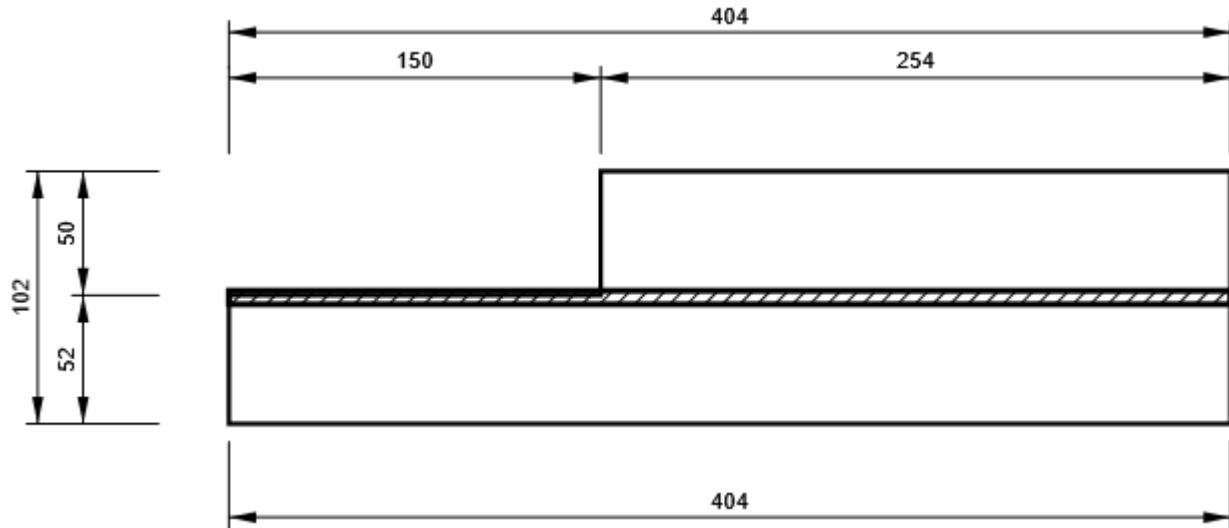
SP1

P10.0x630-200 (S355)

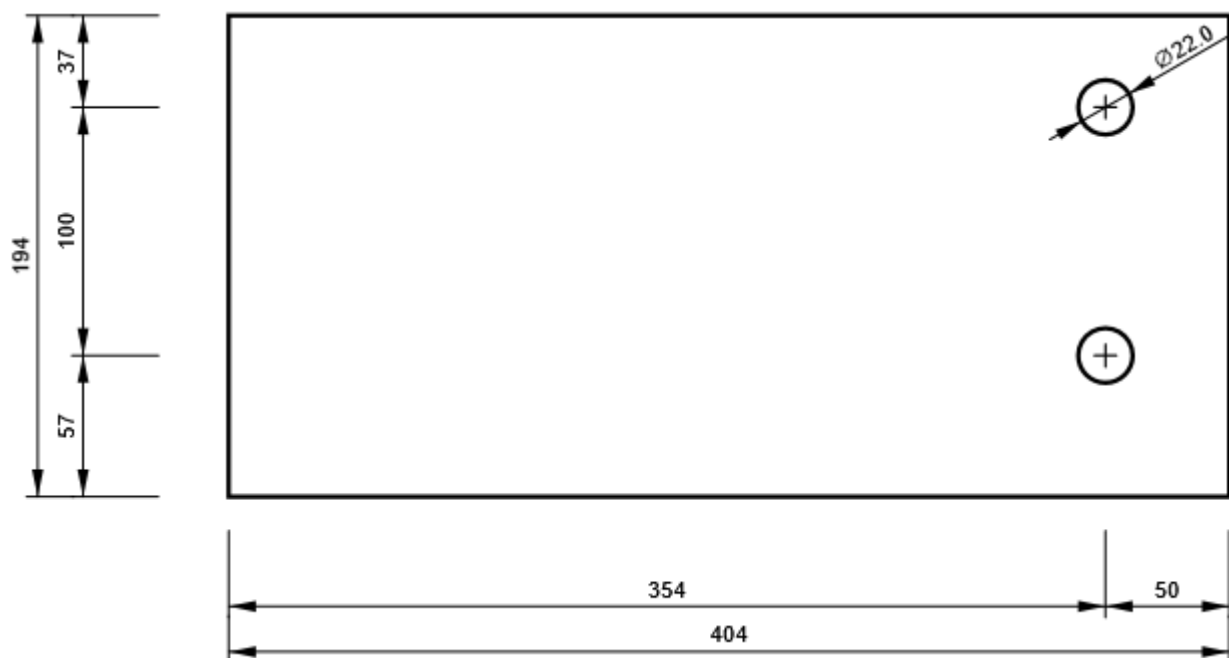


OPN1

P9.3x102-404 (A36)



B1, UB 203 x 102 x 23 - Web 1:



10.5 Secondary beam with Main beam (IPE120)

Name	Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
LE1	M4	0.0	0.0	6.0	0.0	-1.6	0.0

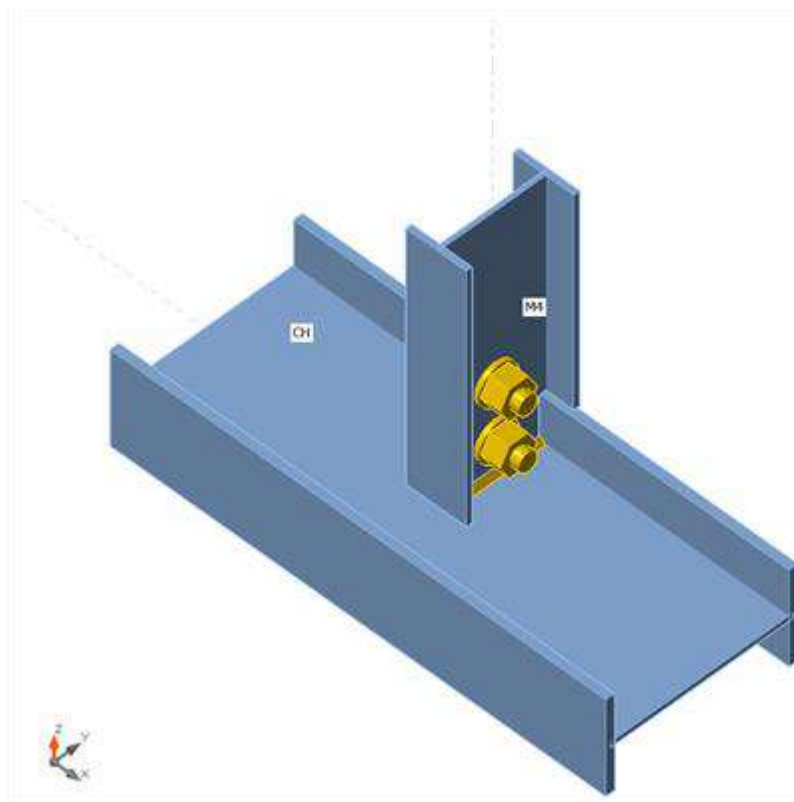
Project item Detail-5

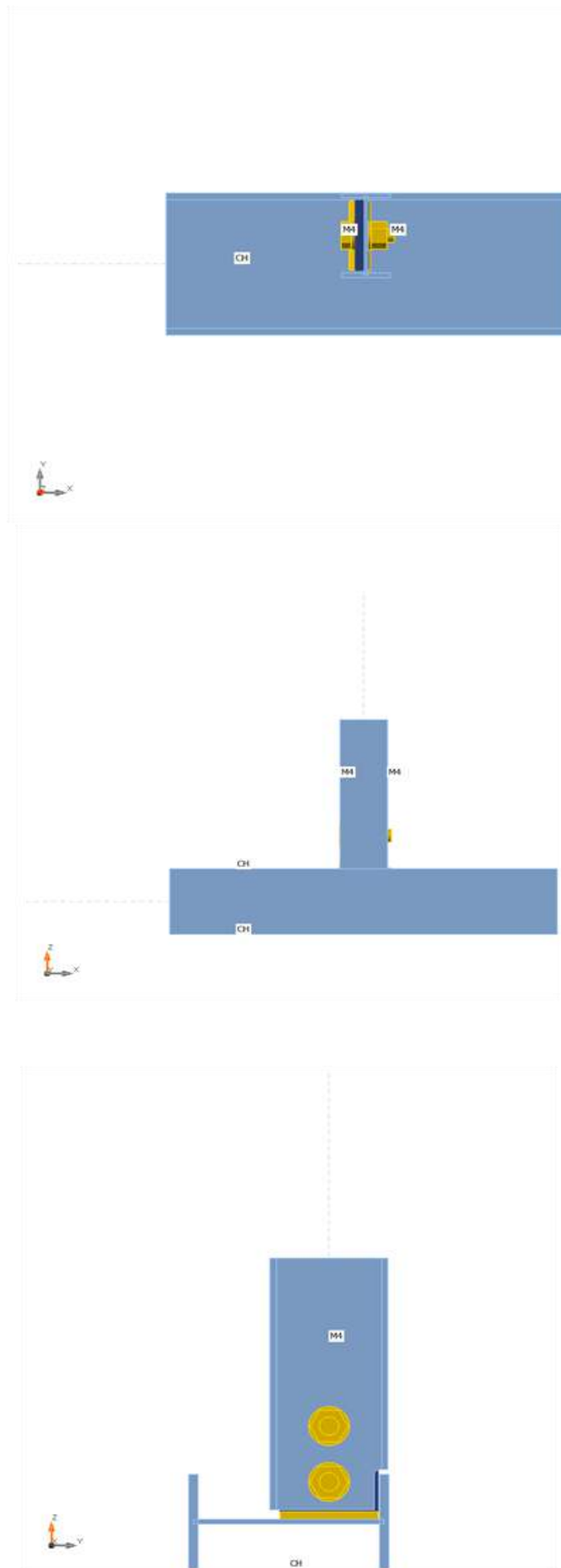
Design

Name	Detail-5
Description	SEC.BEAM TO MEAN BEAM
Analysis	Stress, strain/ simplified loading
Design code	AISC - ASD 2016

Beams and columns

Name	Cross-section	β – Direction [°]	γ - Pitch [°]	α - Rotation [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]	Forces in	X [mm]
CH	UB 203 x 102 x 23	0.0	0.0	90.0	0	0	0	Node	0
M4	IPE120	0.0	-90.0	90.0	0	0	-41	Bolts	73

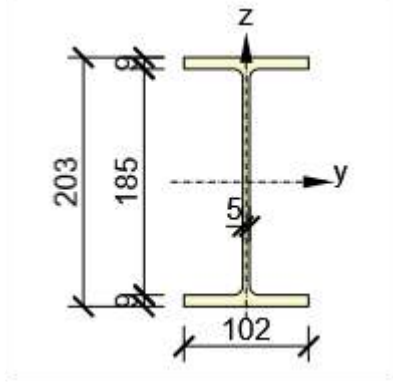
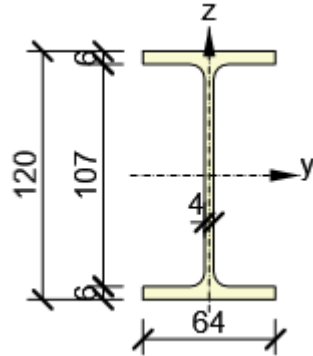




Cross-sections

Name	Material
13 - UB 203 x 102 x 23	S355
14 - IPE120	S355

Cross-sections

Name	Material	Drawing
13 - UB 203 x 102 x 23	S355	 <p>Technical drawing of a Universal Beam (UB) 203 x 102 x 23. The drawing shows the cross-section with dimensions: total height 203 mm, web height 185 mm, flange thickness 9 mm, and web thickness 5 mm. The flange width is 102 mm. The y and z axes are indicated.</p>
14 - IPE120	S355	 <p>Technical drawing of an IPE120 section. The drawing shows the cross-section with dimensions: total height 120 mm, web height 107 mm, flange thickness 6 mm, and web thickness 4 mm. The flange width is 64 mm. The y and z axes are indicated.</p>

Bolts

Name	Bolt assembly	Diameter [mm]	f_u [MPa]	Gross area [mm ²]
20 A325M	20 A325M	20	830.0	314

Load effects (equilibrium not required)

Name	Member	N [kN]	V _y [kN]	V _z [kN]	M _x [kNm]	M _y [kNm]	M _z [kNm]
LE1	M4	0.0	0.0	6.0	0.0	-1.6	0.0

Check

Summary

Name	Value	Check status
Analysis	100.0%	OK

Plates	$0.0 < 5.0\%$	OK
Bolts	$13.8 < 100\%$	OK
Welds	$40.6 < 100\%$	OK
Buckling	Not calculated	

Plates

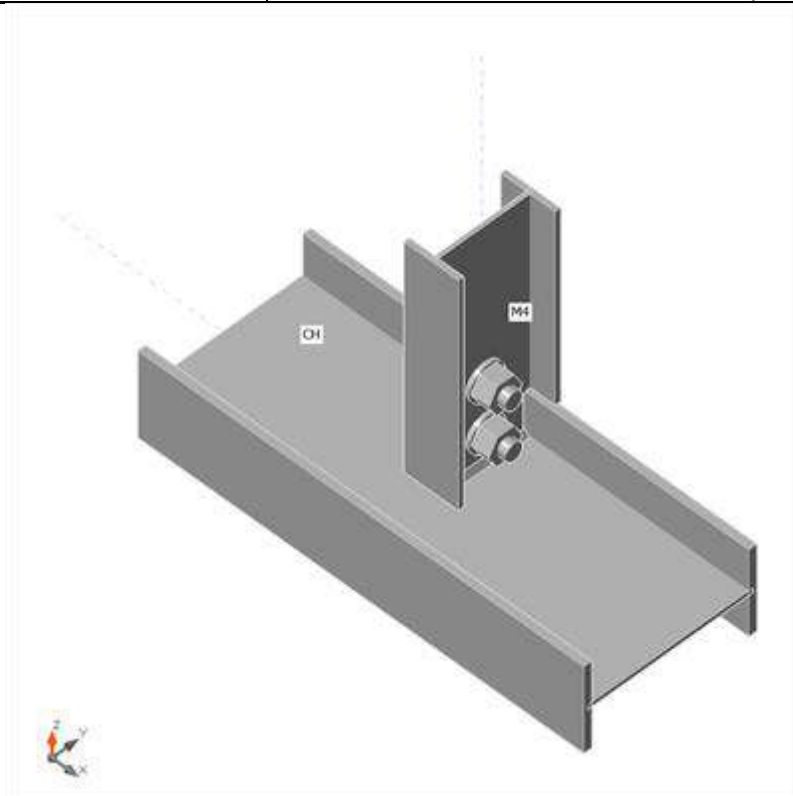
Name	f_y [MPa]	Thickness [mm]	Loads	σ_{Ed} [MPa]	ϵ_{Pl} [%]	σ_{CEd} [MPa]	Check status
CH-bfl 1	355.0	9.3	LE1	20.5	0.0	0.0	OK
CH-tfl 1	355.0	9.3	LE1	22.7	0.0	0.0	OK
CH-w 1	355.0	5.4	LE1	71.6	0.0	0.0	OK
M4-bfl 1	355.0	6.3	LE1	28.0	0.0	0.0	OK
M4-tfl 1	355.0	6.3	LE1	27.7	0.0	0.0	OK
M4-w 1	355.0	4.4	LE1	76.4	0.0	3.9	OK
FP1	355.0	12.0	LE1	47.2	0.0	3.9	OK

Design data

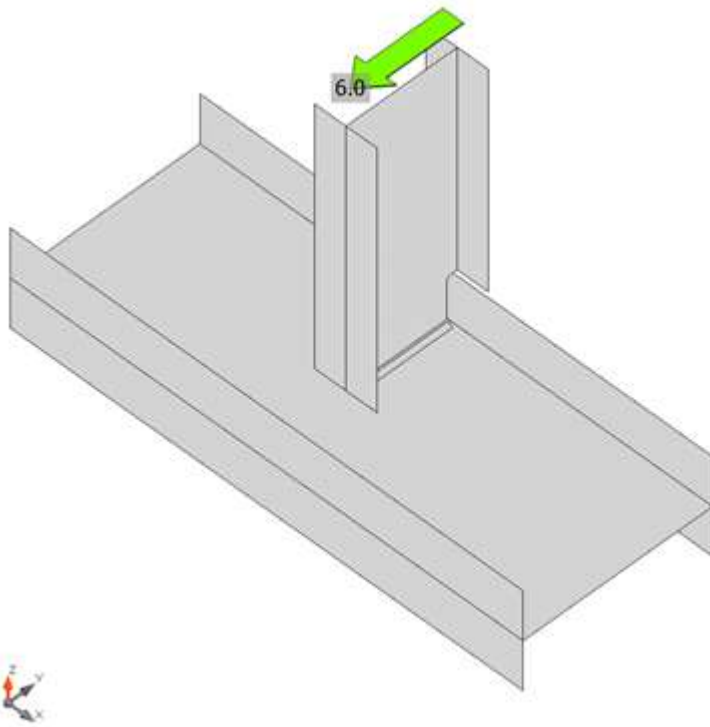
Material	f_y [MPa]	ϵ_{lim} [%]
S355	355.0	5.0

Symbol explanation

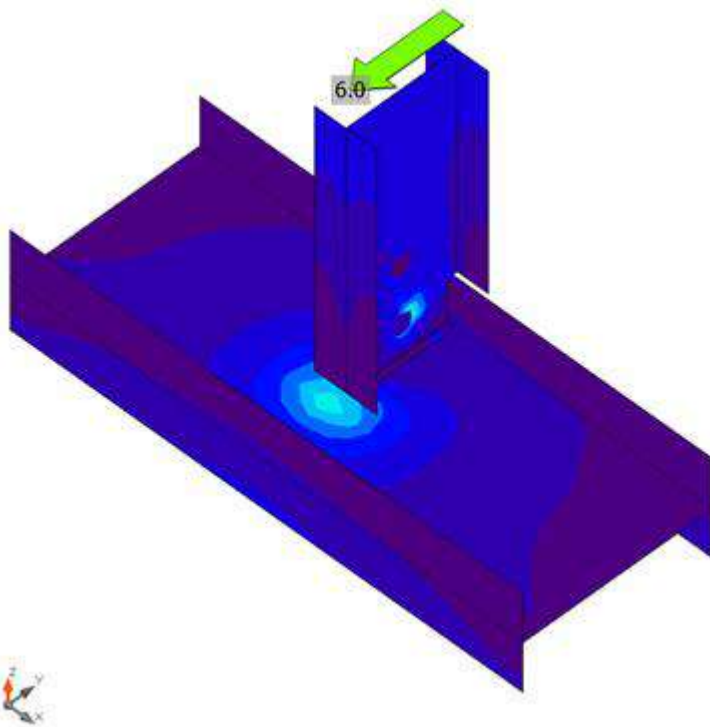
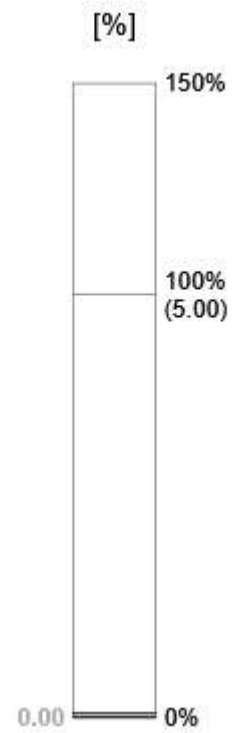
ϵ_{Pl}	Plastic strain
σ_{CEd}	Contact stress
σ_{Ed}	Eq. stress
f_y	Yield strength
ϵ_{lim}	Limit of plastic strain



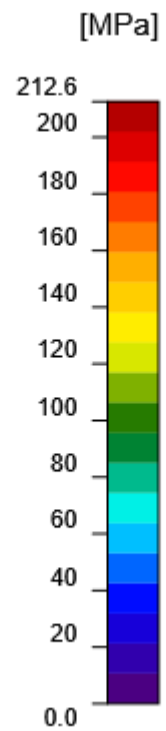
Overall check, LE1



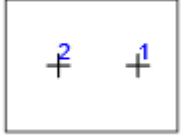
Strain check, LE1



Equivalent stress, LE1



Bolts

Shape	Item	Grade	Loads	F_t [kN]	V [kN]	$Rn/\Omega_{\text{Bearing}}$ [kN]	U_{t_t} [%]	U_{t_s} [%]	$U_{t_{ts}}$ [%]	Status
	B1	20 A325M - 1	LE1	0.3	0.6	53.9	0.3	1.0	-	OK
	B2	20 A325M - 1	LE1	1.8	6.6	47.5	1.9	11.2	-	OK

Design data

Grade	$Rn/\Omega_{\text{Tension}}$ [kN]	Rn/Ω_{Shear} [kN]
20 A325M - 1	97.3	58.4

Symbol explanation

F_t	Tension force
V	Resultant of shear forces V_y, V_z in bolt
$Rn/\Omega_{\text{Bearing}}$	Bolt bearing resistance
U_{t_t}	Utilization in tension
U_{t_s}	Utilization in shear
$U_{t_{ts}}$	Utilization in tension and shear
$Rn/\Omega_{\text{Tension}}$	Bolt tension resistance AISC 360-16 J3.6
Rn/Ω_{Shear}	Bolt shear resistance AISC 360-16 – J3.8

Detailed result for B2

Tension resistance check (AISC 360-16: J3-1)

$\frac{R_n}{\Omega} = \frac{F_{nt} A_b}{\Omega} =$	97.3	kN	\geq	$F_t =$	1.8	kN
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Where:

$F_{nt} = 620.0 \text{ MPa}$	– nominal tensile stress from AISC 360-16 Table J3.2
$A_b = 314 \text{ mm}^2$	– gross bolt cross-sectional area
$\Omega = 2.00$	– safety factor for tension and shear

Shear resistance check

$\frac{R_n}{\Omega} = \frac{F_{nv} A_b}{\Omega} =$	58.4	kN	\geq	$V =$	6.6	kN
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Where:

$F_{nv} = 372.0 \text{ MPa}$	– nominal shear stress from AISC 360-16 Table J3.2
$A_b = 314 \text{ mm}^2$	– gross bolt cross-sectional area
$\Omega = 2.00$	– safety factor for tension and shear

Bearing resistance check (AISC 360-16: J3-6)

$R_n = 1.20 \cdot l_c \cdot t \cdot F_u$			\leq	$2.40 \cdot d \cdot t \cdot F_u$		
$\frac{R_n}{\Omega} =$	47.5	kN	\geq	$V =$	6.6	kN

Where:

$l_c = 35 \text{ mm}$	– clear distance, in the direction of the force, between the edge of the hole and the edge of the adjacent hole or edge of the material
$t = 4 \text{ mm}$	– thickness of the plate
$d = 20 \text{ mm}$	– diameter of a bolt
$F_u = 510.0 \text{ MPa}$	– tensile strength of the connected material
$\Omega = 2.00$	– safety factor for bearing at bolt holes

Interaction of tension and shear check (AISC 360-16: J3-2)

The required stress, in either shear or tension, is less than or equal to 30% of the corresponding available stress and the effects of combined stresses need not to be investigated.

Weld sections

Item	Edge	Xu	T_h [mm]	L_s [mm]	L [mm]	L_c [mm]	Loads	F_n [kN]	R_n/Ω [kN]	U_t [%]	Status
CH-w 1	FP1	S355	▲5.7▲	▲8.0▲	100	10	LE1	4.1	10.1	40.6	OK
		S355	▲5.7▲	▲8.0▲	100	10	LE1	4.1	10.5	39.3	OK

Symbol explanation

T_h	Throat thickness of weld
L_s	Leg size of weld
L	Length of weld
L_c	Length of weld critical element
F_n	Force in weld critical element
R_n/Ω	Weld resistance AISC 360-16 J2.4
U_t	Utilization

Detailed result for CH-w 1 / FP1

Weld resistance check (AISC 360-16: J2-4)

$\frac{R_n}{\Omega} = \frac{F_{nw} \cdot A_{we}}{\Omega} =$	10.1	kN	\geq	$F_n =$	4.1	kN
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Where:


$F_{nw} = 360.5 \text{ MPa}$	– nominal stress of weld material:
$F_{nw} = 0.6 \cdot F_{EXX} \cdot (1 + 0.5 \cdot \sin^{1.5} \theta)$, where: $F_{EXX} =$ 510.0 MPa – electrode classification number, i.e. minimum specified tensile strength $\theta =$ 30.1° – angle of loading measured from the weld longitudinal axis	
$A_{we} = 56 \text{ mm}^2$	– effective area of weld critical element
$\Omega = 2.0$	– safety factor for fillet welds

Buckling

Buckling analysis was not calculated.

Bill of material

Manufacturing operations

Name	Plates [mm]	Shape	Nr.	Welds [mm]	Length [mm]	Bolts	Nr.
FP1	P12.0x130.0-100.0 (S355)		1	Double fillet: a = 5.7	100.0	20 A325M	2

Welds

Type	Material	Throat thickness [mm]	Leg size [mm]	Length [mm]
Double fillet	S355	5.7	8.0	100.0

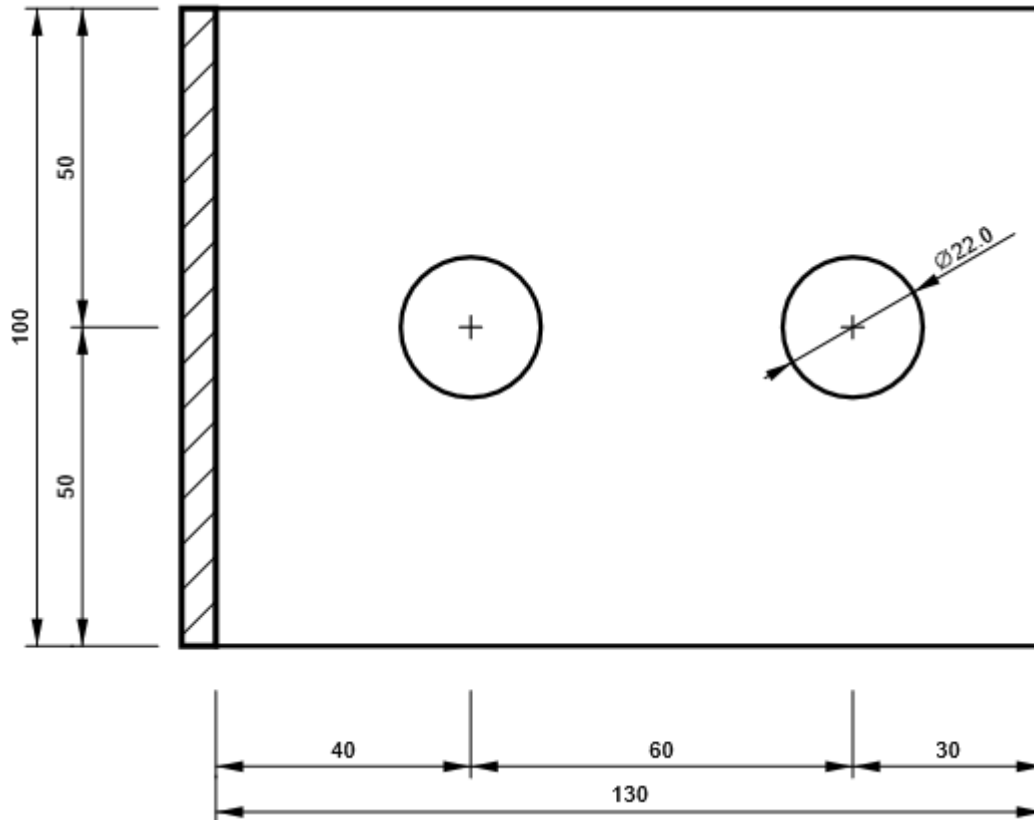
Bolts

Name	Grip length [mm]	Count
20 A325M	16	2

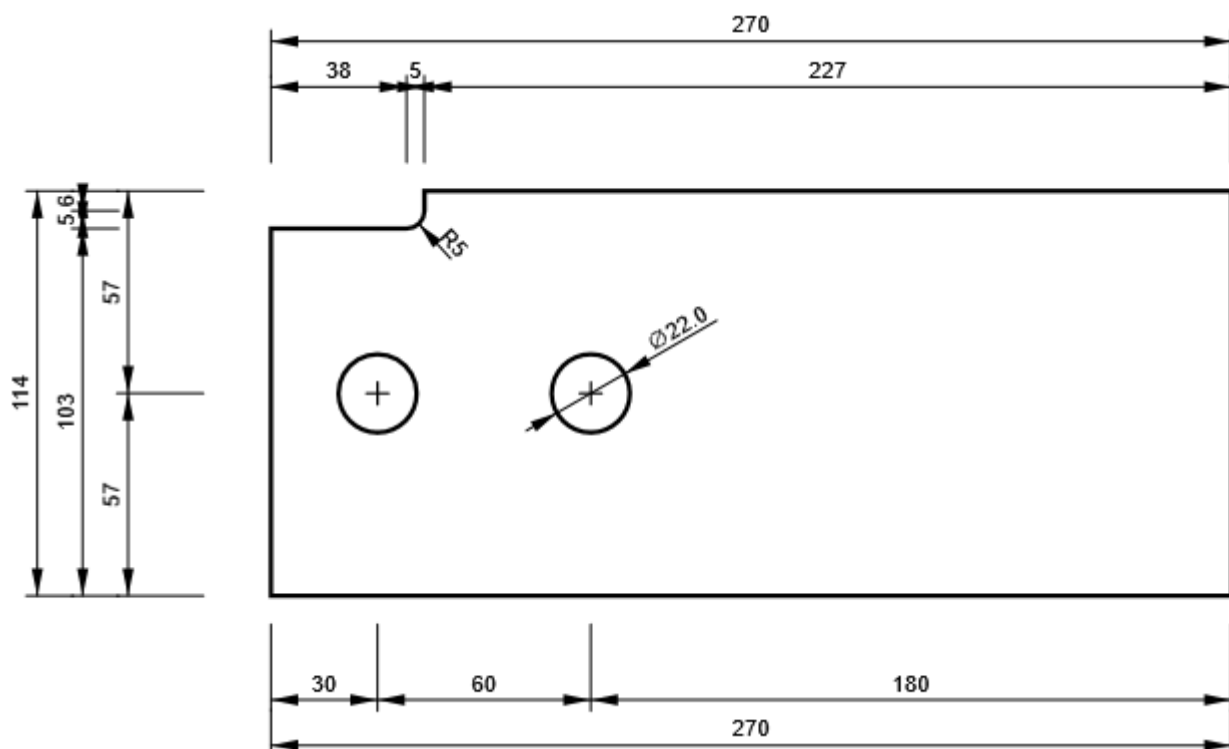
Drawing

FP1

P12.0x100-130 (S355)



M4, IPE120 - Web 1:



10.6 Secondary beam with Main beam (IPE200)

Name	Member	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
LE1	M4	0.0	0.0	6.0	0.0	-1.6	0.0

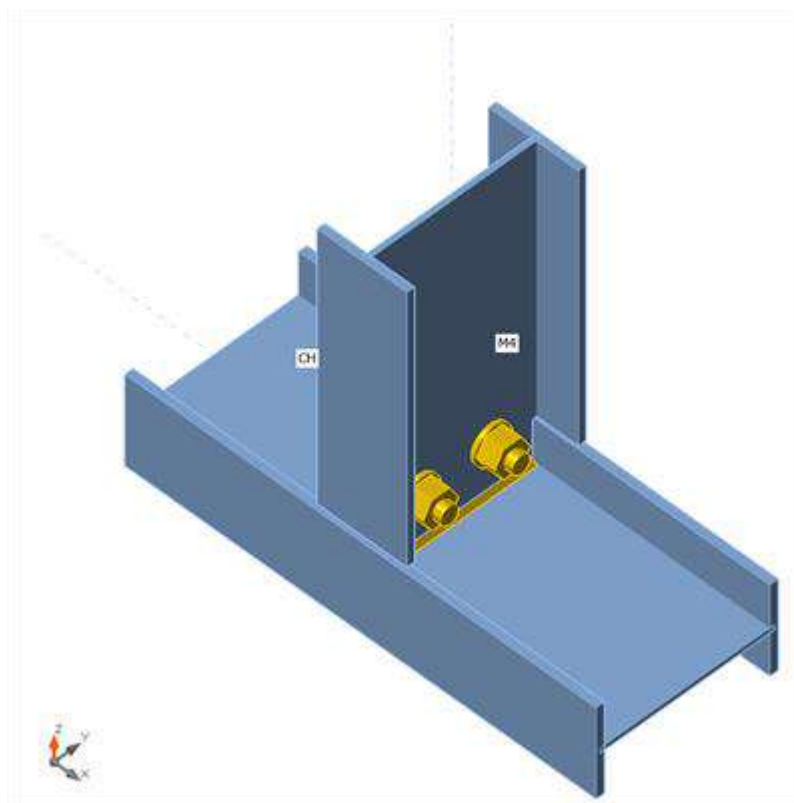
Project item Detail-6

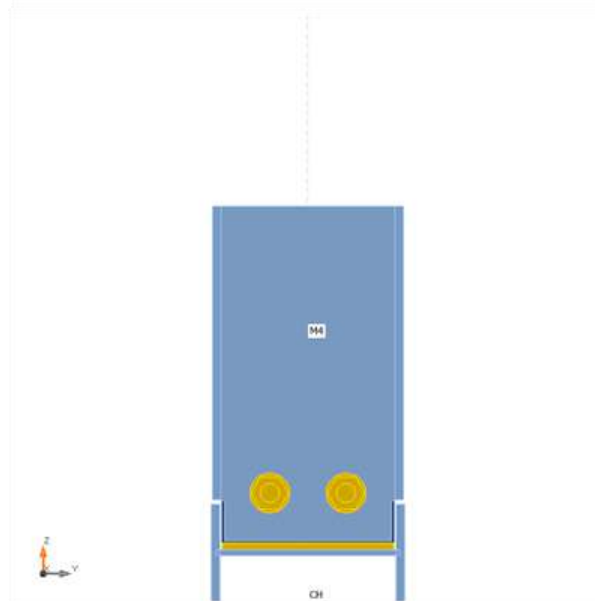
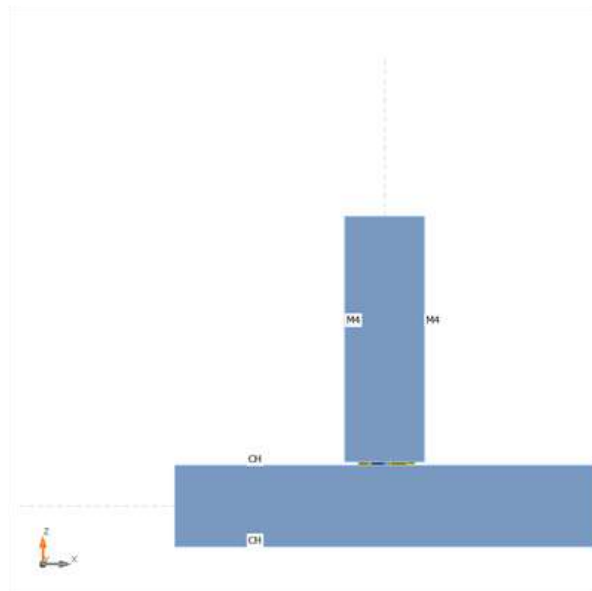
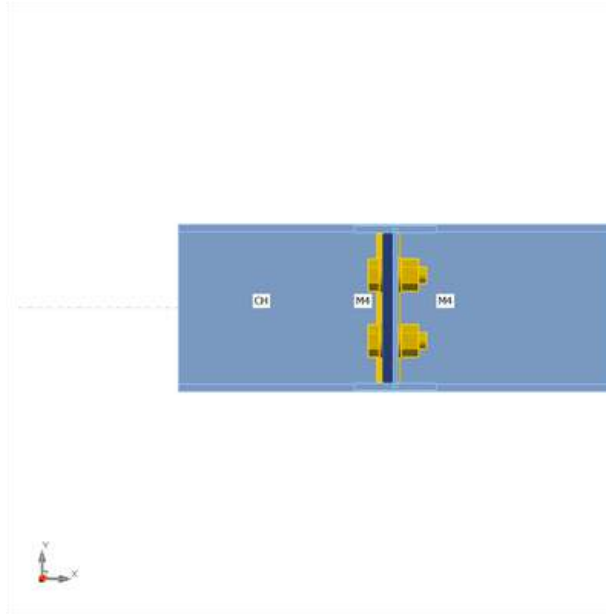
Design

Name	Detail-6
Description	SEC.BEAM TO MEAN BEAM
Analysis	Stress, strain/ simplified loading
Design code	AISC - ASD 2016

Beams and columns

Name	Cross-section	β – Direction [°]	γ – Pitch [°]	α – Rotation [°]	Offset ex [mm]	Offset ey [mm]	Offset ez [mm]	Forces in	X [mm]
CH	13 - UB 203 x 102 x 23	0.0	0.0	90.0	0	0	0	Node	0
M4	14 - IPE200	0.0	-90.0	90.0	0	0	0	Bolts	63

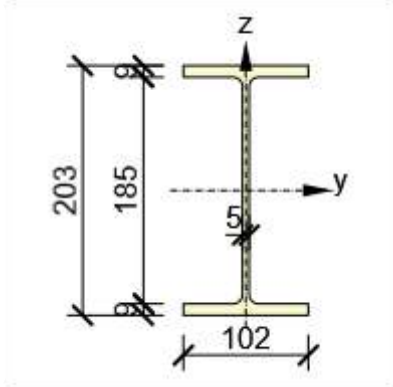
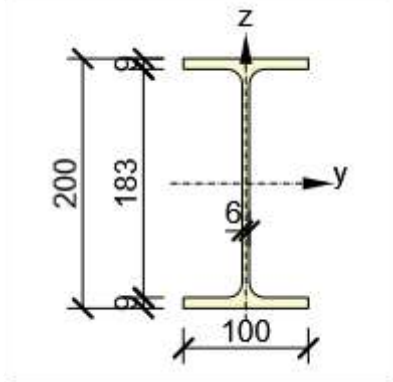




Cross-sections

Name	Material
13 - UB 203 x 102 x 23	S355
14 - IPE200	S355

Cross-sections

Name	Material	Drawing
13 - UB 203 x 102 x 23	S355	 <p>Technical drawing of a Universal Beam (UB) 203 x 102 x 23. The drawing shows a cross-section with dimensions: total height 203 mm, web height 185 mm, flange thickness 9 mm, and web thickness 5 mm. The flange width is 102 mm. The y and z axes are indicated.</p>
14 - IPE200	S355	 <p>Technical drawing of an IPE 200 cross-section. The drawing shows a cross-section with dimensions: total height 200 mm, web height 183 mm, flange thickness 9 mm, and web thickness 6 mm. The flange width is 100 mm. The y and z axes are indicated.</p>

Bolts

Name	Bolt assembly	Diameter [mm]	f_u [MPa]	Gross area [mm ²]
20 A325M	20 A325M	20	830.0	314

Load effects (equilibrium not required)

Name	Member	N [kN]	V _y [kN]	V _z [kN]	M _x [kNm]	M _y [kNm]	M _z [kNm]
LE1	M4	0.0	0.0	6.0	0.0	-1.6	0.0

Check

Summary

Name	Value	Check status
Analysis	100.0%	OK
Plates	0.0 < 5.0%	OK
Bolts	6.8 < 100%	OK
Welds	9.2 < 100%	OK

Buckling	Not calculated	
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Plates

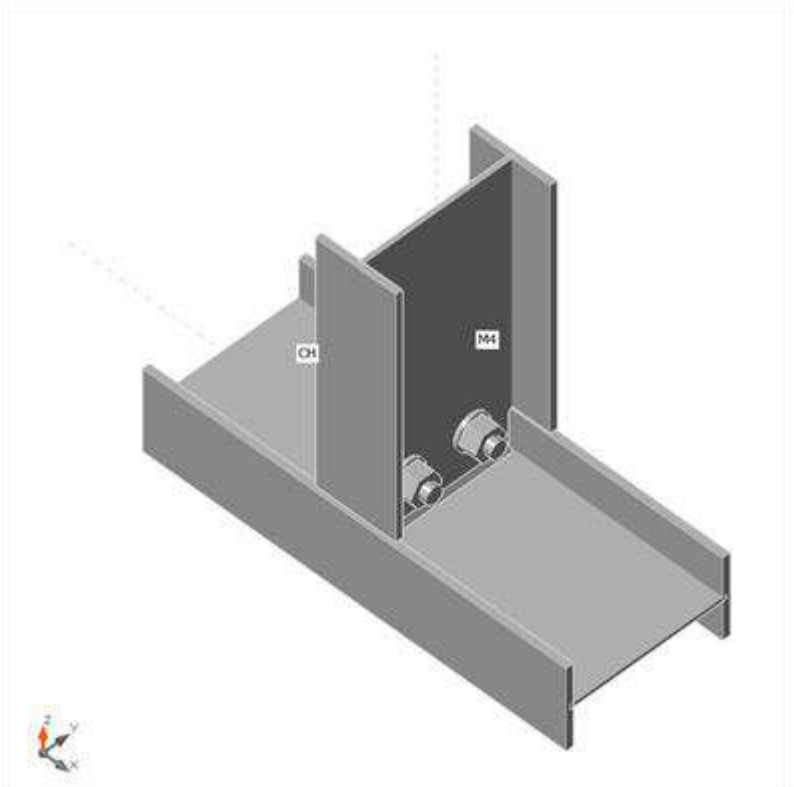
Name	f_y [MPa]	Thickness [mm]	Loads	σ_{Ed} [MPa]	ϵ_{Pl} [%]	$\sigma_{C_{Ed}}$ [MPa]	Check status
CH-bfl 1	355.0	9.3	LE1	17.2	0.0	0.0	OK
CH-tfl 1	355.0	9.3	LE1	17.2	0.0	0.0	OK
CH-w 1	355.0	5.4	LE1	10.6	0.0	0.0	OK
M4-bfl 1	355.0	8.5	LE1	10.6	0.0	0.0	OK
M4-tfl 1	355.0	8.5	LE1	10.5	0.0	0.0	OK
M4-w 1	355.0	5.6	LE1	33.5	0.0	2.4	OK
FP1	355.0	12.0	LE1	19.2	0.0	2.4	OK

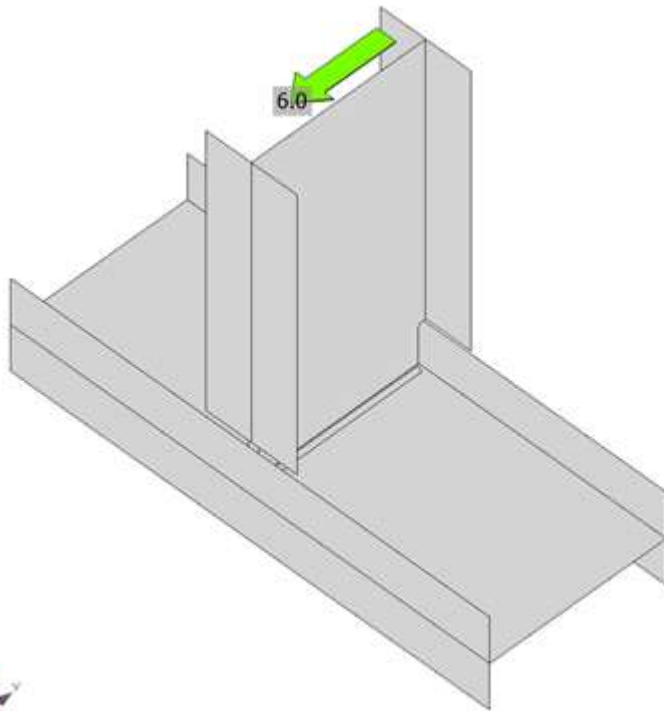
Design data

Material	f_y [MPa]	ϵ_{lim} [%]
S355	355.0	5.0

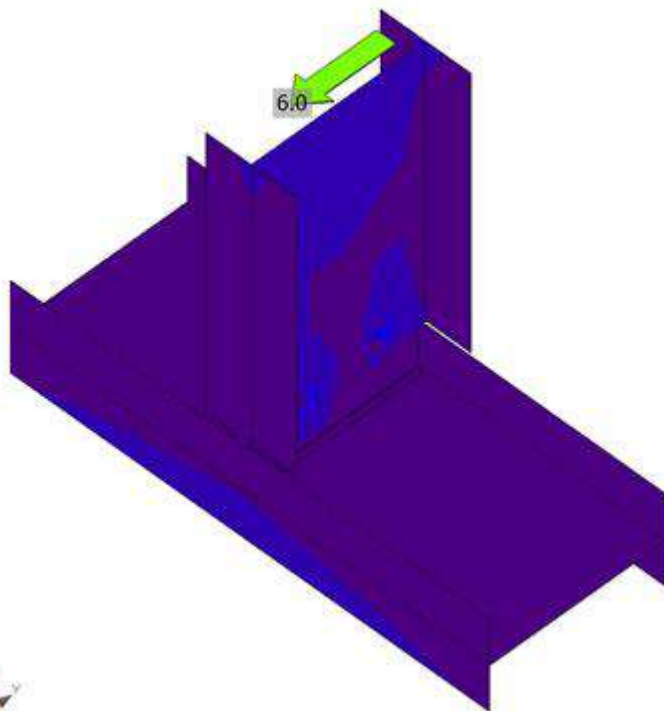
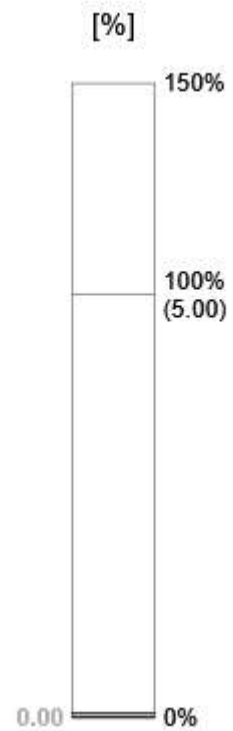
Symbol explanation

ϵ_{Pl}	Plastic strain
$\sigma_{C_{Ed}}$	Contact stress
σ_{Ed}	Eq. stress
f_y	Yield strength
ϵ_{lim}	Limit of plastic strain

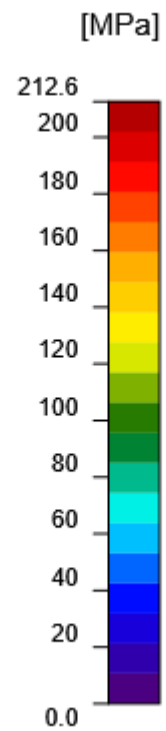
 <p>Overall check, LE1</p>	
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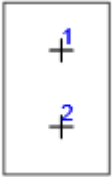
Strain check, LE1



Equivalent stress, LE1



Bolts

Shape	Item	Grade	Loads	F_t [kN]	V [kN]	$Rn/\Omega_{\text{Bearing}}$ [kN]	U_t [%]	U_s [%]	U_{ts} [%]	Status
	B1	20 A325M - 1	LE1	0.7	4.0	68.5	0.7	6.8	-	OK
	B2	20 A325M - 1	LE1	1.0	4.0	68.5	1.1	6.8	-	OK

Design data

Grade	$Rn/\Omega_{\text{Tension}}$ [kN]	Rn/Ω_{Shear} [kN]
20 A325M - 1	97.3	58.4

Symbol explanation

F_t	Tension force
V	Resultant of shear forces V_y, V_z in bolt
$Rn/\Omega_{\text{Bearing}}$	Bolt bearing resistance
U_t	Utilization in tension
U_s	Utilization in shear
U_{ts}	Utilization in tension and shear
$Rn/\Omega_{\text{Tension}}$	Bolt tension resistance AISC 360-16 J3.6
Rn/Ω_{Shear}	Bolt shear resistance AISC 360-16 – J3.8

Detailed result for B2

Tension resistance check (AISC 360-16: J3-1)

$\frac{R_n}{\Omega} = \frac{F_{nt} \cdot A_b}{\Omega} =$	97.3	kN	\geq	$F_t =$	1.0	kN
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Where:

$F_{nt} = 620.0 \text{ MPa}$	– nominal tensile stress from AISC 360-16 Table J3.2
$A_b = 314 \text{ mm}^2$	– gross bolt cross-sectional area
$\Omega = 2.00$	– safety factor for tension and shear

Shear resistance check

$\frac{R_n}{\Omega} = \frac{F_{nv} \cdot A_b}{\Omega} =$	58.4	kN	\geq	$V =$	4.0	kN
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Where:

$F_{nv} = 372.0 \text{ MPa}$	– nominal shear stress from AISC 360-16 Table J3.2
$A_b = 314 \text{ mm}^2$	– gross bolt cross-sectional area
$\Omega = 2.00$	– safety factor for tension and shear

Bearing resistance check (AISC 360-16: J3-6)

$R_n = 1.20 \cdot l_c \cdot t \cdot F_u$				\leq	$2.40 \cdot d \cdot t \cdot F_u$			
$\frac{R_n}{\Omega} =$	68.5	kN	\geq	$V =$	4.0	kN		

Where:

$l_c = 63 \text{ mm}$	– clear distance, in the direction of the force, between the edge of the hole and the edge of the adjacent hole or edge of the material
$t = 6 \text{ mm}$	– thickness of the plate
$d = 20 \text{ mm}$	– diameter of a bolt
$F_u = 510.0 \text{ MPa}$	– tensile strength of the connected material
$\Omega = 2.00$	– safety factor for bearing at bolt holes

Interaction of tension and shear check (AISC 360-16: J3-2)

The required stress, in either shear or tension, is less than or equal to 30% of the corresponding available stress and the effects of combined stresses need not to be investigated.

Weld sections

Item	Edge	Xu	T_h [mm]	L_s [mm]	L [mm]	L_c [mm]	Loads	F_n [kN]	R_n/Ω [kN]	Ut [%]	Status
CH-w 1	FP1	S355	▲5.7▲	▲8.0▲	179	11	LE1	0.7	13.9	4.8	OK
		S355	▲5.7▲	▲8.0▲	179	11	LE1	1.3	14.1	9.2	OK

Symbol explanation

T_h	Throat thickness of weld
L_s	Leg size of weld
L	Length of weld
L_c	Length of weld critical element
F_n	Force in weld critical element
R_n/Ω	Weld resistance AISC 360-16 J2.4
Ut	Utilization

Detailed result for CH-w 1 / FP1

Weld resistance check (AISC 360-16: J2-4)

$\frac{R_n}{\Omega} = \frac{F_{nw} \cdot A_{we}}{\Omega} =$	14.1	kN	\geq	$F_n =$	1.3	kN
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Where:


$F_{nw} = 446.5 \text{ MPa}$	– nominal stress of weld material:
$F_{nw} = 0.6 \cdot F_{EXX} \cdot (1 + 0.5 \cdot \sin^{1.5} \theta)$, where: $F_{EXX} =$ 510.0 MPa – electrode classification number, i.e. minimum specified tensile strength $\theta =$ 70.9° – angle of loading measured from the weld longitudinal axis	
$A_{we} = 63 \text{ mm}^2$	– effective area of weld critical element
$\Omega = 2.0$	– safety factor for fillet welds

Buckling

Buckling analysis was not calculated.

Bill of material

Manufacturing operations

Name	Plates [mm]	Shape	Nr.	Welds [mm]	Length [mm]	Bolts	Nr.
FP1	P12.0x110.0-180.0 (S355)		1	Double fillet: a = 5.7	180.0	20 A325M	2

Welds

Type	Material	Throat thickness [mm]	Leg size [mm]	Length [mm]
Double fillet	S355	5.7	8.0	180.0

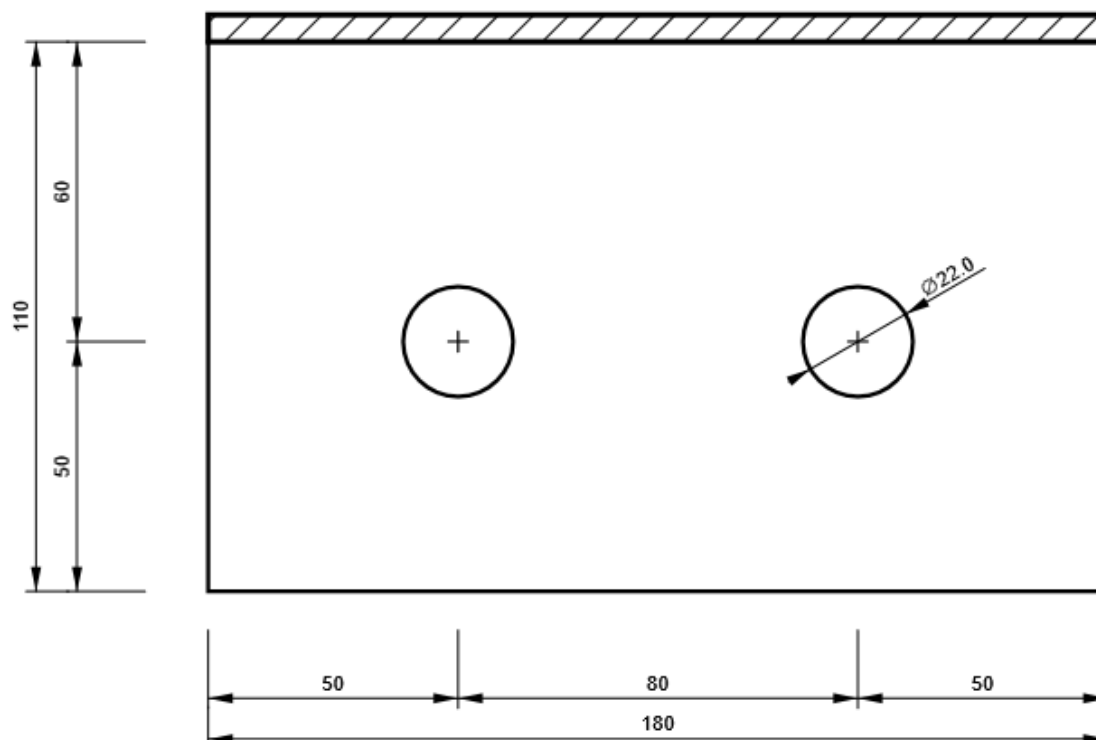
Bolts

Name	Grip length [mm]	Count
20 A325M	18	2

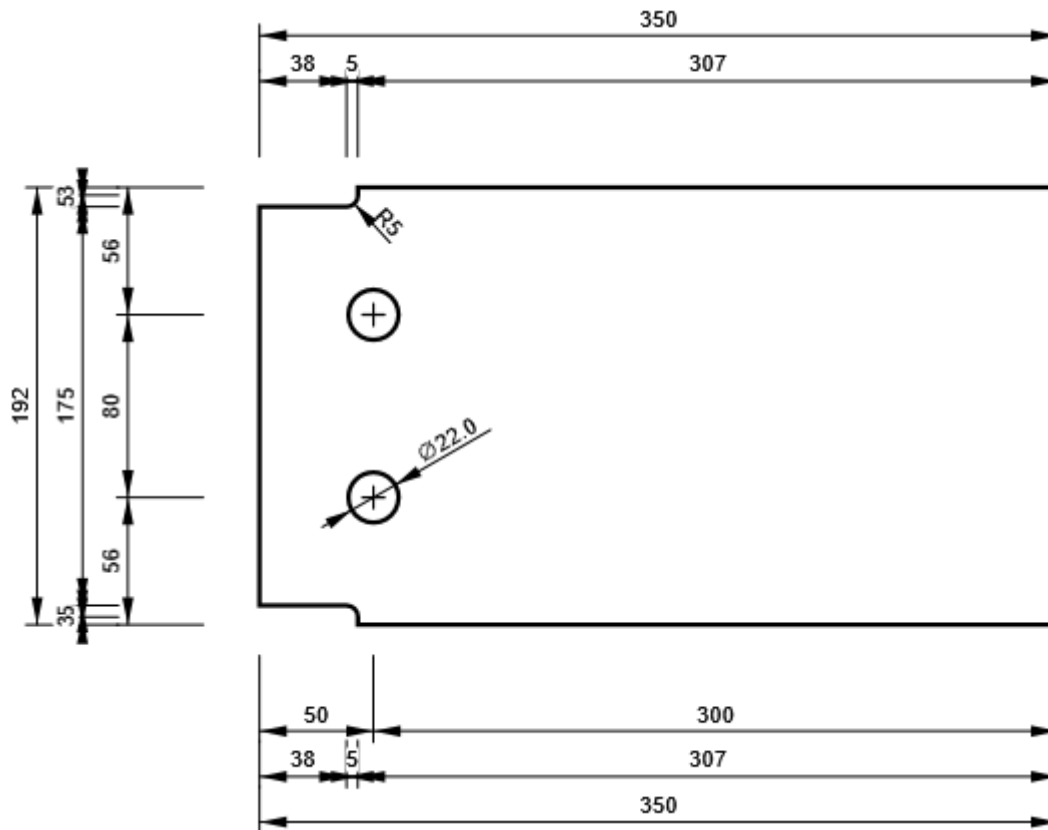
Drawing

FP1

P12.0x180-110 (S355)



M4, IPE200 - Web 1:



11. Sketch drawing