Carmon Creek

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Structural Analysis
Carmon Creek – Base Skids and Dropover Enclosures
De Jong Combustion / NEM Energy

Project : De Jong Combustion / NEM Energy Carmon Creek enclosures

Client : De Jong Combustion BV
PO nr. : PO 613087500/85679

End-user : Shell Canada Ltd

A-L ordernr. : 405109540
Doc. Title : 405109540.6000 Structural Analysis
Description : Structural Analysis of Enclosure Skid and Dropover Enclosure

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1 Introduction

1.1 Project description

For the Shell Carmon Creek site, burner skid units will be delivered by De Jong Combustion BV. For each unit, 5 burner skids will be installed on an enclosure skid with dropover enclosure for protection against environmental conditions.
Alara-Lukagro BV will design and manufacture the enclosure skids and enclosures.

This structural verification, will verify the structural capacity of the enclosure skid and dropover enclosure based the governing Canadian structural codes.

Please note that due to an deviation in the 3rd unit an addendum is attached for lifting verification.

1.2 Scope of delivery

Alara-Lukagro will deliver:

- 3 identical Enclosure Skids ('main skid') carrying the burner skids by de Jong Combustion BV.
- 3 identical Dropover Enclosures ('hoods') to be connected to the enclosure skids.

Internal equipment:
- Fixed lifting beams supporting a travelling lifting beam and lifting trolley WLL 250 kg by Alara-Lukagro BV
- HVAC system by Alara-Lukagro BV
- 5 x Burner Skids by De Jong Combustion BV
- Header and pipe spools by De Jong Combustion BV
- Header support including local panel by De Jong Combustion BV
- Cable trays to connect valves and instruments for gas system by De Jong Combustion BV
- E-system, like lighting, is part of the scope, but structurally not significant.

1.3 Code selection

The governing specification is the Technical Requisition (TR) by De Jong Combustion BV:
08750-SP020-R01 with below referred to specifications with regard to structural verification.

"The scope of supply shall be in accordance with all the documents mentioned below (in sequence of priority) and the documents and specifications referred therein"

Table 1-1 References

No	Ref	Name	Description	Rev	Date
1	TR §1.1	CSA S16-09	*Design of Steel Structures*	2	2012-02
2	TR §1.2	MoM	*Minutes of Meeting 20-11-2013*	0	20-11-2013
3	-	MoM	*Minutes of Meeting 11-04-2014*	0	11-04-2014
4	TR §1.3	DEP 34.00.01.30-Gen	*Structural Design and Engineering of Onshore Structures*		2011-09
5	TR §1.3	DEP 34.28.00.31-Gen	*Onshore Steel Structures*		2011-09
6	TR §1.3	DEP 34.28.00.33-Gen	*Onshore Ancillary Steel Structures*		2011-09
7	TR §1.3	CCK-0000-CS-7880-00-0002-000	*Spec for Detailing, Supply and Fabr. of Struct. And Misc. Steel*	02A	21-11-2012

The primary code to be used is CSA S16-09 with extra requirements where applicable according the provided structural Shell DEPs.

In CSA S16-09 for determining the load factors, there is reference made to NBCC 2010 (National Building Code of Canada) §4.1.2.1. The NBCC was not available for this project, so a Basis of Design provided by contractor NEM Energy BV is used.[1]

[1] 36026-300-10-001-R1PE with Permit No. 11193

1.4 Design Load Conditions

The table below shows the conditions and considerations for the structural verification and the resulting calculation models to be made.

Table 1-2 Calculation models

Consideration	Calc.	Condition	Comment
The complete set must be able to withstand the environmental conditions	A1	OPE	
Bolted Connection to existing support structure	D1	OPE	Using results of model A1
Bolted Connection between enclosure skid and dropover enclosure	D2	OPE	Using results of model A1
The complete set must be able to be lifted to its final location	A2	LIFT	
Design of Primary Lifting Eye for lifting a complete assembled set of enclosure skid and dropover enclosure.	D3	LIFT	Based on total 30T
According Technical Requisition 08750SP020-R01 the enclosure skids + enclosure sets "will be supported in the field by a platform with maximum deflection, being length/300 mm. Supplier to confirm that skid enclosure is stiff enough of deal with bending of the support platform" The deformation of the structure will be compared to this limit.	A3	DEF	Extra limit to be considered
The enclosure skid must is required to be lifted while carrying the burner skids and other applicable equipment.	B	LIFT	
The dropover enclosure must be able to be lifted with attached applicable equipment	C	LIFT	
Design of (removable) Secondary Lifting Eye for lifting the dropover enclosure	D4	LIFT	Based on total 10T

OPE :	Operational Condition
LIFT:	Lifting Condition
DEF :	Deformation Condition

Structural Calculations for transport conditions (ship inertia etc.) are excluded from the scope of Alara-Lukagro BV: sea transport and dynamic loads are excluded according Chapter 11 of the Technical Requisition.

The objective of this report is to verify the structural safety of each calculation model and detail design as seen in Table 1-2 subjected to the applicable loads.

1.5 Load Cases

As NBCC[2] 2010 was not available for the project, BoD 36026-300-10-001 as provided by NEM Energy BV will be adopted. This Basis of Design is used on an equivalent structural application for the Carmon Creek Project.
The load cases in the table below are applicable for the operational condition.

Table 1-3 Load Cases for Calculation model A1 Operational

No	Lbl	Description	Nature	Value	Misc	Ref
1	G1	Structure Selfweight	dead	auto		Structural members, panels and nodal masses
2	SN1	Snow	snow	2,8 kN/m^2		
3	L1	Roof load	live	1,0 kN/m^2	120 kg/pt	ABC[3] Table 4.1.5.3
4	L2	Floor load	live	4,8 kN/m^2		
5	L3	Crane loads	live	WLL 250kg		DEP 34.00.0130-Gen 3.11 / 3.15
6	W1	Wind1 - long side	Wind	0,51 kN/m^2	Base value	ABC Table C-2
7	W2	Wind2 - short side	Wind	0,51 kN/m^2	Base value	
8	E1	Modal	Modal			
9	SEI_X	Seismic - NBCC 2010 Direction_X	Earthquake			ABC
10	SEI_Y	Seismic - NBCC 2010 Direction_Y	Earthquake			ABC
11	SEI_Z	Seismic - NBCC 2010 Direction_Z	Earthquake			ABC

[2] National Building Code Canada
[3] Alberta Building Code (local implementation on national code)

1.6 Load Combinations

Load Combinations are per NBCC 2010. These are automatically generated in Autodesk Robot when selected. See the table in Appendix A for the combinations.

1.7 References

The referred drawings of the 3D production model are the following:

Table 1-4 Reference Drawings of production model

Drawing Nr.
405109540-100 1/2
405109540-100 2/2
405109540-600 1/4

Please note that the referred

- *De Jong Combustion Technical requisition 0875-SP020*;
- *NEM Energy BoD 36026-300-10-001*;
- CSA;
- EN;
- ASTM;
- Shell DEP;
- and other codes

are not attached in the appendices.

1.8 Materials

1.8.1 Primary steel

The TR specifies ASTM 572 Grade 50 to be used with Longitudinal Charpy test value of minimum 27 J @-45 °C. As this material is locally not available for the structural profiles, an European equivalent is selected:
EN 10025-2[4] S355 (or higher) material with extra impact tests to confirm the Charpy test value for the minimum 27J @-45°C as specified in the TR.

During inquiry for the required material and sections the following materials were available and selected.

Table 1-5 Primary structural steel

Application	Pos	Use		Grade	fy (MPa) yield	fu (MPa) tensile	Cert.
Rectangular Hollow Sections	Enclosure	Primary	EN 10219	S420MH	420	500-660	3.1
Open H-; I-; U- profiles	Skid	Primary	EN 10225	S355G11+M	355	460-490	3.2
Plating 2mm	Encl. Walls	Primary	EN 10152	DC01+ZE25	140	270-410	2.2[5]
Plating 3mm	Encl. Roof	Primary	EN 10152	DC01+ZE25	140	270-410	2.2[5]
Plating (Checker plate) 4mm	Skid Floor	Primary	EN 10025-2	S235JR	235	360-510	2.2[5]

1.8.2 Secondary Steel

Secondary steel comprises the cold formed steel sheet for small brackets for miscellaneous lightweight equipment. These brackets are not modeled.

Table 1-6 Secondary structural steel

Application	Pos	Use		Grade	fy (MPa)	fu (MPa)	Cert.
Brackets small equipment	Wall, Roof	Secondary	EN 10152	DC01+ZE25	140	270-410	2.2[5]

1.8.3 Fasteners

Metric sizes will be used, unless noted otherwise:

[4] Fine grain normalized steel according EN 10025-3 is a near equivalent material, for example S355NL with 27 J @ -50 °C. But it is only available for plates, but not for structural profiles.
[5] EN 10152 is applicable for plate material, for impact test ref. EN 10025-1 §7.3.2.1 which states that impact tests are not required for nominal thickness <6mm.

- MoM 2014-04-11 Item 5 is regarding the structural bolt for fastening the enclosure skid with enclosure to the supporting platform. NEM Energy BV would investigate details. 2014-04-14 NEM Energy BV stated:

  "With regard to point of the MOM please be informed that for mounting of the enclosures on the steel structure Imperial bolts (UNC) and nuts shall be used.
  Mounting bolts and nuts shall be in the DJC / Alara Lukagro scope of supply"

  These UNC fasteners will be considered in the structural analysis, but are at this moment not in scope of Alara-Lukagro BV.

1.9 Design Criteria

1.9.1 Deformation Limits

The figures refer to the maximal deflection under permanent and variable actions under SLS-combinations according design code.

Table 1-7 Industrial Buildings Informative Maximum Deflections per CSA S16-09 Table D.1

Deflection	Specified loading	Application	Maximum
Vertical	Live, snow	Members supporting floors	L/300
Vertical	Maximum wheel loads (no impact)	Crane runway girders for crane capacity under 225 kN	L/600
Lateral	Crane lateral	Crane runway girders	L/600
Lateral	Crane lateral or wind	Storey drift*	h/400 (to h/200) (3360/300=8,4mm)

Legend:
h = storey height.
L = length or span.

*The permissible drift of industrial buildings depends on such factors as wall construction, building height, and the effect of deflection on the operation of the crane. Where the operation of the crane is sensitive to lateral deflections, a lateral deflection of less than h/400 may be necessary.

1.9.2 Slenderness

- Max slenderness for a member in compression is 200
  per CSA S16-09 §10.4.2.1

- Max slenderness for a member in tension is 300
  per CSA S16-09 §10.4.2.2

1.10 Computer software

- Autodesk Robot Structural Analysis Professional 2014
- Microsoft Excel
- Microsoft Word

2 Structural Analysis - Operational - A1 OPE

This chapter regards the analysis of the steel structure comprising enclosure skid and dropover enclosure in operational condition subjected to environmental loads.

2.1 FEA model

In the images below the steel structure is shown as only the structure visible and as the structure with panel faces. These faces add stiffness to the structure and distribute the loads to the applicable members. The properties of these panels is based on the plate thickness of the material used for the wall, roof and floor.

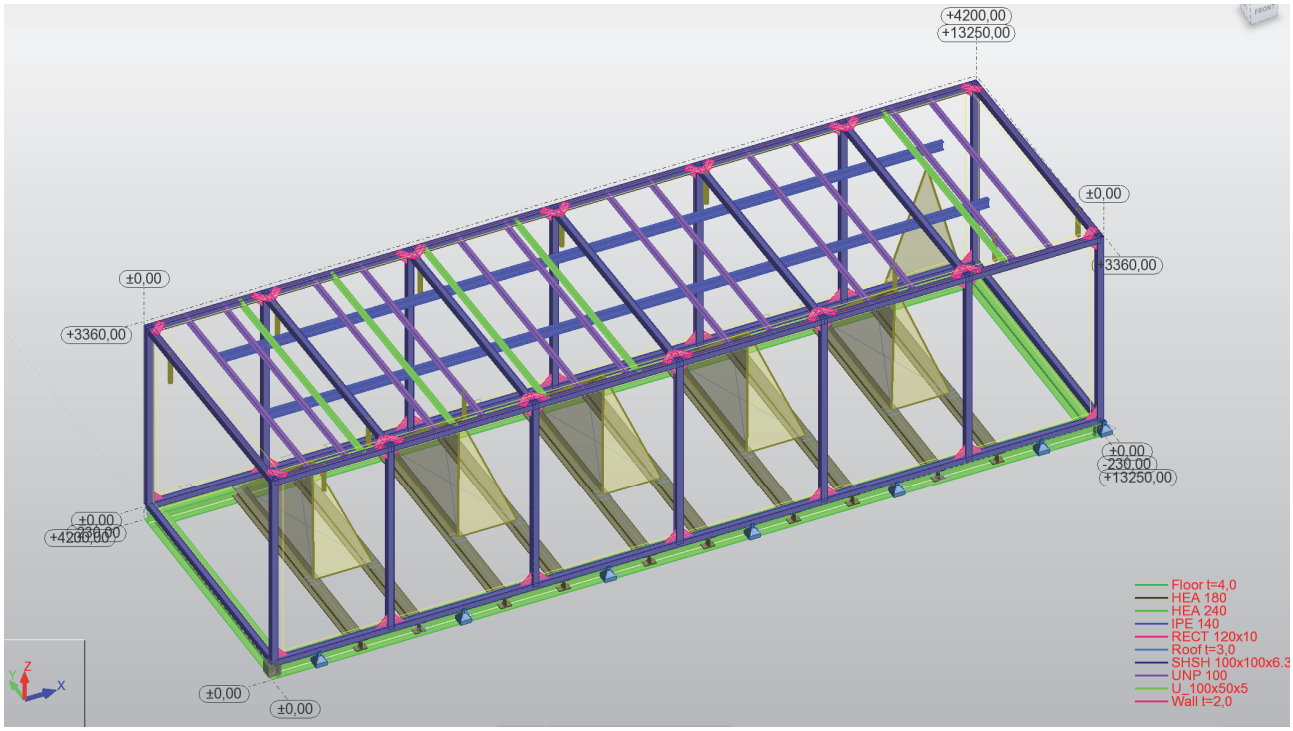


Figure 2-1 FEA model showing columns and beams

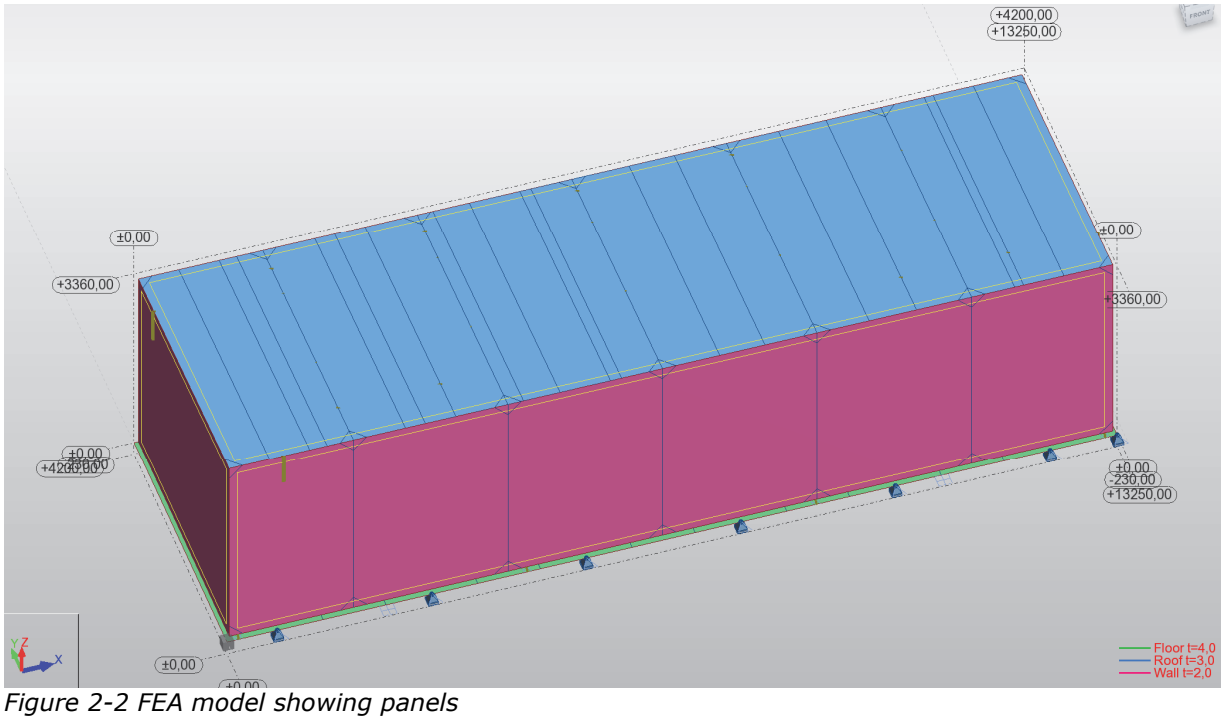


Figure 2-2 FEA model showing panels

The dropover enclosure is modeled as a structure separate from the enclosure skid. At the locations of the connection points the corresponding nodes are connected by rigid link interfaces (infinitely stiff calculation element).

The resulting forces at these locations can be used to verify the connection design.

The enclosure skid is supported at the 14 locations where it will be bolted to the support structure.

2.2 Load Case Application

The application of the load cases will be explained below per case.

2.2.1 Permanent load – Selfweight Auto

Autodesk Robot automatically assigns the selfweight of the modeled structure to the 1st load case as -9,8065 m/s^2 or -1,0 g in z direction.

2.2.2 Permanent load – Selfweight Panels

The structure comprises the wall, roof and floor panels.
As their weight is automatically accounted for based on the modelled plate thickness, an additional load need to be applied to compensate the full weight of the panels.

Table 2-1 Panel weights

Pos	Typical Weight	Modeled thickness / Weight	Additional Distributed load
Wall	32,6 kg/m^2	2mm / 15,7 kg/m^2	Z=-166 N/m^2
Roof	36,0 kg/m^2	3mm / 23,55 kg/m^2	Z=-122 N/m^2
Floor	7458 kg (production model)	5347 kg (members and 4mm panel)	Z=-372 N/m^2

2.2.3 Permanent load – Equipment and HVAC

The equipment by De Jong Combustion and HVAC items are modeled as nodal masses connected to the structure by rigid links.

Table 2-2 Equipment weights

Pos	Weight	
5 Burner skids	5 000,0	kg
Support + loc control	125,0	kg
Headers + cable tray	1 917,0	kg
Total	7 042,0	*kg*

Table 2-3 HVAC weights

Exhaust		**W**		**QTY**	**Subtot**	
X1-WL-001	Weather louvre	22	kg	1	22	
X1-MCD-001	Closing Damper	36	kg	1	36	
	Transition duct	44	kg	1	44	
X1-SA-001	Sound Attenuator	90	kg	1	90	
	Transition duct	16	kg	1	16	
X1-EF-001	Extract Fan	15	kg	1	15	
X1-MVD-001	Damper	13	kg	1	13	
	Duct	52	kg	1	52	
	Ducts low	25	kg	4	100	
	Transition duct	17	kg	1	17	
	Duct end	58	kg	1	58	
					462	**kg**
Inlet 001		**W**		**QTY**	**Subtot**	
X1-RH-001	Rainhood	70	kg	1	70	kg
X1-MCD-002	Closing Damper	12	kg	1	12	kg
	Bend duct 90°	35	kg	1	35	kg
X1-SA-002	Sound Attenuator	45	kg	1	45	kg

X1-AF-001	Filter	15	kg	1	15	kg
X1-UH-001	Heater				82	kg
					259	**kg**
Inlet002		**W**		**QTY**	Subtot	
X1-RH-002	Rainhood	70	kg	1	70	kg
X1-MCD-003	Closing Damper	12	kg	1	12	kg
X1-SA-003	Sound Attenuator	45	kg	1	45	kg
X1-AF-002	Filter	15	kg	1	15	kg
X1-UH-002	Heater				82	kg
					224	**kg**
		HVAC Total			**945**	**kg**

2.2.4 Variable load - Snow

The snow load is applied to the complete roof as a distributed load.

It is calculated according to the ABC, with values that are specified in the project Specifications, based on the BoD provided by NEM Energy.

Ss = 2.3 kPa = 2.3 kN/m2
Sr = 0.4 kPa = 0.4 kN/m2
Is = 1.25
Wind exposure factor: Cw = 1.0
Basic roof snow load factor: Cb = 0.8
Slope factor: Cs = 1.0
Shape factor: Ca = 1.0
$S = Is \cdot [Ss \cdot (Cb \cdot Cw \cdot Cs \cdot Ca) + Sr] = 2.8$ kN/m^2

2.2.5 Variable load – Roofload

The entire roof of about 60m^2 is loaded with an applied distributed load of 1,0 kN/m^2 according ABC as stated in the BoD provided by NEM Energy BV. This is a more unfavorable loading over applying point loads of 120 kg at each member ("at any location").

2.2.6 Variable load – Floorload

The floor ("corridor") of about 60m^2 is loaded with an applied distributed load of 4,8 kN/m^2 according ABC as stated in the BoD provided by NEM Energy BV.

2.2.7 Variable load – Crane Loads

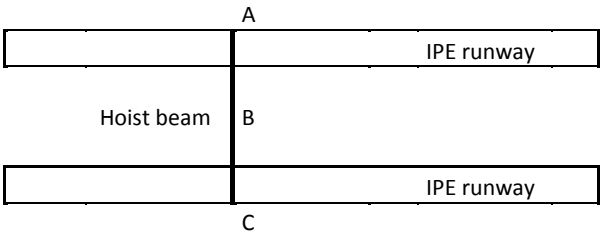
The loads by the hand operated chain hoist of WLL 0,25 T are determined according DEP 34.00.01.30-Gen.

- The DEP 3.11 a) states that "Design lift load shall be equal to two times the lifted load unless a larger factor is required by applicable codes and standards. This factor includes impact."

  As the load factor applied due to use of CSA S16-09 load factors is already '1,5', the load of 250 kg will be multiplied with (2,0 / 1,5 =) **1,33**.
  This results in 333,3 kg or 3270N.
  The 3 trolleys are each 6,5 kg, chain hoist 5 kg and hoist beam is 26 kg.

- The load is applied in the most unfavourable position: asymmetric and in the middle of the span.

According DEP 34.00.01.30-Gen Table 3.3 the following load increases are applicable for the 3 directions. This results in the load values shown below.



		increase	A		C	
FX	long	5%	13	N	-184	N
FY	trans	5%	13	N	- 184	N
FZ	vert	110%	281	N	-4 043	N

2.2.8 Variable Load – Wind1 long side (Y+)

The Design wind pressure is calculated as:

Table 2-4 Wind load calculation

P = Iw x q x Ce x Cg x Cp							
Term	*Value*	*Unit*	*Description*	*Ref*			
Iw	1,25	-	Importance factor	ABC 2006 Table A-2, Commentary A			
q	0,51	kN/m2	Ref velocity pressure	ABC 2006 Table C-2 (location Peace River, return period 50 years)			
Ce(z0)	1,06	-	Exposure factor	(h/10)^0,2 >0,9 for open terrain	z0	13,680	m
Ce(z1)	1,12	-	Exposure factor	(h/10)^0,2 >0,9 for open terrain	z1	17,270	m
Cg	2	-	Gust factor				
Cp	0,8	-	External pressure coefficient	Windward wall (highest long wall) wind in Y+ direction			
Cp	0,5	-	External pressure coefficient	Leeward wall (lowest long wall) wind in Y+ direction			
Cp	0,7	-	External pressure coefficient	Roof suction (α<16,7%)			

	Windward		*Roof*	*Leeward*	
			996	N/m2	
P(17270)	**1 138**	N/m2		**711**	N/m2
P(13680)	**1 086**	N/m2		**679**	N/m2

2.2.9 Variable Load – Wind2 short side (X-)

Please see §2.2.7 for wind load input. The input is the same, but direction application 90° rotated.

2.2.10 Seismic Loads

Seismic data according to ABC are shown below.

Table 2-5 Seismic data input

Parameter	Value	Ref
Sa(0.2)	0.12	
Sa(0.5)	0.06	
Sa(1.0)	0.02	
Sa(2.0)	0.01	
PGA	0.06	
Soil Class	D	
Importance Factor, IE	1.5	
Structures :		Conventional construction of moment frames, braced frames or shear walls (ABC Table 4.1.8.9)
Rd = 1.5		
R0 = 1.3		

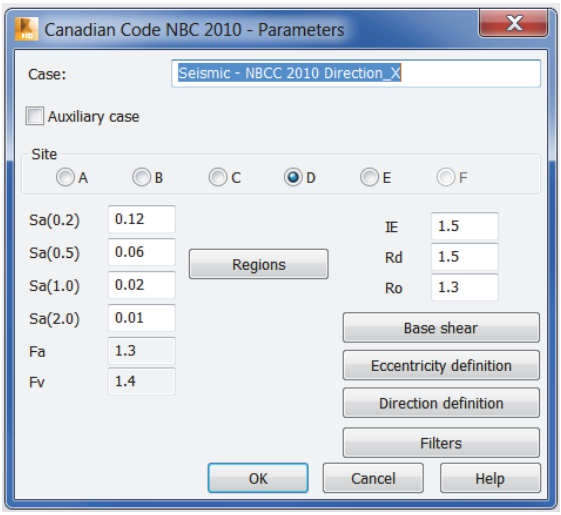


Figure 2-3 Seismic input in Autodesk Robot

In Autodesk Robot the 3 load cases for the 3 directions X, Y and Z are automatically generated.

Please note that load case 8 is a modal load case prerequisite for input of the seismic data and generation of the 3 load cases.

2.3 Results

The following section presents the results of the structural calculation. The profiles will be checked according CSA S16-09 to the ULS cases determining overall ratio. SLS cases are evaluated to determine the deflection ratios, depending on beam or column designation to limits specified in §1.9.1.
Stress and deformation will be displayed to show the behavior of the structure.

2.3.1 Unity Checks

CAN/CSA S16-09 - Member Verification (SLS ; ULS) 2to17 21 23to27 35to71 77to98 100 102 104to114 131 133to142 144 145 147to156 158 171to181 183to194 196

Results | Messages

Member	Section	Material	Lay	Laz	Ratio	Case	Ratio(uy)	Case (uy)	Ratio(uz)	Case (uz)	Ratio(vx)	Case (vx)	Ratio(vy)	Case (vy)
87 dJC Beam 87	UNP 100	S 355	104.96	278.49	0.93	12 ULS /101/	0.02	15 SLS /26/	0.50	15 SLS /29/	-	-	-	-
21 dJC Beam 21	UNP 100	S 355	104.96	278.49	0.92	12 ULS /95/	0.02	15 SLS /26/	0.43	15 SLS /27/	-	-	-	-
2 Beam 2	HEA 240	S 355	131.79	220.67	0.73	12 ULS /45/	0.00	15 SLS /1/	0.00	15 SLS /1/	-	-	-	-
4 Beam 4	HEA 240	S 355	131.79	220.67	0.71	12 ULS /45/	0.00	15 SLS /1/	0.00	15 SLS /1/	-	-	-	-
85 dJC Beam 85	UNP 100	S 355	104.96	278.49	0.58	12 ULS /101/	0.00	15 SLS /26/	0.79	15 SLS /29/	-	-	-	-
25 dJC Beam 25	U 100x50x5	S 235	105.58	266.45	0.55	12 ULS /97/	0.01	15 SLS /31/	0.57	15 SLS /29/	-	-	-	-
24 dJC Beam 24	U 100x50x5	S 235	105.58	266.45	0.51	12 ULS /99/	0.00	15 SLS /26/	0.66	15 SLS /29/	-	-	-	-
26 dJC Beam 26	U 100x50x5	S 235	105.58	266.45	0.48	12 ULS /95/	0.00	15 SLS /25/	0.64	15 SLS /29/	-	-	-	-
82 dJC Beam 82	UNP 100	S 355	104.96	278.49	0.48	12 ULS /97/	0.00	15 SLS /31/	0.78	15 SLS /29/	-	-	-	-
84 dJC Beam 84	UNP 100	S 355	104.96	278.49	0.47	12 ULS /97/	0.00	15 SLS /27/	0.77	15 SLS /29/	-	-	-	-
83 dJC Beam 83	UNP 100	S 355	104.96	278.49	0.46	12 ULS /77/	0.00	15 SLS /31/	0.76	15 SLS /29/	-	-	-	-
79 dJC Beam 79	UNP 100	S 355	104.96	278.49	0.44	12 ULS /97/	0.00	15 SLS /25/	0.69	15 SLS /29/	-	-	-	-
27 dJC Beam 27	U 100x50x5	S 235	105.58	266.45	0.44	12 ULS /99/	0.01	15 SLS /26/	0.57	15 SLS /29/	-	-	-	-
80 dJC Beam 80	UNP 100	S 355	104.96	278.49	0.40	12 ULS /97/	0.00	15 SLS /26/	0.69	15 SLS /29/	-	-	-	-

Figure 2-4 Unity Checks for top utilized profiles (>40%), sorted on overall ratio, high to low

As can be seen the highest utilized members are 87 and 21. These are UNP100 beams in the roof near the edges (marked orange in figure below). For the heaviest loaded beam, 93% of its capacity is used and therefore suffices to the structural verification according CSA S16-09.

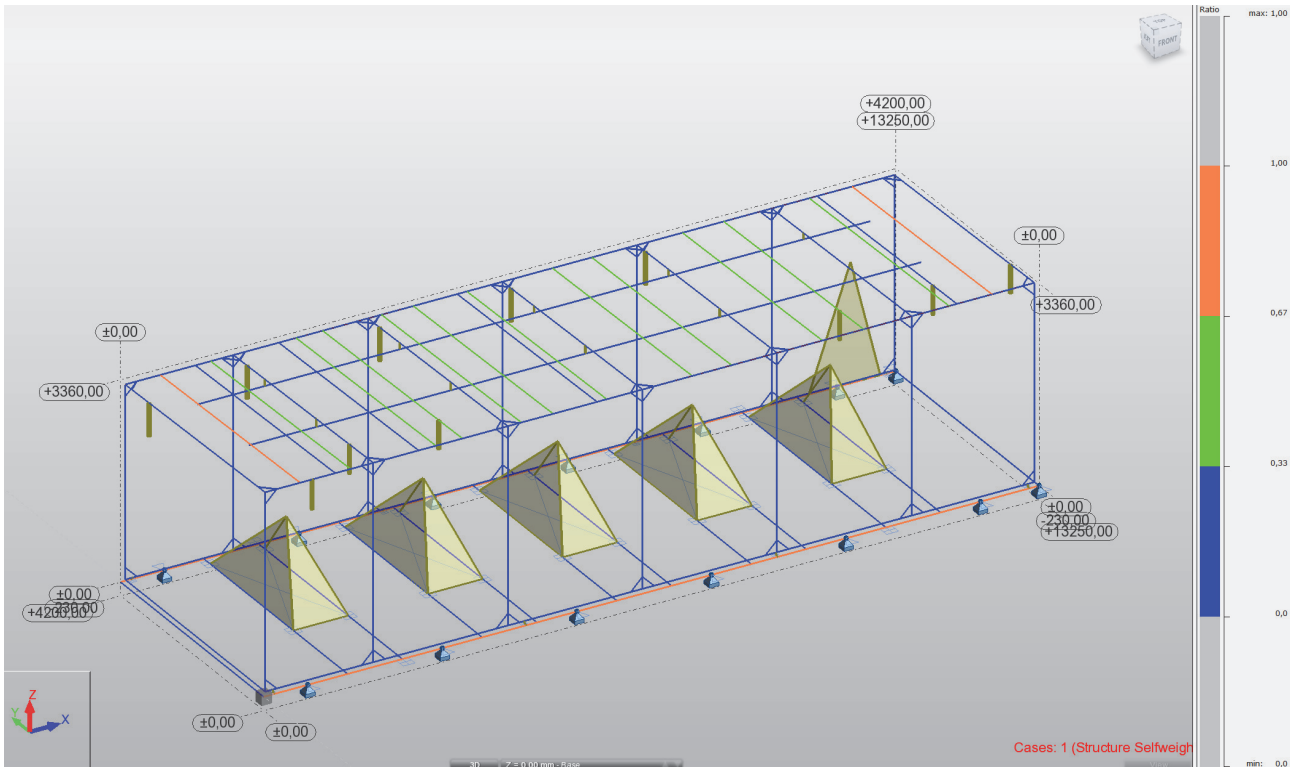


Figure 2-5 Visual presentation of unity checks (blue 0-33%; green 34-67%; orange 68-100%)

2.3.2 Stress

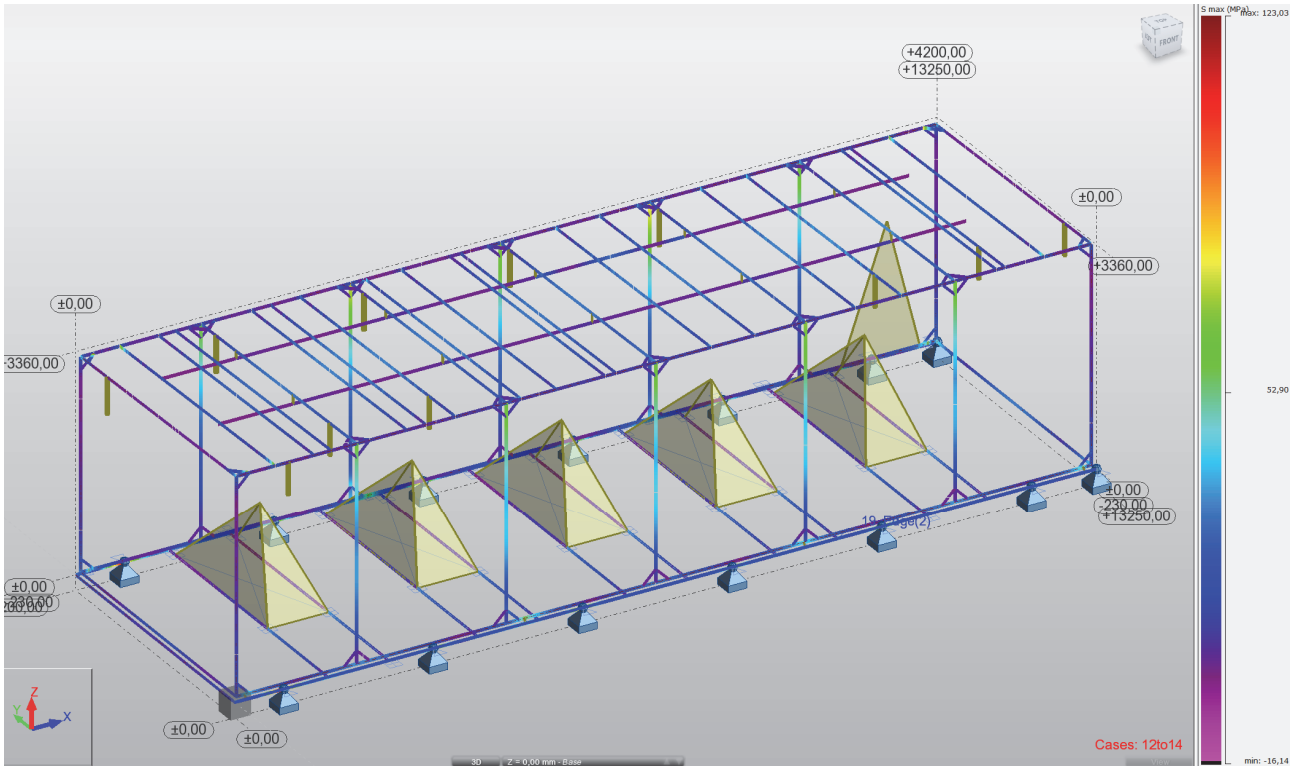


Figure 2-6 Stress peaks in profiles

As can be seen the highest stress peak is 124 MPa in the ULS load cases.
This is within limits: max 124 < 355 MPa.

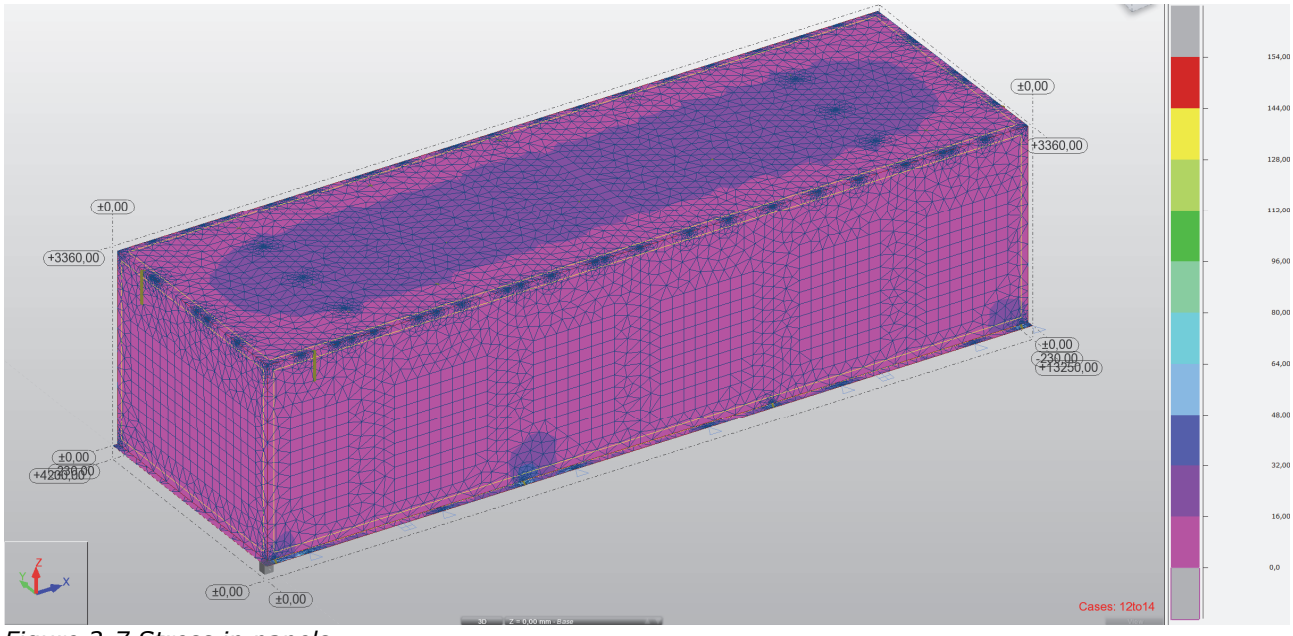


Figure 2-7 Stress in panels

As can be seen global stress values are max 48 MPa < limit of 140 MPa.

2.3.3 Deformation

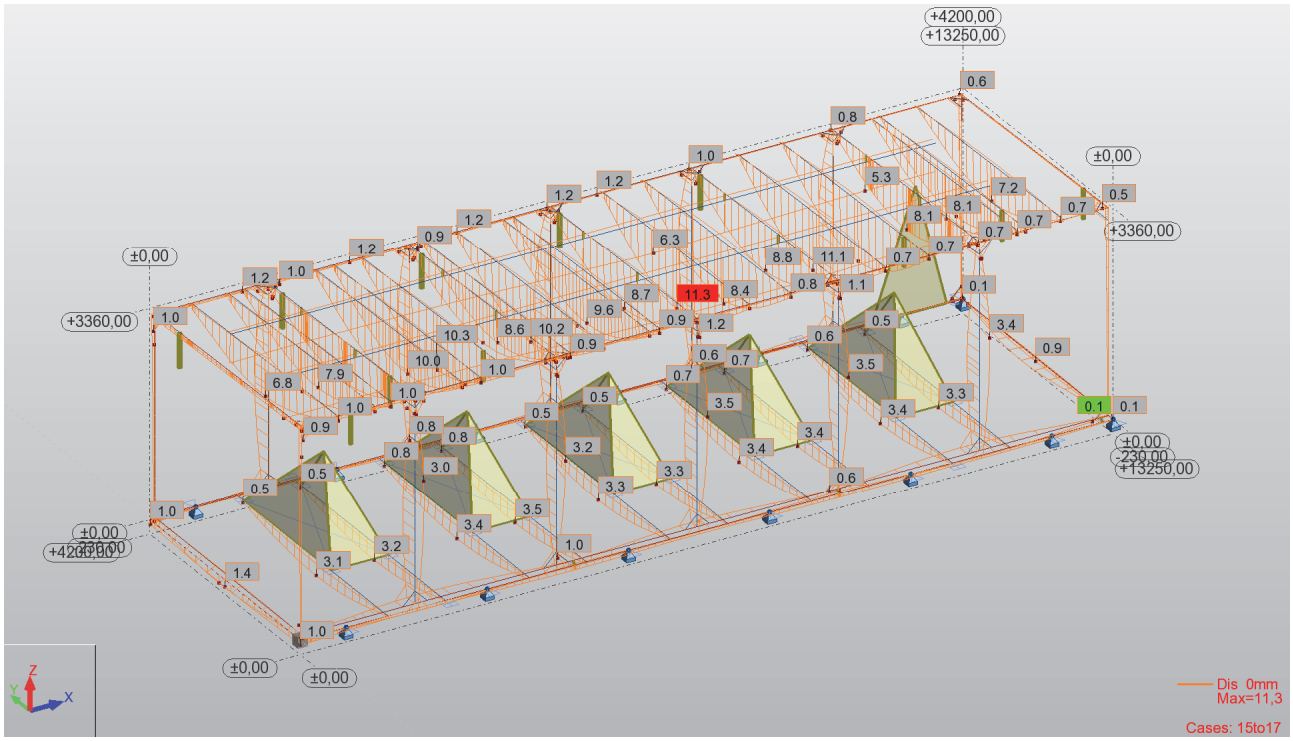


Figure 2-8 Deformation of profiles

As can be seen the largest deformation is about 11,3 mm in the roof in the SLS cases.
This is within limits: (4200/11,3=) 1/371 < 1/300.

3 Detail Analysis – Operational - D1 OPE

Verification of the bolted connection to existing support structure.

3.1 Reactions

Below the highest and lowest ULS reaction values from model A1 OPE in the constraints.
The x and y values are combined for the maximum shear force and negative z values represent a tension force. Positive values are compressive and do not affect the bolted connections.

Table 3-1 Max/Min ULS Reactions from A1 OPE

Node/Case	FX(N)	FY(N)	FY(N)	Shear	Tension	
71/ULS+	10 957	43 114	40 509	44 484	-	
71/ULS-	-1 279	-13 131	1 063	13 193	-	
72/ULS+	5 670	230	48 428	5 674	-	
72/ULS-	-2 972	-57 077	-18 934	57 154	18 934	
1000/ULS+	60 496	-16 152	82 834	62 615	-	
1000/ULS-	10 520	-83 385	-2 711	84 046	2 711	
1001/ULS+	16 615	-12 401	57 149	20 732	-	
1001/ULS-	-78 612	-66 617	9 804	103 042	-	
1002/ULS+	56 504	-13 767	75 262	58 157	-	
1002/ULS-	3 013	-81 283	7 995	81 339	-	
1003/ULS+	2 736	-12 999	57 882	13 284	-	
1003/ULS-	-43 459	-68 199	9 590	80 869	-	
1004/ULS+	21 180	-13 761	63 422	25 258	-	
1004/ULS-	-20 727	-73 944	10 222	76 794	-	
1005/ULS+	7 139	-8 445	36 214	11 058	-	
1005/ULS-	-20 184	-43 487	1 677	47 943	-	
1006/ULS+	69 921	81 018	82 409	107 018	-	
1006/ULS-	-3 409	3 072	14 333	4 589	-	
1007/ULS+	-2 386	66 593	61 621	66 636	-	
1007/ULS-	-69 208	2 521	12 144	69 254	-	
1008/ULS+	48 445	81 622	79 899	94 916	-	
1008/ULS-	-2 180	10 561	13 194	10 784	-	
1009/ULS+	2 048	69 032	65 455	69 063	-	
1009/ULS-	-44 346	8 249	12 028	45 106	-	
1010/ULS+	17 434	69 865	67 155	72 007	-	
1010/ULS-	-10 781	9 105	11 712	14 111	-	
1011/ULS+	6 535	59 935	56 261	60 290	-	
1011/ULS-	-19 589	11 810	14 846	22 874	-	
			MAX (N)	107 018	18 934	N
			MAX (kN)	**107,0**	**18,9**	**kN**

3.2 Results

The used bolted connections will be according ASTM A325. The size on drawing (36026-320-06-004-R00 GA Boiler platform) is ¾" UNC (~M20).

ASTM A325 ¾" UNC bolt (f_u = 120 ksi) (f_u ≈ 825 MPa); A_s = 0,334 in^2 [6]
$F_{n,tension}$ = 90 ksi [7]
$F_{n,shear}$ = 48 ksi [7]
$F_{v,Rd}$ = 30 060 lbf ≈ 134 kN (107 / 134 = 80%)
$F_{t,Rd}$ = 40 100 lbf ≈ 178 kN (18,9 / 178 = 11%)

In comparison: an ISO 4014 or 4017 bolt M20 8.8 bolt (f_u = 800 MPa; f_y = 640 MPa)
$F_{t,Rd}$ = 141,0 kN
$F_{v,Rd}$ = 121,0 kN

This shows that ASTM A325 ¾" bolts will suffice.

[6] According *ANSI / ASTM A 325 - 79*
[7] According *2004 RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts* Table 5.1

4 Detail Analysis – Operational - D2 OPE

Bolted Connection between enclosure skid and dropover enclosure

4.1 Reactions

Below the highest and lowest ULS reaction values from model A1 OPE in the constraints.
The x and y values are combined for the maximum shear force and negative z values represent a tension force. Positive values are compressive and do not affect the bolted connections.

Table 4-1 Max/Min ULS Reactions from A1 OPE

Node/Case	FIX (N)	FIY (N)	FIZ (N)	Shear	Tension	
121-129/ULS+	16 296	21 556	-2 021	27 022	2 021	
121-129/ULS-	-7 034	-602	-47 717	7 060	47 717	
122-130/ULS+	2 010	6 282	2 659	6 595	-	
122-130/ULS-	-8 385	-288	-42 399	8 390	42 399	
123-131/ULS+	9 467	6 453	-1 211	11 457	1 211	
123-131/ULS-	-8 474	-353	-56 447	8 482	56 447	
124-132/ULS+	12 857	16 894	-5 073	21 230	5 073	
124-132/ULS-	-8 321	-8 075	-44 275	11 595	44 275	
133-125/ULS+	6 414	13 565	51 985	15 005	-	
133-125/ULS-	-16 709	-23 801	-25 359	29 080	25 359	
134-126/ULS+	7 505	2 671	38 599	7 966	-	
134-126/ULS-	1 268	-9 790	-3 677	9 872	3 677	
135-127/ULS+	15 664	2 401	58 584	15 847	-	
135-127/ULS-	3 501	-9 735	-3 142	10 345	3 142	
136-128/ULS+	10 103	4 903	46 071	11 230	-	
136-128/ULS-	-3 111	-18 767	-7 818	19 023	7 818	
				29 080	56 447	N
				29,1	**56,4**	**kN**

4.2 Results

The used bolted connections will be metric and bearing according ISO 15048. The used bolts will be ISO 4017 full thread, class 8.8.

Bolt M16 8.8 bolt (f_u = 800 MPa; f_y = 640 MPa)
$F_{t,Rd}$ = 90,4 kN (56,4 / 90,4 = 63%)
$F_{v,Rd}$ = 77,1 kN (29,1 / 77,1 = 38%)

This shows that ISO 4017 M16 8.8 bolts will suffice.
For practical sizing, M20 will be used in the production model.

5 Structural Analysis – Lifting - A2 LIFT

The complete assembly of enclosure skid and dropover enclosure must be able to withstand the lifting forces. This chapter considers the structural verification of the global structure when lifted.

5.1 FEA model

The model of A1 OPE is copied and all load cases deleted except load case 1: selfweight.
In this load case an extra distributed load is applied to the floor face area to reach a total of 30 000 kg.
This equals the 30 t that is used to determine the padeye dimensions.

The calculation model currently weighs in at 25 293 kg.

The set will be lifted from the enclosure skid with a spreader beam as seen below.

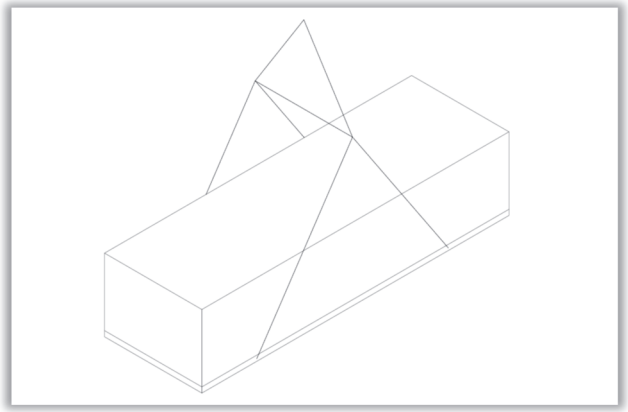


Figure 5-1 Lifting set up with spreader beam

The constraints of A1 OPE are deleted as these fasteners do not apply. New constraints are placed at the lifting points. The image below shows these constraints, recognizable by the support codes indicating the degrees of freedom.

To comply with the degrees of freedom of the lifting setup, the two lifting points on the left side are fixed in X, Y and Z direction and the lifting points on the right side are free to translate in X direction.

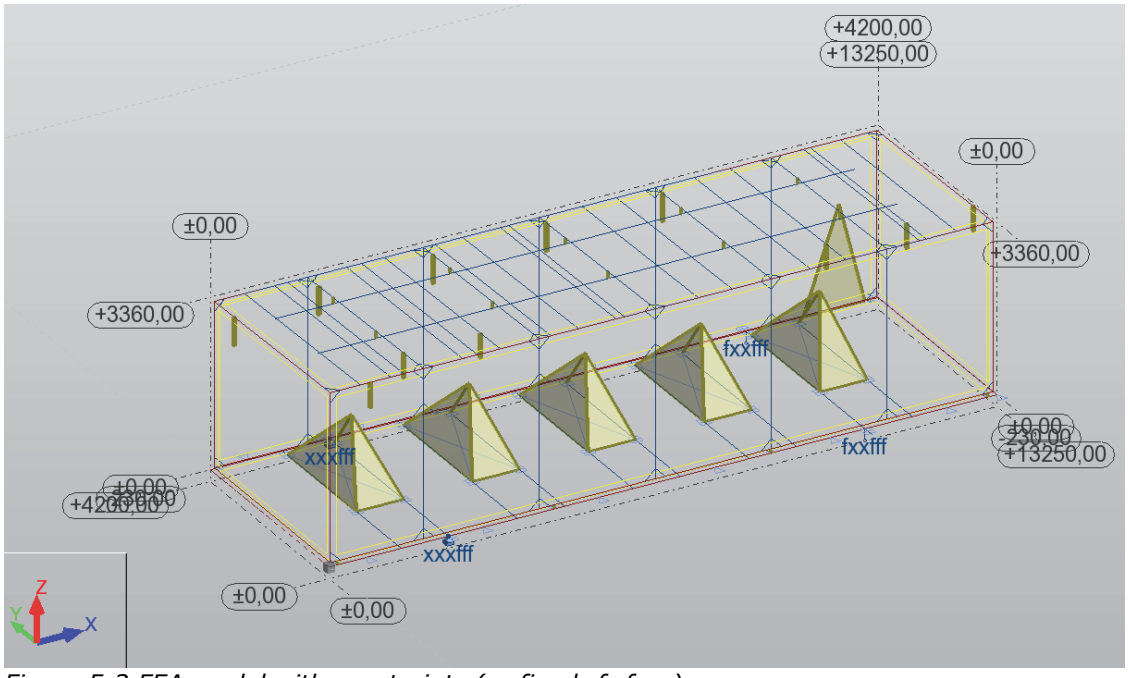


Figure 5-2 FEA model with constraints (x=fixed; f=free)

5.2 Results

Below the results of the structural calculation. The profiles will be checked according CSA S16-09. Stress and deformation will be displayed to show the behavior of the structure.

5.2.1 Unity Checks

CAN/CSA S16-09 - Member Verification (SLS ; ULS) 2to17 20to27 35to50 52to71 77to98 100 102 104to114 131 133to142 144 145 147to156 158 171to181 183to194 196

Results | Messages

Member	Section	Material	Lay	Laz	Ratio	Case	Ratio(uy)	Case (uy)	Ratio(uz)	Case (uz)
4 Beam 4	HEA 240	S 355	131.79	220.67	0.85	1 Structure Selfweight	0.01	1 Structure Selfweight	0.07	1 Structure Selfweight
2 Beam 2	HEA 240	S 355	131.79	220.67	0.70	1 Structure Selfweight	0.00	1 Structure Selfweight	0.06	1 Structure Selfweight
8 dJC Bm Crn 8	IPE 140	S 355	200.41	695.65	0.13	1 Structure Selfweight	0.00	1 Structure Selfweight	0.01	1 Structure Selfweight
17 Beam 17	HEA 180	S 355	56.42	92.95	0.12	1 Structure Selfweight	0.00	1 Structure Selfweight	0.13	1 Structure Selfweight
6 Beam 6	HEA 180	S 355	56.42	92.95	0.11	1 Structure Selfweight	0.00	1 Structure Selfweight	0.11	1 Structure Selfweight
16 Beam 16	HEA 180	S 355	56.42	92.95	0.10	1 Structure Selfweight	0.00	1 Structure Selfweight	0.13	1 Structure Selfweight
7 Beam 7	HEA 180	S 355	56.42	92.95	0.09	1 Structure Selfweight	0.00	1 Structure Selfweight	0.12	1 Structure Selfweight
85 dJC Beam 85	UNP 100	S 355	104.96	278.49	0.09	1 Structure Selfweight	0.00	1 Structure Selfweight	0.12	1 Structure Selfweight
79 dJC Beam 79	UNP 100	S 355	104.96	278.49	0.09	1 Structure Selfweight	0.00	1 Structure Selfweight	0.11	1 Structure Selfweight

Figure 5-3 Unity Checks for top utilized profiles (>8%), sorted on overall ratio high to low

As can be seen the highest utilized members are the long beams HEA 240 4 and 2. 85% / 70% of its capacity is used and therefore suffices to the structural verification according CSA S16-09.

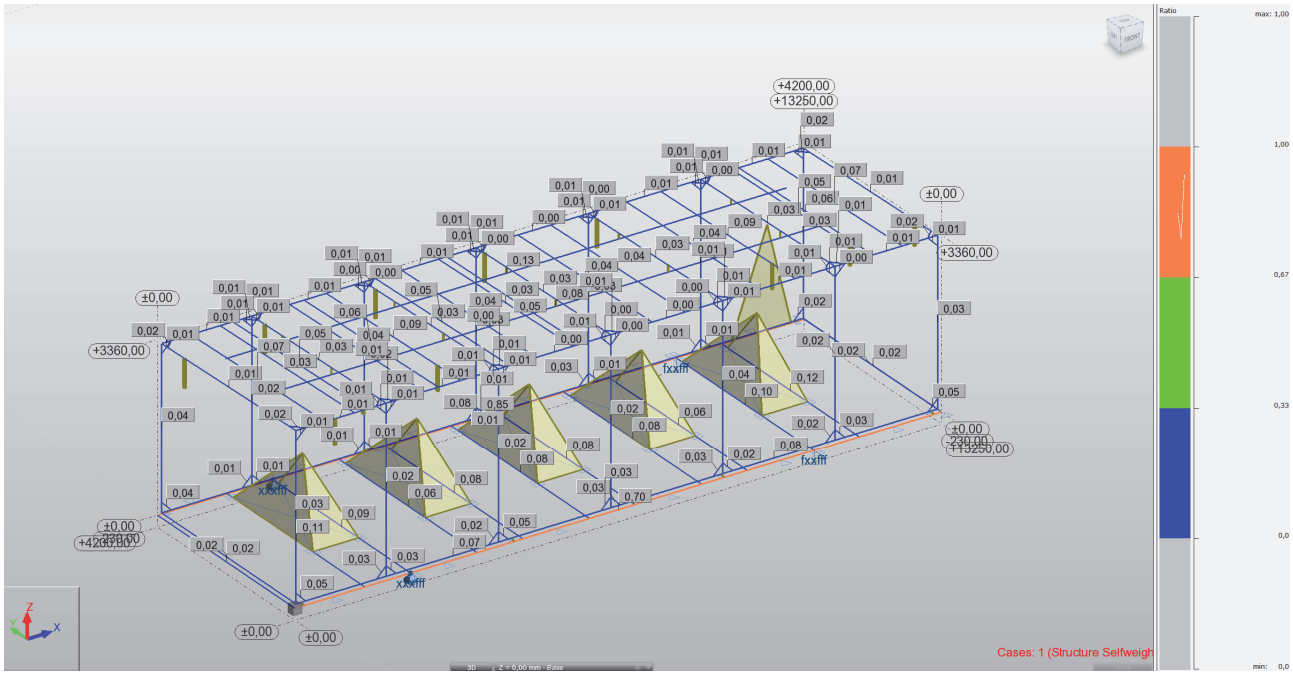


Figure 5-4 Visual presentation of unity checks (blue 0-33%; green 34-67%; orange 68-100%)

5.2.2 Stress

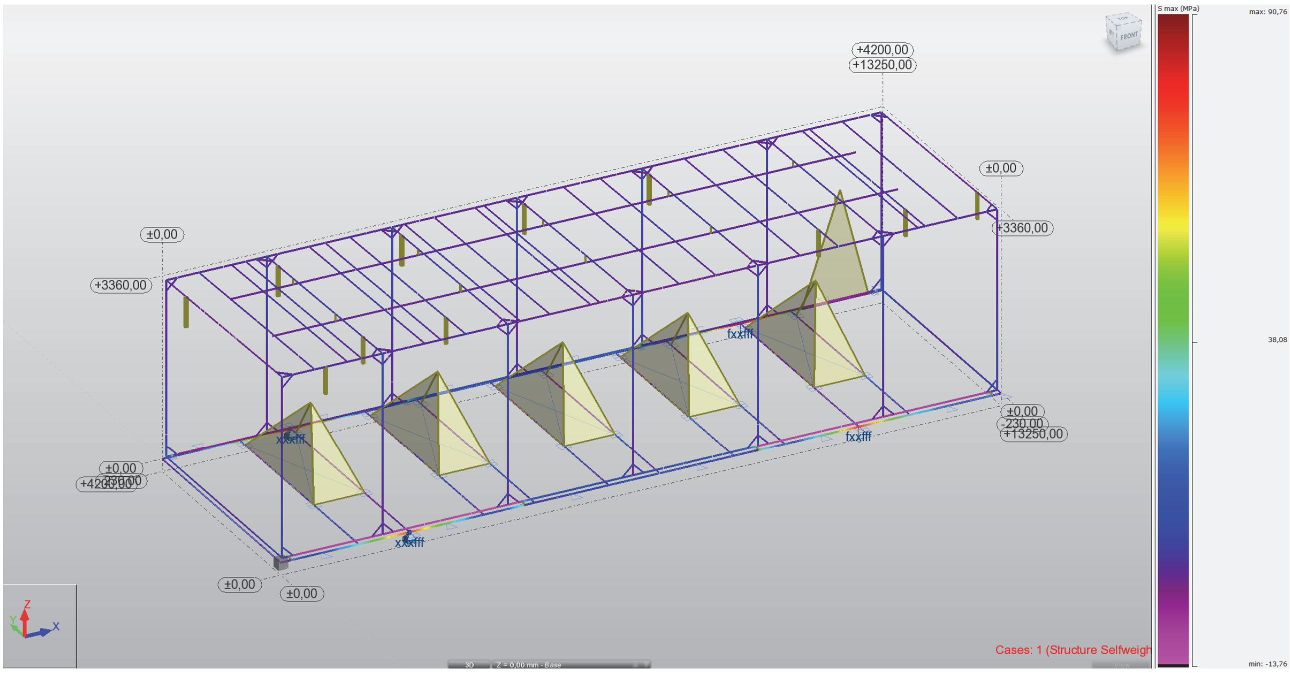


Figure 5-5 Stress peaks in profiles

As can be seen the highest stress peak is 91 MPa.
This is within limits: max 91 < 355 MPa.

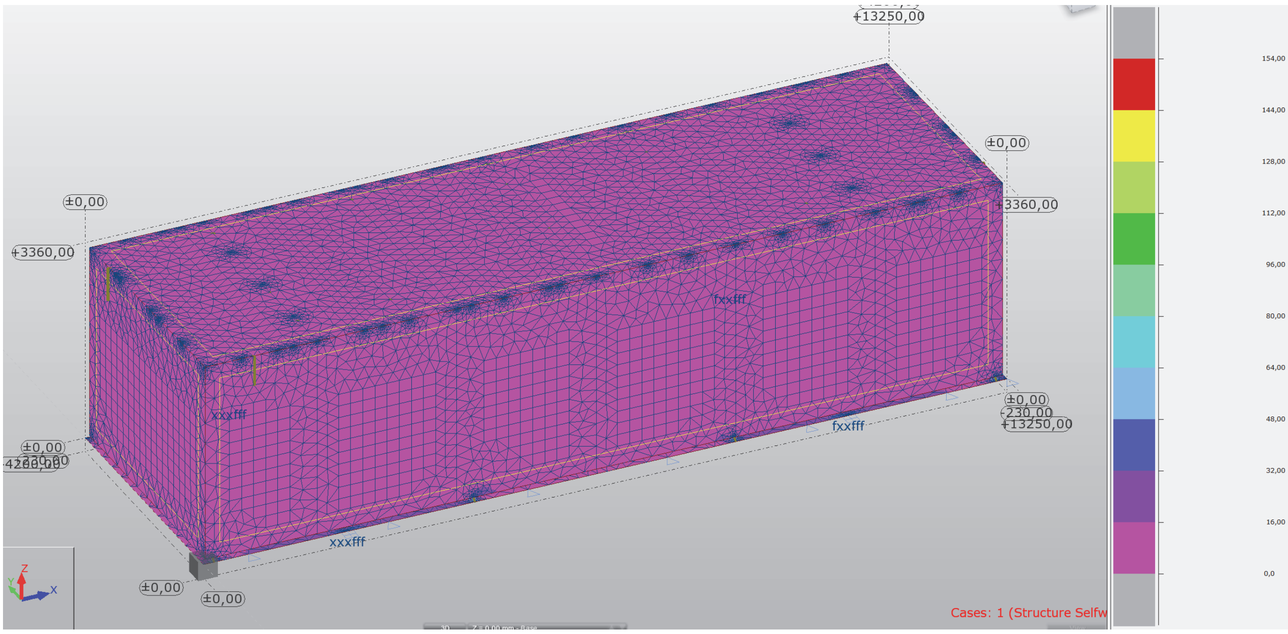


Figure 5-6 Stress in panels

As can be seen global stress values are max 32 MPa < limit of 140 MPa.

5.2.3 Deformation

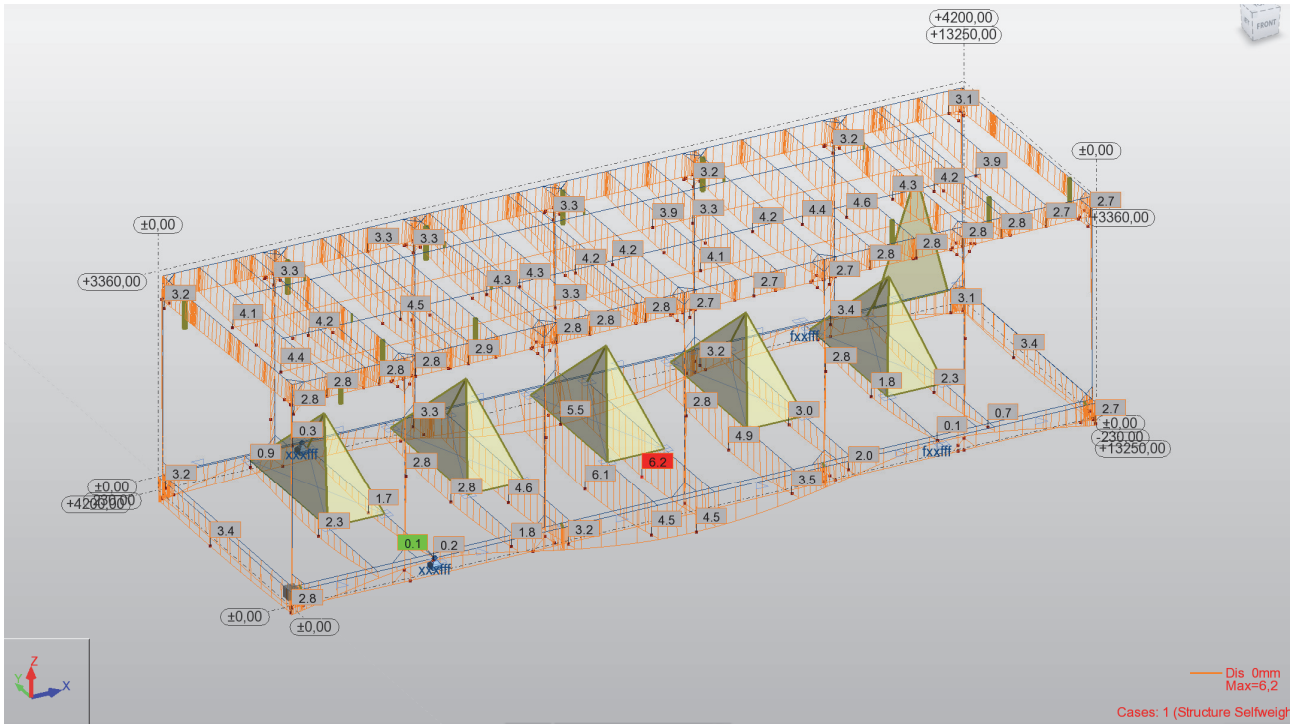


Figure 5-7 Deformation of profiles

As can be seen the largest deformation is about 6,2 mm in the floor.
This is within limits: (4200/6,2=) 1/677 < 1/300.

6 Detail Analysis – Lifting - D3 LIFT

Design of Primary Lifting Eye for lifting a full set comprising enclosure skid and enclosure fully loaded.

Based on EN 1993-1-8 and DEP 34.00.01.30-Gen an excel sheet is used to determine the required shackle which determines the padeye dimensions.

To give the design some margin, the max weight is regarded as 30 000 kg or 30 metric tons.
The current design is 25 293 kg.

The selected shackle is a Greenpin shackle with an MBL equal to 6xWLL, which complies with §4 of the TR 0875-SP020:
"Safety factor 5 shall be used for lifting lugs, relative to the minimum break load."

DEP 34.00.01.30-Gen §3.15 determines a lift load increase due to manufacturing tolerances of **10%**
DEP 34.00.01.30-Gen §2.3.2.a determines an impact factor **1,3** for the shackle.
DEP 34.00.01.30-Gen §2.3.2.a determines an impact factor **2,0** for the lug.

This results in a sling force for the shackle of 162 kN.
This results in a sling force for the lug of 250 kN.

6.1 Shackle

Please see Appendix C for the calculation sheet showing the shackle size.

6.2 Padeye

Please see Appendix C for the calculation sheet showing the padeye dimensions.
These are incorporated in the production model and drawings.

6.3 Bolted Connection

As the padeye requires to be detachable for transport bolted connections are used.

The 4 bolts per padeye are sheared due to the use of a spreader beam.

The used bolted connections will be metric and bearing according ISO 15048. The used bolts will be ISO 4017 full thread, class 8.8.

Bolt M16 8.8 bolt (f_u = 800 MPa; f_y = 640 MPa)
$F_{v,Rd}$ = 77,1 kN (62,5 / 77,1 = 81%)

This shows that ISO 4017 M16 8.8 bolts will suffice.

For practical sizing, M20 will be used in the production model.

7 Structural Analysis – Deformation - A3 DEF

According Technical Requisition 08750SP020-R01 the enclosure skids + enclosure sets "will be supported in the field by a platform with maximum deflection, being length/300 mm. Supplier to confirm that skid enclosure is stiff enough of deal with bending of the support platform"

The deformation of the structure will be compared to this limit.

7.1 FEA model

In reality the skid and enclosure set is stiffer than the support platform. It will therefore locally increase the stiffness of the platform. To compare the stiffness of the skid and enclosure to the requested platform deflection the following situation is considered.

The model of A1 OPE is copied and all load cases deleted except load case 1: selfweight.
The calculation model currently weighs in at 25 293 kg.

The 14 bolted connections / modeled constraints, as in the OPE model, are assumed loose.
The platform will deflect with max L/300. The stiffer skid and enclosure set has to prove todeform less, so the inner constraints will lose contact with the support platform and are not applicable for this analysis.
The 4 outer constraints will remain in contact with the support platform.

The image below shows these constraints, recognizable by the support codes indicating the degrees of freedom. To comply with the setup, the two constraints on the left side are fixed in X, Y and Z direction and the constraints on the right side are free to translate in X direction.

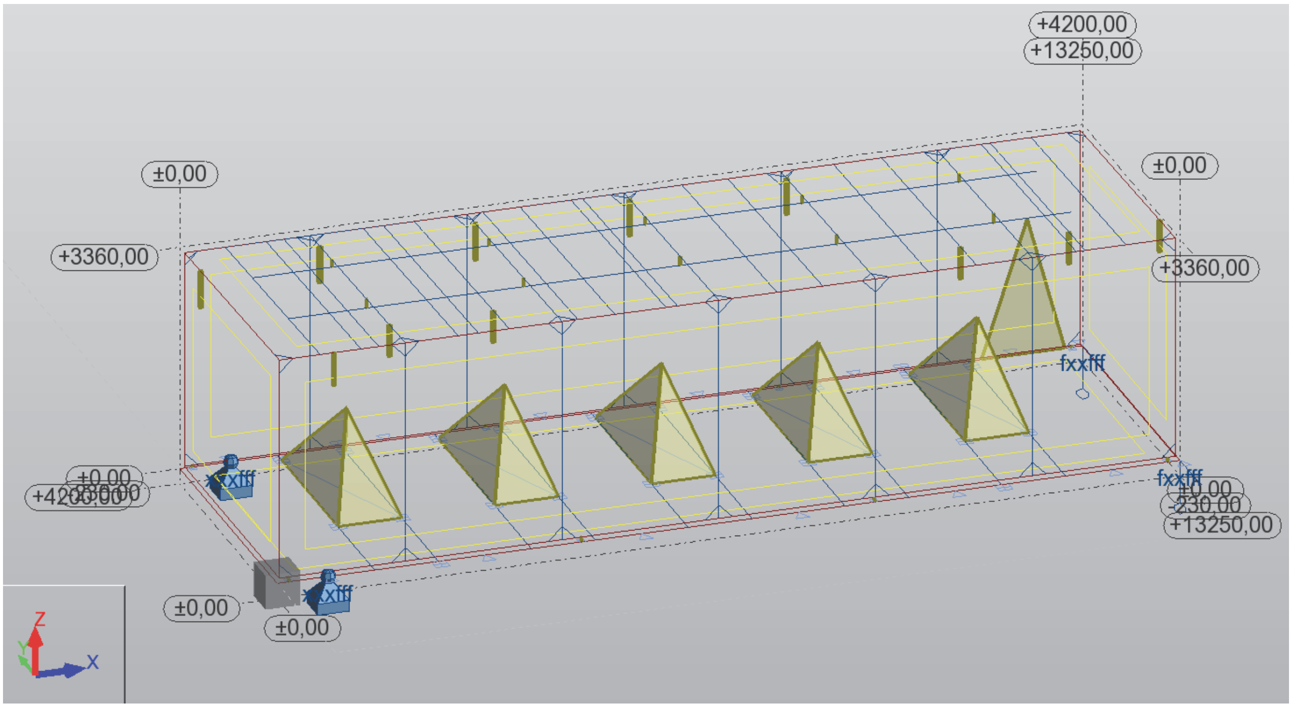


Figure 7-1 FEA model with constraints

7.2 Results

Below the results of the structural calculation. The profiles will be checked according CSA S16-09. Stress and deformation will be displayed to show the behavior of the structure.

7.2.1 Unity Checks

CAN/CSA S16-09 - Member Verification (SLS ; ULS) 2to17 21 23to27 35to71 77to98 100 102 104to114 131 133to142 144 145 147to156 158 171to181 183to194 196

Results | Messages

Member	Section	Material	Lay	Laz	Ratio	Case	Ratio(uy)	Case (uy)	Ratio(uz)	Case (uz)
4 Beam 4	HEA 240	S 355	131.79	220.67	0.52	1 Structure Selfweight	0.01	1 Structure Selfweight	0.03	1 Structure Selfweight
8 dJC Bm Crn 8	IPE 140	S 355	200.41	695.65	0.49	1 Structure Selfweight	0.00	1 Structure Selfweight	0.04	1 Structure Selfweight
2 Beam 2	HEA 240	S 355	131.79	220.67	0.48	1 Structure Selfweight	0.01	1 Structure Selfweight	0.03	1 Structure Selfweight
11 dJC Bm Crn 11	IPE 140	S 355	200.41	695.65	0.29	1 Structure Selfweight	0.00	1 Structure Selfweight	0.03	1 Structure Selfweight
114 dJC Beam 114	RECT 120x10	S 355	8.16	97.98	0.17	1 Structure Selfweight	0.03	1 Structure Selfweight	0.01	1 Structure Selfweight
102 dJC Beam 102	RECT 120x10	S 355	8.16	97.98	0.13	1 Structure Selfweight	0.02	1 Structure Selfweight	0.01	1 Structure Selfweight
100 dJC Beam 100	RECT 120x10	S 355	8.16	97.98	0.11	1 Structure Selfweight	0.00	1 Structure Selfweight	0.01	1 Structure Selfweight

Figure 7-2 Unity Checks for top utilized profiles (>10%), sorted on overall ratio high to low

As can be seen the highest utilized members are the long beams HEA 240 4 and 2. 52% / 48% of its capacity is used and therefore suffices to the structural verification according CSA S16-09.

7.2.2 Stress

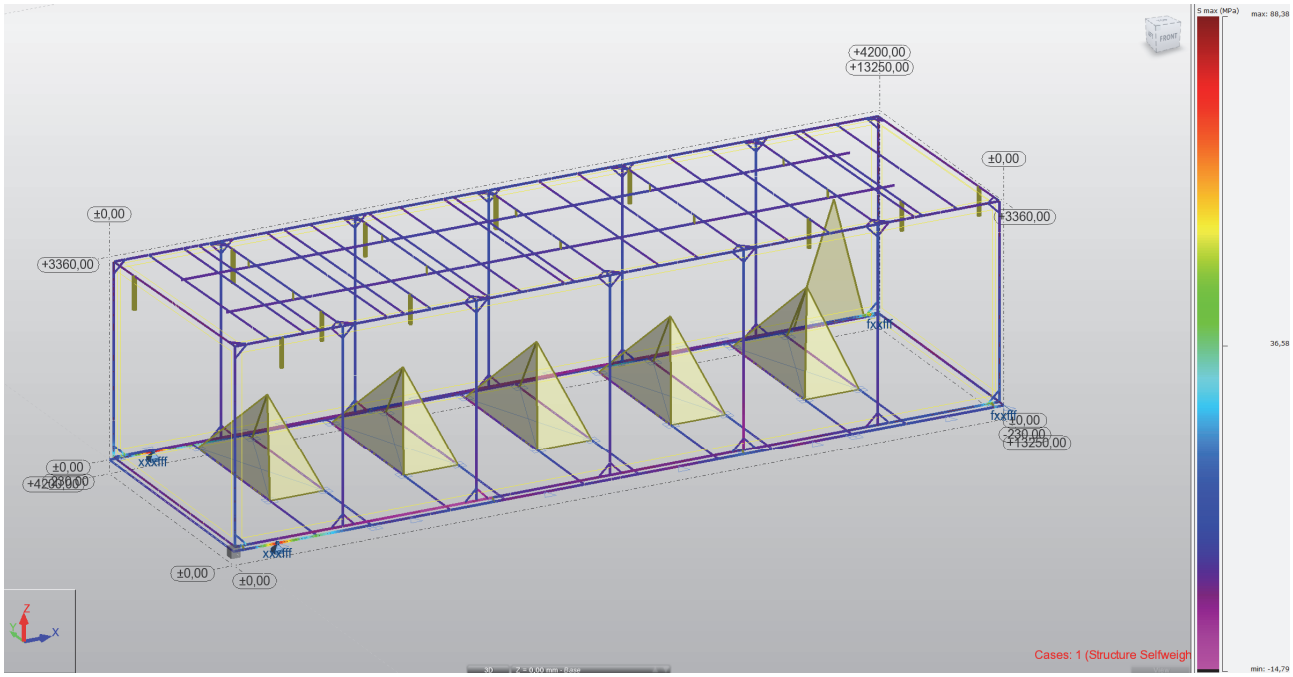


Figure 7-3 Stress peaks in profiles

As can be seen the highest stress peak is 89 MPa.
This is within limits: max 89 < 355 MPa.

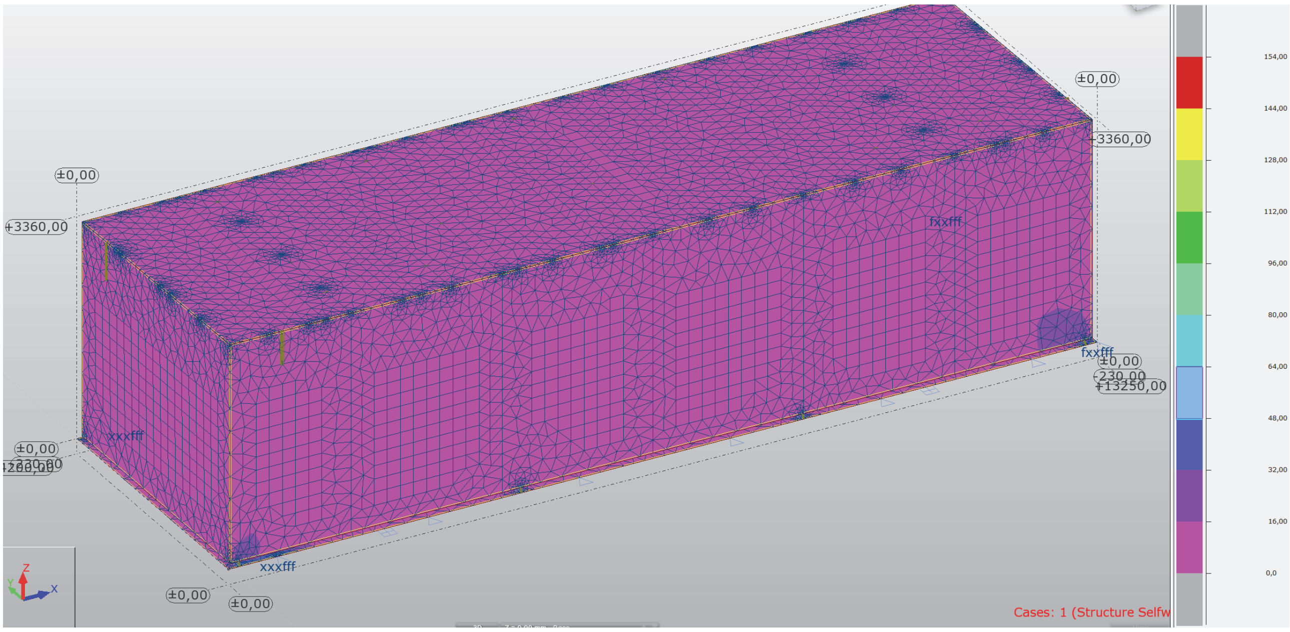


Figure 7-4 Stress in panels

As can be seen global stress values are max 32 MPa < limit of 140 MPa.

7.2.3 Deformation

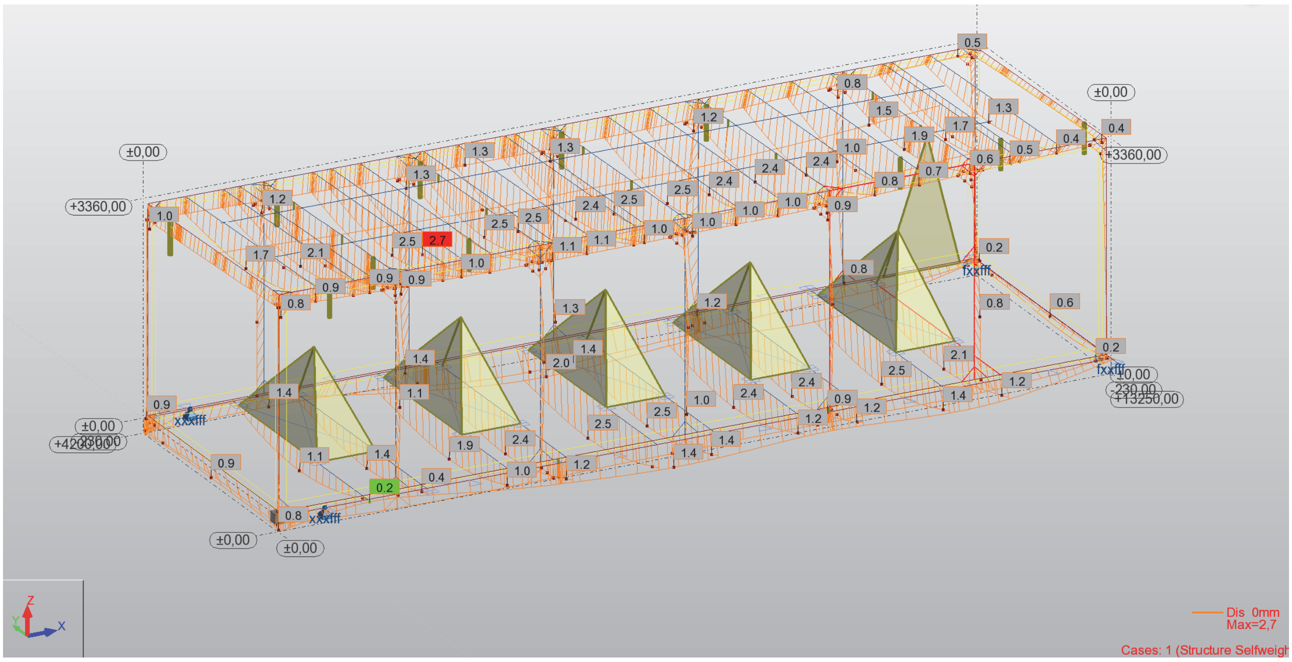


Figure 7-5 Deformation of profiles

As can be seen the largest deformation is 2,7 mm in the roof.
This is within limits: (4200/2,7=) 1/1556 < 1/300.

Considering the largest span between the outer constraints L=12 500 mm, the max deformation is 1,4 mm. This is (12 500 / 1,4) = 1/8928.
L/300 for this span would result in a deflection of 41,7 mm.
This shows the enclosure skid + dropover enclosure set has a higher stiffness than the support platform.

8 Structural Analysis – Lifting - B LIFT

The enclosure skid must be able to resist the occurring forces during lifting while carrying the burner skids and other applicable equipment.

8.1 FEA model

The model of A1 OPE is copied and all load cases deleted except load case 1: selfweight.

The calculation model currently weighs in at 14 500 kg
(7458 kg enclosure skid + 7042 kg de Jong Combustion equipment).
An extra load is applied to reach a total weight of 20 000 kg, having a total of max 30 t in mind and a dropover enclosure of 10 t.

The constraints are placed at the lifting points. The image below shows these constraints, recognizable by the support codes indicating the degrees of freedom.

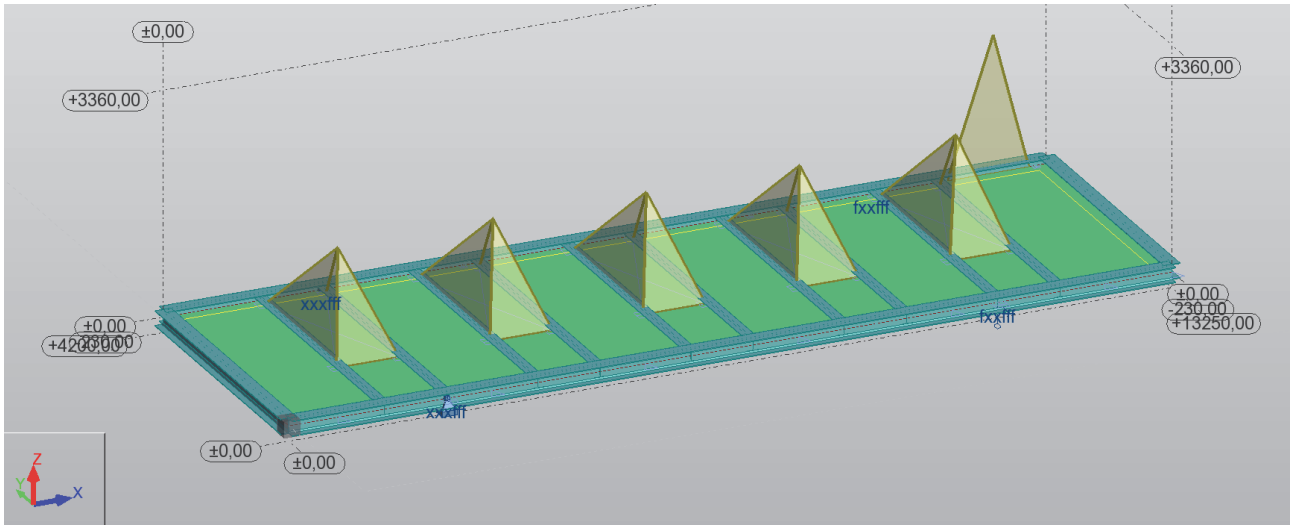


Figure 8-1 FEA model with constraints

To comply with the lifting setup, the two lifting points on the left side are fixed in X, Y and Z direction and the lifting points on the right side are free to translate in X direction.

8.2 Results

Below the results of the structural calculation. The profiles will be checked according CSA S16-09.
Stress and deformation will be displayed to show the behavior of the structure.

8.2.1 Unity Checks

CAN/CSA S16-09 - Member Verification (SLS ; ULS) 2to7 9 10 12to17

Results | Messages

Member	Section	Material	Lay	Laz	Ratio	Case	Ratio(uy)	Case (uy)	Ratio(uz)	Case (uz)
2 Beam 2	HEA 240	S 355	131.79	220.67	0.27	1 Structure Selfweight	0.00	1 Structure Selfweight	0.34	1 Structure Selfweight
3 Beam 3	HEA 240	S 355	41.77	69.95	0.02	1 Structure Selfweight	0.00	1 Structure Selfweight	0.03	1 Structure Selfweight
4 Beam 4	HEA 240	S 355	131.79	220.67	0.39	1 Structure Selfweight	0.00	1 Structure Selfweight	0.38	1 Structure Selfweight
5 Beam 5	HEA 240	S 355	41.77	69.95	0.02	1 Structure Selfweight	0.00	1 Structure Selfweight	0.02	1 Structure Selfweight
6 Beam 6	HEA 180	S 355	56.42	92.95	0.08	1 Structure Selfweight	0.00	1 Structure Selfweight	0.10	1 Structure Selfweight
7 Beam 7	HEA 180	S 355	56.42	92.95	0.10	1 Structure Selfweight	0.00	1 Structure Selfweight	0.12	1 Structure Selfweight
9 Beam 9	HEA 180	S 355	56.42	92.95	0.07	1 Structure Selfweight	0.00	1 Structure Selfweight	0.09	1 Structure Selfweight
10 Beam 10	HEA 180	S 355	56.42	92.95	0.09	1 Structure Selfweight	0.00	1 Structure Selfweight	0.10	1 Structure Selfweight
12 Beam 12	HEA 180	S 355	56.42	92.95	0.08	1 Structure Selfweight	0.00	1 Structure Selfweight	0.10	1 Structure Selfweight
13 Beam 13	HEA 180	S 355	56.42	92.95	0.08	1 Structure Selfweight	0.00	1 Structure Selfweight	0.10	1 Structure Selfweight
14 Beam 14	HEA 180	S 355	56.42	92.95	0.09	1 Structure Selfweight	0.00	1 Structure Selfweight	0.10	1 Structure Selfweight
15 Beam 15	HEA 180	S 355	56.42	92.95	0.07	1 Structure Selfweight	0.00	1 Structure Selfweight	0.09	1 Structure Selfweight
16 Beam 16	HEA 180	S 355	56.42	92.95	0.10	1 Structure Selfweight	0.00	1 Structure Selfweight	0.13	1 Structure Selfweight
17 Beam 17	HEA 180	S 355	56.42	92.95	0.10	1 Structure Selfweight	0.00	1 Structure Selfweight	0.12	1 Structure Selfweight

Figure 8-2 Unity Checks for all profiles

As can be seen the highest utilized members are the long beams HEA 240 4 and 2. 39% / 27% of its capacity is used and therefore suffices to the structural verification according CSA S16-09.

8.2.2 Stress

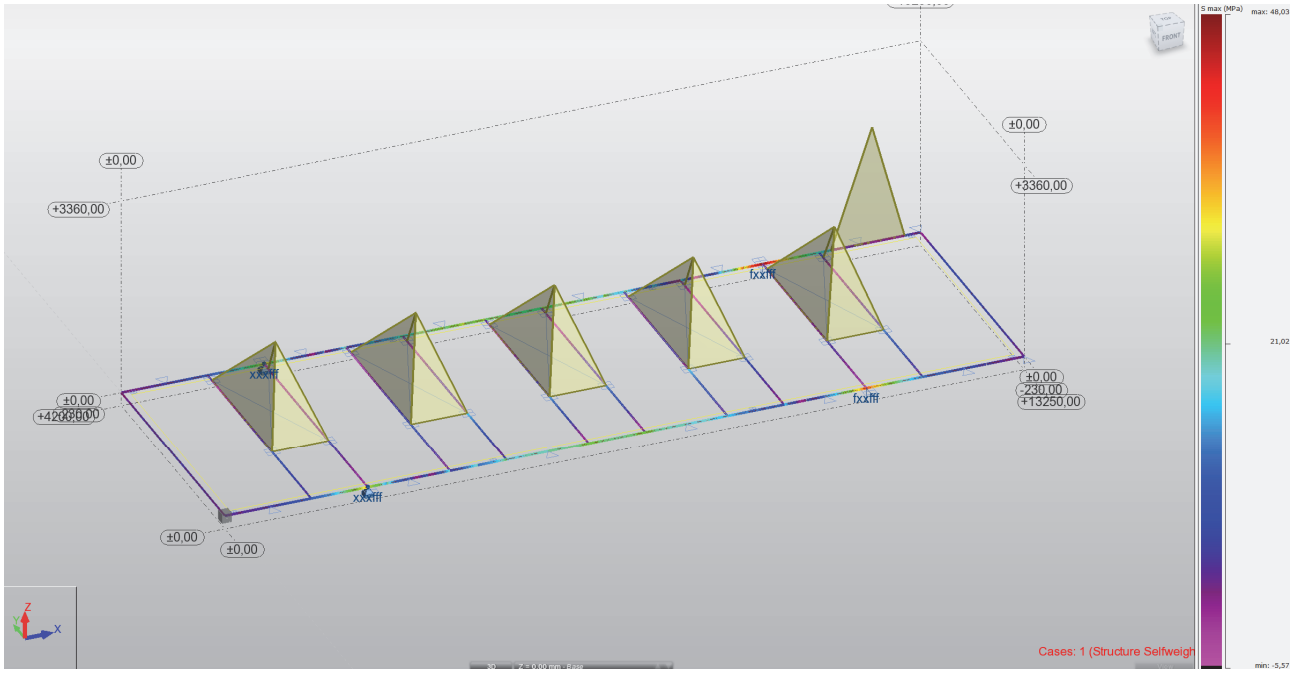


Figure 8-3 Stress peaks in profiles

As can be seen the highest stress peak is 48 MPa.
This is within limits: max 48 < 355 MPa.

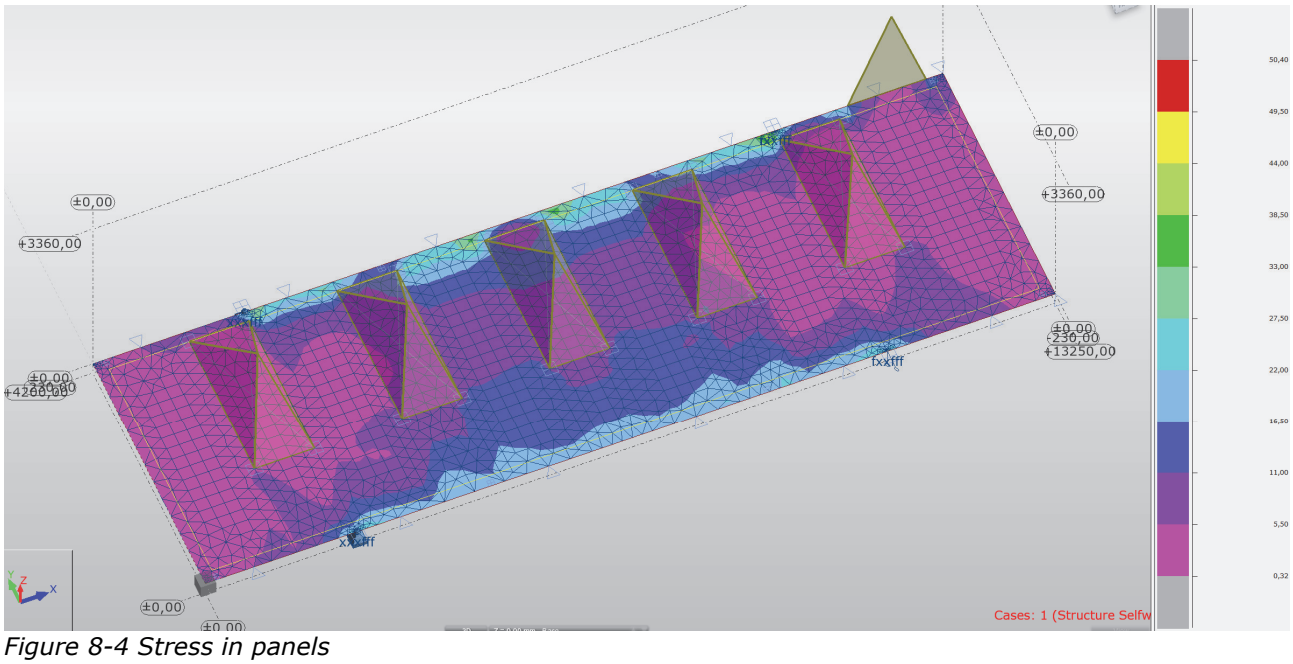


Figure 8-4 Stress in panels

As can be seen global stress values are max 33 MPa < limit of 235 MPa.

8.2.3 Deformation

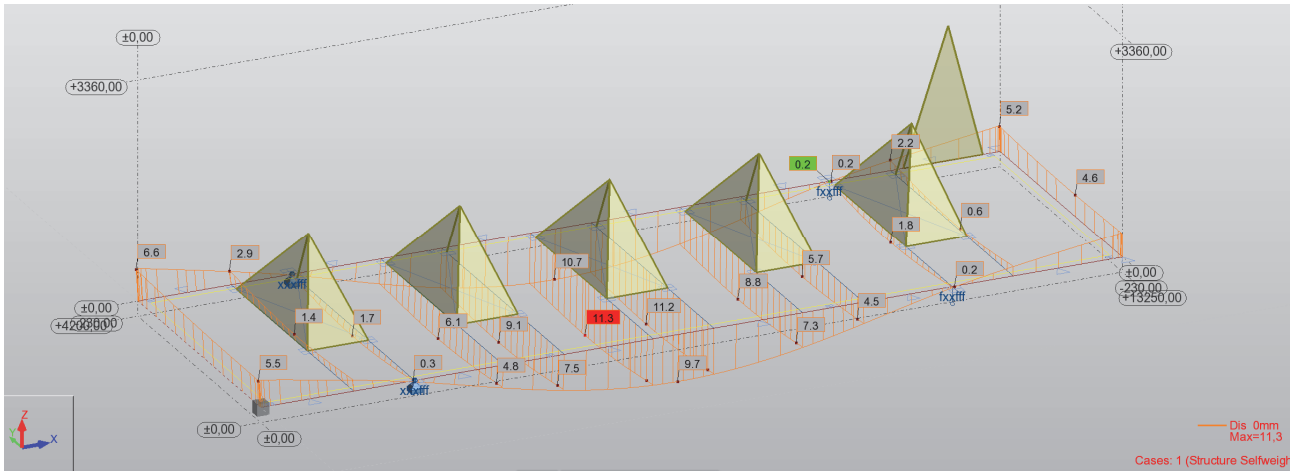


Figure 8-5 Deformation of profiles

As can be seen the largest deformation is 11,3 mm in the floor.
This is within limits: (8264/11,3=) 1/731 < 1/300.

9 Structural Analysis – Lifting - C LIFT

The dropover enclosure must be able to be lifted with attached applicable equipment.

9.1 FEA model

The model of A1 OPE is copied and all load cases deleted except load case 1: selfweight.
In this load case an extra distributed load is applied to the roof area to reach a total of 10 000 kg. This equals the 10T that is used to determine the lifting point dimensions.

The calculation model currently weighs in at 7907 kg.

The dropover will be lifted as a single hook, 4 leg lift as seen below.

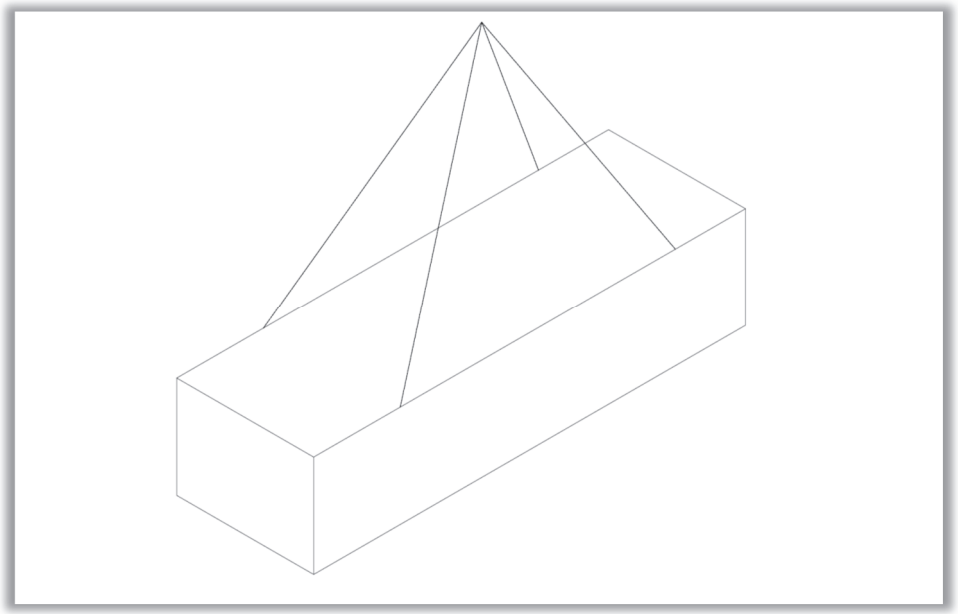


Figure 9-1 Dropover lifting set up

To comply with the lifting setup, one lifting point is fixed for X, Y and Z direction.
The other lifting points allow for translation in X and Y direction, because the 4 leg lift will result in compression in the members between the lifting points.

9.2 Results

Below the results of the structural calculation. The profiles will be checked according CSA S16-09. Stress and deformation will be displayed to show the behavior of the structure.

9.2.1 Unity Checks

CAN/CSA S16-09 - Member Verification (SLS ; ULS) 8 11 21 23to27 35to71 77to98 100 102 104to114 131 133to142 144 145 147to156 158 171to181 183to194 196

Results | Messages

Member	Section	Material	Lay	Laz	Ratio	Case	Ratio(uy)	Case (uy)	Ratio(uz)	Case (uz)
85 dJC Beam 85	UNP 100	S 355	104.96	278.49	0.08	1 Structure Selfweight	0.00	1 Structure Selfweight	0.13	1 Structure Selfweight
87 dJC Beam 87	UNP 100	S 355	104.96	278.49	0.07	1 Structure Selfweight	0.00	1 Structure Selfweight	0.07	1 Structure Selfweight
21 dJC Beam 21	UNP 100	S 355	104.96	278.49	0.07	1 Structure Selfweight	0.00	1 Structure Selfweight	0.06	1 Structure Selfweight
79 dJC Beam 79	UNP 100	S 355	104.96	278.49	0.07	1 Structure Selfweight	0.00	1 Structure Selfweight	0.12	1 Structure Selfweight
24 dJC Beam 24	U 100x50x5	S 235	105.58	266.45	0.06	1 Structure Selfweight	0.00	1 Structure Selfweight	0.11	1 Structure Selfweight
25 dJC Beam 25	U 100x50x5	S 235	105.58	266.45	0.06	1 Structure Selfweight	0.00	1 Structure Selfweight	0.11	1 Structure Selfweight
26 dJC Beam 26	U 100x50x5	S 235	105.58	266.45	0.06	1 Structure Selfweight	0.00	1 Structure Selfweight	0.10	1 Structure Selfweight
27 dJC Beam 27	U 100x50x5	S 235	105.58	266.45	0.06	1 Structure Selfweight	0.00	1 Structure Selfweight	0.09	1 Structure Selfweight
23 dJC Beam 23	U 100x50x5	S 235	105.58	266.45	0.05	1 Structure Selfweight	0.00	1 Structure Selfweight	0.09	1 Structure Selfweight
86 dJC Beam 86	UNP 100	S 355	104.96	278.49	0.05	1 Structure Selfweight	0.00	1 Structure Selfweight	0.09	1 Structure Selfweight
84 dJC Beam 84	UNP 100	S 355	104.96	278.49	0.05	1 Structure Selfweight	0.00	1 Structure Selfweight	0.12	1 Structure Selfweight
82 dJC Beam 82	UNP 100	S 355	104.96	278.49	0.05	1 Structure Selfweight	0.00	1 Structure Selfweight	0.11	1 Structure Selfweight
83 dJC Beam 83	UNP 100	S 355	104.96	278.49	0.05	1 Structure Selfweight	0.00	1 Structure Selfweight	0.11	1 Structure Selfweight

Figure 9-2 Unity Checks for top utilized profiles (>4%), sorted on overall ratio high to low

As can be seen the highest utilized members are the UNP 100 beams in the roof. 8% of its capacity is used and therefore suffices to the structural verification according CSA S16-09.

9.2.2 Stress

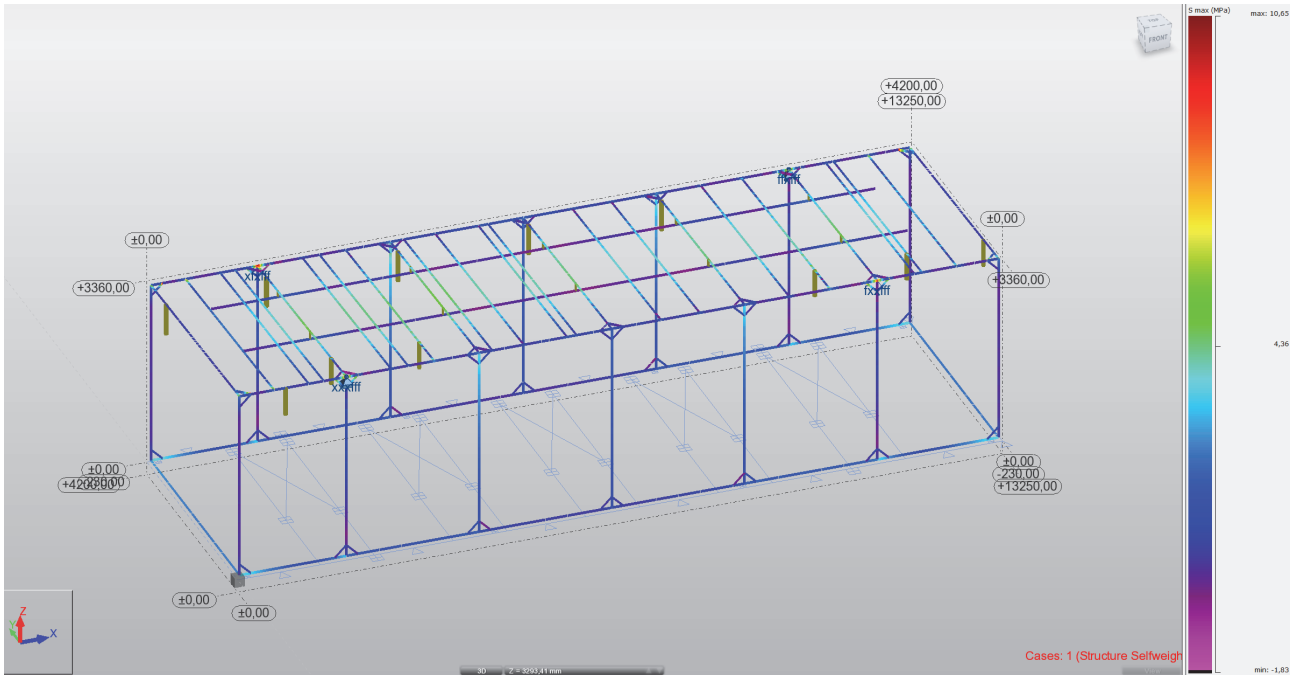


Figure 9-3 Stress peaks in profiles

As can be seen the highest stress peak is 11 MPa.
This is within limits max 11 < 355 MPa.

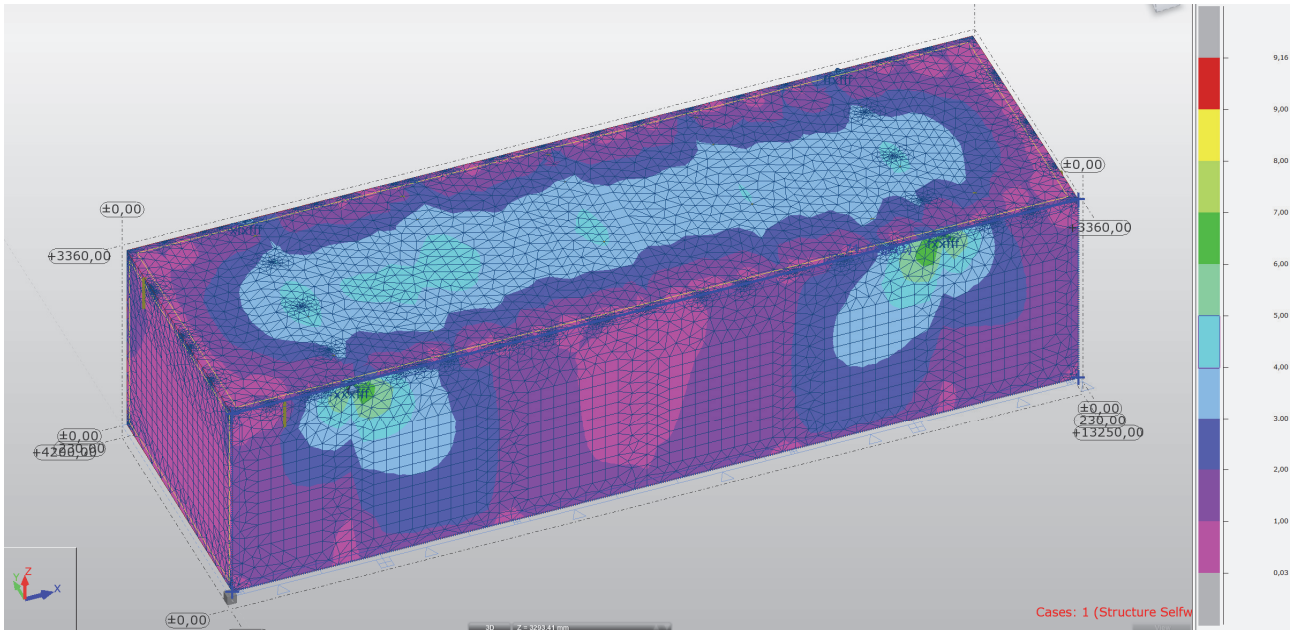


Figure 9-4 Stress in panels

As can be seen global stress values are max 10 MPa < limit of 140 MPa.

9.2.3 Deformation

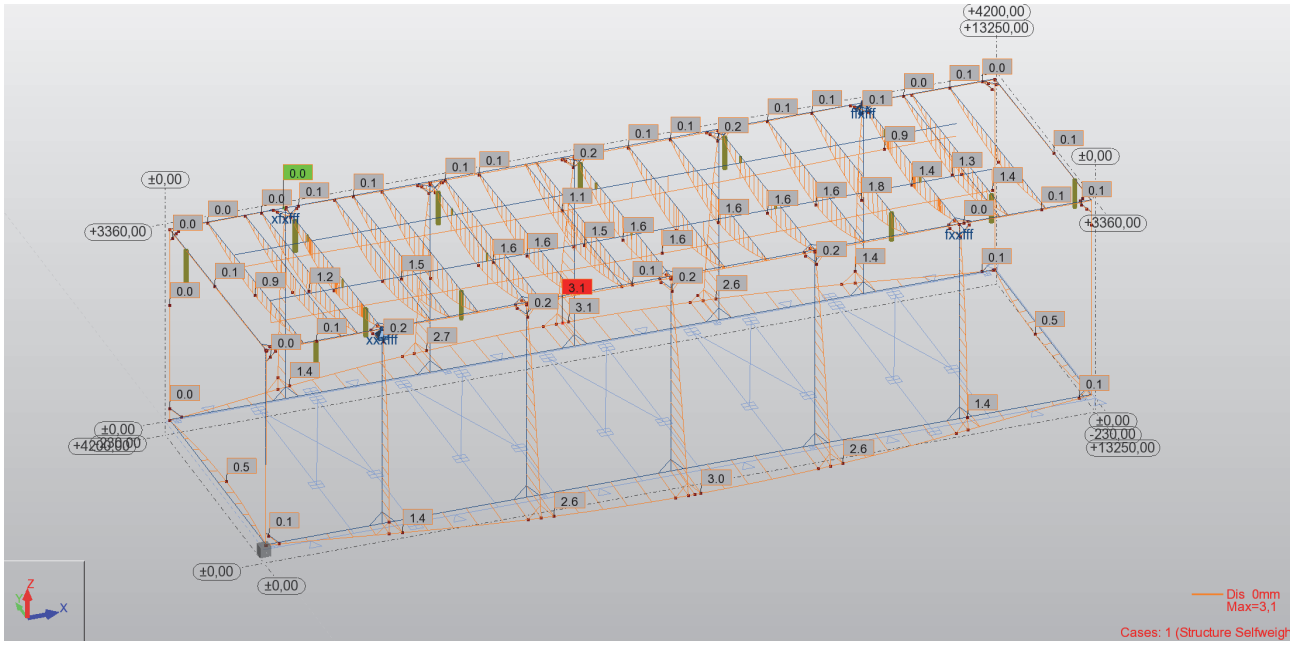


Figure 9-5 Deformation of profiles

As can be seen the largest deformation is 3,1 mm in the roof.
This is within limits: (4200/3,1=) 1/1354 < 1/300.

10 Detail Analysis – Lifting - D4 LIFT

Design of removable Secondary Lifting Eye for lifting the dropover enclosure.

To avoid confusion on which lifting eyes to use: primary padeyes connected to the enclosure skid or the lifting eyes for the dropover enclosure the dropover received the requirement that the lifting eyes must be removable.

As the to be lifted weight allows for this, removable off-the-shelve lifting eyes can be applied.

Based on EN 1993-1-8 and DEP 34.00.01.30-Gen an excel sheet is used to determine the to be used lifting eye.

To give the design some margin, the total to be lifted weight is regarded as 10 000 kg or 10 metric tons. The current design is 7 907 kg.

The selected lifting eye is a swivel lifting point able to rotate 360° and used with a lifting angle between 0 and 90°. The MBL equals 4xWLL, which does not comply with §4 of the TR 0875-SP020:
"Safety factor 5 shall be used for lifting lugs, relative to the minimum break load."

Therefore an extra safety factor 5/4 = **1,25** is applied.

DEP 34.00.01.30-Gen §3.15 determines a lift load increase due to manufacturing tolerances of **10%**
DEP 34.00.01.30-Gen §2.3.2.a determines an impact factor **1,3** for the shackle.

This results in a sling force for the lifting eye of 58,5 kN, determining the WLL of 6T.

Please see Appendix C for the calculation sheet.

Appendix D shows the datasheets of the selected 6T lifting point.

11 Conclusion

For the structural verification of the enclosure skid and dropover enclosure several calculation models and detail calculations are made. The section below presents the conclusions of each calculation.

11.1 Structural Analysis - Operational - A1 OPE

- This calculation model comprises the complete assembly of enclosure skid and dropover enclosure and is subjected to operational conditions.
- The results show that the structural unity checks according CSA S16-09 are sufficient.
- The stress values are below stated limits.
- The deformation values are below stated limits.

- The design is therefore structurally safe for its intended use.

11.2 Detail Analysis – Operational - D1 OPE

- This detail calculation determines the bolted connection between enclosure skid and existing support structure in operational condition. The calculation is based on results from model A1 OPE.
- ASTM A325 ¾" bolts suffice for this connection

11.3 Detail Analysis – Operational - D2 OPE

- This detail calculation determines the bolted connection between enclosure skid and dropover enclosure in operational condition. The calculation is based on results from model A1 OPE.
- ISO 4017 M16 8.8 bolts suffice for this connection. M20 will be used for practical reasons.

11.4 Structural Analysis - Lifting – A2 LIFT

- This calculation model comprises the complete assembly of enclosure skid and dropover enclosure, based on a maximum of 30 t and is subjected to lifting conditions.
- The results show that the structural unity checks according CSA S16-09 are sufficient.
- The stress values are below stated limits.
- The deformation values are below stated limits.

- The design is therefore structurally safe for its intended use.

11.5 Detail Analysis – Lifting - D3 LIFT

- This detail calculation determines the required lifting shackle for lifting the 30 t with single spreader beam. A 17,0 t bow shackle is selected.
- The padeye dimensions are determined based on lifting shackle.
- The bolted connections between enclosure skid and removable lifting eyes are determined as 4 x ISO 4017 M16 8.8. M20 will be used for practical reasons.

11.6 Structural Analysis – Deformation - A3 DEF

- This calculation model comprises the complete assembly of enclosure skid and dropover enclosure and is subjected to a max possible span between constraints with regard to the onsite support structure.
- The results show that the structural unity checks according CSA S16-09 are sufficient.
- The stress values are below stated limits.
- The deformation values are below stated limits. The results show the enclosure skid + dropover enclosure set has a higher stiffness than the support platform.

- The design is therefore structurally safe for its intended use.

11.7 Structural Analysis – Lifting - B LIFT

- This calculation model comprises the enclosure skid, based on a maximum of 20 t and is subjected to lifting conditions.

- The results show that the structural unity checks according CSA S16-09 are sufficient.
- The stress values are below stated limits
- The deformation values are below stated limits

- The design is therefore structurally safe for its intended use.

11.8 Structural Analysis – Lifting - C LIFT

- This calculation model comprises the dropover enclosure, based on a maximum of 10 t and is subjected to lifting conditions.
- The results show that the structural unity checks according CSA S16-09 are sufficient.
- The stress values are below stated limits.
- The deformation values are below stated limits.

- The design is therefore structurally safe for its intended use.

11.9 Detail Analysis – Lifting - D4 LIFT

- This detail calculation determines the required lifting shackle for lifting the 10 t with single spreader beam. A 6,0 t 3d lifting eye is selected.

Appendices

Appendix A Load Combination Table

Load Case	Description
1	Structure Selfweight
2	Snow
3	Roof load
4	Floor load
5	Crane loads
6	Wind1 - long side
7	Wind2 - short side
8	Modal
9	Seismic - NBCC 2010 Direction_X
10	Seismic - NBCC 2010 Direction_Y
11	Seismic - NBCC 2010 Direction_Z

ULS and SLS code combinations according NBCC 2010

Case	Load Case	Coefficient		Load Case	Coefficient		Load Case	Coefficient		Load Case	Coefficient		Load Case	Coefficient		Load Case	Coefficient
ULS/1	1	1.40															
ULS/2	1	1.25	+	3	1.50	+	5	1.50	+	4	1.50						
ULS/3	1	1.25	+	6	0.40	+	3	1.50	+	5	1.50	+	4	1.50			
ULS/4	1	1.25	+	3	1.50	+	5	1.50	+	7	0.40	+	4	1.50			
ULS/5	1	1.25	+	3	1.50												
ULS/6	1	1.25	+	6	0.40	+	3	1.50									
ULS/7	1	1.25	+	3	1.50	+	7	0.40									
ULS/8	1	1.25	+	5	1.50												
ULS/9	1	1.25	+	6	0.40	+	5	1.50									
ULS/10	1	1.25	+	5	1.50	+	7	0.40									
ULS/11	1	1.25	+	3	1.50	+	5	1.50									
ULS/12	1	1.25	+	6	0.40	+	3	1.50	+	5	1.50						
ULS/13	1	1.25	+	3	1.50	+	5	1.50	+	7	0.40						
ULS/14	1	1.25	+	4	1.50												
ULS/15	1	1.25	+	6	0.40	+	4	1.50									
ULS/16	1	1.25	+	7	0.40	+	4	1.50									
ULS/17	1	1.25	+	3	1.50	+	4	1.50									
ULS/18	1	1.25	+	6	0.40	+	3	1.50	+	4	1.50						
ULS/19	1	1.25	+	3	1.50	+	7	0.40	+	4	1.50						
ULS/20	1	1.25	+	5	1.50	+	4	1.50									
ULS/21	1	1.25	+	6	0.40	+	5	1.50	+	4	1.50						
ULS/22	1	1.25	+	5	1.50	+	7	0.40	+	4	1.50						
ULS/23	1	0.90	+	3	1.50	+	5	1.50	+	4	1.50						
ULS/24	1	0.90	+	6	0.40	+	3	1.50	+	5	1.50	+	4	1.50			
ULS/25	1	0.90	+	3	1.50	+	5	1.50	+	7	0.40	+	4	1.50			
ULS/26	1	0.90															
ULS/27	1	0.90	+	3	1.50												
ULS/28	1	0.90	+	6	0.40	+	3	1.50									
ULS/29	1	0.90	+	3	1.50	+	7	0.40									
ULS/30	1	0.90	+	5	1.50												
ULS/31	1	0.90	+	6	0.40	+	5	1.50									
ULS/32	1	0.90	+	5	1.50	+	7	0.40									
ULS/33	1	0.90	+	3	1.50	+	5	1.50									
ULS/34	1	0.90	+	6	0.40	+	3	1.50	+	5	1.50						

ULS/35	1	0.90	+	3	1.50	+	5	1.50	+	7	0.40						
ULS/36	1	0.90	+	4	1.50												
ULS/37	1	0.90	+	6	0.40	+	4	1.50									
ULS/38	1	0.90	+	7	0.40	+	4	1.50									
ULS/39	1	0.90	+	3	1.50	+	4	1.50									
ULS/40	1	0.90	+	6	0.40	+	3	1.50	+	4	1.50						
ULS/41	1	0.90	+	3	1.50	+	7	0.40	+	4	1.50						
ULS/42	1	0.90	+	5	1.50	+	4	1.50									
ULS/43	1	0.90	+	6	0.40	+	5	1.50	+	4	1.50						
ULS/44	1	0.90	+	5	1.50	+	7	0.40	+	4	1.50						
ULS/45	1	1.25	+	2	0.50	+	3	1.50	+	5	1.50	+	4	1.50			
ULS/46	1	1.25	+	2	0.50	+	3	1.50									
ULS/47	1	1.25	+	2	0.50	+	5	1.50									
ULS/48	1	1.25	+	2	0.50	+	3	1.50	+	5	1.50						
ULS/49	1	1.25	+	2	0.50	+	4	1.50									
ULS/50	1	1.25	+	2	0.50	+	3	1.50	+	4	1.50						
ULS/51	1	1.25	+	2	0.50	+	5	1.50	+	4	1.50						
ULS/52	1	0.90	+	2	0.50	+	3	1.50	+	5	1.50	+	4	1.50			
ULS/53	1	0.90	+	2	0.50	+	3	1.50									
ULS/54	1	0.90	+	2	0.50	+	5	1.50									
ULS/55	1	0.90	+	2	0.50	+	3	1.50	+	5	1.50						
ULS/56	1	0.90	+	2	0.50	+	4	1.50									
ULS/57	1	0.90	+	2	0.50	+	3	1.50	+	4	1.50						
ULS/58	1	0.90	+	2	0.50	+	5	1.50	+	4	1.50						
ULS/59	1	1.25	+	6	1.40	+	3	0.50	+	5	0.50	+	4	0.50			
ULS/60	1	1.25	+	3	0.50	+	5	0.50	+	7	1.40	+	4	0.50			
ULS/61	1	1.25	+	6	1.40												
ULS/62	1	1.25	+	7	1.40												
ULS/63	1	1.25	+	6	1.40	+	3	0.50									
ULS/64	1	1.25	+	3	0.50	+	7	1.40									
ULS/65	1	1.25	+	6	1.40	+	5	0.50									
ULS/66	1	1.25	+	5	0.50	+	7	1.40									
ULS/67	1	1.25	+	6	1.40	+	3	0.50	+	5	0.50						
ULS/68	1	1.25	+	3	0.50	+	5	0.50	+	7	1.40						
ULS/69	1	1.25	+	6	1.40	+	4	0.50									
ULS/70	1	1.25	+	7	1.40	+	4	0.50									
ULS/71	1	1.25	+	6	1.40	+	3	0.50	+	4	0.50						
ULS/72	1	1.25	+	3	0.50	+	7	1.40	+	4	0.50						
ULS/73	1	1.25	+	6	1.40	+	5	0.50	+	4	0.50						
ULS/74	1	1.25	+	5	0.50	+	7	1.40	+	4	0.50						
ULS/75	1	0.90	+	6	1.40	+	3	0.50	+	5	0.50	+	4	0.50			
ULS/76	1	0.90	+	3	0.50	+	5	0.50	+	7	1.40	+	4	0.50			
ULS/77	1	0.90	+	6	1.40												
ULS/78	1	0.90	+	7	1.40												
ULS/79	1	0.90	+	6	1.40	+	3	0.50									
ULS/80	1	0.90	+	3	0.50	+	7	1.40									
ULS/81	1	0.90	+	6	1.40	+	5	0.50									
ULS/82	1	0.90	+	5	0.50	+	7	1.40									
ULS/83	1	0.90	+	6	1.40	+	3	0.50	+	5	0.50						
ULS/84	1	0.90	+	3	0.50	+	5	0.50	+	7	1.40						
ULS/85	1	0.90	+	6	1.40	+	4	0.50									
ULS/86	1	0.90	+	7	1.40	+	4	0.50									
ULS/87	1	0.90	+	6	1.40	+	3	0.50	+	4	0.50						
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ULS/89	1	0.90	+	6	1.40	+	5	0.50	+	4	0.50						
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ULS/92	1	1.25	+	2	0.50	+	7	1.40									

ULS/93	1	0.90	+	6	1.40	+	2	0.50									
ULS/94	1	0.90	+	2	0.50	+	7	1.40									
ULS/95	1	1.25	+	2	1.50	+	3	0.50	+	5	0.50	+	4	0.50			
ULS/96	1	1.25	+	2	1.50												
ULS/97	1	1.25	+	2	1.50	+	3	0.50									
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ULS/101	1	1.25	+	2	1.50	+	3	0.50	+	4	0.50						
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ULS/104	1	0.90	+	2	1.50												
ULS/105	1	0.90	+	2	1.50	+	3	0.50									
ULS/106	1	0.90	+	2	1.50	+	5	0.50									
ULS/107	1	0.90	+	2	1.50	+	3	0.50	+	5	0.50						
ULS/108	1	0.90	+	2	1.50	+	4	0.50									
ULS/109	1	0.90	+	2	1.50	+	3	0.50	+	4	0.50						
ULS/110	1	0.90	+	2	1.50	+	5	0.50	+	4	0.50						
ULS/111	1	1.25	+	6	0.40	+	2	1.50									
ULS/112	1	1.25	+	2	1.50	+	7	0.40									
ULS/113	1	0.90	+	6	0.40	+	2	1.50									
ULS/114	1	0.90	+	2	1.50	+	7	0.40									
ULS/115	1	1.00	+	2	0.25	+	3	0.50	+	9	1.00	+	5	0.50	+	4	0.50
ULS/116	1	1.00	+	3	0.50	+	9	1.00	+	5	0.50	+	4	0.50			
ULS/117	1	1.00	+	2	0.25	+	9	1.00									
ULS/118	1	1.00	+	9	1.00												
ULS/119	1	1.00	+	2	0.25	+	3	0.50	+	9	1.00						
ULS/120	1	1.00	+	3	0.50	+	9	1.00									
ULS/121	1	1.00	+	2	0.25	+	9	1.00	+	5	0.50						
ULS/122	1	1.00	+	9	1.00	+	5	0.50									
ULS/123	1	1.00	+	2	0.25	+	3	0.50	+	9	1.00	+	5	0.50			
ULS/124	1	1.00	+	3	0.50	+	9	1.00	+	5	0.50						
ULS/125	1	1.00	+	2	0.25	+	9	1.00	+	4	0.50						
ULS/126	1	1.00	+	9	1.00	+	4	0.50									
ULS/127	1	1.00	+	2	0.25	+	3	0.50	+	9	1.00	+	4	0.50			
ULS/128	1	1.00	+	3	0.50	+	9	1.00	+	4	0.50						
ULS/129	1	1.00	+	2	0.25	+	9	1.00	+	5	0.50	+	4	0.50			
ULS/130	1	1.00	+	9	1.00	+	5	0.50	+	4	0.50						
ULS/131	1	1.00	+	2	0.25	+	3	0.50	+	10	1.00	+	5	0.50	+	4	0.50
ULS/132	1	1.00	+	3	0.50	+	10	1.00	+	5	0.50	+	4	0.50			
ULS/133	1	1.00	+	2	0.25	+	10	1.00									
ULS/134	1	1.00	+	10	1.00												
ULS/135	1	1.00	+	2	0.25	+	3	0.50	+	10	1.00						
ULS/136	1	1.00	+	3	0.50	+	10	1.00									
ULS/137	1	1.00	+	2	0.25	+	10	1.00	+	5	0.50						
ULS/138	1	1.00	+	10	1.00	+	5	0.50									
ULS/139	1	1.00	+	2	0.25	+	3	0.50	+	10	1.00	+	5	0.50			
ULS/140	1	1.00	+	3	0.50	+	10	1.00	+	5	0.50						
ULS/141	1	1.00	+	2	0.25	+	10	1.00	+	4	0.50						
ULS/142	1	1.00	+	10	1.00	+	4	0.50									
ULS/143	1	1.00	+	2	0.25	+	3	0.50	+	10	1.00	+	4	0.50			
ULS/144	1	1.00	+	3	0.50	+	10	1.00	+	4	0.50						
ULS/145	1	1.00	+	2	0.25	+	10	1.00	+	5	0.50	+	4	0.50			
ULS/146	1	1.00	+	10	1.00	+	5	0.50	+	4	0.50						
ULS/147	1	1.00	+	2	0.25	+	3	0.50	+	11	1.00	+	5	0.50	+	4	0.50
ULS/148	1	1.00	+	3	0.50	+	11	1.00	+	5	0.50	+	4	0.50			
ULS/149	1	1.00	+	2	0.25	+	11	1.00									
ULS/150	1	1.00	+	11	1.00												

ULS/151	1	1.00	+	2	0.25	+	3	0.50	+	11	1.00						
ULS/152	1	1.00	+	3	0.50	+	11	1.00									
ULS/153	1	1.00	+	2	0.25	+	11	1.00	+	5	0.50						
ULS/154	1	1.00	+	11	1.00	+	5	0.50									
ULS/155	1	1.00	+	2	0.25	+	3	0.50	+	11	1.00	+	5	0.50			
ULS/156	1	1.00	+	3	0.50	+	11	1.00	+	5	0.50						
ULS/157	1	1.00	+	2	0.25	+	11	1.00	+	4	0.50						
ULS/158	1	1.00	+	11	1.00	+	4	0.50									
ULS/159	1	1.00	+	2	0.25	+	3	0.50	+	11	1.00	+	4	0.50			
ULS/160	1	1.00	+	3	0.50	+	11	1.00	+	4	0.50						
ULS/161	1	1.00	+	2	0.25	+	11	1.00	+	5	0.50	+	4	0.50			
ULS/162	1	1.00	+	11	1.00	+	5	0.50	+	4	0.50						
ULS/163	1	1.00	+	2	0.25	+	3	0.50	+	9	-1.00	+	5	0.50	+	4	0.50
ULS/164	1	1.00	+	3	0.50	+	9	-1.00	+	5	0.50	+	4	0.50			
ULS/165	1	1.00	+	2	0.25	+	9	-1.00									
ULS/166	1	1.00	+	9	-1.00												
ULS/167	1	1.00	+	2	0.25	+	3	0.50	+	9	-1.00						
ULS/168	1	1.00	+	3	0.50	+	9	-1.00									
ULS/169	1	1.00	+	2	0.25	+	9	-1.00	+	5	0.50						
ULS/170	1	1.00	+	9	-1.00	+	5	0.50									
ULS/171	1	1.00	+	2	0.25	+	3	0.50	+	9	-1.00	+	5	0.50			
ULS/172	1	1.00	+	3	0.50	+	9	-1.00	+	5	0.50						
ULS/173	1	1.00	+	2	0.25	+	9	-1.00	+	4	0.50						
ULS/174	1	1.00	+	9	-1.00	+	4	0.50									
ULS/175	1	1.00	+	2	0.25	+	3	0.50	+	9	-1.00	+	4	0.50			
ULS/176	1	1.00	+	3	0.50	+	9	-1.00	+	4	0.50						
ULS/177	1	1.00	+	2	0.25	+	9	-1.00	+	5	0.50	+	4	0.50			
ULS/178	1	1.00	+	9	-1.00	+	5	0.50	+	4	0.50						
ULS/179	1	1.00	+	2	0.25	+	3	0.50	+	10	-1.00	+	5	0.50	+	4	0.50
ULS/180	1	1.00	+	3	0.50	+	10	-1.00	+	5	0.50	+	4	0.50			
ULS/181	1	1.00	+	2	0.25	+	10	-1.00									
ULS/182	1	1.00	+	10	-1.00												
ULS/183	1	1.00	+	2	0.25	+	3	0.50	+	10	-1.00						
ULS/184	1	1.00	+	3	0.50	+	10	-1.00									
ULS/185	1	1.00	+	2	0.25	+	10	-1.00	+	5	0.50						
ULS/186	1	1.00	+	10	-1.00	+	5	0.50									
ULS/187	1	1.00	+	2	0.25	+	3	0.50	+	10	-1.00	+	5	0.50			
ULS/188	1	1.00	+	3	0.50	+	10	-1.00	+	5	0.50						
ULS/189	1	1.00	+	2	0.25	+	10	-1.00	+	4	0.50						
ULS/190	1	1.00	+	10	-1.00	+	4	0.50									
ULS/191	1	1.00	+	2	0.25	+	3	0.50	+	10	-1.00	+	4	0.50			
ULS/192	1	1.00	+	3	0.50	+	10	-1.00	+	4	0.50						
ULS/193	1	1.00	+	2	0.25	+	10	-1.00	+	5	0.50	+	4	0.50			
ULS/194	1	1.00	+	10	-1.00	+	5	0.50	+	4	0.50						
ULS/195	1	1.00	+	2	0.25	+	3	0.50	+	11	-1.00	+	5	0.50	+	4	0.50
ULS/196	1	1.00	+	3	0.50	+	11	-1.00	+	5	0.50	+	4	0.50			
ULS/197	1	1.00	+	2	0.25	+	11	-1.00									
ULS/198	1	1.00	+	11	-1.00												
ULS/199	1	1.00	+	2	0.25	+	3	0.50	+	11	-1.00						
ULS/200	1	1.00	+	3	0.50	+	11	-1.00									
ULS/201	1	1.00	+	2	0.25	+	11	-1.00	+	5	0.50						
ULS/202	1	1.00	+	11	-1.00	+	5	0.50									
ULS/203	1	1.00	+	2	0.25	+	3	0.50	+	11	-1.00	+	5	0.50			
ULS/204	1	1.00	+	3	0.50	+	11	-1.00	+	5	0.50						
ULS/205	1	1.00	+	2	0.25	+	11	-1.00	+	4	0.50						
ULS/206	1	1.00	+	11	-1.00	+	4	0.50									
ULS/207	1	1.00	+	2	0.25	+	3	0.50	+	11	-1.00	+	4	0.50			
ULS/208	1	1.00	+	3	0.50	+	11	-1.00	+	4	0.50						

ULS/209	1	1.00	+	2	0.25	+	11	-1.00	+	5	0.50	+	4	0.50			
ULS/210	1	1.00	+	11	-1.00	+	5	0.50	+	4	0.50						
SLS/1	1	1.00	+	3	1.00	+	5	1.00	+	4	1.00						
SLS/2	1	1.00															
SLS/3	1	1.00	+	3	1.00												
SLS/4	1	1.00	+	5	1.00												
SLS/5	1	1.00	+	3	1.00	+	5	1.00									
SLS/6	1	1.00	+	4	1.00												
SLS/7	1	1.00	+	3	1.00	+	4	1.00									
SLS/8	1	1.00	+	5	1.00	+	4	1.00									
SLS/9	1	1.00	+	6	1.00												
SLS/10	1	1.00	+	7	1.00												
SLS/11	1	1.00	+	2	1.00												
SLS/12	1	1.00	+	6	1.00	+	3	1.00	+	5	1.00	+	4	1.00			
SLS/13	1	1.00	+	3	1.00	+	5	1.00	+	7	1.00	+	4	1.00			
SLS/14	1	1.00	+	6	1.00	+	3	1.00									
SLS/15	1	1.00	+	3	1.00	+	7	1.00									
SLS/16	1	1.00	+	6	1.00	+	5	1.00									
SLS/17	1	1.00	+	5	1.00	+	7	1.00									
SLS/18	1	1.00	+	6	1.00	+	3	1.00	+	5	1.00						
SLS/19	1	1.00	+	3	1.00	+	5	1.00	+	7	1.00						
SLS/20	1	1.00	+	6	1.00	+	4	1.00									
SLS/21	1	1.00	+	7	1.00	+	4	1.00									
SLS/22	1	1.00	+	6	1.00	+	3	1.00	+	4	1.00						
SLS/23	1	1.00	+	3	1.00	+	7	1.00	+	4	1.00						
SLS/24	1	1.00	+	6	1.00	+	5	1.00	+	4	1.00						
SLS/25	1	1.00	+	5	1.00	+	7	1.00	+	4	1.00						
SLS/26	1	1.00	+	2	1.00	+	3	1.00	+	5	1.00	+	4	1.00			
SLS/27	1	1.00	+	2	1.00	+	3	1.00									
SLS/28	1	1.00	+	2	1.00	+	5	1.00									
SLS/29	1	1.00	+	2	1.00	+	3	1.00	+	5	1.00						
SLS/30	1	1.00	+	2	1.00	+	4	1.00									
SLS/31	1	1.00	+	2	1.00	+	3	1.00	+	4	1.00						
SLS/32	1	1.00	+	2	1.00	+	5	1.00	+	4	1.00						
SLS/33	1	1.00	+	6	1.00	+	2	1.00									
SLS/34	1	1.00	+	2	1.00	+	7	1.00									
SLS/35	1	1.00	+	6	1.00	+	2	1.00	+	3	1.00	+	5	1.00	+	4	1.00
SLS/36	1	1.00	+	2	1.00	+	3	1.00	+	5	1.00	+	7	1.00	+	4	1.00
SLS/37	1	1.00	+	6	1.00	+	2	1.00	+	3	1.00						
SLS/38	1	1.00	+	2	1.00	+	3	1.00	+	7	1.00						
SLS/39	1	1.00	+	6	1.00	+	2	1.00	+	5	1.00						
SLS/40	1	1.00	+	2	1.00	+	5	1.00	+	7	1.00						
SLS/41	1	1.00	+	6	1.00	+	2	1.00	+	3	1.00	+	5	1.00			
SLS/42	1	1.00	+	2	1.00	+	3	1.00	+	5	1.00	+	7	1.00			
SLS/43	1	1.00	+	6	1.00	+	2	1.00	+	4	1.00						
SLS/44	1	1.00	+	2	1.00	+	7	1.00	+	4	1.00						
SLS/45	1	1.00	+	6	1.00	+	2	1.00	+	3	1.00	+	4	1.00			
SLS/46	1	1.00	+	2	1.00	+	3	1.00	+	7	1.00	+	4	1.00			
SLS/47	1	1.00	+	6	1.00	+	2	1.00	+	5	1.00	+	4	1.00			
SLS/48	1	1.00	+	2	1.00	+	5	1.00	+	7	1.00	+	4	1.00			

Appendix B Padeye design sheet – Full set

Excel printout

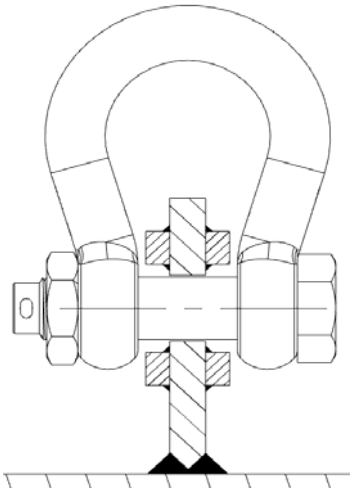
ALARA·LUKAGRO
NOISE CONTROL SOLUTIONS

Pad Eye calculation (EN 1993-1-8 + DEP 34.00.01.30-Gen)

According EN 1993-1-8: 2006 - Table 3.9: automatic calculation of initial padeye dimensions

Blue is input value

Orange is primary dimension for design



Project Information

Client	de Jong Combustion	
Project	Carmon Creek	
Project no.	405109540	
Padeye position	Primary lifting	
Total Weight	30 000	kg
Applicable lifting points	3	
Weight increase	10	%
F_z per shackle	107 910	N
impact factor, shackle	1,3	
impact factor, lug	2,0	
MAX Top Angle - 2 slings	60	°
F_sling, shackle	**161 985**	N
F_sling, lug	**249 207**	N
$f_{y,d}$ (Yield strength of used material)	355	N/mm²
γ_{M0} (Material factor EN 1993-1-1 §6.1)	1,00	

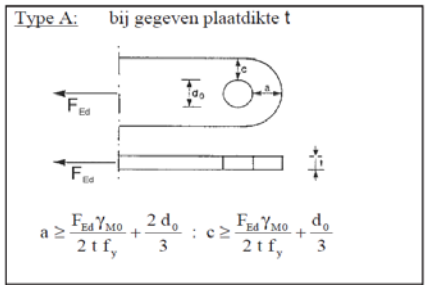
GREENPIN BOW Shackle determination

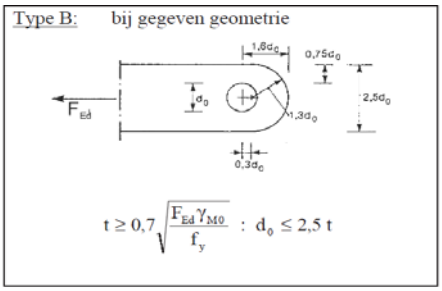
WLL	16,51	t
Applicable BOW-shackle	**17,00**	**t**
Shackle pin diameter d	42,0	mm

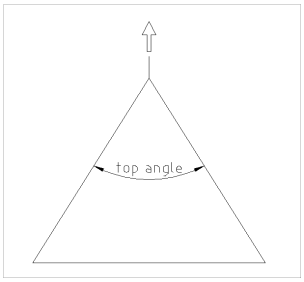
Cheeckplate check

tc	*tp*	*tc*
17 - 15 mm	20 mm	17 - 15 mm

width inside = 60 mm







Initial Dimensions

Hole diameter d0;nom	45	mm	*Depends on shackle, max difference hole-pin of 6% (DNV)*
Minimum Strip Thickness	20	mm	*Based on type A and B minimum thickness*
Minimum Strip Width	145	mm	*Based on type A and B minimum width*
c_p	50	mm	
a_p	50	mm	

Verification Type

Type A - Strip with given thickness			**Current value**	
a_p	48 mm	≤	50 mm	**OK**
c_p	33 mm	≤	50 mm	**OK**

Type B - Strip with given geometry			**Current value**	
t	19 mm	≤	20 mm	**OK**
$d_{g,nom}$	50 mm	≥	45 mm	**OK**
offset centre dim $[0{,}3d_0)$	14 mm			
c_p $[0{,}75d_0]$	34 mm	≤	50 mm	**OK**
a_p $[1{,}1d_0]$	50 mm	≤	50 mm	**OK**
Edge $[1{,}6d_0]$	72 mm	≤	72,5 mm	**OK**
Width strip $[2{,}5d_0]$	113 mm	≤	145 mm	**OK**

BOW-shackle verification 17 metric tons

Maximum hole difference of 4mm per DEP 34.00.01.30-Gen §2.3.2.f

	d_pin (mm)	d0 (mm)	difference		
difference hole and pin	42	45	**3,0**	mm	**OK**

Needed fillet welded cheek plates to obtain min 75% of inside shackle width

	a_shackle (mm)	min (mm)	t_padeye (mm)	2 x cheek plates of tc=
6,0	60,0	54,0	20	17 mm MAX
8,0	60,0	52,0	20	15 mm MIN

Remaining space inside BOW shackle

	f_shackle (mm)	
length inside of shackle	146,0	mm
lost length by padeye ap	50	mm
Remaining space	**96,0**	mm

Appendix C Padeye design sheet – Dropover Enclosure

Excel printout

Pad Eye calculation (EN 1993-1-8 + DEP 34.00.01.30-Gen)

According EN 1993-1-8: 2006 - Table 3.9: automatic calculation of initial padeye dimensions

Blue is input value

Orange is primary dimension for design

Project Information

Client	de Jong Combustion	
Project	Carmon Creek	
Project no.	405109540	
Padeye position	Hood lifting 3D Lifting Eye	
Total Weight	10 000	kg
Applicable lifting points	3	
Weight increase	10	%
F_z per shackle	35 970	N
impact factor, shackle	1,3	
impact factor, lug	2,0	
eye safetyfactor 4 vs req 5	1,25	
MAX Top Angle - 2 slings	0	°
F_sling, 3D shackle	58 451	N
F_sling,bolted connection	89 925	N
$f_{y,d}$ (Yield strength of used material)	355	N/mm²
γ_{M0} (Material factor EN 1993-1-1 §6.1)	1,00	

Eickhoff 3D Lift Eye WLL determination

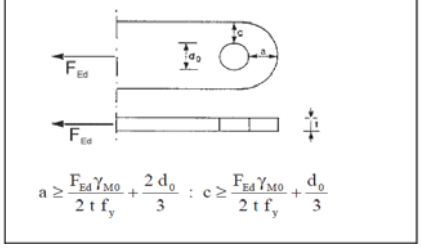
WLL	**5,96**	**t**
Applicable BOW-shackle	6,50	t
Shackle pin diameter d	25,0	mm

Cheeckplate check

tc	*tp*	*tc*
7 - 6 mm	15 mm	7 - 6 mm

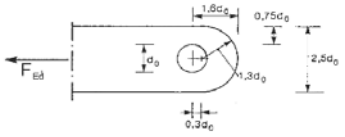
width inside = 36 mm

Type A: bij gegeven plaatdikte t

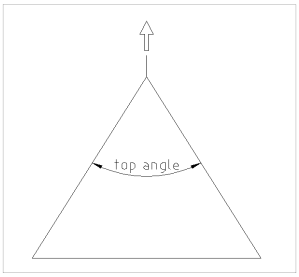


$$a \geq \frac{F_{Ed}\gamma_{M0}}{2\,t\,f_y} + \frac{2\,d_0}{3} \quad : \quad c \geq \frac{F_{Ed}\gamma_{M0}}{2\,t\,f_y} + \frac{d_0}{3}$$

Type B: bij gegeven geometrie



$$t \geq 0{,}7\sqrt{\frac{F_{Ed}\gamma_{M0}}{f_y}} \quad : \quad d_0 \leq 2{,}5\,t$$



Initial Dimensions

Hole diameter d0;nom	27	mm	*Depends on shackle, max difference hole-pin of 6% (DNV)*
Minimum Strip Thickness	15	mm	*Based on type A and B minimum thickness*
Minimum Strip Width	90	mm	*Based on type A and B minimum width*
c_p	31,5	mm	
a_p	31,5	mm	

Verification Type

Type A - Strip with given thickness			**Current value**	
a_p	27 mm	≤	31,5 mm	**OK**
c_p	18 mm	≤	31,5 mm	**OK**

Type B - Strip with given geometry			**Current value**	
t	12 mm	≤	15 mm	**OK**
$d_{g,nom}$	38 mm	≥	27 mm	**OK**
offset centre dim [$0{,}3d_0$)	9 mm			
c_p [$0{,}75d_0$]	21 mm	≤	31,5 mm	**OK**
a_p [$1{,}1d_0$]	30 mm	≤	31,5 mm	**OK**
Edge [$1{,}6d_0$]	44 mm	≤	45 mm	**OK**
Width strip [$2{,}5d_0$]	68 mm	≤	90 mm	**OK**

BOW-shackle verification 6,5 metric tons

Maximum hole difference of 4mm per DEP 34.00.01.30-Gen §2.3.2.f

	d_pin (mm)	d0 (mm)	difference		
difference hole and pin	25	27	**2,0**	mm	**OK**

Needed fillet welded cheek plates to obtain min 75% of inside shackle width

	a_shackle (mm)	min (mm)	t_padeye (mm)	2 x cheek plates of tc=
6,0	36,0	30,0	15	**7** mm MAX
8,0	36,0	28,0	15	**6** mm MIN

Remaining space inside BOW shackle

	f_shackle (mm)		
length inside of shackle	83,0	mm	
lost length by padeye ap	31,5	mm	
Remaining space	**51,5**	mm	

Appendix D 3D lifting point datasheet

PLDW pewag winner profilift delta

Ball-bearing 360° under load rotatable lifting point. High resistant lifting eye 180° movable. The special screws are 100% crack-tested as well as protected against corrosion, and marked with WLL and thread size. Each lifting point is marked with an individual serial number, that allows traceability. The table with the load capacities depending on the method of lifting as lifting gear, number of legs and angle of inclination is a part of the user manual and packed together with each lifting point.

The pewag winner profilift delta lifting points are marked with a WLL for the most inappropriate field of application, which explains the increased WLL in the upright loaded position, with a 4-fold safety against break in all directions of load.

Method of lifting											
Number of legs	1	1	2	2	2	2	3+4	3+4	2	3+4
Angle of inclination	0°	90°	0°	90°	0°–45°	45°–60°	0°–45°	45°–60°	asymm.	asymm.

Code	Thread [mm]	Fastening torque [Nm]	Load capacity [kg]									
PLDW 0,3 t	M8	10	600	300	1.200	600	400	300	600	400	300	300
PLDW 0,5 t	M10	10	1.000	500	2.000	1.000	700	500	1.000	750	500	500
PLDW 0,7 t	M12	15	1.400	700	2.800	1.400	950	700	1.400	1.000	700	700
PLDW 1 t*	M14	25	2.000	1.000	4.000	2.000	1.400	1.000	2.100	1.500	1.000	1.000
PLDW 1,5 t	M16	30	2.600	1.500	5.200	3.000	2.100	1.500	3.100	2.100	1.500	1.500
PLDW 2,5 t	M20	80	4.500	2.500	9.000	5.000	3.500	2.500	5.300	3.500	2.500	2.500
PLDW 4 t	M24	150	7.000	4.000	14.000	8.000	5.500	4.000	8.400	6.000	4.000	4.000
PLDW 6 t	M30	230	10.000	6.000	20.000	12.000	8.400	6.000	12.600	9.000	6.000	6.000
PLDW 8 t	M36	450	12.500	8.000	25.000	16.000	11.200	8.000	16.800	12.000	8.000	8.000
PLDW 10 t	M42	600	16.000	10.000	32.000	20.000	14.000	10.000	21.000	15.000	10.000	10.000
PLDW 12,5 t	M48	600	16.000	12.500	32.000	25.000	17.500	12.500	26.200	18.000	12.500	12.500

* Special models only available on request!
Safety factor 4
Attention: Subject to technical changes!
Availability on request!

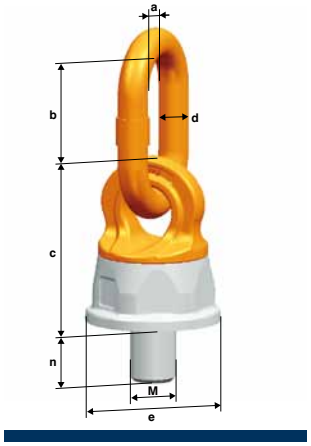
Permissible usage
Load capacity acc. to the inspection certificate respectively table of WLL in the mentioned directions of pull – see picture 1.

Non permissible usage
Make sure when choosing the assembly that improper load can not arise e.g. if:
- The direction of pull is obstructed
- Direction of pull is not in the foreseen area (see picture 2)
- Loading ring rests against edges or load

For more details please have a look into our detailed user manual.

Picture 1


Picture 2



Code	Thread [mm]	Load capacity [kg]	a [mm]	b [mm]	c [mm]	Ø d [mm]	Ø e [mm]	n [mm]	[mm]	Weight [kg/pc.]
PLDW 0,3t	M8	300	30	38	54	13	38	20	34	0,47
PLDW 0,5t	M10	500	30	38	54	13	38	20	34	0,47
PLDW 0,7t	M12	700	35	48	54	13	38	22	34	0,47
PLDW 1t *	M14	1.000	35	48	54	13	38	22	34	0,47
PLDW 1,5t	M16	1.500	35	48	54	13	38	33	34	0,49
PLDW 2,5t	M20	2.500	35	55	75	16	55	33	46	1,10
PLDW 4t	M24	4.000	40	66	82	17	63	40	50	1,50
PLDW 6t	M30	6.000	50	70	92	23	72	40	60	2,50
PLDW 8t	M36	8.000	50	91	124	23	92	55	75	4,30
PLDW 10t	M42	10.000	65	91	124	27	92	60	75	5,10
PLDW 12,5t	M48	12.500	65	116	124	27	92	68	75	5,40

* Only on request!
Attention: Subject to technical changes!
Availability on request!

Appendix F FEA Output Report (Autodesk Robot)

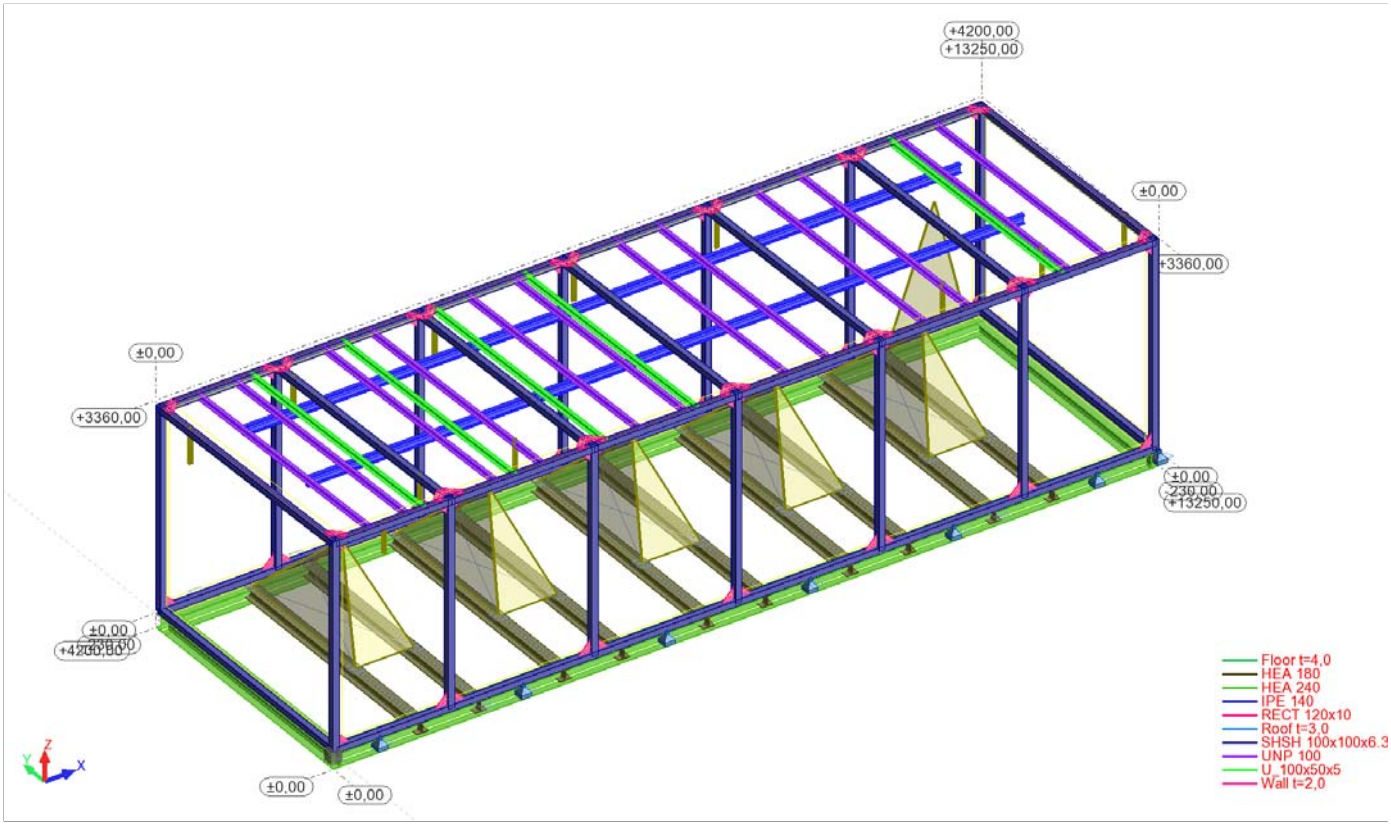
Alara-Lukagro BV
Huijgensweg 3
2964LL GROOT-AMMERS
The Netherlands
T: 0184-661700
F: 0184-662721

Customer	: De Jong Combustion BV
Ordernumber	: 405109540
Customerprojectnr	: PO 613087500/85679
Project	: Carmon Creek
Description	: A1 OPE - Main Skid & Dropover Enclosure - Operational condition
Revision	: R00

Project : 405109540.6000_A1_OPE_REV_01_4 Operational

Made by : BvH

Structure View



Data - Bars

Bar	Node 1	Node 2	Section	Material	Length (mm)	Gamma (Deg)	Type	Stru-cture object	Offset name	Values of automatic offsets
23	111	112	U_100x50-x5	S 23-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
24	113	114	U_100x50-x5	S 23-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
25	115	116	U_100x50-x5	S 23-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
26	117	118	U_100x50-x5	S 23-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
27	119	120	U_100x50-x5	S 23-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
2	5	72	HEA 240	S 3-55	13250,00	0,0	dJC_-Beam	Beam	Bovenflen-s-Links	B :X=0,0 Y=120,00 Z=-115,00 E : X=0,0 Y=120,00 Z=-115,00 Local
3	72	71	HEA 240	S 35-5	4200,00	0,0	dJC_-Beam	Beam	Bovenflens-Links	B :X=0,0 Y=120,00 Z=-115,00 E : X=0,0 Y=120,00 Z=-115,00 Local
4	71	8	HEA 240	S 3-55	13250,00	0,0	dJC_-Beam	Beam	Bovenflen-s-Links	B :X=0,0 Y=120,00 Z=-115,00 E : X=0,0 Y=120,00 Z=-115,00 Local
5	8	5	HEA 240	S 35-5	4200,00	0,0	dJC_-Beam	Beam	Bovenflens-Links	B :X=0,0 Y=120,00 Z=-115,00 E : X=0,0 Y=120,00 Z=-115,00 Local
6	9	10	HEA 180	S 35-5	4200,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-85,50 E : X=0,0 Y=0,0 Z=-85,5-0 Local
7	11	12	HEA 180	S 35-5	4200,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-85,50 E : X=0,0 Y=0,0 Z=-85,5-0 Local
8	2	4	IPE 140	S 3-55	11500,00	0,0	dJC_-Bm_-Crn	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-70,00 E : X=0,0 Y=0,0 Z=-70,0-0 Local
9	15	16	HEA 180	S 35-5	4200,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-85,50 E : X=0,0 Y=0,0 Z=-85,5-0 Local
15	27	28	HEA 180	S 35-5	4200,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-85,50 E : X=0,0 Y=0,0 Z=-85,5-0 Local
16	29	30	HEA 180	S 35-5	4200,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-85,50 E : X=0,0 Y=0,0 Z=-85,5-0 Local
17	31	32	HEA 180	S 35-5	4200,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-85,50 E : X=0,0 Y=0,0 Z=-85,5-0 Local
21	182	183	UNP 100	S 35-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
179	267	257	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
10	17	18	HEA 180	S 35-5	4200,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-85,50 E : X=0,0 Y=0,0 Z=-85,5-0 Local
11	1	3	IPE 140	S 3-55	11500,00	0,0	dJC_-Bm_-Crn	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-70,00 E : X=0,0 Y=0,0 Z=-70,0-0 Local
12	21	22	HEA 180	S 35-5	4200,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-85,50 E : X=0,0 Y=0,0 Z=-85,5-0 Local
13	23	24	HEA 180	S 35-5	4200,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-85,50 E : X=0,0 Y=0,0 Z=-85,5-0 Local
14	25	26	HEA 180	S 35-5	4200,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-85,50 E : X=0,0 Y=0,0 Z=-85,5-0 Local
80	156	157	UNP 100	S 35-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
81	158	159	UNP 100	S 35-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
111	216	214	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
112	217	218	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
113	219	217	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
114	220	221	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A

Bar	Node 1	Node 2	Section	Material	Length (mm)	Gamma (Deg)	Type	Stru-cture object	Offset name	Values of automatic offsets
131	222	223	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
133	225	226	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
175	265	251	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
176	266	253	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
177	266	254	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
178	267	256	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
77	180	181	UNP 100	S 35-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
78	152	153	UNP 100	S 35-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
79	154	155	UNP 100	S 35-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
180	268	259	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
181	268	260	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
183	263	262	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
184	224	223	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
185	269	226	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
186	227	269	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
187	270	229	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
188	230	270	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
189	271	232	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
190	233	271	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
191	272	235	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
192	236	272	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
193	273	238	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
194	239	273	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
196	241	242	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
82	160	161	UNP 100	S 35-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
134	227	225	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
83	162	163	UNP 100	S 35-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
135	228	229	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
136	230	228	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
84	164	165	UNP 100	S 35-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
85	166	167	UNP 100	S 35-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local

Bar	Node 1	Node 2	Section	Material	Length (mm)	Gamma (Deg)	Type	Stru-cture object	Offset name	Values of automatic offsets
137	231	232	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
138	233	231	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
86	168	169	UNP 100	S 35-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
87	170	171	UNP 100	S 35-5	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
139	234	235	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
140	236	234	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
88	185	184	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
89	186	187	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
141	237	238	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
90	188	186	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
142	239	237	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
91	189	190	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
144	241	240	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
145	243	244	RECT 120-x10	S 35-5	282,84	-0,0	dJC_-Beam	Beam	N/A	N/A
92	191	189	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
93	192	193	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
147	246	247	RECT 120-x10	S 35-5	282,84	-0,0	dJC_-Beam	Beam	N/A	N/A
94	194	192	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
148	248	246	RECT 120-x10	S 35-5	282,84	-0,0	dJC_-Beam	Beam	N/A	N/A
95	195	196	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
149	249	250	RECT 120-x10	S 35-5	282,84	-0,0	dJC_-Beam	Beam	N/A	N/A
150	251	249	RECT 120-x10	S 35-5	282,84	-0,0	dJC_-Beam	Beam	N/A	N/A
96	197	195	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
151	252	253	RECT 120-x10	S 35-5	282,84	-0,0	dJC_-Beam	Beam	N/A	N/A
97	198	199	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
98	200	198	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
152	254	252	RECT 120-x10	S 35-5	282,84	-0,0	dJC_-Beam	Beam	N/A	N/A
100	202	201	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
153	255	256	RECT 120-x10	S 35-5	282,84	-0,0	dJC_-Beam	Beam	N/A	N/A
102	203	204	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
154	257	255	RECT 120-x10	S 35-5	282,84	-0,0	dJC_-Beam	Beam	N/A	N/A

Bar	Node 1	Node 2	Section	Material	Length (mm)	Gamma (Deg)	Type	Stru-cture object	Offset name	Values of automatic offsets
104	205	206	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
155	258	259	RECT 120-x10	S 35-5	282,84	-0,0	dJC_-Beam	Beam	N/A	N/A
156	260	258	RECT 120-x10	S 35-5	282,84	-0,0	dJC_-Beam	Beam	N/A	N/A
105	207	205	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
106	208	209	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
158	262	261	RECT 120-x10	S 35-5	282,84	-0,0	dJC_-Beam	Beam	N/A	N/A
107	210	208	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
171	245	244	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
108	211	212	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
172	264	247	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
109	213	211	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
173	264	248	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
110	214	215	RECT 120-x10	S 35-5	282,84	0,0	dJC_-Beam	Beam	N/A	N/A
174	265	250	RECT 120-x10	S 35-5	282,86	90,0	dJC_-Beam	Beam	N/A	N/A
35	75	76	SHSH 100-x100x6.3	S 42-0	3240,00	0,0	dJC_-Col	Column	N/A	N/A
36	77	78	SHSH 100-x100x6.3	S 42-0	3310,00	0,0	dJC_-Col	Column	N/A	N/A
37	79	80	SHSH 100-x100x6.3	S 42-0	3240,00	0,0	dJC_-Col	Column	N/A	N/A
38	81	82	SHSH 100-x100x6.3	S 42-0	3240,00	0,0	dJC_-Col	Column	N/A	N/A
39	83	84	SHSH 100-x100x6.3	S 42-0	3240,00	0,0	dJC_-Col	Column	N/A	N/A
40	85	86	SHSH 100-x100x6.3	S 42-0	3240,00	0,0	dJC_-Col	Column	N/A	N/A
41	87	88	SHSH 100-x100x6.3	S 42-0	3240,00	0,0	dJC_-Col	Column	N/A	N/A
42	89	90	SHSH 100-x100x6.3	S 42-0	3240,00	0,0	dJC_-Col	Column	N/A	N/A
43	91	92	SHSH 100-x100x6.3	S 42-0	3310,00	0,0	dJC_-Col	Column	N/A	N/A
51	77	101	SHSH 100-x100x6.3	S 4-20	13150,00	0,0	dJC_-Beam	Beam	N/A	N/A
57	94	82	SHSH 100-x100x6.3	S 42-0	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,00 Local
44	93	94	SHSH 100-x100x6.3	S 42-0	3310,00	0,0	dJC_-Col	Column	N/A	N/A
45	95	96	SHSH 100-x100x6.3	S 42-0	3310,00	0,0	dJC_-Col	Column	N/A	N/A
46	97	98	SHSH 100-x100x6.3	S 42-0	3310,00	0,0	dJC_-Col	Column	N/A	N/A
47	99	100	SHSH 100-x100x6.3	S 42-0	3310,00	0,0	dJC_-Col	Column	N/A	N/A
48	101	102	SHSH 100-x100x6.3	S 42-0	3310,00	0,0	dJC_-Col	Column	N/A	N/A
49	89	75	SHSH 100-x100x6.3	S 4-20	13150,00	0,0	dJC_-Beam	Beam	N/A	N/A

Bar	Node 1	Node 2	Section	Material	Length (mm)	Gamma (Deg)	Type	Stru-cture object	Offset name	Values of automatic offsets
50	75	77	SHSH 100-x100x6.3	S 42-0	4100,00	0,0	dJC_-Beam	Beam	N/A	N/A
52	101	89	SHSH 100-x100x6.3	S 42-0	4100,00	0,0	dJC_-Beam	Beam	N/A	N/A
53	102	90	SHSH 100-x100x6.3	S 42-0	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
54	100	88	SHSH 100-x100x6.3	S 42-0	4100,60	-0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
56	96	84	SHSH 100-x100x6.3	S 42-0	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
58	92	80	SHSH 100-x100x6.3	S 42-0	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
59	78	76	SHSH 100-x100x6.3	S 42-0	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
70	92	78	SHSH 100-x100x6.3	S 42-0	1850,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
71	80	76	SHSH 100-x100x6.3	S 42-0	1850,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
55	98	86	SHSH 100-x100x6.3	S 42-0	4100,60	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
60	102	100	SHSH 100-x100x6.3	S 42-0	2100,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
61	90	88	SHSH 100-x100x6.3	S 42-0	2100,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
62	100	98	SHSH 100-x100x6.3	S 42-0	2300,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
63	88	86	SHSH 100-x100x6.3	S 42-0	2300,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
64	98	96	SHSH 100-x100x6.3	S 42-0	2300,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
65	86	84	SHSH 100-x100x6.3	S 42-0	2300,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
66	96	94	SHSH 100-x100x6.3	S 42-0	2300,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
67	84	82	SHSH 100-x100x6.3	S 42-0	2300,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
68	94	92	SHSH 100-x100x6.3	S 42-0	2300,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local
69	82	80	SHSH 100-x100x6.3	S 42-0	2300,00	0,0	dJC_-Beam	Beam	Bovenflens	B :X=0,0 Y=0,0 Z=-50,00 E : X=0,0 Y=0,0 Z=-50,0-0 Local

Data - Panels

Panel	Thic-knes s	Material	Meshing type	Reinfo-rcement type	Area (mm2)
19	Flo-or t-=4,0	S 2-35	Del-aun-ay	N/A	55649998,65
72	Wal-l t=-2,0	D-C-01	Del-aun-ay	N/A	13427500,00
73	Wal-l t=-2,0	D-C-01	Del-aun-ay	N/A	13427500,00
74	Wal-l t=-2,0	D-C-01	Del-aun-ay	N/A	43526500,00
75	Wal-l t=-2,0	D-C-01	Del-aun-ay	N/A	42606000,00

76	Roo-ft=-3,0	D-C-01	Del-aun-ay	N/A	53922857,35

Data - Supports

Support name	List of nodes	List of edges	List of objects	Support conditions
Schar-nieren-d	71 72 100-0to1011			UX UY UZ

Data - Sections

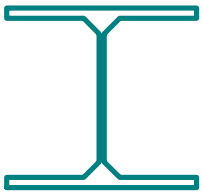
Section name	Bar list	AX (mm2)	AY (mm2)	AZ (mm2)	IX (mm4)	IY (mm4)	IZ (mm4)
H-E-A 2-4-0	2to5	7680,00	5760,00	1725,00	421000,00	77630000,00	27690000,00
I-PE 1-4-0	8 11	1643,00	1007,40	658,00	23990,00	5410000,00	449000,00
U-N-P 1-0-0	21 77to87	1345,00	799,00	549,00	25210,00	2053000,00	291600,00
U-_1-00-x-50-x5	23to27	950,00	500,00	450,00	7522,77	1432916,67	225005,48
H-E-A 1-8-0	6 7 9 10 12to17	4530,00	3420,00	1026,00	148900,00	25100000,00	9250000,00
R-E-C-T 1-2-0-x-1-0	88to98 100 102 104to114 131 133to142 144 145 14-7to156 158 171to181 183to194 196	1200,00	1000,00	1000,00	37899,23	1440000,00	10000,00

S-H-S-H 1-0-0-x-1-0-0-x-6-.3	35to71	2318,65	1159,30	1159,30	5341795,00	3355722,00	3355722,00

Section properties

Section properties:

HEA 240



HY=240,0, HZ=230,0 [mm]
AX=7680,00 [mm2]
IX=421000,00, IY=77630000,00, IZ=27690000,00 [mm4]
Material=S 355

IPE 140

HY=73,0, HZ=140,0 [mm]
AX=1643,00 [mm2]
IX=23990,00, IY=5410000,00, IZ=449000,00 [mm4]
Material=S 355

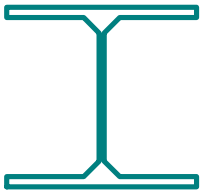
UNP 100

HY=50,0, HZ=100,0 [mm]
AX=1345,00 [mm2]
IX=25210,00, IY=2053000,00, IZ=291600,00 [mm4]
Material=S 355

U_100x50x5

HY=50,0, HZ=100,0 [mm]
AX=950,00 [mm2]
IX=7522,77, IY=1432916,67, IZ=225005,48 [mm4]
Material=S 235

HEA 180

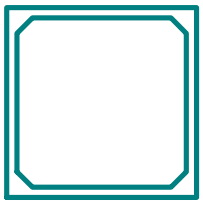


HY=180,0, HZ=171,0 [mm]
AX=4530,00 [mm2]
IX=148900,00, IY=25100000,00, IZ=9250000,00 [mm4]
Material=S 355

RECT 120x10

HY=10,0, HZ=120,0 [mm]
AX=1200,00 [mm2]
IX=37899,23, IY=1440000,00, IZ=10000,00 [mm4]
Material=S 355

SHSH 100x100x6.3



HY=100,0, HZ=100,0 [mm]
AX=2318,65 [mm2]
IX=5341795,00, IY=3355722,00, IZ=3355722,00 [mm4]
Material=S 420

Loads - Cases

Case	Label	Case name	Nature	Analysis type
1	G-1	Structure Selfweight	dead	Static - Linear
2	S-N1	Snow	snow	Static - Linear
3	L1	Roof loads	live	Static - Linear
4	L2	Floor loads	live	Static - Linear
5	L3	Crane loads	live	Static - Linear
6	W-IN-D1	Wind 1	wind	Static - Linear
7	W-IN-D2	Wind 2	wind	Static - Linear
8	M-O-D	Modal		Modal
9	S-EI-_X	Seismic - NBCC 2010 Direction_X	Earthquake/Accidental	Dynamics - Seismic
10	S-EI-_Y	Seismic - NBCC 2010 Direction_Y	Earthquake/Accidental	Dynamics - Seismic
11	S-EI-_Z	Seismic - NBCC 2010 Direction_Z	Earthquake/Accidental	Dynamics - Seismic
12		ULS		Static - Linear
13		ULS+		Static - Linear
14		ULS-		Static - Linear
15		SLS		Static - Linear
16		SLS+		Static - Linear
17		SLS-		Static - Linear

Loads - Values

Case	Load type	List	Load values
1	self-weight	2to17 19 21 23to27 35to98 100 102 104to114 131 133to142 144 145 147to156 158 171to181 183to194 196	PZ Negative Factor=1,00
1	Body forces		AZ=-1,00 relative
1	(FE) uniform	72to75	PZ=-0,000166(N/mm2)
1	(FE) uniform	19	PZ=-0,000372(N/mm2)
1	(FE) uniform	76	PZ=-0,000122(N/mm2)
2	(FE) uniform	76	PZ=-0,002800(N/mm2)

Case	Load type	List	Load values
3	(FE) uniform	76	PZ=-0,001000(N/mm2)
4	(FE) uniform	19	PZ=-0,004800(N/mm2)
5	nodal force	65	FX=13,000000(N) FY=13,000000(N) FZ=-281,000000(N)
5	nodal force	66	FX=184,000000(N) FY=184,000000(N) FZ=-4043,000000(N)
6	(FE) planar	74	PY1=0,001138(N/mm2) PY2=0,001138(N/mm2) PY3=0,001086(N/mm2) N1X=50,00(mm) N1Y=50,00(mm) N1Z=3360,00(mm) N2X=13200,00(mm) N2Y=50,00(mm) N2Z=3360,00(mm) N3X=13200,00(mm) N3Y=50,00(mm) N3Z=50,00(mm)
6	(FE) planar	75	PY1=0,000711(N/mm2) PY2=0,000711(N/mm2) PY3=0,000679(N/mm2) N1X=50,00(mm) N1Y=4150,00(mm) N1Z=3290,00(mm) N2X=13200,00(mm) N2Y=4150,00(mm) N2Z=3290,00(mm) N3X=13200,00(mm) N3Y=4150,00(mm) N3Z=50,00(mm)
6	(FE) uniform	76	PZ=0,000996(N/mm2)
7	(FE) planar	73	PX1=-0,001138(N/mm2) PX2=-0,001138(N/mm2) PX3=-0,001086(N/mm2) N1X=13200,00(mm) N1Y=57,36(mm) N1Z=3359,87(mm) N2X=13200,00(mm) N2Y=4150,00(mm) N2Z=3290,00(mm) N3X=13200,00(mm) N3Y=4150,00(mm) N3Z=50,00(mm)
7	(FE) planar	72	PX1=-0,000711(N/mm2) PX2=-0,000711(N/mm2) PX3=-0,000679(N/mm2) N1X=13200,00(mm) N1Y=57,36(mm) N1Z=3359,87(mm) N2X=13200,00(mm) N2Y=4150,00(mm) N2Z=3290,00(mm) N3X=13200,00(mm) N3Y=4150,00(mm) N3Z=50,00(mm)
7	(FE) uniform	76	PZ=0,000996(N/mm2)

Reactions ULS: global extremes

	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
MAX	69920,554392	81622,442883	82833,960229	0,00	0,00	0,00
Node	1006	1008	1000	1009	1002	1011
Case	ULS/95	ULS/45	ULS/45	ULS/45	ULS/51	ULS/-24
Mode						
MIN	-78611,759740	-83385,064801	-22445,964468	0,00	0,00	0,00
Node	1001	1000	72	1004	71	1002
Case	ULS/99	ULS/45	6	ULS/45	ULS/45	ULS/-45
Mode						

Displacements SLS: global extremes

	UX (mm)	UY (mm)	UZ (mm)	RX (Rad)	RY (Rad)	RZ (Rad)
MAX	10,0	7,6	2,7	0,008	0,014	0,010
Node	1057	7795	5814	5577	4775	7765

	UX (mm)	UY (mm)	UZ (mm)	RX (Rad)	RY (Rad)	RZ (Rad)
Case	9	10	6	SLS/26	SLS/27	10
Mode	SRSS	SRSS				SRSS
MIN	-2,6	-3,7	-11,4	-0,008	-0,014	-0,004
Node	1479	2016	7554	7013	6100	2795
Case	SLS/42	SLS/29	SLS/26	SLS/29	SLS/26	SLS/-27
Mode						

Member Forces ULS: envelope

	Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
2 / MAX	2559,915451	26581,100167	22231,306709		87,37	1063,59	8309,37
	Node	72	5	72	72	72	5
	Case	6	ULS/45	6	ULS-/112	ULS-/15	ULS-/45
	Mode						
2 / MIN	-7848,501209	-25421,207169	-41955,061181		-218,42	-340,63	-691,90
	Node	72	72	72	72	72	5
	Case	ULS/45	ULS/85	ULS/95	ULS-/89	ULS-/114	6
	Mode						
3 / MAX	19237,788837	2286,028310	13508,053495		123,60	4506,00	2682,68
	Node	71	72	72	71	71	71
	Case	6	ULS/73	ULS/16	ULS-/14	ULS-/91	ULS-/91
	Mode						
3 / MIN	-81824,064329	-1958,906185	-11981,231346		-151,50	-6590,16	-2843,56
	Node	71	71	71	72	72	72
	Case	ULS/14	ULS/16	ULS/45	ULS-/21	ULS-/73	ULS-/81
	Mode						
4 / MAX	1350,421109	46850,362468	37308,328043		109,69	1110,49	8170,58
	Node	71	71	71	71	8	71
	Case	7	ULS/16	ULS/11-1	ULS-/14	ULS-/15	ULS-/22
	Mode						
4 / MIN	-13347,794923	-18397,457131	-6335,792033		-151,33	-62,53	-877,40
	Node	71	8	71	71	71	71
	Case	ULS/50	ULS/16	7	ULS-/93	4	6
	Mode						
5 / MAX	2824,066901	1537,148432	11639,751507		179,06	102,34	5460,16
	Node	8	8	8	5	5	5

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Case	2	ULS/21	ULS/45	ULS-/45	6	ULS-/50
Mode						
5 / MIN	-27716,824184	-2539,926948	-11029,133366	-146,53	-1553,70	-1014,52
Node	5	5	5	8	8	5
Case	ULS/45	ULS/50	ULS/14	ULS-/45	ULS-/45	6
Mode						
6 / MAX	6045,775437	255,891702	22890,851191	5,73	438,38	163,38
Node	10	9	9	9	10	10
Case	6	ULS/16	ULS/50	ULS-/107	ULS-/107	6
Mode						
6 / MIN	-32119,292283	-182,311404	-21012,905281	-11,74	-2076,20	-668,46
Node	10	10	10	10	10	10
Case	ULS/45	ULS/85	ULS/21	ULS-/95	ULS-/15	ULS-/45
Mode						
7 / MAX	1850,342993	265,042847	22396,127865	21,97	158,09	724,97
Node	11	11	11	12	12	12
Case	6	ULS/45	ULS/15	ULS-/45	6	ULS-/45
Mode						
7 / MIN	-28894,079083	-471,055359	-20714,846507	-9,84	-1855,86	-58,42
Node	12	12	12	11	12	11
Case	ULS/21	ULS/50	ULS/45	ULS-/95	ULS-/50	6
Mode						
8 / MAX	0,001033	0,006041	0,007874	0,00	0,00	0,00
Node	4	2	4	2	4	2
Case	10	ULS/13-3	10	ULS-/138	ULS-/188	ULS-/113
Mode	SRSS		SRSS			
8 / MIN	-0,000687	-0,006041	-0,004662	-0,00	-0,00	-0,00
Node	4	2	4	2	4	2
Case	ULS/17-9	ULS/18-0	ULS/18-9	ULS-/189	10	ULS-/4
Mode					SRS-S	
9 / MAX	635,910964	396,163236	22857,138398	1,85	78,23	99,22
Node	16	16	15	16	16	16
Case	7	ULS/50	ULS/45	6	2	6
Mode						
9 / MIN	-29335,513911	-99,457172	-20619,199659	-17,96	-1852,07	-1032,53
Node	16	15	16	16	16	16
Case	ULS/45	ULS/22	ULS/15	ULS-/45	ULS-/16	ULS-/45
Mode						

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
1-0 / M-AX	4313,559380	226,175921	22438,122042	24,04	213,39	1306,46
Node	17	17	17	18	18	17
Case	ULS/10-7	ULS/45	ULS/15	ULS-/45	6	ULS-/45
Mode						
1-0 / M-IN	-29840,583757	-524,504127	-20729,513395	-3,93	-2016,00	-155,16
Node	18	18	18	18	17	18
Case	ULS/45	ULS/50	ULS/45	6	ULS-/45	6
Mode						
11 / MAX	0,000938	0,006313	0,012922	0,00	0,00	0,00
Node	1	1	3	1	1	3
Case	10	ULS/14-0	10	ULS-/141	ULS-/183	ULS-/87
Mode	SRSS		SRSS			
11 / MIN	-0,000300	-0,006313	-0,007125	-0,00	-0,00	-0,00
Node	1	1	1	1	1	1
Case	ULS/17-9	ULS/18-9	ULS/17-9	ULS-/185	10	ULS-/86
Mode					SRS-S	
1-2 / M-AX	2900,858540	490,996607	22743,340278	10,47	254,61	91,96
Node	22	22	21	21	22	22
Case	6	ULS/45	ULS/50	ULS-/95	2	6
Mode						
1-2 / M-IN	-35863,394493	-288,278603	-20568,696418	-23,49	-1695,04	-958,29
Node	22	21	22	22	22	22
Case	ULS/45	ULS/45	ULS/21	ULS-/45	ULS-/15	ULS-/45
Mode						
13 / MA-X	746,056592	196,559998	22121,842991	19,01	93,78	793,41
Node	23	23	23	24	23	24
Case	6	ULS/45	ULS/16	ULS-/45	2	ULS-/45
Mode						
1-3 / M-IN	-27316,920754	-361,673891	-21189,265732	-6,25	-1932,48	-34,37
Node	24	24	24	23	24	24
Case	ULS/45	ULS/50	ULS/45	ULS-/95	ULS-/14	6
Mode						
14 / MA-X	2884,022900	429,754227	22473,556360	2,49	81,21	113,20

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Node	25	26	25	26	26	25
Case	2	ULS/50	ULS/45	6	6	7
Mode						
1-4 / MIN	-26599,614159	-171,523024	-20730,616737	-18,94	-1808,53	-1193,18
Node	26	25	26	26	26	25
Case	ULS/3	ULS/45	ULS/16	ULS-/45	ULS-/16	ULS-/45
Mode						
1-5 / MAX	1706,710005	145,311605	22553,758935	17,35	69,83	1078,28
Node	27	27	27	28	27	27
Case	2	ULS/45	ULS/45	ULS-/45	7	ULS-/45
Mode						
1-5 / MIN	-27400,382336	-378,153853	-20671,635179	-2,29	-1767,32	-113,15
Node	28	28	28	28	28	27
Case	ULS/45	ULS/50	ULS/16	6	ULS-/16	7
Mode						
1-6 / MAX	2025,966586	502,929080	23593,602486	15,67	219,92	43,99
Node	29	30	29	29	30	29
Case	7	ULS/50	ULS/45	ULS-/45	2	7
Mode						
1-6 / MIN	-37477,028390	-414,964813	-20672,762776	-19,08	-1544,46	-826,48
Node	30	29	30	30	30	30
Case	ULS/45	ULS/45	ULS/16	ULS-/45	ULS-/16	ULS-/45
Mode						
1-7 / MAX	17817,210990	15,872043	24554,392721	21,67	22,73	383,72
Node	31	32	31	31	32	32
Case	ULS/45	6	ULS/16	ULS-/3	7	ULS-/45
Mode						
1-7 / MIN	-16544,108822	-712,206335	-23110,511038	-0,93	-3644,49	-287,25
Node	32	31	32	32	31	31
Case	ULS/16	ULS/3	ULS/45	6	ULS-/45	ULS-/21
Mode						
2-1 / MAX	18669,502558	1308,831353	5891,200294	7,12	280,61	51,15

Bar		FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
	Node	183	183	182	182	183	182
	Case	ULS/99	ULS/95	ULS/10-1	ULS-/95	6	6
	Mode						
2-1 / M-IN	-3864,112570	-1348,713976	-5888,576694	-7,24	-1396,52	-217,66	
	Node	183	182	183	183	182	182
	Case	ULS/85	ULS/95	ULS/95	ULS-/95	ULS-/101	ULS-/95
	Mode						
23 / MAX	5680,959330	192,151123	3369,594282	0,17	226,63	29,57	
	Node	112	112	111	111	112	111
	Case	ULS/97	ULS/61	ULS/97	ULS-/22	ULS-/81	ULS-/93
	Mode						
23 / MIN	-3692,996366	-118,871738	-3368,627105	-0,62	-454,11	-36,21	
	Node	112	111	112	111	111	112
	Case	ULS/89	ULS/62	ULS/97	ULS-/93	ULS-/101	ULS-/69
	Mode						
24 / MAX	2810,811986	196,732613	3921,704683	0,54	148,15	8,73	
	Node	114	114	113	113	114	113
	Case	ULS/10-5	ULS/95	ULS/97	ULS-/95	ULS-/81	6
	Mode						
24 / MIN	-1658,874052	-254,411297	-3944,725926	-0,45	-363,74	-45,65	
	Node	114	113	114	114	114	113
	Case	ULS/73	ULS/95	ULS/97	ULS-/95	ULS-/101	ULS-/95
	Mode						
25 / MAX	6887,102679	992,497464	3626,694040	0,93	268,49	48,75	
	Node	116	116	115	115	116	116
	Case	ULS/97	ULS/10-1	ULS/95	ULS-/95	ULS-/81	ULS-/81
	Mode						
25 / MIN	-3898,965108	-960,712016	-3661,928089	-0,98	-457,81	-148,66	
	Node	116	115	116	116	116	116
	Case	ULS/89	ULS/10-1	ULS/99	ULS-/95	ULS-/101	ULS-/101
	Mode						
26 / MAX	4656,106319	248,727824	3942,167829	0,68	227,49	39,47	
	Node	118	117	117	118	118	118
	Case	ULS/97	ULS/97	ULS/95	ULS-/97	ULS-/81	ULS-/97
	Mode						
26 / MIN	-3007,153023	-261,102269	-3943,696598	-0,69	-419,94	-26,53	
	Node	118	118	118	117	118	118
	Case	ULS/89	ULS/97	ULS/97	ULS-/111	ULS-/101	ULS-/89
	Mode						
27 / MAX	5887,787036	166,933787	3711,850969	0,83	184,13	46,23	

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Node	120	119	119	119	120	120
Case	ULS/97	ULS/10-3	ULS/97	ULS-/77	ULS-/81	ULS-/95
Mode						
27 / MIN	-2696,307724	-251,374485	-3710,242903	-0,40	-501,97	-51,08
Node	120	119	120	119	120	119
Case	ULS/89	ULS/61	ULS/97	ULS-/95	ULS-/101	ULS-/77
Mode						
3-5 / M-AX	17088,452108	767,314421	2805,469569	56,77	65,91	1346,81
Node	75	75	75	76	75	76
Case	ULS/95	7	ULS/95	ULS-/97	7	ULS-/97
Mode						
3-5 / M-IN	-7788,269642	-5131,696417	-1056,460118	-90,96	-634,61	-1046,55
Node	76	75	76	76	75	75
Case	ULS/10-1	ULS/95	ULS/95	ULS-/90	ULS-/95	ULS-/95
Mode						
3-6 / M-AX	14780,379478	4376,369599	3807,513685	106,72	319,80	368,30
Node	77	78	77	78	77	78
Case	ULS/95	ULS/99	ULS/95	ULS-/86	6	ULS-/89
Mode						
3-6 / M-IN	-7876,851394	-1768,020941	-1682,947446	-62,51	-768,36	-1343,92
Node	78	77	77	78	77	78
Case	ULS/10-1	ULS/81	6	ULS-/99	ULS-/95	ULS-/97
Mode						
3-7 / M-AX	4786,950019	2892,950841	173,219002	50,66	44,99	3817,66
Node	80	80	79	80	79	80
Case	ULS/97	ULS/81	ULS/77	ULS-/91	ULS-/95	ULS-/101
Mode						
37 / MIN	-646,700875	-1880,500892	-676,624021	-0,06	-68,07	-2368,68
Node	80	79	80	79	80	80
Case	7	ULS/91	ULS/95	5	ULS-/45	ULS-/81
Mode						
3-8 / M-AX	8570,913006	2942,680252	1186,266126	9,72	87,95	4808,62
Node	81	82	81	82	81	82

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Case	ULS/95	ULS/85	ULS/97	7	7	ULS-/99
Mode						
3-8 / M-IN	-1209,428307	-2261,166007	-355,157572	-81,04	-472,74	-2252,29
Node	81	81	82	82	81	82
Case	7	ULS/91	ULS/45	ULS-/111	ULS-/99	ULS-/85
Mode						
3-9 / M-AX	5769,715681	3195,081779	137,805992	20,31	21,29	4455,24
Node	84	84	84	84	84	84
Case	ULS/99	ULS/85	ULS/77	ULS-/111	ULS-/77	ULS-/99
Mode						
39 / MIN	-866,422590	-1896,909927	-367,830894	0,01	-52,32	-2705,15
Node	84	83	84	83	84	84
Case	7	ULS/91	ULS/45	9	ULS-/45	ULS-/85
Mode				SRSS		
4-0 / M-AX	26254,807660	3050,023212	364,257681	10,98	285,04	5157,66
Node	85	86	86	85	85	86
Case	ULS/99	ULS/85	ULS/45	ULS-/93	ULS-/99	ULS-/99
Mode						
4-0 / M-IN	-3787,977168	-2265,277056	-2053,843009	-14,65	-56,53	-2406,38
Node	85	85	85	85	85	86
Case	7	ULS/11-1	ULS/99	ULS-/74	7	ULS-/85
Mode						
4-1 / M-AX	4699,291765	3035,280611	770,645305	23,51	102,60	4234,42
Node	88	88	88	88	88	88
Case	ULS/99	ULS/77	ULS/95	ULS-/78	ULS-/45	ULS-/95
Mode						
41 / MIN	-879,869736	-1932,887853	-138,525627	-24,49	-44,88	-2568,99
Node	88	87	88	88	87	88
Case	7	ULS/91	7	ULS-/59	ULS-/95	ULS-/77
Mode						
4-2 / M-AX	17340,534517	949,073904	1036,834764	69,15	722,87	1323,78
Node	89	90	90	89	89	90

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Case	ULS/95	7	ULS/95	ULS-/89	ULS-/91	ULS-/99
Mode						
4-2 / M-IN	-7649,706330	-6065,018828	-3392,281619	-124,59	-95,26	-1137,29
Node	90	89	89	89	89	89
Case	ULS/95	ULS/91	ULS/91	ULS-/92	7	ULS-/95
Mode						
43 / MA-X	4319,740426	4775,285991	200,597687	94,94	44,20	564,81
Node	92	92	92	92	91	92
Case	ULS/99	ULS/91	6	ULS-/89	ULS-/91	7
Mode						
4-3 / MI-N	-1111,718348	-2808,208706	-660,589882	-26,76	-63,72	-3951,11
Node	92	91	92	92	92	92
Case	6	ULS/81	ULS/95	ULS-/97	ULS-/45	ULS-/111
Mode						
4-4 / M-A-X	9505,319356	4825,985960	1088,570983	61,58	112,52	692,74
Node	93	94	93	93	93	94
Case	ULS/99	ULS/91	ULS/99	ULS-/97	6	7
Mode						
4-4 / M-IN	-2015,502734	-3196,400815	-316,392995	-173,37	-472,60	-4137,66
Node	94	93	94	93	93	94
Case	ULS/85	ULS/77	ULS/95	ULS-/89	ULS-/99	ULS-/111
Mode						
45 / MAX	5225,669739	5082,078815	4,714562	33,35	24,90	710,07
Node	96	96	96	96	95	96
Case	ULS/99	ULS/91	7	ULS-/69	ULS-/95	7
Mode						
45 / MIN	-2206,743512	-2963,111076	-343,795259	-1,37	-42,15	-4303,30
Node	96	95	96	96	96	96
Case	ULS/85	ULS/77	ULS/95	ULS-/107	ULS-/95	ULS-/111
Mode						
4-6 / M-A-X	23729,556006	4789,873074	323,644835	51,84	310,85	769,12
Node	97	98	97	97	97	98
Case	ULS/99	ULS/91	6	ULS-/89	ULS-/99	7

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Mode						
46 / MIN	-3490,643850	-3291,574543	-2213,275143	-37,39	-46,44	-4417,60
Node	97	97	97	97	97	98
Case	6	ULS/77	ULS/99	ULS-/97	6	ULS-/111
Mode						
47 / MAX	4625,898480	4904,528652	787,703355	6,16	93,89	772,94
Node	100	100	100	100	100	100
Case	ULS/99	ULS/91	ULS/95	10	ULS-/45	7
Mode				SRS-S		
47 / MIN	-1418,531668	-2969,467520	-394,630156	-28,34	-46,02	-4279,74
Node	100	99	100	100	100	100
Case	ULS/85	ULS/77	ULS/77	ULS-/73	ULS-/77	ULS-/111
Mode						
48 / MAX	16685,674792	4544,866141	2201,023485	136,78	743,65	388,27
Node	101	102	101	101	101	102
Case	ULS/95	ULS/99	ULS/77	ULS-/92	ULS-/95	ULS-/85
Mode						
48 / MIN	-7676,373817	-3054,713092	-3195,541825	-49,47	-476,14	-1356,00
Node	101	101	101	102	101	102
Case	6	ULS/81	ULS/95	ULS-/85	6	ULS-/99
Mode						
49 / MAX	3720,687722	14802,862237	16569,598715	1798,39	750,54	1427,16
Node	89	75	75	89	89	75
Case	ULS/92	ULS/71	ULS/95	ULS-/95	ULS-/91	ULS-/92
Mode						
49 / MIN	-1529,395002	-19464,327216	-18266,345888	-1577,46	-93,80	-2246,67
Node	75	89	89	75	89	89
Case	7	ULS/85	ULS/91	ULS-/99	7	ULS-/74
Mode						
50 / MAX	12396,819175	1966,925118	3585,006872	14,03	566,83	1491,54
Node	75	75	75	75	77	75

Bar		FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
	Case	ULS/85	ULS/70	ULS/85	ULS-/91	ULS-/77	ULS-/92
	Mode						
5-0/M-IN	-13500,593194	-1914,757525	-4564,193638	-5,46	-561,32	-562,84
	Node	77	77	77	77	77	77
	Case	ULS/81	ULS/94	ULS/95	ULS-/174	ULS-/95	ULS-/85
	Mode						
5-1/M-AX	3860,652059	15340,233357	21461,462400	495,19	766,84	1327,01	
	Node	101	77	101	77	77	77
	Case	ULS/92	ULS/81	ULS/95	ULS-/77	ULS-/95	ULS-/92
	Mode						
5-1/M-IN	-2191,374537	-20396,775450	-19487,071785	-502,98	-502,59	-2220,94	
	Node	101	101	77	101	101	101
	Case	ULS/77	ULS/67	ULS/95	ULS-/77	ULS-/77	ULS-/86
	Mode						
5-2/M-AX	14644,606516	3119,929176	4615,618571	6,25	742,15	337,35	
	Node	89	89	101	101	101	101
	Case	ULS/85	ULS/92	ULS/95	ULS-/126	ULS-/77	ULS-/99
	Mode						
5-2/M-IN	-17361,874038	-3087,559301	-4769,131423	-27,85	-546,28	-2355,17	
	Node	101	101	101	89	101	89
	Case	ULS/91	ULS/86	ULS/77	ULS-/83	ULS-/95	ULS-/74
	Mode						
5-3/M-AX	2705,385877	7187,654556	8449,467641	255,82	1459,33	1626,56	
	Node	90	102	90	90	102	102
	Case	6	ULS/99	ULS/95	ULS-/99	ULS-/95	ULS-/99
	Mode						
5-3/M-IN	-11178,612347	-6869,955754	-8467,763403	-276,57	-338,16	-373,47	
	Node	90	90	102	102	90	102
	Case	ULS/95	ULS/99	ULS/99	ULS-/99	6	6
	Mode						

	Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
5-4/M-AX	13354,046479	2428,622472	8248,937385		128,09	1214,34	486,36
	Node	100	100	100	88	88	88
	Case	ULS/59	ULS/95	ULS/95	ULS-/97	ULS-/77	ULS-/95
	Mode						
5-4/MIN	-8273,763274	-2502,806850	-8636,930794		-144,56	-2023,11	-187,09
	Node	88	88	88	100	88	100
	Case	ULS/85	ULS/95	ULS/99	ULS-/97	ULS-/95	ULS-/77
	Mode						
5-5/MAX	15178,655512	173,126348	8107,944381		18,21	1029,57	88,51
	Node	98	86	98	98	86	86
	Case	ULS/65	ULS/97	ULS/95	ULS-/22	ULS-/85	ULS-/43
	Mode						
5-5/MIN	-6670,213020	-794,989053	-9876,489381		-76,70	-2157,34	-32,78
	Node	86	86	86	86	86	98
	Case	ULS/93	ULS/43	ULS/99	ULS-/22	ULS-/99	ULS-/91
	Mode						
5-6/MAX	16599,748490	1578,044519	7857,045166		62,79	1186,30	107,05
	Node	96	84	96	84	84	96
	Case	ULS/65	ULS/45	ULS/95	ULS-/52	ULS-/77	ULS-/77
	Mode						
5-6/MIN	-7857,634921	-1207,931170	-9490,741960		-14,76	-1961,96	-231,83
	Node	84	96	84	96	84	84
	Case	ULS/93	ULS/95	ULS/95	ULS-/89	ULS-/95	ULS-/95
	Mode						
5-7/MAX	11937,870658	1116,368512	6306,129677		46,66	865,97	171,22
	Node	94	82	94	82	82	82
	Case	ULS/65	ULS/10-3	ULS/95	ULS-/43	6	ULS-/61
	Mode						
5-7/MIN	-8563,794493	-1036,363260	-8012,686226		-24,48	-1729,37	-197,64

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Node	94	82	82	94	82	82
Case	ULS/10-9	ULS/61	ULS/99	ULS-/22	ULS-/99	ULS-/103
Mode						
5-8 / M-A-X	14444,053627	1916,902876	7410,540202	97,56	948,28	218,11
Node	92	80	92	92	80	92
Case	ULS/69	ULS/95	ULS/10-1	ULS-/97	6	ULS-/77
Mode						
5-8 / M-IN	-5326,484149	-1933,851923	-8441,856284	-92,73	-1907,67	-347,53
Node	80	92	80	80	92	92
Case	6	ULS/95	ULS/97	ULS-/111	ULS-/91	ULS-/95
Mode						
5-9 / M-A-X	2605,753787	6969,233692	8543,419264	264,46	1489,73	388,64
Node	76	76	76	78	78	78
Case	6	ULS/97	ULS/10-1	ULS-/97	ULS-/101	6
Mode						
5-9 / M-IN	-11282,483223	-7153,224416	-8700,441363	-248,39	-323,38	-1639,60
Node	76	78	78	76	76	78
Case	ULS/10-1	ULS/97	ULS/10-1	ULS-/97	6	ULS-/97
Mode						
6-0 / M-A-X	5130,540896	3239,100130	2114,571824	905,94	228,68	379,25
Node	100	102	100	100	100	102
Case	ULS/91	7	ULS/10-1	ULS-/91	ULS-/101	7
Mode						
6-0 / M-IN	-5694,054628	-15393,549610	-336,642814	-2584,41	-308,11	-1550,63
Node	102	102	100	102	102	102
Case	ULS/99	ULS/95	7	ULS-/99	ULS-/95	ULS-/95
Mode						
6-1 / M-A-X	5226,916199	15414,991109	2298,445866	2550,20	241,43	1546,96
Node	88	90	88	90	88	90
Case	ULS/95	ULS/95	ULS/10-1	ULS-/99	ULS-/101	ULS-/95
Mode						

	Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
6-1 / M-IN	-5441,391116	-3257,556091	-865,098988		-469,81	-331,78	-381,05
	Node	90	90	88	88	90	90
	Case	ULS/99	7	ULS/81	ULS-/101	ULS-/95	7
	Mode						
6-2 / M-AX	9237,007360	4461,209614	1378,845105		1366,84	89,10	350,27
	Node	98	100	98	98	98	98
	Case	ULS/73	ULS/81	ULS/95	ULS-/101	ULS-/45	ULS-/81
	Mode						
6-2 / M-IN	-1411,169863	-4853,920536	-1474,695882		-1621,74	-12,46	-983,22
	Node	98	98	100	100	98	98
	Case	ULS/10-5	ULS/65	ULS/95	ULS-/95	7	ULS-/101
	Mode						
6-3 / M-AX	4159,917710	3869,316233	1742,485046		1600,97	139,95	927,50
	Node	86	86	86	88	86	86
	Case	ULS/22	ULS/10	ULS/95	ULS-/95	ULS-/45	ULS-/101
	Mode						
6-3 / M-IN	-8481,380310	-2875,320037	-1684,461820		-1462,28	-74,32	-334,65
	Node	86	86	88	86	86	86
	Case	ULS/93	ULS/11-3	ULS/95	ULS-/97	6	ULS-/32
	Mode						
6-4 / M-AX	10364,297339	5257,067953	1385,675833		1343,00	103,20	414,87
	Node	96	98	96	96	98	98
	Case	ULS/73	ULS/65	ULS/91	ULS-/99	ULS-/59	ULS-/81
	Mode						
6-4 / M-IN	-1861,093199	-5800,560210	-1265,513492		-1275,68	-14,17	-989,87
	Node	96	96	98	98	96	98
	Case	ULS/10-5	ULS/65	ULS/91	ULS-/95	7	ULS-/101
	Mode						
6-5 / M-AX	3631,691085	3491,700785	1945,789948		1388,70	199,48	918,04

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Node	86	84	84	86	84	86
Case	ULS/22	ULS/10	ULS/45	ULS-/97	ULS-/45	ULS-/101
Mode						
6-5 / M-IN	-9159,352745	-3527,701572	-1896,500593	-1368,15	-86,41	-317,09
Node	84	86	86	84	84	86
Case	ULS/93	ULS/10	ULS/45	ULS-/97	6	ULS-/82
Mode						
6-6 / M-AX	9721,887675	6441,734674	1065,675265	1509,80	107,64	318,92
Node	96	94	94	94	96	96
Case	ULS/73	ULS/10-1	ULS/59	ULS-/95	ULS-/91	ULS-/81
Mode						
6-6 / M-IN	-2893,480930	-3340,662681	-1458,612831	-1055,80	-94,81	-1209,83
Node	94	94	96	96	94	94
Case	ULS/99	ULS/81	ULS/11-1	ULS-/111	ULS-/97	ULS-/101
Mode						
6-7 / M-AX	4044,775249	2649,145628	1195,189318	1024,18	172,03	1153,76
Node	84	82	84	84	84	82
Case	ULS/22	ULS/66	ULS/77	ULS-/97	ULS-/45	ULS-/101
Mode						
6-7 / M-IN	-8888,832302	-5521,692257	-1817,560430	-1688,74	-91,42	-360,16
Node	84	82	84	82	84	82
Case	ULS/93	ULS/10-9	ULS/95	ULS-/99	6	ULS-/81
Mode						
6-8 / M-AX	8937,684080	3484,587387	1182,223697	1264,98	103,54	277,78
Node	94	94	92	92	94	92
Case	ULS/89	ULS/81	ULS/11-1	ULS-/95	ULS-/85	ULS-/61
Mode						
6-8 / M-IN	-2516,735520	-5020,081120	-1170,319206	-1153,29	-46,53	-1015,34
Node	94	92	94	94	94	94
Case	ULS/97	ULS/61	ULS/91	ULS-/101	ULS-/99	ULS-/101
Mode						

Bar		FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
6-9 / MAX	3981,688260	2986,772243	1433,645660		1211,72	76,90	904,38
	Node	80	82	80	82	80	82
	Case	ULS/10-1	ULS/10-9	ULS/95	ULS-/97	ULS-/95	ULS-/97
	Mode						
6-9 / MIN	-8792,689868	-2052,986465	-963,409441		-1257,50	-85,13	-269,71
	Node	82	82	82	80	82	82
	Case	ULS/93	ULS/66	ULS/10-1	ULS-/95	ULS-/93	ULS-/89
	Mode						
7-0 / MAX	4644,897555	15553,141932	408,342146		2611,11	154,48	326,21
	Node	92	78	78	78	92	78
	Case	ULS/11-1	ULS/10-1	ULS/86	ULS-/97	ULS-/101	6
	Mode						
7-0 / MIN	-5589,422616	-3155,605476	-1922,612397		-936,49	-314,42	-1581,78
	Node	78	78	92	92	78	78
	Case	ULS/97	6	ULS/10-1	ULS-/91	ULS-/95	ULS-/101
	Mode						
7-1 / MAX	4979,611429	2758,759010	670,332573		599,30	186,24	1573,58
	Node	80	76	80	80	80	76
	Case	ULS/10-1	6	6	ULS-/103	ULS-/101	ULS-/101
	Mode						
7-1 / MIN	-5513,434150	-15640,602164	-2227,846734		-2596,40	-335,35	-258,72
	Node	76	76	80	76	76	76
	Case	ULS/97	ULS/10-1	ULS/10-1	ULS-/97	ULS-/95	6
	Mode						
77 / MAX	5300,501373	229,440445	4559,504855		2,83	220,94	27,03
	Node	181	181	180	180	181	180
	Case	ULS/95	ULS/10-1	ULS/10-1	ULS-/95	ULS-/77	6
	Mode						
77 / MIN	-2557,782764	-233,197652	-4553,437011		-2,65	-637,47	-49,29
	Node	181	180	181	181	180	181
	Case	ULS/77	ULS/95	ULS/99	ULS-/95	ULS-/101	ULS-/95
	Mode						

	Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
78 / MAX	4556,330058	438,894899	5451,269020	3,60	278,02	23,15
	Node	153	153	152	152	153	153
	Case	ULS/10-9	ULS/95	ULS/95	ULS-/95	ULS-/81	ULS-/77
	Mode						
78 / MIN	-3480,511905	-473,473534	-5460,666936	-3,41	-623,84	-80,80
	Node	153	152	153	153	153	152
	Case	ULS/65	ULS/95	ULS/99	ULS-/95	ULS-/101	ULS-/95
	Mode						
79 / MAX	9761,320020	301,294018	7002,797681	1,56	273,13	41,34
	Node	154	154	154	155	155	155
	Case	ULS/97	ULS/97	ULS/95	ULS-/97	ULS-/81	ULS-/97
	Mode						
79 / MIN	-3212,605595	-294,980316	-6274,808258	-1,47	-994,92	-20,72
	Node	155	155	155	154	154	155
	Case	ULS/89	ULS/97	ULS/97	ULS-/111	ULS-/101	ULS-/89
	Mode						
80 / MAX	8761,080990	194,637342	6451,997303	2,45	317,75	12,01
	Node	157	157	156	156	157	157
	Case	ULS/97	ULS/95	ULS/95	ULS-/95	ULS-/81	ULS-/77
	Mode						
80 / MIN	-3718,638542	-178,796040	-6463,160830	-2,56	-907,50	-49,27
	Node	157	156	157	157	157	157
	Case	ULS/89	ULS/95	ULS/97	ULS-/95	ULS-/101	ULS-/95
	Mode						
81 / MAX	2496,590665	172,210900	4756,659705	1,62	211,29	36,15
	Node	158	158	158	159	159	158
	Case	ULS/77	ULS/97	ULS/95	ULS-/97	ULS-/81	ULS-/97
	Mode						
81 / MIN	-1765,380561	-188,172684	-4746,979050	-1,62	-339,98	-14,60
	Node	159	159	159	158	159	159
	Case	ULS/3	ULS/97	ULS/10-1	ULS-/97	ULS-/101	ULS-/89
	Mode						
82 / MA-X	10324,363067	366,679737	7489,049076	2,16	427,43	25,77
	Node	161	161	160	160	161	161
	Case	ULS/97	ULS/10-1	ULS/95	ULS-/101	ULS-/81	ULS-/81
	Mode						
82 / MIN	-5477,442679	-366,250088	-7481,417146	-2,06	-1098,90	-56,74
	Node	161	160	161	161	161	160
	Case	ULS/89	ULS/10-1	ULS/97	ULS-/101	ULS-/101	ULS-/97
	Mode						

	Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
83 / MAX	9039,706555	449,027803	7162,335193		3,13	393,77	73,07
	Node	163	162	162	163	163	163
	Case	ULS/97	ULS/10-1	ULS/95	ULS-/97	ULS-/89	ULS-/97
	Mode						
83 / MIN	-4953,068278	-458,916144	-7169,853640		-2,88	-1002,94	-20,74
	Node	163	163	163	162	163	163
	Case	ULS/89	ULS/97	ULS/97	ULS-/101	ULS-/97	ULS-/89
	Mode						
84 / MAX	9801,838230	439,338437	7285,785450		2,35	396,12	27,00
	Node	165	165	164	164	165	165
	Case	ULS/97	ULS/97	ULS/95	ULS-/111	ULS-/89	ULS-/89
	Mode						
84 / MIN	-5081,562562	-451,995541	-7324,216702		-2,35	-1053,02	-70,38
	Node	165	164	165	165	165	164
	Case	ULS/89	ULS/97	ULS/97	ULS-/97	ULS-/97	ULS-/97
	Mode						
85 / MA-X	12412,647428	512,109052	8341,452142		3,61	359,31	77,51
	Node	166	166	166	167	167	167
	Case	ULS/97	ULS/10-1	ULS/95	ULS-/95	ULS-/81	ULS-/95
	Mode						
85 / MIN	-4484,264667	-478,932745	-7612,014007		-3,75	-1277,04	-17,30
	Node	167	167	167	166	166	166
	Case	ULS/89	ULS/95	ULS/97	ULS-/95	ULS-/101	ULS-/78
	Mode						
86 / MAX	3622,006086	299,890375	4780,238098		2,57	140,88	71,80
	Node	168	168	168	169	169	169
	Case	ULS/91	ULS/95	ULS/95	ULS-/95	6	ULS-/95
	Mode						
86 / MIN	-716,269403	-314,822197	-4262,594711		-2,90	-538,45	-45,76
	Node	169	169	169	168	168	168
	Case	6	ULS/95	ULS/95	ULS-/95	ULS-/101	ULS-/77
	Mode						
8-7 / MAX	19160,064364	1120,942463	6480,217009		7,20	293,50	187,53
	Node	171	170	170	171	171	170
	Case	ULS/97	ULS/95	ULS/10-1	ULS-/95	6	ULS-/95
	Mode						
8-7 / MIN	-3989,224248	-1110,368155	-6494,083541		-7,42	-1472,21	-46,66

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Node	170	171	171	170	171	170
Case	ULS/90	ULS/95	ULS/10-1	ULS-/95	ULS-/101	6
Mode						
88 / MAX	6576,386455	31,113891	1820,975013	6,09	500,65	3,08
Node	184	184	185	185	185	185
Case	ULS/95	ULS/91	6	ULS-/81	ULS-/95	ULS-/99
Mode						
88 / MIN	-3224,489372	-61,452662	-7074,784566	-2,52	-852,03	-6,90
Node	184	185	184	184	184	185
Case	6	ULS/85	ULS/95	ULS-/101	ULS-/95	ULS-/85
Mode						
89 / MAX	88,318770	29,784176	140,443054	1,28	67,39	3,40
Node	186	187	186	186	186	187
Case	7	ULS/91	6	ULS-/97	ULS-/101	ULS-/85
Mode						
89 / MIN	-1692,287974	-58,725715	-417,794000	-3,05	-45,30	-2,21
Node	186	186	187	186	187	187
Case	ULS/95	ULS/85	ULS/10-1	ULS-/89	ULS-/95	ULS-/99
Mode						
90 / MAX	1055,828750	26,972497	464,856588	6,27	97,30	4,55
Node	188	188	188	188	186	186
Case	ULS/75	ULS/95	ULS/95	ULS-/89	ULS-/95	ULS-/85
Mode						
90 / MIN	-229,466440	-78,096486	-117,897808	-3,61	-28,69	-5,36
Node	186	188	188	188	188	188
Case	ULS/1	ULS/77	6	ULS-/97	ULS-/101	ULS-/77
Mode						
91 / MAX	18154,637449	62,957765	525,085322	4,03	497,04	1,16
Node	190	190	189	189	189	190
Case	ULS/99	ULS/89	6	ULS-/85	ULS-/99	ULS-/97
Mode						
91 / MIN	-4277,575794	-23,327081	-3810,490558	-0,90	-143,59	-8,42
Node	190	189	190	189	190	190
Case	6	ULS/91	ULS/95	ULS-/99	ULS-/95	ULS-/89
Mode						
92 / MAX	305,889562	38,459292	272,866660	0,29	127,28	1,87
Node	191	189	191	191	191	191
Case	6	ULS/91	6	ULS-/97	ULS-/99	ULS-/99
Mode						
92 / MIN	-683,423404	-49,479815	-937,048212	-2,86	-132,23	-6,80
Node	189	191	189	191	189	191
Case	ULS/10-1	ULS/77	ULS/99	ULS-/89	ULS-/99	ULS-/85
Mode						

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
93 / MAX	0,385132	41,362366	34,386916	0,81	43,31	1,39
Node	192	193	192	192	192	193
Case	10	ULS/89	7	ULS-/95	ULS-/95	ULS-/77
Mode	SRSS					
93 / MIN	-1006,739808	-45,112652	-257,238436	-2,87	-25,94	-1,13
Node	192	192	193	192	193	192
Case	ULS/45	ULS/91	ULS/95	ULS-/77	ULS-/45	ULS-/95
Mode						
94 / MAX	259,657013	39,938009	282,270592	3,17	64,19	1,75
Node	194	192	194	194	192	192
Case	ULS/11-2	ULS/91	ULS/95	ULS-/77	ULS-/95	ULS-/77
Mode						
94 / MIN	-88,787927	-47,348197	-31,718626	-0,98	-13,54	-1,37
Node	192	194	194	194	194	192
Case	ULS/36	ULS/85	7	ULS-/95	ULS-/50	ULS-/95
Mode						
95 / MAX	104,517659	54,121432	220,643732	4,64	50,64	2,58
Node	195	196	195	195	195	196
Case	6	ULS/77	7	ULS-/89	ULS-/95	ULS-/95
Mode						
95 / MIN	-1418,141928	-32,752329	-1294,282061	-0,83	-230,93	-8,73
Node	195	195	196	195	196	196
Case	ULS/99	ULS/91	ULS/99	ULS-/97	ULS-/99	ULS-/77
Mode						
96 / MAX	314,814080	35,526449	2751,139492	1,16	189,59	1,62
Node	195	195	197	195	195	197
Case	ULS/78	ULS/91	ULS/99	ULS-/95	ULS-/99	ULS-/95
Mode						
96 / MIN	-679,290367	-49,288157	-429,462707	-5,35	-389,34	-7,65
Node	195	197	197	195	197	197
Case	ULS/45	ULS/85	7	ULS-/77	ULS-/99	ULS-/77
Mode						
97 / MAX	1245,385297	74,732349	36,810837	3,71	39,38	4,10
Node	199	199	198	198	198	198
Case	ULS/45	ULS/77	ULS/70	ULS-/99	ULS-/95	ULS-/85
Mode						
97 / MIN	-381,136367	-25,482201	-98,258038	-6,36	-9,86	-4,85
Node	198	198	199	198	198	199
Case	7	ULS/95	ULS/99	ULS-/85	7	ULS-/77
Mode						
98 / MAX	278,241669	54,019510	59,324592	3,54	6,89	3,02
Node	200	198	200	200	198	200
Case	7	ULS/85	ULS/97	ULS-/89	ULS-/114	ULS-/85
Mode						

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
98 / MIN	-799,156697	-33,930743	-54,469222	-1,58	-11,87	-2,24
Node	198	200	198	200	198	200
Case	ULS/95	ULS/91	ULS/22	ULS-/97	ULS-/21	ULS-/99
Mode						
100 / MAX	6120,633593	55,189845	8295,546647	2,55	491,16	3,47
Node	202	201	202	201	201	201
Case	ULS/95	ULS/85	ULS/95	ULS-/99	ULS-/95	ULS-/99
Mode						
100 / MIN	-4798,517651	-37,889391	-3850,254487	-5,81	-1014,13	-5,99
Node	202	202	202	201	202	201
Case	ULS/77	ULS/91	6	ULS-/85	ULS-/95	ULS-/85
Mode						
102 / MAX	6469,795925	45,647672	767,483194	3,79	462,72	2,94
Node	204	203	204	203	203	203
Case	ULS/95	ULS/95	7	ULS-/85	ULS-/95	ULS-/95
Mode						
102 / MIN	-761,707664	-36,360870	-7326,275208	-3,24	-882,21	-9,74
Node	204	203	204	204	204	204
Case	7	6	ULS/95	ULS-/99	ULS-/95	ULS-/95
Mode						
104 / MAX	749,506800	23,470829	1,221539	0,56	39,52	1,13
Node	205	206	205	205	205	206
Case	6	ULS/91	10	7	ULS-/71	6
Mode			SRSS			
104 / MIN	-1294,700142	-32,969793	-248,455875	-3,32	-29,12	-1,20
Node	205	205	206	205	206	206
Case	ULS/45	ULS/89	ULS/45	ULS-/111	ULS-/45	ULS-/101
Mode						
105 / MAX	932,360946	12,125250	264,557068	5,04	62,70	3,60
Node	207	205	207	207	205	205
Case	ULS/99	6	ULS/45	ULS-/111	ULS-/45	ULS-/111
Mode						
105 / MIN	-1440,374370	-51,060731	0,009259	-0,69	-30,82	-5,25
Node	205	207	207	207	207	207
Case	ULS/85	ULS/91	11	7	ULS-/69	ULS-/95
Mode			SRSS			
106 / MAX	18670,520403	114,205359	497,989917	3,47	455,39	8,00
Node	209	208	209	209	208	208
Case	ULS/99	ULS/99	6	6	ULS-/95	ULS-/95
Mode						
106 / MIN	-3234,560003	-27,176359	-2851,900840	-10,16	-62,63	-24,18
Node	209	208	209	209	208	209

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Case	7	6	ULS/95	ULS-/95	7	ULS-/99
Mode						
107 / MAX	35,338770	26,964690	236,574782	2,35	141,10	0,72
Node	210	208	210	210	210	208
Case	5	ULS/91	7	ULS-/95	ULS-/99	7
Mode						
107 / MIN	-516,828318	-29,910098	-1093,858069	-1,91	-162,76	-4,44
Node	208	210	208	210	208	208
Case	ULS/18	ULS/81	ULS/99	ULS-/77	ULS-/99	ULS-/111
Mode						
108 / MAX	429,222771	27,177114	83,704617	0,51	57,93	1,16
Node	211	212	211	211	211	211
Case	6	ULS/91	6	7	ULS-/95	ULS-/99
Mode						
108 / MIN	-1078,264210	-30,008411	-331,855564	-3,25	-32,17	-1,48
Node	211	211	212	211	212	212
Case	ULS/45	ULS/85	ULS/45	ULS-/99	ULS-/45	ULS-/99
Mode						
109 / MAX	142,922004	26,289159	349,396206	4,78	73,25	3,49
Node	213	211	213	213	211	211
Case	ULS/82	ULS/77	ULS/45	ULS-/99	ULS-/95	ULS-/95
Mode						
109 / MIN	-316,315608	-36,856890	-91,278982	-0,69	-22,85	-5,68
Node	211	213	213	213	213	213
Case	ULS/18	ULS/91	6	7	ULS-/50	ULS-/99
Mode						
110 / MAX	207,081437	33,688693	204,070915	2,67	75,19	0,37
Node	214	215	214	214	214	214
Case	7	ULS/89	6	ULS-/85	ULS-/45	7
Mode						
110 / MIN	-1408,104932	-21,644133	-1474,888514	-1,22	-262,08	-5,35
Node	214	214	215	215	215	215
Case	ULS/95	ULS/91	ULS/99	ULS-/99	ULS-/99	ULS-/91
Mode						
111 / MAX	355,840946	22,298030	2921,169004	2,10	185,98	0,84
Node	214	214	216	216	214	216
Case	6	ULS/85	ULS/99	ULS-/99	ULS-/95	7
Mode						
111 / MIN	-1084,785318	-31,501225	-676,145018	-3,26	-414,19	-5,54
Node	214	216	216	214	216	216
Case	ULS/45	ULS/91	7	ULS-/85	ULS-/99	ULS-/91
Mode						
112 / MAX	1238,674749	51,476422	102,124238	1,00	41,51	3,50
Node	218	218	217	217	217	217

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Case	ULS/99	ULS/91	ULS/78	7	ULS-/45	ULS-/95
Mode						
112 / MIN	-726,376187	-11,525079	-132,452139	-5,03	-19,25	-5,41
Node	217	217	218	217	217	218
Case	ULS/85	6	ULS/3	ULS-/111	7	ULS-/95
Mode						
113 / MAX	394,729932	33,627553	114,703841	3,26	19,09	1,30
Node	219	217	219	219	217	219
Case	7	ULS/89	ULS/21	ULS-/111	ULS-/69	ULS-/89
Mode						
113 / MIN	-990,240449	-23,482091	-96,964928	-0,46	-14,05	-0,93
Node	217	219	217	219	219	219
Case	ULS/45	ULS/91	ULS/94	7	ULS-/20	ULS-/97
Mode						
114 / MAX	7501,706210	19,477969	8308,795913	4,21	509,44	4,70
Node	220	221	220	220	221	220
Case	ULS/11-1	6	ULS/95	ULS-/95	ULS-/111	7
Mode						
114 / MIN	-1061,237703	-56,434220	-1446,760191	-2,45	-992,89	-11,20
Node	220	220	220	220	220	220
Case	7	ULS/91	7	6	ULS-/95	ULS-/95
Mode						
131 / MAX	1272,921191	39,467887	297,493453	1,97	33,18	19,42
Node	223	223	222	223	223	223
Case	ULS/95	ULS/81	ULS/45	6	ULS-/77	ULS-/101
Mode						
131 / MIN	-513,971332	-88,752369	-401,169953	-11,75	-76,38	-4,71
Node	222	222	223	223	223	222
Case	6	ULS/10-1	ULS/95	ULS-/101	ULS-/95	ULS-/95
Mode						
133 / MAX	2491,738816	45,889037	581,768180	6,73	61,28	12,22
Node	226	226	226	226	226	226
Case	ULS/95	ULS/85	ULS/81	ULS-/77	ULS-/81	ULS-/95
Mode						
133 / MIN	-1481,233493	-32,867774	-550,612887	-12,39	-34,04	-8,28
Node	225	225	226	226	225	226
Case	ULS/77	ULS/99	ULS/10-1	ULS-/95	ULS-/75	ULS-/77
Mode						
134 / MAX	1185,411565	18,159606	377,676136	10,26	51,68	8,42
Node	225	225	225	227	225	227
Case	ULS/97	ULS/11-3	ULS/95	ULS-/101	ULS-/45	ULS-/95

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Mode						
134 / MIN	-846,506519	-45,313911	-493,105868	-6,82	-61,53	-8,64
Node	225	227	225	227	225	227
Case	ULS/89	ULS/61	ULS/77	ULS-/81	ULS-/77	ULS-/77
Mode						
135 / M-AX	3265,418998	41,135449	804,651065	6,91	80,60	16,87
Node	229	229	228	229	229	229
Case	ULS/95	ULS/81	ULS/11-1	ULS-/85	ULS-/91	ULS-/99
Mode						
135 / M-IN	-2031,421311	-55,464111	-145,715100	-16,75	-103,68	-9,00
Node	228	228	229	229	228	229
Case	ULS/77	ULS/10-1	ULS/16	ULS-/99	ULS-/111	ULS-/85
Mode						
136 / MAX	808,069427	32,432568	97,191024	14,39	63,05	13,31
Node	230	228	228	230	230	230
Case	ULS/97	ULS/97	ULS/44	ULS-/99	ULS-/91	ULS-/97
Mode						
136 / MI-N	-1104,475530	-44,899500	-859,103786	-6,25	-109,85	-7,58
Node	228	230	228	230	228	230
Case	ULS/89	ULS/89	ULS/91	ULS-/85	ULS-/93	ULS-/89
Mode						
137 / M-AX	1364,460854	46,979154	875,637444	7,48	95,89	13,85
Node	232	232	232	232	232	232
Case	ULS/95	ULS/89	ULS/93	ULS-/85	ULS-/91	ULS-/97
Mode						
137 / MI-N	-1999,563853	-38,797611	-139,371362	-14,29	-89,01	-8,96
Node	231	231	232	232	231	232
Case	ULS/77	ULS/97	ULS/22	ULS-/99	ULS-/93	ULS-/89
Mode						
138 / M-AX	760,710238	30,342120	188,397154	13,01	81,41	11,89
Node	233	231	231	233	233	233
Case	ULS/95	ULS/10-1	ULS/22	ULS-/99	ULS-/91	ULS-/97
Mode						
138 / MI-N	-1508,164889	-46,097322	-828,020459	-7,36	-105,09	-8,99
Node	231	233	231	233	231	233
Case	ULS/77	ULS/81	ULS/93	ULS-/85	ULS-/93	ULS-/89
Mode						
139 / MAX	958,747216	45,702988	811,926107	6,66	87,17	15,40
Node	235	235	235	235	235	235
Case	ULS/99	ULS/89	ULS/91	ULS-/85	ULS-/91	ULS-/97
Mode						
139 / MI-N	-1816,199102	-42,442192	-209,122839	-16,06	-80,36	-8,23

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Node	234	234	234	235	234	235
Case	ULS/85	ULS/97	ULS/22	ULS-/99	ULS-/93	ULS-/89
Mode						
140 / MAX	2172,154076	40,784506	272,742189	15,88	61,18	14,97
Node	236	234	236	236	236	236
Case	ULS/95	ULS/97	ULS/45	ULS-/99	ULS-/83	ULS-/97
Mode						
140 / MIN	-1304,687005	-44,749422	-881,726546	-6,59	-109,83	-8,17
Node	234	236	234	236	234	236
Case	ULS/77	ULS/89	ULS/91	ULS-/85	ULS-/91	ULS-/89
Mode						
141 / MAX	382,181067	39,782210	651,165734	6,51	77,78	7,92
Node	237	238	238	238	237	238
Case	ULS/10-5	ULS/81	ULS/91	ULS-/81	ULS-/45	ULS-/101
Mode						
141 / MIN	-1628,439662	-17,881167	-513,667308	-10,51	-42,61	-7,70
Node	237	237	237	238	237	238
Case	ULS/73	ULS/91	ULS/45	ULS-/101	6	ULS-/81
Mode						
142 / MAX	2878,193417	43,867264	642,690032	14,59	31,35	14,96
Node	239	237	239	239	239	239
Case	ULS/95	ULS/95	ULS/10-1	ULS-/95	ULS-/81	ULS-/95
Mode						
142 / MIN	-964,256443	-44,724143	-578,890947	-7,04	-71,97	-8,59
Node	237	239	237	239	237	239
Case	6	ULS/77	ULS/91	ULS-/77	ULS-/59	ULS-/77
Mode						
144 / MAX	1067,310839	87,947556	451,360412	11,61	24,01	19,17
Node	241	240	241	241	241	241
Case	ULS/95	ULS/95	ULS/95	ULS-/95	6	ULS-/95
Mode						
144 / MIN	-237,232283	-35,823734	-271,119705	-2,50	-76,82	-4,75
Node	240	241	240	241	241	240
Case	6	ULS/77	ULS/45	7	ULS-/95	ULS-/95
Mode						
145 / MAX	1423,551762	88,954871	368,398296	11,82	20,33	4,70
Node	244	243	243	244	244	243
Case	ULS/95	ULS/10-1	ULS/95	ULS-/101	7	ULS-/101
Mode						
145 / MIN	-159,010293	-57,138270	-470,324379	-2,37	-83,90	-19,45
Node	243	243	244	244	244	244

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Case	7	ULS/81	ULS/95	6	ULS-/95	ULS-/101
Mode						
147 / MAX	2368,479878	67,194606	213,117681	12,43	44,31	2,09
Node	247	247	246	247	246	247
Case	ULS/95	ULS/91	ULS/95	ULS-/111	ULS-/61	7
Mode						
147 / MIN	-348,295242	-29,436315	-538,391364	-2,03	-46,16	-13,05
Node	247	246	247	247	247	247
Case	7	ULS/77	ULS/10-1	7	ULS-/71	ULS-/111
Mode						
148 / MAX	1175,924678	28,903838	435,241311	1,60	64,35	1,37
Node	246	246	246	248	246	248
Case	ULS/11-1	ULS/65	ULS/59	7	ULS-/59	ULS-/82
Mode						
148 / MIN	-406,538341	-62,968261	-262,632148	-10,58	-18,75	-12,29
Node	248	248	248	248	248	248
Case	ULS/90	ULS/93	ULS/10-1	ULS-/111	6	ULS-/91
Mode						
149 / MAX	2924,342981	54,478961	802,956572	14,60	91,88	2,79
Node	250	250	249	250	249	250
Case	ULS/95	ULS/91	ULS/99	ULS-/95	ULS-/85	7
Mode						
149 / MIN	-436,726894	-38,648439	-783,048526	-2,69	-106,85	-15,13
Node	250	249	250	250	249	250
Case	7	ULS/89	ULS/69	7	ULS-/99	ULS-/111
Mode						
150 / MAX	1445,681327	23,668796	790,541954	2,19	104,98	2,06
Node	249	249	249	251	249	251
Case	ULS/91	ULS/81	ULS/89	7	ULS-/89	7
Mode						
150 / MIN	-202,576658	-72,810547	-280,721559	-12,90	-60,22	-13,11
Node	251	251	249	251	251	251
Case	7	ULS/91	ULS/97	ULS-/111	ULS-/89	ULS-/111
Mode						
151 / MAX	2226,779104	64,889536	493,407084	13,65	98,20	2,47
Node	252	253	252	253	252	253
Case	ULS/59	ULS/91	ULS/97	ULS-/95	ULS-/89	7
Mode						
151 / MIN	-63,464520	-33,620625	-940,090620	-2,46	-98,22	-14,12
Node	253	252	253	253	253	253
Case	7	ULS/81	ULS/69	7	ULS-/85	ULS-/111

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Mode						
152 / MAX	1430,844276	30,152726	946,882967	2,23	125,52	2,08
Node	252	252	252	254	252	254
Case	ULS/75	ULS/89	ULS/73	7	ULS-/73	7
Mode						
152 / MIN	-335,928799	-65,260385	-370,317510	-12,63	-68,79	-12,57
Node	254	254	254	254	254	254
Case	ULS/62	ULS/91	ULS/97	ULS-/111	ULS-/89	ULS-/91
Mode						
153 / MAX	2052,832830	65,495807	301,604776	14,39	87,58	2,59
Node	255	256	255	256	255	256
Case	ULS/91	ULS/91	ULS/97	ULS-/95	ULS-/73	7
Mode						
153 / MIN	-41,153427	-33,144167	-843,453124	-2,63	-87,06	-14,32
Node	256	255	256	256	256	256
Case	4	ULS/81	ULS/89	7	ULS-/89	ULS-/111
Mode						
154 / MAX	1782,520980	39,186069	910,534608	2,56	116,91	2,49
Node	257	255	255	257	255	257
Case	ULS/95	ULS/89	ULS/85	7	ULS-/89	7
Mode						
154 / MIN	-388,634843	-59,763719	-575,180343	-14,39	-63,18	-13,93
Node	257	257	255	257	257	257
Case	7	ULS/91	ULS/99	ULS-/95	ULS-/85	ULS-/111
Mode						
155 / MAX	1529,940396	65,294619	305,049406	10,84	76,56	1,59
Node	258	259	259	259	258	259
Case	ULS/93	ULS/91	ULS/10-1	ULS-/111	ULS-/45	7
Mode						
155 / MIN	-431,898454	-24,478347	-582,648633	-2,02	-55,52	-12,47
Node	259	258	259	259	259	259
Case	ULS/20	ULS/81	ULS/81	7	ULS-/81	ULS-/91
Mode						
156 / MAX	2876,096848	32,083967	685,778385	2,68	77,48	2,77
Node	260	258	260	260	258	260
Case	ULS/95	ULS/77	ULS/10-1	7	ULS-/77	7
Mode						
156 / MIN	-541,763746	-67,635332	-404,063621	-14,35	-42,88	-15,42
Node	260	260	258	260	260	260
Case	7	ULS/91	ULS/95	ULS-/95	ULS-/18	ULS-/111
Mode						
158 / MAX	1048,149268	58,687767	475,627664	2,51	21,11	4,43

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Node	262	261	262	262	261	261
Case	ULS/95	ULS/77	ULS/95	7	7	ULS-/95
Mode						
158 / MI-N	-249,723252	-87,062090	-279,873929	-11,67	-79,98	-19,22
Node	262	261	261	262	262	262
Case	6	ULS/95	ULS/45	ULS-/95	ULS-/95	ULS-/95
Mode						
1-7-1 / M-A-X	8320,655233	270,230657	15564,707578	13,03	1606,39	20,82
Node	244	245	244	245	244	245
Case	ULS/97	ULS/97	ULS/95	ULS-/97	ULS-/95	ULS-/97
Mode						
171 / MIN	-1475,041129	-54,372270	-3388,602266	-2,67	-346,52	-26,33
Node	244	245	244	245	244	244
Case	7	7	6	7	6	ULS-/97
Mode						
172 / MAX	1836,529830	169,116315	7960,513323	2,43	692,03	12,30
Node	247	264	247	264	247	264
Case	ULS/81	ULS/97	ULS/95	ULS-/105	ULS-/95	ULS-/97
Mode						
172 / M-IN	-3821,411133	-30,107318	-1906,858789	-2,02	-145,90	-4,08
Node	264	264	264	264	247	247
Case	ULS/10-1	7	ULS/11-1	ULS-/73	ULS-/78	ULS-/113
Mode						
173 / MAX	1450,232735	120,122949	2111,608941	1,03	129,88	7,14
Node	248	264	264	248	248	264
Case	ULS/10-9	ULS/95	ULS/91	ULS-/1	ULS-/70	ULS-/95
Mode						
173 / MI-N	-421,000649	-89,913561	-3163,713918	-0,20	-229,87	-6,22
Node	248	248	248	264	248	248
Case	ULS/66	ULS/97	ULS/93	2	ULS-/93	ULS-/89
Mode						
174 / MAX	1535,838828	132,165534	9082,996164	4,43	832,30	9,35
Node	250	265	250	265	250	265
Case	ULS/93	ULS/97	ULS/97	ULS-/97	ULS-/97	ULS-/97
Mode						
174 / MIN	-1212,763474	-23,392530	-1804,070563	-1,22	-171,67	-10,32
Node	265	250	265	265	250	250
Case	ULS/99	ULS/66	ULS/73	ULS-/90	ULS-/90	ULS-/101
Mode						

Bar		FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
175 / MAX	2007,509760	171,685230	1698,917708		1,58	133,94	11,46
	Node	251	265	265	265	251	265
	Case	ULS/69	ULS/97	ULS/73	ULS-/89	7	ULS-/95
	Mode						
175 / M-IN	-2412,358222	-37,897304	-8408,731968		-2,88	-760,18	-3,77
	Node	265	251	251	265	251	251
	Case	ULS/99	ULS/95	ULS/97	ULS-/97	ULS-/97	ULS-/91
	Mode						
176 / MAX	1825,721872	169,327595	8853,344854		2,66	787,82	11,60
	Node	266	266	253	266	253	266
	Case	ULS/85	ULS/97	ULS/97	ULS-/105	ULS-/97	ULS-/97
	Mode						
176 / M-IN	-3015,156772	-30,588371	-2412,254820		-2,37	-186,77	-4,84
	Node	266	266	266	266	253	253
	Case	ULS/99	7	ULS/59	ULS-/73	ULS-/90	ULS-/105
	Mode						
177 / MAX	2468,574128	160,092651	2265,827489		1,56	156,13	10,66
	Node	254	266	266	266	254	266
	Case	ULS/87	ULS/97	ULS/59	ULS-/73	ULS-/90	ULS-/99
	Mode						
177 / M-IN	-1929,106930	-63,716306	-6268,194448		-1,57	-543,93	-4,80
	Node	266	254	254	266	254	254
	Case	ULS/99	ULS/95	ULS/97	ULS-/105	ULS-/97	ULS-/93
	Mode						
178 / MAX	1327,370323	173,438883	8733,023849		2,83	788,33	11,88
	Node	256	267	256	267	256	267
	Case	ULS/71	ULS/97	ULS/97	ULS-/97	ULS-/97	ULS-/99
	Mode						
178 / M-IN	-2022,361456	-30,943931	-2176,568925		-1,86	-174,63	-4,80
	Node	267	267	267	267	256	256
	Case	ULS/99	7	ULS/59	ULS-/89	ULS-/90	ULS-/111
	Mode						
179 / MAX	2618,786909	167,320805	2052,418340		2,06	199,21	11,47
	Node	267	267	257	267	257	267
	Case	ULS/85	ULS/97	ULS/90	ULS-/73	ULS-/90	ULS-/97
	Mode						
179 / M-IN	-3464,781728	-29,897488	-9013,062510		-2,63	-801,79	-4,23
	Node	267	267	257	267	257	257
	Case	ULS/99	7	ULS/97	ULS-/105	ULS-/97	ULS-/105
	Mode						

Bar		FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
180 / MAX	1147,273893	134,117318	3214,707912	0,34	226,50	8,11	
	Node	259	268	259	259	259	259
	Case	ULS/71	ULS/10-1	ULS/91	7	ULS-/91	ULS-/99
	Mode						
180 / MIN	-782,091047	-134,736204	-2032,651412	-2,01	-46,54	-7,16	
	Node	268	259	268	259	259	259
	Case	ULS/10-7	ULS/95	ULS/91	ULS-/95	ULS-/90	ULS-/85
	Mode						
181 / MAX	2825,335153	181,450513	1936,088678	1,88	168,83	13,84	
	Node	268	268	268	268	260	268
	Case	ULS/77	ULS/97	ULS/95	ULS-/89	7	ULS-/97
	Mode						
181 / MIN	-4070,330527	-32,110597	-10020,444058	-3,51	-887,95	-7,97	
	Node	268	268	260	268	260	260
	Case	ULS/95	7	ULS/95	ULS-/97	ULS-/101	ULS-/101
	Mode						
183 / MAX	8219,486538	270,728085	3579,266776	2,54	357,37	20,87	
	Node	262	263	262	263	262	263
	Case	ULS/99	ULS/99	6	6	6	ULS-/99
	Mode						
18-3 / MIN	-1629,975035	-45,905716	-15883,189038	-12,82	-1609,98	-26,16	
	Node	262	263	262	263	262	262
	Case	7	6	ULS/95	ULS-/99	ULS-/95	ULS-/99
	Mode						
184 / MAX	8321,299084	319,437750	2828,509649	2,68	298,28	25,33	
	Node	223	224	223	224	223	224
	Case	ULS/97	ULS/97	7	7	7	ULS-/97
	Mode						
1-8-4 / MIN	-2056,017989	-109,229014	-15532,973731	-13,12	-1653,66	-15,14	
	Node	223	223	223	224	223	223
	Case	ULS/89	ULS/95	ULS/95	ULS-/97	ULS-/101	ULS-/97
	Mode						
185 / MAX	555,485870	240,549569	2382,401407	1,07	195,10	17,54	
	Node	269	269	226	269	226	269
	Case	7	ULS/10-1	ULS/77	ULS-/74	ULS-/77	ULS-/101
	Mode						
185 / MIN	-4253,025868	-175,758614	-7916,016462	-2,27	-693,52	-5,03	
	Node	269	226	226	269	226	269

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Case	ULS/10-1	ULS/95	ULS/95	ULS-/105	ULS-/95	ULS-/81
Mode						
186 / MAX	1225,718214	133,082092	2344,603118	0,24	281,72	9,34
Node	227	227	227	227	227	269
Case	ULS/10-3	ULS/97	ULS/10-7	6	ULS-/69	ULS-/95
Mode						
186 / MIN	-1312,668871	-149,682535	-3137,911938	-1,24	-186,90	-6,15
Node	227	269	227	227	227	269
Case	ULS/61	ULS/95	ULS/69	ULS-/97	ULS-/107	ULS-/77
Mode						
187 / MAX	342,018050	198,853183	2702,042520	1,56	230,47	14,78
Node	229	270	229	270	229	270
Case	2	ULS/10-1	ULS/77	ULS-/74	ULS-/89	ULS-/97
Mode						
187 / M-IN	-2267,071019	-89,379055	-9380,692764	-4,23	-862,70	-5,83
Node	270	229	229	270	229	270
Case	ULS/91	ULS/95	ULS/95	ULS-/105	ULS-/97	ULS-/89
Mode						
188 / MAX	395,508281	173,409857	8085,823809	2,17	160,33	16,06
Node	270	230	230	270	230	270
Case	7	ULS/97	ULS/97	ULS-/105	ULS-/90	ULS-/99
Mode						
188 / MIN	-2686,744295	-227,427996	-1849,338398	-0,85	-724,85	-4,65
Node	270	270	230	270	230	270
Case	ULS/99	ULS/97	ULS/89	ULS-/74	ULS-/97	ULS-/85
Mode						
189 / MAX	411,046073	239,020266	2670,515381	1,93	229,68	16,80
Node	271	271	232	232	232	271
Case	7	ULS/10-1	ULS/89	ULS-/22	ULS-/90	ULS-/101
Mode						
189 / MIN	-3139,469984	-179,214618	-8624,797088	-2,47	-780,37	-6,12
Node	271	232	232	271	232	271
Case	ULS/99	ULS/95	ULS/97	ULS-/105	ULS-/97	ULS-/81
Mode						
190 / MAX	324,253181	167,796471	6166,569341	1,51	212,10	14,75
Node	233	233	233	271	233	271
Case	ULS/10-9	ULS/99	ULS/97	ULS-/105	ULS-/89	ULS-/99
Mode						
190 / MIN	-2739,783909	-212,911458	-2542,116297	-1,70	-540,38	-6,07
Node	271	271	233	271	233	271

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Case	ULS/12	ULS/97	ULS/89	ULS-/22	ULS-/97	ULS-/85
Mode						
191 / MAX	776,155010	241,142818	2733,988646	1,40	232,42	17,46
Node	235	272	235	235	235	272
Case	ULS/10-9	ULS/97	ULS/89	ULS-/22	ULS-/89	ULS-/99
Mode						
191 / MIN	-2834,398563	-173,145581	-8987,450551	-2,54	-810,61	-5,65
Node	272	235	235	272	235	272
Case	ULS/48	ULS/99	ULS/97	ULS-/105	ULS-/97	ULS-/85
Mode						
192 / MAX	558,035465	180,674012	9035,840896	2,46	235,78	17,37
Node	272	236	236	272	236	272
Case	7	ULS/95	ULS/97	ULS-/105	ULS-/90	ULS-/97
Mode						
192 / MIN	-3692,899227	-240,872160	-2323,402568	-2,05	-807,82	-5,55
Node	272	272	272	236	236	272
Case	ULS/99	ULS/97	ULS/45	ULS-/22	ULS-/97	ULS-/89
Mode						
193 / MAX	707,089291	169,485563	2036,502309	2,26	145,37	10,56
Node	238	273	238	238	238	273
Case	ULS/10-1	ULS/99	ULS/73	ULS-/97	ULS-/73	ULS-/95
Mode						
193 / MIN	-1028,462853	-169,772885	-1525,113931	-0,80	-122,84	-5,46
Node	273	238	238	238	273	273
Case	ULS/99	ULS/97	ULS/10-5	6	ULS-/97	ULS-/77
Mode						
194 / MAX	789,867824	171,186334	9501,208021	3,09	167,99	19,86
Node	273	239	239	273	239	273
Case	7	ULS/95	ULS/95	ULS-/97	7	ULS-/101
Mode						
194 / MIN	-4156,897288	-261,819616	-1935,194860	-0,88	-855,61	-5,52
Node	273	273	239	273	239	273
Case	ULS/10-1	ULS/95	6	ULS-/90	ULS-/95	ULS-/81
Mode						
19-6 / M-AX	8200,449692	115,441548	15779,751592	12,84	302,25	25,33
Node	241	241	241	242	241	242
Case	ULS/97	ULS/95	ULS/95	ULS-/99	7	ULS-/99
Mode						
19-6 / MIN	-2434,264999	-318,732948	-2832,433176	-2,41	-1650,69	-14,43

Bar	FX (N)	FY (N)	FZ (N)	MX (Nm)	MY (Nm)	MZ (Nm)
Node	241	242	241	242	241	241
Case	ULS/89	ULS/95	7	6	ULS-/95	ULS-/99
Mode						

Member Verification

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 2 Beam_2 **POINT:** 1 **COORDINATE:** x = 0.06 L = 750.00 mm

---

LOADS:
Governing Load Case: 12 ULS /45/ 1*1.25 + 2*0.50 + 3*1.50 + 5*1.50 + 4*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: HEA 240

d=230.0 mm
b=240.0 mm Ay=5760.00 mm2 Az=1725.00 mm2 A=7680.00 mm2
w=7.5 mm Iy=77630000.00 mm4 Iz=27690000.00 mm4 J=421000.00 mm4
t=12.0 mm Sy=675043.48 mm3 Sz=230750.00 mm3

INTERNAL FORCES AND CAPACITIES:

Cf = 104225.717892 N Mfy = -17934.44 N*m Mfz = -12333.30 N*m
Cr0 = 2453760.000000 N Mry = 215676.39 N*m Mrz = 73724.63 N*m
Vfy = -33961.369958 N Vfz = 30594.375250 N
CLASS: = Semi-compact Vry = 1214611.200000 N Vrz = 363750.750000 N

LATERAL BUCKLING PARAMETERS:

Le = 13250.00 mm om2 = 2.08 Mre = 176164.26 N*m
k = 0.73 Mu = 231584.61 N*m

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:

Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.38 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.73 < 1.00 (13.8.3(c))
Vfy/Vry = 0.03 < 1.00 (13.4.1) Vfz/Vrz = 0.08 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections

uy = 0.0 mm < uy max = L/300.00 = 44.2 mm Verified
Governing Load Case: 15 SLS /1/ 1*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 44.2 mm Verified
Governing Load Case: 15 SLS /1/ 1*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 3 Beam_3 **POINT:** 4 **COORDINATE:** x = 0.50 L = 2100.00 mm

---

LOADS:
Governing Load Case: 12 ULS /45/ 1*1.25 + 2*0.50 + 3*1.50 + 5*1.50 + 4*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: HEA 240

d=230.0 mm

b=240.0 mm	Ay=5760.00 mm2	Az=1725.00 mm2	A=7680.00 mm2
w=7.5 mm	Iy=77630000.00 mm4	Iz=27690000.00 mm4	J=421000.00 mm4
t=12.0 mm	Sy=675043.48 mm3	Sz=230750.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -81969.069138 N	Mfy = 11119.62 N*m	Mfz = -547.38 N*m
Tr = 2453760.000000 N	Mry = 215676.39 N*m	Mrz = 73724.63 N*m
	Vfy = -280.811121 N	Vfz = 649.343204 N
CLASS: = Semi-compact	Vry = 1214611.200000 N	Vrz = 363750.750000 N

LATERAL BUCKLING PARAMETERS:

Le = 4200.00 mm	om2 = 1.17	Mre = 215676.39 N*m
k = 0.98	Mu = 566567.26 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.09 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.03 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.9 mm < uz max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 4 Beam_4 **POINT:** 7 **COORDINATE:** x = 0.94 L = 12500.00 mm

---

LOADS:
Governing Load Case: 12 ULS /45/ 1*1.25 + 2*0.50 + 3*1.50 + 5*1.50 + 4*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: HEA 240

d=230.0 mm

b=240.0 mm	Ay=5760.00 mm2	Az=1725.00 mm2	A=7680.00 mm2
w=7.5 mm	Iy=77630000.00 mm4	Iz=27690000.00 mm4	J=421000.00 mm4
t=12.0 mm	Sy=675043.48 mm3	Sz=230750.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 106091.502656 N	Mfy = -16945.21 N*m	Mfz = -11317.14 N*m
Cr0 = 2453760.000000 N	Mry = 215676.39 N*m	Mrz = 73724.63 N*m
	Vfy = 33124.920552 N	Vfz = -31843.498049 N
CLASS: = Semi-compact	Vry = 1214611.200000 N	Vrz = 363750.750000 N

LATERAL BUCKLING PARAMETERS:

Le = 13250.00 mm	om2 = 2.03	Mre = 174423.23 N*m
k = 0.02	Mu = 226106.74 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.36 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.71 < 1.00 (13.8.3(c))
Vfy/Vry = 0.03 < 1.00 (13.4.1) Vfz/Vrz = 0.09 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 44.2 mm Verified
Governing Load Case: 15 SLS /1/ 1*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 44.2 mm Verified
Governing Load Case: 15 SLS /1/ 1*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 5 Beam_5 **POINT:** 7 **COORDINATE:** x = 1.00 L = 4200.00 mm

---

LOADS:
Governing Load Case: 12 ULS /50/ 1*1.25 + 2*0.50 + 3*1.50 + 4*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: HEA 240

d=230.0 mm

b=240.0 mm	Ay=5760.00 mm2	Az=1725.00 mm2	A=7680.00 mm2
w=7.5 mm	Iy=77630000.00 mm4	Iz=27690000.00 mm4	J=421000.00 mm4
t=12.0 mm	Sy=675043.48 mm3	Sz=230750.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -27668.949365 N	Mfy = -1419.54 N*m	Mfz = 5460.16 N*m
Tr = 2453760.000000 N	Mry = 215676.39 N*m	Mrz = 73724.63 N*m
	Vfy = -2539.926948 N	Vfz = -10831.081198 N
CLASS: = Semi-compact	Vry = 1214611.200000 N	Vrz = 363750.750000 N

LATERAL BUCKLING PARAMETERS:

Le = 4200.00 mm	om2 = 1.18	Mre = 215676.39 N*m
k = 0.91	Mu = 573602.64 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.09 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.07 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.03 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.3 mm < uy max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.7 mm < uz max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /21/ 1*1.00 + 7*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 6 Beam_6 **POINT:** 1 **COORDINATE:** x = 0.62 L = 2610.00 mm

---

LOADS:
Governing Load Case: 12 ULS /45/ 1*1.25 + 2*0.50 + 3*1.50 + 5*1.50 + 4*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: HEA 180

d=171.0 mm

b=180.0 mm	Ay=3420.00 mm2	Az=1026.00 mm2	A=4530.00 mm2
w=6.0 mm	Iy=25100000.00 mm4	Iz=9250000.00 mm4	J=148900.00 mm4
t=9.5 mm	Sy=293567.25 mm3	Sz=102777.78 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -110764.308891 N	Mfy = 15724.37 N*m	Mfz = -149.59 N*m
Tr = 1447335.000000 N	Mry = 93794.74 N*m	Mrz = 32837.50 N*m
	Vfy = 74.396519 N	Vfz = -7589.843139 N
CLASS: = Semi-compact	Vry = 721175.400000 N	Vrz = 216352.620000 N

LATERAL BUCKLING PARAMETERS:

Le = 4200.00 mm	om2 = 1.26	Mre = 90463.96 N*m
k = 0.83	Mu = 180892.83 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.25 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.10 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 3.2 mm < uz max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 7 Beam_7 **POINT:** 1 **COORDINATE:** x = 0.62 L = 2610.00 mm

---

LOADS:
Governing Load Case: 12 ULS /45/ 1*1.25 + 2*0.50 + 3*1.50 + 5*1.50 + 4*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: HEA 180

d=171.0 mm

b=180.0 mm	Ay=3420.00 mm2	Az=1026.00 mm2	A=4530.00 mm2
w=6.0 mm	Iy=25100000.00 mm4	Iz=9250000.00 mm4	J=148900.00 mm4
t=9.5 mm	Sy=293567.25 mm3	Sz=102777.78 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -99563.814729 N	Mfy = 16417.75 N*m	Mfz = 97.30 N*m
Tr = 1447335.000000 N	Mry = 93794.74 N*m	Mrz = 32837.50 N*m
	Vfy = -133.737758 N	Vfz = -8060.818056 N
CLASS: = Semi-compact	Vry = 721175.400000 N	Vrz = 216352.620000 N

LATERAL BUCKLING PARAMETERS:

Le = 4200.00 mm	om2 = 1.31	Mre = 91182.37 N*m
k = 0.72	Mu = 188683.23 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.25 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.11 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 3.1 mm < uz max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 8 dJC_Bm_Crn_8 **POINT:** 1 **COORDINATE:** x = 0.60 L = 6905.00 mm

---

LOADS:
Governing Load Case: 12 ULS /22/ 1*1.25 + 5*1.50 + 7*0.40 + 4*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: IPE 140

d=140.0 mm

b=73.0 mm	Ay=1007.40 mm2	Az=658.00 mm2	A=1643.00 mm2
w=4.7 mm	Iy=5410000.00 mm4	Iz=449000.00 mm4	J=23990.00 mm4
t=6.9 mm	Zy=88400.00 mm3	Zz=19240.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -7384.218399 N	Mfy = 2013.67 N*m	Mfz = 79.03 N*m
Tr = 524938.500000 N	Mry = 28243.80 N*m	Mrz = 6147.18 N*m
	Vfy = 138.417082 N	Vfz = -2993.954091 N
CLASS: = Plastic	Vry = 212430.438000 N	Vrz = 138752.460000 N

LATERAL BUCKLING PARAMETERS:

Le = 11500.00 mm	om2 = 2.50	Mre = 8374.72 N*m
k = 0.00	Mu = 9305.24 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.10 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.21 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.02 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.3 mm < uy max = L/600.00 = 19.2 mm Verified
Governing Load Case: 15 SLS /24/ 1*1.00 + 6*1.00 + 5*1.00 + 4*1.00
uz = 1.1 mm < uz max = L/600.00 = 19.2 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Instability !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 9 Beam_9 **POINT:** 1 **COORDINATE:** x = 0.62 L = 2610.00 mm

---

LOADS:
Governing Load Case: 12 ULS /15/ 1*1.25 + 6*0.40 + 4*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: HEA 180

d=171.0 mm

b=180.0 mm	Ay=3420.00 mm2	Az=1026.00 mm2	A=4530.00 mm2
w=6.0 mm	Iy=25100000.00 mm4	Iz=9250000.00 mm4	J=148900.00 mm4
t=9.5 mm	Sy=293567.25 mm3	Sz=102777.78 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -101456.724164 N	Mfy = 16103.27 N*m	Mfz = -14.36 N*m
Tr = 1447335.000000 N	Mry = 93794.74 N*m	Mrz = 32837.50 N*m
	Vfy = 124.785194 N	Vfz = -7960.835436 N
CLASS: = Semi-compact	Vry = 721175.400000 N	Vrz = 216352.620000 N

LATERAL BUCKLING PARAMETERS:

Le = 4200.00 mm	om2 = 1.30	Mre = 91003.80 N*m
k = 0.77	Mu = 186684.75 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.24 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.11 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.2 mm < uy max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 3.1 mm < uz max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /20/ 1*1.00 + 6*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 10 Beam_10 **POINT:** 1 **COORDINATE:** x = 0.62 L = 2610.00 mm

---

LOADS:
Governing Load Case: 12 ULS /45/ 1*1.25 + 2*0.50 + 3*1.50 + 5*1.50 + 4*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: HEA 180

d=171.0 mm

b=180.0 mm	Ay=3420.00 mm2	Az=1026.00 mm2	A=4530.00 mm2
w=6.0 mm	Iy=25100000.00 mm4	Iz=9250000.00 mm4	J=148900.00 mm4
t=9.5 mm	Sy=293567.25 mm3	Sz=102777.78 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -107782.638615 N	Mfy = 15849.25 N*m	Mfz = 87.84 N*m
Tr = 1447335.000000 N	Mry = 93794.74 N*m	Mrz = 32837.50 N*m
	Vfy = -145.361502 N	Vfz = -8072.786643 N
CLASS: = Semi-compact	Vry = 721175.400000 N	Vrz = 216352.620000 N

LATERAL BUCKLING PARAMETERS:

Le = 4200.00 mm	om2 = 1.29	Mre = 90911.02 N*m
k = 0.98	Mu = 185663.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.25 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.10 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.2 mm < uy max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 3.1 mm < uz max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /20/ 1*1.00 + 6*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 11 dJC_Bm_Crn_11 **POINT:** 7 **COORDINATE:** x = 0.90 L = 10355.00 mm

---

LOADS:
Governing Load Case: 12 ULS /48/ 1*1.25 + 2*0.50 + 3*1.50 + 5*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: IPE 140

d=140.0 mm

b=73.0 mm	Ay=1007.40 mm2	Az=658.00 mm2	A=1643.00 mm2
w=4.7 mm	Iy=5410000.00 mm4	Iz=449000.00 mm4	J=23990.00 mm4
t=6.9 mm	Zy=88400.00 mm3	Zz=19240.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -3361.719727 N	Mfy = -749.41 N*m	Mfz = 9.47 N*m
Tr = 524938.500000 N	Mry = 28243.80 N*m	Mrz = 6147.18 N*m
	Vfy = -7.920320 N	Vfz = -754.403236 N
CLASS: = Plastic	Vry = 212430.438000 N	Vrz = 138752.460000 N

LATERAL BUCKLING PARAMETERS:

Le = 11500.00 mm	om2 = 1.30	Mre = 4343.60 N*m
k = 0.00	Mu = 4826.22 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.03 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.13 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.2 mm < uy max = L/600.00 = 19.2 mm Verified
Governing Load Case: 15 SLS /20/ 1*1.00 + 6*1.00 + 4*1.00
uz = 0.8 mm < uz max = L/600.00 = 19.2 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Instability !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 12 Beam_12 **POINT:** 1 **COORDINATE:** x = 0.62 L = 2610.00 mm

---

LOADS:
Governing Load Case: 12 ULS /45/ 1*1.25 + 2*0.50 + 3*1.50 + 5*1.50 + 4*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: HEA 180

d=171.0 mm

b=180.0 mm	Ay=3420.00 mm2	Az=1026.00 mm2	A=4530.00 mm2
w=6.0 mm	Iy=25100000.00 mm4	Iz=9250000.00 mm4	J=148900.00 mm4
t=9.5 mm	Sy=293567.25 mm3	Sz=102777.78 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -109867.395796 N	Mfy = 16168.76 N*m	Mfz = -149.86 N*m
Tr = 1447335.000000 N	Mry = 93794.74 N*m	Mrz = 32837.50 N*m
	Vfy = 148.425593 N	Vfz = -7679.587559 N
CLASS: = Semi-compact	Vry = 721175.400000 N	Vrz = 216352.620000 N

LATERAL BUCKLING PARAMETERS:

Le = 4200.00 mm	om2 = 1.27	Mre = 90657.07 N*m
k = 0.79	Mu = 182923.01 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.25 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.10 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.2 mm < uy max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 3.2 mm < uz max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 13 Beam_13 **POINT:** 1 **COORDINATE:** x = 0.62 L = 2610.00 mm

---

LOADS:
Governing Load Case: 12 ULS /45/ 1*1.25 + 2*0.50 + 3*1.50 + 5*1.50 + 4*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: HEA 180

d=171.0 mm

b=180.0 mm	Ay=3420.00 mm2	Az=1026.00 mm2	A=4530.00 mm2
w=6.0 mm	Iy=25100000.00 mm4	Iz=9250000.00 mm4	J=148900.00 mm4
t=9.5 mm	Sy=293567.25 mm3	Sz=102777.78 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -105707.285934 N	Mfy = 16632.96 N*m	Mfz = 107.90 N*m
Tr = 1447335.000000 N	Mry = 93794.74 N*m	Mrz = 32837.50 N*m
	Vfy = -93.853108 N	Vfz = -8529.350177 N
CLASS: = Semi-compact	Vry = 721175.400000 N	Vrz = 216352.620000 N

LATERAL BUCKLING PARAMETERS:

Le = 4200.00 mm	om2 = 1.30	Mre = 91014.06 N*m
k = 0.66	Mu = 186798.46 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.25 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.11 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 3.2 mm < uz max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 14 Beam_14 **POINT:** 1 **COORDINATE:** x = 0.62 L = 2610.00 mm

---

LOADS:
Governing Load Case: 12 ULS /15/ 1*1.25 + 6*0.40 + 4*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: HEA 180

d=171.0 mm

b=180.0 mm	Ay=3420.00 mm2	Az=1026.00 mm2	A=4530.00 mm2
w=6.0 mm	Iy=25100000.00 mm4	Iz=9250000.00 mm4	J=148900.00 mm4
t=9.5 mm	Sy=293567.25 mm3	Sz=102777.78 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -101386.489506 N	Mfy = 16236.70 N*m	Mfz = 5.57 N*m
Tr = 1447335.000000 N	Mry = 93794.74 N*m	Mrz = 32837.50 N*m
	Vfy = 137.540139 N	Vfz = -8041.278213 N
CLASS: = Semi-compact	Vry = 721175.400000 N	Vrz = 216352.620000 N

LATERAL BUCKLING PARAMETERS:

Le = 4200.00 mm	om2 = 1.30	Mre = 91063.15 N*m
k = 0.73	Mu = 187344.21 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.24 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.11 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.2 mm < uy max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 3.1 mm < uz max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /20/ 1*1.00 + 6*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 15 Beam_15 **POINT:** 1 **COORDINATE:** x = 0.62 L = 2610.00 mm

---

LOADS:
Governing Load Case: 12 ULS /15/ 1*1.25 + 6*0.40 + 4*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: HEA 180

d=171.0 mm

b=180.0 mm	Ay=3420.00 mm2	Az=1026.00 mm2	A=4530.00 mm2
w=6.0 mm	Iy=25100000.00 mm4	Iz=9250000.00 mm4	J=148900.00 mm4
t=9.5 mm	Sy=293567.25 mm3	Sz=102777.78 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -101548.280130 N	Mfy = 16246.22 N*m	Mfz = 41.26 N*m
Tr = 1447335.000000 N	Mry = 93794.74 N*m	Mrz = 32837.50 N*m
	Vfy = -123.143053 N	Vfz = -8001.046655 N
CLASS: = Semi-compact	Vry = 721175.400000 N	Vrz = 216352.620000 N

LATERAL BUCKLING PARAMETERS:

Le = 4200.00 mm	om2 = 1.30	Mre = 91062.58 N*m
k = 0.78	Mu = 187337.86 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.24 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.11 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.2 mm < uy max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 3.1 mm < uz max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /20/ 1*1.00 + 6*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 16 Beam_16 **POINT:** 1 **COORDINATE:** x = 0.62 L = 2610.00 mm

---

LOADS:
Governing Load Case: 12 ULS /45/ 1*1.25 + 2*0.50 + 3*1.50 + 5*1.50 + 4*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: HEA 180

d=171.0 mm

b=180.0 mm	Ay=3420.00 mm2	Az=1026.00 mm2	A=4530.00 mm2
w=6.0 mm	Iy=25100000.00 mm4	Iz=9250000.00 mm4	J=148900.00 mm4
t=9.5 mm	Sy=293567.25 mm3	Sz=102777.78 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -109205.479311 N	Mfy = 16415.88 N*m	Mfz = -50.46 N*m
Tr = 1447335.000000 N	Mry = 93794.74 N*m	Mrz = 32837.50 N*m
	Vfy = 213.852741 N	Vfz = -7664.872651 N
CLASS: = Semi-compact	Vry = 721175.400000 N	Vrz = 216352.620000 N

LATERAL BUCKLING PARAMETERS:

Le = 4200.00 mm	om2 = 1.27	Mre = 90706.73 N*m
k = 0.76	Mu = 183452.40 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.25 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.10 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 3.3 mm < uz max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 17 Beam_17 **POINT:** 1 **COORDINATE:** x = 0.62 L = 2610.00 mm

---

LOADS:
Governing Load Case: 12 ULS /45/ 1*1.25 + 2*0.50 + 3*1.50 + 5*1.50 + 4*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: HEA 180

d=171.0 mm

b=180.0 mm	Ay=3420.00 mm2	Az=1026.00 mm2	A=4530.00 mm2
w=6.0 mm	Iy=25100000.00 mm4	Iz=9250000.00 mm4	J=148900.00 mm4
t=9.5 mm	Sy=293567.25 mm3	Sz=102777.78 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -105872.093785 N	Mfy = 17285.11 N*m	Mfz = 92.87 N*m
Tr = 1447335.000000 N	Mry = 93794.74 N*m	Mrz = 32837.50 N*m
	Vfy = -166.299160 N	Vfz = -9394.194518 N
CLASS: = Semi-compact	Vry = 721175.400000 N	Vrz = 216352.620000 N

LATERAL BUCKLING PARAMETERS:

Le = 4200.00 mm	om2 = 1.33	Mre = 91462.80 N*m
k = 0.77	Mu = 191909.30 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.26 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.12 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
uz = 3.1 mm < uz max = L/300.00 = 14.0 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 21 dJC_Beam_21 **POINT:** 7 **COORDINATE:** x = 1.00 L = 4100.60 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: UNP 100

d=100.0 mm

b=50.0 mm	Ay=850.00 mm2	Az=600.00 mm2	A=1345.00 mm2
w=6.0 mm	Iy=2053000.00 mm4	Iz=291600.00 mm4	J=25210.00 mm4
t=8.5 mm	Sy=41060.00 mm3	Sz=8452.17 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 18666.753099 N	Mfy = -1395.53 N*m	Mfz = -216.84 N*m
Cr0 = 429727.500000 N	Mry = 13118.67 N*m	Mrz = 2700.47 N*m
	Vfy = 1308.831353 N	Vfz = -5888.576694 N
CLASS: = Semi-compact	Vry = 179239.500000 N	Vrz = 126522.000000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.22	Mre = 9304.91 N*m
k = 1.00	Mu = 10649.95 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.33 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.92 < 1.00 (13.8.3(c))
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.05 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.3 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 5.9 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 23 dJC_Beam_23 **POINT:** 3 **COORDINATE:** x = 0.49 L = 2017.75 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 235 Fy = 235.00 MPa

SECTION PARAMETERS: U_100x50x5

d=100.0 mm

b=50.0 mm	Ay=500.00 mm2	Az=450.00 mm2	A=950.00 mm2
w=5.0 mm	Iy=1432916.67 mm4	Iz=225005.48 mm4	J=7522.77 mm4
t=5.0 mm	Sy=28658.33 mm3	Sz=6310.12 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -25545.526941 N	Mfy = 1568.79 N*m	Mfz = 4.35 N*m
Tr = 200925.000000 N	Mry = 6061.24 N*m	Mrz = 1334.59 N*m
	Vfy = 7.211968 N	Vfz = 57.469664 N
CLASS: = Semi-compact	Vry = 69795.000000 N	Vrz = 62815.500000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.18	Mre = 4361.88 N*m
k = 0.99	Mu = 5038.92 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.39 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.19 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 7.0 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 24 dJC_Beam_24 **POINT:** 7 **COORDINATE:** x = 0.48 L = 1952.67 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 235 Fy = 235.00 MPa

SECTION PARAMETERS: U_100x50x5

d=100.0 mm

b=50.0 mm	Ay=500.00 mm2	Az=450.00 mm2	A=950.00 mm2
w=5.0 mm	Iy=1432916.67 mm4	Iz=225005.48 mm4	J=7522.77 mm4
t=5.0 mm	Sy=28658.33 mm3	Sz=6310.12 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -34953.437946 N	Mfy = 1989.83 N*m	Mfz = 5.02 N*m
Tr = 200925.000000 N	Mry = 6061.24 N*m	Mrz = 1334.59 N*m
	Vfy = -23.826519 N	Vfz = 184.770261 N
CLASS: = Semi-compact	Vry = 69795.000000 N	Vrz = 62815.500000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.16	Mre = 4326.84 N*m
k = 0.92	Mu = 4972.14 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.51 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.22 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 9.1 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 25 dJC_Beam_25 **POINT:** 7 **COORDINATE:** x = 1.00 L = 4100.60 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 235 Fy = 235.00 MPa

SECTION PARAMETERS: U_100x50x5

d=100.0 mm

b=50.0 mm	Ay=500.00 mm2	Az=450.00 mm2	A=950.00 mm2
w=5.0 mm	Iy=1432916.67 mm4	Iz=225005.48 mm4	J=7522.77 mm4
t=5.0 mm	Sy=28658.33 mm3	Sz=6310.12 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 6887.102679 N	Mfy = -457.77 N*m	Mfz = -148.52 N*m
Cr0 = 200925.000000 N	Mry = 6061.24 N*m	Mrz = 1334.59 N*m
	Vfy = 992.277215 N	Vfz = -3650.669880 N
CLASS: = Semi-compact	Vry = 69795.000000 N	Vrz = 62815.500000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.17	Mre = 4349.82 N*m
k = 0.91	Mu = 5015.74 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.26 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.55 < 1.00 (13.8.3(c))
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.06 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
uz = 7.8 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 26 dJC_Beam_26 **POINT:** 7 **COORDINATE:** x = 0.48 L = 1952.67 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 235 Fy = 235.00 MPa

SECTION PARAMETERS: U_100x50x5

d=100.0 mm

b=50.0 mm	Ay=500.00 mm2	Az=450.00 mm2	A=950.00 mm2
w=5.0 mm	Iy=1432916.67 mm4	Iz=225005.48 mm4	J=7522.77 mm4
t=5.0 mm	Sy=28658.33 mm3	Sz=6310.12 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -33609.027685 N	Mfy = 1901.40 N*m	Mfz = -1.58 N*m
Tr = 200925.000000 N	Mry = 6061.24 N*m	Mrz = 1334.59 N*m
	Vfy = 7.644248 N	Vfz = 187.755257 N
CLASS: = Semi-compact	Vry = 69795.000000 N	Vrz = 62815.500000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.16	Mre = 4327.98 N*m
k = 0.99	Mu = 4974.29 N*m	

BUCKLING PARAMETERS:

About Y axis: About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.48 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.21 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /25/ 1*1.00 + 5*1.00 + 7*1.00 + 4*1.00
uz = 8.8 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 27 dJC_Beam_27 **POINT:** 7 **COORDINATE:** x = 0.48 L = 1952.67 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 235 Fy = 235.00 MPa

SECTION PARAMETERS: U_100x50x5

d=100.0 mm

b=50.0 mm	Ay=500.00 mm2	Az=450.00 mm2	A=950.00 mm2
w=5.0 mm	Iy=1432916.67 mm4	Iz=225005.48 mm4	J=7522.77 mm4
t=5.0 mm	Sy=28658.33 mm3	Sz=6310.12 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -29597.991341 N	Mfy = 1730.73 N*m	Mfz = -9.51 N*m
Tr = 200925.000000 N	Mry = 6061.24 N*m	Mrz = 1334.59 N*m
	Vfy = 33.161968 N	Vfz = 131.492766 N
CLASS: = Semi-compact	Vry = 69795.000000 N	Vrz = 62815.500000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.17	Mre = 4350.48 N*m
k = 0.95	Mu = 5017.00 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.44 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.20 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.2 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 7.8 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 35 dJC_Col_35 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 17088.452108 N	Mfy = -634.61 N*m	Mfz = -1046.55 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -5131.696417 N	Vfz = 2805.469569 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

Ly = 3240.00 mm	Lamy = 1.21	Lz = 3240.00 mm	Lamz = 1.21
KyLy = 3240.00 mm	om1y = 0.68	KzLz = 3240.00 mm	om1z = 0.40
KyLy/ry = 85.17	U1y = 0.70	KzLz/rz = 85.17	U1z = 0.41

About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + 1.00*Mfy/Mry + 1.00*Mfz/Mrz = 0.07 < 1.00 (13.8.3(a))
Cf/Cr1 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.07 < 1.00 (13.8.3(b))
Vfy/Vry = 0.02 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0.2 mm < vx max = L/400.00 = 8.1 mm Verified
Governing Load Case: 15 SLS /37/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00
vy = 0.4 mm < vy max = L/400.00 = 8.1 mm Verified
Governing Load Case: 15 SLS /41/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 36 dJC_Col_36 **POINT:** 1 **COORDINATE:** x = 0.06 L = 200.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 21315.683167 N	Mfy = -546.70 N*m	Mfz = 19.85 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 28.760762 N	Vfz = 3445.196095 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

Ly = 3310.00 mm	Lamy = 1.24	Lz = 3310.00 mm	Lamz = 1.24
KyLy = 3310.00 mm	om1y = 0.68	KzLz = 3310.00 mm	om1z = 0.57
KyLy/ry = 87.01	U1y = 0.71	KzLz/rz = 87.01	U1z = 0.59

About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + 1.00*Mfy/Mry + 1.00*Mfz/Mrz = 0.04 < 1.00 (13.8.3(a))
Cf/Cr1 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.07 < 1.00 (13.8.3(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0.1 mm < vx max = L/400.00 = 8.3 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
vy = 0.5 mm < vy max = L/400.00 = 8.3 mm Verified
Governing Load Case: 15 SLS /41/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 37 dJC_Col_37 **POINT:** 7 **COORDINATE:** x = 1.00 L = 3240.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 4753.909505 N	Mfy = -62.16 N*m	Mfz = 3814.66 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -1350.802266 N	Vfz = -676.624021 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

Ly = 3240.00 mm	Lamy = 1.21	Lz = 3240.00 mm	Lamz = 1.21
KyLy = 3240.00 mm	om1y = 0.40	KzLz = 3240.00 mm	om1z = 0.53
KyLy/ry = 85.17	U1y = 0.40	KzLz/rz = 85.17	U1z = 0.53

VERIFICATION FORMULAS:
Cf/Cr0 + 1.00*Mfy/Mry + 1.00*Mfz/Mrz = 0.13 < 1.00 (13.8.3(a))
Mfy/Mry + Mfz/Mrz = 0.13 < 1.00 (13.8.3)
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0.2 mm < vx max = L/400.00 = 8.1 mm Verified
Governing Load Case: 15 SLS /45/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 4*1.00
vy = 1.6 mm < vy max = L/400.00 = 8.1 mm Verified
Governing Load Case: 15 SLS /37/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 38 dJC_Col_38 **POINT:** 7 **COORDINATE:** x = 1.00 L = 3240.00 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 6116.867006 N	Mfy = -68.65 N*m	Mfz = 4808.62 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -2007.054604 N	Vfz = -332.093393 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

Ly = 3240.00 mm	Lamy = 1.21	Lz = 3240.00 mm	Lamz = 1.21
KyLy = 3240.00 mm	om1y = 0.66	KzLz = 3240.00 mm	om1z = 0.44
KyLy/ry = 85.17	U1y = 0.66	KzLz/rz = 85.17	U1z = 0.45

VERIFICATION FORMULAS:
Cf/Cr0 + 1.00*Mfy/Mry + 1.00*Mfz/Mrz = 0.17 < 1.00 (13.8.3(a))
Mfy/Mry + Mfz/Mrz = 0.16 < 1.00 (13.8.3)
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0.2 mm < vx max = L/400.00 = 8.1 mm Verified
Governing Load Case: 15 SLS /45/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 4*1.00
vy = 0.5 mm < vy max = L/400.00 = 8.1 mm Verified
Governing Load Case: 15 SLS /16/ 1*1.00 + 6*1.00 + 5*1.00

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 39 dJC_Col_39 **POINT:** 7 **COORDINATE:** x = 1.00 L = 3240.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 5738.333709 N	Mfy = -44.77 N*m	Mfz = 4455.11 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -1543.933166 N	Vfz = -357.362792 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

Ly = 3240.00 mm	Lamy = 1.21	Lz = 3240.00 mm	Lamz = 1.21
KyLy = 3240.00 mm	om1y = 0.44	KzLz = 3240.00 mm	om1z = 0.54
KyLy/ry = 85.17	U1y = 0.45	KzLz/rz = 85.17	U1z = 0.54

VERIFICATION FORMULAS:
Cf/Cr0 + 1.00*Mfy/Mry + 1.00*Mfz/Mrz = 0.15 < 1.00 (13.8.3(a))
Mfy/Mry + Mfz/Mrz = 0.15 < 1.00 (13.8.3)
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0.2 mm < vx max = L/400.00 = 8.1 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
vy = 1.4 mm < vy max = L/400.00 = 8.1 mm Verified
Governing Load Case: 15 SLS /41/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 40 dJC_Col_40 **POINT:** 7 **COORDINATE:** x = 1.00 L = 3240.00 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 6388.034232 N	Mfy = 43.82 N*m	Mfz = 5157.66 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -2049.834070 N	Vfz = 280.466732 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

Ly = 3240.00 mm	Lamy = 1.21	Lz = 3240.00 mm	Lamz = 1.21
KyLy = 3240.00 mm	om1y = 0.66	KzLz = 3240.00 mm	om1z = 0.47
KyLy/ry = 85.17	U1y = 0.67	KzLz/rz = 85.17	U1z = 0.47

VERIFICATION FORMULAS:
Cf/Cr0 + 1.00*Mfy/Mry + 1.00*Mfz/Mrz = 0.18 < 1.00 (13.8.3(a))
Mfy/Mry + Mfz/Mrz = 0.17 < 1.00 (13.8.3)
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0.2 mm < vx max = L/400.00 = 8.1 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
vy = 0.6 mm < vy max = L/400.00 = 8.1 mm Verified
Governing Load Case: 15 SLS /9/ 1*1.00 + 6*1.00

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 41 dJC_Col_41 **POINT:** 7 **COORDINATE:** x = 1.00 L = 3240.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 4673.308067 N	Mfy = 89.27 N*m	Mfz = 4234.42 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -1470.528688 N	Vfz = 770.645305 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

Ly = 3240.00 mm	Lamy = 1.21	Lz = 3240.00 mm	Lamz = 1.21
KyLy = 3240.00 mm	om1y = 0.40	KzLz = 3240.00 mm	om1z = 0.54
KyLy/ry = 85.17	U1y = 0.40	KzLz/rz = 85.17	U1z = 0.54

VERIFICATION FORMULAS:
Cf/Cr0 + 1.00*Mfy/Mry + 1.00*Mfz/Mrz = 0.15 < 1.00 (13.8.3(a))
Mfy/Mry + Mfz/Mrz = 0.14 < 1.00 (13.8.3)
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0.2 mm < vx max = L/400.00 = 8.1 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
vy = 1.5 mm < vy max = L/400.00 = 8.1 mm Verified
Governing Load Case: 15 SLS /41/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 42 dJC_Col_42 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /111/ 1*1.25 + 6*0.40 + 2*1.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 17213.200392 N	Mfy = 677.86 N*m	Mfz = -1111.85 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -5701.417317 N	Vfz = -2797.912874 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

Ly = 3240.00 mm	Lamy = 1.21	Lz = 3240.00 mm	Lamz = 1.21
KyLy = 3240.00 mm	om1y = 0.66	KzLz = 3240.00 mm	om1z = 0.40
KyLy/ry = 85.17	U1y = 0.68	KzLz/rz = 85.17	U1z = 0.41

VERIFICATION FORMULAS:
Cf/Cr0 + 1.00*Mfy/Mry + 1.00*Mfz/Mrz = 0.08 < 1.00 (13.8.3(a))
Cf/Cr1 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.07 < 1.00 (13.8.3(b))
Vfy/Vry = 0.02 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0.2 mm < vx max = L/400.00 = 8.1 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
vy = 0.3 mm < vy max = L/400.00 = 8.1 mm Verified
Governing Load Case: 15 SLS /41/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 43 dJC_Col_43 **POINT:** 7 **COORDINATE:** x = 1.00 L = 3310.00 mm

---

LOADS:
Governing Load Case: 12 ULS /111/ 1*1.25 + 6*0.40 + 2*1.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 3531.737499 N	Mfy = -41.79 N*m	Mfz = -3951.11 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 2261.843278 N	Vfz = -475.972016 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

Ly = 3310.00 mm	Lamy = 1.24
KyLy = 3310.00 mm	om1y = 0.40
KyLy/ry = 87.01	U1y = 0.40

About Z axis:

Lz = 3310.00 mm	Lamz = 1.24
KzLz = 3310.00 mm	om1z = 0.58
KzLz/rz = 87.01	U1z = 0.58

VERIFICATION FORMULAS:
Cf/Cr0 + 1.00*Mfy/Mry + 1.00*Mfz/Mrz = 0.13 < 1.00 (13.8.3(a))
Mfy/Mry + Mfz/Mrz = 0.13 < 1.00 (13.8.3)
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0.1 mm < vx max = L/400.00 = 8.3 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
vy = 2.1 mm < vy max = L/400.00 = 8.3 mm Verified
Governing Load Case: 15 SLS /24/ 1*1.00 + 6*1.00 + 5*1.00 + 4*1.00

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 44 dJC_Col_44 **POINT:** 7 **COORDINATE:** x = 1.00 L = 3310.00 mm

---

LOADS:
Governing Load Case: 12 ULS /111/ 1*1.25 + 6*0.40 + 2*1.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 4245.630355 N	Mfy = -52.61 N*m	Mfz = -4137.66 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 2299.674947 N	Vfz = -270.136959 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

Ly = 3310.00 mm	Lamy = 1.24	Lz = 3310.00 mm	Lamz = 1.24
KyLy = 3310.00 mm	om1y = 0.65	KzLz = 3310.00 mm	om1z = 0.60
KyLy/ry = 87.01	U1y = 0.66	KzLz/rz = 87.01	U1z = 0.60

About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + 1.00*Mfy/Mry + 1.00*Mfz/Mrz = 0.14 < 1.00 (13.8.3(a))
Mfy/Mry + Mfz/Mrz = 0.14 < 1.00 (13.8.3)
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0.2 mm < vx max = L/400.00 = 8.3 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
vy = 0.7 mm < vy max = L/400.00 = 8.3 mm Verified
Governing Load Case: 15 SLS /41/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 45 dJC_Col_45 **POINT:** 7 **COORDINATE:** x = 1.00 L = 3310.00 mm

---

LOADS:
Governing Load Case: 12 ULS /111/ 1*1.25 + 6*0.40 + 2*1.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 3914.300671 N	Mfy = -37.53 N*m	Mfz = -4303.30 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 2369.381745 N	Vfz = -295.733596 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

Ly = 3310.00 mm	Lamy = 1.24
KyLy = 3310.00 mm	om1y = 0.40
KyLy/ry = 87.01	U1y = 0.40

About Z axis:

Lz = 3310.00 mm	Lamz = 1.24
KzLz = 3310.00 mm	om1z = 0.60
KzLz/rz = 87.01	U1z = 0.60

VERIFICATION FORMULAS:
Cf/Cr0 + 1.00*Mfy/Mry + 1.00*Mfz/Mrz = 0.15 < 1.00 (13.8.3(a))
Mfy/Mry + Mfz/Mrz = 0.14 < 1.00 (13.8.3)
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0.2 mm < vx max = L/400.00 = 8.3 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
vy = 1.3 mm < vy max = L/400.00 = 8.3 mm Verified
Governing Load Case: 15 SLS /20/ 1*1.00 + 6*1.00 + 4*1.00

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 46 dJC_Col_46 **POINT:** 7 **COORDINATE:** x = 1.00 L = 3310.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 5520.455550 N	Mfy = 34.52 N*m	Mfz = -4417.11 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 1329.963151 N	Vfz = 228.775391 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

Ly = 3310.00 mm	Lamy = 1.24	Lz = 3310.00 mm	Lamz = 1.24
KyLy = 3310.00 mm	om1y = 0.65	KzLz = 3310.00 mm	om1z = 0.58
KyLy/ry = 87.01	U1y = 0.65	KzLz/rz = 87.01	U1z = 0.59

VERIFICATION FORMULAS:
Cf/Cr0 + 1.00*Mfy/Mry + 1.00*Mfz/Mrz = 0.15 < 1.00 (13.8.3(a))
Mfy/Mry + Mfz/Mrz = 0.15 < 1.00 (13.8.3)
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0.2 mm < vx max = L/400.00 = 8.3 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
vy = 0.8 mm < vy max = L/400.00 = 8.3 mm Verified
Governing Load Case: 15 SLS /41/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 47 dJC_Col_47 **POINT:** 7 **COORDINATE:** x = 1.00 L = 3310.00 mm

---

LOADS:
Governing Load Case: 12 ULS /111/ 1*1.25 + 6*0.40 + 2*1.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 3639.398490 N	Mfy = 53.48 N*m	Mfz = -4279.74 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 2393.123848 N	Vfz = 508.073981 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

Ly = 3310.00 mm	Lamy = 1.24	Lz = 3310.00 mm	Lamz = 1.24
KyLy = 3310.00 mm	om1y = 0.40	KzLz = 3310.00 mm	om1z = 0.58
KyLy/ry = 87.01	U1y = 0.40	KzLz/rz = 87.01	U1z = 0.59

VERIFICATION FORMULAS:
Cf/Cr0 + 1.00*Mfy/Mry + 1.00*Mfz/Mrz = 0.15 < 1.00 (13.8.3(a))
Mfy/Mry + Mfz/Mrz = 0.14 < 1.00 (13.8.3)
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0.3 mm < vx max = L/400.00 = 8.3 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
vy = 2.0 mm < vy max = L/400.00 = 8.3 mm Verified
Governing Load Case: 15 SLS /20/ 1*1.00 + 6*1.00 + 4*1.00

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 48 dJC_Col_48 **POINT:** 1 **COORDINATE:** x = 0.06 L = 200.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 22609.755181 N	Mfy = 594.99 N*m	Mfz = 33.06 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 24.056584 N	Vfz = -3245.067908 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

Ly = 3310.00 mm	Lamy = 1.24
KyLy = 3310.00 mm	om1y = 0.67
KyLy/ry = 87.01	U1y = 0.70

About Z axis:

Lz = 3310.00 mm	Lamz = 1.24
KzLz = 3310.00 mm	om1z = 0.58
KzLz/rz = 87.01	U1z = 0.60

VERIFICATION FORMULAS:
Cf/Cr0 + 1.00*Mfy/Mry + 1.00*Mfz/Mrz = 0.05 < 1.00 (13.8.3(a))
Cf/Cr1 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.07 < 1.00 (13.8.3(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections *Not analyzed*

Displacements
vx = 0.3 mm < vx max = L/400.00 = 8.3 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
vy = 0.4 mm < vy max = L/400.00 = 8.3 mm Verified
Governing Load Case: 15 SLS /41/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 49 dJC_Beam_49 **POINT:** 1 **COORDINATE:** x = 0.01 L = 125.00 mm

---

LOADS:
Governing Load Case: 12 ULS /59/ 1*1.25 + 6*1.40 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -270.014400 N	Mfy = -1356.49 N*m	Mfz = 1962.30 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 2177.654260 N	Vfz = 17734.939258 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.11 < 1.00 (13.9.1)
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.06 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 2.0 mm < uy max = L/300.00 = 43.8 mm Verified
Governing Load Case: 15 SLS /37/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00
uz = 0.3 mm < uz max = L/300.00 = 43.8 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Instability !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 50 dJC_Beam_50 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /92/ 1*1.25 + 2*0.50 + 7*1.40

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -9965.699872 N	Mfy = 537.04 N*m	Mfz = 1491.54 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 1953.291248 N	Vfz = -1852.316858 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.08 < 1.00 (13.9.1)
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 1.6 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /25/ 1*1.00 + 5*1.00 + 7*1.00 + 4*1.00
uz = 0.1 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 51 dJC_Beam_51 **POINT:** 7 **COORDINATE:** x = 0.34 L = 4425.00 mm

---

LOADS:
Governing Load Case: 12 ULS /91/ 1*1.25 + 6*1.40 + 2*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -5897.042669 N	Mfy = -772.30 N*m	Mfz = -3036.68 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 5552.454203 N	Vfz = -8241.639756 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.13 < 1.00 (13.9.1)
Vfy/Vry = 0.02 < 1.00 (13.4.1) Vfz/Vrz = 0.03 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 2.6 mm < uy max = L/300.00 = 43.8 mm Verified
Governing Load Case: 15 SLS /24/ 1*1.00 + 6*1.00 + 5*1.00 + 4*1.00
uz = 0.3 mm < uz max = L/300.00 = 43.8 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Instability !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 52 dJC_Beam_52 **POINT:** 7 **COORDINATE:** x = 1.00 L = 4100.00 mm

---

LOADS:
Governing Load Case: 12 ULS /86/ 1*0.90 + 7*1.40 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 13113.312998 N	Mfy = -410.22 N*m	Mfz = -2346.31 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 3095.251774 N	Vfz = -2210.106555 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.11 < 1.00 (13.8.3(a))
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 2.6 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /42/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 7*1.00
uz = 0.1 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 53 dJC_Beam_53 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -10766.893715 N	Mfy = 1458.93 N*m	Mfz = 1626.56 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 7187.654556 N	Vfz = -8467.763403 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.11 < 1.00 (13.9.1)
Vfy/Vry = 0.02 < 1.00 (13.4.1) Vfz/Vrz = 0.03 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 54 dJC_Beam_54 **POINT:** 5 **COORDINATE:** x = 0.48 L = 1988.48 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -65781.130606 N	Mfy = 4072.60 N*m	Mfz = -45.11 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 33.578855 N	Vfz = -27.289794 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.21 < 1.00 (13.9.1)
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 7.7 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 55 dJC_Beam_55 **POINT:** 7 **COORDINATE:** x = 0.50 L = 2050.30 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -69118.371825 N	Mfy = 4097.59 N*m	Mfz = -19.66 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 113.933729 N	Vfz = 177.116636 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.21 < 1.00 (13.9.1)
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 8.2 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 56 dJC_Beam_56 **POINT:** 2 **COORDINATE:** x = 0.51 L = 2081.55 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -66088.142741 N	Mfy = 3959.15 N*m	Mfz = 13.38 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 14.961370 N	Vfz = 39.652392 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.21 < 1.00 (13.9.1)
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /36/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 7*1.00 + 4*1.00
uz = 7.9 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 57 dJC_Beam_57 **POINT:** 1 **COORDINATE:** x = 0.50 L = 2050.30 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -52777.449714 N	Mfy = 3625.95 N*m	Mfz = 23.80 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -23.522804 N	Vfz = -215.469035 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.18 < 1.00 (13.9.1)
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 7.1 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 58 dJC_Beam_58 **POINT:** 7 **COORDINATE:** x = 0.49 L = 1996.12 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -52546.699959 N	Mfy = 3552.36 N*m	Mfz = 42.16 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -22.604623 N	Vfz = 28.633805 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.18 < 1.00 (13.9.1)
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 6.7 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 59 dJC_Beam_59 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -11082.320333 N	Mfy = 1489.34 N*m	Mfz = -1639.60 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -7153.224416 N	Vfz = -8698.959993 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.12 < 1.00 (13.9.1)
Vfy/Vry = 0.02 < 1.00 (13.4.1) Vfz/Vrz = 0.03 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 60 dJC_Beam_60 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -5649.926907 N	Mfy = -308.11 N*m	Mfz = -1550.63 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -15393.549610 N	Vfz = 597.114846 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.07 < 1.00 (13.9.1)
Vfy/Vry = 0.05 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 7.0 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 0.0 mm < uz max = L/300.00 = 7.0 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 61 dJC_Beam_61 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -5403.844419 N	Mfy = -331.78 N*m	Mfz = 1546.96 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 15414.991109 N	Vfz = 945.942343 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.07 < 1.00 (13.9.1)
Vfy/Vry = 0.05 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 7.0 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 0.0 mm < uz max = L/300.00 = 7.0 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 62 dJC_Beam_62 **POINT:** 7 **COORDINATE:** x = 0.36 L = 819.00 mm

---

LOADS:
Governing Load Case: 12 ULS /101/ 1*1.25 + 2*1.50 + 3*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 2671.346716 N	Mfy = 494.65 N*m	Mfz = 722.08 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -6219.474896 N	Vfz = 3835.336574 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.04 < 1.00 (13.8.3(a))
Vfy/Vry = 0.02 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 63 dJC_Beam_63 **POINT:** 7 **COORDINATE:** x = 0.36 L = 819.00 mm

---

LOADS:
Governing Load Case: 12 ULS /101/ 1*1.25 + 2*1.50 + 3*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 2887.844704 N	Mfy = 459.23 N*m	Mfz = -679.53 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 5886.352308 N	Vfz = 3691.633282 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.04 < 1.00 (13.8.3(a))
Vfy/Vry = 0.02 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 64 dJC_Beam_64 **POINT:** 1 **COORDINATE:** x = 0.63 L = 1448.00 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -1494.128797 N	Mfy = 435.37 N*m	Mfz = 586.10 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 5048.675355 N	Vfz = -3272.454614 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.04 < 1.00 (13.9.1)
Vfy/Vry = 0.02 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 0.0 mm < uz max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 65 dJC_Beam_65 **POINT:** 1 **COORDINATE:** x = 0.63 L = 1448.00 mm

---

LOADS:
Governing Load Case: 12 ULS /101/ 1*1.25 + 2*1.50 + 3*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 561.719655 N	Mfy = 446.73 N*m	Mfz = -584.77 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -5031.073382 N	Vfz = -3462.870918 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(a))
Vfy/Vry = 0.02 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 66 dJC_Beam_66 **POINT:** 7 **COORDINATE:** x = 1.00 L = 2300.00 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -2882.096730 N	Mfy = -94.81 N*m	Mfz = -1207.57 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 6435.661602 N	Vfz = 331.784814 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.05 < 1.00 (13.9.1)
Vfy/Vry = 0.02 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 0.0 mm < uz max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 67 dJC_Beam_67 **POINT:** 1 **COORDINATE:** x = 0.91 L = 2100.00 mm

---

LOADS:
Governing Load Case: 12 ULS /101/ 1*1.25 + 2*1.50 + 3*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 2074.285338 N	Mfy = 72.72 N*m	Mfz = -600.99 N*m
Cr0 = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -12356.434715 N	Vfz = -346.533869 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(a))
Vfy/Vry = 0.04 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 68 dJC_Beam_68 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -2516.735520 N	Mfy = -45.85 N*m	Mfz = -1013.29 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -4452.812637 N	Vfz = -539.476708 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.04 < 1.00 (13.9.1)
Vfy/Vry = 0.02 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 69 dJC_Beam_69 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /105/ 1*0.90 + 2*1.50 + 3*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -1149.695614 N	Mfy = -7.25 N*m	Mfz = 897.26 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 2984.255201 N	Vfz = -824.392982 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.03 < 1.00 (13.9.1)
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 7.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 70 dJC_Beam_70 **POINT:** 7 **COORDINATE:** x = 1.00 L = 1850.00 mm

---

LOADS:
Governing Load Case: 12 ULS /101/ 1*1.25 + 2*1.50 + 3*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -5536.567822 N	Mfy = -314.37 N*m	Mfz = -1581.78 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = 15553.141932 N	Vfz = -592.704888 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.07 < 1.00 (13.9.1)
Vfy/Vry = 0.05 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 6.2 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 6.2 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 71 dJC_Beam_71 **POINT:** 7 **COORDINATE:** x = 1.00 L = 1850.00 mm

---

LOADS:
Governing Load Case: 12 ULS /101/ 1*1.25 + 2*1.50 + 3*0.50 + 4*0.50

MATERIAL:
S 420 Fy = 420.00 MPa

SECTION PARAMETERS: SHSH 100x100x6.3

d=100.0 mm

b=100.0 mm	Ay=1159.33 mm2	Az=1159.33 mm2	A=2318.65 mm2
w=6.3 mm	Iy=3355722.00 mm4	Iz=3355722.00 mm4	J=5341795.00 mm4
t=6.3 mm	Zy=80862.90 mm3	Zz=80862.90 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -5471.450128 N	Mfy = -335.17 N*m	Mfz = 1573.58 N*m
Tr = 876450.834000 N	Mry = 30566.18 N*m	Mrz = 30566.18 N*m
	Vfy = -15640.602164 N	Vfz = -902.677342 N
CLASS: = Plastic	Vry = 289228.775220 N	Vrz = 289228.775220 N

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

About Y axis:

About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.07 < 1.00 (13.9.1)
Vfy/Vry = 0.05 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 6.2 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 6.2 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 77 dJC_Beam_77 **POINT:** 7 **COORDINATE:** x = 1.00 L = 4100.60 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: UNP 100

d=100.0 mm

b=50.0 mm	Ay=850.00 mm2	Az=600.00 mm2	A=1345.00 mm2
w=6.0 mm	Iy=2053000.00 mm4	Iz=291600.00 mm4	J=25210.00 mm4
t=8.5 mm	Sy=41060.00 mm3	Sz=8452.17 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 5300.501373 N	Mfy = -630.43 N*m	Mfz = -49.29 N*m
Cr0 = 429727.500000 N	Mry = 13118.67 N*m	Mrz = 2700.47 N*m
	Vfy = 229.258583 N	Vfz = -4553.279797 N
CLASS: = Semi-compact	Vry = 179239.500000 N	Vrz = 126522.000000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.18	Mre = 9088.73 N*m
k = 0.99	Mu = 10266.09 N*m	

BUCKLING PARAMETERS:

About Y axis: About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.08 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.26 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 6.8 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 78 dJC_Beam_78 **POINT:** 1 **COORDINATE:** x = 0.52 L = 2147.93 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: UNP 100

d=100.0 mm

b=50.0 mm	Ay=850.00 mm2	Az=600.00 mm2	A=1345.00 mm2
w=6.0 mm	Iy=2053000.00 mm4	Iz=291600.00 mm4	J=25210.00 mm4
t=8.5 mm	Sy=41060.00 mm3	Sz=8452.17 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -47273.027577 N	Mfy = 2772.24 N*m	Mfz = 8.76 N*m
Tr = 429727.500000 N	Mry = 13118.67 N*m	Mrz = 2700.47 N*m
	Vfy = 31.684241 N	Vfz = -286.310574 N
CLASS: = Semi-compact	Vry = 179239.500000 N	Vrz = 126522.000000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.17	Mre = 9022.44 N*m
k = 0.97	Mu = 10153.87 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.32 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.15 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 8.8 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 79 dJC_Beam_79 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: UNP 100

d=100.0 mm

b=50.0 mm	Ay=850.00 mm2	Az=600.00 mm2	A=1345.00 mm2
w=6.0 mm	Iy=2053000.00 mm4	Iz=291600.00 mm4	J=25210.00 mm4
t=8.5 mm	Sy=41060.00 mm3	Sz=8452.17 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 9761.320020 N	Mfy = -993.51 N*m	Mfz = 37.86 N*m
Cr0 = 429727.500000 N	Mry = 13118.67 N*m	Mrz = 2700.47 N*m
	Vfy = 301.294018 N	Vfz = 7001.959851 N
CLASS: = Semi-compact	Vry = 179239.500000 N	Vrz = 126522.000000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.16	Mre = 8990.62 N*m
k = 0.90	Mu = 10100.88 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.12 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.44 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.06 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /25/ 1*1.00 + 5*1.00 + 7*1.00 + 4*1.00
uz = 9.4 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 80 dJC_Beam_80 **POINT:** 7 **COORDINATE:** x = 1.00 L = 4100.60 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: UNP 100

d=100.0 mm

b=50.0 mm	Ay=850.00 mm2	Az=600.00 mm2	A=1345.00 mm2
w=6.0 mm	Iy=2053000.00 mm4	Iz=291600.00 mm4	J=25210.00 mm4
t=8.5 mm	Sy=41060.00 mm3	Sz=8452.17 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 8761.080990 N	Mfy = -907.22 N*m	Mfz = -48.38 N*m
Cr0 = 429727.500000 N	Mry = 13118.67 N*m	Mrz = 2700.47 N*m
	Vfy = 191.179505 N	Vfz = -6463.160830 N
CLASS: = Semi-compact	Vry = 179239.500000 N	Vrz = 126522.000000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.17	Mre = 9067.27 N*m
k = 0.98	Mu = 10229.49 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.12 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.40 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.05 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 9.4 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 81 dJC_Beam_81 **POINT:** 1 **COORDINATE:** x = 0.43 L = 1757.40 mm

---

LOADS:
Governing Load Case: 12 ULS /77/ 1*0.90 + 6*1.40

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: UNP 100

d=100.0 mm

b=50.0 mm	Ay=850.00 mm2	Az=600.00 mm2	A=1345.00 mm2
w=6.0 mm	Iy=2053000.00 mm4	Iz=291600.00 mm4	J=25210.00 mm4
t=8.5 mm	Sy=41060.00 mm3	Sz=8452.17 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 8216.156153 N	Mfy = -479.19 N*m	Mfz = -1.30 N*m
Cr0 = 429727.500000 N	Mry = 13118.67 N*m	Mrz = 2700.47 N*m
	Vfy = -12.860944 N	Vfz = 18.243346 N
CLASS: = Semi-compact	Vry = 179239.500000 N	Vrz = 126522.000000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.18	Mre = 9079.09 N*m
k = -0.73	Mu = 10249.61 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.06 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.32 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /36/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 7*1.00 + 4*1.00
uz = 8.7 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 82 dJC_Beam_82 **POINT:** 7 **COORDINATE:** x = 1.00 L = 4100.60 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: UNP 100

d=100.0 mm

b=50.0 mm	Ay=850.00 mm2	Az=600.00 mm2	A=1345.00 mm2
w=6.0 mm	Iy=2053000.00 mm4	Iz=291600.00 mm4	J=25210.00 mm4
t=8.5 mm	Sy=41060.00 mm3	Sz=8452.17 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 10324.363067 N	Mfy = -1098.83 N*m	Mfz = -56.69 N*m
Cr0 = 429727.500000 N	Mry = 13118.67 N*m	Mrz = 2700.47 N*m
	Vfy = 366.470552 N	Vfz = -7481.417146 N
CLASS: = Semi-compact	Vry = 179239.500000 N	Vrz = 126522.000000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.18	Mre = 9084.07 N*m
k = 0.99	Mu = 10258.12 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.14 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.48 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.06 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
uz = 10.6 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 83 dJC_Beam_83 **POINT:** 1 **COORDINATE:** x = 0.43 L = 1757.40 mm

---

LOADS:
Governing Load Case: 12 ULS /77/ 1*0.90 + 6*1.40

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: UNP 100

d=100.0 mm

b=50.0 mm	Ay=850.00 mm2	Az=600.00 mm2	A=1345.00 mm2
w=6.0 mm	Iy=2053000.00 mm4	Iz=291600.00 mm4	J=25210.00 mm4
t=8.5 mm	Sy=41060.00 mm3	Sz=8452.17 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 12329.467454 N	Mfy = -612.90 N*m	Mfz = -0.48 N*m
Cr0 = 429727.500000 N	Mry = 13118.67 N*m	Mrz = 2700.47 N*m
	Vfy = -12.632665 N	Vfz = -15.353377 N
CLASS: = Semi-compact	Vry = 179239.500000 N	Vrz = 126522.000000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.19	Mre = 9152.19 N*m
k = -0.16	Mu = 10375.89 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.08 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.46 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
uz = 10.4 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 84 dJC_Beam_84 **POINT:** 7 **COORDINATE:** x = 1.00 L = 4100.60 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: UNP 100

d=100.0 mm

b=50.0 mm	Ay=850.00 mm2	Az=600.00 mm2	A=1345.00 mm2
w=6.0 mm	Iy=2053000.00 mm4	Iz=291600.00 mm4	J=25210.00 mm4
t=8.5 mm	Sy=41060.00 mm3	Sz=8452.17 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 9801.838230 N	Mfy = -1053.02 N*m	Mfz = -68.68 N*m
Cr0 = 429727.500000 N	Mry = 13118.67 N*m	Mrz = 2700.47 N*m
	Vfy = 439.338437 N	Vfz = -7324.216702 N
CLASS: = Semi-compact	Vry = 179239.500000 N	Vrz = 126522.000000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.18	Mre = 9081.62 N*m
k = 0.94	Mu = 10253.94 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.14 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.47 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.06 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 10.6 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 85 dJC_Beam_85 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /101/ 1*1.25 + 2*1.50 + 3*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: UNP 100

d=100.0 mm

b=50.0 mm	Ay=850.00 mm2	Az=600.00 mm2	A=1345.00 mm2
w=6.0 mm	Iy=2053000.00 mm4	Iz=291600.00 mm4	J=25210.00 mm4
t=8.5 mm	Sy=41060.00 mm3	Sz=8452.17 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 12409.562999 N	Mfy = -1277.04 N*m	Mfz = 76.90 N*m
Cr0 = 429727.500000 N	Mry = 13118.67 N*m	Mrz = 2700.47 N*m
	Vfy = 512.109052 N	Vfz = 8338.470042 N
CLASS: = Semi-compact	Vry = 179239.500000 N	Vrz = 126522.000000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.17	Mre = 9030.67 N*m
k = 0.93	Mu = 10167.67 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.17 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.58 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.07 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.1 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 10.8 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 86 dJC_Beam_86 **POINT:** 5 **COORDINATE:** x = 0.50 L = 2033.63 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: UNP 100

d=100.0 mm

b=50.0 mm	Ay=850.00 mm2	Az=600.00 mm2	A=1345.00 mm2
w=6.0 mm	Iy=2053000.00 mm4	Iz=291600.00 mm4	J=25210.00 mm4
t=8.5 mm	Sy=41060.00 mm3	Sz=8452.17 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -38859.893448 N	Mfy = 2328.58 N*m	Mfz = -10.20 N*m
Tr = 429727.500000 N	Mry = 13118.67 N*m	Mrz = 2700.47 N*m
	Vfy = 9.034828 N	Vfz = -32.879378 N
CLASS: = Semi-compact	Vry = 179239.500000 N	Vrz = 126522.000000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.15	Mre = 8955.50 N*m
k = 0.85	Mu = 10043.01 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.27 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Sy/(Mre*A) = 0.13 < 1.00 (13.9.2(b))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.2 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 7.5 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 87 dJC_Beam_87 **POINT:** 7 **COORDINATE:** x = 1.00 L = 4100.60 mm

---

LOADS:
Governing Load Case: 12 ULS /101/ 1*1.25 + 2*1.50 + 3*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: UNP 100

d=100.0 mm

b=50.0 mm	Ay=850.00 mm2	Az=600.00 mm2	A=1345.00 mm2
w=6.0 mm	Iy=2053000.00 mm4	Iz=291600.00 mm4	J=25210.00 mm4
t=8.5 mm	Sy=41060.00 mm3	Sz=8452.17 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 19154.982019 N	Mfy = -1472.21 N*m	Mfz = 186.71 N*m
Cr0 = 429727.500000 N	Mry = 13118.67 N*m	Mrz = 2700.47 N*m
	Vfy = -1108.369903 N	Vfz = -6494.083541 N
CLASS: = Semi-compact	Vry = 179239.500000 N	Vrz = 126522.000000 N

LATERAL BUCKLING PARAMETERS:

Le = 4100.60 mm	om2 = 1.22	Mre = 9274.98 N*m
k = 0.98	Mu = 10595.12 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.31 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.93 < 1.00 (13.8.3(c))
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.05 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.3 mm < uy max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 6.9 mm < uz max = L/300.00 = 13.7 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 88 dJC_Beam_88 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 6576.386455 N	Mfy = -852.03 N*m	Mfz = -3.74 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 23.232151 N	Vfz = -7074.784566 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.59	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.10 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.12 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.03 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 89 dJC_Beam_89 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -1653.183974 N	Mfy = -45.30 N*m	Mfz = -2.15 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 7.571750 N	Vfz = -417.697966 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.35	Mre = 11502.00 N*m
k = -0.67	Mu = 65798.73 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.01 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.00 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /20/ 1*1.00 + 6*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 90 dJC_Beam_90 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /81/ 1*0.90 + 6*1.40 + 5*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1024.735094 N	Mfy = 17.54 N*m	Mfz = -5.36 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -78.067357 N	Vfz = -39.058030 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.49	Mre = 11502.00 N*m
k = 0.14	Mu = 41634.53 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.01 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.01 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 91 dJC_Beam_91 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 15680.842550 N	Mfy = 497.04 N*m	Mfz = -0.17 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -4.591016 N	Vfz = -2452.488490 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.12	Mre = 11502.00 N*m
k = -0.27	Mu = 59509.80 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.08 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.14 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /24/ 1*1.00 + 6*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 92 dJC_Beam_92 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -611.408038 N	Mfy = 127.28 N*m	Mfz = 1.87 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 6.051311 N	Vfz = -897.944212 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.34	Mre = 11502.00 N*m
k = -0.96	Mu = 65538.89 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.01 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.01 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /20/ 1*1.00 + 6*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 93 dJC_Beam_93 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -981.724239 N	Mfy = 43.31 N*m	Mfz = -1.13 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -0.714899 N	Vfz = -218.134436 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.24	Mre = 11502.00 N*m
k = -0.55	Mu = 62893.98 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.01 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.00 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /9/ 1*1.00 + 6*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 94 dJC_Beam_94 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 166.278573 N	Mfy = 64.19 N*m	Mfz = -1.37 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 3.516330 N	Vfz = 243.166592 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.86	Mre = 11502.00 N*m
k = -0.16	Mu = 52276.93 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.01 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.01 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /9/ 1*1.00 + 6*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 95 dJC_Beam_95 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -1313.963538 N	Mfy = -230.93 N*m	Mfz = 2.57 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -7.429445 N	Vfz = -1294.282061 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.39	Mre = 11502.00 N*m
k = -0.20	Mu = 66956.65 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.03 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.02 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /20/ 1*1.00 + 6*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 96 dJC_Beam_96 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -558.243464 N	Mfy = -389.34 N*m	Mfz = 1.62 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 3.991687 N	Vfz = 2751.139492 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.49	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.04 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.03 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /9/ 1*1.00 + 6*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 97 dJC_Beam_97 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1188.307118 N	Mfy = 39.38 N*m	Mfz = -3.37 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -25.482201 N	Vfz = -53.681174 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.26	Mre = 11502.00 N*m
k = 0.47	Mu = 35362.34 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.01 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.01 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 98 dJC_Beam_98 **POINT:** 4 **COORDINATE:** x = 0.50 L = 141.42 mm

---

LOADS:
Governing Load Case: 12 ULS /73/ 1*1.25 + 6*1.40 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -431.786534 N	Mfy = -3.83 N*m	Mfz = 5.45 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 10.450722 N	Vfz = -9.453728 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.56	Mre = 11502.00 N*m
k = 0.60	Mu = 43818.50 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.01 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.00 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /20/ 1*1.00 + 6*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /24/ 1*1.00 + 6*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 100 dJC_Beam_100 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 6120.633593 N	Mfy = -1014.13 N*m	Mfz = -4.16 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -26.400955 N	Vfz = 8295.546647 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.48	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.11 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.13 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /41/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 102 dJC_Beam_102 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 6469.795925 N	Mfy = -882.21 N*m	Mfz = -9.74 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 41.744932 N	Vfz = -7326.275208 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.52	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.10 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.12 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.03 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /36/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 7*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 104 dJC_Beam_104 **POINT:** 4 **COORDINATE:** x = 0.50 L = 141.42 mm

---

LOADS:
Governing Load Case: 12 ULS /77/ 1*0.90 + 6*1.40

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 731.372064 N	Mfy = 16.73 N*m	Mfz = 2.82 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -5.796724 N	Vfz = -95.490433 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.60	Mre = 11502.00 N*m
k = 0.07	Mu = 44718.44 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.01 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.01 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /41/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /45/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 105 dJC_Beam_105 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 804.708293 N	Mfy = 61.09 N*m	Mfz = 3.55 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -31.130434 N	Vfz = 175.166440 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.59	Mre = 11502.00 N*m
k = 0.10	Mu = 44676.02 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.01 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.01 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /9/ 1*1.00 + 6*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 106 dJC_Beam_106 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 16214.887176 N	Mfy = 452.29 N*m	Mfz = 7.99 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 114.205359 N	Vfz = -2237.598425 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.09	Mre = 11502.00 N*m
k = -0.13	Mu = 58718.55 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.09 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.14 < 1.00 (13.8.3(c))
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /41/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 107 dJC_Beam_107 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /111/ 1*1.25 + 6*0.40 + 2*1.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -344.214381 N	Mfy = -162.09 N*m	Mfz = -4.44 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 15.175175 N	Vfz = -1043.714427 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.42	Mre = 11502.00 N*m
k = -0.79	Mu = 67719.63 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.02 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.02 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /41/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /37/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 108 dJC_Beam_108 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -1016.808022 N	Mfy = 57.93 N*m	Mfz = 1.11 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 8.741846 N	Vfz = -289.691103 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.23	Mre = 11502.00 N*m
k = -0.51	Mu = 62502.68 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.01 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.00 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 109 dJC_Beam_109 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -186.403143 N	Mfy = 73.25 N*m	Mfz = 3.49 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -32.392443 N	Vfz = 307.777227 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.99	Mre = 11502.00 N*m
k = -0.26	Mu = 55806.59 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.01 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.01 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /20/ 1*1.00 + 6*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 110 dJC_Beam_110 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -1267.785500 N	Mfy = -262.08 N*m	Mfz = -2.48 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -4.003911 N	Vfz = -1474.888514 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.40	Mre = 11502.00 N*m
k = -0.25	Mu = 67354.70 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.03 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.02 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /41/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 111 dJC_Beam_111 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -903.286809 N	Mfy = -414.19 N*m	Mfz = -4.10 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -4.898851 N	Vfz = 2921.169004 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.45	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.04 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.04 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /41/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 112 dJC_Beam_112 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1238.674749 N	Mfy = 21.34 N*m	Mfz = -5.33 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 31.123590 N	Vfz = -69.431980 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.17	Mre = 11502.00 N*m
k = 0.60	Mu = 32877.19 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.01 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.01 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 113 dJC_Beam_113 **POINT:** 4 **COORDINATE:** x = 0.50 L = 141.42 mm

---

LOADS:
Governing Load Case: 12 ULS /77/ 1*0.90 + 6*1.40

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 260.756404 N	Mfy = 7.84 N*m	Mfz = 2.87 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 5.732528 N	Vfz = 64.753959 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.76	Mre = 11502.00 N*m
k = -0.15	Mu = 49297.67 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.00 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.01 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /45/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 114 dJC_Beam_114 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 7233.504288 N	Mfy = -992.89 N*m	Mfz = -11.20 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -51.142101 N	Vfz = 8308.795913 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.49	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.12 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.14 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 131 dJC_Beam_131 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1272.921191 N	Mfy = -76.38 N*m	Mfz = 19.42 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -81.429992 N	Vfz = -401.169953 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.51	Mre = 11502.00 N*m
k = 0.89	Mu = 42387.34 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 133 dJC_Beam_133 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 2491.738816 N	Mfy = -22.60 N*m	Mfz = 12.22 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -30.351697 N	Vfz = -545.784439 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.37	Mre = 11502.00 N*m
k = 0.33	Mu = 38394.33 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /37/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 134 dJC_Beam_134 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1180.164296 N	Mfy = 24.18 N*m	Mfz = 8.38 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 15.716275 N	Vfz = -258.043470 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = 0.53	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.01 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /36/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 7*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 135 dJC_Beam_135 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 3265.418998 N	Mfy = 25.77 N*m	Mfz = 16.87 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -39.069617 N	Vfz = 4.081101 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.26	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.04 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 136 dJC_Beam_136 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 808.069427 N	Mfy = 36.72 N*m	Mfz = 13.31 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 30.015268 N	Vfz = -153.104090 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.17	Mre = 11502.00 N*m
k = -0.28	Mu = 60968.82 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 137 dJC_Beam_137 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1364.460854 N	Mfy = 50.44 N*m	Mfz = 13.80 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -34.682860 N	Vfz = 88.137419 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.60	Mre = 11502.00 N*m
k = -0.42	Mu = 44771.93 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 138 dJC_Beam_138 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 760.641601 N	Mfy = 48.51 N*m	Mfz = 11.72 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 26.372795 N	Vfz = -227.628508 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.01	Mre = 11502.00 N*m
k = 0.12	Mu = 56216.54 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 139 dJC_Beam_139 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 958.747216 N	Mfy = 50.25 N*m	Mfz = 15.33 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -38.003218 N	Vfz = 174.304365 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.82	Mre = 11502.00 N*m
k = -0.12	Mu = 51085.71 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 140 dJC_Beam_140 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 2172.154076 N	Mfy = 12.38 N*m	Mfz = 14.87 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 36.436955 N	Vfz = 251.175937 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.91	Mre = 11502.00 N*m
k = -0.24	Mu = 53653.69 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 141 dJC_Beam_141 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /73/ 1*1.25 + 6*1.40 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -1546.786688 N	Mfy = 58.97 N*m	Mfz = -7.36 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 39.473687 N	Vfz = 627.253048 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.40	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.02 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.01 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 142 dJC_Beam_142 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 2878.193417 N	Mfy = -25.25 N*m	Mfz = 14.96 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 40.579612 N	Vfz = 634.279209 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.33	Mre = 11502.00 N*m
k = 0.97	Mu = 37315.45 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 144 dJC_Beam_144 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1067.310839 N	Mfy = -76.82 N*m	Mfz = 19.17 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 80.682545 N	Vfz = 451.360412 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.63	Mre = 11502.00 N*m
k = 0.78	Mu = 45732.40 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 145 dJC_Beam_145 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1423.551762 N	Mfy = -83.90 N*m	Mfz = -19.45 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 81.354874 N	Vfz = -470.324379 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.58	Mre = 11502.00 N*m
k = 0.92	Mu = 44305.08 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.04 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 147 dJC_Beam_147 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /101/ 1*1.25 + 2*1.50 + 3*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 2364.941824 N	Mfy = -24.49 N*m	Mfz = -12.10 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 31.417121 N	Vfz = -538.391364 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.83	Mre = 11502.00 N*m
k = 0.36	Mu = 51337.61 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /37/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 148 dJC_Beam_148 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /91/ 1*1.25 + 6*1.40 + 2*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 865.510163 N	Mfy = -12.30 N*m	Mfz = -12.29 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -62.636792 N	Vfz = 217.652332 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.20	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 149 dJC_Beam_149 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 2924.342981 N	Mfy = 23.06 N*m	Mfz = -14.81 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 35.276982 N	Vfz = 32.534459 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.22	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 150 dJC_Beam_150 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /91/ 1*1.25 + 6*1.40 + 2*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1251.480604 N	Mfy = -50.87 N*m	Mfz = -12.18 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -72.810547 N	Vfz = 551.715769 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.57	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 151 dJC_Beam_151 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /91/ 1*1.25 + 6*1.40 + 2*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1936.999762 N	Mfy = -78.29 N*m	Mfz = -11.97 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 64.889536 N	Vfz = -837.896596 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.97	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 152 dJC_Beam_152 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /59/ 1*1.25 + 6*1.40 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1420.842116 N	Mfy = 123.43 N*m	Mfz = -5.91 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 26.620132 N	Vfz = 923.822076 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.49	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 153 dJC_Beam_153 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /91/ 1*1.25 + 6*1.40 + 2*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1830.338518 N	Mfy = -71.43 N*m	Mfz = -11.30 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 65.495807 N	Vfz = -765.236458 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.97	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 154 dJC_Beam_154 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1782.520980 N	Mfy = 12.68 N*m	Mfz = -13.74 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -36.944447 N	Vfz = 196.021321 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.24	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 155 dJC_Beam_155 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.84 mm

---

LOADS:
Governing Load Case: 12 ULS /93/ 1*0.90 + 6*1.40 + 2*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1402.882176 N	Mfy = -46.31 N*m	Mfz = -12.14 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 64.935527 N	Vfz = -526.807697 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.90	Mu = 70080.07 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.02 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 156 dJC_Beam_156 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 2876.096848 N	Mfy = -31.61 N*m	Mfz = -14.96 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -42.379240 N	Vfz = 682.211881 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.71	Mre = 11502.00 N*m
k = 0.99	Mu = 47977.23 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.04 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /35/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /41/ 1*1.00 + 6*1.00 + 2*1.00 + 3*1.00 + 5*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 158 dJC_Beam_158 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1048.149268 N	Mfy = -79.98 N*m	Mfz = -19.22 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -79.645436 N	Vfz = 475.627664 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.84 mm	om2 = 1.65	Mre = 11502.00 N*m
k = 0.78	Mu = 46147.32 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.00 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 171 dJC_Beam_171 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.86 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 8320.655233 N	Mfy = 1604.71 N*m	Mfz = -26.33 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 121.693885 N	Vfz = 15546.487051 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.12	Mu = 70074.98 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.19 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.22 < 1.00 (13.8.3(c))
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.07 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 172 dJC_Beam_172 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.86 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -1318.883792 N	Mfy = 692.03 N*m	Mfz = -3.96 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -24.937530 N	Vfz = 7960.513323 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.50	Mre = 11502.00 N*m
k = 0.26	Mu = 70074.98 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.07 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.06 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.03 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 173 dJC_Beam_173 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.86 mm

---

LOADS:
Governing Load Case: 12 ULS /93/ 1*0.90 + 6*1.40 + 2*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 980.588320 N	Mfy = -229.87 N*m	Mfz = -5.65 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 50.995629 N	Vfz = -3163.713918 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.50	Mre = 11502.00 N*m
k = 0.77	Mu = 70074.98 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /25/ 1*1.00 + 5*1.00 + 7*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 174 dJC_Beam_174 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.86 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -26.622853 N	Mfy = 832.30 N*m	Mfz = -10.31 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 43.385842 N	Vfz = 9082.996164 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.05	Mu = 70074.98 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.08 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.08 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 175 dJC_Beam_175 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.86 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -39.751143 N	Mfy = -760.18 N*m	Mfz = -3.25 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -36.987362 N	Vfz = -8408.731968 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.07	Mu = 70074.98 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.07 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.07 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 176 dJC_Beam_176 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.86 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -403.858509 N	Mfy = 787.82 N*m	Mfz = -4.75 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -21.298249 N	Vfz = 8853.344854 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.50	Mre = 11502.00 N*m
k = 0.12	Mu = 70074.98 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.07 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.07 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 177 dJC_Beam_177 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.86 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 189.408571 N	Mfy = -543.93 N*m	Mfz = -0.27 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -61.593279 N	Vfz = -6268.194448 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.50	Mre = 11502.00 N*m
k = 0.04	Mu = 70074.98 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.05 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.05 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.03 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 178 dJC_Beam_178 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.86 mm

---

LOADS:
Governing Load Case: 12 ULS /101/ 1*1.25 + 2*1.50 + 3*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 772.798513 N	Mfy = 781.66 N*m	Mfz = -4.66 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -25.491348 N	Vfz = 8656.368892 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.50	Mre = 11502.00 N*m
k = 0.04	Mu = 70074.98 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.07 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.08 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 179 dJC_Beam_179 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.86 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -889.237777 N	Mfy = -801.79 N*m	Mfz = -4.11 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -24.532276 N	Vfz = -9013.062510 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.50	Mre = 11502.00 N*m
k = 0.06	Mu = 70074.98 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.08 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.07 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 180 dJC_Beam_180 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.86 mm

---

LOADS:
Governing Load Case: 12 ULS /91/ 1*1.25 + 6*1.40 + 2*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 1135.560442 N	Mfy = 226.50 N*m	Mfz = -4.80 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 40.994906 N	Vfz = 3214.707912 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.41	Mre = 11502.00 N*m
k = 0.79	Mu = 67497.74 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.03 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 181 dJC_Beam_181 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.86 mm

---

LOADS:
Governing Load Case: 12 ULS /101/ 1*1.25 + 2*1.50 + 3*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -1016.486020 N	Mfy = -887.95 N*m	Mfz = -7.97 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 10.473999 N	Vfz = -10017.394927 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.50	Mre = 11502.00 N*m
k = 0.20	Mu = 70074.98 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.09 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.08 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 183 dJC_Beam_183 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.86 mm

---

LOADS:
Governing Load Case: 12 ULS /99/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 8219.486538 N	Mfy = -1608.13 N*m	Mfz = -26.16 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 123.329406 N	Vfz = -15861.636394 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.12	Mu = 70074.96 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.19 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.22 < 1.00 (13.8.3(c))
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.07 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /29/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 184 dJC_Beam_184 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.86 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 8321.299084 N	Mfy = -1652.27 N*m	Mfz = -15.14 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -108.879753 N	Vfz = -15516.672761 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.14	Mu = 70074.98 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.18 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.21 < 1.00 (13.8.3(c))
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.07 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /31/ 1*1.00 + 2*1.00 + 3*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 185 dJC_Beam_185 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.86 mm

---

LOADS:
Governing Load Case: 12 ULS /95/ 1*1.25 + 2*1.50 + 3*0.50 + 5*0.50 + 4*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -1649.010470 N	Mfy = -693.52 N*m	Mfz = 4.44 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -175.758614 N	Vfz = -7916.016462 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.50	Mre = 11502.00 N*m
k = 0.27	Mu = 70074.98 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.07 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.06 < 1.00 (13.9.2(a))
Vfy/Vry = 0.01 < 1.00 (13.4.1) Vfz/Vrz = 0.03 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 186 dJC_Beam_186 **POINT:** 1 **COORDINATE:** x = 0.00 L = 0.00 mm

---

LOADS:
Governing Load Case: 12 ULS /61/ 1*1.25 + 6*1.40

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Tf = -1312.668871 N	Mfy = 280.04 N*m	Mfz = 3.44 N*m
Tr = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = 2.944730 N	Vfz = -3115.340177 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.50	Mre = 11502.00 N*m
k = 0.05	Mu = 70074.98 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Tf/Tr + Mfy/Mry + Mfz/Mrz =0.03 < 1.00 (13.9.1)
Mfy/Mre + Mfz/Mrz - Tf*Zy/(Mre*A) = 0.02 < 1.00 (13.9.2(a))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.01 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /27/ 1*1.00 + 2*1.00 + 3*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /24/ 1*1.00 + 6*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

STEEL DESIGN

CODE: *CAN/CSA S16-09*
ANALYSIS TYPE: Member Verification

CODE GROUP:
MEMBER: 187 dJC_Beam_187 **POINT:** 7 **COORDINATE:** x = 1.00 L = 282.86 mm

---

LOADS:
Governing Load Case: 12 ULS /97/ 1*1.25 + 2*1.50 + 3*0.50

MATERIAL:
S 355 Fy = 355.00 MPa

SECTION PARAMETERS: RECT 120x10

d=120.0 mm

b=10.0 mm	Ay=92.31 mm2	Az=1107.69 mm2	A=1200.00 mm2
w=5.0 mm	Iy=1440000.00 mm4	Iz=10000.00 mm4	J=37899.23 mm4
t=5.0 mm	Zy=36000.00 mm3	Zz=3000.00 mm3	

INTERNAL FORCES AND CAPACITIES:

Cf = 38.767927 N	Mfy = -862.70 N*m	Mfz = -4.17 N*m
Cr0 = 383400.000000 N	Mry = 11502.00 N*m	Mrz = 958.50 N*m
	Vfy = -87.965436 N	Vfz = -9373.044862 N
CLASS: = Plastic	Vry = 19464.923077 N	Vrz = 233579.076923 N

LATERAL BUCKLING PARAMETERS:

Le = 282.86 mm	om2 = 2.50	Mre = 11502.00 N*m
k = -0.02	Mu = 70074.98 N*m	

BUCKLING PARAMETERS:

 About Y axis:

 About Z axis:

VERIFICATION FORMULAS:
Cf/Cr0 + U1y*Mfy/Mry + U1z*Mfz/Mrz = 0.08 < 1.00 (13.8.3(a))
Cf/Crz + U1y*Mfy/Mre + U1z*Mfz/Mrz = 0.08 < 1.00 (13.8.3(c))
Vfy/Vry = 0.00 < 1.00 (13.4.1) Vfz/Vrz = 0.04 < 1.00 (13.4.1)

LIMIT DISPLACEMENTS

Deflections
uy = 0.0 mm < uy max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00
uz = 0.0 mm < uz max = L/300.00 = 0.9 mm Verified
Governing Load Case: 15 SLS /26/ 1*1.00 + 2*1.00 + 3*1.00 + 5*1.00 + 4*1.00

Displacements *Not analyzed*

Section OK !!!

Appendix G Addendum

ALARA-LUKAGRO
NOISE CONTROL SOLUTIONS

Title	:	**49540.6110 Structural Analysis - Addendum REV0**
Client	:	**De Jong Combustion BV**
Project	:	**Carmon Creek**
Number	:	**405109540**

0	First issue				
		BvH	2015-06-27	ARo	2015-06-27
Rev:	***Description:***	***Prepared:***	***Date:***	***Checked:***	***Date:***

1 Introduction

For the Shell Carmon Creek site, 3 burner skid units will be delivered by De Jong Combustion BV. For each unit, 5 burner skids will be installed on an enclosure skid with dropover enclosure for protection against environmental conditions.
Alara-Lukagro BV has designed and manufactured the 3 enclosure skids and dropover enclosures.

This structural analysis addendum considers the lifting verification for the 3rd unit that showed a 250 mm deviation in all lifting point positions. The lifting points are assembled in mirrored positions.

Results will be shown for:
- Verification according Canadian structural code CSA S16-09
- Stress values in the structure
- Deformation values in the structure

This report is an addendum to approved document:
49540.6000 Structural Analysis – REV 1.0.

2 Materials - Primary steel

The following materials were used for the structural members.

Table 2-1 Primary structural steel

Application	Pos	Use		Grade	fy (MPa) yield	fu (MPa) tensile	Cert.
Rectangular Hollow Sections	Enclosure	Primary	EN 10219	S420MH	420	500-660	3.1
Open H-; I-; U- profiles	Skid	Primary	EN 10225	S355G11+M	355	460-490	3.2
Plating 2mm	Encl. Walls	Primary	EN 10152	DC01+ZE25	140	270-410	2.2[1]
Plating 3mm	Encl. Roof	Primary	EN 10152	DC01+ZE25	140	270-410	2.2[1]
Plating (Checker plate) 4mm	Skid Floor	Primary	EN 10025-2	S235JR	235	360-510	2.2[1]

[1] EN 10152 is applicable for plate material, for impact test ref. EN 10025-1 §7.3.2.1 which states that impact tests are not required for nominal thickness <6mm.

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F +31 (0) 184 662 721 | E info@alara-lukagro.com | I www.alara-lukagro.com | BIC: INGBNL2A | ING Bank nr. 66.21.17.050
IBAN: NL39 INGB 0662117050 | C.o.C. Rotterdam no. 23033397 | VAT NL 002707056B01

Title	:	**49540.6110 Structural Analysis - Addendum REV0**			
Client	:	**De Jong Combustion BV**			
Project	:	**Carmon Creek**			
Number	:	**405109540**			

0	First issue				
		BvH	2015-06-27	ARo	2015-06-27
Rev:	***Description:***	***Prepared:***	***Date:***	***Checked:***	***Date:***

1 Introduction

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Plating 2mm	Encl. Walls	Primary	EN 10152	DC01+ZE25	140	270-410	2.2[1]
Plating 3mm	Encl. Roof	Primary	EN 10152	DC01+ZE25	140	270-410	2.2[1]
Plating (Checker plate) 4mm	Skid Floor	Primary	EN 10025-2	S235JR	235	360-510	2.2[1]

[1] EN 10152 is applicable for plate material, for impact test ref. EN 10025-1 §7.3.2.1 which states that impact tests are not required for nominal thickness <6mm.

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F +31 (0) 184 662 721 | E info@alara-lukagro.com | I www.alara-lukagro.com | BIC: INGBNL2A | ING Bank nr. 66.21.17.050
IBAN: NL39 INGB 0662117050 | C.o.C. Rotterdam no. 23033397 | VAT NL 002707056B01

3 FEA Model

The set will be lifted from the enclosure skid with a spreader beam as seen below.

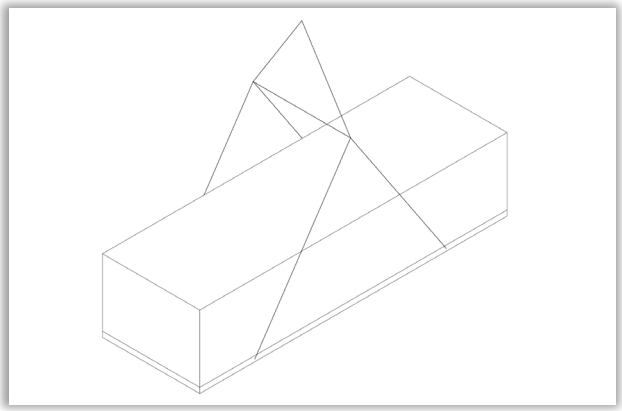


Figure 3-1 Lifting set up with spreader beam

To comply with the degrees of freedom of the lifting setup, the two lifting points on the left side are fixed in X, Y and Z direction and the lifting points on the right side are free to translate in X direction.

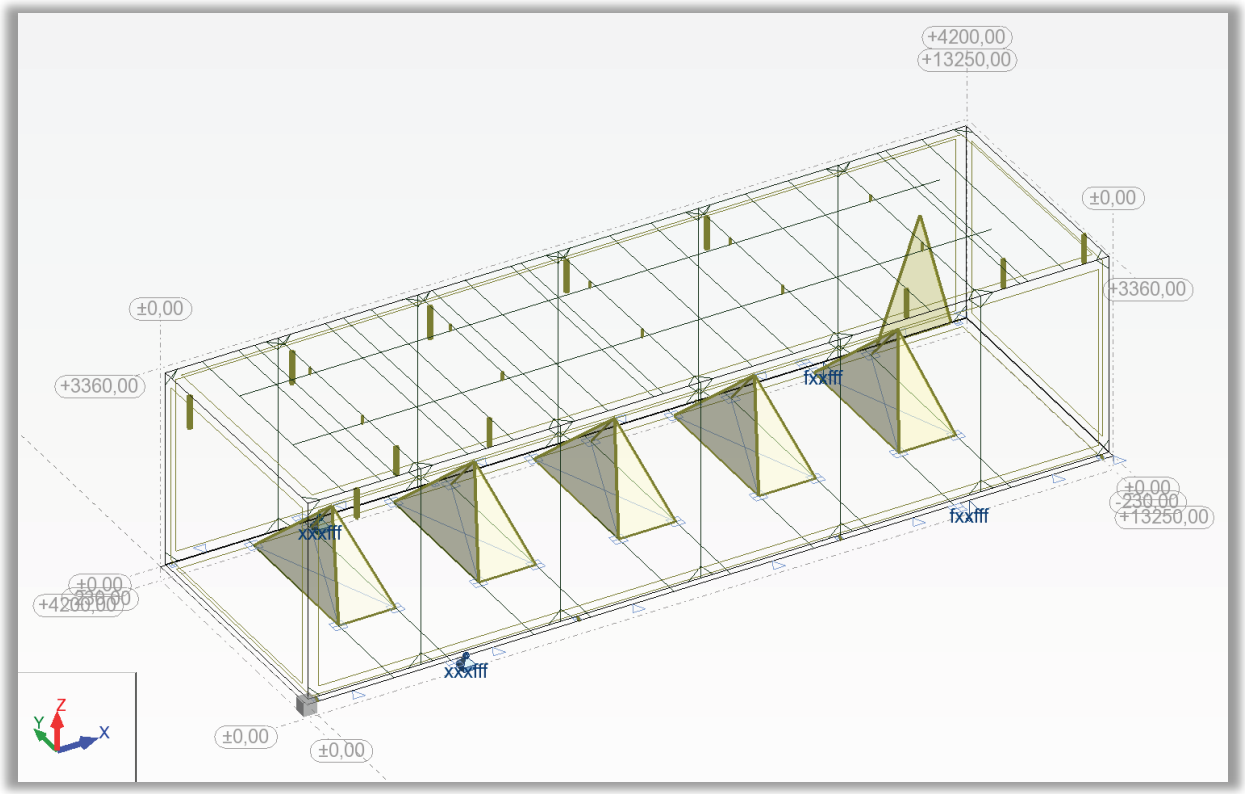


Figure 3-2 FEA model with constraints (x=fixed; f=free)

For this analysis the mirrored positions are used as seen in following Figure.

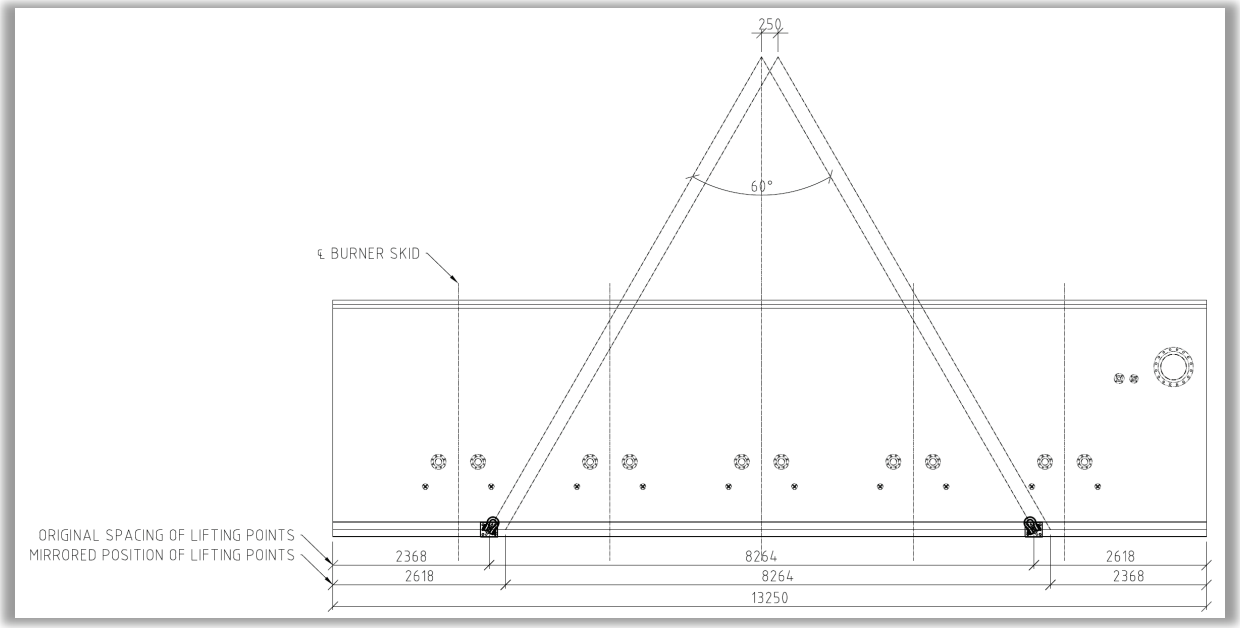


Figure 3-3 Original and mirrored lifting points spacing

4 Load cases

Table 4-1 Load cases and application

Case	*Load*	*Nature*	*Base Value*	*Application*
1	Selfweight	Dead	Auto	Steel structure selfweight automatically added

Several nodal masses are added for all equipment.
The weight of the total structure is increased to reflect the weight of the produced unit of 25.500 kg. Please see attached weight control sheet for BU-101.
The weight is further increased to incorporate an impact factor of 1,1 up to 28.050 kg

5 Results

Below the results of the structural calculation. The profiles will be checked according CSA S16-09. Stress and deformation will be displayed to show the behavior of the structure.

5.1 Unity Checks

CAN/CSA S16-09 - Member Verification (SLS ; ULS) 2to17 20to27 35to50 52to71 77to98 100 102 104to114 131 133to142 144 145 147to156 158 171to181 183to194 196

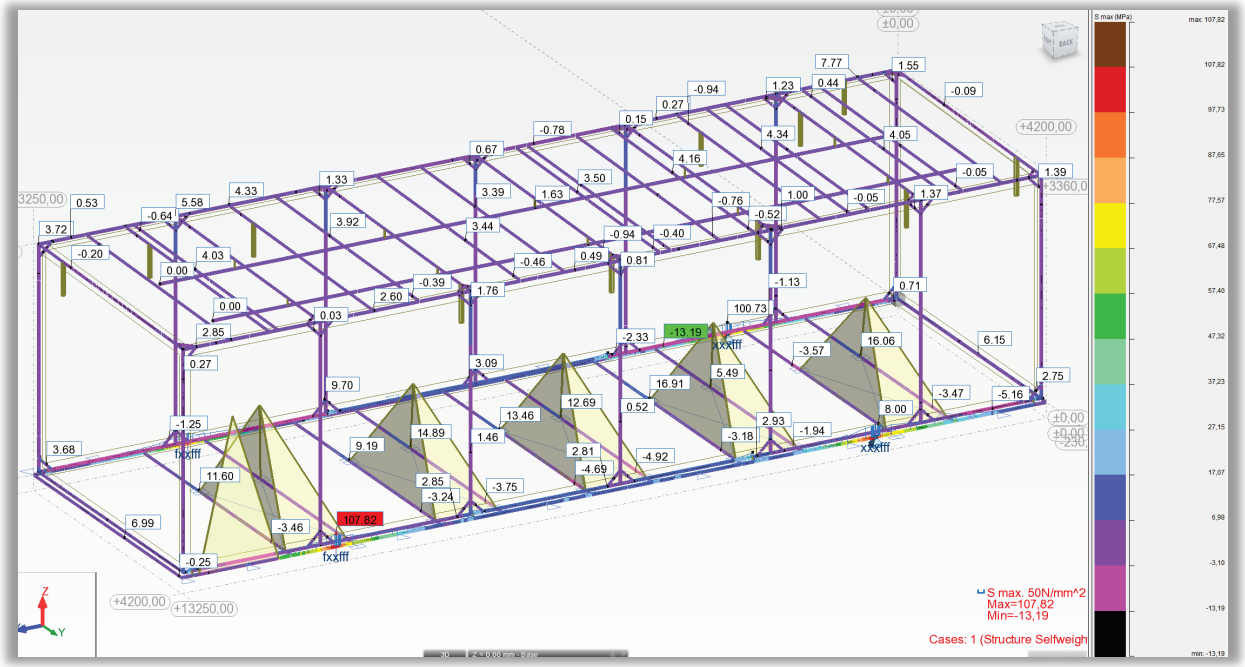
Results | Messages

Member	Section	Material	Lay	Laz	Ratio	Case	Ratio(uy)	Case (uy)	Ratio(uz)	Case (uz)
4 Beam 4	HEA 240	S 355	131.79	220.67	0.99	1 Structure Selfweight	0.01	1 Structure Selfweight	0.07	1 Structure Selfweight
2 Beam 2	HEA 240	S 355	131.79	220.67	0.84	1 Structure Selfweight	0.00	1 Structure Selfweight	0.06	1 Structure Selfweight
8 dJC Bm Crn 8	IPE 140	S 355	200.41	695.65	0.11	1 Structure Selfweight	0.00	1 Structure Selfweight	0.01	1 Structure Selfweight
17 Beam 17	HEA 180	S 355	56.42	92.95	0.11	1 Structure Selfweight	0.01	1 Structure Selfweight	0.12	1 Structure Selfweight
6 Beam 6	HEA 180	S 355	56.42	92.95	0.10	1 Structure Selfweight	0.00	1 Structure Selfweight	0.10	1 Structure Selfweight
20	SHSH 100x100x6.3	S 420	169.54	169.54	0.10	1 Structure Selfweight	0.01	1 Structure Selfweight	0.00	1 Structure Selfweight
16 Beam 16	HEA 180	S 355	56.42	92.95	0.09	1 Structure Selfweight	0.01	1 Structure Selfweight	0.12	1 Structure Selfweight
85 dJC Beam 85	UNP 100	S 355	104.96	278.49	0.09	1 Structure Selfweight	0.00	1 Structure Selfweight	0.12	1 Structure Selfweight
7 Beam 7	HEA 180	S 355	56.42	92.95	0.09	1 Structure Selfweight	0.01	1 Structure Selfweight	0.11	1 Structure Selfweight
79 dJC Beam 79	UNP 100	S 355	104.96	278.49	0.09	1 Structure Selfweight	0.00	1 Structure Selfweight	0.11	1 Structure Selfweight

Figure 5-1 Unity Checks for top utilized profiles (>10%), sorted on overall ratio high to low

As can be seen the highest utilized members are the long beams HEA 240 4 and 2. 99% / 84% of its capacity is used and therefore suffices to the structural verification according CSA S16-09.

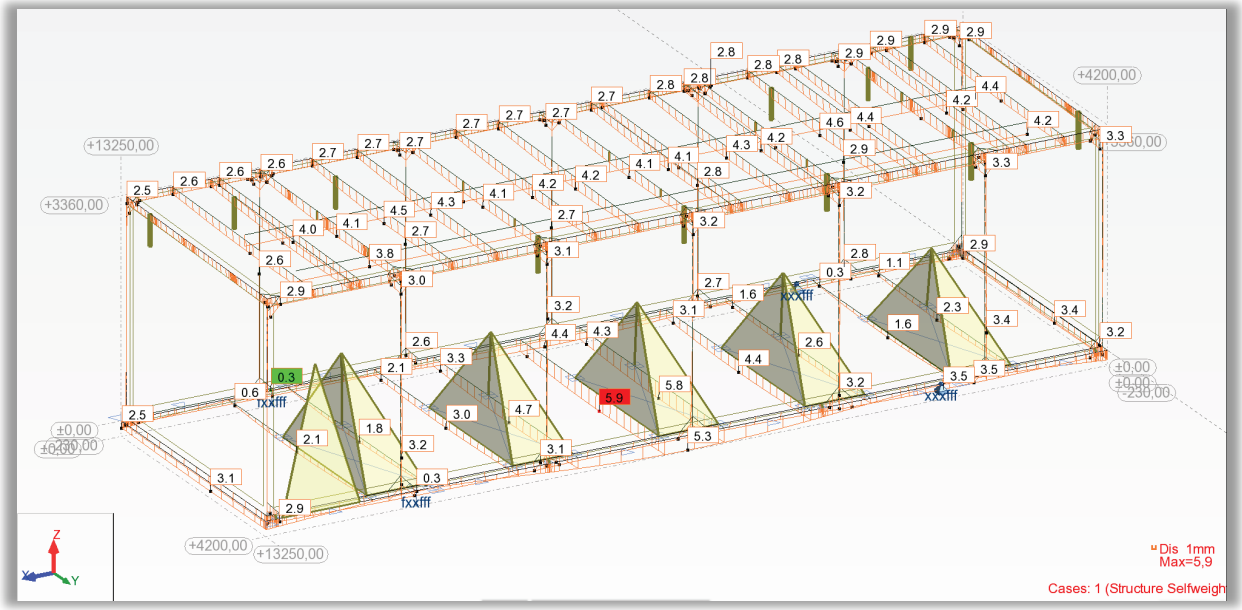
5.2 Stress



As can be seen the highest stress peak is 108 MPa.
This is within limits: max 108 < 355 MPa.

5.3 Deformation

As can be seen the largest deformation is about 5,9 mm in the floor.
This is within limits: (4200/5,9=) 1/711 < 1/300.



5.4 Conclusion

This report is an addendum to approved document:
49540.6000 Structural Analaysis – REV 1.0.

This structural analysis addendum considers the lifting verification of one of the units that showed a 250 mm deviation in all lifting point positions. The lifting points are assembled in mirrored positions.
The lifting calculation is updated with loads reflecting the lifted weight of 25,5T and increased with an impact factor of 1,1 for lifting.

- Verification according governing Canadian CSA S16-09 shows a max utilization of 99% of the carrying HEA240 longitudinal beam on the burner skid penetration side.
- The stress values in the structure are well below the stated limit of 355 MPa with a max peak of 108 MPa.
- The deformation values in the structure are well below stated limit of 1/300 with 5,9 mm global deformation in the floorbeams.

This concludes that the structure is safe for lifting considering the mirrored positions of the lifting points.

6 Appendix

- Weight Control Sheet for BU-101 25,5 T dated 22-06-2015

Weight Control Data Sheet

Carmon Creek

REQUISITION NO.:	Project NO.:	ISSUE:
	405109540	

EQUIPMENT NO.:	EQUIPMENT DESCRIPTION:
BU-101	**Acoustic Enclosure**

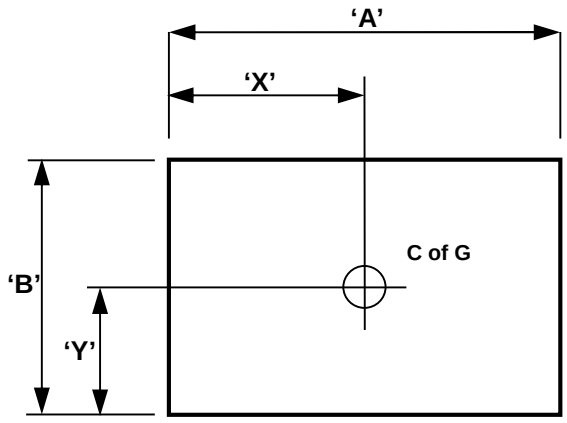
TOLERANCE CODE (Please Tick (√) appropriate box)	PRELIMINARY ESTIMATE	DESIGN ESTIMATE	M.T.O. CALCULATED	CATALOGUE WEIGHT	WEIGHED
					X

WEIGHT DATA (Tonnes)

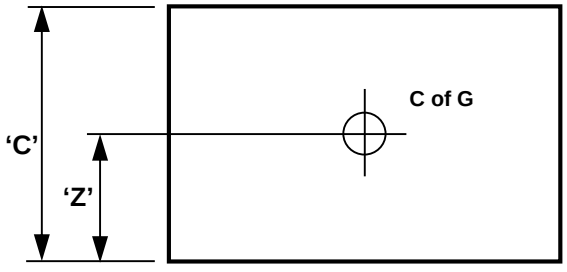
DRY	**25.50**	OPERATING		TEST	

OTHER TEMPORARY WEIGHTS	DESCRIPTION	
	Slings + Shackles + Spreader Beam	**0.30**

DIMENSIONAL DATA (mm)



PLAN



ELEVATION

OVERALL SIZES	
DIMENSION 'A'	**13200**
DIMENSION 'B'	**4200**
DIMENSION 'C'	**3700**

CENTRE OF GRAVITY		
DIM'N	DRY	OPERATING
'X'	**Ca. 6800**	
'Y'	**Ca. 2000**	
'Z'	**Ca. 1400**	

NOTES:

1) ONE SHEET TO BE COMPLETED FOR EACH SEPARATELY INSTALLED SKID / ITEM.

2) EQUIPMENT ORIENTATION ON EACH SKID OR ITEM TO BE INDICATED.

Comments:	Revision	Date	Prepared By
	R00	22-06-2015	AVi