

dh scaffold
SERVICES LIMITED

Project: Site: Market Cross, Swaffham, Norfolk

Client: Narford Scaffolding Ltd

Project number: DH/10894/1

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Designed by: M.Christy

Signed: ..M.Christy...

Checked by: S.Kennedy

Signed: ...S.Kennedy

Approved by: D.I.Hewitt

Signed: ..D.I.Hewitt

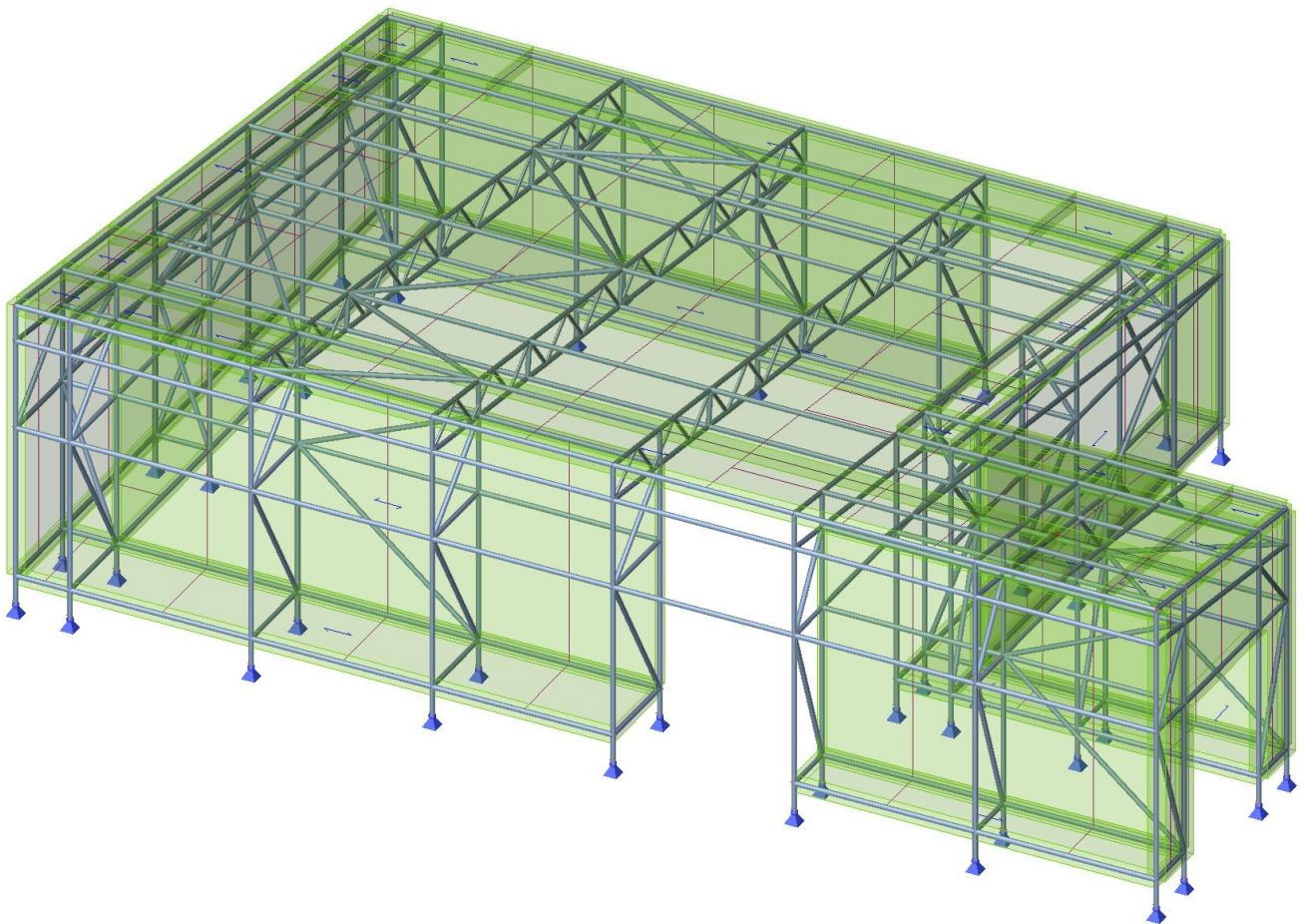
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**DH SCAFFOLD SERVICES LTD
OFFICE 3/4 EUROBROID, DODD STREET, HILLSBOROUGH, S6 2NR**

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2. Analysis Model



3. Standards and properties

British and European standards

BSEN12811 – 1: 2003 – Temporary works equipment & Scaffolds – Performance requirements and general design
 BSEN12911 – 2: 2003 – Temporary works equipment & Scaffolds – Information on materials
 BSEN12810 – 1: 2003 – Façade scaffolds made of prefabricated components – Product specifications
 BSEN1991 – 1 – 1 – 1: 2002 – General actions – Densities, self-weight and imposed loads of buildings
 BSEN1991 – 1 – 1 – 4: 2005 – General actions – Wind actions
 BSEN13374: 2004 – Temporary edge protection systems – Product specification & test methods
 BS5975:2008 – Temporary works procedures and permissible stress design for falsework
 BSEN39, BS1139-2, EN74-1: Metal scaffolding tube and coupler specifications

Guides

TG20:13 – NASC guide to good practice for tube and fittings scaffolds
 TG4:04 – Anchoring systems for scaffolding
 TGN(E)190 – Design and use of temporary scaffold guards
 TG9:12 – Guide to the design & construction of temporary roofs and buildings

Component properties

Properties of scaffold tube – (TG20/BS9573:1993/BS1139-1.2/BSEN12811-2)

Property	Steel tube	Aluminium tube
Outside Diameter	48.30mm	48.30mm
Wall thickness	4.00mm	4.47mm
Cross-sectional area	5.57cm ²	6.15cm ²
Mass	4.37kg/m	1.67kg/m (-7.5%)
Second moment of area	13.80cm ⁴	14.90cm ⁴
Allowable bending moment	0.99kNm	1.33kNm
Allowable Shear	23.3kN	25.5kN
Minimum Yield strength	235N/mm ²	255N/mm ²
Modulus of elasticity	210000N/mm ²	70000N/mm ²

Safe working loads of scaffold couplers – (BSEN74-1:2005/TG20)

Coupler	Slipping force	Rotational moment	Pull apart / failure
Right angle (class A)	6.1kN	0.053kNm	12.2kN
Right angle (class B)	9.1kN	0.079kNm	18.18kN
Swivel (class A)	6.1kN	N/A	8.48kN
Swivel (class B)	9.1kN	N/A	12.12kN
Parallel (class A)	6.1kN	N/A	12.12kN
Parallel (class B)	9.1kN	N/A	18.18kN
Sleeve (class A)	3.6kN	0.57kNm	N/A
Sleeve (class B)	5.5kN	0.85kNm	N/A
SGB MK3A Right angle	12.5kN	N/A	N/A
Putlog Coupler	0.63kN	0.056kNm	N/A

Properties of timber sections – (TG20/BS2483-1)

Basic section	Section area	Section modulus	Strength class	Working shear	Working moment
225mm x 38mm Scaffold board	85cm ²	54.15cm ³	C24	4.6kN	0.475kNm
250mm x 125mm Sleeper	312.5cm ²	651cm ³	C24	16.7kN	5.396kNm
225mm x 75mm Timber Board	168.7cm ²	210.9cm ³	C24	9kN	1.835kNm
225 x 100mm Timber board	225cm ²	375cm ³	C24	12kN	3.178kNm

Properties of prefabricated scaffold beams

Beam type	Material	Depth C/C	Mass	Working shear	Working moment	E (N/mm ²)	I (cm ⁴)
SGB Ladder	Steel	305mm	12kg/m	18kN	13.5kNm	206,000	2,600
SGB Unit	Steel	610mm	12kg/m	18.5kN	27.7kNm	206,000	10,572
SGB Alloy	Aluminium	400mm	4.5kg/m	17.4kN	16.9kNm	70,000	4,958
Layher 450	Aluminium	400mm	4.25kg/m	12.32kN	13.94kNm	70,000	4,481
Layher 750	Aluminium	700mm	6.25kg/m	20.64kN	24.18kNm	70,000	16,563
Layher 450	Steel	400mm	10.35kg/m	16.4kN	25kNm	206,000	4,481
Layher 750	Steel	700mm	17.75kg/m	27.3kN	55.2kNm	206,000	13,702
Apollo X beams	Aluminium	700mm	6.7kg/m	45.4kN	42.9kNm	70,000	14,700
Haki 450	Aluminium	400mm	7.5kg/m	27kN	15.7kNm	70,000	17,182
Haki 750	Aluminium	700mm	4.1kg/m	12.7kN	41.3kNm	70,000	4,483
Libra 750	Aluminium	700mm	6.7kg/m	24.9kN	33.8kNm	70,000	-
DAX Beam 750	Aluminium	750mm	5.9kg/m	38.2kN	40.3kNm	70,000	15,196
ASP UBIX 450	Aluminium	450mm	4.5kg/m	17.1kN	19.6kNm	70,000	4,958
ASP UBIX 780	Aluminium	780mm	6.4kg/m	30.7kN	36.5kNm	70,000	16,563

Scaffold loadings

Loadings of men and materials

Type of load	Loading
Man with hand tools (average)	1kN
Wheel barrow with mortar (full)	1.5kN
100 bricks	2.75kN
Timber (softwood)	6.5kN/m ³
Packaged floor/roof tiles (typical)	16kN/m ³
Demolition debris	16kN/m ³

Loadings of scaffold components

Component	Dimensions	Loading
Type 4 steel scaffold tube	48.3 × 4mm CHS	0.043kN/m
Type 3 steel scaffold tube	48.3 × 3.2mm CHS	0.035kN/m
Softwood scaffold boards	38 × 225mm	0.25kN/m ²
Softwood scaffold boards	50 × 225mm	0.32kN/m ²
Softwood scaffold boards	63 × 225mm	0.41kN/m ²
Profiled metal sheeting	1mm thick	0.10 kN/m ²

4. Hinge type

Name	ux	uy	uz	fix	fiy	fiz	Hinge type	Nxk [kN] Mxk [kNm]	Vyk [kN] Myk [kNm]	Vzk [kN] Mzk [kNm]
RA	Rigid	Rigid	Rigid	Nonlinear	Nonlinear	Nonlinear	Right angle coupler	15.00 0.13	30.00 0.80	15.00 0.13
SW	Rigid	Rigid	Rigid	Rigid	Free	Rigid	Swivel coupler	10.00 0.00	0.00 0.00	0.00 0.00
SL	Rigid	Rigid	Rigid	Free	Free	Free	Friction sleeve	6.00 0.00	0.00 0.00	0.00 0.00

5. Load cases

Name	Description	Action type	Load group	Direction	Duration	Master load case
	Spec	Load type				
LC1	SELFWEIGHT	Permanent Self weight	SELFWEIGHT	-Z		
LC2	PERMANENT	Permanent Standard	PERMANENT			
LC3	VARIABLE - IMPOSED	Variable	VARIABLE - VERTICAL		Short	None
	Standard	Static				
LC4	VARIABLE - WIND @ 0 -	Variable	VARIABLE - WIND		Instantaneous	None
	Standard	Static				
LC5	VARIABLE - WIND @ 0 +	Variable	VARIABLE - WIND		Instantaneous	None
	Standard	Static				
LC6	VARIABLE - WIND @ 90 -	Variable	VARIABLE - WIND		Instantaneous	None
	Standard	Static				
LC7	VARIABLE - WIND @ 90 +	Variable	VARIABLE - WIND		Instantaneous	None
	Standard	Static				
LC8	VARIABLE - WIND @ 180 -	Variable	VARIABLE - VERTICAL		Instantaneous	None
	Standard	Static				
LC9	VARIABLE - WIND @ 180 +	Variable	VARIABLE - VERTICAL		Instantaneous	None
	Standard	Static				
LC10	VARIABLE - WIND @ 270 -	Variable	VARIABLE - VERTICAL		Instantaneous	None
	Standard	Static				
LC11	VARIABLE - WIND @ 270 +	Variable	VARIABLE - VERTICAL		Instantaneous	None
	Standard	Static				
LC12	VARIABLE - SNOW	Variable	VARIABLE - VERTICAL		Short	None
	Standard	Static				

6. Nonlinear combinations

Name	Description	Type	Load cases	Coeff. [-]
NC1	SELF + PERM	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
NC2	SELF + PERM + IMP	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC3 - VARIABLE - IMPOSED	1.00
NC3	SELF + PERM + IMP + SNOW	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC3 - VARIABLE - IMPOSED	1.00
			LC12 - VARIABLE - SNOW	1.00
NC4	SELF + PERM + WIND @ 0 -	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC4 - VARIABLE - WIND @ 0 -	1.00
NC5	SELF + PERM + WIND @ 0 +	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC5 - VARIABLE - WIND @ 0 +	1.00
NC6	SELF + PERM + WIND @ 90 -	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC6 - VARIABLE - WIND @ 90 -	1.00
NC7	SELF + PERM + WIND @ 90 +	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC7 - VARIABLE - WIND @ 90 +	1.00
NC8	SELF + PERM + WIND @ 180 -	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC8 - VARIABLE - WIND @ 180 -	1.00
NC9	SELF + PERM + WIND @ 180 +	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC9 - VARIABLE - WIND @ 180 +	1.00
NC10	SELF + PERM + WIND @ 270 -	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC10 - VARIABLE - WIND @ 270 -	1.00
NC11	SELF + PERM + WIND @ 270 +	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC11 - VARIABLE - WIND @ 270 +	1.00
NC12	SELF + PERM + WIND @ 0 - + IMP	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC3 - VARIABLE - IMPOSED	1.00
			LC4 - VARIABLE - WIND @ 0 -	1.00
NC13	SELF + PERM + WIND @ 0 + + IMP	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC3 - VARIABLE - IMPOSED	1.00
			LC5 - VARIABLE - WIND @ 0 +	1.00
NC14	SELF + PERM + WIND @ 90 - + IMP	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC3 - VARIABLE - IMPOSED	1.00
			LC6 - VARIABLE - WIND @ 90 -	1.00
NC15	SELF + PERM + WIND @ 90 + + IMP	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00

Name	Description	Type	Load cases	Coeff. [-]
			LC3 - VARIABLE - IMPOSED	1.00
			LC7 - VARIABLE - WIND @ 90 +	1.00
NC16	SELF + PERM + WIND @ 180 - + IMP	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC3 - VARIABLE - IMPOSED	1.00
			LC8 - VARIABLE - WIND @ 180 -	1.00
NC17	SELF + PERM + WIND @ 180 + + IMP	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC3 - VARIABLE - IMPOSED	1.00
			LC9 - VARIABLE - WIND @ 180 +	1.00
NC18	SELF + PERM + WIND @ 270 - + IMP	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC3 - VARIABLE - IMPOSED	1.00
			LC10 - VARIABLE - WIND @ 270 -	1.00
NC19	SELF + PERM + WIND @ 270 + + IMP	Serviceability	LC1 - SELFWEIGHT	1.00
			LC2 - PERMANENT	1.00
			LC3 - VARIABLE - IMPOSED	1.00
			LC11 - VARIABLE - WIND @ 270 +	1.00

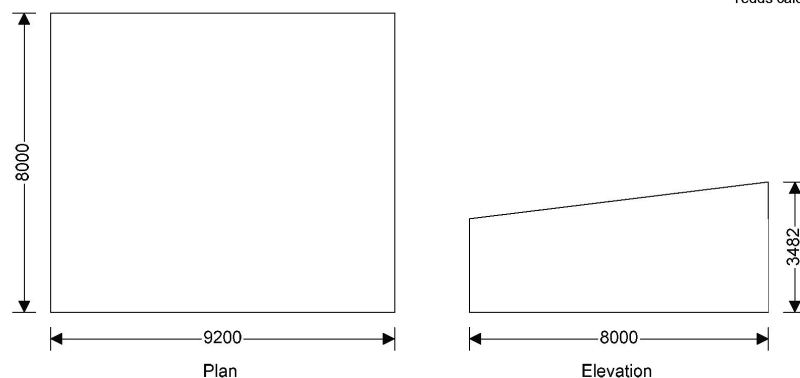
7. External Calculations

CONSIDER WIND

WIND LOADING

In accordance with EN1991-1-4:2005+A1:2010 and the UK national annex

Tedds calculation version 3.0.23



Building data

Type of roof	Monopitch
Length of building	L = 9200 mm
Width of building	W = 8000 mm
Height to low eaves	H = 2500 mm
Pitch of roof	$\alpha_0 = 7.0$ deg
Total height	h = 3482 mm

Basic values

Location	Swaffham
Wind speed velocity (FigureNA.1)	$V_{b,map} = 22.0$ m/s
Distance to shore	$L_{shore} = 38.00$ km
Altitude above sea level	$A_{alt} = 77.0$ m
Altitude factor	$C_{alt} = A_{alt}/1m \times 0.001 + 1 = 1.077$
Fundamental basic wind velocity	$V_{b,0} = V_{b,map} \times C_{alt} = 23.7$ m/s
Direction factor	$C_{dir} = 1.00$
Season factor	$C_{season} = 1.00$
Shape parameter K	K = 0.2
Exponent n	n = 0.5
Air density	$\rho = 1.226$ kg/m ³
Probability factor	$C_{prob} = [(1 - K \times \ln(-\ln(1-p)))/(1 - K \times \ln(-\ln(0.98)))]^n = 1.00$
Basic wind velocity (Exp. 4.1)	$V_b = C_{dir} \times C_{season} \times V_{b,0} \times C_{prob} = 23.7$ m/s
Reference mean velocity pressure	$q_b = 0.5 \times \rho \times V_b^2 = 0.344$ kN/m ²

Orography

Orography factor not significant	$c_o = 1.0$
Terrain category	Town
Displacement height (sheltering effect excluded)	$h_{dis} = 0$ mm

The velocity pressure for the windward face of the building with a 0 degree wind is to be considered as 1 part as the height h is less than b (cl.7.2.2)

The velocity pressure for the windward face of the building with a 90 degree wind is to be considered as 1 part as the height h is less than b (cl.7.2.2)

The velocity pressure for the windward face of the building with a 180 degree wind is to be considered as 1 part as the height h is less than b (cl.7.2.2)

Peak velocity pressure - windward wall - Wind 0 deg and roof

Reference height (at which q is sought) $z = 2500\text{mm}$
 Displacement height (sheltering effects excluded) $h_{dis} = 0\text{ mm}$
 Exposure factor (Figure NA.7) $C_e = 1.56$
 Exposure correction factor (Figure NA.8) $C_{e,T} = 0.78$
 Peak velocity pressure $q_p = C_e \times C_{e,T} \times q_b = 0.42\text{ kN/m}^2$

Structural factor

Structural damping $\delta_s = 0.050$
 Height of element $h_{part} = 2500\text{ mm}$
 Size factor (Table NA.3) $C_s = 0.873$
 Dynamic factor (Figure NA.9) $C_d = 1.027$
 Structural factor $C_s C_d = C_s \times C_d = 0.897$

Peak velocity pressure - windward wall - Wind 90 deg and roof

Reference height (at which q is sought) $z = 3482\text{mm}$
 Displacement height (sheltering effects excluded) $h_{dis} = 0\text{ mm}$
 Exposure factor (Figure NA.7) $C_e = 1.75$
 Exposure correction factor (Figure NA.8) $C_{e,T} = 0.83$
 Peak velocity pressure $q_p = C_e \times C_{e,T} \times q_b = 0.50\text{ kN/m}^2$

Structural factor

Structural damping $\delta_s = 0.050$
 Height of element $h_{part} = 3482\text{ mm}$
 Size factor (Table NA.3) $C_s = 0.874$
 Dynamic factor (Figure NA.9) $C_d = 1.031$
 Structural factor $C_s C_d = C_s \times C_d = 0.901$

Peak velocity pressure - windward wall - Wind 180 deg and roof

Reference height (at which q is sought) $z = 3482\text{mm}$
 Displacement height (sheltering effects excluded) $h_{dis} = 0\text{ mm}$
 Exposure factor (Figure NA.7) $C_e = 1.75$
 Exposure correction factor (Figure NA.8) $C_{e,T} = 0.83$
 Peak velocity pressure $q_p = C_e \times C_{e,T} \times q_b = 0.50\text{ kN/m}^2$

Structural factor

Structural damping $\delta_s = 0.050$
 Height of element $h_{part} = 3482\text{ mm}$
 Size factor (Table NA.3) $C_s = 0.869$
 Dynamic factor (Figure NA.9) $C_d = 1.027$
 Structural factor $C_s C_d = C_s \times C_d = 0.893$

Peak velocity pressure for internal pressure

Peak velocity pressure – internal (as roof press.) $q_{p,i} = 0.50\text{ kN/m}^2$

Pressures and forces

Net pressure $p = C_s C_d \times q_p \times C_{pe} - q_{p,i} \times C_{pi}$

Net force

$$F_w = p_w \times A_{ref}$$

Roof load case 1 - Wind 0, c_{pi} 0.20, $-c_{pe}$

Zone	Ext pressure coefficient c_{pe}	Peak velocity pressure $q_{p,i}$ (kN/m ²)	Net pressure p (kN/m ²)	Area A_{ref} (m ²)	Net force F_w (kN)
F (-ve)	-1.66	0.50	-0.84	2.44	-2.05
G (-ve)	-1.12	0.50	-0.60	4.01	-2.40
H (-ve)	-0.56	0.50	-0.35	67.70	-23.65

 Total vertical net force $F_{w,v} = -27.89$ kN

 Total horizontal net force $F_{w,h} = -3.42$ kN

Walls load case 1 - Wind 0, c_{pi} 0.20, $-c_{pe}$

Zone	Ext pressure coefficient c_{pe}	Peak velocity pressure $q_{p,i}$ (kN/m ²)	Net pressure p (kN/m ²)	Area A_{ref} (m ²)	Net force F_w (kN)
A	-1.20	0.50	-0.64	3.60	-2.29
B	-0.80	0.50	-0.46	16.79	-7.69
C	-0.50	0.50	-0.32	3.54	-1.15
D	0.72	0.42	0.17	23.00	3.96
E	-0.35	0.42	-0.23	32.04	-7.40

Overall loading

 Equiv leeward net force for overall section $F_l = F_{w,wE} = -7.4$ kN

 Net windward force for overall section $F_w = F_{w,wD} = 4.0$ kN

 Lack of correlation (cl.7.2.2(3) – Note) $f_{corr} = 0.85$ as h/W is 0.435

 Overall loading overall section $F_{w,D} = f_{corr} \times (F_w - F_l + F_{w,h}) = 6.8$ kN

Roof load case 2 - Wind 0, c_{pi} -0.3, $+c_{pe}$

Zone	Ext pressure coefficient c_{pe}	Peak velocity pressure $q_{p,i}$ (kN/m ²)	Net pressure p (kN/m ²)	Area A_{ref} (m ²)	Net force F_w (kN)
F (+ve)	0.04	0.50	0.17	2.44	0.41
G (+ve)	0.04	0.50	0.17	4.01	0.67
H (+ve)	0.04	0.50	0.17	67.70	11.34

 Total vertical net force $F_{w,v} = 12.33$ kN

 Total horizontal net force $F_{w,h} = 1.51$ kN

Walls load case 2 - Wind 0, c_{pi} -0.3, $+c_{pe}$

Zone	Ext pressure coefficient c_{pe}	Peak velocity pressure $q_{p,i}$ (kN/m ²)	Net pressure p (kN/m ²)	Area A_{ref} (m ²)	Net force F_w (kN)
A	-1.20	0.50	-0.39	3.60	-1.39
B	-0.80	0.50	-0.21	16.79	-3.50
C	-0.50	0.50	-0.07	3.54	-0.26
D	0.72	0.42	0.42	23.00	9.70
E	-0.35	0.42	0.02	32.04	0.59

Overall loading

 Equiv leeward net force for overall section $F_l = F_{w,wE} = 0.6$ kN

Net windward force for overall section $F_w = F_{w,wD} = 9.7 \text{ kN}$
 Lack of correlation (cl.7.2.2(3) – Note) $f_{corr} = 0.85$ as h/W is 0.435
 Overall loading overall section $F_{w,D} = f_{corr} \times (F_w - F_i + F_{w,h}) = 9.0 \text{ kN}$

Roof load case 3 - Wind 90, c_{pi} 0.20, $-c_{pe}$

Zone	Ext pressure coefficient c_{pe}	Peak velocity pressure $q_{p,i}$ (kN/m ²)	Net pressure p (kN/m ²)	Area A_{ref} (m ²)	Net force F_w (kN)
FU (-ve)	-2.28	0.50	-1.12	1.22	-1.37
FL (-ve)	-2.00	0.50	-1.00	1.22	-1.22
G (-ve)	-1.10	0.50	-0.59	3.17	-1.88
H (-ve)	-0.72	0.50	-0.42	22.45	-9.51
I (-ve)	-0.72	0.50	-0.42	46.09	-19.52

Total vertical net force $F_{w,v} = -33.26 \text{ kN}$

Total horizontal net force $F_{w,h} = 0.00 \text{ kN}$

Walls load case 3 - Wind 90, c_{pi} 0.20, $-c_{pe}$

Zone	Ext pressure coefficient c_{pe}	Peak velocity pressure $q_{p,i}$ (kN/m ²)	Net pressure p (kN/m ²)	Area A_{ref} (m ²)	Net force F_w (kN)
A _U	-1.20	0.50	-0.64	4.85	-3.10
B _U	-0.80	0.50	-0.46	19.40	-8.92
C _U	-0.50	0.50	-0.32	7.78	-2.53
A _L	-1.20	0.42	-0.55	3.48	-1.92
B _L	-0.80	0.42	-0.40	13.93	-5.60
C _L	-0.50	0.42	-0.29	5.59	-1.61
D	0.72	0.50	0.22	23.93	5.33
E	-0.33	0.50	-0.25	23.93	-5.99

Overall loading

Equiv leeward net force for overall section $F_i = F_{w,wE} = -6.0 \text{ kN}$
 Net windward force for overall section $F_w = F_{w,wD} = 5.3 \text{ kN}$
 Lack of correlation (cl.7.2.2(3) – Note) $f_{corr} = 0.85$ as h/L is 0.379
 Overall loading overall section $F_{w,D} = f_{corr} \times (F_w - F_i + F_{w,h}) = 9.6 \text{ kN}$

Roof load case 4 - Wind 90, c_{pi} -0.3, $+c_{pe}$

Zone	Ext pressure coefficient c_{pe}	Peak velocity pressure $q_{p,i}$ (kN/m ²)	Net pressure p (kN/m ²)	Area A_{ref} (m ²)	Net force F_w (kN)
FU (+ve)	0.04	0.50	0.17	1.22	0.20
FL (+ve)	0.04	0.50	0.17	1.22	0.20
G (+ve)	0.04	0.50	0.17	3.17	0.53
H (+ve)	0.04	0.50	0.17	22.45	3.77
I (+ve)	0.04	0.50	0.17	46.09	7.73

Total vertical net force $F_{w,v} = 12.34 \text{ kN}$

Total horizontal net force $F_{w,h} = 0.00 \text{ kN}$

Walls load case 4 - Wind 90, c_{pi} -0.3, $+c_{pe}$

Zone	Ext pressure coefficient c_{pe}	Peak velocity pressure $q_{p,i}$ (kN/m ²)	Net pressure p (kN/m ²)	Area A_{ref} (m ²)	Net force F_w (kN)
A _U	-1.20	0.50	-0.39	4.85	-1.89
B _U	-0.80	0.50	-0.21	19.40	-4.07
C _U	-0.50	0.50	-0.08	7.78	-0.58
A _L	-1.20	0.42	-0.30	3.48	-1.06
B _L	-0.80	0.42	-0.15	13.93	-2.12
C _L	-0.50	0.42	-0.04	5.59	-0.22
D	0.72	0.50	0.47	23.93	11.30
E	-0.33	0.50	0.00	23.93	-0.01

Overall loading

Equiv leeward net force for overall section

$$F_l = F_{w,wE} = 0.0 \text{ kN}$$

Net windward force for overall section

$$F_w = F_{w,wD} = 11.3 \text{ kN}$$

Lack of correlation (cl.7.2.2(3) – Note)

$$f_{corr} = 0.85 \text{ as } h/L \text{ is } 0.379$$

Overall loading overall section

$$F_{w,D} = f_{corr} \times (F_w - F_l + F_{w,h}) = 9.6 \text{ kN}$$

Roof load case 5 - Wind 180, c_{pi} 0.20, - c_{pe}

Zone	Ext pressure coefficient c_{pe}	Peak velocity pressure $q_{p,i}$ (kN/m ²)	Net pressure p (kN/m ²)	Area A_{ref} (m ²)	Net force F_w (kN)
F (-ve)	-2.44	0.50	-1.19	2.44	-2.90
G (-ve)	-1.08	0.50	-0.58	4.01	-2.33
H (-ve)	-0.82	0.50	-0.47	67.70	-31.49

Total vertical net force

$$F_{w,v} = -36.45 \text{ kN}$$

Total horizontal net force

$$F_{w,h} = -4.48 \text{ kN}$$

Walls load case 5 - Wind 180, c_{pi} 0.20, - c_{pe}

Zone	Ext pressure coefficient c_{pe}	Peak velocity pressure $q_{p,i}$ (kN/m ²)	Net pressure p (kN/m ²)	Area A_{ref} (m ²)	Net force F_w (kN)
A	-1.20	0.50	-0.63	4.73	-3.00
B	-0.80	0.50	-0.46	20.35	-9.29
C	-0.50	0.50	-0.32	3.36	-1.08
D	0.72	0.50	0.22	32.04	7.15
E	-0.35	0.50	-0.26	23.00	-5.88

Overall loading

Equiv leeward net force for overall section

$$F_l = F_{w,wE} = -5.9 \text{ kN}$$

Net windward force for overall section

$$F_w = F_{w,wD} = 7.1 \text{ kN}$$

Lack of correlation (cl.7.2.2(3) – Note)

$$f_{corr} = 0.85 \text{ as } h/L \text{ is } 0.379$$

Overall loading overall section

$$F_{w,D} = f_{corr} \times (F_w - F_l - F_{w,h}) = 14.9 \text{ kN}$$

Roof load case 6 - Wind 180, c_{pi} -0.30, - c_{pe}

Zone	Ext pressure coefficient C_{pe}	Peak velocity pressure $q_{p,i}$ (kN/m ²)	Net pressure p (kN/m ²)	Area A_{ref} (m ²)	Net force F_w (kN)
F (-ve)	-2.44	0.50	-0.94	2.44	-2.29
G (-ve)	-1.08	0.50	-0.33	4.01	-1.33
H (-ve)	-0.82	0.50	-0.22	67.70	-14.60

 Total vertical net force $F_{w,v} = -18.08$ kN

 Total horizontal net force $F_{w,h} = -2.22$ kN

Walls load case 6 - Wind 180, c_{pi} -0.30, - c_{pe}

Zone	Ext pressure coefficient C_{pe}	Peak velocity pressure $q_{p,i}$ (kN/m ²)	Net pressure p (kN/m ²)	Area A_{ref} (m ²)	Net force F_w (kN)
A	-1.20	0.50	-0.38	4.73	-1.82
B	-0.80	0.50	-0.21	20.35	-4.21
C	-0.50	0.50	-0.07	3.36	-0.25
D	0.72	0.50	0.47	32.04	15.14
E	-0.35	0.50	-0.01	23.00	-0.14

Overall loading

Equiv leeward net force for overall section

$$F_l = F_{w,wE} = -0.1 \text{ kN}$$

Net windward force for overall section

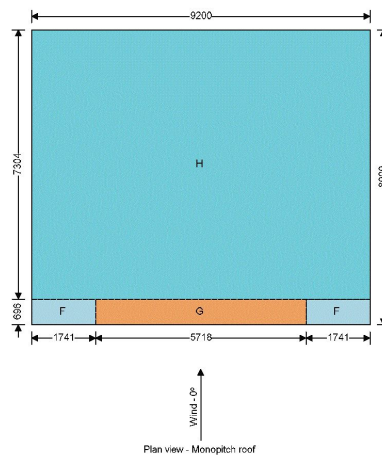
$$F_w = F_{w,wD} = 15.1 \text{ kN}$$

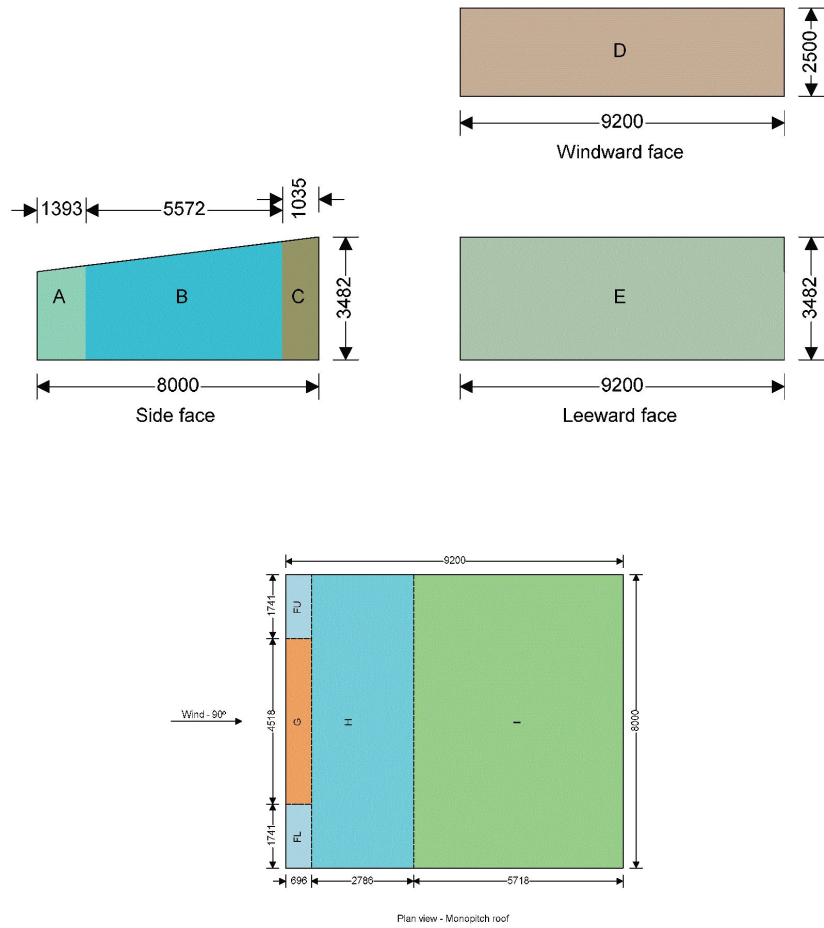
Lack of correlation (cl.7.2.2(3) – Note)

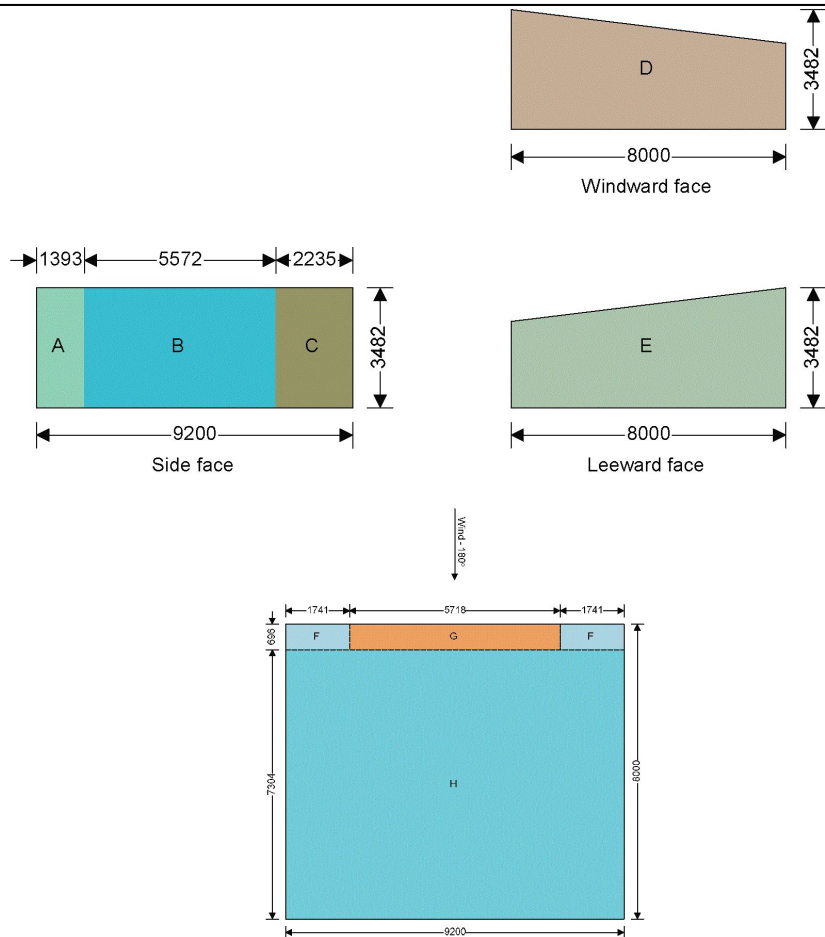
$$f_{corr} = 0.85 \text{ as } h/L \text{ is } 0.379$$

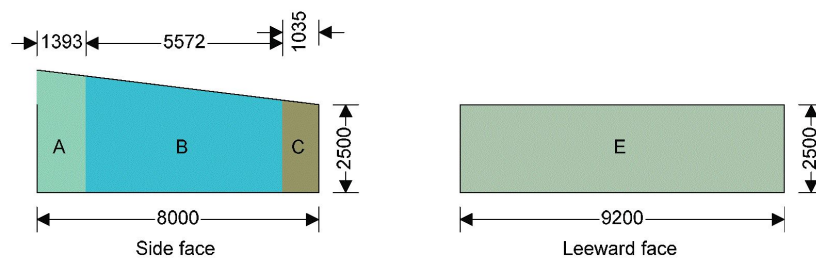
Overall loading overall section

$$F_{w,D} = f_{corr} \times (F_w - F_l - F_{w,h}) = 14.9 \text{ kN}$$









Due to the scaffold being classed as a temporary structure a statistical factor of 0.7 will be used as a multiplier on the dynamic pressure of the wind, this in accordance with clause 6.2.7 of BS EN 12811-1

CONSIDER SNOW

SNOW LOADING

In accordance with EN1991-1-3:2003+A1:2015 incorporating corrigenda dated December 2004 and March 2009 and the UK national annex NA+A1:2015 to BS EN 1991-1-3:2003+A1:2015 incorporating Corrigendum No.1

Tedds calculation version 1.0.10

Characteristic ground snow load

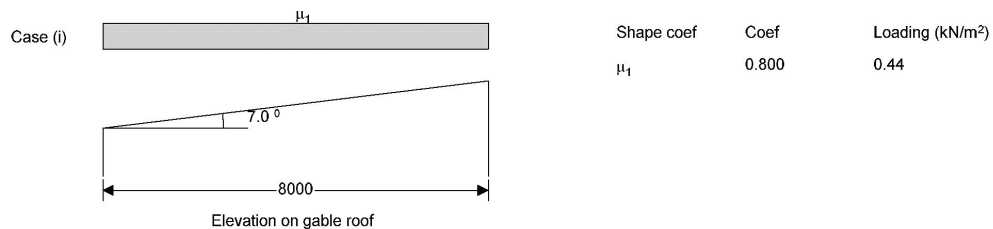
Location	Swaffham
Site altitude above sea level (user modified value)	A = 77 m
Zone number (user modified value)	Z = 4.0
Density of snow	$\gamma = 2.00 \text{ kN/m}^3$
Characteristic ground snow load	$s_k = ((0.15 + (0.1 \times Z + 0.05)) + ((A - 100\text{m}) / 525\text{m})) \times 1 \text{ kN/m}^2 = 0.56 \text{ kN/m}^2$
Exposure coefficient (Normal)	$C_e = 1.0$
Thermal coefficient	$C_t = 1.0$
Snow fence	Not present

Building details

Roof type	Monopitch
Width of roof	b = 8.00 m
Slope of roof	$\alpha = 7.00 \text{ deg}$

Shape coefficients

Shape coefficient roof (Table 5.2) $\mu_1 = 0.80$



Loading to roof 1

$$s_{1,1} = \mu_1 \times C_e \times C_t \times s_k = 0.44 \text{ kN/m}^2$$

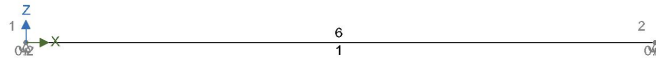
CONSIDER ROOF TRUSS

ANALYSIS

Tedds calculation version 1.0.31

Geometry

Geometry (m) - Aluminium - HAKI 450 BEAM



Materials

Name	Density (kg/m³)	Youngs Modulus kN/mm²	Shear Modulus kN/mm²	Thermal Coefficient °C⁻¹
Aluminium	2720	70	26	0.000022

Sections

Name	Area (cm²)	Moment of inertia		Shear area parallel to	
		Major (cm⁴)	Minor (cm⁴)	Minor (cm²)	Major (cm²)
HAKI 450 BEAM	12	4800	29	6	6

Nodes

Node	Co-ordinates		Freedom			Coordinate system		Spring		
	X (m)	Z (m)	X	Z	Rot.	Name	Angle (°)	X (kN/m)	Z (kN/m)	Rot. kNm/°
1	0	0	Fixed	Fixed	Free		0	0	0	0
2	6	0	Fixed	Fixed	Free		0	0	0	0

Elements

Element	Length (m)	Nodes		Section	Material	Releases			Rotated
		Start	End			Start moment	End moment	Axial	
1	6	1	2	HAKI 450 BEAM	Aluminium	Fixed	Fixed	Fixed	

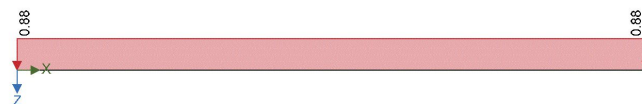
Loading

Self weight included

Permanent - Loading (kN/m)



Imposed - Loading (kN/m)



Load combination factors

Load combination	Self Weight	Permanent	Imposed
COMBINATION 1 (Strength)	1.00	1.00	1.00

Element Loads

Element	Load case	Load Type	Orientation	Description
1	PERMANENT	UDL	GLOBALZ	0.5 KN/M
1	IMPOSED	UDL	GLOBALZ	0.88 KN/M

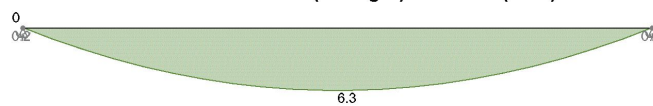
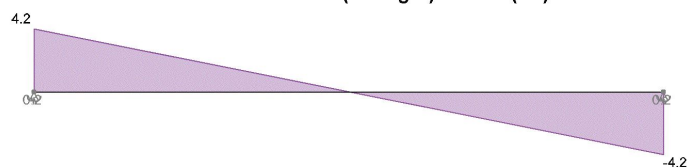
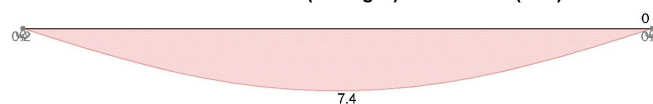
Results
Reactions

COMBINATION 1 (Strength) - Local node reactions - Node: (Horiz (kN), Vert (kN), Mom (kNm))

1: (0,4.2,0) 2: (0,4.2,0)

Load combination: COMBINATION 1 (Strength)

Node	Force		Moment My (kNm)
	Fx (kN)	Fz (kN)	
1	0	4.2	0
2	0	4.2	0

Forces
COMBINATION 1 (Strength) - Moment (kNm)

COMBINATION 1 (Strength) - Shear (kN)

COMBINATION 1 (Strength) - Deflection (mm)


Element results
Load combination: COMBINATION 1 (Strength)

Element	Shear force		Moment			
	Pos (m)	Max abs (kN)	Pos (m)	Max (kNm)	Pos (m)	Min (kNm)
1	6	4.2 (max abs)	3	6.3 (max)	0	0 (min)

Load combination: COMBINATION 1 (Strength)

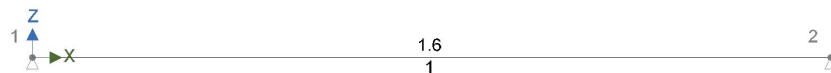
Element	Deflection			
	Pos (m)	Max (mm)	Pos (m)	Min (mm)
1	3	7.4 (max)	6	0

CONSIDER SMALL SPAN ROOF
ANALYSIS

Tedds calculation version 1.0.31

Geometry

Geometry (m) - Steel (EC3) - CHS 48.3x4.0



Span	Length (m)	Section	Start Support	End Support
1	1.6	CHS 48.3x4.0	Pinned	Pinned
CHS 48.3x4.0: Area 6 cm ² , Inertia Major 14 cm ⁴ , Inertia Minor 14 cm ⁴ , Shear area parallel to Minor 3 cm ² , Shear area parallel to Major = 3 cm ²				
Steel (EC3): Density 7850 kg/m ³ , Youngs 210 kN/mm ² , Shear 80.8 kN/mm ² , Thermal 0.000012 °C ⁻¹				

Loading

Self weight included

Imposed - Loading (kN/m)


Load combination factors

Load combination	Self Weight	Imposed
COMBINATION 1 (Strength)	1.00	1.00

Member Loads

Member	Load case	Load Type	Orientation	Description
MEMBER	IMPOSED	UDL	GLOBALZ	0.88 KN/M

Results

Reactions

COMBINATION 1 (Strength) - Local node reactions - Node: (Horiz (kN), Vert (kN), Mom (kNm))

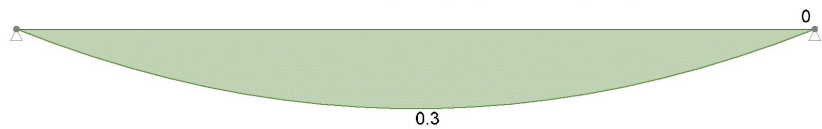
1: (0,0.7,0) 2: (0,0.7,0)

Load combination: COMBINATION 1 (Strength)

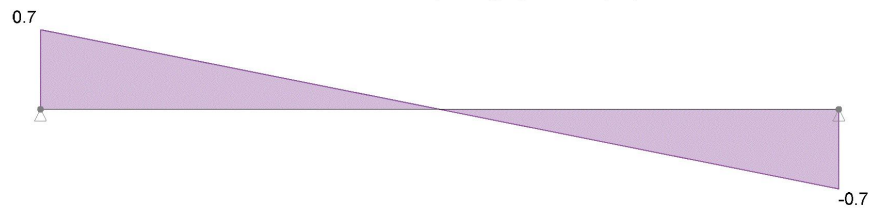
Node	Force		Moment My (kNm)
	Fx (kN)	Fz (kN)	
1	0	0.7	0
2	0	0.7	0

Forces

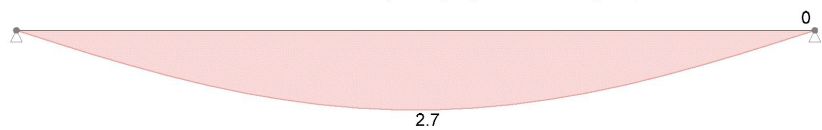
COMBINATION 1 (Strength) - Moment (kNm)



COMBINATION 1 (Strength) - Shear (kN)



COMBINATION 1 (Strength) - Deflection (mm)



Element results

Load combination: COMBINATION 1 (Strength)

Element	Position (m)	Shear force (kN)		Moment (kNm)	
1	0	0.7		0 (min)	
	0.8	0		0.3 (max)	

Element	Position (m)	Shear force (kN)	Moment (kNm)
	1.6	-0.7 (max abs)	0 (min)

Load combination: COMBINATION 1 (Strength)

Element	Position (m)	Deflection (mm)
1	0.8	2.7 (max)
	1.6	0

8. Reactions

Nonlinear calculation, Extreme : Global

Selection : All

Nonlinear combinations : NC1

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn13/N131	NC1	-0.03	-0.02	2.46	0.00	0.00	0.00
Sn17/N172	NC1	0.02	0.03	1.33	0.00	0.00	0.00
Sn10/N92	NC1	0.01	-0.12	0.32	0.00	0.00	0.00
Sn8/N58	NC1	0.00	0.11	0.65	0.00	0.00	0.00
Sn14/N133	NC1	-0.01	-0.08	0.11	0.00	0.00	0.00
Sn9/N90	NC1	-0.01	-0.01	2.80	0.00	0.00	0.00
Sn5/N49	NC1	-0.01	-0.01	2.79	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global

Selection : All

Nonlinear combinations : NC2

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn13/N131	NC2	-0.03	-0.02	2.46	0.00	0.00	0.00
Sn17/N172	NC2	0.02	0.03	1.33	0.00	0.00	0.00
Sn10/N92	NC2	0.01	-0.12	0.32	0.00	0.00	0.00
Sn8/N58	NC2	0.00	0.11	0.65	0.00	0.00	0.00
Sn14/N133	NC2	-0.01	-0.08	0.11	0.00	0.00	0.00
Sn9/N90	NC2	-0.01	-0.01	2.80	0.00	0.00	0.00
Sn5/N49	NC2	-0.01	-0.01	2.79	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global

Selection : All

Nonlinear combinations : NC3

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn15/N138	NC3	-0.06	0.08	5.88	0.00	0.00	0.00
Sn17/N172	NC3	0.07	0.06	2.34	0.00	0.00	0.00
Sn10/N92	NC3	0.01	-0.32	-0.46	0.00	0.00	0.00
Sn8/N58	NC3	0.01	0.30	0.31	0.00	0.00	0.00
Sn14/N133	NC3	0.00	-0.25	-0.72	0.00	0.00	0.00
Sn5/N49	NC3	-0.04	-0.10	7.26	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global

Selection : All

Nonlinear combinations : NC4

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn37/N322	NC4	-0.79	0.09	-1.77	0.00	0.00	0.00
Sn28/N243	NC4	0.81	0.17	-2.22	0.00	0.00	0.00
Sn27/N242	NC4	0.48	-0.02	3.55	0.00	0.00	0.00
Sn9/N90	NC4	0.09	0.46	1.38	0.00	0.00	0.00
Sn5/N49	NC4	0.09	0.41	0.97	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global

Selection : All

Nonlinear combinations : NC5

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn37/N322	NC5	-0.37	0.09	0.21	0.00	0.00	0.00
Sn28/N243	NC5	0.35	0.19	0.44	0.00	0.00	0.00
Sn18/N174	NC5	0.01	-0.14	0.40	0.00	0.00	0.00
Sn45/N371	NC5	0.01	0.51	2.61	0.00	0.00	0.00
Sn43/N362	NC5	-0.05	0.35	-1.03	0.00	0.00	0.00
Sn9/N90	NC5	0.02	0.30	4.34	0.00	0.00	0.00
Sn5/N49	NC5	0.02	0.31	4.16	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global
 Selection : All
 Nonlinear combinations : NC6

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn37/N322	NC6	-0.53	0.05	-1.46	0.00	0.00	0.00
Sn24/N222	NC6	0.03	-0.03	0.18	0.00	0.00	0.00
Sn7/N56	NC6	-0.27	-0.26	1.51	0.00	0.00	0.00
Sn6/N51	NC6	-0.21	0.33	-1.85	0.00	0.00	0.00
Sn11/N97	NC6	-0.23	-0.26	3.54	0.00	0.00	0.00
Sn5/N49	NC6	-0.12	0.01	1.64	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global
 Selection : All
 Nonlinear combinations : NC7

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn26/N239	NC7	-0.84	0.03	4.42	0.00	0.00	0.00
Sn21/N213	NC7	0.10	-0.03	0.16	0.00	0.00	0.00
Sn19/N179	NC7	-0.45	-0.18	2.05	0.00	0.00	0.00
Sn8/N58	NC7	-0.08	0.29	-0.40	0.00	0.00	0.00
Sn27/N242	NC7	-0.64	-0.01	-2.51	0.00	0.00	0.00
Sn11/N97	NC7	-0.33	-0.09	6.19	0.00	0.00	0.00
Sn5/N49	NC7	-0.09	-0.03	4.93	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global
 Selection : All
 Nonlinear combinations : NC8

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn37/N322	NC8	-0.80	-0.05	-1.99	0.00	0.00	0.00
Sn26/N239	NC8	0.81	-0.13	-2.01	0.00	0.00	0.00
Sn45/N371	NC8	-0.07	-0.29	-0.35	0.00	0.00	0.00
Sn18/N174	NC8	0.03	0.07	0.76	0.00	0.00	0.00
Sn28/N243	NC8	0.79	-0.11	-2.33	0.00	0.00	0.00
Sn25/N238	NC8	0.35	0.01	3.05	0.00	0.00	0.00
Sn5/N49	NC8	0.07	-0.24	-0.71	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global
 Selection : All
 Nonlinear combinations : NC9

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn37/N322	NC9	-0.37	0.01	-0.39	0.00	0.00	0.00
Sn26/N239	NC9	0.36	-0.01	-0.27	0.00	0.00	0.00
Sn6/N51	NC9	0.00	-0.06	0.59	0.00	0.00	0.00
Sn12/N99	NC9	0.02	0.04	0.67	0.00	0.00	0.00
Sn28/N243	NC9	0.36	0.00	-0.40	0.00	0.00	0.00
Sn27/N242	NC9	0.22	0.02	1.85	0.00	0.00	0.00
Sn5/N49	NC9	0.03	-0.01	1.22	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global
 Selection : All
 Nonlinear combinations : NC10

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn21/N213	NC10	-0.05	-0.05	1.42	0.00	0.00	0.00
Sn26/N239	NC10	0.50	-0.04	-1.32	0.00	0.00	0.00
Sn7/N56	NC10	0.27	-0.30	3.44	0.00	0.00	0.00
Sn6/N51	NC10	0.16	0.33	-0.17	0.00	0.00	0.00
Sn10/N92	NC10	0.17	0.31	-1.83	0.00	0.00	0.00
Sn5/N49	NC10	0.15	-0.02	1.48	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global
 Selection : All
 Nonlinear combinations : NC11

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn40/N348	NC11	-0.04	-0.05	1.44	0.00	0.00	0.00
Sn37/N322	NC11	0.85	0.03	4.29	0.00	0.00	0.00
Sn43/N362	NC11	0.24	-0.17	2.53	0.00	0.00	0.00
Sn8/N58	NC11	0.01	0.30	-0.36	0.00	0.00	0.00
Sn42/N355	NC11	0.52	-0.07	-1.90	0.00	0.00	0.00
Sn7/N56	NC11	0.12	-0.09	5.27	0.00	0.00	0.00
Sn5/N49	NC11	0.09	-0.06	4.74	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global
 Selection : All
 Nonlinear combinations : NC12

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn37/N322	NC12	-0.79	0.09	-1.77	0.00	0.00	0.00
Sn28/N243	NC12	0.81	0.17	-2.22	0.00	0.00	0.00
Sn27/N242	NC12	0.48	-0.02	3.55	0.00	0.00	0.00
Sn9/N90	NC12	0.09	0.46	1.38	0.00	0.00	0.00
Sn5/N49	NC12	0.09	0.41	0.97	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global
 Selection : All
 Nonlinear combinations : NC13

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn37/N322	NC13	-0.37	0.09	0.21	0.00	0.00	0.00
Sn28/N243	NC13	0.35	0.19	0.44	0.00	0.00	0.00
Sn18/N174	NC13	0.01	-0.14	0.40	0.00	0.00	0.00
Sn45/N371	NC13	0.01	0.51	2.61	0.00	0.00	0.00
Sn43/N362	NC13	-0.05	0.35	-1.03	0.00	0.00	0.00
Sn9/N90	NC13	0.02	0.30	4.34	0.00	0.00	0.00
Sn5/N49	NC13	0.02	0.31	4.16	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global
 Selection : All
 Nonlinear combinations : NC14

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn37/N322	NC14	-0.53	0.05	-1.46	0.00	0.00	0.00
Sn24/N222	NC14	0.03	-0.03	0.18	0.00	0.00	0.00
Sn7/N56	NC14	-0.27	-0.26	1.51	0.00	0.00	0.00
Sn6/N51	NC14	-0.21	0.33	-1.85	0.00	0.00	0.00
Sn11/N97	NC14	-0.23	-0.26	3.54	0.00	0.00	0.00
Sn5/N49	NC14	-0.12	0.01	1.64	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global
 Selection : All
 Nonlinear combinations : NC15

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn26/N239	NC15	-0.84	0.03	4.42	0.00	0.00	0.00
Sn21/N213	NC15	0.10	-0.03	0.16	0.00	0.00	0.00
Sn19/N179	NC15	-0.45	-0.18	2.05	0.00	0.00	0.00
Sn8/N58	NC15	-0.08	0.29	-0.40	0.00	0.00	0.00
Sn27/N242	NC15	-0.64	-0.01	-2.51	0.00	0.00	0.00
Sn11/N97	NC15	-0.33	-0.09	6.19	0.00	0.00	0.00
Sn5/N49	NC15	-0.09	-0.03	4.93	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global
 Selection : All
 Nonlinear combinations : NC16

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn37/N322	NC16	-0.80	-0.05	-1.99	0.00	0.00	0.00
Sn26/N239	NC16	0.81	-0.13	-2.01	0.00	0.00	0.00
Sn45/N371	NC16	-0.07	-0.29	-0.35	0.00	0.00	0.00
Sn18/N174	NC16	0.03	0.07	0.76	0.00	0.00	0.00
Sn28/N243	NC16	0.79	-0.11	-2.33	0.00	0.00	0.00
Sn25/N238	NC16	0.35	0.01	3.05	0.00	0.00	0.00
Sn5/N49	NC16	0.07	-0.24	-0.71	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global
 Selection : All
 Nonlinear combinations : NC17

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn37/N322	NC17	-0.37	0.01	-0.39	0.00	0.00	0.00
Sn26/N239	NC17	0.36	-0.01	-0.27	0.00	0.00	0.00
Sn6/N51	NC17	0.00	-0.06	0.59	0.00	0.00	0.00
Sn12/N99	NC17	0.02	0.04	0.67	0.00	0.00	0.00
Sn28/N243	NC17	0.36	0.00	-0.40	0.00	0.00	0.00
Sn27/N242	NC17	0.22	0.02	1.85	0.00	0.00	0.00
Sn5/N49	NC17	0.03	-0.01	1.22	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global
 Selection : All
 Nonlinear combinations : NC18

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn21/N213	NC18	-0.05	-0.05	1.42	0.00	0.00	0.00
Sn26/N239	NC18	0.50	-0.04	-1.32	0.00	0.00	0.00
Sn7/N56	NC18	0.27	-0.30	3.44	0.00	0.00	0.00
Sn6/N51	NC18	0.16	0.33	-0.17	0.00	0.00	0.00
Sn10/N92	NC18	0.17	0.31	-1.83	0.00	0.00	0.00
Sn5/N49	NC18	0.15	-0.02	1.48	0.00	0.00	0.00

Nonlinear calculation, Extreme : Global
 Selection : All
 Nonlinear combinations : NC19

Support	Case	Rx [kN]	Ry [kN]	Rz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
Sn40/N348	NC19	-0.04	-0.05	1.44	0.00	0.00	0.00
Sn37/N322	NC19	0.85	0.03	4.29	0.00	0.00	0.00
Sn43/N362	NC19	0.24	-0.17	2.53	0.00	0.00	0.00
Sn8/N58	NC19	0.01	0.30	-0.36	0.00	0.00	0.00
Sn42/N355	NC19	0.52	-0.07	-1.90	0.00	0.00	0.00
Sn7/N56	NC19	0.12	-0.09	5.27	0.00	0.00	0.00
Sn5/N49	NC19	0.09	-0.06	4.74	0.00	0.00	0.00

9. Internal forces

Nonlinear calculation, Extreme : Global, System : LCS

Selection : All

Nonlinear combinations : NC1

Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B106	STEEL CHS - CHS48.3/4.0	0.000	NC1	-2.80	-0.06	0.00	0.00	0.00	0.00
B107	STEEL CHS - CHS48.3/4.0	2.000	NC1	0.50	0.00	0.00	0.00	0.00	-0.01
B44	STEEL CHS - CHS48.3/4.0	2.000	NC1	-2.46	-0.63	-0.01	0.00	0.01	0.02
B44	STEEL CHS - CHS48.3/4.0	2.427	NC1	-1.63	0.12	-0.01	0.00	0.00	-0.03
B108	STEEL CHS - CHS48.3/4.0	1.000	NC1	0.04	0.00	-0.28	0.00	-0.01	0.00
B50	STEEL CHS - CHS48.3/4.0	0.000	NC1	-0.12	0.00	0.28	0.00	-0.01	0.00
B426	STEEL CHS - CHS48.3/4.0	1.600	NC1	0.00	0.00	-0.03	0.00	0.01	0.00
B600	STEEL CHS - CHS48.3/4.0	0.000	NC1	-0.03	0.00	0.04	0.00	0.00	0.01
B459	STEEL CHS - CHS48.3/4.0	2.116	NC1	-0.13	-0.01	-0.21	0.00	-0.03	0.00
B449	STEEL CHS - CHS48.3/4.0	1.174	NC1	-0.11	0.00	0.00	0.00	0.09	0.00
B44	STEEL CHS - CHS48.3/4.0	2.125	NC1	-1.65	0.11	-0.02	0.00	0.00	-0.06
B48	STEEL CHS - CHS48.3/4.0	2.875	NC1	-0.48	-0.10	0.01	0.00	0.00	0.04

Nonlinear calculation, Extreme : Global, System : LCS

Selection : All

Nonlinear combinations : NC2

Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B106	STEEL CHS - CHS48.3/4.0	0.000	NC2	-2.80	-0.06	0.00	0.00	0.00	0.00
B107	STEEL CHS - CHS48.3/4.0	2.000	NC2	0.50	0.00	0.00	0.00	0.00	-0.01
B44	STEEL CHS - CHS48.3/4.0	2.000	NC2	-2.46	-0.63	-0.01	0.00	0.01	0.02
B44	STEEL CHS - CHS48.3/4.0	2.427	NC2	-1.63	0.12	-0.01	0.00	0.00	-0.03
B108	STEEL CHS - CHS48.3/4.0	1.000	NC2	0.04	0.00	-0.28	0.00	-0.01	0.00
B50	STEEL CHS - CHS48.3/4.0	0.000	NC2	-0.12	0.00	0.28	0.00	-0.01	0.00
B426	STEEL CHS - CHS48.3/4.0	1.600	NC2	0.00	0.00	-0.03	0.00	0.01	0.00
B600	STEEL CHS - CHS48.3/4.0	0.000	NC2	-0.03	0.00	0.04	0.00	0.00	0.01
B459	STEEL CHS - CHS48.3/4.0	2.116	NC2	-0.13	-0.01	-0.21	0.00	-0.03	0.00
B449	STEEL CHS - CHS48.3/4.0	1.174	NC2	-0.11	0.00	0.00	0.00	0.09	0.00
B44	STEEL CHS - CHS48.3/4.0	2.125	NC2	-1.65	0.11	-0.02	0.00	0.00	-0.06
B48	STEEL CHS - CHS48.3/4.0	2.875	NC2	-0.48	-0.10	0.01	0.00	0.00	0.04

Nonlinear calculation, Extreme : Global, System : LCS

Selection : All

Nonlinear combinations : NC3

Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B106	STEEL CHS - CHS48.3/4.0	2.000	NC3	-7.55	-1.99	-0.05	0.00	0.01	0.07
B107	STEEL CHS - CHS48.3/4.0	2.000	NC3	1.91	0.02	0.00	0.00	0.00	-0.02
B44	STEEL CHS - CHS48.3/4.0	2.000	NC3	-7.50	-1.99	-0.08	0.00	0.02	0.07
B44	STEEL CHS - CHS48.3/4.0	2.427	NC3	-5.13	0.40	-0.02	0.00	0.00	-0.08
B459	STEEL CHS - CHS48.3/4.0	2.116	NC3	-0.33	-0.03	-0.82	0.00	-0.10	0.00
B449	STEEL CHS - CHS48.3/4.0	0.000	NC3	-0.15	0.00	0.81	0.00	-0.10	0.00
B426	STEEL CHS - CHS48.3/4.0	2.000	NC3	0.02	0.00	-0.05	-0.01	-0.01	0.00
B600	STEEL CHS - CHS48.3/4.0	0.000	NC3	0.00	0.00	0.04	0.01	0.00	0.02
B459	STEEL CHS - CHS48.3/4.0	1.032	NC3	-0.23	0.02	0.03	0.00	0.33	0.02
B44	STEEL CHS - CHS48.3/4.0	2.125	NC3	-5.15	0.36	-0.05	0.00	0.01	-0.20
B48	STEEL CHS - CHS48.3/4.0	2.875	NC3	-1.44	-0.33	0.02	0.00	-0.01	0.14

Nonlinear calculation, Extreme : Global, System : LCS

Selection : All

Nonlinear combinations : NC4

Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B331	STEEL CHS - CHS48.3/4.0	0.000	NC4	-3.55	0.04	-0.52	0.00	0.00	0.00
B370	STEEL CHS - CHS48.3/4.0	1.803	NC4	3.24	0.02	-0.01	0.00	0.00	0.01
B515	STEEL CHS - CHS48.3/4.0	2.000	NC4	-0.71	-0.36	0.03	0.00	0.01	-0.11
B106	STEEL CHS - CHS48.3/4.0	2.000	NC4	0.66	0.50	-0.08	0.00	0.02	-0.05
B332	STEEL CHS - CHS48.3/4.0	0.300	NC4	2.23	0.18	-0.83	0.00	-0.25	0.05
B469	STEEL CHS - CHS48.3/4.0	0.000	NC4	1.78	0.10	0.78	0.00	0.00	0.00
B599	STEEL CHS - CHS48.3/4.0	0.000	NC4	-0.35	0.01	0.05	-0.03	0.00	-0.05
B598	STEEL CHS - CHS48.3/4.0	0.000	NC4	-0.23	-0.03	0.05	0.03	0.00	0.07
B469	STEEL CHS - CHS48.3/4.0	0.300	NC4	1.79	0.10	0.78	0.00	0.23	0.03
B459	STEEL CHS - CHS48.3/4.0	1.290	NC4	0.02	0.16	0.01	0.00	-0.04	-0.11
B106	STEEL CHS - CHS48.3/4.0	0.300	NC4	-1.36	0.48	-0.09	0.00	-0.03	0.15

Nonlinear calculation, Extreme : Global, System : LCS

Selection : All

Nonlinear combinations : NC5

Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B106	STEEL CHS - CHS48.3/4.0	0.000	NC5	-4.34	0.39	-0.05	0.00	0.00	0.00
B521	STEEL CHS - CHS48.3/4.0	1.803	NC5	2.45	0.02	-0.01	0.00	0.00	0.01
B44	STEEL CHS - CHS48.3/4.0	2.125	NC5	-3.45	-0.70	0.04	0.00	0.02	-0.12
B110	STEEL CHS - CHS48.3/4.0	0.000	NC5	-1.47	0.55	-0.14	0.00	0.00	0.00
B459	STEEL CHS - CHS48.3/4.0	2.116	NC5	-0.19	0.06	-0.38	0.00	-0.05	0.01
B469	STEEL CHS - CHS48.3/4.0	0.000	NC5	-0.21	0.11	0.40	0.00	0.00	0.00
B601	STEEL CHS - CHS48.3/4.0	0.000	NC5	0.13	0.02	0.04	-0.02	0.00	-0.04
B598	STEEL CHS - CHS48.3/4.0	0.000	NC5	-0.52	-0.01	0.06	0.02	0.00	0.04
B332	STEEL CHS - CHS48.3/4.0	0.300	NC5	-0.43	0.21	-0.37	0.00	-0.11	0.06
B449	STEEL CHS - CHS48.3/4.0	1.174	NC5	-0.16	-0.03	-0.02	0.00	0.16	-0.03
B45	STEEL CHS - CHS48.3/4.0	2.000	NC5	0.41	-0.60	0.00	0.00	0.00	-0.20
B110	STEEL CHS - CHS48.3/4.0	0.300	NC5	-1.46	0.54	-0.13	0.00	-0.04	0.16

Nonlinear calculation, Extreme : Global, System : LCS

Selection : All

Nonlinear combinations : NC6

Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B110	STEEL CHS - CHS48.3/4.0	0.000	NC6	-3.53	-0.23	0.29	0.00	0.00	0.00
B584	STEEL CHS - CHS48.3/4.0	1.803	NC6	2.08	-0.01	-0.01	0.00	0.00	-0.01
B110	STEEL CHS - CHS48.3/4.0	2.000	NC6	-1.31	-0.59	-0.05	0.00	-0.02	-0.15
B107	STEEL CHS - CHS48.3/4.0	2.000	NC6	0.11	0.57	-0.03	0.00	-0.02	0.16
B495	STEEL CHS - CHS48.3/4.0	2.000	NC6	-1.96	0.05	-0.43	0.00	-0.12	0.02
B469	STEEL CHS - CHS48.3/4.0	0.300	NC6	1.48	0.05	0.51	0.00	0.15	0.01
B601	STEEL CHS - CHS48.3/4.0	0.000	NC6	-1.41	-0.02	0.07	-0.01	0.00	-0.01
B598	STEEL CHS - CHS48.3/4.0	0.000	NC6	0.51	-0.01	0.04	0.02	0.00	0.03
B515	STEEL CHS - CHS48.3/4.0	2.000	NC6	0.54	-0.58	-0.03	0.00	-0.01	-0.16

Nonlinear calculation, Extreme : Global, System : LCS

Selection : All

Nonlinear combinations : NC7

Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B110	STEEL CHS - CHS48.3/4.0	0.000	NC7	-6.18	0.00	0.50	0.00	0.00	0.00
B331	STEEL CHS - CHS48.3/4.0	2.000	NC7	2.67	0.00	-0.71	0.01	-0.19	0.00
B168	STEEL CHS - CHS48.3/4.0	2.000	NC7	-3.73	-0.87	0.08	0.00	-0.02	0.03
B110	STEEL CHS - CHS48.3/4.0	2.000	NC7	-4.39	0.30	0.07	0.00	-0.03	-0.09
B329	STEEL CHS - CHS48.3/4.0	2.000	NC7	2.20	0.00	-0.73	0.00	-0.21	0.00
B330	STEEL CHS - CHS48.3/4.0	0.000	NC7	-4.41	0.02	0.92	0.00	0.00	0.00
B207	STEEL CHS - CHS48.3/4.0	0.000	NC7	0.20	0.03	0.02	-0.01	0.00	-0.04
B599	STEEL CHS - CHS48.3/4.0	0.000	NC7	0.03	-0.02	0.04	0.03	0.00	0.06
B330	STEEL CHS - CHS48.3/4.0	0.300	NC7	-4.40	0.02	0.91	0.00	0.27	0.01
B48	STEEL CHS - CHS48.3/4.0	2.000	NC7	-3.08	-0.34	-0.10	0.00	-0.04	-0.10

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B49	STEEL CHS - CHS48.3/4.0	0.300	NC7	0.42	0.29	0.07	0.00	0.02	0.09

Nonlinear calculation, Extreme : Global, System : LCS

Selection : All

Nonlinear combinations : NC8

Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B329	STEEL CHS - CHS48.3/4.0	0.000	NC8	-3.05	-0.05	-0.38	0.00	0.00	0.00
B370	STEEL CHS - CHS48.3/4.0	1.803	NC8	3.14	-0.01	-0.01	0.00	0.00	0.00
B527	STEEL CHS - CHS48.3/4.0	0.300	NC8	0.36	-0.29	0.06	0.00	0.02	-0.09
B45	STEEL CHS - CHS48.3/4.0	2.000	NC8	-0.22	0.37	0.00	0.00	0.00	0.12
B330	STEEL CHS - CHS48.3/4.0	0.300	NC8	2.02	-0.13	-0.83	0.00	-0.25	-0.04
B469	STEEL CHS - CHS48.3/4.0	0.300	NC8	2.02	-0.06	0.78	0.00	0.23	-0.02
B599	STEEL CHS - CHS48.3/4.0	0.000	NC8	0.25	0.02	0.04	-0.03	0.00	-0.06
B598	STEEL CHS - CHS48.3/4.0	0.000	NC8	0.58	-0.04	0.04	0.03	0.00	0.07
B459	STEEL CHS - CHS48.3/4.0	1.290	NC8	0.06	0.16	0.03	0.00	-0.09	-0.11
B336	STEEL CHS - CHS48.3/4.0	1.089	NC8	0.02	0.13	0.04	0.00	-0.08	0.13

Nonlinear calculation, Extreme : Global, System : LCS

Selection : All

Nonlinear combinations : NC9

Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B331	STEEL CHS - CHS48.3/4.0	0.000	NC9	-1.85	-0.01	-0.24	0.00	0.00	0.00
B370	STEEL CHS - CHS48.3/4.0	1.803	NC9	1.44	0.00	-0.01	0.00	0.00	0.00
B44	STEEL CHS - CHS48.3/4.0	2.000	NC9	-0.75	-0.19	0.06	0.00	0.00	0.01
B448	STEEL CHS - CHS48.3/4.0	1.612	NC9	0.00	0.17	-0.07	0.00	0.00	0.00
B330	STEEL CHS - CHS48.3/4.0	0.000	NC9	0.26	-0.02	-0.38	0.00	0.00	0.00
B469	STEEL CHS - CHS48.3/4.0	0.000	NC9	0.39	0.00	0.37	0.00	0.00	0.00
B599	STEEL CHS - CHS48.3/4.0	0.000	NC9	0.00	0.01	0.04	-0.02	0.00	-0.03
B598	STEEL CHS - CHS48.3/4.0	0.000	NC9	0.12	-0.02	0.04	0.01	0.00	0.03
B330	STEEL CHS - CHS48.3/4.0	0.300	NC9	0.28	-0.02	-0.37	0.00	-0.11	-0.01
B469	STEEL CHS - CHS48.3/4.0	0.300	NC9	0.41	0.00	0.37	0.00	0.11	0.00
B459	STEEL CHS - CHS48.3/4.0	1.290	NC9	-0.04	0.07	-0.02	0.00	0.01	-0.05
B336	STEEL CHS - CHS48.3/4.0	1.089	NC9	-0.03	-0.08	-0.02	0.00	0.01	0.06

Nonlinear calculation, Extreme : Global, System : LCS

Selection : All

Nonlinear combinations : NC10

Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B48	STEEL CHS - CHS48.3/4.0	0.000	NC10	-3.44	-0.26	-0.29	0.00	0.00	0.00
B370	STEEL CHS - CHS48.3/4.0	1.803	NC10	2.12	0.00	-0.01	0.00	0.00	0.00
B48	STEEL CHS - CHS48.3/4.0	2.000	NC10	-2.12	-0.61	0.06	0.00	0.02	-0.16
B45	STEEL CHS - CHS48.3/4.0	2.000	NC10	-0.71	0.58	0.04	0.00	0.02	0.16
B330	STEEL CHS - CHS48.3/4.0	0.300	NC10	1.33	-0.04	-0.51	0.00	-0.15	-0.01
B329	STEEL CHS - CHS48.3/4.0	2.000	NC10	-2.02	0.04	0.43	0.00	0.13	0.01
B599	STEEL CHS - CHS48.3/4.0	0.000	NC10	0.20	0.01	0.04	-0.02	0.00	-0.03
B207	STEEL CHS - CHS48.3/4.0	0.000	NC10	-0.77	0.00	0.04	0.01	0.00	0.02

Nonlinear calculation, Extreme : Global, System : LCS

Selection : All

Nonlinear combinations : NC11

Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B48	STEEL CHS - CHS48.3/4.0	0.000	NC11	-5.27	0.01	-0.17	0.00	0.00	0.00
B495	STEEL CHS - CHS48.3/4.0	2.000	NC11	2.13	0.01	0.73	-0.01	0.20	0.00
B106	STEEL CHS - CHS48.3/4.0	2.000	NC11	-4.10	-0.88	0.02	0.00	0.01	0.04

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B49	STEEL CHS - CHS48.3/4.0	0.300	NC11	0.38	0.30	-0.02	0.00	-0.01	0.09
B469	STEEL CHS - CHS48.3/4.0	0.000	NC11	-4.30	0.05	-0.84	0.00	0.00	0.00
B598	STEEL CHS - CHS48.3/4.0	0.000	NC11	0.00	0.04	0.05	-0.03	0.00	-0.07
B600	STEEL CHS - CHS48.3/4.0	0.000	NC11	1.28	0.00	0.04	0.01	0.00	0.01
B469	STEEL CHS - CHS48.3/4.0	0.300	NC11	-4.28	0.04	-0.83	0.00	-0.25	0.01
B48	STEEL CHS - CHS48.3/4.0	2.000	NC11	-4.97	-0.36	0.07	0.00	0.02	-0.10

Nonlinear calculation, Extreme : Global, System : LCS

Selection : All

Nonlinear combinations : NC12

Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B331	STEEL CHS - CHS48.3/4.0	0.000	NC12	-3.55	0.04	-0.52	0.00	0.00	0.00
B370	STEEL CHS - CHS48.3/4.0	1.803	NC12	3.24	0.02	-0.01	0.00	0.00	0.01
B515	STEEL CHS - CHS48.3/4.0	2.000	NC12	-0.71	-0.36	0.03	0.00	0.01	-0.11
B106	STEEL CHS - CHS48.3/4.0	2.000	NC12	0.66	0.50	-0.08	0.00	0.02	-0.05
B332	STEEL CHS - CHS48.3/4.0	0.300	NC12	2.23	0.18	-0.83	0.00	-0.25	0.05
B469	STEEL CHS - CHS48.3/4.0	0.000	NC12	1.78	0.10	0.78	0.00	0.00	0.00
B599	STEEL CHS - CHS48.3/4.0	0.000	NC12	-0.35	0.01	0.05	-0.03	0.00	-0.05
B598	STEEL CHS - CHS48.3/4.0	0.000	NC12	-0.23	-0.03	0.05	0.03	0.00	0.07
B469	STEEL CHS - CHS48.3/4.0	0.300	NC12	1.79	0.10	0.78	0.00	0.23	0.03
B459	STEEL CHS - CHS48.3/4.0	1.290	NC12	0.02	0.16	0.01	0.00	-0.04	-0.11
B106	STEEL CHS - CHS48.3/4.0	0.300	NC12	-1.36	0.48	-0.09	0.00	-0.03	0.15

Nonlinear calculation, Extreme : Global, System : LCS

Selection : All

Nonlinear combinations : NC13

Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B106	STEEL CHS - CHS48.3/4.0	0.000	NC13	-4.34	0.39	-0.05	0.00	0.00	0.00
B521	STEEL CHS - CHS48.3/4.0	1.803	NC13	2.45	0.02	-0.01	0.00	0.00	0.01
B44	STEEL CHS - CHS48.3/4.0	2.125	NC13	-3.45	-0.70	0.04	0.00	0.02	-0.12
B110	STEEL CHS - CHS48.3/4.0	0.000	NC13	-1.47	0.55	-0.14	0.00	0.00	0.00
B459	STEEL CHS - CHS48.3/4.0	2.116	NC13	-0.19	0.06	-0.38	0.00	-0.05	0.01
B469	STEEL CHS - CHS48.3/4.0	0.000	NC13	-0.21	0.11	0.40	0.00	0.00	0.00
B601	STEEL CHS - CHS48.3/4.0	0.000	NC13	0.13	0.02	0.04	-0.02	0.00	-0.04
B598	STEEL CHS - CHS48.3/4.0	0.000	NC13	-0.52	-0.01	0.06	0.02	0.00	0.04
B332	STEEL CHS - CHS48.3/4.0	0.300	NC13	-0.43	0.21	-0.37	0.00	-0.11	0.06
B449	STEEL CHS - CHS48.3/4.0	1.174	NC13	-0.16	-0.03	-0.02	0.00	0.16	-0.03
B45	STEEL CHS - CHS48.3/4.0	2.000	NC13	0.41	-0.60	0.00	0.00	0.00	-0.20
B110	STEEL CHS - CHS48.3/4.0	0.300	NC13	-1.46	0.54	-0.13	0.00	-0.04	0.16

Nonlinear calculation, Extreme : Global, System : LCS

Selection : All

Nonlinear combinations : NC14

Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B110	STEEL CHS - CHS48.3/4.0	0.000	NC14	-3.53	-0.23	0.29	0.00	0.00	0.00
B584	STEEL CHS - CHS48.3/4.0	1.803	NC14	2.08	-0.01	-0.01	0.00	0.00	-0.01
B110	STEEL CHS - CHS48.3/4.0	2.000	NC14	-1.31	-0.59	-0.05	0.00	-0.02	-0.15
B107	STEEL CHS - CHS48.3/4.0	2.000	NC14	0.11	0.57	-0.03	0.00	-0.02	0.16
B495	STEEL CHS - CHS48.3/4.0	2.000	NC14	-1.96	0.05	-0.43	0.00	-0.12	0.02
B469	STEEL CHS - CHS48.3/4.0	0.300	NC14	1.48	0.05	0.51	0.00	0.15	0.01
B601	STEEL CHS - CHS48.3/4.0	0.000	NC14	-1.41	-0.02	0.07	-0.01	0.00	-0.01
B598	STEEL CHS - CHS48.3/4.0	0.000	NC14	0.51	-0.01	0.04	0.02	0.00	0.03
B515	STEEL CHS - CHS48.3/4.0	2.000	NC14	0.54	-0.58	-0.03	0.00	-0.01	-0.16

Nonlinear calculation, Extreme : Global, System : LCS

Selection : All

Nonlinear combinations : NC15
 Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B110	STEEL CHS - CHS48.3/4.0	0.000	NC15	-6.18	0.00	0.50	0.00	0.00	0.00
B331	STEEL CHS - CHS48.3/4.0	2.000	NC15	2.67	0.00	-0.71	0.01	-0.19	0.00
B168	STEEL CHS - CHS48.3/4.0	2.000	NC15	-3.73	-0.87	0.08	0.00	-0.02	0.03
B110	STEEL CHS - CHS48.3/4.0	2.000	NC15	-4.39	0.30	0.07	0.00	-0.03	-0.09
B329	STEEL CHS - CHS48.3/4.0	2.000	NC15	2.20	0.00	-0.73	0.00	-0.21	0.00
B330	STEEL CHS - CHS48.3/4.0	0.000	NC15	-4.41	0.02	0.92	0.00	0.00	0.00
B207	STEEL CHS - CHS48.3/4.0	0.000	NC15	0.20	0.03	0.02	-0.01	0.00	-0.04
B599	STEEL CHS - CHS48.3/4.0	0.000	NC15	0.03	-0.02	0.04	0.03	0.00	0.06
B330	STEEL CHS - CHS48.3/4.0	0.300	NC15	-4.40	0.02	0.91	0.00	0.27	0.01
B48	STEEL CHS - CHS48.3/4.0	2.000	NC15	-3.08	-0.34	-0.10	0.00	-0.04	-0.10
B49	STEEL CHS - CHS48.3/4.0	0.300	NC15	0.42	0.29	0.07	0.00	0.02	0.09

 Nonlinear calculation, Extreme : Global, System : Principal
 Selection : All
 Nonlinear combinations : NC16
 Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B329	STEEL CHS - CHS48.3/4.0	0.000	NC16	-3.05	-0.05	-0.38	0.00	0.00	0.00
B370	STEEL CHS - CHS48.3/4.0	1.803	NC16	3.14	-0.01	-0.01	0.00	0.00	0.00
B527	STEEL CHS - CHS48.3/4.0	0.300	NC16	0.36	-0.29	0.06	0.00	0.02	-0.09
B45	STEEL CHS - CHS48.3/4.0	2.000	NC16	-0.22	0.37	0.00	0.00	0.00	0.12
B330	STEEL CHS - CHS48.3/4.0	0.300	NC16	2.02	-0.13	-0.83	0.00	-0.25	-0.04
B469	STEEL CHS - CHS48.3/4.0	0.300	NC16	2.02	-0.06	0.78	0.00	0.23	-0.02
B599	STEEL CHS - CHS48.3/4.0	0.000	NC16	0.25	0.02	0.04	-0.03	0.00	-0.06
B598	STEEL CHS - CHS48.3/4.0	0.000	NC16	0.58	-0.04	0.04	0.03	0.00	0.07
B459	STEEL CHS - CHS48.3/4.0	1.290	NC16	0.06	0.16	0.03	0.00	-0.09	-0.11
B336	STEEL CHS - CHS48.3/4.0	1.089	NC16	0.02	0.13	0.04	0.00	-0.08	0.13

 Nonlinear calculation, Extreme : Global, System : Principal
 Selection : All
 Nonlinear combinations : NC17
 Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B331	STEEL CHS - CHS48.3/4.0	0.000	NC17	-1.85	-0.01	-0.24	0.00	0.00	0.00
B370	STEEL CHS - CHS48.3/4.0	1.803	NC17	1.44	0.00	-0.01	0.00	0.00	0.00
B44	STEEL CHS - CHS48.3/4.0	2.000	NC17	-0.75	-0.19	0.06	0.00	0.00	0.01
B448	STEEL CHS - CHS48.3/4.0	1.612	NC17	0.00	0.17	-0.07	0.00	0.00	0.00
B330	STEEL CHS - CHS48.3/4.0	0.000	NC17	0.26	-0.02	-0.38	0.00	0.00	0.00
B469	STEEL CHS - CHS48.3/4.0	0.000	NC17	0.39	0.00	0.37	0.00	0.00	0.00
B599	STEEL CHS - CHS48.3/4.0	0.000	NC17	0.00	0.01	0.04	-0.02	0.00	-0.03
B598	STEEL CHS - CHS48.3/4.0	0.000	NC17	0.12	-0.02	0.04	0.01	0.00	0.03
B330	STEEL CHS - CHS48.3/4.0	0.300	NC17	0.28	-0.02	-0.37	0.00	-0.11	-0.01
B469	STEEL CHS - CHS48.3/4.0	0.300	NC17	0.41	0.00	0.37	0.00	0.11	0.00
B459	STEEL CHS - CHS48.3/4.0	1.290	NC17	-0.04	0.07	-0.02	0.00	0.01	-0.05
B336	STEEL CHS - CHS48.3/4.0	1.089	NC17	-0.03	-0.08	-0.02	0.00	0.01	0.06

 Nonlinear calculation, Extreme : Global, System : Principal
 Selection : All
 Nonlinear combinations : NC18
 Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B48	STEEL CHS - CHS48.3/4.0	0.000	NC18	-3.44	-0.26	-0.29	0.00	0.00	0.00
B370	STEEL CHS - CHS48.3/4.0	1.803	NC18	2.12	0.00	-0.01	0.00	0.00	0.00
B48	STEEL CHS - CHS48.3/4.0	2.000	NC18	-2.12	-0.61	0.06	0.00	0.02	-0.16
B45	STEEL CHS - CHS48.3/4.0	2.000	NC18	-0.71	0.58	0.04	0.00	0.02	0.16
B330	STEEL CHS - CHS48.3/4.0	0.300	NC18	1.33	-0.04	-0.51	0.00	-0.15	-0.01
B329	STEEL CHS - CHS48.3/4.0	2.000	NC18	-2.02	0.04	0.43	0.00	0.13	0.01

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B599	STEEL CHS - CHS48.3/4.0	0.000	NC18	0.20	0.01	0.04	-0.02	0.00	-0.03
B207	STEEL CHS - CHS48.3/4.0	0.000	NC18	-0.77	0.00	0.04	0.01	0.00	0.02

Nonlinear calculation, Extreme : Global, System : Principal

Selection : All

Nonlinear combinations : NC19

Cross-section : STEEL CHS - CHS48.3/4.0

Member	css	dx [m]	Case	N [kN]	Vy [kN]	Vz [kN]	Mx [kNm]	My [kNm]	Mz [kNm]
B48	STEEL CHS - CHS48.3/4.0	0.000	NC19	-5.27	0.01	-0.17	0.00	0.00	0.00
B495	STEEL CHS - CHS48.3/4.0	2.000	NC19	2.13	0.01	0.73	-0.01	0.20	0.00
B106	STEEL CHS - CHS48.3/4.0	2.000	NC19	-4.10	-0.88	0.02	0.00	0.01	0.04
B49	STEEL CHS - CHS48.3/4.0	0.300	NC19	0.38	0.30	-0.02	0.00	-0.01	0.09
B469	STEEL CHS - CHS48.3/4.0	0.000	NC19	-4.30	0.05	-0.84	0.00	0.00	0.00
B598	STEEL CHS - CHS48.3/4.0	0.000	NC19	0.00	0.04	0.05	-0.03	0.00	-0.07
B600	STEEL CHS - CHS48.3/4.0	0.000	NC19	1.28	0.00	0.04	0.01	0.00	0.01
B469	STEEL CHS - CHS48.3/4.0	0.300	NC19	-4.28	0.04	-0.83	0.00	-0.25	0.01
B48	STEEL CHS - CHS48.3/4.0	2.000	NC19	-4.97	-0.36	0.07	0.00	0.02	-0.10