Civil & Structural Engineering Design Services Pty. Ltd.

Client: **EXTREME MARQUEES PTY. LTD.**
Project: Design check – 6m, 8m, 10m, 12m Event Standard Tents (5m Bay) for **80km/hr** Wind Speed.
Reference: Extreme Marquees Pty Ltd Technical Data

Report by: KZ
Checked by: EAB
Date: 18/11/2016

JOB NO: E-11-264962-2

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1 Introduction

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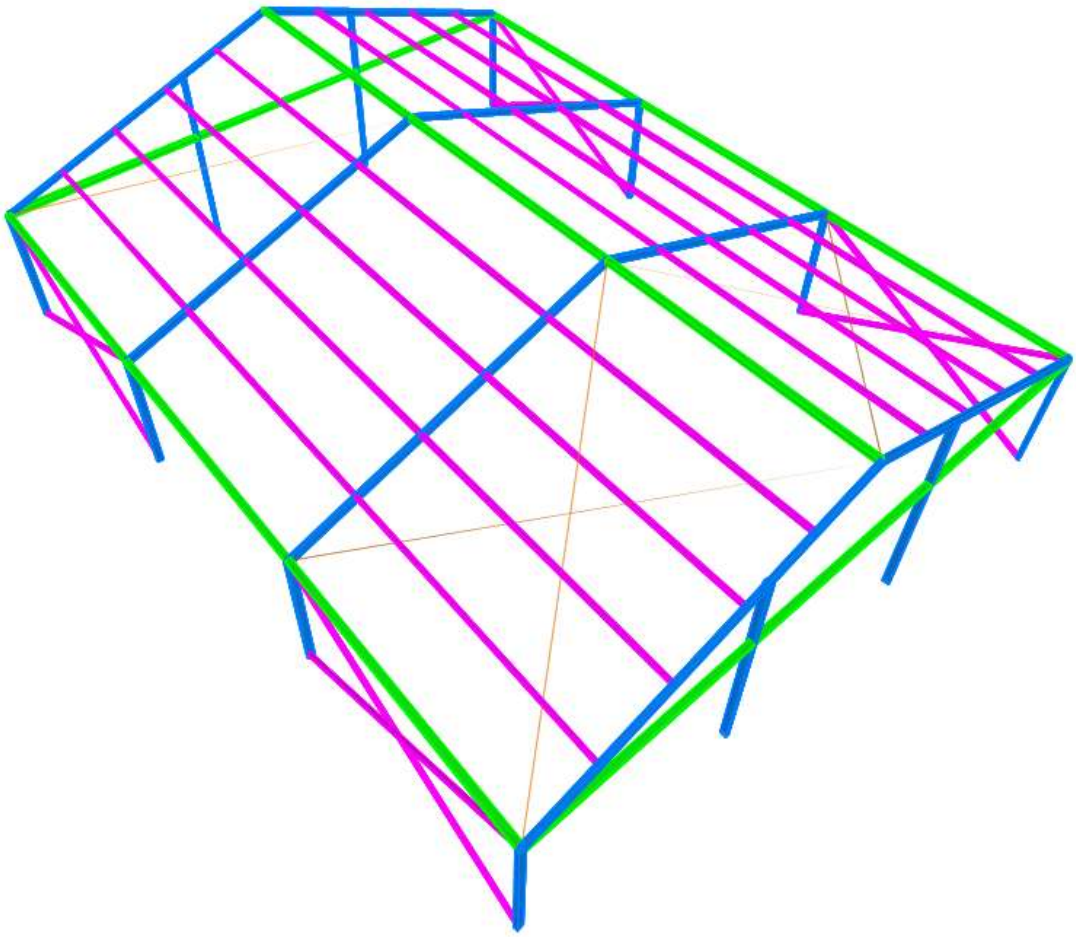
The following structural drawings and calculations are for the transportable tents supplied by Extreme Marquees.

The frame consists principally of extruded '6061-T6' aluminium components with hot dipped galvanized steel ridge and knee connection inserts and base plate.

The report examines the effect of 3s gust wind of 80 km/hr on 12m × 15m Event Standard Tent as the worst-case scenario. The relevant Australian Standards AS1170.0:2002 General principles, AS1170.1:2002 Permanent, imposed and other actions and AS1170.2:2011 Wind actions are used. The design check is in accordance with AS/NZS 1664.1:1997 Aluminum limit state design.



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2 Design Restrictions and Limitations

2.1 The erected structure is for temporary use only.

2.2 It should be noted that if high gust wind speeds are anticipated or forecast in the locality of the tent, the temporary erected structure should be dismantled.

2.3 For forecast winds in excess of **(refer to summary)** – all fabric shall be removed from the frames, and the structure should be completely dismantled.

(Please note that the locality squall or gust wind speed is affected by factors such as terrain exposure and site elevations.)

2.4 The structure may only be erected in regions with wind classifications no greater than the limits specified on the attached wind analysis.

2.5 The wind classifications are based upon Terrain Category 2. Considerations have also been made to the regional wind terrain category, topographical location and site shielding from adjacent structures. Please note that in many instances topographical factors such as a location on the crest of a hill or on top of an escarpment may yield a higher wind speed classification than that derived for a higher wind terrain category in a level topographical region. For this reason, particular regard shall be paid to the topographical location of the structure. For localities which do not conform to the standard prescribed descriptions for wind classes as defined above, a qualified Structural Engineer may be employed to determine an appropriate wind class for that the particular site.

2.6 The structures in no circumstances shall ever be erected in tropical or severe tropical cyclonic condition as defined on the Map of Australia in AS 1170.2-2011, Figure 3.1.

2.7 The tent structure has not been designed to withstand snow and ice loadings such as when erected in alpine regions.

2.8 For the projects, where the site conditions approach the design limits, extra consideration should be given to pullout tests of the stakes and professional assessment of the appropriate wind classification for the site.

2.9 The tents are stabilized as using roof/wall cross bracing at end bays and every third bay in between as shown on the drawings.

2.10 It is important to use 60x60x2 profile for all intermediate purlins with spacing not exceeding 1300mm. This means 8 intermediate purlins are required per bay for the 12m tent structure (as illustrated).

2.11 It is important to use 120x68x3 profile for all gable poles.

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3 Specifications

3.1 General

Tent category	
Material	Aluminum 6061-T6

Size	Model
12m x 12m	Event Standard

EXTREME MARQUEES

Event Standard

6m / 8m / 10m / 12m

Product Photos

Item	Specification
Clear-Span Width	6m / 8m / 10m / 12m
Eave Height	2.6m
Ridge Height	3.7m / 4.0m / 4.4m / 4.8m
Roof Pitch	20°
Bay Distance	5m
Longest Component	3.7m / 4.2m / 5.4m / 6.4m
Minimum Tent Length	10m
Roof Fixing	Bar Tensioning
Main Profile	120 x 68 x 3mm (4-channel)
Max Allowed Windspeed	80km/hr 0.3kn/m²
Eave Connection	Hot-dip galvanized steel insert
Framework Material	Hard pressed extruded aluminium 6061/T6 (13HW)
Cover Material	PVC-coated Polyester textile, flame retardant to DIN 4102 B1,M2 750-900g/m²

Technical Diagrams

Type: WT6/260

Type: WT8/260

Type: WT10/260

Type: WT12/260

Product Info

The Event Standard is the start for our professional 5m bay event range. The Event Standard offers popular clear-span widths of 6m, 8m 10 and 12m with an eave height 2.6m.The Event Tent series are available with a complete range of accessories including sidewalls with clear windows, roof lining glass wall & door systems ABS solid walling system & flooring system.

Accessories:
PVC window sidewalls
Anchoring
Rain gutter
Lining & curtains
Glass door units
Hard walling system
Glass walling system
Transparent PVC cover & sidewall
Flooring System
Weight plate

Profiles

Framework Main profile dimensions and use

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3.2 Aluminium Properties

Aluminium Properties		
Compressive yield strength	Fcy	241 MPa
Tensile yeild strength	Fty	241 MPa
Tensile ultimate strength	Ftu	262 MPa
Shear yield strength	Fsy	138 MPa
Bearing yeild strength	Fby	386 MPa
Bearing ultimate strength	Fbu	552 MPa
Yield stress (min{Fcy:Fty})	Fy	241 MPa
Elastic modulus	E	70000 MPa
Shear modulus	G	26250 MPa
Value of coefficients	kt	1.00
	kc	1.00
Capacity factor (general yield)	φy	0.95
Capacity factor (ultimate)	φu	0.85
Capacity factor (bending)	φb	0.85
Capacity factor (elastic shear buckling)	φv	0.8
Capacity factor (inelastic shear buckling)	φvp	0.9

3.3 Buckling Constants

Type of member and stresses	Intercept, MPa	Slope, MPa	Intersection
Compression in columns and beam flanges	BC= 242.87	Dc= 1.43	Cc= 69.61
Compression in flat plates	Bp= 310.11	Dp= 2.06	Cp= 61.60
Compressive bending stress in solid rectangular bars	Bbr= 459.89	Dbr= 4.57	Cbr= 67.16
Compressive bending stress in round tubes	Btb= 250.32	Dtb= 14.18	Ctb= 183.52
Shear stress in flat plates	Bs= 178.29	Ds= 0.90	Cs= 81.24

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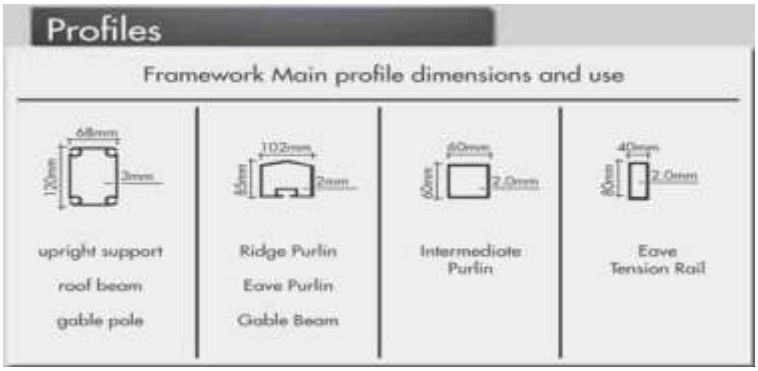
3.4 Section Properties

MEMBER(S)	Section	b	d	t	y_c	A_g	Z_x	Z_y	S_x	S_y	I_x	I_y	J	r_x	r_y
		mm	*mm*	*mm*	*mm*	*mm²*	*mm³*	*mm³*	*mm³*	*mm³*	*mm⁴*	*mm⁴*	*mm⁴*	*mm*	*mm*
Rafter	120X68X3	68	120	3	60.0	1092.0	35622.6	25888.4	43362.0	29166.0	2137356.0	880204.0	1906682.1	44.2	28.4
Upright Support	120X68X3	68	120	3	60.0	1092.0	35622.6	25888.4	43362.0	29166.0	2137356.0	880204.0	1906682.1	44.2	28.4
Gable Pole	120X68X3	68	120	3	60.0	1092.0	35622.6	25888.4	43362.0	29166.0	2137356.0	880204.0	1906682.1	44.2	28.4
Ridge & Eave Purlin	85X102X2	102	85	2	42.5	732.0	20705.0	22820.5	23493.0	26604.0	879961.0	1163844.0	1505792.3	34.7	39.9
Gable Beam	85X102X2	102	85	2	42.5	732.0	20705.0	22820.5	23493.0	26604.0	879961.0	1163844.0	1505792.3	34.7	39.9
Intermediate Purlin	60X60X2	60	60	2	30.0	464.0	8682.0	8682.0	10096.0	10096.0	260458.7	260458.7	390224.0	23.7	23.7
Brace	60	60	60	2	30.0	464.0	8682.0	8682.0	10096.0	10096.0	260458.7	260458.7	390224.0	23.7	23.7



4 Design Loads

4.1 Ultimate

		Distributed load (kPa)	Design load factor (-)	Factored imposed load (kPa)
Live	Q	-	1.5	-
Self weight	G	self weight	1.35, 1.2, 0.9	1.2 self weight, 0.9 self weight
3s 80km/hr gust	W	0.245 C_{fig}	1.0	0.245 C_{fig}

4.2 Load Combinations

4.2.1 Serviceability

Gravity = 1.0 × G
Wind = 1.0 × G + 1.0 × W

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4.2.2 Ultimate

Downward = $1.35 \times G$
= $1.2 \times G + W_u$
= $1.2 \times G + W_u + W_{IS}$

Upward = $0.9 \times G + W_u$
$0.9 \times G + W_u + W_{IP}$

5 Wind Analysis

Wind towards surface (+ve), away from surface (-ve)

5.1 Parameters

Terrain category = 2
Site wind speed ($V_{sit,\beta}$) = $V_R M_d (M_{z,cat} M_s M_t)$
V_R = 22.22m/s (80 km/hr) *(regional 3 s gust wind speed)*
$M_d = 1$
$M_s = 1$
$M_t = 1$
$M_{z,cat} = 0.91$ *(Table 4.1(B) AS1170.2)*

$V_{sit,\beta}$ = 20.22 m/s

Height of structure (h) = 3.7 m *(mid of peak and eave)*
Width of structure (w) = 12 m
Length of structure (l) = 15 m

Pressure (P) = $0.5\rho_{air} (V_{sit,\beta})^2 C_{fig} C_{dyn}$
= $0.245 C_{fig}$ kPa

5.2 Pressure Coefficients (C_{fig})

Name	Symbol	Value	Unit	Notes	Ref.
Input					
Importance level		2			*Table 3.1 - Table 3.2 (AS1170.0)*
Annual probability of exceedance		Temporary			*Table 3.3*
Regional gust wind speed		**80**	Km/hr		Table 3.1
Regional gust wind speed	V_R	**22.22**	m/s		
Wind Direction Multipliers	M_d	1			*Table 3.2 (AS1170.2)*
Terrain Category Multiplier	$M_{Z,Cat}$	0.91			Table 4.1
Shield Multiplier	M_S	1			*4.3 (AS1170.2)*
Topographic Multiplier	M_t	1			*4.4 (AS1170.2)*

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Site Wind Speed	$V_{Site,\beta}$	**20.22**	m/s	$V_{Site,\beta}=V_R*M_d*M_{z,cat}*M_S,M_t$	
Pitch	α	20	Deg		
Pitch	α	0.349	rad		
Width	B	12	m		
Width Span	S_w	4	m		
Length	D	15	m		
Height	Z	3.7	m		
Bay Span		5	m		
Purlin Spacing		1.3	m		
Number of Intermediate Purlin		8			
	h/d	0.25			
	h/b	0.31			
Wind Pressure					
ρair	ρ	1.2	Kg/m^3		
dynamic response factor	C_{dyn}	1			
Wind Pressure	$\rho*C_{fig}$	**0.245**	Kg/m^2	$\rho=0.5\rho_{air}*(V_{des,\beta})^2*C_{fig}*C_{dyn}$	*2.4 (AS1170.2)*
WIND DIRECTION 1 (Perpendicular to Length)					
Internal Pressure					
Opening Assumption	With Dominant Opening (Cpi= nCpe				
Internal Pressure Coefficient (Without Dominant) **MIN**		-0.1			Table 5.1 A
Internal Pressure Coefficient (Without Dominant) **MAX**		0.2			
Internal Pressure Coefficient (With Dominant) **MIN**		-0.1			Table 5.1B
Internal Pressure Coefficient (With Dominant) **MAX**		0.2			
N		**0.7**		*Cpi= N*Cpe*	
Combination Factor	$K_{C,i}$	1			
Internal Pressure Coefficient	$C_{p,i}$	0.70			

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MIN					
Internal Pressure Coefficient	$C_{p,i}$	0.70			
MAX					
External Pressure					
1. Windward Wall					
External Pressure Coefficient	$C_{P,e}$	0.7			Table 5.2 A
Area Reduction Factor	K_a	1			*Table 5.4*
combination factor applied to internal pressures	$K_{C,e}$	0.8			
local pressure factor	K_l	1			
porous cladding reduction factor	K_p	1			
aerodynamic shape factor	$C_{fig,e}$	0.56			
Wind Wall Pressure	P	**0.14**	**kPa**		
Edge Column Force	F	**0.34**	**kN/m**		
Intermediate Column Force	F	**0.69**	**kN/m**		
2. Leeward Wall					Table 5.2 B
External Pressure Coefficient	$C_{P,e}$	-0.4			
Area Reduction Factor	K_a	1			*Table 5.4*
combination factor applied to internal pressures	$K_{C,e}$	0.8			
local pressure factor	K_l	1			
porous cladding reduction factor	K_p	1			
aerodynamic shape factor	$C_{fig,e}$	-0.32			
Lee Wall Pressure	P	**-0.08**	**kPa**		
Edge Column Force	F	**-0.20**	**kN/m**		
Intermediate Column Force	F	**-0.39**	**kN/m**		
					Table 5.2 C
3. Side Wall					
Area Reduction Factor	K_a	1			*Table 5.4*
combination factor applied to internal pressures	$K_{C,e}$	0.8			
local pressure factor	K_l	1			
porous cladding reduction factor	K_p	1			
External Pressure Coefficient	$C_{P,e}$	-0.65		*0 to 1h*	

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External Pressure Coefficient	$C_{P,e}$	-0.5		*1h to 2h*	
External Pressure Coefficient	$C_{P,e}$	-0.3		*2h to 3h*	
External Pressure Coefficient	$C_{P,e}$	-0.2		*>3h*	
aerodynamic shape factor	$C_{fig,e}$	-0.52		*0 to 1h*	
aerodynamic shape factor	$C_{fig,e}$	-0.4		*1h to 2h*	
aerodynamic shape factor	$C_{fig,e}$	-0.24		*2h to 3h*	
aerodynamic shape factor	$C_{fig,e}$	-0.16		*>3h*	
Side Wall Pressure	P	**-0.13**	**kPa**	*0 to 1h*	
Side Wall Pressure	P	**-0.10**	**kPa**	*1h to 2h*	
Side Wall Pressure	P	**-0.06**	**kPa**	*2h to 3h*	
Side Wall Pressure	P	**-0.04**	**kPa**	*>3h*	
4. Roof Up Wind Slope				*α>10º*	
Area Reduction Factor	K_a	1			
combination factor applied to internal pressures	$K_{C,e}$	0.8			
local pressure factor	K_l	1			
porous cladding reduction factor	K_p	1			
External Pressure Coefficient **MIN**	$C_{P,e}$	-0.32			Table 5.3 B
External Pressure Coefficient **MAX**	$C_{P,e}$	0.15			
aerodynamic shape factor **MIN**	$C_{fig,e}$	-0.26			
aerodynamic shape factor **MAX**	$C_{fig,e}$	0.12			
Pressure **MIN**	P	**-0.06**	**kPa**		
Pressure **MAX**	P	**0.03**	**kPa**		
Edge Rafter Force **MIN**	F	**-0.16**	**kN/m**		
Edge Rafter Force **Max**	F	**0.07**	**kN/m**		
Intermediate Rafter Force **MIN**	F	**-0.31**	**kN/m**		
Intermediate Rafter Force **MAX**	F	**0.15**	**kN/m**		
5. Roof Down Wind Slope					
Area Reduction Factor	K_a	1			
combination factor applied to internal pressures	$K_{C,e}$	0.8			
local pressure factor	K_l	1			
porous cladding reduction factor	K_p	1			
External Pressure Coefficient	$C_{P,e}$	-0.6			Table 5.3C
aerodynamic shape factor	$C_{fig,e}$	-0.48			

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Pressure **MIN**	P	**-0.12**	**kPa**		
Pressure **MAX**	P	**-0.12**	**kPa**		
Edge Rafter Force **MIN**	F	**-0.29**	**kN/m**		
Edge Rafter Force **MAX**	F	**-0.29**	**kN/m**		
Intermediate Rafter Force **MIN**	F	**-0.59**	**kN/m**		
Intermediate Rafter Force **MAX**	F	**-0.59**	**kN/m**		

WIND DIRECTION 2 (Parallel to Length)

Internal Pressure

Opening Assumption: With Dominant Opening (Cpi= nCpe

Internal Pressure Coefficient (Without Dominant) **MIN**		-0.1			Table 5.1A
Internal Pressure Coefficient (Without Dominant) **MAX**		0.2			
Internal Pressure Coefficient (With Dominant) **MIN**		-0.1			Table 5.1B
Internal Pressure Coefficient (With Dominant) **MAX**		0.2			
N		**0.7**		*Cpi= N*Cpe*	
Combination Factor	$K_{C,i}$	1			
Internal Pressure Coefficient **MIN**	$C_{p,i}$	0.70			
Internal Pressure Coefficient **MAX**	$C_{p,i}$	0.70			

External Pressure

1. Windward Wall

Table 5.2 A

Table 5.4

External Pressure Coefficient	$C_{P,e}$	0.7			
Area Reduction Factor	K_a	1			
combination factor applied to internal pressures	$K_{C,e}$	0.8			
local pressure factor	K_l	1			
porous cladding reduction factor	K_p	1			
aerodynamic shape factor	$C_{fig,e}$	0.56			
Wind Wall Pressure	P	**0.14**	**kPa**		

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Edge Column Force	F	**0.27**	**kN/m**		
Intermediate Column Force	F	**0.55**	**kN/m**		
2. Leeward Wall					Table 5.2 B
External Pressure Coefficient	$C_{P,e}$	-0.5			
Area Reduction Factor	K_a	1			*Table 5.4*
combination factor applied to internal pressures	$K_{C,e}$	0.8			
local pressure factor	K_l	1			
porous cladding reduction factor	K_p	1			
aerodynamic shape factor	$C_{fig,e}$	-0.4			
Lee Wall Pressure	P	**-0.10**	**kPa**		
Edge Column Force	F	**-0.20**	**kN/m**		
Intermediate Column Force	F	**-0.39**	**kN/m**		
					Table 5.2 C
3. Side Wall					
Area Reduction Factor	K_a	1			*Table 5.4*
combination factor applied to internal pressures	$K_{C,e}$	0.8			
local pressure factor	K_l	1			
porous cladding reduction factor	K_p	1			
External Pressure Coefficient	$C_{P,e}$	-0.65		*0 to 1h*	
External Pressure Coefficient	$C_{P,e}$	-0.5		*1h to 2h*	
External Pressure Coefficient	$C_{P,e}$	-0.3		*2h to 3h*	
External Pressure Coefficient	$C_{P,e}$	-0.2		*>3h*	
aerodynamic shape factor	$C_{fig,e}$	-0.52		*0 to 1h*	
aerodynamic shape factor	$C_{fig,e}$	-0.4		*1h to 2h*	
Side Wall Pressure	**P**	**-0.13**	**kPa**	*0 to 1h*	
Side Wall Pressure	**P**	**-0.10**	**kPa**	*1h to 2h*	
Side Wall Pressure	**P**	**-0.06**	**kPa**	*2h to 3h*	
Side Wall Pressure	**P**	**-0.04**	**kPa**	*>3h*	
4. Roof				α *<10°*	
Area Reduction Factor	K_a	1			Table 5.3 A

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combination factor applied to internal pressures	$K_{C,e}$	0.8		
local pressure factor	K_l	1		
porous cladding reduction factor	K_p	1		
External Pressure Coefficient **MIN**	$C_{P,e}$	-0.90		*0 to 0.5h*
External Pressure Coefficient **MIN**	$C_{P,e}$	-0.90		*0.5 to 1h*
External Pressure Coefficient **MIN**	$C_{P,e}$	-0.50		*1h to 2h*
External Pressure Coefficient **MIN**	$C_{P,e}$	-0.30		*2h to 3h*
External Pressure Coefficient **MIN**	$C_{P,e}$	-0.20		*>3h*
External Pressure Coefficient **MAX**	$C_{P,e}$	-0.40		*0 to 0.5h*
External Pressure Coefficient **MAX**	$C_{P,e}$	-0.40		*0.5 to 1h*
External Pressure Coefficient **MAX**	$C_{P,e}$	0.00		*1h to 2h*
External Pressure Coefficient **MAX**	$C_{P,e}$	0.10		*2h to 3h*
External Pressure Coefficient **MAX**	$C_{P,e}$	0.20		*>3h*
aerodynamic shape factor **MIN**	$C_{fig,e}$	-0.72		*0 to 0.5h*
aerodynamic shape factor **MIN**	$C_{fig,e}$	-0.72		*0.5 to 1h*
aerodynamic shape factor **MIN**	$C_{fig,e}$	-0.4		*1h to 2h*
aerodynamic shape factor **MIN**	$C_{fig,e}$	-0.24		*2h to 3h*
aerodynamic shape factor **MIN**	$C_{fig,e}$	-0.16		*>3h*
aerodynamic shape factor **MAX**	$C_{fig,e}$	-0.32		*0 to 0.5h*
aerodynamic shape factor **MAX**	$C_{fig,e}$	-0.32		*0.5 to 1h*
aerodynamic shape factor **MAX**	$C_{fig,e}$	0		*1h to 2h*
aerodynamic shape factor **MAX**	$C_{fig,e}$	0.08		*2h to 3h*
aerodynamic shape factor **MAX**	$C_{fig,e}$	0.16		*>3h*
Pressure **MIN**	**P**	**-0.18**	**kPa**	*0 to 0.5h*
Pressure **MIN**	**P**	**-0.18**	**kPa**	*0.5 to 1h*
Pressure **MIN**	**P**	**-0.10**	**kPa**	*1h to 2h*
Pressure **MIN**	**P**	**-0.06**	**kPa**	*2h to 3h*
Pressure **MIN**	**P**	**-0.04**	**kPa**	*>3h*
Pressure **MAX**	**P**	**-0.08**	**kPa**	*0 to 0.5h*
Pressure **MAX**	**P**	**-0.08**	**kPa**	*0.5 to 1h*

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Pressure **MAX**	**P**	**0.00**	**kPa**	*1h to 2h*
Pressure **MAX**	**P**	**0.02**	**kPa**	*2h to 3h*
Pressure **MAX**	**P**	**0.04**	**kPa**	*>3h*
Edge Purlin Force **MIN**	**F**	**-0.11**	**kN/m**	*0 to 0.5h*
Edge Purlin Force **MIN**	**F**	**-0.11**	**kN/m**	*0.5 to 1h*
Edge Purlin Force **MIN**	**F**	**-0.06**	**kN/m**	*1h to 2h*
Edge Purlin Force **MIN**	**F**	**-0.04**	**kN/m**	*2h to 3h*
Edge Purlin Force **MIN**	**F**	**-0.03**	**kN/m**	*>3h*
Edge Purlin Force MAX	**F**	**-0.05**	**kN/m**	*0 to 0.5h*
Edge Purlin Force MAX	**F**	**-0.05**	**kN/m**	*0.5 to 1h*
Edge Purlin Force MAX	**F**	**0.00**	**kN/m**	*1h to 2h*
Edge Purlin Force MAX	**F**	**0.01**	**kN/m**	*2h to 3h*
Edge Purlin Force MAX	**F**	**0.03**	**kN/m**	*>3h*
Intermediate Purlin Force **MIN**	**F**	**-0.23**	**kN/m**	*0 to 0.5h*
Intermediate Purlin Force **MIN**	**F**	**-0.23**	**kN/m**	*0.5 to 1h*
Intermediate Purlin Force **MIN**	**F**	**-0.13**	**kN/m**	*1h to 2h*
Intermediate Purlin Force **MIN**	**F**	**-0.08**	**kN/m**	*2h to 3h*
Intermediate Purlin Force **MIN**	**F**	**-0.05**	**kN/m**	*>3h*
Intermediate Purlin Force **MAX**	**F**	**-0.10**	**kN/m**	*0 to 0.5h*
Intermediate Purlin Force **MAX**	**F**	**-0.10**	**kN/m**	*0.5 to 1h*
Intermediate Purlin Force **MAX**	**F**	**0.00**	**kN/m**	*1h to 2h*
Intermediate Purlin Force **MAX**	**F**	**0.03**	**kN/m**	*2h to 3h*
Intermediate Purlin Force **MAX**	**F**	**0.05**	**kN/m**	*>3h*

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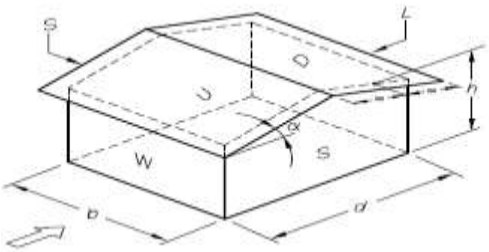
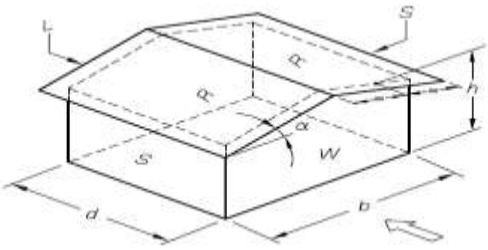
5.2.1 Pressure summary

WIND EXTERNAL PRESSURE			Direction1 (Perpendicular to Length)		Direction2 (Parallel to Length)				
Windward (kPa)			0.14		0.14				
Leeward (kPa)			-0.08		-0.10				
Sidewall (m)	Length	(m)	(m)	(Kpa)	(Kpa)				
	0 - 1h	0	3.7	-0.13	-0.13				
	1h - 2h	3.7	7.4	-0.10	-0.10				
	2h - 3h	7.4	11.1	-0.06	-0.06				
	>3h	11.1	-	-0.04	-0.04				
Roof			Min (Kpa)	Max (Kpa)	Length	(m)	(m)	Min (Kpa)	Max (Kpa)
	Upwind Slope		-0.06	0.03	0-0.5h	0.00	1.85	-0.18	-0.08
	Downwind Slope		-0.12	-0.12	0.5h-1h	1.85	3.70	-0.18	-0.08
					1h-2h	3.70	7.40	-0.10	0.00
					2h-3h	7.40	11.10	-0.06	0.02
					>3h	11.10	-	-0.04	0.04
Wind Internal Pressure (kPa)			Min (kPa)	Max (kPa)	Min (kPa)			Max (kPa)	
			Proportion of Cpe	Proportion of Cpe	Proportion of Cpe			Proportion of Cpe	



Direction 1



Direction 2

AS1170.2

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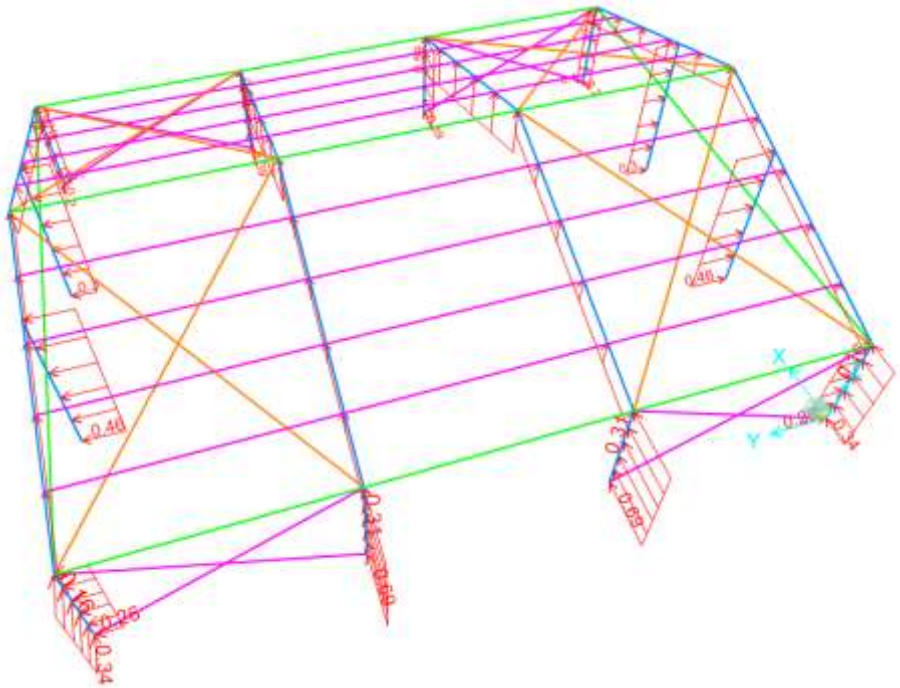
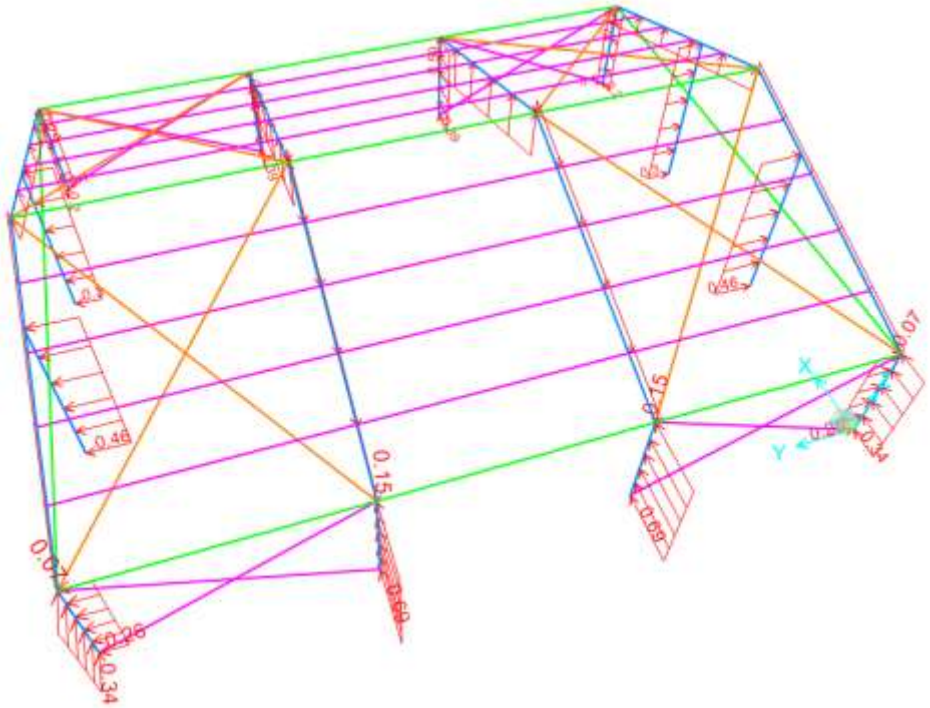
5.3 Wind Load Diagrams

5.3.1 Wind 1(case 1)



5.3.2 Wind 1(case 2)



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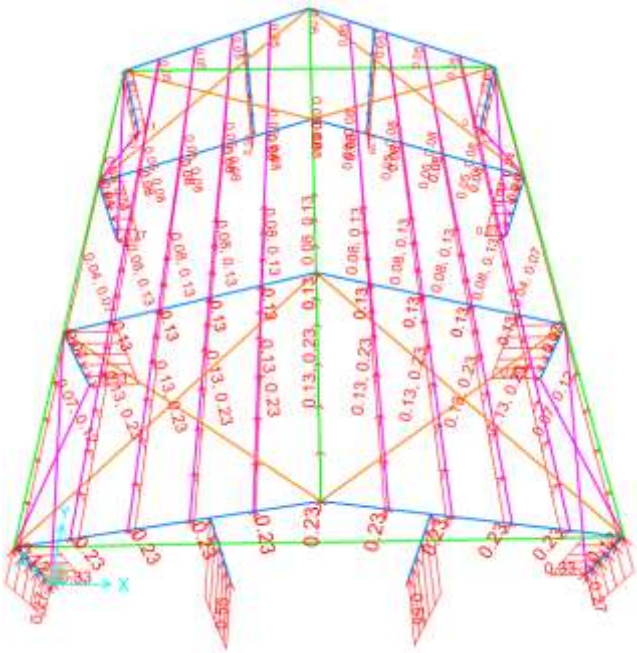
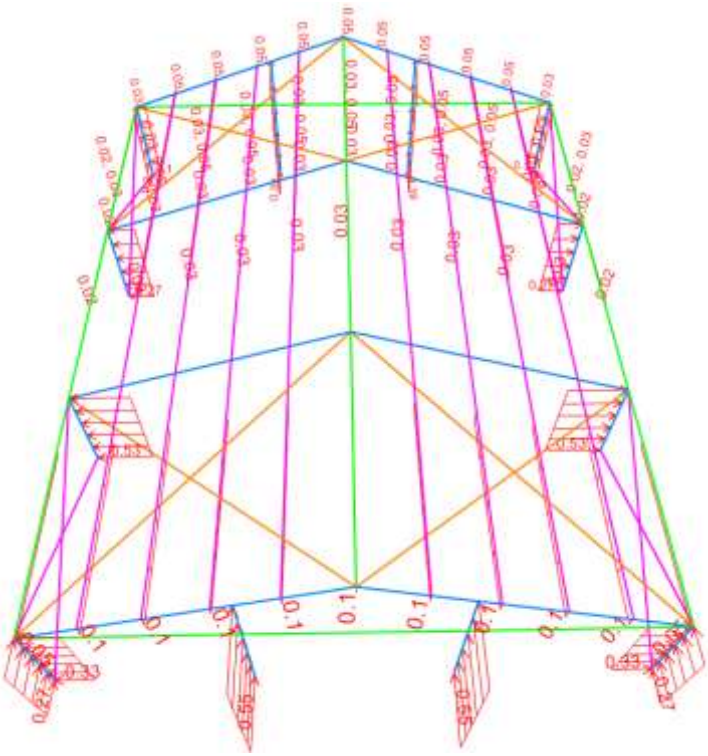
5.3.3 Wind 2(Case1)



5.3.4 Wind 2(case 2)



After 3D model analysis, each member is checked based on adverse load combination.
In this regard the maximum bending moment, shear and axial force due to adverse load combinations for each member are presented as below:

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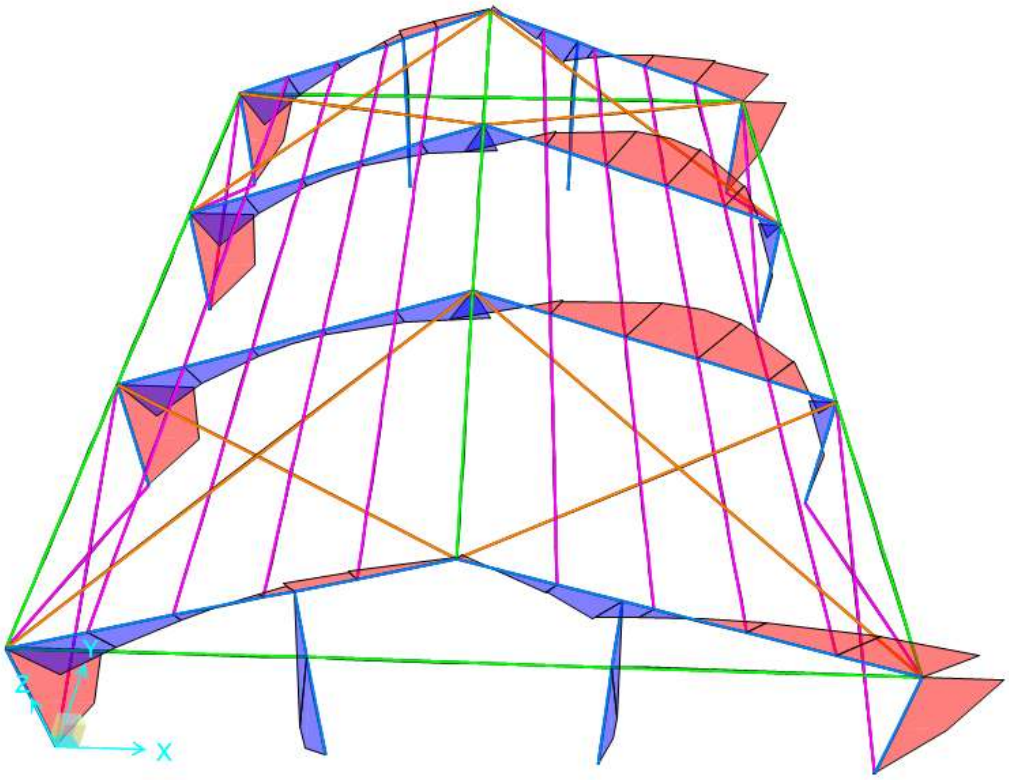
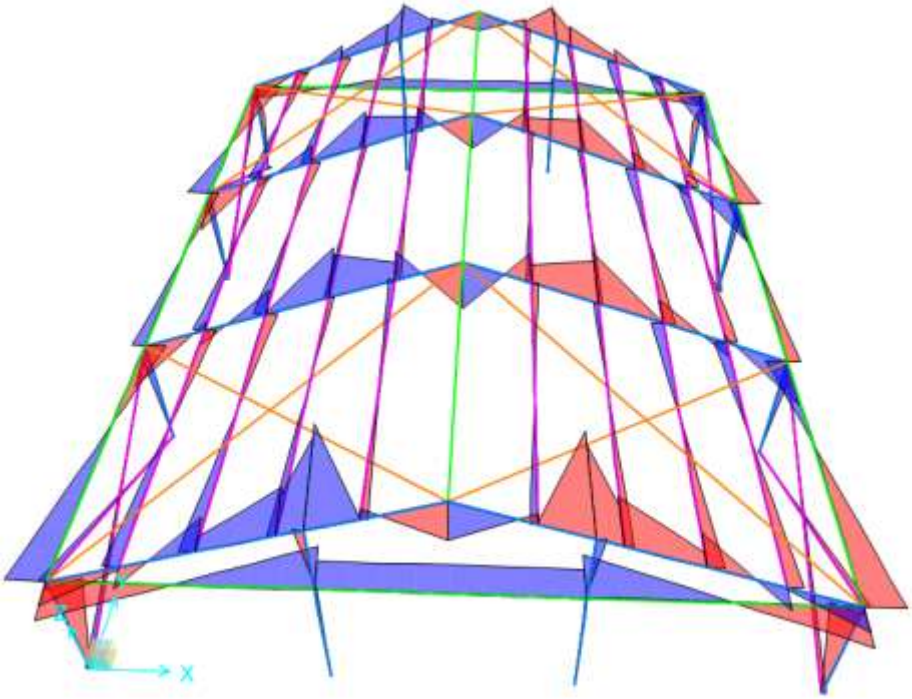
5.3.5 Max Bending Moment due to critical load combination in major axis



5.3.6 Max Bending Moment in minor axis due to critical load combination



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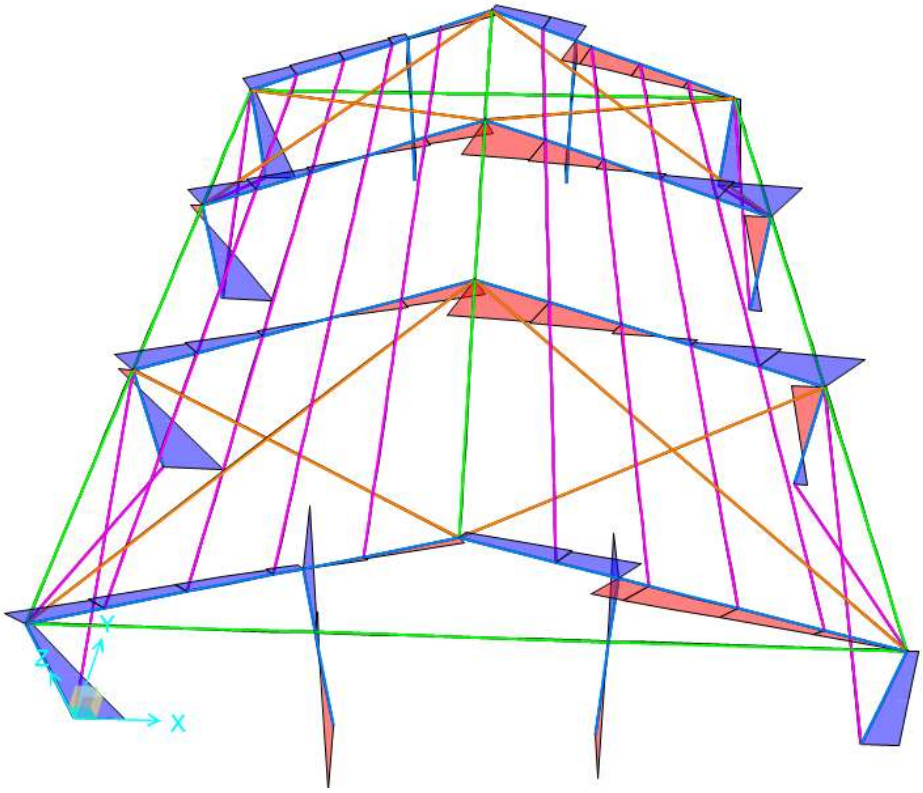
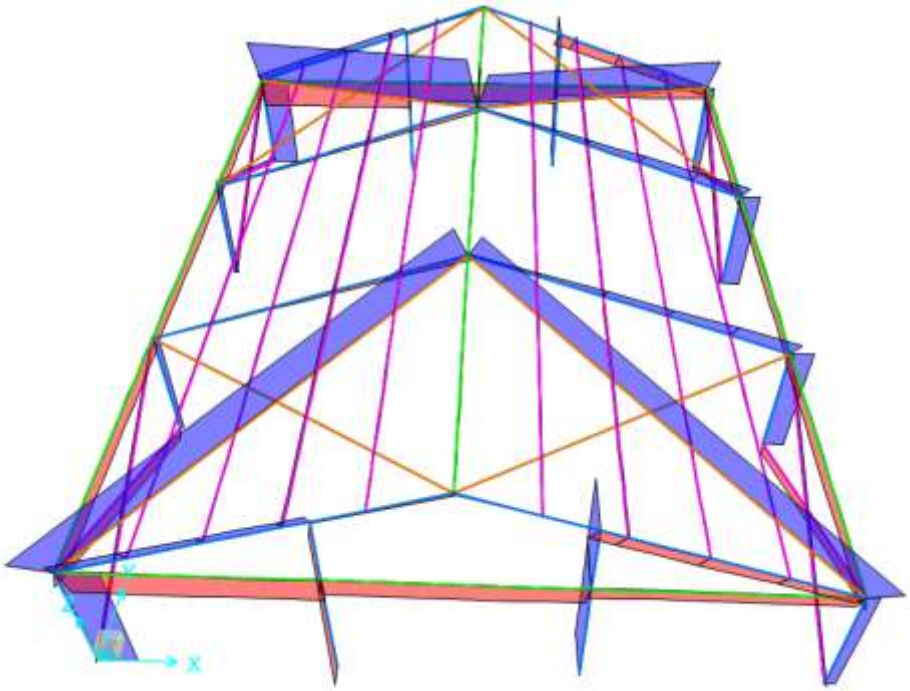
5.3.7 Max Shear in due to critical load combination



5.3.8 Max Axial force in upright support and roof beam due to critical load combination



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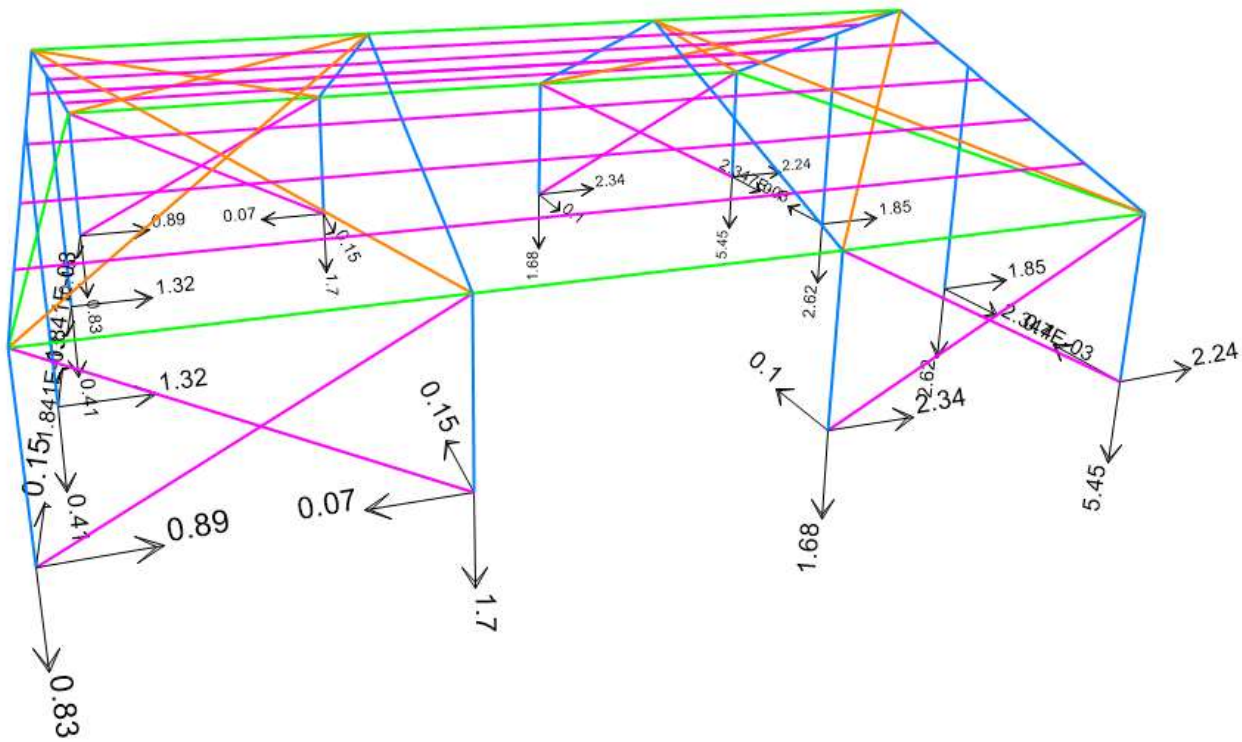
5.3.9 Max reactions



Max Reaction (Bearing) N^* = 3.1 kN
Max Reaction (Uplift) N^* = 5.5 kN

5.3.10 Summary Table:

MEMBER(S)	Section	b	d	t	Vx	Vy	P (Axial) Negative -> Compression Positive -> Tension	Mx	My
		mm	mm	mm	kN	kN	kN	kN.m	kN.m
Rafter	120X68X3	68	120	3	2.322	-0.449	3.488	2.9133	-0.4735
Upright Support	120X68X3	68	120	3	2.258	-0.045	3.021	-2.7853	0.1159
Gable Pole	120X68X3	68	120	3	0.344	1.436	-2.818	1.3461	1.9626
Ridge & Eave Purlin	85X102X2	102	85	2	-0.03	5.2E-16	-0.672	-1.0953	-1.105E-16
Gable Beam	85X102X2	102	85	2	0.035	0.099	-7.114	-2.776E-17	-0.2196
Intermediate Purlin	60X60X2	60	60	2	-0.03	0.015	-0.799	-1.1153	0.0107
Brace	60	60	60	2	0.028	0.018	-2.706	0	-0.0506

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6 Checking Members Based on AS1664.1 ALUMINIUM LSD

6.1 Rafter

NAME	SYMBOL		VALUE	UNIT	NOTES	REF
120X68X3	**Rafter**					
Alloy and temper	6061-T6					AS1664.1
Tension	F_{tu}	=	262	MPa	*Ultimate*	T3.3(A)
	F_{ty}	=	241	MPa	*Yield*	
Compression	F_{cy}	=	241	MPa		
Shear	F_{su}	=	165	MPa	*Ultimate*	
	F_{sy}	=	138	MPa	*Yield*	
Bearing	F_{bu}	=	551	MPa	*Ultimate*	
	F_{by}	=	386	MPa	*Yield*	
Modulus of elasticity	E	=	70000	MPa	*Compressive*	
	k_t	=	1.0			T3.4(B)
	k_c	=	1.0			
FEM ANALYSIS RESULTS						
Axial force	P	=	0	kN	*compression*	
	P	=	3.488	kN	*Tension*	
In plane moment	M_x	=	2.9133	kNm		
Out of plane moment	M_y	=	0.4735	kNm		
DESIGN STRESSES						
Gross cross section area	A_g	=	1092	mm^2		
In-plane elastic section modulus	Z_x	=	35622.6	mm^3		
Out-of-plane elastic section mod.	Z_y	=	25888.353	mm^3		
Stress from axial force	f_a	=	P/A_g			
		=	**0.00**	**MPa**	*compression*	
		=	**3.19**	**MPa**	*Tension*	
Stress from in-plane bending	f_{bx}	=	M_x/Z_x			
		=	**81.78**	**MPa**	*compression*	
Stress from out-of-plane bending	f_{by}	=	M_y/Z_y			
		=	**18.29**	**MPa**	*compression*	
Tension						
***3.4.3** Tension in rectangular tubes*						

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	ϕF_L	**=**	**228.95**	**MPa**		
		OR				
	ϕF_L	**=**	**222.70**	**MPa**		
COMPRESSION						
3.4.8 *Compression in columns, axial, gross section*						
1. General						… 3.4.8.1
Unsupported length of member	L	=	6400	mm		
Effective length factor	k	=	1			
Radius of gyration about buckling axis (Y)	r_y	=	28.39	mm		
Radius of gyration about buckling axis (X)	r_x	=	44.24	mm		
Slenderness ratio	kLb/ry	=	45.79			
Slenderness ratio	kL/rx	=	144.66			
Slenderness parameter	λ	=	2.702			
	D_c*	=	90.3			
	S_1*	=	0.33			
	S_2*	=	1.23			
	ϕ_{cc}	=	0.950			
Factored limit state stress	**ϕF_L**	**=**	**31.36**	**MPa**		
2. Sections not subject to torsional or torsional-flexural buckling						… 3.4.8.2
Largest slenderness ratio for flexural buckling	kL/r	**=**	144.66			
3.4.10 *Uniform compression in components of columns, gross section - flat plates*						
1. Uniform compression in components of columns, gross section - flat plates with both edges supported						… 3.4.10.1
	k_1	**=**	0.35			T3.3(D)
Max. distance between toes of fillets of supporting elements for plate	b'	**=**	62			
	t	**=**	3	mm		
Slenderness	b/t	**=**	20.666667			
Limit 1	S_1	**=**	12.34			
Limit 2	S_2	**=**	32.87			
Factored limit state stress	**ϕF_L**	**=**	**205.58**	**MPa**		

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Most adverse compressive limit state stress	F_a	=	31.36	MPa		
Most adverse tensile limit state stress	F_a	=	222.70	MPa		
Most adverse compressive & Tensile capacity factor	f_a/F_a	=	0.01		PASS	
BENDING - IN-PLANE						
***3.4.15** Compression in beams, extreme fibre, gross section rectangular tubes, box sections*						
Unbraced length for bending	L_b	=	1300	mm		
Second moment of area (weak axis)	I_y	=	8.80E+05	mm^4		
Torsion modulus	J	=	1.91E+06	mm^3		
Elastic section modulus	Z	=	35622.6	mm^3		
Slenderness	S	=	71.49			
Limit 1	S_1	=	0.39			
Limit 2	S_2	=	1695.86			
Factored limit state stress	ϕF_L	=	**210.99**	**MPa**		… 3.4.15(2)
***3.4.17** Compression in components of beams (component under uniform compression), gross section - flat plates with both edges supported*						
	k_1	=	0.5			T3.3(D)
	k_2	=	2.04			T3.3(D)
Max. distance between toes of fillets of supporting elements for plate	b'	=	62	mm		
	t	=	3	mm		
Slenderness	b/t	=	20.666667			
Limit 1	S_1	=	12.34			
Limit 2	S_2	=	46.95			
Factored limit state stress	ϕF_L	=	**205.58**	**MPa**		
Most adverse in-plane bending limit state stress	F_{bx}	=	205.58	MPa		
Most adverse in-plane bending capacity factor	f_{bx}/F_{bx}	=	0.40		PASS	
BENDING - OUT-OF-PLANE						

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NOTE: Limit state stresses, ϕF_L are the same for out-of-plane bending (doubly symmetric section)						
Factored limit state stress	ϕF_L	=	**205.58**	**MPa**		
Most adverse out-of-plane bending limit state stress	F_{by}	=	205.58	MPa		
Most adverse out-of-plane bending capacity factor	f_{by}/F_{by}	=	0.09		PASS	
COMBINED ACTIONS						
4.1.1 *Combined compression and bending*						… 4.1.1(2)
	F_a	=	31.36	MPa		… 3.4.8
	F_{ao}	=	205.58	MPa		… 3.4.10
	F_{bx}	=	205.58	MPa		… 3.4.17
	F_{by}	=	205.58	MPa		… 3.4.17
	f_a/F_a	=	0.014			
Check:	$f_a/F_a + f_{bx}/F_{bx} + f_{by}/F_{by} \leq 1.0$					… 4.1.1 (3)
i.e.	0.50	≤	1.0		PASS	
SHEAR						
3.4.24 *Shear in webs (Major Axis)*						… 4.1.1(2)
Clear web height	h	=	114	mm		
	t	=	3	mm		
Slenderness	h/t	=	38			
Limit 1	S_1	=	29.01			
Limit 2	S_2	=	59.31			
Factored limit state stress	ϕF_L	=	**122.00**	**MPa**		
Stress From Shear force	f_{sx}	=	V/A_w			
			3.39	**MPa**		
3.4.25 *Shear in webs (Minor Axis)*						
Clear web height	b	=	62	mm		
	t	=	3	mm		
Slenderness	b/t	=	20.666667			
Factored limit state stress	ϕF_L	=	**131.10**	**MPa**		

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Stress From Shear force	f_{sy}	=	V/A_w			
			1.21	**MPa**		

6.2 Upright Supports

NAME	SYMBOL		VALUE	UNIT	NOTES	REF
120X68X3	**Upright Support**					
Alloy and temper	6061-T6					AS1664.1
Tension	F_{tu}	=	262	MPa	*Ultimate*	T3.3(A)
	F_{ty}	=	241	MPa	*Yield*	
Compression	F_{cy}	=	241	MPa		
Shear	F_{su}	=	165	MPa	*Ultimate*	
	F_{sy}	=	138	MPa	*Yield*	
Bearing	F_{bu}	=	551	MPa	*Ultimate*	
	F_{by}	=	386	MPa	*Yield*	
Modulus of elasticity	E	=	70000	MPa	*Compressive*	
	k_t	=	1.0			T3.4(B)
	k_c	=	1.0			
FEM ANALYSIS RESULTS						
Axial force	P	=	0	kN	*compression*	
	P	=	3.021	kN	*Tension*	
In plane moment	M_x	=	2.7853	kNm		
Out of plane moment	M_y	=	0.1159	kNm		
DESIGN STRESSES						
Gross cross section area	A_g	=	1092	mm^2		
In-plane elastic section modulus	Z_x	=	35622.6	mm^3		
Out-of-plane elastic section mod.	Z_y	=	25888.353	mm^3		
Stress from axial force	f_a	=	P/A_g			
		=	**0.00**	**MPa**	*compression*	
		=	**2.77**	**MPa**	*Tension*	
Stress from in-plane bending	f_{bx}	=	M_x/Z_x			
		=	**78.19**	**MPa**	*compression*	
Stress from out-of-plane bending	f_{by}	=	M_y/Z_y			
		=	**4.48**	**MPa**	*compression*	

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Tension						
3.4.3 *Tension in rectangular tubes*						
	ϕF_L	**=**	**228.95**	**MPa**		
		O R				
	ϕF_L	**=**	**222.70**	**MPa**		
COMPRESSION						
3.4.8 *Compression in columns, axial, gross section*						
1. General						… 3.4.8.1
Unsupported length of member	L	=	2600	mm		
Effective length factor	k	=	1			
Radius of gyration about buckling axis (Y)	r_y	=	28.39	mm		
Radius of gyration about buckling axis (X)	r_x	=	44.24	mm		
Slenderness ratio	kLb/ry	=	91.58			
Slenderness ratio	kL/rx	=	58.77			
Slenderness parameter	λ	=	1.71			
	D_c*	=	90.3			
	S_1*	=	0.33			
	S_2*	=	1.23			
	ϕ_{cc}	=	0.819			
Factored limit state stress	**ϕF_L**	**=**	**67.51**	**MPa**		
2. Sections not subject to torsional or torsional-flexural buckling						… 3.4.8.2
Largest slenderness ratio for flexural buckling	kL/r	**=**	91.58			
3.4.10 *Uniform compression in components of columns, gross section - flat plates*						
1. Uniform compression in components of columns, gross section - flat plates with both edges supported						… 3.4.10.1
	k_1	**=**	0.35			T3.3(D)
Max. distance between toes of fillets of supporting elements for plate	b'	**=**	62			
	t	**=**	3	mm		
Slenderness	b/t	**=**	20.666667			
Limit 1	S_1	**=**	12.34			

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Limit 2	S_2	=	32.87			
Factored limit state stress	**ϕF_L**	**=**	**205.58**	**MPa**		
Most adverse compressive limit state stress	F_a	=	67.51	MPa		
Most adverse tensile limit state stress	F_a	=	222.70	MPa		
Most adverse compressive & Tensile capacity factor	f_a/F_a	=	0.01		PASS	
BENDING - IN-PLANE						
***3.4.15** Compression in beams, extreme fibre, gross section rectangular tubes, box sections*						
Unbraced length for bending	L_b	=	2600	mm		
Second moment of area (weak axis)	I_y	=	8.80E+05	mm^4		
Torsion modulus	J	=	1.91E+06	mm^3		
Elastic section modulus	Z	=	35622.6	mm^3		
Slenderness	S	=	142.99			
Limit 1	S_1	=	0.39			
Limit 2	S_2	=	1695.86			
Factored limit state stress	**ϕF_L**	=	**202.96**	**MPa**		… 3.4.15(2)
***3.4.17** Compression in components of beams (component under uniform compression), gross section - flat plates with both edges supported*						
	k_1	**=**	0.5			T3.3(D)
	k_2	**=**	2.04			T3.3(D)
Max. distance between toes of fillets of supporting elements for plate	b'	**=**	62	mm		
	t	**=**	3	mm		
Slenderness	b/t	**=**	20.666667			
Limit 1	S_1	=	12.34			
Limit 2	S_2	=	46.95			
Factored limit state stress	**ϕF_L**	=	**205.58**	**MPa**		
Most adverse in-plane bending limit state stress	F_{bx}	=	202.96	MPa		

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Most adverse in-plane bending capacity factor	f_{bx}/F_{bx}	=	0.39		PASS	
BENDING - OUT-OF-PLANE						
NOTE: Limit state stresses, ϕF_L are the same for out-of-plane bending (doubly symmetric section)						
Factored limit state stress	ϕF_L	=	**202.96**	**MPa**		
Most adverse out-of-plane bending limit state stress	F_{by}	=	202.96	MPa		
Most adverse out-of-plane bending capacity factor	f_{by}/F_{by}	=	0.02		PASS	
COMBINED ACTIONS						
4.1.1 *Combined compression and bending*						… 4.1.1(2)
	F_a	=	67.51	MPa		… 3.4.8
	F_{ao}	=	205.58	MPa		… 3.4.10
	F_{bx}	=	202.96	MPa		… 3.4.17
	F_{by}	=	202.96	MPa		… 3.4.17
	f_a/F_a	=	0.012			
Check:	$f_a/F_a + f_{bx}/F_{bx} + f_{by}/F_{by}$	≤	1.0			… 4.1.1 (3)
i.e.	0.42	≤	1.0		PASS	
SHEAR						
3.4.24 *Shear in webs (Major Axis)*						… 4.1.1(2)
Clear web height	h	=	114	mm		
	t	=	3	mm		
Slenderness	h/t	=	38			
Limit 1	S_1	=	29.01			
Limit 2	S_2	=	59.31			
Factored limit state stress	ϕF_L	=	**122.00**	**MPa**		
Stress From Shear force	f_{sx}	=	V/A_w			
			3.30	**MPa**		
3.4.25 *Shear in webs (Minor Axis)*						
Clear web height	b	=	62	mm		

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	t	=	3	mm		
Slenderness	b/t	=	20.666667			
Factored limit state stress	**ϕF_L**	=	**131.10**	**MPa**		
Stress From Shear force	**f_{sy}**	=	V/A_w			
			0.12	**MPa**		

6.3 Gable Pole

NAME	SYMBOL		VALUE	UNIT	NOTES	REF
120X68X3	**Gable Pole**					
Alloy and temper	6061-T6					AS1664.1
Tension	F_{tu}	=	262	MPa	*Ultimate*	T3.3(A)
	F_{ty}	=	241	MPa	*Yield*	
Compression	F_{cy}	=	241	MPa		
Shear	F_{su}	=	165	MPa	*Ultimate*	
	F_{sy}	=	138	MPa	*Yield*	
Bearing	F_{bu}	=	551	MPa	*Ultimate*	
	F_{by}	=	386	MPa	*Yield*	
Modulus of elasticity	E	=	70000	MPa	*Compressive*	
	k_t	=	1.0			T3.4(B)
	k_c	=	1.0			
FEM ANALYSIS RESULTS						
Axial force	P	=	2.818	kN	*compression*	
	P	=	0	kN	*Tension*	
In plane moment	M_x	=	1.3461	kNm		
Out of plane moment	M_y	=	1.9626	kNm		
DESIGN STRESSES						
Gross cross section area	A_g	=	1092	mm^2		
In-plane elastic section modulus	Z_x	=	35622.6	mm^3		
Out-of-plane elastic section mod.	Z_y	=	25888.353	mm^3		
Stress from axial force	**f_a**	=	P/A_g			
		=	**2.58**	**MPa**	*compression*	
		=	**0.00**	**MPa**	*Tension*	

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Stress from in-plane bending	f_{bx}	=	M_x/Z_x			
		=	**37.79**	**MPa**	*compression*	
Stress from out-of-plane bending	f_{by}	=	M_y/Z_y			
		=	**75.81**	**MPa**	*compression*	
Tension						
3.4.3 *Tension in rectangular tubes*						
	ϕF_L	=	**228.95**	**MPa**		
		OR				
	ϕF_L	=	**222.70**	**MPa**		
COMPRESSION						
3.4.8 *Compression in columns, axial, gross section*						
1. General						… 3.4.8.1
Unsupported length of member	L	=	4060	mm		
Effective length factor	k	=	1			
Radius of gyration about buckling axis (Y)	r_y	=	28.39	mm		
Radius of gyration about buckling axis (X)	r_x	=	44.24	mm		
Slenderness ratio	kLb/ry	=	91.58			
Slenderness ratio	kL/rx	=	91.77			
Slenderness parameter	λ	=	1.71			
	D_c*	=	90.3			
	S_1*	=	0.33			
	S_2*	=	1.23			
	ϕ_{cc}	=	0.820			
Factored limit state stress	**ϕF_L**	**=**	**67.27**	**MPa**		
2. Sections not subject to torsional or torsional-flexural buckling						… 3.4.8.2
Largest slenderness ratio for flexural buckling	kL/r	**=**	91.77			
3.4.10 *Uniform compression in components of columns, gross section - flat plates*						
1. Uniform compression in components of columns, gross section - flat plates with both edges supported						… 3.4.10.1
	k_1	**=**	0.35			T3.3(D)

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Max. distance between toes of fillets of supporting elements for plate	b'	=	62			
	t	=	3	mm		
Slenderness	b/t	=	20.666667			
Limit 1	S_1	=	12.34			
Limit 2	S_2	=	32.87			
Factored limit state stress	**ϕF_L**	=	**205.58**	**MPa**		
Most adverse compressive limit state stress	F_a	=	67.27	MPa		
Most adverse tensile limit state stress	F_a	=	222.70	MPa		
Most adverse compressive & Tensile capacity factor	f_a/F_a	=	0.04		PASS	
BENDING - IN-PLANE						
***3.4.15** Compression in beams, extreme fibre, gross section rectangular tubes, box sections*						
Unbraced length for bending	L_b	=	2600	mm		
Second moment of area (weak axis)	I_y	=	880204	mm^4		
Torsion modulus	J	=	1906682.1	mm^3		
Elastic section modulus	Z	=	35622.6	mm^3		
Slenderness	S	=	142.99			
Limit 1	S_1	=	0.39			
Limit 2	S_2	=	1695.86			
Factored limit state stress	**ϕF_L**	=	**202.96**	**MPa**		… 3.4.15(2)
***3.4.17** Compression in components of beams (component under uniform compression), gross section - flat plates with both edges supported*						
	k_1	=	0.5			T3.3(D)
	k_2	=	2.04			T3.3(D)
Max. distance between toes of fillets of supporting elements for plate	b'	=	62	mm		
	t	=	3	mm		
Slenderness	b/t	=	20.666667			
Limit 1	S_1	=	12.34			

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Limit 2	S_2	=	46.95			
Factored limit state stress	**ϕF_L**	=	**205.58**	**MPa**		
Most adverse in-plane bending limit state stress	F_{bx}	=	202.96	MPa		
Most adverse in-plane bending capacity factor	f_{bx}/F_{bx}	=	0.19		PASS	
BENDING - OUT-OF-PLANE						
NOTE: Limit state stresses, ϕF_L are the same for out-of-plane bending (doubly symmetric section)						
Factored limit state stress	**ϕF_L**	=	**202.96**	**MPa**		
Most adverse out-of-plane bending limit state stress	**F_{by}**	=	202.96	MPa		
Most adverse out-of-plane bending capacity factor	**f_{by}/F_{by}**	=	0.37		PASS	
COMBINED ACTIONS						
4.1.1 *Combined compression and bending*						… 4.1.1(2)
	F_a	=	67.27	MPa		… 3.4.8
	F_{ao}	=	205.58	MPa		… 3.4.10
	F_{bx}	=	202.96	MPa		… 3.4.17
	F_{by}	=	202.96	MPa		… 3.4.17
	f_a/F_a	=	0.038			
Check:	$f_a/F_a + f_{bx}/F_{bx} + f_{by}/F_{by} \leq 1.0$					… 4.1.1 (3)
i.e.	0.60	≤	1.0		PASS	
SHEAR						
3.4.24 *Shear in webs (Major Axis)*						… 4.1.1(2)
Clear web height	h	=	114	mm		
	t	=	3	mm		
Slenderness	h/t	=	38			
Limit 1	S_1	=	29.01			
Limit 2	S_2	=	59.31			

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Factored limit state stress	ϕF_L	=	**122.00**	**MPa**
Stress From Shear force	f_{sx}	=	V/A_w	
			0.50	**MPa**
3.4.25 *Shear in webs (Minor Axis)*				
Clear web height	b	=	62	mm
	t	=	3	mm
Slenderness	b/t	=	20.666667	
Factored limit state stress	ϕF_L	=	**131.10**	**MPa**
Stress From Shear force	f_{sy}	=	V/A_w	
			3.86	**MPa**

6.4 Ridge & Eave Purlin

NAME	SYMBOL		VALUE	UNIT	NOTES	REF
85X102X2	**Ridge & Eave Purlin**					
Alloy and temper	6061-T6					AS1664.1
Tension	F_{tu}	=	262	MPa	*Ultimate*	T3.3(A)
	F_{ty}	=	241	MPa	*Yield*	
Compression	F_{cy}	=	241	MPa		
Shear	F_{su}	=	165	MPa	*Ultimate*	
	F_{sy}	=	138	MPa	*Yield*	
Bearing	F_{bu}	=	551	MPa	*Ultimate*	
	F_{by}	=	386	MPa	*Yield*	
Modulus of elasticity	E	=	70000	MPa	*Compressive*	
	k_t	=	1.0			T3.4(B)
	k_c	=	1.0			
FEM ANALYSIS RESULTS						
Axial force	P	=	0.672	kN	*compression*	
	P	=	0	kN	*Tension*	
In plane moment	M_x	=	1.0953	kNm		
Out of plane moment	M_y	=	1.105E-16	kNm		
DESIGN STRESSES						

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Gross cross section area	A_g	=	732	mm^2		
In-plane elastic section modulus	Z_x	=	20704.965	mm^3		
Out-of-plane elastic section mod.	Z_y	=	22820.471	mm^3		
Stress from axial force	$\mathbf{f_a}$	=	P/A_g			
		=	**0.92**	**MPa**	*compression*	
		=	**0.00**	**MPa**	*Tension*	
Stress from in-plane bending	$\mathbf{f_{bx}}$	=	M_x/Z_x			
		=	**52.90**	**MPa**	*compression*	
Stress from out-of-plane bending	$\mathbf{f_{by}}$	=	M_y/Z_y			
		=	**0.00**	**MPa**	*compression*	
Tension						
3.4.3 *Tension in rectangular tubes*						
	$\mathbf{\phi F_L}$	=	**228.95**	**MPa**		
		OR				
	$\mathbf{\phi F_L}$	=	**222.70**	**MPa**		
COMPRESSION						
3.4.8 *Compression in columns, axial, gross section*						
1. General						… 3.4.8.1
Unsupported length of member	L	=	5000	mm		
Effective length factor	k	=	1			
Radius of gyration about buckling axis (Y)	r_y	=	39.87	mm		
Radius of gyration about buckling axis (X)	r_x	=	34.67	mm		
Slenderness ratio	kLb/ry	=	125.39			
Slenderness ratio	kL/rx	=	144.21			
Slenderness parameter	λ	=	2.69			
	D_c*	=	90.3			
	S_1*	=	0.33			
	S_2*	=	1.23			
	ϕ_{cc}	=	0.950			
Factored limit state stress	$\mathbf{\phi F_L}$	=	**31.56**	**MPa**		
2. Sections not subject to torsional or torsional-flexural buckling						… 3.4.8.2

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Largest slenderness ratio for flexural buckling	kL/r	=	144.21			
3.4.10 *Uniform compression in components of columns, gross section - flat plates*						
1. Uniform compression in components of columns, gross section - flat plates with both edges supported						… 3.4.10.1
	k_1	=	0.35			T3.3(D)
Max. distance between toes of fillets of supporting elements for plate	b'	=	98			
	t	=	2	mm		
Slenderness	b/t	=	49			
Limit 1	S_1	=	12.34			
Limit 2	S_2	=	32.87			
Factored limit state stress	**ϕF_L**	=	**114.67**	**MPa**		
Most adverse compressive limit state stress	F_a	=	31.56	MPa		
Most adverse tensile limit state stress	F_a	=	222.70	MPa		
Most adverse compressive & Tensile capacity factor	f_a/F_a	=	0.03		PASS	
BENDING - IN-PLANE						
3.4.15 *Compression in beams, extreme fibre, gross section rectangular tubes, box sections*						
Unbraced length for bending	L_b	=	5000	mm		
Second moment of area (weak axis)	I_y	=	1163844	mm^4		
Torsion modulus	J	=	1505792.3	mm^3		
Elastic section modulus	Z	=	20704.965	mm^3		
Slenderness	S	=	156.40			
Limit 1	S_1	=	0.39			
Limit 2	S_2	=	1695.86			
Factored limit state stress	**ϕF_L**	=	**201.70**	**MPa**		… 3.4.15(2)

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3.4.17 *Compression in components of beams (component under uniform compression), gross section - flat plates with both edges supported*						
	k_1	=	0.5			T3.3(D)
	k_2	=	2.04			T3.3(D)
Max. distance between toes of fillets of supporting elements for plate	b'	=	98	mm		
	t	=	2	mm		
Slenderness	b/t	=	49			
Limit 1	S_1	=	12.34			
Limit 2	S_2	=	46.95			
Factored limit state stress	ϕF_L	=	**103.05**	**MPa**		
Most adverse in-plane bending limit state stress	F_{bx}	=	103.05	MPa		
Most adverse in-plane bending capacity factor	f_{bx}/F_{bx}	=	0.51		PASS	
BENDING - OUT-OF-PLANE						
NOTE: Limit state stresses, ϕF_L are the same for out-of-plane bending (doubly symmetric section)						
Factored limit state stress	ϕF_L	=	**103.05**	**MPa**		
Most adverse out-of-plane bending limit state stress	F_{by}	=	103.05	MPa		
Most adverse out-of-plane bending capacity factor	f_{by}/F_{by}	=	0.00		PASS	
COMBINED ACTIONS						
4.1.1 *Combined compression and bending*						… 4.1.1(2)
	F_a	=	31.56	MPa		… 3.4.8
	F_{ao}	=	114.67	MPa		… 3.4.10
	F_{bx}	=	103.05	MPa		… 3.4.17
	F_{by}	=	103.05	MPa		… 3.4.17
	f_a/F_a	=	0.029			
Check:	$f_a/F_a + f_{bx}/F_{bx} + f_{by}/F_{by} \leq 1.0$					… 4.1.1 (3)

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i.e.	0.54	≤	1.0		PASS	
SHEAR						
3.4.24 *Shear in webs (Major Axis)*						… 4.1.1(2)
Clear web height	h	=	81	mm		
	t	=	2	mm		
Slenderness	h/t	=	40.5			
Limit 1	S_1	=	29.01			
Limit 2	S_2	=	59.31			
Factored limit state stress	**ϕF_L**	=	**119.46**	**MPa**		
Stress From Shear force	**f_{sx}**	=	V/A_w			
			0.09	**MPa**		
3.4.25 *Shear in webs (Minor Axis)*						
Clear web height	b	=	98	mm		
	t	=	2	mm		
Slenderness	b/t	=	49			
Factored limit state stress	**ϕF_L**	=	**110.86**	**MPa**		
Stress From Shear force	**f_{sy}**	=	V/A_w			
			0.00	**MPa**		

6.5 Gable Beam

NAME	SYMBOL		VALUE	UNIT	NOTES	REF
85X102X2	**Gable Beam**					
Alloy and temper	6061-T6					AS1664.1
Tension	F_{tu}	=	262	MPa	*Ultimate*	T3.3(A)
	F_{ty}	=	241	MPa	*Yield*	
Compression	F_{cy}	=	241	MPa		
Shear	F_{su}	=	165	MPa	*Ultimate*	
	F_{sy}	=	138	MPa	*Yield*	
Bearing	F_{bu}	=	551	MPa	*Ultimate*	
	F_{by}	=	386	MPa	*Yield*	
Modulus of elasticity	E	=	70000	MPa	*Compressive*	
	k_t	=	1.0			T3.4(B)

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	k_c	=	1.0			
FEM ANALYSIS RESULTS						
Axial force	P	=	7.114	kN	*compression*	
	P	=	0	kN	*Tension*	
In plane moment	M_x	=	2.776E-17	kNm		
Out of plane moment	M_y	=	0.2196	kNm		
DESIGN STRESSES						
Gross cross section area	A_g	=	732	mm^2		
In-plane elastic section modulus	Z_x	=	20704.965	mm^3		
Out-of-plane elastic section mod.	Z_y	=	22820.471	mm^3		
Stress from axial force	$\mathbf{f_a}$	=	P/A_g			
		=	**9.72**	**MPa**	*compression*	
		=	**0.00**	**MPa**	*Tension*	
Stress from in-plane bending	$\mathbf{f_{bx}}$	=	M_x/Z_x			
		=	**0.00**	**MPa**	*compression*	
Stress from out-of-plane bending	$\mathbf{f_{by}}$	=	M_y/Z_y			
		=	**9.62**	**MPa**	*compression*	
Tension						
3.4.3 *Tension in rectangular tubes*						
	$\mathbf{\phi F_L}$	=	**228.95**	**MPa**		
		OR				
	$\mathbf{\phi F_L}$	=	**222.70**	**MPa**		
COMPRESSION						
3.4.8 *Compression in columns, axial, gross section*						
1. General						… 3.4.8.1
Unsupported length of member	L	=	4000	mm		
Effective length factor	k	=	1			
Radius of gyration about buckling axis (Y)	r_y	=	39.87	mm		
Radius of gyration about buckling axis (X)	r_x	=	34.67	mm		
Slenderness ratio	kLb/ry	=	100.32			
Slenderness ratio	kL/rx	=	115.37			
Slenderness parameter	λ	=	2.15			
	D_c*	=	90.3			

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	S_1*	=	0.33			
	S_2*	=	1.23			
	ϕ_{cc}	=	0.882			
Factored limit state stress	**ϕF_L**	**=**	**45.76**	**MPa**		
2. Sections not subject to torsional or torsional-flexural buckling						… 3.4.8.2
Largest slenderness ratio for flexural buckling	kL/r	=	115.37			
***3.4.10** Uniform compression in components of columns, gross section - flat plates*						
1. Uniform compression in components of columns, gross section - flat plates with both edges supported						… 3.4.10.1
	k_1	=	0.35			T3.3(D)
Max. distance between toes of fillets of supporting elements for plate	b'	=	98			
	t	=	2	mm		
Slenderness	b/t	=	49			
Limit 1	S_1	=	12.34			
Limit 2	S_2	=	32.87			
Factored limit state stress	**ϕF_L**	**=**	**114.67**	**MPa**		
Most adverse compressive limit state stress	F_a	=	45.76	MPa		
Most adverse tensile limit state stress	F_a	=	222.70	MPa		
Most adverse compressive & Tensile capacity factor	f_a/F_a	=	0.21		PASS	
BENDING - IN-PLANE						
***3.4.15** Compression in beams, extreme fibre, gross section rectangular tubes, box sections*						
Unbraced length for bending	L_b	=	4000	mm		
Second moment of area (weak axis)	I_y	=	1163844	mm^4		
Torsion modulus	J	=	1505792.3	mm^3		
Elastic section modulus	Z	=	20704.965	mm^3		
Slenderness	S	=	125.12			
Limit 1	S_1	=	0.39			

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Limit 2	S_2	=	1695.86			
Factored limit state stress	ϕF_L	=	**204.73**	**MPa**		… 3.4.15(2)
3.4.17 *Compression in components of beams (component under uniform compression), gross section - flat plates with both edges supported*						
	k_1	=	0.5			T3.3(D)
	k_2	=	2.04			T3.3(D)
Max. distance between toes of fillets of supporting elements for plate	b'	=	98	mm		
	t	=	2	mm		
Slenderness	b/t	=	49			
Limit 1	S_1	=	12.34			
Limit 2	S_2	=	46.95			
Factored limit state stress	ϕF_L	=	**103.05**	**MPa**		
Most adverse in-plane bending limit state stress	F_{bx}	=	103.05	MPa		
Most adverse in-plane bending capacity factor	f_{bx}/F_{bx}	=	0.00		PASS	
BENDING - OUT-OF-PLANE						
NOTE: Limit state stresses, ϕF_L are the same for out-of-plane bending (doubly symmetric section)						
Factored limit state stress	ϕF_L	=	**103.05**	**MPa**		
Most adverse out-of-plane bending limit state stress	F_{by}	=	103.05	MPa		
Most adverse out-of-plane bending capacity factor	f_{by}/F_{by}	=	0.09		PASS	
COMBINED ACTIONS						
4.1.1 *Combined compression and bending*						… 4.1.1(2)
	F_a	=	45.76	MPa		… 3.4.8
	F_{ao}	=	114.67	MPa		… 3.4.10
	F_{bx}	=	103.05	MPa		… 3.4.17
	F_{by}	=	103.05	MPa		… 3.4.17

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	f_a/F_a	=	0.212			
Check:	$f_a/F_a + f_{bx}/F_{bx} + f_{by}/F_{by} \leq 1.0$					… 4.1.1 (3)
i.e.	0.31	≤	1.0		PASS	
SHEAR						
3.4.24 *Shear in webs (Major Axis)*						… 4.1.1(2)
Clear web height	h	=	81	mm		
	t	=	2	mm		
Slenderness	h/t	=	40.5			
Limit 1	S_1	=	29.01			
Limit 2	S_2	=	59.31			
Factored limit state stress	**ϕF_L**	=	**119.46**	**MPa**		
Stress From Shear force	**f_{sx}**	=	V/A_w			
			0.11	**MPa**		
3.4.25 *Shear in webs (Minor Axis)*						
Clear web height	b	=	98	mm		
	t	=	2	mm		
Slenderness	b/t	=	49			
Factored limit state stress	**ϕF_L**	=	**110.86**	**MPa**		
Stress From Shear force	**f_{sy}**	=	V/A_w			
			0.25	**MPa**		

6.6 Intermediate Purlin

NAME	SYMBOL		VALUE	UNIT	NOTES	REF
60X60X2	**Intermediate Purlin**					
Alloy and temper	6061-T6					AS1664.1
Tension	F_{tu}	=	262	MPa	*Ultimate*	T3.3(A)
	F_{ty}	=	241	MPa	*Yield*	
Compression	F_{cy}	=	241	MPa		
Shear	F_{su}	=	165	MPa	*Ultimate*	
	F_{sy}	=	138	MPa	*Yield*	
Bearing	F_{bu}	=	551	MPa	*Ultimate*	

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	F_{by}	=	386	MPa	*Yield*	
Modulus of elasticity	E	=	70000	MPa	*Compressive*	
	k_t	=	1.0			T3.4(B)
	k_c	=	1.0			
FEM ANALYSIS RESULTS						
Axial force	P	=	0.799	kN	*compression*	
	P	=	0	kN	*Tension*	
In plane moment	M_x	=	1.1153	kNm		
Out of plane moment	M_y	=	0.0107	kNm		
DESIGN STRESSES						
Gross cross section area	A_g	=	464	mm^2		
In-plane elastic section modulus	Z_x	=	8681.9556	mm^3		
Out-of-plane elastic section mod.	Z_y	=	8681.9556	mm^3		
Stress from axial force	f_a	=	P/A_g			
		=	**1.72**	**MPa**	*compression*	
		=	**0.00**	**MPa**	*Tension*	
Stress from in-plane bending	f_{bx}	=	M_x/Z_x			
		=	**128.46**	**MPa**	*compression*	
Stress from out-of-plane bending	f_{by}	=	M_y/Z_y			
		=	**1.23**	**MPa**	*compression*	
Tension						
3.4.3 *Tension in rectangular tubes*						
	ϕF_L	=	**228.95**	**MPa**		
		O R				
	ϕF_L	=	**222.70**	**MPa**		
COMPRESSION						
3.4.8 *Compression in columns, axial, gross section*						
1. General						… 3.4.8.1
Unsupported length of member	L	=	5000	mm		
Effective length factor	k	=	1			
Radius of gyration about buckling axis (Y)	r_y	=	23.69	mm		

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Radius of gyration about buckling axis (X)	r_x	=	23.69	mm		
Slenderness ratio	kLb/ry	=	211.04			
Slenderness ratio	kL/rx	=	211.04			
Slenderness parameter	λ	=	3.94			
	D_c*	=	90.3			
	S_1*	=	0.33			
	S_2*	=	1.23			
	ϕ_{cc}	=	0.950			
Factored limit state stress	**ϕF_L**	**=**	**14.74**	**MPa**		
2. Sections not subject to torsional or torsional-flexural buckling						… 3.4.8.2
Largest slenderness ratio for flexural buckling	kL/r	**=**	211.04			
***3.4.10** Uniform compression in components of columns, gross section - flat plates*						
1. Uniform compression in components of columns, gross section - flat plates with both edges supported						… 3.4.10.1
	k_1	**=**	0.35			T3.3(D)
Max. distance between toes of fillets of supporting elements for plate	b'	**=**	56			
	t	**=**	2	mm		
Slenderness	b/t	**=**	28			
Limit 1	S_1	**=**	12.34			
Limit 2	S_2	**=**	32.87			
Factored limit state stress	**ϕF_L**	**=**	**185.00**	**MPa**		
Most adverse compressive limit state stress	F_a	**=**	14.74	MPa		
Most adverse tensile limit state stress	F_a	**=**	222.70	MPa		
Most adverse compressive & Tensile capacity factor	f_a/F_a	**=**	0.12		PASS	
BENDING - IN-PLANE						
***3.4.15** Compression in beams, extreme fibre, gross section rectangular tubes, box sections*						
Unbraced length for	L_b	=	5000	mm		

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bending						
Second moment of area (weak axis)	I_y	=	260458.67	mm^4		
Torsion modulus	J	=	390224	mm^3		
Elastic section modulus	Z	=	8681.9556	mm^3		
Slenderness	S	=	272.33			
Limit 1	S_1	=	0.39			
Limit 2	S_2	=	1695.86			
Factored limit state stress	**ϕF_L**	=	**192.53**	**MPa**		… 3.4.15(2)
3.4.17 *Compression in components of beams (component under uniform compression), gross section - flat plates with both edges supported*						
	k_1	**=**	0.5			T3.3(D)
	k_2	**=**	2.04			T3.3(D)
Max. distance between toes of fillets of supporting elements for plate	b'	**=**	56	mm		
	t	**=**	2	mm		
Slenderness	b/t	**=**	28			
Limit 1	S_1	=	12.34			
Limit 2	S_2	=	46.95			
Factored limit state stress	**ϕF_L**	=	**185.00**	**MPa**		
Most adverse in-plane bending limit state stress	F_{bx}	=	185.00	MPa		
Most adverse in-plane bending capacity factor	f_{bx}/F_{bx}	**=**	0.69		PASS	
BENDING - OUT-OF-PLANE						
NOTE: Limit state stresses, ϕF_L are the same for out-of-plane bending (doubly symmetric section)						
Factored limit state stress	**ϕF_L**	=	**185.00**	**MPa**		
Most adverse out-of-plane bending limit state stress	**F_{by}**	=	185.00	MPa		
Most adverse out-of-plane bending capacity factor	**f_{by}/F_{by}**	**=**	0.01		PASS	

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COMBINED ACTIONS						
4.1.1 *Combined compression and bending*						… 4.1.1(2)
	F_a	=	14.74	MPa		… 3.4.8
	F_{ao}	=	185.00	MPa		… 3.4.10
	F_{bx}	=	185.00	MPa		… 3.4.17
	F_{by}	=	185.00	MPa		… 3.4.17
	f_a/F_a	=	0.117			
Check:	$f_a/F_a + f_{bx}/F_{bx} + f_{by}/F_{by} \leq 1.0$					… 4.1.1 (3)
i.e.	0.82	≤	1.0		PASS	
SHEAR						
3.4.24 *Shear in webs (Major Axis)*						… 4.1.1(2)
Clear web height	h	=	56	mm		
	t	=	2	mm		
Slenderness	h/t	=	28			
Limit 1	S_1	=	29.01			
Limit 2	S_2	=	59.31			
Factored limit state stress	**ϕF_L**	=	**131.10**	**MPa**		
Stress From Shear force	**f_{sx}**	=	V/A_w			
			0.13	**MPa**		
3.4.25 *Shear in webs (Minor Axis)*						
Clear web height	b	=	56	mm		
	t	=	2	mm		
Slenderness	b/t	=	28			
Factored limit state stress	**ϕF_L**	=	**131.10**	**MPa**		
Stress From Shear force	**f_{sy}**	=	V/A_w			
			0.07	**MPa**		

6.7 Brace

NAME	SYMBOL	VALUE	UNIT	NOTES	REF
60X60X2	**Brace**				
Alloy and temper	6061-T6				AS1664.

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						1
Tension	F_{tu}	=	262	MPa	*Ultimate*	T3.3(A)
	F_{ty}	=	241	MPa	*Yield*	
Compression	F_{cy}	=	241	MPa		
Shear	F_{su}	=	165	MPa	*Ultimate*	
	F_{sy}	=	138	MPa	*Yield*	
Bearing	F_{bu}	=	551	MPa	*Ultimate*	
	F_{by}	=	386	MPa	*Yield*	
Modulus of elasticity	E	=	70000	MPa	*Compressive*	
	k_t	=	1.0			T3.4(B)
	k_c	=	1.0			
FEM ANALYSIS RESULTS						
Axial force	P	=	2.706	kN	*compression*	
	P	=	0	kN	*Tension*	
In plane moment	M_x	=	0	kNm		
Out of plane moment	M_y	=	0.0506	kNm		
DESIGN STRESSES						
Gross cross section area	A_g	=	464	mm^2		
In-plane elastic section modulus	Z_x	=	8681.9556	mm^3		
Out-of-plane elastic section mod.	Z_y	=	8681.9556	mm^3		
Stress from axial force	f_a	=	P/A_g			
		=	**5.83**	**MPa**	*compression*	
		=	**0.00**	**MPa**	*Tension*	
Stress from in-plane bending	f_{bx}	=	M_x/Z_x			
		=	**0.00**	**MPa**	*compression*	
Stress from out-of-plane bending	f_{by}	=	M_y/Z_y			
		=	**5.83**	**MPa**	*compression*	
Tension						
3.4.3 *Tension in rectangular tubes*						
	ϕF_L	=	**228.95**	**MPa**		
		OR				
	ϕF_L	=	**222.70**	**MPa**		
COMPRESSION						

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***3.4.8** Compression in columns, axial, gross section*

1. General … 3.4.8.1

Unsupported length of member	L	=	5640	mm
Effective length factor	k	=	1	
Radius of gyration about buckling axis (Y)	r_y	=	23.69	mm
Radius of gyration about buckling axis (X)	r_x	=	23.69	mm
Slenderness ratio	kLb/ry	=	238.05	
Slenderness ratio	kL/rx	=	238.05	
Slenderness parameter	λ	=	4.45	
	D_c*	=	90.3	
	S_1*	=	0.33	
	S_2*	=	1.23	
	ϕ_{cc}	=	0.950	
Factored limit state stress	**ϕF_L**	**=**	**11.58**	**MPa**

2. Sections not subject to torsional or torsional-flexural buckling … 3.4.8.2

Largest slenderness ratio for flexural buckling	kL/r	=	238.05	

***3.4.10** Uniform compression in components of columns, gross section - flat plates*

1. Uniform compression in components of columns, gross section - flat plates with both edges supported … 3.4.10.1

	k_1	=	0.35	T3.3(D)
Max. distance between toes of fillets of supporting elements for plate	b'	=	56	
	t	=	2	mm
Slenderness	b/t	=	28	
Limit 1	S_1	=	12.34	
Limit 2	S_2	=	32.87	
Factored limit state stress	**ϕF_L**	**=**	**185.00**	**MPa**

Most adverse compressive limit state stress	F_a	=	11.58	MPa
Most adverse tensile limit state stress	F_a	=	222.70	MPa

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Most adverse compressive & Tensile capacity factor	f_a/F_a	=	0.50		PASS	
BENDING - IN-PLANE						
***3.4.15** Compression in beams, extreme fibre, gross section rectangular tubes, box sections*						
Unbraced length for bending	L_b	=	5640	mm		
Second moment of area (weak axis)	I_y	=	260458.67	mm^4		
Torsion modulus	J	=	390224	mm^3		
Elastic section modulus	Z	=	8681.9556	mm^3		
Slenderness	S	=	307.19			
Limit 1	S_1	=	0.39			
Limit 2	S_2	=	1695.86			
Factored limit state stress	ϕF_L	=	**190.18**	**MPa**		… 3.4.15(2)
***3.4.17** Compression in components of beams (component under uniform compression), gross section - flat plates with both edges supported*						
	k_1	=	0.5			T3.3(D)
	k_2	=	2.04			T3.3(D)
Max. distance between toes of fillets of supporting elements for plate	b'	=	56	mm		
	t	=	2	mm		
Slenderness	b/t	=	28			
Limit 1	S_1	=	12.34			
Limit 2	S_2	=	46.95			
Factored limit state stress	ϕF_L	=	**185.00**	**MPa**		
Most adverse in-plane bending limit state stress	F_{bx}	=	185.00	MPa		
Most adverse in-plane bending capacity factor	f_{bx}/F_{bx}	=	0.00		PASS	
BENDING - OUT-OF-PLANE						
NOTE: Limit state stresses, ϕF_L are the same for out-of-plane bending (doubly symmetric section)						

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Factored limit state stress	ϕF_L	=	**185.00**	**MPa**		
Most adverse out-of-plane bending limit state stress	F_{by}	=	185.00	MPa		
Most adverse out-of-plane bending capacity factor	f_{by}/F_{by}	=	0.03		PASS	
COMBINED ACTIONS						
4.1.1 *Combined compression and bending*						… 4.1.1(2)
	F_a	=	11.58	MPa		… 3.4.8
	F_{ao}	=	185.00	MPa		… 3.4.10
	F_{bx}	=	185.00	MPa		… 3.4.17
	F_{by}	=	185.00	MPa		… 3.4.17
	f_a/F_a	=	0.504			
Check:	$f_a/F_a + f_{bx}/F_{bx} + f_{by}/F_{by} \leq 1.0$					… 4.1.1 (3)
i.e.	0.54	≤	1.0		PASS	
SHEAR						
3.4.24 *Shear in webs (Major Axis)*						… 4.1.1(2)
Clear web height	h	=	56	mm		
	t	=	2	mm		
Slenderness	h/t	=	28			
Limit 1	S_1	=	29.01			
Limit 2	S_2	=	59.31			
Factored limit state stress	ϕF_L	=	**131.10**	**MPa**		
Stress From Shear force	f_{sx}	=	V/A_w			
			0.13	**MPa**		
3.4.25 *Shear in webs (Minor Axis)*						
Clear web height	b	=	56	mm		
	t	=	2	mm		
Slenderness	b/t	=	28			
Factored limit state stress	ϕF_L	=	**131.10**	**MPa**		
Stress From Shear force	f_{sy}	=	V/A_w			
			0.08	**MPa**		

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7 Summary

7.1 Conclusions

a. The 12m x 15m Event Standard Tent structure as specified has been analyzed with a conclusion that it has the capacity to withstand wind speeds up to and including **80km/hr.**

b. For forecast winds in excess of **80km/hr** – all fabric shall be removed from the frames, and the structure should be completely dismantled.

c. Wall cross bracing as well as roof cable bracing are required at each end bay and every third bay in between to resist against lateral movement due to wind direction2.

d. For uplift due to 80km/hr, 4.5 kN (650kg) holding down weight/per leg for upright support is required.

e. For uplift due to 80km/hr, 3.5 kN (450kg) hold down weight/ per leg for gable pole is required.

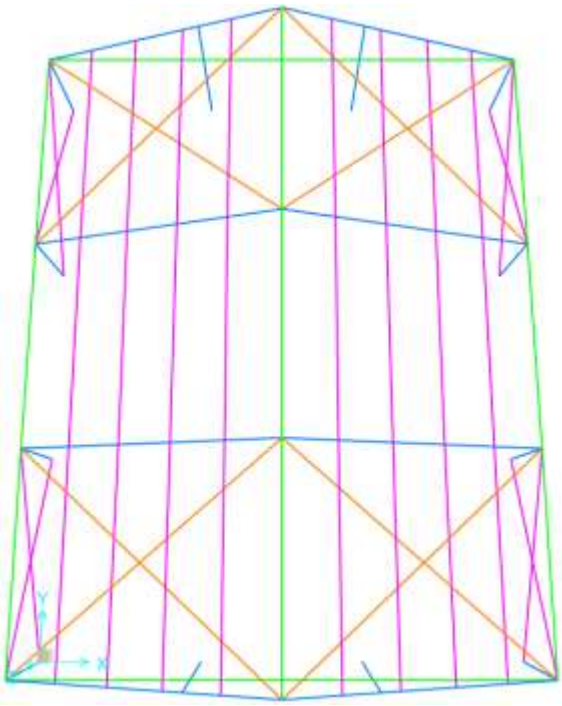
f. The bearing pressure of soil should be clarified and checked by an engineer prior to any construction for considering foundation and base plate.

g. Bracing Cables are required to have the minimum tensile strength (SWL) equal to 15kN.

h. It is important to use 60x60x2 profile for all intermediate purlins with spacing not exceeding 1300mm. This means 8 intermediate purlins are required per bay (as illustrated below).

i. It is important to use 120x68x3 profile for all gable poles.

MEMBER(S)	Section	b	d	t
		mm	mm	mm
Rafter	120X68X3	68	120	3
Upright Support	120X68X3	68	120	3
Gable Pole	120X68X3	68	120	3
Ridge & Eave Purlin	85X102X2	102	85	2
Gable Beam	85X102X2	102	85	2
Intermediate Purlin	60X60X2	60	60	2
Brace	60	60	60	2



Yours faithfully,

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8 Appendix A – Base Anchorage Requirements

12m x 12m Event Standard Tent:

Tent Span	Sile Type	Required Weight Per Leg
12 m	A	650kg
	B	650kg
	C	650kg
	D	650kg
	E	600kg
10 m	A	600kg
	B	600kg
	C	600kg
	D	600kg
	E	600kg
8 m	A	500kg
	B	500kg
	C	500kg
	D	500kg
	E	500kg
6 m	A	450kg
	B	450kg
	C	450kg
	D	450kg
	E	450kg

Definition of Soil Types:

Type A : Loose sand such as dunal sand. Uncompacted site filling may also be included in this soil type.

Type B : Medium to stiff clays or silty clays

Type C: Moderately compact sand or gravel eg. of alluvial origin.

Type D : Compact sand and gravel eg. Weathered sandstone or compacted quarry rubble hardstand

Type E : Concrete slab on ground. Number of dyna bolts and slab thickness to be designed.

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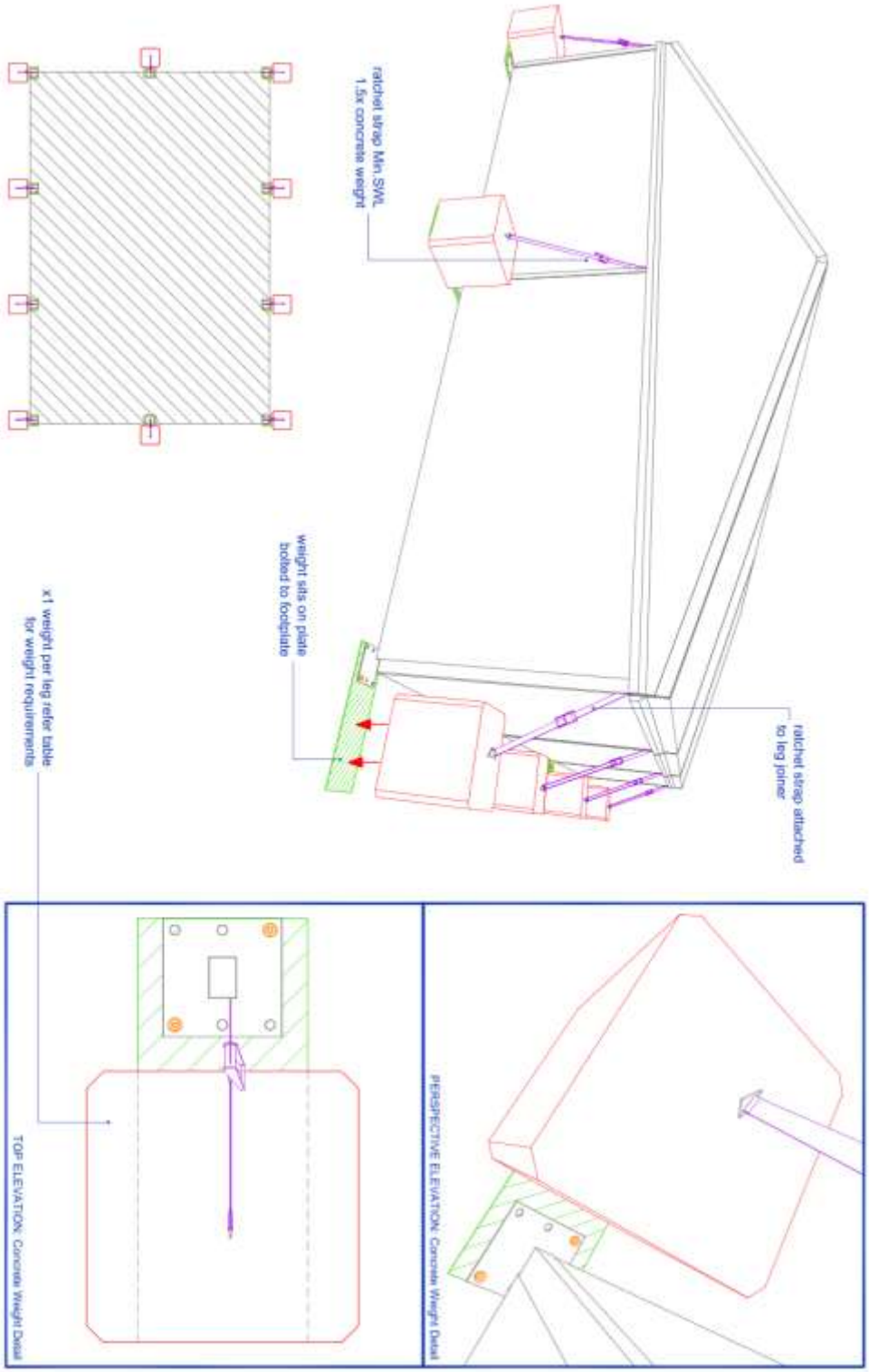
9 Appendix B – Hold Down Method Details



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