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Project No: 9467

Structural Engineers Calculations

For

Travelling Barn

Design Standards:

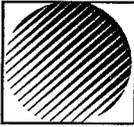
BS648 Weights

BS6399 Loads

BS5268 Timber

Designer's Guide To Wind Loading Of Building Structures

<u>Issue</u>	<u>Date</u>	<u>Documents</u>	<u>Issued</u>	<u>Reviewed</u>
Initial	27/01/2012	9467/1-11, Appendix A 1-7, Appendix B 1-4, Appendix C 1-6 & Appendix D 1-8	AWS	AJS



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PROJECT NO: 9467 SHEET NO: 1

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PROJECT: TRAVELLING BARN

Brief

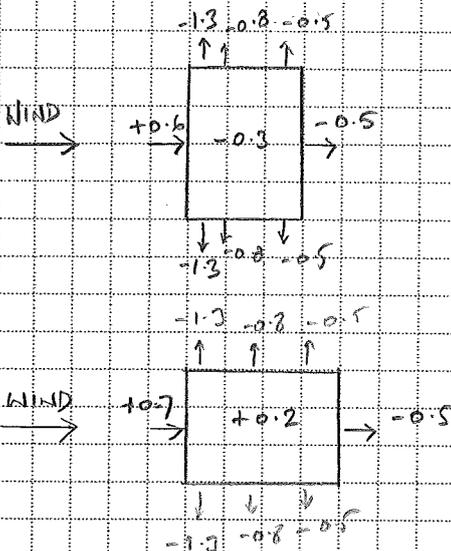
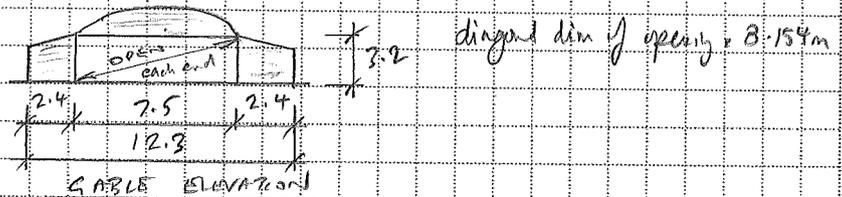
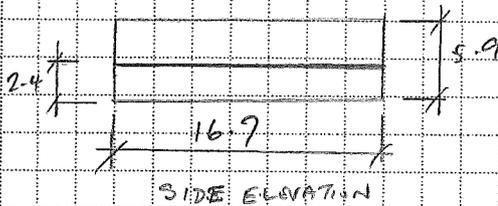
Structural assessment of timber framed demountable structure
part canvas clad as indicated on Gabriel Langlands Company
Drawings nos. 1, 2, 3 & 4.

Wind loading

Use recommendations of BS 6868 publication - Temporary Demountable Structures
Third Edition - limit max wind gust to 25 m/s @ 10m using Wind Action Plan
Max height = 5.9m $q = 0.328 \text{ kN/m}^2$ ($V_e = 23.14 \text{ m/s}$)
 q at side wall 2.4m high = 0.244 kN/m^2 ($V_e = 19.96 \text{ m/s}$)

Structure dimensions:-

Plan - 16.7m x 12.3m Height - 2.4m side walls Gable 5.9m max



$$D/H = \frac{12.3}{2.4} = 5.125 \quad b = 2.4 \times 2 = 4.8 \quad 0.2b = 0.96m$$

$$\text{Zone A} = -1.3 \quad \text{Zone B} = -0.8 \quad \text{Zone C} = -0.5$$

$$q_{\text{internal}} = 10 \times \sqrt[3]{881.93} = 95.9m \quad C_{pe} = 0.817$$

$$p_i = 0.328 \times 0.3 \times 0.817 = -0.08 \text{ kN/m}^2 + 0.05 \text{ kN/m}^2$$

Beneficial effect only; ignore

$$D/H = \frac{16.7}{5.9} = 2.83$$

Barrel-vault roof coefficients from BS 6399 Handbook

$$R/W = \frac{1.9}{7.5} = 0.25 \quad H/W = \frac{3.7}{7.5} = 0.5$$

$$a = -0.3 \quad b = -0.55 \quad c = -0.95 \quad d = -0.78 \quad e = -0.55 \quad f = -0.55$$
$$A = -1.4 \quad B = -2 \quad C = -0.9 \quad D = -0.38 \quad E = -0.2 \quad F = +0.2$$



PROJECT: Travelling Barn

Timber Hoop Design

b (mm)	d (mm)	Stength class	Service class	No. of members	Span (mm)	BMx-x (kNm)	Compression (kN)	Tension (kN)	Hole area (mm ²)
35	200	C24	2	1	8715	0	0.44	0	0

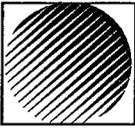
$\sigma_{m//}$ 7.50 N/mm ² K_2 1.00 K_3 1.75 K_7 1.0456 K_8 1.0 $\sigma_{m adm//}$ 13.72 N/mm ² Z 233.3 x10 ³ mm ³ $\sigma_{m all}$ 0.00 N/mm ² MR 3.202 kNm UF 0.000	$\sigma_{t//}$ 4.50 N/mm ² K_2 1.00 K_3 1.8 K_8 1.0 $\sigma_{t adm//}$ 7.88 N/mm ² A 7.00 x10E ³ mm ² A_{net} 7.00 x10E ³ mm ² $\sigma_{t all}$ 0.00 N/mm ² PT 55.13 kN UF 0.000	$\sigma_{c//}$ 7.90 N/mm ² K_{2comp} 1.00 $K_{2mod-elast}$ 1.00 K_3 1.75 K_8 1.0 K_9 or K_{28} 1.00 E_{mod} 7,200 N/mm ² $E/\sigma_{c//}$ 520.80 I_{xx} 2.333E+07 mm ⁴ I_{yy} 7.146E+05 mm ⁴ r_y 10.10 mm λ 862.56 K_{12} 0.0046 $\sigma_{c adm//}$ 0.06 N/mm ² $\sigma_{c all}$ 0.06 N/mm ² PC 0.45 kN σ_e 0.10 N/mm ² UF 0.987	<table border="1"> <tr> <td>Bmy-y (kNm)</td> </tr> <tr> <td>0.008</td> </tr> </table> $\sigma_{m//}$ 7.50 N/mm ² K_2 1.00 K_3 1.75 K_7 1.1700 K_8 1.0 $\sigma_{m adm//}$ 15.36 N/mm ² Z 40.8 x10 ³ mm ³ $\sigma_{m all}$ 0.20 N/mm ² MR 0.627 kNm UF 0.013	Bmy-y (kNm)	0.008
Bmy-y (kNm)					
0.008					

Combined bending & tension	0.013
Combined bending & compression	1.002

OK Bm not reduced

Note: Loads are total for combined members (5+ assumed to be load per member)

Provide 35x200 C24 @ 1100max c/c



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PROJECT: TRAVELLING BARN

Frame Loads - SIDE WIND - Refer to Appendix C for analysis

Eaves point load:-

LHS

RHS

Barrel-vault roof - Vertical - 2.152 kN ↑
Horizontal - 2.198 kN → ← 2.356 kN ↑
1.918 kN

Aisle roof - Vertical - 0.535 kN ↓
Horizontal - 0.29 kN → 0.642 kN ↑
1.345 kN →

END WIND - Refer to Appendix D for analysis

Eaves point load - $0.328 \times (0.7 + 0.5) \times 17.83/2 = 3.51 \text{ kN}$ (each side)

Wind suction from roof:-

Aisle roof Zone A - $0.328 \times -1.2 \times 2.73/2 \times \cos 28.44^\circ = -0.472 \text{ kN/m}$
Zone B - $0.328 \times -0.6 \times 2.73/2 \times \cos 28.44^\circ = -0.236 \text{ kN/m}$
Zone D - $0.328 \times -0.5 \times 2.73/2 \times \cos 28.44^\circ = -0.197 \text{ kN/m}$

Barrel vault roof Zone A/B = -1.94 kN/m
Zone C = -1.082 kN/m
Zone D = -0.445 kN/m
Zone E/F = -0.224 kN/m

} Refer to Appendix B for barrel vault loading



PROJECT: Travelling Barn

Timber Post Design (SIDEWIND WORST CASE)

b (mm)	d (mm)	Strength class	Service class	No. of members	Span (mm)	BMx-x (kNm)	Compression (kN)	Tension (kN)	Hole area (mm ²)
200	200	C16	2	1	2400	3.8	1.794	6.096	10000

$\sigma_{m//}$ 5.30 N/mm²
 K_2 1.00
 K_3 1.75
 K_7 1.0456
 K_8 1.0
 $\sigma_{m adm//}$ 9.70 N/mm²
 Z 1333.3 x10³ mm³
 $\sigma_{m all}$ 2.85 N/mm²
MR 12.931 kNm
UF 0.294

$\sigma_{//}$ 3.20 N/mm²
 K_2 1.00
 K_3 1.8
 K_8 1.0
 $\sigma_{t adm//}$ 5.60 N/mm²
 A 40.00 x10E³mm²
 A_{net} 30.00 x10E³mm²
 $\sigma_{t all}$ 0.20 N/mm²
PT 168.00 kN
UF 0.036

$\sigma_{c//}$ 6.80 N/mm²
 K_{2comp} 1.00
 $K_{2mod-elastic}$ 1.00
 K_3 1.75
 K_8 1.0
 K_9 or K_{28} 1.00
 E_{mod} 5,800 N/mm²
 $E/\sigma_{c//}$ 487.39
 I_{xx} 1.333E+08 mm⁴
 I_{yy} 1.333E+08 mm⁴
 r_y 57.74 mm
 λ 41.57
 K_{12} 0.9890
 $\sigma_{c adm//}$ 11.77 N/mm²
 $\sigma_{c all}$ 0.04 N/mm²
PC 470.76 kN
 σ_e 33.13 N/mm²
UF 0.004

Bmy-y (kNm)
0

$\sigma_{m//}$ 5.30 N/mm²
 K_2 1.00
 K_3 1.75
 K_7 1.0456
 K_8 1.0
 $\sigma_{m adm//}$ 9.70 N/mm²
 Z 1333.3 x10³ mm³
 $\sigma_{m all}$ 0.00 N/mm²
MR 12.931 kNm
UF 0.000

Combined bending & tension	0.330
Combined bending & compression	0.298

Note: Loads are total for combined members (5+ assumed to be load per member)

Provide 200x200 C16 Posts



PROJECT: Travelling Barn

Timber Horizontal Member Design (SIDE WIND WORST CASE)

b (mm)	d (mm)	Stength class	Service class	No. of members	Span (mm)	BMx-x (kNm)	Compression (kN)	Tension (kN)	Hole area (mm ²)
150	200	C16	2	1	7500	3.866	5.508	6.084	20000

$\sigma_{m//}$ 5.30 N/mm²
 K_2 1.00
 K_3 1.75
 K_7 1.0456
 K_8 1.0
 $\sigma_{m adm//}$ 9.70 N/mm²
 Z 1000.0 x10³ mm³
 $\sigma_{m all}$ 3.87 N/mm²
MR 9.698 kNm
UF 0.399

$\sigma_{t//}$ 3.20 N/mm²
 K_2 1.00
 K_3 1.8
 K_8 1.0
 $\sigma_{t adm//}$ 5.60 N/mm²
 A 30.00 x10E³mm²
 A_{net} 10.00 x10E³mm²
 $\sigma_{t all}$ 0.61 N/mm²
PT 56.00 kN
UF 0.109

$\sigma_{c//}$ 6.80 N/mm²
 K_{2comp} 1.00
 $K_{2mod- elast}$ 1.00
 K_3 1.75
 K_8 1.0
 K_9 or K_{28} 1.00
 E_{mod} 5,800 N/mm²
 $E/\sigma_{c//}$ 487.39
 I_{xx} 1.000E+08 mm⁴
 I_{yy} 5.625E+07 mm⁴
 r_y 43.30 mm
 λ 173.21
 K_{12} 0.1068
 $\sigma_{c adm//}$ 1.27 N/mm²
 $\sigma_{c all}$ 0.18 N/mm²
PC 38.14 kN
 σ_e 1.91 N/mm²
UF 0.144

Bmy-y (kNm)
0

$\sigma_{m//}$ 5.30 N/mm²
 K_2 1.00
 K_3 1.75
 K_7 1.0792
 K_8 1.0
 $\sigma_{m adm//}$ 10.01 N/mm²
 Z 750.0 x10³ mm³
 $\sigma_{m all}$ 0.00 N/mm²
MR 7.507 kNm
UF 0.000

Combined bending & tension	0.507
Combined bending & compression	0.549

Note: Loads are total for combined members (5+ assumed to be load per member)

~ Provide 150 x 200 C16 HORIZONTAL



PROJECT: Travelling Barn

Timber Brace Design

b (mm)	d (mm)	Stength class	Service class	No. of members	Span (mm)	BMx-x (kNm)	Compression (kN)	Tension (kN)	Hole area (mm ²)
100	200	C16	2	1	1700	0	7.35	6.084	6666.7

$\sigma_{m//}$ 5.30 N/mm²
 K_2 1.00
 K_3 1.75
 K_7 1.0456
 K_8 1.0
 $\sigma_{m adm//}$ 9.70 N/mm²
 Z 666.7 x10³ mm³
 $\sigma_{m all}$ 0.00 N/mm²
MR 6.465 kNm
UF 0.000

$\sigma_{//}$ 3.20 N/mm²
 K_2 1.00
 K_3 1.8
 K_8 1.0
 $\sigma_{t adm//}$ 5.60 N/mm²
 A 20.00 x10E³mm²
 A_{net} 13.33 x10E³mm²
 $\sigma_{t all}$ 0.46 N/mm²
PT 74.67 kN
UF 0.081

σ_{cl} 6.80 N/mm²
 K_{2comp} 1.00
 $K_{2mod-elastic}$ 1.00
 K_3 1.75
 K_8 1.0
 K_9 or K_{28} 1.00
 E_{mod} 5,800 N/mm²
 E/σ_{cl} 487.39
 I_{xx} 6.667E+07 mm⁴
 I_{yy} 1.667E+07 mm⁴
 r_y 28.87 mm
 λ 58.89
 K_{12} 0.8870
 $\sigma_{c adm//}$ 10.56 N/mm²
 $\sigma_{c all}$ 0.37 N/mm²
PC 211.10 kN
 σ_e 16.51 N/mm²
UF 0.035

Bmy-y (kNm)
0

$\sigma_{m//}$ 5.30 N/mm²
 K_2 1.00
 K_3 1.75
 K_7 1.1285
 K_8 1.0
 $\sigma_{m adm//}$ 10.47 N/mm²
 Z 333.3 x10³ mm³
 $\sigma_{m all}$ 0.00 N/mm²
MR 3.489 kNm
UF 0.000

Combined bending & tension	0.081
Combined bending & compression	0.035

Note: Loads are total for combined members (5+ assumed to be load per member)

Provide 100x200 DIAGONALS



PROJECT: Travelling Barn

Timber Wall Plate Design (END WIND WORST CASE)

b (mm)	d (mm)	Stength class	Service class	No. of members	Span (mm)	BMx-x (kNm)	Compression (kN)	Tension (kN)	Hole area (mm ²)
200	100	C16	2	1	1200	0.419	1.204		0

$\sigma_{m//}$ 5.30 N/mm²
 K_2 1.00
 K_3 1.75
 K_7 1.1285
 K_8 1.0
 $\sigma_{m adm//}$ 10.47 N/mm²
 Z 333.3 x10³ mm³
 $\sigma_{m all}$ 1.26 N/mm²
MR 3.489 kNm
UF 0.120

$\sigma_{t//}$ 3.20 N/mm²
 K_2 1.00
 K_3 1.8
 K_8 1.0
 $\sigma_{t adm//}$ 5.60 N/mm²
 A 20.00 x10E³mm²
 A_{net} 20.00 x10E³mm²
 $\sigma_{t all}$ 0.00 N/mm²
PT 112.00 kN
UF 0.000

$\sigma_{c//}$ 6.80 N/mm²
 K_{2comp} 1.00
 $K_{2mod-elast}$ 1.00
 K_3 1.75
 K_8 1.0
 K_9 or K_{28} 1.00
 E_{mod} 5,800 N/mm²
 $E/\sigma_{c//}$ 487.39
 I_{xx} 1.667E+07 mm⁴
 I_{yy} 6.667E+07 mm⁴
 r_y 57.74 mm
 λ 20.78
 K_{12} 0.9940
 $\sigma_{c adm//}$ 11.83 N/mm²
 $\sigma_{c all}$ 0.06 N/mm²
PC 236.58 kN
 σ_e 132.51 N/mm²
UF 0.005

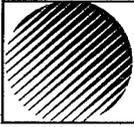
Bmy-y (kNm)

$\sigma_{m//}$ 5.30 N/mm²
 K_2 1.00
 K_3 1.75
 K_7 1.0456
 K_8 1.0
 $\sigma_{m adm//}$ 9.70 N/mm²
 Z 666.7 x10³ mm³
 $\sigma_{m all}$ 0.00 N/mm²
MR 6.465 kNm
UF 0.000

Combined bending & tension	0.120
Combined bending & compression	0.125

Note: Loads are total for combined members (5+ assumed to be load per member)

Provide 100x200 C16 WALL PLATE



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PROJECT: TRAVELLING BARN

POST FOUNDATIONS

Max compression = 1.058 kN

Max horizontal = 0.179 kN (Dead load)

Max uplift from wind = 2.11 kN

Max horizontal = 1.809 kN (with wind)

Beachy pressure under soil = $\frac{1.058}{0.4 \times 0.4} = 6.6 \text{ kN/m}^2 \leq dk$

Minimum kentledge req'd for uplift = $2.11 \times 1.5 = 3.1665 \text{ kN}$

\therefore Provide 325kg of kentledge to each post

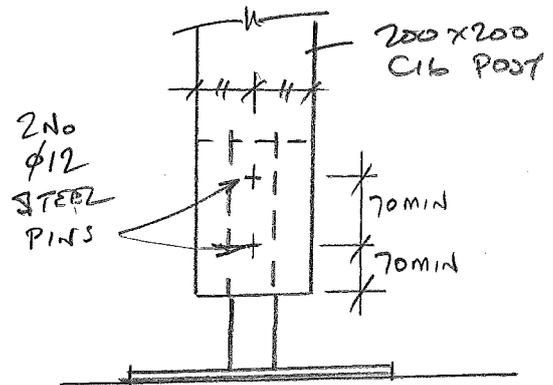


PROJECT: Travelling Barn

Post Base Pin Connection

Basic shear loads from BS5268 Appendix G

	Basic Shear	Basic Shear ⊥
Bolt diameter	M12	M12
t_1	95mm	38mm
t_2	95mm	63mm
Load duration	Short term	Short term
Bolt grade	4.6	4.6
Timber grade	C16	C16
Spacing parallel to grain	70mm	70mm
No of bolts in line	2	2
K_{2b}	1.33	1.33
K_{90}	1.53	1.53
M_{yd}	82944	82944
Angle to grain	0°	90°
α_{ij}	70mm	70mm
K_a	0.913	1.208
p_k	310	310
f_{h0d}	14.195	18.778
f_{had}	14.195	12.273
β	1	1
F_d	1400	1400
K_d	1.00	1.00
2 Member Joint		
Equation G.1	16182.05	5522.92
Equation G.2	16182.05	9278.50
Equation G.3	8914.75	4299.35
Equation G.4	6857.82	3984.24
Equation G.5	6857.82	4722.28
Equation G.6	5847.30	5437.12
Min	5847.30	3984.24
F	4.18	2.85
3 Member Joint		
Equation G.7	16182.05	5522.92
Equation G.8	8091.02	4639.25
Equation G.9	6857.82	3984.24
Equation G.10	5847.30	5437.12
Min	5847.30	3984.24
F	4.18	2.85
K_{46} (Steel to timber)	1.25	1
K_{56}	1	1
$K_{57} = 1-3x(2-1)/100 =$	0.97	0.97
Shear capacity per bolt	5.06	2.76



NOTE 325Kg of kentledge to be applied to each post!

$$5.06 \times 2 = 10.12 > 3.17 \text{ kN}$$

Therefore provide 2 no. 12mm diameter pins to baseplate/post connection

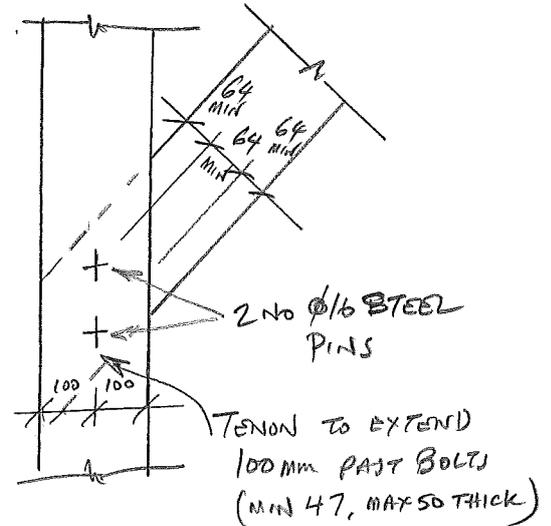


PROJECT: Travelling Barn

Diagonal Brace Pin Connection

Basic shear loads from BS5268 Appendix G

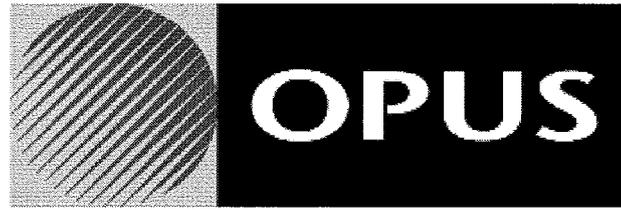
	Basic Shear	Basic Shear ⊥
Bolt diameter	M16	M16
t ₁	47mm	47mm
t ₂	47mm	47mm
Load duration	Short term	Short term
Bolt grade	4.6	4.6
Timber grade	C16	C16
Spacing parallel to grain	100mm	100mm
No of bolts in line	1	1
K _{2b}	1.33	1.33
K ₉₀	1.59	1.59
M _{yd}	196608	196608
Angle to grain	45°	45°
α _{fl}	100mm	100mm
K _a	1.010	1.010
p _k	310	310
f _{h0d}	14.998	14.998
f _{had}	11.581	11.581
β	1	1
F _d	1400	1400
K _d	1.00	1.00
2 Member Joint		
Equation G.1	8709.26	8709.26
Equation G.2	8709.26	8709.26
Equation G.3	4797.97	4797.97
Equation G.4	6785.00	6785.00
Equation G.5	6785.00	6785.00
Equation G.6	9389.66	9389.66
Min	4797.97	4797.97
F	3.43	3.43
3 Member Joint		
Equation G.7	8709.26	8709.26
Equation G.8	4354.63	4354.63
Equation G.9	6785.00	6785.00
Equation G.10	9389.66	9389.66
Min	4354.63	4354.63
F	3.11	3.11
K ₄₆ (Steel to timber)	1.25	1
K ₅₆	1	1
K ₅₇ = 1-3x(2-1)/100 =	1	1
Shear capacity per bolt	3.89	3.11



$3.11 \times 2 = 6.22 \text{ kN} > 6.08 \text{ kN}$

Therefore provide 2 no. 16mm diameter pins to each end of diagonal brace

NOTE HORIZONTAL TIE CONNECTION SIMILAR (MAX TENSION = 3.93 kN)



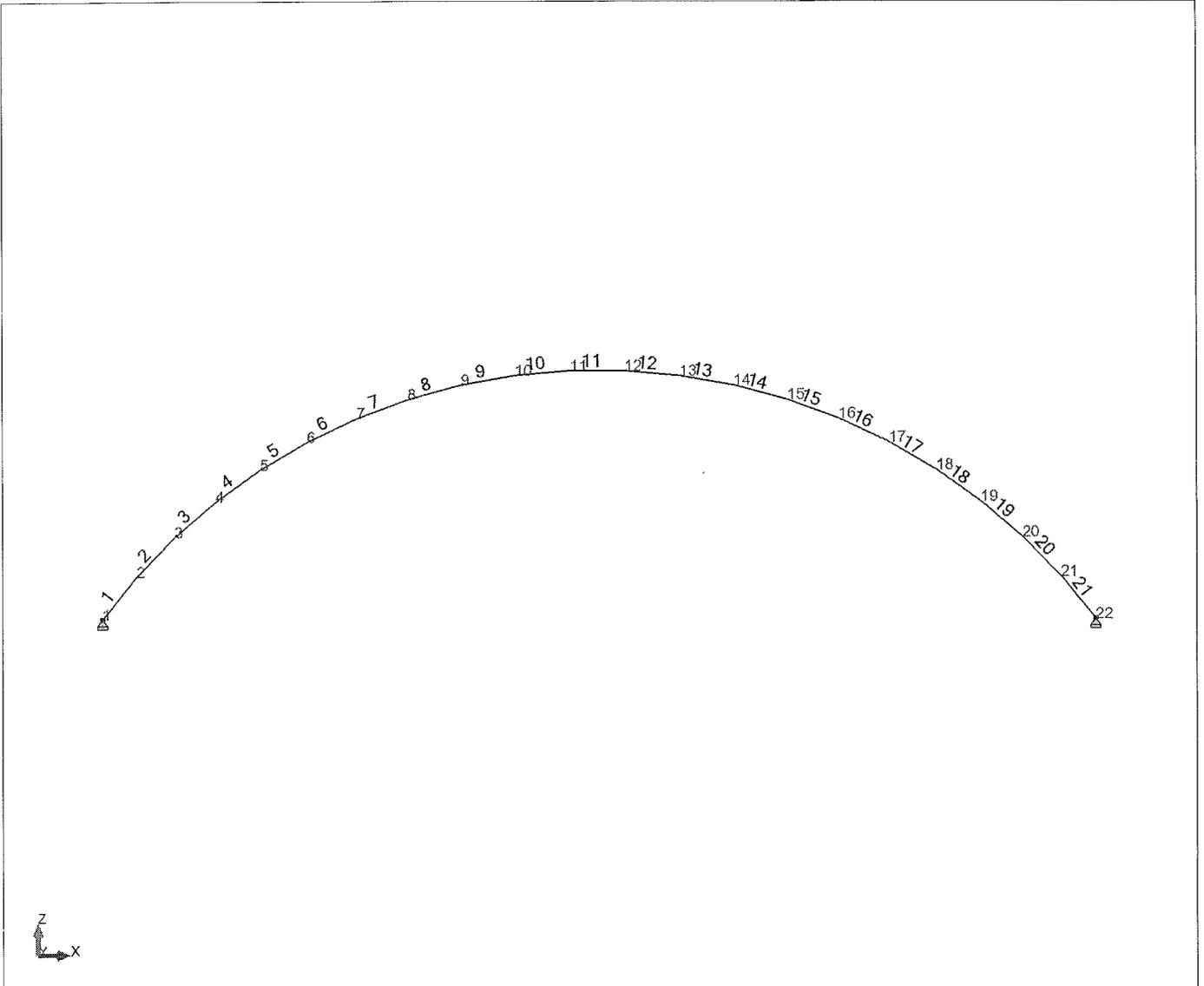
TITLE PAGE

Project: 9467 Travelling Barn - Hoop

APPENDIX A

Author : AWS

View - Cases: 7 (D+W3)



Nodes: Values: 1

Node	X (m)	Z (m)	Support code	Support
1	0.0	0.0	xxf	Pinned
2	0.260	0.324		
3	0.548	0.623		
4	0.862	0.895		
5	1.199	1.138		
6	1.556	1.350		
7	1.931	1.529		
8	2.320	1.675		
9	2.720	1.785		

Node	X (m)	Z (m)	Support code	Support
10	3.129	1.858		
11	3.542	1.895		
12	3.958	1.895		
13	4.371	1.858		
14	4.780	1.785		
15	5.180	1.675		
16	5.569	1.529		
17	5.944	1.350		
18	6.301	1.138		
19	6.638	0.895		
20	6.952	0.623		
21	7.240	0.324		
22	7.500	0.0	xxf	Pinned

Bars: Values: 1

Bar	Node 1	Node 2	Section	Material	Length (m)	Gamma (Deg)
1	1	2	RECT_181	TIMBER-C16	0.415	0.0
2	2	3	RECT_181	TIMBER-C16	0.415	0.0
3	3	4	RECT_181	TIMBER-C16	0.415	0.0
4	4	5	RECT_181	TIMBER-C16	0.415	0.0
5	5	6	RECT_181	TIMBER-C16	0.415	0.0
6	6	7	RECT_181	TIMBER-C16	0.415	0.0
7	7	8	RECT_181	TIMBER-C16	0.415	0.0
8	8	9	RECT_181	TIMBER-C16	0.415	0.0
9	9	10	RECT_181	TIMBER-C16	0.415	0.0
10	10	11	RECT_181	TIMBER-C16	0.415	0.0
11	11	12	RECT_181	TIMBER-C16	0.415	0.0
12	12	13	RECT_181	TIMBER-C16	0.415	0.0
13	13	14	RECT_181	TIMBER-C16	0.415	0.0
14	14	15	RECT_181	TIMBER-C16	0.415	0.0
15	15	16	RECT_181	TIMBER-C16	0.415	0.0
16	16	17	RECT_181	TIMBER-C16	0.415	0.0
17	17	18	RECT_181	TIMBER-C16	0.415	0.0
18	18	19	RECT_181	TIMBER-C16	0.415	0.0
19	19	20	RECT_181	TIMBER-C16	0.415	0.0
20	20	21	RECT_181	TIMBER-C16	0.415	0.0
21	21	22	RECT_181	TIMBER-C16	0.415	0.0

Properties: Bars: 1

Section name	Bar list	AX (cm ²)	AY (cm ²)	AZ (cm ²)	IX (cm ⁴)	IY (cm ⁴)
RECT_181	1to21	50.0	41.7	41.7	96.0	26.0

Section name	IZ (cm ⁴)	HY (mm)	HZ (mm)	VY (mm)	VZ (mm)	VPY (mm)	VPZ (mm)
RECT_181	1666.7	200.0	25.0	100.0	12.5	100.0	12.5

Loads - Cases: 1to4 : Values: 1

Case	Load type	List
1	self-weight	1to21
1	uniform load	1to21
2	uniform load	1to4
2	uniform load	5to7 15to21
2	trapezoidal load (2p)	8
2	trapezoidal load (2p)	8
2	uniform load	9 10
2	trapezoidal load (2p)	11
2	trapezoidal load (2p)	11
2	uniform load	12 13
2	trapezoidal load (2p)	14
2	trapezoidal load (2p)	14
3	uniform load	1to7 15to21
3	uniform load	9to13
3	trapezoidal load (2p)	8
3	trapezoidal load (2p)	14
3	trapezoidal load (2p)	8
3	trapezoidal load (2p)	14
4	uniform load	1to21

Case	Load values	Label
1	PZ Negative Factor=1.000	DL1
1	PZ=-0.009(kN/m)	DL1
2	PZ=0.162(kN/m) local	WIND1
2	PZ=0.298(kN/m) local	WIND1
2	PZ2=0.298(kN/m) PZ1=0.298(kN/m) X2=0.500 X1=0.0 local not project. relative	WIND1
2	PZ2=0.514(kN/m) PZ1=0.514(kN/m) X2=1.000 X1=0.500 local not project. relative	WIND1
2	PZ=0.514(kN/m) local	WIND1
2	PZ2=0.514(kN/m) PZ1=0.514(kN/m) X2=0.500 X1=0.0 local not project. relative	WIND1
2	PZ2=0.422(kN/m) PZ1=0.422(kN/m) X2=1.000 X1=0.500 local not project. relative	WIND1
2	PZ=0.422(kN/m) local	WIND1
2	PZ2=0.422(kN/m) PZ1=0.422(kN/m) X2=0.500 X1=0.0 local not project. relative	WIND1
2	PZ2=0.298(kN/m) PZ1=0.298(kN/m) X2=1.000 X1=0.500 local not project. relative	WIND1
3	PZ=0.564(kN/m) local	WIND2
3	PZ=0.580(kN/m) local	WIND2
3	PZ2=0.564(kN/m) PZ1=0.564(kN/m) X2=0.500 X1=0.0 local not project. relative	WIND2
3	PZ2=0.564(kN/m) PZ1=0.564(kN/m) X2=1.000 X1=0.500 local not project. relative	WIND2
3	PZ2=0.580(kN/m) PZ1=0.580(kN/m) X2=1.000 X1=0.500 local not project. relative	WIND2
3	PZ2=0.580(kN/m) PZ1=0.580(kN/m) X2=0.500 X1=0.0 local not project. relative	WIND2
4	PZ=-0.108(kN/m) local	WIND3

Load Combination - Cases: 5to7 : Values: 1

Combinations	Name	Analysis type	Combination type	Definition
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Combinations	Name	Analysis type	Combination type	Definition
5 (C)	D+W1	Linear Combination	SLS	(1+2)*1.000
6 (C)	D+W2	Linear Combination	SLS	(1+3)*1.000
7 (C)	D+W3	Linear Combination	SLS	(1+4)*1.000

Reactions in the coordinate system: global - Cases: 1to7 : Values: 1

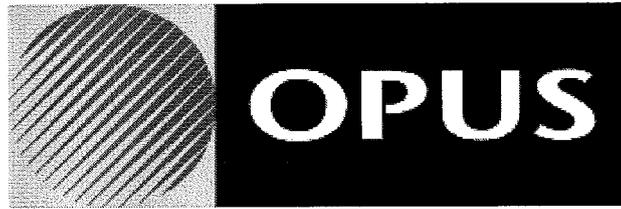
Node/Case	FX (kN)	FZ (kN)	MY (kNm)
1/ 1	0.105	0.118	-0.000
1/ 2	-1.204	-1.194	-0.000
1/ 3	-1.584	-2.135	0.000
1/ 4	0.298	0.405	0.000
1/ 5 (C)	-1.099	-1.076	-0.000
1/ 6 (C)	-1.479	-2.016	-0.000
1/ 7 (C)	0.403	0.523	-0.000
22/ 1	-0.105	0.118	-0.000
22/ 2	1.064	-1.296	-0.000
22/ 3	1.584	-2.135	-0.000
22/ 4	-0.298	0.405	-0.000
22/ 5 (C)	0.959	-1.178	-0.000
22/ 6 (C)	1.479	-2.016	-0.000
22/ 7 (C)	-0.403	0.523	-0.000
Case 1	DL1		
Sum of val.	-0.000	0.237	-0.000
Sum of reac.	-0.000	0.237	-0.888
Sum of forc.	0.000	-0.237	0.888
Check val.	-0.000	-0.000	-0.000
Precision	3.75110e-013	2.43641e-025	
Case 2	WIND1		
Sum of val.	-0.139	-2.490	-0.000
Sum of reac.	-0.139	-2.490	9.722
Sum of forc.	0.139	2.490	-9.722
Check val.	0.000	-0.000	0.000
Precision	1.18908e-012	1.10183e-024	
Case 3	WIND2		
Sum of val.	0.000	-4.269	-0.000
Sum of reac.	0.000	-4.269	16.010
Sum of forc.	-0.000	4.269	-16.010
Check val.	0.000	0.000	0.000
Precision	2.34331e-014	5.75001e-028	
Case 4	WIND3		
Sum of val.	0.000	0.810	0.000
Sum of reac.	0.000	0.810	-3.037

Node/Case	FX (kN)	FZ (kN)	MY (kNm)
Sum of forc.	0.000	-0.810	3.038
Check val.	0.000	0.000	0.000
Precision	1.90882e-014	2.07537e-028	
Case 5 (C)	D+W1		
Sum of val.	-0.139	-2.253	-0.000
Sum of reac.	-0.139	-2.253	8.834
Sum of forc.	0.139	2.253	-8.834
Check val.	0.000	-0.000	0.000
Precision	1.56419e-012	1.34547e-024	
Case 6 (C)	D+W2		
Sum of val.	-0.000	-4.033	-0.000
Sum of reac.	-0.000	-4.033	15.122
Sum of forc.	-0.000	4.033	-15.122
Check val.	-0.000	-0.000	-0.000
Precision	3.98543e-013	2.44216e-025	
Case 7 (C)	D+W3		
Sum of val.	-0.000	1.047	-0.000
Sum of reac.	-0.000	1.047	-3.925
Sum of forc.	0.000	-1.047	3.925
Check val.	-0.000	-0.000	-0.000
Precision	3.94198e-013	2.43849e-025	

Forces - Case: 7 (D+W3): Values: 1

Bar/Node/Case	Fx compression (kN)	Fx tension (kN)	FZ (kN)	MY (kNm)
1/ 1/ 7 (C)	0.660		0.014	-0.000
1/ 2/ 7 (C)	0.652		-0.038	-0.005
2/ 2/ 7 (C)	0.652		0.020	-0.005
2/ 3/ 7 (C)	0.644		-0.032	-0.007
3/ 3/ 7 (C)	0.645		0.025	-0.007
3/ 4/ 7 (C)	0.637		-0.028	-0.008
4/ 4/ 7 (C)	0.637		0.029	-0.008
4/ 5/ 7 (C)	0.631		-0.025	-0.007
5/ 5/ 7 (C)	0.630		0.031	-0.007
5/ 6/ 7 (C)	0.625		-0.023	-0.005
6/ 6/ 7 (C)	0.624		0.033	-0.005
6/ 7/ 7 (C)	0.619		-0.022	-0.003
7/ 7/ 7 (C)	0.619		0.033	-0.003
7/ 8/ 7 (C)	0.615		-0.023	-0.001
8/ 8/ 7 (C)	0.614		0.032	-0.001
8/ 9/ 7 (C)	0.611		-0.023	0.001
9/ 9/ 7 (C)	0.611		0.031	0.001
9/ 10/ 7 (C)	0.609		-0.025	0.002

Bar/Node/Case	Fx compression (kN)	Fx tension (kN)	FZ (kN)	MY (kNm)
10/ 10/ 7 (C)	0.609		0.030	0.002
10/ 11/ 7 (C)	0.608		-0.026	0.003
11/ 11/ 7 (C)	0.608		0.028	0.003
11/ 12/ 7 (C)	0.608		-0.028	0.003
12/ 12/ 7 (C)	0.608		0.026	0.003
12/ 13/ 7 (C)	0.609		-0.030	0.002
13/ 13/ 7 (C)	0.609		0.025	0.002
13/ 14/ 7 (C)	0.611		-0.031	0.001
14/ 14/ 7 (C)	0.611		0.023	0.001
14/ 15/ 7 (C)	0.614		-0.032	-0.001
15/ 15/ 7 (C)	0.615		0.023	-0.001
15/ 16/ 7 (C)	0.619		-0.033	-0.003
16/ 16/ 7 (C)	0.619		0.022	-0.003
16/ 17/ 7 (C)	0.624		-0.033	-0.005
17/ 17/ 7 (C)	0.625		0.023	-0.005
17/ 18/ 7 (C)	0.630		-0.031	-0.007
18/ 18/ 7 (C)	0.631		0.025	-0.007
18/ 19/ 7 (C)	0.637		-0.029	-0.008
19/ 19/ 7 (C)	0.637		0.028	-0.008
19/ 20/ 7 (C)	0.645		-0.025	-0.007
20/ 20/ 7 (C)	0.644		0.032	-0.007
20/ 21/ 7 (C)	0.652		-0.020	-0.005
21/ 21/ 7 (C)	0.652		0.038	-0.005
21/ 22/ 7 (C)	0.660		-0.014	0.000



TITLE PAGE

Project: 9467 Travelling Barn - Hoop-1

APPENDIX B

BARREL VAULT ROOF LOADING

Author : AWS

Nodes: Values: 1

Node	X (m)	Z (m)	Support code	Support
1	0.0	0.0	xxf	Pinned
2	0.260	0.324		
3	0.548	0.623		
4	0.862	0.895		
5	1.199	1.138		
6	1.556	1.350		
7	1.931	1.529		
8	2.320	1.675		
9	2.720	1.785		
10	3.129	1.858		
11	3.542	1.895		
12	3.958	1.895		
13	4.371	1.858		
14	4.780	1.785		
15	5.180	1.675		
16	5.569	1.529		
17	5.944	1.350		
18	6.301	1.138		
19	6.638	0.895		
20	6.952	0.623		
21	7.240	0.324		
22	7.500	0.0	xxf	Pinned

Bars: Values: 1

Bar	Node 1	Node 2	Section	Material	Length (m)	Gamma (Deg)
1	1	2	RECT_181	TIMBER-C16	0.415	0.0
2	2	3	RECT_181	TIMBER-C16	0.415	0.0
3	3	4	RECT_181	TIMBER-C16	0.415	0.0
4	4	5	RECT_181	TIMBER-C16	0.415	0.0
5	5	6	RECT_181	TIMBER-C16	0.415	0.0
6	6	7	RECT_181	TIMBER-C16	0.415	0.0
7	7	8	RECT_181	TIMBER-C16	0.415	0.0
8	8	9	RECT_181	TIMBER-C16	0.415	0.0
9	9	10	RECT_181	TIMBER-C16	0.415	0.0
10	10	11	RECT_181	TIMBER-C16	0.415	0.0
11	11	12	RECT_181	TIMBER-C16	0.415	0.0
12	12	13	RECT_181	TIMBER-C16	0.415	0.0
13	13	14	RECT_181	TIMBER-C16	0.415	0.0
14	14	15	RECT_181	TIMBER-C16	0.415	0.0
15	15	16	RECT_181	TIMBER-C16	0.415	0.0
16	16	17	RECT_181	TIMBER-C16	0.415	0.0
17	17	18	RECT_181	TIMBER-C16	0.415	0.0
18	18	19	RECT_181	TIMBER-C16	0.415	0.0

Bar	Node 1	Node 2	Section	Material	Length (m)	Gamma (Deg)
19	19	20	RECT_181	TIMBER-C16	0.415	0.0
20	20	21	RECT_181	TIMBER-C16	0.415	0.0
21	21	22	RECT_181	TIMBER-C16	0.415	0.0

Properties: Bars: 1

Section name	Bar list	AX (cm ²)	AY (cm ²)	AZ (cm ²)	IX (cm ⁴)	IY (cm ⁴)
RECT_181	1to21	50.0	41.7	41.7	96.0	26.0

Section name	IZ (cm ⁴)	HY (mm)	HZ (mm)	VY (mm)	VZ (mm)	VPY (mm)	VPZ (mm)
RECT_181	1666.7	200.0	25.0	100.0	12.5	100.0	12.5

Loads - Cases: 1to4 : Values: 1

Case	Load type	List	Load values	Label
1	uniform load	1to21	PZ=-0.005(kN/m)	DL1
2	uniform load	1to7 15to21	PZ=0.459(kN/m) local	WIND1
2	uniform load	9to13	PZ=0.656(kN/m) local	WIND1
2	trapezoidal load (2p)	8	PZ2=0.459(kN/m) PZ1=0.459(kN/m) X2=0.500 X1=0.- 0 local not project. relative	WIND1
2	trapezoidal load (2p)	8	PZ2=0.656(kN/m) PZ1=0.656(kN/m) X2=1.000 X1=0.- 500 local not project. relative	WIND1
2	trapezoidal load (2p)	14	PZ2=0.656(kN/m) PZ1=0.656(kN/m) X2=0.500 X1=0.- 0 local not project. relative	WIND1
2	trapezoidal load (2p)	14	PZ2=0.459(kN/m) PZ1=0.459(kN/m) X2=1.000 X1=0.- 500 local not project. relative	WIND1
3	uniform load	1to21	PZ=0.295(kN/m) local	WIND2
4	uniform load	1to21	PZ=0.125(kN/m) local	WIND3

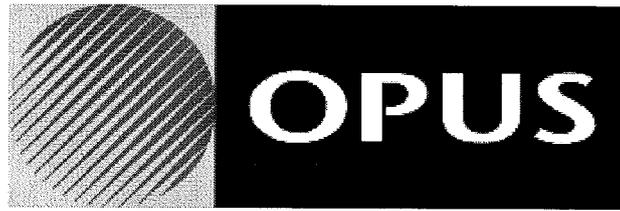
Load Combination - Cases: 5to7 : Values: 1

Combinations	Name	Analysis type	Combination type	Definition
9 (C)	Wind A-B	Linear Combination	SLS	(1+2)*1.000
10 (C)	Wind C	Linear Combination	SLS	(1+3)*1.000
11 (C)	Wind D	Linear Combination	SLS	(1+4)*1.000
12 (C)	Wind E-F	Linear Combination	SLS	(1+5)*1.000

Reactions in the coordinate system: global - Cases: 9to12 : Values: 1

Node/Case	FX (kN)	FZ (kN)	MY (kNm)	Case name
1/ 9 (C)	-1.586	-1.940	0.000	Wind A-B
1/ 10 (C)	-0.793	-1.082	-0.000	Wind C
1/ 11 (C)	-0.324	-0.445	-0.000	Wind D
1/ 12 (C)	-0.161	-0.224	0.000	Wind E-F
22/ 9 (C)	1.586	-1.940	0.000	Wind A-B

Node/Case	FX (kN)	FZ (kN)	MY (kNm)	Case name
22/ 10 (C)	0.793	-1.082	0.000	Wind C
22/ 11 (C)	0.324	-0.445	-0.000	Wind D
22/ 12 (C)	0.161	-0.224	0.000	Wind E-F
Case 9 (C)	Wind A-B			
Sum of val.	0.000	-3.879	0.000	
Sum of reac.	0.000	-3.879	14.547	
Sum of forc.	0.000	3.879	-14.547	
Check val.	0.000	0.000	0.000	
Precision	1.03744e-012	4.67075e-025		
Case 10 (C)	Wind C			
Sum of val.	-0.000	-2.165	0.000	
Sum of reac.	-0.000	-2.165	8.117	
Sum of forc.	-0.000	2.165	-8.117	
Check val.	-0.000	-0.000	-0.000	
Precision	4.78595e-013	2.22596e-025		
Case 11 (C)	Wind D			
Sum of val.	-0.000	-0.890	-0.000	
Sum of reac.	-0.000	-0.890	3.336	
Sum of forc.	0.000	0.890	-3.336	
Check val.	-0.000	-0.000	-0.000	
Precision	4.80773e-013	2.22650e-025		
Case 12 (C)	Wind E-F			
Sum of val.	-0.000	-0.447	0.000	
Sum of reac.	-0.000	-0.447	1.676	
Sum of forc.	0.000	0.447	-1.676	
Check val.	-0.000	-0.000	-0.000	
Precision	4.76773e-013	2.22552e-025		



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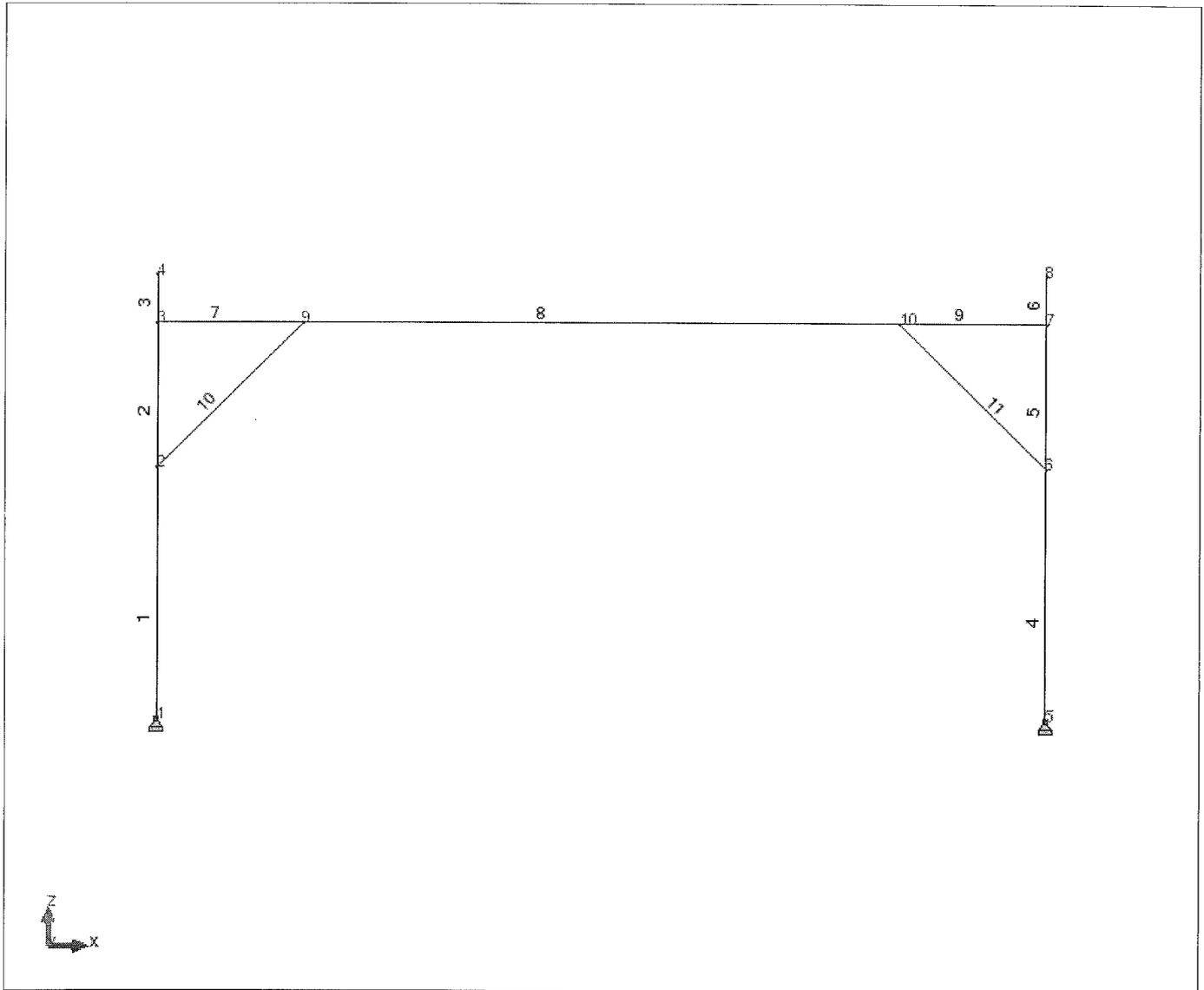
Project: 9467 Travelling Barn - Timber Frame

APPENDIX C

BARN FRAMEWORK SIDE WIND

Author : AWS

View



Nodes: Values: 1

Node	X (m)	Z (m)	Support code	Support
1	0.0	0.0	xxf	Pinned
2	0.0	2.100		
3	0.0	3.300		
4	0.0	3.700		
5	7.300	0.0	xxf	Pinned
6	7.300	2.100		
7	7.300	3.300		
8	7.300	3.700		
9	1.200	3.300		

10 6.100 3.300

Bars: Values: 1

Bar	Node 1	Node 2	Section	Material	Length (m)	Gamma (Deg)
1	1	2	RECT_200x200	TIMBER-C16	2.100	0.0
2	2	3	RECT_200x200	TIMBER-C16	1.200	0.0
3	3	4	RECT_200x200	TIMBER-C16	0.400	0.0
4	5	6	RECT_200x200	TIMBER-C16	2.100	0.0
5	6	7	RECT_200x200	TIMBER-C16	1.200	0.0
6	7	8	RECT_200x200	TIMBER-C16	0.400	0.0
7	3	9	RECT_150x200	TIMBER-C16	1.200	0.0
8	9	10	RECT_150x200	TIMBER-C16	4.900	0.0
9	10	7	RECT_150x200	TIMBER-C16	1.200	0.0
10	2	9	RECT_100x200	TIMBER-C16	1.697	0.0
11	6	10	RECT_100x200	TIMBER-C16	1.697	0.0

Properties: Bars: 1

Section name	Bar list	AX (cm2)	AY (cm2)	AZ (cm2)	IX (cm4)	IY (cm4)
RECT_100x200	10 11	200.0	166.7	166.7	4573.7	6666.7
RECT_150x200	7to9	300.0	250.0	250.0	12181.2	10000.0
RECT_200x200	1to6	400.0	333.3	333.3	22493.3	13333.3

Section name	IZ (cm4)	HY (mm)	HZ (mm)	VY (mm)	VZ (mm)	VPY (mm)	VPZ (mm)
RECT_100x200	1666.7	100.0	200.0	50.0	100.0	50.0	100.0
RECT_150x200	5625.0	150.0	200.0	75.0	100.0	75.0	100.0
RECT_200x200	13333.3	200.0	200.0	100.0	100.0	100.0	100.0

Loads - Cases: 1 2 : Values: 1

Case	Load type	List	Load values	Label
1	self-w eight	1to11	PZ Negative Factor=1.000	DL1
2	nodal force	4	FX=2.488(kN) FZ=1.617(kN)	WIND1
2	nodal force	8	FX=0.573(kN) FZ=2.998(kN)	WIND1

Load Combination - Case: 3 (COMB1): Values: 1

Combinations	Name	Analysis type	Combination type	Definition
3 (C)	COMB1	Linear Combination	SLS	(1+2)*1.000

Reactions in the coordinate system: global - Cases: 1to3 : Values: 1

Node/Case	FX (kN)	FZ (kN)	MY (kNm)
1/1	0.179	1.058	0.000

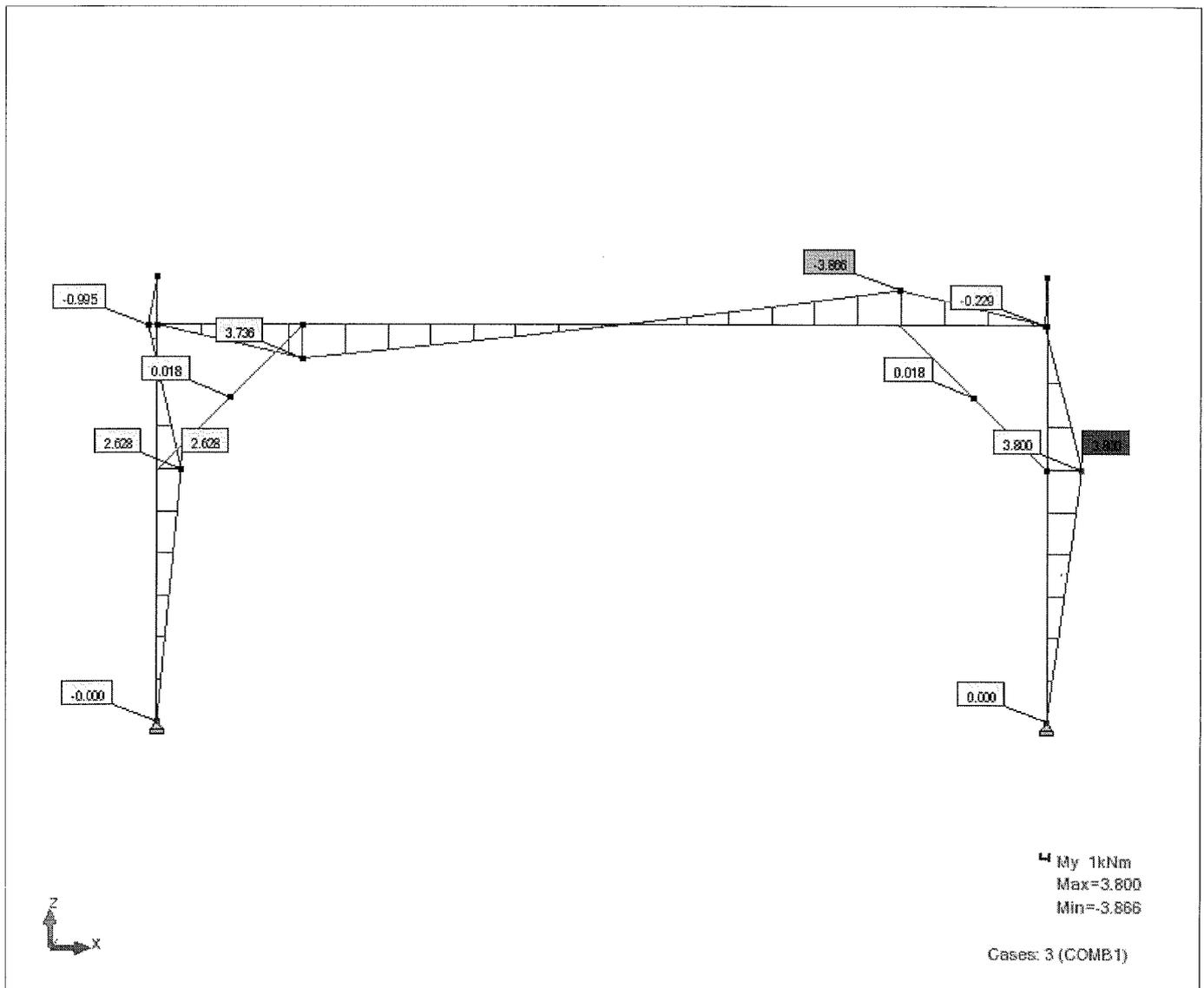
Node/Case	FX (kN)	FZ (kN)	MY (kNm)
1/ 2	-1.431	-3.168	-0.000
1/ 3 (C)	-1.252	-2.111	-0.000
5/ 1	-0.179	1.058	0.000
5/ 2	-1.630	-1.447	0.000
5/ 3 (C)	-1.809	-0.389	0.000
Case 1	DL1		
Sum of val.	0.000	2.116	0.000
Sum of reac.	0.000	2.116	-7.723
Sum of forc.	-0.000	-2.116	7.723
Check val.	0.000	-0.000	0.000
Precision	4.52890e-011	1.39975e-021	
Case 2	WIND1		
Sum of val.	-3.061	-4.615	0.000
Sum of reac.	-3.061	-4.615	10.560
Sum of forc.	3.061	4.615	-10.560
Check val.	0.000	-0.000	0.000
Precision	1.44690e-009	1.55110e-017	
Case 3 (C)	COMB1		
Sum of val.	-3.061	-2.499	0.000
Sum of reac.	-3.061	-2.499	2.837
Sum of forc.	3.061	2.499	-2.837
Check val.	0.000	-0.000	0.000
Precision	1.49219e-009	1.55124e-017	

Forces - Case: 3 (COMB1): Values: 1

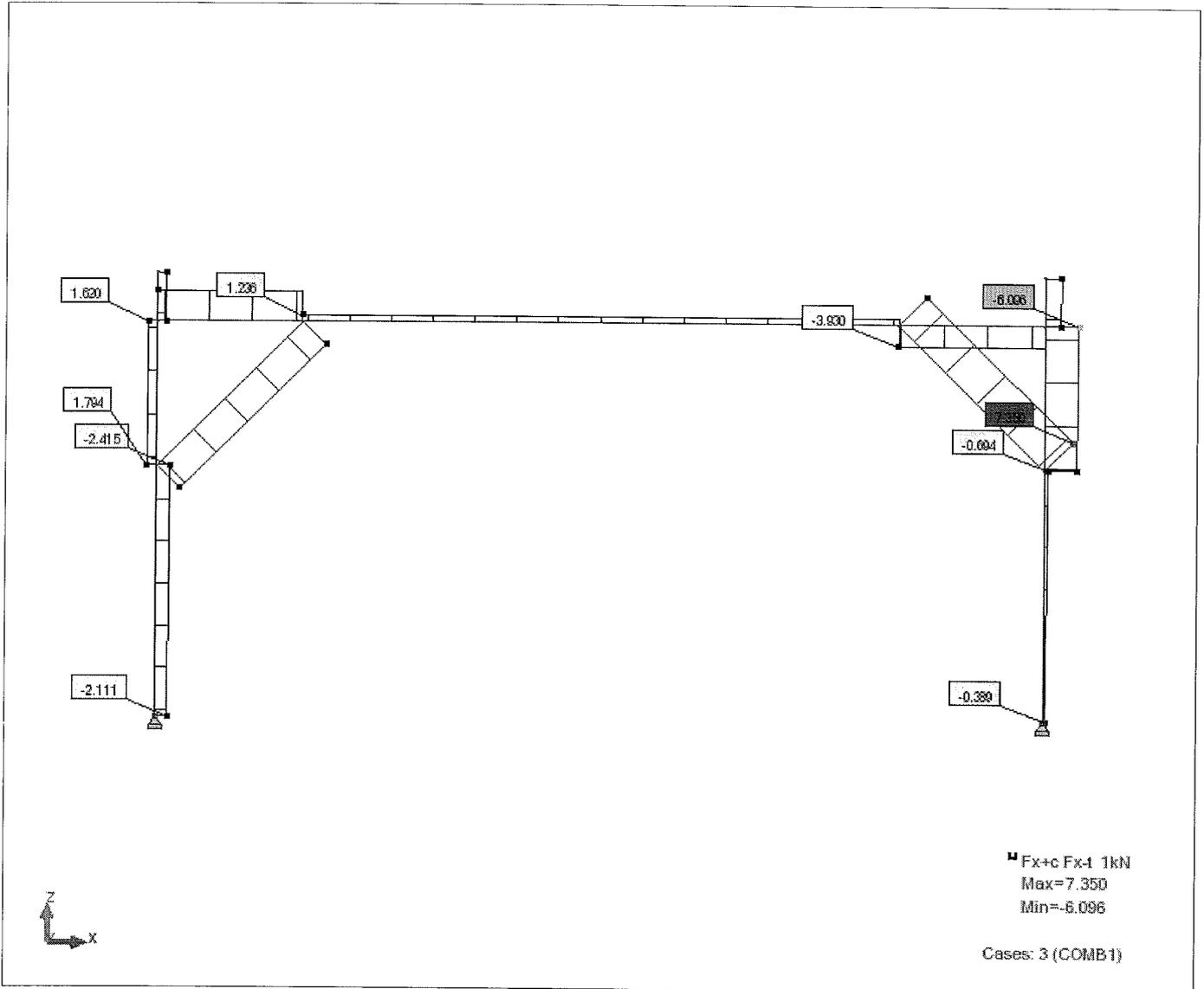
Bar/Point (m)/Case	Fx compression (kN)	Fx tension (kN)	FZ (kN)	MY (kNm)
1/ origin (1)/ 3 (C)		-2.111	1.252	-0.000
1/ end (2)/ 3 (C)		-2.415	1.252	2.628
2/ origin (2)/ 3 (C)	1.794		-3.020	2.628
2/ end (3)/ 3 (C)	1.620		-3.020	-0.995
3/ origin (3)/ 3 (C)		-1.559	2.488	-0.995
3/ end (4)/ 3 (C)		-1.617	2.488	0.000
4/ origin (5)/ 3 (C)		-0.389	1.809	0.000
4/ end (6)/ 3 (C)		-0.694	1.809	3.800
5/ origin (6)/ 3 (C)		-5.922	-3.357	3.800
5/ end (7)/ 3 (C)		-6.096	-3.357	-0.229
6/ origin (7)/ 3 (C)		-2.940	0.573	-0.229
6/ end (8)/ 3 (C)		-2.998	0.573	-0.000
7/ origin (3)/ 3 (C)	5.508		3.179	0.000
7/ end (9)/ 3 (C)	5.508		3.048	3.736
8/ origin (9)/ 3 (C)	1.236		-1.285	3.736
8/ end (10)/ 3 (C)	1.236		-1.818	-3.866

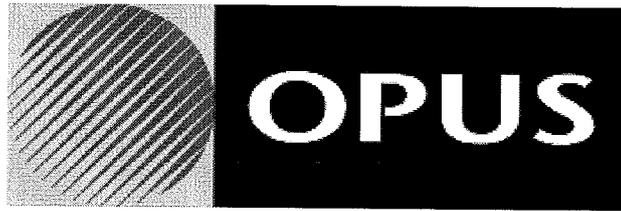
Bar/Point (m)/Case	Fx compression (kN)	Fx tension (kN)	FZ (kN)	MY (kNm)
9/ origin (10)/ 3 (C)		-3.930	3.287	-3.866
9/ end (7)/ 3 (C)		-3.930	3.156	-0.000
10/ origin (2)/ 3 (C)		-5.997	0.044	0.000
10/ end (9)/ 3 (C)		-6.084	-0.044	-0.000
11/ origin (6)/ 3 (C)	7.350		0.044	-0.000
11/ end (10)/ 3 (C)	7.263		-0.044	0.000

View - MY, Cases: 3 (COMB1)



View - FX, Cases: 3 (COMB1)





TITLE PAGE

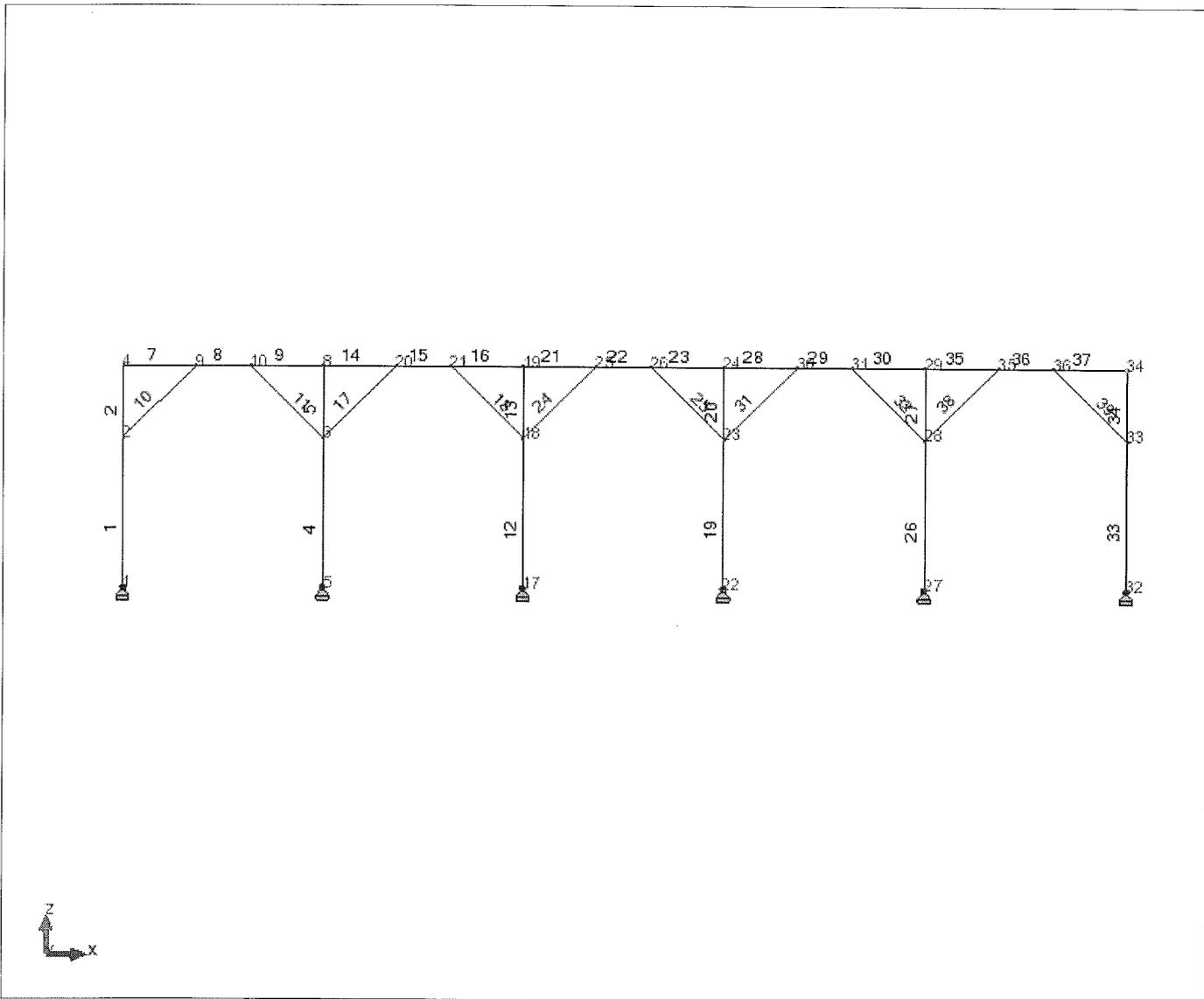
Project: 9467 Travelling Barn - Timber Frame-1

APPENDIX D

BARN FRAMEWORK END WIND

Author : AWS

View



Nodes: Values: 1

Node	X (m)	Z (m)	Support code	Support
1	0.0	0.0	xxf	Pinned
2	0.0	2.500		
4	0.0	3.700		
5	3.300	0.0	xxf	Pinned
6	3.300	2.500		
8	3.300	3.700		
9	1.200	3.700		
10	2.100	3.700		
17	6.600	0.0	xxf	Pinned

Node	X (m)	Z (m)	Support code	Support
18	6.600	2.500		
19	6.600	3.700		
20	4.500	3.700		
21	5.400	3.700		
22	9.900	0.0	xxf	Pinned
23	9.900	2.500		
24	9.900	3.700		
25	7.800	3.700		
26	8.700	3.700		
27	13.200	0.0	xxf	Pinned
28	13.200	2.500		
29	13.200	3.700		
30	11.100	3.700		
31	12.000	3.700		
32	16.500	0.0	xxf	Pinned
33	16.500	2.500		
34	16.500	3.700		
35	14.400	3.700		
36	15.300	3.700		

Bars: Values: 1

Bar	Node 1	Node 2	Section	Material	Length (m)	Gamma (Deg)
1	1	2	RECT_200x200	TIMBER-C16	2.500	0.0
2	2	4	RECT_200x200	TIMBER-C16	1.200	0.0
4	5	6	RECT_200x200	TIMBER-C16	2.500	0.0
5	6	8	RECT_200x200	TIMBER-C16	1.200	0.0
7	4	9	RECT_100x200	TIMBER-C16	1.200	90.0
8	9	10	RECT_100x200	TIMBER-C16	0.900	90.0
9	10	8	RECT_100x200	TIMBER-C16	1.200	90.0
10	2	9	RECT_100x200	TIMBER-C16	1.697	0.0
11	6	10	RECT_100x200	TIMBER-C16	1.697	0.0
12	17	18	RECT_200x200	TIMBER-C16	2.500	0.0
13	18	19	RECT_200x200	TIMBER-C16	1.200	0.0
14	8	20	RECT_100x200	TIMBER-C16	1.200	90.0
15	20	21	RECT_100x200	TIMBER-C16	0.900	90.0
16	21	19	RECT_100x200	TIMBER-C16	1.200	90.0
17	6	20	RECT_100x200	TIMBER-C16	1.697	0.0
18	18	21	RECT_100x200	TIMBER-C16	1.697	0.0
19	22	23	RECT_200x200	TIMBER-C16	2.500	0.0
20	23	24	RECT_200x200	TIMBER-C16	1.200	0.0
21	19	25	RECT_100x200	TIMBER-C16	1.200	90.0
22	25	26	RECT_100x200	TIMBER-C16	0.900	90.0
23	26	24	RECT_100x200	TIMBER-C16	1.200	90.0
24	18	25	RECT_100x200	TIMBER-C16	1.697	0.0
25	23	26	RECT_100x200	TIMBER-C16	1.697	0.0

Bar	Node 1	Node 2	Section	Material	Length (m)	Gamma (Deg)
26	27	28	RECT_200x200	TIMBER-C16	2.500	0.0
27	28	29	RECT_200x200	TIMBER-C16	1.200	0.0
28	24	30	RECT_100x200	TIMBER-C16	1.200	90.0
29	30	31	RECT_100x200	TIMBER-C16	0.900	90.0
30	31	29	RECT_100x200	TIMBER-C16	1.200	90.0
31	23	30	RECT_100x200	TIMBER-C16	1.697	0.0
32	28	31	RECT_100x200	TIMBER-C16	1.697	0.0
33	32	33	RECT_200x200	TIMBER-C16	2.500	0.0
34	33	34	RECT_200x200	TIMBER-C16	1.200	0.0
35	29	35	RECT_100x200	TIMBER-C16	1.200	90.0
36	35	36	RECT_100x200	TIMBER-C16	0.900	90.0
37	36	34	RECT_100x200	TIMBER-C16	1.200	90.0
38	28	35	RECT_100x200	TIMBER-C16	1.697	0.0
39	33	36	RECT_100x200	TIMBER-C16	1.697	0.0

Properties: Bars: 1

Section name	Bar list	AX (cm ²)	AY (cm ²)	AZ (cm ²)
RECT_100x200	7to11 14to18 21to25 28to32 35to39	200.0	166.7	166.7
RECT_200x200	1 2 4 5to33By7 13to34By7	400.0	333.3	333.3

Section name	IX (cm ⁴)	IY (cm ⁴)	IZ (cm ⁴)	HY (mm)
RECT_100x200	4573.7	6666.7	1666.7	100.0
RECT_200x200	22493.3	13333.3	13333.3	200.0

Section name	HZ (mm)	VY (mm)	VZ (mm)	VPY (mm)	VPZ (mm)
RECT_100x200	200.0	50.0	100.0	50.0	100.0
RECT_200x200	200.0	100.0	100.0	100.0	100.0

Loads - Cases: 1to4 : Values: 1

Case	Load type	List
1	self-w eight	1 2 4 5 7to39
2	trapezoidal load (2p)	7
2	trapezoidal load (2p)	7
2	uniform load	8
2	trapezoidal load (2p)	9
2	trapezoidal load (2p)	9
2	uniform load	14
2	trapezoidal load (2p)	15
2	trapezoidal load (2p)	15
2	uniform load	16 21to23 28to30 35to37
4	uniform load	7
4	uniform load	8 9 14 15
4	trapezoidal load (2p)	16
4	trapezoidal load (2p)	16

4	uniform load	21to23 28to30 35to37
Case	Load values	
1	PZ Negative Factor=1.000	
2	PZ2=1.940(kN/m) PZ1=1.940(kN/m) X2=0.750(m) X1=0.0(m) global not project. absolute	
2	PZ2=1.082(kN/m) PZ1=1.082(kN/m) X2=1.200(m) X1=0.750(m) global not project. absolute	
2	PZ=1.082(kN/m)	
2	PZ2=1.082(kN/m) PZ1=1.082(kN/m) X2=0.400(m) X1=0.0(m) global not project. absolute	
2	PZ2=0.445(kN/m) PZ1=0.445(kN/m) X2=1.200(m) X1=0.400(m) global not project. absolute	
2	PZ=0.445(kN/m)	
2	PZ2=0.445(kN/m) PZ1=0.445(kN/m) X2=0.500(m) X1=0.0(m) global not project. absolute	
2	PZ2=0.224(kN/m) PZ1=0.224(kN/m) X2=0.900(m) X1=0.500(m) global not project. absolute	
2	PZ=0.224(kN/m)	
4	PZ=0.472(kN/m)	
4	PZ=0.236(kN/m)	
4	PZ2=0.236(kN/m) PZ1=0.236(kN/m) X2=0.500(m) X1=0.0(m) global not project. absolute	
4	PZ2=0.197(kN/m) PZ1=0.197(kN/m) X2=1.200(m) X1=0.500(m) global not project. absolute	
4	PZ=0.197(kN/m)	

Load Combination - Case: 3 (COMB1): Values: 1

Combinations	Name	Analysis type	Combination type	Definition
3 (C)	COMB1	Linear Combination	SLS	(1+2+4)*1.000

Reactions in the coordinate system: global - Cases: 1to3 : Values: 1

Node/Case	FX (kN)	FZ (kN)	MY (kNm)
1/ 1	0.030	0.745	0.0
1/ 2	-0.329	-2.163	-0.000
1/ 3 (C)	-0.385	-1.989	-0.000
1/ 4	-0.087	-0.572	-0.000
5/ 1	-0.009	1.068	0.000
5/ 2	0.197	-2.444	-0.000
5/ 3 (C)	0.218	-2.285	-0.000
5/ 4	0.029	-0.909	-0.000
17/ 1	0.004	1.013	-0.000
17/ 2	-0.016	-0.489	-0.000
17/ 3 (C)	-0.010	-0.129	-0.000
17/ 4	0.002	-0.652	-0.000
22/ 1	-0.004	1.013	0.000
22/ 2	0.053	-0.797	-0.000
22/ 3 (C)	0.061	-0.417	-0.000
22/ 4	0.011	-0.633	-0.000
27/ 1	0.009	1.068	0.000
27/ 2	0.017	-0.781	0.000
27/ 3 (C)	0.019	-0.431	0.000
27/ 4	-0.007	-0.718	-0.000

Node/Case	FX (kN)	FZ (kN)	MY (kNm)
32/ 1	-0.030	0.745	0.0
32/ 2	0.078	-0.363	0.000
32/ 3 (C)	0.099	0.103	0.000
32/ 4	0.051	-0.280	0.000
Case 1	DL1		
Sum of val.	0.000	5.653	0.000
Sum of reac.	0.000	5.653	-46.641
Sum of forc.	0.0	-5.653	46.641
Check val.	0.000	-0.000	0.000
Precision	1.06786e-011	4.55215e-024	
Case 2	WIND1		
Sum of val.	0.000	-7.037	-0.000
Sum of reac.	0.000	-7.037	35.486
Sum of forc.	0.0	7.037	-35.486
Check val.	0.000	0.000	-0.000
Precision	5.90383e-011	7.19239e-021	
Case 3 (C)	COMB1		
Sum of val.	0.000	-5.147	-0.000
Sum of reac.	0.000	-5.147	16.511
Sum of forc.	0.0	5.147	-16.511
Check val.	0.000	0.000	-0.000
Precision	1.30495e-010	7.70086e-021	
Case 4	WIND2		
Sum of val.	0.000	-3.764	-0.000
Sum of reac.	0.000	-3.764	27.665
Sum of forc.	0.0	3.764	-27.665
Check val.	0.000	0.000	-0.000
Precision	6.07779e-011	5.03916e-022	

Forces - Case: 3 (COMB1): Values: 1

Bar/Point (m)/Case	Fx compression (kN)	Fx tension (kN)	FZ (kN)	MY (kNm)
1/ origin (1)/ 3 (C)		-1.989	0.385	-0.000
1/ end (2)/ 3 (C)		-2.352	0.385	0.963
2/ origin (2)/ 3 (C)		-1.225	-0.803	0.963
2/ end (4)/ 3 (C)		-1.399	-0.803	-0.000
4/ origin (5)/ 3 (C)		-2.285	-0.218	-0.000
4/ end (6)/ 3 (C)		-2.648	-0.218	-0.544
5/ origin (6)/ 3 (C)		-0.262	0.453	-0.544
5/ end (8)/ 3 (C)		-0.437	0.453	0.000
7/ origin (4)/ 3 (C)	0.803		-1.399	0.000
7/ end (9)/ 3 (C)	0.803		1.022	-0.082

Bar/Point (m)/Case	Fx compression (kN)	Fx tension (kN)	FZ (kN)	MY (kNm)
8/ origin (9)/ 3 (C)		-0.385	-0.228	-0.082
8/ end (10)/ 3 (C)		-0.385	0.893	0.217
9/ origin (10)/ 3 (C)	1.204		-0.758	0.217
9/ end (8)/ 3 (C)	1.204		0.226	0.000
10/ origin (2)/ 3 (C)		-1.637	0.044	0.000
10/ end (9)/ 3 (C)		-1.724	-0.044	0.000
11/ origin (6)/ 3 (C)		-2.205	0.044	-0.000
11/ end (10)/ 3 (C)		-2.292	-0.044	0.000
12/ origin (17)/ 3 (C)		-0.129	0.010	-0.000
12/ end (18)/ 3 (C)		-0.492	0.010	0.026
13/ origin (18)/ 3 (C)		-0.260	-0.022	0.026
13/ end (19)/ 3 (C)		-0.434	-0.022	-0.000
14/ origin (8)/ 3 (C)	0.751		-0.210	-0.000
14/ end (20)/ 3 (C)	0.751		0.520	0.186
15/ origin (20)/ 3 (C)		-0.168	-0.461	0.186
15/ end (21)/ 3 (C)		-0.168	-0.001	0.000
16/ origin (21)/ 3 (C)		-0.006	-0.225	0.000
16/ end (19)/ 3 (C)		-0.006	0.213	0.000
17/ origin (6)/ 3 (C)		-1.256	0.044	-0.000
17/ end (20)/ 3 (C)		-1.343	-0.044	0.000
18/ origin (18)/ 3 (C)		-0.185	0.044	-0.000
18/ end (21)/ 3 (C)		-0.272	-0.044	0.000
19/ origin (22)/ 3 (C)		-0.417	-0.061	-0.000
19/ end (23)/ 3 (C)		-0.780	-0.061	-0.152
20/ origin (23)/ 3 (C)		-0.160	0.127	-0.152
20/ end (24)/ 3 (C)		-0.334	0.127	-0.000
21/ origin (19)/ 3 (C)	0.015		-0.221	0.000
21/ end (25)/ 3 (C)	0.015		0.197	-0.014
22/ origin (25)/ 3 (C)		-0.178	-0.058	-0.014
22/ end (26)/ 3 (C)		-0.178	0.255	0.075
23/ origin (26)/ 3 (C)	0.287		-0.271	0.075
23/ end (24)/ 3 (C)	0.287		0.147	0.000
24/ origin (18)/ 3 (C)		-0.230	0.044	0.000
24/ end (25)/ 3 (C)		-0.318	-0.044	0.0
25/ origin (23)/ 3 (C)		-0.614	0.044	-0.000
25/ end (26)/ 3 (C)		-0.701	-0.044	-0.000
26/ origin (27)/ 3 (C)		-0.431	-0.019	0.000
26/ end (28)/ 3 (C)		-0.794	-0.019	-0.047
27/ origin (28)/ 3 (C)		-0.156	0.039	-0.047
27/ end (29)/ 3 (C)		-0.330	0.039	-0.000
28/ origin (24)/ 3 (C)	0.160		-0.188	-0.000
28/ end (30)/ 3 (C)	0.160		0.231	0.026
29/ origin (30)/ 3 (C)		-0.118	-0.109	0.026
29/ end (31)/ 3 (C)		-0.118	0.205	0.069
30/ origin (31)/ 3 (C)	0.292		-0.267	0.069
30/ end (29)/ 3 (C)	0.292		0.152	-0.000
31/ origin (23)/ 3 (C)		-0.349	0.044	-0.000

Bar/Point (m)/Case	Fx compression (kN)	Fx tension (kN)	FZ (kN)	MY (kNm)
31/ end (30)/ 3 (C)		-0.436	-0.044	0.000
32/ origin (28)/ 3 (C)		-0.536	0.044	-0.000
32/ end (31)/ 3 (C)		-0.623	-0.044	-0.000
33/ origin (32)/ 3 (C)	0.103		-0.099	0.000
33/ end (33)/ 3 (C)		-0.260	-0.099	-0.247
34/ origin (33)/ 3 (C)		-0.017	0.206	-0.247
34/ end (34)/ 3 (C)		-0.192	0.206	0.000
35/ origin (29)/ 3 (C)	0.253		-0.179	-0.000
35/ end (35)/ 3 (C)	0.253		0.239	0.036
36/ origin (35)/ 3 (C)		-0.099	-0.174	0.036
36/ end (36)/ 3 (C)		-0.099	0.140	0.021
37/ origin (36)/ 3 (C)	0.206		-0.227	0.021
37/ end (34)/ 3 (C)	0.206		0.192	-0.000
38/ origin (28)/ 3 (C)		-0.454	0.044	-0.000
38/ end (35)/ 3 (C)		-0.541	-0.044	-0.000
39/ origin (33)/ 3 (C)		-0.387	0.044	0.000
39/ end (36)/ 3 (C)		-0.474	-0.044	0.000