TRISON
Engineering Group, Inc.

Structural Analysis Report

20' x 20'
E-Series Frame Tent Assembly

Project: **20' x 20' Frame Tent Assembly**

Client: TentCraft

TentCraft
2662 Cass Rd.
Traverse City, Michigan 49684
(800) 950-4553 Phone

Provide By: **Trison Engineering Group, INC.**
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Trison Job # G21008

July 26, 2021

Prepared by: Mark S. Bryce, P.E.
State of Michigan # 6201030495

Mark S Bryce, P.E.
7-26-2021

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Sheet Index

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Scope

The Structural analysis was performed by Trison Engineering Group, Inc. as requested by TentCraft to determine the conformance of the E-Series 20' x 20' tent structural support frame and 8' head clearance with the governing building codes and the industry standards. The tent structural support frame is the tent's Main Wind-Force Resisting System (MWFRS) and therefore shall be designed to resist the wind loads. This structural analysis is also to determine the adequacy of the structural support frame of the tent to determine the maximum allowed wind speed for the installation. This analysis considers the structural properties of the support frame members, ballast weights and the applied wind loading. Different enclosure and exposure categories will also be considered in this analysis to determine the maximum allowable wind speed for use of the tent installation.

Analysis Criteria

The structural analysis was performed using the following design criteria:

Codes:	2015 International Building Code
	ASCE 7-10 Minimum Design Loads for Buildings & Other Structures
Wind Criteria:	Allowable design three-second gust wind speed to be determined, refer to conclusion for each tent structural support frame.
	Occupancy Category I
	Exposure Category B & C
	No Topographic Effects Kzt = 1.0
Frame Tent Assembly:	E-Series
	Width = 20'-0"
	Length = 20'-0"
	Eave Height = 8'-0"

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Tent Materials / Components

Pipe Beams & Poles: Anodized Aluminum 6105
2.25" Outside diameter
0.1875" Wall thickness
Cross-sectional Area A = 1.22 in^2
Moment of Inertia I = 0.653 in^4
Section Modulus S = 0.579 in^3
Ultimate Tensile Strength = 38.0 ksi
Yield Tensile Strength = 35.0 ksi

Pipe Connectors: Cast Aluminum
Yield Tensile Strength = 24.0 ksi

Guy Strap Assembly: 1" Strap with Ratchet
Allowable Working Load Limit = 750. #

Steel Cable Assembly: 5/16" diameter galvanized steel cable
Turnbuckle and shackles
Allowable Working Load Limit = 1960. #

Ballast: 75 Gallon water barrel = 625.8 #
Ballast and guy strap set at 3'-6" from poles.

Tent Stake: 36" long tent stake as provided by TentCraft
Pullout capacity equal to ballast weight.
Tent stake pullout capacity is dependent on the strength of the soil and shall be verified by a Soils Engineer at the time of installation.

Tent Fabric: 18 oz. Vinyl-Coated -Polyester

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Assumptions

This structural analysis is based on the theoretical capacity of the members. The structural analysis is based solely on the information supplied, and in turn the results are only as accurate as the data extracted from that information. Trison Engineering Group, Inc. has been instructed by TentCraft to assume the information supplied is accurate, and Trison Engineering Group. Inc. has made no independent determination of its accuracy.

- The tent structure is assumed to have been properly maintained, to be in good condition with no structural defects and with no deterioration to its member capacities.
- The tent configuration is as supplied by the construction drawings and information supplied by TentCraft. It is assumed to be complete and accurate. All components are assumed to be properly installed and supported as per the manufacturer's requirements.
- If the actual configuration is different than above, then this analysis is invalid.
- All connections are assumed to develop at least the member capacity, unless explicitly stated in this report.
- It is assumed that there have been no structural modifications to the tent assembly, if any, then this analysis is invalid.
- Tent installation was in accordance with the manufacturer's requirements. Responsibility of proper installations is with the installation contractor. The cables and straps are always held taut. The fabric is stretched tight enough to prevent development of pockets and maintain roof slope.

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Conclusion

A 3-Dimensional structural frame computer analysis was used for this analysis. Different load combinations were considered to identify the critical design factors. Member and detail checks were performed to derive the conclusions for the report. The calculations used an iteration process to determine the maximum allowable wind speed for each different exposure category and enclosure configuration. The noted maximum wind speed, exposure category and enclosure for the structure satisfies the requirements of the "American Society of Civil Engineering Minimum Design Loads for Buildings and Other Structures" (Asce 7-10), as well as the "2015 International Building Code" (1BC 2015). As such, the following conclusions and recommendations were developed:

Tent: 20' x 20' with 8' Head Clearance
Ballasting weight at each leg of 625 lbs. minimum, with 1" guy strap assembly.

Enclosure	**Exposure 'B'** Maximum Wind Speed	**Exposure 'C'** Maximum Wind Speed
Open Tent (Roof and Valance)	65 MPH	50 MPH
Partially Enclosed Tent (Roof and Open Walls)	50 MPH	40 MPH
Enclosed Tent (Roof and Walls)	50 MPH	40 MPH
	Urban and suburban areas, wooded areas or terrain with numerous closely spaced obstructions of single- family buildings or larger.	Open terrain with scattered obstructions with heights less than 30 feet and grasslands.

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Limitations

The engineering services rendered by Trison Engineering Group, Inc. in connection with this structural analysis are limited to an analysis of the tent structural support frame.

The information and conclusions contained in this report were determined by application of the current engineering standards and analysis procedures and formulae, and Trison Engineering Group, Inc. assumes no obligation to revise any of the information or conclusions contained in this report in the event such engineering and analysis procedures and formulae are hereafter modified or revised.

Trison Engineering Group, Inc. make no warranties, expressed or implied in connection with this report and disclaims any liability arising from original design, material, fabrication and erection deficiencies or the "as-built" condition of this structure. Trison Engineering Group, Inc. will not be responsible whatsoever for or on account of consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report.

Installation procedures and loading are not within the scope of this report and should be performed and evaluated by a competent contractor.

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Load Combinations and Loading

Load combinations using Allowable Stress Design (ASD)

LC1 = D

LC5 = D + (0.6)W

LC7 = (0.6)D + (0.6)W

The tent structural support frame is designed to support the dead load of the tent and support frame and the wind loading as noted in these calculations. The tent structural support frame may, or may not, be structurally capable of supporting additional loads. Additional loads applied to the tent structural support frame such as live load, snow load, hanging dead loads, or wind speed up subject to escarpment effects caused by hills will exert additional loads to the tent support frame. Prior to adding additional loading to the tent structural support frame, the structural support frame shall be reviewed by a qualified structural engineer to determine if the frame is structurally acceptable for the additional loading. The owner of the tent structure shall get written certification from a qualified structural engineer as to the magnitude and location for additional loads being applied and any restrictions to the tent structure which they assumed.

D = Dead loads consist of the self-weight of all materials incorporated into the tent fabric material, supporting frame and ballast weight. Hanging dead loads are auxiliary additional loads that typically are hanging from the structure, and are not part of the tent structural support frame. In this analysis of the tent structural support frame there are no hanging dead loads considered.

W = Wind Loads have been included in this analysis of the tent structural support frame.

L = Live loads are loads produced by the use and occupancy of the structure that does not include construction or environment loads. In this analysis of the tent structural support frame there are no live loads considered.

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S = Snow loads have not been included in this analysis of the tent structural support frame. This tent structure is assumed to be erected on a temporary basis, in locations, and during seasons, where snow loading is not expected. If snow is expected or is likely to occur while the tent fabric is still in place, then measures shall be provided to ensure snow removal. In addition, the roof fabric slope shall be maintained to allow for a smooth drainage and to prevent the potential for ponding of melt water.

E = Seismic / earthquake loading does not control over the wind loading. Due to the low mass of the tent structural support frame the seismic base shear does not control the structural design of the support structure and therefore has not been included in this analysis.

R = Rain water loading shall drain off the sloped roof surface and shall not be allowed to pond on the tent fabric.

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Wind Loading Criteria

The tent structural support frame is the tent's Main Wind-Force Resisting System (MWFRS) and therefore designed to resist the wind loads. Basic Wind Speed per ASCE 7-10 = 105 MPH three-second gust wind speed is the building code required design wind speed. However, this structural analysis is to determine the adequacy of the tent structural support frame and to determine the maximum allowed wind speed for the tent installation.

V = Maximum allowable three-second gust wind speed for the tent structural support frame.

Occupancy Category = I

Surface Roughness = B & C

Surface Roughness B: Urban and suburban areas, wooded areas or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger.

Surface Roughness C: Open terrain with scattered obstructions having heights generally less than 30 feet. This category includes flat open country, grasslands, and all water surfaces in hurricane-prone regions.

Surface Roughness D: Flat, unobstructed areas and water surfaces outside hurricane-prone regions. This category includes smooth mud flats, salt flats and unbroken ice.

Exposure Category = B & C

Exposure B shall apply where the ground surface roughness condition category B prevails in the upwind direction for a distance of at least 1500 feet or 20 times the height of the structure height, whichever is greater.

Exposure C shall apply for all cases where Exposures B or D do not apply.

Exposure D shall apply where the ground surface roughness condition category D prevails in the upwind direction for a distance of at least 5000 feet or 20 times the structure height, whichever is greater. In addition, Exposure D shall extend inland from the shoreline for a distance of 600 feet or 20 times the structure height, whichever is greater.

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Enclosure Classification = Open, Partially Enclosed & Enclosed

Open: A structure having each wall at least 80 percent open. GCpi = 0.00

Partially Enclosed: A structure that the total area of openings in a wall that receives positive wind pressure exceeds the sum of the areas of openings in the balance of the remaining walls & roof by more than 10 percent. In addition, the total area of openings in a wall that receives positive wind pressure exceeds 4 square feet or 1 percent of the area of that wall, whichever is smaller and the percentage of openings in the balance of the remaining walls & roof does not exceed 20 percent. GCpi = +/-0.55

Enclosed: A structure that does not comply with the requirements for open or partially enclosed structures. GCpi = +/-0.18

Topographic Factor Kzt = 1.0 (no wind speed-up effects)

Wind speed-up effects at isolated hills, ridges, and escarpments constituting abrupt changes in the general topography have not been included in this analysis of the tent structural support frame.

Importance Factor I = 1.0

Wind Direction Factor Kd = 0.85

Gust Effect Factor G = 0.85

Height above ground = z

Mean roof height above ground = h

Velocity pressure exposure coefficients = Kh & Kz

Velocity Pressure $qz = (0.00256)(Kz)(Kzt)(Kd)(V)^2$

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Enclosure: Open (roof and valance only)

Mean Roof Height h = 13.02 feet

Roof Angle = 38.3 degrees

External Pressure Coefficients:

ASCE 7-10 Figure 27.4-5 Pitched Roof, Open Building

Clear Wind Flow

Load Case 'A': Cnw = 1.3 Cnl = 0.6

Load Case 'B': Cnw = -0.2 Cnl = -0.6

MWFRS Net Design Roof Pressure p = (qz) (G) (Cn)

ASCE 7-10 Section 27.4.5 Valance

GCpn = +1.5 Windward

GCpn = -1.0 Leeward

MWFRS Net Design Valance Pressure p = (qz) (GCpn)

Velocity Pressure Coefficient Kh & Kz = 0.57 Exposure 'B'
(ASCE 7-10 Table 27.3-1)

Velocity Pressure Coefficient Kh & Kz = 0.85 Exposure 'C'
(ASCE 7-10 Table 27.3-1)

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Enclosure: Enclosed & Partially Enclosed: (roof and walls)

Mean Roof Height h = 13.02 feet

Roof Angle = 38.3 degrees

External Pressure Coefficients:

ASCE 7-10 Figure 27.4-1 Enclosed, Partially Enclosed Buildings

Horizontal building dimension parallel to the wind direction = L

Horizontal building dimension perpendicular to the wind direction = B

L/B = (20'-0") / (20'-0") = 1.0

h/L = (13.02') / (20'-0") = 0.651

Windward wall Cp = 0.8

Leeward wall Cp = -0.5

Side wall Cp = -0.7

Windward Roof: Load Case 'A' Cp = -0.2

Load Case 'B' Cp = 0.3

Leeward Roof: Cp = -0.6

MWFRS Design Roof Pressure $p = (qz)(G)(Cp) - (qz)(GCpi)$

Velocity Pressure Coefficient Kh & Kz = 0.57 Exposure 'B'
(ASCE 7-10 Table 27.3-1)

Velocity Pressure Coefficient Kh & Kz = 0.85 Exposure 'C'
(ASCE 7-10 Table 27.3-1)

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Main Wind Force Resisting System – Part 1	All Heights
Velocity Pressure Exposure Coefficients, K_h and K_z	
Table 27.3-1	

Height above ground level, z		Exposure		
		B	C	D
ft	(m)			
0-15	(0-4.6)	0.57	0.85	1.03
20	(6.1)	0.62	0.90	1.08
25	(7.6)	0.66	0.94	1.12
30	(9.1)	0.70	0.98	1.16
40	(12.2)	0.76	1.04	1.22
50	(15.2)	0.81	1.09	1.27
60	(18)	0.85	1.13	1.31
70	(21.3)	0.89	1.17	1.34
80	(24.4)	0.93	1.21	1.38
90	(27.4)	0.96	1.24	1.40
100	(30.5)	0.99	1.26	1.43
120	(36.6)	1.04	1.31	1.48
140	(42.7)	1.09	1.36	1.52
160	(48.8)	1.13	1.39	1.55
180	(54.9)	1.17	1.43	1.58
200	(61.0)	1.20	1.46	1.61
250	(76.2)	1.28	1.53	1.68
300	(91.4)	1.35	1.59	1.73
350	(106.7)	1.41	1.64	1.78
400	(121.9)	1.47	1.69	1.82
450	(137.2)	1.52	1.73	1.86
500	(152.4)	1.56	1.77	1.89

Notes:

1. The velocity pressure exposure coefficient K_z may be determined from the following formula:

   For $15 \text{ ft.} \le z \le z_g$ $\quad K_z = 2.01\,(z/z_g)^{2/\alpha}$

   For $z < 15$ ft. $\quad K_z = 2.01\,(15/z_g)^{2/\alpha}$

2. α and z_g are tabulated in Table 26.9.1.
3. Linear interpolation for intermediate values of height z is acceptable.
4. Exposure categories are defined in Section 26.7.

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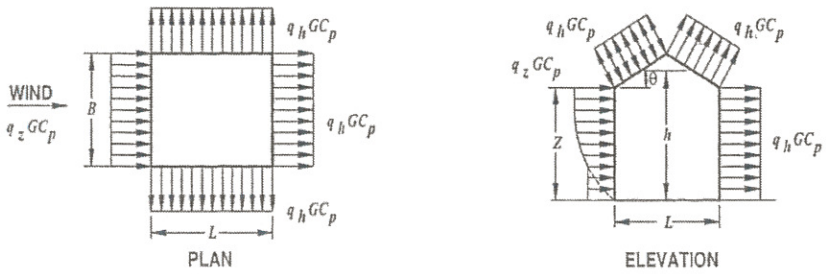
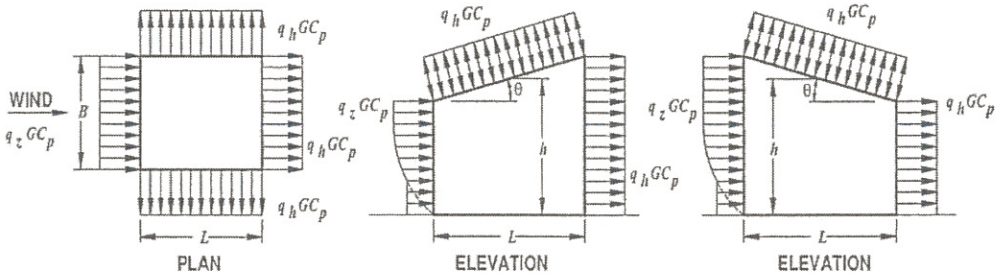
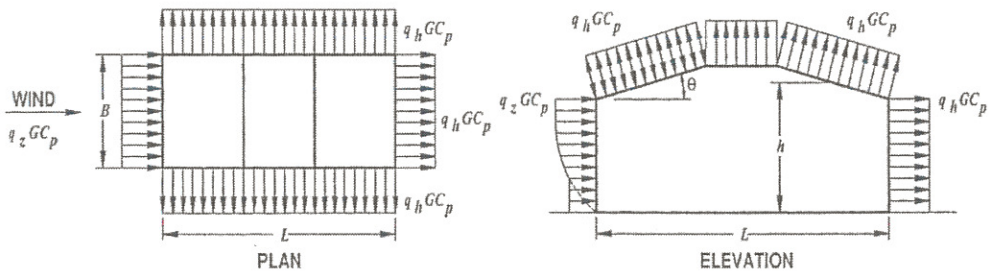
Main Wind Force Resisting System – Part 1		All Heights
Figure 27.4-1	External Pressure Coefficients, C_p	Walls & Roofs
Enclosed, Partially Enclosed Buildings		



GABLE, HIP ROOF



MONOSLOPE ROOF (NOTE 4)



MANSARD ROOF (NOTE 8)

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Main Wind Force Resisting System – Part 1		All Heights
Figure 27.4-1 (cont.)	External Pressure Coefficients, C_p	Walls & Roofs
Enclosed, Partially Enclosed Buildings		

Wall Pressure Coefficients, C_p

Surface	L/B	C_p	Use With
Windward Wall	All values	0.8	q_z
Leeward Wall	0-1	-0.5	q_h
	2	-0.3	
	≥4	-0.2	
Side Wall	All values	-0.7	q_h

Roof Pressure Coefficients, C_p, for use with q_h

Wind Direction	Windward Angle, θ (degrees)								Leeward Angle, θ (degrees)		
	h/L	10	15	20	25	30	35	45	≥60#	10	15	≥20
Normal to ridge for θ ≥ 10°	≤0.25	-0.7 -0.18	-0.5 0.0*	-0.3 0.2	-0.2 0.3	-0.2 0.3	0.0* 0.4	0.4	0.01 θ	-0.3	-0.5	-0.6
	0.5	-0.9 -0.18	-0.7 -0.18	-0.4 0.0*	-0.3 0.2	-0.2 0.2	-0.2 0.3	0.0* 0.4	0.01 θ	-0.5	-0.5	-0.6
	≥1.0	-1.3** -0.18	-1.0 -0.18	-0.7 -0.18	-0.5 0.0*	-0.3 0.2	-0.2 0.2	0.0* 0.3	0.01 θ	-0.7	-0.6	-0.6

Normal to ridge for θ < 10 and Parallel to ridge for all θ		Horiz distance from windward edge	C_p
	≤ 0.5	0 to h/2	-0.9, -0.18
		h/2 to h	-0.9, -0.18
		h to 2 h	-0.5, -0.18
		> 2h	-0.3, -0.18
	≥ 1.0	0 to h/2	-1.3**, -0.18
		> h/2	-0.7, -0.18

*Value is provided for interpolation purposes.

**Value can be reduced linearly with area over which it is applicable as follows

Area (sq ft)	Reduction Factor
≤ 100 (9.3 sq m)	1.0
250 (23.2 sq m)	0.9
≥ 1000 (92.9 sq m)	0.8

Notes:

1. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.
2. Linear interpolation is permitted for values of *L/B*, *h/L* and θ other than shown. Interpolation shall only be carried out between values of the same sign. Where no value of the same sign is given, assume 0.0 for interpolation purposes.
3. Where two values of C_p are listed, this indicates that the windward roof slope is subjected to either positive or negative pressures and the roof structure shall be designed for both conditions. Interpolation for intermediate ratios of h/L in this case shall only be carried out between C_p values of like sign.
4. For monoslope roofs, entire roof surface is either a windward or leeward surface.
5. For flexible buildings use appropriate G_f as determined by Section 26.9.4.
6. Refer to Figure 27.4-2 for domes and Figure 27.4-3 for arched roofs.
7. Notation:
   B: Horizontal dimension of building, in feet (meter), measured normal to wind direction.
   L: Horizontal dimension of building, in feet (meter), measured parallel to wind direction.
   h: Mean roof height in feet (meters), except that eave height shall be used for θ ≤ 10 degrees.
   z: Height above ground, in feet (meters).
   G: Gust effect factor.
   q_z,q_h: Velocity pressure, in pounds per square foot (N/m^2), evaluated at respective height.
   θ: Angle of plane of roof from horizontal, in degrees.
8. For mansard roofs, the top horizontal surface and leeward inclined surface shall be treated as leeward surfaces from the table.
9. Except for MWFRS's at the roof consisting of moment resisting frames, the total horizontal shear shall not be less than that determined by neglecting wind forces on roof surfaces.

#For roof slopes greater than 80°, use $C_p = 0.8$

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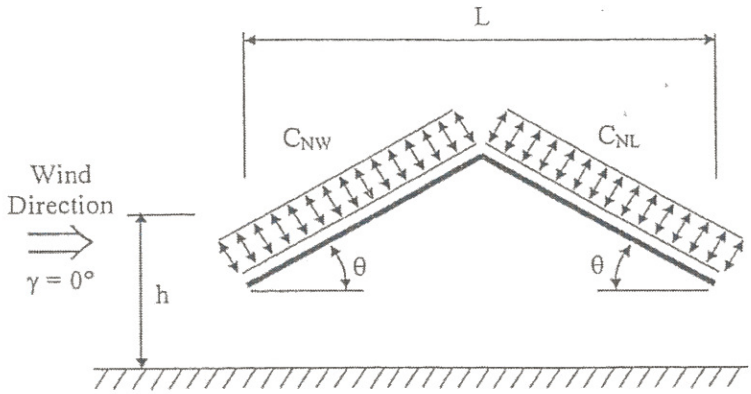
Main Wind Force Resisting System – Part 1		$0.25 \leq h/L \leq 1.0$
Figure 27.4-5	Net Pressure Coefficient, C_N	**Pitched Free Roofs** $\theta \leq 45°, \gamma = 0°, 180°$
Open Buildings		



Roof Angle, θ	Load Case	Wind Direction, $\gamma = 0°, 180°$			
		Clear Wind Flow		Obstructed Wind Flow	
		C_{NW}	C_{NL}	C_{NW}	C_{NL}
7.5°	A	1.1	-0.3	-1.6	-1
	B	0.2	-1.2	-0.9	-1.7
15°	A	1.1	-0.4	-1.2	-1
	B	0.1	-1.1	-0.6	-1.6
22.5°	A	1.1	0.1	-1.2	-1.2
	B	-0.1	-0.8	-0.8	-1.7
30°	A	1.3	0.3	-0.7	-0.7
	B	-0.1	-0.9	-0.2	-1.1
37.5°	A	1.3	0.6	-0.6	-0.6
	B	-0.2	-0.6	-0.3	-0.9
45°	A	1.1	0.9	-0.5	-0.5
	B	-0.3	-0.5	-0.3	-0.7

Notes:
1. C_{NW} and C_{NL} denote net pressures (contributions from top and bottom surfaces) for windward and leeward half of roof surfaces, respectively.
2. Clear wind flow denotes relatively unobstructed wind flow with blockage less than or equal to 50%. Obstructed wind flow denotes objects below roof inhibiting wind flow (>50% blockage).
3. For values of θ between 7.5° and 45°, linear interpolation is permitted. For values of θ less than 7.5°, use monoslope roof load coefficients.
4. Plus and minus signs signify pressures acting towards and away from the top roof surface, respectively.
5. All load cases shown for each roof angle shall be investigated.
6. Notation:
   - L : horizontal dimension of roof, measured in the along wind direction, ft. (m)
   - h : mean roof height, ft. (m)
   - γ : direction of wind, degrees
   - θ : angle of plane of roof from horizontal, degrees

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Base Reactions

The tent structural support frame post base reactions are given in the table below for each enclosure and exposure category. The tent support post base should be set on firm and unyielding ground. The ground should be structurally adequate for the required bearing pressures of the post base as well as the required forces of the tent stakes. A Soils Engineer shall verify the ground condition on a site-by-site basis and provide appropriate bearing plate sizes to accommodate the post loading.

Tent: 20' x 20' with 8' Head Clearance
Ballasting weight at each leg of 625 lbs. minimum, with 1" guy strap assembly.

Enclosure	Exposure	Maximum Wind Speed	Post #	Vertical Reaction Down	Post Uplift Reaction	Ballast Weight
Open Tent	B	65 MPH	P1	749.0#	-38.0#	560.0#
Open Tent	C	50 MPH	P1	666.0#	-31.0#	493.0#
Partially Enclosed Tent	B	50 MPH	P1	715.0#	-61.0#	619.0#
Partially Enclosed Tent	C	40 MPH	P1	610.0#	-36.0#	518.0#
Enclosed Tent	B	50 MPH	P1	606.0#	-27.0#	547.0#
Enclosed Tent	C	40 MPH	P1	580.0#	-25.0#	521.0#

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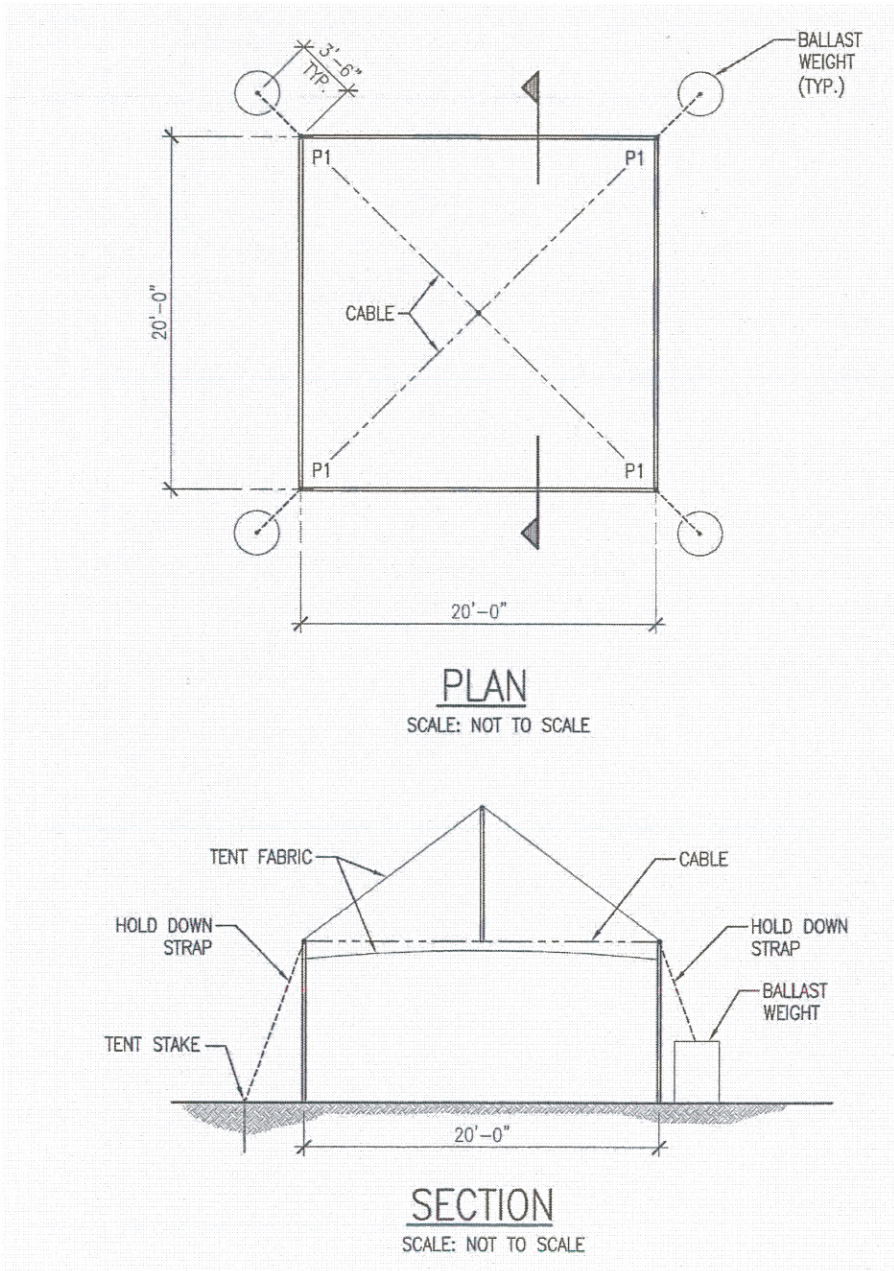
Computer Model of Tent Support Frame

The tent structural support frame analysis utilized a 3-dimensional structural computer analysis program. The computer program aided in determining the deflection and stresses of the tent frame members based on the several load combinations. The tent support frame is modeled in the program based on the actual size and configuration of the tent and members used. Loads are applied to the members in accordance to the code required load combinations. Then based on the member capacities the maximum allowable wind speed was determined.



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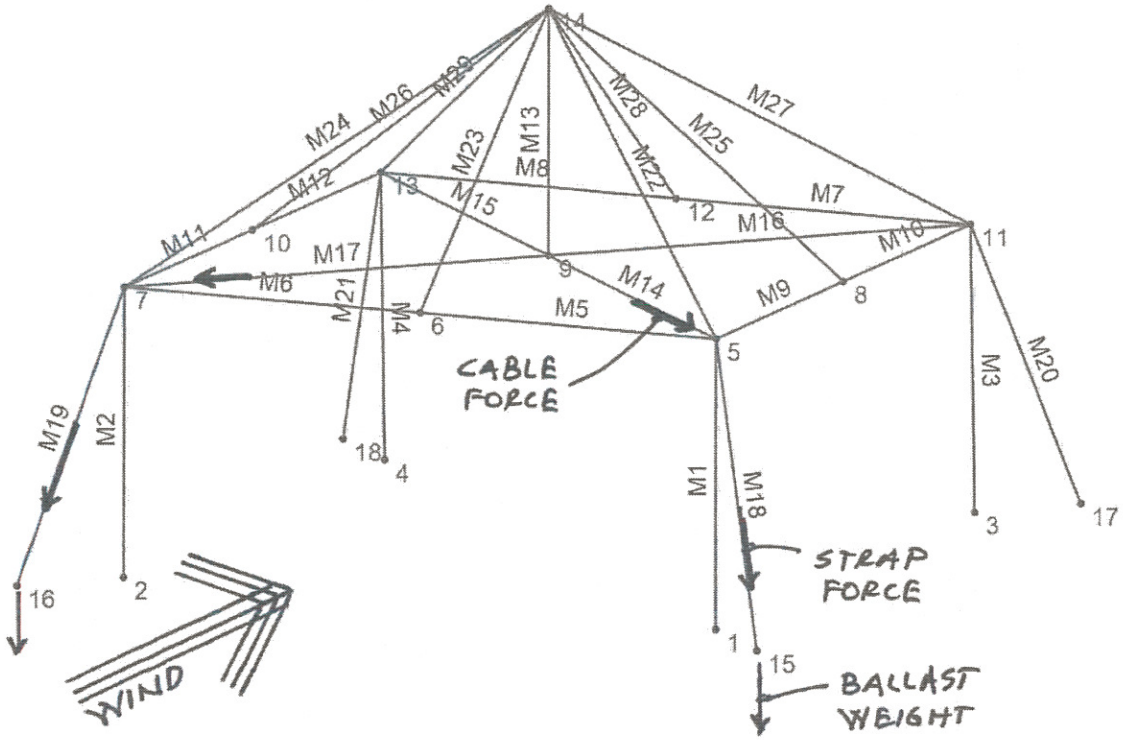
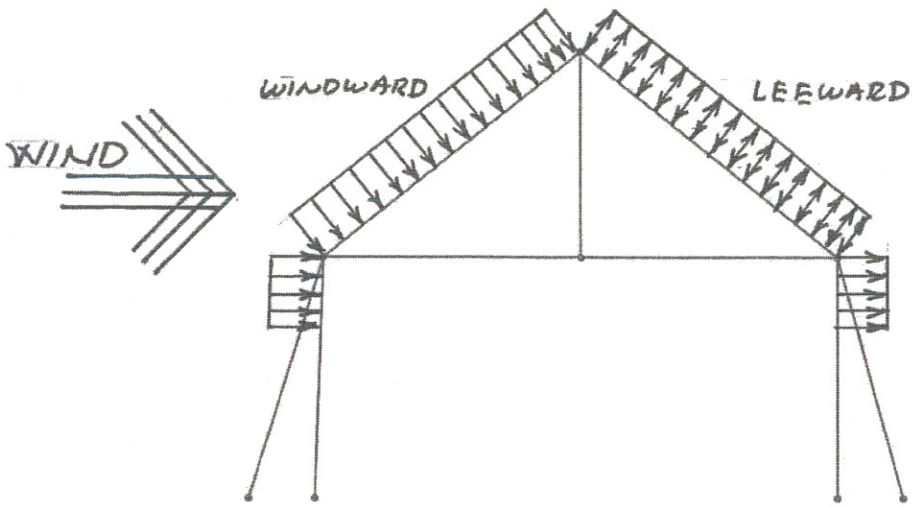
20' x 20' x 8' OPEN TENT with VALANCE





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JOB TENT CRAFT
SHEET NO. 21 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

20' x 20' x 8' OPEN STRUCTURE WITH VALANCE

EXPOSURE = B

V = ALLOWABLE DESIGN WIND SPEED = 65 MPH

VELOCITY PRESSURE $q_z = (0.00256)(0.57)(0.85)(65)^2 = 5.24$ PSF

LOAD CASE 'A'
- WINDWARD ROOF $p = (5.24\ PSF)(0.85)(1.3) = 5.79$ PSF
- LEEWARD ROOF $p = (5.24\ PSF)(0.85)(0.6) = 2.67$ PSF
- WINDWARD VALANCE $p = (5.24\ PSF)(1.5) = 7.86$ PSF
- LEEWARD VALANCE $p = (5.24\ PSF)(-1.0) = -5.24$ PSF

LOAD CASE 'B'
- WINDWARD ROOF $p = (5.24\ PSF)(0.85)(-0.2) = -0.891$ PSF
- LEEWARD ROOF $p = (5.24\ PSF)(0.85)(-0.6) = -2.67$ PSF
- WINDWARD VALANCE $p = (5.24\ PSF)(1.5) = 7.86$ PSF
- LEEWARD VALANCE $p = (5.24\ PSF)(-1.0) = -5.24$ PSF

V = 65 MPH

	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 545.0#	#16 559.2#	#15 438.4#	#16 434.9#
STRAP FORCE	M18 583.9#	M19 599.1#	M18 469.6#	M19 465.9#
CABLE FORCE	M14 88.5#	M17 92.3#	M14 82.6#	M17 82.0#
VERTICAL DEFLECTION	NODE #6 $\Delta V = -1.203$"		NODE #12 $\Delta V = 0.566$"	
HORIZONTAL DEFLECTION	NODE #6 $\Delta H = 0.986$"		NODE #12 $\Delta H = 0.511$"	

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JOB TENT CRAFT
SHEET NO. 22 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

20' x 20' x 8' OPEN STRUCTURE WITH VALANCE

EXPOSURE = C
V = ALLOWABLE DESIGN WIND SPEED = 50 MPH
VELOCITY PRESSURE $q_z = (0.00256)(0.85)(0.85)(50)^2 = 4.62$ PSF

LOAD CASE 'A'
WINDWARD ROOF $p = (4.62\ PSF)(0.85)(1.3) = 5.11$ PSF
LEEWARD ROOF $p = (4.62\ PSF)(0.85)(0.6) = 2.36$ PSF
WINDWARD VALANCE $p = (4.62\ PSF)(1.5) = 6.93$ PSF
LEEWARD VALANCE $p = (4.62\ PSF)(-1.0) = -4.62$ PSF

LOAD CASE 'B'
WINDWARD ROOF $p = (4.62\ PSF)(0.85)(-0.2) = -0.785$ PSF
LEEWARD ROOF $p = (4.62\ PSF)(0.85)(-0.6) = -2.36$ PSF
WINDWARD VALANCE $p = (4.62\ PSF)(1.5) = 6.93$ PSF
LEEWARD VALANCE $p = (4.62\ PSF)(-1.0) = -4.62$ PSF

V = 50 MPH

	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 480.2#	#16 492.9#	#15 387.0#	#16 384.1#
STRAP FORCE	M18 514.5#	M19 528.0#	M18 414.6#	M19 411.4#
CABLE FORCE	M14 86.0#	M17 89.5#	M14 80.9#	M17 80.4#
VERTICAL DEFLECTION	NODE #6 $\Delta V = -1.069$"		NODE #12 $\Delta V = 0.498$"	
HORIZONTAL DEFLECTION	NODE #6 $\Delta H = 0.875$"		NODE #12 $\Delta H = 0.45$"	

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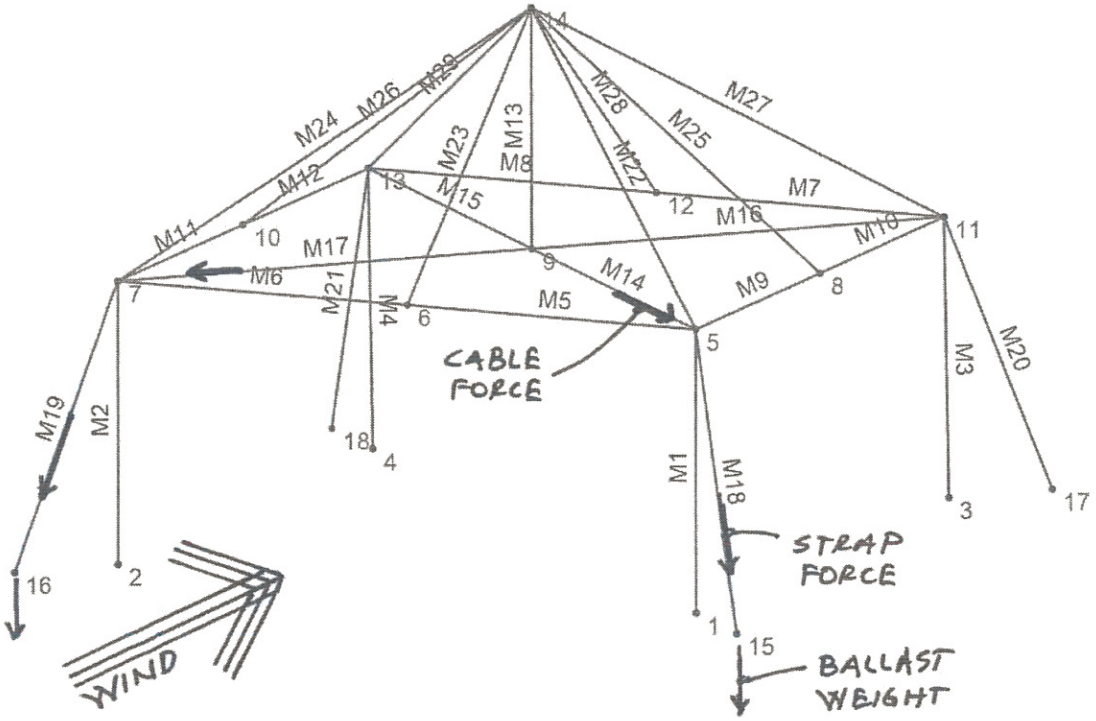
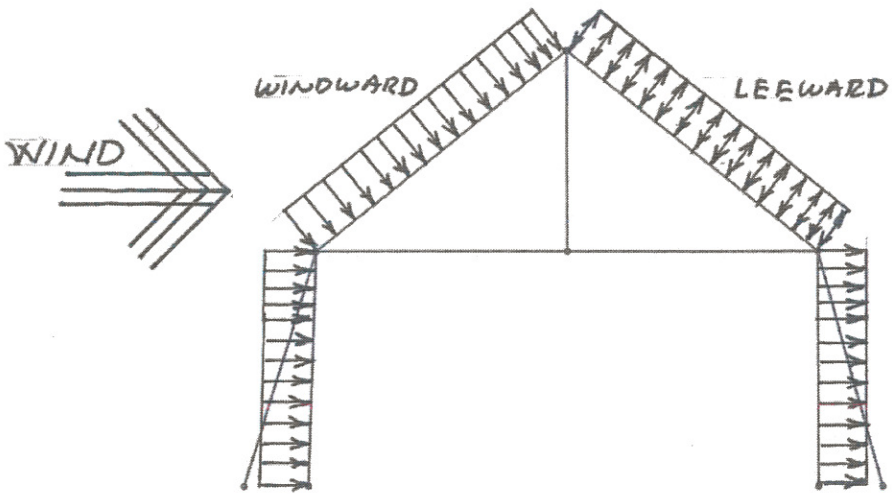
TentCraft

20' x 20' x 8' PARTIALLY ENCLOSED TENT with WALLS





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JOB TENT CRAFT
SHEET NO. 24 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

20' x 20' x 8' PARTIALLY ENCLOSED TENT

EXPOSURE = B

V = ALLOWABLE DESIGN WIND SPEED = 50 MPH

VELOCITY PRESSURE $q_z = (0.00256)(0.57)(0.85)(50)^2 = 3.1_{PSF}$

LOAD CASE 'A' GCpi = +0.55

WINDWARD WALL p = (3.1 PSF)(0.85)(0.8) - (3.1 PSF)(0.55) = 0.403 PSF
LEEWARD WALL p = (3.1 PSF)(0.85)(-0.5) - (3.1 PSF)(0.55) = -3.02 PSF
WINDWARD ROOF p = (3.1 PSF)(0.85)(-0.2) - (3.1 PSF)(0.55) = -2.23 PSF
LEEWARD ROOF p = (3.1 PSF)(0.85)(-0.6) - (3.1 PSF)(0.55) = -3.29 PSF

LOAD CASE 'B' GCpi = +0.55

WINDWARD WALL p = (3.1 PSF)(0.85)(0.8) - (3.1 PSF)(0.55) = 0.403 PSF
LEEWARD WALL p = (3.1 PSF)(0.85)(-0.5) - (3.1 PSF)(0.55) = -3.02 PSF
WINDWARD ROOF p = (3.1 PSF)(0.85)(0.3) - (3.1 PSF)(0.55) = -0.915 PSF
LEEWARD ROOF p = (3.1 PSF)(0.85)(-0.6) - (3.1 PSF)(0.55) = -3.29 PSF

LOAD CASE 'A' GCpi = -0.55

WINDWARD WALL p = (3.1 PSF)(0.85)(0.8) - (3.1 PSF)(-0.55) = 3.81 PSF
LEEWARD WALL p = (3.1 PSF)(0.85)(-0.5) - (3.1 PSF)(-0.55) = 0.388 PSF
WINDWARD ROOF p = (3.1 PSF)(0.85)(-0.2) - (3.1 PSF)(-0.55) = 1.18 PSF
LEEWARD ROOF p = (3.1 PSF)(0.85)(-0.6) - (3.1 PSF)(-0.55) = 0.124 PSF

LOAD CASE 'B' GCpi = -0.55

WINDWARD WALL p = (3.1 PSF)(0.85)(0.8) - (3.1 PSF)(-0.55) = 3.81 PSF
LEEWARD WALL p = (3.1 PSF)(0.85)(-0.5) - (3.1 PSF)(-0.55) = 0.388 PSF
WINDWARD ROOF p = (3.1 PSF)(0.85)(0.3) - (3.1 PSF)(-0.55) = 2.50 PSF
LEEWARD ROOF p = (3.1 PSF)(0.85)(-0.6) - (3.1 PSF)(-0.55) = 0.124 PSF

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JOB TENT CRAFT
SHEET NO. 25 OF
CALCULATED BY MSB DATE
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SCALE

V = 50 MPH EXPOSURE 'B' PARTIALLY ENCLOSED

GCpi = +0.55	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 444.2#	#16 433.6#	#15 553.8#	#16 545.1#
STRAP FORCE	M18 475.9#	M19 464.5#	M18 593.3#	M19 584.0#
CABLE FORCE	M14 86.1#	M17 84.6#	M14 91.7#	M17 89.4#
VERTICAL DEFLECTION	NODE #12	$\Delta V = 0.889"$	NODE #12	$\Delta V = 0.897"$
HORIZONTAL DEFLECTION	NODE #12	$\Delta H = 0.777"$	NODE #12	$\Delta H = 0.808"$

GCpi = -0.55	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 499.2#	#16 506.6#	#15 609.3#	#16 618.7#
STRAP FORCE	M18 534.8#	M19 542.7#	M18 652.8#	M19 662.9#
CABLE FORCE	M14 82.6#	M17 85.1#	M14 87.0#	M17 90.2#
VERTICAL DEFLECTION	NODE #6	$\Delta V = -0.722"$	NODE #6	$\Delta V = -0.929"$
HORIZONTAL DEFLECTION	NODE #6	$\Delta H = 0.67"$	NODE #6	$\Delta H = 0.847"$

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JOB TENT CRAFT
SHEET NO. 26 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

20' x 20' x 8' PARTIALLY ENCLOSED TENT

EXPOSURE = C

V: ALLOWABLE DESIGN WIND SPEED = 40 MPH

VELOCITY PRESSURE $q_z = (0.00256)(0.85)(0.85)(40)^2 = 2.96$ PSF

LOAD CASE 'A' $GC_{pi} = +0.55$

WINDWARD WALL $p = (2.96\ PSF)(0.85)(0.8) - (2.96\ PSF)(0.55) = 0.385\ PSF$

LEEWARD WALL $p = (2.96\ PSF)(0.85)(-0.5) - (2.96\ PSF)(0.55) = -2.88\ PSF$

WINDWARD ROOF $p = (2.96\ PSF)(0.85)(-0.2) - (2.96\ PSF)(0.55) = -2.13\ PSF$

LEEWARD ROOF $p = (2.96\ PSF)(0.85)(-0.6) - (2.96\ PSF)(0.55) = -2.12\ PSF$

LOAD CASE 'B' $GC_{pi} = +0.55$

WINDWARD WALL $p = (2.96\ PSF)(0.85)(0.8) - (2.96\ PSF)(0.55) = 0.385\ PSF$

LEEWARD WALL $p = (2.96\ PSF)(0.85)(-0.5) - (2.96\ PSF)(0.55) = -2.88\ PSF$

WINDWARD ROOF $p = (2.96\ PSF)(0.85)(0.3) - (2.96\ PSF)(0.55) = -0.873\ PSF$

LEEWARD ROOF $p = (2.96\ PSF)(0.85)(-0.6) - (2.96\ PSF)(0.55) = -2.12\ PSF$

LOAD CASE 'A' $GC_{pi} = -0.55$

WINDWARD WALL $p = (2.96\ PSF)(0.85)(0.8) - (2.96\ PSF)(-0.55) = 3.64\ PSF$

LEEWARD WALL $p = (2.96\ PSF)(0.85)(-0.5) - (2.96\ PSF)(-0.55) = 0.370\ PSF$

WINDWARD ROOF $p = (2.96\ PSF)(0.85)(-0.2) - (2.96\ PSF)(-0.55) = 1.125\ PSF$

LEEWARD ROOF $p = (2.96\ PSF)(0.85)(-0.6) - (2.96\ PSF)(-0.55) = 0.118\ PSF$

LOAD CASE 'B' $GC_{pi} = -0.55$

WINDWARD WALL $p = (2.96\ PSF)(0.85)(0.8) - (2.96\ PSF)(-0.55) = 3.64\ PSF$

LEEWARD WALL $p = (2.96\ PSF)(0.85)(-0.5) - (2.96\ PSF)(-0.55) = 0.370\ PSF$

WINDWARD ROOF $p = (2.96\ PSF)(0.85)(0.3) - (2.96\ PSF)(-0.55) = 2.38\ PSF$

LEEWARD ROOF $p = (2.96\ PSF)(0.85)(-0.6) - (2.96\ PSF)(-0.55) = 0.118\ PSF$

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JOB TENT CRAFT
SHEET NO. 27 OF
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V = 40 MPH EXPOSURE 'C' PARTIALLY ENCLOSED

GCpi = +0.55	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 333.1#	#16 324.5#	#15 437.8#	#16 431.1#
STRAP FORCE	M18 356.8#	M19 347.6#	M18 469.0#	M19 461.9#
CABLE FORCE	M14 82.9#	M17 80.4#	M14 87.4#	M17 85.7#
VERTICAL DEFLECTION	NODE # 12 $\Delta V = 0.687"$		NODE # 12 $\Delta V = 0.693"$	
HORIZONTAL DEFLECTION	NODE # 12 $\Delta H = 0.60"$		NODE # 12 $\Delta H = 0.632"$	

GCpi = -0.55	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 402.3#	#16 410.5#	#15 507.1#	#16 517.1#
STRAP FORCE	M18 431.0#	M19 439.7#	M18 543.3#	M19 553.9#
CABLE FORCE	M14 78.0#	M17 80.6#	M14 82.2#	M17 85.5#
VERTICAL DEFLECTION	NODE # 6 $\Delta V = -0.688"$		NODE # 6 $\Delta V = -0.886"$	
HORIZONTAL DEFLECTION	NODE # 6 $\Delta H = 0.627"$		NODE # 6 $\Delta H = 0.796"$	

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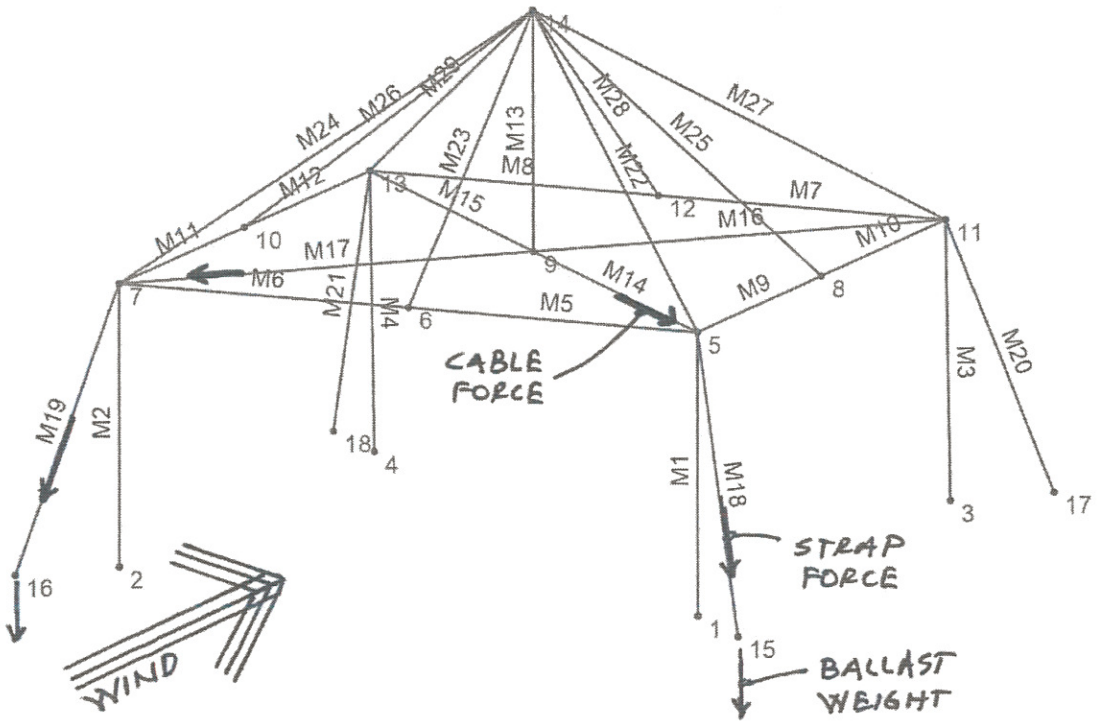
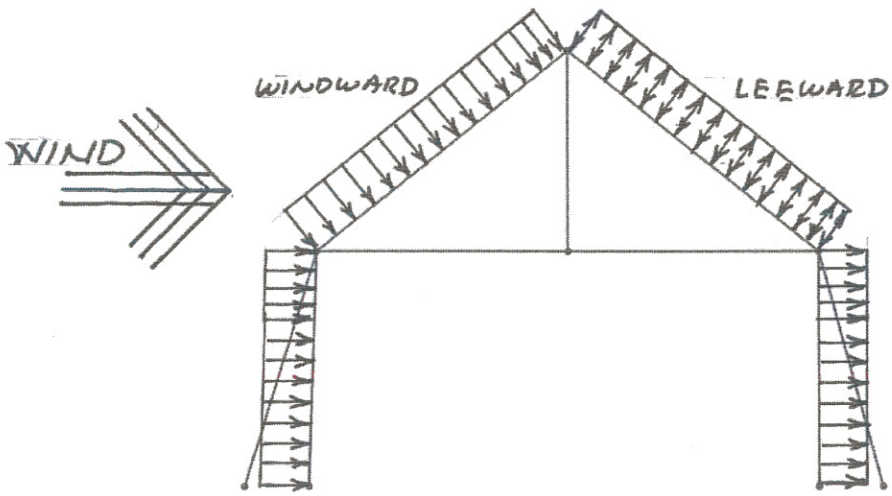
TentCraft

20' x 20' x 8' ENCLOSED TENT with WALLS





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JOB TENT CRAFT
SHEET NO. 29 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

20' x 20' x 8' ENCLOSED TENT

EXPOSURE = B

V = ALLOWABLE DESIGN WIND SPEED = 50 MPH

VELOCITY PRESSURE $q_z = (0.00256)(0.57)(0.85)(50)^2 = 3.1$ PSF

LOAD CASE 'A' $GC_{pi} = +0.18$

WINDWARD WALL $p = (3.1\ PSF)(0.85)(0.8) - (3.1\ PSF)(0.18) = 1.55\ PSF$
LEEWARD WALL $p = (3.1\ PSF)(0.85)(-0.5) - (3.1\ PSF)(0.18) = -1.88\ PSF$
WINDWARD ROOF $p = (3.1\ PSF)(0.85)(-0.2) - (3.1\ PSF)(0.18) = -1.09\ PSF$
LEEWARD ROOF $p = (3.1\ PSF)(0.85)(-0.6) - (3.1\ PSF)(0.18) = -2.14\ PSF$

LOAD CASE 'B' $GC_{pi} = +0.18$

WINDWARD WALL $p = (3.1\ PSF)(0.85)(0.8) - (3.1\ PSF)(0.18) = 1.55\ PSF$
LEEWARD WALL $p = (3.1\ PSF)(0.85)(-0.5) - (3.1\ PSF)(0.18) = -1.88\ PSF$
WINDWARD ROOF $p = (3.1\ PSF)(0.85)(0.3) - (3.1\ PSF)(0.18) = 0.233\ PSF$
LEEWARD ROOF $p = (3.1\ PSF)(0.85)(-0.6) - (3.1\ PSF)(0.18) = -2.14\ PSF$

LOAD CASE 'A' $GC_{pi} = -0.18$

WINDWARD WALL $p = (3.1\ PSF)(0.85)(0.8) - (3.1\ PSF)(-0.18) = 2.67\ PSF$
LEEWARD WALL $p = (3.1\ PSF)(0.85)(-0.5) - (3.1\ PSF)(-0.18) = -0.76\ PSF$
WINDWARD ROOF $p = (3.1\ PSF)(0.85)(-0.2) - (3.1\ PSF)(-0.18) = 0.031\ PSF$
LEEWARD ROOF $p = (3.1\ PSF)(0.85)(-0.6) - (3.1\ PSF)(-0.18) = -1.02\ PSF$

LOAD CASE 'B' $GC_{pi} = -0.18$

WINDWARD WALL $p = (3.1\ PSF)(0.85)(0.8) - (3.1\ PSF)(-0.18) = 2.67\ PSF$
LEEWARD WALL $p = (3.1\ PSF)(0.85)(-0.5) - (3.1\ PSF)(-0.18) = -0.76\ PSF$
WINDWARD ROOF $p = (3.1\ PSF)(0.85)(0.3) - (3.1\ PSF)(-0.18) = 1.35\ PSF$
LEEWARD ROOF $p = (3.1\ PSF)(0.85)(-0.6) - (3.1\ PSF)(-0.18) = -1.02\ PSF$

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JOB TENT CRAFT
SHEET NO. 30 OF
CALCULATED BY MSB DATE
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SCALE

V = 50 MPH EXPOSURE 'B' ENCLOSED

GCpi = +0.18	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 436.2#	#16 431.8#	#15 546.5#	#16 544.0#
STRAP FORCE	M18 467.3#	M19 462.6#	M18 585.5#	M19 582.9#
CABLE FORCE	M14 84.1#	M17 83.3#	M14 88.9#	M17 88.9#
VERTICAL DEFLECTION	NODE #12	$\Delta V = 0.577"$	NODE #12	$\Delta V = 0.582"$
HORIZONTAL DEFLECTION	NODE #12	$\Delta H = 0.544"$	NODE #12	$\Delta H = 0.582"$

GCpi = -0.18	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 429.0#	#16 430.9#	#15 539.0#	#16 542.9#
STRAP FORCE	M18 459.6#	M19 461.6#	M18 577.5#	M19 581.6#
CABLE FORCE	M14 81.2#	M17 82.6#	M14 86.0#	M17 88.2#
VERTICAL DEFLECTION	NODE #6	$\Delta V = -0.407"$	NODE #6	$\Delta V = -0.612"$
HORIZONTAL DEFLECTION	NODE #6	$\Delta H = 0.414"$	NODE #6	$\Delta H = 0.598"$

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JOB TENT CRAFT
SHEET NO. 31 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

20' x 20' x 8' ENCLOSED TENT

EXPOSURE = C

V: ALLOWABLE DESIGN WIND SPEED = 40 MPH

VELOCITY PRESSURE $q_z = (0.00256)(0.85)(0.85)(40)^2 = 2.96$ PSF

LOAD CASE 'A' $GC_{pi} = +0.18$

WINDWARD WALL $p = (2.96\text{PSF})(0.85)(0.8) - (2.96\text{PSF})(0.18) = 1.48$ PSF

LEEWARD WALL $p = (2.96\text{PSF})(0.85)(-0.5) - (2.96\text{PSF})(0.18) = -1.79$ PSF

WINDWARD ROOF $p = (2.96\text{PSF})(0.85)(-0.2) - (2.96\text{PSF})(0.18) = -1.04$ PSF

LEEWARD ROOF $p = (2.96\text{PSF})(0.85)(-0.6) - (2.96\text{PSF})(0.18) = -2.04$ PSF

LOAD CASE 'B' $GC_{pi} = +0.18$

WINDWARD WALL $p = (2.96\text{PSF})(0.85)(0.8) - (2.96\text{PSF})(0.18) = 1.48$ PSF

LEEWARD WALL $p = (2.96\text{PSF})(0.85)(-0.5) - (2.96\text{PSF})(0.18) = -1.79$ PSF

WINDWARD ROOF $p = (2.96\text{PSF})(0.85)(0.3) - (2.96\text{PSF})(0.18) = 0.222$ PSF

LEEWARD ROOF $p = (2.96\text{PSF})(0.85)(-0.6) - (2.96\text{PSF})(0.18) = -2.04$ PSF

LOAD CASE 'A' $GC_{pi} = -0.18$

WINDWARD WALL $p = (2.96\text{PSF})(0.85)(0.8) - (2.96\text{PSF})(-0.18) = 2.55$ PSF

LEEWARD WALL $p = (2.96\text{PSF})(0.85)(-0.5) - (2.96\text{PSF})(-0.18) = -0.725$ PSF

WINDWARD ROOF $p = (2.96\text{PSF})(0.85)(-0.2) - (2.96\text{PSF})(-0.18) = 0.030$ PSF

LEEWARD ROOF $p = (2.96\text{PSF})(0.85)(-0.6) - (2.96\text{PSF})(-0.18) = -0.977$ PSF

LOAD CASE 'B' $GC_{pi} = -0.18$

WINDWARD WALL $p = (2.96\text{PSF})(0.85)(0.8) - (2.96\text{PSF})(-0.18) = 2.55$ PSF

LEEWARD WALL $p = (2.96\text{PSF})(0.85)(-0.5) - (2.96\text{PSF})(-0.18) = -0.725$ PSF

WINDWARD ROOF $p = (2.96\text{PSF})(0.85)(0.3) - (2.96\text{PSF})(-0.18) = 1.288$ PSF

LEEWARD ROOF $p = (2.96\text{PSF})(0.85)(-0.6) - (2.96\text{PSF})(-0.18) = -0.977$ PSF

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JOB TENT CRAFT
SHEET NO. 32 OF
CALCULATED BY MSB DATE
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V = 40 MPH EXPOSURE 'C' ENCLOSED

GCpi = ±0.18	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 415.6#	#16 411.4#	#15 520.8#	#16 518.5#
STRAP FORCE	M18 445.3#	M19 440.8#	M18 558.0#	M19 555.5#
CABLE FORCE	M14 83.4#	M17 82.6#	M14 87.9#	M17 87.9#
VERTICAL DEFLECTION	NODE # 12 $\Delta V = 0.549"$		NODE # 12 $\Delta V = 0.554"$	
HORIZONTAL DEFLECTION	NODE # 12 $\Delta H = 0.518"$		NODE # 12 $\Delta H = 0.554"$	

GCpi = -0.18	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 409.7#	#16 411.6#	#15 514.6#	#16 518.3#
STRAP FORCE	M18 438.9#	M19 440.9#	M18 551.4#	M19 555.3#
CABLE FORCE	M14 80.6#	M17 82.0#	M14 85.2#	M17 87.4#
VERTICAL DEFLECTION	NODE # 6 $\Delta V = -0.39"$		NODE # 6 $\Delta V = -0.587"$	
HORIZONTAL DEFLECTION	NODE # 6 $\Delta H = 0.396"$		NODE # 6 $\Delta H = 0.572"$	

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TentCraft

Appendix: Alternate 2" Guy Strap Assembly

An alternate 2" guy strap assembly was used with the tent structural support frame. The table below provides post base reactions and ballast weights for each enclosure and exposure category. The ground should be structurally adequate for the required bearing pressures of the post base as well as the required forces of the tent stakes. A Soils Engineer shall verify the ground condition on a site-by-site basis and provide appropriate bearing plate sizes to accommodate the post loading.

Tent: 20' x 20' with 8' Head Clearance
2" guy strap assembly with an allowable working load limit = 3333. #
Ballasting weight as noted in table

Enclosure	Exposure	Maximum Wind Speed	Post #	Vertical Reaction Down	Post Uplift Reaction	Ballast Weight
Open Tent	B	65 MPH	P1	749.0#	-38.0#	560.0#
Open Tent	C	50 MPH	P1	666.0#	-31.0#	493.0#
Partially Enclosed Tent	B	60 MPH	P1	1013.0#	-99.0#	894.0#
Partially Enclosed Tent	C	45 MPH	P1	763.0#	-79.0#	672.0#
Enclosed Tent	B	70 MPH	P1	1149.0#	-78.0#	1075.0#
Enclosed Tent	C	55 MPH	P1	1062.0#	-70.0#	989.0#

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JOB TENT CRAFT
SHEET NO. 34 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

20' x 20' x 8' OPEN STRUCTURE WITH VALANCE

EXPOSURE = B

V = ALLOWABLE DESIGN WIND SPEED = 65 MPH

VELOCITY PRESSURE $q_z = (0.00256)(0.57)(0.85)(65)^2 = 5.24$ PSF

LOAD CASE 'A'
- WINDWARD ROOF $p = (5.24\ PSF)(0.85)(1.3) = 5.79$ PSF
- LEEWARD ROOF $p = (5.24\ PSF)(0.85)(0.6) = 2.67$ PSF
- WINDWARD VALANCE $p = (5.24\ PSF)(1.5) = 7.86$ PSF
- LEEWARD VALANCE $p = (5.24\ PSF)(-1.0) = -5.24$ PSF

LOAD CASE 'B'
- WINDWARD ROOF $p = (5.24\ PSF)(0.85)(-0.2) = -0.891$ PSF
- LEEWARD ROOF $p = (5.24\ PSF)(0.85)(-0.6) = -2.67$ PSF
- WINDWARD VALANCE $p = (5.24\ PSF)(1.5) = 7.86$ PSF
- LEEWARD VALANCE $p = (5.24\ PSF)(-1.0) = -5.24$ PSF

V = 65 MPH

	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 545.0#	#16 559.2#	#15 438.4#	#16 434.9#
STRAP FORCE	M18 583.9#	M19 599.1#	M18 469.6#	M19 465.9#
CABLE FORCE	M14 88.5#	M17 92.3#	M14 82.6#	M17 82.0#
VERTICAL DEFLECTION	NODE #6 $\Delta V = -1.203$"		NODE #12 $\Delta V = 0.566$"	
HORIZONTAL DEFLECTION	NODE #6 $\Delta H = 0.986$"		NODE #12 $\Delta H = 0.511$"	

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JOB TENT CRAFT
SHEET NO. 35 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

20' x 20' x 8' OPEN STRUCTURE WITH VALANCE

EXPOSURE = C

V = ALLOWABLE DESIGN WIND SPEED = 50 MPH

VELOCITY PRESSURE $q_z = (0.00256)(0.85)(0.85)(50)^2 = 4.62$ PSF

LOAD CASE 'A'
- WINDWARD ROOF $p = (4.62\ PSF)(0.85)(1.3) = 5.11$ PSF
- LEEWARD ROOF $p = (4.62\ PSF)(0.85)(0.6) = 2.36$ PSF
- WINDWARD VALANCE $p = (4.62\ PSF)(1.5) = 6.93$ PSF
- LEEWARD VALANCE $p = (4.62\ PSF)(-1.0) = -4.62$ PSF

LOAD CASE 'B'
- WINDWARD ROOF $p = (4.62\ PSF)(0.85)(-0.2) = -0.785$ PSF
- LEEWARD ROOF $p = (4.62\ PSF)(0.85)(-0.6) = -2.36$ PSF
- WINDWARD VALANCE $p = (4.62\ PSF)(1.5) = 6.93$ PSF
- LEEWARD VALANCE $p = (4.62\ PSF)(-1.0) = -4.62$ PSF

V = 50 MPH

	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 480.2#	#16 492.9#	#15 387.0#	#16 384.1#
STRAP FORCE	M18 514.5#	M19 528.0#	M18 414.6#	M19 411.4#
CABLE FORCE	M14 86.0#	M17 89.5#	M14 80.9#	M17 80.4#
VERTICAL DEFLECTION	NODE #6 $\Delta V = -1.069$"		NODE #12 $\Delta V = 0.498$"	
HORIZONTAL DEFLECTION	NODE #6 $\Delta H = 0.875$"		NODE #12 $\Delta H = 0.45$"	

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JOB TENT CRAFT
SHEET NO. 36 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

20' x 20' x 8' PARTIALLY ENCLOSED TENT

EXPOSURE = B

V: ALLOWABLE DESIGN WIND SPEED = 60 MPH

VELOCITY PRESSURE $q_z = (0.00256)(0.57)(0.85)(60)^2 = 4.47$ PSF

LOAD CASE 'A' $GC_{pi} = +0.55$

WINDWARD WALL $p = (4.47\ PSF)(0.85)(0.8) - (4.47\ PSF)(0.55) = 0.581\ PSF$

LEEWARD WALL $p = (4.47\ PSF)(0.85)(-0.5) - (4.47\ PSF)(0.55) = -4.36\ PSF$

WINDWARD ROOF $p = (4.47\ PSF)(0.85)(-0.2) - (4.47\ PSF)(0.55) = -3.22\ PSF$

LEEWARD ROOF $p = (4.47\ PSF)(0.85)(-0.6) - (4.47\ PSF)(0.55) = -4.74\ PSF$

LOAD CASE 'B' $GC_{pi} = +0.55$

WINDWARD WALL $p = (4.47\ PSF)(0.85)(0.8) - (4.47\ PSF)(0.55) = 0.581\ PSF$

LEEWARD WALL $p = (4.47\ PSF)(0.85)(-0.5) - (4.47\ PSF)(0.55) = -4.36\ PSF$

WINDWARD ROOF $p = (4.47\ PSF)(0.85)(0.3) - (4.47\ PSF)(0.55) = -1.319\ PSF$

LEEWARD ROOF $p = (4.47\ PSF)(0.85)(-0.6) - (4.47\ PSF)(0.55) = -4.74\ PSF$

LOAD CASE 'A' $GC_{pi} = -0.55$

WINDWARD WALL $p = (4.47\ PSF)(0.85)(0.8) - (4.47\ PSF)(-0.55) = 5.50\ PSF$

LEEWARD WALL $p = (4.47\ PSF)(0.85)(-0.5) - (4.47\ PSF)(-0.55) = 0.559\ PSF$

WINDWARD ROOF $p = (4.47\ PSF)(0.85)(-0.2) - (4.47\ PSF)(-0.55) = 1.699\ PSF$

LEEWARD ROOF $p = (4.47\ PSF)(0.85)(-0.6) - (4.47\ PSF)(-0.55) = 0.179\ PSF$

LOAD CASE 'B' $GC_{pi} = -0.55$

WINDWARD WALL $p = (4.47\ PSF)(0.85)(0.8) - (4.47\ PSF)(-0.55) = 5.50\ PSF$

LEEWARD WALL $p = (4.47\ PSF)(0.85)(-0.5) - (4.47\ PSF)(-0.55) = 0.559\ PSF$

WINDWARD ROOF $p = (4.47\ PSF)(0.85)(0.3) - (4.47\ PSF)(-0.55) = 3.60\ PSF$

LEEWARD ROOF $p = (4.47\ PSF)(0.85)(-0.6) - (4.47\ PSF)(-0.55) = 0.179\ PSF$

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Fax (231) 932-0179

JOB TENT CRAFT
SHEET NO. 37 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

V = 60 MPH EXPOSURE 'B' PARTIALLY ENCLOSED

GCpi = +0.55	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 641.6#	#16 625.9#	#15 799.9#	#16 787.1#
STRAP FORCE	M18 687.4#	M19 670.6#	M18 857.1#	M19 843.4#
CABLE FORCE	M14 93.6#	M17 91.4#	M14 102.1#	M17 98.5#
VERTICAL DEFLECTION	NODE #12 $\Delta V = 1.284"$		NODE #12 $\Delta V = 1.295"$	
HORIZONTAL DEFLECTION	NODE #12 $\Delta H = 1.12"$		NODE #12 $\Delta H = 1.162"$	

GCpi = -0.55	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 722.0#	#16 732.1#	#15 880.8#	#16 893.7#
STRAP FORCE	M18 773.6#	M19 784.4#	M18 943.8#	M19 957.6#
CABLE FORCE	M14 88.5#	M17 93.2#	M14 95.6#	M17 99.9#
VERTICAL DEFLECTION	NODE #6 $\Delta V = -1.015"$		NODE #6 $\Delta V = -1.307"$	
HORIZONTAL DEFLECTION	NODE #6 $\Delta H = 0.95"$		NODE #6 $\Delta H = 1.201"$	

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JOB TENT CRAFT
SHEET NO. 38 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

20' x 20' x 8' PARTIALLY ENCLOSED TENT

EXPOSURE = C

V: ALLOWABLE DESIGN WIND SPEED = 45 MPH

VELOCITY PRESSURE $q_z = (0.00256)(0.85)(0.85)(45)^2 = 3.75$ PSF

LOAD CASE 'A' GCpi = +0.55

WINDWARD WALL $p = (3.75\text{PSF})(0.85)(0.8) - (3.75\text{ PSF})(0.55) = 0.488$ PSF
LEEWARD WALL $p = (3.75\text{ PSF})(0.85)(-0.5) - (3.75\text{ PSF})(0.55) = -3.66$ PSF
WINDWARD ROOF $p = (3.75\text{ PSF})(0.85)(-0.2) - (3.75\text{ PSF})(0.55) = -2.70$ PSF
LEEWARD ROOF $p = (3.75\text{ PSF})(0.85)(-0.6) - (3.75\text{ PSF})(0.55) = -3.98$ PSF

LOAD CASE 'B' GCpi = +0.55

WINDWARD WALL $p = (3.75\text{ PSF})(0.85)(0.8) - (3.75\text{ PSF})(0.55) = 0.488$ PSF
LEEWARD WALL $p = (3.75\text{ PSF})(0.85)(-0.5) - (3.75\text{ PSF})(0.55) = -3.66$ PSF
WINDWARD ROOF $p = (3.75\text{ PSF})(0.85)(0.3) - (3.75\text{ PSF})(0.55) = -1.106$ PSF
LEEWARD ROOF $p = (3.75\text{ PSF})(0.85)(-0.6) - (3.75\text{ PSF})(0.55) = -3.98$ PSF

LOAD CASE 'A' GCpi = -0.55

WINDWARD WALL $p = (3.75\text{ PSF})(0.85)(0.8) - (3.75\text{ PSF})(-0.55) = 4.61$ PSF
LEEWARD WALL $p = (3.75\text{ PSF})(0.85)(-0.5) - (3.75\text{ PSF})(-0.55) = 0.469$ PSF
WINDWARD ROOF $p = (3.75\text{ PSF})(0.85)(-0.2) - (3.75\text{ PSF})(-0.55) = 1.425$ PSF
LEEWARD ROOF $p = (3.75\text{ PSF})(0.85)(-0.6) - (3.75\text{ PSF})(-0.55) = 0.150$ PSF

LOAD CASE 'B' GCpi = -0.55

WINDWARD WALL $p = (3.75\text{ PSF})(0.85)(0.8) - (3.75\text{ PSF})(-0.55) = 4.61$ PSF
LEEWARD WALL $p = (3.75\text{ PSF})(0.85)(-0.5) - (3.75\text{ PSF})(-0.55) = 0.469$ PSF
WINDWARD ROOF $p = (3.75\text{ PSF})(0.85)(0.3) - (3.75\text{ PSF})(-0.55) = 3.02$ PSF
LEEWARD ROOF $p = (3.75\text{ PSF})(0.85)(-0.6) - (3.75\text{ PSF})(-0.55) = 0.150$ PSF

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Fax (231) 932-0179

JOB TENT CRAFT
SHEET NO. 39 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

V = 45 MPH EXPOSURE 'C' PARTIALLY ENCLOSED

GCpi = +0.55	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 538.7#	#16 525.6#	#15 671.4#	#16 660.8#
STRAP FORCE	M18 577.1#	M19 563.1#	M18 719.4#	M19 708.0#
CABLE FORCE	M14 89.7#	M17 87.8#	M14 96.7#	M17 93.8#
VERTICAL DEFLECTION	NODE #12 $\Delta V = 1.077"$		NODE #12 $\Delta V = 1.087"$	
HORIZONTAL DEFLECTION	NODE #12 $\Delta H = 0.941"$		NODE #12 $\Delta H = 0.977"$	

GCpi = -0.55	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 510.6#	#16 520.5#	#15 643.7#	#16 656.0#
STRAP FORCE	M18 547.0#	M19 557.7#	M18 689.7#	M19 702.8#
CABLE FORCE	M14 80.8#	M17 84.0#	M14 86.2#	M17 90.1#
VERTICAL DEFLECTION	NODE #6 $\Delta V = -0.856"$		NODE #6 $\Delta V = -1.106"$	
HORIZONTAL DEFLECTION	NODE #6 $\Delta H = 0.786"$		NODE #6 $\Delta H = 0.999"$	

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JOB TENT CRAFT
SHEET NO. 40 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

20' x 20' x 8' ENCLOSED TENT

EXPOSURE = B

V: ALLOWABLE DESIGN WIND SPEED = 70 MPH

VELOCITY PRESSURE $q_z = (0.00256)(0.57)(0.85)(70)^2 = 6.08$ PSF

LOAD CASE 'A' $GC_{pi} = +0.18$

WINDWARD WALL $p = (6.08\text{PSF})(0.85)(0.8) - (6.08\text{ PSF})(0.18) = 3.04$ PSF

LEEWARD WALL $p = (6.08\text{ PSF})(0.85)(-0.5) - (6.08\text{ PSF})(0.18) = -3.68$ PSF

WINDWARD ROOF $p = (6.08\text{ PSF})(0.85)(-0.2) - (6.08\text{ PSF})(0.18) = -2.13$ PSF

LEEWARD ROOF $p = (6.08\text{ PSF})(0.85)(-0.6) - (6.08\text{ PSF})(0.18) = -4.20$ PSF

LOAD CASE 'B' $GC_{pi} = +0.18$

WINDWARD WALL $p = (6.08\text{PSF})(0.85)(0.8) - (6.08\text{PSF})(0.18) = 3.04$ PSF

LEEWARD WALL $p = (6.08\text{ PSF})(0.85)(-0.5) - (6.08\text{ PSF})(0.18) = -3.68$ PSF

WINDWARD ROOF $p = (6.08\text{ PSF})(0.85)(0.3) - (6.08\text{ PSF})(0.18) = 0.456$ PSF

LEEWARD ROOF $p = (6.08\text{ PSF})(0.85)(-0.6) - (6.08\text{ PSF})(0.18) = -4.20$ PSF

LOAD CASE 'A' $GC_{pi} = -0.18$

WINDWARD WALL $p = (6.08\text{PSF})(0.85)(0.8) - (6.08\text{PSF})(-0.18) = 5.23$ PSF

LEEWARD WALL $p = (6.08\text{ PSF})(0.85)(-0.5) - (6.08\text{ PSF})(-0.18) = -1.49$ PSF

WINDWARD ROOF $p = (6.08\text{ PSF})(0.85)(-0.2) - (6.08\text{ PSF})(-0.18) = 0.061$ PSF

LEEWARD ROOF $p = (6.08\text{ PSF})(0.85)(-0.6) - (6.08\text{ PSF})(-0.18) = -2.01$ PSF

LOAD CASE 'B' $GC_{pi} = -0.18$

WINDWARD WALL $p = (6.08\text{ PSF})(0.85)(0.8) - (6.08\text{ PSF})(-0.18) = 5.23$ PSF

LEEWARD WALL $p = (6.08\text{ PSF})(0.85)(-0.5) - (6.08\text{ PSF})(-0.18) = -1.49$ PSF

WINDWARD ROOF $p = (6.08\text{ PSF})(0.85)(0.3) - (6.08\text{ PSF})(-0.18) = 2.64$ PSF

LEEWARD ROOF $p = (6.08\text{ PSF})(0.85)(-0.6) - (6.08\text{ PSF})(-0.18) = -2.01$ PSF

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Fax (231) 932-0179

JOB TENT CRAFT
SHEET NO. 41 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

V = 70 MPH EXPOSURE 'B' ENCLOSED

GCpi = +0.18	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 858.4#	#16 849.0#	#15 1074.1#	#16 1068.5#
STRAP FORCE	M18 919.9#	M19 909.8#	M18 1151.2#	M19 1145.1#
CABLE FORCE	M14 99.5#	M17 97.3#	M14 108.9#	M17 108.2#
VERTICAL DEFLECTION	NODE #12 $\Delta V = 1.142"$		NODE #12 $\Delta V = 1.153"$	
HORIZONTAL DEFLECTION	NODE #12 $\Delta H = 1.068"$		NODE #12 $\Delta H = 1.144"$	

GCpi = -0.18	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 844.9#	#16 847.6#	#15 1060.2#	#16 1066.7#
STRAP FORCE	M18 905.3#	M19 908.3#	M18 1136.2#	M19 1143.3#
CABLE FORCE	M14 93.9#	M17 96.0#	M14 103.3#	M17 106.9#
VERTICAL DEFLECTION	NODE #6 $\Delta V = -0.752"$		NODE #6 $\Delta V = -1.142"$	
HORIZONTAL DEFLECTION	NODE #6 $\Delta H = 0.783"$		NODE #6 $\Delta H = 1.133"$	

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JOB TENT CRAFT
SHEET NO. 42 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

20' x 20' x 8' ENCLOSED TENT

EXPOSURE = C

V: ALLOWABLE DESIGN WIND SPEED = 55 MPH

VELOCITY PRESSURE $q_z = (0.00256)(0.85)(0.85)(55)^2 = 5.60$ PSF

LOAD CASE 'A' $GC_{pi} = +0.18$

WINDWARD WALL $p = (5.6\ PSF)(0.85)(0.8) - (5.6\ PSF)(0.18) = 2.80\ PSF$
LEEWARD WALL $p = (5.6\ PSF)(0.85)(-0.5) - (5.6\ PSF)(0.18) = -3.39\ PSF$
WINDWARD ROOF $p = (5.6\ PSF)(0.85)(-0.2) - (5.6\ PSF)(0.18) = -1.96\ PSF$
LEEWARD ROOF $p = (5.6\ PSF)(0.85)(-0.6) - (5.6\ PSF)(0.18) = -3.86\ PSF$

LOAD CASE 'B' $GC_{pi} = +0.18$

WINDWARD WALL $p = (5.6\ PSF)(0.85)(0.8) - (5.6\ PSF)(0.18) = 2.8\ PSF$
LEEWARD WALL $p = (5.6\ PSF)(0.85)(-0.5) - (5.6\ PSF)(0.18) = -3.39\ PSF$
WINDWARD ROOF $p = (5.6\ PSF)(0.85)(0.3) - (5.6\ PSF)(0.18) = 0.420\ PSF$
LEEWARD ROOF $p = (5.6\ PSF)(0.85)(-0.6) - (5.6\ PSF)(0.18) = -3.86\ PSF$

LOAD CASE 'A' $GC_{pi} = -0.18$

WINDWARD WALL $p = (5.6\ PSF)(0.85)(0.8) - (5.6\ PSF)(-0.18) = 4.82\ PSF$
LEEWARD WALL $p = (5.6\ PSF)(0.85)(-0.5) - (5.6\ PSF)(-0.18) = -1.372\ PSF$
WINDWARD ROOF $p = (5.6\ PSF)(0.85)(-0.2) - (5.6\ PSF)(-0.18) = 0.056\ PSF$
LEEWARD ROOF $p = (5.6\ PSF)(0.85)(-0.6) - (5.6\ PSF)(-0.18) = -1.848\ PSF$

LOAD CASE 'B' $GC_{pi} = -0.18$

WINDWARD WALL $p = (5.6\ PSF)(0.85)(0.8) - (5.6\ PSF)(-0.18) = 4.82\ PSF$
LEEWARD WALL $p = (5.6\ PSF)(0.85)(-0.5) - (5.6\ PSF)(-0.18) = -1.372\ PSF$
WINDWARD ROOF $p = (5.6\ PSF)(0.85)(0.3) - (5.6\ PSF)(-0.18) = 2.44\ PSF$
LEEWARD ROOF $p = (5.6\ PSF)(0.85)(-0.6) - (5.6\ PSF)(-0.18) = -1.848\ PSF$

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Phone (231) 932-9177
Fax (231) 932-0179

JOB TENT CRAFT
SHEET NO. 43 OF
CALCULATED BY MSB DATE
CHECKED BY DATE
SCALE

V = 55 MPH EXPOSURE 'C' ENCLOSED

GCpi = +0.18	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 790.1#	#16 781.5#	#15 988.6#	#16 983.5#
STRAP FORCE	M18 846.7#	M19 837.4#	M18 1059.5#	M19 1054.0#
CABLE FORCE	M14 97.0#	M17 95.1#	M14 105.6#	M17 105.1#
VERTICAL DEFLECTION	NODE # 12 $\Delta V = 1.051"$		NODE # 12 $\Delta V = 1.061"$	
HORIZONTAL DEFLECTION	NODE # 12 $\Delta H = 0.983"$		NODE # 12 $\Delta H = 1.053"$	

GCpi = -0.18	WIND CASE 'A'		WIND CASE 'B'	
BALLAST WEIGHT	#15 777.8#	#16 780.5#	#15 976.8#	#16 983.0#
STRAP FORCE	M18 833.5#	M19 836.3#	M18 1046.9#	M19 1053.4#
CABLE FORCE	M14 91.9#	M17 93.8#	M14 100.5#	M17 103.9#
VERTICAL DEFLECTION	NODE # 6 $\Delta V = -0.697"$		NODE # 6 $\Delta V = -1.059"$	
HORIZONTAL DEFLECTION	NODE # 6 $\Delta H = 0.724"$		NODE # 6 $\Delta H = 1.049"$	