



MT FAIR COW

**STRUCTURAL ANALYSIS
REVISION 0**

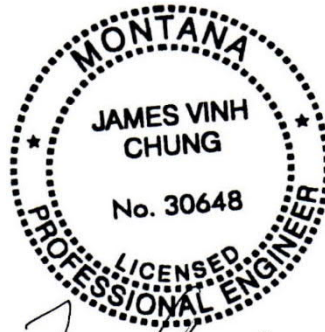
TIA-222-H / IBC 2021 / ASCE 7-16

55'-0" Pnuematic Mass COW

**BILLINGS, MT
YELLOWSTONE COUNTY
45°47'53.09" -108°28'46.50"**

PROJECT ENGINEER: DANH HO, E.I.T

EOR: JAMES CHUNG, P.E.



May 3, 2024

MAXIMUM ANTICIPATED STRESS LEVEL & RESULTS

STRUCTURAL COMPONENT	RESULTS
Pnuematic Mass COW	Sufficient

REVISION CHART

REVISION	DATE ISSUED	DESCRIPTION
0	05/03/2023	Initial Structural Analysis



May 3, 2024

Verizon

Subject: *Structural Analysis*
Project: *COW Installation Project*
Revision: *0*
Site Name: *MT Fair COW*
Site Number:
Site Location: *308 6th Ave. N*
Billings, MT 59101
Coordinate *45°47'53.09" -108°28'46.50"*
Structure Information: *55'-0" Pnuematic Mass COW*

To Whom It May Concern:

PM&As is pleased to present the following **Structural Analysis report** for the **MT Pair COW** Pnuematic Mass COW located in Billings, MT. It was a pleasure assisting you with the project referenced above and we look forward to providing you with our Structural Engineering Services in the future.

Based on our analysis, PM&As has determined the following conclusion:

Structural Adequacy: **Sufficient**
Maximum CSR : **96%**

This analysis has been performed based upon an ultimate 3-second gust wind speed of 110 mph in accordance with the 2021 International Building Code. Refer to the following pages for applicable Standard references and design criteria as required.

If you have any questions concerning the content of this report please do not hesitate to contact us at 949-247-7767.

Prepared By: Danh Ho, E.I.T
Signed and Submitted By:
James Chung, P.E.

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PURPOSE

At the request of Verizon, PM&A performed a Structural Analysis of the MT Fair COW Pnuematic Mass COW located in Billings, MT. The analysis was performed to determine the Pnuematic Mass COW 's capability of supporting Verizon's proposed appurtenance implementations.

EXECUTIVE SUMMARY

PM&A concludes the existing 55'-0" Pnuematic Mass COW structure is capable of supporting Verizon's proposed appurtenance implementations. Please refer to the "Conclusion & Recommendations" portion of this report for further information.

TOWER DESCRIPTIONS

The Pnuematic mast cow consists of a pre-manufactured heavy-duty pneumatic mast mounted on a communication on-site light trailer (COLT) in which it is intended for a temporarily Cell on Wheel (COW) deployment. structural elements and geometry.

DOCUMENTATIONS

- PM&A Construction Drawing 90% CD Rev-A, dated 04/17/2024.
- RFDS, dated 04/12/2024, provided by Verizon.
- BOI Peabody COW Mapping, dated 01/09/2020, provided by Geostructural.

SCOPE OF WORKS

Verizon proposed the following:

- Install new Cell on Wheel.
- Install (9) new Panel Antennas at the 55'-0" and 50'-0" levels.
- Install (6) new Remote Radio Heads on Communication on-Site Light Trailer (COLT).

Table 1.0 Final Antenna Configuration on the COW:

ATTACH LEVEL (COR)	AZIMUTH (deg., MN)	ANTENNA TYPE	ANTENNA QUANTITY	MOUNT TYPE	COAX (QTY.) SIZE (Nominal)
~55'-0"	70°	Commscope NHH-65B-R2B	6	Pipe Mounts	(36) 7/8"
~50'-0"	180°	Ericsson AIR6449	3		
-	325°	Ericsson 4449	3	COLT	
	-	Ericsson 8843	3		
	-	Raycap OVP12	2		

Notes:

1. New appurtenances are shown in "BOLD".

STRUCTURAL ANALYSIS

CODE AND STANDARDS:

Our Structural Analysis was performed in accordance with the requirements set forth in the following:

- Jurisdiction: Billings, MT
- TIA-222-H, Structural Standard for Antenna Supporting Structures and Antennas
- International Building Code (IBC) 2021, §1609, §1613, §3108.1, and Referenced Standards
- ASCE 7-16, Minimum Design Loads for Buildings and Other Structures, Chapter 29

DESIGN CRITERIA:

The tower design criteria limitation (load/codes) as set forth in the following:

- $V_{ULT} = 110$ mph (3-sec. gust)
- $V_{ICE} = 50$ mph
- Radial Ice = 1/2"
- Risk Category = II
- Topography Category = 1
- Exposure = C
- Soil Site Class = D(Default)
- Seismic Design Category = B
- $S_{DS} = 0.137$

The material properties of the tower are based on following:

Tower Steel Grades (assumed for the purpose of structural analysis):

- Pneumatic Mast: Aluminum 6061-T6.

STRUCTURAL ANALYSIS PROCEDURES

ANALYSIS ASSUMPTIONS:

- All tower components including tower members, bolts, connections and welds are in good and reliable structural condition with no structural defects.
- All tower components, including any modifications were properly designed, detailed, fabricated, erected and maintained throughout the lifetime of the tower.
- Structural members and materials used for construction in accordance with original design documents.
- The Trailer being used to support the Pnuematic mast is intended for the purposes of cell on wheel.
- All new antennas and coax to be installed according to recommendations (if any).

DISCLAIMERS:

1. Due to limited data and access to the existing tower, PM&As made certain assumptions regarding the structural analysis. All existing structural elements of the tower structure and antenna mount are presumed to be properly fastened and in good and reliable structural condition without structural damage at the time of the analysis. Should any existing structural elements be deemed to not be in good and reliable structural condition, PM&As shall not be held liable for any structural deficiencies. As such, PM&As shall be notified of the structural deficiencies in which any necessary upgrades or remedies can be determined as required at that time.
2. PM&As made certain assumptions pertaining to the material properties of the tower framing elements. It should be noted that if the members are of lower material grades than what was assumed for this analysis, additional capacity may not exist. As such, PM&As will be notified in which a revised structural analysis will be required.
3. The results of this analysis are representative of the Pnuematic Mast COW, as presented to PM&As, based on the tower mapping by GeoStructural. Confirmation of the aforementioned data is beyond the scope of this project. It should be noted that omissions of any structural elements of the tower and the associated trailer which can change the result of this analysis will void this analysis and require re-evaluation. In no event shall PM&As be liable for the accuracy of the information.

ANALYSIS PROCEDURES:

PM&As utilized TNX Tower (version 8.1.1.0), an industry standard program for tower structure analysis and RISA 3D (version 17.0.4 or 21.0.0), a three-dimensional analysis and design program, to perform the structural analysis of the tower and determine the tower adequacy within the codes allowable limits. The proposed loads being evaluated take into account the design load criteria set forth by the jurisdiction as required.

ANALYSIS RESULTS

TOWER ANALYSIS:

MAXIMUM STRESS USAGE:

The following chart outlines the maximum anticipated tower stresses (expressed as a percentage of overall capacity) as a result of the associated Load Combination.

Table 2.0: Tower Stress Usage:

LOAD COMBINATION	% USAGE		
	MAXIMUM MEMBER STRESS	TOWER MEMBER (SECTION)	MAXIMUM GUY CABLE STRESS
Existing Antennas + Verizon Antenna Implementations	96%	Pole	75% @ G1

In pursuant to the TIA-222-H section 15.5, the change in design loads less than 105% is acceptable and design loads greater than 105% is not acceptable without requiring structural modifications. Thus, the change in design loads due to Verizon's proposed appurtenances is less than 105%. Therefore, it is within code allowable limits.

COMMUNICATION ON LIGHT TRAILER (COLT):

OVERTURNING ANALYSIS:

The following chart outlines the maximum anticipated overturning moment and GVWR capacity (expressed as a factor of safety exceeding the maximum requiring limit) as a result of the associated Load Combination.

Table 3.0: Safety of Factor Usage:

LOAD COMBINATION	FORCE ELEMENT	CALCULATED FACTOR OF SAFETY	PASS/FAIL
Proposed Verizon Antennas (Worst Case)	Overturning Moment	2.59 (1.5 S.F)	Pass
	GVWR Capacity (18,000 lbs)	1.16 (1.0 SF)	Pass

FOUNDATION ANALYSIS:

The use of the COW is intended for a temporary Cell On Wheel (COW) deployment in which it is assumed the trailer is on stable ground. Therefore, the foundation was not considered in the analysis.

CONCLUSION & RECOMMENDATIONS

PM&As concludes the existing MT Fair COW 55'-0" Pneumatic Mass COW located in Billings, MT is capable of supporting Verizon's proposed appurtenance implementations.

PM&A

APPENDIX A

STRUCTURAL ANALYSIS

 1000 Holcomb Woods Pkwy, Suite 210, Roswell, GA 30076	Project Name: Verizon MT Fair COW , MT	Prepared by: Checked by: DVH JC
	Project Description: C-Band 5G	Date: 5/2/2024

Antenna Mount Analysis

1.0 Jurisdiction and Code Compliance

Code :	TIA-222-H, IBC 2021
State :	Montana
County :	Yellowstone

* The design appurtenance loads being used to evaluate the antenna mount take into account the design load criteria set forth by the jurisdiction accordingly.

1.1 Antenna Mount Input Data

Mount Type:	
Condition :	Existing
Concealed:	No
Attachment Height AGL (ft) :	10

* The Existing mount shall be evaluated for the applied appurtenance loadings with a demand-capacity ratio less than 105% code allowable limit .

1.2 Structure Input Data

Main Structure Type:	Latticed Frame Work
Main Structure Top of Height (ft) :	55.0

* The structure is, for all intents and purposes, a supporting structure for telecommunication related equipments.

1.4 Wind Design Criteria

Per IBC 2021 / ASCE 7-16 / TIA-222-H

Exposure Category :	C
Topographic Category :	1
Structure Class :	II
Terrain Crest Height (ft) :	By Default
Elevation above Sea Level :	Specify Zs
Input Zs (ft):	3108
Wind Speed :	Specify Wind Speed
Input Vult (mph) :	110
Input Vult Ice (mph)	50
Design Radial Ice Thck (Design or Default):	Design
Specify Design Ice Thickness:	0.5

* Design Wind Loads consider the following default conditions unless otherwise specified:

- Exposure Category C - Open Terrain with no
- Topographic Category 1 - Flat Terrain where Crest Height level is at 0'.
- Structural class II - Assuming the structure does not pose a significant hazard to life or property damages.

* Site Specific Wind Speed can be obtained from ATC Hazard Tool or ASCE 7 Hazard Tool Below:

<https://hazards.atcouncil.org/> <https://asce7hazardtool.online/>

1.5 Seismic Design Criteria

Per IBC 2021 / ASCE 7-16 / TIA-222-H

Site Class :	D(Default)
Seismic Design Category (SDC) :	B
S_s & S₁, F_a & F_v :	Specify Coeff
0.137 : Input SDS	Input S _s : 0.128
0.09 : Input SD1	Input S ₁ : 0.056
Design Seismic Coeff for Components	
Communication equipment per ASCE 07-16 Table 13.6-1	
a_p :	1

* Design Seismic Load consider default category D for Site Class and SDC unless otherwise specified:


* Site Specific Seismic coefficients S_s & S₁, Site Class, and SDC can be obtained from ATC Hazard Tool or ASCE 7 Hazard Tool. Links Below:

<https://hazards.atcouncil.org/> <https://asce7hazardtool.online/>

1.6 Appurtenances Input Data



Type	Appurtenance
CPNT	72x30 Hydraulic Box
CPNT	73x30 Generator
CPNT	32x32 Clean Up Kit
CPNT	AC Panel
CPNT	Transfer Switch
CPNT	EQ Cabinet
RRH	Ericsson 4449
RRH	Ericsson 8843

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	Project Description: C-Band 5G	Date: 5/2/2024	

Component Wind Analysis

2.0 Code Reference

TIA-222-H, IBC 2021

2.1. Existing & Proposed Nonstructural Component Spec

Nonstructural Component	Height (in)	Width (in)	Depth (in)	Weight (lbs)
72x30 Hydraulic Box	24	30	72	500
73x30 Generator	30	73	30	801
32x32 Clean Up Kit	32	32	32	100
AC Panel	48	24	12	200
Transfer Switch	48	24	12	200
EQ Cabinet	74	42	32	1500
Ericsson 4449	20.9	11.8	7.5	55.6
Ericsson 8843	18	13.2	11.3	75

2.2 Determine Wind Velocity Pressure

Topographic Factor (Method 1)
 Velocity Pressure Coefficient
 Directionality Factor
 Ground Elevation Factor
 Rooftop Wind Speed-Up Factor

$$K_{zt} = \left[1 + \frac{K_c K_t}{K_h} \right]^2 = \begin{matrix} 1.00 & (\text{unitless}) \\ K_h = 0.85 & (\text{unitless}) \\ K_d = 0.85 & (\text{unitless}) \\ K_e = 0.90 & (\text{unitless}) \\ K_s = 1.00 & (\text{unitless}) \end{matrix}$$

ASCE07 ch26 sec 26.6

Basic Wind Speed

$$V_{ult} = 110 \text{ MPH}$$

*Wind load calculations are based on wind speed obtained from ATC website. See Attached.
<https://hazards.atcouncil.org/>.

Velocity pressure w/no ice
 Velocity pressure w/ ice


$$q_z = 0.00256 K_h K_{zt} K_s K_e K_d V_{ult}^2 = 20.0 \text{ lb/ft}^2$$

Gust Affect Factor

$$\text{ASCE07 ch26 sec 26.9} \quad G_h = 1.00 \text{ (Unitless)}$$

2.3 Wind Design Force for the Appurtenance

$$F = q_z G_h (C_r \text{ or } C_f) (EPA)_A = 20.0 * (EPA)_A$$

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	Project Discription: C-Band 5G	Date: 5/2/2024	

Component Seismic Analysis

3.0 Code Reference

TIA-222-H, IBC 2021

3.1 Design Spectral Response Accelerations

Structure Class	II
Site Class	D(Default)
Seismic Design Category	B

Spectral Response Acceleration at short period	$S_S =$	0.128	g
Max Considered Earthquake Spectral Response acceleration at 1 second	$S_1 =$	0.056	g
Acceleration-based site coefficient at short periods	$F_a =$	NA	
Velocity-based site coefficient at 1.0 seconds	$F_V =$	NA	

Design Spectral Response Acceleration at short periods $S_{DS} = (2/3)F_a S_S =$ 0.137 (unitless)

Design Spectral Response Acceleration at a 1.0 sec period $S_{D1} = (2/3)F_V S_1 =$ 0.090 (unitless)

3.2 Seismic Design Force for Appurtenance

Per ASCE 07-16

Input a_p : 1

Importance Factor	$a_p =$	1	
Response Modification Coefficient	$\Omega =$	1	
Component Amplification Factor	$I =$	1.00	
	$R_p =$	1.5	
	$a_p =$	1	
	$z =$	10.0	ft
	$h =$	55.0	ft
	$z/h =$	0.18	

ASCE 07-16 Control $F_p = \frac{0.4 a_p S_{DS} W_p}{\left(\frac{R_p}{I_p}\right)} \left(1 + 2 \frac{z}{h}\right) =$ 0.05 * W_p

3.3 Equivalent Lateral Force Procedure:

Per TIA-222-H Section 2.7.7.1

Seismic Response Coefficient	$C_s = \frac{S_{DS} I}{R} =$	
	$\Omega =$	
	$T =$	
	$T_L =$	


Fundamental of Period $C_s = \frac{S_{DS} I}{T R}$ when $T < T_L =$

Long-period Transition Period $C_s = \frac{S_{D1} I}{T^2 R}$ when $T > T_L =$

Figure B-19 $C_s = 0.044 S_{DS} I$ OR 0.03 =

C_s Less Than the Following : $Where S_1 > 0.6, C_s = \frac{0.85 I}{R} =$

C_s Greater Than the Following : $V =$ NA

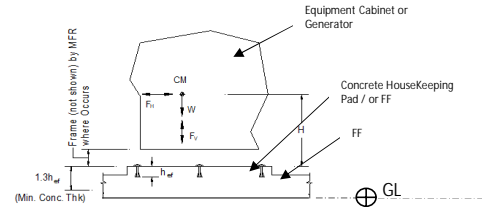
 1000 Holcomb Woods Pkwy, Suite 210, Roswell, GA 30076	Project Name: Verizon MT Fair COW , MT	Prepared by: DVH	Checked by: JC
	Project Discription: C-Band 5G	Date: 5/2/2024	

Not Strutral Component Lateral and Vertical Forces with no Ice

4.0 Non-Structural Component Lateral Force w/ no ice Calculation

Design Wind Force with no ice: 20.0 (EPA)_n

Where the Effective Projected Area of the component (EPA)_n Without Ice is as follow



$$\text{Critical Equipment } (EPA)_n = \sum(C_r A_e)_n \text{ (psf)}$$

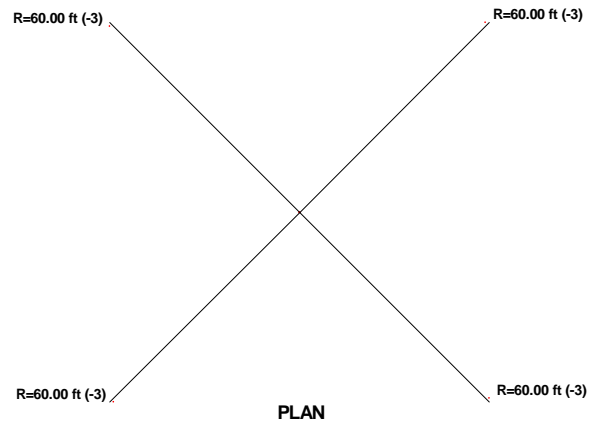
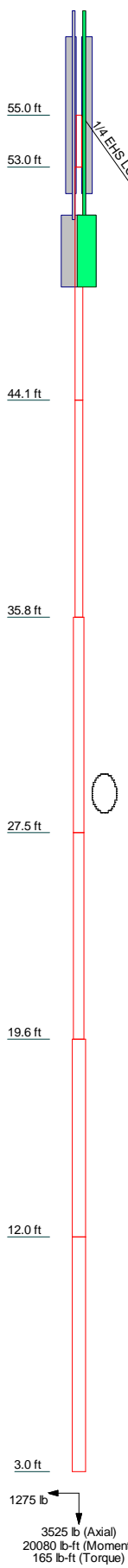
Design Seismic Force with no ice: 0.05 W_p

Where the Weight W_p of the component Without Ice is per Nonstructural component Spec Schedule

The following table outlines the maximum anticipated component Forces (Lateral and Vertical) due to Wind and Seismic loads associated with windard face normal to the component azimuth and side face of the component azimuth.

Component Load Table no ice			EPA (ft ²)		Horizontal Wind Force (Factored) (lbs)		Horizontal Seismic Force (Factored) (lbs)	Vertical Force (Factored) (lbs)	Vertical Seismic Force (Factored) (lbs)
Component	C _{rN}	C _{rT}	(EPA) _N	(EPA) _T	F _N	F _T	F _{sz}	F _z	E _v
72x30 Hydraulic Box	1.900	1.881	9.50	22.57	190	452	25	600	14
73x30 Generator	1.881	1.881	28.61	11.76	573	236	40	961	22
32x32 Clean Up Kit	1.881	1.881	13.38	13.38	268	268	5	120	3
AC Panel	1.881	1.881	15.05	7.52	302	151	10	240	5
Tranfer Switch	1.881	1.881	15.05	7.52	302	151	10	240	5
EQ Cabinet	1.313	1.881	28.33	30.93	568	620	75	1800	41
Ericsson 4449	1.313	1.330	2.25	1.45	45	29	3	67	2
Ericsson 8843	1.306	1.310	2.16	1.85	43	37	4	90	2

Section	1	2	3	4	5	6	7	
Size	RT4.5x4.5	RT5x5	RT6x6	RT7x7	RT8x8	RT9x9	RT10x10	
Length (ft)	2.00	8.90	8.35	8.25	7.90	7.60	9.00	
Socket Length (ft)	4.00	2.00	2.00	2.00	2.00	2.00		
Grade	Aluminum 6061-T6							
Weight (lb)	9.0	44.9	51.4	59.7	66.8	71.4	94.6	396.8



DESIGNED APPURTENANCE LOADING

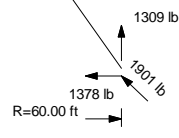
TYPE	ELEVATION	TYPE	ELEVATION
8'x2 1/2" Pipe Mount	55	COMMSCOPE NHH-65B-R2B	55
8'x2 1/2" Pipe Mount	55	AIR 6449	49.8
8'x2 1/2" Pipe Mount	55	AIR 6449	49.8
COMMSCOPE NHH-65B-R2B	55	AIR 6449	49.8

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
Aluminum 6061-T6	35 ksi	38 ksi			

TOWER DESIGN NOTES

1. Tower is located in Butte County, Idaho.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 110 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 0.25 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft



ALL REACTIONS ARE FACTORED

J5 Infrastructure Partner 23 Mauchly #110 Irvine, CA 92618 Phone: (949) 247-7767 FAX:	Job: Pneumatic mast		
	Project: Structural Analysis - Rev-0		
	Client: Verizon Wireless	Drawn by: DanHo	App'd:
	Code: TIA-222-H	Date: 05/02/24	Scale: NTS
	Path:	Dwg No. E-1	

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<p style="text-align: center;">tnxTower</p> <p style="text-align: center;">J5 Infrastructure Partner 23 Mauchly #110 Irvine, CA 92618 Phone: (949) 247-7767 FAX:</p>	<p>Job</p> <p style="text-align: center;">Pnuematic mast</p>	<p>Page</p> <p style="text-align: center;">1 of 5</p>
	<p>Project</p> <p style="text-align: center;">Structural Analysis -- Rev-0</p>	<p>Date</p> <p style="text-align: center;">12:23:40 05/02/24</p>
	<p>Client</p> <p style="text-align: center;">Verizon Wireless</p>	<p>Designed by</p> <p style="text-align: center;">DanhHo</p>

Guy-Tensioning Information

Temperature At Time Of Tensioning																	
Guy Elevation ft	H ft	V ft	0 F		20 F		40 F		60 F		80 F		100 F		120 F		
			Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	Initial Tension lb	Intercept ft	
55	A	59.81	58.00	812.601	0.51	763.310	0.55	714.103	0.58	665.000	0.63	616.029	0.68	567.230	0.74	518.660	0.80
	B	59.81	58.00	812.601	0.51	763.310	0.55	714.103	0.58	665.000	0.63	616.029	0.68	567.230	0.74	518.660	0.80
	C	59.81	58.00	812.601	0.51	763.310	0.55	714.103	0.58	665.000	0.63	616.029	0.68	567.230	0.74	518.660	0.80
	D	59.81	58.00	812.601	0.51	763.310	0.55	714.103	0.58	665.000	0.63	616.029	0.68	567.230	0.74	518.660	0.80

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice+1.0 Guy
3	1.2 Dead+1.0 Wind 45 deg - No Ice+1.0 Guy
4	1.2 Dead+1.0 Wind 90 deg - No Ice+1.0 Guy
5	1.2 Dead+1.0 Wind 135 deg - No Ice+1.0 Guy
6	1.2 Dead+1.0 Wind 180 deg - No Ice+1.0 Guy
7	1.2 Dead+1.0 Wind 225 deg - No Ice+1.0 Guy
8	1.2 Dead+1.0 Wind 270 deg - No Ice+1.0 Guy
9	1.2 Dead+1.0 Wind 315 deg - No Ice+1.0 Guy
10	1.2 Dead+1.0 Ice+1.0 Temp+Guy
11	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy
12	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp+1.0 Guy
13	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy
14	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp+1.0 Guy
15	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy
16	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp+1.0 Guy
17	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy
18	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp+1.0 Guy
19	Dead+Wind 0 deg - Service+Guy
20	Dead+Wind 45 deg - Service+Guy
21	Dead+Wind 90 deg - Service+Guy
22	Dead+Wind 135 deg - Service+Guy
23	Dead+Wind 180 deg - Service+Guy
24	Dead+Wind 225 deg - Service+Guy
25	Dead+Wind 270 deg - Service+Guy
26	Dead+Wind 315 deg - Service+Guy

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Mast	Max. Vert	2	3.53	0.01	1.26
	Max. H _x	8	3.52	1.27	0.00
	Max. H _z	2	3.53	0.01	1.26
	Max. M _x	2	19.59	0.01	1.26
	Max. M _z	4	19.64	-1.26	-0.02
	Max. Torsion	4	0.17	-1.26	-0.02

tnxTower J5 Infrastructure Partner 23 Mauchly #110 Irvine, CA 92618 Phone: (949) 247-7767 FAX:	Job	Pneumatic mast	Page	2 of 5
	Project	Structural Analysis -- Rev-0	Date	12:23:40 05/02/24
	Client	Verizon Wireless	Designed by	DanhHo

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K	
Guy D @ 60 ft Elev -3 ft Azimuth -45 deg	Min. Vert	1	2.75	0.00	-0.00	
	Min. H _x	4	3.52	-1.26	-0.02	
	Min. H _z	6	3.51	-0.01	-1.27	
	Min. M _x	6	-19.85	-0.01	-1.27	
	Min. M _z	8	-19.80	1.27	0.00	
	Min. Torsion	8	-0.16	1.27	0.00	
	Max. Vert	9	-0.08	-0.05	-0.05	
	Max. H _x	9	-0.08	-0.05	-0.05	
	Max. H _z	9	-0.08	-0.05	-0.05	
	Min. Vert	5	-1.31	-0.98	-0.97	
Guy C @ 60 ft Elev -3 ft Azimuth 225 deg	Min. H _x	5	-1.31	-0.98	-0.97	
	Min. H _z	5	-1.31	-0.98	-0.97	
	Max. Vert	7	-0.08	-0.05	0.05	
	Max. H _x	7	-0.08	-0.05	0.05	
	Max. H _z	3	-1.25	-0.93	0.93	
	Min. Vert	3	-1.25	-0.93	0.93	
	Min. H _x	3	-1.25	-0.93	0.93	
	Min. H _z	7	-0.08	-0.05	0.05	
	Max. Vert	5	-0.08	0.05	0.05	
	Guy B @ 60 ft Elev -3 ft Azimuth 135 deg	Max. H _x	9	-1.31	0.98	0.97
Max. H _z		9	-1.31	0.98	0.97	
Min. Vert		9	-1.31	0.98	0.97	
Min. H _x		5	-0.08	0.05	0.05	
Min. H _z		5	-0.08	0.05	0.05	
Max. Vert		3	-0.08	0.05	-0.05	
Guy A @ 60 ft Elev -3 ft Azimuth 45 deg		Max. H _x	7	-1.24	0.92	-0.93
		Max. H _z	3	-0.08	0.05	-0.05
		Min. Vert	7	-1.24	0.92	-0.93
		Min. H _x	3	-0.08	0.05	-0.05
	Min. H _z	7	-1.24	0.92	-0.93	

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	2.75	-0.00	0.00	0.10	0.06	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice+1.0 Guy	3.53	-0.01	-1.26	-19.59	0.42	0.04
1.2 Dead+1.0 Wind 45 deg - No Ice+1.0 Guy	3.47	0.88	-0.88	-13.54	-13.69	-0.09
1.2 Dead+1.0 Wind 90 deg - No Ice+1.0 Guy	3.52	1.26	0.02	0.57	-19.64	-0.17
1.2 Dead+1.0 Wind 135 deg - No Ice+1.0 Guy	3.51	0.90	0.91	14.39	-14.01	-0.15
1.2 Dead+1.0 Wind 180 deg - No Ice+1.0 Guy	3.51	0.01	1.27	19.85	-0.19	-0.04
1.2 Dead+1.0 Wind 225 deg - No Ice+1.0 Guy	3.46	-0.89	0.89	13.89	13.74	0.09

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Load Combination	Vertical	Shear _x	Shear _z	Overturning Moment, M _x	Overturning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 270 deg - No Ice+1.0 Guy	3.52	-1.27	-0.00	-0.04	19.80	0.16
1.2 Dead+1.0 Wind 315 deg - No Ice+1.0 Guy	3.51	-0.90	-0.89	-13.96	14.34	0.15
1.2 Dead+1.0 Ice+1.0 Temp+Guy	2.89	-0.00	0.01	0.16	0.08	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy	2.98	-0.01	-0.26	-3.97	0.15	0.01
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp+1.0 Guy	2.98	0.19	-0.18	-2.71	-2.79	-0.02
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy	2.98	0.27	0.01	0.24	-4.05	-0.04
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp+1.0 Guy	2.97	0.19	0.20	3.14	-2.87	-0.04
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy	2.98	-0.00	0.28	4.32	0.03	-0.01
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp+1.0 Guy	2.98	-0.19	0.20	3.05	2.97	0.02
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy	2.98	-0.27	0.00	0.12	4.24	0.04
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp+1.0 Guy	2.98	-0.20	-0.19	-2.79	3.06	0.04
Dead+Wind 0 deg - Service+Guy	2.75	-0.01	-0.33	-4.97	0.14	0.01
Dead+Wind 45 deg - Service+Guy	2.75	0.23	-0.23	-3.42	-3.47	-0.03
Dead+Wind 90 deg - Service+Guy	2.75	0.33	0.01	0.19	-5.01	-0.05
Dead+Wind 135 deg - Service+Guy	2.75	0.24	0.24	3.75	-3.57	-0.04
Dead+Wind 180 deg - Service+Guy	2.75	0.00	0.34	5.18	-0.01	-0.01
Dead+Wind 225 deg - Service+Guy	2.75	-0.24	0.24	3.64	3.59	0.03
Dead+Wind 270 deg - Service+Guy	2.75	-0.34	0.00	0.04	5.14	0.05
Dead+Wind 315 deg - Service+Guy	2.75	-0.24	-0.23	-3.53	3.71	0.04

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-0.94	0.00	-0.00	0.94	0.00	0.083%
2	-0.04	-1.12	-2.59	0.04	1.12	2.59	0.003%
3	1.80	-1.12	-1.80	-1.80	1.12	1.80	0.001%
4	2.59	-1.12	0.04	-2.59	1.12	-0.04	0.001%
5	1.87	-1.12	1.86	-1.87	1.12	-1.86	0.001%
6	0.04	-1.12	2.59	-0.04	1.12	-2.59	0.003%
7	-1.80	-1.12	1.80	1.80	1.12	-1.80	0.001%
8	-2.59	-1.12	-0.04	2.59	1.12	0.04	0.001%
9	-1.87	-1.12	-1.86	1.87	1.12	1.86	0.001%
10	0.00	-1.35	0.00	-0.00	1.35	0.00	0.089%
11	-0.01	-1.35	-0.61	0.01	1.35	0.61	0.026%
12	0.43	-1.35	-0.43	-0.43	1.35	0.43	0.010%
13	0.61	-1.35	0.01	-0.61	1.35	-0.01	0.006%
14	0.44	-1.35	0.44	-0.44	1.35	-0.44	0.005%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
15	0.01	-1.35	0.61	-0.01	1.35	-0.61	0.014%
16	-0.43	-1.35	0.43	0.43	1.35	-0.43	0.012%
17	-0.61	-1.35	-0.01	0.61	1.35	0.01	0.006%
18	-0.44	-1.35	-0.44	0.44	1.35	0.44	0.005%
19	-0.01	-0.94	-0.69	0.01	0.94	0.69	0.017%
20	0.48	-0.94	-0.48	-0.48	0.94	0.48	0.007%
21	0.69	-0.94	0.01	-0.69	0.94	-0.01	0.003%
22	0.50	-0.94	0.50	-0.50	0.94	-0.50	0.004%
23	0.01	-0.94	0.69	-0.01	0.94	-0.69	0.018%
24	-0.48	-0.94	0.48	0.48	0.94	-0.48	0.008%
25	-0.69	-0.94	-0.01	0.69	0.94	0.01	0.004%
26	-0.50	-0.94	-0.50	0.50	0.94	0.50	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00004406
2	Yes	17	0.00000001	0.00007522
3	Yes	18	0.00000001	0.00007768
4	Yes	19	0.00000001	0.00006297
5	Yes	19	0.00000001	0.00006702
6	Yes	17	0.00000001	0.00007635
7	Yes	18	0.00000001	0.00007907
8	Yes	19	0.00000001	0.00006334
9	Yes	19	0.00000001	0.00006660
10	Yes	6	0.00000001	0.00007302
11	Yes	12	0.00000001	0.00008834
12	Yes	13	0.00000001	0.00007020
13	Yes	14	0.00000001	0.00008075
14	Yes	14	0.00000001	0.00007187
15	Yes	13	0.00000001	0.00005388
16	Yes	13	0.00000001	0.00008430
17	Yes	14	0.00000001	0.00008657
18	Yes	14	0.00000001	0.00006782
19	Yes	13	0.00000001	0.00007033
20	Yes	14	0.00000001	0.00005811
21	Yes	15	0.00000001	0.00005435
22	Yes	15	0.00000001	0.00005103
23	Yes	13	0.00000001	0.00007650
24	Yes	14	0.00000001	0.00006412
25	Yes	15	0.00000001	0.00005693
26	Yes	15	0.00000001	0.00004975

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T_u K	Allowable ϕT_n K	Required S.F.	Actual S.F.
L1	55.00 (A) (11)	1/4 EHS	0.67	6.65	1.81	3.99	1.000	2.205 ✓
	55.00 (B) (10)	1/4 EHS	0.67	6.65	1.91	3.99	1.000	2.092 ✓

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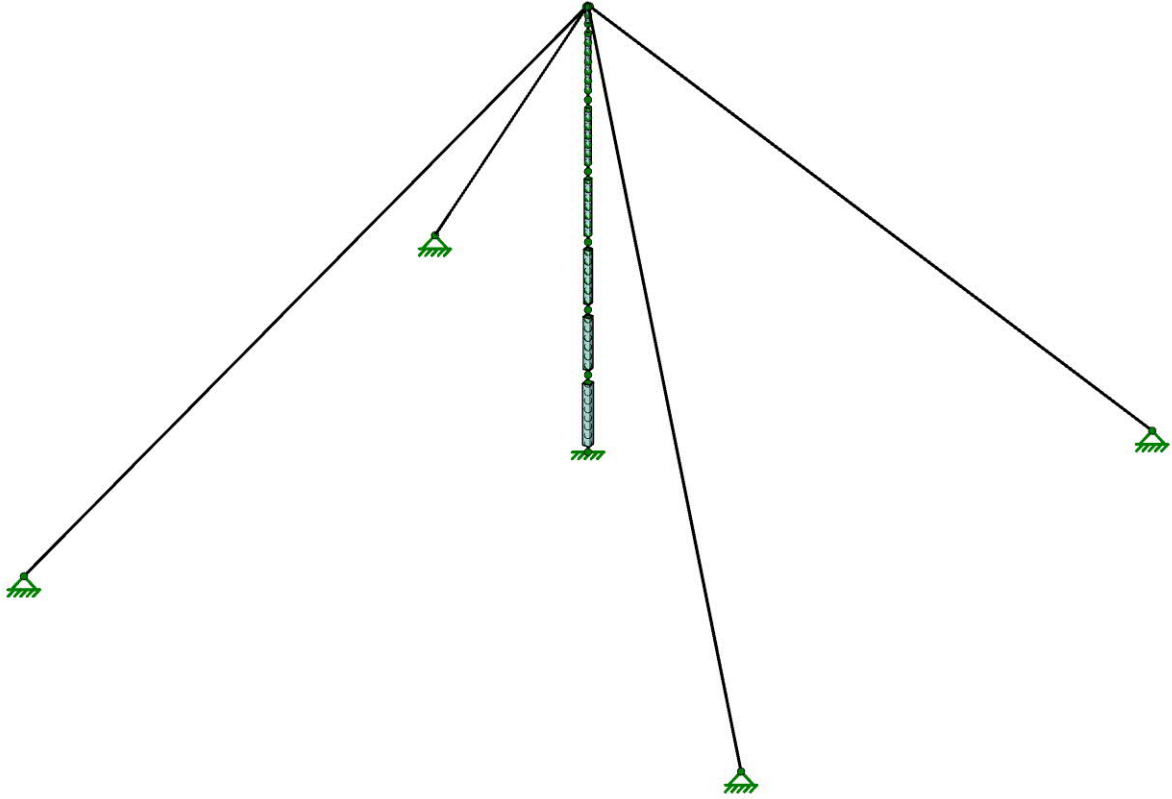
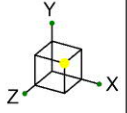
Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T_u K	Allowable ϕT_n K	Required S.F.	Actual S.F.
	55.00 (C) (9)	1/4 EHS	0.67	6.65	1.82	3.99	1.000	2.188 ✓
	55.00 (D) (8)	1/4 EHS	0.67	6.65	1.90	3.99	1.000	2.096 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail	
L1	55 - 53	Guy A@55 (90 deg)	1/4	11	1.81	3.99	45.3	Pass	
L1	55 - 53	Guy B@55 (90 deg)	1/4	10	1.91	3.99	47.8	Pass	
L1	55 - 53	Guy C@55 (90 deg)	1/4	9	1.82	3.99	45.7	Pass	
L1	55 - 53	Guy D@55 (90 deg)	1/4	8	1.90	3.99	47.7	Pass	
Summary									
							Guy A (L1)	45.3	Pass
							Guy B (L1)	47.8	Pass
							Guy C (L1)	45.7	Pass
							Guy D (L1)	47.7	Pass
							RATING =	47.8	Pass

Note:

Defer to the following Risa solution output for the Pole stress capacity



Envelope Only Solution



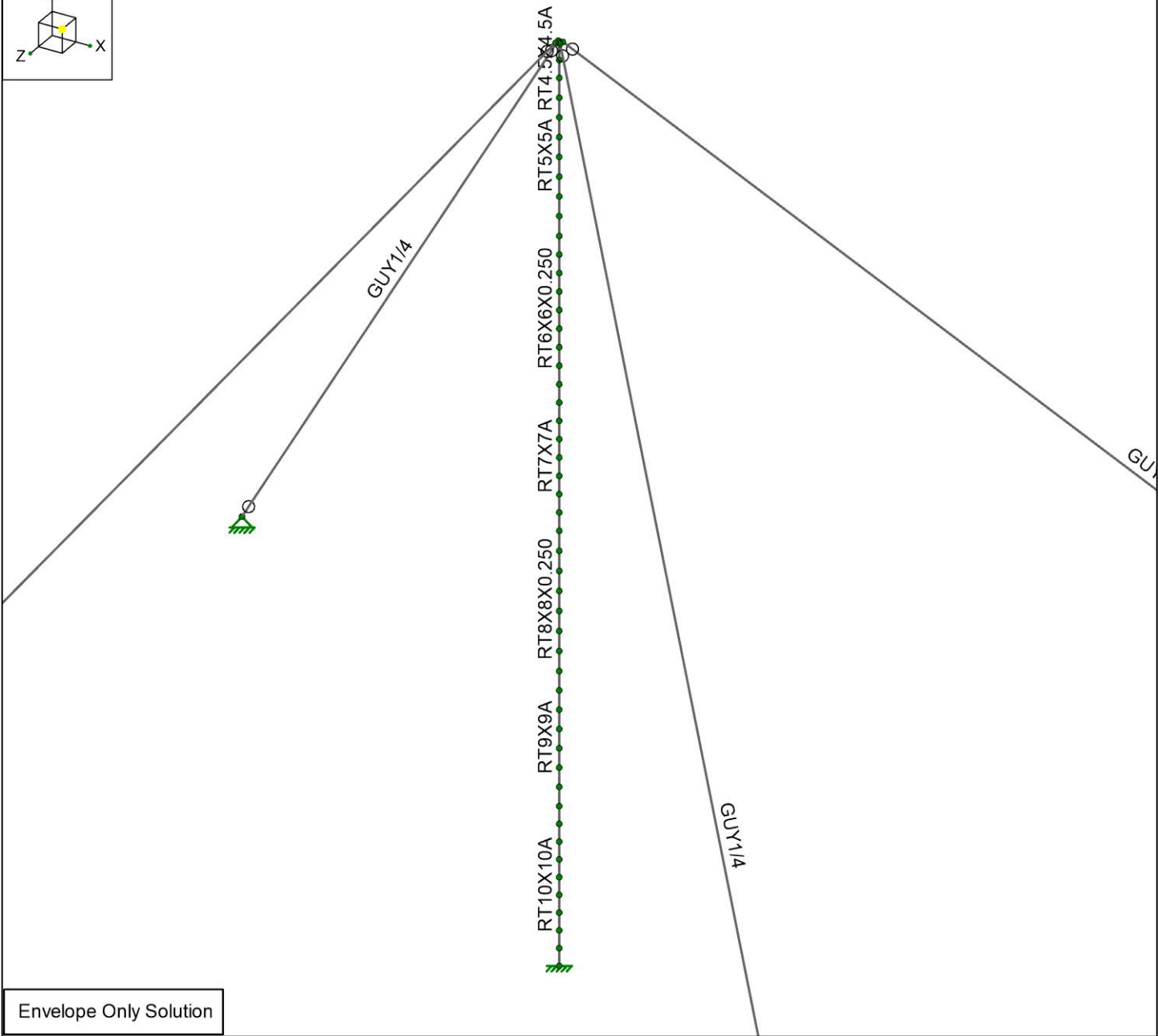
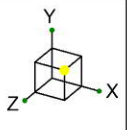
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Structural Analysis -- Rev-0

RT 52' Pnuematic mast

SK-1

May 02, 2024 at 10:47 AM

MT8 MT Fair Pnuematic ma...



Envelope Only Solution



J5 Infrastructure Partners

JamesChung

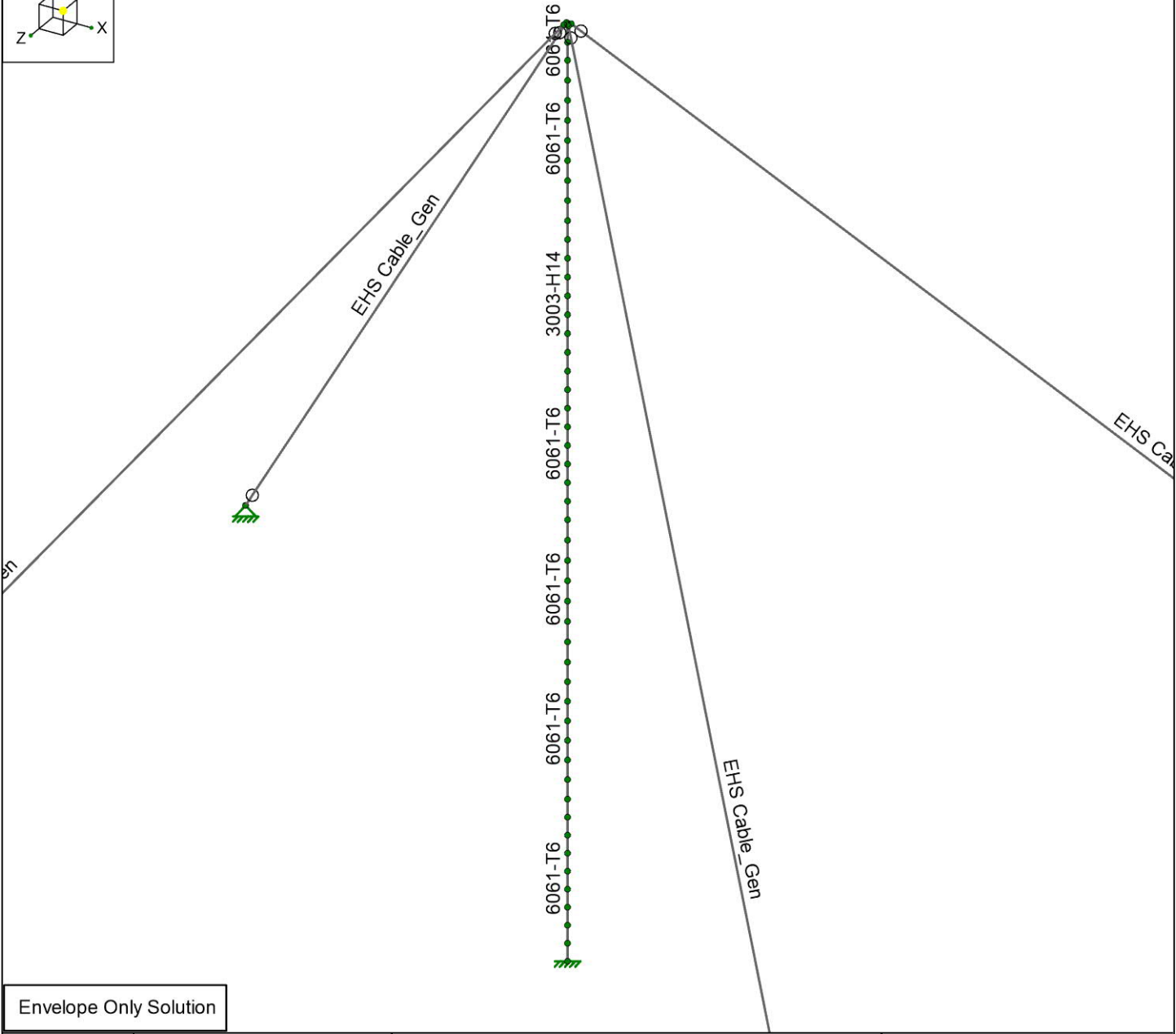
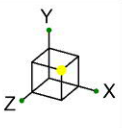
Structural Analysis -- Rev-0

RT 52' Pnuematic mast

SK-2

May 02, 2024 at 10:48 AM

MT8 MT Fair Pnuematic ma...



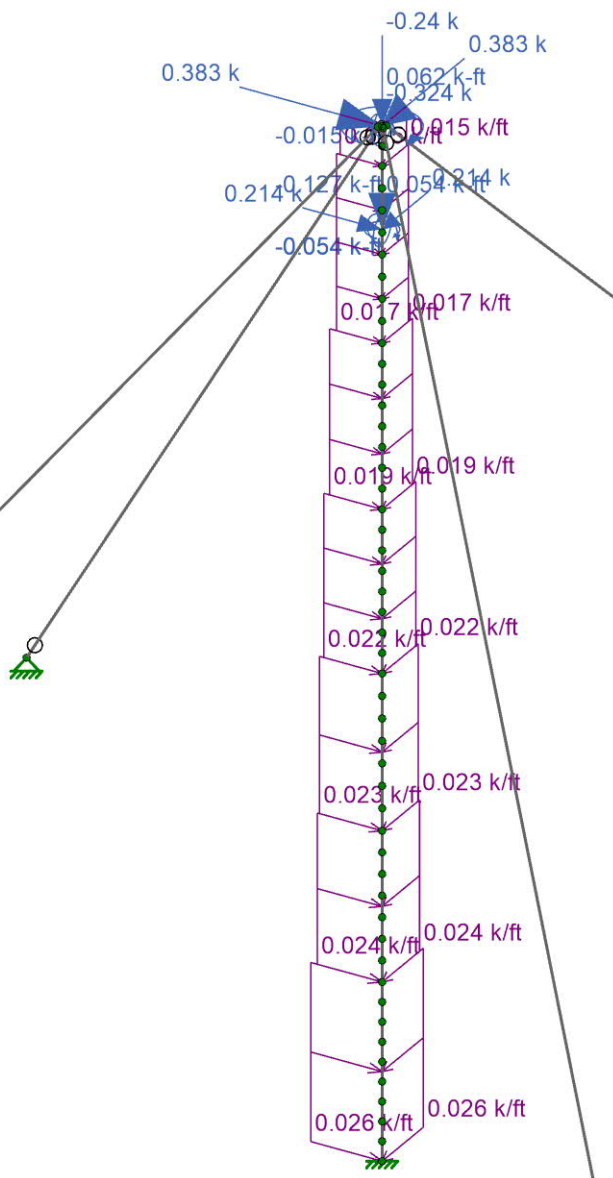
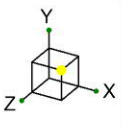
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 Structural Analysis -- Rev-0

RT 52' Pnuematic mast

SK-3
 May 02, 2024 at 10:48 AM
 MT8 MT Fair Pnuematic ma...



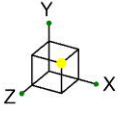
Loads: LC 5, 1.2 Dead+1.0 Wind 135 deg - No Ice+1.0 Guy
Envelope Only Solution



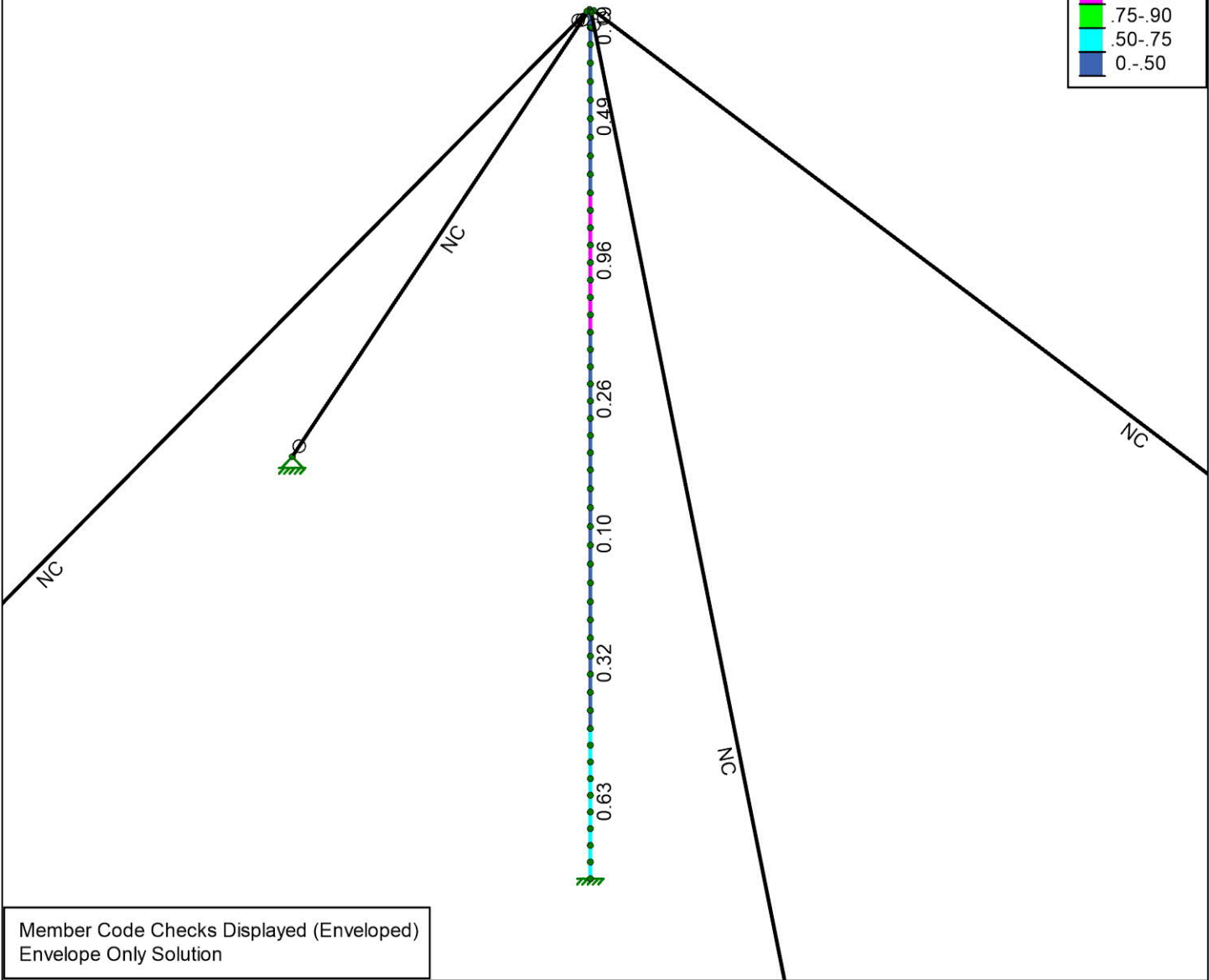
J5 Infrastructure Partners
JamesChung
Structural Analysis -- Rev-0

RT 52' Pnuematic mast


SK-4
May 02, 2024 at 10:50 AM
MT8 MT Fair Pnuematic ma...



Code Check (Env)	
Black	No Calc
Red	> 1.0
Magenta	.90-1.0
Green	.75-.90
Cyan	.50-.75
Blue	0-.50



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

	J5 Infrastructure Partners	RT 52' Pnuematic mast	SK-5
	JamesChung		May 02, 2024 at 10:50 AM
	Structural Analysis -- Rev-0		MT8 MT Fair Pnuematic ma...

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]	Y Rot [k-ft/rad]	Z Rot [k-ft/rad]
1	N43	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N52	Tether N4	Tether N4	Tether N4	Tether N4	Tether N4	Tether N4
3	N53	Reaction	Reaction	Reaction			
4	N54	Tether N4	Tether N4	Tether N4	Tether N4	Tether N4	Tether N4
5	N55	Reaction	Reaction	Reaction			
6	N56	Tether N4	Tether N4	Tether N4	Tether N4	Tether N4	Tether N4
7	N57	Reaction	Reaction	Reaction			
8	N58	Tether N4	Tether N4	Tether N4	Tether N4	Tether N4	Tether N4
9	N59	Reaction	Reaction	Reaction			

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N2	N4	RT4.5X4.5A	Column	Rectangular Tubes	6061-T6	Typical
2	M2	N5	N2	RT5X5A	Column	Rectangular Tubes	6061-T6	Typical
3	M3	N13	N5	RT6X6X0.250	Column	Rectangular Tubes	3003-H14	Typical
4	M4	N21	N13	RT7X7A	Column	Rectangular Tubes	6061-T6	Typical
5	M5	N29	N21	RT8X8X0.250	Column	Rectangular Tubes	6061-T6	Typical
6	M6	N36	N29	RT9X9A	Column	Rectangular Tubes	6061-T6	Typical
7	M7	N43	N36	RT10X10A	Column	Rectangular Tubes	6061-T6	Typical
8	M8	N53	N52	TWR GUYD L1	VBrace	None	EHS Cable Gen	Typical
9	M9	N55	N54	TWR GUYC L1	VBrace	None	EHS Cable Gen	Typical
10	M10	N57	N56	TWR GUYB L1	VBrace	None	EHS Cable Gen	Typical
11	M11	N59	N58	TWR GUYA L1	VBrace	None	EHS Cable Gen	Typical

Member Point Loads (BLC 1 : Dead)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	Y	-0.04	2
2	M1	My	0.012	2
3	M1	Mz	0.012	2
4	M1	Y	-0.04	2
5	M1	My	0.012	2
6	M1	Mz	-0.012	2
7	M1	Y	-0.04	2
8	M1	My	-0.012	2
9	M1	Mz	-0.012	2
10	M1	Y	-0.04	2

Member Point Loads (BLC 1 : Dead) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
11	M1	My	0.019	2
12	M1	Mz	0.019	2
13	M1	Y	-0.04	2
14	M1	My	0.019	2
15	M1	Mz	-0.019	2
16	M2	Y	-0.09	5.7
17	M2	My	0.045	5.7
18	M2	Mz	0.045	5.7
19	M2	Y	-0.09	5.7
20	M2	My	0.045	5.7
21	M2	Mz	-0.045	5.7
22	M2	Y	-0.09	5.7
23	M2	My	-0.045	5.7
24	M2	Mz	-0.045	5.7

Member Point Loads (BLC 3 : No Ice Wind 0 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	Z	-0.056	2
2	M1	Mx	-0.017	2
3	M1	Z	-0.056	2
4	M1	Mx	0.017	2
5	M1	Z	-0.056	2
6	M1	Mx	0.017	2
7	M1	X	-0.038	2
8	M1	Z	-0.187	2
9	M1	Mx	-0.072	2
10	M1	X	0.038	2
11	M1	Z	-0.187	2
12	M1	Mx	0.072	2
13	M2	X	-0.018	5.7
14	M2	Z	-0.095	5.7
15	M2	Mx	-0.038	5.7
16	M2	X	0.018	5.7
17	M2	Z	-0.095	5.7
18	M2	Mx	0.038	5.7
19	M2	X	-0.018	5.7
20	M2	Z	-0.095	5.7
21	M2	Mx	0.038	5.7

Member Point Loads (BLC 4 : No Ice Wind 45 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	0.039	2
2	M1	Z	-0.039	2
3	M1	Mx	-0.024	2
4	M1	X	0.039	2
5	M1	Z	-0.039	2
6	M1	X	0.039	2
7	M1	Z	-0.039	2
8	M1	Mx	0.024	2
9	M1	X	0.105	2
10	M1	Z	-0.105	2
11	M1	Mx	-0.102	2
12	M1	X	0.159	2
13	M1	Z	-0.159	2
14	M2	X	0.054	5.7
15	M2	Z	-0.054	5.7
16	M2	Mx	-0.054	5.7
17	M2	X	0.08	5.7
18	M2	Z	-0.08	5.7
19	M2	X	0.054	5.7
20	M2	Z	-0.054	5.7
21	M2	Mx	0.054	5.7

Member Point Loads (BLC 5 : No Ice Wind 90 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	0.056	2
2	M1	Mx	-0.017	2
3	M1	X	0.056	2
4	M1	Mx	-0.017	2
5	M1	X	0.056	2
6	M1	Mx	0.017	2
7	M1	X	0.187	2
8	M1	Z	0.038	2
9	M1	Mx	-0.072	2
10	M1	X	0.187	2
11	M1	Z	-0.038	2
12	M1	Mx	-0.072	2
13	M2	X	0.095	5.7

Member Point Loads (BLC 5 : No Ice Wind 90 deg) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
14	M2	Z	0.018	5.7
15	M2	Mx	-0.038	5.7
16	M2	X	0.095	5.7
17	M2	Z	-0.018	5.7
18	M2	Mx	-0.038	5.7
19	M2	X	0.095	5.7
20	M2	Z	0.018	5.7
21	M2	Mx	0.038	5.7

Member Point Loads (BLC 6 : No Ice Wind 135 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	0.039	2
2	M1	Z	0.039	2
3	M1	X	0.039	2
4	M1	Z	0.039	2
5	M1	Mx	-0.024	2
6	M1	X	0.039	2
7	M1	Z	0.039	2
8	M1	X	0.159	2
9	M1	Z	0.159	2
10	M1	X	0.105	2
11	M1	Z	0.105	2
12	M1	Mx	-0.102	2
13	M2	X	0.08	5.7
14	M2	Z	0.08	5.7
15	M2	X	0.054	5.7
16	M2	Z	0.054	5.7
17	M2	Mx	-0.054	5.7
18	M2	X	0.08	5.7
19	M2	Z	0.08	5.7

Member Point Loads (BLC 7 : No Ice Wind 180 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	Z	0.056	2
2	M1	Mx	0.017	2
3	M1	Z	0.056	2
4	M1	Mx	-0.017	2

Member Point Loads (BLC 7 : No Ice Wind 180 deg) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
5	M1	Z	0.056	2
6	M1	Mx	-0.017	2
7	M1	X	0.038	2
8	M1	Z	0.187	2
9	M1	Mx	0.072	2
10	M1	X	-0.038	2
11	M1	Z	0.187	2
12	M1	Mx	-0.072	2
13	M2	X	0.018	5.7
14	M2	Z	0.095	5.7
15	M2	Mx	0.038	5.7
16	M2	X	-0.018	5.7
17	M2	Z	0.095	5.7
18	M2	Mx	-0.038	5.7
19	M2	X	0.018	5.7
20	M2	Z	0.095	5.7
21	M2	Mx	-0.038	5.7

Member Point Loads (BLC 8 : No Ice Wind 225 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	-0.039	2
2	M1	Z	0.039	2
3	M1	Mx	0.024	2
4	M1	X	-0.039	2
5	M1	Z	0.039	2
6	M1	X	-0.039	2
7	M1	Z	0.039	2
8	M1	Mx	-0.024	2
9	M1	X	-0.105	2
10	M1	Z	0.105	2
11	M1	Mx	0.102	2
12	M1	X	-0.159	2
13	M1	Z	0.159	2
14	M2	X	-0.054	5.7
15	M2	Z	0.054	5.7
16	M2	Mx	0.054	5.7
17	M2	X	-0.08	5.7
18	M2	Z	0.08	5.7

Member Point Loads (BLC 8 : No Ice Wind 225 deg) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
19	M2	X	-0.054	5.7
20	M2	Z	0.054	5.7
21	M2	Mx	-0.054	5.7

Member Point Loads (BLC 9 : No Ice Wind 270 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	-0.056	2
2	M1	Mx	0.017	2
3	M1	X	-0.056	2
4	M1	Mx	0.017	2
5	M1	X	-0.056	2
6	M1	Mx	-0.017	2
7	M1	X	-0.187	2
8	M1	Z	-0.038	2
9	M1	Mx	0.072	2
10	M1	X	-0.187	2
11	M1	Z	0.038	2
12	M1	Mx	0.072	2
13	M2	X	-0.095	5.7
14	M2	Z	-0.018	5.7
15	M2	Mx	0.038	5.7
16	M2	X	-0.095	5.7
17	M2	Z	0.018	5.7
18	M2	Mx	0.038	5.7
19	M2	X	-0.095	5.7
20	M2	Z	-0.018	5.7
21	M2	Mx	-0.038	5.7

Member Point Loads (BLC 10 : No Ice Wind 315 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	-0.039	2
2	M1	Z	-0.039	2
3	M1	X	-0.039	2
4	M1	Z	-0.039	2
5	M1	Mx	0.024	2
6	M1	X	-0.039	2
7	M1	Z	-0.039	2

Member Point Loads (BLC 10 : No Ice Wind 315 deg) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
8	M1	X	-0.159	2
9	M1	Z	-0.159	2
10	M1	X	-0.105	2
11	M1	Z	-0.105	2
12	M1	Mx	0.102	2
13	M2	X	-0.08	5.7
14	M2	Z	-0.08	5.7
15	M2	X	-0.054	5.7
16	M2	Z	-0.054	5.7
17	M2	Mx	0.054	5.7
18	M2	X	-0.08	5.7
19	M2	Z	-0.08	5.7

Member Point Loads (BLC 11 : Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	Y	-0.007	2
2	M1	My	0.002	2
3	M1	Mz	0.002	2
4	M1	Y	-0.007	2
5	M1	My	0.002	2
6	M1	Mz	-0.002	2
7	M1	Y	-0.007	2
8	M1	My	-0.002	2
9	M1	Mz	-0.002	2
10	M1	Y	-0.028	2
11	M1	My	0.014	2
12	M1	Mz	0.014	2
13	M1	Y	-0.028	2
14	M1	My	0.014	2
15	M1	Mz	-0.014	2
16	M2	Y	-0.017	5.7
17	M2	My	0.008	5.7
18	M2	Mz	0.008	5.7
19	M2	Y	-0.017	5.7
20	M2	My	0.008	5.7
21	M2	Mz	-0.008	5.7
22	M2	Y	-0.017	5.7
23	M2	My	-0.008	5.7

Member Point Loads (BLC 11 : Ice) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
24	M2	Mz	-0.008	5.7

Member Point Loads (BLC 13 : Ice Wind 0 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	Z	-0.014	2
2	M1	Mx	-0.004	2
3	M1	Z	-0.014	2
4	M1	Mx	0.004	2
5	M1	Z	-0.014	2
6	M1	Mx	0.004	2
7	M1	X	-0.008	2
8	M1	Z	-0.04	2
9	M1	Mx	-0.016	2
10	M1	X	0.008	2
11	M1	Z	-0.04	2
12	M1	Mx	0.016	2
13	M2	X	-0.004	5.7
14	M2	Z	-0.02	5.7
15	M2	Mx	-0.008	5.7
16	M2	X	0.004	5.7
17	M2	Z	-0.02	5.7
18	M2	Mx	0.008	5.7
19	M2	X	-0.004	5.7
20	M2	Z	-0.02	5.7
21	M2	Mx	0.008	5.7

Member Point Loads (BLC 14 : Ice Wind 45 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	0.01	2
2	M1	Z	-0.01	2
3	M1	Mx	-0.006	2
4	M1	X	0.01	2
5	M1	Z	-0.01	2
6	M1	X	0.01	2
7	M1	Z	-0.01	2
8	M1	Mx	0.006	2
9	M1	X	0.023	2

Member Point Loads (BLC 14 : Ice Wind 45 deg) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
10	M1	Z	-0.023	2
11	M1	Mx	-0.022	2
12	M1	X	0.034	2
13	M1	Z	-0.034	2
14	M2	X	0.012	5.7
15	M2	Z	-0.012	5.7
16	M2	Mx	-0.012	5.7
17	M2	X	0.017	5.7
18	M2	Z	-0.017	5.7
19	M2	X	0.012	5.7
20	M2	Z	-0.012	5.7
21	M2	Mx	0.012	5.7

Member Point Loads (BLC 15 : Ice Wind 90 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	0.014	2
2	M1	Mx	-0.004	2
3	M1	X	0.014	2
4	M1	Mx	-0.004	2
5	M1	X	0.014	2
6	M1	Mx	0.004	2
7	M1	X	0.04	2
8	M1	Z	0.008	2
9	M1	Mx	-0.016	2
10	M1	X	0.04	2
11	M1	Z	-0.008	2
12	M1	Mx	-0.016	2
13	M2	X	0.02	5.7
14	M2	Z	0.004	5.7
15	M2	Mx	-0.008	5.7
16	M2	X	0.02	5.7
17	M2	Z	-0.004	5.7
18	M2	Mx	-0.008	5.7
19	M2	X	0.02	5.7
20	M2	Z	0.004	5.7
21	M2	Mx	0.008	5.7

Member Point Loads (BLC 16 : Ice Wind 135 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	0.01	2
2	M1	Z	0.01	2
3	M1	X	0.01	2
4	M1	Z	0.01	2
5	M1	Mx	-0.006	2
6	M1	X	0.01	2
7	M1	Z	0.01	2
8	M1	X	0.034	2
9	M1	Z	0.034	2
10	M1	X	0.023	2
11	M1	Z	0.023	2
12	M1	Mx	-0.022	2
13	M2	X	0.017	5.7
14	M2	Z	0.017	5.7
15	M2	X	0.012	5.7
16	M2	Z	0.012	5.7
17	M2	Mx	-0.012	5.7
18	M2	X	0.017	5.7
19	M2	Z	0.017	5.7

Member Point Loads (BLC 17 : Ice Wind 180 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	Z	0.014	2
2	M1	Mx	0.004	2
3	M1	Z	0.014	2
4	M1	Mx	-0.004	2
5	M1	Z	0.014	2
6	M1	Mx	-0.004	2
7	M1	X	0.008	2
8	M1	Z	0.04	2
9	M1	Mx	0.016	2
10	M1	X	-0.008	2
11	M1	Z	0.04	2
12	M1	Mx	-0.016	2
13	M2	X	0.004	5.7
14	M2	Z	0.02	5.7
15	M2	Mx	0.008	5.7

Member Point Loads (BLC 17 : Ice Wind 180 deg) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
16	M2	X	-0.004	5.7
17	M2	Z	0.02	5.7
18	M2	Mx	-0.008	5.7
19	M2	X	0.004	5.7
20	M2	Z	0.02	5.7
21	M2	Mx	-0.008	5.7

Member Point Loads (BLC 18 : Ice Wind 225 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	-0.01	2
2	M1	Z	0.01	2
3	M1	Mx	0.006	2
4	M1	X	-0.01	2
5	M1	Z	0.01	2
6	M1	X	-0.01	2
7	M1	Z	0.01	2
8	M1	Mx	-0.006	2
9	M1	X	-0.023	2
10	M1	Z	0.023	2
11	M1	Mx	0.022	2
12	M1	X	-0.034	2
13	M1	Z	0.034	2
14	M2	X	-0.012	5.7
15	M2	Z	0.012	5.7
16	M2	Mx	0.012	5.7
17	M2	X	-0.017	5.7
18	M2	Z	0.017	5.7
19	M2	X	-0.012	5.7
20	M2	Z	0.012	5.7
21	M2	Mx	-0.012	5.7

Member Point Loads (BLC 19 : Ice Wind 270 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	-0.014	2
2	M1	Mx	0.004	2
3	M1	X	-0.014	2
4	M1	Mx	0.004	2

Member Point Loads (BLC 19 : Ice Wind 270 deg) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
5	M1	X	-0.014	2
6	M1	Mx	-0.004	2
7	M1	X	-0.04	2
8	M1	Z	-0.008	2
9	M1	Mx	0.016	2
10	M1	X	-0.04	2
11	M1	Z	0.008	2
12	M1	Mx	0.016	2
13	M2	X	-0.02	5.7
14	M2	Z	-0.004	5.7
15	M2	Mx	0.008	5.7
16	M2	X	-0.02	5.7
17	M2	Z	0.004	5.7
18	M2	Mx	0.008	5.7
19	M2	X	-0.02	5.7
20	M2	Z	-0.004	5.7
21	M2	Mx	-0.008	5.7

Member Point Loads (BLC 20 : Ice Wind 315 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	-0.01	2
2	M1	Z	-0.01	2
3	M1	X	-0.01	2
4	M1	Z	-0.01	2
5	M1	Mx	0.006	2
6	M1	X	-0.01	2
7	M1	Z	-0.01	2
8	M1	X	-0.034	2
9	M1	Z	-0.034	2
10	M1	X	-0.023	2
11	M1	Z	-0.023	2
12	M1	Mx	0.022	2
13	M2	X	-0.017	5.7
14	M2	Z	-0.017	5.7
15	M2	X	-0.012	5.7
16	M2	Z	-0.012	5.7
17	M2	Mx	0.012	5.7
18	M2	X	-0.017	5.7

Member Point Loads (BLC 20 : Ice Wind 315 deg) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
19	M2	Z	-0.017	5.7

Member Point Loads (BLC 21 : Service Wind 0 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	Z	-0.015	2
2	M1	Mx	-0.005	2
3	M1	Z	-0.015	2
4	M1	Mx	0.005	2
5	M1	Z	-0.015	2
6	M1	Mx	0.005	2
7	M1	X	-0.01	2
8	M1	Z	-0.05	2
9	M1	Mx	-0.019	2
10	M1	X	0.01	2
11	M1	Z	-0.05	2
12	M1	Mx	0.019	2
13	M2	X	-0.005	5.7
14	M2	Z	-0.025	5.7
15	M2	Mx	-0.01	5.7
16	M2	X	0.005	5.7
17	M2	Z	-0.025	5.7
18	M2	Mx	0.01	5.7
19	M2	X	-0.005	5.7
20	M2	Z	-0.025	5.7
21	M2	Mx	0.01	5.7

Member Point Loads (BLC 22 : Service Wind 45 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	0.011	2
2	M1	Z	-0.011	2
3	M1	Mx	-0.007	2
4	M1	X	0.011	2
5	M1	Z	-0.011	2
6	M1	X	0.011	2
7	M1	Z	-0.011	2
8	M1	Mx	0.007	2
9	M1	X	0.028	2

Member Point Loads (BLC 22 : Service Wind 45 deg) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
10	M1	Z	-0.028	2
11	M1	Mx	-0.027	2
12	M1	X	0.042	2
13	M1	Z	-0.042	2
14	M2	X	0.014	5.7
15	M2	Z	-0.014	5.7
16	M2	Mx	-0.014	5.7
17	M2	X	0.021	5.7
18	M2	Z	-0.021	5.7
19	M2	X	0.014	5.7
20	M2	Z	-0.014	5.7
21	M2	Mx	0.014	5.7

Member Point Loads (BLC 23 : Service Wind 90 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	0.015	2
2	M1	Mx	-0.005	2
3	M1	X	0.015	2
4	M1	Mx	-0.005	2
5	M1	X	0.015	2
6	M1	Mx	0.005	2
7	M1	X	0.05	2
8	M1	Z	0.01	2
9	M1	Mx	-0.019	2
10	M1	X	0.05	2
11	M1	Z	-0.01	2
12	M1	Mx	-0.019	2
13	M2	X	0.025	5.7
14	M2	Z	0.005	5.7
15	M2	Mx	-0.01	5.7
16	M2	X	0.025	5.7
17	M2	Z	-0.005	5.7
18	M2	Mx	-0.01	5.7
19	M2	X	0.025	5.7
20	M2	Z	0.005	5.7
21	M2	Mx	0.01	5.7

Member Point Loads (BLC 24 : Service Wind 135 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	0.011	2
2	M1	Z	0.011	2
3	M1	X	0.011	2
4	M1	Z	0.011	2
5	M1	Mx	-0.007	2
6	M1	X	0.011	2
7	M1	Z	0.011	2
8	M1	X	0.042	2
9	M1	Z	0.042	2
10	M1	X	0.028	2
11	M1	Z	0.028	2
12	M1	Mx	-0.027	2
13	M2	X	0.021	5.7
14	M2	Z	0.021	5.7
15	M2	X	0.014	5.7
16	M2	Z	0.014	5.7
17	M2	Mx	-0.014	5.7
18	M2	X	0.021	5.7
19	M2	Z	0.021	5.7

Member Point Loads (BLC 25 : Service Wind 180 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	Z	0.015	2
2	M1	Mx	0.005	2
3	M1	Z	0.015	2
4	M1	Mx	-0.005	2
5	M1	Z	0.015	2
6	M1	Mx	-0.005	2
7	M1	X	0.01	2
8	M1	Z	0.05	2
9	M1	Mx	0.019	2
10	M1	X	-0.01	2
11	M1	Z	0.05	2
12	M1	Mx	-0.019	2
13	M2	X	0.005	5.7
14	M2	Z	0.025	5.7
15	M2	Mx	0.01	5.7

Member Point Loads (BLC 25 : Service Wind 180 deg) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
16	M2	X	-0.005	5.7
17	M2	Z	0.025	5.7
18	M2	Mx	-0.01	5.7
19	M2	X	0.005	5.7
20	M2	Z	0.025	5.7
21	M2	Mx	-0.01	5.7

Member Point Loads (BLC 26 : Service Wind 225 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	-0.011	2
2	M1	Z	0.011	2
3	M1	Mx	0.007	2
4	M1	X	-0.011	2
5	M1	Z	0.011	2
6	M1	X	-0.011	2
7	M1	Z	0.011	2
8	M1	Mx	-0.007	2
9	M1	X	-0.028	2
10	M1	Z	0.028	2
11	M1	Mx	0.027	2
12	M1	X	-0.042	2
13	M1	Z	0.042	2
14	M2	X	-0.014	5.7
15	M2	Z	0.014	5.7
16	M2	Mx	0.014	5.7
17	M2	X	-0.021	5.7
18	M2	Z	0.021	5.7
19	M2	X	-0.014	5.7
20	M2	Z	0.014	5.7
21	M2	Mx	-0.014	5.7

Member Point Loads (BLC 27 : Service Wind 270 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	-0.015	2
2	M1	Mx	0.005	2
3	M1	X	-0.015	2
4	M1	Mx	0.005	2

Member Point Loads (BLC 27 : Service Wind 270 deg) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
5	M1	X	-0.015	2
6	M1	Mx	-0.005	2
7	M1	X	-0.05	2
8	M1	Z	-0.01	2
9	M1	Mx	0.019	2
10	M1	X	-0.05	2
11	M1	Z	0.01	2
12	M1	Mx	0.019	2
13	M2	X	-0.025	5.7
14	M2	Z	-0.005	5.7
15	M2	Mx	0.01	5.7
16	M2	X	-0.025	5.7
17	M2	Z	0.005	5.7
18	M2	Mx	0.01	5.7
19	M2	X	-0.025	5.7
20	M2	Z	-0.005	5.7
21	M2	Mx	-0.01	5.7

Member Point Loads (BLC 28 : Service Wind 315 deg)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	-0.011	2
2	M1	Z	-0.011	2
3	M1	X	-0.011	2
4	M1	Z	-0.011	2
5	M1	Mx	0.007	2
6	M1	X	-0.011	2
7	M1	Z	-0.011	2
8	M1	X	-0.042	2
9	M1	Z	-0.042	2
10	M1	X	-0.028	2
11	M1	Z	-0.028	2
12	M1	Mx	0.027	2
13	M2	X	-0.021	5.7
14	M2	Z	-0.021	5.7
15	M2	X	-0.014	5.7
16	M2	Z	-0.014	5.7
17	M2	Mx	0.014	5.7
18	M2	X	-0.021	5.7

Member Point Loads (BLC 28 : Service Wind 315 deg) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
19	M2	Z	-0.021	5.7

Member Distributed Loads (BLC 3 : No Ice Wind 0 deg)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Z	-0.022	-0.022	0	2
2	M2	Z	-0.024	-0.024	0	8.9
3	M3	Z	-0.027	-0.027	0	8.35
4	M4	Z	-0.03	-0.03	0	8.25
5	M5	Z	-0.033	-0.033	0	7.9
6	M6	Z	-0.034	-0.034	0	7.6
7	M7	Z	-0.037	-0.037	0	9

Member Distributed Loads (BLC 4 : No Ice Wind 45 deg)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	0.015	0.015	0	2
2	M1	Z	-0.015	-0.015	0	2
3	M2	X	0.017	0.017	0	8.9
4	M2	Z	-0.017	-0.017	0	8.9
5	M3	X	0.019	0.019	0	8.35
6	M3	Z	-0.019	-0.019	0	8.35
7	M4	X	0.022	0.022	0	8.25
8	M4	Z	-0.022	-0.022	0	8.25
9	M5	X	0.023	0.023	0	7.9
10	M5	Z	-0.023	-0.023	0	7.9
11	M6	X	0.024	0.024	0	7.6
12	M6	Z	-0.024	-0.024	0	7.6
13	M7	X	0.026	0.026	0	9
14	M7	Z	-0.026	-0.026	0	9

Member Distributed Loads (BLC 5 : No Ice Wind 90 deg)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	0.022	0.022	0	2
2	M2	X	0.024	0.024	0	8.9
3	M3	X	0.027	0.027	0	8.35
4	M4	X	0.03	0.03	0	8.25

Member Distributed Loads (BLC 5 : No Ice Wind 90 deg) (Continued)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
5	M5	X	0.033	0	7.9
6	M6	X	0.034	0	7.6
7	M7	X	0.037	0	9

Member Distributed Loads (BLC 6 : No Ice Wind 135 deg)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	0.015	0	2
2	M1	Z	0.015	0	2
3	M2	X	0.017	0	8.9
4	M2	Z	0.017	0	8.9
5	M3	X	0.019	0	8.35
6	M3	Z	0.019	0	8.35
7	M4	X	0.022	0	8.25
8	M4	Z	0.022	0	8.25
9	M5	X	0.023	0	7.9
10	M5	Z	0.023	0	7.9
11	M6	X	0.024	0	7.6
12	M6	Z	0.024	0	7.6
13	M7	X	0.026	0	9
14	M7	Z	0.026	0	9

Member Distributed Loads (BLC 7 : No Ice Wind 180 deg)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Z	0.022	0	2
2	M2	Z	0.024	0	8.9
3	M3	Z	0.027	0	8.35
4	M4	Z	0.03	0	8.25
5	M5	Z	0.033	0	7.9
6	M6	Z	0.034	0	7.6
7	M7	Z	0.037	0	9

Member Distributed Loads (BLC 8 : No Ice Wind 225 deg)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	-0.015	0	2
2	M1	Z	0.015	0	2

Member Distributed Loads (BLC 8 : No Ice Wind 225 deg) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
3	M2	X	-0.017	-0.017	0	8.9
4	M2	Z	0.017	0.017	0	8.9
5	M3	X	-0.019	-0.019	0	8.35
6	M3	Z	0.019	0.019	0	8.35
7	M4	X	-0.022	-0.022	0	8.25
8	M4	Z	0.022	0.022	0	8.25
9	M5	X	-0.023	-0.023	0	7.9
10	M5	Z	0.023	0.023	0	7.9
11	M6	X	-0.024	-0.024	0	7.6
12	M6	Z	0.024	0.024	0	7.6
13	M7	X	-0.026	-0.026	0	9
14	M7	Z	0.026	0.026	0	9

Member Distributed Loads (BLC 9 : No Ice Wind 270 deg)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	-0.022	-0.022	0	2
2	M2	X	-0.024	-0.024	0	8.9
3	M3	X	-0.027	-0.027	0	8.35
4	M4	X	-0.03	-0.03	0	8.25
5	M5	X	-0.033	-0.033	0	7.9
6	M6	X	-0.034	-0.034	0	7.6
7	M7	X	-0.037	-0.037	0	9

Member Distributed Loads (BLC 10 : No Ice Wind 315 deg)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	-0.015	-0.015	0	2
2	M1	Z	-0.015	-0.015	0	2
3	M2	X	-0.017	-0.017	0	8.9
4	M2	Z	-0.017	-0.017	0	8.9
5	M3	X	-0.019	-0.019	0	8.35
6	M3	Z	-0.019	-0.019	0	8.35
7	M4	X	-0.022	-0.022	0	8.25
8	M4	Z	-0.022	-0.022	0	8.25
9	M5	X	-0.023	-0.023	0	7.9
10	M5	Z	-0.023	-0.023	0	7.9
11	M6	X	-0.024	-0.024	0	7.6
12	M6	Z	-0.024	-0.024	0	7.6

Member Distributed Loads (BLC 10 : No Ice Wind 315 deg) (Continued)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
13	M7	X	-0.026	-0.026	0 9
14	M7	Z	-0.026	-0.026	0 9

Member Distributed Loads (BLC 11 : Ice)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.00046	-0.00046	0 %100
2	M2	Y	-0.000505	-0.000505	0 %100
3	M3	Y	-0.000595	-0.000595	0 %100
4	M4	Y	-0.000678	-0.000678	0 %100
5	M5	Y	-0.000752	-0.000752	0 %100
6	M6	Y	-0.000813	-0.000813	0 %100
7	M7	Y	-0.000838	-0.000838	0 %100

Member Distributed Loads (BLC 12 : Temperature Drop)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	T	-50	-50	0 %100
2	M2	T	-50	-50	0 %100
3	M3	T	-50	-50	0 %100
4	M4	T	-50	-50	0 %100
5	M5	T	-50	-50	0 %100
6	M6	T	-50	-50	0 %100
7	M7	T	-50	-50	0 %100
8	M8	T	-50	-50	0 %100
9	M9	T	-50	-50	0 %100
10	M10	T	-50	-50	0 %100
11	M11	T	-50	-50	0 %100

Member Distributed Loads (BLC 13 : Ice Wind 0 deg)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Z	-0.005	-0.005	0 2
2	M2	Z	-0.005	-0.005	0 8.9
3	M3	Z	-0.006	-0.006	0 8.35
4	M4	Z	-0.007	-0.007	0 8.25
5	M5	Z	-0.007	-0.007	0 7.9
6	M6	Z	-0.007	-0.007	0 7.6



Member Distributed Loads (BLC 13 : Ice Wind 0 deg) (Continued)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
7	M7	Z	-0.008	-0.008	0 9

Member Distributed Loads (BLC 14 : Ice Wind 45 deg)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	0.003	0.003	0 2
2	M1	Z	-0.003	-0.003	0 2
3	M2	X	0.004	0.004	0 8.9
4	M2	Z	-0.004	-0.004	0 8.9
5	M3	X	0.004	0.004	0 8.35
6	M3	Z	-0.004	-0.004	0 8.35
7	M4	X	0.005	0.005	0 8.25
8	M4	Z	-0.005	-0.005	0 8.25
9	M5	X	0.005	0.005	0 7.9
10	M5	Z	-0.005	-0.005	0 7.9
11	M6	X	0.005	0.005	0 7.6
12	M6	Z	-0.005	-0.005	0 7.6
13	M7	X	0.006	0.006	0 9
14	M7	Z	-0.006	-0.006	0 9

Member Distributed Loads (BLC 15 : Ice Wind 90 deg)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	0.005	0.005	0 2
2	M2	X	0.005	0.005	0 8.9
3	M3	X	0.006	0.006	0 8.35
4	M4	X	0.007	0.007	0 8.25
5	M5	X	0.007	0.007	0 7.9
6	M6	X	0.007	0.007	0 7.6
7	M7	X	0.008	0.008	0 9

Member Distributed Loads (BLC 16 : Ice Wind 135 deg)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	0.003	0.003	0 2
2	M1	Z	0.003	0.003	0 2
3	M2	X	0.004	0.004	0 8.9
4	M2	Z	0.004	0.004	0 8.9

Member Distributed Loads (BLC 16 : Ice Wind 135 deg) (Continued)

Member	Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
5	M3	X	0.004	0.004	0	8.35
6	M3	Z	0.004	0.004	0	8.35
7	M4	X	0.005	0.005	0	8.25
8	M4	Z	0.005	0.005	0	8.25
9	M5	X	0.005	0.005	0	7.9
10	M5	Z	0.005	0.005	0	7.9
11	M6	X	0.005	0.005	0	7.6
12	M6	Z	0.005	0.005	0	7.6
13	M7	X	0.006	0.006	0	9
14	M7	Z	0.006	0.006	0	9

Member Distributed Loads (BLC 17 : Ice Wind 180 deg)

Member	Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Z	0.005	0.005	0	2
2	M2	Z	0.005	0.005	0	8.9
3	M3	Z	0.006	0.006	0	8.35
4	M4	Z	0.007	0.007	0	8.25
5	M5	Z	0.007	0.007	0	7.9
6	M6	Z	0.007	0.007	0	7.6
7	M7	Z	0.008	0.008	0	9

Member Distributed Loads (BLC 18 : Ice Wind 225 deg)

Member	Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	-0.003	-0.003	0	2
2	M1	Z	0.003	0.003	0	2
3	M2	X	-0.004	-0.004	0	8.9
4	M2	Z	0.004	0.004	0	8.9
5	M3	X	-0.004	-0.004	0	8.35
6	M3	Z	0.004	0.004	0	8.35
7	M4	X	-0.005	-0.005	0	8.25
8	M4	Z	0.005	0.005	0	8.25
9	M5	X	-0.005	-0.005	0	7.9
10	M5	Z	0.005	0.005	0	7.9
11	M6	X	-0.005	-0.005	0	7.6
12	M6	Z	0.005	0.005	0	7.6
13	M7	X	-0.006	-0.006	0	9
14	M7	Z	0.006	0.006	0	9

Member Distributed Loads (BLC 19 : Ice Wind 270 deg)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	-0.005	-0.005	0 2
2	M2	X	-0.005	-0.005	0 8.9
3	M3	X	-0.006	-0.006	0 8.35
4	M4	X	-0.007	-0.007	0 8.25
5	M5	X	-0.007	-0.007	0 7.9
6	M6	X	-0.007	-0.007	0 7.6
7	M7	X	-0.008	-0.008	0 9

Member Distributed Loads (BLC 20 : Ice Wind 315 deg)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	-0.003	-0.003	0 2
2	M1	Z	-0.003	-0.003	0 2
3	M2	X	-0.004	-0.004	0 8.9
4	M2	Z	-0.004	-0.004	0 8.9
5	M3	X	-0.004	-0.004	0 8.35
6	M3	Z	-0.004	-0.004	0 8.35
7	M4	X	-0.005	-0.005	0 8.25
8	M4	Z	-0.005	-0.005	0 8.25
9	M5	X	-0.005	-0.005	0 7.9
10	M5	Z	-0.005	-0.005	0 7.9
11	M6	X	-0.005	-0.005	0 7.6
12	M6	Z	-0.005	-0.005	0 7.6
13	M7	X	-0.006	-0.006	0 9
14	M7	Z	-0.006	-0.006	0 9

Member Distributed Loads (BLC 21 : Service Wind 0 deg)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Z	-0.006	-0.006	0 2
2	M2	Z	-0.006	-0.006	0 8.9
3	M3	Z	-0.007	-0.007	0 8.35
4	M4	Z	-0.008	-0.008	0 8.25
5	M5	Z	-0.009	-0.009	0 7.9
6	M6	Z	-0.009	-0.009	0 7.6
7	M7	Z	-0.01	-0.01	0 9

Member Distributed Loads (BLC 22 : Service Wind 45 deg)

Member	Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	0.004	0.004	0	2
2	M1	Z	-0.004	-0.004	0	2
3	M2	X	0.004	0.004	0	8.9
4	M2	Z	-0.004	-0.004	0	8.9
5	M3	X	0.005	0.005	0	8.35
6	M3	Z	-0.005	-0.005	0	8.35
7	M4	X	0.006	0.006	0	8.25
8	M4	Z	-0.006	-0.006	0	8.25
9	M5	X	0.006	0.006	0	7.9
10	M5	Z	-0.006	-0.006	0	7.9
11	M6	X	0.006	0.006	0	7.6
12	M6	Z	-0.006	-0.006	0	7.6
13	M7	X	0.007	0.007	0	9
14	M7	Z	-0.007	-0.007	0	9

Member Distributed Loads (BLC 23 : Service Wind 90 deg)

Member	Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	0.006	0.006	0	2
2	M2	X	0.006	0.006	0	8.9
3	M3	X	0.007	0.007	0	8.35
4	M4	X	0.008	0.008	0	8.25
5	M5	X	0.009	0.009	0	7.9
6	M6	X	0.009	0.009	0	7.6
7	M7	X	0.01	0.01	0	9

Member Distributed Loads (BLC 24 : Service Wind 135 deg)

Member	Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	0.004	0.004	0	2
2	M1	Z	0.004	0.004	0	2
3	M2	X	0.004	0.004	0	8.9
4	M2	Z	0.004	0.004	0	8.9
5	M3	X	0.005	0.005	0	8.35
6	M3	Z	0.005	0.005	0	8.35
7	M4	X	0.006	0.006	0	8.25
8	M4	Z	0.006	0.006	0	8.25
9	M5	X	0.006	0.006	0	7.9

Member Distributed Loads (BLC 24 : Service Wind 135 deg) (Continued)

Member	Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
10	M5	Z	0.006	0.006	0	7.9
11	M6	X	0.006	0.006	0	7.6
12	M6	Z	0.006	0.006	0	7.6
13	M7	X	0.007	0.007	0	9
14	M7	Z	0.007	0.007	0	9

Member Distributed Loads (BLC 25 : Service Wind 180 deg)

Member	Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Z	0.006	0.006	0	2
2	M2	Z	0.006	0.006	0	8.9
3	M3	Z	0.007	0.007	0	8.35
4	M4	Z	0.008	0.008	0	8.25
5	M5	Z	0.009	0.009	0	7.9
6	M6	Z	0.009	0.009	0	7.6
7	M7	Z	0.01	0.01	0	9

Member Distributed Loads (BLC 26 : Service Wind 225 deg)

Member	Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	-0.004	-0.004	0	2
2	M1	Z	0.004	0.004	0	2
3	M2	X	-0.004	-0.004	0	8.9
4	M2	Z	0.004	0.004	0	8.9
5	M3	X	-0.005	-0.005	0	8.35
6	M3	Z	0.005	0.005	0	8.35
7	M4	X	-0.006	-0.006	0	8.25
8	M4	Z	0.006	0.006	0	8.25
9	M5	X	-0.006	-0.006	0	7.9
10	M5	Z	0.006	0.006	0	7.9
11	M6	X	-0.006	-0.006	0	7.6
12	M6	Z	0.006	0.006	0	7.6
13	M7	X	-0.007	-0.007	0	9
14	M7	Z	0.007	0.007	0	9

Member Distributed Loads (BLC 27 : Service Wind 270 deg)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	-0.006	-0.006	0 2
2	M2	X	-0.006	-0.006	0 8.9
3	M3	X	-0.007	-0.007	0 8.35
4	M4	X	-0.008	-0.008	0 8.25
5	M5	X	-0.009	-0.009	0 7.9
6	M6	X	-0.009	-0.009	0 7.6
7	M7	X	-0.01	-0.01	0 9

Member Distributed Loads (BLC 28 : Service Wind 315 deg)

Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	-0.004	-0.004	0 2
2	M1	Z	-0.004	-0.004	0 2
3	M2	X	-0.004	-0.004	0 8.9
4	M2	Z	-0.004	-0.004	0 8.9
5	M3	X	-0.005	-0.005	0 8.35
6	M3	Z	-0.005	-0.005	0 8.35
7	M4	X	-0.006	-0.006	0 8.25
8	M4	Z	-0.006	-0.006	0 8.25
9	M5	X	-0.006	-0.006	0 7.9
10	M5	Z	-0.006	-0.006	0 7.9
11	M6	X	-0.006	-0.006	0 7.6
12	M6	Z	-0.006	-0.006	0 7.6
13	M7	X	-0.007	-0.007	0 9
14	M7	Z	-0.007	-0.007	0 9

Basic Load Cases

	BLC Description	Category	Y Gravity	Point	Distributed
1	Dead	None	-1	24	
2	Guy Weight	None			
3	No Ice Wind 0 deg	None		21	7
4	No Ice Wind 45 deg	None		21	14
5	No Ice Wind 90 deg	None		21	7
6	No Ice Wind 135 deg	None		19	14
7	No Ice Wind 180 deg	None		21	7
8	No Ice Wind 225 deg	None		21	14
9	No Ice Wind 270 deg	None		21	7

Basic Load Cases (Continued)

	BLC Description	Category	Y Gravity	Point	Distributed
10	No Ice Wind 315 deg	None		19	14
11	Ice	None		24	7
12	Temperature Drop	None			11
13	Ice Wind 0 deg	None		21	7
14	Ice Wind 45 deg	None		21	14
15	Ice Wind 90 deg	None		21	7
16	Ice Wind 135 deg	None		19	14
17	Ice Wind 180 deg	None		21	7
18	Ice Wind 225 deg	None		21	14
19	Ice Wind 270 deg	None		21	7
20	Ice Wind 315 deg	None		19	14
21	Service Wind 0 deg	None		21	7
22	Service Wind 45 deg	None		21	14
23	Service Wind 90 deg	None		21	7
24	Service Wind 135 deg	None		19	14
25	Service Wind 180 deg	None		21	7
26	Service Wind 225 deg	None		21	14
27	Service Wind 270 deg	None		21	7
28	Service Wind 315 deg	None		19	14

Load Combinations

	Description	Solve	P-Delta	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	
1	Dead Only	Yes	Y	1	1	2	1	29	1	30	1						
2	1.2 Dead+1.0 Wind 0 deg - No Ice+1.0 Guy	Yes	Y	1	1.2	3	1	2	1	29	1.2	30	1				
3	1.2 Dead+1.0 Wind 45 deg - No Ice+1.0 Guy	Yes	Y	1	1.2	4	1	2	1	29	1.2	30	1				
4	1.2 Dead+1.0 Wind 90 deg - No Ice+1.0 Guy	Yes	Y	1	1.2	5	1	2	1	29	1.2	30	1				
5	1.2 Dead+1.0 Wind 135 deg - No Ice+1.0 Guy	Yes	Y	1	1.2	6	1	2	1	29	1.2	30	1				
6	1.2 Dead+1.0 Wind 180 deg - No Ice+1.0 Guy	Yes	Y	1	1.2	7	1	2	1	29	1.2	30	1				
7	1.2 Dead+1.0 Wind 225 deg - No Ice+1.0 Guy	Yes	Y	1	1.2	8	1	2	1	29	1.2	30	1				
8	1.2 Dead+1.0 Wind 270 deg - No Ice+1.0 Guy	Yes	Y	1	1.2	9	1	2	1	29	1.2	30	1				
9	1.2 Dead+1.0 Wind 315 deg - No Ice+1.0 Guy	Yes	Y	1	1.2	10	1	2	1	29	1.2	30	1				
10	1.2 Dead+1.0 Ice+1.0 Temp+Guy	Yes	Y	1	1.2	11	1	12	1	2	1	29	1.2	30	1		
11	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy	Yes	Y	1	1.2	13	1	11	1	12	1	2	1	29	1.2	30	1
12	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp+1.0 Guy	Yes	Y	1	1.2	14	1	11	1	12	1	2	1	29	1.2	30	1
13	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy	Yes	Y	1	1.2	15	1	11	1	12	1	2	1	29	1.2	30	1
14	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp+1.0 Guy	Yes	Y	1	1.2	16	1	11	1	12	1	2	1	29	1.2	30	1
15	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy	Yes	Y	1	1.2	17	1	11	1	12	1	2	1	29	1.2	30	1
16	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp+1.0 Guy	Yes	Y	1	1.2	18	1	11	1	12	1	2	1	29	1.2	30	1

Load Combinations (Continued)

Description		Solve	P-Delta	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC Factor		
17	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy	Yes	Y	1	1.2	19	1	11	1	12	1	2	1	29	1.2	30	1
18	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp+1.0 Guy	Yes	Y	1	1.2	20	1	11	1	12	1	2	1	29	1.2	30	1
19	Dead+Wind 0 deg - Service+Guy	Yes	Y	1	1	21	1	2	1	29	1	30	1				
20	Dead+Wind 45 deg - Service+Guy	Yes	Y	1	1	22	1	2	1	29	1	30	1				
21	Dead+Wind 90 deg - Service+Guy	Yes	Y	1	1	23	1	2	1	29	1	30	1				
22	Dead+Wind 135 deg - Service+Guy	Yes	Y	1	1	24	1	2	1	29	1	30	1				
23	Dead+Wind 180 deg - Service+Guy	Yes	Y	1	1	25	1	2	1	29	1	30	1				
24	Dead+Wind 225 deg - Service+Guy	Yes	Y	1	1	26	1	2	1	29	1	30	1				
25	Dead+Wind 270 deg - Service+Guy	Yes	Y	1	1	27	1	2	1	29	1	30	1				
26	Dead+Wind 315 deg - Service+Guy	Yes	Y	1	1	28	1	2	1	29	1	30	1				

Envelope Node Reactions

Node Label	X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1 N43 max	1.222	8	1.383	10	1.215	2	17.37	2	0.2	4	17.418	4
2 min	-1.217	4	0.92	26	-1.224	6	-17.599	6	-0.2	8	-17.552	8
3 N53 max	0.431	9	0.596	9	0.428	9	LOCKED		0	26	LOCKED	
4 min	-0.425	5	-0.574	5	-0.422	5	LOCKED		0	1	LOCKED	
5 N55 max	0.416	7	0.579	7	0.417	3	LOCKED		LOCKED		0	26
6 min	-0.414	3	-0.563	3	-0.418	7	LOCKED		LOCKED		0	1
7 N57 max	0.426	9	0.595	5	0.423	9	LOCKED		0	26	LOCKED	
8 min	-0.43	5	-0.575	9	-0.427	5	LOCKED		0	1	LOCKED	
9 N59 max	0.411	7	0.584	3	0.422	3	0	26	LOCKED		LOCKED	
10 min	-0.419	3	-0.558	7	-0.413	7	0	1	LOCKED		LOCKED	
11 Totals: max	2.411	8	1.308	10	2.411	2						
12 min	-2.411	4	0.954	19	-2.411	6						

Aluminum Properties

Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e ⁶ F ⁻¹]	Density [k/ft ³]	Table B.4	kt	Ftu [ksi]	Fty [ksi]	Fcy [ksi]	Fsu [ksi]	Ct
1 3003-H14	10100	3787.5	0.33	1.3	0.173	Table B.4-1	1	19	16	13	12	141
2 6061-T6	10100	3787.5	0.33	1.3	0.173	Table B.4-2	1	38	35	35	24	141
3 6063-T5	10100	3787.5	0.33	1.3	0.173	Table B.4-2	1	22	16	16	13	141
4 6063-T6	10100	3787.5	0.33	1.3	0.173	Table B.4-2	1	30	25	25	19	141
5 5052-H34	10200	3787.5	0.33	1.3	0.173	Table B.4-1	1	34	26	24	20	141
6 6061-T6 W	10100	3787.5	0.33	1.3	0.173	Table B.4-1	1	24	15	15	15	141

Aluminum Design Parameters

Label	Shape	Length [ft]	Lb y-y [ft]	Lb z-z [ft]	Lcomp top [ft]	Lcomp bot [ft]	L-Torque [ft]	K y-y	K z-z	Function
1	M1	RT4.5X4.5A	2	1	1	1	1	0	0	Lateral
2	M2	RT5X5A	8.9	1.113	1.113	1.113	1.113	0	0	Lateral
3	M3	RT6X6X0.250	8.35	1.044	1.044	1.044	1.044	0	0	Lateral
4	M4	RT7X7A	8.25	1.031	1.031	1.031	1.031	0	0	Lateral
5	M5	RT8X8X0.250	7.9	1.129	1.129	1.129	1.129	0	0	Lateral
6	M6	RT9X9A	7.6	1.086	1.086	1.086	1.086	0	0	Lateral
7	M7	RT10X10A	9	1	1	1	1	0	0	Lateral

Envelope Member Section Forces

Member	Sec	Axial[k]	LC y Shear[k]	LC z Shear[k]	LC Torque[k-ft]	LC y-y Moment[k-ft]	LC z-z Moment[k-ft]	LC							
1	M1	1	max	0.453	10	0.622	8	0.62	6	0.162	4	1.239	2	1.302	8
2			min	0.216	26	-0.627	4	-0.628	2	-0.162	8	-1.345	6	-1.282	4
3		2	max	0.45	10	0.633	8	0.631	6	0.162	4	0.922	2	0.988	8
4			min	0.214	26	-0.638	4	-0.639	2	-0.162	8	-1.033	6	-0.966	4
5		3	max	0.446	10	0.644	8	0.642	6	0.162	4	0.599	2	0.669	8
6			min	0.211	26	-0.648	4	-0.65	2	-0.162	8	-0.714	6	-0.644	4
7		4	max	0.443	10	0.655	8	0.653	6	0.162	4	0.272	2	0.345	8
8			min	0.209	26	-0.659	4	-0.661	2	-0.162	8	-0.391	6	-0.318	4
9		5	max	0.44	10	0.665	8	0.664	6	0.162	4	-0.051	26	0.017	13
10			min	0.206	26	-0.67	4	-0.672	2	-0.162	8	-0.091	16	0.012	25
11	M2	1	max	0.893	10	0.123	8	0.122	6	0.2	4	4.254	2	4.369	8
12			min	0.537	26	-0.128	4	-0.13	2	-0.2	8	-4.397	6	-4.283	4
13		2	max	0.876	10	0.185	8	0.183	6	0.2	4	3.901	2	4.03	8
14			min	0.524	26	-0.19	4	-0.192	2	-0.2	8	-4.062	6	-3.933	4
15		3	max	0.86	10	0.245	8	0.244	6	0.2	4	3.412	2	3.555	8
16			min	0.512	26	-0.25	4	-0.251	2	-0.2	8	-3.591	6	-3.448	4
17		4	max	0.469	10	0.577	8	0.575	6	0.162	4	2.577	2	2.626	8
18			min	0.229	26	-0.581	4	-0.583	2	-0.162	8	-2.665	6	-2.616	4
19		5	max	0.453	10	0.622	8	0.62	6	0.162	4	1.239	2	1.302	8
20			min	0.216	26	-0.626	4	-0.628	2	-0.162	8	-1.345	6	-1.282	4
21	M3	1	max	0.967	10	0.124	4	0.122	2	0.2	4	4.276	2	4.332	8
22			min	0.595	26	-0.129	8	-0.131	6	-0.2	8	-4.345	6	-4.289	4
23		2	max	0.948	10	0.064	4	0.062	2	0.2	4	4.468	2	4.539	8
24			min	0.58	26	-0.069	8	-0.071	6	-0.2	8	-4.556	6	-4.485	4
25		3	max	0.93	10	0.002	5	0	9	0.2	4	4.527	2	4.613	8
26			min	0.566	26	-0.007	9	-0.009	5	-0.2	8	-4.634	6	-4.548	4
27		4	max	0.911	10	0.06	8	0.058	6	0.2	4	4.456	2	4.556	8

Envelope Member Section Forces (Continued)

Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC	
28		min	0.552	26	-0.065	4	-0.067	2	-0.2	8	-4.581	6	-4.481	4	
29	5	max	0.893	10	0.12	8	0.118	6	0.2	4	4.254	2	4.369	8	
30		min	0.537	26	-0.125	4	-0.127	2	-0.2	8	-4.397	6	-4.283	4	
31	M4	1	max	1.053	10	0.389	4	0.387	2	0.2	4	2.164	2	2.16	8
32		min	0.662	26	-0.395	8	-0.396	6	-0.2	8	-2.158	6	-2.162	4	
33	2	max	1.031	10	0.325	4	0.323	2	0.2	4	2.897	2	2.908	8	
34		min	0.645	26	-0.33	8	-0.332	6	-0.2	8	-2.909	6	-2.898	4	
35	3	max	1.01	10	0.259	4	0.257	2	0.2	4	3.493	2	3.519	8	
36		min	0.628	26	-0.264	8	-0.266	6	-0.2	8	-3.525	6	-3.499	4	
37	4	max	0.988	10	0.193	4	0.191	2	0.2	4	3.953	2	3.994	8	
38		min	0.611	26	-0.198	8	-0.2	6	-0.2	8	-4.004	6	-3.963	4	
39	5	max	0.967	10	0.126	4	0.124	2	0.2	4	4.276	2	4.332	8	
40		min	0.595	26	-0.131	8	-0.133	6	-0.2	8	-4.345	6	-4.289	4	
41	M5	1	max	1.147	10	0.651	4	0.649	2	0.2	4	2.018	6	1.956	4
42		min	0.735	26	-0.657	8	-0.659	6	-0.2	8	-1.939	2	-2.001	8	
43	2	max	1.123	10	0.587	4	0.585	2	0.2	4	0.781	6	0.733	4	
44		min	0.717	26	-0.592	8	-0.594	6	-0.2	8	-0.72	2	-0.768	8	
45	3	max	1.1	10	0.522	4	0.52	2	0.2	4	0.371	2	0.338	8	
46		min	0.698	26	-0.527	8	-0.529	6	-0.2	8	-0.328	6	-0.361	4	
47	4	max	1.076	10	0.456	4	0.454	2	0.2	4	1.333	2	1.314	8	
48		min	0.68	26	-0.461	8	-0.463	6	-0.2	8	-1.308	6	-1.327	4	
49	5	max	1.053	10	0.39	4	0.388	2	0.2	4	2.164	2	2.16	8	
50		min	0.662	26	-0.396	8	-0.398	6	-0.2	8	-2.158	6	-2.162	4	
51	M6	1	max	1.249	10	0.903	4	0.901	2	0.2	4	7.984	6	7.866	4
52		min	0.815	26	-0.908	8	-0.91	6	-0.2	8	-7.835	2	-7.953	8	
53	2	max	1.223	10	0.84	4	0.838	2	0.2	4	6.314	6	6.211	4	
54		min	0.795	26	-0.846	8	-0.847	6	-0.2	8	-6.183	2	-6.287	8	
55	3	max	1.198	10	0.778	4	0.776	2	0.2	4	4.762	6	4.673	4	
56		min	0.775	26	-0.784	8	-0.785	6	-0.2	8	-4.648	2	-4.738	8	
57	4	max	1.172	10	0.715	4	0.713	2	0.2	4	3.33	6	3.254	4	
58		min	0.755	26	-0.721	8	-0.722	6	-0.2	8	-3.233	2	-3.31	8	
59	5	max	1.147	10	0.651	4	0.649	2	0.2	4	2.018	6	1.956	4	
60		min	0.735	26	-0.657	8	-0.658	6	-0.2	8	-1.939	2	-2.001	8	
61	M7	1	max	1.383	10	1.219	4	1.217	2	0.2	4	17.599	6	17.418	4
62		min	0.92	26	-1.224	8	-1.226	6	-0.2	8	-17.37	2	-17.552	8	
63	2	max	1.349	10	1.141	4	1.139	2	0.2	4	14.931	6	14.766	4	
64		min	0.894	26	-1.146	8	-1.148	6	-0.2	8	-14.722	2	-14.888	8	
65	3	max	1.316	10	1.062	4	1.06	2	0.2	4	12.437	6	12.288	4	
66		min	0.867	26	-1.067	8	-1.069	6	-0.2	8	-12.248	2	-12.398	8	

Envelope Member Section Forces (Continued)

Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC	
67		4	max	1.282	10	0.982	4	0.98	2	0.2	4	10.12	6	9.987	4
68			min	0.841	26	-0.988	8	-0.989	6	-0.2	8	-9.951	2	-10.085	8
69		5	max	1.249	10	0.901	4	0.9	2	0.2	4	7.984	6	7.866	4
70			min	0.815	26	-0.907	8	-0.909	6	-0.2	8	-7.835	2	-7.953	8
71	M8	1	max	0.851	9	0.004	9	0	26	0	26	0	26	0	26
72			min	-0.829	5	0.004	20	0	1	0	1	0	1	0	1
73		2	max	0.849	9	0.002	9	0	26	0	26	0	26	-0.056	20
74			min	-0.832	5	0.002	20	0	1	0	1	0	1	-0.067	9
75		3	max	0.847	9	0	26	0	26	0	26	0	26	-0.075	20
76			min	-0.834	5	0	1	0	1	0	1	0	1	-0.09	9
77		4	max	0.845	9	-0.002	26	0	26	0	26	0	26	-0.056	20
78			min	-0.836	5	-0.002	2	0	1	0	1	0	1	-0.067	9
79		5	max	0.843	9	-0.004	26	0	26	0	26	0	26	0	26
80			min	-0.838	5	-0.004	2	0	1	0	1	0	1	0	1
81	M9	1	max	0.827	7	0.004	8	0	26	0	26	0	26	0	26
82			min	-0.814	3	0.004	19	0	1	0	1	0	1	0	1
83		2	max	0.825	7	0.002	8	0	26	0	26	0	26	-0.056	20
84			min	-0.816	3	0.002	19	0	1	0	1	0	1	-0.067	7
85		3	max	0.823	7	0	26	0	26	0	26	0	26	-0.075	20
86			min	-0.818	3	0	1	0	1	0	1	0	1	-0.09	7
87		4	max	0.821	7	-0.002	25	0	26	0	26	0	26	-0.056	20
88			min	-0.82	3	-0.002	2	0	1	0	1	0	1	-0.067	7
89		5	max	0.819	7	-0.004	25	0	26	0	26	0	26	0	26
90			min	-0.822	3	-0.004	2	0	1	0	1	0	1	0	1
91	M10	1	max	0.85	5	0.004	4	0	26	0	26	0	26	0	26
92			min	-0.831	9	0.004	25	0	1	0	1	0	1	0	1
93		2	max	0.847	5	0.002	4	0	26	0	26	0	26	-0.056	25
94			min	-0.833	9	0.002	25	0	1	0	1	0	1	-0.067	4
95		3	max	0.845	5	0	26	0	26	0	26	0	26	-0.075	25
96			min	-0.835	9	0	1	0	1	0	1	0	1	-0.09	4
97		4	max	0.843	5	-0.002	23	0	26	0	26	0	26	-0.056	25
98			min	-0.837	9	-0.002	8	0	1	0	1	0	1	-0.067	4
99		5	max	0.841	5	-0.004	23	0	26	0	26	0	26	0	26
100			min	-0.84	9	-0.004	8	0	1	0	1	0	1	0	1
101	M11	1	max	0.834	3	0.004	3	0	26	0	26	0	26	0	26
102			min	-0.807	7	0.004	24	0	1	0	1	0	1	0	1
103		2	max	0.832	3	0.002	3	0	26	0	26	0	26	-0.056	24
104			min	-0.809	7	0.002	24	0	1	0	1	0	1	-0.067	3
105		3	max	0.83	3	0	26	0	26	0	26	0	26	-0.075	24

Envelope Member Section Forces (Continued)

Member	Sec	Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC	
106		min	-0.811	7	0	1	0	1	0	1	0	1	-0.09	3
107	4	max	0.827	3	-0.002	26	0	26	0	26	0	26	-0.056	24
108		min	-0.813	7	-0.002	6	0	1	0	1	0	1	-0.067	3
109	5	max	0.825	3	-0.004	26	0	26	0	26	0	26	0	26
110		min	-0.815	7	-0.004	6	0	1	0	1	0	1	0	1

Envelope Maximum Member Section Forces

Member	Axial[k]	Loc[ft]	LC	y Shear[k]	Loc[ft]	LC	z Shear[k]	Loc[ft]	LC	Torque[k-ft]	Loc[ft]	LC	y-y Moment[k-ft]	Loc[ft]	LC	z-z Moment[k-ft]	Loc[ft]	LC		
1	M1	max	0.453	0	10	0.665	2	8	0.664	2	6	0.162	2	4	1.239	0	2	1.302	0	8
2		min	0.206	2	26	-0.67	2	4	-0.672	2	2	-0.162	1	8	-1.345	0	6	-1.282	0	4
3	M2	max	0.893	0	10	0.622	8.9	8	0.62	8.9	6	0.2	3.337	4	4.254	0	2	4.369	0	8
4		min	0.216	8.9	26	-0.626	8.9	4	-0.628	8.9	2	-0.2	2.225	8	-4.397	0	6	-4.283	0	4
5	M3	max	0.967	0	10	0.124	0	4	0.122	0	2	0.2	8.35	4	4.527	4.088	2	4.614	4.262	8
6		min	0.537	8.35	26	-0.129	0	8	-0.131	0	6	-0.2	6.263	8	-4.634	4.349	6	-4.548	4.175	4
7	M4	max	1.053	0	10	0.389	0	4	0.387	0	2	0.2	5.156	4	4.276	8.25	2	4.332	8.25	8
8		min	0.595	8.25	26	-0.395	0	8	-0.396	0	6	-0.2	4.125	8	-4.345	8.25	6	-4.289	8.25	4
9	M5	max	1.147	0	10	0.651	0	4	0.649	0	2	0.2	5.596	4	2.164	7.9	2	2.16	7.9	8
10		min	0.662	7.9	26	-0.657	0	8	-0.659	0	6	-0.2	4.526	8	-2.158	7.9	6	-2.162	7.9	4
11	M6	max	1.249	0	10	0.903	0	4	0.901	0	2	0.2	6.492	4	7.984	0	6	7.866	0	4
12		min	0.735	7.6	26	-0.908	0	8	-0.91	0	6	-0.2	5.463	8	-7.835	0	2	-7.953	0	8
13	M7	max	1.383	0	10	1.219	0	4	1.217	0	2	0.2	6.938	4	17.599	0	6	17.418	0	4
14		min	0.815	9	26	-1.224	0	8	-1.226	0	6	-0.2	6	8	-17.37	0	2	-17.552	0	8
15	M8	max	0.851	0	9	0.004	0	9	0	83.316	26	0	83.316	26	0	83.316	26	0	83.316	26
16		min	-0.838	83.316	5	-0.004	83.316	2	0	0	1	0	0	1	0	0	1	-0.09	41.658	9
17	M9	max	0.827	0	7	0.004	0	8	0	83.316	26	0	83.316	26	0	83.316	26	0	83.316	26
18		min	-0.822	83.316	3	-0.004	83.316	2	0	0	1	0	0	1	0	0	1	-0.09	41.658	7
19	M10	max	0.85	0	5	0.004	0	4	0	83.316	26	0	83.316	26	0	83.316	26	0	83.316	26
20		min	-0.84	83.316	9	-0.004	83.316	8	0	0	1	0	0	1	0	0	1	-0.09	41.658	4
21	M11	max	0.834	0	3	0.004	0	3	0	83.316	26	0	83.316	26	0	83.316	26	0	83.316	26
22		min	-0.815	83.316	7	-0.004	83.316	6	0	0	1	0	0	1	0	0	1	-0.09	41.658	3

Envelope Member End Reactions

Member	Member End	Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Moment[k-ft]	LC	z-z Moment[k-ft]	LC		
1	M1	I	max	0.453	10	0.622	8	0.62	6	0.162	4	1.239	2	1.302	8
2			min	0.216	26	-0.627	4	-0.628	2	-0.162	8	-1.345	6	-1.282	4
3		J	max	0.44	10	0.665	8	0.664	6	0.162	4	-0.051	26	0.017	13
4			min	0.206	26	-0.67	4	-0.672	2	-0.162	8	-0.091	16	0.012	25

Envelope Member End Reactions (Continued)

Member	Member End		Axial[k]	LC y	Shear[k]	LC z	Shear[k]	LC Torque[k-ft]	LC y-y Moment[k-ft]	LC z-z Moment[k-ft]	LC				
5	M2	I	max	0.893	10	0.123	8	0.122	6	0.2	4	4.254	2	4.369	8
6			min	0.537	26	-0.128	4	-0.13	2	-0.2	8	-4.397	6	-4.283	4
7		J	max	0.453	10	0.622	8	0.62	6	0.162	4	1.239	2	1.302	8
8			min	0.216	26	-0.626	4	-0.628	2	-0.162	8	-1.345	6	-1.282	4
9	M3	I	max	0.967	10	0.124	4	0.122	2	0.2	4	4.276	2	4.332	8
10			min	0.595	26	-0.129	8	-0.131	6	-0.2	8	-4.345	6	-4.289	4
11		J	max	0.893	10	0.12	8	0.118	6	0.2	4	4.254	2	4.369	8
12			min	0.537	26	-0.125	4	-0.127	2	-0.2	8	-4.397	6	-4.283	4
13	M4	I	max	1.053	10	0.389	4	0.387	2	0.2	4	2.164	2	2.16	8
14			min	0.662	26	-0.395	8	-0.396	6	-0.2	8	-2.158	6	-2.162	4
15		J	max	0.967	10	0.126	4	0.124	2	0.2	4	4.276	2	4.332	8
16			min	0.595	26	-0.131	8	-0.133	6	-0.2	8	-4.345	6	-4.289	4
17	M5	I	max	1.147	10	0.651	4	0.649	2	0.2	4	2.018	6	1.956	4
18			min	0.735	26	-0.657	8	-0.659	6	-0.2	8	-1.939	2	-2.001	8
19		J	max	1.053	10	0.39	4	0.388	2	0.2	4	2.164	2	2.16	8
20			min	0.662	26	-0.396	8	-0.398	6	-0.2	8	-2.158	6	-2.162	4
21	M6	I	max	1.249	10	0.903	4	0.901	2	0.2	4	7.984	6	7.866	4
22			min	0.815	26	-0.908	8	-0.91	6	-0.2	8	-7.835	2	-7.953	8
23		J	max	1.147	10	0.651	4	0.649	2	0.2	4	2.018	6	1.956	4
24			min	0.735	26	-0.657	8	-0.658	6	-0.2	8	-1.939	2	-2.001	8
25	M7	I	max	1.383	10	1.219	4	1.217	2	0.2	4	17.599	6	17.418	4
26			min	0.92	26	-1.224	8	-1.226	6	-0.2	8	-17.37	2	-17.552	8
27		J	max	1.249	10	0.901	4	0.9	2	0.2	4	7.984	6	7.866	4
28			min	0.815	26	-0.907	8	-0.909	6	-0.2	8	-7.835	2	-7.953	8
29	M8	I	max	0.851	9	0.004	9	0	26	0	26	0	26	0	26
30			min	-0.829	5	0.004	20	0	1	0	1	0	1	0	1
31		J	max	0.843	9	-0.004	26	0	26	0	26	0	26	0	26
32			min	-0.838	5	-0.004	2	0	1	0	1	0	1	0	1
33	M9	I	max	0.827	7	0.004	8	0	26	0	26	0	26	0	26
34			min	-0.814	3	0.004	19	0	1	0	1	0	1	0	1
35		J	max	0.819	7	-0.004	25	0	26	0	26	0	26	0	26
36			min	-0.822	3	-0.004	2	0	1	0	1	0	1	0	1
37	M10	I	max	0.85	5	0.004	4	0	26	0	26	0	26	0	26
38			min	-0.831	9	0.004	25	0	1	0	1	0	1	0	1
39		J	max	0.841	5	-0.004	23	0	26	0	26	0	26	0	26
40			min	-0.84	9	-0.004	8	0	1	0	1	0	1	0	1
41	M11	I	max	0.834	3	0.004	3	0	26	0	26	0	26	0	26
42			min	-0.807	7	0.004	24	0	1	0	1	0	1	0	1
43		J	max	0.825	3	-0.004	26	0	26	0	26	0	26	0	26

Envelope Member End Reactions (Continued)

Member	Member End	Axial[k]	LC y Shear[k]	LC z Shear[k]	LC Torque[k-ft]	LC y-y Moment[k-ft]	LC z-z Moment[k-ft]	LC			
44	min	-0.815	7	-0.004	6	0	1	0	1	0	1

Envelope Member 2nd/1st Moment Ratios

Member	Member End	y-y Moment [k-ft]	2nd/1st Ratio	Loc [ft]	LC	z-z Moment [k-ft]	2nd/1st Ratio	Loc [ft]	LC	
1	M1	max	0.117	1.062	0	12	0.209	1.044	0	16
2		min	-0.062	1	2	8	0.017	1	2	10
3	M2	max	0.574	1.079	0	12	-0.62	1.078	0	12
4		min	0.035	0.995	5.748	8	-0.073	1.008	5.748	6
5	M3	max	-1.092	1.08	5.219	15	1.056	1.08	4.784	17
6		min	-0.044	1.037	8.35	25	0.021	1.033	8.35	23
7	M4	max	-0.052	1.107	8.25	13	0.031	1.103	8.25	11
8		min	0.771	1.044	8.25	20	0.007	1.016	0	6
9	M5	max	0.504	1.111	0	15	-0.476	1.113	0	17
10		min	0.409	1.027	7.9	20	-0.407	1.027	7.9	20
11	M6	max	0.006	1.138	0	8	-0.036	1.084	0	15
12		min	-1.404	1.037	0	20	0.025	1.034	0	6
13	M7	max	0.013	1.109	0	8	-0.056	1.07	0	15
14		min	-3.163	1.022	0	20	0.035	1.022	0	6
15	M8	max	NC	NC			-0.09	1	41.658	9
16		min	NC	NC			-0.09	1	41.658	6
17	M9	max	NC	NC			-0.09	1	41.658	8
18		min	NC	NC			-0.09	1	41.658	5
19	M10	max	NC	NC			-0.09	1	41.658	4
20		min	NC	NC			-0.09	1	41.658	12
21	M11	max	NC	NC			-0.09	1	41.658	17
22		min	NC	NC			-0.09	1	41.658	13

Envelope Member Torsion Stresses

Member	Sec	Torque[k-ft]	LC Torsion Shear[ksi]	LC y-y Warp Shear[ksi]	z-z Warp Shear[ksi]	z-Top Warp Bend[ksi]	z-Bot Warp Bend[ksi]			
1	M1	1 max	0.162	4	0.215	4	NC	NC	NC	NC
2		min	-0.162	8	-0.215	8	NC	NC	NC	NC
3		2 max	0.162	4	0.215	4	NC	NC	NC	NC
4		min	-0.162	8	-0.215	8	NC	NC	NC	NC
5		3 max	0.162	4	0.215	4	NC	NC	NC	NC
6		min	-0.162	8	-0.215	8	NC	NC	NC	NC
7		4 max	0.162	4	0.215	4	NC	NC	NC	NC
8		min	-0.162	8	-0.215	8	NC	NC	NC	NC

Envelope Member Torsion Stresses (Continued)

Member	Sec		Torque[k-ft]	LC Torsion Shear[ksi]	LC y-y Warp Shear[ksi]	z-z Warp Shear[ksi]	z-Top Warp Bend[ksi]	z-Bot Warp Bend[ksi]			
9		5	max	0.162	4	0.215	4	NC	NC	NC	NC
10			min	-0.162	8	-0.215	8	NC	NC	NC	NC
11	M2	1	max	0.2	4	0.213	4	NC	NC	NC	NC
12			min	-0.2	8	-0.213	8	NC	NC	NC	NC
13		2	max	0.2	4	0.213	4	NC	NC	NC	NC
14			min	-0.2	8	-0.213	8	NC	NC	NC	NC
15		3	max	0.2	4	0.213	4	NC	NC	NC	NC
16			min	-0.2	8	-0.213	8	NC	NC	NC	NC
17		4	max	0.162	4	0.172	4	NC	NC	NC	NC
18			min	-0.162	8	-0.172	8	NC	NC	NC	NC
19		5	max	0.162	4	0.172	4	NC	NC	NC	NC
20			min	-0.162	8	-0.172	8	NC	NC	NC	NC
21	M3	1	max	0.2	4	0.145	4	NC	NC	NC	NC
22			min	-0.2	8	-0.145	8	NC	NC	NC	NC
23		2	max	0.2	4	0.145	4	NC	NC	NC	NC
24			min	-0.2	8	-0.145	8	NC	NC	NC	NC
25		3	max	0.2	4	0.145	4	NC	NC	NC	NC
26			min	-0.2	8	-0.145	8	NC	NC	NC	NC
27		4	max	0.2	4	0.145	4	NC	NC	NC	NC
28			min	-0.2	8	-0.145	8	NC	NC	NC	NC
29		5	max	0.2	4	0.145	4	NC	NC	NC	NC
30			min	-0.2	8	-0.145	8	NC	NC	NC	NC
31	M4	1	max	0.2	4	0.106	4	NC	NC	NC	NC
32			min	-0.2	8	-0.106	8	NC	NC	NC	NC
33		2	max	0.2	4	0.106	4	NC	NC	NC	NC
34			min	-0.2	8	-0.106	8	NC	NC	NC	NC
35		3	max	0.2	4	0.106	4	NC	NC	NC	NC
36			min	-0.2	8	-0.106	8	NC	NC	NC	NC
37		4	max	0.2	4	0.106	4	NC	NC	NC	NC
38			min	-0.2	8	-0.106	8	NC	NC	NC	NC
39		5	max	0.2	4	0.106	4	NC	NC	NC	NC
40			min	-0.2	8	-0.106	8	NC	NC	NC	NC
41	M5	1	max	0.2	4	0.08	4	NC	NC	NC	NC
42			min	-0.2	8	-0.08	8	NC	NC	NC	NC
43		2	max	0.2	4	0.08	4	NC	NC	NC	NC
44			min	-0.2	8	-0.08	8	NC	NC	NC	NC
45		3	max	0.2	4	0.08	4	NC	NC	NC	NC
46			min	-0.2	8	-0.08	8	NC	NC	NC	NC
47		4	max	0.2	4	0.08	4	NC	NC	NC	NC

Envelope Member Torsion Stresses (Continued)

Member	Sec		Torque[k-ft]	LC Torsion Shear[ksi]	LC y-y Warp Shear[ksi]	z-z Warp Shear[ksi]	z-Top Warp Bend[ksi]	z-Bot Warp Bend[ksi]
48		min	-0.2	8	-0.08	8	NC	NC
49	5	max	0.2	4	0.08	4	NC	NC
50		min	-0.2	8	-0.08	8	NC	NC
51	M6	1	max	0.2	4	0.063	4	NC
52		min	-0.2	8	-0.063	8	NC	NC
53	2	max	0.2	4	0.063	4	NC	NC
54		min	-0.2	8	-0.063	8	NC	NC
55	3	max	0.2	4	0.063	4	NC	NC
56		min	-0.2	8	-0.063	8	NC	NC
57	4	max	0.2	4	0.063	4	NC	NC
58		min	-0.2	8	-0.063	8	NC	NC
59	5	max	0.2	4	0.063	4	NC	NC
60		min	-0.2	8	-0.063	8	NC	NC
61	M7	1	max	0.2	4	0.051	4	NC
62		min	-0.2	8	-0.051	8	NC	NC
63	2	max	0.2	4	0.051	4	NC	NC
64		min	-0.2	8	-0.051	8	NC	NC
65	3	max	0.2	4	0.051	4	NC	NC
66		min	-0.2	8	-0.051	8	NC	NC
67	4	max	0.2	4	0.051	4	NC	NC
68		min	-0.2	8	-0.051	8	NC	NC
69	5	max	0.2	4	0.051	4	NC	NC
70		min	-0.2	8	-0.051	8	NC	NC
71	M8	1	max	0	26	0	26	NC
72		min	0	1	0	1	NC	NC
73	2	max	0	26	0	26	NC	NC
74		min	0	1	0	1	NC	NC
75	3	max	0	26	0	26	NC	NC
76		min	0	1	0	1	NC	NC
77	4	max	0	26	0	26	NC	NC
78		min	0	1	0	1	NC	NC
79	5	max	0	26	0	26	NC	NC
80		min	0	1	0	1	NC	NC
81	M9	1	max	0	26	0	26	NC
82		min	0	1	0	1	NC	NC
83	2	max	0	26	0	26	NC	NC
84		min	0	1	0	1	NC	NC
85	3	max	0	26	0	26	NC	NC
86		min	0	1	0	1	NC	NC

Envelope Member Torsion Stresses (Continued)

Member	Sec	LC	Torque[k-ft]	Torsion Shear[ksi]	LC y-y Warp Shear[ksi]	z-z Warp Shear[ksi]	z-Top Warp Bend[ksi]	z-Bot Warp Bend[ksi]
87	4	max	0	26	0	26	NC	NC
88		min	0	1	0	1	NC	NC
89	5	max	0	26	0	26	NC	NC
90		min	0	1	0	1	NC	NC
91	M10	1	max	0	26	0	26	NC
92		min	0	1	0	1	NC	NC
93	2	max	0	26	0	26	NC	NC
94		min	0	1	0	1	NC	NC
95	3	max	0	26	0	26	NC	NC
96		min	0	1	0	1	NC	NC
97	4	max	0	26	0	26	NC	NC
98		min	0	1	0	1	NC	NC
99	5	max	0	26	0	26	NC	NC
100		min	0	1	0	1	NC	NC
101	M11	1	max	0	26	0	26	NC
102		min	0	1	0	1	NC	NC
103	2	max	0	26	0	26	NC	NC
104		min	0	1	0	1	NC	NC
105	3	max	0	26	0	26	NC	NC
106		min	0	1	0	1	NC	NC
107	4	max	0	26	0	26	NC	NC
108		min	0	1	0	1	NC	NC
109	5	max	0	26	0	26	NC	NC
110		min	0	1	0	1	NC	NC

Envelope Member Section Stresses

Member	Sec	Axial[ksi]	LC y Shear[ksi]	LC z Shear[ksi]	LC y-Top[ksi]	LC y-Bot[ksi]	LC z-Top[ksi]	LC z-Bot[ksi]									
1	M1	1	max	0.107	10	0.276	8	0.276	6	2.696	4	2.738	8	2.605	2	2.83	6
2			min	0.051	26	-0.278	4	-0.279	2	-2.738	8	-2.696	4	-2.83	6	-2.605	2
3		2	max	0.106	10	0.281	8	0.28	6	2.032	4	2.079	8	1.938	2	2.172	6
4			min	0.05	26	-0.283	4	-0.284	2	-2.079	8	-2.032	4	-2.172	6	-1.938	2
5		3	max	0.105	10	0.286	8	0.285	6	1.355	4	1.408	8	1.261	2	1.502	6
6			min	0.05	26	-0.288	4	-0.289	2	-1.408	8	-1.355	4	-1.502	6	-1.261	2
7		4	max	0.104	10	0.291	8	0.29	6	0.668	4	0.725	8	0.571	2	0.822	6
8			min	0.049	26	-0.293	4	-0.294	2	-0.725	8	-0.668	4	-0.822	6	-0.571	2
9		5	max	0.103	10	0.296	8	0.295	6	-0.026	25	0.036	13	-0.108	26	0.191	16
10			min	0.049	26	-0.298	4	-0.299	2	-0.036	13	0.026	25	-0.191	16	0.108	26
11	M2	1	max	0.188	10	0.049	8	0.049	6	7.173	4	7.317	8	7.125	2	7.365	6

Envelope Member Section Stresses (Continued)

Member	Sec		Axial[ksi]	LC	y	Shear[ksi]	LC	z	Shear[ksi]	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
12		min	0.113	26	-0.051	4	-0.052	2	-7.317	8	-7.173	4	-7.365	6	-7.125	2		
13	2	max	0.185	10	0.074	8	0.073	6	6.588	4	6.75	8	6.533	2	6.804	6		
14		min	0.11	26	-0.076	4	-0.077	2	-6.75	8	-6.588	4	-6.804	6	-6.533	2		
15	3	max	0.181	10	0.098	8	0.097	6	5.775	4	5.955	8	5.714	2	6.015	6		
16		min	0.108	26	-0.1	4	-0.101	2	-5.955	8	-5.775	4	-6.015	6	-5.714	2		
17	4	max	0.099	10	0.231	8	0.23	6	4.382	4	4.398	8	4.315	2	4.464	6		
18		min	0.048	26	-0.233	4	-0.233	2	-4.398	8	-4.382	4	-4.464	6	-4.315	2		
19	5	max	0.095	10	0.249	8	0.248	6	2.147	4	2.181	8	2.075	2	2.254	6		
20		min	0.046	26	-0.251	4	-0.251	2	-2.181	8	-2.147	4	-2.254	6	-2.075	2		
21	M3	1	max	0.168	10	0.041	4	0.041	2	4.871	4	4.92	8	4.856	2	4.935	6	
22		min	0.103	26	-0.043	8	-0.044	6	-4.92	8	-4.871	4	-4.935	6	-4.856	2		
23	2	max	0.165	10	0.021	4	0.021	2	5.093	4	5.155	8	5.074	2	5.174	6		
24		min	0.101	26	-0.023	8	-0.024	6	-5.155	8	-5.093	4	-5.174	6	-5.074	2		
25	3	max	0.162	10	0.001	5	0	9	5.165	4	5.239	8	5.141	2	5.263	6		
26		min	0.098	26	-0.002	9	-0.003	5	-5.239	8	-5.165	4	-5.263	6	-5.141	2		
27	4	max	0.158	10	0.02	8	0.019	6	5.089	4	5.175	8	5.06	2	5.202	6		
28		min	0.096	26	-0.022	4	-0.022	2	-5.175	8	-5.089	4	-5.202	6	-5.06	2		
29	5	max	0.155	10	0.04	8	0.039	6	4.863	4	4.961	8	4.831	2	4.993	6		
30		min	0.093	26	-0.042	4	-0.042	2	-4.961	8	-4.863	4	-4.993	6	-4.831	2		
31	M4	1	max	0.156	10	0.111	4	0.111	2	1.769	4	1.768	8	1.771	2	1.766	6	
32		min	0.098	26	-0.113	8	-0.113	6	-1.768	8	-1.769	4	-1.766	6	-1.771	2		
33	2	max	0.153	10	0.093	4	0.092	2	2.372	4	2.379	8	2.37	2	2.381	6		
34		min	0.096	26	-0.094	8	-0.095	6	-2.379	8	-2.372	4	-2.381	6	-2.37	2		
35	3	max	0.15	10	0.074	4	0.073	2	2.863	4	2.88	8	2.858	2	2.884	6		
36		min	0.093	26	-0.076	8	-0.076	6	-2.88	8	-2.863	4	-2.884	6	-2.858	2		
37	4	max	0.146	10	0.055	4	0.054	2	3.242	4	3.269	8	3.235	2	3.276	6		
38		min	0.091	26	-0.057	8	-0.057	6	-3.269	8	-3.242	4	-3.276	6	-3.235	2		
39	5	max	0.143	10	0.036	4	0.035	2	3.51	4	3.545	8	3.499	2	3.556	6		
40		min	0.088	26	-0.038	8	-0.038	6	-3.545	8	-3.51	4	-3.556	6	-3.499	2		
41	M5	1	max	0.148	10	0.163	4	0.162	2	1.236	8	1.208	4	1.247	6	1.198	2	
42		min	0.095	26	-0.164	8	-0.165	6	-1.208	4	-1.236	8	-1.198	2	-1.247	6		
43	2	max	0.145	10	0.147	4	0.146	2	0.474	8	0.453	4	0.482	6	0.445	2		
44		min	0.092	26	-0.148	8	-0.149	6	-0.453	4	-0.474	8	-0.445	2	-0.482	6		
45	3	max	0.142	10	0.13	4	0.13	2	0.223	4	0.209	8	0.229	2	0.203	6		
46		min	0.09	26	-0.132	8	-0.132	6	-0.209	8	-0.223	4	-0.203	6	-0.229	2		
47	4	max	0.139	10	0.114	4	0.113	2	0.82	4	0.812	8	0.823	2	0.808	6		
48		min	0.088	26	-0.115	8	-0.116	6	-0.812	8	-0.82	4	-0.808	6	-0.823	2		
49	5	max	0.136	10	0.098	4	0.097	2	1.336	4	1.335	8	1.337	2	1.333	6		
50		min	0.085	26	-0.099	8	-0.099	6	-1.335	8	-1.336	4	-1.333	6	-1.337	2		

Envelope Member Section Stresses (Continued)

Member	Sec		Axial[ksi]	LC	y	Shear[ksi]	LC	z	Shear[ksi]	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
51	M6	1	max	0.143	10	0.201	4	0.2	2	3.843	8	3.801	4	3.858	6	3.786	2	
52			min	0.093	26	-0.202	8	-0.202	6	-3.801	4	-3.843	8	-3.786	2	-3.858	6	
53		2	max	0.14	10	0.187	4	0.186	2	3.038	8	3.001	4	3.051	6	2.988	2	
54			min	0.091	26	-0.188	8	-0.188	6	-3.001	4	-3.038	8	-2.988	2	-3.051	6	
55		3	max	0.137	10	0.173	4	0.173	2	2.29	8	2.258	4	2.301	6	2.246	2	
56			min	0.089	26	-0.174	8	-0.175	6	-2.258	4	-2.29	8	-2.246	2	-2.301	6	
57		4	max	0.134	10	0.159	4	0.159	2	1.599	8	1.573	4	1.609	6	1.562	2	
58			min	0.086	26	-0.16	8	-0.161	6	-1.573	4	-1.599	8	-1.562	2	-1.609	6	
59		5	max	0.131	10	0.145	4	0.144	2	0.967	8	0.945	4	0.975	6	0.937	2	
60			min	0.084	26	-0.146	8	-0.146	6	-0.945	4	-0.967	8	-0.937	2	-0.975	6	
61	M7	1	max	0.142	10	0.244	4	0.243	2	6.813	8	6.761	4	6.831	6	6.742	2	
62			min	0.094	26	-0.245	8	-0.245	6	-6.761	4	-6.813	8	-6.742	2	-6.831	6	
63		2	max	0.138	10	0.228	4	0.228	2	5.779	8	5.731	4	5.795	6	5.714	2	
64			min	0.092	26	-0.229	8	-0.23	6	-5.731	4	-5.779	8	-5.714	2	-5.795	6	
65		3	max	0.135	10	0.212	4	0.212	2	4.812	8	4.769	4	4.827	6	4.754	2	
66			min	0.089	26	-0.213	8	-0.214	6	-4.769	4	-4.812	8	-4.754	2	-4.827	6	
67		4	max	0.132	10	0.196	4	0.196	2	3.915	8	3.876	4	3.928	6	3.863	2	
68			min	0.086	26	-0.198	8	-0.198	6	-3.876	4	-3.915	8	-3.863	2	-3.928	6	
69		5	max	0.128	10	0.18	4	0.18	2	3.087	8	3.053	4	3.099	6	3.041	2	
70			min	0.084	26	-0.181	8	-0.182	6	-3.053	4	-3.087	8	-3.041	2	-3.099	6	
71	M8	1	max	24.184	9	0.122	9	0	26	0	26	0	26	0	26	0	26	
72			min	-23.563	5	0.102	20	0	1	0	1	0	1	0	1	0	1	
73		2	max	24.125	9	0.061	9	0	26	0	26	0	26	0	26	0	26	
74			min	-23.622	5	0.051	20	0	1	0	1	0	1	0	1	0	1	
75		3	max	24.065	9	0	26	0	26	0	26	0	26	0	26	0	26	
76			min	-23.682	5	0	1	0	1	0	1	0	1	0	1	0	1	
77		4	max	24.006	9	-0.051	26	0	26	0	26	0	26	0	26	0	26	
78			min	-23.741	5	-0.061	2	0	1	0	1	0	1	0	1	0	1	
79		5	max	23.947	9	-0.102	26	0	26	0	26	0	26	0	26	0	26	
80			min	-23.8	5	-0.122	2	0	1	0	1	0	1	0	1	0	1	
81	M9	1	max	23.492	7	0.122	8	0	26	0	26	0	26	0	26	0	26	
82			min	-23.115	3	0.102	19	0	1	0	1	0	1	0	1	0	1	
83		2	max	23.432	7	0.061	8	0	26	0	26	0	26	0	26	0	26	
84			min	-23.174	3	0.051	19	0	1	0	1	0	1	0	1	0	1	
85		3	max	23.373	7	0	26	0	26	0	26	0	26	0	26	0	26	
86			min	-23.233	3	0	1	0	1	0	1	0	1	0	1	0	1	
87		4	max	23.314	7	-0.051	25	0	26	0	26	0	26	0	26	0	26	
88			min	-23.292	3	-0.061	2	0	1	0	1	0	1	0	1	0	1	
89		5	max	23.255	7	-0.102	25	0	26	0	26	0	26	0	26	0	26	

Envelope Member Section Stresses (Continued)

Member	Sec		Axial[ksi]	LC	y Shear[ksi]	LC	z Shear[ksi]	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC	
90		min	-23.351	3	-0.122	2	0	1	0	1	0	1	0	1	0	1	
91	M10	1	max	24.134	5	0.122	4	0	26	0	26	0	26	0	26	0	26
92		min	-23.613	9	0.102	25	0	1	0	1	0	1	0	1	0	1	
93		2	max	24.075	5	0.061	4	0	26	0	26	0	26	0	26	0	26
94		min	-23.672	9	0.051	25	0	1	0	1	0	1	0	1	0	1	
95		3	max	24.016	5	0	26	0	26	0	26	0	26	0	26	0	26
96		min	-23.731	9	0	1	0	1	0	1	0	1	0	1	0	1	
97		4	max	23.957	5	-0.051	23	0	26	0	26	0	26	0	26	0	26
98		min	-23.79	9	-0.061	8	0	1	0	1	0	1	0	1	0	1	
99		5	max	23.897	5	-0.102	23	0	26	0	26	0	26	0	26	0	26
100		min	-23.85	9	-0.122	8	0	1	0	1	0	1	0	1	0	1	
101	M11	1	max	23.686	3	0.122	3	0	26	0	26	0	26	0	26	0	26
102		min	-22.921	7	0.102	24	0	1	0	1	0	1	0	1	0	1	
103		2	max	23.626	3	0.061	3	0	26	0	26	0	26	0	26	0	26
104		min	-22.98	7	0.051	24	0	1	0	1	0	1	0	1	0	1	
105		3	max	23.567	3	0	26	0	26	0	26	0	26	0	26	0	26
106		min	-23.039	7	0	1	0	1	0	1	0	1	0	1	0	1	
107		4	max	23.508	3	-0.051	26	0	26	0	26	0	26	0	26	0	26
108		min	-23.098	7	-0.061	6	0	1	0	1	0	1	0	1	0	1	
109		5	max	23.449	3	-0.102	26	0	26	0	26	0	26	0	26	0	26
110		min	-23.157	7	-0.122	6	0	1	0	1	0	1	0	1	0	1	

Envelope Member Section Deflections - Service

No Data to Print...																
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Envelope Member Section Deflections - Strength

Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [rad]	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC	
1	M1	1	max	-0.007	26	2.166	8	2.174	6	0.006	8	NC	26	NC	26
2		min	-0.401	10	-2.153	4	-2.144	2	-0.006	4	NC	1	NC	1	
3		2	max	-0.007	26	1.912	8	1.918	6	0.006	8	NC	26	NC	26
4		min	-0.405	10	-1.903	4	-1.897	2	-0.006	4	4952.538	8	4682.424	6	
5		3	max	-0.007	26	1.654	8	1.657	6	0.006	8	NC	26	NC	26
6		min	-0.409	10	-1.649	4	-1.646	2	-0.006	4	4303.036	8	4031.926	6	
7		4	max	-0.007	26	1.393	8	1.394	6	0.006	8	NC	26	NC	26
8		min	-0.413	10	-1.393	4	-1.392	2	-0.006	4	4220.169	15	2778.256	25	
9		5	max	-0.007	26	1.13	8	1.129	6	0.006	8	NC	26	NC	26
10		min	-0.417	10	-1.135	4	-1.137	2	-0.006	4	3123.447	15	2017.758	25	
11	M2	1	max	-0.006	26	5.315	8	5.341	6	0.003	8	NC	26	NC	26

Envelope Member Section Deflections - Strength (Continued)

Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [rad]	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC	
12		min	-0.329	10	-5.247	4	-5.22	2	-0.003	4	NC	1	NC	1	
13	2	max	-0.006	26	4.849	8	4.874	6	0.004	8	NC	23	NC	25	
14		min	-0.347	10	-4.787	4	-4.762	2	-0.004	4	332.04	8	328.901	6	
15	3	max	-0.006	26	4.146	8	4.167	6	0.005	8	NC	23	NC	25	
16		min	-0.365	10	-4.096	4	-4.074	2	-0.005	4	263.332	8	260.607	6	
17	4	max	-0.007	26	3.233	8	3.249	6	0.005	8	NC	23	NC	25	
18		min	-0.383	10	-3.201	4	-3.185	2	-0.005	4	381.194	8	376.767	6	
19	5	max	-0.007	26	2.166	8	2.174	6	0.006	8	NC	26	NC	26	
20		min	-0.401	10	-2.153	4	-2.144	2	-0.006	4	NC	1	8204.895	8	
21	M3	1	max	-0.004	26	5.521	8	5.544	6	0.002	8	NC	26	NC	26
22		min	-0.262	10	-5.457	4	-5.433	2	-0.002	4	NC	1	NC	1	
23	2	max	-0.005	26	5.67	8	5.695	6	0.002	8	NC	23	NC	25	
24		min	-0.279	10	-5.603	4	-5.578	2	-0.002	4	498.209	8	496.105	6	
25	3	max	-0.005	26	5.687	8	5.713	6	0.003	8	NC	23	NC	25	
26		min	-0.296	10	-5.617	4	-5.591	2	-0.003	4	372.521	8	370.85	6	
27	4	max	-0.005	26	5.568	8	5.594	6	0.003	8	NC	23	NC	25	
28		min	-0.313	10	-5.498	4	-5.471	2	-0.003	4	497.565	8	495.193	6	
29	5	max	-0.006	26	5.315	8	5.341	6	0.003	8	NC	26	NC	26	
30		min	-0.329	10	-5.247	4	-5.22	2	-0.003	4	NC	1	NC	1	
31	M4	1	max	-0.003	26	4.135	8	4.15	6	0.001	8	NC	26	NC	26
32		min	-0.196	10	-4.093	4	-4.077	2	-0.001	4	NC	1	NC	1	
33	2	max	-0.004	26	4.569	8	4.586	6	0.001	8	NC	23	NC	25	
34		min	-0.213	10	-4.521	4	-4.503	2	-0.001	4	1132.111	8	1130.73	6	
35	3	max	-0.004	26	4.951	8	4.971	6	0.002	8	NC	23	NC	25	
36		min	-0.229	10	-4.898	4	-4.878	2	-0.002	4	802.141	8	800.923	6	
37	4	max	-0.004	26	5.271	8	5.293	6	0.002	8	NC	23	NC	25	
38		min	-0.246	10	-5.212	4	-5.19	2	-0.002	4	1019.811	8	1017.979	6	
39	5	max	-0.004	26	5.521	8	5.544	6	0.002	8	NC	26	NC	26	
40		min	-0.262	10	-5.457	4	-5.433	2	-0.002	4	NC	1	NC	1	
41	M5	1	max	-0.002	26	2.308	8	2.316	6	0.001	8	NC	26	NC	26
42		min	-0.133	10	-2.287	4	-2.279	2	-0.001	4	NC	1	NC	1	
43	2	max	-0.002	26	2.764	8	2.773	6	0.001	8	NC	26	NC	26	
44		min	-0.149	10	-2.738	4	-2.729	2	-0.001	4	NC	1	NC	1	
45	3	max	-0.003	26	3.228	8	3.239	6	0.001	8	NC	26	NC	26	
46		min	-0.164	10	-3.197	4	-3.186	2	-0.001	4	7324.954	2	5702.418	4	
47	4	max	-0.003	26	3.688	8	3.702	6	0.001	8	NC	26	NC	26	
48		min	-0.18	10	-3.652	4	-3.638	2	-0.001	4	4729.89	2	3682.426	4	
49	5	max	-0.003	26	4.135	8	4.15	6	0.001	8	NC	26	NC	26	
50		min	-0.196	10	-4.093	4	-4.077	2	-0.001	4	3462.967	2	2696.265	4	

Envelope Member Section Deflections - Strength (Continued)

Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [rad]	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC	
51	M6	1	max	-0.001	26	0.798	8	0.8	6	0	8	NC	26	NC	26
52			min	-0.072	10	-0.791	4	-0.789	2	0	4	NC	1	NC	1
53		2	max	-0.001	26	1.121	8	1.124	6	0	8	NC	23	NC	25
54			min	-0.087	10	-1.111	4	-1.108	2	0	4	282.393	8	281.496	6
55		3	max	-0.002	26	1.487	8	1.492	6	0	8	NC	23	NC	25
56			min	-0.102	10	-1.474	4	-1.47	2	0	4	132.305	8	131.875	6
57		4	max	-0.002	26	1.886	8	1.892	6	0.001	8	NC	23	NC	25
58			min	-0.118	10	-1.869	4	-1.863	2	-0.001	4	83.793	8	83.514	6
59		5	max	-0.002	26	2.308	8	2.316	6	0.001	8	NC	23	NC	25
60			min	-0.133	10	-2.287	4	-2.279	2	-0.001	4	60.385	8	60.179	6
61	M7	1	max	0	26	0	26	0	26	0	26	NC	26	NC	26
62			min	0	1	0	1	0	1	0	1	NC	1	NC	1
63		2	max	0	26	0.06	8	0.06	6	0	8	NC	23	NC	25
64			min	-0.018	10	-0.06	4	-0.06	2	0	4	1793.311	8	1788.461	6
65		3	max	-0.001	26	0.225	8	0.225	6	0	8	NC	23	NC	25
66			min	-0.036	10	-0.223	4	-0.222	2	0	4	480.643	8	479.302	6
67		4	max	-0.001	26	0.476	8	0.477	6	0	8	NC	23	NC	25
68			min	-0.054	10	-0.472	4	-0.471	2	0	4	226.897	8	226.247	6
69		5	max	-0.001	26	0.798	8	0.8	6	0	8	NC	23	NC	25
70			min	-0.072	10	-0.791	4	-0.789	2	0	4	135.357	8	134.959	6
71	M8	1	max	0	26	0	26	0	26	0.028	3	NC	26	NC	26
72			min	0	1	0	1	0	1	-0.029	7	NC	1	NC	1
73		2	max	0.204	5	-7388.498	26	0.279	7	0.028	3	1	26	NC	26
74			min	-0.207	9	-8866.46	5	-0.281	3	-0.029	7	1	1	NC	1
75		3	max	0.408	5	-10369.79	26	0.557	7	0.028	3	1	26	NC	26
76			min	-0.415	9	-12444.275	5	-0.562	3	-0.029	7	1	1	NC	1
77		4	max	0.612	5	-7388.393	26	0.836	7	0.028	3	1	26	NC	26
78			min	-0.622	9	-8866.862	5	-0.843	3	-0.029	7	1	1	NC	1
79		5	max	0.816	5	0.793	9	1.114	7	0.028	3	NC	26	NC	26
80			min	-0.83	9	-0.803	5	-1.124	3	-0.029	7	NC	1	NC	1
81	M9	1	max	0	26	0	26	0	26	0.035	9	NC	26	NC	26
82			min	0	1	0	1	0	1	-0.036	5	NC	1	NC	1
83		2	max	0.2	3	-7388.5	24	0.286	5	0.035	9	1	26	NC	26
84			min	-0.201	7	-8866.457	3	-0.287	9	-0.036	5	1	1	NC	1
85		3	max	0.4	3	-10369.794	24	0.573	5	0.035	9	1	26	NC	26
86			min	-0.403	7	-12444.267	3	-0.574	9	-0.036	5	1	1	NC	1
87		4	max	0.601	3	-7388.4	24	0.859	5	0.035	9	1	26	NC	26
88			min	-0.604	7	-8866.851	3	-0.861	9	-0.036	5	1	1	NC	1
89		5	max	0.801	3	0.77	7	1.145	5	0.035	9	NC	26	NC	26

Envelope Member Section Deflections - Strength (Continued)

Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [rad]	LC	(n) L/y' Ratio	LC	(n) L/z' Ratio	LC
90		min	-0.806	7	-0.788	3	-1.148	9	-0.036	5	NC	1	NC	1
91	M10	max	0	26	0	26	0	26	0.034	7	NC	26	NC	26
92		min	0	1	0	1	0	1	-0.032	3	NC	1	NC	1
93	2	max	0.205	9	-7388.498	22	0.281	3	0.034	7	1	26	NC	26
94		min	-0.207	5	-8866.461	9	-0.279	7	-0.032	3	1	1	NC	1
95	3	max	0.409	9	-10369.791	22	0.562	3	0.034	7	1	26	NC	26
96		min	-0.414	5	-12444.275	9	-0.557	7	-0.032	3	1	1	NC	1
97	4	max	0.614	9	-7388.394	22	0.843	3	0.034	7	1	26	NC	26
98		min	-0.621	5	-8866.863	9	-0.836	7	-0.032	3	1	1	NC	1
99	5	max	0.818	9	0.791	5	1.124	3	0.034	7	NC	26	NC	26
100		min	-0.828	5	-0.805	9	-1.114	7	-0.032	3	NC	1	NC	1
101	M11	max	0	26	0	26	0	26	0.028	5	NC	26	NC	26
102		min	0	1	0	1	0	1	-0.027	9	NC	1	NC	1
103	2	max	0.199	7	-7388.498	20	0.287	9	0.028	5	1	26	NC	26
104		min	-0.203	3	-8866.455	7	-0.286	5	-0.027	9	1	1	NC	1
105	3	max	0.397	7	-10369.792	20	0.574	9	0.028	5	1	26	NC	26
106		min	-0.406	3	-12444.264	7	-0.573	5	-0.027	9	1	1	NC	1
107	4	max	0.596	7	-7388.396	20	0.861	9	0.028	5	1	26	NC	26
108		min	-0.609	3	-8866.846	7	-0.859	5	-0.027	9	1	1	NC	1
109	5	max	0.794	7	0.776	3	1.148	9	0.028	5	NC	26	NC	26
110		min	-0.812	3	-0.782	7	-1.145	5	-0.027	9	NC	1	NC	1

Envelope Beam Deflections


No Data to Print...														
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Envelope Beam Deflection Checks

No Data to Print...														
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Envelope AA ADM1-15: ASD - BUILDING Member Aluminum Code Checks

Member	Shape	Code	Check	Loc[ft]	LC	Shear	Check	Loc[ft]	Dir	LC	Pnc/Om[k]	Pnt/Om[k]	Mny/Om[k-ft]	Mnz/Om[k-ft]	Vny/Om[k]	Vnz/Om[k]	Cb	Eqn
1	M3	RT6X6X0.250	0.96	4.349	5	0.037	0	y	8	45.303	55.758	6.938	6.938	15.273	15.273	1	H.1-1	
2	M7	RT10X10A	0.634	0	5	0.026	0	y	8	148.736	190	39.301	39.301	56.923	56.923	1	H.1-1	
3	M2	RT5X5A	0.492	0	5	0.04	8.9	y	4	100.758	92.564	12.665	12.665	26.154	26.154	1	H.1-1	
4	M6	RT9X9A	0.321	0	5	0.023	0	y	8	149.185	170.513	35.282	35.282	50.769	50.769	1	H.1-1	
5	M4	RT7X7A	0.255	8.25	5	0.02	0	y	8	132.977	131.538	24.076	24.076	38.462	38.462	1	H.1-1	
6	M1	RT4.5X4.5A	0.19	0	5	0.05	2	y	4	90.152	82.821	10.086	10.086	23.077	23.077	1	H.1-1	
7	M5	RT8X8X0.250	0.102	7.9	3	0.022	0	y	8	143.647	151.026	30.004	30.004	44.615	44.615	1	H.1-1	

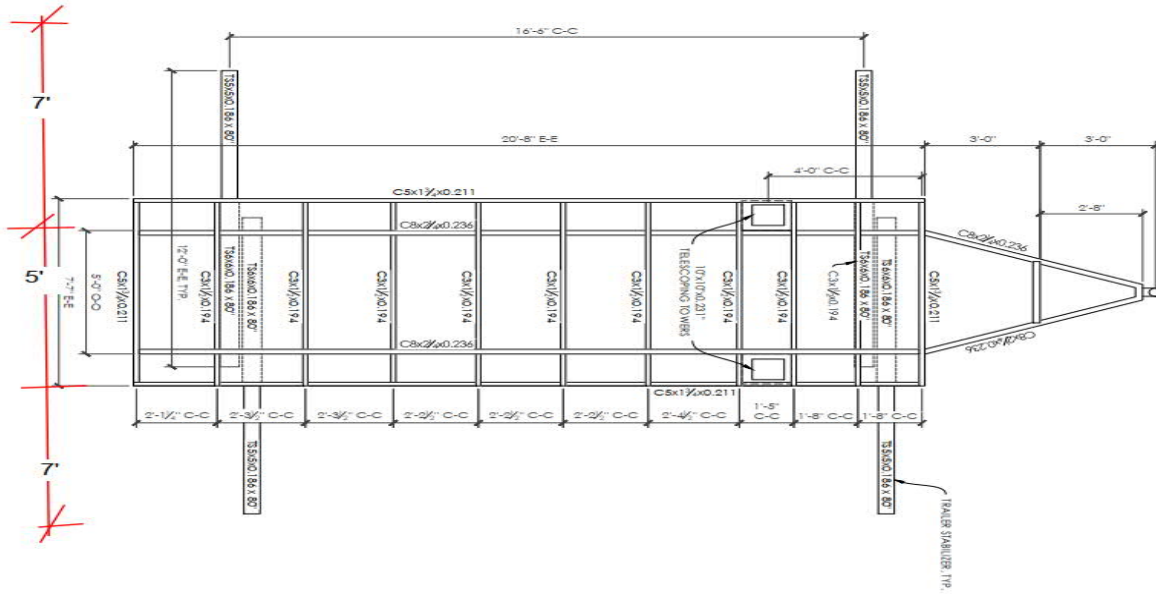
 23 Mauchly, #110 Irvine, CA 92618	Project Name: MT Fair COW	Prepared by: DVH	Checked by: JVC
	Project Description: COW SA	Date: 5/2/2024	

Load Analysis

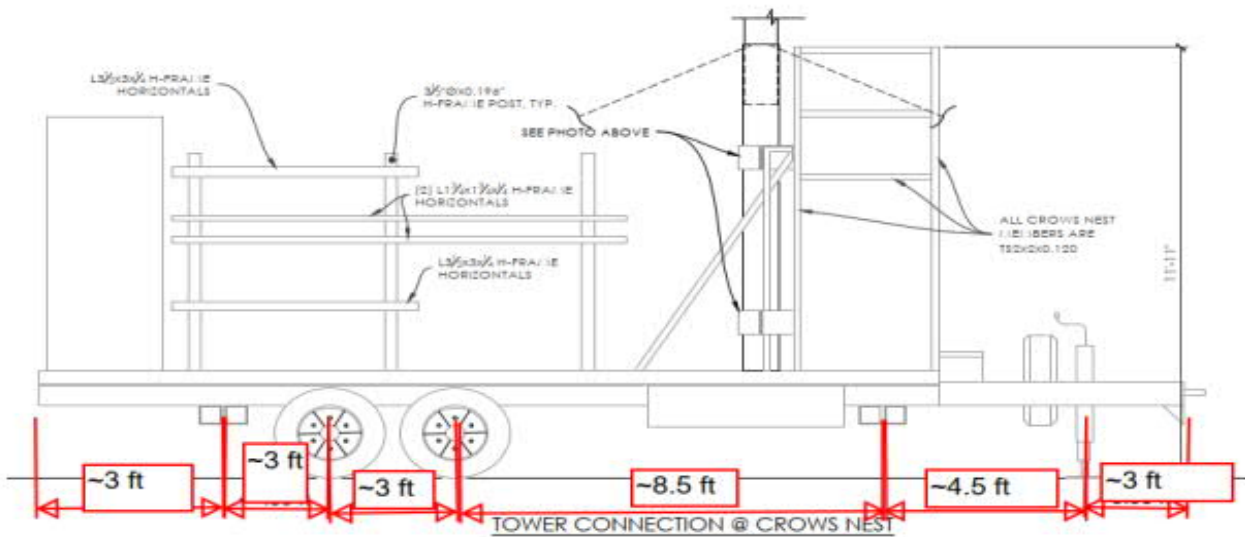
Code Reference

TIA-222H, IBC 2021

Trailer Approx. Dimension:



Plan View



Elevation View



23 Mauchly, #110
Irvine, CA 92618

Project Name:
MT Fair COW

Project Description:
Rooftop SA

Prepared by:
DVH

Checked by:
JVC

Date:
5/2/2024

Load Analysis

Vertical and Lateral Load on Trailer:

Snow Load 30 psf

Equipment	Wind Load (lbs)		Overturn Moment (#-ft)		Vertical Load (lbs)	EQ Center Load (ft)
	Normal	Trans	Normal	Trans.		
72x30 Hydraulic Box	190	452	1900	4520	500	10
73x30 Generator	236	573	1770	4297.5	800	7.5
Clean Up Kit	268	268	1608	1608	100	6
AC Panel	151	302	1132.5	2265	200	7.5
Transfer Switch	151	302	906	1812	200	6
EQ Cabinet	568	620	4260	4650	1500	7.5
(3) Ericsson 8843	129	111	1290	1110	225	10
(3) Ericsson 4449	135	87	1350	870	168	10
(2) Pneumatic	2550	2550	40160	40160	7050	3
Total	4378	5265	54376.5	61292.5	10743	

$$W_{SNOW} = 30\text{psf} \times 20'-8" \times 7'-7" = 4720 \text{ lbs}$$

$$W_{Trailer\ Frame} = 6000 \text{ lbs}$$

Check Trailer Load:

Gross Vehicle Weight Rating (GVWR): 18000 lbs

Total Load: $10743 + 4720 = 15463$ lbs

$$F.O.S = 18000 / 15463 = 1.16 > 1.0 \text{ OK}$$

Check Overturning:

$$M_{RESIST} = (8893+6000) \times (7+5/2) = 146898 \text{ lbs-ft}$$

$$M_{OT} = 61293 \text{ lbs-ft}$$

$$F.O.S = 134037 / 26803 = 2.39 > 1.5 \text{ OK}$$

Note:

All load and rating being considered in the analysis is assumed for the purposes of this structural analysis only

Design Criteria

Type	Requirements
Multifamily and Commercial	Design per IBC 2021
One and Two Family Dwellings	Design per IRC 2021
Seismic Zone	Residential: "A" Multi-Family and Commercial: use Code Central Seismic Design Parameters version 3.10
Wind Load - Exposure "C" (3-second gust in miles per hour)	Risk Category I: 100 MPH Risk Category II: 110 MPH Risk Category III: 115 MPH Risk Category IV: 120 MPH Residential: 110 MPH
Foundation Depth	42 in. frost depth
Roof Snow Load	Minimum design roof snow load after allowed reductions shall be 30 psf (i.e. $P_f = 30$ psf) For drift / unbalanced loading: $P_g = 33$

International Energy Conservation Code 2021 (IECC)

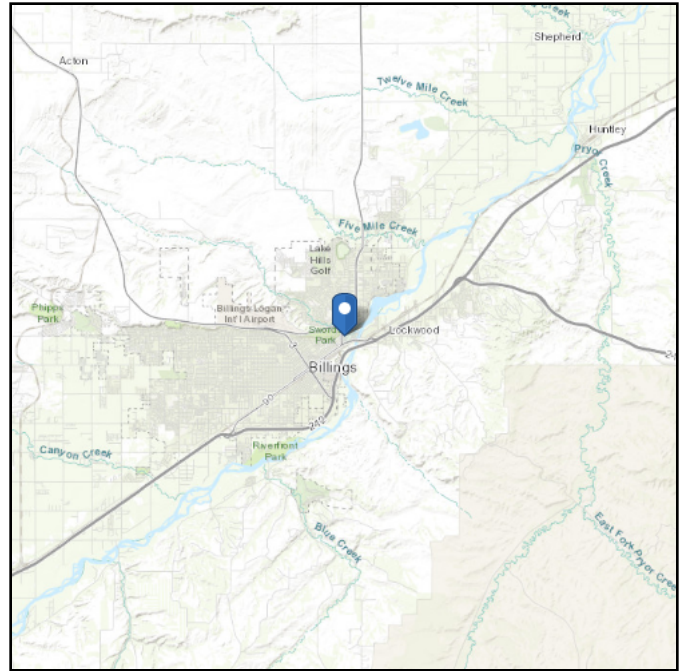
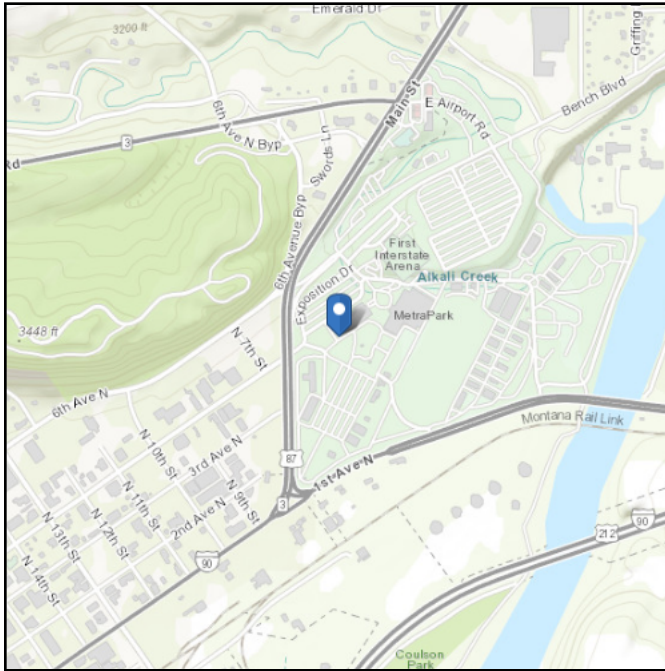
Structure	Default Values
Ceilings	R - 49
Walls	R-21 or R-20 + R-5ci or R-13 + R-10ci or R-15ci
Floor over unheated space	R - 30
Crawl Space walls	R - 15 - Continuous R - 19 - Framed
Basement walls	R - 15 - Continuous R - 19 - Framed
Windows	U - 0.30

ASCE Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Latitude: 45.798081
Longitude: -108.479583
Elevation: 3108.3578068132474 ft (NAVD 88)



Wind

Results:

Wind Speed	109 Vmph
10-year MRI	75 Vmph
25-year MRI	83 Vmph
50-year MRI	88 Vmph
100-year MRI	94 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2

Date Accessed: Tue Apr 09 2024

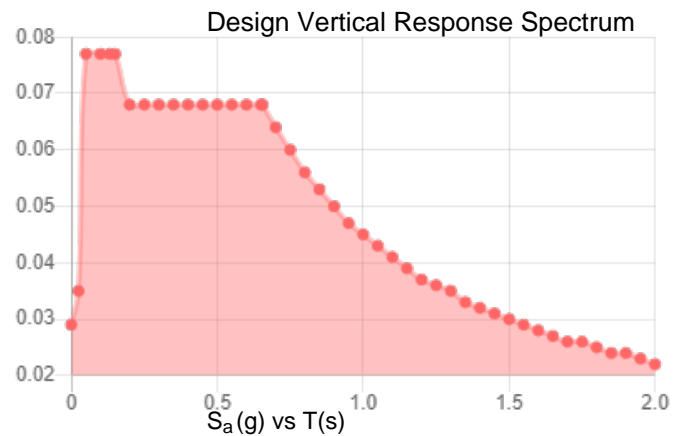
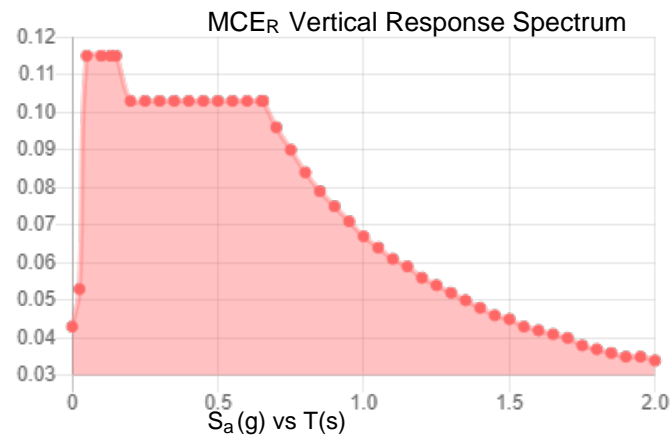
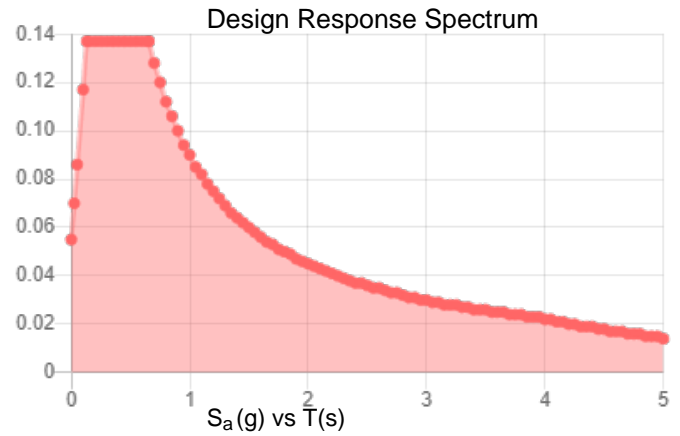
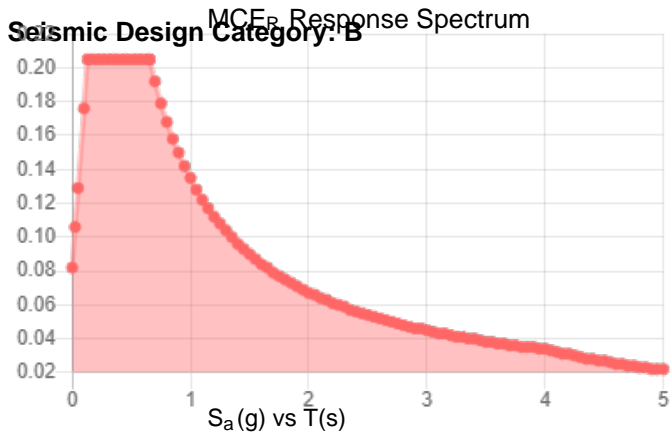
Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Site Soil Class: D - Default (see Section 11.4.3)

Results:

S_s :	0.128	S_{D1} :	0.09
S_1 :	0.056	T_L :	4
F_a :	1.6	PGA :	0.062
F_v :	2.4	PGA _M :	0.099
S_{MS} :	0.205	F_{PGA} :	1.6
S_{M1} :	0.135	I_e :	1
S_{DS} :	0.137	C_v :	0.7



Data Accessed: Tue Apr 09 2024

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness: 0.50 in.
Concurrent Temperature: -5 F
Gust Speed 50 mph

Data Source: Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

Date Accessed: Tue Apr 09 2024

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

In the mountain west, ice thicknesses may exceed the mapped values in the foothills and passes. However, at elevations above 5,000 ft, freezing rain is unlikely.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Results:

Mapped Elevation:

Data Source:

Date Accessed: Tue Apr 09 2024

In "Case Study" areas, site-specific case studies are required to establish ground snow loads. Extreme local variations in ground snow loads in these areas preclude mapping at this scale.

Ground snow load determination for such sites shall be based on an extreme value statistical analysis of data available in the vicinity of the site using a value with a 2 percent annual probability of being exceeded (50-year mean recurrence interval).

Statutory requirements of the Authority Having Jurisdiction are not included. Site is outside ASCE/SEI 7-16, Table 7.2-4 boundaries. For ground snow loads in this area, see Theisen, G. P., Keller, M. J., Stephens, J. E., Vinton, F. F., and Schilke, J. P. (2004). [Snow Loads for Structural Design in Montana](#), Dept. of Civil Engineering, Montana State Univ., Bozeman, MT. Snow load values are mapped to a 0.5 mile resolution. This resolution can create a mismatch between the mapped elevation and the site-specific elevation in topographically complex areas. Engineers should consult the local authority having jurisdiction in locations where the reported 'elevation' and 'mapped elevation' differ significantly from each other.

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