STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

January 8, 2014

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103

RE: **EM-VER-033-131219**– Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 100 Berlin Road, Cromwell, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated December 17, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/MP/jb

c: The Honorable Enzo Faienza, Mayor, Town of Cromwell
Jonathan Sistare, Town Manager, Town of Cromwell
Stuart Popper, Town Planner, Town of Cromwell

CSC
CONNECTICUT SITING COUNCIL

Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

December 17, 2014

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **EM-VER-057-131127 – 1323 King Street, Greenwich, Connecticut**
EM-VER-057-131004 – 36 Ritch Avenue, Greenwich, Connecticut
EM-VER-011-140114 – Blue Hills Avenue, Bloomfield, Connecticut
EM-VER-158-131122 – 2 Raymond Allen Lane, Westport, Connecticut
EM-VER-033-140819 – 179 Shunpike Road, Cromwell, Connecticut
EM-VER-033-131219 – 100 Berlin Road, Cromwell, Connecticut
EM-VER-054-131126 – 374 Three Mile Road, Glastonbury, Connecticut
EM-VER-052-140828 – Rattlesnake Mountain, Farmington, Connecticut
EM-VER-057-140127 – 5 Perryridge Road, Greenwich, Connecticut
EM-VER-057-140224 – 411 West Putnam Avenue, Greenwich, Connecticut

Completion of Construction Activity

Dear Ms. Bachman:

The purpose of this letter is to notify the Siting Council that construction activity associated with the above-referenced Cellco Partnership d/b/a Verizon Wireless telecommunications facilities has been completed.

If you have any questions or need any additional information regarding these facilities please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

Copy to:
Sandy M. Carter

13310863-v1

ROBINSON & COLE LLP

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Also admitted in Massachusetts

December 17, 2013

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification**
100 Berlin Road, Cromwell, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains fifteen (15) wireless telecommunications antennas at the 88-foot level on the existing sign support structure at the above-referenced address. The sign support structure is owned by Cellco. Cellco now intends to replace six (6) of its antennas with three (3) model BXA-171085-12BF PCS antennas and three (3) model BXA-171063-12CF AWS antennas, all at the same level on the sign structure. Cellco also intends to install three (3) remote radio heads ("RRHs") behind its AWS antennas and one (1) HYBRIFLEX™ antenna cable. Included in Attachment 1 are specifications for the replacement antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Jonathan Sistare, Town Manager for the Town of Cromwell. A copy of this letter is also being sent to Shaner Hotel Group Properties II LP, the owner of the property where the tower is located.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing sign structure. Cellco's replacement antennas and RRHs will be located at the same level as its existing antennas.

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. Far Field Approximation tables for each of Cellco's operating frequencies are included behind Attachment 2. The Far Field calculations demonstrate that Cellco's modified facility will operate well within the RF emissions limits established by the FCC.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The sign structure and its foundation can support Cellco's proposed modifications. (*See* Structural Analysis Report included in Attachment 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Jonathan Sistare, Cromwell Town Manger
Shaner Hotel Group Properties II LP
Sandy M. Carter

ATTACHMENT 1

BXA-171085-12BF-EDIN-X

Replace "X" with desired electrical downtilt.

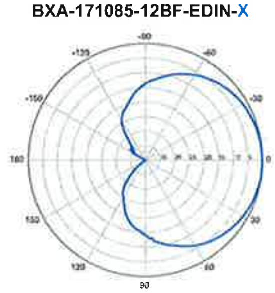
X-Pol | FET Panel | 85° | 18.0 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	88°	85°	80°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	15.1 dBd / 17.2 dBi	15.5 dBd / 17.6 dBi	15.9 dBd / 18.0 dBi
Electrical downtilt (X)	0, 2, 4		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	> 28 dB		
IM3 (2x20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1842 x 154 x 105 mm	72.5 x 6.1 x 4.1 in	
Depth with z-brackets	133 mm	5.2 in	
Weight without mounting brackets	5.8 kg	12.8 lbs	
Survival wind speed	> 201 km/hr	> 125 mph	
Wind area	Front: 0.28 m² Side: 0.19 m²	Front: 3.1 ft² Side: 2.1 ft²	
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N	Front: 103 lbf Side: 68 lbf	
Mounting Options	**Part Number**	**Fits Pipe Diameter**	**Weight**
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171085-12BF-EDIN-X-FP		

BXA-171085-12BF-EDIN-X

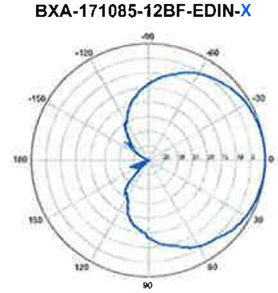
Horizontal | 1710-1880 MHz

BXA-171085-12BF-EDIN-X



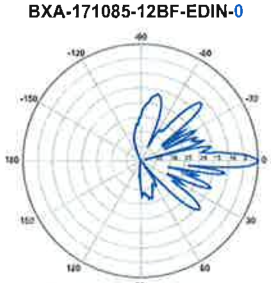
Horizontal | 1850-1990 MHz

BXA-171085-12BF-EDIN-X



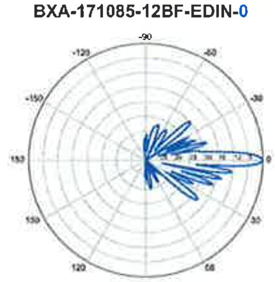
Horizontal | 1920-2170 MHz

BXA-171085-12BF-EDIN-0



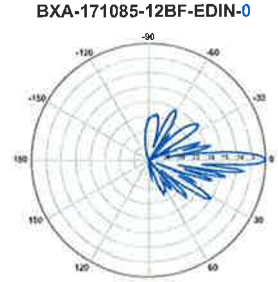
0° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-0



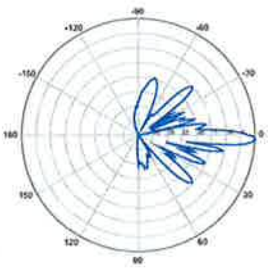
0° | Vertical | 1920-2170 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

BXA-171085-12BF-EDIN-X

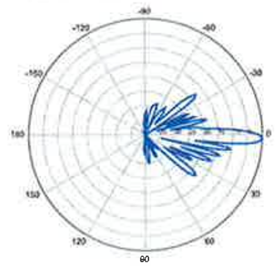
X-Pol | FET Panel | 85° | 18.0 dBi

BXA-171085-12BF-EDIN-2



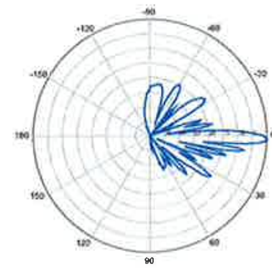
2° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-2



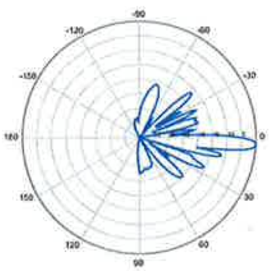
2° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-2



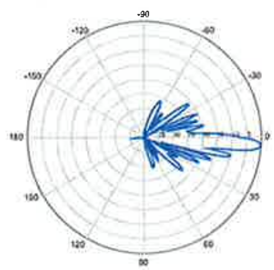
2° | Vertical | 1920-2170 MHz

BXA-171085-12BF-EDIN-4



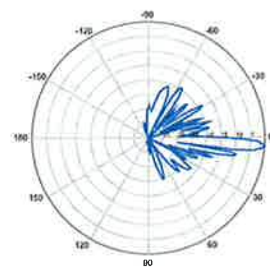
4° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-4



4° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-4



4° | Vertical | 1920-2170 MHz

Amphenol ANTENNA SOLUTIONS

BXA-171063-12CF-EDIN-X

Replace "X" with desired electrical downtilt.

Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

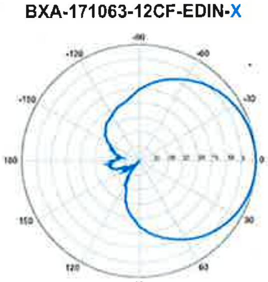
X-Pol | FET Panel | 63° | 19.0 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	16.1 dBd / 18.2 dBi	16.5 dBd / 18.6 dBi	16.9 dBd / 19.0 dBi
Electrical downtilt (X)	0, 2, 5		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	< -25 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)		
Operating temperature	-40° to +60° C / -40° to +140° F		

Mechanical Characteristics		
Dimensions Length x Width x Depth	1842 x 154 x 105 mm	72.5 x 6.1 x 4.1 in
Depth with z-brackets	133 mm	5.2 in
Weight without mounting brackets	5.8 kg	12.8 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.28 m² Side: 0.19 m²	Front: 3.1 ft² Side: 2.1 ft²
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N	Front: 103 lbf Side: 68 lbf

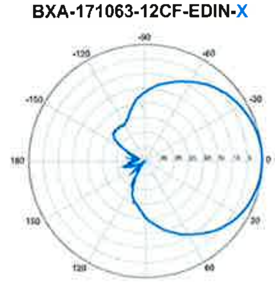
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-12CF-EDIN-X-FP		

BXA-171063-12CF-EDIN-X



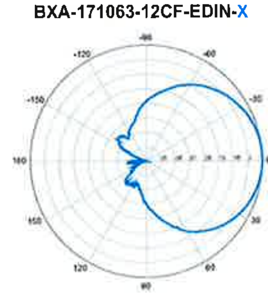
Horizontal | 1710-1880 MHz

BXA-171063-12CF-EDIN-X



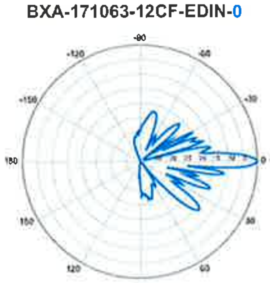
Horizontal | 1850-1990 MHz

BXA-171063-12CF-EDIN-X



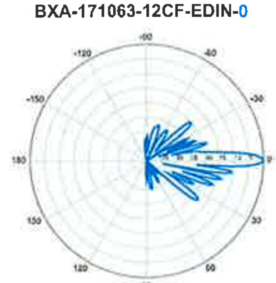
Horizontal | 1920-2170 MHz

BXA-171063-12CF-EDIN-0



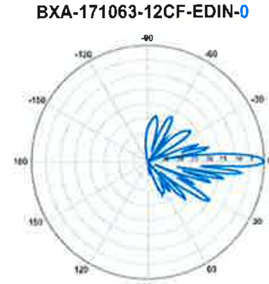
0° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-0

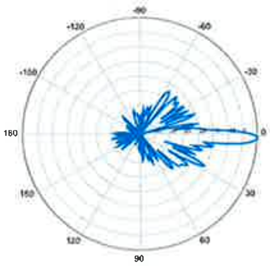


0° | Vertical | 1920-2170 MHz

BXA-171063-12CF-EDIN-X

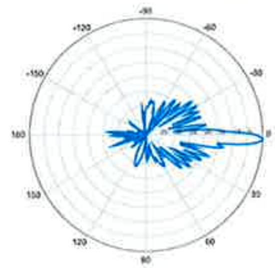
X-Pol | FET Panel | 63° | 19.0 dBi

BXA-171063-12CF-EDIN-2



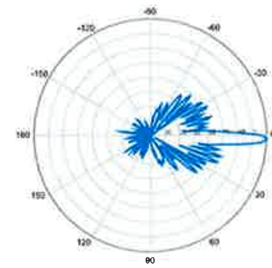
2° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-2



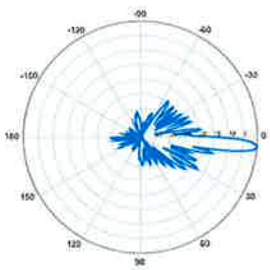
2° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-2



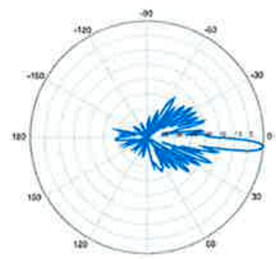
2° | Vertical | 1920-2170 MHz

BXA-171063-12CF-EDIN-5



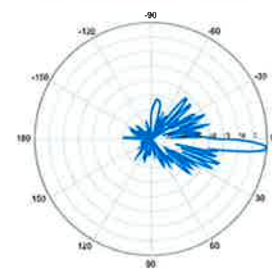
5° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-5



5° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-5

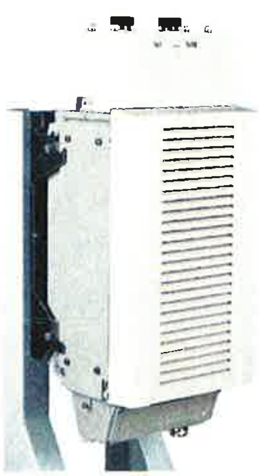


5° | Vertical | 1920-2170 MHz

Alcatel-Lucent RRH2x40-AWS

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-AWS is a high-power, small form-factor Remote Radio Head (RRH) operating in the AWS frequency band (1700/2100MHz - 3GPP Band 4). The Alcatel-Lucent RRH2x40-AWS is designed with an eco-efficient approach, providing operators with the means to achieve high quality and capacity coverage with minimum site requirements.



A distributed eNodeB expands deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of an eNodeB to be installed separately, within the same site or several kilometres apart.

The Alcatel-Lucent RRH2x40-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information. The Alcatel-Lucent RRH2x40-AWS has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to four-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 20 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-AWS is designed to make available all the benefits of a distributed eNodeB, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent RRH2x40-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

Fast, low-cost installation and deployment

The Alcatel-Lucent RRH2x40-AWS is a zero-footprint solution and operates noise-free, simplifying negotiations with site property owners and minimizing environmental impacts. Installation can easily be done by a single person because the Alcatel-Lucent RRH2x40-AWS is compact and weighs less than 20 kg (44 lb), eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day — a fraction of the time required for a traditional BTS.

Excellent RF performance

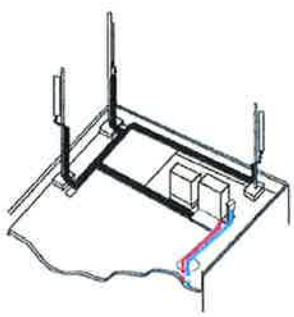
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation costs are reduced or eliminated, and there is no need for a Tower Mounted Amplifier (TMA) because losses introduced by the RF feeder are greatly reduced.
The Alcatel-Lucent RRH2x40-AWS provides more RF power while at the same time consuming less electricity.

Features

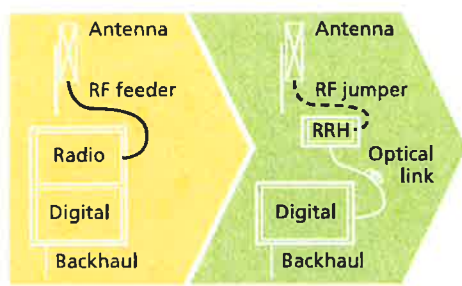
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

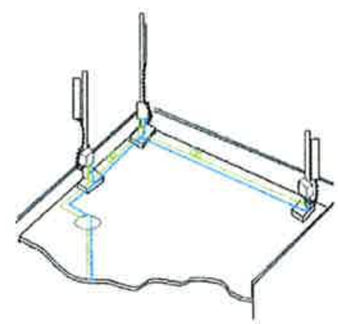
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility to network planning



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

- Height: 620 mm (24.4 in.)
- Width: 270 mm (10.63 in.)
- Depth: 170m (6.7 in.)
- Weight (without mounting kit): less than 20 kg (44 lb)

Power

- Power supply: -48VDC

Operating environment

- Outdoor temperature range:
  - With solar load: -40°C to +50°C (-40°F to +122°F)
  - Without solar load: -40°C to +55°C (-40°F to +131°F)
- Passive convection cooling (no fans)
- Enclosure protection
  - IP65 (International Protection rating)

RF characteristics

- Frequency band: 1700/2100 MHz (AWS); 3GPP Band 4
- Bandwidth: up to 20 MHz
- RF output power at antenna port: 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way with optional Rx Diversity module
- Noise figure: below 2.0 dB typical
- Antenna Line Device features
  - TMA and Remote electrical tilt (RET) support via AISG v2.0

Optical characteristics

Type/number of fibers

- Single-mode variant
  - One Single Mode Single Fiber per RRH2x, carrying UL and DL using CWDM
  - Single mode dual fiber (SM/DF)
- Multi-mode variant
  - Two Multi-mode fibers per RRH2x: one carrying UL, the other carrying DL

Optical fiber length

- Up to 500 m (0.31 mi), using MM fiber
- Up to 20 km (12.43 mi), using SM fiber

Digital Ports and Alarms

- Two optical ports to support daisy-chaining
- Six external alarms

HYBRIFLEX™ RRH Hybrid Feeder Cabling Solution, 1-5/8", Single-Mode Fiber

Product Description

RFS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

It was developed to reduce installation complexity and costs at Cellular sites. HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber (multi-mode or single-mode) and power in a single corrugated cable. It eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX® accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

Figure 1: HYBRIFLEX Series

Features/Benefits

- Aluminum corrugated armor with outstanding bending characteristics – minimizes installation time and enables mechanical protection and shielding
- Same accessories as 1 5/8" coaxial cable
- Outer conductor grounding – Eliminates typical grounding requirements and saves on installation costs
- Lightweight solution and compact design – Decreases tower loading
- Robust cabling – Eliminates need for expensive cable trays and ducts
- Installation of tight bundled fiber optic cable pairs directly to the RRH – Reduces CAPEX and wind load by eliminating need for interconnection
- Optical fiber and power cables housed in single corrugated cable – Saves CAPEX by standardizing RRH cable installation and reducing installation requirements
- Outdoor polyethylene jacket – Ensures long-lasting cable protection

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		[kg/m (lb/ft)]	1 9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 8.4mm² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[μm]	50/125
Primary Coating (Acrylate)		[μm]	245
Buffer Diameter, Nominal		[μm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
Size (Power)		[mm (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

* This data is provisional and subject to change

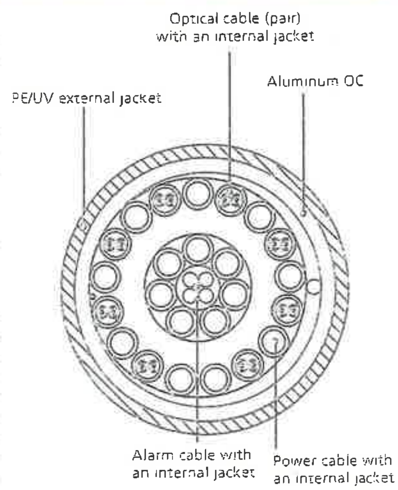


Figure 2: Construction Detail

ATTACHMENT 2

Far Field Approximation
with downtilt variation

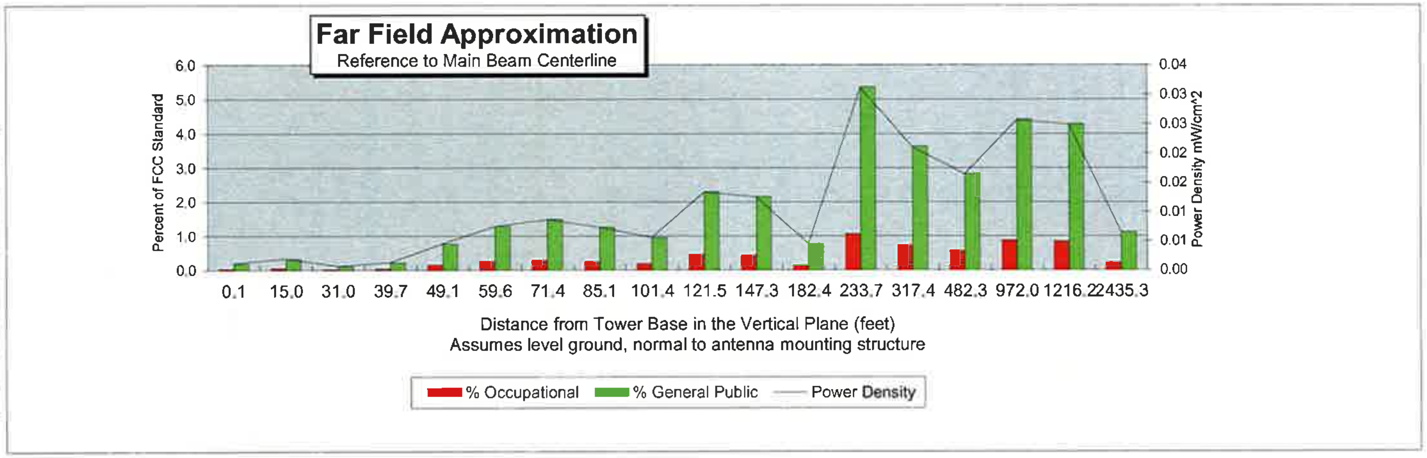
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	CROMWELL SW, CT
Site #:	
Date:	12/13/13
Name:	Mark Brauer
File Name:	Cromwell SW, CT - FF Power

Operating Freq. (MHz)	**869.0**
Antenna Height (ft):	**88.0**
Antenna Gain (dBi):	**16.7**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**3807.0**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	85.0	86.3	90.5	93.8	98.2	103.8	111.0	120.3	132.3	148.3	170.1	201.2	248.6	328.6	489.7	975.8	1219.1	2436.8	
Distance from Antenna Structure Base in Horizontal plane	0.1	15.0	31.0	39.7	49.1	59.6	71.4	85.1	101.4	121.5	147.3	182.4	233.7	317.4	482.3	972.0	1216.2	2435.3	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.03	0.02	0.02	0.03	0.02	0.01	
Percent of Occupational Standard	0.0	0.1	0.0	0.0	0.2	0.3	0.3	0.3	0.2	0.5	0.4	0.2	1.1	0.7	0.6	0.9	0.9	0.2	
Percent of General Population Standard	0.2	0.3	0.1	0.2	0.8	1.3	1.5	1.3	1.0	2.3	2.2	0.8	5.4	3.6	2.8	4.4	4.3	1.1	

Antenna Type DB846F65ZAXY
Max% 5.37%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Po
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

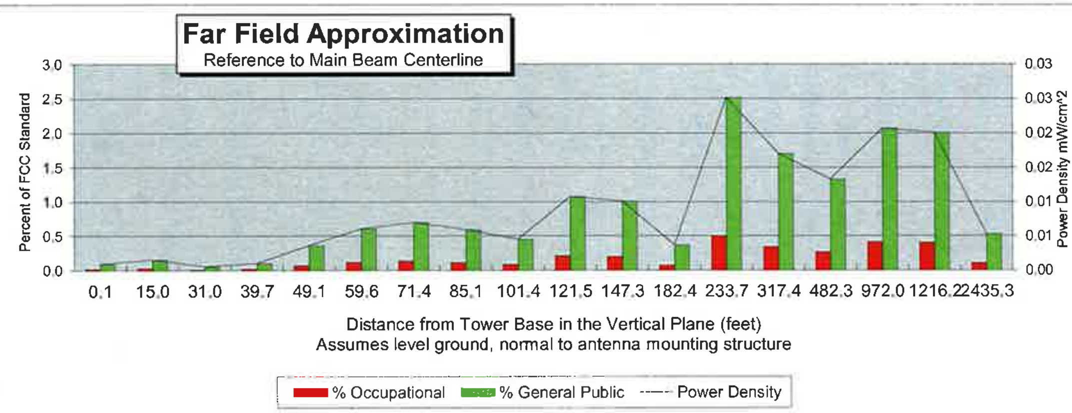
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	CROMWELL SW, CT
Site #:	
Date:	12/13/13
Name:	Mark Brauer
File Name:	CROMWELL SW, CT - FF Pow

Operating Freq. (MHz)	2120.0
Antenna Height (ft):	88.0
Antenna Gain (dBi):	19.1
Antenna Size (in.):	72.0
Downtilt (degrees):	0.0
Feedline Loss (dB):	0.0
Power @ J4 (w):	1750.0



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	85.0	86.3	90.5	93.8	98.2	103.8	111.0	120.3	132.3	148.3	170.1	201.2	248.6	328.6	489.7	975.8	1219.1	2436.8	
Distance from Antenna Structure Base in Horizontal plane	0.1	15.0	31.0	39.7	49.1	59.6	71.4	85.1	101.4	121.5	147.3	182.4	233.7	317.4	482.3	972.0	1216.2	2435.3	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.03	0.02	0.01	0.02	0.02	0.01	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.5	0.3	0.3	0.4	0.4	0.1	
Percent of General Population Standard	0.1	0.2	0.1	0.1	0.4	0.6	0.7	0.6	0.4	1.1	1.0	0.4	2.5	1.7	1.3	2.1	2.0	0.5	

Antenna Type BXA-171063-12CF
Max% 2.51%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Po
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

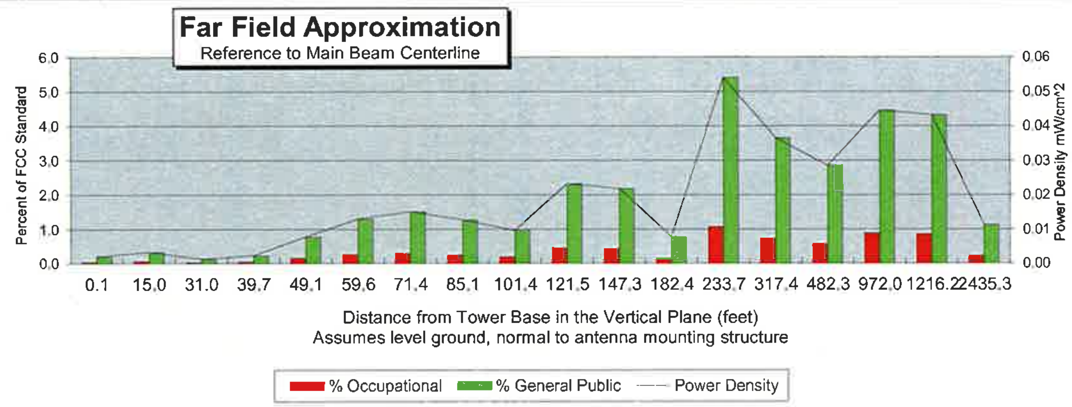
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	CROMWELL SW, CT
Site #:	
Date:	12/13/13
Name:	Mark Brauer
File Name:	Cromwell SW, CT - FF Power

Operating Freq. (MHz)	1970.0
Antenna Height (ft):	88.0
Antenna Gain (dBi):	17.7
Antenna Size (in.):	72.0
Downtilt (degrees):	0.0
Feedline Loss (dB):	0.0
Power @ J4 (w):	5197.0



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	85.0	86.3	90.5	93.8	98.2	103.8	111.0	120.3	132.3	148.3	170.1	201.2	248.6	328.6	489.7	975.8	1219.1	2436.8	
Distance from Antenna Structure Base in Horizontal plane	0.1	15.0	31.0	39.7	49.1	59.6	71.4	85.1	101.4	121.5	147.3	182.4	233.7	317.4	482.3	972.0	1216.2	2435.3	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.01	0.05	0.04	0.03	0.04	0.04	0.01	
Percent of Occupational Standard	0.0	0.1	0.0	0.0	0.2	0.3	0.3	0.3	0.2	0.5	0.4	0.2	1.1	0.7	0.6	0.9	0.9	0.2	
Percent of General Population Standard	0.2	0.3	0.1	0.2	0.8	1.3	1.5	1.3	1.0	2.3	2.2	0.8	5.4	3.7	2.9	4.4	4.3	1.1	

Antenna Type BXA-171085-12BF
Max% 5.41%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Po
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

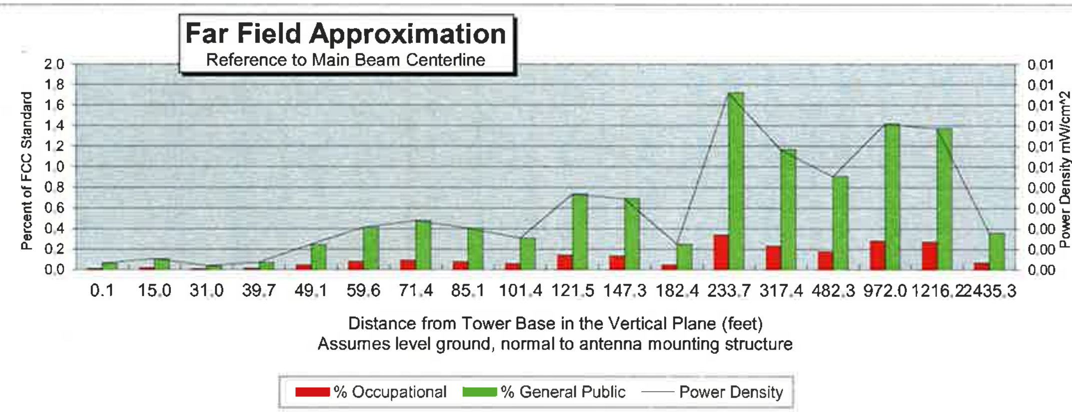
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	CROMWELL SW, CT
Site #:	
Date:	12/13/13
Name:	Mark Brauer
File Name:	Cromwell SW, CT - FF Power

Operating Freq. (MHz)	746.0
Antenna Height (ft):	88.0
Antenna Gain (dBi):	16.7
Antenna Size (in.):	72.0
Downtilt (degrees):	0.0
Feedline Loss (dB):	0.0
Power @ J4 (w):	1050.0



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	85.0	86.3	90.5	93.8	98.2	103.8	111.0	120.3	132.3	148.3	170.1	201.2	248.6	328.6	489.7	975.8	1219.1	2436.8
Distance from Antenna Structure Base in Horizontal plane	0.1	15.0	31.0	39.7	49.1	59.6	71.4	85.1	101.4	121.5	147.3	182.4	233.7	317.4	482.3	972.0	1216.2	2435.3
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.00
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.2	0.3	0.3	0.1
Percent of General Population Standard	0.1	0.1	0.0	0.1	0.2	0.4	0.5	0.4	0.3	0.7	0.7	0.3	1.7	1.2	0.9	1.4	1.4	0.4

Antenna Type BXA-70063-6CF
Max% 1.72%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Po
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

ATTACHMENT 3

CENTEK engineering

Centered on Solutions[SM]

Structural Analysis Report

82' Sign Structure w/ 111' Pipe Mast

Proposed Verizon Wireless
Antenna Upgrade

Verizon Site Ref: Cromwell SW

100 Berlin Road
Cromwell, CT

Centek Project No. 13001.070

Date: December 11, 2013

Prepared for:

Verizon Wireless
99 East River Road, 9th Floor
East Hartford, CT 06108

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna installation proposed by Verizon Wireless on the existing 82-ft sign structure located in Cromwell, Connecticut.

The host structure is a 82-ft sign structure with a 111-ft pipe mast. The existing structure geometry, member sizes and foundation system were obtained from a previous structural design report prepared by Centek job no. 12044.CO2 dated June 14, 2012.

Antenna and appurtenance information were obtained from the aforementioned Centek structural analysis report, visual verification from grade by Centek personnel on October 10, 2013 and a RF data sheet.

The structure is made up of two (2) W24x68 vertical steel legs, one (1) HSS18x0.5 steel pipe mast, L5x5x5/16 horizontal and diagonal steel bracing and WT6x15 steel bracing.

Verizon proposes the removal of six (6) panel antennas and the installation of six (6) panel antennas, three (3) remote radio heads and one (1) main distribution box mounted to the existing low profile platform. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing structure was designed to support several communication antennas. The existing, proposed and future loads considered in this analysis consist of the following:

- T-MOBILE: (Existing)
  Antennas: Six (6) RFS APX16DWV-16DWVS-E-A20 panel antennas and nine (9) Andrew OneBase Twin Dual Duplex TMA's on a low profile platform mounted on a 111-ft pipe mast with a RAD center elevation of 108-ft AGL.
  Coax Cables: Eighteen (18) 1-5/8" Ø coax cables, nine (9) within existing 111-ft pipe mast and nine (9) on the exterior of the pipe mast.
- AT&T: (Existing)
  Antennas: Six (6) Powerwave 7770.00 panel antennas, twelve (12) Powerwave LPG21401 TMA's, three (3) KMW AM-X-CD-16-65-00T panel antennas, six (6) Ericsson RRUS-11 and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted on pipe mounts to the existing Verizon Wireless low profile platform with a RAD center elevation of 98-ft AGL.
  Coax Cables: Twelve (12) 1-5/8" Ø coax cables, one (1) fiber cable and two (2) dc control cables run on the exterior of existing sign structure.
- MetroPCS (Existing)
  Antennas: Three (3) RFS APXV18-206517S-C panel antennas mounted to the steel flanges (legs) of the existing sign structure with a RAD center elevation of 77-ft AGL.
  Coax Cable: Six (6) 1-5/8" ∅ coaxial cables vertically supported on the existing legs of the sign structure.

- T-MOBILE (Existing/Reserved)
  Antennas: One (1) VIC-100 GPS antenna on a side arm mounted to the leg of the sign structure with a RAD center elevation of 50-ft AGL.
  Coax Cables: One (1) 1/2" Ø coax cable run on the exterior of the existing sign structure.
- VERIZON: (Existing To Remain)
  Antennas: Four (4) Decibel DB846F65ZAXY, two (2) Antel LPA-80080/6CF and three (3) Antel BXA-70063-6CF panel antennas mounted on a low profile platform with a RAD center elevation of 88-ft AGL.
  Coax Cables: Eighteen (18) 1-5/8" Ø coax cables run on the exterior of the existing sign structure.
- VERIZON: (Existing To Remove)
  Antennas: Six (6) Decibel 948F85T2E-M_2 panel antennas mounted on a low profile platform with a RAD center elevation of 88-ft AGL.
- **VERIZON (PROPOSED):**
  Antennas: Three (3) Antel BXA-171063-12CF panel antennas, three (3) Antel BXA-171085-12BF panel antennas, three (3) Alcatel-Lucent RRH2x40-AWS Remote Radio Heads and one (1) RFS DB-T1-6Z-8AB-0Z main distribution box mounted on a low profile platform with a RAD center elevation of 88-ft AGL.
  Coax Cables: One (1) 1-5/8" Ø fiber cable running on the exterior of the existing sign structure.

Primary Assumptions Used in the Analysis

- The structure's theoretical capacity not including any assessment of the condition of the tower.
- The structure carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Structure is properly installed and maintained.
- Structure is in plumb condition.
- Structure loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original structure design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All structure members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled RISATower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (fastest mile) with no ice and a 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC[1] and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation on the tower analysis.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice on the tower structure and its components.

Basic Wind Speed:	Middlesex; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Cromwell; v = 100 mph (3 second gust) equivalent to v = 80 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA/EIA-222-F wind speed controls.	
Load Cases:	Load Case 1; 85 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 74 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 74 mph wind speed velocity represents 75% of the wind pressure generated by the 85 mph wind speed.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

[1] The 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)

Structure Capacity

Member stresses were calculated utilizing the structural analysis software RISA-3D. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

Calculated stresses were found to be within allowable limits. In Load Case 6, per RISA-3D "Steel Code Checks", this structure was found to be at **99.4%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg 2	1.25'	99.4%	**PASS**

Foundation and Anchors

The existing foundation consists of an 55-ft long (approx) x 8.5-ft wide x 3-ft deep reinforced concrete strip footing with concrete column pedestals. The sub-grade conditions used in the analysis of the existing foundation were based on normal soil values as permitted by EIA/TIA-222-F Section 7.1.3. The base of the sign structure is connected to the foundation by means of (20) 1"∅, (assumed ASTM A-615-75) anchor bolts embedded into the existing concrete foundation. The base of the communications pipe structure is connected to the foundation by means of (10) 1.75"∅, ASTM A615-75 anchor bolts embedded into the existing concrete foundation.

- The foundation was found to be within allowable limits.

Foundation	Design Limit	IBC 2003/2005 CT State Building Code Section 3108.4.2	Proposed Loading	Result
Reinf. Conc. Pad w/ Pedestals	OTM	2.0	3.6	**PASS**

Note: OTM denotes Overturning Moment

- The structure anchor bolts, base plate and flange plates were found to be within allowable limits.

Structure Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts (Mast)	Tension	57.2%	**PASS**
Base Plate (Mast)	Bending	43.2%	**PASS**
Flange Bolts	Tension	70.9%	**PASS**
Flange Plate	Bending	61.4%	**PASS**
Anchor Bolts (Leg)	Tension	52.8%	**PASS**
Base Plate (Leg)	Bending	96.0%	**PASS**

Conclusion

This analysis shows that the subject structure **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by Verizon Wireless. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer

STATE OF CONNECTICUT
CARLO F. CENTORE
No. 16684
LICENSED
PROFESSIONAL ENGINEER

Prepared by:

Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provide to CENTEK engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. CENTEK engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA-3D

RISA-3D Structural Analysis Program is an integrated structural analysis and design software package for buildings, bridges, tower structures, etc.

Modeling Features:

- Comprehensive CAD-like graphic drawing/editing capabilities that let you draw, modify and load elements as well as snap, move, rotate, copy, mirror, scale, split, merge, mesh, delete, apply, etc.
- Versatile drawing grids (orthogonal, radial, skewed)
- Universal snaps and object snaps allow drawing without grids
- Versatile general truss generator
- Powerful graphic select/unselect tools including box, line, polygon, invert, criteria, spreadsheet selection, with locking
- Saved selections to quickly recall desired selections
- Modification tools that modify single items or entire selections
- Real spreadsheets with cut, paste, fill, math, sort, find, etc.
- Dynamic synchronization between spreadsheets and views so you can edit or view any data in the plotted views or in the spreadsheets
- Simultaneous view of multiple spreadsheets
- Constant in-stream error checking and data validation
- Unlimited undo/redo capability
- Generation templates for grids, disks, cylinders, cones, arcs, trusses, tanks, hydrostatic loads, etc.
- Support for all units systems & conversions at any time
- Automatic interaction with RISASection libraries
- Import DXF, RISA-2D, STAAD and ProSteel 3D files
- Export DXF, SDNF and ProSteel 3D files

Analysis Features:

- Static analysis and P-Delta effects
- Multiple simultaneous dynamic and response spectra analysis using Gupta, CQC or SRSS mode combinations
- Automatic inclusion of mass offset (5% or user defined) for dynamic analysis
- Physical member modeling that does not require members to be broken up at intermediate joints
- State of the art 3 or 4 node plate/shell elements
- High-end automatic mesh generation — draw a polygon with any number of sides to create a mesh of well-formed quadrilateral (NOT triangular) elements.
- Accurate analysis of tapered wide flanges - web, top and bottom flanges may all taper independently
- Automatic rigid diaphragm modeling
- Area loads with one-way or two-way distributions
- Multiple simultaneous moving loads with standard AASHTO loads and custom moving loads for bridges, cranes, etc.
- Torsional warping calculations for stiffness, stress and design
- Automatic Top of Member offset modeling
- Member end releases & rigid end offsets
- Joint master-slave assignments
- Joints detachable from diaphragms

- Enforced joint displacements
- 1-Way members, for tension only bracing, slipping, etc.
- 1-Way springs, for modeling soils and other effects
- Euler members that take compression up to their buckling load, then turn off.
- Stress calculations on any arbitrary shape
- Inactive members, plates, and diaphragms allows you to quickly remove parts of structures from consideration
- Story drift calculations provide relative drift and ratio to height
- Automatic self-weight calculations for members and plates
- Automatic subgrade soil spring generator

Graphics Features:

- Unlimited simultaneous model view windows
- Extraordinary "true to scale" rendering, even when drawing
- High-speed redraw algorithm for instant refreshing
- Dynamic scrolling stops right where you want
- Plot & print virtually everything with color coding & labeling
- Rotate, zoom, pan, scroll and snap views
- Saved views to quickly restore frequent or desired views
- Full render or wire-frame animations of deflected model and dynamic mode shapes with frame and speed control
- Animation of moving loads with speed control
- High quality customizable graphics printing

Design Features:

- Designs concrete, hot rolled steel, cold formed steel and wood
- ACI 1999/2002, BS 8110-97, CSA A23.3-94, IS456:2000,EC 2-1992 with consistent bar sizes through adjacent spans
- Exact integration of concrete stress distributions using parabolic or rectangular stress blocks
- Concrete beam detailing (Rectangular, T and L)
- Concrete column interaction diagrams
- Steel Design Codes: AISC ASD 9th, LRFD 2nd & 3rd, HSS Specification, CAN/CSA-S16.1-1994 & 2004, BS 5950-1-2000, IS 800-1984, Euro 3-1993 including local shape databases
- AISI 1999 cold formed steel design
- NDS 1991/1997/2001 wood design, including Structural Composite Lumber, multi-ply, full sawn
- Automatic spectra generation for UBC 1997, IBC 2000/2003
- Generation of load combinations: ASCE, UBC, IBC, BOCA, SBC, ACI
- Unbraced lengths for physical members that recognize connecting elements and full lengths of members
- Automatic approximation of K factors
- Tapered wide flange design with either ASD or LRFD codes
- Optimization of member sizes for all materials and all design codes, controlled by standard or user-defined lists of available sizes and criteria such as maximum depths
- Automatic calculation of custom shape properties
- Steel Shapes: AISC, HSS, CAN, ARBED, British, Euro, Indian, Chilean
- Light Gage Shapes: AISI, SSMA, Dale / Incor, Dietrich, Marino\WARE
- Wood Shapes: Complete NDS species/grade database
- Full seamless integration with RISAFoot (Ver 2 or better) for advanced footing design and detailing
- Plate force summation tool

Results Features:

- Graphic presentation of color-coded results and plotted designs
- Color contours of plate stresses and forces with quadratic smoothing, the contours may also be animated
- Spreadsheet results with sorting and filtering of: reactions, member & joint deflections, beam & plate forces/stresses, optimized sizes, code designs, concrete reinforcing, material takeoffs, frequencies and mode shapes
- Standard and user-defined reports
- Graphic member detail reports with force/stress/deflection diagrams and detailed design calculations and expanded diagrams that display magnitudes at any dialed location
- Saved solutions quickly restore analysis and design results.

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA/EIA

Wind Speeds

Basic Wind Speed, V $V := 85$ mph

Basic Wind Speed with Ice, V_i $V_i := 74$ mph (per TIA/EIA-222-F Section 2.3.16)

Heights above ground level, z

Leg Member Section 1 = $z_1 := 10$ ft

Leg Member Section 2 = $z_2 := 30$ ft

Leg Member Section 3 = $z_3 := 50$ ft

Leg Member Section 4 = $z_4 := 70$ ft

Bracing Members = $z_{Br} := 40$ ft

Exposure Coefficients, kz

(per TIA/EIA-222-F Section 2.3.3)

Leg Member Section 1 = $Kz_1 := \left(\frac{z_1}{33}\right)^{\frac{2}{7}} = 0.711$

Leg Member Section 2 = $Kz_2 := \left(\frac{z_2}{33}\right)^{\frac{2}{7}} = 0.973$

Leg Member Section 3 = $Kz_3 := \left(\frac{z_3}{33}\right)^{\frac{2}{7}} = 1.126$

Leg Member Section 4 = $Kz_4 := \left(\frac{z_4}{33}\right)^{\frac{2}{7}} = 1.24$

Bracing Members = $Kz_{Br} := \left(\frac{z_{Br}}{33}\right)^{\frac{2}{7}} = 1.057$

Velocity Pressure without ice, qz

(per TIA/EIA-222-F Section 2.3.3)

Leg Member Section 1 = $qz_1 := 0.00256 \cdot Kz_1 \cdot V^2 = 13.15$

Leg Member Section 2 = $qz_2 := 0.00256 \cdot Kz_2 \cdot V^2 = 17.999$

Leg Member Section 3 = $qz_3 := 0.00256 \cdot Kz_3 \cdot V^2 = 20.827$

Leg Member Section 4 = $qz_4 := 0.00256 \cdot Kz_4 \cdot V^2 = 22.929$

Bracing Members = $qz_{Br} := 0.00256 \cdot Kz_{Br} \cdot V^2 = 19.541$

Velocity Pressure with ice, qzICE (per TIA/EIA-222-F Section 2.3.3)

Leg Member Section 1 = $qzICE_1 := 0.00256 \cdot Kz_1 \cdot V_i^2 = 9.967$

Leg Member Section 2 = $qzICE_2 := 0.00256 \cdot Kz_2 \cdot V_i^2 = 13.642$

Leg Member Section 3 = $qzICE_3 := 0.00256 \cdot Kz_3 \cdot V_i^2 = 15.786$

Leg Member Section 4 = $qzICE_4 := 0.00256 \cdot Kz_4 \cdot V_i^2 = 17.379$

Bracing Members = $qzICE_{Br} := 0.00256 \cdot Kz_{Br} \cdot V_i^2 = 14.811$

TIA/EIA Common Factors:

Gust Response Factor =	$G_H := 1.69$		(per TIA/EIA-222-F Section 2.3.4)
Gust Response Factor Multiplier =	$m := 1.25$		(per TIA/EIA-222-F Section 2.3.4.4)
Radial Ice Thickness =	$Ir := 0.50$	in	(per TIA/EIA-222-F Section 2.3.1)
Radial Ice Density =	$Id := 56.00$	pcf	

Development of Wind & Ice Load on W24x68 w/ Plate (per TIA/EIA-222-F-1996 Criteria)

W24x68 w/ Plate Data:

Shape =	Flat	
Depth =	$d := 25.75$	in
Length =	$L := 20$	ft
Flange Width =	$b_f := 16$	in
Flange Thickness =	$t_f := 2.585$	in
Web Thickness =	$t_w := .415$	in
Member Cross Sectional Area =	$A_{member} := 52.1$	in^2

Gravity Loads (without ice)

Weight of the Member = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{member} := 2\left(t_f + 2\cdot Ir\right)\cdot\left(b_f + 2\cdot Ir\right) + \left(d - 2t_f - 2Ir\right)\left(t_w + 2\cdot Ir\right) - A_{member} = 97.5$

Weight of Ice on Member = $W_{ICE\_member} := Id\cdot\frac{Ai_{member}}{144} = 38$ plf **BLC 3**

Wind Perpendicular to Flange:

Member Aspect Ratio = $Ar_{member} := \frac{12L}{b_f} = 15.0$

Member Force Coefficient = $Ca_{member} = 1.67$ (per TIA/EIA-222-F Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Flange Projected Surface Area = $A_{member} := \frac{b_f}{12} = 1.333$ ft

Section 1 Flange Wind Force = $qz_1\cdot G_H\cdot Ca_{member}\cdot A_{member} = 49$ plf **BLC 7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Flange Projected Surface Area w/ Ice = $AICE_{member} := \frac{\left(b_f + 2\cdot Ir\right)}{12} = 1.417$ ft

Section 1 Flange Wind Force w/ Ice = $qzICE_1\cdot G_H\cdot Ca_{member}\cdot AICE_{member} = 40$ plf **BLC 6**

Wind Perpendicular to Web

Member Aspect Ratio = $Ar_{member} := \frac{12L}{d} = 9.3$

Member Force Coefficient = $Ca_{member} = 1.48$ (per TIA/EIA-222-F Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Web Projected Surface Area = $A_{member} := \frac{d}{12} = 2.146$ ft

Section 1 Web Wind Force = $qz_1 \cdot G_H \cdot Ca_{member} \cdot A_{member} = 70$ plf **BLC 5**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Web Projected Surface Area w/ Ice = $AICE_{member} := \frac{(d + 2 \cdot Ir)}{12} = 2.229$ ft

Section 1 Web Wind Force w/ Ice = $qzICE_1 \cdot G_H \cdot Ca_{member} \cdot AICE_{member} = 55$ plf **BLC 4**

Development of Wind & Ice Load on W24x68 (per TIA/EIA-222-F-1996 Criteria)

W24x68 Data:

Shape = Flat

Depth = $d := 23.75$ in

Length = $L := 20$ ft

Flange Width = $b_f := 9$ in

Flange Thickness = $t_f := .585$ in

Web Thickness = $t_w := .415$ in

Member Cross Sectional Area = $A_{member} := 20.1$ in^2

Gravity Loads (without ice)

Weight of the Member = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{member} := 2\left(t_f + 2 \cdot Ir\right) \cdot \left(b_f + 2 \cdot Ir\right) + \left(d - 2t_f - 2Ir\right)\left(t_w + 2 \cdot Ir\right) - A_{member} = 42.1$

Weight of Ice on Member = $W_{ICE\_member} := Id \cdot \frac{Ai_{member}}{144} = 16$ plf **BLC 3**

Wind Perpendicular to Flange:

Member Aspect Ratio = $Ar_{member} := \frac{12L}{b_f} = 26.7$

Member Force Coefficient = $Ca_{member} = 2$ (per TIA/EIA-222-F Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Flange Projected Surface Area = $A_{member} := \frac{b_f}{12} = 0.75$ ft

Section 2 Flange Wind Force = $qz_2 \cdot G_H \cdot Ca_{member} \cdot A_{member} = 46$ plf **BLC 7**

Section 3 Flange Wind Force = $qz_3 \cdot G_H \cdot Ca_{member} \cdot A_{member} = 53$ plf **BLC 7**

Section 4 Flange Wind Force = $qz_4 \cdot G_H \cdot Ca_{member} \cdot A_{member} = 58$ plf **BLC 7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Flange Projected Surface Area w/ Ice = $AICE_{member} := \frac{\left(b_f + 2 \cdot Ir\right)}{12} = 0.833$ ft

Section 2 Flange Wind Force w/ Ice = $qzICE_2 \cdot G_H \cdot Ca_{member} \cdot AICE_{member} = 38$ plf **BLC 6**

Section 3 Flange Wind Force w/ Ice = $qzICE_3 \cdot G_H \cdot Ca_{member} \cdot AICE_{member} = 44$ plf **BLC 6**

Section 4 Flange Wind Force w/ Ice = $qzICE_4 \cdot G_H \cdot Ca_{member} \cdot AICE_{member} = 49$ plf **BLC 6**

Wind Perpendicular to Web

Member Aspect Ratio = $Ar_{member} := \frac{12L}{d} = 10.1$

Member Force Coefficient = $Ca_{member} = 1.5$ (per TIA/EIA-222-F Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Web Projected Surface Area = $A_{member} := \frac{d}{12} = 1.979$ ft

Section 2 Web Wind Force =	$qz_2 \cdot G_H \cdot Ca_{member} \cdot A_{member} = 91$	plf	**BLC 5**
Section 3 Web Wind Force =	$qz_3 \cdot G_H \cdot Ca_{member} \cdot A_{member} = 105$	plf	**BLC 5**
Section 4 Web Wind Force =	$qz_4 \cdot G_H \cdot Ca_{member} \cdot A_{member} = 115$	plf	**BLC 5**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

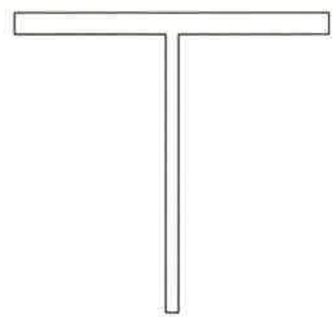
Web Projected Surface Area w/ Ice = $AICE_{member} := \frac{(d + 2 \cdot Ir)}{12} = 2.063$ ft

Section 2 Web Wind Force w/ Ice =	$qzICE_2 \cdot G_H \cdot Ca_{member} \cdot AICE_{member} = 71$	plf	**BLC 4**
Section 3 Web Wind Force w/ Ice =	$qzICE_3 \cdot G_H \cdot Ca_{member} \cdot AICE_{member} = 83$	plf	**BLC 4**
Section 4 Web Wind Force w/ Ice =	$qzICE_4 \cdot G_H \cdot Ca_{member} \cdot AICE_{member} = 91$	plf	**BLC 4**

Development of Wind & Ice Load on WT 6x15 (per TIA/EIA-222-F-1996 Criteria)

WT 6x15 Data:

Shape = Flat



Depth = $d := 6.17$ in

Length = $L := 10$ ft

Flange Width = $b_f := 6.52$ in

Flange Thickness = $t_f := 0.44$ in

Web Thickness = $t_w := 0.26$ in

Member Cross Sectional Area = $A_{member} := 4.4$ in^2

Member Aspect Ratio = $Ar_{member} := \frac{12L}{b_f} = 18.4$

Member Force Coefficient = $Ca_{member} = 1.78$ (per TIA/EIA-222-F Table 3)

Gravity Loads (without ice)

Weight of the Member = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{member} := \left[\left(t_f + 2 \cdot Ir\right) \cdot \left(b_f + 2 \cdot Ir\right) + \left(d - t_f\right)\left(t_w + 2 \cdot Ir\right) - A_{member}\right] = 13.6$

Weight of Ice on Member = $W_{ICE\_member} := Id \cdot \frac{Ai_{member}}{144} = 5$ plf **BLC 3**

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Member Projected Surface Area = $A_{member} := \frac{b_f}{12} = 0.543$ ft

Total Member Wind Force = $qz_{Br} \cdot G_H \cdot Ca_{member} \cdot A_{member} = 32$ plf **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Member Projected Surface Area w/ Ice = $AICE_{member} := \frac{\left(b_f + 2 \cdot Ir\right)}{12} = 0.627$ ft

Total Member Wind Force w/ Ice = $qzICE_{Br} \cdot G_H \cdot Ca_{member} \cdot AICE_{member} = 28$ plf **BLC 4,6**

Development of Wind & Ice Load on L5x5x5/16 (per TIA/EIA-222-F-1996 Criteria)

L5x5x5/16 Data:

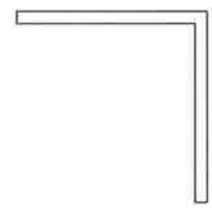
Shape = Flat

Length = $L := 32$ ft

Width = $b := 5$ in

Thickness = $t := 0.3125$ in

Member Cross Sectional Area = $A_{member} := 3.03$ in^2



Member Aspect Ratio = $Ar_{member} := \frac{12L}{b} = 76.8$

Member Force Coefficient = $Ca_{member} = 2$ (per TIA/EIA-222-F Table 3)

Gravity Loads (without ice)

Weight of the Member = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{member} := (b - t)(t + 2 \cdot Ir) + (b + 2 \cdot Ir)(t + 2 \cdot Ir) - A_{member} = 11$

Weight of Ice on Member = $W_{ICE\_member} := Id \cdot \frac{Ai_{member}}{144} = 4$ plf **BLC 3**

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Member Projected Surface Area = $A_{member} := \frac{b}{12} = 0.417$ ft

Total Member Wind Force = $qz_{Br} \cdot G_H \cdot Ca_{member} \cdot A_{member} = 28$ plf **BLC 7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Member Projected Surface Area w/ Ice = $AICE_{member} := \frac{(b + 2 \cdot Ir)}{12} = 0.5$ ft

Total Member Wind Force w/ Ice = $qzICE_{Br} \cdot G_H \cdot Ca_{member} \cdot AICE_{member} = 25$ plf **BLC 6**

Development of Wind & Ice Load on L3.5x3.5x5/16 (per TIA/EIA-222-F-1996 Criteria)

L3.5x3.5x5/16 Data:

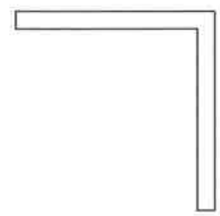
Shape = Flat

Length = $L := 20$ ft

Width = $b := 3.5$ in

Thickness = $t := 0.3125$ in

Member Cross Sectional Area = $A_{member} := 2.09$ in^2



Member Aspect Ratio = $Ar_{member} := \frac{12L}{b} = 68.6$

Member Force Coefficient = $Ca_{member} = 2$ (per TIA/EIA-222-F Table 3)

Gravity Loads (without ice)

Weight of the Member = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{member} := [(b - t)(t + 2 \cdot Ir) + (b + 2 \cdot Ir)(t + 2 \cdot Ir)] - A_{member} = 8$

Weight of Ice on Member = $W_{ICE\_member} := Id \cdot \frac{Ai_{member}}{144} = 3$ plf **BLC 3**

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Member Projected Surface Area = $A_{member} := \frac{b}{12} = 0.292$ ft

Total Member Wind Force = $qz_{Br} \cdot G_H \cdot Ca_{member} \cdot A_{member} = 19$ plf **BLC 7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Member Projected Surface Area w/ Ice = $AICE_{member} := \frac{(b + 2 \cdot Ir)}{12} = 0.375$ ft

Total Member Wind Force w/ Ice = $qzICE_{Br} \cdot G_H \cdot Ca_{member} \cdot AICE_{member} = 19$ plf **BLC 6**

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA/EIA

Wind Speeds

Basic Wind Speed, V	$V := 85$	mph	
Basic Wind Speed with Ice, V_i	$V_i := 74$	mph	(per TIA/EIA-222-F Section 2.3.16)

Heights above ground level, z

Mast 1 =	$z_{mast1} := 15$	ft
Mast 2 =	$z_{mast2} := 45$	ft
Mast 3 =	$z_{mast3} := 75$	ft
Mast 4 =	$z_{mast4} := 100$	ft
Verizon =	$z_{vz} := 88$	ft
AT&T =	$z_{att} := 98$	ft
T-Mobile =	$z_{t\_mb} := 108$	ft
MetroPCS =	$z_{metro} := 77$	ft
GPS =	$z_{gps} := 50$	ft

Exposure Coefficients, kz (per TIA/EIA-222-F Section 2.3.3)

Mast 1 = $$Kz_{mast1} := \left(\frac{z_{mast1}}{33}\right)^{\frac{2}{7}} = 0.798$$

Mast 2 = $$Kz_{mast2} := \left(\frac{z_{mast2}}{33}\right)^{\frac{2}{7}} = 1.093$$

Mast 3 = $$Kz_{mast3} := \left(\frac{z_{mast3}}{33}\right)^{\frac{2}{7}} = 1.264$$

Mast 4 = $$Kz_{mast4} := \left(\frac{z_{mast4}}{33}\right)^{\frac{2}{7}} = 1.373$$

Verizon = $$Kz_{vz} := \left(\frac{z_{vz}}{33}\right)^{\frac{2}{7}} = 1.323$$

AT&T = $$Kz_{att} := \left(\frac{z_{att}}{33}\right)^{\frac{2}{7}} = 1.365$$

T-Mobile = $$Kz_{t\_mb} := \left(\frac{z_{t\_mb}}{33}\right)^{\frac{2}{7}} = 1.403$$

MetroPCS = $Kz_{metro} := \left(\frac{z_{metro}}{33}\right)^{\frac{2}{7}} = 1.274$

GPS = $Kz_{gps} := \left(\frac{z_{gps}}{33}\right)^{\frac{2}{7}} = 1.126$

Velocity Pressure without ice, qz (per TIA/EIA-222-F Section 2.3.3)

Mast 1 = $qz_{mast1} := 0.00256 \cdot Kz_{mast1} \cdot V^2 = 14.765$

Mast 2 = $qz_{mast2} := 0.00256 \cdot Kz_{mast2} \cdot V^2 = 20.21$

Mast 3 = $qz_{mast3} := 0.00256 \cdot Kz_{mast3} \cdot V^2 = 23.386$

Mast 4 = $qz_{mast4} := 0.00256 \cdot Kz_{mast4} \cdot V^2 = 25.389$

Verizon = $qz_{vz} := 0.00256 \cdot Kz_{vz} \cdot V^2 = 24.478$

AT&T = $qz_{att} := 0.00256 \cdot Kz_{att} \cdot V^2 = 25.243$

T-Mobile = $qz_{t\_mb} := 0.00256 \cdot Kz_{t\_mb} \cdot V^2 = 25.953$

MetroPCS = $qz_{metro} := 0.00256 \cdot Kz_{metro} \cdot V^2 = 23.562$

GPS = $qz_{gps} := 0.00256 \cdot Kz_{gps} \cdot V^2 = 20.827$

Velocity Pressure with ice, qzICE (per TIA/EIA-222-F Section 2.3.3)

Mast 1 = $qzICE_{mast1} := 0.00256 \cdot Kz_{mast1} \cdot V_i^2 = 11.191$

Mast 2 = $qzICE_{mast2} := 0.00256 \cdot Kz_{mast2} \cdot V_i^2 = 15.318$

Mast 3 = $qzICE_{mast3} := 0.00256 \cdot Kz_{mast3} \cdot V_i^2 = 17.725$

Mast 4 = $qzICE_{mast4} := 0.00256 \cdot Kz_{mast4} \cdot V_i^2 = 19.243$

Verizon = $qzICE_{vz} := 0.00256 \cdot Kz_{vz} \cdot V_i^2 = 18.553$

AT&T = $qzICE_{att} := 0.00256 \cdot Kz_{att} \cdot V_i^2 = 19.132$

T-Mobile = $qzICE_{t\_mb} := 0.00256 \cdot Kz_{t\_mb} \cdot V_i^2 = 19.671$

MetroPCS = $qzICE_{metro} := 0.00256 \cdot Kz_{metro} \cdot V_i^2 = 17.858$

GPS = $qzICE_{gps} := 0.00256 \cdot Kz_{gps} \cdot V_i^2 = 15.786$

TIA/EIA Common Factors:

Gust Response Factor =	$G_H := 1.69$		(per TIA/EIA-222-F Section 2.3.4)
Gust Response Factor Multiplier =	$m := 1.25$		(per TIA/EIA-222-F Section 2.3.4.4)
Radial Ice Thickness =	$Ir := 0.50$	in	(per TIA/EIA-222-F Section 2.3.1)
Radial Ice Density =	$Id := 56.00$	pcf	

Development of Wind & Ice Load on PCS Mast (per TIA/EIA-222-F-1996 Criteria)

PCS Mast Data:

Mast Shape =	Round		
Mast Diameter =	$D_{mast} := 18$	in	(HSS18x0.5)
Mast Length =	$L_{mast} := 111$	ft	
Mast Thickness =	$t_{mast} := .465$	in	
Velocity Coefficient =	$C := \left(\sqrt{Kz_{mast1}}\right) \cdot V \cdot \frac{D_{mast}}{12} = 113.918$		
Structure Force Coefficient =	$C_{Fmast} = 0.59$		(per TIA/EIA-222-F Table 1 for round pole)

Wind Load (without Ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Mast Projected Surface Area =	$A_{mast} := \frac{D_{mast}}{12} = 1.5$	sf/ft	
Total Mast Wind Force =	$qz_{mast1} \cdot G_H \cdot C_{Fmast} \cdot A_{mast} = 22$	plf	**BLC 5,7**
Total Mast Wind Force =	$qz_{mast2} \cdot G_H \cdot C_{Fmast} \cdot A_{mast} = 30$	plf	**BLC 5,7**
Total Mast Wind Force =	$qz_{mast3} \cdot G_H \cdot C_{Fmast} \cdot A_{mast} = 35$	plf	**BLC 5,7**
Total Mast Wind Force =	$qz_{mast4} \cdot G_H \cdot C_{Fmast} \cdot A_{mast} = 38$	plf	**BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Mast Projected Surface Area w/ Ice =	$AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 1.583$	sf/ft	
Total Mast Wind Force w/ Ice =	$qzICE_{mast1} \cdot G_H \cdot C_{Fmast} \cdot AICE_{mast} = 18$	plf	**BLC 4,6**
Total Mast Wind Force w/ Ice =	$qzICE_{mast2} \cdot G_H \cdot C_{Fmast} \cdot AICE_{mast} = 24$	plf	**BLC 4,6**
Total Mast Wind Force w/ Ice =	$qzICE_{mast3} \cdot G_H \cdot C_{Fmast} \cdot AICE_{mast} = 28$	plf	**BLC 4,6**
Total Mast Wind Force w/ Ice =	$qzICE_{mast4} \cdot G_H \cdot C_{Fmast} \cdot AICE_{mast} = 30$	plf	**BLC 4,6**

Gravity Loads (without ice)

Weight of the mast =	Self Weight	**(Computed internally by Risa-3D)**	plf	**BLC 1**

Gravity Loads (ice only)

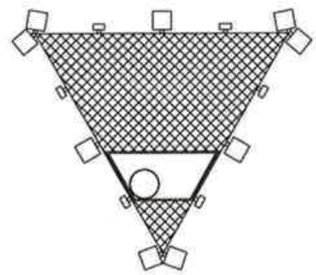
Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + Ir \cdot 2\right)^2 - D_{mast}^{\ 2}\right] = 29.1$	sq in	
Weight of Ice on Mast =	$W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 11$	plf	**BLC 3**

Development of Wind & Ice Load on Antennas (per TIA/EIA-222-F-1996 Criteria)

Antenna Data:

Antenna Model = Antel BXA-70063/6CF (Verizon)

Antenna Shape = Flat



Antenna Height = $L_{ant} := 71.0$ in

Antenna Width = $W_{ant} := 11.2$ in

Antenna Thickness = $T_{ant} := 4.5$ in

Antenna Weight = $WT_{ant} := 17.0$ lbs

Number of Antennas = $N_{ant} := 3$

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.3$

Antenna Force Coefficient = $Ca_{ant} = 1.4$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.5$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 16.6$ sf

Total Antenna Wind Force = $F_{ant} := qz_{vz} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 959$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.1$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 18.3$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{vz} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 803$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 51$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 3578$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1253$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 41$ lbs

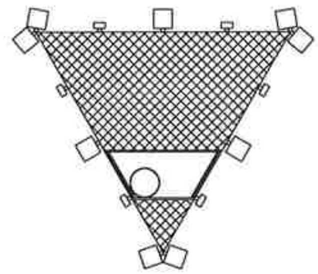
Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 122$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas (per TIA/EIA-222-F-1996 Criteria)

Antenna Data:

Antenna Model = Antel LPA-80080/6CF (Verizon)

Antenna Shape = Flat



Antenna Height = $L_{ant} := 70.9$ in

Antenna Width = $W_{ant} := 13.2$ in

Antenna Thickness = $T_{ant} := 5.5$ in

Antenna Weight = $WT_{ant} := 21.0$ lbs

Number of Antennas = $N_{ant} := 2$

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 5.4$

Antenna Force Coefficient = $Ca_{ant} = 1.4$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 6.5$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 13$ sf

Total Antenna Wind Force = $F_{ant} := qz_{vz} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 753$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 7.1$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 14.2$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{vz} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 622$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 42$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5147$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1489$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 48$ lbs

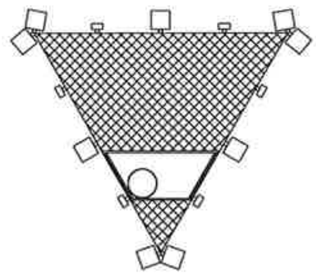
Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 97$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas (per TIA/EIA-222-F-1996 Criteria)

Antenna Data:

Antenna Model = Decibel DB846F65ZAXY (Verizon)

Antenna Shape = Flat



Antenna Height = $L_{ant} := 72$ in

Antenna Width = $W_{ant} := 10$ in

Antenna Thickness = $T_{ant} := 8.5$ in

Antenna Weight = $WT_{ant} := 21$ lbs

Number of Antennas = $N_{ant} := 4$

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 7.2$

Antenna Force Coefficient = $Ca_{ant} = 1.41$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 20$ sf

Total Antenna Wind Force = $F_{ant} := qz_{vz} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 1164$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 5.6$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 22.3$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{vz} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 984$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 84$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6120$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1509$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 49$ lbs

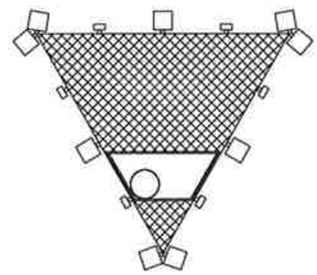
Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 196$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas (per TIA/EIA-222-F-1996 Criteria)

Antenna Data:

Antenna Model = Antel BXA-171063-12CF (Verizon)

Antenna Shape = Flat



Antenna Height = $L_{ant} := 72.5$ in

Antenna Width = $W_{ant} := 6.1$ in

Antenna Thickness = $T_{ant} := 4.1$ in

Antenna Weight = $WT_{ant} := 12.8$ lbs

Number of Antennas = $N_{ant} := 3$

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 11.9$

Antenna Force Coefficient = $Ca_{ant} = 1.56$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 3.1$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 9.2$ sf

Total Antenna Wind Force = $F_{ant} := qz_{vz} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 596$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 3.6$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 10.9$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{vz} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 533$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 38$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1813$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 848$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 27$ lbs

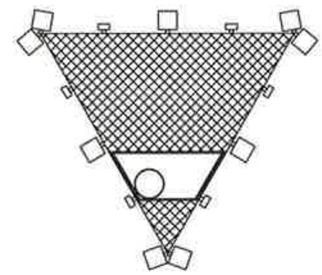
Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 82$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas (per TIA/EIA-222-F-1996 Criteria)

Antenna Data:

Antenna Model = Antel BXA-171085-12BF (Verizon)

Antenna Shape = Flat



Antenna Height = $L_{ant} := 72.5$ in

Antenna Width = $W_{ant} := 6.1$ in

Antenna Thickness = $T_{ant} := 4.1$ in

Antenna Weight = $WT_{ant} := 12.8$ lbs

Number of Antennas = $N_{ant} := 3$

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 11.9$

Antenna Force Coefficient = $Ca_{ant} = 1.56$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 3.1$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 9.2$ sf

Total Antenna Wind Force = $F_{ant} := qz_{vz} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 596$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant}+1) \cdot (W_{ant}+1)}{144} = 3.6$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 10.9$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{vz} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 533$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 38$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1813$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant}+1)(W_{ant}+1) \cdot (T_{ant}+1) - V_{ant} = 848$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 27$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 82$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas (per TIA/EIA-222-F-1996 Criteria)

Antenna Data:

Antenna Model = RRH2x40-AWS (Verizon)

Antenna Shape = Flat

Antenna Height = $L_{ant} := 24.4$ in

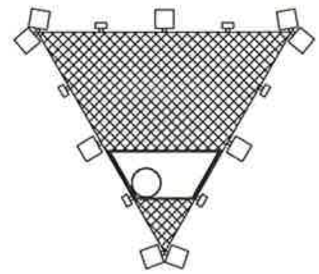
Antenna Width = $W_{ant} := 10.62$ in

Antenna Thickness = $T_{ant} := 6.7$ in

Antenna Weight = $WT_{ant} := 44$ lbs

Number of Antennas = $N_{ant} := 3$

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 2.3$



Antenna Force Coefficient = $Ca_{ant} = 1.4$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 1.8$ sf

Antenna Projected Surface Area = $A_{ant} := 0$ (Shielded by antenna) sf

Total Antenna Wind Force = $F_{ant} := qz_{vz} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 0$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 2$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := 0$ (Shielded by antenna) sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{vz} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 0$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 132$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1736$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 536$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 17$ lbs

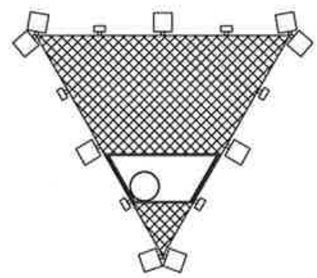
Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 52$ lbs **BLC 3**

Development of Wind & Ice Load on Platform (per TIA/EIA-222-F-1996 Criteria)

Platform Data:

Platform Model = 13' Platform w/ Handrails (Verizon)

Platform Shape = Flat



(Force Coefficient Value Included in Area) Platform Area = $CaA_{plt} := 31.3$ sq ft

(Force Coefficient Value Included in Area) Platform Area w/ Ice = $CaA_{ICEplt} := 40.2$ sq ft

Platform Weight = $WT_{plt} := 1822$ lbs

Platform Weight w/ Ice = $WT_{ICEplt} := 2452$ lbs

Wind Load (without Ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Total Platform Wind Force = $F_{plt} := qz_{vz} \cdot G_H \cdot CaA_{plt} = 1295$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Total Platform Wind Force w/ Ice = $Fi_{plt} := qzICE_{vz} \cdot G_H \cdot CaA_{ICEplt} = 1260$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of Platform = $WT_{plt} = 1822$ lbs **BLC 2**

Gravity Load (ice only)

Weight of Ice on Platform = $WT_{ICEplt} - WT_{plt} = 630$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

(per TIA/EIA-222-F-1996 Criteria)

Antenna Data:

Antenna Model = Powerwave 7770 (AT&T)

Antenna Shape = Flat

Antenna Height = $L_{ant} := 55$ in

Antenna Width = $W_{ant} := 11$ in

Antenna Thickness = $T_{ant} := 5$ in

Antenna Weight = $WT_{ant} := 35$ lbs

Number of Antennas = $N_{ant} := 6$

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 5.0$

Antenna Force Coefficient = $Ca_{ant} = 1.4$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice)

(per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.2$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 25.2$ sf

Total Antenna Wind Force = $F_{ant} := qz_{att} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 1506$ lbs **BLC 5,7**

Wind Load (with Ice)

(per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 4.7$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 28$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{att} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 1267$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 210$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 3025$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1007$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 33$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 196$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas (per TIA/EIA-222-F-1996 Criteria)

Antenna Data:

Antenna Model =	KMW AM-X-Cd-16-65-00T (AT&T)		
Antenna Shape =	Flat		
Antenna Height =	$L_{ant} := 72$	in	
Antenna Width =	$W_{ant} := 11.8$	in	
Antenna Thickness =	$T_{ant} := 5.9$	in	
Antenna Weight =	$WT_{ant} := 49$	lbs	
Number of Antennas =	$N_{ant} := 3$		
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.1$		
Antenna Force Coefficient =	$Ca_{ant} = 1.4$		(per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.9$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 17.7$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{att} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 1057$	lbs	**BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant}+1) \cdot (W_{ant}+1)}{144} = 6.5$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19.5$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qzICE_{att} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 881$	lbs	**BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 147$	lbs	**BLC 2**

Gravity Load (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5013$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant}+1)(W_{ant}+1) \cdot (T_{ant}+1) - V_{ant} = 1435$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 46$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 139$	lbs	**BLC 3**

Development of Wind & Ice Load on TMA's (per TIA/EIA-222-F-1996 Criteria)

TMA Data:

TMA Model =	Powerwave LGP214		(AT&T)
TMA Shape =	Flat		
TMA Height =	$L_{TMA} := 14.4$	in	
TMA Width =	$W_{TMA} := 9.2$	in	
TMA Thickness =	$T_{TMA} := 2.6$	in	
TMA Weight =	$WT_{TMA} := 14.1$	lbs	
Number of TMA's =	$N_{TMA} := 12$		
TMA Aspect Ratio =	$Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1.6$		
TMA Force Coefficient =	$Ca_{TMA} = 1.4$		(per TIA/EIA-222-F Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on TMA's

Surface Area for One TMA =	$SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.9$	sf	
TMA Projected Surface Area =	$A_{TMA} := SA_{TMA} \cdot N_{TMA} = 11$	sf	
Total TMA Wind Force =	$F_{TMA} := qz_{att} \cdot G_H \cdot Ca_{TMA} \cdot A_{TMA} = 659$	lbs	**BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on TMA's

Surface Area for One TMA w/ Ice =	$SA_{ICETMA} := \frac{(L_{TMA} + 1) \cdot (W_{TMA} + 1)}{144} = 1.1$	sf	
TMA Projected Surface Area w/ Ice =	$A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 13.1$	sf	
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := qzICE_{att} \cdot G_H \cdot Ca_{TMA} \cdot A_{ICETMA} = 593$	lbs	**BLC 4,6**

Gravity Load (without ice)

Weight of All TMA's =	$WT_{TMA} \cdot N_{TMA} = 169$	lbs	**BLC 2**

Gravity Load (ice only)

Volume of Each TMA =	$V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 344$	cu in	
Volume of Ice on Each TMA =	$V_{ice} := (L_{TMA} + 1)(W_{TMA} + 1)(T_{TMA} + 1) - V_{TMA} = 221$	cu in	
Weight of Ice on Each TMA =	$W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 7$	lbs	
Weight of Ice on All TMA's	$W_{ICETMA} \cdot N_{TMA} = 86$	lbs	**BLC 3**

Development of Wind & Ice Load on RRU's (per TIA/EIA-222-F-1996 Criteria)

RRU Data:

RRU Model = Ericsson RRUS-11 (AT&T)

RRU Shape = Flat

RRU Height = $L_{RRU} := 17.8$ in

RRU Width = $W_{RRU} := 17.3$ in

RRU Thickness = $T_{RRU} := 7.2$ in

RRU Weight = $WT_{RRU} := 50$ lbs

Number of RRU's = $N_{RRU} := 6$

RRU Aspect Ratio = $Ar_{RRU} := \frac{L_{RRU}}{W_{RRU}} = 1$

RRU Force Coefficient = $Ca_{RRU} = 1.4$ (per TIA/EIA-222-F Table 3)

Wind Load (without Ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on RRU's

Surface Area for One RRU = $SA_{RRU} := \frac{L_{RRU} \cdot W_{RRU}}{144} = 2.1$ sf

RRU Projected Surface Area = $A_{RRU} := SA_{RRU} \cdot N_{RRU} = 12.8$ sf

Total RRU Wind Force = $F_{RRU} := qz_{att} \cdot G_H \cdot Ca_{RRU} \cdot A_{RRU} = 766$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on RRU's

Surface Area for One RRU w/ Ice = $SA_{ICERRU} := \frac{(L_{RRU} + 1) \cdot (W_{RRU} + 1)}{144} = 2.4$ sf

RRU Projected Surface Area w/ Ice = $A_{ICERRU} := SA_{ICERRU} \cdot N_{RRU} = 14.3$ sf

Total RRU Wind Force w/ Ice = $Fi_{RRU} := qzICE_{att} \cdot G_H \cdot Ca_{RRU} \cdot A_{ICERRU} = 649$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All RRU's = $WT_{RRU} \cdot N_{RRU} = 300$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each RRU = $V_{RRU} := L_{RRU} \cdot W_{RRU} \cdot T_{RRU} = 2 \times 10^3$ cu in

Volume of Ice on Each RRU = $V_{ice} := (L_{RRU} + 1)(W_{RRU} + 1)(T_{RRU} + 1) - V_{RRU} = 604$ cu in

Weight of Ice on Each RRU = $W_{ICERRU} := \frac{V_{ice}}{1728} \cdot Id = 20$ lbs

Weight of Ice on All RRU's $W_{ICERRU} \cdot N_{RRU} = 117$ lbs **BLC 3**

Development of Wind & Ice Load on Surge Arrestor (per TIA/EIA-222-F-1996 Criteria)

Surge Arrestor Data:

Surge Arrestor Model = DC6-48-60-18-8F (AT&T)

Surge Arrestor Shape = Flat

Surge Arrestor Height = $L_{SA} := 23.5$ in

Surge Arrestor Width = $W_{SA} := 9.7$ in

Surge Arrestor Thickness = $T_{SA} := 9.7$ in

Surge Arrestor Weight = $WT_{SA} := 20$ lbs

Number of Surge Arrestor = $N_{SA} := 1$

Surge Arrestor Aspect Ratio = $Ar_{SA} := \frac{L_{SA}}{W_{SA}} = 2.4$

Surge Arrestor Force Coefficient = $Ca_{SA} = 1.4$ (per TIA/EIA-222-F Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Surge Arrestor

Surface Area for One Surge Arrestor = $SA_{SA} := \frac{L_{SA} \cdot W_{SA}}{144} = 1.6$ sf

Surge Arrestor Projected Surface Area = $A_{SA} := SA_{SA} \cdot N_{SA} = 1.6$ sf

Total Surge Arrestor Wind Force = $F_{SA} := qz_{att} \cdot G_H \cdot Ca_{SA} \cdot A_{SA} = 95$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Surge Arrestor

Surface Area for One Surge Arrestor w/ Ice = $SA_{ICESA} := \frac{(L_{SA} + 1) \cdot (W_{SA} + 1)}{144} = 1.8$ sf

Surge Arrestor Projected Surface Area w/ Ice = $A_{ICESA} := SA_{ICESA} \cdot N_{SA} = 1.8$ sf

Total Surge Arrestor Wind Force w/ Ice = $Fi_{SA} := qzICE_{att} \cdot G_H \cdot Ca_{SA} \cdot A_{ICESA} = 82$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of Surge Arrestor = $WT_{SA} \cdot N_{SA} = 20$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Surge Arrestor = $V_{SA} := L_{SA} \cdot W_{SA} \cdot T_{SA} = 2 \times 10^3$ cu in

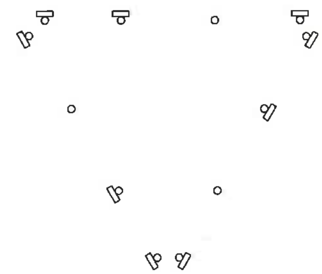
Volume of Ice on Each Surge Arrestor = $V_{ice} := (L_{SA} + 1)(W_{SA} + 1)(T_{SA} + 1) - V_{SA} = 594$ cu in

Weight of Ice on Each Surge Arrestor = $W_{ICESA} := \frac{V_{ice}}{1728} \cdot Id = 19$ lbs

Weight of Ice on All Surge Arrestor = $W_{ICESA} \cdot N_{SA} = 19$ lbs **BLC 3**

Development of Wind & Ice Load on Antenna Mounts (per TIA/EIA-222-F-1996 Criteria)

Mount Data:



Mount Type:	4" Φ Pipes	(AT&T)
Mount Shape =	Round	
Pipe Mount Length =	$L_{mnt} := 120$	in
Exposed Pipe Mount Length =	$L_{exp.mnt} := 65$	(Antennas shield top 55" of pipe)
4 inch Pipe Mount Linear Weight =	$W_{mnt} := 10.8$	plf
Pipe Mount Outside Diameter =	$D_{mnt} := 4.5$	in
Number of Mounting Pipes =	$N_{mnt} := 12$	
Mount Aspect Ratio =	$Ar_{mnt} := \frac{L_{mnt}}{D_{mnt}} = 27$	
Mount Force Factor =	$Ca_{mnt} = 1.2$	(per TIA/EIA-222-F Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Surface Area for One Mount =	$SA_{mnt} := \frac{D_{mnt} \cdot L_{exp.mnt}}{144} = 2.031$	sf	
Mount Projected Surface Area =	$A_{mnt} := SA_{mnt} \cdot N_{mnt} = 24.375$	sf	
Total Mount Wind Force =	$F_{mnt} := qz_{att} \cdot G_H \cdot Ca_{mnt} \cdot A_{mnt} = 1248$	lbs	**BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Surface Area for One Mount w/ Ice =	$SA_{ICEmnt} := \frac{(D_{mnt} + 2 \cdot Ir) \cdot L_{exp.mnt}}{144} = 2.483$	sf	
Mount Projected Surface Area w/ Ice =	$A_{ICEmnt} := SA_{ICEmnt} \cdot N_{mnt} = 29.792$	sf	
Total Mount Wind Force =	$Fi_{mnt} := qzICE_{att} \cdot G_H \cdot Ca_{mnt} \cdot A_{ICEmnt} = 1156$	lbs	**BLC 4,6**

Gravity Loads (without Ice) (per TIA/EIA-222-F-1996)

Weight Each Pipe Mount =	$WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 108$	lbs	
Weight of All Mounts =	$WT_{mnt} \cdot N_{mnt} = 1296$	lbs	**BLC 2**

Gravity Loads (ice only) (per TIA/EIA-222-F-1996)

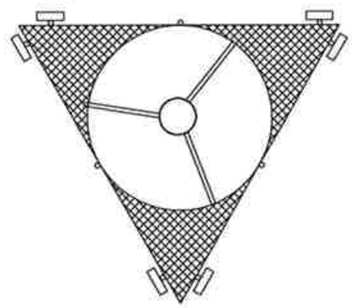
Volume of Each Pipe =	$V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^{2} \cdot L_{mnt} = 1909$	cu in	
Volume of Ice on Each Pipe =	$V_{ice} := \left[\frac{\pi}{4}\left[(D_{mnt} + 1)^2\right] \cdot (L_{mnt} + 1)\right] - V_{mnt} = 966$	cu in	
Weight of Ice each mount (incl, hardware) =	$W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 31$	lbs	
Weight of Ice on All Mounts =	$W_{ICEmnt} \cdot N_{mnt} + 5 = 381$	lbs	**BLC 3**

Development of Wind & Ice Load on Antennas (per TIA/EIA-222-F-1996 Criteria)

Antenna Data:

Antenna Model = RFS APX16DWV-16DWVS-E-A20 (T-Mobile)

Antenna Shape = Flat



Antenna Height = $L_{ant} := 55.9$ in

Antenna Width = $W_{ant} := 13$ in

Antenna Thickness = $T_{ant} := 3.15$ in

Antenna Weight = $WT_{ant} := 40.7$ lbs

Number of Antennas = $N_{ant} := 6$

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.3$

Antenna Force Coefficient = $Ca_{ant} = 1.4$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 30.3$ sf

Total Antenna Wind Force = $F_{ant} := qz_{t\_mb} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 1859$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant}+1) \cdot (W_{ant}+1)}{144} = 5.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 33.2$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{t\_mb} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 1545$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 244$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2289$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant}+1)(W_{ant}+1) \cdot (T_{ant}+1) - V_{ant} = 1017$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 33$ lbs

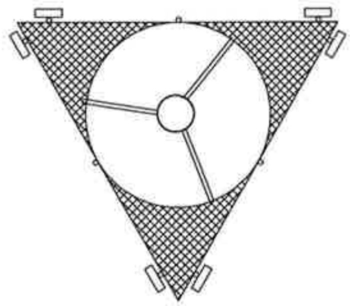
Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 198$ lbs **BLC 3**

Development of Wind & Ice Load on TMA's (per TIA/EIA-222-F-1996 Criteria)

TMA Data:

TMA Model = Andrew OneBase PCS Twin Dual Duplex TMA (T-Mobile)

TMA Shape = Flat



TMA Height = $L_{TMA} := 10.2$ in

TMA Width = $W_{TMA} := 6.7$ in

TMA Thickness = $T_{TMA} := 3.7$ in

TMA Weight = $WT_{TMA} := 14.6$ lbs

Number of TMA's = $N_{TMA} := 9$

TMA Aspect Ratio = $Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1.5$

TMA Force Coefficient = $Ca_{TMA} = 1.4$ (per TIA/EIA-222-F Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on TMA's

Surface Area for One TMA = $SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.5$ sf

TMA Projected Surface Area = $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 4.3$ sf

Total TMA Wind Force = $F_{TMA} := qz_{t\_mb} \cdot G_H \cdot Ca_{TMA} \cdot A_{TMA} = 262$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on TMA's

Surface Area for One TMA w/ Ice = $SA_{ICETMA} := \frac{(L_{TMA} + 1) \cdot (W_{TMA} + 1)}{144} = 0.6$ sf

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 5.4$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := qzICE_{t\_mb} \cdot G_H \cdot Ca_{TMA} \cdot A_{ICETMA} = 251$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All TMA's = $WT_{TMA} \cdot N_{TMA} = 131$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 253$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 1)(W_{TMA} + 1)(T_{TMA} + 1) - V_{TMA} = 152$ cu in

Weight of Ice on Each TMA = $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 5$ lbs

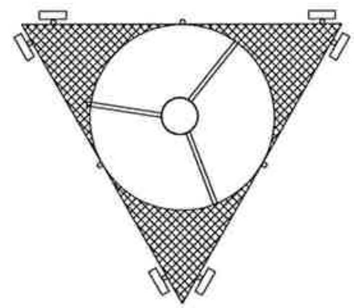
Weight of Ice on All TMA's = $W_{ICETMA} \cdot N_{TMA} = 44$ lbs **BLC 3**

Development of Wind & Ice Load on Platform (per TIA/EIA-222-F-1996 Criteria)

Platform Data:

Platform Model = 13' Low Profile Platform (T-Mobile)

Platform Shape = Flat



(Force Coefficient Value Included in Area) Platform Area = $CaA_{plt} := 15.7$ sq ft

(Force Coefficient Value Included in Area) Platform Area w/ Ice = $CaA_{ICEplt} := 20.1$ sq ft

Platform Weight = $WT_{plt} := 1300$ lbs

Platform Weight w/ Ice = $WT_{ICEplt} := 1765$ lbs

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Total Platform Wind Force = $F_{plt} := qz_{t\_mb} \cdot G_H \cdot CaA_{plt} = 689$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Total Platform Wind Force w/ Ice = $Fi_{plt} := qzICE_{t\_mb} \cdot G_H \cdot CaA_{ICEplt} = 668$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of Platform = $WT_{plt} = 1300$ lbs **BLC 2**

Gravity Load (ice only)

Weight of Ice on Platform = $WT_{ICEplt} - WT_{plt} = 465$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas (per TIA/EIA-222-F-1996 Criteria)

Antenna Data:

Antenna Model = GPS VIC-100 (T-Mobile)

Antenna Shape = Flat

Antenna Height = $L_{ant} := 3.9$ in

Antenna Width = $W_{ant} := 3.5$ in

Antenna Thickness = $T_{ant} := 3.5$ in

Antenna Weight = $WT_{ant} := 8$ lbs

Number of Antennas = $N_{ant} := 1$

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.1$

Antenna Force Coefficient = $Ca_{ant} = 1.4$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.1$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.1$ sf

Total Antenna Wind Force = $F_{ant} := qz_{gps} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 5$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant}+1) \cdot (W_{ant}+1)}{144} = 0.2$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 0.2$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{gps} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 6$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 8$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 48$ cu in

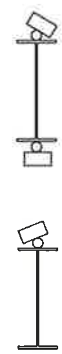
Volume of Ice on Each Antenna = $V_{ice} := (L_{ant}+1)(W_{ant}+1) \cdot (T_{ant}+1) - V_{ant} = 51$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 2$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 2$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas (per TIA/EIA-222-F-1996 Criteria)

Antenna Data:



Antenna Model = RFS APXV18-206517-S-C (MetroPCS)

Antenna Shape = Flat

Antenna Height = $L_{ant} := 72.0$ in

Antenna Width = $W_{ant} := 6.8$ in

Antenna Thickness = $T_{ant} := 3.15$ in

Antenna Weight = $WT_{ant} := 32.5$ lbs

Number of Antennas = $N_{ant} := 3$

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 10.6$

Antenna Force Coefficient = $Ca_{ant} = 1.52$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 3.4$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 10.2$ sf

Total Antenna Wind Force = $F_{ant} := qz_{metro} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 617$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure on Antennas

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 4$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 11.9$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{metro} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 544$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 98$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1542$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 821$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 27$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 80$ lbs **BLC 3**

CENTEK engineering

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Branford, CT 06405 F: (203) 488-8587

Subject: Wind Loading on Antennas and Mounts

Location: Cromwell, CT

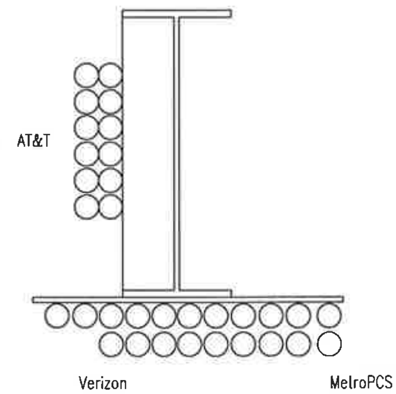
Rev. 0: 12/11/13

Prepared by: T.J.L. Checked by: C.F.C.

Job No. 13001.070

Development of Wind & Ice Load on Coax Cables (per TIA/EIA-222-F-1996 Criteria)

Coax Cable Data:



Coax Type: Use HELIAX 1-5/8"

Shape: Round

Coax Outside Diameter = $D_{coax} := 1.98$ in

Coax Cable Length = $L_{coax} := 110$ ft

Weight of Coax per foot = $WT_{coax} := 1.04$ plf

Total Number of Coax = $N_{coax} := 32$

Number of Projected Coax = $NP_{coax} := 5$

Coax aspect ratio = $Ar_{coax} := L_{coax} \cdot \frac{12}{D_{coax}} = 667$

Coax Cable Force Factor = $Ca_{coax} = 1.2$ TIA/EIA-222-F Table 3

Wind Load (without Ice) per TIA/EIA-222-F Section 2.3.2

Surface Area for One Coax = $SA_{coax} := \frac{D_{coax}}{12} = 0.17$ sf/ft

Coax Projected Surface Area = $A_{coax} := SA_{coax} \cdot NP_{coax} = 0.825$ sf/ft

Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{mast2} \cdot G_H \cdot A_{coax} = 34$ plf **BLC 5,7**

Wind Load (wiith Ice) per TIA/EIA-222-F Section 2.3.2

Coax Projected Surface Area w/ Ice = $A_{ICEcoax} := \frac{D_{coax}}{12} \cdot NP_{coax} + 2 \cdot \frac{Ir}{12} = 0.908$ sf/ft

Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qzICE_{mast2} \cdot G_H \cdot A_{ICEcoax} = 28$ plf **BLC 4,6**

Gravity Loads (without ice)

Weight of all cables w/o ice = $WT_{coax} \cdot N_{coax} = 33$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^{\ 2}\right] = 3.9$ si

Ice Weight per Linear Foot = $WTi_{coax} := Id \cdot \frac{Ai_{coax}}{144} = 2$ plf

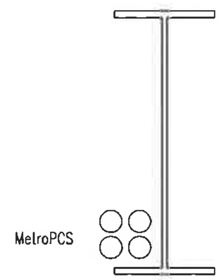
Ice Weight All Coax per foot = $WTi_{coax} \cdot N_{coax} = 48$ plf **BLC 3**

Development of Wind & Ice Load on Coax Cables (per TIA/EIA-222-F-1996 Criteria)

Coax Cable Data:

Coax Type: Use HELIAX 1-5/8"

Shape: Round



Coax Outside Diameter = $D_{coax} := 1.98$ in

Coax Cable Length = $L_{coax} := 110$ ft

Weight of Coax per foot = $WT_{coax} := 1.04$ plf

Total Number of Coax = $N_{coax} := 4$

Number of Projected Coax = $NP_{coax} := 0$

Coax aspect ratio = $Ar_{coax} := L_{coax} \cdot \frac{12}{D_{coax}} = 667$

Coax Cable Force Factor = $Ca_{coax} = 1.2$ TIA/EIA-222-F Table 3

Wind Load (without ice) per TIA/EIA-222-F Section 2.3.2

Surface Area for One Coax = $SA_{coax} := \frac{D_{coax}}{12} = 0.17$ sf/ft

Coax Projected Surface Area = $A_{coax} := SA_{coax} \cdot NP_{coax} = 0$ sf/ft

Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{mast2} \cdot G_H \cdot A_{coax} = 0$ plf **BLC 5,7**

Wind Load (wiith ice) per TIA/EIA-222-F Section 2.3.2

Coax Projected Surface Area w/ Ice = $A_{ICEcoax} := \frac{D_{coax}}{12} \cdot NP_{coax} = 0$ sf/ft

Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qzICE_{mast2} \cdot G_H \cdot A_{ICEcoax} = 0$ plf **BLC 4,6**

Gravity Loads (without ice)

Weight of all cables w/o ice = $WT_{coax} \cdot N_{coax} = 4$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}{}^2\right] = 3.9$ si

Ice Weight per Linear Foot = $WTi_{coax} := Id \cdot \frac{Ai_{coax}}{144} = 2$ plf

Ice Weight All Coax per foot = $WTi_{coax} \cdot N_{coax} = 6$ plf **BLC 3**

Development of Wind & Ice Load on Coax Cables (per TIA/EIA-222-F-1996 Criteria)

Coax Cable Data:

Coax Type: Use HELIAX 1-5/8"

Shape: Round

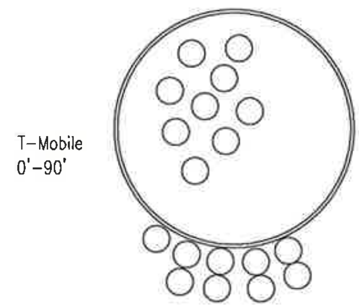
Coax Outside Diameter = $D_{coax} := 1.98$ in

Coax Cable Length = $L_{coax} := 110$ ft

Weight of Coax per foot = $WT_{coax} := 1.04$ plf

Total Number of Coax = $N_{coax} := 18$

Number of Projected Coax = $NP_{coax} := 2$



Coax aspect ratio = $Ar_{coax} := L_{coax} \cdot \frac{12}{D_{coax}} = 667$

Coax Cable Force Factor = $Ca_{coax} = 1.2$ TIA/EIA-222-F Table 3

Wind Load per (without ice) per TIA/EIA-222-F Section 2.3.2

Surface Area for One Coax = $SA_{coax} := \frac{D_{coax}}{12} = 0.17$ sf/ft

Coax Projected Surface Area = $A_{coax} := SA_{coax} \cdot NP_{coax} = 0.33$ sf/ft

Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{mast3} \cdot G_H \cdot A_{coax} = 16$ plf **BLC 5,7**

Wind Load per (with ice) per TIA/EIA-222-F Section 2.3.2

Coax Projected Surface Area w/ Ice = $AICE_{coax} := \frac{D_{coax}}{12} \cdot NP_{coax} + 2 \cdot \frac{Ir}{12} = 0.413$ sf/ft

Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qzICE_{mast3} \cdot G_H \cdot AICE_{coax} = 15$ plf **BLC 4,6**

Gravity Loads (without ice)

Weight of all cables w/o ice = $WT_{coax} \cdot N_{coax} = 19$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^{\ 2}\right] = 3.9$ si

Ice Weight per Linear Foot = $WTi_{coax} := Id \cdot \frac{Ai_{coax}}{144} = 2$ plf

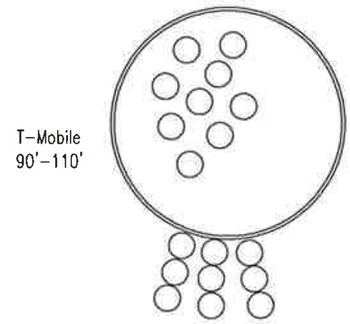
Ice Weight All Coax per foot = $WTi_{coax} \cdot \frac{N_{coax}}{2} = 14$ plf **BLC 3**

Development of Wind & Ice Load on Coax Cables (per TIA/EIA-222-F-1996 Criteria)

Coax Cable Data:

Coax Type: Use HELIAX 1-5/8"

Shape: Round



Coax Outside Diameter = $D_{coax} := 1.98$ in

Coax Cable Length = $L_{coax} := 110$ ft

Weight of Coax per foot = $WT_{coax} := 1.04$ plf

Total Number of Coax = $N_{coax} := 18$

Number of Projected Coax = $NP_{coax} := 3$

Coax aspect ratio = $Ar_{coax} := L_{coax} \cdot \frac{12}{D_{coax}} = 667$

Coax Cable Force Factor = $Ca_{coax} = 1.2$ TIA/EIA-222-F Table 3

Wind Load per (without ice) per TIA/EIA-222-F Section 2.3.2

Surface Area for One Coax = $SA_{coax} := \frac{D_{coax}}{12} = 0.17$ sf/ft

Coax Projected Surface Area = $A_{coax} := SA_{coax} \cdot NP_{coax} = 0.495$ sf/ft

Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{mast3} \cdot G_H \cdot A_{coax} = 23$ plf **BLC 5,7**

Wind Load per (with ice) per TIA/EIA-222-F Section 2.3.2

Coax Projected Surface Area w/ Ice = $A_{ICEcoax} := \frac{D_{coax}}{12} \cdot NP_{coax} + 2 \cdot \frac{Ir}{12} = 0.578$ sf/ft

Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qzICE_{mast3} \cdot G_H \cdot A_{ICEcoax} = 21$ plf **BLC 4,6**

Gravity Loads (without ice)

Weight of all cables w/o ice = $WT_{coax} \cdot N_{coax} = 19$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^{\ 2}\right] = 3.9$ si

Ice Weight per Linear Foot = $WTi_{coax} := Id \cdot \frac{Ai_{coax}}{144} = 2$ plf

Ice Weight All Coax per foot = $WTi_{coax} \cdot \frac{N_{coax}}{2} = 14$ plf **BLC 3**

Global

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Increase Nailing Capacity for Wind?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automaticly Iterate Stiffness for Walls?	No
Maximum Iteration Number for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 9th: ASD
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

Global, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct Z	.035
Ct X	.035
T Z (sec)	Not Entered
T X (sec)	Not Entered
R Z	8.5
R X	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Seismic Detailing Code	ASCE 7-05
Om Z	1
Om X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1

Hot Rolled Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp b...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
1	CROSS...	L5x5x5/16	15.207	Segment	Segment										Lateral
2	CROSS...	L5x5x5/16	15.207	Segment	Segment										Lateral
3	CROSS...	L5x5x5/16	15.207	Segment	Segment										Lateral
4	CROSS...	L5x5x5/16	15.207	Segment	Segment										Lateral
5	CROSS...	L3.5x3.5x...	18.916	Segment	Segment										Lateral
6	CROSS...	L3.5x3.5x...	18.916	Segment	Segment										Lateral
7	CROSS...	L5x5x5/16	33.126												Lateral
8	CROSS...	L5x5x5/16	33.126												Lateral
9	HORZ1	L5x5x5/16	13.509	Segment	Segment	12	20								Lateral
10	HORZ2	L5x5x5/16	13.509	Segment	Segment	12	20								Lateral
11	HORZ3	L5x5x5/16	13.509	Segment	Segment	12	20								Lateral
12	HORZ4	L5x5x5/16	13.509	Segment	Segment	12	20								Lateral
13	HORZ5	L5x5x5/16	13.509	Segment	Segment	12	20								Lateral
14	HORZ6	L5x5x5/16	13.509	Segment	Segment	12	20								Lateral
15	HORZ7	L5x5x5/16	13.509	Segment	Segment	12	20								Lateral
16	HORZ8	L5x5x5/16	13.509	Segment	Segment	12	20								Lateral
17	HORZ9	L5x5x5/16	13.509	Segment	Segment	12	20								Lateral
18	HORZ10	L5x5x5/16	13.509	Segment	Segment	12	20								Lateral
19	HORZ11	Tube8x4x...	13.5	1	1	1	1								Lateral
20	LEG1	W24x68	60	Segment	Segment	20	14								Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp b...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
21	LEG2	W24x68	60	Segment	Segment	20	14								Lateral
22	LEG_W_...	W24x68 ...	20.5	Segment	Segment	20.5									Lateral
23	LEG_W_...	W24x68 ...	20.5	Segment	Segment	20.5									Lateral
24	WT1	WT6x15	10.091												Lateral
25	WT2	WT6x15	10.091												Lateral
26	WT3	WT6x15	10.091												Lateral
27	WT4	WT6x15	10.091												Lateral
28	WT5	WT6x15	10.091												Lateral
29	WT6	WT6x15	10.091												Lateral
30	WT7	WT6x15	10.091												Lateral
31	WT8	WT6x15	10.091												Lateral
32	WT9	WT6x15	10.091												Lateral
33	WT10	WT6x15	10.091												Lateral
34	WT11	WT6x15	10.091												Lateral
35	WT12	WT6x15	10.091												Lateral
36	WT13	WT6x15	10.091												Lateral
37	WT14	WT6x15	10.091												Lateral
38	WT15	WT6x15	10.091												Lateral
39	WT16	WT6x15	10.091												Lateral
40	WT17	WT6x15	10.091												Lateral
41	WT18	WT6x15	10.091												Lateral
42	WT19	WT6x15	10.091												Lateral
43	WT20	WT6x15	10.091												Lateral
44	Mast1	HSS18x0...	29	Segment	Segment										Lateral
45	Mast2	HSS18x0...	27.5	Segment	Segment										Lateral
46	Mast3	HSS18x0...	27.5	Segment	Segment										Lateral
47	Mast4	HSS18x0...	27	Segment	Segment										Lateral
48	Horz 12	Tube8x4x...	13.5	1	1	1	1								Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	W24x68	W24x68	Beam	Wide Flange	A992	Typical	20.1	70.4	1830	1.87
2	L5x5x5/16	L5x5x5	Beam	Wide Flange	A36 Gr.36	Typical	3.07	7.44	7.44	.108
3	L3.5x3.5x5/16	L3.5x3.5x5	Beam	Wide Flange	A36 Gr.36	Typical	2.1	2.44	2.44	.073
4	Tube8x4x5/16	TU8X4X5	Beam	Wide Flange	A500 Gr.46	Typical	6.86	18.1	53.9	45.2
5	HSS18x0.5	HSS18x0.5	Beam	Wide Flange	A500 Gr.42	Typical	25.6	985	985	1970
6	WT6x15	WT6x15	Beam	W_Tee	A572 Gr.50	Typical	4.4	10.2	13.5	.228
7	W24x68 w/ pl	new	Beam	Wide Flange	A992	Typical	52.1	753.067	6733.167	10

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	CROSSDIAG1	5	10			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
2	CROSSDIAG2	9	6			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
3	CROSSDIAG3	9	12			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
4	CROSSDIAG4	11	10			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
5	CROSSDIAG5	13	18			L3.5x3.5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
6	CROSSDIAG6	17	14			L3.5x3.5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
7	CROSSDIAG7	19	TOPLEG2			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
8	CROSSDIAG8	TOPLEG1	20			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
9	HORZ1	3	6			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
10	HORZ2	5	4			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
11	HORZ3	11	14			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
12	HORZ4	13	12			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
13	HORZ5	17	20			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
14	HORZ6	19	18			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
15	HORZ7	23	26			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
16	HORZ8	25	24			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
17	HORZ9	29	32			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
18	HORZ10	31	30			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
19	HORZ11	TOPLEG1	TOPLEG2			Tube8x4x5/16	Beam	Wide Flange	A500 Gr...	Typical
20	LEG1	TOPPLT1	TOPLEG1		90	W24x68	Beam	Wide Flange	A992	Typical
21	LEG2	TOPPLT2	TOPLEG2		90	W24x68	Beam	Wide Flange	A992	Typical
22	LEG_W_PLT1	BOTLEG1	TOPPLT1		90	W24x68 w/ pl	Beam	Wide Flange	A992	Typical
23	LEG_W_PLT2	BOTLEG2	TOPPLT2		90	W24x68 w/ pl	Beam	Wide Flange	A992	Typical
24	WT1	1	MC1		270	WT6x15	Beam	W_Tee	A572 Gr....	Typical
25	WT2	MC1	2		270	WT6x15	Beam	W_Tee	A572 Gr....	Typical
26	WT3	MC1	7		90	WT6x15	Beam	W_Tee	A572 Gr....	Typical
27	WT4	MC1	8		270	WT6x15	Beam	W_Tee	A572 Gr....	Typical
28	WT5	MC2	7		90	WT6x15	Beam	W_Tee	A572 Gr....	Typical
29	WT6	MC2	8		270	WT6x15	Beam	W_Tee	A572 Gr....	Typical
30	WT7	MC2	15		90	WT6x15	Beam	W_Tee	A572 Gr....	Typical
31	WT8	MC2	16		270	WT6x15	Beam	W_Tee	A572 Gr....	Typical
32	WT9	16	MC3		90	WT6x15	Beam	W_Tee	A572 Gr....	Typical
33	WT10	15	MC3		270	WT6x15	Beam	W_Tee	A572 Gr....	Typical
34	WT11	21	MC3		270	WT6x15	Beam	W_Tee	A572 Gr....	Typical
35	WT12	MC3	22		270	WT6x15	Beam	W_Tee	A572 Gr....	Typical
36	WT13	21	MC4		270	WT6x15	Beam	W_Tee	A572 Gr....	Typical
37	WT14	22	MC4		90	WT6x15	Beam	W_Tee	A572 Gr....	Typical
38	WT15	MC4	27		90	WT6x15	Beam	W_Tee	A572 Gr....	Typical
39	WT16	MC4	28		270	WT6x15	Beam	W_Tee	A572 Gr....	Typical
40	WT17	MC5	27		90	WT6x15	Beam	W_Tee	A572 Gr....	Typical
41	WT18	MC5	28		270	WT6x15	Beam	W_Tee	A572 Gr....	Typical
42	WT19	MC5	33		90	WT6x15	Beam	W_Tee	A572 Gr....	Typical
43	WT20	MC5	34		270	WT6x15	Beam	W_Tee	A572 Gr....	Typical
44	Mast1	BOTMAST	FC1			HSS18x0.5	Beam	Wide Flange	A500 Gr....	Typical
45	Mast2	FC1	FC2			HSS18x0.5	Beam	Wide Flange	A500 Gr....	Typical
46	Mast3	FC2	FC3			HSS18x0.5	Beam	Wide Flange	A500 Gr....	Typical
47	Mast4	FC3	TOPMAST			HSS18x0.5	Beam	Wide Flange	A500 Gr....	Typical
48	Horz 12	TOPLEG1	TOPLEG2			Tube8x4x5/16	Beam	Wide Flange	A500 Gr....	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	1	0	12	0	0	
2	2	13.5	12	0	0	
3	3	0	23	0	0	
4	4	13.5	23	0	0	
5	5	0	23.5	0	0	
6	6	13.5	23.5	0	0	
7	7	0	25.75	0	0	
8	8	13.5	25.75	0	0	
9	9	0	30.5	0	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
10	10	13.5	30.5	0	0	
11	11	0	37.5	0	0	
12	12	13.5	37.5	0	0	
13	13	0	38	0	0	
14	14	13.5	38	0	0	
15	15	0	39.5	0	0	
16	16	13.5	39.5	0	0	
17	17	0	51.25	0	0	
18	18	13.5	51.25	0	0	
19	19	0	51.75	0	0	
20	20	13.5	51.75	0	0	
21	21	0	53.25	0	0	
22	22	13.5	53.25	0	0	
23	23	0	55.25	0	0	
24	24	13.5	55.25	0	0	
25	25	0	55.75	0	0	
26	26	13.5	55.75	0	0	
27	27	0	67	0	0	
28	28	13.5	67	0	0	
29	29	0	75.5	0	0	
30	30	13.5	75.5	0	0	
31	31	0	76	0	0	
32	32	13.5	76	0	0	
33	33	0	80.75	0	0	
34	34	13.5	80.75	0	0	
35	35	6.75	23.25	0	0	
36	36	6.75	27	0	0	
37	37	6.75	34	0	0	
38	38	6.75	37.75	0	0	
39	39	6.75	44.625	0	0	
40	40	6.75	51.5	0	0	
41	41	6.75	55.5	0	0	
42	43	6.75	75.75	0	0	
43	BOTLEG1	0	1.5	0	0	
44	BOTLEG2	13.5	1.5	0	0	
45	BOTMAST	6.75	0	3	0	
46	MC1	6.75	18.875	3	0	
47	MC2	6.75	32.625	3	0	
48	MC3	6.75	46.375	3	0	
49	MC4	6.75	60.125	3	0	
50	MC5	6.75	73.875	3	0	
51	TOPLEG1	0	82	0	0	
52	TOPLEG2	13.5	82	0	0	
53	TOPMAST	6.75	111	3	0	
54	TOPPLT1	0	22	0	0	
55	TOPPLT2	13.5	22	0	0	
56	T_MOBILE	6.75	108	3	0	
57	METRO	0	77	0	0	
58	METRO2	13.5	77	0	0	
59	FC1	6.75	29	3	0	
60	FC2	6.75	56.5	3	0	
61	FC3	6.75	84	3	0	
62	GPS	0	50	0	0	

Joint Boundary Conditions

	Joint 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]	Footing
1	BOTLEG1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
2	BOTMAST	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
3	BOTLEG2	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
4	TOPLEG1							
5	TOPLEG2							
6	FC3							
7	FC2							
8	FC1							

Member Point Loads

Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
No Data to Print ...			

Joint Loads and Enforced Displacements (BLC 2 : Weight of Equipment)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TOPLEG1	L	Y	-.026
2	TOPLEG2	L	Y	-.026
3	TOPLEG1	L	Y	-.021
4	TOPLEG2	L	Y	-.021
5	TOPLEG1	L	Y	-.042
6	TOPLEG2	L	Y	-.042
7	TOPLEG1	L	Y	-.019
8	TOPLEG2	L	Y	-.019
9	TOPLEG1	L	Y	-.019
10	TOPLEG2	L	Y	-.019
11	TOPLEG1	L	Y	-.911
12	TOPLEG2	L	Y	-.911
13	TOPLEG1	L	Y	-.105
14	TOPLEG2	L	Y	-.105
15	TOPLEG1	L	Y	-.074
16	TOPLEG2	L	Y	-.074
17	TOPLEG1	L	Y	-.085
18	TOPLEG2	L	Y	-.085
19	TOPLEG1	L	Y	-.15
20	TOPLEG2	L	Y	-.15
21	TOPLEG1	L	Y	-.01
22	TOPLEG2	L	Y	-.01
23	TOPLEG1	L	Y	-.648
24	TOPLEG2	L	Y	-.648
25	T_MOBILE	L	Y	-.244
26	T_MOBILE	L	Y	-.131
27	T_MOBILE	L	Y	-1.3
28	GPS	L	Y	-.008
29	METRO2	L	Y	-.033
30	METRO	L	Y	-.066
31	TOPLEG1	L	Y	-.066
32	TOPLEG2	L	Y	-.066

Joint Loads and Enforced Displacements (BLC 3 : Weight of Ice)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TOPLEG1	L	Y	-.061
2	TOPLEG2	L	Y	-.061
3	TOPLEG1	L	Y	-.049
4	TOPLEG2	L	Y	-.049
5	TOPLEG1	L	Y	-.098
6	TOPLEG2	L	Y	-.098
7	TOPLEG1	L	Y	-.041
8	TOPLEG2	L	Y	-.041
9	TOPLEG1	L	Y	-.041
10	TOPLEG2	L	Y	-.041
11	TOPLEG1	L	Y	-.315
12	TOPLEG2	L	Y	-.315
13	TOPLEG1	L	Y	-.098
14	TOPLEG2	L	Y	-.098
15	TOPLEG1	L	Y	-.07
16	TOPLEG2	L	Y	-.07
17	TOPLEG1	L	Y	-.043
18	TOPLEG2	L	Y	-.043
19	TOPLEG1	L	Y	-.059
20	TOPLEG2	L	Y	-.059
21	TOPLEG1	L	Y	-.01
22	TOPLEG2	L	Y	-.01
23	TOPLEG1	L	Y	-.191
24	TOPLEG2	L	Y	-.191
25	T_MOBILE	L	Y	-.198
26	T_MOBILE	L	Y	-.044
27	T_MOBILE	L	Y	-.465
28	GPS	L	Y	-.002
29	METRO2	L	Y	-.027
30	METRO	L	Y	-.053
31	TOPLEG1	L	Y	-.026
32	TOPLEG2	L	Y	-.026

Joint Loads and Enforced Displacements (BLC 4 : TIA/EIA Wind with Ice (+X))

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TOPLEG1	L	X	.402
2	TOPLEG2	L	X	.402
3	TOPLEG1	L	X	.311
4	TOPLEG2	L	X	.311
5	TOPLEG1	L	X	.492
6	TOPLEG2	L	X	.492
7	TOPLEG1	L	X	.267
8	TOPLEG2	L	X	.267
9	TOPLEG1	L	X	.267
10	TOPLEG2	L	X	.267
11	TOPLEG1	L	X	.63
12	TOPLEG2	L	X	.63
13	TOPLEG1	L	X	.634
14	TOPLEG2	L	X	.634
15	TOPLEG1	L	X	.441
16	TOPLEG2	L	X	.441
17	TOPLEG1	L	X	.297

Joint Loads and Enforced Displacements (BLC 4 : TIA/EIA Wind with Ice (+X)) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
18	TOPLEG2	L	X	.297
19	TOPLEG1	L	X	.325
20	TOPLEG2	L	X	.325
21	TOPLEG1	L	X	.041
22	TOPLEG2	L	X	.041
23	TOPLEG1	L	X	.578
24	TOPLEG2	L	X	.578
25	T_MOBILE	L	X	1.545
26	T_MOBILE	L	X	.251
27	T_MOBILE	L	X	.668
28	GPS	L	X	.006
29	METRO2	L	X	.181
30	METRO	L	X	.363
31	TOPLEG1	L	Y	5.14
32	TOPLEG2	L	Y	-5.14
33	TOPLEG1	L	X	0
34	TOPLEG2	L	X	0

Joint Loads and Enforced Displacements (BLC 5 : TIA/EIA Wind (+X))

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TOPLEG1	L	X	.48
2	TOPLEG2	L	X	.48
3	TOPLEG1	L	X	.377
4	TOPLEG2	L	X	.377
5	TOPLEG1	L	X	.582
6	TOPLEG2	L	X	.582
7	TOPLEG1	L	X	.298
8	TOPLEG2	L	X	.298
9	TOPLEG1	L	X	.298
10	TOPLEG2	L	X	.298
11	TOPLEG1	L	X	.648
12	TOPLEG2	L	X	.648
13	TOPLEG1	L	X	.753
14	TOPLEG2	L	X	.753
15	TOPLEG1	L	X	.529
16	TOPLEG2	L	X	.529
17	TOPLEG1	L	X	.33
18	TOPLEG2	L	X	.33
19	TOPLEG1	L	X	.383
20	TOPLEG2	L	X	.383
21	TOPLEG1	L	X	.048
22	TOPLEG2	L	X	.048
23	TOPLEG1	L	X	.624
24	TOPLEG2	L	X	.624
25	T_MOBILE	L	X	1.859
26	T_MOBILE	L	X	.262
27	T_MOBILE	L	X	.689
28	GPS	L	X	.005
29	METRO2	L	X	.206
30	METRO	L	X	.411
31	TOPLEG1	L	Y	5.92
32	TOPLEG2	L	Y	-5.92

Joint Loads and Enforced Displacements (BLC 5 : TIA/EIA Wind (+X)) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
33	TOPLEG1	L	X	0
34	TOPLEG2	L	X	0

Joint Loads and Enforced Displacements (BLC 6 : TIA/EIA Wind with Ice(+Z))

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TOPLEG1	L	Z	.402
2	TOPLEG2	L	Z	.402
3	TOPLEG1	L	Z	.311
4	TOPLEG2	L	Z	.311
5	TOPLEG1	L	Z	.492
6	TOPLEG2	L	Z	.492
7	TOPLEG1	L	Z	.267
8	TOPLEG2	L	Z	.267
9	TOPLEG1	L	Z	.267
10	TOPLEG2	L	Z	.267
11	TOPLEG1	L	Z	.63
12	TOPLEG2	L	Z	.63
13	TOPLEG1	L	Z	.634
14	TOPLEG2	L	Z	.634
15	TOPLEG1	L	Z	.441
16	TOPLEG2	L	Z	.441
17	TOPLEG1	L	Z	.297
18	TOPLEG2	L	Z	.297
19	TOPLEG1	L	Z	.325
20	TOPLEG2	L	Z	.325
21	TOPLEG1	L	Z	.041
22	TOPLEG2	L	Z	.041
23	TOPLEG1	L	Z	.578
24	TOPLEG2	L	Z	.578
25	T_MOBILE	L	Z	1.545
26	T_MOBILE	L	Z	.251
27	T_MOBILE	L	Z	.668
28	GPS	L	Z	.006
29	METRO2	L	Z	.181
30	METRO	L	Z	.363
31	TOPLEG1	L	Mx	34.71
32	TOPLEG2	L	Mx	34.71
33	TOPLEG1	L	Z	0
34	TOPLEG2	L	Z	0

Joint Loads and Enforced Displacements (BLC 7 : TIA/EIA Wind (+Z))

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TOPLEG1	L	Z	.48
2	TOPLEG2	L	Z	.48
3	TOPLEG1	L	Z	.377
4	TOPLEG2	L	Z	.377
5	TOPLEG1	L	Z	.582
6	TOPLEG2	L	Z	.582
7	TOPLEG1	L	Z	.298
8	TOPLEG2	L	Z	.298
9	TOPLEG1	L	Z	.298
10	TOPLEG2	L	Z	.298

Joint Loads and Enforced Displacements (BLC 7 : TIA/EIA Wind (+Z)) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
11	TOPLEG1	L	Z	.648
12	TOPLEG2	L	Z	.648
13	TOPLEG1	L	Z	.753
14	TOPLEG2	L	Z	.753
15	TOPLEG1	L	Z	.529
16	TOPLEG2	L	Z	.529
17	TOPLEG1	L	Z	.33
18	TOPLEG2	L	Z	.33
19	TOPLEG1	L	Z	.383
20	TOPLEG2	L	Z	.383
21	TOPLEG1	L	Z	.048
22	TOPLEG2	L	Z	.048
23	TOPLEG1	L	Z	.624
24	TOPLEG2	L	Z	.624
25	T_MOBILE	L	Z	1.859
26	T_MOBILE	L	Z	.262
27	T_MOBILE	L	Z	.689
28	GPS	L	Z	.005
29	METRO2	L	Z	.206
30	METRO	L	Z	.411
31	TOPLEG1	L	Mx	39.97
32	TOPLEG2	L	Mx	39.97
33	TOPLEG1	L	Z	0
34	TOPLEG2	L	Z	0

Member Distributed Loads (BLC 2 : Weight of Equipment)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	LEG_W_PLT1	Y	-.004	-.004	0	0
2	LEG1	Y	-.004	-.004	0	0
3	LEG_W_PLT2	Y	-.033	-.033	0	0
4	LEG2	Y	-.033	-.033	0	0
5	Mast1	Y	-.019	-.019	0	0
6	Mast2	Y	-.019	-.019	0	0
7	Mast3	Y	-.019	-.019	0	0
8	Mast4	Y	-.019	-.019	0	0

Member Distributed Loads (BLC 3 : Weight of Ice)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	CROSSDIAG1	Y	-.004	-.004	0	0
2	CROSSDIAG2	Y	-.004	-.004	0	0
3	CROSSDIAG3	Y	-.004	-.004	0	0
4	CROSSDIAG4	Y	-.004	-.004	0	0
5	CROSSDIAG5	Y	-.003	-.003	0	0
6	CROSSDIAG6	Y	-.003	-.003	0	0
7	CROSSDIAG7	Y	-.004	-.004	0	0
8	CROSSDIAG8	Y	-.004	-.004	0	0
9	HORZ1	Y	-.004	-.004	0	0
10	HORZ2	Y	-.004	-.004	0	0
11	HORZ3	Y	-.004	-.004	0	0
12	HORZ4	Y	-.004	-.004	0	0
13	HORZ5	Y	-.004	-.004	0	0

Member Distributed Loads (BLC 3 : Weight of Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
14	HORZ6	Y	-.004	-.004	0	0
15	HORZ7	Y	-.004	-.004	0	0
16	HORZ8	Y	-.004	-.004	0	0
17	HORZ9	Y	-.004	-.004	0	0
18	HORZ10	Y	-.004	-.004	0	0
19	HORZ11	Y	-.004	-.004	0	0
20	LEG1	Y	-.016	-.016	0	0
21	LEG2	Y	-.016	-.016	0	0
22	LEG_W_PLT1	Y	-.006	-.006	0	0
23	LEG1	Y	-.006	-.006	0	0
24	LEG_W_PLT2	Y	-.048	-.048	0	0
25	LEG2	Y	-.048	-.048	0	0
26	LEG_W_PLT1	Y	-.038	-.038	0	0
27	LEG_W_PLT2	Y	-.038	-.038	0	0
28	Mast4	Y	-.011	-.011	0	0
29	Mast1	Y	-.011	-.011	0	0
30	Mast2	Y	-.011	-.011	0	0
31	Mast3	Y	-.011	-.011	0	0
32	WT1	Y	-.005	-.005	0	0
33	WT2	Y	-.005	-.005	0	0
34	WT3	Y	-.005	-.005	0	0
35	WT4	Y	-.005	-.005	0	0
36	WT5	Y	-.005	-.005	0	0
37	WT6	Y	-.005	-.005	0	0
38	WT7	Y	-.005	-.005	0	0
39	WT8	Y	-.005	-.005	0	0
40	WT9	Y	-.005	-.005	0	0
41	WT10	Y	-.005	-.005	0	0
42	WT11	Y	-.005	-.005	0	0
43	WT12	Y	-.005	-.005	0	0
44	WT13	Y	-.005	-.005	0	0
45	WT14	Y	-.005	-.005	0	0
46	WT15	Y	-.005	-.005	0	0
47	WT16	Y	-.005	-.005	0	0
48	WT17	Y	-.005	-.005	0	0
49	WT18	Y	-.005	-.005	0	0
50	WT19	Y	-.005	-.005	0	0
51	WT20	Y	-.005	-.005	0	0
52	Mast1	Y	-.014	-.014	0	0
53	Mast2	Y	-.014	-.014	0	0
54	Mast3	Y	-.014	-.014	0	0
55	Mast4	Y	-.014	-.014	0	0

Member Distributed Loads (BLC 4 : TIA/EIA Wind with Ice (+X))

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	LEG1	X	.071	.071	0	20
2	LEG1	X	.083	.083	20	40
3	LEG1	X	.091	.091	40	60
4	LEG2	X	.013	.013	0	0
5	LEG_W_PLT1	X	.055	.055	0	0
6	Mast1	X	.018	.018	0	0
7	Mast1	X	.015	.015	0	0

Member Distributed Loads (BLC 4 : TIA/EIA Wind with Ice (+X)) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
8	Mast2	X	.024	.024	0	0
9	Mast2	X	.015	.015	0	0
10	Mast3	X	.028	.028	0	0
11	Mast3	X	.015	.015	0	0
12	Mast4	X	.03	.03	0	0
13	Mast4	X	.021	.021	0	0
14	WT1	X	.028	.028	0	0
15	WT2	X	.028	.028	0	0
16	WT3	X	.028	.028	0	0
17	WT4	X	.028	.028	0	0
18	WT5	X	.028	.028	0	0
19	WT6	X	.028	.028	0	0
20	WT7	X	.028	.028	0	0
21	WT8	X	.028	.028	0	0
22	WT9	X	.028	.028	0	0
23	WT10	X	.028	.028	0	0
24	WT11	X	.028	.028	0	0
25	WT12	X	.028	.028	0	0
26	WT13	X	.028	.028	0	0
27	WT14	X	.028	.028	0	0
28	WT15	X	.028	.028	0	0
29	WT16	X	.028	.028	0	0
30	WT17	X	.028	.028	0	0
31	WT18	X	.028	.028	0	0
32	WT19	X	.028	.028	0	0
33	WT20	X	.028	.028	0	0

Member Distributed Loads (BLC 5 : TIA/EIA Wind (+X))

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	LEG1	X	.115	.115	40	60
2	LEG1	X	.105	.105	20	40
3	LEG1	X	.091	.091	0	20
4	LEG2	X	.014	.014	0	0
5	LEG_W_PLT1	X	.07	.07	0	0
6	Mast1	X	.022	.022	0	0
7	Mast1	X	.016	.016	0	0
8	Mast2	X	.03	.03	0	0
9	Mast2	X	.016	.016	0	0
10	Mast3	X	.035	.035	0	0
11	Mast3	X	.016	.016	0	0
12	Mast4	X	.038	.038	0	0
13	Mast4	X	.023	.023	0	0
14	WT1	X	.032	.032	0	0
15	WT2	X	.032	.032	0	0
16	WT3	X	.032	.032	0	0
17	WT4	X	.032	.032	0	0
18	WT5	X	.032	.032	0	0
19	WT6	X	.032	.032	0	0
20	WT7	X	.032	.032	0	0
21	WT8	X	.032	.032	0	0
22	WT9	X	.032	.032	0	0
23	WT10	X	.032	.032	0	0

Member Distributed Loads (BLC 5 : TIA/EIA Wind (+X)) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
24	WT11	X	.032	.032	0	0
25	WT12	X	.032	.032	0	0
26	WT13	X	.032	.032	0	0
27	WT14	X	.032	.032	0	0
28	WT15	X	.032	.032	0	0
29	WT16	X	.032	.032	0	0
30	WT17	X	.032	.032	0	0
31	WT18	X	.032	.032	0	0
32	WT19	X	.032	.032	0	0
33	WT20	X	.032	.032	0	0

Member Distributed Loads (BLC 6 : TIA/EIA Wind with Ice(+Z))

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	CROSSDIAG1	Z	.025	.025	0	0
2	CROSSDIAG2	Z	.025	.025	0	0
3	CROSSDIAG3	Z	.025	.025	0	0
4	CROSSDIAG4	Z	.025	.025	0	0
5	CROSSDIAG5	Z	.019	.019	0	0
6	CROSSDIAG6	Z	.019	.019	0	0
7	CROSSDIAG7	Z	.025	.025	0	0
8	CROSSDIAG8	Z	.025	.025	0	0
9	HORZ1	Z	.025	.025	0	0
10	HORZ2	Z	.025	.025	0	0
11	HORZ3	Z	.025	.025	0	0
12	HORZ4	Z	.025	.025	0	0
13	HORZ5	Z	.025	.025	0	0
14	HORZ6	Z	.025	.025	0	0
15	HORZ7	Z	.025	.025	0	0
16	HORZ8	Z	.025	.025	0	0
17	HORZ9	Z	.025	.025	0	0
18	HORZ10	Z	.025	.025	0	0
19	HORZ11	Z	.025	.025	0	0
20	LEG1	Z	.038	.038	0	20
21	LEG1	Z	.044	.044	20	40
22	LEG1	Z	.049	.049	40	60
23	LEG2	Z	.038	.038	0	20
24	LEG2	Z	.044	.044	20	40
25	LEG2	Z	.049	.049	40	60
26	LEG2	Z	.028	.028	0	0
27	LEG_W_PLT1	Z	.04	.04	0	0
28	LEG_W_PLT2	Z	.04	.04	0	0
29	Mast1	Z	.018	.018	0	0
30	Mast1	Z	.015	.015	0	0
31	Mast2	Z	.024	.024	0	0
32	Mast2	Z	.015	.015	0	0
33	Mast3	Z	.028	.028	0	0
34	Mast3	Z	.015	.015	0	0
35	Mast4	Z	.03	.03	0	0
36	Mast4	Z	.021	.021	0	0
37	WT1	Z	.028	.028	0	0
38	WT2	Z	.028	.028	0	0
39	WT3	Z	.028	.028	0	0

Member Distributed Loads (BLC 6 : TIA/EIA Wind with Ice(+Z)) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
40	WT4	Z	.028	.028	0	0
41	WT5	Z	.028	.028	0	0
42	WT6	Z	.028	.028	0	0
43	WT7	Z	.028	.028	0	0
44	WT8	Z	.028	.028	0	0
45	WT9	Z	.028	.028	0	0
46	WT10	Z	.028	.028	0	0
47	WT11	Z	.028	.028	0	0
48	WT12	Z	.028	.028	0	0
49	WT13	Z	.028	.028	0	0
50	WT14	Z	.028	.028	0	0
51	WT15	Z	.028	.028	0	0
52	WT16	Z	.028	.028	0	0
53	WT17	Z	.028	.028	0	0
54	WT18	Z	.028	.028	0	0
55	WT19	Z	.028	.028	0	0
56	WT20	Z	.028	.028	0	0

Member Distributed Loads (BLC 7 : TIA/EIA Wind (+Z))

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	CROSSDIAG1	Z	.028	.028	0	0
2	CROSSDIAG2	Z	.028	.028	0	0
3	CROSSDIAG3	Z	.028	.028	0	0
4	CROSSDIAG4	Z	.028	.028	0	0
5	CROSSDIAG5	Z	.019	.019	0	0
6	CROSSDIAG6	Z	.019	.019	0	0
7	CROSSDIAG7	Z	.028	.028	0	0
8	CROSSDIAG8	Z	.028	.028	0	0
9	HORZ1	Z	.028	.028	0	0
10	HORZ2	Z	.028	.028	0	0
11	HORZ3	Z	.028	.028	0	0
12	HORZ4	Z	.028	.028	0	0
13	HORZ5	Z	.028	.028	0	0
14	HORZ6	Z	.028	.028	0	0
15	HORZ7	Z	.028	.028	0	0
16	HORZ8	Z	.028	.028	0	0
17	HORZ9	Z	.028	.028	0	0
18	HORZ10	Z	.028	.028	0	0
19	HORZ11	Z	.028	.028	0	0
20	LEG1	Z	.046	.046	0	20
21	LEG1	Z	.053	.053	20	40
22	LEG1	Z	.058	.058	40	60
23	LEG2	Z	.046	.046	0	20
24	LEG2	Z	.053	.053	20	40
25	LEG2	Z	.058	.058	40	60
26	LEG2	Z	.034	.034	0	0
27	LEG_W_PLT1	Z	.049	.049	0	0
28	LEG_W_PLT2	Z	.049	.049	0	0
29	Mast1	Z	.022	.022	0	0
30	Mast1	Z	.016	.016	0	0
31	Mast2	Z	.03	.03	0	0
32	Mast2	Z	.016	.016	0	0

Member Distributed Loads (BLC 7 : TIA/EIA Wind (+Z)) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
33	Mast3	Z	.035	.035	0	0
34	Mast3	Z	.016	.016	0	0
35	Mast4	Z	.038	.038	0	0
36	Mast4	Z	.023	.023	0	0
37	WT1	Z	.032	.032	0	0
38	WT2	Z	.032	.032	0	0
39	WT3	Z	.032	.032	0	0
40	WT4	Z	.032	.032	0	0
41	WT5	Z	.032	.032	0	0
42	WT6	Z	.032	.032	0	0
43	WT7	Z	.032	.032	0	0
44	WT8	Z	.032	.032	0	0
45	WT9	Z	.032	.032	0	0
46	WT10	Z	.032	.032	0	0
47	WT11	Z	.032	.032	0	0
48	WT12	Z	.032	.032	0	0
49	WT13	Z	.032	.032	0	0
50	WT14	Z	.032	.032	0	0
51	WT15	Z	.032	.032	0	0
52	WT16	Z	.032	.032	0	0
53	WT17	Z	.032	.032	0	0
54	WT18	Z	.032	.032	0	0
55	WT19	Z	.032	.032	0	0
56	WT20	Z	.032	.032	0	0

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Grav...	Joint	Point	Distrib...	Area(...	Surfac...
1	Self Weight	None		-1						
2	Weight of Equipment	None				32		8		
3	Weight of Ice	None				32		55		
4	TIA/EIA Wind with Ice (+X)	None				34		33		
5	TIA/EIA Wind (+X)	None				34		33		
6	TIA/EIA Wind with Ice(+Z)	None				34		56		
7	TIA/EIA Wind (+Z)	None				34		56		

Load Combinations

	Description	Solve	PDelta	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	TIA/EIA Wind + Ice in +X Direct...	Yes			1	1	2	1	3	1	4	1								
2	TIA/EIA Wind in +X Direction	Yes			1	1	2	1	5	1										
3	TIA/EIA Wind + Ice in +Z Direct...	Yes			1	1	2	1	3	1	6	1								
4	TIA/EIA Wind in +Z Direction	Yes			1	1	2	1	7	1										
5	TIA/EIA Wind + Ice in -Z' Direct...	Yes			1	1	2	1	3	1	6	-1								
6	TIA/EIA Wind in -Z' Direction	Yes			1	1	2	1	7	-1										
7	Self Weight				1	1														

Envelope Member Section Forces

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
1	CROSSDIAG1	1	max	2.227	4	.098	3	.204	6	.001	6	0	1	0	1
2			min	-8.235	2	-.041	6	-.205	4	-.001	4	0	1	0	1
3		2	max	2.209	4	.059	4	.098	6	.001	6	.249	6	.563	6
4			min	-8.253	2	-.076	6	-.099	4	-.001	4	-.202	4	-.614	4
5		3	max	2.344	4	.14	5	.009	6	.002	6	.118	6	1.049	6
6			min	-8.412	2	-.043	4	-.04	2	-.002	4	-.213	3	-.952	4
7		4	max	2.325	4	.097	6	.099	4	.002	6	.193	6	.62	6
8			min	-8.43	2	-.079	4	-.098	6	-.002	4	-.149	4	-.667	4
9		5	max	2.307	4	.062	6	.205	4	.002	6	0	1	0	1
10			min	-8.448	2	-.114	3	-.204	6	-.002	4	0	1	0	1
11	CROSSDIAG2	1	max	8.711	2	.123	4	.221	6	.001	4	0	1	0	1
12			min	-5.175	6	-.072	6	-.221	4	-.001	2	0	1	0	1
13		2	max	8.73	2	.088	4	.115	6	.001	4	.211	6	.693	6
14			min	-5.157	6	-.107	6	-.114	4	-.001	2	-.166	4	-.735	4
15		3	max	8.948	2	.053	4	.009	6	.001	4	.155	6	1.195	6
16			min	-5.138	6	-.148	5	-.035	1	-.001	6	-.246	4	-1.089	4
17		4	max	8.967	2	.086	6	.114	4	.001	4	.268	6	.636	6
18			min	-4.636	6	-.069	4	-.115	6	-.001	6	-.219	4	-.682	4
19		5	max	8.985	2	.051	6	.221	4	.001	4	0	1	0	1
20			min	-4.618	6	-.106	3	-.221	6	-.001	6	0	1	0	1
21	CROSSDIAG3	1	max	1.589	6	.089	3	.203	6	0	6	0	1	0	1
22			min	-13.642	2	-.029	6	-.205	4	0	4	0	1	0	1
23		2	max	1.571	6	.049	4	.097	6	0	6	.278	6	.529	6
24			min	-13.66	2	-.064	6	-.099	4	0	4	-.229	4	-.587	4
25		3	max	1.552	6	.127	5	.01	6	.001	6	.175	6	.965	6
26			min	-13.82	2	-.03	4	-.04	2	-.001	4	-.266	4	-.883	4
27		4	max	1.087	6	.083	6	.099	4	.001	6	.229	6	.578	6
28			min	-13.838	2	-.066	4	-.097	6	-.001	4	-.184	4	-.632	4
29		5	max	1.069	6	.047	6	.205	4	.001	6	0	1	0	1
30			min	-13.856	2	-.103	3	-.203	6	-.001	4	0	1	0	1
31	CROSSDIAG4	1	max	13.711	2	.111	3	.222	6	0	4	0	1	0	1
32			min	-3.08	6	-.059	6	-.221	4	-.001	2	0	1	0	1
33		2	max	13.729	2	.075	4	.116	6	0	4	.25	6	.66	6
34			min	-3.061	6	-.094	6	-.114	4	-.001	2	-.201	4	-.7	4
35		3	max	13.946	2	.04	4	.01	6	0	4	.217	6	1.128	6
36			min	-3.043	6	-.136	5	-.034	1	-.001	2	-.3	4	-1.02	4
37		4	max	13.964	2	.076	6	.114	4	0	4	.299	6	.61	6
38			min	-2.589	6	-.059	4	-.116	6	0	6	-.246	4	-.655	4
39		5	max	13.982	2	.04	6	.221	4	0	4	0	1	0	1
40			min	-2.571	6	-.097	3	-.222	6	0	6	0	1	0	1
41	CROSSDIAG5	1	max	8.188	6	.09	3	.177	5	0	2	0	1	0	1
42			min	-13.431	2	-.045	6	-.178	3	0	4	0	1	0	1
43		2	max	8.165	6	.058	4	.087	5	0	2	.257	5	.628	6
44			min	-13.455	2	-.072	5	-.088	3	0	4	-.21	4	-.688	3
45		3	max	8.141	6	.109	5	.004	6	0	6	.115	6	1.082	5
46			min	-13.519	2	-.037	4	-.052	1	0	4	-.216	3	-.992	4
47		4	max	7.915	6	.075	5	.088	3	0	6	.247	5	.639	6
48			min	-13.543	2	-.061	4	-.087	5	0	4	-.199	4	-.697	3
49		5	max	7.892	6	.048	6	.178	3	0	6	0	1	0	1
50			min	-13.567	2	-.093	3	-.177	5	0	4	0	1	0	1
51	CROSSDIAG6	1	max	14.953	2	.095	3	.184	6	0	4	0	1	0	1
52			min	-3.574	4	-.053	6	-.182	4	0	2	0	1	0	1
53		2	max	14.977	2	.064	4	.094	6	0	4	.256	5	.679	6

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
54			min	-3.551	4	-.079	5	-.092	4	0	2	-.206	4	-.717	3
55		3	max	15.081	2	.04	4	.004	6	0	4	.136	6	1.147	5
56			min	-3.599	4	-.113	5	-.034	1	0	6	-.225	3	-1.043	4
57		4	max	15.105	2	.076	5	.092	4	0	4	.265	5	.668	6
58			min	-3.575	4	-.061	4	-.094	6	0	6	-.216	4	-.708	3
59		5	max	15.129	2	.049	6	.182	4	0	4	0	1	0	1
60			min	-3.552	4	-.092	3	-.184	6	0	6	0	1	0	1
61	CROSSDIAG7	1	max	0	5	.098	1	0	5	.002	2	0	1	0	1
62			min	-27.601	2	0	5	-.464	4	0	4	0	1	0	1
63		2	max	0	5	.049	1	0	5	.002	2	.428	1	0	5
64			min	-27.68	2	0	5	-.232	4	0	4	-1.728	4	-2.346	4
65		3	max	0	5	0	1	0	1	.002	2	.571	1	0	5
66			min	-27.759	2	0	1	0	1	0	4	-2.304	4	-3.128	4
67		4	max	0	5	0	5	.232	4	.002	2	.428	1	0	5
68			min	-27.838	2	-.049	3	0	1	0	4	-1.728	4	-2.346	4
69		5	max	0	5	0	5	.464	4	.002	2	0	1	0	1
70			min	-27.917	2	-.098	3	0	2	0	4	0	1	0	1
71	CROSSDIAG8	1	max	0	1	.098	3	0	1	0	4	0	1	0	1
72			min	-4.928	4	0	1	-.464	4	0	1	0	1	0	1
73		2	max	0	1	.049	3	0	1	0	4	0	1	0	1
74			min	-4.849	4	0	1	-.232	4	0	1	-1.728	4	-2.346	4
75		3	max	0	1	0	1	0	1	0	4	0	1	0	1
76			min	-4.77	4	0	1	0	1	0	1	-2.304	4	-3.128	4
77		4	max	0	1	0	1	.232	4	0	4	0	1	0	1
78			min	-4.691	4	-.049	3	0	1	0	1	-1.728	4	-2.346	4
79		5	max	0	1	0	1	.464	4	0	4	0	1	0	1
80			min	-4.612	4	-.098	3	0	1	0	1	0	1	0	1
81	HORZ1	1	max	5.252	4	.126	3	.188	6	0	6	0	1	0	1
82			min	-3.991	6	-.033	6	-.188	4	-.001	2	0	1	0	1
83		2	max	5.251	4	.083	4	.093	6	0	6	.224	5	.456	6
84			min	-3.992	6	-.068	6	-.094	4	-.001	2	-.096	4	-.577	4
85		3	max	7.93	4	.108	5	0	6	0	6	.13	5	.787	6
86			min	-9.667	6	-.05	4	-.004	2	-.001	2	-.05	4	-.858	4
87		4	max	7.929	4	.071	6	.094	4	0	6	.22	5	.464	6
88			min	-9.669	6	-.086	4	-.094	6	-.001	2	-.091	4	-.584	4
89		5	max	7.927	4	.035	6	.189	4	0	6	0	1	0	1
90			min	-9.67	6	-.128	3	-.189	6	-.001	2	0	1	0	1
91	HORZ2	1	max	8.055	4	.129	3	.19	6	0	6	0	1	0	1
92			min	-9.733	6	-.036	6	-.19	4	-.001	2	0	1	0	1
93		2	max	8.056	4	.087	4	.096	6	0	6	.221	5	.47	6
94			min	-9.731	6	-.072	6	-.096	4	-.001	2	-.093	4	-.59	4
95		3	max	8.057	4	.051	4	.001	6	0	6	.133	5	.799	6
96			min	-9.73	6	-.108	5	-.004	2	-.001	2	-.053	4	-.87	4
97		4	max	5.378	4	.069	6	.095	4	0	6	.225	5	.462	6
98			min	-4.055	6	-.084	4	-.095	6	-.001	2	-.097	4	-.583	4
99		5	max	5.379	4	.034	6	.19	4	0	6	0	1	0	1
100			min	-4.054	6	-.127	3	-.19	6	-.001	2	0	1	0	1
101	HORZ3	1	max	1.972	3	.128	3	.188	6	0	6	0	1	0	1
102			min	-1.547	2	-.034	6	-.188	4	-.001	2	0	1	0	1
103		2	max	1.97	3	.085	4	.093	6	0	6	.221	5	.459	6
104			min	-1.548	2	-.069	6	-.093	4	-.001	2	-.09	4	-.582	4
105		3	max	4.67	4	.108	5	0	6	0	6	.124	5	.791	6
106			min	-6.317	6	-.052	4	-.004	2	-.001	2	-.039	4	-.867	4

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
107		4	max	4.669	4	.072	6	.094	4	0	6	.218	5	.466	6
108			min	-6.318	6	-.087	4	-.094	6	-.001	2	-.087	4	-.589	4
109		5	max	4.667	4	.036	6	.189	4	0	6	0	1	0	1
110			min	-6.319	6	-.13	3	-.188	6	-.001	2	0	1	0	1
111	HORZ4	1	max	5.405	4	.131	3	.191	6	0	6	0	1	0	1
112			min	-7.006	6	-.038	6	-.19	4	-.001	2	0	1	0	1
113		2	max	5.407	4	.088	4	.096	6	0	6	.219	5	.474	6
114			min	-7.004	6	-.073	6	-.096	4	-.001	2	-.088	4	-.595	4
115		3	max	5.408	4	.053	4	.001	6	0	6	.127	5	.806	6
116			min	-7.003	6	-.109	5	-.004	2	-.001	2	-.042	4	-.879	4
117		4	max	2.799	2	.071	6	.095	4	0	6	.223	5	.467	6
118			min	-1.256	6	-.086	4	-.095	6	-.001	2	-.092	4	-.588	4
119		5	max	2.8	2	.035	6	.19	4	0	6	0	1	0	1
120			min	-1.255	6	-.129	3	-.19	6	-.001	2	0	1	0	1
121	HORZ5	1	max	2.312	4	.086	3	.187	6	0	6	0	1	0	1
122			min	-1.429	2	.014	6	-.188	4	-.002	2	0	1	0	1
123		2	max	2.311	4	.037	4	.093	6	0	6	.327	6	.342	6
124			min	-1.43	2	-.021	6	-.094	4	-.002	2	-.206	4	-.467	4
125		3	max	2.466	4	.066	5	.005	2	0	6	.344	6	.554	6
126			min	-2.973	1	-.04	1	0	4	-.002	2	-.271	4	-.634	4
127		4	max	2.464	4	.022	6	.094	4	0	6	.325	6	.348	6
128			min	-2.975	1	-.039	4	-.093	6	-.002	2	-.204	4	-.472	4
129		5	max	2.463	4	-.013	6	.189	4	0	6	0	1	0	1
130			min	-2.977	1	-.087	3	-.188	6	-.002	2	0	1	0	1
131	HORZ6	1	max	6.74	2	.088	3	.191	6	0	6	0	1	0	1
132			min	-4.859	6	.011	6	-.19	4	-.002	2	0	1	0	1
133		2	max	6.741	2	.039	4	.096	6	0	6	.327	6	.358	6
134			min	-4.857	6	-.024	6	-.095	4	-.002	2	-.205	4	-.477	4
135		3	max	8.169	2	.034	1	.005	2	0	6	.35	6	.575	6
136			min	-4.856	6	-.067	5	0	4	-.002	2	-.273	4	-.644	4
137		4	max	8.17	2	.022	6	.095	4	0	6	.33	6	.353	6
138			min	-1.737	6	-.038	4	-.096	6	-.002	2	-.208	4	-.472	4
139		5	max	8.172	2	-.013	6	.189	4	0	6	0	1	0	1
140			min	-1.735	6	-.086	3	-.19	6	-.002	2	0	1	0	1
141	HORZ7	1	max	3.89	6	.102	3	.187	6	0	6	0	1	0	1
142			min	-2.095	2	-.006	6	-.188	4	-.002	2	0	1	0	1
143		2	max	3.888	6	.055	4	.093	6	0	6	.277	6	.392	6
144			min	-2.097	2	-.042	6	-.094	4	-.002	2	-.163	4	-.511	4
145		3	max	3.887	6	.083	5	.001	6	0	6	.245	6	.648	6
146			min	-3.675	2	-.021	4	-.006	2	-.002	2	-.184	4	-.718	4
147		4	max	-.34	6	.043	6	.094	4	0	6	.276	6	.395	6
148			min	-3.677	2	-.056	4	-.093	6	-.002	2	-.162	4	-.514	4
149		5	max	-.342	6	.007	6	.189	4	0	6	0	1	0	1
150			min	-3.678	2	-.102	3	-.188	6	-.002	2	0	1	0	1
151	HORZ8	1	max	3.328	2	.103	3	.191	6	0	6	0	1	0	1
152			min	-2.02	5	-.009	6	-.19	4	-.002	2	0	1	0	1
153		2	max	3.329	2	.057	4	.096	6	0	6	.279	6	.407	6
154			min	-2.018	5	-.044	6	-.095	4	-.002	2	-.163	4	-.518	4
155		3	max	4.908	2	.022	4	.002	6	0	6	.251	6	.672	6
156			min	-.987	4	-.085	5	-.006	2	-.002	2	-.186	4	-.727	4
157		4	max	4.91	2	.043	6	.095	4	0	6	.281	6	.404	6
158			min	-.986	4	-.056	4	-.096	6	-.002	2	-.164	4	-.516	4
159		5	max	4.911	2	.008	6	.19	4	0	6	0	1	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
160			min	-.985	4	-.102	3	-.191	6	-.002	2	0	1	0	1
161	HORZ9	1	max	3.556	6	.071	3	.187	6	0	6	0	1	0	1
162			min	-1.577	4	.029	6	-.189	4	-.002	2	0	1	0	1
163		2	max	3.555	6	.022	3	.093	6	0	6	.363	6	.306	6
164			min	-1.578	4	-.006	6	-.094	4	-.002	2	-.248	4	-.429	4
165		3	max	3.554	6	.051	5	.002	6	0	6	.416	6	.472	6
166			min	-2.88	1	.015	4	-.006	2	-.002	2	-.354	4	-.548	4
167		4	max	1.28	6	.006	6	.094	4	0	6	.363	6	.307	6
168			min	-2.882	1	-.022	3	-.093	6	-.002	2	-.248	4	-.429	4
169		5	max	1.278	6	-.029	6	.189	4	0	6	0	1	0	1
170			min	-2.883	1	-.071	3	-.188	6	-.002	2	0	1	0	1
171	HORZ10	1	max	1.706	2	.071	3	.191	6	0	6	0	1	0	1
172			min	-2.388	3	.027	6	-.189	4	-.002	2	0	1	0	1
173		2	max	1.708	2	.023	3	.096	6	0	6	.366	6	.319	6
174			min	-2.386	3	-.008	6	-.095	4	-.002	2	-.248	4	-.43	4
175		3	max	3.282	2	-.015	4	.002	6	0	6	.423	6	.497	6
176			min	-2.384	3	-.053	5	-.006	2	-.002	2	-.355	4	-.551	4
177		4	max	3.284	2	.008	6	.095	4	0	6	.366	6	.319	6
178			min	-1.488	4	-.023	3	-.096	6	-.002	2	-.248	4	-.43	4
179		5	max	3.285	2	-.028	6	.189	4	0	6	0	1	0	1
180			min	-1.487	4	-.071	3	-.191	6	-.002	2	0	1	0	1
181	HORZ11	1	max	7.207	6	.212	5	.19	6	.234	6	.22	4	2.758	6
182			min	-5.88	4	.111	2	-.19	4	-.851	2	-.224	6	-1.826	4
183		2	max	7.207	6	.12	5	.096	6	.234	6	.259	6	2.242	6
184			min	-5.88	4	.032	2	-.095	4	-.851	2	-.261	4	-2.317	4
185		3	max	7.207	6	.035	6	.001	6	.234	6	.423	6	1.992	6
186			min	-5.88	4	-.049	1	-.005	2	-.851	2	-.423	4	-2.542	4
187		4	max	7.207	6	-.044	6	.094	4	.234	6	.268	6	2.008	6
188			min	-5.88	4	-.141	1	-.093	6	-.851	2	-.266	4	-2.501	4
189		5	max	7.207	6	-.123	6	.188	4	.234	6	.211	4	2.29	6
190			min	-5.88	4	-.233	1	-.188	6	-.851	2	-.206	6	-2.195	4
191	LEG1	1	max	242.289	6	15.029	6	3.415	4	.03	2	10.159	4	226.628	6
192			min	-222.959	4	-15.135	4	-3.438	6	-.002	4	-13.068	2	-229.733	4
193		2	max	198.709	6	6.332	6	1.512	2	.032	2	4.247	4	95.826	6
194			min	-183.389	4	-6.29	4	-.18	6	-.006	6	-3.872	6	-99.007	4
195		3	max	143.917	6	1.317	6	1.184	6	.034	2	2.036	4	48.495	6
196			min	-126.652	4	-1.191	4	-3.37	2	-.011	6	-3.474	6	-53.373	4
197		4	max	93.605	6	1.06	2	.526	6	.057	2	2.496	2	39.665	6
198			min	-79.489	4	-.304	4	-1.011	2	-.022	6	-.738	6	-41.603	4
199		5	max	7.511	3	6.005	6	14.414	6	.068	2	5.516	6	40.438	6
200			min	-3.349	2	-6.004	4	-13.705	4	-.023	6	-3.652	4	-40.021	4
201	LEG2	1	max	243.839	6	16.643	6	3.912	6	.03	2	11.579	6	235.95	6
202			min	-221.161	4	-16.776	4	-3.835	4	-.014	6	-13.508	2	-237.689	4
203		2	max	200.626	6	6.104	6	1.191	2	.031	2	3.156	6	99.79	6
204			min	-182.691	4	-6.369	4	-.078	6	-.01	6	-3.365	4	-98.042	4
205		3	max	147.355	6	.899	6	1.579	6	.035	2	3.01	2	55.832	6
206			min	-129.678	4	-1.115	4	-3.782	2	-.008	6	-1.621	4	-50.696	4
207		4	max	94.005	6	.433	6	.397	4	.058	2	2.325	2	39.469	6
208			min	-80.013	4	-.786	2	-.698	2	-.009	6	-.281	4	-37.137	4
209		5	max	34.027	2	6	6	14.654	4	.069	2	4.389	4	39.502	6
210			min	2.595	6	-6.001	4	-14.414	6	-.014	6	-4.58	6	-39.918	4
211	LEG_W_PLT1	1	max	254.897	6	20.042	6	5.219	6	.029	2	114.922	2	587.112	6
212			min	-227.777	4	-20.058	4	-14.894	2	-.004	4	-30.067	6	-591.448	4

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
213		2	max	253.968	6	19.791	6	5.219	6	.029	2	39.509	2	485.039	6
214			min	-228.706	4	-19.807	4	-14.535	2	-.004	4	-3.321	6	-489.294	4
215		3	max	253.039	6	19.54	6	5.219	6	.029	2	23.424	6	384.253	6
216			min	-229.635	4	-19.556	4	-14.177	2	-.004	4	-34.066	2	-388.426	4
217		4	max	243.218	6	15.28	6	3.415	4	.03	2	7.968	6	304.295	6
218			min	-222.03	4	-15.386	4	-3.438	6	-.002	4	-26.519	2	-307.945	4
219		5	max	242.289	6	15.029	6	3.415	4	.03	2	10.159	4	226.628	6
220			min	-222.959	4	-15.135	4	-3.438	6	-.002	4	-13.068	2	-229.733	4
221	LEG_W_PLT2	1	max	257.572	6	21.888	6	5.073	4	.029	2	113.785	2	631.947	6
222			min	-225.847	4	-21.901	4	-14.438	2	-.016	6	-26.654	4	-635.164	4
223		2	max	256.495	6	21.636	6	5.073	4	.029	2	39.789	2	520.417	6
224			min	-226.925	4	-21.65	4	-14.438	2	-.016	6	-.654	4	-523.564	4
225		3	max	255.417	6	21.385	6	5.073	4	.029	2	25.345	4	410.174	6
226			min	-228.003	4	-21.399	4	-14.438	2	-.016	6	-34.207	2	-413.251	4
227		4	max	244.916	6	16.894	6	3.912	6	.03	2	7.918	4	321.887	6
228			min	-220.083	4	-17.027	4	-3.835	4	-.014	6	-25.966	2	-324.31	4
229		5	max	243.839	6	16.643	6	3.912	6	.03	2	11.579	6	235.95	6
230			min	-221.161	4	-16.776	4	-3.835	4	-.014	6	-13.508	2	-237.689	4
231	WT1	1	max	13.041	6	.148	4	.162	1	.003	6	0	1	0	1
232			min	-24.128	2	-.148	6	.011	6	-.003	4	0	1	0	1
233		2	max	12.991	6	.074	4	.081	1	.003	6	.306	1	.279	6
234			min	-24.099	2	-.074	6	.005	6	-.003	4	.02	6	-.279	4
235		3	max	12.941	6	0	1	0	1	.003	6	.408	1	.372	6
236			min	-24.071	2	0	1	0	1	-.003	4	.027	6	-.372	4
237		4	max	12.892	6	.074	6	-.005	6	.003	6	.306	1	.279	6
238			min	-24.043	2	-.074	4	-.081	1	-.003	4	.02	6	-.279	4
239		5	max	12.842	6	.148	6	-.011	6	.003	6	0	1	0	1
240			min	-24.015	2	-.148	4	-.162	1	-.003	4	0	1	0	1
241	WT2	1	max	24.818	2	.148	4	.113	3	.003	4	0	1	0	1
242			min	-13.32	4	-.148	6	-.045	2	-.003	6	0	1	0	1
243		2	max	24.897	2	.074	4	.056	3	.003	4	.214	3	.279	6
244			min	-13.319	4	-.074	6	-.023	2	-.003	6	-.086	2	-.279	4
245		3	max	24.977	2	0	1	0	1	.003	4	.285	3	.372	6
246			min	-13.317	4	0	1	0	1	-.003	6	-.114	2	-.372	4
247		4	max	25.057	2	.074	6	.023	2	.003	4	.214	3	.279	6
248			min	-13.315	4	-.074	4	-.056	3	-.003	6	-.086	2	-.279	4
249		5	max	25.137	2	.148	6	.045	2	.003	4	0	1	0	1
250			min	-13.313	4	-.148	4	-.113	3	-.003	6	0	1	0	1
251	WT3	1	max	28.969	2	.148	4	.045	2	.001	4	0	1	0	1
252			min	-18.07	6	-.148	6	-.113	5	-.001	6	0	1	0	1
253		2	max	28.89	2	.074	4	.023	2	.001	4	.086	2	.279	6
254			min	-18.072	6	-.074	6	-.056	5	-.001	6	-.214	5	-.279	4
255		3	max	28.81	2	0	1	0	1	.001	4	.114	2	.372	6
256			min	-18.074	6	0	1	0	1	-.001	6	-.285	5	-.372	4
257		4	max	28.73	2	.074	6	.056	5	.001	4	.086	2	.279	6
258			min	-18.076	6	-.074	4	-.023	2	-.001	6	-.214	5	-.279	4
259		5	max	28.65	2	.148	6	.113	5	.001	4	0	1	0	1
260			min	-18.077	6	-.148	4	-.045	2	-.001	6	0	1	0	1
261	WT4	1	max	18.254	4	.148	4	.162	1	.001	6	0	1	0	1
262			min	-29.683	2	-.148	6	.011	4	-.002	4	0	1	0	1
263		2	max	18.205	4	.074	4	.081	1	.001	6	.306	1	.279	6
264			min	-29.655	2	-.074	6	.005	4	-.002	4	.02	4	-.279	4
265		3	max	18.155	4	0	1	0	1	.001	6	.408	1	.372	6

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
266			min	-29.627	2	0	1	0	1	-.002	4	.027	4	-.372	4
267		4	max	18.105	4	.074	6	-.005	4	.001	6	.306	1	.279	6
268			min	-29.599	2	-.074	4	-.081	1	-.002	4	.02	4	-.279	4
269		5	max	18.055	4	.148	6	-.011	4	.001	6	0	1	0	1
270			min	-29.57	2	-.148	4	-.162	1	-.002	4	0	1	0	1
271	WT5	1	max	40.431	6	.148	4	-.011	6	.003	6	0	1	0	1
272			min	-40.513	4	-.148	6	-.162	1	-.003	4	0	1	0	1
273		2	max	40.481	6	.074	4	-.005	6	.003	6	-.02	6	.279	6
274			min	-40.511	4	-.074	6	-.081	1	-.003	4	-.306	1	-.279	4
275		3	max	40.53	6	0	1	0	1	.003	6	-.027	6	.372	6
276			min	-40.509	4	0	1	0	1	-.003	4	-.408	1	-.372	4
277		4	max	40.58	6	.074	6	.081	1	.003	6	-.02	6	.279	6
278			min	-40.507	4	-.074	4	.005	6	-.003	4	-.306	1	-.279	4
279		5	max	40.63	6	.148	6	.162	1	.003	6	0	1	0	1
280			min	-40.506	4	-.148	4	.011	6	-.003	4	0	1	0	1
281	WT6	1	max	45.533	6	.148	4	.113	3	.002	4	0	1	0	1
282			min	-44.593	4	-.148	6	-.045	2	-.002	2	0	1	0	1
283		2	max	45.583	6	.074	4	.056	3	.002	4	.214	3	.279	6
284			min	-44.592	4	-.074	6	-.023	2	-.002	2	-.086	2	-.279	4
285		3	max	45.633	6	0	1	0	1	.002	4	.285	3	.372	6
286			min	-44.59	4	0	1	0	1	-.002	2	-.114	2	-.372	4
287		4	max	45.682	6	.074	6	.023	2	.002	4	.214	3	.279	6
288			min	-44.588	4	-.074	4	-.056	3	-.002	2	-.086	2	-.279	4
289		5	max	45.732	6	.148	6	.045	2	.002	4	0	1	0	1
290			min	-44.586	4	-.148	4	-.113	3	-.002	2	0	1	0	1
291	WT7	1	max	32.268	4	.148	4	.045	2	.002	4	0	1	0	1
292			min	-31.995	6	-.148	6	-.113	5	-.003	6	0	1	0	1
293		2	max	32.218	4	.074	4	.023	2	.002	4	.086	2	.279	6
294			min	-31.997	6	-.074	6	-.056	5	-.003	6	-.214	5	-.279	4
295		3	max	32.168	4	0	1	0	1	.002	4	.114	2	.372	6
296			min	-31.999	6	0	1	0	1	-.003	6	-.285	5	-.372	4
297		4	max	32.119	4	.074	6	.056	5	.002	4	.086	2	.279	6
298			min	-32.001	6	-.074	4	-.023	2	-.003	6	-.214	5	-.279	4
299		5	max	32.069	4	.148	6	.113	5	.002	4	0	1	0	1
300			min	-32.002	6	-.148	4	-.045	2	-.003	6	0	1	0	1
301	WT8	1	max	36.331	4	.148	4	.162	1	.002	2	0	1	0	1
302			min	-37.037	6	-.148	6	.011	4	-.002	4	0	1	0	1
303		2	max	36.281	4	.074	4	.081	1	.002	2	.306	1	.279	6
304			min	-37.038	6	-.074	6	.005	4	-.002	4	.02	4	-.279	4
305		3	max	36.231	4	0	1	0	1	.002	2	.408	1	.372	6
306			min	-37.04	6	0	1	0	1	-.002	4	.027	4	-.372	4
307		4	max	36.182	4	.074	6	-.005	4	.002	2	.306	1	.279	6
308			min	-37.042	6	-.074	4	-.081	1	-.002	4	.02	4	-.279	4
309		5	max	36.132	4	.148	6	-.011	4	.002	2	0	1	0	1
310			min	-37.044	6	-.148	4	-.162	1	-.002	4	0	1	0	1
311	WT9	1	max	43.291	6	.148	4	.045	2	0	4	0	1	0	1
312			min	-42.54	4	-.148	6	-.113	3	-.005	2	0	1	0	1
313		2	max	43.241	6	.074	4	.023	2	0	4	.086	2	.279	6
314			min	-42.542	4	-.074	6	-.056	3	-.005	2	-.214	3	-.279	4
315		3	max	43.191	6	0	1	0	1	0	4	.114	2	.372	6
316			min	-42.544	4	0	1	0	1	-.005	2	-.285	3	-.372	4
317		4	max	43.142	6	.074	6	.056	3	0	4	.086	2	.279	6
318			min	-42.545	4	-.074	4	-.023	2	-.005	2	-.214	3	-.279	4

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
319		5	max	43.092	6	.148	6	.113	3	0	4	0	1	0	1
320			min	-42.547	4	-.148	4	-.045	2	-.005	2	0	1	0	1
321	WT10	1	max	39.247	6	.148	4	.162	1	.003	6	0	1	0	1
322			min	-39.599	4	-.148	6	.011	6	-.005	2	0	1	0	1
323		2	max	39.197	6	.074	4	.081	1	.003	6	.306	1	.279	6
324			min	-39.601	4	-.074	6	.005	6	-.005	2	.02	6	-.279	4
325		3	max	39.147	6	0	1	0	1	.003	6	.408	1	.372	6
326			min	-39.602	4	0	1	0	1	-.005	2	.027	6	-.372	4
327		4	max	39.098	6	.074	6	-.005	6	.003	6	.306	1	.279	6
328			min	-39.604	4	-.074	4	-.081	1	-.005	2	.02	6	-.279	4
329		5	max	39.048	6	.148	6	-.011	6	.003	6	0	1	0	1
330			min	-39.606	4	-.148	4	-.162	1	-.005	2	0	1	0	1
331	WT11	1	max	36.575	4	.148	4	.113	5	.005	2	0	1	0	1
332			min	-36.347	6	-.148	6	-.045	2	-.002	6	0	1	0	1
333		2	max	36.624	4	.074	4	.056	5	.005	2	.214	5	.279	6
334			min	-36.346	6	-.074	6	-.023	2	-.002	6	-.086	2	-.279	4
335		3	max	36.674	4	0	1	0	1	.005	2	.285	5	.372	6
336			min	-36.344	6	0	1	0	1	-.002	6	-.114	2	-.372	4
337		4	max	36.724	4	.074	6	.023	2	.005	2	.214	5	.279	6
338			min	-36.342	6	-.074	4	-.056	5	-.002	6	-.086	2	-.279	4
339		5	max	36.774	4	.148	6	.045	2	.005	2	0	1	0	1
340			min	-36.34	6	-.148	4	-.113	5	-.002	6	0	1	0	1
341	WT12	1	max	39.787	4	.148	4	.162	1	.005	2	0	1	0	1
342			min	-40.495	6	-.148	6	.011	4	0	4	0	1	0	1
343		2	max	39.737	4	.074	4	.081	1	.005	2	.306	1	.279	6
344			min	-40.497	6	-.074	6	.005	4	0	4	.02	4	-.279	4
345		3	max	39.687	4	0	1	0	1	.005	2	.408	1	.372	6
346			min	-40.498	6	0	1	0	1	0	4	.027	4	-.372	4
347		4	max	39.638	4	.074	6	-.005	4	.005	2	.306	1	.279	6
348			min	-40.5	6	-.074	4	-.081	1	0	4	.02	4	-.279	4
349		5	max	39.588	4	.148	6	-.011	4	.005	2	0	1	0	1
350			min	-40.502	6	-.148	4	-.162	1	0	4	0	1	0	1
351	WT13	1	max	35.493	6	.148	4	.162	1	.003	6	0	1	0	1
352			min	-34.539	4	-.148	6	.011	6	-.01	2	0	1	0	1
353		2	max	35.443	6	.074	4	.081	1	.003	6	.306	1	.279	6
354			min	-34.54	4	-.074	6	.005	6	-.01	2	.02	6	-.279	4
355		3	max	35.393	6	0	1	0	1	.003	6	.408	1	.372	6
356			min	-34.542	4	0	1	0	1	-.01	2	.027	6	-.372	4
357		4	max	35.343	6	.074	6	-.005	6	.003	6	.306	1	.279	6
358			min	-34.544	4	-.074	4	-.081	1	-.01	2	.02	6	-.279	4
359		5	max	35.294	6	.148	6	-.011	6	.003	6	0	1	0	1
360			min	-34.546	4	-.148	4	-.162	1	-.01	2	0	1	0	1
361	WT14	1	max	35.333	6	.148	4	.045	2	.002	6	0	1	0	1
362			min	-35.899	4	-.148	6	-.113	3	-.01	2	0	1	0	1
363		2	max	35.283	6	.074	4	.023	2	.002	6	.086	2	.279	6
364			min	-35.901	4	-.074	6	-.056	3	-.01	2	-.214	3	-.279	4
365		3	max	35.234	6	0	1	0	1	.002	6	.114	2	.372	6
366			min	-35.903	4	0	1	0	1	-.01	2	-.285	3	-.372	4
367		4	max	35.184	6	.074	6	.056	3	.002	6	.086	2	.279	6
368			min	-35.904	4	-.074	4	-.023	2	-.01	2	-.214	3	-.279	4
369		5	max	35.134	6	.148	6	.113	3	.002	6	0	1	0	1
370			min	-35.906	4	-.148	4	-.045	2	-.01	2	0	1	0	1
371	WT15	1	max	52.332	4	.148	4	.045	2	.008	2	0	1	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
372			min	-52.93	6	-.148	6	-.113	5	-.004	6	0	1	0	1
373		2	max	52.282	4	.074	4	.023	2	.008	2	.086	2	.279	6
374			min	-52.932	6	-.074	6	-.056	5	-.004	6	-.214	5	-.279	4
375		3	max	52.233	4	0	1	0	1	.008	2	.114	2	.372	6
376			min	-52.934	6	0	1	0	1	-.004	6	-.285	5	-.372	4
377		4	max	52.183	4	.074	6	.056	5	.008	2	.086	2	.279	6
378			min	-52.936	6	-.074	4	-.023	2	-.004	6	-.214	5	-.279	4
379		5	max	52.133	4	.148	6	.113	5	.008	2	0	1	0	1
380			min	-52.937	6	-.148	4	-.045	2	-.004	6	0	1	0	1
381	WT16	1	max	53.674	4	.148	4	.162	1	.008	2	0	1	0	1
382			min	-52.771	6	-.148	6	.011	4	0	6	0	1	0	1
383		2	max	53.624	4	.074	4	.081	1	.008	2	.306	1	.279	6
384			min	-52.772	6	-.074	6	.005	4	0	6	.02	4	-.279	4
385		3	max	53.574	4	0	1	0	1	.008	2	.408	1	.372	6
386			min	-52.774	6	0	1	0	1	0	6	.027	4	-.372	4
387		4	max	53.525	4	.074	6	-.005	4	.008	2	.306	1	.279	6
388			min	-52.776	6	-.074	4	-.081	1	0	6	.02	4	-.279	4
389		5	max	53.475	4	.148	6	-.011	4	.008	2	0	1	0	1
390			min	-52.778	6	-.148	4	-.162	1	0	6	0	1	0	1
391	WT17	1	max	51.869	6	.148	4	-.011	6	.008	6	0	1	0	1
392			min	-51.452	4	-.148	6	-.162	1	-.012	2	0	1	0	1
393		2	max	51.919	6	.074	4	-.005	6	.008	6	-.02	6	.279	6
394			min	-51.45	4	-.074	6	-.081	1	-.012	2	-.306	1	-.279	4
395		3	max	51.969	6	0	1	0	1	.008	6	-.027	6	.372	6
396			min	-51.449	4	0	1	0	1	-.012	2	-.408	1	-.372	4
397		4	max	52.018	6	.074	6	.081	1	.008	6	-.02	6	.279	6
398			min	-51.447	4	-.074	4	.005	6	-.012	2	-.306	1	-.279	4
399		5	max	52.068	6	.148	6	.162	1	.008	6	0	1	0	1
400			min	-51.445	4	-.148	4	.011	6	-.012	2	0	1	0	1
401	WT18	1	max	52.127	6	.148	4	.113	3	.003	4	0	1	0	1
402			min	-52.951	4	-.148	6	-.045	2	-.012	2	0	1	0	1
403		2	max	52.177	6	.074	4	.056	3	.003	4	.214	3	.279	6
404			min	-52.949	4	-.074	6	-.023	2	-.012	2	-.086	2	-.279	4
405		3	max	52.227	6	0	1	0	1	.003	4	.285	3	.372	6
406			min	-52.948	4	0	1	0	1	-.012	2	-.114	2	-.372	4
407		4	max	52.276	6	.074	6	.023	2	.003	4	.214	3	.279	6
408			min	-52.946	4	-.074	4	-.056	3	-.012	2	-.086	2	-.279	4
409		5	max	52.326	6	.148	6	.045	2	.003	4	0	1	0	1
410			min	-52.944	4	-.148	4	-.113	3	-.012	2	0	1	0	1
411	WT19	1	max	25.699	4	.148	4	.045	2	.015	2	0	1	0	1
412			min	-26.178	6	-.148	6	-.113	5	-.001	6	0	1	0	1
413		2	max	25.65	4	.074	4	.023	2	.015	2	.086	2	.279	6
414			min	-26.18	6	-.074	6	-.056	5	-.001	6	-.214	5	-.279	4
415		3	max	25.6	4	0	1	0	1	.015	2	.114	2	.372	6
416			min	-26.181	6	0	1	0	1	-.001	6	-.285	5	-.372	4
417		4	max	25.55	4	.074	6	.056	5	.015	2	.086	2	.279	6
418			min	-26.183	6	-.074	4	-.023	2	-.001	6	-.214	5	-.279	4
419		5	max	25.5	4	.148	6	.113	5	.015	2	0	1	0	1
420			min	-26.185	6	-.148	4	-.045	2	-.001	6	0	1	0	1
421	WT20	1	max	27.192	4	.148	4	.162	1	.015	2	0	1	0	1
422			min	-26.411	6	-.148	6	.011	4	-.006	6	0	1	0	1
423		2	max	27.142	4	.074	4	.081	1	.015	2	.306	1	.279	6
424			min	-26.413	6	-.074	6	.005	4	-.006	6	.02	4	-.279	4

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
425		3	max	27.092	4	0	1	0	1	.015	2	.408	1	.372	6
426			min	-26.414	6	0	1	0	1	-.006	6	.027	4	-.372	4
427		4	max	27.043	4	.074	6	-.005	4	.015	2	.306	1	.279	6
428			min	-26.416	6	-.074	4	-.081	1	-.006	6	.02	4	-.279	4
429		5	max	26.993	4	.148	6	-.011	4	.015	2	0	1	0	1
430			min	-26.418	6	-.148	4	-.162	1	-.006	6	0	1	0	1
431	Mast1	1	max	496.652	4	5.169	2	2.843	6	.084	2	91.952	4	60.857	2
432			min	-469.442	6	-.047	6	-2.814	4	-.022	6	-91.395	6	-.324	6
433		2	max	495.883	4	4.894	2	2.568	6	.084	2	72.55	4	24.378	2
434			min	-470.211	6	-.047	6	-2.538	4	-.022	6	-71.779	6	.008	4
435		3	max	495.114	4	4.618	2	2.292	6	.084	2	55.144	4	.355	6
436			min	-470.98	6	-.047	6	-2.263	4	-.022	6	-54.16	6	-10.104	2
437		4	max	452.029	4	.017	6	1.559	4	.08	2	49.936	4	.512	6
438			min	-428.794	6	-2.583	2	-1.653	6	-.022	6	-49.09	6	-22.677	2
439		5	max	451.26	4	.017	6	1.835	4	.08	2	62.241	4	.392	6
440			min	-429.563	6	-2.858	2	-1.928	6	-.022	6	-62.069	6	-2.951	2
441	Mast2	1	max	451.26	4	.017	6	1.835	4	.08	2	62.241	4	.392	6
442			min	-429.563	6	-2.858	2	-1.928	6	-.022	6	-62.069	6	-2.951	2
443		2	max	345.649	4	.057	6	2.201	6	.074	2	61.908	4	7.531	2
444			min	-324.856	6	-.031	4	-2.168	4	-.02	6	-61.965	6	-.036	4
445		3	max	344.92	4	.057	6	1.885	6	.074	2	48.093	4	8.745	2
446			min	-325.585	6	-.335	2	-1.851	4	-.02	6	-47.921	6	-.248	6
447		4	max	235.897	4	2.852	2	2.557	6	.061	2	32.962	4	.75	2
448			min	-218.167	6	-.017	6	-2.609	4	-.016	6	-32.84	6	-.402	6
449		5	max	235.167	4	2.535	2	2.24	6	.061	2	16.112	4	.129	3
450			min	-218.896	6	-.017	6	-2.293	4	-.016	6	-16.35	6	-17.767	2
451	Mast3	1	max	235.167	4	2.535	2	2.24	6	.061	2	16.112	4	.129	3
452			min	-218.896	6	-.017	6	-2.293	4	-.016	6	-16.35	6	-17.767	2
453		2	max	114.055	4	.006	3	9.217	4	.037	2	37.82	4	11.279	2
454			min	-99.791	6	-11.745	2	-9.186	6	-.01	6	-38.146	6	-.173	6
455		3	max	113.326	4	.006	3	9.567	4	.037	2	102.39	4	93.232	2
456			min	-100.521	6	-12.096	2	-9.536	6	-.01	6	-102.503	6	-.06	6
457		4	max	6.823	5	4.808	2	4.808	6	0	1	121.522	4	121.522	2
458			min	5.27	2	0	3	-4.808	4	0	1	-121.522	6	0	3
459		5	max	5.922	5	4.457	2	4.457	6	0	1	89.675	4	89.675	2
460			min	4.54	2	0	3	-4.457	4	0	1	-89.675	6	0	3
461	Mast4	1	max	5.922	3	4.457	2	4.457	6	0	1	89.675	4	89.675	2
462			min	4.54	6	0	3	-4.457	4	0	1	-89.675	6	0	3
463		2	max	5.037	3	4.045	2	4.045	6	0	1	60.979	4	60.979	2
464			min	3.824	6	0	3	-4.045	4	0	1	-60.979	6	0	3
465		3	max	4.152	3	3.634	2	3.634	6	0	1	35.064	4	35.064	2
466			min	3.107	6	0	3	-3.634	4	0	1	-35.064	6	0	3
467		4	max	3.267	3	3.222	2	3.222	6	0	1	11.927	4	11.927	2
468			min	2.391	6	0	3	-3.222	4	0	1	-11.927	6	0	3
469		5	max	0	1	0	1	0	1	0	1	0	1	0	1
470			min	0	1	0	1	0	1	0	1	0	1	0	1
471	Horz 12	1	max	7.207	6	.192	6	.001	6	.234	6	.201	6	2.758	6
472			min	-5.88	4	.109	1	-.005	2	-.851	2	-.206	4	-1.826	4
473		2	max	7.207	6	.113	6	.001	6	.234	6	.206	6	2.242	6
474			min	-5.88	4	.03	1	-.005	2	-.851	2	-.208	4	-2.317	4
475		3	max	7.207	6	.035	6	.001	6	.234	6	.21	6	1.992	6
476			min	-5.88	4	-.049	1	-.005	2	-.851	2	-.21	4	-2.542	4
477		4	max	7.207	6	-.044	6	.001	6	.234	6	.215	6	2.008	6

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
478			min	-5.88	4	-.127	1	-.005	2	-.851	2	-.212	4	-2.501	4
479		5	max	7.207	6	-.123	6	.001	6	.234	6	.22	6	2.29	6
480			min	-5.88	4	-.206	1	-.005	2	-.851	2	-.215	4	-2.195	4

Envelope Member Section Stresses

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
1	CROSSDIAG1	1	max	.725	4	.075	3	.157	6	0	1	0	1	0	1	0	1
2			min	-2.682	2	-.031	6	-.157	4	0	1	0	1	0	1	0	1
3		2	max	.72	4	.045	4	.075	6	2.127	4	1.95	6	1.729	6	1.537	4
4			min	-2.688	2	-.058	6	-.076	4	-1.951	6	-2.126	4	-1.4	4	-1.899	6
5		3	max	.763	4	.108	5	.007	6	3.298	4	3.631	6	.817	6	1.621	3
6			min	-2.74	2	-.033	4	-.031	2	-3.633	6	-3.297	4	-1.476	3	-.897	6
7		4	max	.757	4	.075	6	.076	4	2.309	4	2.147	6	1.335	6	1.137	4
8			min	-2.746	2	-.06	4	-.075	6	-2.148	6	-2.308	4	-1.035	4	-1.467	6
9		5	max	.751	4	.048	6	.157	4	0	1	0	1	0	1	0	1
10			min	-2.752	2	-.088	3	-.157	6	0	1	0	1	0	1	0	1
11	CROSSDIAG2	1	max	2.838	2	.095	4	.17	6	0	1	0	1	0	1	0	1
12			min	-1.686	6	-.055	6	-.17	4	0	1	0	1	0	1	0	1
13		2	max	2.843	2	.068	4	.088	6	2.545	4	2.4	6	1.465	6	1.267	4
14			min	-1.68	6	-.082	6	-.088	4	-2.401	6	-2.544	4	-1.154	4	-1.609	6
15		3	max	2.915	2	.041	4	.007	6	3.771	4	4.138	6	1.075	6	1.874	4
16			min	-1.674	6	-.114	5	-.027	1	-4.139	6	-3.77	4	-1.707	4	-1.181	6
17		4	max	2.921	2	.066	6	.088	4	2.363	4	2.203	6	1.858	6	1.666	4
18			min	-1.51	6	-.053	4	-.088	6	-2.204	6	-2.362	4	-1.517	4	-2.041	6
19		5	max	2.927	2	.039	6	.17	4	0	1	0	1	0	1	0	1
20			min	-1.504	6	-.081	3	-.17	6	0	1	0	1	0	1	0	1
21	CROSSDIAG3	1	max	.518	6	.069	3	.156	6	0	1	0	1	0	1	0	1
22			min	-4.444	2	-.022	6	-.157	4	0	1	0	1	0	1	0	1
23		2	max	.512	6	.038	4	.074	6	2.033	4	1.832	6	1.928	6	1.742	4
24			min	-4.45	2	-.049	6	-.076	4	-1.833	6	-2.032	4	-1.586	4	-2.118	6
25		3	max	.506	6	.098	5	.007	6	3.058	4	3.342	6	1.215	6	2.026	4
26			min	-4.501	2	-.023	4	-.031	2	-3.343	6	-3.057	4	-1.844	4	-1.334	6
27		4	max	.354	6	.063	6	.076	4	2.188	4	2.002	6	1.588	6	1.401	4
28			min	-4.507	2	-.05	4	-.074	6	-2.003	6	-2.188	4	-1.275	4	-1.745	6
29		5	max	.348	6	.036	6	.157	4	0	1	0	1	0	1	0	1
30			min	-4.513	2	-.079	3	-.156	6	0	1	0	1	0	1	0	1
31	CROSSDIAG4	1	max	4.466	2	.085	3	.171	6	0	1	0	1	0	1	0	1
32			min	-1.003	6	-.045	6	-.17	4	0	1	0	1	0	1	0	1
33		2	max	4.472	2	.058	4	.089	6	2.425	4	2.284	6	1.735	6	1.533	4
34			min	-.997	6	-.072	6	-.088	4	-2.285	6	-2.424	4	-1.396	4	-1.905	6
35		3	max	4.543	2	.031	4	.007	6	3.531	4	3.906	6	1.506	6	2.288	4
36			min	-.991	6	-.105	5	-.026	1	-3.907	6	-3.529	4	-2.083	4	-1.654	6
37		4	max	4.549	2	.058	6	.088	4	2.269	4	2.113	6	2.074	6	1.873	4
38			min	-.843	6	-.045	4	-.089	6	-2.114	6	-2.268	4	-1.705	4	-2.278	6
39		5	max	4.554	2	.031	6	.17	4	0	1	0	1	0	1	0	1
40			min	-.838	6	-.075	3	-.171	6	0	1	0	1	0	1	0	1
41	CROSSDIAG5	1	max	3.899	6	.099	3	.194	5	0	1	0	1	0	1	0	1
42			min	-6.396	2	-.049	6	-.195	3	0	1	0	1	0	1	0	1
43		2	max	3.888	6	.063	4	.095	5	5.013	3	4.572	6	3.762	5	3.534	4
44			min	-6.407	2	-.079	5	-.097	3	-4.574	6	-5.011	3	-3.067	4	-4.334	5
45		3	max	3.877	6	.12	5	.004	6	7.23	4	7.879	5	1.689	6	3.637	3

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
46			min	-6.438	2	-.04	4	-.057	1	-7.883	5	-7.227	4	-3.157	3	-1.945	6
47		4	max	3.769	6	.082	5	.096	3	5.076	3	4.652	6	3.618	5	3.358	4
48			min	-6.449	2	-.067	4	-.095	5	-4.654	6	-5.074	3	-2.915	4	-4.168	5
49		5	max	3.758	6	.053	6	.195	3	0	1	0	1	0	1	0	1
50			min	-6.46	2	-.102	3	-.194	5	0	1	0	1	0	1	0	1
51	CROSSDIAG6	1	max	7.12	2	.104	3	.201	6	0	1	0	1	0	1	0	1
52			min	-1.702	4	-.058	6	-.2	4	0	1	0	1	0	1	0	1
53		2	max	7.132	2	.07	4	.103	6	5.226	3	4.949	6	3.742	5	3.466	4
54			min	-1.691	4	-.086	5	-.101	4	-4.951	6	-5.224	3	-3.009	4	-4.311	5
55		3	max	7.182	2	.043	4	.004	6	7.597	4	8.354	5	1.992	6	3.802	3
56			min	-1.714	4	-.124	5	-.037	1	-8.358	5	-7.594	4	-3.3	3	-2.295	6
57		4	max	7.193	2	.083	5	.101	4	5.162	3	4.868	6	3.885	5	3.637	4
58			min	-1.703	4	-.066	4	-.103	6	-4.87	6	-5.16	3	-3.157	4	-4.476	5
59		5	max	7.204	2	.054	6	.2	4	0	1	0	1	0	1	0	1
60			min	-1.691	4	-.101	3	-.201	6	0	1	0	1	0	1	0	1
61	CROSSDIAG7	1	max	0	5	.075	1	0	1	0	1	0	1	0	1	0	1
62			min	-8.991	2	0	5	-.356	4	0	1	0	1	0	1	0	1
63		2	max	0	5	.037	1	0	1	8.123	4	0	5	2.968	1	13.157	4
64			min	-9.016	2	0	5	-.178	4	0	5	-8.12	4	-11.979	4	-3.26	1
65		3	max	0	5	0	1	0	1	10.831	4	0	5	3.957	1	17.543	4
66			min	-9.042	2	0	1	0	1	0	5	-10.827	4	-15.972	4	-4.346	1
67		4	max	0	5	0	5	.178	4	8.123	4	0	5	2.968	1	13.157	4
68			min	-9.068	2	-.037	3	0	1	0	5	-8.12	4	-11.979	4	-3.26	1
69		5	max	0	5	0	5	.356	4	0	1	0	1	0	1	0	1
70			min	-9.094	2	-.075	3	0	1	0	1	0	1	0	1	0	1
71	CROSSDIAG8	1	max	0	1	.075	3	0	1	0	1	0	1	0	1	0	1
72			min	-1.605	4	0	1	-.356	4	0	1	0	1	0	1	0	1
73		2	max	0	1	.037	3	0	1	8.123	4	0	1	0	1	13.157	4
74			min	-1.579	4	0	1	-.178	4	0	1	-8.12	4	-11.979	4	0	1
75		3	max	0	1	0	1	0	1	10.831	4	0	1	0	1	17.543	4
76			min	-1.554	4	0	1	0	1	0	1	-10.827	4	-15.972	4	0	1
77		4	max	0	1	0	1	.178	4	8.123	4	0	1	0	1	13.157	4
78			min	-1.528	4	-.037	3	0	1	0	1	-8.12	4	-11.979	4	0	1
79		5	max	0	1	0	1	.356	4	0	1	0	1	0	1	0	1
80			min	-1.502	4	-.075	3	0	1	0	1	0	1	0	1	0	1
81	HORZ1	1	max	1.711	4	.097	3	.144	6	0	1	0	1	0	1	0	1
82			min	-1.3	6	-.025	6	-.144	4	0	1	0	1	0	1	0	1
83		2	max	1.71	4	.064	4	.072	6	1.999	4	1.58	6	1.553	5	.729	4
84			min	-1.3	6	-.052	6	-.072	4	-1.58	6	-1.998	4	-.663	4	-1.706	5
85		3	max	2.583	4	.083	5	0	6	2.972	4	2.724	6	.901	5	.378	4
86			min	-3.149	6	-.039	4	-.003	2	-2.725	6	-2.971	4	-.344	4	-.99	5
87		4	max	2.583	4	.054	6	.072	4	2.023	4	1.607	6	1.523	5	.694	4
88			min	-3.149	6	-.066	4	-.072	6	-1.607	6	-2.022	4	-.631	4	-1.672	5
89		5	max	2.582	4	.027	6	.145	4	0	1	0	1	0	1	0	1
90			min	-3.15	6	-.098	3	-.145	6	0	1	0	1	0	1	0	1
91	HORZ2	1	max	2.624	4	.099	3	.146	6	0	1	0	1	0	1	0	1
92			min	-3.17	6	-.028	6	-.146	4	0	1	0	1	0	1	0	1
93		2	max	2.624	4	.066	4	.073	6	2.043	4	1.628	6	1.532	5	.705	4
94			min	-3.17	6	-.055	6	-.073	4	-1.628	6	-2.042	4	-.642	4	-1.682	5
95		3	max	2.625	4	.039	4	0	6	3.013	4	2.766	6	.919	5	.401	4
96			min	-3.169	6	-.083	5	-.003	2	-2.767	6	-3.011	4	-.365	4	-1.009	5
97		4	max	1.752	4	.053	6	.073	4	2.019	4	1.601	6	1.562	5	.74	4
98			min	-1.321	6	-.065	4	-.073	6	-1.601	6	-2.018	4	-.674	4	-1.716	5

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
99		5	max	1.752	4	.026	6	.146	4	0	1	0	1	0	1	0	1
100			min	-1.32	6	-.097	3	-.146	6	0	1	0	1	0	1	0	1
101	HORZ3	1	max	.642	3	.098	3	.144	6	0	1	0	1	0	1	0	1
102			min	-.504	2	-.026	6	-.144	4	0	1	0	1	0	1	0	1
103		2	max	.642	3	.066	4	.072	6	2.016	4	1.589	6	1.532	5	.687	4
104			min	-.504	2	-.053	6	-.072	4	-1.59	6	-2.015	4	-.625	4	-1.683	5
105		3	max	1.521	4	.083	5	0	6	3.003	4	2.737	6	.859	5	.294	4
106			min	-2.058	6	-.04	4	-.003	2	-2.738	6	-3.002	4	-.268	4	-.944	5
107		4	max	1.521	4	.055	6	.072	4	2.038	4	1.613	6	1.51	5	.661	4
108			min	-2.058	6	-.067	4	-.072	6	-1.614	6	-2.037	4	-.602	4	-1.658	5
109		5	max	1.52	4	.028	6	.145	4	0	1	0	1	0	1	0	1
110			min	-2.058	6	-.1	3	-.145	6	0	1	0	1	0	1	0	1
111	HORZ4	1	max	1.761	4	.1	3	.146	6	0	1	0	1	0	1	0	1
112			min	-2.282	6	-.029	6	-.146	4	0	1	0	1	0	1	0	1
113		2	max	1.761	4	.068	4	.074	6	2.059	4	1.64	6	1.521	5	.673	4
114			min	-2.282	6	-.056	6	-.073	4	-1.641	6	-2.058	4	-.613	4	-1.671	5
115		3	max	1.762	4	.041	4	.001	6	3.045	4	2.791	6	.882	5	.318	4
116			min	-2.281	6	-.084	5	-.003	2	-2.792	6	-3.043	4	-.29	4	-.969	5
117		4	max	.912	2	.054	6	.073	4	2.037	4	1.616	6	1.544	5	.699	4
118			min	-.409	6	-.066	4	-.073	6	-1.617	6	-2.036	4	-.636	4	-1.696	5
119		5	max	.912	2	.027	6	.146	4	0	1	0	1	0	1	0	1
120			min	-.409	6	-.099	3	-.146	6	0	1	0	1	0	1	0	1
121	HORZ5	1	max	.753	4	.066	3	.144	6	0	1	0	1	0	1	0	1
122			min	-.465	2	.011	6	-.145	4	0	1	0	1	0	1	0	1
123		2	max	.753	4	.028	4	.071	6	1.617	4	1.185	6	2.268	6	1.571	4
124			min	-.466	2	-.016	6	-.072	4	-1.185	6	-1.616	4	-1.43	4	-2.491	6
125		3	max	.803	4	.051	5	.004	2	2.196	4	1.917	6	2.386	6	2.062	4
126			min	-.968	1	-.031	1	0	4	-1.918	6	-2.195	4	-1.877	4	-2.621	6
127		4	max	.803	4	.017	6	.072	4	1.634	4	1.203	6	2.251	6	1.553	4
128			min	-.969	1	-.03	4	-.072	6	-1.204	6	-1.634	4	-1.414	4	-2.472	6
129		5	max	.802	4	-.01	6	.145	4	0	1	0	1	0	1	0	1
130			min	-.97	1	-.067	3	-.144	6	0	1	0	1	0	1	0	1
131	HORZ6	1	max	2.195	2	.067	3	.147	6	0	1	0	1	0	1	0	1
132			min	-1.583	6	.009	6	-.146	4	0	1	0	1	0	1	0	1
133		2	max	2.196	2	.03	4	.074	6	1.651	4	1.24	6	2.27	6	1.562	4
134			min	-1.582	6	-.019	6	-.073	4	-1.24	6	-1.651	4	-1.422	4	-2.493	6
135		3	max	2.661	2	.026	1	.004	2	2.229	4	1.99	6	2.424	6	2.081	4
136			min	-1.582	6	-.052	5	0	4	-1.991	6	-2.228	4	-1.895	4	-2.663	6
137		4	max	2.661	2	.017	6	.073	4	1.634	4	1.221	6	2.287	6	1.58	4
138			min	-.566	6	-.029	4	-.073	6	-1.222	6	-1.633	4	-1.439	4	-2.512	6
139		5	max	2.662	2	-.01	6	.146	4	0	1	0	1	0	1	0	1
140			min	-.565	6	-.066	3	-.146	6	0	1	0	1	0	1	0	1
141	HORZ7	1	max	1.267	6	.078	3	.144	6	0	1	0	1	0	1	0	1
142			min	-.683	2	-.005	6	-.145	4	0	1	0	1	0	1	0	1
143		2	max	1.267	6	.043	4	.071	6	1.771	4	1.356	6	1.924	6	1.24	4
144			min	-.683	2	-.032	6	-.072	4	-1.357	6	-1.77	4	-1.129	4	-2.113	6
145		3	max	1.266	6	.064	5	.001	6	2.485	4	2.243	6	1.698	6	1.4	4
146			min	-1.197	2	-.016	4	-.004	2	-2.244	6	-2.484	4	-1.275	4	-1.865	6
147		4	max	-.111	6	.033	6	.072	4	1.779	4	1.367	6	1.914	6	1.231	4
148			min	-1.198	2	-.043	4	-.072	6	-1.367	6	-1.778	4	-1.121	4	-2.102	6
149		5	max	-.111	6	.006	6	.145	4	0	1	0	1	0	1	0	1
150			min	-1.198	2	-.079	3	-.144	6	0	1	0	1	0	1	0	1
151	HORZ8	1	max	1.084	2	.079	3	.147	6	0	1	0	1	0	1	0	1

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
152			min	-.658	5	-.007	6	-.146	4	0	1	0	1	0	1	0	1
153		2	max	1.084	2	.044	4	.074	6	1.795	4	1.408	6	1.935	6	1.24	4
154			min	-.657	5	-.034	6	-.073	4	-1.408	6	-1.794	4	-1.129	4	-2.125	6
155		3	max	1.599	2	.017	4	.001	6	2.516	4	2.325	6	1.74	6	1.418	4
156			min	-.322	4	-.065	5	-.004	2	-2.326	6	-2.515	4	-1.291	4	-1.911	6
157		4	max	1.599	2	.033	6	.073	4	1.786	4	1.397	6	1.945	6	1.249	4
158			min	-.321	4	-.043	4	-.074	6	-1.398	6	-1.786	4	-1.137	4	-2.136	6
159		5	max	1.6	2	.006	6	.146	4	0	1	0	1	0	1	0	1
160			min	-.321	4	-.079	3	-.146	6	0	1	0	1	0	1	0	1
161	HORZ9	1	max	1.158	6	.055	3	.144	6	0	1	0	1	0	1	0	1
162			min	-.514	4	.023	6	-.145	4	0	1	0	1	0	1	0	1
163		2	max	1.158	6	.017	3	.071	6	1.485	4	1.06	6	2.517	6	1.886	4
164			min	-.514	4	-.004	6	-.072	4	-1.061	6	-1.485	4	-1.717	4	-2.765	6
165		3	max	1.158	6	.039	5	.001	6	1.897	4	1.634	6	2.885	6	2.694	4
166			min	-.938	1	.011	4	-.005	2	-1.634	6	-1.896	4	-2.453	4	-3.169	6
167		4	max	.417	6	.005	6	.072	4	1.485	4	1.062	6	2.516	6	1.887	4
168			min	-.939	1	-.017	3	-.071	6	-1.062	6	-1.485	4	-1.718	4	-2.764	6
169		5	max	.416	6	-.023	6	.145	4	0	1	0	1	0	1	0	1
170			min	-.939	1	-.055	3	-.144	6	0	1	0	1	0	1	0	1
171	HORZ10	1	max	.556	2	.055	3	.147	6	0	1	0	1	0	1	0	1
172			min	-.778	3	.021	6	-.145	4	0	1	0	1	0	1	0	1
173		2	max	.556	2	.017	3	.074	6	1.49	4	1.105	6	2.539	6	1.89	4
174			min	-.777	3	-.006	6	-.073	4	-1.106	6	-1.49	4	-1.72	4	-2.788	6
175		3	max	1.069	2	-.011	4	.001	6	1.908	4	1.721	6	2.929	6	2.7	4
176			min	-.777	3	-.04	5	-.005	2	-1.722	6	-1.907	4	-2.458	4	-3.218	6
177		4	max	1.07	2	.006	6	.073	4	1.49	4	1.104	6	2.539	6	1.889	4
178			min	-.485	4	-.017	3	-.074	6	-1.104	6	-1.49	4	-1.72	4	-2.789	6
179		5	max	1.07	2	-.021	6	.145	4	0	1	0	1	0	1	0	1
180			min	-.484	4	-.055	3	-.146	6	0	1	0	1	0	1	0	1
181	HORZ11	1	max	1.051	6	.042	5	.076	6	1.626	4	2.456	6	.291	4	.297	6
182			min	-.857	4	.022	2	-.076	4	-2.456	6	-1.626	4	-.297	6	-.291	4
183		2	max	1.051	6	.024	5	.038	6	2.063	4	1.997	6	.343	6	.346	4
184			min	-.857	4	.006	2	-.038	4	-1.997	6	-2.063	4	-.346	4	-.343	6
185		3	max	1.051	6	.007	6	0	6	2.264	4	1.774	6	.561	6	.561	4
186			min	-.857	4	-.01	1	-.002	2	-1.774	6	-2.264	4	-.561	4	-.561	6
187		4	max	1.051	6	-.009	6	.038	4	2.228	4	1.788	6	.355	6	.352	4
188			min	-.857	4	-.028	1	-.037	6	-1.788	6	-2.228	4	-.352	4	-.355	6
189		5	max	1.051	6	-.025	6	.075	4	1.954	4	2.04	6	.279	4	.273	6
190			min	-.857	4	-.047	1	-.075	6	-2.04	6	-1.954	4	-.273	6	-.279	4
191	LEG1	1	max	12.054	6	1.528	6	.325	4	17.851	4	17.61	6	7.766	4	9.991	2
192			min	-11.093	4	-1.539	4	-.328	6	-17.61	6	-17.851	4	-9.991	2	-7.766	4
193		2	max	9.886	6	.644	6	.144	2	7.693	4	7.446	6	3.247	4	2.96	6
194			min	-9.124	4	-.64	4	-.017	6	-7.446	6	-7.693	4	-2.96	6	-3.247	4
195		3	max	7.16	6	.134	6	.113	6	4.147	4	3.768	6	1.557	4	2.656	6
196			min	-6.301	4	-.121	4	-.321	2	-3.768	6	-4.147	4	-2.656	6	-1.557	4
197		4	max	4.657	6	.108	2	.05	6	3.233	4	3.082	6	1.908	2	.564	6
198			min	-3.955	4	-.031	4	-.096	2	-3.082	6	-3.233	4	-.564	6	-1.908	2
199		5	max	.374	3	.611	6	1.373	6	3.11	4	3.142	6	4.217	6	2.792	4
200			min	-.167	2	-.61	4	-1.306	4	-3.142	6	-3.11	4	-2.792	4	-4.217	6
201	LEG2	1	max	12.131	6	1.692	6	.373	6	18.47	4	18.334	6	8.852	6	10.327	2
202			min	-11.003	4	-1.706	4	-.365	4	-18.334	6	-18.47	4	-10.327	2	-8.852	6
203		2	max	9.981	6	.621	6	.113	2	7.618	4	7.754	6	2.413	6	2.572	4
204			min	-9.089	4	-.648	4	-.007	6	-7.754	6	-7.618	4	-2.572	4	-2.413	6

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
205		3	max	7.331	6	.091	6	.15	6	3.939	4	4.338	6	2.301	2	1.239	4
206			min	-6.452	4	-.113	4	-.36	2	-4.338	6	-3.939	4	-1.239	4	-2.301	2
207		4	max	4.677	6	.044	6	.038	4	2.886	4	3.067	6	1.777	2	.215	4
208			min	-3.981	4	-.08	2	-.066	2	-3.067	6	-2.886	4	-.215	4	-1.777	2
209		5	max	1.693	2	.61	6	1.396	4	3.102	4	3.07	6	3.356	4	3.502	6
210			min	.129	6	-.61	4	-1.373	6	-3.07	6	-3.102	4	-3.502	6	-3.356	4
211	LEG_W_PLT1	1	max	4.892	6	2.038	6	.496	6	12.491	4	12.399	6	8.241	2	2.156	6
212			min	-4.372	4	-2.039	4	-1.414	2	-12.399	6	-12.491	4	-2.156	6	-8.241	2
213		2	max	4.875	6	2.012	6	.496	6	10.334	4	10.244	6	2.833	2	.238	6
214			min	-4.39	4	-2.014	4	-1.38	2	-10.244	6	-10.334	4	-.238	6	-2.833	2
215		3	max	4.857	6	1.987	6	.496	6	8.203	4	8.115	6	1.68	6	2.443	2
216			min	-4.408	4	-1.988	4	-1.346	2	-8.115	6	-8.203	4	-2.443	2	-1.68	6
217		4	max	4.668	6	1.554	6	.324	4	6.504	4	6.426	6	.571	6	1.902	2
218			min	-4.262	4	-1.564	4	-.326	6	-6.426	6	-6.504	4	-1.902	2	-.571	6
219		5	max	4.65	6	1.528	6	.324	4	4.852	4	4.786	6	.728	4	.937	2
220			min	-4.279	4	-1.539	4	-.326	6	-4.786	6	-4.852	4	-.937	2	-.728	4
221	LEG_W_PLT2	1	max	4.944	6	2.225	6	.482	4	13.414	4	13.346	6	8.159	2	1.911	4
222			min	-4.335	4	-2.227	4	-1.371	2	-13.346	6	-13.414	4	-1.911	4	-8.159	2
223		2	max	4.923	6	2.2	6	.482	4	11.057	4	10.991	6	2.853	2	.047	4
224			min	-4.356	4	-2.201	4	-1.371	2	-10.991	6	-11.057	4	-.047	4	-2.853	2
225		3	max	4.902	6	2.174	6	.482	4	8.728	4	8.663	6	1.817	4	2.453	2
226			min	-4.376	4	-2.176	4	-1.371	2	-8.663	6	-8.728	4	-2.453	2	-1.817	4
227		4	max	4.701	6	1.718	6	.372	6	6.849	4	6.798	6	.568	4	1.862	2
228			min	-4.224	4	-1.731	4	-.364	4	-6.798	6	-6.849	4	-1.862	2	-.568	4
229		5	max	4.68	6	1.692	6	.372	6	5.02	4	4.983	6	.83	6	.969	2
230			min	-4.245	4	-1.706	4	-.364	4	-4.983	6	-5.02	4	-.969	2	-.83	6
231	WT1	1	max	2.964	6	.11	4	.068	1	0	1	0	1	0	1	0	1
232			min	-5.484	2	-.11	6	.004	6	0	1	0	1	0	1	0	1
233		2	max	2.953	6	.055	4	.034	1	.315	4	1.216	6	1.174	1	-.077	6
234			min	-5.477	2	-.055	6	.002	6	-.315	6	-1.216	4	.077	6	-1.174	1
235		3	max	2.941	6	0	1	0	1	.42	4	1.621	6	1.565	1	-.103	6
236			min	-5.471	2	0	1	0	1	-.42	6	-1.621	4	.103	6	-1.565	1
237		4	max	2.93	6	.055	6	-.002	6	.315	4	1.216	6	1.174	1	-.077	6
238			min	-5.464	2	-.055	4	-.034	1	-.315	6	-1.216	4	.077	6	-1.174	1
239		5	max	2.919	6	.11	6	-.004	6	0	1	0	1	0	1	0	1
240			min	-5.458	2	-.11	4	-.068	1	0	1	0	1	0	1	0	1
241	WT2	1	max	5.64	2	.11	4	.047	3	0	1	0	1	0	1	0	1
242			min	-3.027	4	-.11	6	-.019	2	0	1	0	1	0	1	0	1
243		2	max	5.658	2	.055	4	.024	3	.315	4	1.216	6	.819	3	.328	2
244			min	-3.027	4	-.055	6	-.009	2	-.315	6	-1.216	4	-.328	2	-.819	3
245		3	max	5.677	2	0	1	0	1	.42	4	1.621	6	1.092	3	.438	2
246			min	-3.027	4	0	1	0	1	-.42	6	-1.621	4	-.438	2	-1.092	3
247		4	max	5.695	2	.055	6	.009	2	.315	4	1.216	6	.819	3	.328	2
248			min	-3.026	4	-.055	4	-.024	3	-.315	6	-1.216	4	-.328	2	-.819	3
249		5	max	5.713	2	.11	6	.019	2	0	1	0	1	0	1	0	1
250			min	-3.026	4	-.11	4	-.047	3	0	1	0	1	0	1	0	1
251	WT3	1	max	6.584	2	.11	4	.019	2	0	1	0	1	0	1	0	1
252			min	-4.107	6	-.11	6	-.047	5	0	1	0	1	0	1	0	1
253		2	max	6.566	2	.055	4	.009	2	.315	4	1.216	6	.328	2	.819	5
254			min	-4.107	6	-.055	6	-.024	5	-.315	6	-1.216	4	-.819	5	-.328	2
255		3	max	6.548	2	0	1	0	1	.42	4	1.621	6	.438	2	1.092	5
256			min	-4.108	6	0	1	0	1	-.42	6	-1.621	4	-1.092	5	-.438	2
257		4	max	6.53	2	.055	6	.024	5	.315	4	1.216	6	.328	2	.819	5

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
258			min	-4.108	6	-.055	4	-.009	2	-.315	6	-1.216	4	-.819	5	-.328	2
259		5	max	6.511	2	.11	6	.047	5	0	1	0	1	0	1	0	1
260			min	-4.109	6	-.11	4	-.019	2	0	1	0	1	0	1	0	1
261	WT4	1	max	4.149	4	.11	4	.068	1	0	1	0	1	0	1	0	1
262			min	-6.746	2	-.11	6	.004	4	0	1	0	1	0	1	0	1
263		2	max	4.137	4	.055	4	.034	1	.315	4	1.216	6	1.174	1	-.077	4
264			min	-6.74	2	-.055	6	.002	4	-.315	6	-1.216	4	.077	4	-1.174	1
265		3	max	4.126	4	0	1	0	1	.42	4	1.621	6	1.565	1	-.103	4
266			min	-6.733	2	0	1	0	1	-.42	6	-1.621	4	.103	4	-1.565	1
267		4	max	4.115	4	.055	6	-.002	4	.315	4	1.216	6	1.174	1	-.077	4
268			min	-6.727	2	-.055	4	-.034	1	-.315	6	-1.216	4	.077	4	-1.174	1
269		5	max	4.104	4	.11	6	-.004	4	0	1	0	1	0	1	0	1
270			min	-6.721	2	-.11	4	-.068	1	0	1	0	1	0	1	0	1
271	WT5	1	max	9.189	6	.11	4	-.004	6	0	1	0	1	0	1	0	1
272			min	-9.207	4	-.11	6	-.068	1	0	1	0	1	0	1	0	1
273		2	max	9.2	6	.055	4	-.002	6	.315	4	1.216	6	-.077	6	1.174	1
274			min	-9.207	4	-.055	6	-.034	1	-.315	6	-1.216	4	-1.174	1	.077	6
275		3	max	9.211	6	0	1	0	1	.42	4	1.621	6	-.103	6	1.565	1
276			min	-9.207	4	0	1	0	1	-.42	6	-1.621	4	-1.565	1	.103	6
277		4	max	9.223	6	.055	6	.034	1	.315	4	1.216	6	-.077	6	1.174	1
278			min	-9.206	4	-.055	4	.002	6	-.315	6	-1.216	4	-1.174	1	.077	6
279		5	max	9.234	6	.11	6	.068	1	0	1	0	1	0	1	0	1
280			min	-9.206	4	-.11	4	.004	6	0	1	0	1	0	1	0	1
281	WT6	1	max	10.348	6	.11	4	.047	3	0	1	0	1	0	1	0	1
282			min	-10.135	4	-.11	6	-.019	2	0	1	0	1	0	1	0	1
283		2	max	10.36	6	.055	4	.024	3	.315	4	1.216	6	.819	3	.328	2
284			min	-10.134	4	-.055	6	-.009	2	-.315	6	-1.216	4	-.328	2	-.819	3
285		3	max	10.371	6	0	1	0	1	.42	4	1.621	6	1.092	3	.438	2
286			min	-10.134	4	0	1	0	1	-.42	6	-1.621	4	-.438	2	-1.092	3
287		4	max	10.382	6	.055	6	.009	2	.315	4	1.216	6	.819	3	.328	2
288			min	-10.134	4	-.055	4	-.024	3	-.315	6	-1.216	4	-.328	2	-.819	3
289		5	max	10.394	6	.11	6	.019	2	0	1	0	1	0	1	0	1
290			min	-10.133	4	-.11	4	-.047	3	0	1	0	1	0	1	0	1
291	WT7	1	max	7.334	4	.11	4	.019	2	0	1	0	1	0	1	0	1
292			min	-7.272	6	-.11	6	-.047	5	0	1	0	1	0	1	0	1
293		2	max	7.322	4	.055	4	.009	2	.315	4	1.216	6	.328	2	.819	5
294			min	-7.272	6	-.055	6	-.024	5	-.315	6	-1.216	4	-.819	5	-.328	2
295		3	max	7.311	4	0	1	0	1	.42	4	1.621	6	.438	2	1.092	5
296			min	-7.272	6	0	1	0	1	-.42	6	-1.621	4	-1.092	5	-.438	2
297		4	max	7.3	4	.055	6	.024	5	.315	4	1.216	6	.328	2	.819	5
298			min	-7.273	6	-.055	4	-.009	2	-.315	6	-1.216	4	-.819	5	-.328	2
299		5	max	7.288	4	.11	6	.047	5	0	1	0	1	0	1	0	1
300			min	-7.273	6	-.11	4	-.019	2	0	1	0	1	0	1	0	1
301	WT8	1	max	8.257	4	.11	4	.068	1	0	1	0	1	0	1	0	1
302			min	-8.417	6	-.11	6	.004	4	0	1	0	1	0	1	0	1
303		2	max	8.246	4	.055	4	.034	1	.315	4	1.216	6	1.174	1	-.077	4
304			min	-8.418	6	-.055	6	.002	4	-.315	6	-1.216	4	.077	4	-1.174	1
305		3	max	8.234	4	0	1	0	1	.42	4	1.621	6	1.565	1	-.103	4
306			min	-8.418	6	0	1	0	1	-.42	6	-1.621	4	.103	4	-1.565	1
307		4	max	8.223	4	.055	6	-.002	4	.315	4	1.216	6	1.174	1	-.077	4
308			min	-8.419	6	-.055	4	-.034	1	-.315	6	-1.216	4	.077	4	-1.174	1
309		5	max	8.212	4	.11	6	-.004	4	0	1	0	1	0	1	0	1
310			min	-8.419	6	-.11	4	-.068	1	0	1	0	1	0	1	0	1

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
311	WT9	1	max	9.839	6	.11	4	.019	2	0	1	0	1	0	1	0	1
312			min	-9.668	4	-.11	6	-.047	3	0	1	0	1	0	1	0	1
313		2	max	9.828	6	.055	4	.009	2	.315	4	1.216	6	.328	2	.819	3
314			min	-9.669	4	-.055	6	-.024	3	-.315	6	-1.216	4	-.819	3	-.328	2
315		3	max	9.816	6	0	1	0	1	.42	4	1.621	6	.438	2	1.092	3
316			min	-9.669	4	0	1	0	1	-.42	6	-1.621	4	-1.092	3	-.438	2
317		4	max	9.805	6	.055	6	.024	3	.315	4	1.216	6	.328	2	.819	3
318			min	-9.669	4	-.055	4	-.009	2	-.315	6	-1.216	4	-.819	3	-.328	2
319		5	max	9.794	6	.11	6	.047	3	0	1	0	1	0	1	0	1
320			min	-9.67	4	-.11	4	-.019	2	0	1	0	1	0	1	0	1
321	WT10	1	max	8.92	6	.11	4	.068	1	0	1	0	1	0	1	0	1
322			min	-9	4	-.11	6	.004	6	0	1	0	1	0	1	0	1
323		2	max	8.908	6	.055	4	.034	1	.315	4	1.216	6	1.174	1	-.077	6
324			min	-9	4	-.055	6	.002	6	-.315	6	-1.216	4	.077	6	-1.174	1
325		3	max	8.897	6	0	1	0	1	.42	4	1.621	6	1.565	1	-.103	6
326			min	-9.001	4	0	1	0	1	-.42	6	-1.621	4	.103	6	-1.565	1
327		4	max	8.886	6	.055	6	-.002	6	.315	4	1.216	6	1.174	1	-.077	6
328			min	-9.001	4	-.055	4	-.034	1	-.315	6	-1.216	4	.077	6	-1.174	1
329		5	max	8.875	6	.11	6	-.004	6	0	1	0	1	0	1	0	1
330			min	-9.001	4	-.11	4	-.068	1	0	1	0	1	0	1	0	1
331	WT11	1	max	8.312	4	.11	4	.047	5	0	1	0	1	0	1	0	1
332			min	-8.261	6	-.11	6	-.019	2	0	1	0	1	0	1	0	1
333		2	max	8.324	4	.055	4	.024	5	.315	4	1.216	6	.819	5	.328	2
334			min	-8.26	6	-.055	6	-.009	2	-.315	6	-1.216	4	-.328	2	-.819	5
335		3	max	8.335	4	0	1	0	1	.42	4	1.621	6	1.092	5	.438	2
336			min	-8.26	6	0	1	0	1	-.42	6	-1.621	4	-.438	2	-1.092	5
337		4	max	8.346	4	.055	6	.009	2	.315	4	1.216	6	.819	5	.328	2
338			min	-8.26	6	-.055	4	-.024	5	-.315	6	-1.216	4	-.328	2	-.819	5
339		5	max	8.358	4	.11	6	.019	2	0	1	0	1	0	1	0	1
340			min	-8.259	6	-.11	4	-.047	5	0	1	0	1	0	1	0	1
341	WT12	1	max	9.042	4	.11	4	.068	1	0	1	0	1	0	1	0	1
342			min	-9.203	6	-.11	6	.004	4	0	1	0	1	0	1	0	1
343		2	max	9.031	4	.055	4	.034	1	.315	4	1.216	6	1.174	1	-.077	4
344			min	-9.204	6	-.055	6	.002	4	-.315	6	-1.216	4	.077	4	-1.174	1
345		3	max	9.02	4	0	1	0	1	.42	4	1.621	6	1.565	1	-.103	4
346			min	-9.204	6	0	1	0	1	-.42	6	-1.621	4	.103	4	-1.565	1
347		4	max	9.009	4	.055	6	-.002	4	.315	4	1.216	6	1.174	1	-.077	4
348			min	-9.205	6	-.055	4	-.034	1	-.315	6	-1.216	4	.077	4	-1.174	1
349		5	max	8.997	4	.11	6	-.004	4	0	1	0	1	0	1	0	1
350			min	-9.205	6	-.11	4	-.068	1	0	1	0	1	0	1	0	1
351	WT13	1	max	8.066	6	.11	4	.068	1	0	1	0	1	0	1	0	1
352			min	-7.85	4	-.11	6	.004	6	0	1	0	1	0	1	0	1
353		2	max	8.055	6	.055	4	.034	1	.315	4	1.216	6	1.174	1	-.077	6
354			min	-7.85	4	-.055	6	.002	6	-.315	6	-1.216	4	.077	6	-1.174	1
355		3	max	8.044	6	0	1	0	1	.42	4	1.621	6	1.565	1	-.103	6
356			min	-7.851	4	0	1	0	1	-.42	6	-1.621	4	.103	6	-1.565	1
357		4	max	8.033	6	.055	6	-.002	6	.315	4	1.216	6	1.174	1	-.077	6
358			min	-7.851	4	-.055	4	-.034	1	-.315	6	-1.216	4	.077	6	-1.174	1
359		5	max	8.021	6	.11	6	-.004	6	0	1	0	1	0	1	0	1
360			min	-7.851	4	-.11	4	-.068	1	0	1	0	1	0	1	0	1
361	WT14	1	max	8.03	6	.11	4	.019	2	0	1	0	1	0	1	0	1
362			min	-8.159	4	-.11	6	-.047	3	0	1	0	1	0	1	0	1
363		2	max	8.019	6	.055	4	.009	2	.315	4	1.216	6	.328	2	.819	3

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
364			min	-8.159	4	-.055	6	-.024	3	-.315	6	-1.216	4	-.819	3	-.328	2
365		3	max	8.008	6	0	1	0	1	.42	4	1.621	6	.438	2	1.092	3
366			min	-8.16	4	0	1	0	1	-.42	6	-1.621	4	-1.092	3	-.438	2
367		4	max	7.996	6	.055	6	.024	3	.315	4	1.216	6	.328	2	.819	3
368			min	-8.16	4	-.055	4	-.009	2	-.315	6	-1.216	4	-.819	3	-.328	2
369		5	max	7.985	6	.11	6	.047	3	0	1	0	1	0	1	0	1
370			min	-8.16	4	-.11	4	-.019	2	0	1	0	1	0	1	0	1
371	WT15	1	max	11.894	4	.11	4	.019	2	0	1	0	1	0	1	0	1
372			min	-12.03	6	-.11	6	-.047	5	0	1	0	1	0	1	0	1
373		2	max	11.882	4	.055	4	.009	2	.315	4	1.216	6	.328	2	.819	5
374			min	-12.03	6	-.055	6	-.024	5	-.315	6	-1.216	4	-.819	5	-.328	2
375		3	max	11.871	4	0	1	0	1	.42	4	1.621	6	.438	2	1.092	5
376			min	-12.03	6	0	1	0	1	-.42	6	-1.621	4	-1.092	5	-.438	2
377		4	max	11.86	4	.055	6	.024	5	.315	4	1.216	6	.328	2	.819	5
378			min	-12.031	6	-.055	4	-.009	2	-.315	6	-1.216	4	-.819	5	-.328	2
379		5	max	11.848	4	.11	6	.047	5	0	1	0	1	0	1	0	1
380			min	-12.031	6	-.11	4	-.019	2	0	1	0	1	0	1	0	1
381	WT16	1	max	12.199	4	.11	4	.068	1	0	1	0	1	0	1	0	1
382			min	-11.993	6	-.11	6	.004	4	0	1	0	1	0	1	0	1
383		2	max	12.187	4	.055	4	.034	1	.315	4	1.216	6	1.174	1	-.077	4
384			min	-11.994	6	-.055	6	.002	4	-.315	6	-1.216	4	.077	4	-1.174	1
385		3	max	12.176	4	0	1	0	1	.42	4	1.621	6	1.565	1	-.103	4
386			min	-11.994	6	0	1	0	1	-.42	6	-1.621	4	.103	4	-1.565	1
387		4	max	12.165	4	.055	6	-.002	4	.315	4	1.216	6	1.174	1	-.077	4
388			min	-11.994	6	-.055	4	-.034	1	-.315	6	-1.216	4	.077	4	-1.174	1
389		5	max	12.153	4	.11	6	-.004	4	0	1	0	1	0	1	0	1
390			min	-11.995	6	-.11	4	-.068	1	0	1	0	1	0	1	0	1
391	WT17	1	max	11.788	6	.11	4	-.004	6	0	1	0	1	0	1	0	1
392			min	-11.694	4	-.11	6	-.068	1	0	1	0	1	0	1	0	1
393		2	max	11.8	6	.055	4	-.002	6	.315	4	1.216	6	-.077	6	1.174	1
394			min	-11.693	4	-.055	6	-.034	1	-.315	6	-1.216	4	-1.174	1	.077	6
395		3	max	11.811	6	0	1	0	1	.42	4	1.621	6	-.103	6	1.565	1
396			min	-11.693	4	0	1	0	1	-.42	6	-1.621	4	-1.565	1	.103	6
397		4	max	11.822	6	.055	6	.034	1	.315	4	1.216	6	-.077	6	1.174	1
398			min	-11.693	4	-.055	4	.002	6	-.315	6	-1.216	4	-1.174	1	.077	6
399		5	max	11.834	6	.11	6	.068	1	0	1	0	1	0	1	0	1
400			min	-11.692	4	-.11	4	.004	6	0	1	0	1	0	1	0	1
401	WT18	1	max	11.847	6	.11	4	.047	3	0	1	0	1	0	1	0	1
402			min	-12.034	4	-.11	6	-.019	2	0	1	0	1	0	1	0	1
403		2	max	11.858	6	.055	4	.024	3	.315	4	1.216	6	.819	3	.328	2
404			min	-12.034	4	-.055	6	-.009	2	-.315	6	-1.216	4	-.328	2	-.819	3
405		3	max	11.87	6	0	1	0	1	.42	4	1.621	6	1.092	3	.438	2
406			min	-12.034	4	0	1	0	1	-.42	6	-1.621	4	-.438	2	-1.092	3
407		4	max	11.881	6	.055	6	.009	2	.315	4	1.216	6	.819	3	.328	2
408			min	-12.033	4	-.055	4	-.024	3	-.315	6	-1.216	4	-.328	2	-.819	3
409		5	max	11.892	6	.11	6	.019	2	0	1	0	1	0	1	0	1
410			min	-12.033	4	-.11	4	-.047	3	0	1	0	1	0	1	0	1
411	WT19	1	max	5.841	4	.11	4	.019	2	0	1	0	1	0	1	0	1
412			min	-5.95	6	-.11	6	-.047	5	0	1	0	1	0	1	0	1
413		2	max	5.829	4	.055	4	.009	2	.315	4	1.216	6	.328	2	.819	5
414			min	-5.95	6	-.055	6	-.024	5	-.315	6	-1.216	4	-.819	5	-.328	2
415		3	max	5.818	4	0	1	0	1	.42	4	1.621	6	.438	2	1.092	5
416			min	-5.95	6	0	1	0	1	-.42	6	-1.621	4	-1.092	5	-.438	2

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
417		4	max	5.807	4	.055	6	.024	5	.315	4	1.216	6	.328	2	.819	5
418			min	-5.951	6	-.055	4	-.009	2	-.315	6	-1.216	4	-.819	5	-.328	2
419		5	max	5.796	4	.11	6	.047	5	0	1	0	1	0	1	0	1
420			min	-5.951	6	-.11	4	-.019	2	0	1	0	1	0	1	0	1
421	WT20	1	max	6.18	4	.11	4	.068	1	0	1	0	1	0	1	0	1
422			min	-6.002	6	-.11	6	.004	4	0	1	0	1	0	1	0	1
423		2	max	6.169	4	.055	4	.034	1	.315	4	1.216	6	1.174	1	-.077	4
424			min	-6.003	6	-.055	6	.002	4	-.315	6	-1.216	4	.077	4	-1.174	1
425		3	max	6.157	4	0	1	0	1	.42	4	1.621	6	1.565	1	-.103	4
426			min	-6.003	6	0	1	0	1	-.42	6	-1.621	4	.103	4	-1.565	1
427		4	max	6.146	4	.055	6	-.002	4	.315	4	1.216	6	1.174	1	-.077	4
428			min	-6.004	6	-.055	4	-.034	1	-.315	6	-1.216	4	.077	4	-1.174	1
429		5	max	6.135	4	.11	6	-.004	4	0	1	0	1	0	1	0	1
430			min	-6.004	6	-.11	4	-.068	1	0	1	0	1	0	1	0	1
431	Mast1	1	max	19.4	4	.404	2	.222	6	.035	6	6.673	2	10.082	4	10.021	6
432			min	-18.338	6	-.004	6	-.22	4	-6.673	2	-.035	6	-10.021	6	-10.082	4
433		2	max	19.37	4	.382	2	.201	6	0	4	2.673	2	7.955	4	7.87	6
434			min	-18.368	6	-.004	6	-.198	4	-2.673	2	0	4	-7.87	6	-7.955	4
435		3	max	19.34	4	.361	2	.179	6	1.108	2	.039	6	6.046	4	5.938	6
436			min	-18.398	6	-.004	6	-.177	4	-.039	6	-1.108	2	-5.938	6	-6.046	4
437		4	max	17.657	4	.001	6	.122	4	2.486	2	.056	6	5.475	4	5.382	6
438			min	-16.75	6	-.202	2	-.129	6	-.056	6	-2.486	2	-5.382	6	-5.475	4
439		5	max	17.627	4	.001	6	.143	4	.324	2	.043	6	6.824	4	6.806	6
440			min	-16.78	6	-.223	2	-.151	6	-.043	6	-.324	2	-6.806	6	-6.824	4
441	Mast2	1	max	17.627	4	.001	6	.143	4	.324	2	.043	6	6.824	4	6.806	6
442			min	-16.78	6	-.223	2	-.151	6	-.043	6	-.324	2	-6.806	6	-6.824	4
443		2	max	13.502	4	.004	6	.172	6	.004	4	.826	2	6.788	4	6.794	6
444			min	-12.69	6	-.002	4	-.169	4	-.826	2	-.004	4	-6.794	6	-6.788	4
445		3	max	13.473	4	.004	6	.147	6	.027	6	.959	2	5.273	4	5.254	6
446			min	-12.718	6	-.026	2	-.145	4	-.959	2	-.027	6	-5.254	6	-5.273	4
447		4	max	9.215	4	.223	2	.2	6	.044	6	.082	2	3.614	4	3.601	6
448			min	-8.522	6	-.001	6	-.204	4	-.082	2	-.044	6	-3.601	6	-3.614	4
449		5	max	9.186	4	.198	2	.175	6	1.948	2	.014	3	1.767	4	1.793	6
450			min	-8.551	6	-.001	6	-.179	4	-.014	3	-1.948	2	-1.793	6	-1.767	4
451	Mast3	1	max	9.186	4	.198	2	.175	6	1.948	2	.014	3	1.767	4	1.793	6
452			min	-8.551	6	-.001	6	-.179	4	-.014	3	-1.948	2	-1.793	6	-1.767	4
453		2	max	4.455	4	0	3	.72	4	.019	6	1.237	2	4.147	4	4.183	6
454			min	-3.898	6	-.918	2	-.718	6	-1.237	2	-.019	6	-4.183	6	-4.147	4
455		3	max	4.427	4	0	3	.747	4	.007	6	10.222	2	11.227	4	11.239	6
456			min	-3.927	6	-.945	2	-.745	6	-10.222	2	-.007	6	-11.239	6	-11.227	4
457		4	max	.267	5	.376	2	.376	6	0	3	13.324	2	13.324	4	13.324	6
458			min	.206	2	0	3	-.376	4	-13.324	2	0	3	-13.324	6	-13.324	4
459		5	max	.231	5	.348	2	.348	6	0	3	9.832	2	9.832	4	9.832	6
460			min	.177	2	0	3	-.348	4	-9.832	2	0	3	-9.832	6	-9.832	4
461	Mast4	1	max	.231	3	.348	2	.348	6	0	3	9.832	2	9.832	4	9.832	6
462			min	.177	6	0	3	-.348	4	-9.832	2	0	3	-9.832	6	-9.832	4
463		2	max	.197	3	.316	2	.316	6	0	3	6.686	2	6.686	4	6.686	6
464			min	.149	6	0	3	-.316	4	-6.686	2	0	3	-6.686	6	-6.686	4
465		3	max	.162	3	.284	2	.284	6	0	3	3.845	2	3.845	4	3.845	6
466			min	.121	6	0	3	-.284	4	-3.845	2	0	3	-3.845	6	-3.845	4
467		4	max	.128	3	.252	2	.252	6	0	3	1.308	2	1.308	4	1.308	6
468			min	.093	6	0	3	-.252	4	-1.308	2	0	3	-1.308	6	-1.308	4
469		5	max	0	1	0	1	0	1	0	1	0	1	0	1	0	1

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
470			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
471	Horz 12	1	max	1.051	6	.038	6	0	6	1.626	4	2.456	6	.267	6	.273	4
472			min	-.857	4	.022	1	-.002	2	-2.456	6	-1.626	4	-.273	4	-.267	6
473		2	max	1.051	6	.023	6	0	6	2.063	4	1.997	6	.273	6	.276	4
474			min	-.857	4	.006	1	-.002	2	-1.997	6	-2.063	4	-.276	4	-.273	6
475		3	max	1.051	6	.007	6	0	6	2.264	4	1.774	6	.279	6	.279	4
476			min	-.857	4	-.01	1	-.002	2	-1.774	6	-2.264	4	-.279	4	-.279	6
477		4	max	1.051	6	-.009	6	0	6	2.228	4	1.788	6	.285	6	.282	4
478			min	-.857	4	-.025	1	-.002	2	-1.788	6	-2.228	4	-.282	4	-.285	6
479		5	max	1.051	6	-.025	6	0	6	1.954	4	2.04	6	.291	6	.285	4
480			min	-.857	4	-.041	1	-.002	2	-2.04	6	-1.954	4	-.285	4	-.291	6

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BOTLEG1	max	5.219	6	254.897	6	20.042	6	587.112	6	.029	2	114.922	2
2		min	-14.894	2	-227.777	4	-20.058	4	-591.448	4	-.004	4	-30.067	6
3	BOTMAST	max	.047	6	496.652	4	2.843	6	91.395	6	.084	2	60.857	2
4		min	-5.169	2	-469.442	6	-2.814	4	-91.952	4	-.022	6	-.324	6
5	BOTLEG2	max	5.073	4	257.572	6	21.888	6	631.947	6	.029	2	113.785	2
6		min	-14.438	2	-225.847	4	-21.901	4	-635.164	4	-.016	6	-26.654	4
7	Totals:	max	0	6	58.846	1	44.773	6						
8		min	-34.502	2	43.028	4	-44.773	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	1	max	.292	2	.019	4	.264	4	3.771e-3	4	3.553e-5	4	1.848e-4	6
2		min	-.057	6	-.021	6	-.262	6	-3.738e-3	6	-2.305e-4	2	-2.632e-3	2
3	2	max	.291	2	.019	4	.283	4	4.035e-3	4	1.267e-4	6	1.546e-6	3
4		min	-.044	4	-.021	6	-.281	6	-4.011e-3	6	-2.271e-4	2	-2.63e-3	2
5	3	max	.493	2	.041	4	.948	4	6.633e-3	4	6.512e-5	4	4.898e-4	6
6		min	-.024	6	-.045	6	-.939	6	-6.565e-3	6	-6.166e-4	2	-5.504e-4	4
7	4	max	.493	2	.041	4	1.012	4	7.035e-3	4	3.085e-4	6	4.739e-4	4
8		min	-.015	6	-.046	6	-1.006	6	-6.988e-3	6	-6.069e-4	2	-4.355e-4	6
9	5	max	.492	2	.044	4	.989	4	6.919e-3	4	7.116e-5	4	9.466e-4	6
10		min	-.028	6	-.048	6	-.98	6	-6.847e-3	6	-6.958e-4	2	-1.013e-3	4
11	6	max	.492	2	.043	4	1.056	4	7.329e-3	4	3.458e-4	6	1.009e-3	4
12		min	-.011	6	-.048	6	-1.05	6	-7.28e-3	6	-6.849e-4	2	-9.806e-4	6
13	7	max	.478	2	.054	4	1.196	4	8.084e-3	4	9.06e-5	4	9.026e-4	6
14		min	-.065	6	-.059	6	-1.185	6	-7.995e-3	6	-1.053e-3	2	-9.126e-4	4
15	8	max	.476	2	.054	4	1.275	4	8.518e-3	4	5.058e-4	6	9.325e-4	4
16		min	-.03	4	-.06	6	-1.267	6	-8.46e-3	6	-1.036e-3	2	-9.503e-4	6
17	9	max	.548	2	.072	4	1.721	4	1.012e-2	4	1.844e-4	6	9.383e-4	4
18		min	-.038	6	-.079	6	-1.703	6	-9.991e-3	6	-1.855e-3	2	-1.425e-3	2
19	10	max	.548	2	.071	4	1.825	4	1.056e-2	4	7.864e-4	6	1.083e-3	6
20		min	-.008	6	-.079	6	-1.813	6	-1.05e-2	6	-1.825e-3	2	-1.477e-3	2
21	11	max	.631	2	.099	4	2.676	4	1.236e-2	4	4.218e-4	6	7.608e-4	6
22		min	-.029	6	-.108	6	-2.646	6	-1.218e-2	6	-3.021e-3	2	-1.295e-3	2
23	12	max	.632	2	.098	4	2.818	4	1.28e-2	4	1.157e-3	6	6.405e-4	4
24		min	-.026	6	-.108	6	-2.801	6	-1.275e-2	6	-2.971e-3	2	-1.191e-3	2
25	13	max	.64	2	.1	4	2.751	4	1.249e-2	4	4.396e-4	6	8.727e-4	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
26		min	-.034	6	-.11	6	-2.719	6	-1.23e-2	6	-3.103e-3	2	-1.372e-3	2
27	14	max	.64	2	.1	4	2.895	4	1.293e-2	4	1.182e-3	6	7.424e-4	4
28		min	-.022	6	-.11	6	-2.878	6	-1.288e-2	6	-3.051e-3	2	-1.241e-3	2
29	15	max	.664	2	.106	4	2.98	4	1.285e-2	4	4.948e-4	6	7.862e-4	6
30		min	-.05	6	-.116	6	-2.945	6	-1.265e-2	6	-3.346e-3	2	-1.301e-3	2
31	16	max	.661	2	.105	4	3.132	4	1.328e-2	4	1.254e-3	6	6.911e-4	4
32		min	-.008	6	-.117	6	-3.114	6	-1.325e-2	6	-3.29e-3	2	-1.133e-3	2
33	17	max	.848	2	.137	4	4.962	4	1.505e-2	4	1.163e-3	6	2.041e-4	4
34		min	-.042	6	-.15	6	-4.89	6	-1.472e-2	6	-5.573e-3	2	-2.316e-3	2
35	18	max	.843	2	.136	4	5.171	4	1.541e-2	4	1.758e-3	6	7.388e-4	6
36		min	-.035	6	-.151	6	-5.155	6	-1.55e-2	6	-5.475e-3	2	-2.26e-3	2
37	19	max	.862	2	.139	4	5.053	4	1.513e-2	4	1.192e-3	6	1.391e-4	4
38		min	-.041	6	-.152	6	-4.979	6	-1.479e-2	6	-5.668e-3	2	-2.459e-3	2
39	20	max	.857	2	.138	4	5.264	4	1.548e-2	4	1.778e-3	6	7.211e-4	6
40		min	-.04	6	-.153	6	-5.248	6	-1.557e-2	6	-5.567e-3	2	-2.408e-3	2
41	21	max	.908	2	.143	4	5.327	4	1.534e-2	4	1.279e-3	6	3.26e-4	6
42		min	-.045	6	-.156	6	-5.247	6	-1.499e-2	6	-5.938e-3	2	-2.412e-3	2
43	22	max	.903	2	.142	4	5.545	4	1.569e-2	4	1.84e-3	6	4.351e-4	6
44		min	-.051	6	-.157	6	-5.531	6	-1.58e-2	6	-5.843e-3	2	-2.527e-3	2
45	23	max	.961	2	.146	4	5.699	4	1.562e-2	4	1.43e-3	6	3.507e-4	6
46		min	-.054	6	-.16	6	-5.61	6	-1.523e-2	6	-6.403e-3	2	-2.094e-3	2
47	24	max	.96	2	.145	4	5.925	4	1.595e-2	4	1.939e-3	6	1.609e-4	6
48		min	-.056	6	-.161	6	-5.914	6	-1.608e-2	6	-6.314e-3	2	-2.148e-3	2
49	25	max	.973	2	.147	4	5.793	4	1.568e-2	4	1.468e-3	6	3.11e-4	6
50		min	-.056	6	-.161	6	-5.702	6	-1.529e-2	6	-6.519e-3	2	-2.067e-3	2
51	26	max	.972	2	.146	4	6.02	4	1.601e-2	4	1.964e-3	6	1.579e-4	6
52		min	-.057	6	-.162	6	-6.011	6	-1.615e-2	6	-6.432e-3	2	-2.054e-3	2
53	27	max	1.234	2	.165	4	8.005	4	1.704e-2	4	2.322e-3	6	3.61e-4	6
54		min	-.089	6	-.183	6	-7.854	6	-1.656e-2	6	-9.13e-3	2	-2.122e-3	2
55	28	max	1.223	2	.164	4	8.268	4	1.724e-2	4	2.521e-3	6	1.158e-4	4
56		min	-.07	6	-.184	6	-8.287	6	-1.749e-2	6	-9.079e-3	2	-2.191e-3	2
57	29	max	1.46	2	.167	4	9.792	4	1.8e-2	4	3.315e-3	6	6.806e-4	4
58		min	-.104	6	-.186	6	-9.589	6	-1.748e-2	6	-1.17e-2	2	-1.873e-3	2
59	30	max	1.46	2	.165	4	10.07	4	1.811e-2	4	2.946e-3	6	9.041e-4	6
60		min	-.102	6	-.188	6	-10.117	6	-1.84e-2	6	-1.168e-2	2	-1.908e-3	2
61	31	max	1.471	2	.167	4	9.9	4	1.805e-2	4	3.373e-3	6	7.88e-4	4
62		min	-.1	6	-.187	6	-9.694	6	-1.754e-2	6	-1.185e-2	2	-1.815e-3	2
63	32	max	1.471	2	.165	4	10.179	4	1.817e-2	4	2.971e-3	6	9.93e-4	6
64		min	-.108	6	-.188	6	-10.227	6	-1.846e-2	6	-1.183e-2	2	-1.823e-3	2
65	33	max	1.56	2	.168	4	10.944	4	1.863e-2	4	3.927e-3	6	1.082e-3	6
66		min	-.088	6	-.189	6	-10.709	6	-1.811e-2	6	-1.329e-2	2	-1.343e-3	2
67	34	max	1.559	2	.166	4	11.229	4	1.873e-2	4	3.208e-3	6	1.081e-3	4
68		min	-.136	6	-.19	6	-11.294	6	-1.902e-2	6	-1.329e-2	2	-1.295e-3	2
69	35	max	.492	2	.012	4	1.082	4	6.928e-3	4	4.216e-4	6	-2.178e-6	4
70		min	-.02	6	-.064	5	-1.099	6	-6.859e-3	6	-1.763e-3	2	-3.244e-4	2
71	36	max	.516	2	.052	4	1.551	4	8.677e-3	4	5.543e-4	6	6.519e-6	6
72		min	-.021	6	-.058	6	-1.54	6	-8.577e-3	6	-2.324e-3	2	-4.828e-4	2
73	37	max	.586	2	.098	4	2.426	4	1.138e-2	4	8.186e-4	6	8.736e-6	6
74		min	-.025	6	-.108	6	-2.408	6	-1.125e-2	6	-3.374e-3	2	-6.946e-4	2
75	38	max	.636	2	.066	4	2.864	4	1.258e-2	4	9.691e-4	6	-4.319e-6	6
76		min	-.028	6	-.119	6	-2.865	6	-1.246e-2	6	-3.939e-3	2	-7.027e-4	2
77	39	max	.733	2	.119	4	4.721	4	1.399e-2	4	1.305e-3	6	2.954e-5	6
78		min	-.033	6	-.132	6	-4.688	6	-1.386e-2	6	-5.154e-3	2	-1.058e-3	2

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
79	40	max	.853	2	.167	4	5.228	4	1.521e-2	4	1.648e-3	6	-6.169e-6	6
80		min	-.039	6	-.224	6	-5.209	6	-1.508e-2	6	-6.394e-3	2	-9.497e-4	2
81	41	max	.967	2	.152	4	5.961	4	1.579e-2	4	1.89e-3	6	-6.303e-6	4
82		min	-.056	6	-.207	6	-5.935	6	-1.566e-2	6	-7.261e-3	2	-9.938e-4	2
83	43	max	1.466	2	.218	4	10.114	4	1.808e-2	4	3.273e-3	6	-7.107e-6	4
84		min	-.103	6	-.279	6	-10.06	6	-1.796e-2	6	-1.223e-2	2	-1.153e-3	2
85	BOTLEG1	max	0	2	0	4	0	4	0	4	0	4	0	6
86		min	0	6	0	6	0	6	0	6	0	2	0	2
87	BOTLEG2	max	0	2	0	4	0	4	0	4	0	6	0	4
88		min	0	4	0	6	0	6	0	6	0	2	0	2
89	BOTMAST	max	0	2	0	6	0	4	0	4	0	6	0	6
90		min	0	6	0	4	0	6	0	6	0	2	0	2
91	MC1	max	.325	2	.144	6	.816	4	6.437e-3	4	2.718e-6	6	6.651e-6	4
92		min	0	6	-.151	4	-.808	6	-6.358e-3	6	-1.035e-5	2	-1.363e-3	2
93	MC2	max	.444	2	.239	6	2.178	4	1.037e-2	4	4.656e-6	6	2.548e-5	4
94		min	-.002	4	-.252	4	-2.153	6	-1.026e-2	6	-1.76e-5	2	-5.498e-4	2
95	MC3	max	.579	2	.311	6	4.231	4	1.417e-2	4	6.441e-6	6	2.013e-5	4
96		min	-.007	4	-.328	4	-4.188	6	-1.405e-2	6	-2.431e-5	2	-1.122e-3	2
97	MC4	max	.751	2	.36	6	6.741	4	1.584e-2	4	7.908e-6	6	7.953e-6	4
98		min	-.009	4	-.381	4	-6.678	6	-1.573e-2	6	-2.981e-5	2	-5.042e-4	2
99	MC5	max	.977	2	.382	6	9.633	4	2.083e-2	4	8.792e-6	6	5.899e-6	4
100		min	-.01	4	-.406	4	-9.553	6	-2.073e-2	6	-3.314e-5	2	-4.288e-3	2
101	TOPLEG1	max	1.58	2	.167	4	11.226	4	1.878e-2	4	4.078e-3	6	1.389e-3	6
102		min	-.11	6	-.189	6	-10.983	6	-1.826e-2	6	-1.374e-2	2	-1.44e-3	4
103	TOPLEG2	max	1.577	2	.166	4	11.512	4	1.888e-2	4	3.299e-3	6	1.501e-3	4
104		min	-.116	6	-.19	6	-11.581	6	-1.917e-2	6	-1.374e-2	2	-1.309e-3	6
105	TOPMAST	max	6.32	2	.38	6	22.345	4	3.169e-2	4	8.792e-6	6	5.899e-6	4
106		min	-.012	4	-.408	4	-22.222	6	-3.159e-2	6	-3.314e-5	2	-1.515e-2	2
107	TOPPLT1	max	.487	2	.037	4	.87	4	6.03e-3	4	5.299e-5	4	2.866e-4	4
108		min	-.023	6	-.04	6	-.862	6	-5.97e-3	6	-4.584e-4	2	-9.227e-4	2
109	TOPPLT2	max	.487	2	.036	4	.93	4	6.412e-3	4	2.34e-4	6	5.192e-4	6
110		min	-.014	6	-.041	6	-.924	6	-6.37e-3	6	-4.512e-4	2	-9.377e-4	2
111	T_MOBILE	max	5.774	2	.38	6	21.204	4	3.169e-2	4	8.792e-6	6	5.899e-6	4
112		min	-.012	4	-.408	4	-21.084	6	-3.159e-2	6	-3.314e-5	2	-1.515e-2	2
113	METRO	max	1.493	2	.167	4	10.117	4	1.817e-2	4	3.49e-3	6	8.624e-4	4
114		min	-.091	6	-.187	6	-9.905	6	-1.765e-2	6	-1.216e-2	2	-1.706e-3	2
115	METRO2	max	1.492	2	.166	4	10.397	4	1.828e-2	4	3.021e-3	6	1.021e-3	6
116		min	-.121	6	-.188	6	-10.449	6	-1.857e-2	6	-1.214e-2	2	-1.697e-3	2
117	FC1	max	.422	2	.214	6	1.754	4	9.173e-3	4	4.145e-6	6	2.232e-5	4
118		min	-.001	4	-.225	4	-1.734	6	-9.061e-3	6	-1.569e-5	2	-5.072e-4	2
119	FC2	max	.719	2	.347	6	6.056	4	1.562e-2	4	7.521e-6	6	9.599e-6	4
120		min	-.008	4	-.367	4	-5.998	6	-1.55e-2	6	-2.836e-5	2	-9.108e-4	2
121	FC3	max	1.878	2	.381	6	12.543	4	2.66e-2	4	8.792e-6	6	5.899e-6	4
122		min	-.011	4	-.407	4	-12.452	6	-2.651e-2	6	-3.314e-5	2	-1.006e-2	2
123	GPS	max	.817	2	.134	4	4.737	4	1.486e-2	4	1.092e-3	6	3.237e-4	4
124		min	-.044	6	-.146	6	-4.671	6	-1.455e-2	6	-5.337e-3	2	-1.847e-3	2

Envelope AISC ASD Steel Code Checks

	Mem...	Shape	Code Check	Loc[ft]	LC	Shear C...	Loc[ft]	Dir	LC	Fa [...	Ft [...	Fb y..	Fb z...	C..	C..	AS...
1	CRO...	L5x5x5	.096	15.207	2	.012	15.207	z	4	17.54	28.7...	- Co...				H2-1
2	CRO...	L5x5x5	.167	15.207	2	.011	15.207	z	4	17.54	28.7...	- Co...				H1-1

Envelope AISC ASD Steel Code Checks (Continued)

	Mem...	Shape	Code Check	Loc[ft]	LC	Shear C...	Loc[ft]	Dir	LC	Fa [...	Ft [...	Fb y..	Fb z....		C...	C..	AS...
3	CRO...	L5x5x5	.157	15.207	2	.011	15.207	z	4	17.54	28.7...	- Co...					H2-1
4	CRO...	L5x5x5	.260	15.207	2	.010	15.207	z	4	17.54	28.7...	- Co...					H1-1
5	CRO...	L3.5x3.5x5	.538	0	6	.012	18.916	z	4	7.251	28.7...	- Co...					H1-1
6	CRO...	L3.5x3.5x5	.994	18.916	2	.012	18.916	z	4	7.251	28.7...	- Co...					H1-1
7	CRO...	L5x5x5	.316	33.126	2	.019	0	z	4	1.235	28.7...	- Co...					H2-1
8	CRO...	L5x5x5	.056	0	4	.020	0	z	4	1.235	28.7...	- Co...					H2-1
9	HOR...	L5x5x5	.137	6.755	4	.008	13.509	z	6	18.8...	28.7...	- Co...					H1-1
10	HOR...	L5x5x5	.139	6.755	4	.008	13.509	z	6	18.8...	28.7...	- Co...					H1-1
11	HOR...	L5x5x5	.081	6.755	4	.008	13.509	z	6	18.8...	28.7...	- Co...					H1-1
12	HOR...	L5x5x5	.093	6.755	4	.008	13.509	z	6	18.8...	28.7...	- Co...					H1-1
13	HOR...	L5x5x5	.043	6.755	4	.009	13.509	z	6	18.8...	28.7...	- Co...					H1-1
14	HOR...	L5x5x5	.141	13.509	2	.009	13.509	z	6	18.8...	28.7...	- Co...					H1-1
15	HOR...	L5x5x5	.067	0	6	.009	13.509	z	6	18.8...	28.7...	- Co...					H1-1
16	HOR...	L5x5x5	.085	13.509	2	.009	13.509	z	6	18.8...	28.7...	- Co...					H1-1
17	HOR...	L5x5x5	.061	0	6	.009	13.509	z	6	18.8...	28.7...	- Co...					H1-1
18	HOR...	L5x5x5	.057	13.509	2	.009	13.509	z	6	18.8...	28.7...	- Co...					H1-1
19	HOR...	TU8X4X5	.097	0	6	.025	13.5	y	2	36.1...	36.7...	40.47	40.47	...	.85	.85	H1-2
20	LEG1	W24x68	.941	.625	6	.061	0	y	4	39.3...	39.99	49.9...	36.7...	...	.9...	.85	H1-2
21	LEG2	W24x68	.994	1.25	6	.069	0	y	4	39.7...	39.99	49.9...	36.8...	...	.8...	.85	H1-2
22	LEG...	new	.478	0	6	.080	0	y	4	35.6...	39.99	49.9...	39.7...	...	.2...	.85	H1-2
23	LEG...	new	.500	0	6	.088	0	y	4	35.6...	39.99	49.9...	39.7...	...	.2...	.85	H1-2
24	WT1	WT6x15	.212	5.045	6	.007	0	y	4	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
25	WT2	WT6x15	.318	5.256	2	.006	10.091	y	4	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
26	WT3	WT6x15	.365	4.835	2	.005	0	y	6	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
27	WT4	WT6x15	.232	4.94	4	.005	10.091	y	4	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
28	WT5	WT6x15	.545	5.045	6	.007	0	y	6	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
29	WT6	WT6x15	.607	5.045	6	.006	10.091	y	4	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
30	WT7	WT6x15	.397	4.94	4	.007	10.091	y	6	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
31	WT8	WT6x15	.445	4.94	4	.006	0	y	4	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
32	WT9	WT6x15	.578	5.045	6	.006	0	y	2	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
33	WT10	WT6x15	.528	5.045	6	.007	0	z	2	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
34	WT11	WT6x15	.451	5.151	4	.006	10.091	y	6	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
35	WT12	WT6x15	.486	4.94	4	.006	10.091	z	2	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
36	WT13	WT6x15	.483	5.045	6	.011	0	z	2	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
37	WT14	WT6x15	.481	5.045	6	.010	10.091	y	2	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
38	WT15	WT6x15	.635	4.94	4	.009	10.091	y	2	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
39	WT16	WT6x15	.651	4.94	4	.009	10.091	z	2	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
40	WT17	WT6x15	.685	5.045	6	.013	0	z	2	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
41	WT18	WT6x15	.688	5.045	6	.012	10.091	y	2	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
42	WT19	WT6x15	.320	4.94	4	.015	10.091	y	2	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
43	WT20	WT6x15	.337	4.94	4	.016	0	z	2	19.53	39.99	28.3...	28.3...	1	1	1	H1-1
44	Mast1	HSS18x...	.850	0	4	.018	0		2	29.9...	33.5...	36.9...	36.9...	1	.85	.3...	H1-2
45	Mast2	HSS18x...	.729	3.438	4	.011	3.438		2	33.0...	33.5...	36.9...	36.9...	...	.85	.8...	H1-2
46	Mast3	HSS18x...	.534	17.188	4	.043	17.188		2	31.15	33.5...	36.9...	36.9...	...	.85	.6...	H1-2
47	Mast4	HSS18x...	.271	0	6	.016	0		6	28.5...	33.5...	36.9...	36.9...	...	.85	.6	H1-2
48	Horz ...	TU8X4X5	.096	0	6	.025	13.5	y	2	36.1...	36.7...	40.47	40.47	...	.9...	.85	H1-2

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTLEG1	-12.644	-109.218	-1.208	52.069	.025	97.824
2	1	BOTMAST	-4.417	17.272	-.029	-.806	.072	52.005
3	1	BOTLEG2	-12.37	150.793	1.237	-56.342	.025	97.446
4	1	Totals:	-29.431	58.846	0			
5	1	COG (ft):	X: 8.577	Y: 50.966	Z: .966			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTLEG1	-14.894	-134.238	-1.388	61.776	.029	114.922
2	2	BOTMAST	-5.169	13.322	-.038	-.845	.084	60.857
3	2	BOTLEG2	-14.438	163.944	1.426	-65.914	.029	113.785
4	2	Totals:	-34.502	43.028	0			
5	2	COG (ft):	X: 8.967	Y: 50.534	Z: 1.043			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	BOTLEG1	-4.341	-191.82	-17.426	-514.971	-.004	24.851
2	3	BOTMAST	-.028	437.149	-2.441	-79.964	.009	.235
3	3	BOTLEG2	4.369	-186.483	-18.928	-550.568	.011	-22.959
4	3	Totals:	0	58.846	-38.795			
5	3	COG (ft):	X: 7.398	Y: 50.966	Z: .966			

Joint Reactions

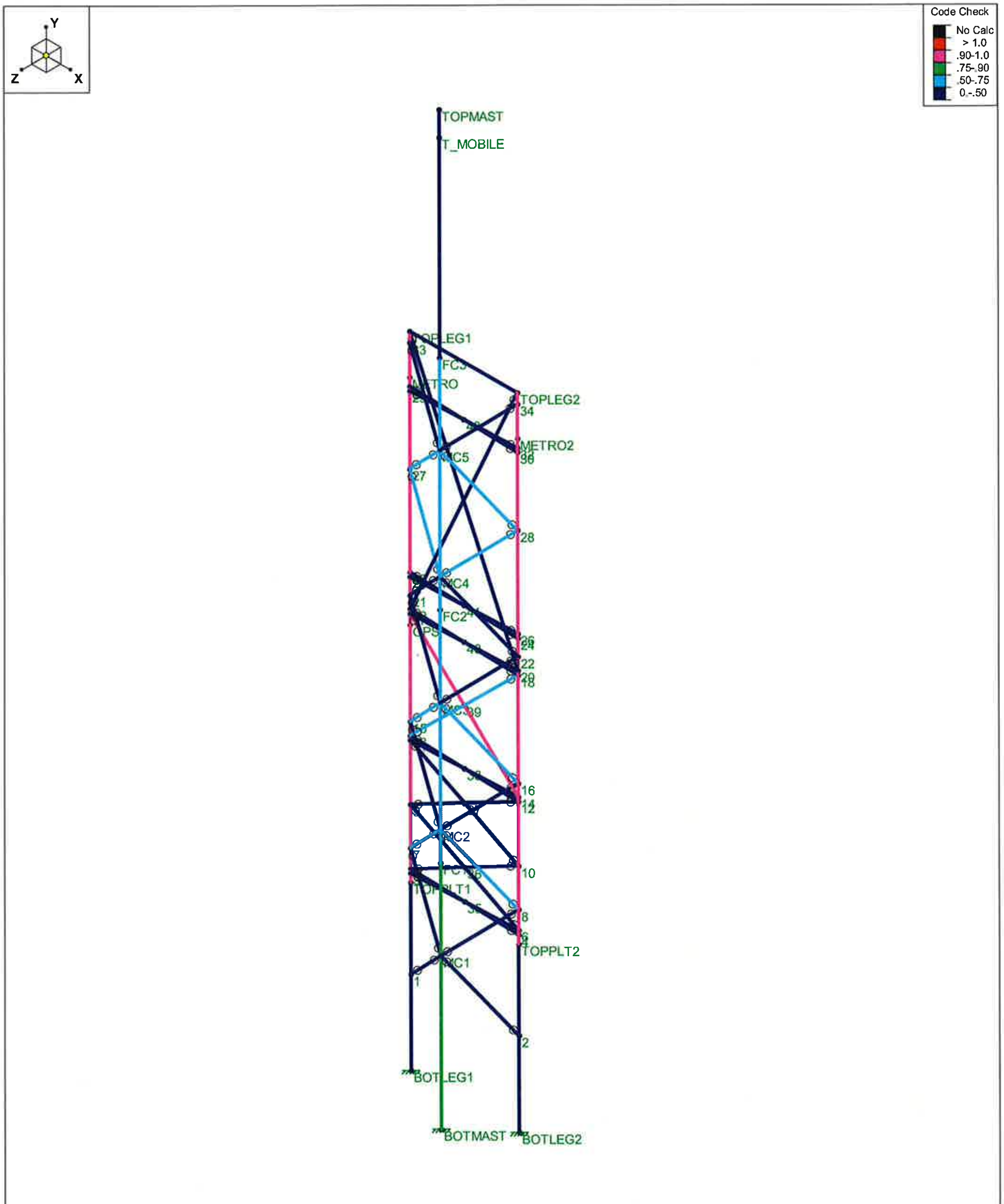
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	BOTLEG1	-5.037	-227.777	-20.058	-591.448	-.004	28.896
2	4	BOTMAST	-.036	496.652	-2.814	-91.952	.011	.266
3	4	BOTLEG2	5.073	-225.847	-21.901	-635.164	.012	-26.654
4	4	Totals:	0	43.028	-44.773			
5	4	COG (ft):	X: 7.11	Y: 50.534	Z: 1.043			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	5	BOTLEG1	4.564	227.529	17.411	510.526	0	-26.205
2	5	BOTMAST	.039	-402.155	2.467	79.232	-.018	-.242
3	5	BOTLEG2	-4.603	233.472	18.916	547.061	-.013	24.384
4	5	Totals:	0	58.846	38.795			
5	5	COG (ft):	X: 7.398	Y: 50.966	Z: .966			

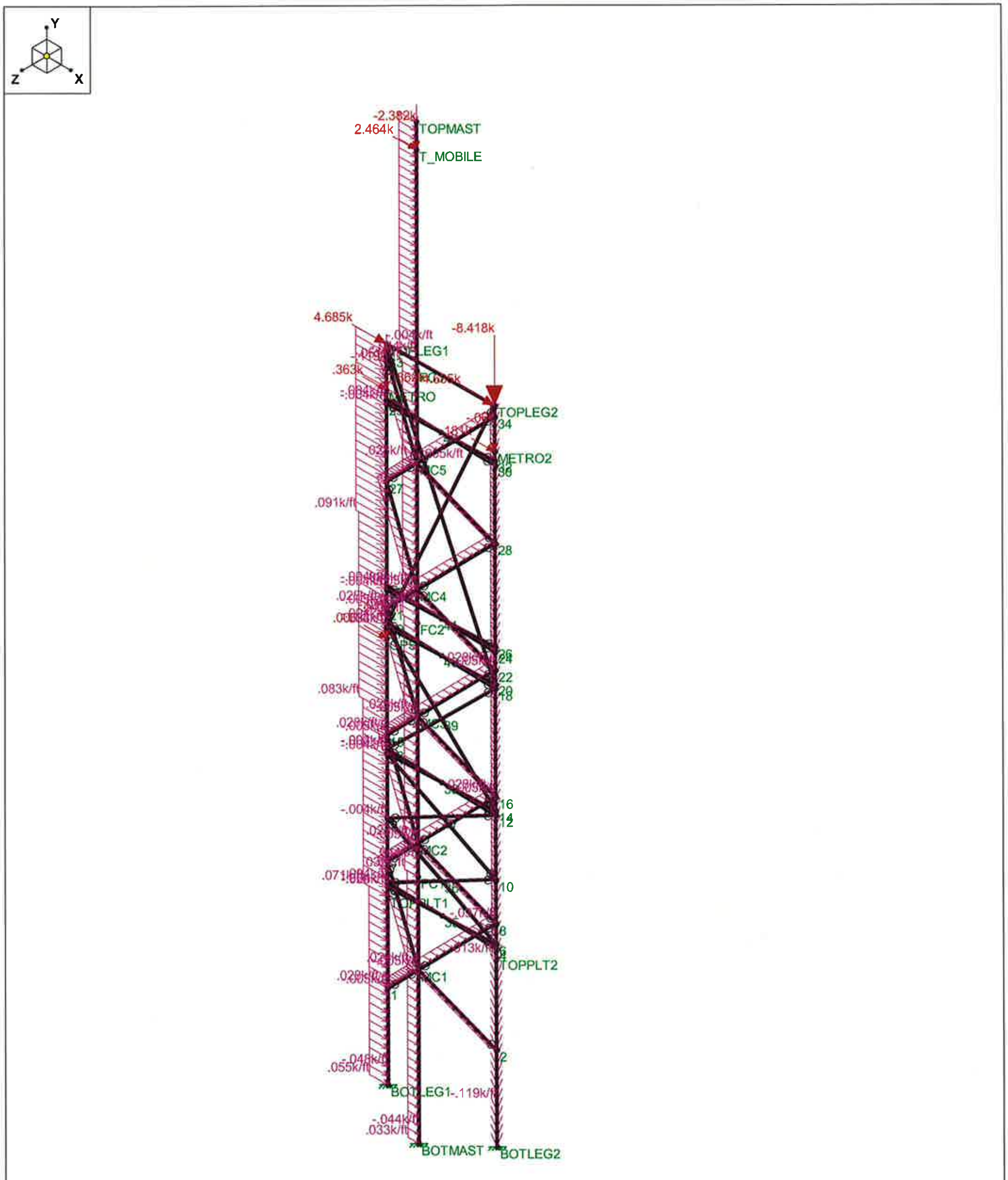
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	6	BOTLEG1	5.219	254.897	20.042	587.112	0	-30.067
2	6	BOTMAST	.047	-469.442	2.843	91.395	-.022	-.324
3	6	BOTLEG2	-5.265	257.572	21.888	631.947	-.016	27.745
4	6	Totals:	0	43.028	44.773			
5	6	COG (ft):	X: 7.11	Y: 50.534	Z: 1.043			



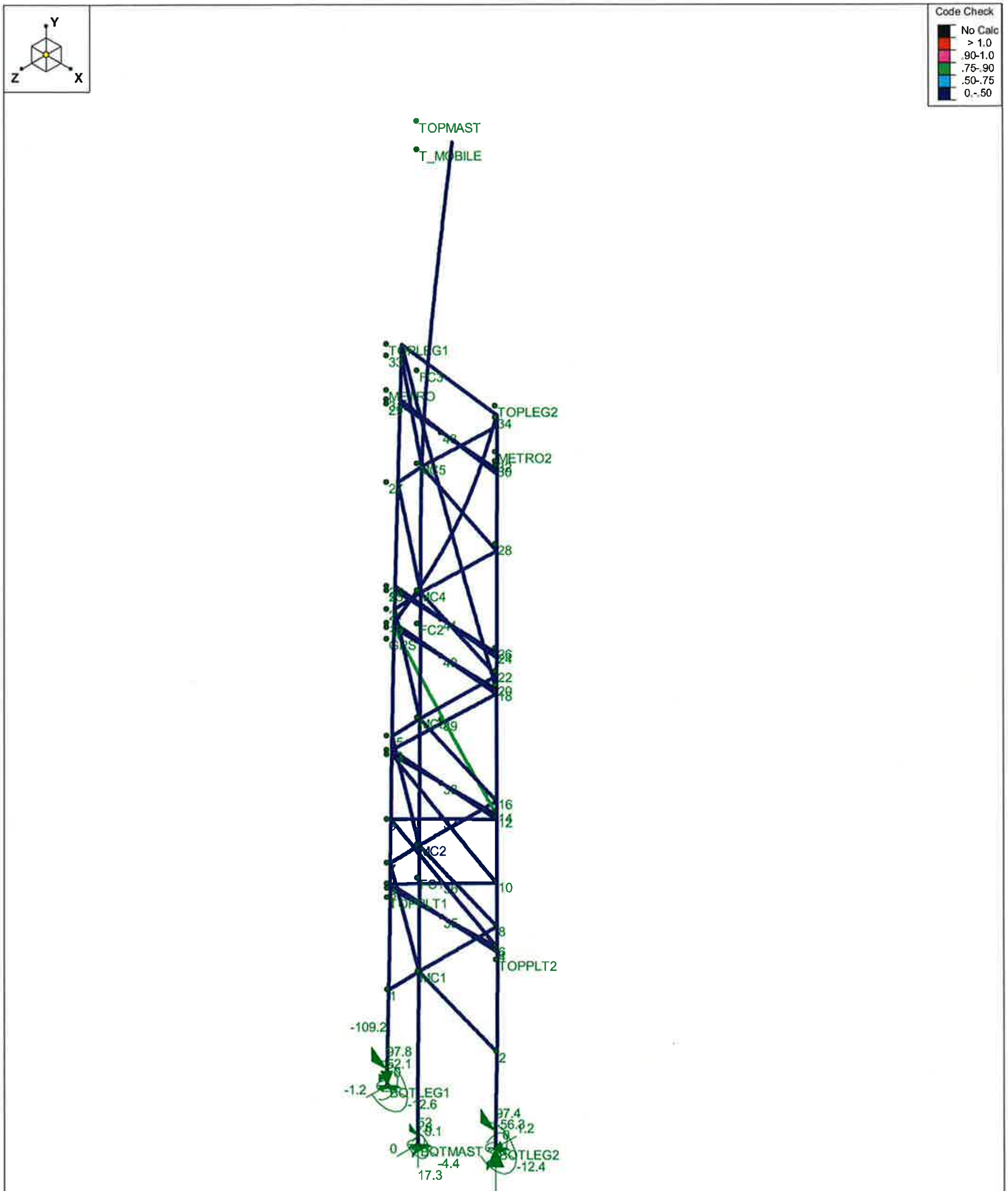
Solution: Envelope

Centek Engineering	82' Sign Structure with 111' Pipe Mast	
TJL/CFC	Unity Check	Dec 11, 2013 at 11:27 AM
13001.070		82' Sign Structure.r3d



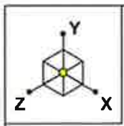
Loads: LC 1, TIA/EIA Wind + Ice in +X Direction

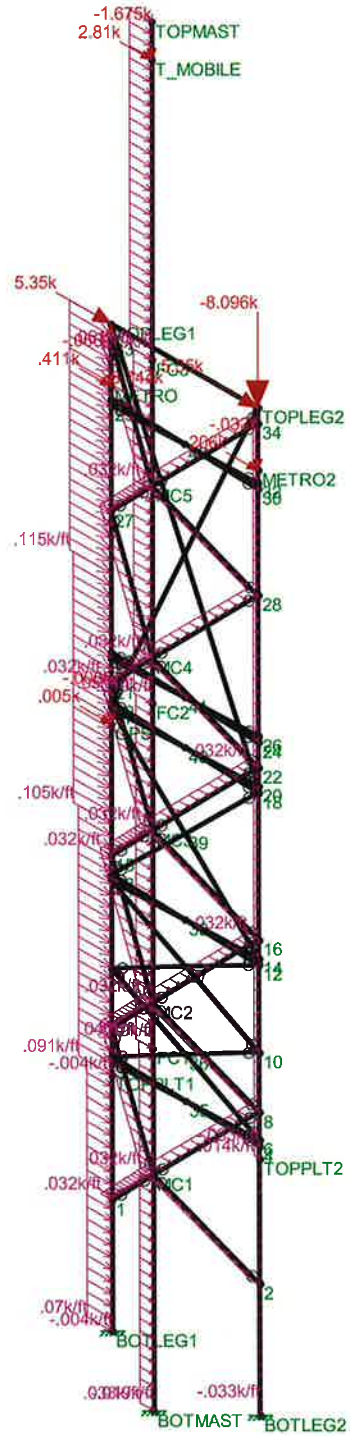
Centek Engineering		
TJL/CFC	82' Sign Structure with 111' Pipe Mast	Dec 11, 2013 at 11:28 AM
13001.070	LC #1 Loads	82' Sign Structure.r3d



Results for LC 1, TIA/EIA Wind + Ice in +X Direction
Z-moment Reaction units are k and k-ft

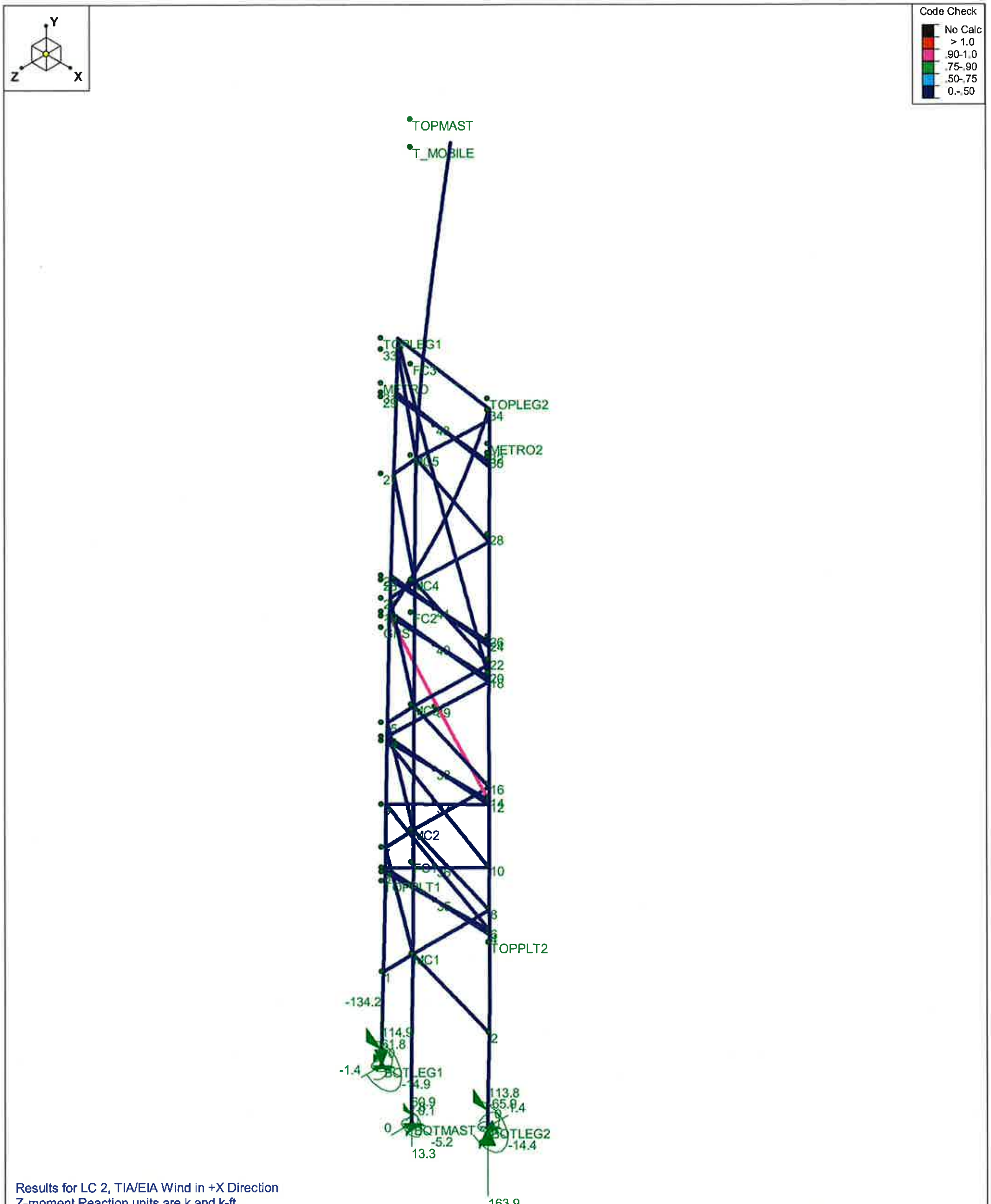
Centek Engineering		
TJL/CFC	82' Sign Structure with 111' Pipe Mast	Dec 11, 2013 at 11:30 AM
13001.070	LC #1 Reactions and Deflected Shape	82' Sign Structure.r3d





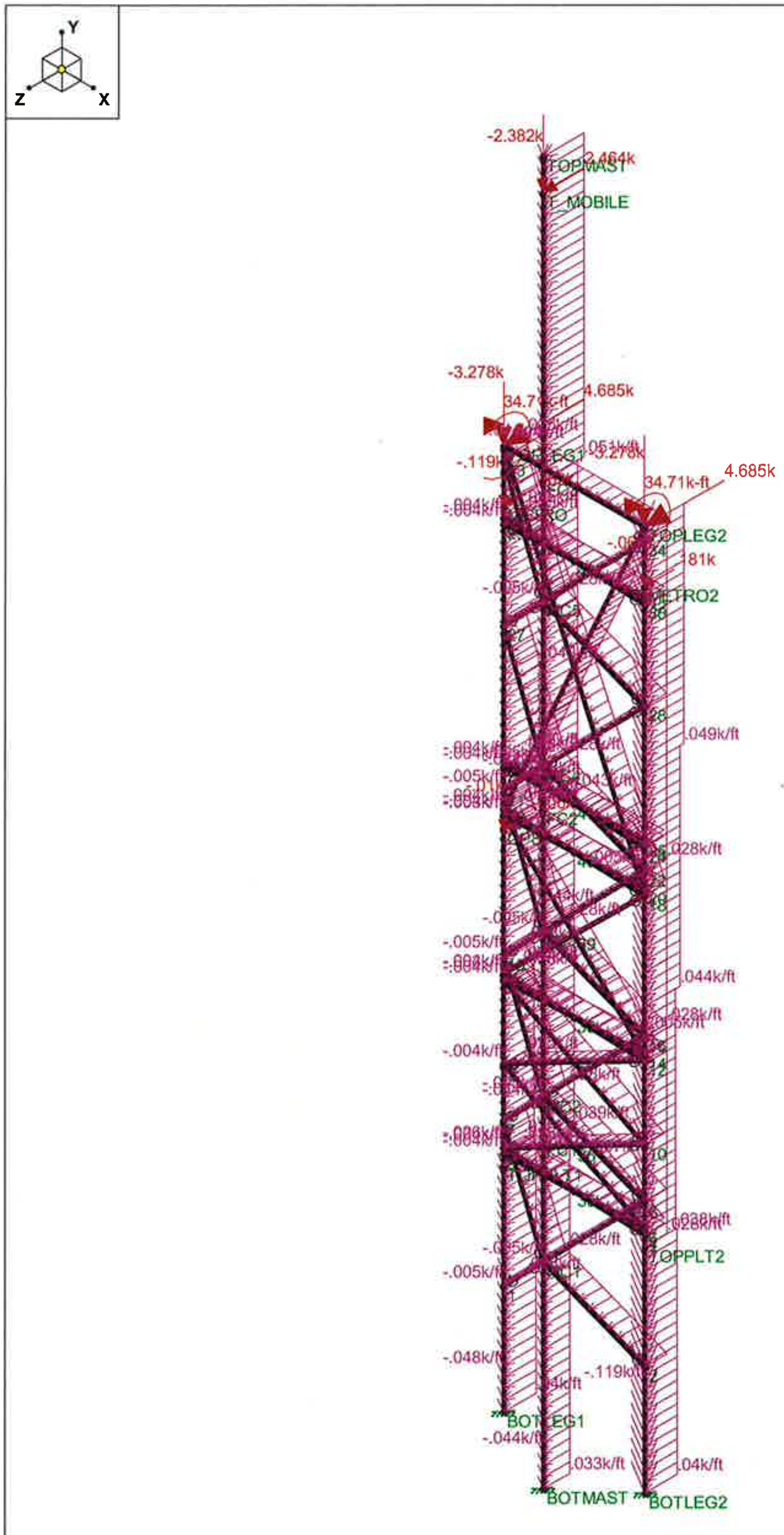
Loads: LC 2, TIA/EIA Wind in +X Direction

Centek Engineering	82' Sign Structure with 111' Pipe Mast	
TJL/CFC		Dec 11, 2013 at 11:28 AM
13001.070	LC #2 Loads	82' Sign Structure.r3d



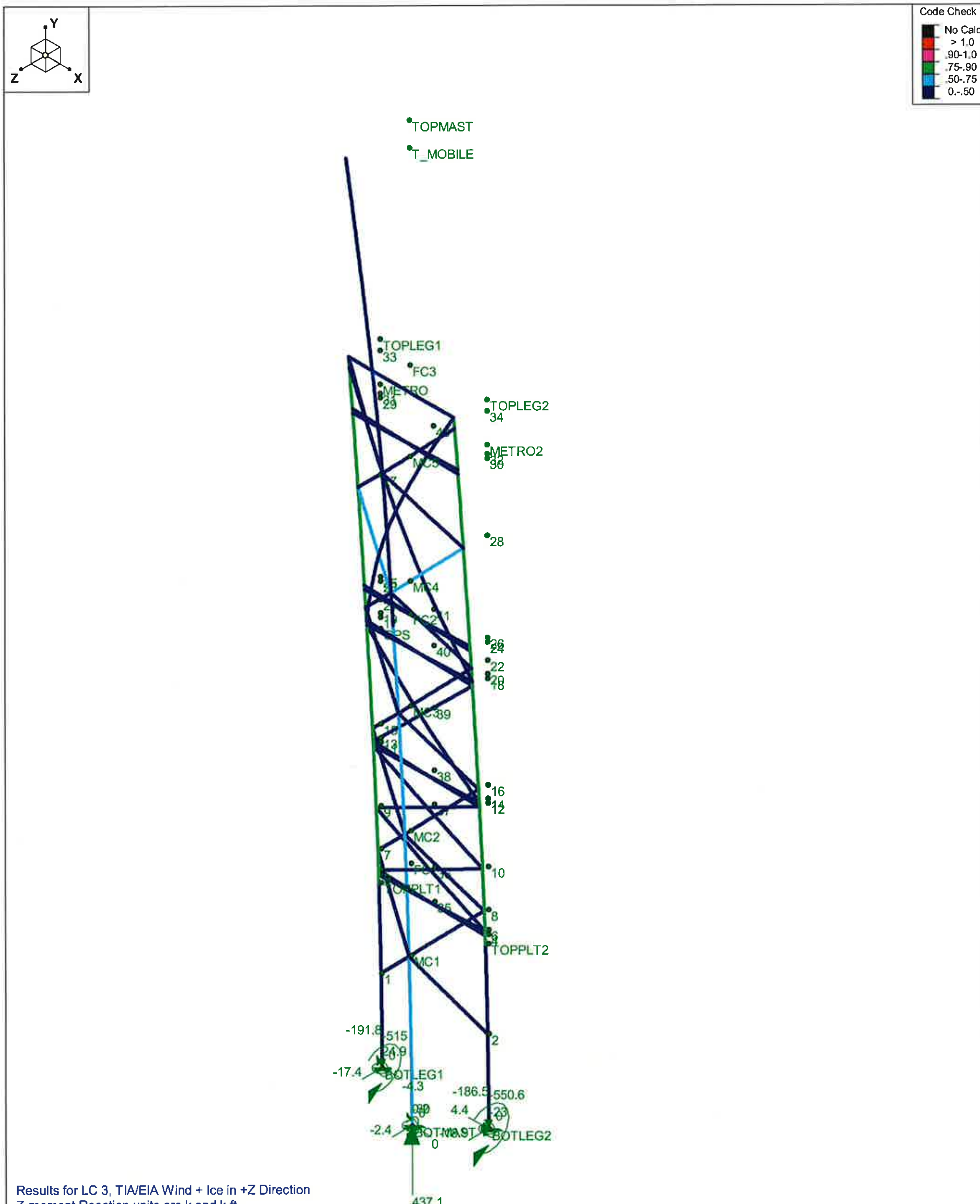
Results for LC 2, TIA/EIA Wind in +X Direction
Z-moment Reaction units are k and k-ft

Centek Engineering		
TJL/CFC	82' Sign Structure with 111' Pipe Mast	Dec 11, 2013 at 11:30 AM
13001.070	LC #2 Reactions and Deflected Shape	82' Sign Structure.r3d



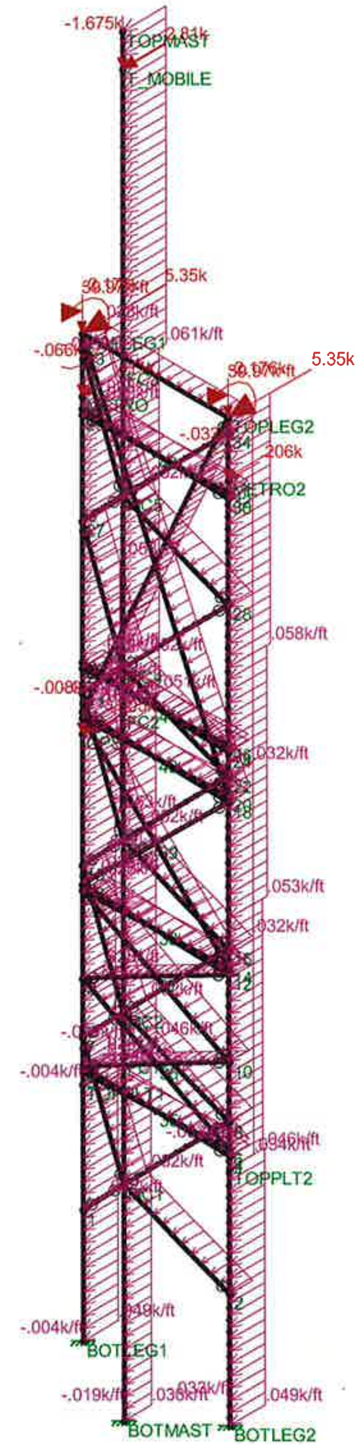
Loads: LC 3, TIA/EIA Wind + Ice in +Z Direction

Centek Engineering		
TJL/CFC	82' Sign Structure with 111' Pipe Mast	Dec 11, 2013 at 11:28 AM
13001.070	LC #3 Loads	82' Sign Structure.r3d



Results for LC 3, TIA/EIA Wind + Ice in +Z Direction
Z-moment Reaction units are k and k-ft

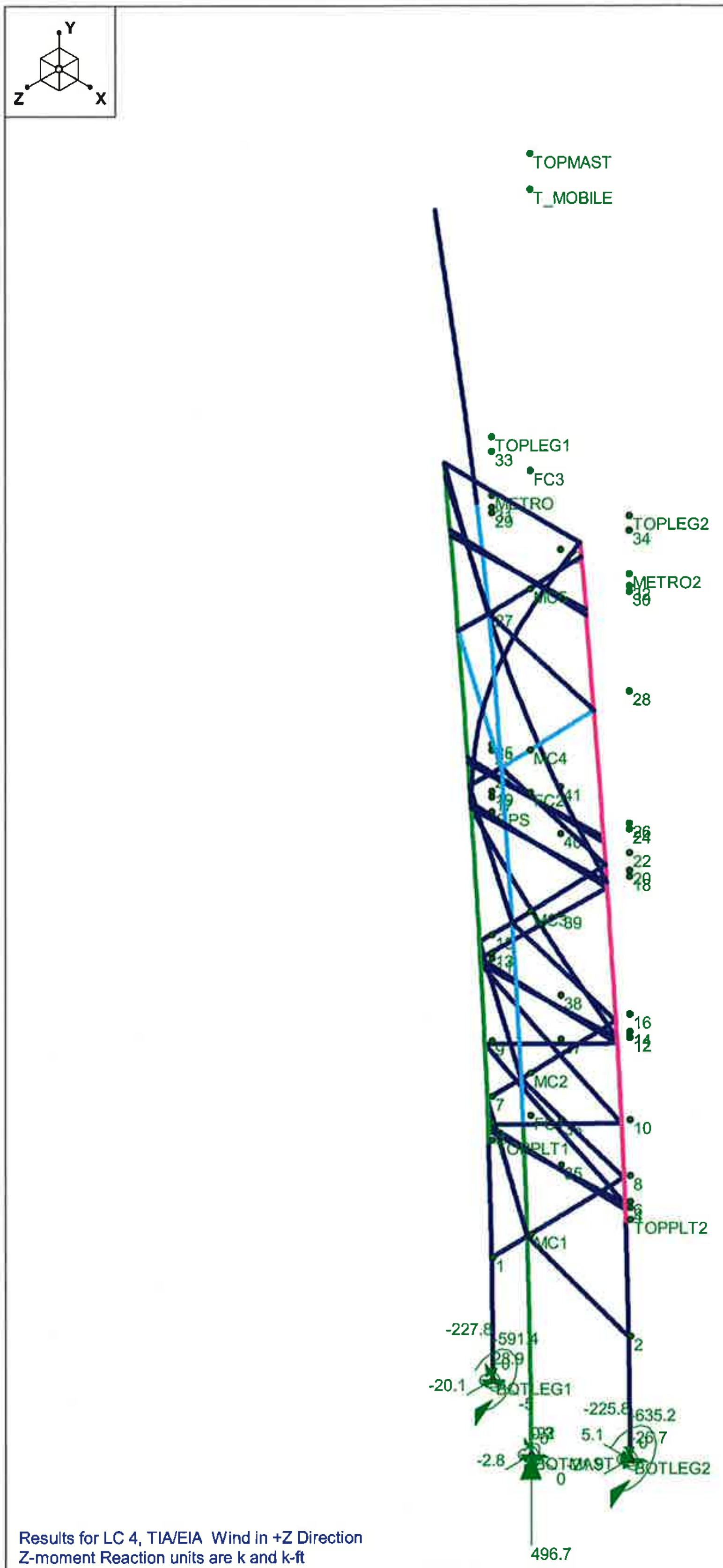
Centek Engineering		
TJL/CFC	82' Sign Structure with 111' Pipe Mast	Dec 11, 2013 at 11:31 AM
13001.070	LC #3 Reactions and Deflected Shape	82' Sign Structure.r3d



Loads: LC 4, TIA/EIA Wind in +Z Direction

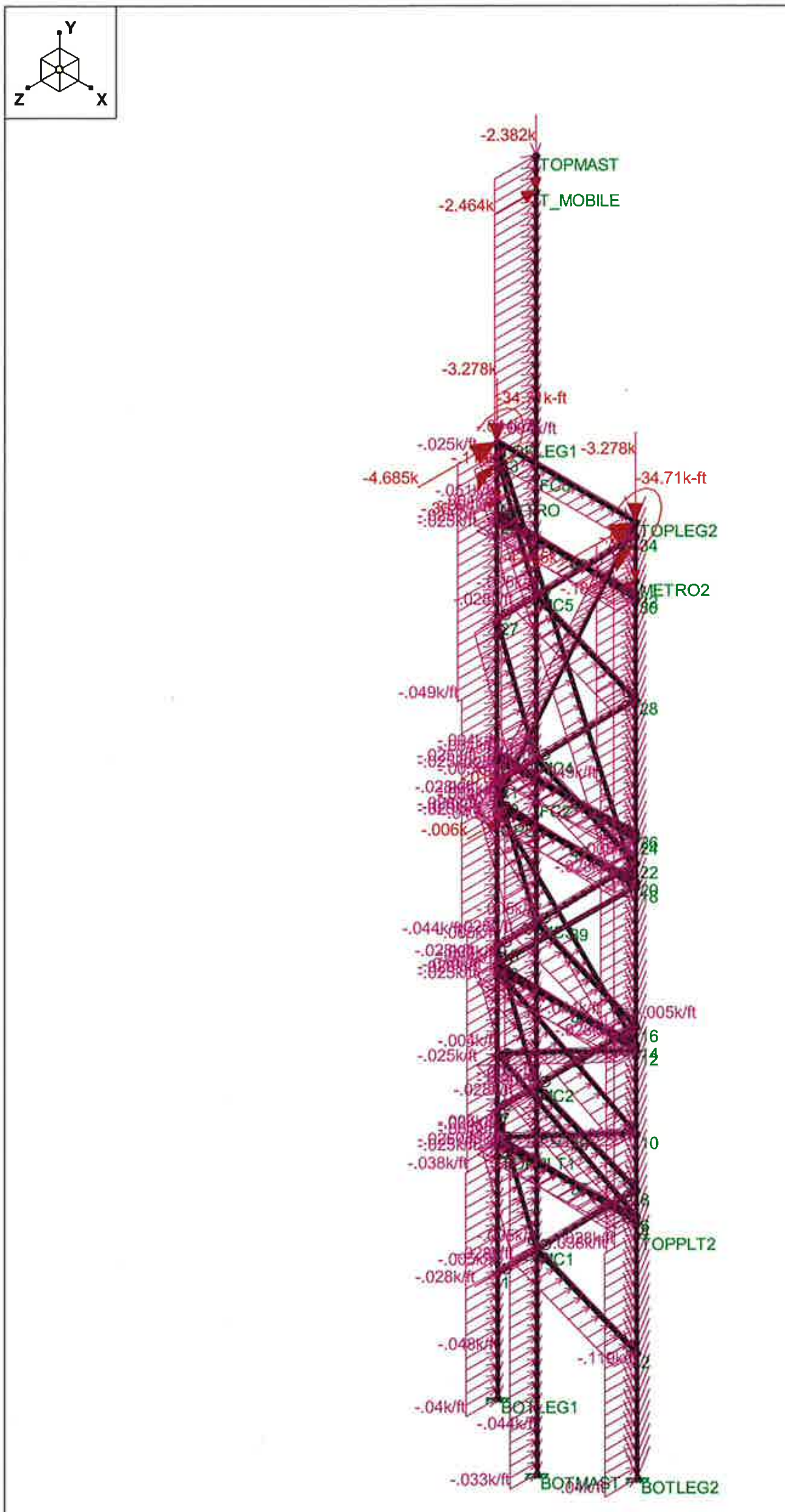
Centek Engineering		
TJL/CFC	82' Sign Structure with 111' Pipe Mast	Dec 11, 2013 at 11:29 AM
13001.070	LC #4 Loads	82' Sign Structure.r3d

Code Check
- No Calc
- > 1.0
- .90-1.0
- .75-.90
- .50-.75
- 0.-.50



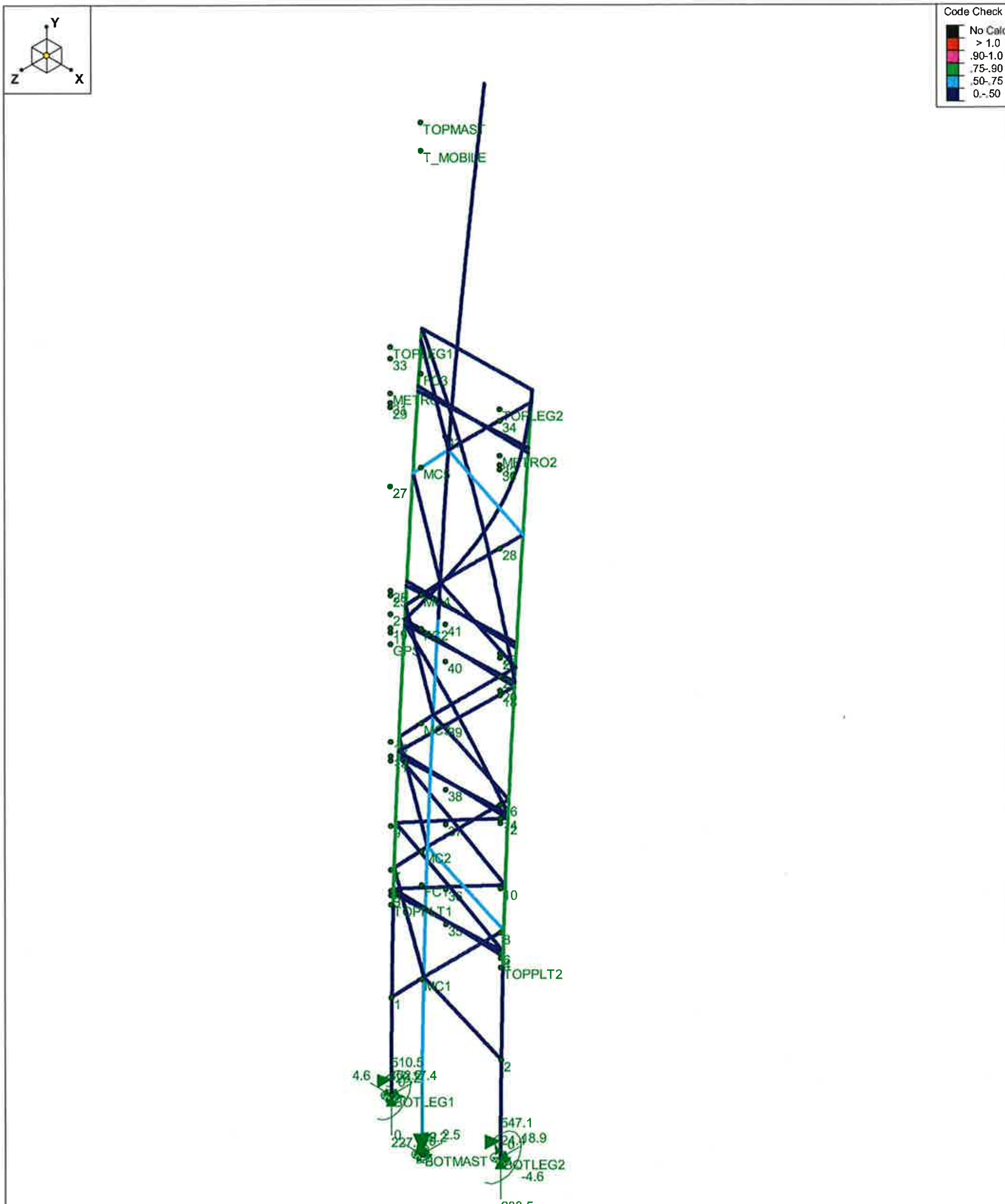
Results for LC 4, TIA/EIA Wind in +Z Direction
Z-moment Reaction units are k and k-ft

Centek Engineering		
TJL/CFC	82' Sign Structure with 111' Pipe Mast	Dec 11, 2013 at 11:32 AM
13001.070	LC #4 Reactions and Deflected Shape	82' Sign Structure.r3d



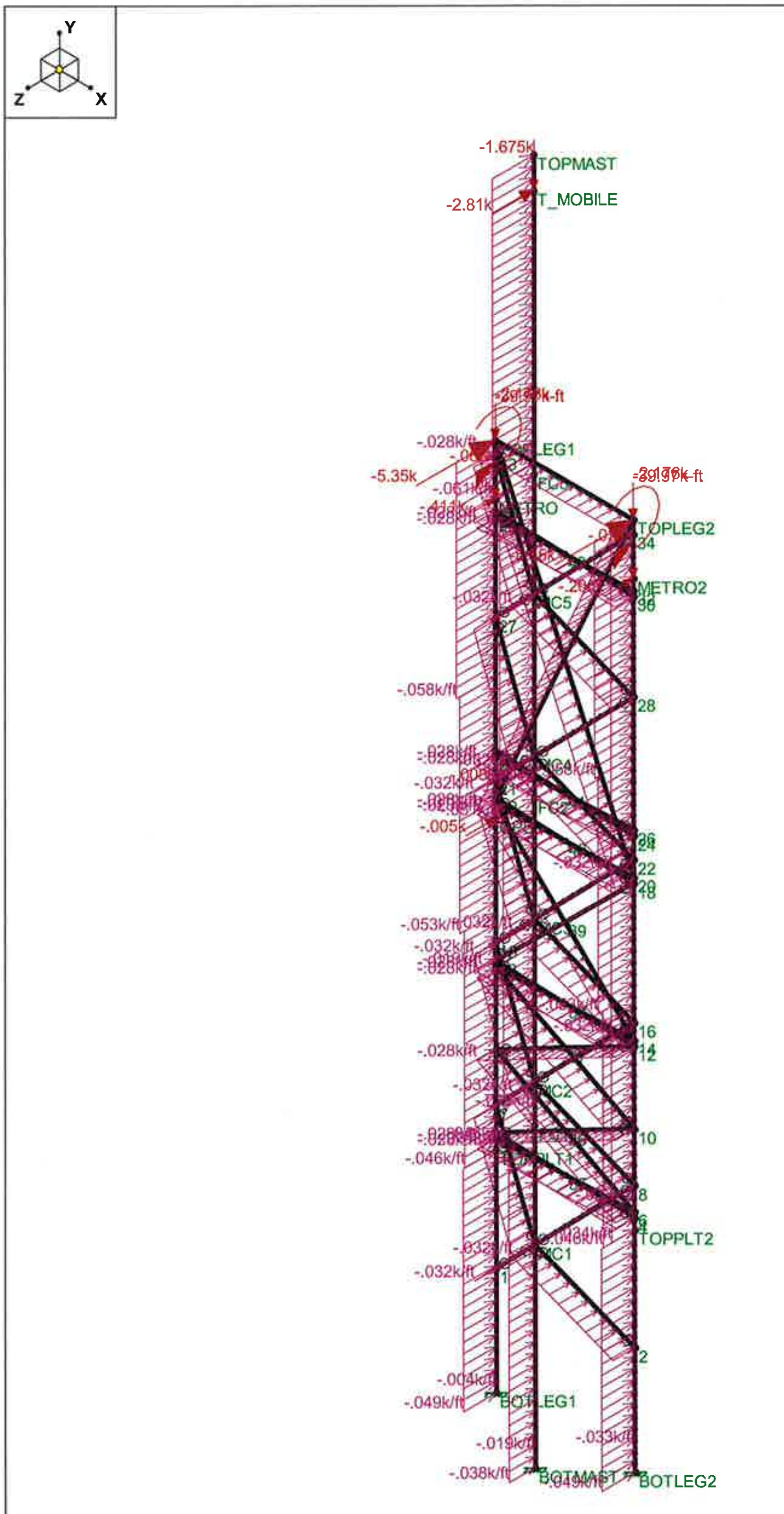
Loads: LC 5, TIA/EIA Wind + Ice in -Z' Direction

Centek Engineering	82' Sign Structure with 111' Pipe Mast	
TJL/CFC		Dec 11, 2013 at 11:29 AM
13001.070	LC #5 Loads	82' Sign Structure.r3d



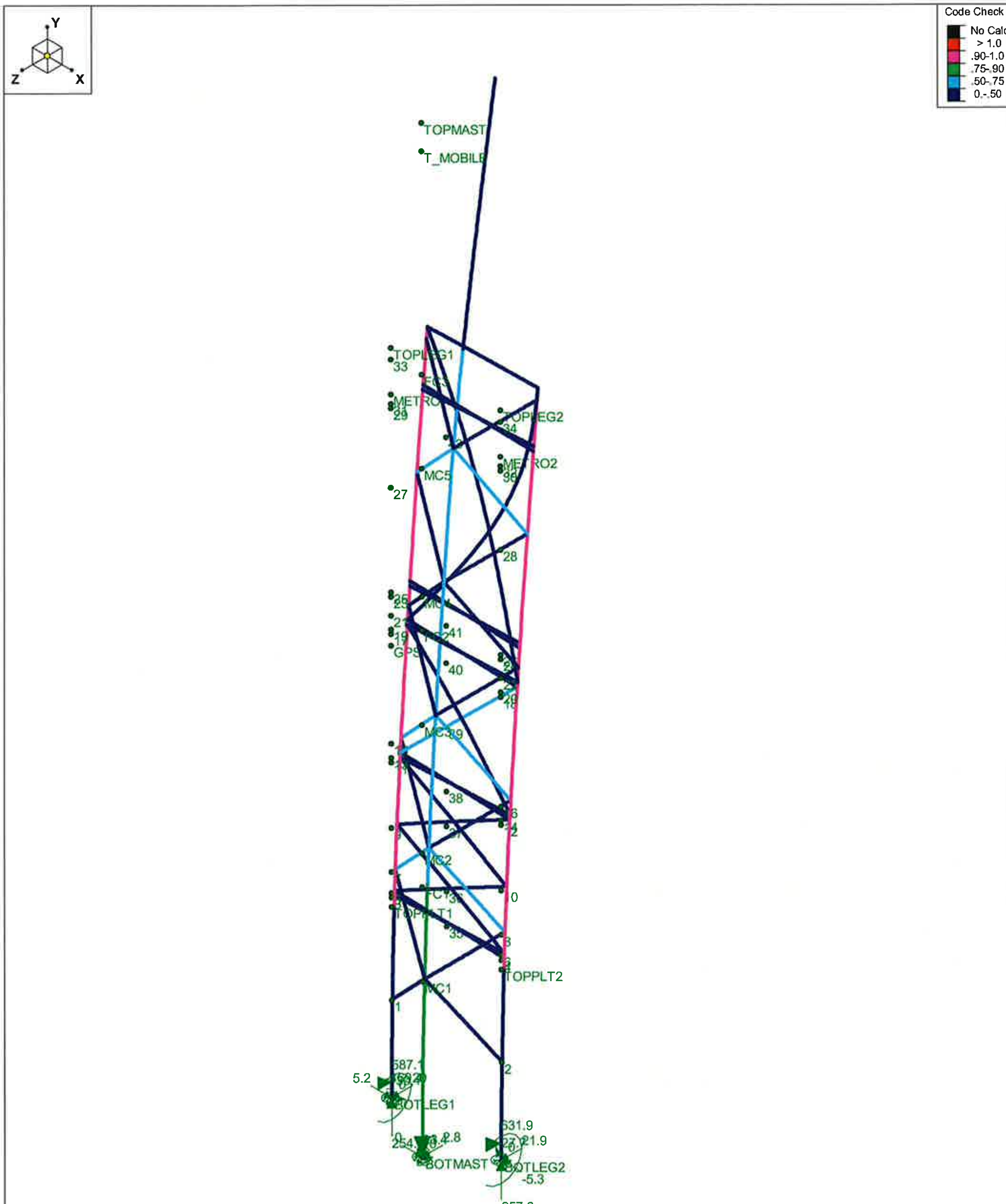
Results for LC 5, TIA/EIA Wind + Ice in -Z' Direction
Z-moment Reaction units are k and k-ft

Centek Engineering		
TJL/CFC	82' Sign Structure with 111' Pipe Mast	Dec 11, 2013 at 11:32 AM
13001.070	LC #5 Reactions and Deflected Shape	82' Sign Structure.r3d



Loads: LC 6, TIA/EIA Wind in -Z' Direction

Centek Engineering		
TJL/CFC	82' Sign Structure with 111' Pipe Mast	Dec 11, 2013 at 11:29 AM
13001.070	LC #6 Loads	82' Sign Structure.r3d

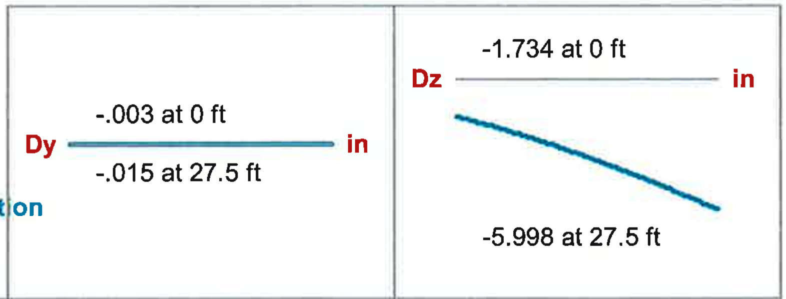


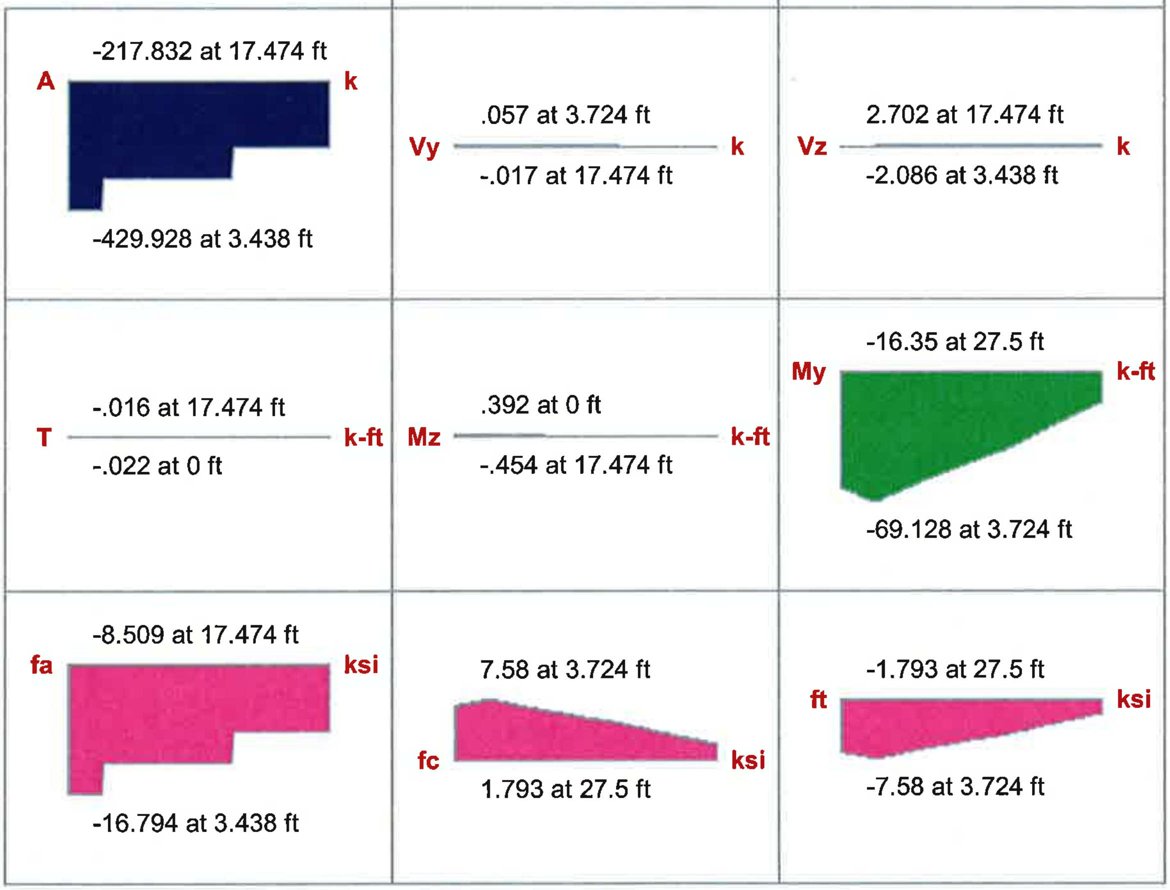
Results for LC 6, TIA/EIA Wind in -Z' Direction
Z-moment Reaction units are k and k-ft

Centek Engineering		
TJL/CFC	82' Sign Structure with 111' Pipe Mast	Dec 11, 2013 at 11:33 AM
13001.070	LC #6 Reactions and Deflected Shape	82' Sign Structure.r3d

Beam: *Mast2*

Shape: **HSS18x0.5**
Material: **A500 Gr.42**
Length: **27.5 ft**
I Joint: **FC1**
J Joint: **FC2**
LC 6: TIA/EIA Wind in -Z' Direction
Code Check: **0.705 (bending)**
Report Based On 97 Sections





AISC 9th: ASD Code Check

Max Bending Check	**0.705**	Max Shear Check	**0.009 (s)**
Location	**3.438 ft**	Location	**17.474 ft**
Equation	**H2-1**	Max Defl Ratio	**L/77**

Compact
Allowables Increase: **1.333**

Fy	**42 ksi**		y-y	z-z
Fa	**33.084 ksi**	Cm	**.85**	**.942**
Ft	**33.592 ksi**	Lb	**3.625 ft**	**3.625 ft**
Fby	**36.951 ksi**	KL/r	**7.013**	**7.013**
Fbz	**36.951 ksi**	Sway	**No**	**No**
Fvy	**22.394 ksi**	L Comp Flange	**27.5 ft**	
Fvz	**22.394 ksi**	Warp Length	**NC**	
Cb	**1**			

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 91.4 \cdot ft \cdot kips$	(Input From Risa-3D LC #6)
Shear Force =	$Shear := 3 \cdot kips$	(Input From Risa-3D LC #6)
Axial Force =	$Axial := -469 \cdot kips$	(Input From Risa-3D LC #6)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts =	$N := 10$
Diameter of Bolt Circle =	$D_{bc} := 24 \cdot in$
Bolt "Column" Distance =	$l := 3 \cdot in$
Bolt Ultimate Strenght =	$F_u := 100 \cdot ksi$
Bolt Yeild Strenght =	$F_y := 75 \cdot ksi$
Bolt Modulus =	$E := 29000 \cdot ksi$
Diameter of Anchor Bolts =	$D := 1.75 \cdot in$
Threads per Inch =	$n := 5$

Base Plate Data:

Use ASTM A572 Mod 50

Plate Yield Strength =	$Fy_{bp} := 50 \cdot ksi$
Base Plate Thickness =	$t_{bp} := 2.0 \cdot in$
Base Plate Diameter =	$D_{bp} := 30 \cdot in$
Outer Pole Diameter =	$D_{pole} := 18 \cdot in$

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 12 \cdot in$

Distance to Bolts = $i := 1 .. N$

$$d_i := \begin{vmatrix} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{vmatrix}$$

$d_1 = 7.05 \cdot in$	$d_6 = -7.05 \cdot in$
$d_2 = 11.41 \cdot in$	$d_7 = -11.41 \cdot in$
$d_3 = 11.41 \cdot in$	$d_8 = -11.41 \cdot in$
$d_4 = 7.05 \cdot in$	$d_9 = -7.05 \cdot in$
$d_5 = 0.00 \cdot in$	$d_{10} = -0.00 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 9 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$	$MA_6 = 0.00 \cdot in$
$MA_2 = 2.41 \cdot in$	$MA_7 = 0.00 \cdot in$
$MA_3 = 2.41 \cdot in$	$MA_8 = 0.00 \cdot in$
$MA_4 = 0.00 \cdot in$	$MA_9 = 0.00 \cdot in$
$MA_5 = 0.00 \cdot in$	$MA_{10} = 0.00 \cdot in$

Effective Width of Baseplate for Bending = $W_{eff} := .9 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 21.6 \cdot in$

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i (d_i)^2 = 720 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 2.405 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 1.899 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 1.555 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.389 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.369 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 65.2 \cdot kips$

Allowable Tensile Force = $T_{ALL.Gross} := 1.333 \cdot \left(0.33 \cdot A_g \cdot F_u\right) = 105.8 \cdot kips$ (1.333 increase allowed per TIA/EIA)

$T_{ALL.Net} := 1.333 \cdot \left(0.60 \cdot A_n \cdot F_y\right) = 113.939 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} = 57.2 \cdot \%$ Bolts are "upset bolts". Use net area per AISC

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Net}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Check Anchor Bolt Bending Stress:

Maximum Bending Moment = $M_x := \left(\frac{Shear}{N}\right) \cdot l = 0.075 \cdot ft \cdot kips$

Maximum Bending Stress = $f_{bx} := \frac{M_x}{S_x} = 2.4 \cdot ksi$

Allowable Bending Stress = $F_{bx} := 1.333 \cdot 0.6 \cdot F_y = 60 \cdot ksi$ (1.333 increase allowed per TIA/EIA)

Check Combined Stress Requirement:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required.

$$l := \begin{cases} l & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot in$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot ksi$$

Check Anchor Bolt Compression/Combined Stress:

Maximum Compressive Force = $C_{Max} := OM \cdot \frac{R_{bc}}{I_p} + \frac{Axial}{N} = -28.6 \cdot kips$

Maximum Compressive Stress = $f_a := \frac{C_{Max}}{A_n} = -15.1 \cdot ksi$

$K := 0.65$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} = 87.364$$

$$F_a := \begin{cases} \dfrac{\left[1 - \dfrac{\left(\frac{K \cdot l}{r}\right)^2}{2 \cdot C_c^{\,2}}\right] \cdot F_y}{\dfrac{5}{3} + \dfrac{3 \cdot \left(\frac{K \cdot l}{r}\right)}{8 \cdot C_c} - \dfrac{\left(\frac{K \cdot l}{r}\right)^3}{8 \cdot C_c^{\,3}}} & \text{if } \frac{K \cdot l}{r} \le C_c \\ \dfrac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r}\right)^2} & \text{if } \frac{K \cdot l}{r} > C_c \end{cases} = 45 \cdot ksi$$

Allowable Compressive Stress = $F_a := 1.333 \cdot F_a = 60 \cdot ksi$ (1.333 increase allowed per TIA/EIA)

Combined Stress % of Capacity = $\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}}\right) = -25.1 \cdot \%$

Condition 2 = Condition2 := if$\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition2 = "OK"

Base Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{|Axial|}{N}$

$C_1 = 57.6 \cdot kips$ $C_6 = 36.2 \cdot kips$

$C_2 = 64.3 \cdot kips$ $C_7 = 29.5 \cdot kips$

$C_3 = 64.3 \cdot kips$ $C_8 = 29.5 \cdot kips$

$C_4 = 57.6 \cdot kips$ $C_9 = 36.2 \cdot kips$

$C_5 = 46.9 \cdot kips$ $C_{10} = 46.9 \cdot kips$

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(W_{eff} \cdot t_{bp}^{\,2}\right)} = 21.5 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 1.33 \cdot 0.75 \cdot Fy_{bp} = 49.9 \cdot ksi$

Plate Bending Stresse % of Capacity = $\frac{f_{bp}}{F_{bp}} = 43.2 \cdot \%$

Condition3 = Condition3 := if$\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$

Condition3 = "Ok"

Flange Bolt and Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 69.2 \cdot ft \cdot kips$	(Input From Risa-3D LC #6)
Shear Force =	$Shear := 3 \cdot kips$	(Input From Risa-3D LC #6)
Axial Force =	$Axial := -430 \cdot kips$	(Input From Risa-3D LC #6)

Flange Bolt Data:

Use ASTM A325

Number of Flange Bolts =	$N := 20$
Diameter of Bolt Circle =	$D_{bc} := 21.0 \cdot in$
Bolt "Column" Distance =	$l := .125 \cdot in$
Bolt Ultimate Strenght =	$F_u := 120 \cdot ksi$
Bolt Yield Strenght =	$F_y := 92 \cdot ksi$
Bolt Modulus =	$E := 29000 \cdot ksi$
Diameter of Flange Bolts =	$D := 1.00 \cdot in$
Threads per Inch =	$n := 8$

Plate Data:

Use ASTM A572 Mod 50

Plate Yield Strength =	$Fy_{bp} := 50 \cdot ksi$
Plate Thickness =	$t_{bp} := 1.25 \cdot in$
Plate Diameter =	$D_{bp} := 24.00 \cdot in$
Outer Pole Diameter =	$D_{pole} := 18.00 \cdot in$

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 10.5 \cdot in$

Distance to Bolts = $i := 1..N$

$$d_i := \begin{vmatrix} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{vmatrix}$$

$d_1 = 3.24 \cdot in$ $d_6 = 9.99 \cdot in$

$d_2 = 6.17 \cdot in$ $d_7 = 8.49 \cdot in$

$d_3 = 8.49 \cdot in$ $d_8 = 6.17 \cdot in$

$d_4 = 9.99 \cdot in$ $d_9 = 3.24 \cdot in$

$d_5 = 10.50 \cdot in$ $d_{10} = 0.00 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 9 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_6 = 0.99 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$

$MA_3 = 0.00 \cdot in$ $MA_8 = 0.00 \cdot in$

$MA_4 = 0.99 \cdot in$ $MA_9 = 0.00 \cdot in$

$MA_5 = 1.50 \cdot in$ $MA_{10} = 0.00 \cdot in$

Effective Width of plate for Bending = $W_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 12.7 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i (d_i)^2 = 1102.5 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.878 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.22 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\,3}}{32} = 0.066 \cdot in^3$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 29.4 \cdot kips$

Allowable Tensile Force = $T_{ALL.Gross} := 1.333 \cdot \left(0.33 \cdot A_g \cdot F_u\right) = 41.5 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Gross}} = 70.9 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Gross}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Check Flange Bolt Bending Stress:

Maximum Bending Moment = $M_x := \left(\frac{Shear}{N}\right) \cdot l = 1.562 \times 10^{-3} \cdot ft \cdot kips$

Maximum Bending Stress = $f_{bx} := \frac{M_x}{S_x} = 0.3 \cdot ksi$

Allowable Bending Stress = $F_{bx} := 1.333 \cdot 0.6 \cdot F_y = 73.6 \cdot ksi$ (1.333 increase allowed per TIA/EIA)

Check Combined Stress Requirement:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required.

$$l := \begin{cases} l & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot in$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot ksi$$

Check Flange Bolt Compression/Combined Stress:

Maximum Compressive Force = $C_{Max} := OM \cdot \frac{R_{bc}}{I_p} + \frac{Axial}{N} = -13.6 \cdot kips$

Maximum Compressive Stress = $f_a := \frac{C_{Max}}{A_n} = -22.4 \cdot ksi$

$K := 0.65$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} = 78.881$$

$$F_a := \begin{cases} \dfrac{\left[1 - \dfrac{\left(\frac{K \cdot l}{r}\right)^2}{2 \cdot C_c^{\,2}}\right] \cdot F_y}{\dfrac{5}{3} + \dfrac{3\left(\frac{K \cdot l}{r}\right)}{8 \cdot C_c} - \dfrac{\left(\frac{K \cdot l}{r}\right)^3}{8 \cdot C_c^{\,3}}} & \text{if } \frac{K \cdot l}{r} \le C_c \\ \dfrac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r}\right)^2} & \text{if } \frac{K \cdot l}{r} > C_c \end{cases} = 55.2 \cdot ksi$$

Allowable Compressive Stress = $F_a := 1.333 \cdot F_a = 73.6 \cdot ksi$ (1.333 increase allowed per TIA/EIA)

Combined Stress % of Capacity = $\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}}\right) = -30.493 \cdot \%$

Condition 2 = Condition2 := if$\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition2 = "OK"

Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{|Axial|}{N}$

$C_1 = 23.9 \cdot kips$ $C_6 = 29.0 \cdot kips$

$C_2 = 26.1 \cdot kips$ $C_7 = 27.9 \cdot kips$

$C_3 = 27.9 \cdot kips$ $C_8 = 26.1 \cdot kips$

$C_4 = 29.0 \cdot kips$ $C_9 = 23.9 \cdot kips$

$C_5 = 29.4 \cdot kips$ $C_{10} = 21.5 \cdot kips$

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(W_{eff} \cdot t_{bp}^{\,2}\right)} = 30.6 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 1.33 \cdot 0.75 \cdot Fy_{bp} = 49.9 \cdot ksi$

Plate Bending Stresse % of Capacity = $\frac{f_{bp}}{F_{bp}} = 61.4 \cdot \%$

Condition3 = Condition3 := if$\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$

Condition3 = "Ok"

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 636·ft·kips	(Input From Risa-3D LC # 4)
Shear Force =	Shear := 22·kips	(Input From Risa-3D LC # 4)
Axial Force =	Axial := −226·kips	(Input From Risa-3D LC # 4)

Anchor Bolt Data:

Use ASTM A36

Number of Anchor Bolts =	N := 20	(User Input)
Bolt Ultimate Strenght =	F_u := 58·ksi	(User Input)
Bolt Yeild Strenght =	F_y := 36·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D_b := 1.5·in	(User Input)
Threads per Inch =	n_b := 6	(User Input)

Base Plate Data:

Use ASTM 36

Plate Yield Strength =	Fy_{bp} := 36·ksi	(User Input)
Base Plate Thickness =	t_{bp} := 1.5·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 17.125\text{in}$ (User Input)

$d_2 := 11.25\text{in}$ (User Input)

$d_3 := 4.9375\text{in}$ (User Input)

Number of Bolts at Distance:

$N_1 := 12$

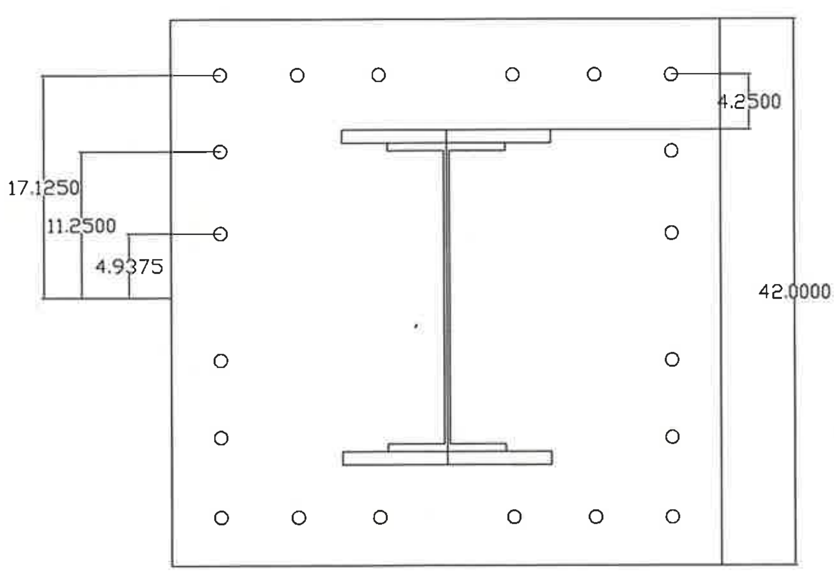
$N_2 := 4$

$N_3 := 4$

Critical Distances For Bending in Plate:

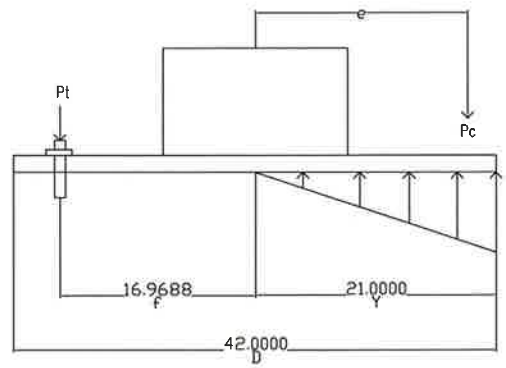
$ma_1 := 4.25\text{in}$ (User Input)

Effective Width of Baseplate for Bending = $B_{eff} := 42\text{in}$ (User Input)



ANCHOR BOLT AND PLATE GEOMETRY

Base Plate Analysis:



Length of Base Plate = $D := 42in$

Width of Base Plate = $B := 42in$

Length of Stress Distribution = $Y := 21in$

Distance from NA to Bolts in Tension = $f := 17in$

Modular Ratio = $n := \frac{E_s}{57 \cdot \sqrt{E_c}} = 9.29$

Area of Steel in Tension Zone = $A_s := 7.5 \cdot in^2$

$$K_1 := \frac{6n \cdot A_s}{B} = 0.829ft$$

Eccentricity = $e := \frac{\left(K_1 \cdot f^2 + K_1 \cdot \frac{D}{2} \cdot f - K_1 \cdot f \cdot Y + \frac{3}{2} \cdot D \cdot Y^2 - Y^3\right)}{\left(3 \cdot Y^2 + K_1 \cdot Y - K_1 \cdot \frac{D}{2} - K_1 \cdot f\right)} = 18.546 \cdot in$

Compression Force = $P_c := \frac{OM}{e} = 412 \cdot kips$

Uplift Force = $P_t := -P_c \cdot \left[\frac{\left(\frac{D}{2} - \frac{Y}{3} - e\right)}{\left(\frac{D}{2} - \frac{Y}{3} + f\right)}\right] = 60 \cdot kips$

Bearing Force on Grout = $\sigma_c := 2 \cdot \frac{\left(P_c + P_t\right)}{Y \cdot B} = 1070psi$

Total Uplift Force = $F := P_t - 6 \cdot \frac{Axial}{N} = 128 \cdot kips$

Applied Bending Stress in Plate = $f_{bp} := \frac{6 \cdot \left(F \cdot ma_1\right)}{B_{eff} \cdot t_{bp}^{\ 2}} = 34.58 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 1.33 \cdot 0.75 \cdot Fy_{bp} = 35.9 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 0.96$

Check Plate Bending Stress $Plate\_Bending\_Stress := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Plate_Bending_Stress = "Ok"

Allowable Bearing Capacity of Grout = $\sigma_{all} := 3000 \cdot psi$

Bearing Percent of Capacity = $\frac{\sigma_c}{\sigma_{all}} = 0.36$

$Grout\_Bearing\_Capicity := if(\sigma_{all} > \sigma_c, "OK", "NG")$

Grout_Bearing_Capicity = "OK"

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2 \cdot N_1 + (d_2)^2 \cdot N_2 + (d_3)^2 \cdot N_3\right] = 4123 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D_b^{\ 2} = 1.767 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D_b - \frac{0.9743 \cdot in}{n_b}\right)^2 = 1.405 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 1.338 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.334 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\ 3}}{32} = 0.235 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := \frac{P_t}{6} - \frac{Axial}{N} = 21.4 \cdot kips$

Allowable Tensile Force (Gross Area) = $T_{ALL.Gross} := 1.333 \cdot (0.33 \cdot A_g \cdot F_u) = 45.1 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Allowable Tensile Force (Net Area) = $T_{ALL.Net} := 1.333 \cdot (0.60 \cdot A_n \cdot F_y) = 40.5 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} \cdot 100 = 52.8$

Condition1 = Bolt_Tension := if$\left(\frac{T_{Max}}{T_{ALL.Net}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Bolt_Tension = "OK"

Note Shear stress is negligible

Foundation Check

Base Reactions:

$OM_1 := 591 \cdot kip \cdot ft$

$Axial_1 := -228 \cdot kips$

$Shear_1 := 20 \cdot kips$

$OM_2 := 635 \cdot kip \cdot ft$

$Axial_2 := -226 \cdot kips$

$Shear_2 := 22 \cdot kips$

$OM_m := 92 \cdot kip \cdot ft$

$Axial_m := 497 \cdot kips$

$Shear_m := 3 \cdot kips$

Foundation Data:

$D1 := 1.29 \cdot ft$

$D2 := 2 \cdot ft$

$D3 := 3 \cdot ft$

$D4 := 3 \cdot ft$

$D_{tot} := 7.17 \cdot ft$

$W1 := 6 \cdot ft$

$W2 := 21.5 \cdot ft$

$W3 := 26.5 \cdot ft$

$W4 := 55 \cdot ft$

$L1 := 6 \cdot ft$

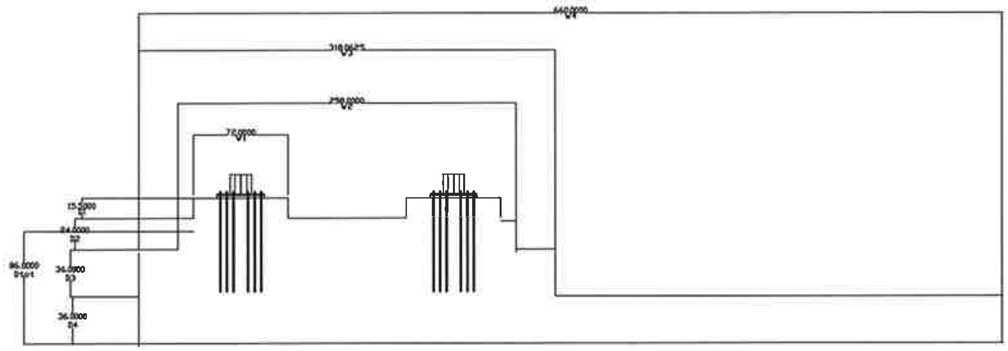
$L2 := 11 \cdot ft$

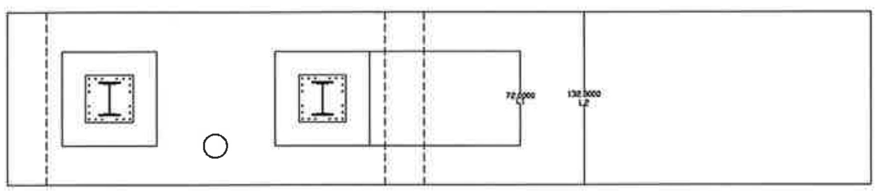
Material Data;

$\gamma_{conc} := 150 \cdot pcf$

$\gamma_{soil} := 100 \cdot pcf$

$\Phi_s := 30 \cdot deg$





Volume of Concrete = $V_c := (D1 \cdot W1 \cdot L1) + (D2 \cdot W2 + D3 \cdot W3 + D4 \cdot W4) \cdot L2 = 3209 \cdot ft^3$

Volume of Soil Above Footing = $V_{s1} := [(D2 - 10 \cdot in) \cdot (W3 - W2) + [(D2 - 10 \cdot in) + D3] \cdot (W4 - W3)] \cdot L2 = 1370 \cdot ft^3$

Volume of Soil Wedge at Back Face = $V_{s2} := D_{tot}^{\ 2} \cdot W4 \cdot \tan(\Phi_s) = 1632 \cdot ft^3$

Volume of Soil Wedge at Back Face Corners = $V_{s3} := 2 \cdot \left[(D_{tot})^3 \cdot \frac{\tan(\Phi_s)}{3} \right] = 142 \cdot ft^3$

Weight of Concrete = $W_c := V_c \cdot \gamma_{conc} = 481 \cdot kips$

Weight of Soil Above Footing = $W_{s1} := V_{s1} \cdot \gamma_{soil} = 137 \cdot kips$

Weight of Soil Wedge at Back Face = $W_{s2} := V_{s2} \cdot \gamma_{soil} = 163 \cdot kips$

Weight of Soil Wedge at Back Face Corners = $W_{s3} := V_{s3} \cdot \gamma_{soil} = 14 \cdot kips$

$$M_r := \left(W_c + W_{s1} + Axial_1 + Axial_2 + Axial_m\right)\cdot\frac{L2}{2} + \left(W_{s2} + W_{s3}\right)\left(L2 + \frac{D_{tot}\cdot\tan\left(\Phi_s\right)}{2}\right) = 5957\cdot kip\cdot ft$$

$$M_{ot} := OM_1 + OM_2 + OM_m + \left(Shear_1 + Shear_2 + Shear_m\right)\cdot D_{tot} = 1641\cdot kip\cdot ft$$

$$FS := \frac{M_r}{M_{ot}} = 3.6$$

$$Condition1 := if\left(\frac{M_r}{M_{ot}} > 2, \text{"OK"}, \text{"Overstressed"}\right)$$

Condition1 = "OK"

13001.07

SITE NAME	CROMWELL SW CT	ECP - CELL #	8 / 155
LATITUDE	41-36-22.36 N	LONGITUDE	72-42-04.34 W
		SAVE BUTTON	
Additional Comments: 2014 AWS Swap PCS for xpol, add AWS.		STRUCTURE TYPE	SIGN

AWS - LTE ANTENNA ADD	ALPHA	BETA	GAMMA
EQUIPMENT TYPE	2100 MHz BBU	2100 MHz BBU	2100 MHz BBU
ANTENNA TYPE	BXA-171063-12CF-EDIN-2	BXA-171063-12CF-EDIN-2	BXA-171063-12CF-EDIN-2
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	0	120	240
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	88	88	88
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
RRH - QTY/MODEL	1 ALU RH_2X40-AWS	1 ALU RH_2X40-AWS	1 ALU RH_2X40-AWS
SECTOR DISTRIBUTION BOX			
MAIN DISTRIBUTION BOX	1		DB-T1-6Z-8AB-0Z
700 Mhz - LTE Current Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	Lucent	Lucent	Lucent
ANTENNA TYPE	BXA-70063-6CF	BXA-70063-6CF	BXA-70063-6CF
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	0	120	240
DOWN TILT (MECH/DEG)	0	2	0
RAD CTR (FT AGL)	88	88	88
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
MCPA BRICKS (QTY)			
RRH - QTY/MODEL			
SECTOR DISTRIBUTION BOX			
MAIN DISTRIBUTION BOX			
700 Mhz - LTE Future Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	Lucent	Lucent	Lucent
ANTENNA TYPE	BXA-70063-6CF	BXA-70063-6CF	BXA-70063-6CF
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	0	120	240
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	88	88	88
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
MCPA BRICKS (QTY)			
RRH - QTY/MODEL			
SECTOR DISTRIBUTION BOX			
MAIN DISTRIBUTION BOX			
850 Celluar - Current Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	Modcell 4.0 HD	Modcell 4.0 HD	Modcell 4.0 HD
ANTENNA TYPE	DB846F65ZAXY	DB846F65ZAXY	LPA-80080/6CF
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	0	120	240
DOWN TILT (MECH/DEG)	0	2	0
RAD CTR (FT AGL)	88	88	88
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
DIPLEX WITH LTE CABLE			
850 Celluar - Future Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	Modcell 4.0 HD	Modcell 4.0 HD	Modcell 4.0 HD
ANTENNA TYPE	DB846F65ZAXY	DB846F65ZAXY	LPA-80080/6CF
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	0	120	240
DOWN TILT (MECH/DEG)	0	2	0
RAD CTR (FT AGL)	88	88	88
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
DIPLEX WITH LTE CABLE			
1900 PCS - Current Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	PCS Modcell 4.0	PCS Modcell 4.0	PCS Modcell 4.0
ANTENNA TYPE	948F85T2E-M-2	948F85T2E-M-2	948F85T2E-M-2
QTY OF ANTENNAS PER FACE	2	2	2
ORIENTATION (DEG)	0	120	240
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	88	88	88
TMA - QTY / MODEL			
DIPLEXER - QTY / MODEL			
DIPLEX WITH CELLULAR CABLE			
1900 PCS - Future Config	**ALPHA**	**BETA**	**GAMMA**
EQUIPMENT TYPE	PCS Modcell 4.0	PCS Modcell 4.0	PCS Modcell 4.0
ANTENNA TYPE	BXA-171085-12BF-EDIN-2	BXA-171085-12BF-EDIN-2	BXA-171085-12BF-EDIN-2
QTY OF ANTENNAS PER FACE	1	1	1
ORIENTATION (DEG)	0	120	240
DOWN TILT (MECH/DEG)	0	0	0
RAD CTR (FT AGL)	88	88	88
TMA - QTY / MODEL			
DIPLEX WITH CELLULAR CABLE			

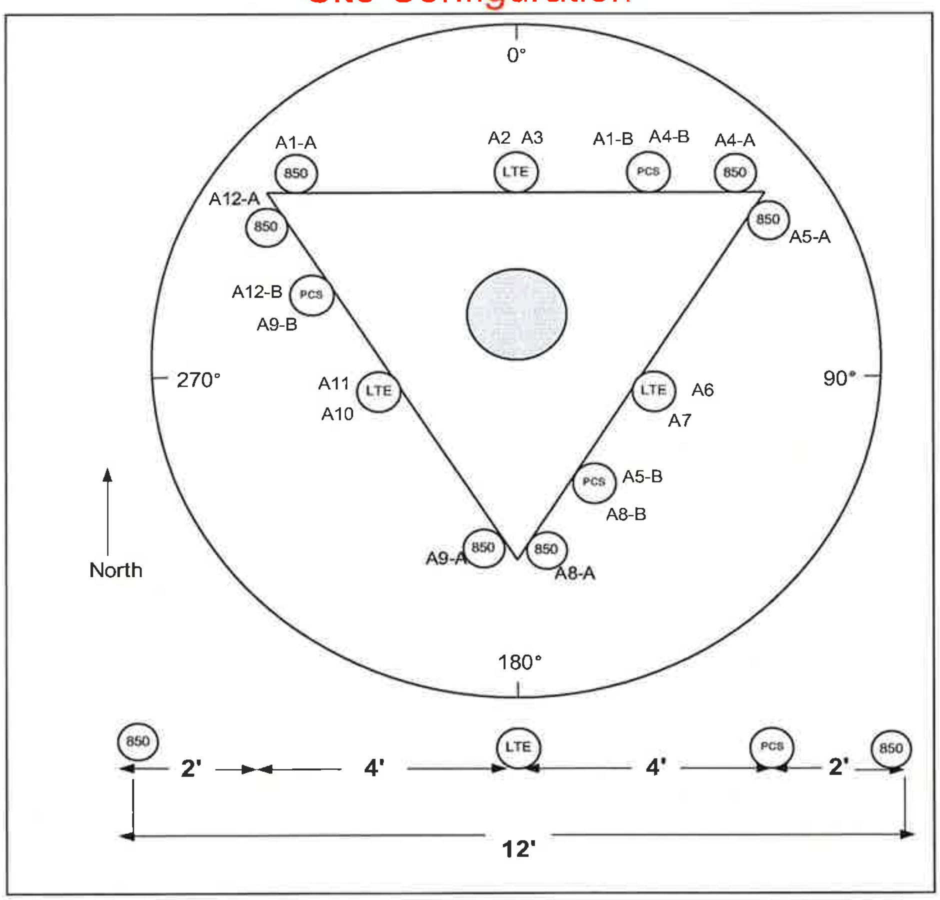
NUMBER OF CABLE'S NEEDED					ESTIMATED CABLE LENGTH				
MAINLINE SIZE	1 5/8"	TOTAL # OF MAINLINES		18	MAINLINE (FT)				115
JUMPER SIZE	1/2 "	TOTAL # OF TOP JUMPERS		18	TOP JUMPER (FT)				10
Equipment Cable Ordering		**MAIN CABLE #**	12 +	6	**TOP JUMPER #**	12	+		6
FIBER LINE SIZE	1 5/8"	TOTAL # OF FIBER LINES		1	FIBER LINE MODEL #				HB158-1-08U8-S8J18
JUMPER SIZE	5/8"	TOTAL # OF TOP JUMPERS		3	TOP JUMPER MODEL #				HB058-1-08U1-S1J18
Fiber Cable Ordering		**FIBER CABLE**	0 +	1	**TOP JUMPER #**	0	+		3

TX / RX FREQUENCIES			TX POWER OUTPUT	
Cellular A-Band	**PCS F-Band**	**700 Mhz C - B**	Cellular (Watts)	20
TX - 869-880,890-891.5 MHz	TX - 1970-1975	TX - 746-757	PCS (Watts)	16
RX - 824-835,845-846.5 MHz	RX - 1890-1895	RX - 776-787	LTE (Watts)	40

ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1-A	800	Tx1/Rx0	RED	A5-A	800	Tx2/Rx0	BLUE	A9-A	800	Tx3/Rx0	GREEN
A1-B	1900	Tx1/Rx0	RED/ WHITE	A5-B	1900	Tx2/Rx0	BLUE/ WHITE	A9-B	1900	Tx3/Rx0	GREEN/WHITE
A2	700	Tx1/Rx0	RED/ ORANGE	A6	700	Tx2/Rx0	BLUE/ ORANGE	A10	700	Tx3/Rx0	GREEN/ORANGE
A3	700	Tx4/Rx1	RED/RED/ ORANGE	A7	700	Tx5/Rx1	BLUE/BLUE/ ORANGE	A11	700	Tx6/Rx1	GREEN/GREEN/ ORANGE
A4-B	1900	Tx4/Rx1	RED/RED/ WHITE	A8-B	1900	Tx5/Rx1	BLUE/BLUE/ WHITE	A12-B	1900	Tx6/Rx1	GREEN/GREEN/ WHITE
A4-A	800	Tx4/Rx1	RED/RED	A8-A	800	Tx5/Rx1	BLUE/BLUE	A12-A	800	Tx6/Rx1	GREEN/GREEN

RF ENGINEER	RF MANAGER	INITIALS	DATE
Prepared By : Justin Kober	Robert Hesselbach	JK	12/11/2013

Site Configuration



BXA-171063-12CF-EDIN-X

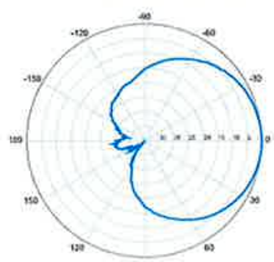
X-Pol | FET Panel | 63° | 19.0 dBi

Replace "X" with desired electrical downtilt.

Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

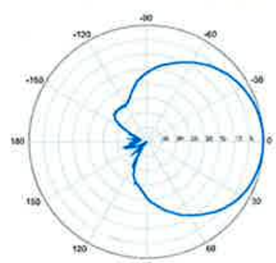
Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	16.1 dBd / 18.2 dBi	16.5 dBd / 18.6 dBi	16.9 dBd / 19.0 dBi
Electrical downtilt (X)	0, 2, 5		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	< -25 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1842 x 154 x 105 mm	72.5 x 6.1 x 4.1 in	
Depth with z-brackets	133 mm	5.2 in	
Weight without mounting brackets	5.8 kg	12.8 lbs	
Survival wind speed	> 201 km/hr	> 125 mph	
Wind area	Front: 0.28 m² Side: 0.19 m²	Front: 3.1 ft² Side: 2.1 ft²	
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N	Front: 103 lbf Side: 68 lbf	
Mounting Options	**Part Number**	**Fits Pipe Diameter**	**Weight**
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-12CF-EDIN-X-FP		

BXA-171063-12CF-EDIN-X



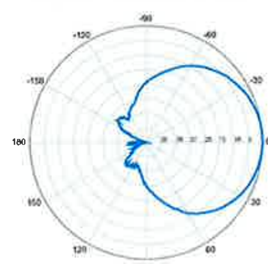
Horizontal | 1710-1880 MHz

BXA-171063-12CF-EDIN-X



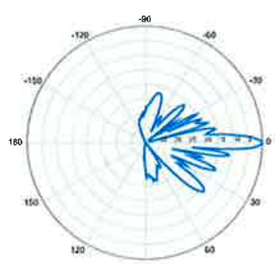
Horizontal | 1850-1990 MHz

BXA-171063-12CF-EDIN-X



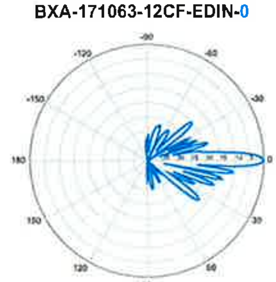
Horizontal | 1920-2170 MHz

BXA-171063-12CF-EDIN-0



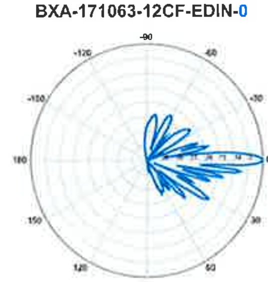
0° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-0



0° | Vertical | 1920-2170 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

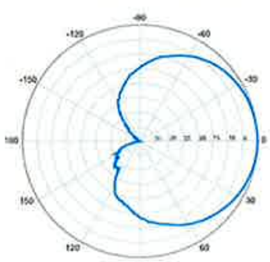
BXA-171085-12BF-EDIN-X

Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 85° | 18.0 dBi

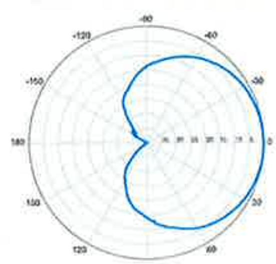
Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	88°	85°	80°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	15.1 dBd / 17.2 dBi	15.5 dBd / 17.6 dBi	15.9 dBd / 18.0 dBi
Electrical downtilt (X)	0, 2, 4		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	< -25 dB		
IM3 (2x20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1842 x 154 x 105 mm		72.5 x 6.1 x 4.1 in
Depth with z-brackets	133 mm		5.2 in
Weight without mounting brackets	5.8 kg		12.8 lbs
Survival wind speed	> 201 km/hr		> 125 mph
Wind area	Front: 0.28 m² Side: 0.19 m²		Front: 3.1 ft² Side: 2.1 ft²
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N		Front: 103 lbf Side: 68 lbf
Mounting Options	**Part Number**	**Fits Pipe Diameter**	**Weight**
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171085-12BF-EDIN-X-FP		

BXA-171085-12BF-EDIN-X



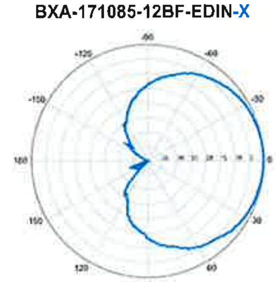
Horizontal | 1710-1880 MHz

BXA-171085-12BF-EDIN-X



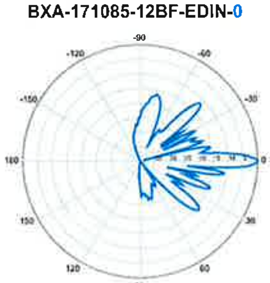
Horizontal | 1850-1990 MHz

BXA-171085-12BF-EDIN-X



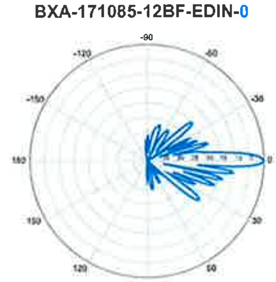
Horizontal | 1920-2170 MHz

BXA-171085-12BF-EDIN-0



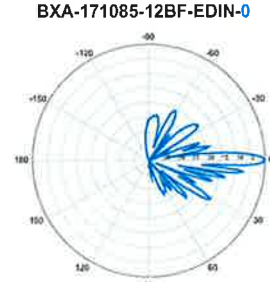
0° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-0



0° | Vertical | 1920-2170 MHz

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Alcatel·Lucent

Alcatel-Lucent RRH2x40-AWS

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-AWS is a high-power, small form-factor Remote Radio Head (RRH) operating in the AWS frequency band (1700/2100MHz - 3GPP Band 4). The Alcatel-Lucent RRH2x40-AWS is designed with an eco-efficient approach, providing operators with the means to achieve high quality and capacity coverage with minimum site requirements.

A distributed eNodeB expands deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of an eNodeB to be installed separately, within the same site or several kilometres apart.

The Alcatel-Lucent RRH2x40-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information. The Alcatel-Lucent RRH2x40-AWS has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to four-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 20 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-AWS is designed to make available all the benefits of a distributed eNodeB, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent RRH2x40-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

Fast, low-cost installation and deployment

The Alcatel-Lucent RRH2x40-AWS is a zero-footprint solution and operates noise-free, simplifying negotiations with site property owners and minimizing environmental impacts. Installation can easily be done by a single person because the Alcatel-Lucent RRH2x40-AWS is compact and weighs less than 20 kg (44 lb), eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day — a fraction of the time required for a traditional BTS.

Excellent RF performance

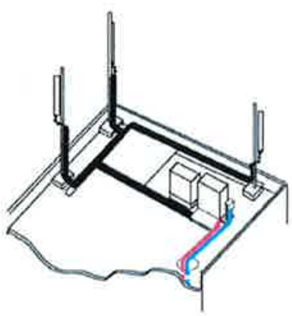
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation costs are reduced or eliminated, and there is no need for a Tower Mounted Amplifier (TMA) because losses introduced by the RF feeder are greatly reduced. The Alcatel-Lucent RRH2x40-AWS provides more RF power while at the same time consuming less electricity.

Features

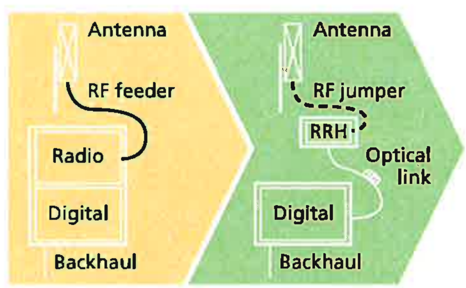
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

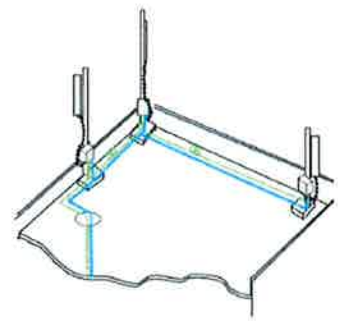
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility to network planning



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

- Height: 620 mm (24.4 in.)
- Width: 270 mm (10.63 in.)
- Depth: 170m (6.7 in.)
- Weight (without mounting kit): less than 20 kg (44 lb)

Power

- Power supply: -48VDC

Operating environment

- Outdoor temperature range:
  - With solar load: -40°C to +50°C (-40°F to +122°F)
  - Without solar load: -40°C to +55°C (-40°F to +131°F)
- Passive convection cooling (no fans)
- Enclosure protection
  - IP65 (International Protection rating)

RF characteristics

- Frequency band: 1700/2100 MHz (AWS); 3GPP Band 4
- Bandwidth: up to 20 MHz
- RF output power at antenna port: 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way with optional Rx Diversity module
- Noise figure: below 2.0 dB typical
- Antenna Line Device features
  - TMA and Remote electrical tilt (RET) support via AISG v2.0

Optical characteristics

Type/number of fibers

- Single-mode variant
  - One Single Mode Single Fiber per RRH2x, carrying UL and DL using CWDM
  - Single mode dual fiber (SM/DF)
- Multi-mode variant
  - Two Multi-mode fibers per RRH2x: one carrying UL, the other carrying DL

Optical fiber length

- Up to 500 m (0.31 mi), using MM fiber
- Up to 20 km (12.43 mi), using SM fiber

Digital Ports and Alarms

- Two optical ports to support daisy-chaining
- Six external alarms

Product Data Sheet DB-B1 and DB-T1 Series

DC and Fiber Management Distribution Boxes for HYBRIFLEX™ Cable

Product Description

The RFS Distribution Box design comes with the option for pluggable over voltage protection (OVP) for up to 6 remote radios and the connection for 6 pairs of optical fiber with LC optical fiber cable management. There is a hybrid cable input with a jumper configuration for power and optical fiber to the remote radio heads (RRHs). A custom wall, a 2-inch pole, and an H-Frame mounting bracket are included. Both the compact and standard design are available with lightening protection.

Features/Benefits

- Designed to accommodate varying diameters of HYBRIFLEX™ (combined power and fiber optic) cables – up to 2 inches
- Supports Single- and Multi-Mode Optical fiber
- NEMA 4x rated enclosure – allows **flexibility for indoor or outdoor installation** on a roof or tower top
- Weatherproof enclosure and ports – **improves system reliability**
- Modular design – makes replacement or addition of OVP easy without removal of other components within the box
- Strikesorb OVP technology – protects equipment from damaging surges up to 60 kA on an 8/20 waveform and up to 5 kA on a 10/350 waveform (certain models only)
- Low residual voltage and high impedance – **ideally suited for RRH technology** – won't shut down the RRH the way spark gap technology does (certain models only)

Technical Specifications

Mechanical Specifications

Model Number	DB-B1-6C-8AB-0Z	DB-T1-6Z-8AB-0Z
Enclosure Design	Standard, 6 OVP's	Standard without OVP
Dimensions - H x W x D, mm (in)	610 x 610 x 254 (24 x 24 x 10)	610 x 610 x 254 (24 x 24 x 10)
Weight, kg (lb)	20 (44)	20 (44)
Suppression Connection Method	Compression lug, #2-#14 AWG Copper, #2-#12 Aluminum	
Fiber Connection Method	LC-LC Single- or Multi-mode duplex	
Environmental Rating	NEMA 4x	
Operating Temperature, °C (°F)	-40 to +80 (-40 to +176)	
UV Protection	ISO 4892-2 Method A Xenon-Arc 2160 hrs	

Electrical Specifications

Nominal Operating Voltage	48 VDC	
Nominal Discharge Current (I_n) per UL 1449 3rd Ed	20 kA 8/20 µs	N/A
Maximum Discharge Current (I_{max}) per NEMA LS-1	60 kA 8/20 µs	N/A
Maximum Impulse (Lightning) Current (I_{imp}) per IEC 61643-1	5 kA 10/350 µs	N/A
Maximum Continuous Operating Voltage (U_c)	75 VDC	N/A
Voltage Protection Rating per UL1449 3rd Ed	400 V	N/A
Protection Class as per IEC 61643-1	Class 1	N/A
Strikesorb OVP Compliance	ANSI/UL 1449-3rd Ed IEEE C62.41 NEMA LS-1 IEC 61643-1 IEC 61643-12 EN 61643-11	N/A N/A N/A N/A N/A N/A

* This data is provisional and subject to change.