*T-Mobile USA*
*35 Griffin Road South*
*Bloomfield, CT 06002*

June 28, 2018

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06501

Dear Attorney Bachman,

The following T-Mobile exempt modification was originally filed by Vertical Development with a structural analysis report and construction drawings prepared by Centek Engineering revised February 25, 2014 and stamped by Carlo F. Centore; following the approval of the modifications proposed on the below site the structural analysis required a revision of an additional six 3/8" RET cables running on the outside of the tower as indicated in section 4 of the attached report, the revised analysis is dated October 21, 2015.

EM-T-MOBILE-138-150928: 670 Chapel Street, Eversource Pole 1321, Stratford

The attached PE Closeout Letter dated March 21, 2016 provides evidence of compliance with the conditions outlined by the Council with exception to the revised structural analysis that is reviewed below. In addition, T-Mobile hereby notifies the Council that construction of the acknowledged modifications were complete as of December 20, 2015.

Please contact Denise Sabo at 860-209-4690 with any questions or concerns.

Sincerely,

Samuel Simons, Engineering Development - Connecticut

cc: Mark Richard, Engineering and Operations

CENTEK engineering
Centered on Solutions℠

March 21, 2016

Mr. Richard
35 Griffin Road South
Bloomfield, CT 06002

**Re: Letter of Professional Opinion**

**Project:** T-Mobile Job Number CT11426A
670 Chapel Street
Stratford, CT 06614

**Owner:** CL&P
107 Seldon Street
Berlin, CT 06037

**Engineer:** Centek Engineering, Inc.
63-2 North Branford Rd., Branford, CT 06405

**Centek Project No.:** 14065.001/13317.000

Dear Mr. Richard

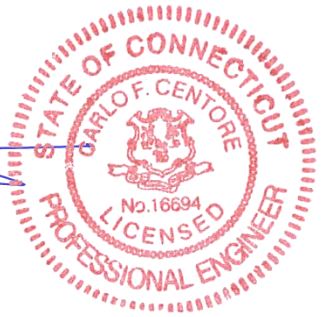
We are providing this "Letter of Professional Opinion" with regard to the structural components at the above referenced project.

The following are the basis for substantiating compliance with Structural Analysis Report prepared by Centek Engineering, Inc. dated 10/21/15 Rev. 03:

- ❑ Field observations of completed site [refer to FVR dated 03/16/16].
- ❑ Structural Analysis Report dated 10/21/15 Rev. 03.
- ❑ Structural Analysis Report prepared by Centek Engineering, Inc. dated 10/21/15 Rev. 03 [attached for record]

The work under this Contract has been reviewed and found, to the Engineer's best knowledge, information and belief, to be completed in general compliance with the documents prepared by Centek Engineering, Inc. and issued for construction on 10/21/15 Rev. 03.

Sincerely,




Carlo F. Centore, PE
Senior Project Manager

Cc: File
Doug Braker – McPhee Electric (via email)

CENTEK engineering
Centered on Solutions℠

63-2 North Branford Road
Branford, Connecticut 06405
(203) 488-0580
Fax (203) 488-8587
www.CentekEng.com

# F I E L D  V I S I T  R E P O R T

**DATE:** March 16, 2016 **TIME:** 8:45 AM

**TO:** T-Mobile **PHONE:** 860-692-7143
**ATTN:** Mark Richard **EMAIL:** Mark.Richard64@T-Mobile.com

**PREPARED BY:** Erik Armas **PHONE:** 203.488.0580 ext. 144
**EMAIL:** earmas@centekeng.com

**SUBMITTED BY:** Carlo F. Centore, PE **PHONE:** 203.488.0580 ext. 122
**EMAIL:** cfcentore@centekeng.com

**CENTEK NO.:** 14065.001/13317.000

**PROJECT NAME:** T-Mobile Site Reference CT11426A

**CC:**

The following was observed, discussed, reviewed and/or resolved at the site, which requires action by the Contractor unless noted otherwise. Items shall remain on this ongoing report until resolved to the satisfaction of this office.

| | | |
|---|---|---|
| **031616. 1** | Purpose of the field visit was to confirm compliance of the completed site upgrade with Centek Engineering, Inc. Structural Analysis Report dated 10/21/2015 Rev.3. | |
| **031616. 2** | View of the installed antennas. |  |
| **031616. 3** | Reinforcing bracket installed per the below referenced drawings.<br><br>Ref. Centek Engineering, Inc. drawings S-2 dated 10/21/15 Rev. 2 |  |

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| | | |
|---|---|---|
| **031616. 4** | See above note (031616.3) |  |
| **031616. 5** | Antennas & associated appurtenances placement is consistent with the below referenced.<br><br>Centek Engineering, Inc. Structural Analysis Report dated 10/21/2015 Rev.3. |  |
| **031616. 6** | All specified installations are confirmed as completed. | |

CENTEK engineering

Centered on Solutions℠

# Structural Analysis of Powermount and CL&P Tower

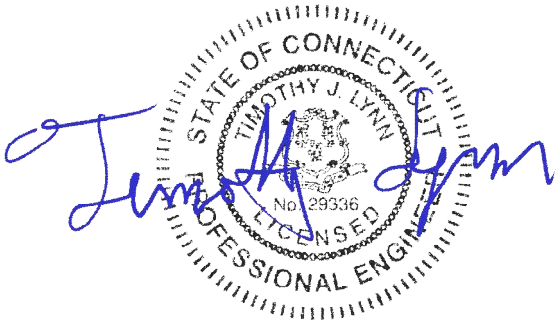
T-Mobile Site Ref: CT11426A

CL&P Structure No. 1321
101' Electric Transmission Lattice Tower

670 Chapel Street
Stratford, CT

CENTEK Project No. 13317.000

~~Date: November 22, 2013~~
~~Rev 1: January 27, 2014~~
~~Rev 2: February 25, 2014~~
Rev 3: October 21, 2015




**Prepared for:**
T-Mobile Towers
4 Sylvan Way
Parsippany, NJ 07054

# *Table of Contents*

## *Introduction*

The purpose of this report is to analyze the existing powermount and 101' CL&P tower located at 670 Chapel Street in Stratford, CT for the proposed antenna and equipment upgrade by T-Mobile.

The existing and proposed loads consist of the following:

- AT&T (Existing to Remain):
  Antennas: Six (6) Powerwave 7770 panel antennas, three (3) Powerwave P65-16-XHL-RR panel antennas, twelve (12) Powerwave LGP214 TMA's and three (3) CCI DTMABP7819VG12A TMA's mounted on a low profile platform with a RAD center elevation of 124-ft above grade.
  Coax Cables: Eighteen (18) 1-1/4" ∅ coax cables running on the inside of the existing FWT Powermount.
- T-MOBILE (Existing to be Removed):
  Antennas: Two (2) RR90-17-02DP panel antennas and two (2) TMA's mounted on a PCS mast with a RAD center elevation of 109-ft above grade. One (1) RR90-17-02DP panel antenna and one (1) TMA's flush mounted to the FWT Powermount with a RAD center elevation of 109-ft above grade.
  Mast: 4-in SCH. 40 pipe (O.D. = 4.5") and related hardware.
- T-MOBILE (Existing to remain):
  Coax Cables: Six (6) 1-1/4" ∅ coax cables running on the outside of the tower as indicated in section 4 of this report.
- **T-MOBILE (Proposed):**
  **Antennas: Three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas mounted the existing FWT Powermount with a RAD center elevation of 109-ft above grade.**
  **Coax Cables: Six (6) 1-1/4" ∅ coax cables and six (6) 3/8" ∅ RET cables running on the outside of the tower as indicated in section 4 of this report**

## *Primary assumptions used in the analysis*

- Allowable steel stresses are defined by AISC-ASD 9th edition for design of the Powermount and antenna supporting elements.
- ASCE Manual No. 10-97, "Design of Latticed Steel Transmission Structures", defines allowable steel stresses for evaluation of the CL&P utility tower.
- All utility tower members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- All coaxial cable will be installed within the powermount unless specified otherwise.
- Powermount will be properly installed and maintained.
- No residual stresses exist due to incorrect tower erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Powermount and utility tower will be in plumb condition.
- Utility tower was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

## *A n a l y s i s*

Structural analysis of the existing powermount was independently completed using the current version of RISA-3D computer program licensed to CENTEK Engineering, Inc. The RISA-3D program contains a library of all AISC shapes and corresponding section properties are computed and applied directly within the program. The program's Steel Code Check option was also utilized.

The existing FWT powermount consisting of a HSS18"x0.375" pipe conforming to ASTM A500 Grade B (Fy = 42ksi) connected at six points to the existing tower was analyzed for its ability to resist loads prescribed by the TIA/EIA standard. Section 5 of this report details these gravity and lateral wind loads. Load cases and combinations used in RISA-3D for TIA/EIA loading are listed in report Section 6.

Structural analysis of the existing CL&P tower structure was completed using the current version of PLS-Tower computer program licensed to CENTEK Engineering, Inc. The NESC program contains a library of all AISC angle shapes and corresponding section properties are computed and applied directly within the program. The program's Steel Code Check option was also utilized.

The existing 101-ft tall CL&P lattice tower was analyzed for its ability to resist loads prescribed by the NESC standard. Maximum usage for the tower was calculated considering the additional forces from the powermount and associated appurtenances. Section 7 of this report details these gravity and lateral wind loads.

## *D e s i g n B a s i s*

Our analysis was performed in accordance with EIA-222-F-1996, ASCE Manual No. 10-97, "Design of Latticed Steel Transmission Structures", NESC C2-2007 and Northeast Utilities Design Criteria.

The CL&P tower structure, considering existing and future conductor and shield wire loading, with the existing powermount was analyzed under two conditions:

- UTILITY TOWER ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility structure to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the NU Design Criteria Table, NESC C2-2007 ~ Construction Grade B, and ASCE Manual No. 10-97, "Design of Latticed Steel Transmission Structures".

  Load cases considered:

  Load Case 1: NESC Heavy
  Wind Pressure…….. 4.0 psf
  Radial Ice Thickness…… 0.5"
  Vertical Overload Capacity Factor……. 1.50
  Wind Overload Capacity Factor……. 2.50
  Wire Tension Overload Capacity Factor…… 1.65

  Load Case 2: NESC Extreme
  Wind Speed……. 110 mph (1)
  Radial Ice Thickness…… 0"

  *Note 1: NESC C2-2007, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)*

- POWERMOUNT ANALYSIS

  The powermount, appurtenances and connections to the utility tower were analyzed and designed in accordance with the NU Design Criteria Table, TIA/EIA-222-F, and AISC-ASD standards.

  Load cases considered:

  Load Case 1:
  Wind Speed……... 85 mph (2)
  Radial Ice Thickness…..……. 0”

  Load Case 2:
  Wind Pressure..…… 75% of 85 mph wind pressure
  Radial Ice Thickness…..…….. 0.5”

  *Note 2: Per NU Mast Design Criteria Exception 1.*

## *R e s u l t s*

- POWERMOUNT

  **With the proposed reinforcements detailed in Section 4 of this report** the existing powermount was determined to be structurally **adequate**.

| Component | Design Limit | Stress Ratio (percentage of capacity) | Result |
|---|---|---|---|
| HSS 18” x 0.375” Pipe | Bending | 69.3% | **PASS** |
| L2.5x2.5x3/16 Brace | Bending | 80.8% | **PASS** |
| Connection | Shear | 87.4% | **PASS** |

- UTILITY TOWER

  This analysis finds that the subject utility structure is adequate to support the proposed antenna mast and related appurtenances. The tower stresses meet the requirements set forth by the ASCE Manual No. 10-97, “Design of Latticed Steel Transmission Structures”, for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 8 of this report. The analysis results are summarized as follows:

  A maximum usage of **94.01%** occurs in the utility tower under the **NESC Extreme** loading condition.

  TOWER SECTION:

  The utility structure was found to be within allowable limits.

| Tower Member | Stress Ratio (% of capacity) | Result |
|---|---|---|
| Angle g37X | 94.03% | **PASS** |

- FOUNDATION AND ANCHORS

  The existing foundation consists of four (4) 2-ft square tapering to 5-ft square x 5-ft-8” long reinforced concrete piers and four (4) 8-ft square x 2-ft thick reinforced concrete pads with a 33-ft-6in square x 3-ft-6-in thick concrete mat flush with the top of the piers. The base of the tower is connected to the foundation by four (4) 1-1/4” ∅ ASTM A36 anchor bolts per leg. Foundation information was obtained from NUSCO drawing # 01021-60001 and construction drawings prepared by Centek engineering project no. 10021.CO3 dated 10/6/2010 marked rev 2.

BASE REACTIONS:

From PLS-Tower analysis of CL&P tower based on NESC/NU prescribed loads.

| Load Case | Shear | Uplift | Compression |
|---|---|---|---|
| NESC Heavy Wind | 10.25 kips | 31.06 kips | 53.19 kips |
| NESC Extreme Wind | 21.27 kips | 76.43 kips | 93.16 kips |

Note 1 – 10% increase to be applied to the above tower base reactions for foundation verification per OTRM 051

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

| Tower Component | Design Limit | Stress Ratio (percentage of capacity) | Result |
|---|---|---|---|
| Anchor Bolts | Tension | 87.2% | **PASS** |

FOUNDATION:

The foundation was found to be within allowable limits.

| Foundation | Design Limit | Required FS (1) | Proposed Loading FS (2) | Result |
|---|---|---|---|---|
| Reinf. Conc. Pad & Pier w/ Mat | Uplift | 1.0 | 2.06 | **PASS** |
| | Bearing Pressure | 4 ksf | 1.09 ksf | **PASS** |

*Note 1: FS denotes Factor of Safety*
*Note 2: 10% increase to PLS base reactions used in foundation analysis per OTRM 051.*

## *Conclusion*

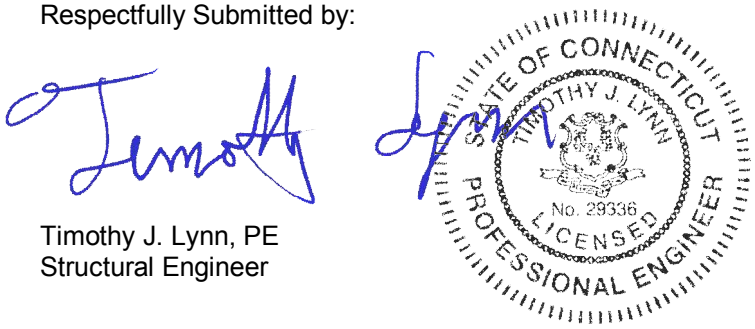
This analysis shows that the subject utility tower **with the proposed reinforcements outlined below and detailed in Section 4 of this report is adequate** to support the proposed T-Mobile equipment installaiton.

- Replacement of the existing powermount connection brackets at 101-ft and 96-ft AGL.

The analysis is based, in part on the information provided to this office by Northeast Utilities and T-Mobile. 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:




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 provided 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 are performed, results obtained, and recommendations made 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.

## *GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-TOWER*

PLS-TOWER is a Microsoft Windows program for the analysis and design of steel latticed towers used in electric power lines or communication facilities. Both self-supporting and guyed towers can be modeled. The program performs design checks of structures under user specified loads. For electric power structures it can also calculate maximum allowable wind and weight spans and interaction diagrams between different ratios of allowable wind and weight spans.

Modeling Features:

- Powerful graphics module (stress usages shown in different colors)
- Graphical selection of joints and members allows graphical editing and checking
- Towers can be shown as lines, wire frames or can be rendered as 3-d polygon surfaces
- Can extract geometry and connectivity information from a DXF CAD drawing
- CAD design drawings, title blocks, drawing borders or photos can be tied to structure model
- XML based post processor interface
- Steel Detailing Neutral File (SDNF) export to link with detailing packages
- Can link directly to line design program PLS-CADD
- Automatic generation of structure files for PLS-CADD
- Databases of steel angles, rounds, bolts, guys, etc.
- Automatic generation of joints and members by symmetries and interpolations
- Automated mast generation (quickly builds model for towers that have regular repeating sections) via graphical copy/paste
- Steel angles and rounds modeled either as truss, beam or tension-only elements
- Guys are easily handled (can be modeled as exact cable elements)

Analysis Features:

- Automatic handling of tension-only members
- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Automatic calculation of tower dead, ice, and wind loads as well as drag coefficients according to:
  - ASCE 74-1991
  - NESC 2002
  - NESC 2007
  - IEC 60826:2003
  - EN50341-1:2001 (CENELEC)
  - EN50341-3-9:2001 (UK NNA)
  - EN50341-3-17:2001 (Portugal NNA)
  - ESAA C(b)1-2003 (Australia)
  - TPNZ (New Zealand)
  - REE (Spain)
  - EIA/TIA 222-F
  - ANSI/TIA 222-G
  - CSA S37-01
- Automated microwave antenna loading as per EIA/TIA 222-F and ANSI/TIA 222-G
- Minimization of problems caused by unstable joints and mechanisms
- Automatic bandwidth minimization and ability to solve large problems
- Design checks according to (other standards can be added easily):
  - ASCE Standard 10-90

- AS 3995 (Australian Standard 3995)
- BS 8100 (British Standard 8100)
- EN50341-1 (CENELEC, both empirical and analytical methods are available)
- ECCS 1985
- NGT-ECCS
- PN-90/B-03200
- EIA/TIA 222-F
- ANSI/TIA 222-G
- CSA S37-01
- EDF/RTE Resal
- IS 802 (India Standard 802)

Results Features:

- Design summaries printed for each group of members
- Easy to interpret text, spreadsheet and graphics design summaries
- Automatic determination of allowable wind and weight spans
- Automatic determination of interaction diagrams between allowable wind and weight spans
- Capability to batch run multiple tower configurations and consolidate the results
- Automated optimum angle member size selection and bolt quantity determination

Tool for interactive angle member sizing and bolt quantity determination.

# Criteria for Design of PCS Facilities On or Extending Above Metal Electric Transmission Towers & Analysis of Transmission Towers Supporting PCS Masts [1]

## Introduction

This criteria is the result from an evaluation of the methods and loadings specified by the separate standards, which are used in designing telecommunications towers and electric transmission towers. That evaluation is detailed elsewhere, but in summary; the methods and loadings are significantly different. This criteria specifies the manner in which the appropriate standard is used to design PCS facilities including masts and brackets (hereafter referred to as "masts"), and to evaluate the electric transmission towers to support PCS masts. The intent is to achieve an equivalent level of safety and security under the extreme design conditions expected in Connecticut and Massachusetts.

ANSI Standard TIA/EIA-222 covering the design of telecommunications structures specifies a working strength/allowable stress design approach. This approach applies the loads from extreme weather loading conditions, and designs the structure so that it does not exceed some defined percentage of failure strength (allowable stress).

ANSI Standard C2-2007 (National Electrical Safety Code) covering the design of electric transmission metal structures is based upon an ultimate strength/yield stress design approach. This approach applies a multiplier (overload capacity factor) to the loads possible from extreme weather loading conditions, and designs the structure so that it does not exceed its ultimate strength (yield stress).

Each standard defines the details of how loads are to be calculated differently. Most of the NU effort in "unifying" both codes was to establish what level of strength each approach would provide, and then increasing the appropriate elements of each to achieve a similar level of security under extreme weather loadings.

Two extreme weather conditions are considered. The first is an extreme wind condition (hurricane) based upon a 50-year recurrence (2% annual probability). The second is a winter condition combining wind and ice loadings.

The following sections describe the design criteria for any PCS mast extending above the top of an electric transmission tower, and the analysis criteria for evaluating the loads on the transmission tower from such a mast from the lower portions of such a mast, and loads on the pre-existing electric lower portions of such a mast, and loads on the pre-existing electric transmission tower and the conductors it supports.

*Note 1: Prepared from documentation provide from Northeast Utilities.*

## *P C S  M a s t*

The PCS facility (mast, external cable/trays, including the initial and any planned future support platforms, antennas, etc. extending the full height above the top level of the electric transmission structure) shall be designed in accordance with the provisions of TIA/EIA Standard 222 with two exceptions:

1. An 85 mph extreme wind speed shall be used for locations in all counties throughout the NU system.
2. The stress increase of TIA Section 3.1.1.1 is disallowed. The combined wind and ice condition shall consider ½" radial ice in combination with the wind load (0.75 Wi) as specified in TIA section 2.3.16.

## *E L E C T R I C  T R A N S M I S S I O N  T O W E R*

The electric transmission tower shall be analyzed using yield stress theory in accordance with the attached table titled "NU Design Criteria". This specifies uniform loadings (different from the TIA loadings) on the each of the following components of the installed facility:

- PCS mast for its total height above ground level, including the initial and planned future support platforms, antennas, etc. above the top of an electric transmission structure.
- Conductors are related devices and hardware.
- Electric transmission structure. The loads from the PCS facility and from the electric conductors shall be applied to the structure at conductor and PCS mast attachment points, where those load transfer to the tower.

The uniform loadings and factors specified for the above components in the table are based upon the National Electrical Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to TIA and its loads and factors with the exceptions noted above. (Note that the NESC does not require the projected wind surfaces of structures and equipment to be increased by the ice covering.)

In the event that the electric transmission tower is not sufficient to support the additional loadings of the PCS mast, reinforcement will be necessary to upgrade the strength of the overstressed members.

## Attachment A

## NU Design Criteria

| | | | Basic Wind Speed | Pressure | Height Factor | Gust Factor | Load or Stress Factor | Force Coef - Shape Factor |
|---|---|---|---|---|---|---|---|---|
| | | | V (MPH) | Q (PSF) | Kz | Gh | | |
| Ice Condition | TIA/EIA | Antenna Mount | TIA | TIA (.75Wi) | TIA | TIA | TIA, Section 3.1.1.1 disallowed for connection design | TIA |
| | NESC Heavy | Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress) | ------ | 4 | 1.00 | 1.00 | 2.50 | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
| | | Tower/Pole Analysis with Antennas below top of Tower/Pole (on two faces) | ----- | 4 | 1.00 | 1.00 | 2.50 | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
| | | Conductors: | Conductor loads provided by NU | | | | | |
| High Wind Condtion | TIA/EIA | Antenna Mount | 85 | TIA | TIA | TIA | TIA, Section 3.1.1.1 disallowed for connection design | TIA |
| | NESC Extreme Wind | Tower/Pole Analysis with antennas extending above top of Tower/Pole | Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading<br>1.25 x Gust Response Factor<br>Height above ground level based on top of Mast/Antenna | | | | | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
| | | Tower/Pole Analysis with Antennas below top of Tower/Pole | Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading<br>Height above ground level based on top of Tower/Pole | | | | | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
| | | Conductors: | Conductor loads provided by NU | | | | | |
| NESC Extreme Ice with Wind Conditon* | | Tower/Pole Analysis with antennas extending above top of Tower/Pole | Use NESC C2-2007, Section 25, Rule 250D: Extreme Ice with Wind Loading<br>4PSF Wind Load 1.25 x Gust Response Factor<br>Height above ground level based on top of Mast/Antenna | | | | | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
| | | Tower/Pole Analysis with Antennas below top of Tower/Pole | Use NESC C2-2007, Section 25, Rule 250D: Extreme Ice with Wind Loading<br>4PSF Wind Load<br>Height above ground level based on top of Tower/Pole | | | | | 1.6 Flat Surfaces<br>1.3 Round Surfaces |
| | | Conductors: | Conductor loads provided by NU | | | | | |
| | | * Only for Structures Installed after 2007 | | | | | | |

Shape Factor Criteria shall be per TIA Shape Factors.

2) STEP 2 - The electric transmission structure analysis and evaluation shall be performed in accordance with NESC requirements and shall include the mast and antenna loads determined from NESC applied loading conditions (not TIA/EIA Loads) on the structure and mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

The structure shall be analyzed using yield stress theory in accordance with Attachment A, "NU Design Criteria." This specifies uniform loadings (different from the TIA loadings) on each of the following components of the installed facility:

a) Wireless communication mast for its total height above ground level, including the initial and any planned future equipment (Support Platforms, Antennas, TMA's etc.) above the top of an electric transmission structure.

b) Conductors and related devices and hardware (wire loads will be provided by NU).

c) Electric Transmission Structure

i) The loads from the wireless communication equipment components based on NESC and NU Criteria in Attachment A, and from the electric conductors shall be applied to the structure at conductor and wireless communication mast attachment points, where those loads transfer to the tower.

ii) Shape Factor Multiplier:

| NESC Structure Shape | Cd |
|---|---|
| Polyround (for polygonal steel poles) | 1.3 |
| Flat | 1.6 |
| Open Lattice | 3.2 |

iii) When Coaxial Cables are mounted along side the pole structure, the shape multiplier shall be:

| Mount Type | Cable Cd | Pole Cd |
|---|---|---|
| Coaxial Cables on outside periphery (One layer) | 1.45 | 1.45 |
| Coaxial Cables mounted on stand offs | 1.6 | 1.3 |

d) The uniform loadings and factors specified for the above components in Attachment A, "NU Design Criteria" are based upon the National Electric Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to the TIA and its loads and factors with the exceptions noted above.

**Note:** The NESC does not require ice load be included in the supporting structure. (Ice on conductors and shield wire only, and NU will provide these loads).

e) Mast reaction loads shall be evaluated for local effects on the transmission structure members at the attachment points.

Northeast Utilities System

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| | Checked by | Date | |

## INPUT DATA

**TOWER ID:** 1321

**Structure Height (ft) :** 101

**Wind Zone :** Central CT (green)

**Wind Speed :** 90.5711047 mph

**Tower Type :** (●) Suspension ( ) Strain

**Extreme Wind Model :** PCS Addition

### Shield Wire Properties:

| | BACK | AHEAD |
|---|---|---|
| NAME = | *3/8 CW* | *3/8 CW* |
| DESCRIPTION = | 3/8 | 3/8 |
| STRANDING = | 7 #8 Cu Weld | 7 #8 Cu Weld |
| DIAMETER = | 0.385 in | 0.385 in |
| WEIGHT = | 0.324 lb/ft | 0.324 lb/ft |

### Conductor Properties:

| | | BACK | AHEAD | | |
|---|---|---|---|---|---|
| | NAME = | *TERN* | *TERN* | | |
| Number of Conductors per phase | 1 | 795.000 45/7 ACSR | 795.000 45/7 ACSR | 1 | Number of Conductors per phase |
| | DIAMETER = | 1.063 in | 1.063 in | | |
| | WEIGHT = | 0.895 lb/ft | 0.895 lb/ft | | |

Insulator Weight = 0 lbs

Broken Wire Side = AHEAD SPAN

### Horizontal Line Tensions:

| | BACK | | AHEAD | |
|---|---|---|---|---|
| | Shield | Conductor | Shield | Conductor |
| NESC HEAVY = | 3,800 | 7,000 | 3,800 | 7,000 |
| EXTREME WIND = | 3,038 | 7,356 | 3,061 | 8,027 |
| LONG. WIND = | na | na | na | na |
| 250D COMBINED = | na | na | na | na |
| NESC W/O OLF = | na | na | na | na |
| 60 DEG F NO WIND = | 1,280 | 2,733 | 1,073 | 2,736 |

### Line Geometry:

| | | | | | SUM |
|---|---|---|---|---|---|
| LINE ANGLE (deg) = | BACK: | 1 | AHEAD: | 1 | **2** |
| WIND SPAN (ft) = | BACK: | 402 | AHEAD: | 402 | **804** |
| WEIGHT SPAN (ft) = | BACK: | 489 | AHEAD: | 489 | **978** |

Northeast Utilities System

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| | Computed by | Date | 7/27/10 |
| | Checked by | Date | |

## WIRE LOADING AT ATTACHMENTS

TOWER ID: 1321

| | | | |
|---|---|---|---|
| Wind Span = | 804 | ft | |
| Weight Span = | 978 | ft | |
| Total Angle = | 2 | degrees | |

Broken Wire Span = AHEAD SPAN

Type of Insulator Attachment = SUSPENSION

### 1. NESC RULE 250B Heavy Loading:

| | INTACT CONDITION | | | BROKEN WIRE CONDITION | | |
|---|---|---|---|---|---|---|
| | Horizontal | Longitudinal | Vertical | Horizontal | Longitudinal | Vertical |
| Shield Wire = | 1,147 lb | 0 lb | 1,282 lb | 573 lb | 6,269 lb | 641 lb |
| Conductor = | 1,785 lb | 0 lb | 2,739 lb | 893 lb | 11,548 lb | 1,369 lb |

### 2. NESC RULE 250C Transverse Extreme Wind Loading:

| | Horizontal | Longitudinal | Vertical |
|---|---|---|---|
| Shield Wire = | 705 lb | 26 lb | 364 lb |
| Conductor = | 1,917 lb | 772 lb | 1,007 lb |

### 3. NESC RULE 250C Longitudinal Extreme Wind Loading:

| | Horizontal | Longitudinal | Vertical |
|---|---|---|---|
| Shield Wire = | #VALUE! | #VALUE! | 364 lb |
| Conductor = | #VALUE! | #VALUE! | 1,007 lb |

### 4. NESC RULE 250D Extreme Ice & Wind Loading:

| | Horizontal | Longitudinal | Vertical |
|---|---|---|---|
| Shield Wire = | #VALUE! | #VALUE! | 2,001 lb |
| Conductor = | #VALUE! | #VALUE! | 3,384 lb |

### 5. NESC RULE 250B w/o OLF's

| | Horizontal | Longitudinal | Vertical |
|---|---|---|---|
| Shield Wire = | #VALUE! | #VALUE! | 855 lb |
| Conductor = | #VALUE! | #VALUE! | 1,826 lb |

### 6. 60 Deg. F, No Wind

| | Horizontal | Longitudinal | Vertical |
|---|---|---|---|
| Shield Wire = | 41 lb | 207 lb | 317 lb |
| Conductor = | 95 lb | 3 lb | 875 lb |

### 7. Construction

| | Horizontal | Longitudinal | Vertical |
|---|---|---|---|
| Shield Wire = | 62 lb | 310 lb | 475 lb |
| Conductor = | 143 lb | 4 lb | 1,313 lb |

Northeast Utilities System

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| | Checked by | Date | |

## INPUT DATA

**TOWER ID:** 1321

**Structure Height (ft) :** 101

**Wind Zone :** Central CT (green)

**Wind Speed :** 90.5711047 mph

**Tower Type :** (●) Suspension ( ) Strain

**Extreme Wind Model :** PCS Addition

### Shield Wire Properties:

| | BACK | AHEAD |
|---|---|---|
| NAME = | *3/8 AW* | *3/8 AW* |
| DESCRIPTION = | 3/8 | 3/8 |
| STRANDING = | 7 #8 Al Weld | 7 #8 Al Weld |
| DIAMETER = | 0.385 in | 0.385 in |
| WEIGHT = | 0.262 lb/ft | 0.262 lb/ft |

### Conductor Properties:

| | BACK | AHEAD | |
|---|---|---|---|
| NAME = | *TERN* | *TERN* | |
| Number of Conductors per phase: 1 | 795.000 45/7 ACSR | 795.000 45/7 ACSR | 1 Number of Conductors per phase |
| DIAMETER = | 1.063 in | 1.063 in | |
| WEIGHT = | 0.895 lb/ft | 0.895 lb/ft | |

Insulator Weight = 0 lbs

Broken Wire Side = AHEAD SPAN

### Horizontal Line Tensions:

| | BACK | | AHEAD | |
|---|---|---|---|---|
| | Shield | Conductor | Shield | Conductor |
| NESC HEAVY = | 3,600 | 7,000 | 3,600 | 7,000 |
| EXTREME WIND = | 2,846 | 7,356 | 2,838 | 8,027 |
| LONG. WIND = | na | na | na | na |
| 250D COMBINED = | na | na | na | na |
| NESC W/O OLF = | na | na | na | na |
| 60 DEG F NO WIND = | 1,094 | 2,733 | 783 | 2,736 |

### Line Geometry:

| | | | | | SUM |
|---|---|---|---|---|---|
| LINE ANGLE (deg) = | BACK: | 1 | AHEAD: | 1 | **2** |
| WIND SPAN (ft) = | BACK: | 402 | AHEAD: | 402 | **804** |
| WEIGHT SPAN (ft) = | BACK: | 489 | AHEAD: | 489 | **978** |

Northeast Utilities System

| | | | |
|---|---|---|---|
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| | | Checked by | Date 7/27/10 |
| | | | Date |

## WIRE LOADING AT ATTACHMENTS

**TOWER ID:** 1321

| | | | |
|---|---|---|---|
| Wind Span = | 804 ft | Broken Wire Span = | AHEAD SPAN |
| Weight Span = | 978 ft | Type of Insulator Attachment = | SUSPENSION |
| Total Angle = | 2 degrees | | |

### 1. NESC RULE 250B Heavy Loading:

| | INTACT CONDITION | | | BROKEN WIRE CONDITION | | |
|---|---|---|---|---|---|---|
| | Horizontal | Longitudinal | Vertical | Horizontal | Longitudinal | Vertical |
| Shield Wire = | 1,135 lb | 0 lb | 1,191 lb | 568 lb | 5,939 lb | 596 lb |
| Conductor = | 1,785 lb | 0 lb | 2,739 lb | 893 lb | 11,548 lb | 1,369 lb |

### 2. NESC RULE 250C Transverse Extreme Wind Loading:

| | Horizontal | Longitudinal | Vertical |
|---|---|---|---|
| Shield Wire = | 697 lb | 9 lb | 294 lb |
| Conductor = | 1,917 lb | 772 lb | 1,007 lb |

### 3. NESC RULE 250C Longitudinal Extreme Wind Loading:

| | Horizontal | Longitudinal | Vertical |
|---|---|---|---|
| Shield Wire = | #VALUE! | #VALUE! | 294 lb |
| Conductor = | #VALUE! | #VALUE! | 1,007 lb |

### 4. NESC RULE 250D Extreme Ice & Wind Loading:

| | Horizontal | Longitudinal | Vertical |
|---|---|---|---|
| Shield Wire = | #VALUE! | #VALUE! | 1,940 lb |
| Conductor = | #VALUE! | #VALUE! | 3,384 lb |

### 5. NESC RULE 250B w/o OLF's

| | Horizontal | Longitudinal | Vertical |
|---|---|---|---|
| Shield Wire = | #VALUE! | #VALUE! | 794 lb |
| Conductor = | #VALUE! | #VALUE! | 1,826 lb |

### 6. 60 Deg. F, No Wind

| | Horizontal | Longitudinal | Vertical |
|---|---|---|---|
| Shield Wire = | 33 lb | 311 lb | 256 lb |
| Conductor = | 95 lb | 3 lb | 875 lb |

### 7. Construction

| | Horizontal | Longitudinal | Vertical |
|---|---|---|---|
| Shield Wire = | 49 lb | 466 lb | 384 lb |
| Conductor = | 143 lb | 4 lb | 1,313 lb |

# Connecticut Light & Power

## POWERMOUNT REINFORCEMENT DESIGN

# CL&P STRUCT. NO. 1321
# 670 CHAPEL STREET
# STRATFORD, CT 06614


VICINITY MAP

NORTH

## PROJECT SUMMARY

| | |
|---|---|
| SITE ADDRESS: | 670 CHAPEL STREET<br>STRATFORD, CT 06614 |
| PROJECT COORDINATES: | LAT: 41°–14'–16.80"N<br>LON: 73°–07'–20.50"W<br>ELEV:±152' AMSL |
| CL&P STRUCT NO: | 1321 |
| CL&P CONTACT: | ROBERT GRAY<br>860.665.3175 |
| T–MOBILE SITE REF.: | CT11426A |
| T–MOBILE CONTACT: | MARK RICHARD<br>860.692.7143 |
| ANTENNA CL HEIGHT: | 109'–0" |
| ENGINEER OF RECORD: | CENTEK ENGINEERING, INC.<br>63–2 NORTH BRANFORD ROAD<br>BRANFORD, CT 06405 |
| CENTEK CONTACT: | CARLO F. CENTORE, PE<br>203.488.0580 ext. 122 |

## SHEET INDEX



| REV. | DATE | DRAWN BY | CHK'D BY | DESCRIPTION |
|---|---|---|---|---|
| 2 | 10/21/15 | TJL | CFC | ISSUED FOR CONSTRUCTION |
| 1 | 2/25/14 | TJL | CFC | ISSUED FOR CONSTRUCTION |
| 0 | 1/27/14 | TJL | CFC | ISSUED FOR CONSTRUCTION |

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T-Mobile


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Centered on Solutions℠
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Branford, CT 06405
www.CentekEng.com


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CL&P STRUCTURE 1321

670 CHAPEL STREET
STRATFORD CT 06614

| | |
|---|---|
| DATE: | 01/27/14 |
| SCALE: | AS SHOWN |
| JOB NO. | 13317.000 |

TITLE SHEET

SHEET NO.
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# DESIGN BASIS

1. GOVERNING CODE: 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2005 CT STATE BUILDING CODE AND 2009 AMENDMENTS.

2. TIA/EIA-222-F-1996, ASCE MANUAL NO. 72 – "DESIGN OF STEEL TRANSMISSION POLE STRUCTURES SECOND EDITION", NESC C2-2007 AND NORTHEAST UTILITIES DESIGN CRITERIA.

3. DESIGN CRITERIA

   WIND LOAD: (PCS MAST)
   BASIC WIND SPEED (V) =85 MPH (FASTEST MILE); BASED ON TIA/EIA-222F AND NU MAST DESIGN CRITERIA EXCEPTION 1.

   WIND LOAD: (UTILITY POLE & FOUNDATION)
   BASIC WIND SPEED (V) =110 MPH (3-SECOND GUST) BASED ON NESC C2-2007, SECTION 25 RULE 250C.

# GENERAL NOTES

1. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., FOR T-MOBILE, DATED 10/21/15.

2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM THE TOWER DESIGN DRAWINGS PREPARED BY R.D. COOMBS & CO.; DATED APRIL 12, 1957.

3. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE GOVERNING BUILDING CODE.

4. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS SCOPE OF WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.

5. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK. THIS INCLUDES VERIFYING ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK.

6. ALL WORK SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF TRANSMISSION STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA.

7. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

8. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.

9. NO DRILLING WELDING OR TAPING IS PERMITTED ON CL&P OWNED EQUIPMENT.

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| | |
|---|---|
| DATE: | 01/27/14 |
| SCALE: | AS SHOWN |
| JOB NO. | 13317.000 |

DESIGN BASIS AND GENERAL NOTES

SHEET NO.
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Sheet No. 2 of 6

# STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD).

2. MATERIAL SPECIFICATIONS

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI).
   C. STRUCTURAL STEEL (TOWER REINF. SOLID ROUND BAR)--- ASTM A572_GR50 (50 KSI)
   D. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   E. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   F. PIPE---ASTM A53 GRADE B (FY = 35 KSI)

3. FASTENER SPECIFICATIONS

   A. CONNECTION BOLTS---ASTM A325-N, UNLESS OTHERWISE SCHEDULED.
   B U-BOLTS---ASTM A307
   C. ANCHOR RODS---ASTM F1554
   D. WELDING ELECTRODES---ASTM E70XX FOR A36 & A572_GR50 STEELS, ASTM E80XX FOR A572_GR65 STEEL.
   E. BLIND BOLTS---AS1252 PROPERTY CLASS 8.8 (FU=120 KSI).

4. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.

5. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.

6. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.

7. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.

8. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.

9. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.

10. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.

11. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".

12. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING THE SCHEDULED ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.

13. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.

14. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.

15. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.

16. ALL BOLTS SHALL BE INSTALLED PER THE REQUIREMENTS OF AISC 14TH EDITION & RCSC "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH STRENGTH BOLTS".

17. ALL BOLTS SHALL BE INSTALLED AS SNUG-TIGHT CONNECTIONS UNLESS OTHERWISE INDICATED. CONNECTIONS SPECIFIED AS PRETENSIONED OR SLIP-CRITICAL SHALL BE TIGHTENED TO A BOLT TENSION NOT LESS THAN THAT GIVEN IN TABLE J3.1 OF AISC 14TH EDITION.

18. LOCK WASHER ARE NOT PERMITTED FOR A325 BOLTED STEEL ASSEMBLIES.

19. LOAD INDICATOR WASHERS SHALL BE UTILIZED ON ALL PRETENSIONED OR SLIP-CRITICAL CONNECTIONS.

20. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.

21. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.

22. FABRICATE BEAMS WITH MILL CAMBER UP.

23. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.

24. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

| REV. | DATE | DRAWN BY | CHK'D BY | DESCRIPTION |
|---|---|---|---|---|
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| | |
|---|---|
| DATE: | 01/27/14 |
| SCALE: | AS SHOWN |
| JOB NO. | 13317.000 |

STRUCTURAL STEEL NOTES

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# MODIFICATION INSPECTION REPORT REQUIREMENTS

| PRE-CONSTUCTION | | DURING CONSTRUCTION | | POST-CONSTRUCTION | |
|---|---|---|---|---|---|
| SCHEDULED ITEM | REPORT ITEM | SCHEDULED ITEM | REPORT ITEM | SCHEDULED ITEM | REPORT ITEM |
| X | EOR MODIFICATION INSPECTION DRAWING | - | FOUNDATIONS | X | MODIFICATION INSPECTOR RECORD REDLINE DRAWING |
| X | EOR APPROVED SHOP DRAWINGS | - | EARTHWORK: BACKFILL MATERIAL & COMPACTION | - | POST-INSTALLED ANCHOR ROD PULL-OUT TEST |
| - | EOR APPROVED POST-INSTALLED ANCHOR MPII | - | REBAR & FORMWORK GEOMETRY VERIFICATION | X | PHOTOGRAPHS |
| - | FABRICATION INSPECTION | - | CONCRETE TESTING | | |
| - | FABRICATOR CERTIFIED WELDER INSPECTION | X | STEEL INSPECTION | | |
| X | MATERIAL CERTIFICATIONS | - | POST INSTALLED ANCHOR ROD VERIFICATION | | |
| | | - | BASE PLATE GROUT VERIFICATION | | |
| | | - | CONTRACTOR'S CERTIFIED WELD INSPECTION | | |
| | | X | ON-SITE COLD GALVANIZING VERIFICATION | | |
| | | X | CONTRACTOR AS-BUILT REDLINE DRAWINGS | | |

NOTES:

1. REFER TO MODIFICATION INSPECTION NOTES FOR ADDITIONAL REQUIREMENTS
2. "X" DENOTES DOCUMENT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
3. "-" DENOTES DOCUMENT NOT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
4. EOR - ENGINEER OF RECORD
4. MPII - "MANUFACTURER'S PRINTED INSTALLATION GUIDELINES"

## GENERAL

1. THE MODIFICATION INSPECTION IS A VISUAL INSPECTION OF STRUCTURAL MODIFICATIONS, TO INCLUDE A REVIEW AND COMPILATION OF SPECIFIED SUBMITTALS AND CONSTRUCTION INSPECTIONS, AS AN ASSURANCE OF COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS PREPARED UNDER THE DIRECTION OF THE ENGINEER OF RECORD (EOR).

2. THE MODIFICATION INSPECTION IS TO CONFIRM INSTALLATION CONFIGURATION AND GENERAL WORKMANSHIP AND IS NOT A REVIEW OF THE MODIFICATION DESIGN. OWNERSHIP OF THE MODIFICATION DESIGN EFFECTIVENESS AND INTENT RESIDES WITH THE ENGINEER OF RECORD.

3. TO ENSURE COMPLIANCE WITH THE MODIFICATION INSPECTION REQUIREMENTS THE GENERAL CONTRACTOR (GC) AND THE MODIFICATION INSPECTOR (MI) COMMENCE COMMUNICATION UPON AUTHORIZATION TO PROCEED BY THE CLIENT. EACH PARTY SHALL BE PROACTIVE IN CONTACTING THE OTHER. THE EOR SHALL BE CONTACTED IF SPECIFIC GC/MI CONTACT INFORMATION IS NOT MADE AVAILABLE.

4. THE GC SHALL PROVIDE THE MI WITH A MINIMUM OF 5 BUSINESS DAYS NOTICE OF IMPENDING INSPECTIONS.

5. WHEN POSSIBLE, THE GC AND MI SHALL BE ON SITE DURING THE MODIFICATION INSPECTION TO HAVE ANY NOTED DEFICIENCIES ADDRESSED DURING THE INITIAL MODIFICATION INSPECTION.

## MODIFICATION INSPECTOR (MI)

1. THE MI SHALL CONTACT THE GC UPON AUTHORIZATION BY THE CLIENT TO:

   - REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   - WORK WITH THE GC IN DEVELOPMENT OF A SCHEDULE FOR ON-SITE INSPECTIONS.
   - DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE MI IS RESPONSIBLE FOR COLLECTION OF ALL INSPECTION AND TEST REPORTS, REVIEWING REPORTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING ON-SITE INSPECTIONS AND COMPILATION & SUBMISSION OF THE MODIFICATION INSPECTION REPORT TO THE CLIENT AND THE EOR.

## GENERAL CONTRACTOR (GC)

1. THE GC IS REQUIRED TO CONTACT THE GC UPON AUTHORIZATION TO PROCEED WITH CONSTRUCTION BY THE CLIENT TO:

   - REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   - WORK WITH THE MI IN DEVELOPMENT OF A SCHEDULE FOR ON-SITE INSPECTIONS.
   - DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE GC IS RESPONSIBLE FOR COORDINATING AND SCHEDULING IN ADVANCE ALL REQUIRED INSPECTIONS AND TESTS WITH THE MI.

## CORRECTION OF FAILING MODIFICATION INSPECTION

1. SHOULD THE STRUCTURAL MODIFICATION NOT COMPLY WITH THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS, THE GC SHALL WORK WITH THE MODIFICATION INSPECTOR IN A VIABLE REMEDIATION PLAN AS FOLLOWS:

   - CORRECT ALL DEFICIENCIES TO COMPLY WITH THE CONTRACT DOCUMENTS AND COORDINATE WITH THE MI FOR A FOLLOW UP INSPECTION.
   - WITH CLIENT AUTHORIZATION, THE GC MAY WORK WITH THE EOR TO REANALYZE THE MODIFICATION USING THE AS-BUILT CONDITION.

## REQUIRED PHOTOGRAPHS

1. THE GC AND MI SHALL AT MINIMUM PHOTO DOCUMENT THE FOLLOWING FOR INCLUSION IN THE MODIFICATION INSPECTION REPORT:

   - PRE-CONSTRUCTION: GENERAL CONDITION OF THE SITE.
   - DURING CONSTRUCTION: RAW MATERIALS, CRITICAL DETAILS, WELD PREPARATION, BOLT INSTALLATION & TORQUE, FINAL INSTALLED CONDITION & SURFACE COATING REPAIRS.
   - POST-CONSTRUCTION: FINAL CONDITION OF THE SITE

| REV. | DATE | DRAWN BY | CHK'D BY | DESCRIPTION |
|---|---|---|---|---|
| 2 | 10/21/15 | TJL | CFC | ISSUED FOR CONSTRUCTION |
| 1 | 2/25/14 | TJL | CFC | ISSUED FOR CONSTRUCTION |
| 0 | 1/27/14 | TJL | CFC | ISSUED FOR CONSTRUCTION |

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T-MOBILE
PROPOSED ANTENNA LOCATION

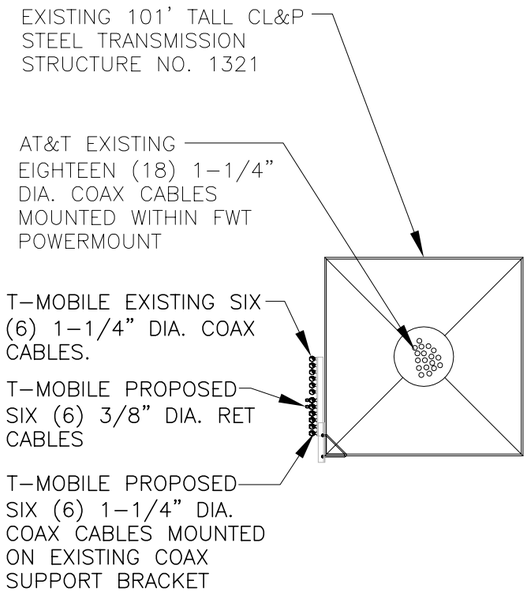
CT11-426A
CL&P STRUCTURE 1321

670 CHAPEL STREET
STRATFORD CT 06614

| | |
|---|---|
| DATE: | 01/27/14 |
| SCALE: | AS SHOWN |
| JOB NO. | 13317.000 |

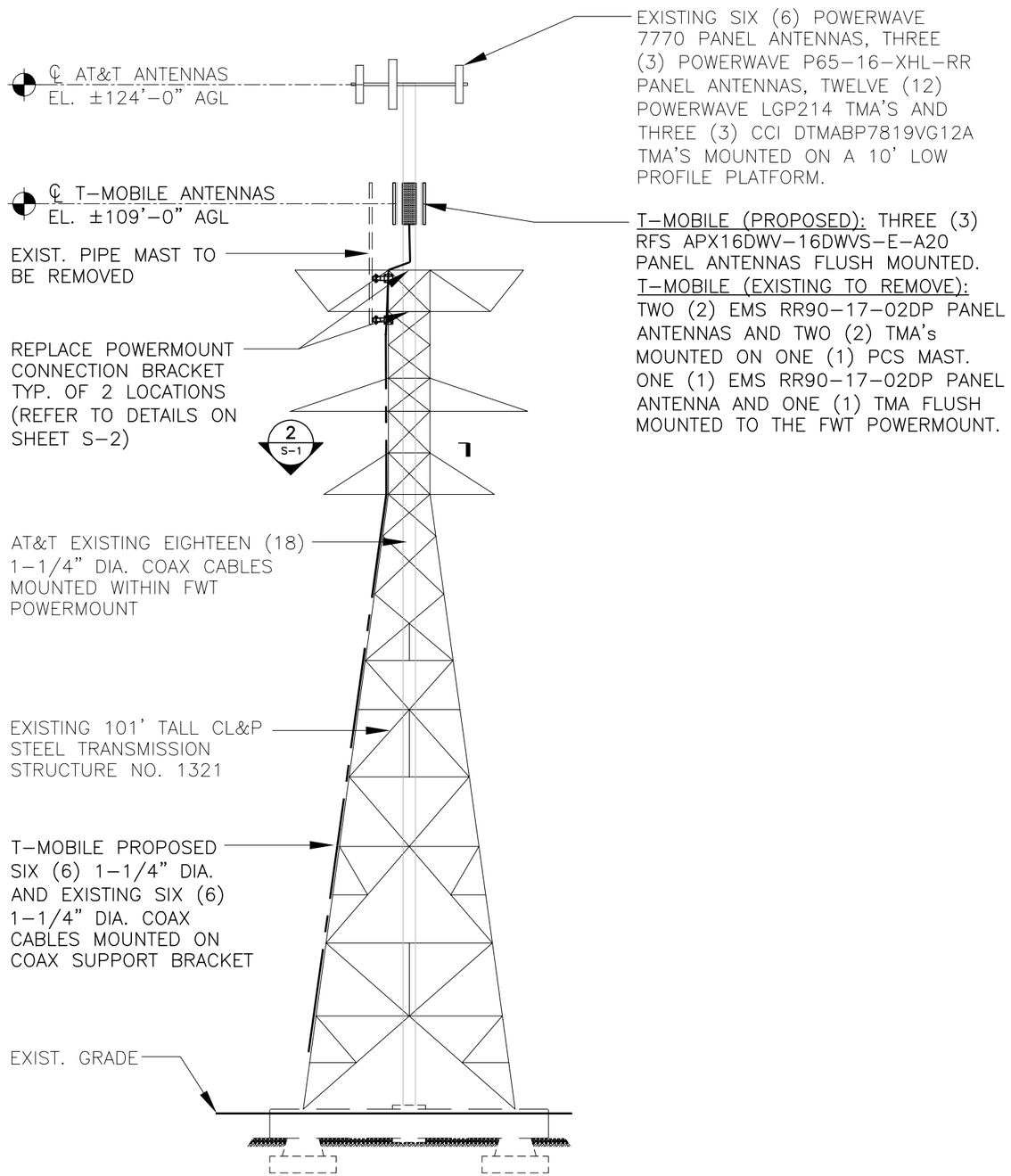
MODIFICATION INSPECTION REQUIREMENTS

SHEET NO.
MI-1
Sheet No. 4 of 6




2 S-1 COAX CABLE PLAN

SCALE: NOT TO SCALE




1 S-1 TOWER & MAST ELEVATION

SCALE: NOT TO SCALE

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|---|---|---|---|---|
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| 1 | 2/25/14 | TJL | CFC | ISSUED FOR CONSTRUCTION |
| 0 | 1/27/14 | TJL | CFC | ISSUED FOR CONSTRUCTION |

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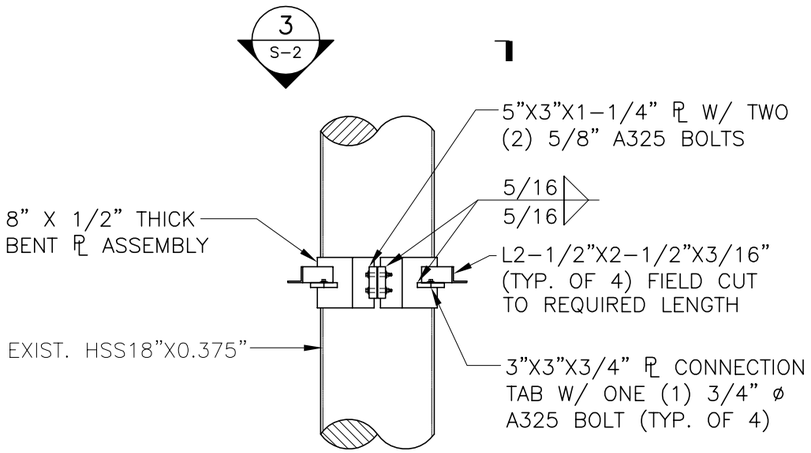
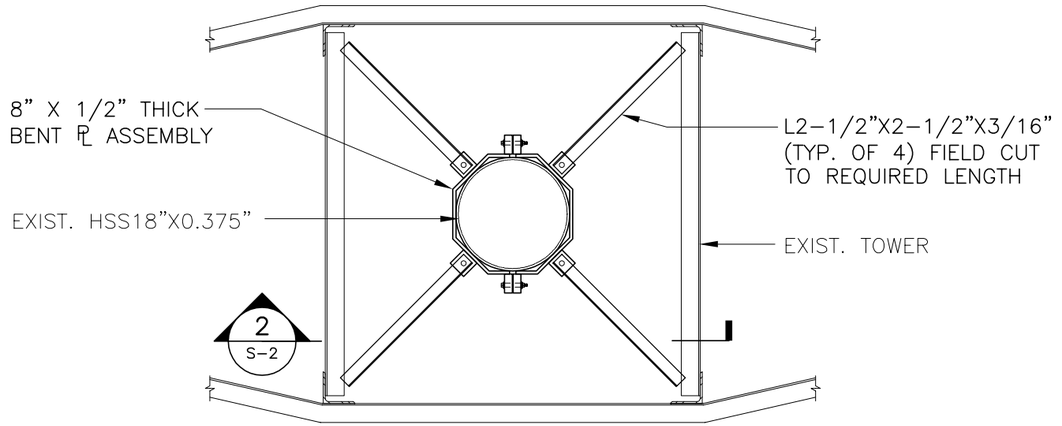
| SCALE: | AS SHOWN |
| JOB NO. | 13317.000 |

TOWER ELEVATION AND FEEDLINE PLAN

SHEET NO.
S-1
Sheet No. 5 of 6



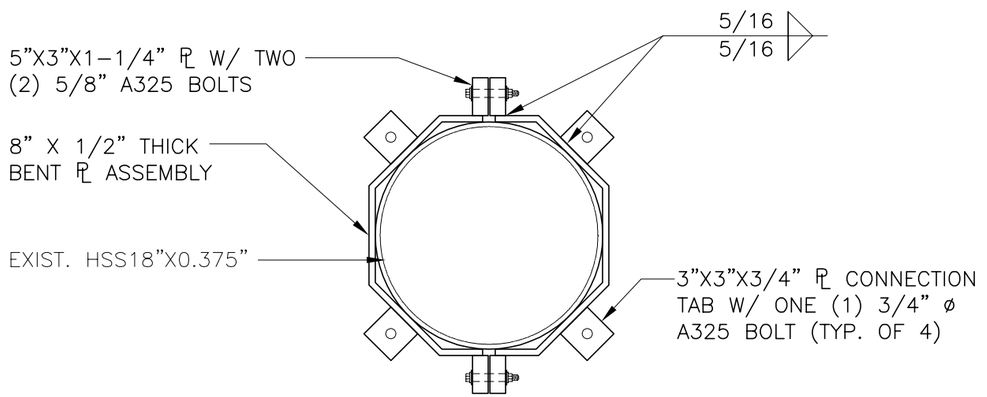




## 2 S-2 BRACKET ELEVATION

SCALE: 1/2" = 1'-0"

## 1 S-2 BRACKET PLAN

SCALE: 1/2" = 1'-0"




## 3 S-2 BRACKET DETAIL

SCALE: 1" = 1'-0"

| REV. | DATE | DRAWN BY | CHK'D BY | DESCRIPTION |
|---|---|---|---|---|
| 2 | 10/21/15 | TJL | CFC | ISSUED FOR CONSTRUCTION |
| 1 | 2/25/14 | TJL | CFC | ISSUED FOR CONSTRUCTION |
| 0 | 1/27/14 | TJL | CFC | ISSUED FOR CONSTRUCTION |

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|---|---|
| DATE: | 01/27/14 |
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**POWERMOUNT CONNECTION DETAILS**

SHEET NO.
S-2
Sheet No. 6 of 6

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|---|---|
| Subject: | Load Analysis of Powermount on CL&P Tower # 1321 |
| Location: | Stratford, CT |
| Rev. 0: 11/20/13 | Prepared by: T.J.L. Checked by: C.F.C. Job No. 13317.000 |

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

### Wind Speeds

| | | | |
|---|---|---|---|
| Basic Wind Speed | $V := 85$ | mph | (User Input per NU Mast Design Criteria Exception 1) |
| Basic Wind Speed with Ice | $V_i := 74$ | mph | (User Input per TIA/EIA-222-F Section 2.3.16) |

### Heights above ground level, z

| | | | |
|---|---|---|---|
| Powermount Section 1 | $z_{pmnt1} := 105$ | ft | (User Input) |
| Powermount Section 2 | $z_{pmnt2} := 75$ | ft | (User Input) |
| Powermount Section 3 | $z_{pmnt3} := 45$ | ft | (User Input) |
| Powermount Section 4 | $z_{pmnt4} := 15$ | ft | (User Input) |
| AT&T | $z_{att} := 124$ | ft | (User Input) |
| T-Mobile | $z_{tm} := 109$ | ft | (User Input) |
| Coax Cable | $z_{coax} := 105$ | ft | (User Input) |

### Exposure Coefficients, kz

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

Powermount Section 1: $Kz_{pmnt1} := \left(\frac{z_{pmnt1}}{33}\right)^{\frac{2}{7}} = 1.392$

Powermount Section 2: $Kz_{pmnt2} := \left(\frac{z_{pmnt2}}{33}\right)^{\frac{2}{7}} = 1.264$

Powermount Section 3: $Kz_{pmnt3} := \left(\frac{z_{pmnt3}}{33}\right)^{\frac{2}{7}} = 1.093$

Powermount Section 4: $Kz_{pmnt4} := \left(\frac{z_{pmnt4}}{33}\right)^{\frac{2}{7}} = 0.798$

AT&T: $Kz_{att} := \left(\frac{z_{att}}{33}\right)^{\frac{2}{7}} = 1.46$

T-Mobile: $Kz_{tm} := \left(\frac{z_{tm}}{33}\right)^{\frac{2}{7}} = 1.407$

Coax Cable: $Kz_{coax} := \left(\frac{z_{coax}}{33}\right)^{\frac{2}{7}} = 1.392$

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

| | |
|---|---|
| Powermount Section 1 | $qz_{pmnt1} := 0.00256 \cdot Kz_{pmnt1} \cdot V^2 = 25.745$ |
| Powermount Section 2 | $qz_{pmnt2} := 0.00256 \cdot Kz_{pmnt2} \cdot V^2 = 23.386$ |
| Powermount Section 3 | $qz_{pmnt3} := 0.00256 \cdot Kz_{pmnt3} \cdot V^2 = 20.21$ |
| Powermount Section 4 | $qz_{pmnt4} := 0.00256 \cdot Kz_{pmnt4} \cdot V^2 = 14.765$ |
| AT&T | $qz_{att} := 0.00256 \cdot Kz_{att} \cdot V^2 = 26.998$ |
| T-Mobile | $qz_{tm} := 0.00256 \cdot Kz_{tm} \cdot V^2 = 26.022$ |
| Coax Cable | $qz_{coax} := 0.00256 \cdot Kz_{coax} \cdot V^2 = 25.745$ |

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

| | |
|---|---|
| Powermount Section 1 | $qzICE_{pmnt1} := 0.00256 \cdot Kz_{pmnt1} \cdot V_i^2 = 19.513$ |
| Powermount Section 2 | $qzICE_{pmnt2} := 0.00256 \cdot Kz_{pmnt2} \cdot V_i^2 = 17.725$ |
| Powermount Section 3 | $qzICE_{pmnt3} := 0.00256 \cdot Kz_{pmnt3} \cdot V_i^2 = 15.318$ |
| Powermount Section 4 | $qzICE_{pmnt4} := 0.00256 \cdot Kz_{pmnt4} \cdot V_i^2 = 11.191$ |
| AT&T | $qzICE_{att} := 0.00256 \cdot Kz_{att} \cdot V_i^2 = 20.463$ |
| T-Mobile | $qzICE_{tm} := 0.00256 \cdot Kz_{tm} \cdot V_i^2 = 19.723$ |
| Coax Cable | $qzICE_{coax} := 0.00256 \cdot Kz_{coax} \cdot V_i^2 = 19.513$ |

**TIA/EIA Common Factors:**

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

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| Location: | Stratford, CT |
| Rev. 0: 11/20/13 | Prepared by: T.J.L. Checked by: C.F.C. Job No. 13317.000 |

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

**Powermount Data:** (HSS 18 x 0.375)

| | | | |
|---|---|---|---|
| Powermount Shape = | Round | | (User Input) |
| Powermount Diameter = | $D_{pmnt} := 18$ | in | (User Input) |
| Powermount Length = | $L_{pmnt} := 124$ | ft | (User Input) |
| Powermount Thickness = | $t_{pmnt} := 0.375$ | in | (User Input) |
| Velocity Coefficient = | $C := \sqrt{Kz_{pmnt4}} \cdot V \cdot \frac{D_{pmnt}}{12} = 114$ | | |
| Powermount Force Coefficient = | $CF_{pmnt} = 0.59$ | | (per TIA/EIA-222-F Table 1) |

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

| | | | | |
|---|---|---|---|---|
| Powermount Projected Surface Area = | $A_{pmnt} := \frac{D_{pmnt}}{12} = 1.5$ | sf/ft | | |
| Total Powermount Section 1 Wind Force = | $qz_{pmnt1} \cdot G_H \cdot CF_{pmnt} \cdot A_{pmnt} = 39$ | plf | **BLC 5** | |
| Total Powermount Section 2 Wind Force = | $qz_{pmnt2} \cdot G_H \cdot CF_{pmnt} \cdot A_{pmnt} = 35$ | plf | **BLC 5** | |
| Total Powermount Section 3 Wind Force = | $qz_{pmnt3} \cdot G_H \cdot CF_{pmnt} \cdot A_{pmnt} = 30$ | plf | **BLC 5** | |
| Total Powermount Section 4 Wind Force = | $qz_{pmnt4} \cdot G_H \cdot CF_{pmnt} \cdot A_{pmnt} = 22$ | plf | **BLC 5** | |

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

| | | | | |
|---|---|---|---|---|
| Powermount Projected Surface Area w/ Ice = | $AICE_{pmnt} := \frac{(D_{pmnt} + 2 \cdot Ir)}{12} = 1.583$ | sf/ft | | |
| Total Powermount Section 1 Wind Force w/ Ice = | $qzICE_{pmnt1} \cdot G_H \cdot CF_{pmnt} \cdot AICE_{pmnt} = 31$ | plf | **BLC 4** | |
| Total Powermount Section 2 Wind Force w/ Ice = | $qzICE_{pmnt2} \cdot G_H \cdot CF_{pmnt} \cdot AICE_{pmnt} = 28$ | plf | **BLC 4** | |
| Total Powermount Section 3 Wind Force w/ Ice = | $qzICE_{pmnt3} \cdot G_H \cdot CF_{pmnt} \cdot AICE_{pmnt} = 24$ | plf | **BLC 4** | |
| Total Powermount Section 4 Wind Force w/ Ice = | $qzICE_{pmnt4} \cdot G_H \cdot CF_{pmnt} \cdot AICE_{pmnt} = 18$ | plf | **BLC 4** | |

**Gravity Loads (without ice)**

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

**Gravity Loads (ice only)**

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

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Subject: Load Analysis of Powermount on CL&P Tower # 1321

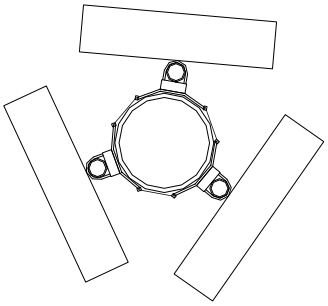
Location: Stratford, CT

Rev. 0: 11/20/13

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 13317.000

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

**Antenna Data:** (T-Mobile)



| | | | | |
|---|---|---|---|---|
| Antenna Model = | RFS APX 16DWV-16DWVS-E-A20 | | | |
| Antenna Shape = | Flat | | (User Input) | |
| Antenna Height = | $L_{ant} := 55.9$ | in | (User Input) | |
| Antenna Width = | $W_{ant} := 13.0$ | in | (User Input) | |
| Antenna Thickness = | $T_{ant} := 3.15$ | in | (User Input) | |
| Antenna Weight = | $WT_{ant} := 40.7$ | lbs | (User Input) | |
| Number of Antennas = | $N_{ant} := 3$ | | (User Input) | |
| 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 Applied to all Antennas Simultaneously***

| | | | |
|---|---|---|---|
| Surface Area for One Antenna = | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$ | sf | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 15.1$ | sf | |
| Total Antenna Wind Force = | $F_{ant} := qz_{tm} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 932$ | lbs | **BLC 5** |

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

***Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously***

| | | | |
|---|---|---|---|
| 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 = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 16.6$ | sf | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant} := qzICE_{tm} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 774$ | lbs | **BLC 4** |

**Gravity Load (without ice)**

| | | | |
|---|---|---|---|
| Weight of All Antennas = | $WT_{ant} \cdot N_{ant} = 122$ | lbs | **BLC 2** |

**Gravity Loads (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 = | $W_{ICEant} \cdot N_{ant} = 99$ | lbs | **BLC 3** |

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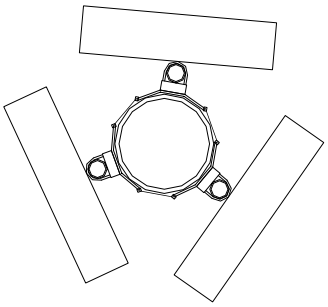
| Location: | Stratford, CT |
| Rev. 0: 11/20/13 | Prepared by: T.J.L. Checked by: C.F.C. Job No. 13317.000 |

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

**Mount Data:** (T-Mobile)

Mount Type: Microflect Tri-Sector Chain Mount w/ 3 Pipes



| | | | |
|---|---|---|---|
| Mount Shape = | Round | | (User Input) |
| Pipe Mount Length = | $L_{mnt} := 66$ | in | (User Input) |
| 2 inch Pipe Mount Linear Weight = | $W_{mnt} := 3.66$ | plf | (User Input) |
| Pipe Mount Outside Diameter = | $D_{mnt} := 2.375$ | in | (User Input) |
| Number of Mounting Pipes = | $N_{mnt} := 3$ | | (User Input) |
| Tri Sector Chain Mount Weight = | $W_{tsc.mnt} := 101$ | lbs | (User Input) |
| Mount Aspect Ratio = | $Ar_{mnt} := \frac{L_{mnt}}{D_{mnt}} = 28$ | | |
| Mount Force Coefficient = | $Ca_{mnt} = 1.2$ | | (per TIA/EIA-222-F Table 3) |

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

***Assumes Mount is Shielded by Antenna***

| | | | |
|---|---|---|---|
| Mount Projected Surface Area = | $A_{mnt} := 0.0$ | sf | |
| Total Mount Wind Force = | $F_{mnt} := qz_{tm} \cdot G_H \cdot Ca_{mnt} \cdot A_{mnt} = 0$ | lbs | **BLC 5** |

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

***Assumes Mount is Shielded by Antenna***

| | | | |
|---|---|---|---|
| Mount Projected Surface Area w/ Ice = | $A_{ICEmnt} := 0.0$ | sf | |
| Total Mount Wind Force = | $Fi_{mnt} := qzICE_{tm} \cdot G_H \cdot Ca_{mnt} \cdot A_{ICEmnt} = 0$ | lbs | **BLC 4** |

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

| | | | |
|---|---|---|---|
| Weight Each Pipe Mount = | $WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 20$ | lbs | |
| Weight of All Mounts = | $WT_{mnt} \cdot N_{mnt} + W_{tsc.mnt} = 161$ | lbs | **BLC 2** |

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

| | | | |
|---|---|---|---|
| Volume of Each Pipe = | $V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^{2} \cdot L_{mnt} = 292$ | cu in | |
| Volume of Ice on Each Pipe = | $V_{ice} := \left[\frac{\pi}{4} \cdot \left[(D_{mnt} + 1)^2\right] \cdot (L_{mnt} + 1)\right] - V_{mnt} = 307$ | cu in | |
| Weight of Ice each mount (incl, hardware) = | $W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 10$ | lbs | |
| Weight of Ice on All Mounts = | $W_{ICEmnt} \cdot N_{mnt} + 5 = 35$ | lbs | **BLC 3** |

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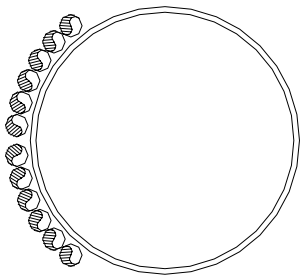
**Development of Wind & Ice Load on Coax Cables** per TIA/EIA-222-F-96 Criteria

**Coax Cable Data:** (T-Mobile)

Coax Type 1 = HELIAX 1-1/4"

Shape = Round (User Input)



Coax Outside Diameter = $D_{coax1} := 1.55$ in (User Input)

Coax Cable Length = $L_{coax1} := 8$ ft (User Input)

Weight of Coax per foot = $Wt_{coax1} := 0.66$ plf (User Input)

Total Number of Coax = $N_{coax1} := 12$ (User Input)

No. of Coax Projecting Outside Face of PCS Mast = $NP_{coax1} := 2$ (User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax1} \cdot 12)}{D_{coax1}} = 61.9$

Coax Cable Force Factor Coefficient = $Ca_{coax} = 1.2$ TIA/EIA-222-F-96 Table 3

**Wind Load (without ice)** per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area = $A_{coax} := \frac{(NP_{coax1} D_{coax1})}{12} = 0.3$ ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{coax} \cdot G_H \cdot A_{coax} = 13$ plf **BLC 5**

**Wind Load (with ice)** per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax1} \cdot D_{coax1} + 2 \cdot Ir)}{12} = 0.3$ ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qzICE_{coax} \cdot G_H \cdot AICE_{coax} = 14$ plf **BLC 4**

**Gravity Loads (without ice)**

Weight of all cables w/o ice = $WT_{coax} := Wt_{coax1} \cdot N_{coax1} = 8$ plf **BLC 2**

**Gravity Loads (ice only)**

Ice Area per Linear Foot = $Ai_{coax1} := \frac{\pi}{4}\left[\left(D_{coax1} + 2 \cdot Ir\right)^2 - D_{coax1}^2\right] = 3.2$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := Id \cdot \left(N_{coax1} \cdot \frac{Ai_{coax1}}{144}\right) = 15$ plf **BLC 3**

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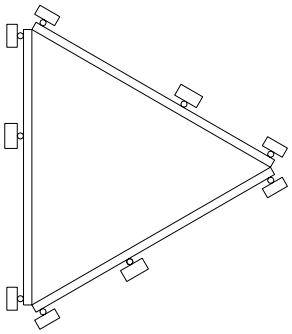
**Development of Wind & Ice Load on Antennas** (per TIA/EIA-222-F-1996 Criteria)

**Antenna Data:** (AT&T)



| | | | |
|---|---|---|---|
| Antenna Model = | Powerwave 7770 | | |
| Antenna Shape = | Flat | | (User Input) |
| Antenna Height = | $L_{ant} := 55$ | in | (User Input) |
| Antenna Width = | $W_{ant} := 11$ | in | (User Input) |
| Antenna Thickness = | $T_{ant} := 5$ | in | (User Input) |
| Antenna Weight = | $WT_{ant} := 39$ | lbs | (User Input) |
| Number of Antennas = | $N_{ant} := 6$ | | (User Input) |
| 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 Applied to all Antennas Simultaneously***

| | | | |
|---|---|---|---|
| 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 = | $F_{ant} := qz_{att} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 1610$ | lbs | **BLC 5** |

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

***Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously***

| | | | |
|---|---|---|---|
| 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 = | $Fi_{ant} := qzICE_{att} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 1356$ | lbs | **BLC 4** |

**Gravity Load (without ice)**

| | | | |
|---|---|---|---|
| Weight of All Antennas = | $WT_{ant} \cdot N_{ant} = 234$ | lbs | **BLC 2** |

**Gravity Loads (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** |

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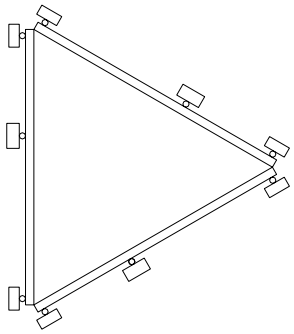
**Development of Wind & Ice Load on Antennas** (per TIA/EIA-222-F-1996 Criteria)

**Antenna Data:** (AT&T)



| | | | |
|---|---|---|---|
| Antenna Model = | Powerwave P65-16-XLH-RR | | |
| Antenna Shape = | Flat | | (User Input) |
| Antenna Height = | $L_{ant} := 72$ | in | (User Input) |
| Antenna Width = | $W_{ant} := 12$ | in | (User Input) |
| Antenna Thickness = | $T_{ant} := 6$ | in | (User Input) |
| Antenna Weight = | $WT_{ant} := 64$ | lbs | (User Input) |
| Number of Antennas = | $N_{ant} := 3$ | | (User Input) |
| Antenna Aspect Ratio = | $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.0$ | | |
| 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 Applied to all Antennas Simultaneously***

| | | | |
|---|---|---|---|
| Surface Area for One Antenna = | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 6$ | sf | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 18$ | sf | |
| Total Antenna Wind Force = | $F_{ant} := qz_{att} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 1150$ | lbs | **BLC 5** |

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

***Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously***

| | | | |
|---|---|---|---|
| Surface Area for One Antenna w/ Ice = | $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.6$ | sf | |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19.8$ | sf | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant} := qzICE_{att} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 957$ | lbs | **BLC 4** |

**Gravity Load (without ice)**

| | | | |
|---|---|---|---|
| Weight of All Antennas = | $WT_{ant} \cdot N_{ant} = 192$ | lbs | **BLC 2** |

**Gravity Loads (ice only)**

| | | | |
|---|---|---|---|
| Volume of Each Antenna = | $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5184$ | cu in | |
| Volume of Ice on Each Antenna = | $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1459$ | cu in | |
| Weight of Ice on Each Antenna = | $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 47$ | lbs | |
| Weight of Ice on All Antennas = | $W_{ICEant} \cdot N_{ant} = 142$ | lbs | **BLC 3** |

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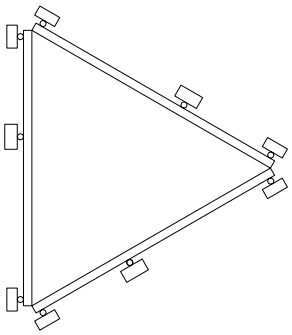
**Development of Wind & Ice Load on TMAs** (per TIA/EIA-222-F-1996 Criteria)

**TMA Data:** (AT&T)



| | | | |
|---|---|---|---|
| TMA Model = | Powerwave LGP214 | | |
| TMA Shape = | Flat | | (User Input) |
| TMA Height = | $L_{tma} := 9.2$ | in | (User Input) |
| TMA Width = | $W_{tma} := 14.4$ | in | (User Input) |
| TMA Thickness = | $T_{tma} := 2.6$ | in | (User Input) |
| TMA Weight = | $WT_{tma} := 14.1$ | lbs | (User Input) |
| Number of TMAs = | $N_{tma} := 12$ | | (User Input) |
| TMA Aspect Ratio = | $Ar_{tma} := \frac{L_{tma}}{W_{tma}} = 0.6$ | | |
| TMA Force Coefficient = | $Ca_{tma} = 1.4$ | | (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 Applied to ALL TMAs Simultaneously***

| | | | |
|---|---|---|---|
| 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 = | $F_{tma} := qz_{att} \cdot G_H \cdot Ca_{tma} \cdot A_{tma} = 705$ | lbs | **BLC 5** |

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

***Assumes Maximum Possible Wind Pressure Applied to ALL TMAs Simultaneously***

| | | | |
|---|---|---|---|
| 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 = | $Fi_{tma} := qzICE_{att} \cdot G_H \cdot Ca_{tma} \cdot A_{ICEtma} = 634$ | lbs | **BLC 4** |

**Gravity Load (without ice)**

| | | | |
|---|---|---|---|
| Weight of All TMAs = | $WT_{tma} \cdot N_{tma} = 169$ | lbs | **BLC 2** |

**Gravity Loads (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 = | $V_{ice} := (L_{tma} + 1)(W_{tma} + 1) \cdot (T_{tma} + 1) - V_{tma} = 221$ | cu in | |
| Weight of Ice on Each TMA = | $W_{ICEtma} := \frac{V_{ice}}{1728} \cdot Id = 7$ | lbs | |
| Weight of Ice on All TMAs = | $W_{ICEtma} \cdot N_{tma} = 86$ | lbs | **BLC 3** |

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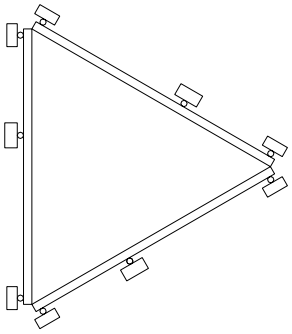
**Development of Wind & Ice Load on TMAs** (per TIA/EIA-222-F-1996 Criteria)

**TMA Data:** (AT&T)



| | | | | |
|---|---|---|---|---|
| TMA Model = | CCI DTMABP7819VG12A TMA | | | |
| TMA Shape = | Flat | | (User Input) | |
| TMA Height = | $L_{tma} := 14.25$ | in | (User Input) | |
| TMA Width = | $W_{tma} := 11.46$ | in | (User Input) | |
| TMA Thickness = | $T_{tma} := 4.17$ | in | (User Input) | |
| TMA Weight = | $WT_{tma} := 20$ | lbs | (User Input) | |
| Number of TMAs = | $N_{tma} := 3$ | | (User Input) | |
| TMA Aspect Ratio = | $Ar_{tma} := \frac{L_{tma}}{W_{tma}} = 1.2$ | | | |
| TMA Force Coefficient = | $Ca_{tma} = 1.4$ | | (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 Applied to ALL TMAs Simultaneously***

| | | | |
|---|---|---|---|
| Surface Area for One TMA = | $SA_{tma} := \frac{L_{tma} \cdot W_{tma}}{144} = 1.1$ | sf | |
| TMA Projected Surface Area = | $A_{tma} := SA_{tma} \cdot N_{tma} = 3.4$ | sf | |
| Total TMA Wind Force = | $F_{tma} := qz_{att} \cdot G_H \cdot Ca_{tma} \cdot A_{tma} = 217$ | lbs | **BLC 5** |

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

***Assumes Maximum Possible Wind Pressure Applied to ALL TMAs Simultaneously***

| | | | |
|---|---|---|---|
| Surface Area for One TMA w/ Ice = | $SA_{ICEtma} := \frac{(L_{tma} + 1) \cdot (W_{tma} + 1)}{144} = 1.3$ | sf | |
| TMA Projected Surface Area w/ Ice = | $A_{ICEtma} := SA_{ICEtma} \cdot N_{tma} = 4$ | sf | |
| Total TMA Wind Force w/ Ice = | $Fi_{tma} := qzICE_{att} \cdot G_H \cdot Ca_{tma} \cdot A_{ICEtma} = 192$ | lbs | **BLC 4** |

**Gravity Load (without ice)**

| | | | |
|---|---|---|---|
| Weight of All TMAs = | $WT_{tma} \cdot N_{tma} = 60$ | lbs | **BLC 2** |

**Gravity Loads (ice only)**

| | | | |
|---|---|---|---|
| Volume of Each TMA = | $V_{tma} := L_{tma} \cdot W_{tma} \cdot T_{tma} = 681$ | cu in | |
| Volume of Ice on Each TMA = | $V_{ice} := (L_{tma} + 1)(W_{tma} + 1) \cdot (T_{tma} + 1) - V_{tma} = 301$ | cu in | |
| Weight of Ice on Each TMA = | $W_{ICEtma} := \frac{V_{ice}}{1728} \cdot Id = 10$ | lbs | |
| Weight of Ice on All TMAs = | $W_{ICEtma} \cdot N_{tma} = 29$ | lbs | **BLC 3** |

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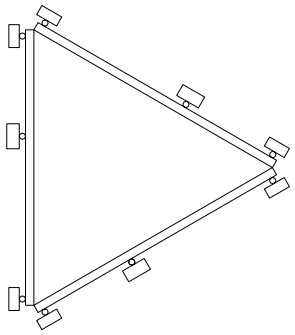
**Development of Wind & Ice Load on Platform** (per TIA/EIA-222-F-1996 Criteria)

**Platform Data:** (AT&T)

| | | | |
|---|---|---|---|
| Platform Model = | 10' Low Profile Platform | | |
| Platform Shape = | Flat | | (User Input) |
| Platform Area = | $A_{plt} := 10.58$ | sq ft | (User Input) |
| Platform Area w/ Ice = | $A_{ICE.plt} := 13.38$ | sq ft | (User Input) |
| Platform Weight = | $WT_{plt} := 2902$ | lbs | (User Input) |
| Platform Weight w/ Ice = | $WT_{ICE.plt} := 3953$ | lbs | (User Input) |
| Platform Force Coefficient = | $Ca_{plt} := 2.0$ | | (per TIA/EIA-222-F-1996 Table 3) |



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

Total Platform Wind Force = $F_{plt} := qz_{att} \cdot G_H \cdot Ca_{plt} \cdot A_{plt} = 965$ lbs **BLC 5**

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

Total Platform Wind Force w/ Ice = $Fi_{plt} := qzICE_{att} \cdot G_H \cdot Ca_{plt} \cdot A_{ICE.plt} = 925$ lbs **BLC 4**

**Gravity Load (without ice)**

Weight of Platform = $WT_{plt} = 2902$ lbs **BLC 2**

**Gravity Loads (ice only)**

Weight of Ice on Platform = $WT_{ICE.plt} - WT_{plt} = 1051$ lbs **BLC 3**

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**Development of Wind & Ice Load on Coax Cables** per TIA/EIA-222-F-96 Criteria

**Coax Cable Data:** (AT&T)

Coax Type 1 = HELIAX 1-1/4"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax1} := 1.55$ in (User Input)

Coax Cable Length = $L_{coax1} := 124$ ft (User Input)

Weight of Coax per foot = $Wt_{coax1} := 0.66$ plf (User Input)

Total Number of Coax = $N_{coax1} := 18$ (User Input)

No. of Coax Projecting Outside Face of PCS Mast = $NP_{coax1} := 0$ (User Input) (Coax within Powermount)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax1} \cdot 12)}{D_{coax1}} = 960$

Coax Cable Force Factor Coefficient = $Ca_{coax} = 1.2$ TIA/EIA-222-F-96 Table 3

**Wind Load (without ice)** per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area = $A_{coax} := 0$ ft

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

**Wind Load (with ice)** per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area w/ Ice = $AICE_{coax} := 0$ ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qzICE_{coax} \cdot G_H \cdot AICE_{coax} = 0$ plf **BLC 4**

**Gravity Loads (without ice)**

Weight of all cables w/o ice $WT_{coax} := Wt_{coax1} \cdot N_{coax1} = 12$ plf **BLC 2**

**Gravity Loads (ice only)**

Ice Area per Linear Foot = $Ai_{coax1} := 0$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := Id \cdot \left( N_{coax1} \cdot \frac{Ai_{coax1}}{144} \right) = 0$ plf **BLC 3**

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

**Member Data:** L2.5x2.5x3/16

Antenna Shape = Flat (User Input)

Height = $H_{mem} := 2.5$ in (User Input)

Width = $W_{mem} := 2.5$ in (User Input)

Thickness = $t_{mem} := 0.1875$ in (User Input)

Length = $L_{mem} := 42$ in (User Input)

Member Aspect Ratio = $Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 16.8$

Member Force Coefficient = $Ca_{mem} = 1.73$ (per TIA/EIA-222-F-1996 Table 3)

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

Member Projected Surface Area = $A_{mem} := \frac{H_{mem}}{12} = 0.2$ sf/ft

Total Member Wind Force = $F_{mem} := qz_{pmnt1} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 16$ plf **BLC 5**

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

Member Projected Surface Area w/ Ice = $A_{ICEmem} := \frac{(H_{mem} + 2 \cdot Ir)}{12} = 0.3$ sf/ft

Total Member Wind Force w/ Ice = $Fi_{mem} := qzICE_{pmnt1} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 17$ plf **BLC 4**

**Gravity Load (without ice)**

Weight of Member = Self Weight lbs **BLC 1**

**Gravity Loads (ice only)**

Ice Area per Linear foot =

$$Ai_{mem} := \left[\left(H_{mem} + 2 \cdot Ir\right) + \left(W_{mem} - t_{mem}\right)\right] \cdot \left(t_{mem} + 2 \cdot Ir\right) - \left[H_{mem} + \left(W_{mem} + t_{mem}\right)\right] \cdot t_{mem} = 6 \text{ sq in}$$

Weight of Ice on Member = $W_{ICE.mem} := Id \cdot \frac{Ai_{mem}}{144} = 2$ plf **BLC 3**

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

| | |
|---|---|
| Subject: | Load Analysis of Powermount on CL&P Tower # 1321 |
| Location: | Stratford, CT |
| Rev. 0: 11/20/13 | Prepared by: T.J.L. Checked by: C.F.C. Job No. 13317.000 |

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

**Member Data:** L3.5x3.5x1/4

Antenna Shape = Flat (User Input)

Height = $H_{mem} := 3.5$ in (User Input)

Width = $W_{mem} := 3.5$ in (User Input)

Thickness = $t_{mem} := 0.25$ in (User Input)

Length = $L_{mem} := 123$ in (User Input)

Member Aspect Ratio = $Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 35.1$

Member Force Coefficient = $Ca_{mem} = 2$ (per TIA/EIA-222-F-1996 Table 3)

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

Member Projected Surface Area = $A_{mem} := \frac{H_{mem}}{12} = 0.3$ sf/ft

Total Member Wind Force = $F_{mem} := qz_{pmnt3} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 20$ plf **BLC 5**

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

Member Projected Surface Area w/ Ice = $A_{ICEmem} := \frac{(H_{mem} + 2 \cdot Ir)}{12} = 0.4$ sf/ft

Total Member Wind Force w/ Ice = $Fi_{mem} := qzICE_{pmnt3} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 19$ plf **BLC 4**

**Gravity Load (without ice)**

Weight of Member = Self Weight lbs **BLC 1**

**Gravity Loads (ice only)**

Ice Area per Linear foot =

$$Ai_{mem} := \left[\left(H_{mem} + 2 \cdot Ir\right) + \left(W_{mem} - t_{mem}\right)\right] \cdot \left(t_{mem} + 2 \cdot Ir\right) - \left[H_{mem} + \left(W_{mem} + t_{mem}\right)\right] \cdot t_{mem} = 8 \text{ sq in}$$

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

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

| | |
|---|---|
| Subject: | Load Analysis of Powermount on CL&P Tower # 1321 |
| Location: | Stratford, CT |
| Rev. 0: 11/20/13 | Prepared by: T.J.L. Checked by: C.F.C. Job No. 13317.000 |

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

**Member Data:** L5x5x3/8

| | | | |
|---|---|---|---|
| Antenna Shape = | Flat | | (User Input) |
| Height = | $H_{mem} := 5$ | in | (User Input) |
| Width = | $W_{mem} := 5$ | in | (User Input) |
| Thickness = | $t_{mem} := 0.375$ | in | (User Input) |
| Length = | $L_{mem} := 168$ | in | (User Input) |
| Member Aspect Ratio = | $Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 33.6$ | | |
| Member Force Coefficient = | $Ca_{mem} = 2$ | | (per TIA/EIA-222-F-1996 Table 3) |

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

| | | | |
|---|---|---|---|
| Member Projected Surface Area = | $A_{mem} := \frac{H_{mem}}{12} = 0.4$ | sf/ft | |
| Total Member Wind Force = | $F_{mem} := qz_{pmnt4} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 21$ | plf | **BLC 5** |

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

| | | | |
|---|---|---|---|
| Member Projected Surface Area w/ Ice = | $A_{ICEmem} := \frac{(H_{mem} + 2 \cdot Ir)}{12} = 0.5$ | sf/ft | |
| Total Member Wind Force w/ Ice = | $Fi_{mem} := qzICE_{pmnt4} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 19$ | plf | **BLC 4** |

**Gravity Load (without ice)**

| | | | |
|---|---|---|---|
| Weight of Member = | Self Weight | lbs | **BLC 1** |

**Gravity Loads (ice only)**

Ice Area per Linear foot =

$$Ai_{mem} := \left[\left(H_{mem} + 2 \cdot Ir\right) + \left(W_{mem} - t_{mem}\right)\right] \cdot \left(t_{mem} + 2 \cdot Ir\right) - \left[H_{mem} + \left(W_{mem} + t_{mem}\right)\right] \cdot t_{mem} = 11 \quad \text{sq in}$$

| | | | |
|---|---|---|---|
| Weight of Ice on Member = | $W_{ICE.mem} := Id \cdot \frac{Ai_{mem}}{144} = 4$ | plf | **BLC 3** |

| | | |
|---|---|---|
| **CENTEK engineering, INC.**<br>**Consulting Engineers**<br>63-2 North Branford Road<br>Branford, CT 06405<br>Ph. 203-488-0580 / Fax. 203-488-8587 | Subject:<br><br><br>Location:<br>Date: 11/21/13 | **Analysis of TIA/EIA Wind and Ice Loads for Analysis of Powermount**<br>**Tabulated Load Cases**<br>**Stratford, CT**<br>Prepared by: T.J.L. Checked by: C.F.C. Job No. 13317.000 |

| Load Case | Description |
|---|---|
| 1 | Self Weight (Powermountt) |
| 2 | Weight of Appurtenances |
| 3 | Weight of Ice Only on PCS Structure |
| 4 | TIA/EIA Wind with Ice on PCS Structure |
| 5 | TIA/EIA Wind on PCS Structure |

Footnotes:
(1) PCS Structure includes: Powermount and Appurtenances

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Ph. 203-488-0580 / Fax. 203-488-8587

Subject: **Analysis of TIA/EIA Wind and Ice Loads for Analysis of Powermount Only Load Combinations Table**

Location: **Stratford, CT**

Date: 11/21/13 Prepared by: T.J.L. Checked by: C.F.C. Job No. 13317.000

| Load Combination | Description | Envelope Soultion | Wind Factor | P-Delta | BLC | Factor | BLC | Factor | BLC | Factor | BLC | Factor | BLC | Factor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | TIA/EIA Wind + Ice on PCS Structure | | 1 | | 1 | 1 | 2 | 1 | 3 | 1 | 4 | 1 | | |
| 2 | TIA/EIA Wind on PCS Structure | | 1 | | 1 | 1 | 2 | 1 | 5 | 1 | | | | |

Footnotes:
(1) BLC = Basic Load Case
(2) PCS Structure includes: Powermount and Appurtenances

## 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 |
| 6 | A53 Gr. B | 29000 | 11154 | .3 | .65 | .49 | 35 | 1.5 | 58 | 1.2 |

## 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 | M1 | Powermo... | 124 | | | | | | | | | | | | Lateral |
| 2 | M2 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 3 | M3 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 4 | M4 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 5 | M5 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 6 | M6 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 7 | M7 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 8 | M8 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 9 | M9 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 10 | M10 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 11 | M11 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 12 | M12 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 13 | M13 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 14 | M14 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 15 | M15 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 16 | M16 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 17 | M17 | L2.5x2.5x... | 3.536 | | | | | | | | | | | | Lateral |
| 18 | M18 | L3.5x3.5x... | 10.253 | | | | | | | | | | | | Lateral |
| 19 | M19 | L3.5x3.5x... | 10.253 | | | | | | | | | | | | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | M20 | L3.5x3.5x... | 10.253 | | | | | | | | | | | | Lateral |
| 21 | M21 | L3.5x3.5x... | 10.253 | | | | | | | | | | | | Lateral |
| 22 | M22 | L5x5x3/8 | 14.142 | | | | | | | | | | | | Lateral |
| 23 | M23 | L5x5x3/8 | 14.142 | | | | | | | | | | | | Lateral |
| 24 | M24 | L5x5x3/8 | 14.142 | | | | | | | | | | | | Lateral |
| 25 | M25 | L5x5x3/8 | 14.142 | | | | | | | | | | | | Lateral |

## Hot Rolled Steel Section Sets

| | Label | Shape | Type | Design List | Material | Design Rules | A [in2] | Iyy [in4] | Izz [in4] | J [in4] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Powermount | HSS18x0.3... | Beam | Pipe | A500 Gr.42 | Typical | 19.4 | 754 | 754 | 1510 |
| 2 | L2.5x2.5x3/16 | L2.5x2.5x3 | Beam | Single Angle | A36 Gr.36 | Typical | .901 | .535 | .535 | .011 |
| 3 | L3.5x3.5x1/4 | L3.5x3.5x4 | Beam | Single Angle | A36 Gr.36 | Typical | 1.7 | 2 | 2 | .039 |
| 4 | L5x5x3/8 | L5x5x6 | Beam | Single Angle | A36 Gr.36 | Typical | 3.65 | 8.76 | 8.76 | .183 |

## Member Primary Data

| | Label | I Joint | J Joint | K Joint | Rotate(d... | Section/Shape | Type | Design List | Material | Design Rul... |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | M1 | N1 | N8 | | | Powermount | Beam | Pipe | A500 Gr... | Typical |
| 2 | M2 | N7 | N32 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 3 | M3 | N7 | N31 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 4 | M4 | N7 | N30 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 5 | M5 | N7 | N29 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 6 | M6 | N6 | N28 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 7 | M7 | N6 | N27 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 8 | M8 | N6 | N26 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 9 | M9 | N6 | N25 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 10 | M10 | N5 | N24 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 11 | M11 | N5 | N23 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 12 | M12 | N5 | N22 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 13 | M13 | N5 | N21 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 14 | M14 | N4 | N20 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 15 | M15 | N4 | N19 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 16 | M16 | N4 | N18 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 17 | M17 | N4 | N17 | | | L2.5x2.5x3/16 | Beam | Single Angle | A36 Gr.36 | Typical |
| 18 | M18 | N3 | N16 | | | L3.5x3.5x1/4 | Beam | Single Angle | A36 Gr.36 | Typical |
| 19 | M19 | N3 | N15 | | | L3.5x3.5x1/4 | Beam | Single Angle | A36 Gr.36 | Typical |
| 20 | M20 | N3 | N14 | | | L3.5x3.5x1/4 | Beam | Single Angle | A36 Gr.36 | Typical |
| 21 | M21 | N3 | N13 | | | L3.5x3.5x1/4 | Beam | Single Angle | A36 Gr.36 | Typical |
| 22 | M22 | N2 | N12 | | | L5x5x3/8 | Beam | Single Angle | A36 Gr.36 | Typical |
| 23 | M23 | N2 | N11 | | | L5x5x3/8 | Beam | Single Angle | A36 Gr.36 | Typical |
| 24 | M24 | N2 | N10 | | | L5x5x3/8 | Beam | Single Angle | A36 Gr.36 | Typical |
| 25 | M25 | N2 | N9 | | | L5x5x3/8 | Beam | Single Angle | A36 Gr.36 | Typical |

## Joint Coordinates and Temperatures

| | Label | X [ft] | Y [ft] | Z [ft] | Temp [F] | Detach From Diap... |
|---|---|---|---|---|---|---|
| 1 | N1 | 0 | 0 | 0 | 0 | |
| 2 | N2 | 0 | 20 | 0 | 0 | |
| 3 | N3 | 0 | 40 | 0 | 0 | |
| 4 | N4 | 0 | 74 | 0 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [ft] | Y [ft] | Z [ft] | Temp [F] | Detach From Diap... |
|---|---|---|---|---|---|---|
| 5 | N5 | 0 | 84 | 0 | 0 | |
| 6 | N6 | 0 | 96 | 0 | 0 | |
| 7 | N7 | 0 | 101 | 0 | 0 | |
| 8 | N8 | 0 | 124 | 0 | 0 | |
| 9 | N9 | 10 | 20 | 10 | 0 | |
| 10 | N10 | 10 | 20 | -10 | 0 | |
| 11 | N11 | -10 | 20 | 10 | 0 | |
| 12 | N12 | -10 | 20 | -10 | 0 | |
| 13 | N13 | 7.25 | 40 | 7.25 | 0 | |
| 14 | N14 | 7.25 | 40 | -7.25 | 0 | |
| 15 | N15 | -7.25 | 40 | 7.25 | 0 | |
| 16 | N16 | -7.25 | 40 | -7.25 | 0 | |
| 17 | N17 | 2.5 | 74 | 2.5 | 0 | |
| 18 | N18 | 2.5 | 74 | -2.5 | 0 | |
| 19 | N19 | -2.5 | 74 | 2.5 | 0 | |
| 20 | N20 | -2.5 | 74 | -2.5 | 0 | |
| 21 | N21 | 2.5 | 84 | 2.5 | 0 | |
| 22 | N22 | 2.5 | 84 | -2.5 | 0 | |
| 23 | N23 | -2.5 | 84 | 2.5 | 0 | |
| 24 | N24 | -2.5 | 84 | -2.5 | 0 | |
| 25 | N25 | 2.5 | 96 | 2.5 | 0 | |
| 26 | N26 | 2.5 | 96 | -2.5 | 0 | |
| 27 | N27 | -2.5 | 96 | 2.5 | 0 | |
| 28 | N28 | -2.5 | 96 | -2.5 | 0 | |
| 29 | N29 | 2.5 | 101 | 2.5 | 0 | |
| 30 | N30 | 2.5 | 101 | -2.5 | 0 | |
| 31 | N31 | -2.5 | 101 | 2.5 | 0 | |
| 32 | N32 | -2.5 | 101 | -2.5 | 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 | N1 | Reaction | Reaction | Reaction | Reaction | Reaction | Reaction | |
| 2 | N2 | | | | | | | |
| 3 | N3 | | | | | | | |
| 4 | N4 | | | | | | | |
| 5 | N5 | | | | | | | |
| 6 | N6 | | | | | | | |
| 7 | N7 | | | | | | | |
| 8 | N8 | | | | | | | |
| 9 | N9 | Reaction | Reaction | Reaction | | | | |
| 10 | N10 | Reaction | Reaction | Reaction | | | | |
| 11 | N11 | Reaction | Reaction | Reaction | | | | |
| 12 | N12 | Reaction | Reaction | Reaction | | | | |
| 13 | N13 | Reaction | Reaction | Reaction | | | | |
| 14 | N14 | Reaction | Reaction | Reaction | | | | |
| 15 | N15 | Reaction | Reaction | Reaction | | | | |
| 16 | N16 | Reaction | Reaction | Reaction | | | | |
| 17 | N17 | Reaction | Reaction | Reaction | | | | |
| 18 | N18 | Reaction | Reaction | Reaction | | | | |
| 19 | N19 | Reaction | Reaction | Reaction | | | | |
| 20 | N20 | Reaction | Reaction | Reaction | | | | |

## Joint Boundary Conditions (Continued)

| | 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 |
|---|---|---|---|---|---|---|---|---|
| 21 | N21 | Reaction | Reaction | Reaction | | | | |
| 22 | N22 | Reaction | Reaction | Reaction | | | | |
| 23 | N23 | Reaction | Reaction | Reaction | | | | |
| 24 | N24 | Reaction | Reaction | Reaction | | | | |
| 25 | N25 | Reaction | Reaction | Reaction | | | | |
| 26 | N26 | Reaction | Reaction | Reaction | | | | |
| 27 | N27 | Reaction | Reaction | Reaction | | | | |
| 28 | N28 | Reaction | Reaction | Reaction | | | | |
| 29 | N29 | Reaction | Reaction | Reaction | | | | |
| 30 | N30 | Reaction | Reaction | Reaction | | | | |
| 31 | N31 | Reaction | Reaction | Reaction | | | | |
| 32 | N32 | Reaction | Reaction | Reaction | | | | |

## Member Point Loads (BLC 2 : Weight of Appurtenances)

| | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | M1 | Y | -.122 | 109 |
| 2 | M1 | Y | -.161 | 109 |
| 3 | M1 | Y | -.234 | 123.5 |
| 4 | M1 | Y | -.192 | 123.5 |
| 5 | M1 | Y | -.169 | 123.5 |
| 6 | M1 | Y | -.06 | 123.5 |
| 7 | M1 | Y | -2.902 | 123.5 |

## Member Point Loads (BLC 3 : Weight of Ice Only on PCS Struct)

| | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | M1 | Y | -.099 | 109 |
| 2 | M1 | Y | -.035 | 109 |
| 3 | M1 | Y | -.196 | 123.5 |
| 4 | M1 | Y | -.142 | 123.5 |
| 5 | M1 | Y | -.086 | 123.5 |
| 6 | M1 | Y | -.029 | 123.5 |
| 7 | M1 | Y | -1.051 | 123.5 |

## Member Point Loads (BLC 4 : TIA/EIA Wind with Ice on P)

| | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | M1 | X | .774 | 109 |
| 2 | M1 | X | 1.356 | 123.5 |
| 3 | M1 | X | .957 | 123.5 |
| 4 | M1 | X | .634 | 123.5 |
| 5 | M1 | X | .192 | 123.5 |
| 6 | M1 | X | .925 | 123.5 |

## Member Point Loads (BLC 5 : TIA/EIA Wind on PCS Struct)

| | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | M1 | X | .932 | 109 |
| 2 | M1 | X | 1.61 | 123.5 |
| 3 | M1 | X | 1.15 | 123.5 |
| 4 | M1 | X | .705 | 123.5 |
| 5 | M1 | X | .217 | 123.5 |
| 6 | M1 | X | .965 | 123.5 |

## Joint Loads and Enforced Displacements

| Joint Label | L,D,M | Direction | Magnitude[(k,k-ft), (in,rad), (k*s^2/f... |
|---|---|---|---|
| No Data to Print ... | | | |

## Member Distributed Loads (BLC 2 : Weight of Appurtenances)

| | Member Label | Direction | Start Magnitude[k/ft,F] | End Magnitude[k/ft,F] | Start Location[ft,%] | End Location[ft,%] |
|---|---|---|---|---|---|---|
| 1 | M1 | Y | -.008 | -.008 | 101 | 109 |
| 2 | M1 | Y | -.012 | -.012 | 0 | 0 |

## Member Distributed Loads (BLC 3 : Weight of Ice Only on PCS Struct)

| | Member Label | Direction | Start Magnitude[k/ft,F] | End Magnitude[k/ft,F] | Start Location[ft,%] | End Location[ft,%] |
|---|---|---|---|---|---|---|
| 1 | M1 | Y | -.011 | -.011 | 0 | 0 |
| 2 | M1 | Y | -.015 | -.015 | 101 | 109 |
| 3 | M2 | Y | -.002 | -.002 | 0 | 0 |
| 4 | M3 | Y | -.002 | -.002 | 0 | 0 |
| 5 | M5 | Y | -.002 | -.002 | 0 | 0 |
| 6 | M4 | Y | -.002 | -.002 | 0 | 0 |
| 7 | M6 | Y | -.002 | -.002 | 0 | 0 |
| 8 | M7 | Y | -.002 | -.002 | 0 | 0 |
| 9 | M9 | Y | -.002 | -.002 | 0 | 0 |
| 10 | M8 | Y | -.002 | -.002 | 0 | 0 |
| 11 | M10 | Y | -.002 | -.002 | 0 | 0 |
| 12 | M11 | Y | -.002 | -.002 | 0 | 0 |
| 13 | M13 | Y | -.002 | -.002 | 0 | 0 |
| 14 | M12 | Y | -.002 | -.002 | 0 | 0 |
| 15 | M14 | Y | -.002 | -.002 | 0 | 0 |
| 16 | M15 | Y | -.002 | -.002 | 0 | 0 |
| 17 | M17 | Y | -.002 | -.002 | 0 | 0 |
| 18 | M16 | Y | -.002 | -.002 | 0 | 0 |
| 19 | M18 | Y | -.003 | -.003 | 0 | 0 |
| 20 | M19 | Y | -.003 | -.003 | 0 | 0 |
| 21 | M21 | Y | -.003 | -.003 | 0 | 0 |
| 22 | M20 | Y | -.003 | -.003 | 0 | 0 |
| 23 | M22 | Y | -.004 | -.004 | 0 | 0 |
| 24 | M23 | Y | -.004 | -.004 | 0 | 0 |
| 25 | M25 | Y | -.004 | -.004 | 0 | 0 |
| 26 | M24 | Y | -.004 | -.004 | 0 | 0 |

## Member Distributed Loads (BLC 4 : TIA/EIA Wind with Ice on P)

| | Member Label | Direction | Start Magnitude[k/ft,F] | End Magnitude[k/ft,F] | Start Location[ft,%] | End Location[ft,%] |
|---|---|---|---|---|---|---|
| 1 | M1 | X | .031 | .031 | 90 | 124 |
| 2 | M1 | X | .028 | .028 | 60 | 90 |
| 3 | M1 | X | .024 | .024 | 30 | 60 |
| 4 | M1 | X | .018 | .018 | 0 | 30 |
| 5 | M1 | X | .014 | .014 | 101 | 109 |
| 6 | M2 | X | .017 | .017 | 0 | 0 |
| 7 | M4 | X | .017 | .017 | 0 | 0 |
| 8 | M3 | X | .017 | .017 | 0 | 0 |
| 9 | M5 | X | .017 | .017 | 0 | 0 |
| 10 | M6 | X | .017 | .017 | 0 | 0 |
| 11 | M8 | X | .017 | .017 | 0 | 0 |

## Member Distributed Loads (BLC 4 : TIA/EIA Wind with Ice on P) (Continued)

| | Member Label | Direction | Start Magnitude[k/ft,F] | End Magnitude[k/ft,F] | Start Location[ft,%] | End Location[ft,%] |
|---|---|---|---|---|---|---|
| 12 | M7 | X | .017 | .017 | 0 | 0 |
| 13 | M9 | X | .017 | .017 | 0 | 0 |
| 14 | M10 | X | .017 | .017 | 0 | 0 |
| 15 | M12 | X | .017 | .017 | 0 | 0 |
| 16 | M11 | X | .017 | .017 | 0 | 0 |
| 17 | M13 | X | .017 | .017 | 0 | 0 |
| 18 | M14 | X | .017 | .017 | 0 | 0 |
| 19 | M16 | X | .017 | .017 | 0 | 0 |
| 20 | M15 | X | .017 | .017 | 0 | 0 |
| 21 | M17 | X | .017 | .017 | 0 | 0 |
| 22 | M18 | X | .019 | .019 | 0 | 0 |
| 23 | M20 | X | .019 | .019 | 0 | 0 |
| 24 | M19 | X | .019 | .019 | 0 | 0 |
| 25 | M21 | X | .019 | .019 | 0 | 0 |
| 26 | M22 | X | .019 | .019 | 0 | 0 |
| 27 | M24 | X | .019 | .019 | 0 | 0 |
| 28 | M23 | X | .019 | .019 | 0 | 0 |
| 29 | M25 | X | .019 | .019 | 0 | 0 |

## Member Distributed Loads (BLC 5 : TIA/EIA Wind on PCS Struct)

| | Member Label | Direction | Start Magnitude[k/ft,F] | End Magnitude[k/ft,F] | Start Location[ft,%] | End Location[ft,%] |
|---|---|---|---|---|---|---|
| 1 | M1 | X | .039 | .039 | 90 | 124 |
| 2 | M1 | X | .035 | .035 | 60 | 90 |
| 3 | M1 | X | .03 | .03 | 30 | 60 |
| 4 | M1 | X | .022 | .022 | 0 | 30 |
| 5 | M1 | X | .013 | .013 | 101 | 109 |
| 6 | M2 | X | .016 | .016 | 0 | 0 |
| 7 | M3 | X | .016 | .016 | 0 | 0 |
| 8 | M4 | X | .016 | .016 | 0 | 0 |
| 9 | M5 | X | .016 | .016 | 0 | 0 |
| 10 | M6 | X | .016 | .016 | 0 | 0 |
| 11 | M7 | X | .016 | .016 | 0 | 0 |
| 12 | M8 | X | .016 | .016 | 0 | 0 |
| 13 | M9 | X | .016 | .016 | 0 | 0 |
| 14 | M10 | X | .016 | .016 | 0 | 0 |
| 15 | M11 | X | .016 | .016 | 0 | 0 |
| 16 | M12 | X | .016 | .016 | 0 | 0 |
| 17 | M13 | X | .016 | .016 | 0 | 0 |
| 18 | M14 | X | .016 | .016 | 0 | 0 |
| 19 | M15 | X | .016 | .016 | 0 | 0 |
| 20 | M16 | X | .016 | .016 | 0 | 0 |
| 21 | M17 | X | .016 | .016 | 0 | 0 |
| 22 | M18 | X | .02 | .02 | 0 | 0 |
| 23 | M19 | X | .02 | .02 | 0 | 0 |
| 24 | M20 | X | .02 | .02 | 0 | 0 |
| 25 | M21 | X | .02 | .02 | 0 | 0 |
| 26 | M22 | X | .021 | .021 | 0 | 0 |
| 27 | M24 | X | .021 | .021 | 0 | 0 |
| 28 | M23 | X | .021 | .021 | 0 | 0 |
| 29 | M25 | X | .021 | .021 | 0 | 0 |

## Basic Load Cases

| | BLC Description | Category | X Gra... | Y Gra... | Z Grav... | Joint | Point | Distrib... | Area(... | Surfac... |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Self Weight (Powermount) | None | | -1 | | | | | | |
| 2 | Weight of Appurtenances | None | | | | | 7 | 2 | | |
| 3 | Weight of Ice Only on PCS Struct | None | | | | | 7 | 26 | | |
| 4 | TIA/EIA Wind with Ice on P | None | | | | | 6 | 29 | | |
| 5 | TIA/EIA Wind on PCS Struct | None | | | | | 6 | 29 | | |

## 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 on PCS Str... | Yes | | | 1 | 1 | 2 | 1 | 3 | 1 | 4 | 1 | | | | | | | | |
| 2 | TIA/EIA Wind on PCS Structure | Yes | | | 1 | 1 | 2 | 1 | 5 | 1 | | | | | | | | | | |
| 3 | Self Weight | | | | | | | | | | | | | | | | | | | |

## 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 | M1 | 1 | max | 17.488 | 1 | .249 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .971 | 2 |
| 2 | | | min | 14.134 | 2 | .204 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | .796 | 1 |
| 3 | | 2 | max | 14.264 | 1 | -.084 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | .133 | 2 |
| 4 | | | min | 11.365 | 2 | -.105 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .098 | 1 |
| 5 | | 3 | max | 11.324 | 1 | -.135 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | -1.187 | 1 |
| 6 | | | min | 8.828 | 2 | -.167 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | -1.5 | 2 |
| 7 | | 4 | max | 8.493 | 1 | -1.132 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 5.982 | 2 |
| 8 | | | min | 6.366 | 2 | -1.318 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 5.192 | 1 |
| 9 | | 5 | max | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 10 | | | min | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 11 | M2 | 1 | max | -8.949 | 1 | .009 | 1 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 12 | | | min | -10.345 | 2 | .005 | 2 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 13 | | 2 | max | -8.959 | 1 | .004 | 1 | -.01 | 2 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 14 | | | min | -10.355 | 2 | .003 | 2 | -.011 | 1 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 15 | | 3 | max | -8.97 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | -.008 | 1 | -.016 | 2 |
| 16 | | | min | -10.365 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | -.009 | 2 | -.019 | 1 |
| 17 | | 4 | max | -8.981 | 1 | -.003 | 2 | .011 | 1 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 18 | | | min | -10.375 | 2 | -.004 | 1 | .01 | 2 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 19 | | 5 | max | -8.991 | 1 | -.005 | 2 | .021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 20 | | | min | -10.385 | 2 | -.009 | 1 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 21 | M3 | 1 | max | -8.949 | 1 | .009 | 1 | .021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 22 | | | min | -10.345 | 2 | .005 | 2 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 23 | | 2 | max | -8.959 | 1 | .004 | 1 | .011 | 1 | 0 | 1 | .014 | 1 | .007 | 2 |
| 24 | | | min | -10.355 | 2 | .003 | 2 | .01 | 2 | 0 | 1 | .012 | 2 | .006 | 1 |
| 25 | | 3 | max | -8.97 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | .019 | 1 | .009 | 2 |
| 26 | | | min | -10.365 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .016 | 2 | .008 | 1 |
| 27 | | 4 | max | -8.981 | 1 | -.003 | 2 | -.01 | 2 | 0 | 1 | .014 | 1 | .007 | 2 |
| 28 | | | min | -10.375 | 2 | -.004 | 1 | -.011 | 1 | 0 | 1 | .012 | 2 | .006 | 1 |
| 29 | | 5 | max | -8.991 | 1 | -.005 | 2 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 30 | | | min | -10.385 | 2 | -.009 | 1 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 31 | M4 | 1 | max | 10.345 | 2 | .009 | 1 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 32 | | | min | 8.949 | 1 | .005 | 2 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 33 | | 2 | max | 10.355 | 2 | .004 | 1 | -.01 | 2 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 34 | | | min | 8.959 | 1 | .003 | 2 | -.011 | 1 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 35 | | 3 | max | 10.365 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | -.008 | 1 | -.016 | 2 |

## *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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | | | min | 8.97 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | -.009 | 2 | -.019 | 1 |
| 37 | | 4 | max | 10.375 | 2 | -.003 | 2 | .011 | 1 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 38 | | | min | 8.981 | 1 | -.004 | 1 | .01 | 2 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 39 | | 5 | max | 10.385 | 2 | -.005 | 2 | .021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 40 | | | min | 8.991 | 1 | -.009 | 1 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 41 | M5 | 1 | max | 10.345 | 2 | .009 | 1 | .021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 42 | | | min | 8.949 | 1 | .005 | 2 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 43 | | 2 | max | 10.355 | 2 | .004 | 1 | .011 | 1 | 0 | 1 | .014 | 1 | .007 | 2 |
| 44 | | | min | 8.959 | 1 | .003 | 2 | .01 | 2 | 0 | 1 | .012 | 2 | .006 | 1 |
| 45 | | 3 | max | 10.365 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .019 | 1 | .009 | 2 |
| 46 | | | min | 8.97 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | .016 | 2 | .008 | 1 |
| 47 | | 4 | max | 10.375 | 2 | -.003 | 2 | -.01 | 2 | 0 | 1 | .014 | 1 | .007 | 2 |
| 48 | | | min | 8.981 | 1 | -.004 | 1 | -.011 | 1 | 0 | 1 | .012 | 2 | .006 | 1 |
| 49 | | 5 | max | 10.385 | 2 | -.005 | 2 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 50 | | | min | 8.991 | 1 | -.009 | 1 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 51 | M6 | 1 | max | 7.402 | 2 | .009 | 1 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 52 | | | min | 6.416 | 1 | .005 | 2 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 53 | | 2 | max | 7.392 | 2 | .004 | 1 | -.01 | 2 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 54 | | | min | 6.406 | 1 | .003 | 2 | -.011 | 1 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 55 | | 3 | max | 7.382 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | -.008 | 1 | -.016 | 2 |
| 56 | | | min | 6.395 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | -.009 | 2 | -.019 | 1 |
| 57 | | 4 | max | 7.372 | 2 | -.003 | 2 | .011 | 1 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 58 | | | min | 6.384 | 1 | -.004 | 1 | .01 | 2 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 59 | | 5 | max | 7.362 | 2 | -.005 | 2 | .021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 60 | | | min | 6.374 | 1 | -.009 | 1 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 61 | M7 | 1 | max | 7.402 | 2 | .009 | 1 | .021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 62 | | | min | 6.416 | 1 | .005 | 2 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 63 | | 2 | max | 7.392 | 2 | .004 | 1 | .011 | 1 | 0 | 1 | .014 | 1 | .007 | 2 |
| 64 | | | min | 6.406 | 1 | .003 | 2 | .01 | 2 | 0 | 1 | .012 | 2 | .006 | 1 |
| 65 | | 3 | max | 7.382 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .019 | 1 | .009 | 2 |
| 66 | | | min | 6.395 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | .016 | 2 | .008 | 1 |
| 67 | | 4 | max | 7.372 | 2 | -.003 | 2 | -.01 | 2 | 0 | 1 | .014 | 1 | .007 | 2 |
| 68 | | | min | 6.384 | 1 | -.004 | 1 | -.011 | 1 | 0 | 1 | .012 | 2 | .006 | 1 |
| 69 | | 5 | max | 7.362 | 2 | -.005 | 2 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 70 | | | min | 6.374 | 1 | -.009 | 1 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 71 | M8 | 1 | max | -6.416 | 1 | .009 | 1 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 72 | | | min | -7.402 | 2 | .005 | 2 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 73 | | 2 | max | -6.406 | 1 | .004 | 1 | -.01 | 2 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 74 | | | min | -7.392 | 2 | .003 | 2 | -.011 | 1 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 75 | | 3 | max | -6.395 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | -.008 | 1 | -.016 | 2 |
| 76 | | | min | -7.382 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | -.009 | 2 | -.019 | 1 |
| 77 | | 4 | max | -6.384 | 1 | -.003 | 2 | .011 | 1 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 78 | | | min | -7.372 | 2 | -.004 | 1 | .01 | 2 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 79 | | 5 | max | -6.374 | 1 | -.005 | 2 | .021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 80 | | | min | -7.362 | 2 | -.009 | 1 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 81 | M9 | 1 | max | -6.416 | 1 | .009 | 1 | .021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 82 | | | min | -7.402 | 2 | .005 | 2 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 83 | | 2 | max | -6.406 | 1 | .004 | 1 | .011 | 1 | 0 | 1 | .014 | 1 | .007 | 2 |
| 84 | | | min | -7.392 | 2 | .003 | 2 | .01 | 2 | 0 | 1 | .012 | 2 | .006 | 1 |
| 85 | | 3 | max | -6.395 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | .019 | 1 | .009 | 2 |
| 86 | | | min | -7.382 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .016 | 2 | .008 | 1 |
| 87 | | 4 | max | -6.384 | 1 | -.003 | 2 | -.01 | 2 | 0 | 1 | .014 | 1 | .007 | 2 |
| 88 | | | min | -7.372 | 2 | -.004 | 1 | -.011 | 1 | 0 | 1 | .012 | 2 | .006 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 89 | | 5 | max | -6.374 | 1 | -.005 | 2 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 90 | | | min | -7.362 | 2 | -.009 | 1 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 91 | M10 | 1 | max | .53 | 2 | .009 | 1 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 92 | | | min | .458 | 1 | .005 | 2 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 93 | | 2 | max | .52 | 2 | .004 | 1 | -.01 | 2 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 94 | | | min | .447 | 1 | .003 | 2 | -.011 | 1 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 95 | | 3 | max | .51 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | -.008 | 1 | -.016 | 2 |
| 96 | | | min | .436 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | -.009 | 2 | -.019 | 1 |
| 97 | | 4 | max | .5 | 2 | -.003 | 2 | .011 | 1 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 98 | | | min | .426 | 1 | -.004 | 1 | .01 | 2 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 99 | | 5 | max | .49 | 2 | -.005 | 2 | .021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 100 | | | min | .415 | 1 | -.009 | 1 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 101 | M11 | 1 | max | .53 | 2 | .009 | 1 | .021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 102 | | | min | .458 | 1 | .005 | 2 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 103 | | 2 | max | .52 | 2 | .004 | 1 | .011 | 1 | 0 | 1 | .014 | 1 | .007 | 2 |
| 104 | | | min | .447 | 1 | .003 | 2 | .01 | 2 | 0 | 1 | .012 | 2 | .006 | 1 |
| 105 | | 3 | max | .51 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .019 | 1 | .009 | 2 |
| 106 | | | min | .436 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | .016 | 2 | .008 | 1 |
| 107 | | 4 | max | .5 | 2 | -.003 | 2 | -.01 | 2 | 0 | 1 | .014 | 1 | .007 | 2 |
| 108 | | | min | .426 | 1 | -.004 | 1 | -.011 | 1 | 0 | 1 | .012 | 2 | .006 | 1 |
| 109 | | 5 | max | .49 | 2 | -.005 | 2 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 110 | | | min | .415 | 1 | -.009 | 1 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 111 | M12 | 1 | max | -.458 | 1 | .009 | 1 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 112 | | | min | -.53 | 2 | .005 | 2 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 113 | | 2 | max | -.447 | 1 | .004 | 1 | -.01 | 2 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 114 | | | min | -.52 | 2 | .003 | 2 | -.011 | 1 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 115 | | 3 | max | -.436 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | -.008 | 1 | -.016 | 2 |
| 116 | | | min | -.51 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | -.009 | 2 | -.019 | 1 |
| 117 | | 4 | max | -.426 | 1 | -.003 | 2 | .011 | 1 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 118 | | | min | -.5 | 2 | -.004 | 1 | .01 | 2 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 119 | | 5 | max | -.415 | 1 | -.005 | 2 | .021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 120 | | | min | -.49 | 2 | -.009 | 1 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 121 | M13 | 1 | max | -.458 | 1 | .009 | 1 | .021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 122 | | | min | -.53 | 2 | .005 | 2 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 123 | | 2 | max | -.447 | 1 | .004 | 1 | .011 | 1 | 0 | 1 | .014 | 1 | .007 | 2 |
| 124 | | | min | -.52 | 2 | .003 | 2 | .01 | 2 | 0 | 1 | .012 | 2 | .006 | 1 |
| 125 | | 3 | max | -.436 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | .019 | 1 | .009 | 2 |
| 126 | | | min | -.51 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .016 | 2 | .008 | 1 |
| 127 | | 4 | max | -.426 | 1 | -.003 | 2 | -.01 | 2 | 0 | 1 | .014 | 1 | .007 | 2 |
| 128 | | | min | -.5 | 2 | -.004 | 1 | -.011 | 1 | 0 | 1 | .012 | 2 | .006 | 1 |
| 129 | | 5 | max | -.415 | 1 | -.005 | 2 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 130 | | | min | -.49 | 2 | -.009 | 1 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 131 | M14 | 1 | max | -.458 | 1 | .009 | 1 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 132 | | | min | -.551 | 2 | .005 | 2 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 133 | | 2 | max | -.468 | 1 | .004 | 1 | -.01 | 2 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 134 | | | min | -.561 | 2 | .003 | 2 | -.011 | 1 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 135 | | 3 | max | -.479 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | -.008 | 1 | -.016 | 2 |
| 136 | | | min | -.571 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | -.009 | 2 | -.019 | 1 |
| 137 | | 4 | max | -.489 | 1 | -.003 | 2 | .011 | 1 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 138 | | | min | -.581 | 2 | -.004 | 1 | .01 | 2 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 139 | | 5 | max | -.5 | 1 | -.005 | 2 | .021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 140 | | | min | -.591 | 2 | -.009 | 1 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 141 | M15 | 1 | max | -.458 | 1 | .009 | 1 | .021 | 1 | 0 | 1 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 142 | | | min | -.551 | 2 | .005 | 2 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 143 | | 2 | max | -.468 | 1 | .004 | 1 | .011 | 1 | 0 | 1 | .014 | 1 | .007 | 2 |
| 144 | | | min | -.561 | 2 | .003 | 2 | .01 | 2 | 0 | 1 | .012 | 2 | .006 | 1 |
| 145 | | 3 | max | -.479 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | .019 | 1 | .009 | 2 |
| 146 | | | min | -.571 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .016 | 2 | .008 | 1 |
| 147 | | 4 | max | -.489 | 1 | -.003 | 2 | -.01 | 2 | 0 | 1 | .014 | 1 | .007 | 2 |
| 148 | | | min | -.581 | 2 | -.004 | 1 | -.011 | 1 | 0 | 1 | .012 | 2 | .006 | 1 |
| 149 | | 5 | max | -.5 | 1 | -.005 | 2 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 150 | | | min | -.591 | 2 | -.009 | 1 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 151 | M16 | 1 | max | .551 | 2 | .009 | 1 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 152 | | | min | .458 | 1 | .005 | 2 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 153 | | 2 | max | .561 | 2 | .004 | 1 | -.01 | 2 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 154 | | | min | .468 | 1 | .003 | 2 | -.011 | 1 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 155 | | 3 | max | .571 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | -.008 | 1 | -.016 | 2 |
| 156 | | | min | .479 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | -.009 | 2 | -.019 | 1 |
| 157 | | 4 | max | .581 | 2 | -.003 | 2 | .011 | 1 | 0 | 1 | -.006 | 1 | -.012 | 2 |
| 158 | | | min | .489 | 1 | -.004 | 1 | .01 | 2 | 0 | 1 | -.007 | 2 | -.014 | 1 |
| 159 | | 5 | max | .591 | 2 | -.005 | 2 | .021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 160 | | | min | .5 | 1 | -.009 | 1 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 161 | M17 | 1 | max | .551 | 2 | .009 | 1 | .021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 162 | | | min | .458 | 1 | .005 | 2 | .02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 163 | | 2 | max | .561 | 2 | .004 | 1 | .011 | 1 | 0 | 1 | .014 | 1 | .007 | 2 |
| 164 | | | min | .468 | 1 | .003 | 2 | .01 | 2 | 0 | 1 | .012 | 2 | .006 | 1 |
| 165 | | 3 | max | .571 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .019 | 1 | .009 | 2 |
| 166 | | | min | .479 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | .016 | 2 | .008 | 1 |
| 167 | | 4 | max | .581 | 2 | -.003 | 2 | -.01 | 2 | 0 | 1 | .014 | 1 | .007 | 2 |
| 168 | | | min | .489 | 1 | -.004 | 1 | -.011 | 1 | 0 | 1 | .012 | 2 | .006 | 1 |
| 169 | | 5 | max | .591 | 2 | -.005 | 2 | -.02 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 170 | | | min | .5 | 1 | -.009 | 1 | -.021 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 171 | M18 | 1 | max | -.317 | 1 | .045 | 1 | -.069 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 172 | | | min | -.383 | 2 | .03 | 2 | -.072 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 173 | | 2 | max | -.351 | 1 | .023 | 1 | -.034 | 1 | 0 | 1 | -.032 | 1 | -.139 | 2 |
| 174 | | | min | -.419 | 2 | .015 | 2 | -.036 | 2 | 0 | 1 | -.058 | 2 | -.155 | 1 |
| 175 | | 3 | max | -.386 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | -.043 | 1 | -.185 | 2 |
| 176 | | | min | -.456 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | -.078 | 2 | -.206 | 1 |
| 177 | | 4 | max | -.42 | 1 | -.015 | 2 | .036 | 2 | 0 | 1 | -.032 | 1 | -.139 | 2 |
| 178 | | | min | -.492 | 2 | -.023 | 1 | .034 | 1 | 0 | 1 | -.058 | 2 | -.155 | 1 |
| 179 | | 5 | max | -.455 | 1 | -.03 | 2 | .073 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 180 | | | min | -.528 | 2 | -.045 | 1 | .069 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 181 | M19 | 1 | max | -.317 | 1 | .045 | 1 | .073 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 182 | | | min | -.383 | 2 | .03 | 2 | .069 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 183 | | 2 | max | -.351 | 1 | .023 | 1 | .036 | 2 | 0 | 1 | .155 | 1 | .058 | 2 |
| 184 | | | min | -.419 | 2 | .015 | 2 | .034 | 1 | 0 | 1 | .139 | 2 | .032 | 1 |
| 185 | | 3 | max | -.386 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | .206 | 1 | .078 | 2 |
| 186 | | | min | -.456 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .185 | 2 | .043 | 1 |
| 187 | | 4 | max | -.42 | 1 | -.015 | 2 | -.034 | 1 | 0 | 1 | .155 | 1 | .058 | 2 |
| 188 | | | min | -.492 | 2 | -.023 | 1 | -.036 | 2 | 0 | 1 | .139 | 2 | .032 | 1 |
| 189 | | 5 | max | -.455 | 1 | -.03 | 2 | -.069 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 190 | | | min | -.528 | 2 | -.045 | 1 | -.073 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 191 | M20 | 1 | max | .383 | 2 | .045 | 1 | -.069 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 192 | | | min | .317 | 1 | .03 | 2 | -.073 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 193 | | 2 | max | .419 | 2 | .023 | 1 | -.034 | 1 | 0 | 1 | -.032 | 1 | -.139 | 2 |
| 194 | | | min | .351 | 1 | .015 | 2 | -.036 | 2 | 0 | 1 | -.058 | 2 | -.155 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 195 | | 3 | max | .456 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | -.043 | 1 | -.185 | 2 |
| 196 | | | min | .386 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | -.078 | 2 | -.206 | 1 |
| 197 | | 4 | max | .492 | 2 | -.015 | 2 | .036 | 2 | 0 | 1 | -.032 | 1 | -.139 | 2 |
| 198 | | | min | .42 | 1 | -.023 | 1 | .034 | 1 | 0 | 1 | -.058 | 2 | -.155 | 1 |
| 199 | | 5 | max | .528 | 2 | -.03 | 2 | .073 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 200 | | | min | .455 | 1 | -.045 | 1 | .069 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 201 | M21 | 1 | max | .383 | 2 | .045 | 1 | .072 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 202 | | | min | .317 | 1 | .03 | 2 | .069 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 203 | | 2 | max | .419 | 2 | .023 | 1 | .036 | 2 | 0 | 1 | .155 | 1 | .058 | 2 |
| 204 | | | min | .351 | 1 | .015 | 2 | .034 | 1 | 0 | 1 | .139 | 2 | .032 | 1 |
| 205 | | 3 | max | .456 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .206 | 1 | .078 | 2 |
| 206 | | | min | .386 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | .185 | 2 | .043 | 1 |
| 207 | | 4 | max | .492 | 2 | -.015 | 2 | -.034 | 1 | 0 | 1 | .155 | 1 | .058 | 2 |
| 208 | | | min | .42 | 1 | -.023 | 1 | -.036 | 2 | 0 | 1 | .139 | 2 | .032 | 1 |
| 209 | | 5 | max | .528 | 2 | -.03 | 2 | -.069 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 210 | | | min | .455 | 1 | -.045 | 1 | -.073 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 211 | M22 | 1 | max | -.193 | 1 | .116 | 1 | -.095 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 212 | | | min | -.224 | 2 | .088 | 2 | -.105 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 213 | | 2 | max | -.24 | 1 | .058 | 1 | -.048 | 1 | 0 | 1 | .039 | 1 | -.362 | 2 |
| 214 | | | min | -.276 | 2 | .044 | 2 | -.053 | 2 | 0 | 1 | -.032 | 2 | -.396 | 1 |
| 215 | | 3 | max | -.288 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | .053 | 1 | -.482 | 2 |
| 216 | | | min | -.329 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | -.043 | 2 | -.528 | 1 |
| 217 | | 4 | max | -.335 | 1 | -.044 | 2 | .052 | 2 | 0 | 1 | .039 | 1 | -.362 | 2 |
| 218 | | | min | -.381 | 2 | -.058 | 1 | .048 | 1 | 0 | 1 | -.032 | 2 | -.396 | 1 |
| 219 | | 5 | max | -.383 | 1 | -.088 | 2 | .105 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 220 | | | min | -.434 | 2 | -.116 | 1 | .095 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 221 | M23 | 1 | max | -.193 | 1 | .116 | 1 | .105 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 222 | | | min | -.224 | 2 | .088 | 2 | .095 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 223 | | 2 | max | -.24 | 1 | .058 | 1 | .053 | 2 | 0 | 1 | .396 | 1 | .032 | 2 |
| 224 | | | min | -.276 | 2 | .044 | 2 | .048 | 1 | 0 | 1 | .362 | 2 | -.04 | 1 |
| 225 | | 3 | max | -.288 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | .528 | 1 | .043 | 2 |
| 226 | | | min | -.329 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .482 | 2 | -.053 | 1 |
| 227 | | 4 | max | -.335 | 1 | -.044 | 2 | -.047 | 1 | 0 | 1 | .396 | 1 | .032 | 2 |
| 228 | | | min | -.381 | 2 | -.058 | 1 | -.052 | 2 | 0 | 1 | .362 | 2 | -.04 | 1 |
| 229 | | 5 | max | -.383 | 1 | -.088 | 2 | -.095 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 230 | | | min | -.434 | 2 | -.116 | 1 | -.105 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 231 | M24 | 1 | max | .224 | 2 | .116 | 1 | -.095 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 232 | | | min | .193 | 1 | .088 | 2 | -.105 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 233 | | 2 | max | .276 | 2 | .058 | 1 | -.048 | 1 | 0 | 1 | .039 | 1 | -.362 | 2 |
| 234 | | | min | .24 | 1 | .044 | 2 | -.053 | 2 | 0 | 1 | -.032 | 2 | -.396 | 1 |
| 235 | | 3 | max | .329 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .053 | 1 | -.482 | 2 |
| 236 | | | min | .288 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | -.043 | 2 | -.528 | 1 |
| 237 | | 4 | max | .381 | 2 | -.044 | 2 | .052 | 2 | 0 | 1 | .039 | 1 | -.362 | 2 |
| 238 | | | min | .335 | 1 | -.058 | 1 | .047 | 1 | 0 | 1 | -.032 | 2 | -.396 | 1 |
| 239 | | 5 | max | .434 | 2 | -.088 | 2 | .105 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 240 | | | min | .383 | 1 | -.116 | 1 | .095 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 241 | M25 | 1 | max | .224 | 2 | .116 | 1 | .105 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 242 | | | min | .193 | 1 | .088 | 2 | .095 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 243 | | 2 | max | .276 | 2 | .058 | 1 | .053 | 2 | 0 | 1 | .396 | 1 | .032 | 2 |
| 244 | | | min | .24 | 1 | .044 | 2 | .048 | 1 | 0 | 1 | .362 | 2 | -.04 | 1 |
| 245 | | 3 | max | .329 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .528 | 1 | .043 | 2 |
| 246 | | | min | .288 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | .482 | 2 | -.053 | 1 |
| 247 | | 4 | max | .381 | 2 | -.044 | 2 | -.047 | 1 | 0 | 1 | .396 | 1 | .032 | 2 |

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 248 | | | min | .335 | 1 | -.058 | 1 | -.052 | 2 | 0 | 1 | .362 | 2 | -.04 | 1 |
| 249 | | 5 | max | .434 | 2 | -.088 | 2 | -.095 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 250 | | | min | .383 | 1 | -.116 | 1 | -.105 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |

## 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 | M1 | 1 | max | .901 | 1 | .026 | 2 | 0 | 1 | -.114 | 1 | .139 | 2 | 0 | 1 | 0 | 1 |
| 2 | | | min | .729 | 2 | .021 | 1 | 0 | 1 | -.139 | 2 | .114 | 1 | 0 | 1 | 0 | 1 |
| 3 | | 2 | max | .735 | 1 | -.009 | 1 | 0 | 1 | -.014 | 1 | .019 | 2 | 0 | 1 | 0 | 1 |
| 4 | | | min | .586 | 2 | -.011 | 2 | 0 | 1 | -.019 | 2 | .014 | 1 | 0 | 1 | 0 | 1 |
| 5 | | 3 | max | .584 | 1 | -.014 | 1 | 0 | 1 | .215 | 2 | -.17 | 1 | 0 | 1 | 0 | 1 |
| 6 | | | min | .455 | 2 | -.017 | 2 | 0 | 1 | .17 | 1 | -.215 | 2 | 0 | 1 | 0 | 1 |
| 7 | | 4 | max | .438 | 1 | -.117 | 1 | 0 | 1 | -.744 | 1 | .857 | 2 | 0 | 1 | 0 | 1 |
| 8 | | | min | .328 | 2 | -.136 | 2 | 0 | 1 | -.857 | 2 | .744 | 1 | 0 | 1 | 0 | 1 |
| 9 | | 5 | max | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 10 | | | min | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 11 | M2 | 1 | max | -9.932 | 1 | .023 | 1 | -.051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 12 | | | min | -11.482 | 2 | .014 | 2 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 13 | | 2 | max | -9.944 | 1 | .011 | 1 | -.026 | 2 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 14 | | | min | -11.493 | 2 | .007 | 2 | -.027 | 1 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 1 |
| 15 | | 3 | max | -9.956 | 1 | 0 | 1 | 0 | 1 | .448 | 1 | -.377 | 2 | -.381 | 1 | .508 | 2 |
| 16 | | | min | -11.504 | 2 | 0 | 1 | 0 | 1 | .377 | 2 | -.448 | 1 | -.451 | 2 | .428 | 1 |
| 17 | | 4 | max | -9.968 | 1 | -.007 | 2 | .027 | 1 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 18 | | | min | -11.515 | 2 | -.011 | 1 | .026 | 2 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 1 |
| 19 | | 5 | max | -9.979 | 1 | -.014 | 2 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 20 | | | min | -11.526 | 2 | -.023 | 1 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 21 | M3 | 1 | max | -9.932 | 1 | .023 | 1 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 22 | | | min | -11.482 | 2 | .014 | 2 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 23 | | 2 | max | -9.944 | 1 | .011 | 1 | .027 | 1 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 24 | | | min | -11.493 | 2 | .007 | 2 | .026 | 2 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 25 | | 3 | max | -9.956 | 1 | 0 | 1 | 0 | 1 | -.182 | 1 | .216 | 2 | .934 | 1 | -.885 | 2 |
| 26 | | | min | -11.504 | 2 | 0 | 1 | 0 | 1 | -.216 | 2 | .182 | 1 | .786 | 2 | -1.052 | 1 |
| 27 | | 4 | max | -9.968 | 1 | -.007 | 2 | -.026 | 2 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 28 | | | min | -11.515 | 2 | -.011 | 1 | -.027 | 1 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 29 | | 5 | max | -9.979 | 1 | -.014 | 2 | -.051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 30 | | | min | -11.526 | 2 | -.023 | 1 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 31 | M4 | 1 | max | 11.482 | 2 | .023 | 1 | -.051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 32 | | | min | 9.932 | 1 | .014 | 2 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 33 | | 2 | max | 11.493 | 2 | .011 | 1 | -.026 | 2 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 34 | | | min | 9.944 | 1 | .007 | 2 | -.027 | 1 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 1 |
| 35 | | 3 | max | 11.504 | 2 | 0 | 1 | 0 | 1 | .448 | 1 | -.377 | 2 | -.381 | 1 | .508 | 2 |
| 36 | | | min | 9.956 | 1 | 0 | 1 | 0 | 1 | .377 | 2 | -.448 | 1 | -.451 | 2 | .428 | 1 |
| 37 | | 4 | max | 11.515 | 2 | -.007 | 2 | .027 | 1 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 38 | | | min | 9.968 | 1 | -.011 | 1 | .026 | 2 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 1 |
| 39 | | 5 | max | 11.526 | 2 | -.014 | 2 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 40 | | | min | 9.979 | 1 | -.023 | 1 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 41 | M5 | 1 | max | 11.482 | 2 | .023 | 1 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 42 | | | min | 9.932 | 1 | .014 | 2 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 43 | | 2 | max | 11.493 | 2 | .011 | 1 | .027 | 1 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 44 | | | min | 9.944 | 1 | .007 | 2 | .026 | 2 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 45 | | 3 | max | 11.504 | 2 | 0 | 1 | 0 | 1 | -.182 | 1 | .216 | 2 | .934 | 1 | -.885 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 46 | | | min | 9.956 | 1 | 0 | 1 | 0 | 1 | -.216 | 2 | .182 | 1 | .786 | 2 | -1.052 | 1 |
| 47 | | 4 | max | 11.515 | 2 | -.007 | 2 | -.026 | 2 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 48 | | | min | 9.968 | 1 | -.011 | 1 | -.027 | 1 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 49 | | 5 | max | 11.526 | 2 | -.014 | 2 | -.051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 50 | | | min | 9.979 | 1 | -.023 | 1 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 51 | M6 | 1 | max | 8.216 | 2 | .023 | 1 | -.051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 52 | | | min | 7.121 | 1 | .014 | 2 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 53 | | 2 | max | 8.205 | 2 | .011 | 1 | -.026 | 2 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 54 | | | min | 7.11 | 1 | .007 | 2 | -.027 | 1 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 1 |
| 55 | | 3 | max | 8.193 | 2 | 0 | 1 | 0 | 1 | .448 | 1 | -.377 | 2 | -.381 | 1 | .508 | 2 |
| 56 | | | min | 7.098 | 1 | 0 | 1 | 0 | 1 | .377 | 2 | -.448 | 1 | -.451 | 2 | .428 | 1 |
| 57 | | 4 | max | 8.182 | 2 | -.007 | 2 | .027 | 1 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 58 | | | min | 7.086 | 1 | -.011 | 1 | .026 | 2 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 1 |
| 59 | | 5 | max | 8.171 | 2 | -.014 | 2 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 60 | | | min | 7.074 | 1 | -.023 | 1 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 61 | M7 | 1 | max | 8.216 | 2 | .023 | 1 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 62 | | | min | 7.121 | 1 | .014 | 2 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 63 | | 2 | max | 8.205 | 2 | .011 | 1 | .027 | 1 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 64 | | | min | 7.11 | 1 | .007 | 2 | .026 | 2 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 65 | | 3 | max | 8.193 | 2 | 0 | 1 | 0 | 1 | -.182 | 1 | .216 | 2 | .934 | 1 | -.885 | 2 |
| 66 | | | min | 7.098 | 1 | 0 | 1 | 0 | 1 | -.216 | 2 | .182 | 1 | .786 | 2 | -1.052 | 1 |
| 67 | | 4 | max | 8.182 | 2 | -.007 | 2 | -.026 | 2 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 68 | | | min | 7.086 | 1 | -.011 | 1 | -.027 | 1 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 69 | | 5 | max | 8.171 | 2 | -.014 | 2 | -.051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 70 | | | min | 7.074 | 1 | -.023 | 1 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 71 | M8 | 1 | max | -7.121 | 1 | .023 | 1 | -.051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 72 | | | min | -8.216 | 2 | .014 | 2 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 73 | | 2 | max | -7.11 | 1 | .011 | 1 | -.026 | 2 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 74 | | | min | -8.205 | 2 | .007 | 2 | -.027 | 1 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 1 |
| 75 | | 3 | max | -7.098 | 1 | 0 | 1 | 0 | 1 | .448 | 1 | -.377 | 2 | -.381 | 1 | .508 | 2 |
| 76 | | | min | -8.193 | 2 | 0 | 1 | 0 | 1 | .377 | 2 | -.448 | 1 | -.451 | 2 | .428 | 1 |
| 77 | | 4 | max | -7.086 | 1 | -.007 | 2 | .027 | 1 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 78 | | | min | -8.182 | 2 | -.011 | 1 | .026 | 2 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 1 |
| 79 | | 5 | max | -7.074 | 1 | -.014 | 2 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 80 | | | min | -8.171 | 2 | -.023 | 1 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 81 | M9 | 1 | max | -7.121 | 1 | .023 | 1 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 82 | | | min | -8.216 | 2 | .014 | 2 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 83 | | 2 | max | -7.11 | 1 | .011 | 1 | .027 | 1 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 84 | | | min | -8.205 | 2 | .007 | 2 | .026 | 2 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 85 | | 3 | max | -7.098 | 1 | 0 | 1 | 0 | 1 | -.182 | 1 | .216 | 2 | .934 | 1 | -.885 | 2 |
| 86 | | | min | -8.193 | 2 | 0 | 1 | 0 | 1 | -.216 | 2 | .182 | 1 | .786 | 2 | -1.052 | 1 |
| 87 | | 4 | max | -7.086 | 1 | -.007 | 2 | -.026 | 2 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 88 | | | min | -8.182 | 2 | -.011 | 1 | -.027 | 1 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 89 | | 5 | max | -7.074 | 1 | -.014 | 2 | -.051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 90 | | | min | -8.171 | 2 | -.023 | 1 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 91 | M10 | 1 | max | .588 | 2 | .023 | 1 | -.051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 92 | | | min | .508 | 1 | .014 | 2 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 93 | | 2 | max | .577 | 2 | .011 | 1 | -.026 | 2 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 94 | | | min | .496 | 1 | .007 | 2 | -.027 | 1 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 1 |
| 95 | | 3 | max | .566 | 2 | 0 | 1 | 0 | 1 | .448 | 1 | -.377 | 2 | -.381 | 1 | .508 | 2 |
| 96 | | | min | .484 | 1 | 0 | 1 | 0 | 1 | .377 | 2 | -.448 | 1 | -.451 | 2 | .428 | 1 |
| 97 | | 4 | max | .555 | 2 | -.007 | 2 | .027 | 1 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 98 | | | min | .472 | 1 | -.011 | 1 | .026 | 2 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 99 | | 5 | max | .544 | 2 | -.014 | 2 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 100 | | | min | .461 | 1 | -.023 | 1 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 101 | M11 | 1 | max | .588 | 2 | .023 | 1 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 102 | | | min | .508 | 1 | .014 | 2 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 103 | | 2 | max | .577 | 2 | .011 | 1 | .027 | 1 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 104 | | | min | .496 | 1 | .007 | 2 | .026 | 2 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 105 | | 3 | max | .566 | 2 | 0 | 1 | 0 | 1 | -.182 | 1 | .216 | 2 | .934 | 1 | -.885 | 2 |
| 106 | | | min | .484 | 1 | 0 | 1 | 0 | 1 | -.216 | 2 | .182 | 1 | .786 | 2 | -1.052 | 1 |
| 107 | | 4 | max | .555 | 2 | -.007 | 2 | -.026 | 2 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 108 | | | min | .472 | 1 | -.011 | 1 | -.027 | 1 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 109 | | 5 | max | .544 | 2 | -.014 | 2 | -.051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 110 | | | min | .461 | 1 | -.023 | 1 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 111 | M12 | 1 | max | -.508 | 1 | .023 | 1 | -.051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 112 | | | min | -.588 | 2 | .014 | 2 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 113 | | 2 | max | -.496 | 1 | .011 | 1 | -.026 | 2 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 114 | | | min | -.577 | 2 | .007 | 2 | -.027 | 1 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 1 |
| 115 | | 3 | max | -.484 | 1 | 0 | 1 | 0 | 1 | .448 | 1 | -.377 | 2 | -.381 | 1 | .508 | 2 |
| 116 | | | min | -.566 | 2 | 0 | 1 | 0 | 1 | .377 | 2 | -.448 | 1 | -.451 | 2 | .428 | 1 |
| 117 | | 4 | max | -.472 | 1 | -.007 | 2 | .027 | 1 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 118 | | | min | -.555 | 2 | -.011 | 1 | .026 | 2 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 1 |
| 119 | | 5 | max | -.461 | 1 | -.014 | 2 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 120 | | | min | -.544 | 2 | -.023 | 1 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 121 | M13 | 1 | max | -.508 | 1 | .023 | 1 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 122 | | | min | -.588 | 2 | .014 | 2 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 123 | | 2 | max | -.496 | 1 | .011 | 1 | .027 | 1 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 124 | | | min | -.577 | 2 | .007 | 2 | .026 | 2 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 125 | | 3 | max | -.484 | 1 | 0 | 1 | 0 | 1 | -.182 | 1 | .216 | 2 | .934 | 1 | -.885 | 2 |
| 126 | | | min | -.566 | 2 | 0 | 1 | 0 | 1 | -.216 | 2 | .182 | 1 | .786 | 2 | -1.052 | 1 |
| 127 | | 4 | max | -.472 | 1 | -.007 | 2 | -.026 | 2 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 128 | | | min | -.555 | 2 | -.011 | 1 | -.027 | 1 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 129 | | 5 | max | -.461 | 1 | -.014 | 2 | -.051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 130 | | | min | -.544 | 2 | -.023 | 1 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 131 | M14 | 1 | max | -.508 | 1 | .023 | 1 | -.051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 132 | | | min | -.612 | 2 | .014 | 2 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 133 | | 2 | max | -.52 | 1 | .011 | 1 | -.026 | 2 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 134 | | | min | -.623 | 2 | .007 | 2 | -.027 | 1 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 1 |
| 135 | | 3 | max | -.531 | 1 | 0 | 1 | 0 | 1 | .448 | 1 | -.377 | 2 | -.381 | 1 | .508 | 2 |
| 136 | | | min | -.634 | 2 | 0 | 1 | 0 | 1 | .377 | 2 | -.448 | 1 | -.451 | 2 | .428 | 1 |
| 137 | | 4 | max | -.543 | 1 | -.007 | 2 | .027 | 1 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 138 | | | min | -.645 | 2 | -.011 | 1 | .026 | 2 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 1 |
| 139 | | 5 | max | -.555 | 1 | -.014 | 2 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 140 | | | min | -.656 | 2 | -.023 | 1 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 141 | M15 | 1 | max | -.508 | 1 | .023 | 1 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 142 | | | min | -.612 | 2 | .014 | 2 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 143 | | 2 | max | -.52 | 1 | .011 | 1 | .027 | 1 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 144 | | | min | -.623 | 2 | .007 | 2 | .026 | 2 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 145 | | 3 | max | -.531 | 1 | 0 | 1 | 0 | 1 | -.182 | 1 | .216 | 2 | .934 | 1 | -.885 | 2 |
| 146 | | | min | -.634 | 2 | 0 | 1 | 0 | 1 | -.216 | 2 | .182 | 1 | .786 | 2 | -1.052 | 1 |
| 147 | | 4 | max | -.543 | 1 | -.007 | 2 | -.026 | 2 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 148 | | | min | -.645 | 2 | -.011 | 1 | -.027 | 1 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 149 | | 5 | max | -.555 | 1 | -.014 | 2 | -.051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 150 | | | min | -.656 | 2 | -.023 | 1 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 151 | M16 | 1 | max | .612 | 2 | .023 | 1 | -.051 | 2 | 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 | .508 | 1 | .014 | 2 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 153 | | 2 | max | .623 | 2 | .011 | 1 | -.026 | 2 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 154 | | | min | .52 | 1 | .007 | 2 | -.027 | 1 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 1 |
| 155 | | 3 | max | .634 | 2 | 0 | 1 | 0 | 1 | .448 | 1 | -.377 | 2 | -.381 | 1 | .508 | 2 |
| 156 | | | min | .531 | 1 | 0 | 1 | 0 | 1 | .377 | 2 | -.448 | 1 | -.451 | 2 | .428 | 1 |
| 157 | | 4 | max | .645 | 2 | -.007 | 2 | .027 | 1 | .336 | 1 | -.283 | 2 | -.285 | 1 | .381 | 2 |
| 158 | | | min | .543 | 1 | -.011 | 1 | .026 | 2 | .283 | 2 | -.336 | 1 | -.338 | 2 | .321 | 1 |
| 159 | | 5 | max | .656 | 2 | -.014 | 2 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 160 | | | min | .555 | 1 | -.023 | 1 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 161 | M17 | 1 | max | .612 | 2 | .023 | 1 | .054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 162 | | | min | .508 | 1 | .014 | 2 | .051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 163 | | 2 | max | .623 | 2 | .011 | 1 | .027 | 1 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 164 | | | min | .52 | 1 | .007 | 2 | .026 | 2 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 165 | | 3 | max | .634 | 2 | 0 | 1 | 0 | 1 | -.182 | 1 | .216 | 2 | .934 | 1 | -.885 | 2 |
| 166 | | | min | .531 | 1 | 0 | 1 | 0 | 1 | -.216 | 2 | .182 | 1 | .786 | 2 | -1.052 | 1 |
| 167 | | 4 | max | .645 | 2 | -.007 | 2 | -.026 | 2 | -.137 | 1 | .162 | 2 | .701 | 1 | -.664 | 2 |
| 168 | | | min | .543 | 1 | -.011 | 1 | -.027 | 1 | -.162 | 2 | .137 | 1 | .59 | 2 | -.789 | 1 |
| 169 | | 5 | max | .656 | 2 | -.014 | 2 | -.051 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 170 | | | min | .555 | 1 | -.023 | 1 | -.054 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 171 | M18 | 1 | max | -.186 | 1 | .062 | 1 | -.094 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 172 | | | min | -.225 | 2 | .041 | 2 | -.099 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 173 | | 2 | max | -.207 | 1 | .031 | 1 | -.047 | 1 | 1.388 | 1 | -1.244 | 2 | -.588 | 1 | 1.173 | 2 |
| 174 | | | min | -.247 | 2 | .02 | 2 | -.05 | 2 | 1.245 | 2 | -1.387 | 1 | -1.056 | 2 | .653 | 1 |
| 175 | | 3 | max | -.227 | 1 | 0 | 1 | 0 | 1 | 1.851 | 1 | -1.659 | 2 | -.784 | 1 | 1.564 | 2 |
| 176 | | | min | -.268 | 2 | 0 | 1 | 0 | 1 | 1.66 | 2 | -1.85 | 1 | -1.408 | 2 | .871 | 1 |
| 177 | | 4 | max | -.247 | 1 | -.02 | 2 | .05 | 2 | 1.388 | 1 | -1.244 | 2 | -.588 | 1 | 1.173 | 2 |
| 178 | | | min | -.289 | 2 | -.031 | 1 | .047 | 1 | 1.245 | 2 | -1.387 | 1 | -1.056 | 2 | .653 | 1 |
| 179 | | 5 | max | -.268 | 1 | -.041 | 2 | .099 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 180 | | | min | -.311 | 2 | -.062 | 1 | .094 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 181 | M19 | 1 | max | -.186 | 1 | .062 | 1 | .099 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 182 | | | min | -.225 | 2 | .041 | 2 | .094 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 183 | | 2 | max | -.207 | 1 | .031 | 1 | .05 | 2 | -.29 | 1 | .521 | 2 | 2.806 | 1 | -2.794 | 2 |
| 184 | | | min | -.247 | 2 | .02 | 2 | .047 | 1 | -.522 | 2 | .29 | 1 | 2.517 | 2 | -3.116 | 1 |
| 185 | | 3 | max | -.227 | 1 | 0 | 1 | 0 | 1 | -.387 | 1 | .695 | 2 | 3.741 | 1 | -3.726 | 2 |
| 186 | | | min | -.268 | 2 | 0 | 1 | 0 | 1 | -.695 | 2 | .386 | 1 | 3.356 | 2 | -4.154 | 1 |
| 187 | | 4 | max | -.247 | 1 | -.02 | 2 | -.047 | 1 | -.29 | 1 | .521 | 2 | 2.806 | 1 | -2.794 | 2 |
| 188 | | | min | -.289 | 2 | -.031 | 1 | -.05 | 2 | -.522 | 2 | .29 | 1 | 2.517 | 2 | -3.116 | 1 |
| 189 | | 5 | max | -.268 | 1 | -.041 | 2 | -.094 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 190 | | | min | -.311 | 2 | -.062 | 1 | -.099 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 191 | M20 | 1 | max | .225 | 2 | .062 | 1 | -.094 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 192 | | | min | .186 | 1 | .041 | 2 | -.099 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 193 | | 2 | max | .247 | 2 | .031 | 1 | -.047 | 1 | 1.388 | 1 | -1.244 | 2 | -.588 | 1 | 1.173 | 2 |
| 194 | | | min | .207 | 1 | .02 | 2 | -.05 | 2 | 1.245 | 2 | -1.387 | 1 | -1.056 | 2 | .653 | 1 |
| 195 | | 3 | max | .268 | 2 | 0 | 1 | 0 | 1 | 1.851 | 1 | -1.659 | 2 | -.784 | 1 | 1.564 | 2 |
| 196 | | | min | .227 | 1 | 0 | 1 | 0 | 1 | 1.66 | 2 | -1.85 | 1 | -1.408 | 2 | .871 | 1 |
| 197 | | 4 | max | .289 | 2 | -.02 | 2 | .05 | 2 | 1.388 | 1 | -1.244 | 2 | -.588 | 1 | 1.173 | 2 |
| 198 | | | min | .247 | 1 | -.031 | 1 | .047 | 1 | 1.245 | 2 | -1.387 | 1 | -1.056 | 2 | .653 | 1 |
| 199 | | 5 | max | .311 | 2 | -.041 | 2 | .099 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 200 | | | min | .268 | 1 | -.062 | 1 | .094 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 201 | M21 | 1 | max | .225 | 2 | .062 | 1 | .099 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 202 | | | min | .186 | 1 | .041 | 2 | .094 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 203 | | 2 | max | .247 | 2 | .031 | 1 | .05 | 2 | -.29 | 1 | .521 | 2 | 2.806 | 1 | -2.794 | 2 |
| 204 | | | min | .207 | 1 | .02 | 2 | .047 | 1 | -.522 | 2 | .29 | 1 | 2.517 | 2 | -3.116 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 205 | | 3 | max | .268 | 2 | 0 | 1 | 0 | 1 | -.387 | 1 | .695 | 2 | 3.741 | 1 | -3.726 | 2 |
| 206 | | | min | .227 | 1 | 0 | 1 | 0 | 1 | -.695 | 2 | .386 | 1 | 3.356 | 2 | -4.154 | 1 |
| 207 | | 4 | max | .289 | 2 | -.02 | 2 | -.047 | 1 | -.29 | 1 | .521 | 2 | 2.806 | 1 | -2.794 | 2 |
| 208 | | | min | .247 | 1 | -.031 | 1 | -.05 | 2 | -.522 | 2 | .29 | 1 | 2.517 | 2 | -3.116 | 1 |
| 209 | | 5 | max | .311 | 2 | -.041 | 2 | -.094 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 210 | | | min | .268 | 1 | -.062 | 1 | -.099 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 211 | M22 | 1 | max | -.053 | 1 | .074 | 1 | -.061 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 212 | | | min | -.061 | 2 | .056 | 2 | -.067 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 213 | | 2 | max | -.066 | 1 | .037 | 1 | -.03 | 1 | 1.157 | 1 | -1.056 | 2 | .231 | 1 | .212 | 2 |
| 214 | | | min | -.076 | 2 | .028 | 2 | -.034 | 2 | 1.057 | 2 | -1.157 | 1 | -.189 | 2 | -.258 | 1 |
| 215 | | 3 | max | -.079 | 1 | 0 | 1 | 0 | 1 | 1.543 | 1 | -1.409 | 2 | .308 | 1 | .283 | 2 |
| 216 | | | min | -.09 | 2 | 0 | 1 | 0 | 1 | 1.409 | 2 | -1.542 | 1 | -.253 | 2 | -.344 | 1 |
| 217 | | 4 | max | -.092 | 1 | -.028 | 2 | .034 | 2 | 1.157 | 1 | -1.056 | 2 | .231 | 1 | .212 | 2 |
| 218 | | | min | -.104 | 2 | -.037 | 1 | .03 | 1 | 1.057 | 2 | -1.157 | 1 | -.189 | 2 | -.258 | 1 |
| 219 | | 5 | max | -.105 | 1 | -.056 | 2 | .067 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 220 | | | min | -.119 | 2 | -.074 | 1 | .061 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 221 | M23 | 1 | max | -.053 | 1 | .074 | 1 | .067 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 222 | | | min | -.061 | 2 | .056 | 2 | .061 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 223 | | 2 | max | -.066 | 1 | .037 | 1 | .034 | 2 | .116 | 1 | .094 | 2 | 2.318 | 1 | -2.369 | 2 |
| 224 | | | min | -.076 | 2 | .028 | 2 | .03 | 1 | -.094 | 2 | -.116 | 1 | 2.118 | 2 | -2.593 | 1 |
| 225 | | 3 | max | -.079 | 1 | 0 | 1 | 0 | 1 | .155 | 1 | .125 | 2 | 3.091 | 1 | -3.159 | 2 |
| 226 | | | min | -.09 | 2 | 0 | 1 | 0 | 1 | -.125 | 2 | -.155 | 1 | 2.824 | 2 | -3.458 | 1 |
| 227 | | 4 | max | -.092 | 1 | -.028 | 2 | -.03 | 1 | .116 | 1 | .094 | 2 | 2.318 | 1 | -2.369 | 2 |
| 228 | | | min | -.104 | 2 | -.037 | 1 | -.034 | 2 | -.094 | 2 | -.116 | 1 | 2.118 | 2 | -2.593 | 1 |
| 229 | | 5 | max | -.105 | 1 | -.056 | 2 | -.061 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 230 | | | min | -.119 | 2 | -.074 | 1 | -.067 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 231 | M24 | 1 | max | .061 | 2 | .074 | 1 | -.061 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 232 | | | min | .053 | 1 | .056 | 2 | -.067 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 233 | | 2 | max | .076 | 2 | .037 | 1 | -.03 | 1 | 1.157 | 1 | -1.056 | 2 | .231 | 1 | .212 | 2 |
| 234 | | | min | .066 | 1 | .028 | 2 | -.034 | 2 | 1.057 | 2 | -1.157 | 1 | -.189 | 2 | -.258 | 1 |
| 235 | | 3 | max | .09 | 2 | 0 | 1 | 0 | 1 | 1.543 | 1 | -1.409 | 2 | .308 | 1 | .283 | 2 |
| 236 | | | min | .079 | 1 | 0 | 1 | 0 | 1 | 1.409 | 2 | -1.542 | 1 | -.253 | 2 | -.344 | 1 |
| 237 | | 4 | max | .104 | 2 | -.028 | 2 | .034 | 2 | 1.157 | 1 | -1.056 | 2 | .231 | 1 | .212 | 2 |
| 238 | | | min | .092 | 1 | -.037 | 1 | .03 | 1 | 1.057 | 2 | -1.157 | 1 | -.189 | 2 | -.258 | 1 |
| 239 | | 5 | max | .119 | 2 | -.056 | 2 | .067 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 240 | | | min | .105 | 1 | -.074 | 1 | .061 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 241 | M25 | 1 | max | .061 | 2 | .074 | 1 | .067 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 242 | | | min | .053 | 1 | .056 | 2 | .061 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 243 | | 2 | max | .076 | 2 | .037 | 1 | .034 | 2 | .116 | 1 | .094 | 2 | 2.318 | 1 | -2.369 | 2 |
| 244 | | | min | .066 | 1 | .028 | 2 | .03 | 1 | -.094 | 2 | -.116 | 1 | 2.118 | 2 | -2.593 | 1 |
| 245 | | 3 | max | .09 | 2 | 0 | 1 | 0 | 1 | .155 | 1 | .125 | 2 | 3.091 | 1 | -3.159 | 2 |
| 246 | | | min | .079 | 1 | 0 | 1 | 0 | 1 | -.125 | 2 | -.155 | 1 | 2.824 | 2 | -3.458 | 1 |
| 247 | | 4 | max | .104 | 2 | -.028 | 2 | -.03 | 1 | .116 | 1 | .094 | 2 | 2.318 | 1 | -2.369 | 2 |
| 248 | | | min | .092 | 1 | -.037 | 1 | -.034 | 2 | -.094 | 2 | -.116 | 1 | 2.118 | 2 | -2.593 | 1 |
| 249 | | 5 | max | .119 | 2 | -.056 | 2 | -.061 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 250 | | | min | .105 | 1 | -.074 | 1 | -.067 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |

## 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 | N1 | max | -.204 | 1 | 17.488 | 1 | 0 | 2 | 0 | 2 | 0 | 1 | .971 | 2 |
| 2 | | min | -.249 | 2 | 14.134 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | .796 | 1 |

## *Envelope Joint Reactions (Continued)*

| | Joint | | X [k] | LC | Y [k] | LC | Z [k] | LC | MX [k-ft] | LC | MY [k-ft] | LC | MZ [k-ft] | LC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | N9 | max | -.338 | 1 | .116 | 1 | -.203 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 4 | | min | -.381 | 2 | .088 | 2 | -.232 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 5 | N10 | max | -.338 | 1 | .116 | 1 | .232 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 6 | | min | -.381 | 2 | .088 | 2 | .203 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 7 | N11 | max | -.338 | 1 | .116 | 1 | .232 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 8 | | min | -.381 | 2 | .088 | 2 | .203 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 9 | N12 | max | -.338 | 1 | .116 | 1 | -.203 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 10 | | min | -.381 | 2 | .088 | 2 | -.232 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 11 | N13 | max | -.37 | 1 | .045 | 1 | -.273 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 12 | | min | -.425 | 2 | .03 | 2 | -.322 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 13 | N14 | max | -.37 | 1 | .045 | 1 | .322 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 14 | | min | -.425 | 2 | .03 | 2 | .273 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 15 | N15 | max | -.37 | 1 | .045 | 1 | .322 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 16 | | min | -.425 | 2 | .03 | 2 | .273 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 17 | N16 | max | -.37 | 1 | .045 | 1 | -.273 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 18 | | min | -.425 | 2 | .03 | 2 | -.322 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 19 | N17 | max | -.369 | 1 | .009 | 1 | -.339 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 20 | | min | -.432 | 2 | .005 | 2 | -.404 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 21 | N18 | max | -.369 | 1 | .009 | 1 | .404 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 22 | | min | -.432 | 2 | .005 | 2 | .339 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 23 | N19 | max | -.369 | 1 | .009 | 1 | .404 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 24 | | min | -.432 | 2 | .005 | 2 | .339 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 25 | N20 | max | -.369 | 1 | .009 | 1 | -.339 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 26 | | min | -.432 | 2 | .005 | 2 | -.404 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 27 | N21 | max | .332 | 2 | .009 | 1 | .361 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 28 | | min | .278 | 1 | .005 | 2 | .309 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 29 | N22 | max | .332 | 2 | .009 | 1 | -.309 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 30 | | min | .278 | 1 | .005 | 2 | -.361 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 31 | N23 | max | .332 | 2 | .009 | 1 | -.309 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 32 | | min | .278 | 1 | .005 | 2 | -.361 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 33 | N24 | max | .332 | 2 | .009 | 1 | .361 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 34 | | min | .278 | 1 | .005 | 2 | .309 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 35 | N25 | max | 5.192 | 2 | .009 | 1 | 5.22 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 36 | | min | 4.492 | 1 | .005 | 2 | 4.522 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 37 | N26 | max | 5.192 | 2 | .009 | 1 | -4.522 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 38 | | min | 4.492 | 1 | .005 | 2 | -5.22 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 39 | N27 | max | 5.192 | 2 | .009 | 1 | -4.522 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 40 | | min | 4.492 | 1 | .005 | 2 | -5.22 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 41 | N28 | max | 5.192 | 2 | .009 | 1 | 5.22 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 42 | | min | 4.492 | 1 | .005 | 2 | 4.522 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 43 | N29 | max | -6.373 | 1 | .009 | 1 | -6.343 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 44 | | min | -7.358 | 2 | .005 | 2 | -7.329 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 45 | N30 | max | -6.373 | 1 | .009 | 1 | 7.329 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 46 | | min | -7.358 | 2 | .005 | 2 | 6.343 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 47 | N31 | max | -6.373 | 1 | .009 | 1 | 7.329 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 48 | | min | -7.358 | 2 | .005 | 2 | 6.343 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 49 | N32 | max | -6.373 | 1 | .009 | 1 | -6.343 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 50 | | min | -7.358 | 2 | .005 | 2 | -7.329 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 51 | Totals: | max | -10.92 | 1 | 18.275 | 1 | 0 | 1 | | | | | | |
| 52 | | min | -12.532 | 2 | 14.691 | 2 | 0 | 1 | | | | | | |

## *Envelope Joint Displacements*

| | Joint | | X [in] | LC | Y [in] | LC | Z [in] | LC | X Rotation [... | LC | Y Rotation [... | LC | Z Rotation [... | LC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | N1 | max | 0 | 2 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 2 | | min | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 2 | 0 | 1 | 0 | 2 |
| 3 | N2 | max | 0 | 2 | -.006 | 2 | 0 | 2 | 0 | 2 | 0 | 1 | 7.085e-6 | 2 |
| 4 | | min | 0 | 1 | -.007 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 5.409e-6 | 1 |
| 5 | N3 | max | .002 | 2 | -.011 | 2 | 0 | 2 | 0 | 1 | 0 | 1 | -4.403e-5 | 1 |
| 6 | | min | .001 | 1 | -.013 | 1 | 0 | 1 | 0 | 2 | 0 | 1 | -5.553e-5 | 2 |
| 7 | N4 | max | .001 | 2 | -.017 | 2 | 0 | 1 | 0 | 2 | 0 | 1 | 3.587e-5 | 2 |
| 8 | | min | .001 | 1 | -.022 | 1 | 0 | 2 | 0 | 1 | 0 | 1 | 2.724e-5 | 1 |
| 9 | N5 | max | -.001 | 1 | -.019 | 2 | 0 | 2 | 0 | 1 | 0 | 1 | 9.96e-5 | 2 |
| 10 | | min | -.001 | 2 | -.024 | 1 | 0 | 1 | 0 | 2 | 0 | 1 | 8.708e-5 | 1 |
| 11 | N6 | max | -.015 | 1 | -.021 | 2 | 0 | 2 | 0 | 2 | 0 | 1 | -7.989e-5 | 1 |
| 12 | | min | -.017 | 2 | -.026 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | -9.201e-5 | 2 |
| 13 | N7 | max | .024 | 2 | -.021 | 2 | 0 | 2 | 0 | 2 | 0 | 1 | -1.971e-3 | 1 |
| 14 | | min | .021 | 1 | -.027 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | -2.277e-3 | 2 |
| 15 | N8 | max | 2.263 | 2 | -.023 | 2 | 0 | 2 | 0 | 2 | 0 | 1 | -9.331e-3 | 1 |
| 16 | | min | 1.963 | 1 | -.03 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | -1.075e-2 | 2 |
| 17 | N9 | max | 0 | 2 | 0 | 2 | 0 | 2 | -1.575e-3 | 2 | -2.305e-3 | 2 | 1.818e-3 | 1 |
| 18 | | min | 0 | 1 | 0 | 1 | 0 | 1 | -1.812e-3 | 1 | -2.404e-3 | 1 | 1.582e-3 | 2 |
| 19 | N10 | max | 0 | 2 | 0 | 2 | 0 | 1 | 6.436e-4 | 1 | 7.767e-4 | 2 | 6.49e-4 | 1 |
| 20 | | min | 0 | 1 | 0 | 1 | 0 | 2 | 2.828e-4 | 2 | 3.838e-4 | 1 | 2.899e-4 | 2 |
| 21 | N11 | max | 0 | 2 | 0 | 2 | 0 | 1 | -1.582e-3 | 2 | -2.305e-3 | 2 | -1.575e-3 | 2 |
| 22 | | min | 0 | 1 | 0 | 1 | 0 | 2 | -1.818e-3 | 1 | -2.404e-3 | 1 | -1.812e-3 | 1 |
| 23 | N12 | max | 0 | 2 | 0 | 2 | 0 | 2 | 6.49e-4 | 1 | 7.767e-4 | 2 | -2.828e-4 | 2 |
| 24 | | min | 0 | 1 | 0 | 1 | 0 | 1 | 2.899e-4 | 2 | 3.838e-4 | 1 | -6.436e-4 | 1 |
| 25 | N13 | max | 0 | 2 | 0 | 2 | 0 | 2 | -1.835e-3 | 2 | -3.065e-3 | 2 | 2.117e-3 | 1 |
| 26 | | min | 0 | 1 | 0 | 1 | 0 | 1 | -2.161e-3 | 1 | -3.252e-3 | 1 | 1.78e-3 | 2 |
| 27 | N14 | max | 0 | 2 | 0 | 2 | 0 | 1 | 1.91e-4 | 1 | 1.866e-3 | 2 | 1.47e-4 | 1 |
| 28 | | min | 0 | 1 | 0 | 1 | 0 | 2 | -2.383e-4 | 2 | 1.431e-3 | 1 | -2.938e-4 | 2 |
| 29 | N15 | max | 0 | 2 | 0 | 2 | 0 | 1 | -1.78e-3 | 2 | -3.065e-3 | 2 | -1.835e-3 | 2 |
| 30 | | min | 0 | 1 | 0 | 1 | 0 | 2 | -2.117e-3 | 1 | -3.252e-3 | 1 | -2.161e-3 | 1 |
| 31 | N16 | max | 0 | 2 | 0 | 2 | 0 | 2 | 1.47e-4 | 1 | 1.866e-3 | 2 | 2.383e-4 | 2 |
| 32 | | min | 0 | 1 | 0 | 1 | 0 | 1 | -2.938e-4 | 2 | 1.431e-3 | 1 | -1.91e-4 | 1 |
| 33 | N17 | max | 0 | 2 | 0 | 2 | 0 | 2 | -4.611e-4 | 2 | -3.81e-4 | 2 | 6.14e-4 | 1 |
| 34 | | min | 0 | 1 | 0 | 1 | 0 | 1 | -5.868e-4 | 1 | -4.298e-4 | 1 | 4.969e-4 | 2 |
| 35 | N18 | max | 0 | 2 | 0 | 2 | 0 | 1 | 3.058e-4 | 1 | 2.797e-4 | 2 | 3.33e-4 | 1 |
| 36 | | min | 0 | 1 | 0 | 1 | 0 | 2 | 1.966e-4 | 2 | 2.624e-4 | 1 | 2.325e-4 | 2 |
| 37 | N19 | max | 0 | 2 | 0 | 2 | 0 | 1 | -4.969e-4 | 2 | -3.81e-4 | 2 | -4.611e-4 | 2 |
| 38 | | min | 0 | 1 | 0 | 1 | 0 | 2 | -6.14e-4 | 1 | -4.298e-4 | 1 | -5.868e-4 | 1 |
| 39 | N20 | max | 0 | 2 | 0 | 2 | 0 | 2 | 3.33e-4 | 1 | 2.797e-4 | 2 | -1.966e-4 | 2 |
| 40 | | min | 0 | 1 | 0 | 1 | 0 | 1 | 2.325e-4 | 2 | 2.624e-4 | 1 | -3.058e-4 | 1 |
| 41 | N21 | max | 0 | 1 | 0 | 2 | 0 | 1 | -4.558e-4 | 2 | -3.396e-4 | 2 | 6.787e-4 | 1 |
| 42 | | min | 0 | 2 | 0 | 1 | 0 | 2 | -5.916e-4 | 1 | -3.948e-4 | 1 | 5.554e-4 | 2 |
| 43 | N22 | max | 0 | 1 | 0 | 2 | 0 | 2 | 3.106e-4 | 1 | 2.383e-4 | 2 | 3.977e-4 | 1 |
| 44 | | min | 0 | 2 | 0 | 1 | 0 | 1 | 1.913e-4 | 2 | 2.273e-4 | 1 | 2.909e-4 | 2 |
| 45 | N23 | max | 0 | 1 | 0 | 2 | 0 | 2 | -5.554e-4 | 2 | -3.396e-4 | 2 | -4.558e-4 | 2 |
| 46 | | min | 0 | 2 | 0 | 1 | 0 | 1 | -6.787e-4 | 1 | -3.948e-4 | 1 | -5.916e-4 | 1 |
| 47 | N24 | max | 0 | 1 | 0 | 2 | 0 | 1 | 3.977e-4 | 1 | 2.383e-4 | 2 | -1.913e-4 | 2 |
| 48 | | min | 0 | 2 | 0 | 1 | 0 | 2 | 2.909e-4 | 2 | 2.273e-4 | 1 | -3.106e-4 | 1 |
| 49 | N25 | max | 0 | 1 | 0 | 2 | 0 | 1 | -5.798e-4 | 2 | -7.664e-5 | 2 | 6.326e-4 | 1 |
| 50 | | min | 0 | 2 | 0 | 1 | 0 | 2 | -7.124e-4 | 1 | -1.668e-4 | 1 | 4.877e-4 | 2 |
| 51 | N26 | max | 0 | 1 | 0 | 2 | 0 | 2 | 4.315e-4 | 1 | -7.097e-7 | 1 | 3.516e-4 | 1 |
| 52 | | min | 0 | 2 | 0 | 1 | 0 | 1 | 3.153e-4 | 2 | -2.472e-5 | 2 | 2.233e-4 | 2 |

## Envelope Joint Displacements (Continued)

| | Joint | | X [in] | LC | Y [in] | LC | Z [in] | LC | X Rotation [... | LC | Y Rotation [... | LC | Z Rotation [... | LC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 53 | N27 | max | 0 | 1 | 0 | 2 | 0 | 2 | -4.877e-4 | 2 | -7.664e-5 | 2 | -5.798e-4 | 2 |
| 54 | | min | 0 | 2 | 0 | 1 | 0 | 1 | -6.326e-4 | 1 | -1.668e-4 | 1 | -7.124e-4 | 1 |
| 55 | N28 | max | 0 | 1 | 0 | 2 | 0 | 1 | 3.516e-4 | 1 | -7.097e-7 | 1 | -3.153e-4 | 2 |
| 56 | | min | 0 | 2 | 0 | 1 | 0 | 2 | 2.233e-4 | 2 | -2.472e-5 | 2 | -4.315e-4 | 1 |
| 57 | N29 | max | 0 | 2 | 0 | 2 | 0 | 2 | -1.672e-3 | 1 | -7.548e-4 | 1 | -2.989e-4 | 1 |
| 58 | | min | 0 | 1 | 0 | 1 | 0 | 1 | -1.683e-3 | 2 | -7.559e-4 | 2 | -5.941e-4 | 2 |
| 59 | N30 | max | 0 | 2 | 0 | 2 | 0 | 1 | 1.418e-3 | 2 | 6.545e-4 | 2 | -5.799e-4 | 1 |
| 60 | | min | 0 | 1 | 0 | 1 | 0 | 2 | 1.391e-3 | 1 | 5.873e-4 | 1 | -8.586e-4 | 2 |
| 61 | N31 | max | 0 | 2 | 0 | 2 | 0 | 1 | 5.941e-4 | 2 | -7.548e-4 | 1 | -1.672e-3 | 1 |
| 62 | | min | 0 | 1 | 0 | 1 | 0 | 2 | 2.989e-4 | 1 | -7.559e-4 | 2 | -1.683e-3 | 2 |
| 63 | N32 | max | 0 | 2 | 0 | 2 | 0 | 2 | -5.799e-4 | 1 | 6.545e-4 | 2 | -1.391e-3 | 1 |
| 64 | | min | 0 | 1 | 0 | 1 | 0 | 1 | -8.586e-4 | 2 | 5.873e-4 | 1 | -1.418e-3 | 2 |

## Envelope AISC ASD Steel Code Checks

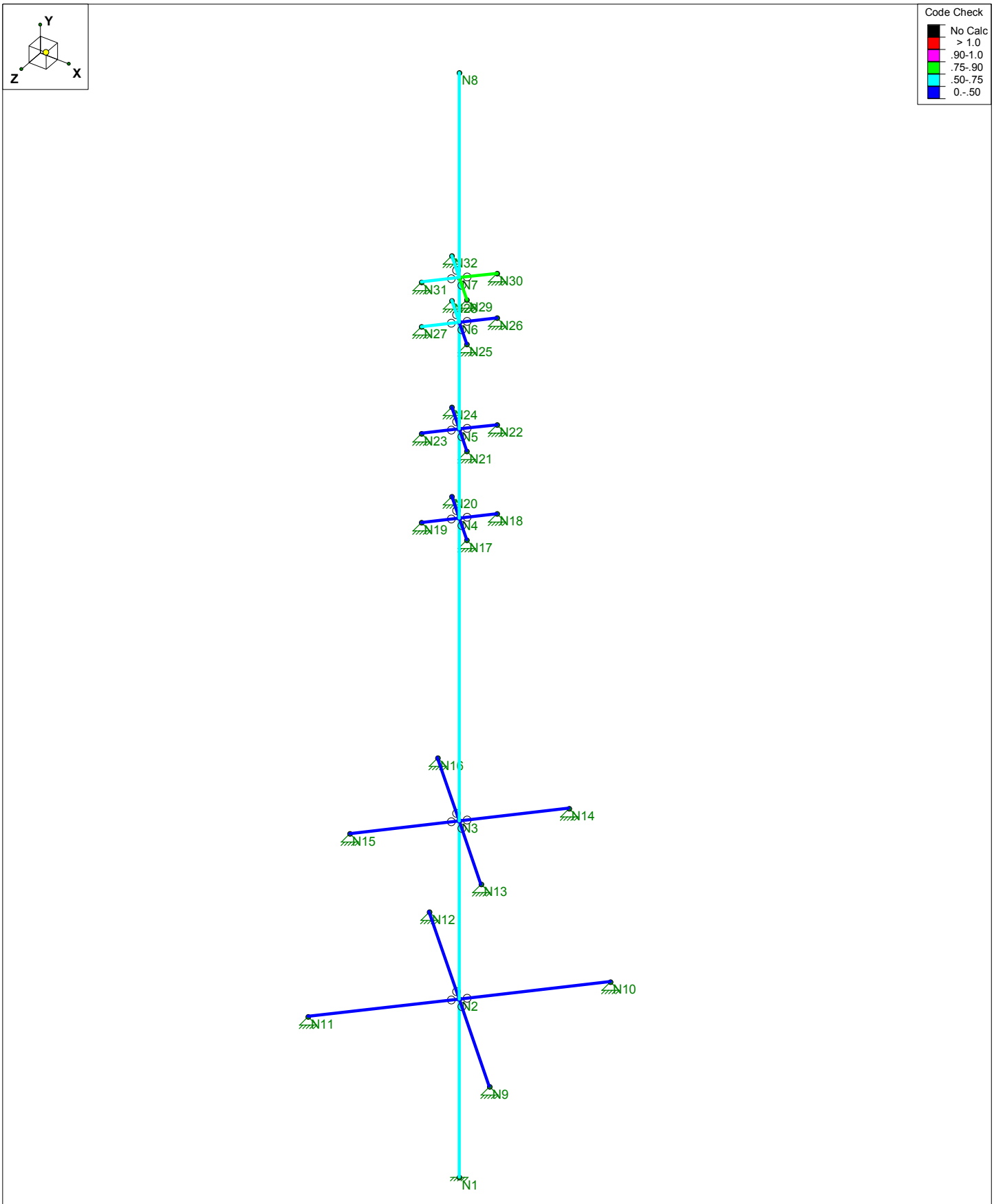
| | Mem... | Shape | Code Check | Loc[ft] | LC | Shear C... | Loc[ft] | Dir | LC | Fa [... | Ft [... | Fb y... | Fb z... | C... | C... | AS... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | M1 | HSS18x... | .693 | 100.75 | 2 | .139 | 100.75 | | 2 | 2.621 | 25.2 | 27.72 | 27.72 | 1 | .6 | .85 | H1-1 |
| 2 | M2 | L2.5x2.5x3 | .534 | 3.536 | 2 | .004 | 3.536 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H2-1 |
| 3 | M3 | L2.5x2.5x3 | .534 | 3.536 | 2 | .004 | 3.536 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H2-1 |
| 4 | M4 | L2.5x2.5x3 | .808 | 3.536 | 2 | .004 | 3.536 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H1-1 |
| 5 | M5 | L2.5x2.5x3 | .808 | 3.536 | 2 | .004 | 3.536 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H1-1 |
| 6 | M6 | L2.5x2.5x3 | .576 | 0 | 2 | .004 | 0 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H1-1 |
| 7 | M7 | L2.5x2.5x3 | .576 | 0 | 2 | .004 | 0 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H1-1 |
| 8 | M8 | L2.5x2.5x3 | .380 | 0 | 2 | .004 | 0 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H2-1 |
| 9 | M9 | L2.5x2.5x3 | .380 | 0 | 2 | .004 | 0 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H2-1 |
| 10 | M10 | L2.5x2.5x3 | .041 | 0 | 2 | .004 | 3.536 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H1-1 |
| 11 | M11 | L2.5x2.5x3 | .041 | 0 | 2 | .004 | 3.536 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H1-1 |
| 12 | M12 | L2.5x2.5x3 | .027 | 0 | 2 | .004 | 3.536 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H2-1 |
| 13 | M13 | L2.5x2.5x3 | .027 | 0 | 2 | .004 | 0 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H2-1 |
| 14 | M14 | L2.5x2.5x3 | .030 | 3.536 | 2 | .004 | 3.536 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H2-1 |
| 15 | M15 | L2.5x2.5x3 | .030 | 3.536 | 2 | .004 | 3.536 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H2-1 |
| 16 | M16 | L2.5x2.5x3 | .046 | 3.536 | 2 | .004 | 0 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H1-1 |
| 17 | M17 | L2.5x2.5x3 | .046 | 3.536 | 2 | .004 | 3.536 | z | 1 | 14.2... | 21.6 | - Co... | | | | | H1-1 |
| 18 | M18 | L3.5x3.5x4 | .014 | 10.253 | 2 | .007 | 10.253 | z | 2 | 4.669 | 21.6 | - Co... | | | | | H2-1 |
| 19 | M19 | L3.5x3.5x4 | .014 | 10.253 | 2 | .007 | 10.253 | z | 2 | 4.669 | 21.6 | - Co... | | | | | H2-1 |
| 20 | M20 | L3.5x3.5x4 | .067 | 10.253 | 2 | .007 | 10.253 | z | 2 | 4.669 | 21.6 | - Co... | | | | | H1-1 |
| 21 | M21 | L3.5x3.5x4 | .067 | 10.253 | 2 | .007 | 10.253 | z | 2 | 4.669 | 21.6 | - Co... | | | | | H1-1 |
| 22 | M22 | L5x5x6 | .005 | 14.142 | 2 | .005 | 14.142 | y | 1 | 5.041 | 21.6 | - Co... | | | | | H2-1 |
| 23 | M23 | L5x5x6 | .005 | 14.142 | 2 | .005 | 14.142 | y | 1 | 5.041 | 21.6 | - Co... | | | | | H2-1 |
| 24 | M24 | L5x5x6 | .024 | 14.142 | 2 | .005 | 14.142 | y | 1 | 5.041 | 21.6 | - Co... | | | | | H1-1 |
| 25 | M25 | L5x5x6 | .024 | 14.142 | 2 | .005 | 14.142 | y | 1 | 5.041 | 21.6 | - Co... | | | | | H1-1 |

## *Joint Reactions*

| | LC | Joint Label | X [k] | Y [k] | Z [k] | MX [k-ft] | MY [k-ft] | MZ [k-ft] |
|---|---|---|---|---|---|---|---|---|
| 1 | 1 | N1 | -.204 | 17.488 | 0 | 0 | 0 | .796 |
| 2 | 1 | N9 | -.338 | .116 | -.203 | 0 | 0 | 0 |
| 3 | 1 | N10 | -.338 | .116 | .203 | 0 | 0 | 0 |
| 4 | 1 | N11 | -.338 | .116 | .203 | 0 | 0 | 0 |
| 5 | 1 | N12 | -.338 | .116 | -.203 | 0 | 0 | 0 |
| 6 | 1 | N13 | -.37 | .045 | -.273 | 0 | 0 | 0 |
| 7 | 1 | N14 | -.37 | .045 | .273 | 0 | 0 | 0 |
| 8 | 1 | N15 | -.37 | .045 | .273 | 0 | 0 | 0 |
| 9 | 1 | N16 | -.37 | .045 | -.273 | 0 | 0 | 0 |
| 10 | 1 | N17 | -.369 | .009 | -.339 | 0 | 0 | 0 |
| 11 | 1 | N18 | -.369 | .009 | .339 | 0 | 0 | 0 |
| 12 | 1 | N19 | -.369 | .009 | .339 | 0 | 0 | 0 |
| 13 | 1 | N20 | -.369 | .009 | -.339 | 0 | 0 | 0 |
| 14 | 1 | N21 | .278 | .009 | .309 | 0 | 0 | 0 |
| 15 | 1 | N22 | .278 | .009 | -.309 | 0 | 0 | 0 |
| 16 | 1 | N23 | .278 | .009 | -.309 | 0 | 0 | 0 |
| 17 | 1 | N24 | .278 | .009 | .309 | 0 | 0 | 0 |
| 18 | 1 | N25 | 4.492 | .009 | 4.522 | 0 | 0 | 0 |
| 19 | 1 | N26 | 4.492 | .009 | -4.522 | 0 | 0 | 0 |
| 20 | 1 | N27 | 4.492 | .009 | -4.522 | 0 | 0 | 0 |
| 21 | 1 | N28 | 4.492 | .009 | 4.522 | 0 | 0 | 0 |
| 22 | 1 | N29 | -6.373 | .009 | -6.343 | 0 | 0 | 0 |
| 23 | 1 | N30 | -6.373 | .009 | 6.343 | 0 | 0 | 0 |
| 24 | 1 | N31 | -6.373 | .009 | 6.343 | 0 | 0 | 0 |
| 25 | 1 | N32 | -6.373 | .009 | -6.343 | 0 | 0 | 0 |
| 26 | 1 | Totals: | -10.92 | 18.275 | 0 | | | |
| 27 | 1 | COG (ft): | X: 0 | Y: 78.388 | Z: 0 | | | |

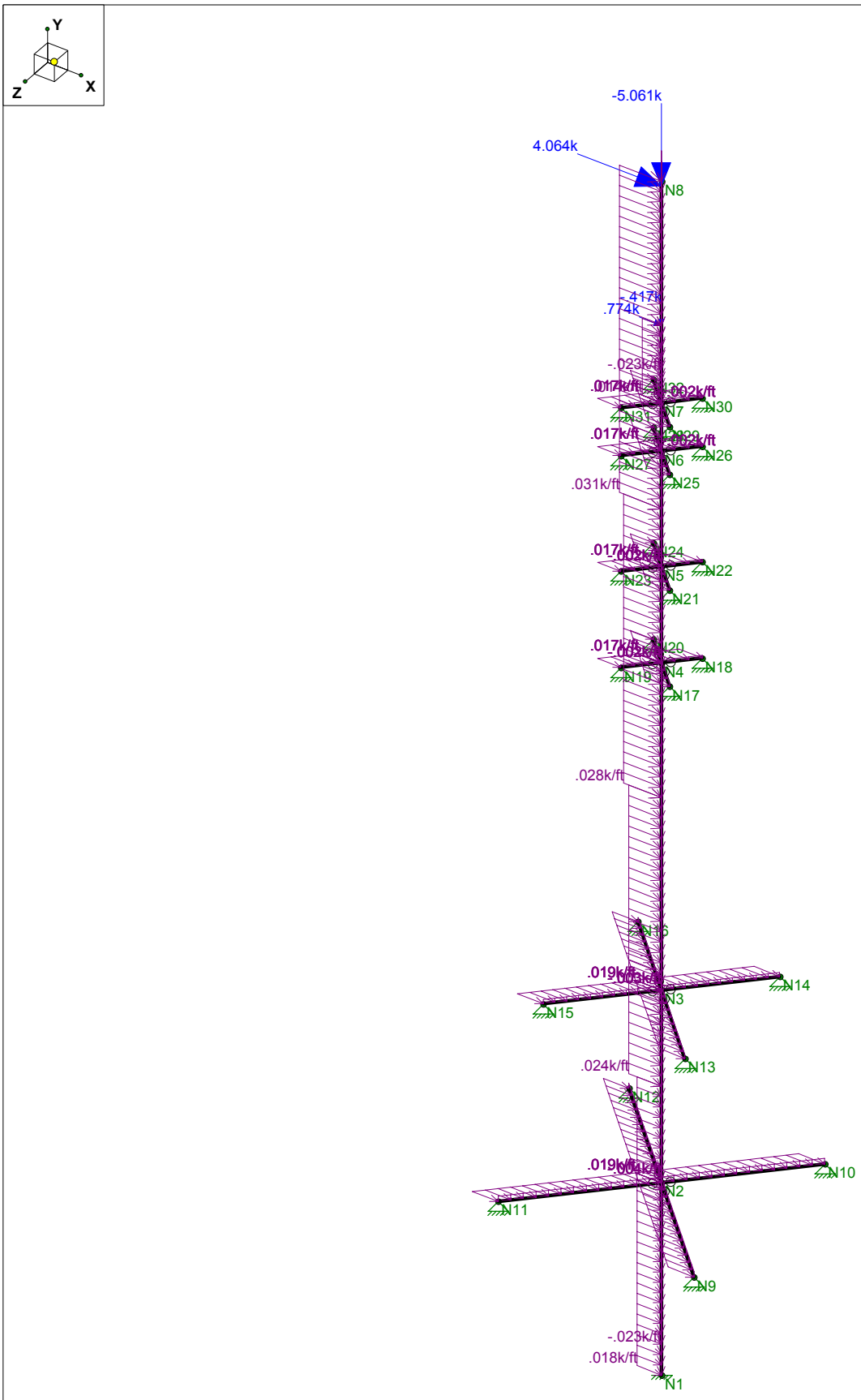
## *Joint Reactions*

| | LC | Joint Label | X [k] | Y [k] | Z [k] | MX [k-ft] | MY [k-ft] | MZ [k-ft] |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | N1 | -.249 | 14.134 | 0 | 0 | 0 | .971 |
| 2 | 2 | N9 | -.381 | .088 | -.232 | 0 | 0 | 0 |
| 3 | 2 | N10 | -.381 | .088 | .232 | 0 | 0 | 0 |
| 4 | 2 | N11 | -.381 | .088 | .232 | 0 | 0 | 0 |
| 5 | 2 | N12 | -.381 | .088 | -.232 | 0 | 0 | 0 |
| 6 | 2 | N13 | -.425 | .03 | -.322 | 0 | 0 | 0 |
| 7 | 2 | N14 | -.425 | .03 | .322 | 0 | 0 | 0 |
| 8 | 2 | N15 | -.425 | .03 | .322 | 0 | 0 | 0 |
| 9 | 2 | N16 | -.425 | .03 | -.322 | 0 | 0 | 0 |
| 10 | 2 | N17 | -.432 | .005 | -.404 | 0 | 0 | 0 |
| 11 | 2 | N18 | -.432 | .005 | .404 | 0 | 0 | 0 |
| 12 | 2 | N19 | -.432 | .005 | .404 | 0 | 0 | 0 |
| 13 | 2 | N20 | -.432 | .005 | -.404 | 0 | 0 | 0 |
| 14 | 2 | N21 | .332 | .005 | .361 | 0 | 0 | 0 |
| 15 | 2 | N22 | .332 | .005 | -.361 | 0 | 0 | 0 |
| 16 | 2 | N23 | .332 | .005 | -.361 | 0 | 0 | 0 |
| 17 | 2 | N24 | .332 | .005 | .361 | 0 | 0 | 0 |
| 18 | 2 | N25 | 5.192 | .005 | 5.22 | 0 | 0 | 0 |
| 19 | 2 | N26 | 5.192 | .005 | -5.22 | 0 | 0 | 0 |
| 20 | 2 | N27 | 5.192 | .005 | -5.22 | 0 | 0 | 0 |
| 21 | 2 | N28 | 5.192 | .005 | 5.22 | 0 | 0 | 0 |
| 22 | 2 | N29 | -7.358 | .005 | -7.329 | 0 | 0 | 0 |
| 23 | 2 | N30 | -7.358 | .005 | 7.329 | 0 | 0 | 0 |
| 24 | 2 | N31 | -7.358 | .005 | 7.329 | 0 | 0 | 0 |
| 25 | 2 | N32 | -7.358 | .005 | -7.329 | 0 | 0 | 0 |
| 26 | 2 | Totals: | -12.532 | 14.691 | 0 | | | |
| 27 | 2 | COG (ft): | X: 0 | Y: 75.935 | Z: 0 | | | |



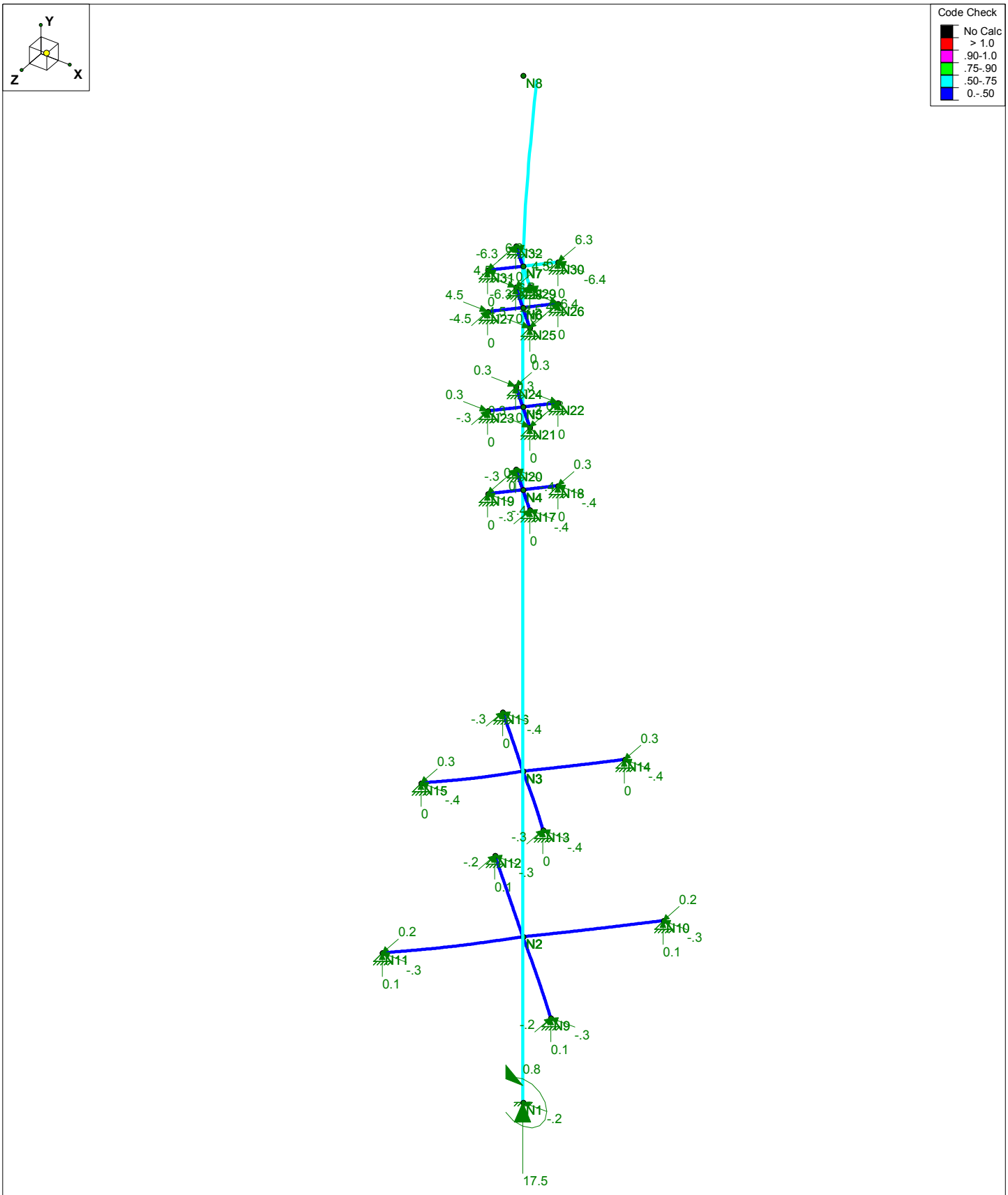

Solution: Envelope

| | | |
|---|---|---|
| CENTEK Engineering, INC. | | |
| tjl, cfc | CL&P Pole # 1321 - Powermount | Jan 23, 2014 at 10:16 AM |
| 13317.000 - CT11426A | Unity Check | EIA-TIA - Powermount.r3d |



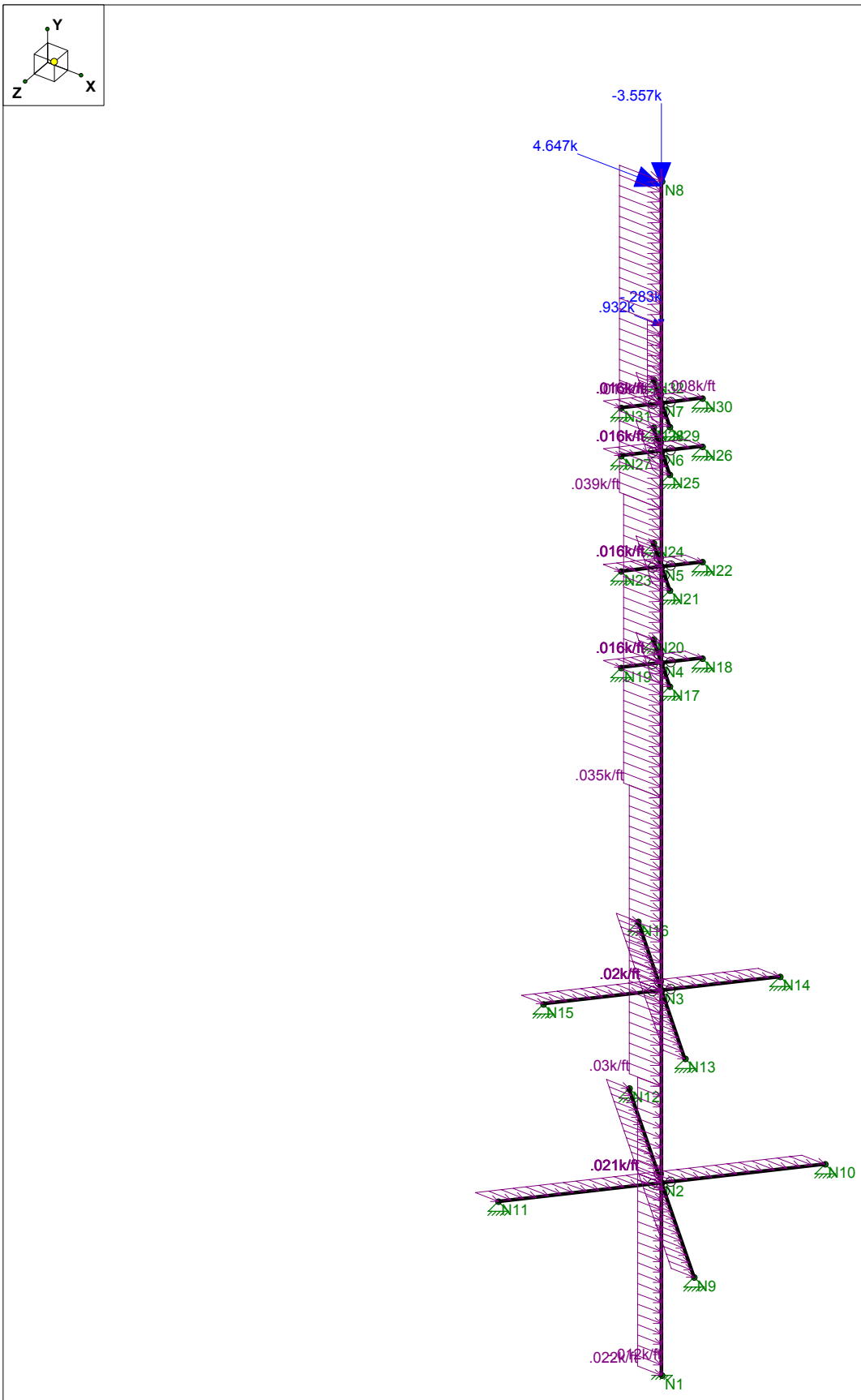

Loads: LC 1, TIA/EIA Wind + Ice on PCS Structure

| | | |
|---|---|---|
| CENTEK Engineering, INC. | | |
| tjl, cfc | CL&P Pole # 1321 - Powermount | Jan 23, 2014 at 10:17 AM |
| 13317.000 - CT11426A | LC #1 Loads | EIA-TIA - Powermount.r3d |



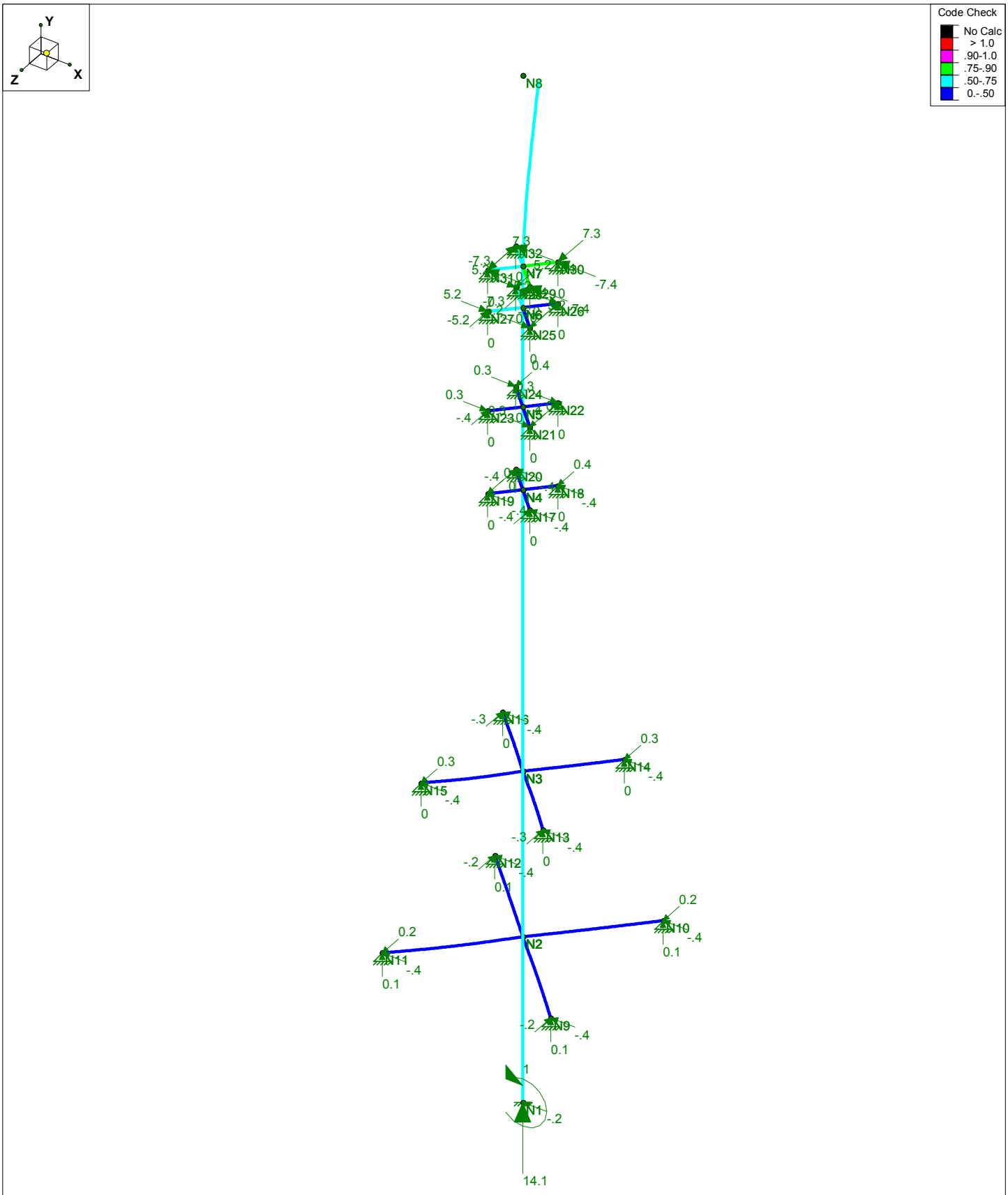

Results for LC 1, TIA/EIA Wind + Ice on PCS Structure
Z-moment Reaction units are k and k-ft

| | | |
|---|---|---|
| CENTEK Engineering, INC. | | |
| tjl, cfc | CL&P Pole # 1321 - Powermount | Jan 23, 2014 at 10:18 AM |
| 13317.000 - CT11426A | LC # 1 Reactions and Deflected Shape | EIA-TIA - Powermount.r3d |




Loads: LC 2, TIA/EIA Wind on PCS Structure

| | | |
|---|---|---|
| CENTEK Engineering, INC. | | |
| tjl, cfc | CL&P Pole # 1321 - Powermount | Jan 23, 2014 at 10:17 AM |
| 13317.000 - CT11426A | LC #2 Loads | EIA-TIA - Powermount.r3d |




Results for LC 2, TIA/EIA Wind on PCS Structure
Z-moment Reaction units are k and k-ft

| | | |
|---|---|---|
| CENTEK Engineering, INC. | | |
| tjl, cfc | CL&P Pole # 1321 - Powermount | Jan 23, 2014 at 10:19 AM |
| 13317.000 - CT11426A | LC # 2 Reactions and Deflected Shape | EIA-TIA - Powermount.r3d |

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| | |
|---|---|
| Subject: | Connection of Powermount to CL&P Tower # 1321 |
| Location: | Stratford, CT |
| Rev. 1: 01/27/14 | Prepared by: T.J.L. Checked by: C.F.C. Job No. 13317.000 |

## Powermount Connection to CL&P Tower:

### Reactions:

Horz = $Horz := 31 \cdot kips$ (User Input)

### Pipe Collar:

#### Bolt Data:

Bolt Type = ASTM A325 (User Input)

Bolt Diameter = $D := 0.625 \cdot in$ (User Input)

Number of Bolts = $N_b := 4$ (User Input)

Allowable Tensile Strength = $F_t := 13.8 \cdot kips$ (User Input)

Allowable Shear Strength = $F_v := 8.3 \cdot kips$ (User Input)

#### Plate Data:

Plate Width = $W_{plt} := 5 \cdot in$ (User Input)

Plate Thickness = $t_{plt} := 1.25 \cdot in$ (User Input)

Distance from Bolt to Collar = $d_{st} := 1.75 \cdot in$ (User Input)

Allowable Yield Strength = $F_y := 36 \cdot ksi$ (User Input)

#### Weld Data:

Weld Size = $sw := \frac{5}{16} \cdot in$ (User Input)

Weld Length = $l_w := 5 \cdot in$ (User Input)

Number of Welds = $n_w := 2$ (User Input)

Weld Strength = $F_w := 70 \cdot ksi$ (User Input)

## Check Pipe Collar Bolts:

Tension Force = $f_t := \frac{Horz}{N_b} = 7.8 \cdot kips$

Bolt Tenison % of Capacity = $\frac{f_t}{F_t} = 56.16 \cdot \%$

Check Bolt Tension = $Bolt\_Tension := if\left(\frac{f_t}{F_t} \le 1.00, "OK", "Overstressed"\right)$

$Bolt\_Tension = "OK"$

## Check Pipe Collar Plate:

Allowable Bending Strength = $F_b := 0.75F_y = 27 \cdot ksi$

Plate Section Modulus = $S_{plt} := \frac{1}{6} \cdot W_{plt} \cdot t_{plt}^{2} = 1.302 \cdot in^3$

Plate Bending Moment = $M := \frac{Horz}{2} \cdot d_{st} = 27.125 \cdot in \cdot kips$

Plate Bending Stress = $f_b := \frac{M}{S_{plt}} = 20.832 \cdot ksi$

$Plate\_Bending := if\left(f_b < F_b, "OK", "Overstressed"\right)$

$Plate\_Bending = "OK"$

## Check Pipe Collar Weld:

Allowable Weld Strength = $F_w := 0.3 \cdot F_w = 21 \cdot ksi$

Weld Section Modulus = $S_w := \frac{1}{6} \cdot .707 \cdot sw \cdot l_w^{2} = 0.921 \cdot in^3$

Weld Area = $A_w := .707 \cdot sw \cdot l_w = 1.105 \cdot in^2$

Plate Stress = $f_w := \frac{Horz}{A_w \cdot n_w} = 14.031 \cdot ksi$

$Weld := if\left(f_w < F_w, "OK", "Overstressed"\right)$

$Weld = "OK"$

## Reactions:

| | | |
|---|---|---|
| Angle Brace Force = | Fab := 10.4·kips | (User Input) |

## Angle Plate:

### Bolt Data:

| | | |
|---|---|---|
| Bolt Type = | ASTM A325 | (User Input) |
| Bolt Diameter = | $D := 0.75 \cdot in$ | (User Input) |
| Number of Bolts = | $N_b := 1$ | (User Input) |
| Allowable Tensile Strength = | $F_t := 19.9 \cdot kips$ | (User Input) |
| Allowable Shear Strength = | $F_v := 11.9 \cdot kips$ | (User Input) |

### Plate Data:

| | | |
|---|---|---|
| Plate Width = | $W_{plt} := 3 \cdot in$ | (User Input) |
| Plate Thickness = | $t_{plt} := 0.75 \cdot in$ | (User Input) |
| Distance from Bolt to Collar = | $d_{st} := 1.5 \cdot in$ | (User Input) |
| Yield Strength = | $F_y := 36 \cdot ksi$ | (User Input) |
| Tensile Strength = | $F_u := 58 \cdot ksi$ | (User Input) |
| Hole Diamter = | $Hole_d := .8125 \cdot in$ | (User Input) |

### Weld Data:

| | | |
|---|---|---|
| Weld Size = | $sw := \frac{5}{16} \cdot in$ | (User Input) |
| Weld Length = | $l_w := 3 \cdot in$ | (User Input) |
| Number of Welds = | $n_w := 2$ | (User Input) |
| Weld Strength = | $F_w := 70 \cdot ksi$ | (User Input) |

## Check Angle Brace Bolts:

Shear Force = $f_v := \frac{Fab}{N_b} = 10.4 \cdot kips$

Bolt Shear % of Capacity = $\frac{f_v}{F_v} = 87.39 \cdot \%$

Check Bolt Shear = $Bolt\_Shear := if\left(\frac{f_v}{F_v} \le 1.00, "OK", "Overstressed"\right)$

$Bolt\_Shear = "OK"$

## Check Angle Connection Plate:

Plate Gross Area = $A_g := W_{plt} \cdot t_{plt} = 2.25 in^2$

Plate Net Area = $A_n := \left[W_{plt} - \left(Hole_d + .0625 \cdot in\right)\right] \cdot t_{plt} = 1.594 in^2$

Shear Lag Factor = $U := 1.0$

Plate Effective Net Area = $A_e := A_n \cdot U = 1.594 in^2$

Yielding Safety Factor = $\Omega_t := 1.67$

Rupture Safety Factor = $\Omega_r := 2.0$

Bearing Strength Safety Factor = $\Omega_b := 2.0$

Clear Distance = $l_c := d_{st} - \frac{Hole_d}{2} = 1.094 in$

Tensile Yielding = $P_{at} := \frac{F_y \cdot A_g}{\Omega_t} = 48.503 kips$

Tensile Rupture = $P_{ar} := \frac{F_u \cdot A_e}{\Omega_r} = 46.219 kips$

Bearing Strength = $R_a := \frac{1.2 \cdot l_c \cdot t_{plt} \cdot F_u}{\Omega_b} = 28.547 kips$

$Pa := \min\left(P_{at}, P_{ar}, R_a\right) = 28.547 kips$

$Plate := if\left(Fab < Pa, "OK", "Overstressed"\right)$

$Plate = "OK"$

## Check Angle Connection Plate Weld:

Allowable Weld Strength = $F_w := 0.3 \cdot F_w = 21 \cdot ksi$

Weld Area = $A_w := .707 \cdot sw \cdot l_w = 0.663 \cdot in^2$

Plate Stress = $f_w := \frac{Fab}{A_w \cdot n_w} = 7.845 \cdot ksi$

$Weld := if\left(f_w < F_w, "OK", "Overstressed"\right)$

$Weld = "OK"$

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| | |
|---|---|
| Subject: | Load Analysis of Powermount on CL&P Structure #1321 |
| Location: | Stratford, CT |
| Rev. 0: 11/20/13 | Prepared by: T.J.L Checked by: C.F.C. Job No. 13317.000 |

## Basic Components

| | | | |
|---|---|---|---|
| Heavy Wind Pressure = | p := 4.00 | psf | (User Input NESC 2007 Figure 250-1 & Table 250-1) |
| Basic Windspeed = | V := 110 | mph | (User Input NESC 2007 Figure 250-2(e) ) |
| Radial Ice Thickness = | Ir := 0.50 | in | (User Input) |
| Radial Ice Density = | Id := 56.0 | pcf | (User Input) |

## Factors for Extreme Wind Calculation

| | | | |
|---|---|---|---|
| Elevation of Top of PCS Mast Above Grade = | TME := 124 | ft | (User Input) |
| Multiplier Gust Response Factor = | m := 1.25 | | (User Input - Only for NESC Extreme wind case) |
| NESC Factor = | kv := 1.43 | | (User Input from NESC 2007 Table 250-3 equation) |
| Importance Factor = | I := 1.0 | | (User Input from NESC 2007 Section 250.C.2) |

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.324$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.303$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.826$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.853$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 35$ psf (NESC 2007 Section 250.C.2)

## Shape Factors

NUS Design Criteria Issued April 12, 2007

| | | |
|---|---|---|
| Shape Factor for Round Members = | $Cd_R := 1.3$ | (User Input) |
| Shape Factor for Flat Members = | $Cd_F := 1.6$ | (User Input) |
| Shape Factor for Coax Cables Attached to Outside of Pole = | $Cd_{coax} := 1.45$ | (User Input) |

## Overload Factors

NU Design Criteria Table

### Overload Factors for Wind Loads:

| | | | |
|---|---|---|---|
| **NESC Heavy Loading =** | **2.5** | (User Input) | Apply in Risa-3D Analysis |
| **NESC Extreme Loading =** | **1.0** | (User Input) | Apply in Risa-3D Analysis |

### Overload Factors for Vertical Loads:

| | | | |
|---|---|---|---|
| **NESC Heavy Loading =** | **1.5** | (User Input) | Apply in Risa-3D Analysis |
| **NESC Extreme Loading =** | **1.0** | (User Input) | Apply in Risa-3D Analysis |

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Subject: Load Analysis of Powermount on CL&P Structure #1321

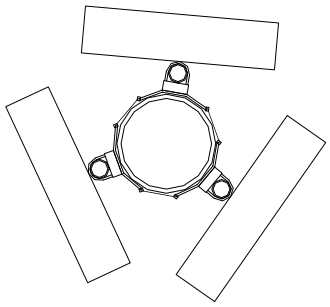
Location: Stratford, CT

Rev. 0: 11/20/13

Prepared by: T.J.L Checked by: C.F.C.
Job No. 13317.000

## Development of Wind & Ice Load on Antennas

**Antenna Data:** (T-Mobile)



| | | | |
|---|---|---|---|
| Antenna Model = | RFS APX 16DWV-16DWVS-E-A20 | | |
| Antenna Shape = | Flat | | (User Input) |
| Antenna Height = | $L_{ant} := 55.9$ | in | (User Input) |
| Antenna Width = | $W_{ant} := 13.0$ | in | (User Input) |
| Antenna Thickness = | $T_{ant} := 3.15$ | in | (User Input) |
| Antenna Weight = | $WT_{ant} := 40.7$ | lbs | (User Input) |
| Number of Antennas = | $N_{ant} := 3$ | | (User Input) |

## Wind Load (NESC Extreme)

***Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously***

| | | | |
|---|---|---|---|
| Surface Area for One Antenna = | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$ | sf | |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 15.1$ | sf | |
| Total Antenna Wind Force = | $F_{ant1} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1059$ | lbs | **BLC 5** |

## Wind Load (NESC Heavy)

***Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously***

| | | | |
|---|---|---|---|
| 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 = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 16.6$ | sf | |
| Total Antenna Wind Force w/ Ice = | $Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 106$ | lbs | **BLC 4** |

## Gravity Load (without ice)

| | | | |
|---|---|---|---|
| Weight of All Antennas = | $Wt_{ant1} := (WT_{ant} \cdot N_{ant}) = 122$ | 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 = | $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 99$ | lbs | **BLC 3** |

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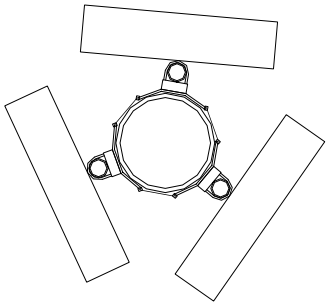
| | |
|---|---|
| Subject: | Load Analysis of Powermount on CL&P Structure #1321 |
| Location: | Stratford, CT |
| Rev. 0: 11/20/13 | Prepared by: T.J.L Checked by: C.F.C. Job No. 13317.000 |

## Development of Wind & Ice Load on Antenna Mounts

**Mount Data:** (T-Mobile)

Mount Type: Microflect Tri-Sector Chain Mount w/ 3 Pipes



| | | | |
|---|---|---|---|
| Mount Shape = | Round | | (User Input) |
| Pipe Mount Length = | $L_{mnt} := 66$ | in | (User Input) |
| 2 inch Pipe Mount Linear Weight = | $W_{mnt} := 3.66$ | plf | (User Input) |
| Pipe Mount Outside Diameter = | $D_{mnt} := 2.375$ | in | (User Input) |
| Number of Mounting Pipes = | $N_{mnt} := 3$ | | (User Input) |
| Tri Sector Chain Mount Weight = | $W_{tsc.mnt} := 101$ | lbs | (User Input) |

### Wind Load (NESC Extreme)

***Assumes Mount is Shielded by Antenna***

Mount Projected Surface Area = $A_{mnt} := 0.0$ sf

Total Mount Wind Force = $F_{mnt1} := qz \cdot Cd_F \cdot A_{mnt} \cdot m = 0$ lbs **BLC 5**

### Wind Load (NESC Heavy)

***Assumes Mount is Shielded by Antenna***

Mount Projected Surface Area w/ Ice = $A_{ICEmnt} := 0.0$ sf

Total Mount Wind Force = $Fi_{mnt1} := p \cdot Cd_F \cdot A_{ICEmnt} = 0$ lbs **BLC 4**

### Gravity Loads (without ice)

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

Weight Each Pipe Mount = $WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 20$ lbs

Weight of All Mounts = $Wt_{mnt1} := \left(WT_{mnt} \cdot N_{mnt}\right) = 60$ lbs **BLC 2**

### Gravity Load (ice only)

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

Volume of Each Pipe = $V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^{2} \cdot L_{mnt} = 292$ cu in

Volume of Ice on Each Pipe = $V_{ice} := \left[\frac{\pi}{4} \cdot \left[\left(D_{mnt} + 1\right)^2\right] \cdot \left(L_{mnt} + 1\right)\right] - V_{mnt} = 307$ cu in

Weight of Ice each mount (incl, hardware) = $W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 10$ lbs

Weight of Ice on All Mounts = $Wt_{ice.mnt1} := W_{ICEmnt} \cdot N_{mnt} = 30$ lbs **BLC 3**

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Subject: Load Analysis of Powermount on CL&P Structure #1321

Location: Stratford, CT

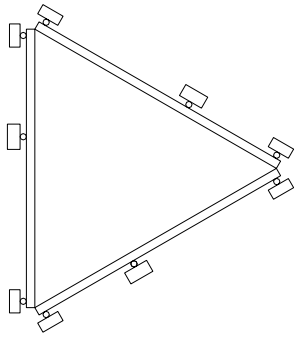
Rev. 0: 11/20/13

Prepared by: T.J.L Checked by: C.F.C.
Job No. 13317.000

## Development of Wind & Ice Load on Antennas

**Antenna Data:** (AT&T)

| | | | |
|---|---|---|---|
| Antenna Model = | Powerwave 7770 | | |
| Antenna Shape = | Flat | | (User Input) |
| Antenna Height = | $L_{ant} := 55$ | in | (User Input) |
| Antenna Width = | $W_{ant} := 11$ | in | (User Input) |
| Antenna Thickness = | $T_{ant} := 5$ | in | (User Input) |
| Antenna Weight = | $WT_{ant} := 39$ | lbs | (User Input) |
| Number of Antennas = | $N_{ant} := 6$ | | (User Input) |



### Wind Load (NESC Extreme)

***Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously***

| | | | |
|---|---|---|---|
| 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 = | $F_{ant2} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1764$ | lbs | **BLC 5** |

### Wind Load (NESC Heavy)

***Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously***

| | | | |
|---|---|---|---|
| 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 = | $Fi_{ant2} := p \cdot Cd_F \cdot A_{ICEant} = 179$ | lbs | **BLC 4** |

### Gravity Load (without ice)

| | | | |
|---|---|---|---|
| Weight of All Antennas = | $Wt_{ant2} := (WT_{ant} \cdot N_{ant}) = 234$ | 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 = | $W_{ICEant} := \frac{V_{ice}}{1728} \cdot ld = 33$ | lbs | |
| Weight of Ice on All Antennas = | $Wt_{ice.ant2} := W_{ICEant} \cdot N_{ant} = 196$ | lbs | **BLC 3** |

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Subject: Load Analysis of Powermount on CL&P Structure #1321

Location: Stratford, CT

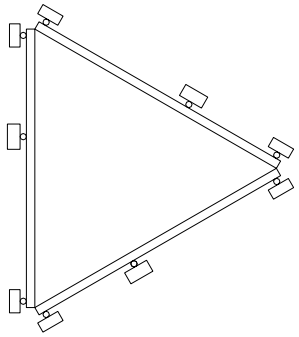
Rev. 0: 11/20/13

Prepared by: T.J.L Checked by: C.F.C.
Job No. 13317.000

## Development of Wind & Ice Load on Antennas

**Antenna Data:** (AT&T)

| | | | |
|---|---|---|---|
| Antenna Model = | Powerwave P65-16-XLH-RR | | |
| Antenna Shape = | Flat | | (User Input) |
| Antenna Height = | $L_{ant} := 72$ | in | (User Input) |
| Antenna Width = | $W_{ant} := 12$ | in | (User Input) |
| Antenna Thickness = | $T_{ant} := 6$ | in | (User Input) |
| Antenna Weight = | $WT_{ant} := 64$ | lbs | (User Input) |
| Number of Antennas = | $N_{ant} := 3$ | | (User Input) |



### Wind Load (NESC Extreme)

***Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously***

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 6$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 18$ sf

Total Antenna Wind Force = $F_{ant3} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1259$ lbs **BLC 5**

### Wind Load (NESC Heavy)

***Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously***

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.6$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19.8$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant3} := p \cdot Cd_F \cdot A_{ICEant} = 127$ lbs **BLC 4**

### Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant3} := (WT_{ant} \cdot N_{ant}) = 192$ lbs **BLC 2**

### Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5184$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1459$ cu in

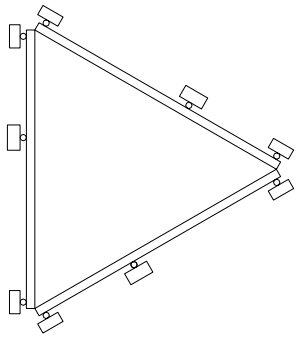
Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot ld = 47$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant3} := W_{ICEant} \cdot N_{ant} = 142$ lbs **BLC 3**

## Development of Wind & Ice Load on TMA's

**TMA Data:** (AT&T)

| | | | |
|---|---|---|---|
| TMA Model = | Powerwave LGP214 | | |
| TMA Shape = | Flat | | (User Input) |
| TMA Height = | $L_{TMA} := 9.2$ | in | (User Input) |
| TMA Width = | $W_{TMA} := 14.4$ | in | (User Input) |
| TMA Thickness = | $T_{TMA} := 2.6$ | in | (User Input) |
| TMA Weight = | $WT_{TMA} := 14.1$ | lbs | (User Input) |
| Number of TMA's = | $N_{TMA} := 12$ | | (User Input) |



### Wind Load (NESC Extreme Wind)

*Assumes Maximum Possible Wind Pressure Applied to All TMA's Simultaneously*

| | | | |
|---|---|---|---|
| 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 = | $F_{TMA1} := qz \cdot Cd_F \cdot A_{TMA} \cdot m = 772$ | lbs | **BLC 5** |

### Wind Load (NESC Heavy Wind)

*Assumes Maximum Possible Wind Pressure Applied to All TMA's Simultaneously*

| | | | |
|---|---|---|---|
| Surface Area for One TMA w/ Ice = | $SA_{ICETMA} := \frac{(L_{TMA} + 2 \cdot Ir) \cdot (W_{TMA} + 2 \cdot Ir)}{144} = 1.1$ | sf | |
| TMA Projected Surface Area w/ Ice = | $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 13.1$ | sf | |
| Total TMA Wind Force w/ Ice = | $Fi_{TMA1} := p \cdot Cd_F \cdot A_{ICETMA} = 84$ | lbs | **BLC 4** |

### Gravity Load (without ice)

| | | | |
|---|---|---|---|
| Weight of All TMA's = | $Wt_{TMA1} := (WT_{TMA} \cdot N_{TMA}) = 169$ | lbs | **BLC 2** |

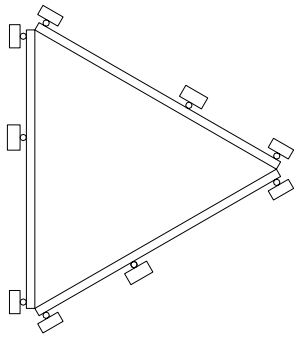
### Gravity Load (ice)

| | | | |
|---|---|---|---|
| Volume of Each TMA = | $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 344$ | cu in | |
| Volume of Ice on Each TMA = | $V_{ice} := (L_{TMA} + 2 \cdot Ir)(W_{TMA} + 2 \cdot Ir)(T_{TMA} + 2 \cdot Ir) - V_{TMA} = 221$ | 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 = | $Wt_{ice.TMA1} := W_{ICETMA} \cdot N_{TMA} = 86$ | lbs | **BLC 3** |

## Development of Wind & Ice Load on TMA's

**TMA Data:** (AT&T)

| | | | |
|---|---|---|---|
| TMA Model = | CCI DTMABP7819VG12A TMA | | |
| TMA Shape = | Flat | | (User Input) |
| TMA Height = | $L_{TMA} := 14.25$ | in | (User Input) |
| TMA Width = | $W_{TMA} := 1.46$ | in | (User Input) |
| TMA Thickness = | $T_{TMA} := 4.17$ | in | (User Input) |
| TMA Weight = | $WT_{TMA} := 20$ | lbs | (User Input) |
| Number of TMA's = | $N_{TMA} := 3$ | | (User Input) |



### Wind Load (NESC Extreme Wind)

*Assumes Maximum Possible Wind Pressure Applied to All TMA's Simultaneously*

| | | | |
|---|---|---|---|
| Surface Area for One TMA = | $SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.1$ | sf | |
| TMA Projected Surface Area = | $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 0.4$ | sf | |
| Total TMA Wind Force = | $F_{TMA2} := qz \cdot Cd_F \cdot A_{TMA} \cdot m = 30$ | lbs | **BLC 5** |

### Wind Load (NESC Heavy Wind)

*Assumes Maximum Possible Wind Pressure Applied to All TMA's Simultaneously*

| | | | |
|---|---|---|---|
| Surface Area for One TMA w/ Ice = | $SA_{ICETMA} := \frac{(L_{TMA} + 2 \cdot Ir) \cdot (W_{TMA} + 2 \cdot Ir)}{144} = 0.3$ | sf | |
| TMA Projected Surface Area w/ Ice = | $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 0.8$ | sf | |
| Total TMA Wind Force w/ Ice = | $Fi_{TMA2} := p \cdot Cd_F \cdot A_{ICETMA} = 5$ | lbs | **BLC 4** |

### Gravity Load (without ice)

| | | | |
|---|---|---|---|
| Weight of All TMA's = | $Wt_{TMA2} := (WT_{TMA} \cdot N_{TMA}) = 60$ | lbs | **BLC 2** |

### Gravity Load (ice)

| | | | |
|---|---|---|---|
| Volume of Each TMA = | $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 87$ | cu in | |
| Volume of Ice on Each TMA = | $V_{ice} := (L_{TMA} + 2 \cdot Ir)(W_{TMA} + 2 \cdot Ir)(T_{TMA} + 2 \cdot Ir) - V_{TMA} = 107$ | cu in | |
| Weight of Ice on Each TMA = | $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 3$ | lbs | |
| Weight of Ice on All TMA's = | $Wt_{ice.TMA2} := W_{ICETMA} \cdot N_{TMA} = 10$ | lbs | **BLC 3** |

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Subject: Load Analysis of Powermount on CL&P Structure #1321

Location: Stratford, CT

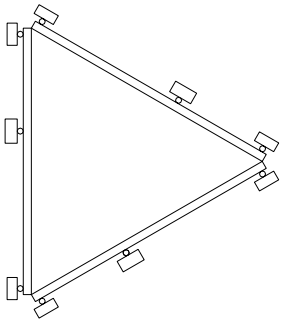
Rev. 0: 11/20/13

Prepared by: T.J.L Checked by: C.F.C.
Job No. 13317.000

## Development of Wind & Ice Load on Platform

**Platform Data:** (AT&T)

| | | | |
|---|---|---|---|
| Platform Model = | 10' Low Profile Platform | | (User Input) |
| Platform Shape = | Flat | | (User Input) |
| Platform Area = | $A_{plt} := 10.58$ | sq ft | (User Input) |
| Platform Area w/ Ice = | $A_{ICEplt} := 13.38$ | sq ft | (User Input) |
| Platform Weight = | $WT_{plt} := 2902$ | lbs | (User Input) |
| Platform Weight w/ Ice = | $WT_{ICEplt} := 3953$ | lbs | (User Input) |



### Wind Load (NESC Extreme)

Total Platform Wind Force = $F_{mnt2} := qz \cdot Cd_F \cdot A_{plt} \cdot m = 740$ lbs **BLC 5**

### Wind Load (NESC Heavy)

Total Platform Wind Force w/ Ice = $Fi_{mnt2} := p \cdot Cd_F \cdot A_{ICEplt} = 86$ lbs **BLC 4**

### Gravity Load (without ice)

Weight of Platform = $Wt_{mnt2} := WT_{plt} = 2902$ lbs **BLC 2**

### Gravity Load (ice only)

Weight of Ice on Platform = $Wt_{ice.mnt2} := WT_{ICEplt} - WT_{plt} = 1051$ lbs **BLC 3**

# Total Equipment Loads:

## AT&T @ 124-ft AGL

NESC Heavy Wind Vertical =

$$\left(Wt_{ant2} + Wt_{ice.ant2} + Wt_{ant3} + Wt_{ice.ant3} + Wt_{TMA1} + Wt_{ice.TMA1} + Wt_{TMA2} + Wt_{ice.TMA2} + Wt_{mnt2} + Wt_{ice.mnt2}\right)\cdot 1.5 = 7563$$

NESC Heavy Wind Trasnsverse = $\left(Fi_{ant2} + Fi_{ant3} + Fi_{TMA1} + Fi_{TMA2} + Fi_{mnt2}\right)\cdot 2.5 = 1200$

NESC Extreme Wind Vertical = $\left(Wt_{ant2} + Wt_{ant3} + Wt_{TMA1} + Wt_{TMA2} + Wt_{mnt2}\right) = 3557$

NESC Extreme Wind Trasnsverse = $\left(F_{ant2} + F_{ant3} + F_{TMA1} + F_{TMA2} + F_{mnt2}\right) = 4566$

## T-Mobile @ 109-ft AGL

NESC Heavy Wind Vertical = $\left(Wt_{ant1} + Wt_{ice.ant1} + Wt_{mnt1} + Wt_{ice.mnt1}\right)\cdot 1.5 = 467$

NESC Heavy Wind Trasnsverse = $\left(Fi_{ant1} + Fi_{mnt1}\right)\cdot 2.5 = 266$

NESC Extreme Wind Vertical = $\left(Wt_{ant1} + Wt_{mnt1}\right) = 182$

NESC Extreme Wind Trasnsverse = $\left(F_{ant1} + F_{mnt1}\right) = 1059$

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| | |
|---|---|
| Subject: | Coax Cable on Powermount on CL&P Tower # 1321 |
| Location: | Stratford, CT |
| Rev. 0: 11/22/13 | Prepared by: T.J.L Checked by: C.F.C. Job No. 13317.000 |

## Coax Cable within Powermount

Distance Between Coax Cable Attach Points = $Coax_{Span} := \begin{pmatrix} 11.5 \\ 14 \\ 8.5 \\ 11 \\ 22 \\ 27 \\ 30 \end{pmatrix} \cdot ft$ *(User Input)*

Diameter of Coax Cable = $D_{coax} := 1.55 \cdot in$ *(User Input)*

Weight of Coax Cable = $W_{coax} := 0.66 \cdot plf$ *(User Input)*

Number of Coax Cables = $N_{coax} := 18$ *(User Input)* (18 Cables inside Powermount)

Number of Projected Coax Cables Transverse = $NP_{Tcoax} := 0$ *(User Input)*

Extreme Wind Pressure = $qz := 35 \cdot psf$ *(User Input)*

Heavy Wind Pressure = $p := 4 \cdot psf$ *(User Input)*

Radial Ice Thickness = $Ir := 0.5 \cdot in$ *(User Input)*

Radial Ice Density = $Id := 56 \cdot pcf$ *(User Input)*

Shape Factor = $Cd_{coax} := 1.6$ *(User Input)*

Overload Factor for NESC Heavy Wind Load = $OF_{HW} := 2.5$ *(User Input)*

Overload Factor for NESC Extreme Wind Load = $OF_{EW} := 1.0$ *(User Input)*

Overload Factor for NESC Heavy Vertical Load = $OF_{HV} := 1.5$ *(User Input)*

Overload Factor for NESC Extreme Vertical Load = $OF_{EV} := 1.0$ *(User Input)*

Wind Area with Ice Transverse = $A_{Tice} := 0$

Wind Area without Ice Transverse = $A_T := 0$

Ice Area per Liner Ft = $Ai_{coax} := 0$

Weight of Ice on All Coax Cables = $W_{ice} := 0$

Heavy Vertical Load =

$$\overrightarrow{Heavy_{Vert} := \left[\left(N_{coax} \cdot W_{coax} + W_{ice}\right) \cdot Coax_{Span} \cdot OF_{HV}\right]}$$

Heavy Transverse Load =

$$\overrightarrow{Heavy_{Trans} := \left(p \cdot A_{Tice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HW}\right)}$$

$$Heavy_{Vert} = \begin{pmatrix} 205 \\ 249 \\ 151 \\ 196 \\ 392 \\ 481 \\ 535 \end{pmatrix} lb \qquad Heavy_{Trans} = \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}$$

Extreme Vertical Load =

$$\overrightarrow{Extreme_{Vert} := \left[\left(N_{coax} \cdot W_{coax}\right) \cdot Coax_{Span} \cdot OF_{EV}\right]}$$

Extreme Transverse Load =

$$\overrightarrow{Extreme_{Trans} := \left[\left(qz \cdot A_T \cdot Cd_{coax}\right) \cdot Coax_{Span} \cdot OF_{EW}\right]}$$

$$Extreme_{Vert} = \begin{pmatrix} 137 \\ 166 \\ 101 \\ 131 \\ 261 \\ 321 \\ 356 \end{pmatrix} lb \qquad Extreme_{Trans} = \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}$$

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| | |
|---|---|
| Subject: | Coax Cable on CL&P Tower # 1321 |
| Location: | Stratford, CT |
| Rev. 3: 10/21/15 | Prepared by: T.J.L Checked by: C.F.C.<br>Job No. 13317.000 |

## Coax Cable on CL&P Tower

Distance Between Coax Cable Attach Points =

Coaxial Cable Span = $Coax_{Span} := \begin{pmatrix} 5 \\ 8 \\ 9 \\ 11 \\ 10 \\ 11 \\ 17 \\ 30 \end{pmatrix} \cdot ft$ *(User Input)*

Diameter of Coax Cable = $D_{coax} := 1.55 \cdot in$ *(User Input)*

Weight of Coax Cable = $W_{coax} := 0.66 \cdot plf$ *(User Input)*

Number of Coax Cables = $N_{coax} := 12$ *(User Input)*

Number of Projected Coax Cables Transverse = $NP_{Tcoax} := 12$ *(User Input)*

Diameter of Ret Cable = $D_{RET} := 0.375 \cdot in$ *(User Input)*

Weight of Ret Cable = $W_{RET} := 0.06 \cdot plf$ *(User Input)*

Number of Ret Cables = $N_{RET} := 6$ *(User Input)*

Number of Projected Ret Cables Transverse = $NP_{RET} := 0$ *(User Input)*

Extreme Wind Pressure = $qz := 34.7 \cdot psf$ *(User Input)*

Heavy Wind Pressure = $p := 4 \cdot psf$ *(User Input)*

Radial Ice Thickness = $Ir := 0.5 \cdot in$ *(User Input)*

Radial Ice Density = $Id := 56 \cdot pcf$ *(User Input)*

Shape Factor = $Cd_{coax} := 1.6$ *(User Input)*

Overload Factor for NESC Heavy Wind Load = $OF_{HW} := 2.5$ *(User Input)*

Overload Factor for NESC Extreme Wind Load = $OF_{EW} := 1.0$ *(User Input)*

Overload Factor for NESC Heavy Vertical Load = $OF_{HV} := 1.5$ *(User Input)*

Overload Factor for NESC Extreme Vertical Load = $OF_{EV} := 1.0$ *(User Input)*

Wind Area with Ice Transverse = $A_{Tice} := \left(NP_{Tcoax} \cdot D_{coax} + 2 \cdot Ir\right) = 19.6 \cdot in$

Wind Area without Ice Transverse = $A_T := \left(NP_{Tcoax} \cdot D_{coax}\right) = 18.6 \cdot in$

Ice Area per Liner Ft Coax = $Ai_{coax} := \frac{\pi}{4} \cdot \left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^2\right] = 0.022\,ft^2$

Ice Area per Liner Ft RET = $Ai_{RET} := \frac{\pi}{4} \cdot \left[\left(D_{RET} + 2 \cdot Ir\right)^2 - D_{RET}^2\right] = 0.01\,ft^2$

Weight of Ice on All Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} + Ai_{RET} \cdot Id \cdot N_{RET} = 18.234 \cdot plf$

Heavy Vertical Load =

$$Heavy_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + N_{RET} \cdot W_{RET} + W_{ice}\right) \cdot Coax_{Span} \cdot OF_{HV}\right]}$$

Heavy Transverse Load =

$$Heavy_{Trans} := \overrightarrow{\left(p \cdot A_{Tice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HW}\right)}$$

$$Heavy_{Vert} = \begin{pmatrix} 199 \\ 318 \\ 358 \\ 437 \\ 398 \\ 437 \\ 676 \\ 1193 \end{pmatrix} lb \qquad Heavy_{Trans} = \begin{pmatrix} 131 \\ 209 \\ 235 \\ 287 \\ 261 \\ 287 \\ 444 \\ 784 \end{pmatrix} lb$$

Extreme Vertical Load =

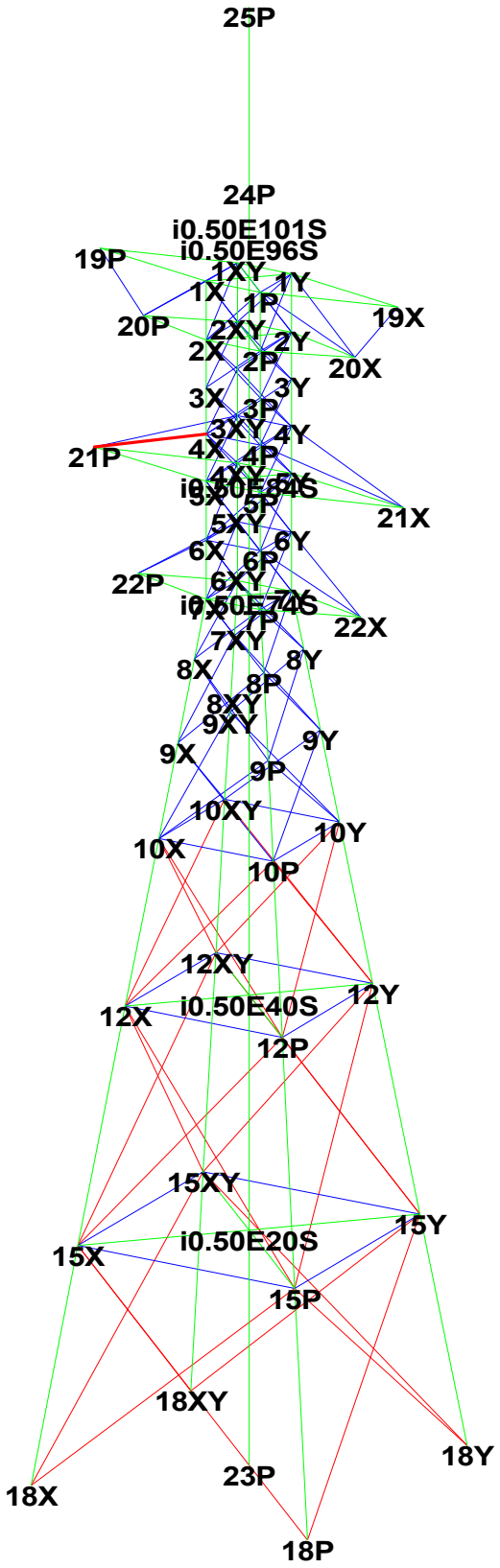
$$Extreme_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + N_{RET} \cdot W_{RET}\right) \cdot Coax_{Span} \cdot OF_{EV}\right]}$$

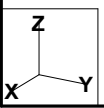
Extreme Transverse Load =

$$Extreme_{Trans} := \overrightarrow{\left[\left(qz \cdot A_T \cdot Cd_{coax}\right) \cdot Coax_{Span} \cdot OF_{EW}\right]}$$

$$Extreme_{Vert} = \begin{pmatrix} 41 \\ 66 \\ 75 \\ 91 \\ 83 \\ 91 \\ 141 \\ 248 \end{pmatrix} lb \qquad Extreme_{Trans} = \begin{pmatrix} 430 \\ 688 \\ 775 \\ 947 \\ 861 \\ 947 \\ 1463 \\ 2582 \end{pmatrix} lb$$

Centek Engineering Inc, Project: "cl&p tower #1321"
Tower Version 12.50, 11:31:41 AM Wednesday, October 21, 2015
Undeformed geometry displayed



Project Name : 13317.000 - Stratford, CT
Project Notes: CL&P Structure # 1321/ T-Mobile CT11426A
Project File : J:\Jobs\1331700.WI\04_Structural\Backup Documentation\Calcs\Rev (3) - Ret Cables Added\PLS Tower\cl&p tower #1321.tow
Date run : 11:31:00 AM Wednesday, October 21, 2015
by : Tower Version 12.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

**Member "g8P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g8X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g8XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g8Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g10P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g10X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g10XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g10Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g12P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g12X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g12XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g12Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g13P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g13X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g13XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g13Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g14P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g14X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g14XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**Member "g14Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
**KL/R value of 224.65 exceeds maximum of 200.00 for member "g46P" ??**
**KL/R value of 224.65 exceeds maximum of 200.00 for member "g46X" ??**
**KL/R value of 224.65 exceeds maximum of 200.00 for member "g46XY" ??**
**KL/R value of 224.65 exceeds maximum of 200.00 for member "g46Y" ??**
**KL/R value of 301.66 exceeds maximum of 200.00 for member "g50P" ??**
**KL/R value of 301.66 exceeds maximum of 200.00 for member "g50X" ??**
**KL/R value of 301.66 exceeds maximum of 200.00 for member "g50XY" ??**
**KL/R value of 301.66 exceeds maximum of 200.00 for member "g50Y" ??**
**KL/R value of 233.23 exceeds maximum of 200.00 for member "g56P" ??**

**KL/R value of 233.23 exceeds maximum of 200.00 for member "g56X" ??**
**KL/R value of 233.23 exceeds maximum of 200.00 for member "g56XY" ??**
**KL/R value of 233.23 exceeds maximum of 200.00 for member "g56Y" ??**
**Problem calculating gross area of longitudinal face for section "3": width is zero at elevation 101.00 (ft) which is not the top of the section. ??**
**Unusual number of fixed joints found: 5. Towers normally have from between 1 and 4 fixed joints. ??**
**The model has 34 warnings. ??**

Member check option: ASCE 10
Connection rupture check: ASCE 10
Crossing diagonal check: ASCE 10 [Alternate Unsupported RLOUT = 1]
Included angle check: None
Climbing load check: None
Redundant members checked with: Actual Force

Loads from file: j:\jobs\1331700.wi\04_structural\backup documentation\calcs\rev (3) - ret cables added\pls tower\cl&p # 1321.lca

*** Analysis Results:

Maximum element usage is 94.03% for Angle "g37X" in load case "NESC Extreme"
Maximum insulator usage is 17.09% for Clamp "Clamp28" in load case "NESC Heavy"

**Summary of Joint Support Reactions For All Load Cases:**

| Load Case | Joint Label | Long. Force (kips) | Tran. Force (kips) | Vert. Force (kips) | Shear Force (kips) | Tran. Moment (ft-k) | Long. Moment (ft-k) | Bending Moment (ft-k) | Vert. Moment (ft-k) | Found. Usage % |
|---|---|---|---|---|---|---|---|---|---|---|
| NESC Heavy | 18P | -7.26 | -7.23 | -53.19 | 10.25 | 0.24 | 0.11 | 0.26 | 0.02 | 0.00 |
| NESC Heavy | 23P | 0.16 | -1.03 | -26.59 | 1.04 | 12.55 | 2.40 | 12.78 | -0.65 | 0.00 |
| NESC Heavy | 18X | 6.09 | -7.79 | 31.06 | 9.89 | 0.33 | 0.04 | 0.33 | 0.01 | 0.00 |
| NESC Heavy | 18XY | -5.82 | -6.32 | 30.00 | 8.59 | 0.21 | -0.03 | 0.21 | -0.04 | 0.00 |
| NESC Heavy | 18Y | 6.82 | -6.81 | -50.03 | 9.64 | 0.18 | 0.11 | 0.21 | -0.03 | 0.00 |
| NESC Extreme | 18P | -12.95 | -13.38 | -93.16 | 18.62 | 0.50 | 0.23 | 0.55 | 0.01 | 0.00 |
| NESC Extreme | 23P | 0.42 | -1.70 | -10.65 | 1.76 | 23.20 | 5.85 | 23.92 | -1.74 | 0.00 |
| NESC Extreme | 18X | 12.63 | -17.12 | 64.25 | 21.27 | 0.69 | 0.05 | 0.69 | -0.01 | 0.00 |
| NESC Extreme | 18XY | -14.76 | -15.02 | 76.43 | 21.06 | 0.29 | -0.08 | 0.30 | -0.10 | 0.00 |
| NESC Extreme | 18Y | 9.99 | -10.71 | -73.35 | 14.65 | 0.32 | 0.26 | 0.41 | -0.07 | 0.00 |

**Summary of Joint Support Reactions For All Load Cases in Direction of Leg:**

| Load Case | Support Joint | Origin Joint | Leg Member | Force In Leg Dir. (kips) | Residual Shear Perpendicular To Leg (kips) | Residual Shear Horizontal To Leg - Res. (kips) | Residual Shear Horizontal To Leg - Long. (kips) | Residual Shear Horizontal To Leg - Tran. (kips) | Total Long. Force (kips) | Total Tran. Force (kips) | Total Vert. Force (kips) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NESC Heavy | 18P | 15P | g14X | 54.167 | 0.096 | 0.098 | -0.056 | -0.080 | -7.26 | -7.23 | -53.19 |
| NESC Heavy | 18X | 15X | g14P | -32.362 | 3.892 | 3.958 | -1.819 | 3.515 | 6.09 | -7.79 | 31.06 |
| NESC Heavy | 18XY | 15XY | g14Y | -31.084 | 2.722 | 2.772 | 1.693 | 2.195 | -5.82 | -6.32 | 30.00 |
| NESC Heavy | 18Y | 15Y | g14XY | 50.946 | 0.090 | 0.092 | 0.055 | -0.073 | 6.82 | -6.81 | -50.03 |
| NESC Extreme | 18P | 15P | g14X | 95.003 | 0.581 | 0.589 | 0.136 | 0.573 | -12.95 | -13.38 | -93.16 |
| NESC Extreme | 18X | 15X | g14P | -67.088 | 8.960 | 9.107 | -3.791 | 8.281 | 12.63 | -17.12 | 64.25 |
| NESC Extreme | 18XY | 15XY | g14Y | -79.046 | 6.084 | 6.198 | 4.255 | 4.507 | -14.76 | -15.02 | 76.43 |
| NESC Extreme | 18Y | 15Y | g14XY | 74.796 | 0.625 | 0.629 | 0.091 | 0.622 | 9.99 | -10.71 | -73.35 |

**Sections Information:**

| Section Label | Top Z (ft) | Bottom Z (ft) | Joint Count | Member Count | Tran. Face Top Width (ft) | Tran. Face Bot Width (ft) | Tran. Face Gross Area (ft^2) | Long. Face Top Width (ft) | Long. Face Bot Width (ft) | Long. Face Gross Area (ft^2) |
|---|---|---|---|---|---|---|---|---|---|---|

```
-------------------------------------------------------------------------------------------------------
       3 124.000 74.000    42    147       0.00       5.00    192.500       0.00      20.50    629.500  Problem calculating gross area of longitudinal
face for section "3": width is zero at elevation 101.00 (ft) which is not the top of the section.  ??
       2  74.000 40.000    22     61       5.00      14.46    330.830       5.00      14.46    330.830
       1  40.000  0.000    15     34      14.46      25.50    799.600      14.46      25.50    799.600

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress
  Printed capacities do not include the strength factor entered for each load case.
  The Group Summary reports on the member and load case that resulted in maximum usage
  which may not necessarily be the same as that which produces maximum force.


Group Summary (Compression Portion):

 Group           Group Angle          Angle    Steel   Max Usage   Max   Comp.   Comp.   Comp.      L/R    Comp.    Comp.   RLX   RLY   RLZ    L/R
KL/R Length Curve   No.
 Label           Desc.  Type          Size Strength Usage Cont-   Use Control   Force Control Capacity Connect. Connect.
Comp.   No.    Of                                                 rol    In  Member           Load            Shear  Bearing
Member       Bolts                                                      Comp.                  Case          Capacity Capacity
Comp.                                                  (ksi)     %          %          (kips)           (kips)   (kips)   (kips)
(ft)
-------------------------------------------------------------------------------------------------------------------------------------------------
----------------------
  Leg1       L5x5x5/16   SAE     5X5X0.3125     33.0 65.89  Tens 61.73     g8X -55.238NESC Ext   89.489  166.500  210.937 1.000 1.000 1.000  60.36
60.36  5.000     1    10
  Leg2       L6x6x5/16   SAE     6X6X0.3125     33.0 78.32  Comp 78.32    g10X -71.601NESC Ext   91.422  166.500  210.937 1.000 1.000 1.000  71.33
71.33  7.133     1    10
  Leg3        L6x6x3/8   SAE      6X6X0.375     33.0 75.61  Comp 75.61    g14X -94.104NESC Ext  124.467  199.800  303.750 0.333 0.333 0.333  68.42
68.42 20.375     1    12
 Diag1     L2.5x2x3/16   SAU   2.5X2X0.1875     33.0 56.35  Comp 56.35    g15P  -9.852NESC Ext   17.484   33.300   25.312 0.500 0.750 0.500 106.07
109.55  7.071     2     2
 Diag2      L2.5x2x1/4   SAU     2.5X2X0.25     33.0 26.61  Comp 26.61    g21P  -6.460NESC Ext   24.281   33.300   33.750 0.500 0.750 0.500  97.34
103.01  6.403     2     2
 Diag3    L2.5x2.5x1/4   SAE   2.5X2.5X0.25     33.0 34.77 Cross 34.77    g26Y  -8.434NESC Ext   24.256   49.950   50.625 1.000 0.500 0.500 110.34
115.17  7.071     3     3
 Diag4   L2.5x2.5x5/16   SAE 2.5X2.5X0.3125     33.0 10.05 Cross 10.05    g28P  -2.832NESC Ext   28.168   33.300   42.187 1.000 0.560 0.560 120.07
120.04  7.614     6     2
    M1      L2.5x2x1/4   SAU     2.5X2X0.25     33.0  0.00        0.00           0.000            0.000    0.000    0.000 0.000 0.000 0.000   0.00
0.00  0.000     0     0
    M2    L2.5x2.5x1/4   SAE   2.5X2.5X0.25     33.0 32.23  Comp 32.23    g60X  -5.043NESC Ext   15.646   33.300   33.750 1.000 0.500 0.500 164.79
147.54 10.560     6     2
    M3      L3x2.5x1/4   SAU     3X2.5X0.25     33.0 25.77  Comp 25.77    g41P  -6.760NESC Ext   26.226   33.300   33.750 1.000 1.000 1.000 113.64
116.82  5.000     3     2
    M4        L3x3x1/4   SAE       3X3X0.25     33.0 15.45  Comp 15.45    g42P  -4.805NESC Hea   31.104   49.950   50.625 1.000 0.500 0.500  98.95
109.48  7.669     3     3
    M5        L4x3x1/4   SAU       4X3X0.25     33.0 23.29  Comp 23.29    g62X  -6.702NESC Ext   28.782   33.300   33.750 1.000 0.500 0.500 135.56
129.57 14.460     6     2
    M6        L4x4x1/4   SAE       4X4X0.25     33.0 28.32  Comp 28.32    g63P  -5.826NESC Ext   20.575   33.300   33.750 1.000 0.500 0.500 192.00
164.28 20.000     6     2
    M7     L2.5x2x3/16   SAU   2.5X2X0.1875     33.0 24.59  Comp 24.59    g45P  -1.760NESC Hea    7.160   16.650   12.656 1.000 1.000 1.000 179.95
179.95  6.403     4     1
    M8      L2.5x2x1/4   SAU     2.5X2X0.25     33.0 20.91  Tens  0.00    g50Y   0.000             3.334   33.300   33.750 1.000 1.000 1.000 358.34
301.66 12.661     5     2
 Diag5      L2.5x2x1/4   SAU     2.5X2X0.25     33.0 94.03  Tens 58.26    g33P  -2.522NESC Hea    4.330   33.300   33.750 0.580 0.790 0.580 309.85
264.71 18.876     5     2
    M9     L2.5x2x3/16   SAU   2.5X2X0.1875     33.0 83.05  Tens 61.16    g57X  -7.181NESC Ext   11.742   16.650   12.656 1.000 1.000 1.000 140.52
```

```
140.52  5.000     4     1
   M10   L2.5x2.5x3/16   SAE 2.5X2.5X0.1875     33.0 85.54  Tens 80.39    g70Y  -8.478NESC Ext   20.689   16.800   10.547 1.000 1.000 1.000  85.71
102.85  3.536     3     1 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize
moments): g70X g70XY  ??
   M11        L5x5x3/8   SAE      5X5X0.375     33.0 27.30  Comp 27.30   g65XY  -4.586NESC Ext   35.163   16.800   21.094 1.000 1.000 1.000 171.42
171.42 14.142     4     1
   M12    L3.5x3.5x1/4   SAE   3.5X3.5X0.25     33.0 22.05  Comp 22.05    g66Y  -3.101NESC Ext   15.475   16.800   14.062 1.000 1.000 1.000 176.80
176.80 10.225     4     1
    PM      Powermount Pwmnt  Pipe 18" Std.     50.0  2.80  Comp  2.80    g71P -25.425NESC Hea  907.332    0.000    0.000 1.000 1.000 1.000  38.46
38.46 20.000     1     0
   M13        L4x3x1/4   SAU       4X3X0.25     33.0 15.61  Comp 15.61    g47P  -5.310NESC Hea   34.023   66.600   67.500 1.000 0.500 0.500 112.62
116.31 12.013     3     4
   M14 Bar 2-1/2 x 1/4   Bar          2x1/4     33.0 30.33  Tens  0.00    g58Y   0.000           14.788   33.300   33.750 1.000 1.000 1.000  60.00
60.00  5.000     1     2
```

**Group Summary (Tension Portion):**

| Group Label | Group Desc. | Angle Type | Angle Size | Steel Strength (ksi) | Max Usage % | Usage Control | Max Tension Use % | Tension Control Member | Tension Force (kips) | Tension Control Load Case | Net Section Capacity (kips) | Tension Connect. Shear Capacity (kips) | Tension Connect. Bearing Capacity (kips) | Tension Connect. Rupture Capacity (kips) | Length Tens. Member (ft) | No. Of Bolts | No. Of Holes | Hole Diameter (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Leg1 | L5x5x5/16 | SAE | 5X5X0.3125 | 33.0 | 65.89 | Tens | 65.89 | g8Y | 46.201 | NESC Ext | 70.122 | 166.500 | 210.937 | 183.823 | 5.000 | 10 | 3.310 | 0.875 |
| Leg2 | L6x6x5/16 | SAE | 6X6X0.3125 | 33.0 | 78.32 | Comp | 70.59 | g10Y | 63.942 | NESC Ext | 90.582 | 166.500 | 210.937 | 183.823 | 7.133 | 10 | 3.310 | 0.875 |
| Leg3 | L6x6x3/8 | SAE | 6X6X0.375 | 33.0 | 75.61 | Comp | 65.31 | g14Y | 70.562 | NESC Ext | 108.039 | 199.800 | 303.750 | 281.250 | 20.375 | 12 | 3.310 | 0.875 |
| Diag1 | L2.5x2x3/16 | SAU | 2.5X2X0.1875 | 33.0 | 56.35 | Comp | 50.08 | g15XY | 9.608 | NESC Ext | 19.184 | 33.300 | 25.312 | 21.094 | 7.071 | 2 | 1.000 | 0.875 |
| Diag2 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | 33.0 | 26.61 | Comp | 25.73 | g21XY | 6.428 | NESC Ext | 24.985 | 33.300 | 33.750 | 26.766 | 6.403 | 2 | 1.000 | 0.875 |
| Diag3 | L2.5x2.5x1/4 | SAE | 2.5X2.5X0.25 | 33.0 | 34.77 | Cross | 27.31 | g23X | 7.878 | NESC Ext | 28.846 | 49.950 | 50.625 | 42.187 | 7.071 | 3 | 1.000 | 0.875 |
| Diag4 | L2.5x2.5x5/16 | SAE | 2.5X2.5X0.3125 | 33.0 | 10.05 | Cross | 10.01 | g28X | 3.334 | NESC Ext | 35.241 | 33.300 | 42.187 | 35.156 | 7.614 | 2 | 1.000 | 0.875 |
| M1 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | 33.0 | 0.00 | | 0.00 | | 0.000 | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 0 |
| M2 | L2.5x2.5x1/4 | SAE | 2.5X2.5X0.25 | 33.0 | 32.23 | Comp | 4.90 | g60P | 1.078 | NESC Ext | 28.846 | 33.300 | 33.750 | 21.984 | 10.560 | 2 | 1.000 | 0.875 |
| M3 | L3x2.5x1/4 | SAU | 3X2.5X0.25 | 33.0 | 25.77 | Comp | 19.60 | g41X | 5.763 | NESC Ext | 32.410 | 33.300 | 33.750 | 29.412 | 5.000 | 2 | 1.000 | 0.875 |
| M4 | L3x3x1/4 | SAE | 3X3X0.25 | 33.0 | 15.45 | Comp | 6.80 | g40Y | 3.233 | NESC Hea | 47.520 | 0.000 | 0.000 | 0.000 | 5.000 | 0 | 0.000 | 0 |
| M5 | L4x3x1/4 | SAU | 4X3X0.25 | 33.0 | 23.29 | Comp | 8.34 | g62P | 2.093 | NESC Ext | 36.271 | 33.300 | 33.750 | 25.078 | 14.460 | 2 | 1.000 | 0.875 |
| M6 | L4x4x1/4 | SAE | 4X4X0.25 | 33.0 | 28.32 | Comp | 11.77 | g64P | 3.309 | NESC Ext | 44.624 | 33.300 | 33.750 | 28.125 | 20.000 | 2 | 2.000 | 0.875 |
| M7 | L2.5x2x3/16 | SAU | 2.5X2X0.1875 | 33.0 | 24.59 | Comp | 21.38 | g46P | 3.855 | NESC Hea | 19.184 | 33.300 | 25.312 | 18.035 | 9.155 | 2 | 1.000 | 0.875 |
| M8 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | 33.0 | 20.91 | Tens | 20.91 | g50XY | 4.597 | NESC Hea | 24.985 | 33.300 | 33.750 | 21.984 | 12.661 | 2 | 1.000 | 0.875 |
| Diag5 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | 33.0 | 94.03 | Tens | 94.03 | g37X | 11.151 | NESC Ext | 24.985 | 16.650 | 16.875 | 11.859 | 30.416 | 1 | 1.000 | |

```
0.875
    M9     L2.5x2x3/16   SAU   2.5X2X0.1875     33.0 83.05  Tens 83.05    g57P   7.387NESC Ext   19.184   16.650   12.656    8.895  5.000     1 1.000
0.875
   M10   L2.5x2.5x3/16   SAE 2.5X2.5X0.1875     33.0 85.54  Tens 85.54   g70XY   9.022NESC Ext   22.961   16.800   10.547   11.719  3.536     1 1.000
0.6875 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g70X g70XY  ??
   M11        L5x5x3/8   SAE      5X5X0.375     33.0 27.30  Comp  0.00    g65Y   0.000           99.560   16.800   21.094   23.437 14.142     1 1.000
0.6875
   M12    L3.5x3.5x1/4   SAE   3.5X3.5X0.25     33.0 22.05  Comp  0.00    g66Y   0.000           45.088   16.800   14.062   15.625 10.225     1 1.000
0.6875
    PM      Powermount Pwmnt  Pipe 18" Std.     50.0  2.80  Comp  0.00    g78P   0.000          969.998    0.000    0.000    0.000 15.000     0 0.000
0
   M13        L4x3x1/4   SAU       4X3X0.25     33.0 15.61  Comp  1.23   g47XY   0.539NESC Ext   43.696   66.600   67.500   56.250 12.013     4 1.000
0.875
   M14 Bar 2-1/2 x 1/4   Bar          2x1/4     33.0 30.33  Tens 30.33    g51P   2.815NESC Hea    9.281   33.300   33.750   28.125  5.000     2 1.000
0.875
```

*** Maximum Stress Summary for Each Load Case

**Summary of Maximum Usages by Load Case:**

| Load Case | Maximum Usage % | Element Label | Element Type |
|---|---|---|---|
| NESC Heavy | 58.26 | g33P | Angle |
| NESC Extreme | 94.03 | g37X | Angle |

**Summary of Insulator Usages:**

| Insulator Label | Insulator Type | Maximum Usage % | Load Case | Weight (lbs) |
|---|---|---|---|---|
| Clamp1 | Clamp | 3.64 | NESC Heavy | 0.0 |
| Clamp2 | Clamp | 3.44 | NESC Heavy | 0.0 |
| Clamp3 | Clamp | 6.81 | NESC Heavy | 0.0 |
| Clamp4 | Clamp | 6.73 | NESC Heavy | 0.0 |
| Clamp5 | Clamp | 6.91 | NESC Heavy | 0.0 |
| Clamp6 | Clamp | 6.85 | NESC Heavy | 0.0 |
| Clamp7 | Clamp | 6.78 | NESC Heavy | 0.0 |
| Clamp8 | Clamp | 6.71 | NESC Heavy | 0.0 |
| Clamp9 | Clamp | 1.92 | NESC Extreme | 0.0 |
| Clamp10 | Clamp | 2.09 | NESC Extreme | 0.0 |
| Clamp11 | Clamp | 3.45 | NESC Extreme | 0.0 |
| Clamp12 | Clamp | 2.71 | NESC Extreme | 0.0 |
| Clamp13 | Clamp | 2.88 | NESC Extreme | 0.0 |
| Clamp14 | Clamp | 5.68 | NESC Extreme | 0.0 |
| Clamp15 | Clamp | 6.86 | NESC Extreme | 0.0 |
| Clamp17 | Clamp | 2.05 | NESC Heavy | 0.0 |
| Clamp18 | Clamp | 2.34 | NESC Heavy | 0.0 |
| Clamp19 | Clamp | 3.11 | NESC Heavy | 0.0 |
| Clamp20 | Clamp | 5.96 | NESC Heavy | 0.0 |
| Clamp21 | Clamp | 7.72 | NESC Heavy | 0.0 |
| Clamp22 | Clamp | 7.18 | NESC Heavy | 0.0 |
| Clamp23 | Clamp | 1.41 | NESC Extreme | 0.0 |
| Clamp24 | Clamp | 0.61 | NESC Extreme | 0.0 |

| | | | | |
|---|---|---|---|---|
| Clamp25 | Clamp | 0.61 | NESC Extreme | 0.0 |
| Clamp26 | Clamp | 0.61 | NESC Extreme | 0.0 |
| Clamp27 | Clamp | 4.25 | NESC Heavy | 0.0 |
| Clamp28 | Clamp | 17.09 | NESC Heavy | 0.0 |

*** Weight of structure (lbs):

| | |
|---|---|
| Weight of Angles*Section DLF: | 23724.7 |
| Total: | 23724.7 |

*** End of Report

```
*****************************************************************************
*                                                                           *
* TOWER - Analysis and Design -  Copyright Power Line Systems, Inc. 1986-2011 *
*                                                                           *
*****************************************************************************

Project Name : 13317.000 - Stratford, CT
Project Notes: CL&P Structure # 1321/ T-Mobile CT11426A
Project File : J:\Jobs\1331700.WI\04_Structural\Backup Documentation\Calcs\Rev (3) - Ret Cables Added\PLS Tower\cl&p tower #1321.tow
Date run     : 11:31:00 AM Wednesday, October 21, 2015
by           : Tower Version 12.50
Licensed to  : Centek Engineering Inc

Successfully performed nonlinear analysis

Member "g8P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g8X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g8XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g8Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g10P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g10X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g10XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g10Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g12P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g12X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g12XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g12Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g13P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g13X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g13XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g13Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g14P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g14X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g14XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g14Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
KL/R value of 224.65 exceeds maximum of 200.00 for member "g46P" ??
KL/R value of 224.65 exceeds maximum of 200.00 for member "g46X" ??
KL/R value of 224.65 exceeds maximum of 200.00 for member "g46XY" ??
```

**KL/R value of 224.65 exceeds maximum of 200.00 for member "g46Y" ??**
**KL/R value of 301.66 exceeds maximum of 200.00 for member "g50P" ??**
**KL/R value of 301.66 exceeds maximum of 200.00 for member "g50X" ??**
**KL/R value of 301.66 exceeds maximum of 200.00 for member "g50XY" ??**
**KL/R value of 301.66 exceeds maximum of 200.00 for member "g50Y" ??**
**KL/R value of 233.23 exceeds maximum of 200.00 for member "g56P" ??**
**KL/R value of 233.23 exceeds maximum of 200.00 for member "g56X" ??**
**KL/R value of 233.23 exceeds maximum of 200.00 for member "g56XY" ??**
**KL/R value of 233.23 exceeds maximum of 200.00 for member "g56Y" ??**
**Problem calculating gross area of longitudinal face for section "3": width is zero at elevation 101.00 (ft) which is not the top of the section. ??**
**Unusual number of fixed joints found: 5.  Towers normally have from between 1 and 4 fixed joints. ??**
**The model has 34 warnings.  ??**

Nonlinear convergence parameters: Use Standard Parameters
Tension only member maximum compression load as a percent of compression capacity: 100%
Member check option: ASCE 10
Connection rupture check: ASCE 10
Crossing diagonal check: ASCE 10  [Alternate Unsupported RLOUT = 1]
Included angle check: None
Climbing load check: None
Redundant members checked with: Actual Force

**Joints Geometry:**

| Joint Label | Symmetry Code | X Coord. (ft) | Y Coord. (ft) | Z Coord. (ft) | X Disp. Rest. | Y Disp. Rest. | Z Disp. Rest. | X Rot. Rest. | Y Rot. Rest. | Z Rot. Rest. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1P | XY-Symmetry | 2.5 | 2.5 | 101 | Free | Free | Free | Free | Free | Free |
| 2P | XY-Symmetry | 2.5 | 2.5 | 96 | Free | Free | Free | Free | Free | Free |
| 3P | XY-Symmetry | 2.5 | 2.5 | 92 | Free | Free | Free | Free | Free | Free |
| 4P | XY-Symmetry | 2.5 | 2.5 | 88 | Free | Free | Free | Free | Free | Free |
| 5P | XY-Symmetry | 2.5 | 2.5 | 84 | Free | Free | Free | Free | Free | Free |
| 6P | XY-Symmetry | 2.5 | 2.5 | 79 | Free | Free | Free | Free | Free | Free |
| 7P | XY-Symmetry | 2.5 | 2.5 | 74 | Free | Free | Free | Free | Free | Free |
| 8P | XY-Symmetry | 3.2 | 3.2 | 69 | Free | Free | Free | Free | Free | Free |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 9P | XY-Symmetry | 4.17 | 4.17 | 62 | Free | Free | Free | Free | Free | Free |
| 10P | XY-Symmetry | 5.28 | 5.28 | 54 | Free | Free | Free | Free | Free | Free |
| 12P | XY-Symmetry | 7.23 | 7.23 | 40 | Free | Free | Free | Free | Free | Free |
| 15P | XY-Symmetry | 10 | 10 | 20 | Free | Free | Free | Free | Free | Free |
| 18P | XY-Symmetry | 12.75 | 12.75 | 0 | Fixed | Fixed | Fixed | Fixed | Fixed | Fixed |
| 19P | X-Symmetry | 0 | -13.75 | 101 | Free | Free | Free | Free | Free | Free |
| 20P | X-Symmetry | 0 | -9.75 | 96 | Free | Free | Free | Free | Free | Free |
| 21P | X-Symmetry | 0 | -14.25 | 84 | Free | Free | Free | Free | Free | Free |
| 22P | X-Symmetry | 0 | -10.25 | 74 | Free | Free | Free | Free | Free | Free |
| 23P | None | 0 | 0 | 0 | Fixed | Fixed | Fixed | Fixed | Fixed | Fixed |
| 24P | None | 0 | 0 | 109 | Free | Free | Free | Free | Free | Free |
| 25P | None | 0 | 0 | 124 | Free | Free | Free | Free | Free | Free |
| 1X | X-GenXY | 2.5 | -2.5 | 101 | Free | Free | Free | Free | Free | Free |
| 1XY | XY-GenXY | -2.5 | -2.5 | 101 | Free | Free | Free | Free | Free | Free |
| 1Y | Y-GenXY | -2.5 | 2.5 | 101 | Free | Free | Free | Free | Free | Free |
| 2X | X-GenXY | 2.5 | -2.5 | 96 | Free | Free | Free | Free | Free | Free |
| 2XY | XY-GenXY | -2.5 | -2.5 | 96 | Free | Free | Free | Free | Free | Free |
| 2Y | Y-GenXY | -2.5 | 2.5 | 96 | Free | Free | Free | Free | Free | Free |
| 3X | X-GenXY | 2.5 | -2.5 | 92 | Free | Free | Free | Free | Free | Free |
| 3XY | XY-GenXY | -2.5 | -2.5 | 92 | Free | Free | Free | Free | Free | Free |
| 3Y | Y-GenXY | -2.5 | 2.5 | 92 | Free | Free | Free | Free | Free | Free |
| 4X | X-GenXY | 2.5 | -2.5 | 88 | Free | Free | Free | Free | Free | Free |
| 4XY | XY-GenXY | -2.5 | -2.5 | 88 | Free | Free | Free | Free | Free | Free |
| 4Y | Y-GenXY | -2.5 | 2.5 | 88 | Free | Free | Free | Free | Free | Free |
| 5X | X-GenXY | 2.5 | -2.5 | 84 | Free | Free | Free | Free | Free | Free |
| 5XY | XY-GenXY | -2.5 | -2.5 | 84 | Free | Free | Free | Free | Free | Free |
| 5Y | Y-GenXY | -2.5 | 2.5 | 84 | Free | Free | Free | Free | Free | Free |
| 6X | X-GenXY | 2.5 | -2.5 | 79 | Free | Free | Free | Free | Free | Free |
| 6XY | XY-GenXY | -2.5 | -2.5 | 79 | Free | Free | Free | Free | Free | Free |
| 6Y | Y-GenXY | -2.5 | 2.5 | 79 | Free | Free | Free | Free | Free | Free |
| 7X | X-GenXY | 2.5 | -2.5 | 74 | Free | Free | Free | Free | Free | Free |
| 7XY | XY-GenXY | -2.5 | -2.5 | 74 | Free | Free | Free | Free | Free | Free |
| 7Y | Y-GenXY | -2.5 | 2.5 | 74 | Free | Free | Free | Free | Free | Free |
| 8X | X-GenXY | 3.2 | -3.2 | 69 | Free | Free | Free | Free | Free | Free |
| 8XY | XY-GenXY | -3.2 | -3.2 | 69 | Free | Free | Free | Free | Free | Free |
| 8Y | Y-GenXY | -3.2 | 3.2 | 69 | Free | Free | Free | Free | Free | Free |
| 9X | X-GenXY | 4.17 | -4.17 | 62 | Free | Free | Free | Free | Free | Free |
| 9XY | XY-GenXY | -4.17 | -4.17 | 62 | Free | Free | Free | Free | Free | Free |
| 9Y | Y-GenXY | -4.17 | 4.17 | 62 | Free | Free | Free | Free | Free | Free |
| 10X | X-GenXY | 5.28 | -5.28 | 54 | Free | Free | Free | Free | Free | Free |
| 10XY | XY-GenXY | -5.28 | -5.28 | 54 | Free | Free | Free | Free | Free | Free |
| 10Y | Y-GenXY | -5.28 | 5.28 | 54 | Free | Free | Free | Free | Free | Free |
| 12X | X-GenXY | 7.23 | -7.23 | 40 | Free | Free | Free | Free | Free | Free |
| 12XY | XY-GenXY | -7.23 | -7.23 | 40 | Free | Free | Free | Free | Free | Free |
| 12Y | Y-GenXY | -7.23 | 7.23 | 40 | Free | Free | Free | Free | Free | Free |
| 15X | X-GenXY | 10 | -10 | 20 | Free | Free | Free | Free | Free | Free |
| 15XY | XY-GenXY | -10 | -10 | 20 | Free | Free | Free | Free | Free | Free |
| 15Y | Y-GenXY | -10 | 10 | 20 | Free | Free | Free | Free | Free | Free |
| 18X | X-GenXY | 12.75 | -12.75 | 0 | Fixed | Fixed | Fixed | Fixed | Fixed | Fixed |
| 18XY | XY-GenXY | -12.75 | -12.75 | 0 | Fixed | Fixed | Fixed | Fixed | Fixed | Fixed |
| 18Y | Y-GenXY | -12.75 | 12.75 | 0 | Fixed | Fixed | Fixed | Fixed | Fixed | Fixed |
| 19X | X-Gen | 0 | 13.75 | 101 | Free | Free | Free | Free | Free | Free |
| 20X | X-Gen | 0 | 9.75 | 96 | Free | Free | Free | Free | Free | Free |
| 21X | X-Gen | 0 | 14.25 | 84 | Free | Free | Free | Free | Free | Free |
| 22X | X-Gen | 0 | 10.25 | 74 | Free | Free | Free | Free | Free | Free |

**Secondary Joints:**

| Joint | Symmetry Origin | End Fraction | Elevation | X Disp. | Y Disp. | Z Disp. | X Rot. | Y Rot. | Z Rot. |
|---|---|---|---|---|---|---|---|---|---|

| Label | Code | Joint | Joint | (ft) | | Rest. | Rest. | Rest. | Rest. | Rest. | Rest. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| i0.50E20S | None | 15X | 15Y | 0.5 | 0 | Free | Free | Free | Free | Free | Free |
| i0.50E40S | None | 12X | 12Y | 0.5 | 0 | Free | Free | Free | Free | Free | Free |
| i0.50E74S | None | 7X | 7Y | 0.5 | 0 | Free | Free | Free | Free | Free | Free |
| i0.50E84S | None | 5X | 5Y | 0.5 | 0 | Free | Free | Free | Free | Free | Free |
| i0.50E96S | None | 2XY | 2P | 0.5 | 0 | Free | Free | Free | Free | Free | Free |
| i0.50E101S | None | 1XY | 1P | 0.5 | 0 | Free | Free | Free | Free | Free | Free |

The model contains 63 primary and 6 secondary joints for a total of 69 joints.

**Steel Material Properties:**

| Steel Material Label | Modulus of Elasticity (ksi) | Yield Stress Fy (ksi) | Ultimate Stress Fu (ksi) | Member All. Stress Hyp. 1 (ksi) | Member All. Stress Hyp. 2 (ksi) | Member Rupture Hyp. 1 (ksi) | Member Rupture Hyp. 2 (ksi) | Member Bearing Hyp. 1 (ksi) | Member Bearing Hyp. 2 (ksi) |
|---|---|---|---|---|---|---|---|---|---|
| A7 | 2.9e+004 | 33 | 60 | 0 | 0 | 0 | 0 | 0 | 0 |
| A500-50 | 2.9e+004 | 50 | 62 | 0 | 0 | 0 | 0 | 0 | 0 |

**Bolt Properties:**

| Bolt Label | Bolt Diameter (in) | Hole Diameter (in) | Ultimate Shear Capacity (kips) | Default End Distance (in) | Default Bolt Spacing (in) | Shear Capacity Hyp. 1 (kips) | Shear Capacity Hyp. 2 (kips) |
|---|---|---|---|---|---|---|---|
| 3/4 A394 TYPE0 N | 0.75 | 0.875 | 16.65 | 1.35 | 1.8 | 0 | 0 |
| 5/8 A325 | 0.625 | 0.6875 | 16.8 | 1.25 | 1.5 | 0 | 0 |

**Number Bolts Used By Type:**

| Bolt Type | Number Bolts |
|---|---|
| 3/4 A394 TYPE0 N | 550 |
| 5/8 A325 | 24 |

**Angle Properties:**

| Angle Type | Angle Size | Long Leg (in) | Short Leg (in) | Thick. (in) | Unit Weight (lbs/ft) | Gross Area (in^2) | w/t Ratio | Radius of Gyration Rx (in) | Radius of Gyration Ry (in) | Radius of Gyration Rz (in) | Number of Angles | Wind Width (in) | Short Edge Dist. (in) | Long Edge Dist. (in) | Optimize Cost Factor | Section Modulus (in^3) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAE | 6X6X0.375 | 6 | 6 | 0.375 | 14.9 | 4.36 | 13.67 | 1.88 | 1.88 | 1.19 | 1 | 6 | 3 | 0 | 1.0000 | 0 |
| SAE | 6X6X0.3125 | 6 | 6 | 0.3125 | 12.5 | 3.65 | 16.6 | 1.89 | 1.89 | 1.2 | 1 | 6 | 3 | 0 | 1.0000 | 0 |
| SAE | 5X5X0.375 | 5 | 5 | 0.375 | 12.3 | 3.61 | 11 | 1.56 | 1.56 | 0.99 | 1 | 5 | 2.5 | 0 | 1.0000 | 0 |
| SAE | 5X5X0.3125 | 5 | 5 | 0.3125 | 10.3 | 3.03 | 13.4 | 1.57 | 1.57 | 0.994 | 1 | 5 | 2.5 | 0 | 1.0000 | 0 |
| SAE | 4X4X0.25 | 4 | 4 | 0.25 | 6.6 | 1.94 | 13.5 | 1.25 | 1.25 | 0.795 | 1 | 4 | 2 | 0 | 1.0000 | 0 |
| SAE | 3.5X3.5X0.25 | 3.5 | 3.5 | 0.25 | 5.8 | 1.69 | 11.5 | 1.09 | 1.09 | 0.694 | 1 | 3.5 | 1.75 | 0 | 1.0000 | 0 |
| SAE | 3X3X0.25 | 3 | 3 | 0.25 | 4.9 | 1.44 | 9.75 | 0.93 | 0.93 | 0.592 | 1 | 3 | 1.5 | 0 | 1.0000 | 0 |
| SAE | 2.5X2.5X0.3125 | 2.5 | 2.5 | 0.3125 | 5 | 1.46 | 6 | 0.761 | 0.761 | 0.489 | 1 | 2.5 | 1.25 | 0 | 1.0000 | 0 |
| SAE | 2.5X2.5X0.25 | 2.5 | 2.5 | 0.25 | 4.1 | 1.19 | 7.75 | 0.769 | 0.769 | 0.491 | 1 | 2.5 | 1.25 | 0 | 1.0000 | 0 |
| SAE | 2.5X2.5X0.1875 | 2.5 | 2.5 | 0.1875 | 3.07 | 0.902 | 10.67 | 0.778 | 0.778 | 0.495 | 1 | 2.5 | 1.25 | 0 | 1.0000 | 0 |
| SAU | 4X3X0.25 | 4 | 3 | 0.25 | 5.8 | 1.69 | 13.25 | 1.28 | 0.896 | 0.651 | 1 | 4 | 1.5 | 0 | 1.0000 | 0 |
| SAU | 3X2.5X0.25 | 3 | 2.5 | 0.25 | 4.5 | 1.31 | 9.5 | 0.945 | 0.753 | 0.528 | 1 | 3 | 1.25 | 0 | 1.0000 | 0 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAU | 2.5X2X0.25 | 2.5 | 2 | 0.25 | 3.62 | 1.06 | 7.75 | 0.784 | 0.592 | 0.424 | 1 | 2.5 | 1 | 0 | 1.0000 | 0 |
| SAU | 2.5X2X0.1875 | 2.5 | 2 | 0.1875 | 2.75 | 0.81 | 10.67 | 0.793 | 0.6 | 0.427 | 1 | 2.5 | 1 | 0 | 1.0000 | 0 |
| Pwmnt | Pipe 18" Std. | 18 | 17.25 | 0 | 70.66 | 19.4 | 1 | 6.24 | 6.24 | 6.24 | 1 | 18 | 0 | 0 | 0.0000 | 0 |
| Bar | 2x1/4 | 2 | 0 | 0.25 | 1.7 | 0.5 | 8 | 1 | 1 | 1 | 1 | 2 | 0 | 0 | 0.0000 | 0 |

**Angle Groups:**

| Group Label | Group Description | Angle Type | Angle Size | Material Type | Element Type | Group Type | Optimize Group | Allow. Add. Angle Width For Optimize (in) |
|---|---|---|---|---|---|---|---|---|
| Leg1 | L5x5x5/16 | SAE | 5X5X0.3125 | A7 | Beam | Leg | None | 0.000 |
| Leg2 | L6x6x5/16 | SAE | 6X6X0.3125 | A7 | Beam | Leg | None | 0.000 |
| Leg3 | L6x6x3/8 | SAE | 6X6X0.375 | A7 | Beam | Leg | None | 0.000 |
| Diag1 | L2.5x2x3/16 | SAU | 2.5X2X0.1875 | A7 | Truss | Crossing Diagonal | None | 0.000 |
| Diag2 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | A7 | Truss | Crossing Diagonal | None | 0.000 |
| Diag3 | L2.5x2.5x1/4 | SAE | 2.5X2.5X0.25 | A7 | Truss | Crossing Diagonal | None | 0.000 |
| Diag4 | L2.5x2.5x5/16 | SAE | 2.5X2.5X0.3125 | A7 | Truss | Crossing Diagonal | None | 0.000 |
| M1 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | A7 | Beam | Other | None | 0.000 |
| M2 | L2.5x2.5x1/4 | SAE | 2.5X2.5X0.25 | A7 | Truss | Other | None | 0.000 |
| M3 | L3x2.5x1/4 | SAU | 3X2.5X0.25 | A7 | Truss | Other | None | 0.000 |
| M4 | L3x3x1/4 | SAE | 3X3X0.25 | A7 | Beam | Other | None | 0.000 |
| M5 | L4x3x1/4 | SAU | 4X3X0.25 | A7 | Truss | Other | None | 0.000 |
| M6 | L4x4x1/4 | SAE | 4X4X0.25 | A7 | Truss | Other | None | 0.000 |
| M7 | L2.5x2x3/16 | SAU | 2.5X2X0.1875 | A7 | Truss | Other | None | 0.000 |
| M8 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | A7 | Truss | Other | None | 0.000 |
| Diag5 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | A7 | T-Only | Other | None | 0.000 |
| M9 | L2.5x2x3/16 | SAU | 2.5X2X0.1875 | A7 | Truss | Other | None | 0.000 |
| M10 | L2.5x2.5x3/16 | SAE | 2.5X2.5X0.1875 | A7 | Beam | Other | None | 0.000 |
| M11 | L5x5x3/8 | SAE | 5X5X0.375 | A7 | Beam | Other | None | 0.000 |
| M12 | L3.5x3.5x1/4 | SAE | 3.5X3.5X0.25 | A7 | Beam | Other | None | 0.000 |
| PM | Powermount | Pwmnt | Pipe 18" Std. | A500-50 | Beam | Other | None | 0.000 |
| M13 | L4x3x1/4 | SAU | 4X3X0.25 | A7 | Beam | Other | None | 0.000 |
| M14 | Bar 2-1/2 x 1/4 | Bar | 2x1/4 | A7 | Truss | Other | None | 0.000 |

**Aggregate Angle Information:**

**Note: Estimate of surface area reported for painting purposes, not wind loading.**

| Angle Type | Angle Size | Material Type | Total Length (ft) | Total Surface Area (ft^2) | Total Weight (lbs) |
|---|---|---|---|---|---|
| SAE | 5X5X0.3125 | A7 | 108.00 | 180.00 | 1112.40 |
| SAE | 6X6X0.3125 | A7 | 48.92 | 97.84 | 611.51 |
| SAE | 6X6X0.375 | A7 | 252.70 | 505.41 | 3765.30 |
| SAU | 2.5X2X0.1875 | A7 | 164.22 | 123.16 | 451.60 |
| SAU | 2.5X2X0.25 | A7 | 811.00 | 608.25 | 2935.83 |
| SAE | 2.5X2.5X0.25 | A7 | 336.51 | 280.43 | 1379.70 |
| SAE | 2.5X2.5X0.3125 | A7 | 60.92 | 50.76 | 304.58 |
| SAE | 3X3X0.25 | A7 | 139.35 | 139.35 | 682.80 |
| SAU | 3X2.5X0.25 | A7 | 40.00 | 36.67 | 180.00 |
| SAU | 4X3X0.25 | A7 | 115.89 | 135.21 | 672.17 |
| Bar | 2x1/4 | A7 | 20.00 | 6.67 | 34.00 |
| SAE | 4X4X0.25 | A7 | 80.00 | 106.67 | 528.00 |
| SAE | 5X5X0.375 | A7 | 56.57 | 94.28 | 695.79 |
| SAE | 3.5X3.5X0.25 | A7 | 40.90 | 47.72 | 237.21 |

| | | | | | | |
|---|---|---|---|---|---|---|
| SAE 2.5X2.5X0.1875 | A7 | 56.57 | 47.14 | 173.67 | | |
| Pwmnt Pipe 18" Std. | A500-50 | 124.00 | 728.50 | 8761.84 | | |

**Sections:**

**The adjustment factors below only apply to dead load and wind areas that are calculated for members in the model.**
**They do not apply to equipment or to manually input dead load and drag areas.**

| Section Label | Joint Defining Section Bottom | Dead Load Adjust. Factor | Transverse Drag x Area Factor For Face | Longitudinal Drag x Area Factor For Face | Transverse Area Factor (CD From Code) | Longitudinal Area Factor (CD From Code) | Af Flat Factor For Face EIA Only | Ar Round Factor For Face EIA Only | Transverse Drag x Area Factor For All | Longitudinal Drag x Area Factor For All | SAPS Angle Drag x Area Factor | SAPS Round Drag x Area Factor | Force Solid Face |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 7X | 1.050 | 3.300 | 3.300 | 1.000 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | None |
| 2 | 12X | 1.000 | 3.200 | 3.200 | 1.000 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | None |
| 1 | 18X | 1.100 | 3.400 | 3.400 | 1.000 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | None |

**Angle Member Connectivity:**

| Member Label | Group Label | Section Label | Symmetry Code | Origin Joint | End Joint | Ecc. Code | Rest. Code | Ratio RLX | Ratio RLY | Ratio RLZ | Bolt Type | # Bolts | # Bolt Holes | # Shear Planes | Connect Leg | Short Edge Dist. (in) | Long Edge Dist. (in) | End Bolt Spacing (in) | End Shear Path Length (in) | Tension Rest. Path Length (in) | Rest. Coef. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g3P | Leg1 | | XY-Symmetry | 1X | 2X | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| g3X | Leg1 | | X-GenXY | 1P | 2P | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| g3XY | Leg1 | | XY-GenXY | 1Y | 2Y | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| g3Y | Leg1 | | Y-GenXY | 1XY | 2XY | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| g4P | Leg1 | | XY-Symmetry | 2X | 3X | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| g4X | Leg1 | | X-GenXY | 2P | 3P | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| g4XY | Leg1 | | XY-GenXY | 2Y | 3Y | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| g4Y | Leg1 | | Y-GenXY | 2XY | 3XY | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| g5P | Leg1 | | XY-Symmetry | 3X | 4X | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| g5X | Leg1 | | X-GenXY | 3P | 4P | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| g5XY | Leg1 | | XY-GenXY | 3Y | 4Y | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| g5Y | Leg1 | | Y-GenXY | 3XY | 4XY | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| g6P | Leg1 | | XY-Symmetry | 4X | 5X | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| g6X | Leg1 | | X-GenXY | 4P | 5P | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| g6XY | Leg1 | | XY-GenXY | 4Y | 5Y | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| g6Y | Leg1 | | Y-GenXY | 4XY | 5XY | 1 | 4 | 1 | 1 | 1 | 3/4 A394 TYPE0 N | 0 | 4 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g7P | Leg1 | | XY-Symmetry | | 5X | | 6X | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 0 | 4 | 0 | | | 0 | 0 | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g7X | Leg1 | | X-GenXY | | 5P | | 6P | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 0 | 4 | 0 | | | 0 | 0 | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g7XY | Leg1 | | XY-GenXY | | 5Y | | 6Y | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 0 | 4 | 0 | | | 0 | 0 | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g7Y | Leg1 | | Y-GenXY | | 5XY | | 6XY | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 0 | 4 | 0 | | | 0 | 0 | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g8P | Leg1 | | XY-Symmetry | | 6X | | 7X | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 10 | 3.31 | 1 | Both | | 1 | 3 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g8X | Leg1 | | X-GenXY | | 6P | | 7P | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 10 | 3.31 | 1 | Both | | 1 | 3 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g8XY | Leg1 | | XY-GenXY | | 6Y | | 7Y | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 10 | 3.31 | 1 | Both | | 1 | 3 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g8Y | Leg1 | | Y-GenXY | | 6XY | | 7XY | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 10 | 3.31 | 1 | Both | | 1 | 3 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g9P | Leg2 | | XY-Symmetry | | 7X | | 8X | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 0 | 2.36 | 0 | | | 0 | 0 | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g9X | Leg2 | | X-GenXY | | 7P | | 8P | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 0 | 2.36 | 0 | | | 0 | 0 | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g9XY | Leg2 | | XY-GenXY | | 7Y | | 8Y | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 0 | 2.36 | 0 | | | 0 | 0 | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g9Y | Leg2 | | Y-GenXY | | 7XY | | 8XY | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 0 | 2.36 | 0 | | | 0 | 0 | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g10P | Leg2 | | XY-Symmetry | | 8X | | 9X | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 10 | 3.31 | 1 | Both | | 1 | 3 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g10X | Leg2 | | X-GenXY | | 8P | | 9P | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 10 | 3.31 | 1 | Both | | 1 | 3 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g10XY | Leg2 | | XY-GenXY | | 8Y | | 9Y | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 10 | 3.31 | 1 | Both | | 1 | 3 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g10Y | Leg2 | | Y-GenXY | | 8XY | | 9XY | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 10 | 3.31 | 1 | Both | | 1 | 3 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g11P | Leg3 | | XY-Symmetry | | 9X | | 10X | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 0 | 3 | 0 | | | 0 | 0 | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g11X | Leg3 | | X-GenXY | | 9P | | 10P | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 0 | 3 | 0 | | | 0 | 0 | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g11XY | Leg3 | | XY-GenXY | | 9Y | | 10Y | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 0 | 3 | 0 | | | 0 | 0 | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g11Y | Leg3 | | Y-GenXY | | 9XY | | 10XY | 1 | 4 | 1 | 1 | 1 3/4 | A394 | TYPE0 | N | 0 | 3 | 0 | | | 0 | 0 | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g12P | Leg3 | | XY-Symmetry | | 10X | | 12X | 1 | 4 | 0.5 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 12 | 3.31 | 1 | Both | 1.4375 | 3.4375 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g12X | Leg3 | | X-GenXY | | 10P | | 12P | 1 | 4 | 0.5 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 12 | 3.31 | 1 | Both | 1.4375 | 3.4375 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g12XY | Leg3 | | XY-GenXY | | 10Y | | 12Y | 1 | 4 | 0.5 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 12 | 3.31 | 1 | Both | 1.4375 | 3.4375 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g12Y | Leg3 | | Y-GenXY | | 10XY | | 12XY | 1 | 4 | 0.5 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 12 | 3.31 | 1 | Both | 1.4375 | 3.4375 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g13P | Leg3 | | XY-Symmetry | | 12X | | 15X | 1 | 4 | 0.333 | 0.333 | 0.333 | 3/4 | A394 | TYPE0 | N | 12 | 3.31 | 1 | Both | | 1 | 3 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g13X | Leg3 | | X-GenXY | | 12P | | 15P | 1 | 4 | 0.333 | 0.333 | 0.333 | 3/4 | A394 | TYPE0 | N | 12 | 3.31 | 1 | Both | | 1 | 3 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g13XY | Leg3 | | XY-GenXY | | 12Y | | 15Y | 1 | 4 | 0.333 | 0.333 | 0.333 | 3/4 | A394 | TYPE0 | N | 12 | 3.31 | 1 | Both | | 1 | 3 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g13Y | Leg3 | | Y-GenXY | | 12XY | | 15XY | 1 | 4 | 0.333 | 0.333 | 0.333 | 3/4 | A394 | TYPE0 | N | 12 | 3.31 | 1 | Both | | 1 | 3 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | g14P | Leg3 | | XY-Symmetry | | 15X | | 18X | 1 | 4 | 0.333 | 0.333 | 0.333 | 3/4 | A394 | TYPE0 | N | 12 | 3.31 | 1 | Both | 1.4375 | 3.4375 | | | | | | | | |
| 1.25 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g14X | Leg3 | | X-GenXY | 15P | 18P | 1 | 4 | 0.333 | 0.333 | 0.333 | 3/4 | A394 | TYPE0 | N | 12 | 3.31 | 1 | | Both | 1.4375 | 3.4375 | 1.25 | 3 | 0 | 0 | 0 |
| g14XY | Leg3 | | XY-GenXY | 15Y | 18Y | 1 | 4 | 0.333 | 0.333 | 0.333 | 3/4 | A394 | TYPE0 | N | 12 | 3.31 | 1 | | Both | 1.4375 | 3.4375 | 1.25 | 3 | 0 | 0 | 0 |
| g14Y | Leg3 | | Y-GenXY | 15XY | 18XY | 1 | 4 | 0.333 | 0.333 | 0.333 | 3/4 | A394 | TYPE0 | N | 12 | 3.31 | 1 | | Both | 1.4375 | 3.4375 | 1.25 | 3 | 0 | 0 | 0 |
| g15P | Diag1 | | XY-Symmetry | 1X | 2P | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.8125 | 0 | 0 | 0 |
| g15X | Diag1 | | X-GenXY | 1P | 2X | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.8125 | 0 | 0 | 0 |
| g15XY | Diag1 | | XY-GenXY | 1Y | 2XY | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.8125 | 0 | 0 | 0 |
| g15Y | Diag1 | | Y-GenXY | 1XY | 2Y | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.8125 | 0 | 0 | 0 |
| g16P | Diag1 | | XY-Symmetry | 1P | 2Y | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.8125 | 0 | 0 | 0 |
| g16X | Diag1 | | X-GenXY | 1X | 2XY | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.8125 | 0 | 0 | 0 |
| g16XY | Diag1 | | XY-GenXY | 1XY | 2X | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.8125 | 0 | 0 | 0 |
| g16Y | Diag1 | | Y-GenXY | 1Y | 2P | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.8125 | 0 | 0 | 0 |
| g17P | Diag2 | | XY-Symmetry | 2X | 3P | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g17X | Diag2 | | X-GenXY | 2P | 3X | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g17XY | Diag2 | | XY-GenXY | 2Y | 3XY | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g17Y | Diag2 | | Y-GenXY | 2XY | 3Y | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g18P | Diag2 | | XY-Symmetry | 2P | 3Y | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g18X | Diag2 | | X-GenXY | 2X | 3XY | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g18XY | Diag2 | | XY-GenXY | 2XY | 3X | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g18Y | Diag2 | | Y-GenXY | 2Y | 3P | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g19P | Diag2 | | XY-Symmetry | 3X | 4P | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g19X | Diag2 | | X-GenXY | 3P | 4X | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g19XY | Diag2 | | XY-GenXY | 3Y | 4XY | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g19Y | Diag2 | | Y-GenXY | 3XY | 4Y | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g20P | Diag2 | | XY-Symmetry | 3P | 4Y | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g20X | Diag2 | | X-GenXY | 3X | 4XY | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g20XY | Diag2 | | XY-GenXY | 3XY | 4X | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g20Y | Diag2 | | Y-GenXY | 3Y | 4P | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g21P | Diag2 | | XY-Symmetry | 4X | 5P | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g21X | Diag2 | | X-GenXY | 4P | 5X | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | 1.125 | 2.5313 | 0 | 0 | 0 |
| g21XY | Diag2 | | XY-GenXY | 4Y | 5XY | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long | only | 1.125 | 0 | | | | | |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.125 | 2.5313 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g21Y Diag2 | | Y-GenXY | 4XY | 5Y | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 |
| 1.125 | 2.5313 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g22P Diag2 | | XY-Symmetry | 4P | 5Y | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 |
| 1.125 | 2.5313 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g22X Diag2 | | X-GenXY | 4X | 5XY | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 |
| 1.125 | 2.5313 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g22XY Diag2 | | XY-GenXY | 4XY | 5X | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 |
| 1.125 | 2.5313 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g22Y Diag2 | | Y-GenXY | 4Y | 5P | 2 | 5 | 0.5 | 0.75 | 0.5 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 |
| 1.125 | 2.5313 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g23P Diag3 | | XY-Symmetry | 5X | 6P | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g23X Diag3 | | X-GenXY | 5P | 6X | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g23XY Diag3 | | XY-GenXY | 5Y | 6XY | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g23Y Diag3 | | Y-GenXY | 5XY | 6Y | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g24P Diag3 | | XY-Symmetry | 5P | 6Y | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g24X Diag3 | | X-GenXY | 5X | 6XY | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g24XY Diag3 | | XY-GenXY | 5XY | 6X | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g24Y Diag3 | | Y-GenXY | 5Y | 6P | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g25P Diag3 | | XY-Symmetry | 6X | 7P | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g25X Diag3 | | X-GenXY | 6P | 7X | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g25XY Diag3 | | XY-GenXY | 6Y | 7XY | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g25Y Diag3 | | Y-GenXY | 6XY | 7Y | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g26P Diag3 | | XY-Symmetry | 6P | 7Y | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g26X Diag3 | | X-GenXY | 6X | 7XY | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g26XY Diag3 | | XY-GenXY | 6XY | 7X | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g26Y Diag3 | | Y-GenXY | 6Y | 7P | 2 | 5 | 0.75 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 2.8125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g27P Diag4 | | XY-Symmetry | 7X | 8P | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 3.0625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g27X Diag4 | | X-GenXY | 7P | 8X | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 3.0625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g27XY Diag4 | | XY-GenXY | 7Y | 8XY | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 3.0625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g27Y Diag4 | | Y-GenXY | 7XY | 8Y | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 3.0625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g28P Diag4 | | XY-Symmetry | 7P | 8Y | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 3.0625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g28X Diag4 | | X-GenXY | 7X | 8XY | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 3.0625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g28XY Diag4 | | XY-GenXY | 7XY | 8X | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 3.0625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| | g28Y Diag4 | | Y-GenXY | 7Y | 8P | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 |
| 1.125 | 3.0625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g29P Diag3 | XY-Symmetry | 8X | 9P | 2 | 5 | 0.78 | 0.57 | 0.57 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3.3125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g29X Diag3 | X-GenXY | 8P | 9X | 2 | 5 | 0.78 | 0.57 | 0.57 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3.3125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g29XY Diag3 | XY-GenXY | 8Y | 9XY | 2 | 5 | 0.78 | 0.57 | 0.57 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3.3125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g29Y Diag3 | Y-GenXY | 8XY | 9Y | 2 | 5 | 0.78 | 0.57 | 0.57 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3.3125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g30P Diag3 | XY-Symmetry | 8P | 9Y | 2 | 5 | 0.78 | 0.57 | 0.57 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3.3125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g30X Diag3 | X-GenXY | 8X | 9XY | 2 | 5 | 0.78 | 0.57 | 0.57 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3.3125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g30XY Diag3 | XY-GenXY | 8XY | 9X | 2 | 5 | 0.78 | 0.57 | 0.57 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3.3125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g30Y Diag3 | Y-GenXY | 8Y | 9P | 2 | 5 | 0.78 | 0.57 | 0.57 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3.3125 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g31P Diag3 | XY-Symmetry | 9X | 10P | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g31X Diag3 | X-GenXY | 9P | 10X | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g31XY Diag3 | XY-GenXY | 9Y | 10XY | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g31Y Diag3 | Y-GenXY | 9XY | 10Y | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g32P Diag3 | XY-Symmetry | 9P | 10Y | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g32X Diag3 | X-GenXY | 9X | 10XY | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g32XY Diag3 | XY-GenXY | 9XY | 10X | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g32Y Diag3 | Y-GenXY | 9Y | 10P | 2 | 5 | 0.78 | 0.56 | 0.56 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Short only | 1.125 | 0 | |
| 1.125 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g33P Diag5 | XY-Symmetry | 10X | 12P | 2 | 5 | 0.58 | 0.79 | 0.58 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 | |
| 1.125 | 3.625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g33X Diag5 | X-GenXY | 10P | 12X | 2 | 5 | 0.58 | 0.79 | 0.58 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 | |
| 1.125 | 3.625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g33XY Diag5 | XY-GenXY | 10Y | 12XY | 2 | 5 | 0.58 | 0.79 | 0.58 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 | |
| 1.125 | 3.625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g33Y Diag5 | Y-GenXY | 10XY | 12Y | 2 | 5 | 0.58 | 0.79 | 0.58 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 | |
| 1.125 | 3.625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g34P Diag5 | XY-Symmetry | 10P | 12Y | 2 | 5 | 0.58 | 0.79 | 0.58 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 | |
| 1.125 | 3.625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g34X Diag5 | X-GenXY | 10X | 12XY | 2 | 5 | 0.58 | 0.79 | 0.58 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 | |
| 1.125 | 3.625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g34XY Diag5 | XY-GenXY | 10XY | 12X | 2 | 5 | 0.58 | 0.79 | 0.58 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 | |
| 1.125 | 3.625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g34Y Diag5 | Y-GenXY | 10Y | 12P | 2 | 5 | 0.58 | 0.79 | 0.58 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 | |
| 1.125 | 3.625 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g35P Diag5 | XY-Symmetry | 12X | 15P | 2 | 5 | 0.42 | 0.79 | 0.42 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 | |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g35X Diag5 | X-GenXY | 12P | 15X | 2 | 5 | 0.42 | 0.79 | 0.42 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 | |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g35XY Diag5 | XY-GenXY | 12Y | 15XY | 2 | 5 | 0.42 | 0.79 | 0.42 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 | |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g35Y Diag5 | Y-GenXY | 12XY | 15Y | 2 | 5 | 0.42 | 0.79 | 0.42 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 | |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g36P Diag5 | XY-Symmetry | 12P | 15Y | 2 | 5 | 0.42 | 0.79 | 0.42 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 | |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | |
| g36X Diag5 | X-GenXY | 12X | 15XY | 2 | 5 | 0.42 | 0.79 | 0.42 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 | |

```
1.125       2      0       0     0
  g36XY Diag5             XY-GenXY       12XY       15X    2     5  0.42  0.79  0.42 3/4 A394 TYPE0 N     2      1       1  Long only  1.125      0
1.125       2      0       0     0
   g36Y Diag5              Y-GenXY        12Y       15P    2     5  0.42  0.79  0.42 3/4 A394 TYPE0 N     2      1       1  Long only  1.125      0
1.125       2      0       0     0
   g37P Diag5          XY-Symmetry        15X       18P    2     4  0.44  0.78  0.44 3/4 A394 TYPE0 N     1      1       1  Long only  1.125      0
1.125       2      0       0     0
   g37X Diag5              X-GenXY        15P       18X    2     4  0.44  0.78  0.44 3/4 A394 TYPE0 N     1      1       1  Long only  1.125      0
1.125       2      0       0     0
  g37XY Diag5             XY-GenXY        15Y      18XY    2     4  0.44  0.78  0.44 3/4 A394 TYPE0 N     1      1       1  Long only  1.125      0
1.125       2      0       0     0
   g37Y Diag5              Y-GenXY       15XY       18Y    2     4  0.44  0.78  0.44 3/4 A394 TYPE0 N     1      1       1  Long only  1.125      0
1.125       2      0       0     0
   g38P Diag5          XY-Symmetry        15P       18Y    2     4  0.44  0.78  0.44 3/4 A394 TYPE0 N     1      1       1  Long only  1.125      0
1.125       2      0       0     0
   g38X Diag5              X-GenXY        15X      18XY    2     4  0.44  0.78  0.44 3/4 A394 TYPE0 N     1      1       1  Long only  1.125      0
1.125       2      0       0     0
  g38XY Diag5             XY-GenXY       15XY       18X    2     4  0.44  0.78  0.44 3/4 A394 TYPE0 N     1      1       1  Long only  1.125      0
1.125       2      0       0     0
   g38Y Diag5              Y-GenXY        15Y       18P    2     4  0.44  0.78  0.44 3/4 A394 TYPE0 N     1      1       1  Long only  1.125      0
1.125       2      0       0     0
   g39P    M4          XY-Symmetry        19P        1X    3     6   0.5   0.5   0.5 3/4 A394 TYPE0 N     2      1       1  Long only    1.5      0
1.125       3      0       0     0
   g39X    M4              X-GenXY        19X        1P    3     6   0.5   0.5   0.5 3/4 A394 TYPE0 N     2      1       1  Long only    1.5      0
1.125       3      0       0     0
  g39XY    M4             XY-GenXY        19X        1Y    3     6   0.5   0.5   0.5 3/4 A394 TYPE0 N     2      1       1  Long only    1.5      0
1.125       3      0       0     0
   g39Y    M4              Y-GenXY        19P       1XY    3     6   0.5   0.5   0.5 3/4 A394 TYPE0 N     2      1       1  Long only    1.5      0
1.125       3      0       0     0
   g40P    M4           Y-Symmetry         1X        1P    3     6     1     1     1                       0      0       0                 0      0
0       0      0       0     0
   g40Y    M4                Y-Gen        1XY        1Y    3     6     1     1     1                       0      0       0                 0      0
0       0      0       0     0
   g41P    M3           X-Symmetry         1X       1XY    3     6     1     1     1 3/4 A394 TYPE0 N     2      1       1  Long only      1      0
1.5       3      0       0     0
   g41X    M3                X-Gen         1P        1Y    3     6     1     1     1 3/4 A394 TYPE0 N     2      1       1  Long only      1      0
1.5       3      0       0     0
   g42P    M4          XY-Symmetry        20P        2X    3     6     1   0.5   0.5 3/4 A394 TYPE0 N     3      1       1  Long only    1.5      0
1.125     2.5      0       0     0
   g42X    M4              X-GenXY        20X        2P    3     6     1   0.5   0.5 3/4 A394 TYPE0 N     3      1       1  Long only    1.5      0
1.125     2.5      0       0     0
  g42XY    M4             XY-GenXY        20X        2Y    3     6     1   0.5   0.5 3/4 A394 TYPE0 N     3      1       1  Long only    1.5      0
1.125     2.5      0       0     0
   g42Y    M4              Y-GenXY        20P       2XY    3     6     1   0.5   0.5 3/4 A394 TYPE0 N     3      1       1  Long only    1.5      0
1.125     2.5      0       0     0
   g43P    M4           Y-Symmetry         2X        2P    3     6     1     1     1 3/4 A394 TYPE0 N     0      0       0                 0      0
0       0      0       0     0
   g43Y    M4                Y-Gen        2XY        2Y    3     6     1     1     1 3/4 A394 TYPE0 N     0      0       0                 0      0
0       0      0       0     0
   g44P    M3           X-Symmetry         2X       2XY    3     6     1     1     1 3/4 A394 TYPE0 N     2      1       1  Long only      1      0
1.5       3      0       0     0
   g44X    M3                X-Gen         2P        2Y    3     6     1     1     1 3/4 A394 TYPE0 N     2      1       1  Long only      1      0
1.5       3      0       0     0
   g45P    M7           X-Symmetry        19P       20P    3     4     1     1     1 3/4 A394 TYPE0 N     1      1       1  Long only  1.125      0
1.125       0      0       0     0
   g45X    M7                X-Gen        19X       20X    3     4     1     1     1 3/4 A394 TYPE0 N     1      1       1  Long only  1.125      0
1.125       0      0       0     0
   g46P    M7          XY-Symmetry        20P        1X    3     5     1     1     1 3/4 A394 TYPE0 N     2      1       1  Long only  1.375      0
1.125       2      0       0     0
```

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g46X | M7 | | X-GenXY | 20X | 1P | 3 | 5 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.375 | 0 |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g46XY | M7 | | XY-GenXY | 20X | 1Y | 3 | 5 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.375 | 0 |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g46Y | M7 | | Y-GenXY | 20P | 1XY | 3 | 5 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.375 | 0 |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g47P | M13 | | XY-Symmetry | 21P | 5X | 3 | 5 | 1 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 4 | 1 | 1 | Long only | 1.5 | 0 |
| 1.125 | 2.5 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g47X | M13 | | X-GenXY | 21X | 5P | 3 | 5 | 1 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 4 | 1 | 1 | Long only | 1.5 | 0 |
| 1.125 | 2.5 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g47XY | M13 | | XY-GenXY | 21X | 5Y | 3 | 5 | 1 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 4 | 1 | 1 | Long only | 1.5 | 0 |
| 1.125 | 2.5 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g47Y | M13 | | Y-GenXY | 21P | 5XY | 3 | 5 | 1 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 4 | 1 | 1 | Long only | 1.5 | 0 |
| 1.125 | 2.5 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g48P | M13 | | Y-Symmetry | 5X | 5P | 3 | 6 | 1 | 1 | 1 | | | | | 0 | 0 | 0 | | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g48Y | M13 | | Y-Gen | 5XY | 5Y | 3 | 6 | 1 | 1 | 1 | | | | | 0 | 0 | 0 | | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g49P | M3 | | X-Symmetry | 5X | 5XY | 3 | 6 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1 | 0 |
| 1.5 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g49X | M3 | | X-Gen | 5P | 5Y | 3 | 6 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1 | 0 |
| 1.5 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g50P | M8 | | XY-Symmetry | 21P | 4X | 3 | 5 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g50X | M8 | | X-GenXY | 21X | 4P | 3 | 5 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g50XY | M8 | | XY-GenXY | 21X | 4Y | 3 | 5 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g50Y | M8 | | Y-GenXY | 21P | 4XY | 3 | 5 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g51P | M14 | | Y-Symmetry | 4X | 4P | 1 | 4 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Both | 1.125 | 0 |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g51Y | M14 | | Y-Gen | 4XY | 4Y | 1 | 4 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Both | 1.125 | 0 |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g52P | M9 | | X-Symmetry | 4X | 4XY | 3 | 4 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 1 | 1 | 1 | Long only | 1.125 | 0 |
| 1.125 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g52X | M9 | | X-Gen | 4P | 4Y | 3 | 4 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 1 | 1 | 1 | Long only | 1.125 | 0 |
| 1.125 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g53P | M4 | | XY-Symmetry | 22P | 7X | 3 | 5 | 1 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Long only | 1.5 | 0 |
| 1.125 | 2.5 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g53X | M4 | | X-GenXY | 22X | 7P | 3 | 5 | 1 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Long only | 1.5 | 0 |
| 1.125 | 2.5 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g53XY | M4 | | XY-GenXY | 22X | 7Y | 3 | 5 | 1 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Long only | 1.5 | 0 |
| 1.125 | 2.5 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g53Y | M4 | | Y-GenXY | 22P | 7XY | 3 | 5 | 1 | 0.5 | 0.5 | 3/4 | A394 | TYPE0 | N | 3 | 1 | 1 | Long only | 1.5 | 0 |
| 1.125 | 2.5 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g54P | M4 | | Y-Symmetry | 7X | 7P | 3 | 6 | 1 | 1 | 1 | | | | | 0 | 0 | 0 | | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g54Y | M4 | | Y-Gen | 7XY | 7Y | 3 | 6 | 1 | 1 | 1 | | | | | 0 | 0 | 0 | | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g55P | M3 | | X-Symmetry | 7X | 7XY | 3 | 6 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1 | 0 |
| 1.125 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g55X | M3 | | X-Gen | 7P | 7Y | 3 | 6 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1 | 0 |
| 1.125 | 3 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g56P | M7 | | XY-Symmetry | 22P | 6X | 3 | 5 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g56X | M7 | | X-GenXY | 22X | 6P | 3 | 5 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 |
| 1.125 | 2 | 0 | 0 | 0 | | | | | | | | | | | | | | | | |
| g56XY | M7 | | XY-GenXY | 22X | 6Y | 3 | 5 | 1 | 1 | 1 | 3/4 | A394 | TYPE0 | N | 2 | 1 | 1 | Long only | 1.125 | 0 |

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1.125       2      0       0     0
   g56Y    M7              Y-GenXY        22P        6XY    3     5     1     1     1 3/4 A394 TYPE0 N     2      1       1  Long only  1.125      0
1.125       2      0       0     0
   g57P    M9            X-Symmetry        6P         6Y    3     4     1     1     1 3/4 A394 TYPE0 N     1      1       1  Long only  1.125      0
1.125       0      0       0     0
   g57X    M9              X-Gen           6X         6XY   3     4     1     1     1 3/4 A394 TYPE0 N     1      1       1  Long only  1.125      0
1.125       0      0       0     0
   g58P   M14            Y-Symmetry        6X         6P    1     4     1     1     1 3/4 A394 TYPE0 N     2      1       1        Both   1.25      0
1.125       2      0       0     0
   g58Y   M14              Y-Gen           6XY        6Y    1     4     1     1     1 3/4 A394 TYPE0 N     2      1       1        Both   1.25      0
1.125       2      0       0     0
   g59P    M2            Y-Symmetry       10X        10P    3     6     1   0.5   0.5 3/4 A394 TYPE0 N     2      1       1 Short only  1.125      0
1.125       2      0       0     0
   g59Y    M2              Y-Gen          10XY        10Y    3     6     1   0.5   0.5 3/4 A394 TYPE0 N     2      1       1 Short only  1.125      0
1.125       2      0       0     0
   g60P    M2            X-Symmetry       10P        10Y    3     6     1   0.5   0.5 3/4 A394 TYPE0 N     2      1       1 Short only  1.125      0
1.125       2      0       0     0
   g60X    M2              X-Gen          10X        10XY   3     6     1   0.5   0.5 3/4 A394 TYPE0 N     2      1       1 Short only  1.125      0
1.125       2      0       0     0
   g61P    M5            Y-Symmetry       12X        12P    3     6     1   0.5   0.5 3/4 A394 TYPE0 N     2      1       1 Short only    1.5      0
1.125       2      0       0     0
   g61Y    M5              Y-Gen          12XY        12Y    3     6     1   0.5   0.5 3/4 A394 TYPE0 N     2      1       1 Short only    1.5      0
1.125       2      0       0     0
   g62P    M5            X-Symmetry       12P        12Y    3     6     1   0.5   0.5 3/4 A394 TYPE0 N     2      1       1 Short only    1.5      0
1.125       2      0       0     0
   g62X    M5              X-Gen          12X        12XY   3     6     1   0.5   0.5 3/4 A394 TYPE0 N     2      1       1 Short only    1.5      0
1.125       2      0       0     0
   g63P    M6            Y-Symmetry       15X        15P    3     6     1   0.5   0.5 3/4 A394 TYPE0 N     2      2       1 Short only      2      0
1.125       2      0       0     0
   g63Y    M6              Y-Gen          15XY        15Y    3     6     1   0.5   0.5 3/4 A394 TYPE0 N     2      2       1 Short only      2      0
1.125       2      0       0     0
   g64P    M6            X-Symmetry       15P        15Y    3     6     1   0.5   0.5 3/4 A394 TYPE0 N     2      2       1 Short only      2      0
1.125       2      0       0     0
   g64X    M6              X-Gen          15X        15XY   3     6     1   0.5   0.5 3/4 A394 TYPE0 N     2      2       1 Short only      2      0
1.125       2      0       0     0
   g65P   M11           XY-Symmetry  i0.50E20S        15Y    3     4     1     1     1         5/8 A325     1      1       1  Long only      0      0
0       0      0       0     0
   g65X   M11              X-GenXY  i0.50E20S       15XY    3     4     1     1     1         5/8 A325     1      1       1  Long only      0      0
0       0      0       0     0
  g65XY   M11             XY-GenXY  i0.50E20S        15X    3     4     1     1     1         5/8 A325     1      1       1  Long only      0      0
0       0      0       0     0
   g65Y   M11              Y-GenXY  i0.50E20S        15P    3     4     1     1     1         5/8 A325     1      1       1  Long only      0      0
0       0      0       0     0
   g66P   M12           XY-Symmetry  i0.50E40S        12Y    3     4     1     1     1         5/8 A325     1      1       1  Long only      0      0
0       0      0       0     0
   g66X   M12              X-GenXY  i0.50E40S       12XY    3     4     1     1     1         5/8 A325     1      1       1  Long only      0      0
0       0      0       0     0
  g66XY   M12             XY-GenXY  i0.50E40S        12X    3     4     1     1     1         5/8 A325     1      1       1  Long only      0      0
0       0      0       0     0
   g66Y   M12              Y-GenXY  i0.50E40S        12P    3     4     1     1     1         5/8 A325     1      1       1  Long only      0      0
0       0      0       0     0
   g67P   M10           XY-Symmetry  i0.50E74S         7Y    3     4     1     1     1         5/8 A325     1      1       1  Long only      0      0
0       0      0       0     0
   g67X   M10              X-GenXY  i0.50E74S        7XY    3     4     1     1     1         5/8 A325     1      1       1  Long only      0      0
0       0      0       0     0
  g67XY   M10             XY-GenXY  i0.50E74S         7X    3     4     1     1     1         5/8 A325     1      1       1  Long only      0      0
0       0      0       0     0
   g67Y   M10              Y-GenXY  i0.50E74S         7P    3     4     1     1     1         5/8 A325     1      1       1  Long only      0      0
0       0      0       0     0
```

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g68P | M10 | | XY-Symmetry | i0.50E84S | | 5Y | 3 | 4 | 1 | 1 | 1 | | 5/8 | A325 | 1 | 1 | 1 | Long only | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g68X | M10 | | X-GenXY | i0.50E84S | | 5XY | 3 | 4 | 1 | 1 | 1 | | 5/8 | A325 | 1 | 1 | 1 | Long only | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g68XY | M10 | | XY-GenXY | i0.50E84S | | 5X | 3 | 4 | 1 | 1 | 1 | | 5/8 | A325 | 1 | 1 | 1 | Long only | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g68Y | M10 | | Y-GenXY | i0.50E84S | | 5P | 3 | 4 | 1 | 1 | 1 | | 5/8 | A325 | 1 | 1 | 1 | Long only | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g69P | M10 | | XY-Symmetry | i0.50E96S | | 2P | 3 | 4 | 1 | 1 | 1 | | 5/8 | A325 | 1 | 1 | 1 | Long only | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g69X | M10 | | X-GenXY | i0.50E96S | | 2X | 3 | 4 | 1 | 1 | 1 | | 5/8 | A325 | 1 | 1 | 1 | Long only | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g69XY | M10 | | XY-GenXY | i0.50E96S | | 2XY | 3 | 4 | 1 | 1 | 1 | | 5/8 | A325 | 1 | 1 | 1 | Long only | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g69Y | M10 | | Y-GenXY | i0.50E96S | | 2Y | 3 | 4 | 1 | 1 | 1 | | 5/8 | A325 | 1 | 1 | 1 | Long only | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g70P | M10 | | XY-Symmetry | i0.50E101S | | 1P | 3 | 4 | 1 | 1 | 1 | | 5/8 | A325 | 1 | 1 | 1 | Long only | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g70X | M10 | | X-GenXY | i0.50E101S | | 1X | 3 | 4 | 1 | 1 | 1 | | 5/8 | A325 | 1 | 1 | 1 | Long only | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g70XY | M10 | | XY-GenXY | i0.50E101S | | 1XY | 3 | 4 | 1 | 1 | 1 | | 5/8 | A325 | 1 | 1 | 1 | Long only | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g70Y | M10 | | Y-GenXY | i0.50E101S | | 1Y | 3 | 4 | 1 | 1 | 1 | | 5/8 | A325 | 1 | 1 | 1 | Long only | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g71P | PM | | None | | 23P | i0.50E20S | 1 | 4 | 1 | 1 | 1 | | | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g72P | PM | | None | i0.50E20S | | i0.50E40S | 1 | 4 | 1 | 1 | 1 | | | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g73P | PM | | None | i0.50E40S | | i0.50E74S | 1 | 4 | 1 | 1 | 1 | | | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g74P | PM | | None | i0.50E74S | | i0.50E84S | 1 | 4 | 1 | 1 | 1 | | | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g75P | PM | | None | i0.50E84S | | i0.50E96S | 1 | 4 | 1 | 1 | 1 | | | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g76P | PM | | None | i0.50E96S | | i0.50E101S | 1 | 4 | 1 | 1 | 1 | | | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g77P | PM | | None | i0.50E101S | | 24P | 1 | 4 | 1 | 1 | 1 | | | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| g78P | PM | | None | | 24P | 25P | 1 | 4 | 1 | 1 | 1 | | | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Member Capacities and Overrides:**

| Member Label | Group Label | Design Comp. | Design Control | Tension Criterion | L/r Control | Length (ft) | L/r Comp. | Connection Shear Capacity (kips) | Connection Bearing Capacity (kips) | Net Section Tension Capacity (kips) | Rupture Tension Capacity (kips) | RTE End Dist. Capacity (kips) | RTE Edge Dist. Capacity (kips) | Override Comp. Capacity (kips) | Override Tension Capacity (kips) | Override Unsup. Member (kips) | Override Warnings |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g3P | Leg1 | 89.489 | L/r | 63.896 | Net Sect | 60 | 5.00 | 89.489 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g3X | Leg1 | 89.489 | L/r | 63.896 | Net Sect | 60 | 5.00 | 89.489 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g3XY | Leg1 | 89.489 | L/r | 63.896 | Net Sect | 60 | 5.00 | 89.489 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g3Y | Leg1 | 89.489 | L/r | 63.896 | Net Sect | 60 | 5.00 | 89.489 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g4P | Leg1 | 93.269 | L/r | 63.896 | Net Sect | 48 | 4.00 | 93.269 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g4X | Leg1 | 93.269 | L/r | 63.896 | Net Sect | 48 | 4.00 | 93.269 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g4XY | Leg1 | 93.269 | L/r | 63.896 | Net Sect | 48 | 4.00 | 93.269 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g4Y | Leg1 | 93.269 | L/r | 63.896 | Net Sect | 48 | 4.00 | 93.269 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g5P | Leg1 | 93.269 | L/r | 63.896 | Net Sect | 48 | 4.00 | 93.269 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g5X | Leg1 | 93.269 | L/r | 63.896 | Net Sect | 48 | 4.00 | 93.269 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g5XY | Leg1 | 93.269 | L/r | 63.896 | Net Sect | 48 | 4.00 | 93.269 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g5Y | Leg1 | 93.269 | L/r | 63.896 | Net Sect | 48 | 4.00 | 93.269 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g6P | Leg1 | 93.269 | L/r | 63.896 | Net Sect | 48 | 4.00 | 93.269 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g6X | Leg1 | 93.269 | L/r | 63.896 | Net Sect | 48 | 4.00 | 93.269 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g6XY | Leg1 | 93.269 | L/r | 63.896 | Net Sect | 48 | 4.00 | 93.269 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g6Y | Leg1 | 93.269 | L/r | 63.896 | Net Sect | 48 | 4.00 | 93.269 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g7P | Leg1 | 89.489 | L/r | 63.896 | Net Sect | 60 | 5.00 | 89.489 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g7X | Leg1 | 89.489 | L/r | 63.896 | Net Sect | 60 | 5.00 | 89.489 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g7XY | Leg1 | 89.489 | L/r | 63.896 | Net Sect | 60 | 5.00 | 89.489 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g7Y | Leg1 | 89.489 | L/r | 63.896 | Net Sect | 60 | 5.00 | 89.489 | 0.000 | 0.000 | 63.896 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| **g8P** | **Leg1** | **89.489** | **L/r** | **70.122** | **Net Sect** | **60** | **5.00** | **89.489** | **166.500** | **210.937** | **70.122** | **183.823** | **0.000** | **0.000** | **0.000** | **0.000** |
| **0.000** | | **Automatic** | **Member "g8P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??** | | | | | | | | | | | | | |
| **g8X** | **Leg1** | **89.489** | **L/r** | **70.122** | **Net Sect** | **60** | **5.00** | **89.489** | **166.500** | **210.937** | **70.122** | **183.823** | **0.000** | **0.000** | **0.000** | **0.000** |
| **0.000** | | **Automatic** | **Member "g8X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??** | | | | | | | | | | | | | |
| **g8XY** | **Leg1** | **89.489** | **L/r** | **70.122** | **Net Sect** | **60** | **5.00** | **89.489** | **166.500** | **210.937** | **70.122** | **183.823** | **0.000** | **0.000** | **0.000** | **0.000** |
| **0.000** | | **Automatic** | **Member "g8XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??** | | | | | | | | | | | | | |
| **g8Y** | **Leg1** | **89.489** | **L/r** | **70.122** | **Net Sect** | **60** | **5.00** | **89.489** | **166.500** | **210.937** | **70.122** | **183.823** | **0.000** | **0.000** | **0.000** | **0.000** |
| **0.000** | | **Automatic** | **Member "g8Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??** | | | | | | | | | | | | | |
| g9P | Leg2 | 97.966 | L/r | 99.155 | Net Sect | 51 | 5.10 | 97.966 | 0.000 | 0.000 | 99.155 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g9X | Leg2 | 97.966 | L/r | 99.155 | Net Sect | 51 | 5.10 | 97.966 | 0.000 | 0.000 | 99.155 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g9XY | Leg2 | 97.966 | L/r | 99.155 | Net Sect | 51 | 5.10 | 97.966 | 0.000 | 0.000 | 99.155 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g9Y | Leg2 | 97.966 | L/r | 99.155 | Net Sect | 51 | 5.10 | 97.966 | 0.000 | 0.000 | 99.155 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g10P | Leg2 | 91.422 | L/r | 90.582 | Net Sect | 71 | 7.13 | 91.422 | 166.500 | 210.937 | 90.582 | 183.823 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g10P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g10X | Leg2 | 91.422 | L/r | 90.582 | Net Sect | 71 | 7.13 | 91.422 | 166.500 | 210.937 | 90.582 | 183.823 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g10X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g10XY | Leg2 | 91.422 | L/r | 90.582 | Net Sect | 71 | 7.13 | 91.422 | 166.500 | 210.937 | 90.582 | 183.823 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g10XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g10Y | Leg2 | 91.422 | L/r | 90.582 | Net Sect | 71 | 7.13 | 91.422 | 166.500 | 210.937 | 90.582 | 183.823 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g10Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g11P | Leg3 | 115.850 | L/r | 111.395 | Net Sect | 82 | 8.15 | 115.850 | 0.000 | 0.000 | 111.395 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | | | | | | | | | | | | | | | | | |
| g11X | Leg3 | 115.850 | L/r | 111.395 | Net Sect | 82 | 8.15 | 115.850 | 0.000 | 0.000 | 111.395 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | | | | | | | | | | | | | | | | | |
| g11XY | Leg3 | 115.850 | L/r | 111.395 | Net Sect | 82 | 8.15 | 115.850 | 0.000 | 0.000 | 111.395 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | | | | | | | | | | | | | | | | | |
| g11Y | Leg3 | 115.850 | L/r | 111.395 | Net Sect | 82 | 8.15 | 115.850 | 0.000 | 0.000 | 111.395 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | | | | | | | | | | | | | | | | | |
| g12P | Leg3 | 122.414 | L/r | 108.039 | Net Sect | 72 | 14.27 | 122.414 | 199.800 | 303.750 | 108.039 | 281.250 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g12P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g12X | Leg3 | 122.414 | L/r | 108.039 | Net Sect | 72 | 14.27 | 122.414 | 199.800 | 303.750 | 108.039 | 281.250 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g12X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g12XY | Leg3 | 122.414 | L/r | 108.039 | Net Sect | 72 | 14.27 | 122.414 | 199.800 | 303.750 | 108.039 | 281.250 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g12XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g12Y | Leg3 | 122.414 | L/r | 108.039 | Net Sect | 72 | 14.27 | 122.414 | 199.800 | 303.750 | 108.039 | 281.250 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g12Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g13P | Leg3 | 124.456 | L/r | 108.039 | Net Sect | 68 | 20.38 | 124.456 | 199.800 | 303.750 | 108.039 | 264.705 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g13P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g13X | Leg3 | 124.456 | L/r | 108.039 | Net Sect | 68 | 20.38 | 124.456 | 199.800 | 303.750 | 108.039 | 264.705 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g13X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g13XY | Leg3 | 124.456 | L/r | 108.039 | Net Sect | 68 | 20.38 | 124.456 | 199.800 | 303.750 | 108.039 | 264.705 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g13XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g13Y | Leg3 | 124.456 | L/r | 108.039 | Net Sect | 68 | 20.38 | 124.456 | 199.800 | 303.750 | 108.039 | 264.705 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g13Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g14P | Leg3 | 124.467 | L/r | 108.039 | Net Sect | 68 | 20.37 | 124.467 | 199.800 | 303.750 | 108.039 | 281.250 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g14P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g14X | Leg3 | 124.467 | L/r | 108.039 | Net Sect | 68 | 20.37 | 124.467 | 199.800 | 303.750 | 108.039 | 281.250 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g14X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g14XY | Leg3 | 124.467 | L/r | 108.039 | Net Sect | 68 | 20.37 | 124.467 | 199.800 | 303.750 | 108.039 | 281.250 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g14XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g14Y | Leg3 | 124.467 | L/r | 108.039 | Net Sect | 68 | 20.37 | 124.467 | 199.800 | 303.750 | 108.039 | 281.250 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | Member "g14Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ?? | | | | | | | | | | | | | | | | |
| g15P | Diag1 | 17.484 | L/r | 19.184 | Net Sect | 106 | 7.07 | 17.484 | 33.300 | 25.312 | 19.184 | 21.094 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Automatic | | | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g15X Diag1 | 17.484 | L/r | 19.184 | Net Sect | 106 | 7.07 | 17.484 | 33.300 | 25.312 | 19.184 | 21.094 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g15XY Diag1 | 17.484 | L/r | 19.184 | Net Sect | 106 | 7.07 | 17.484 | 33.300 | 25.312 | 19.184 | 21.094 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g15Y Diag1 | 17.484 | L/r | 19.184 | Net Sect | 106 | 7.07 | 17.484 | 33.300 | 25.312 | 19.184 | 21.094 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g16P Diag1 | 17.484 | L/r | 19.184 | Net Sect | 106 | 7.07 | 17.484 | 33.300 | 25.312 | 19.184 | 21.094 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g16X Diag1 | 17.484 | L/r | 19.184 | Net Sect | 106 | 7.07 | 17.484 | 33.300 | 25.312 | 19.184 | 21.094 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g16XY Diag1 | 17.484 | L/r | 19.184 | Net Sect | 106 | 7.07 | 17.484 | 33.300 | 25.312 | 19.184 | 21.094 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g16Y Diag1 | 17.484 | L/r | 19.184 | Net Sect | 106 | 7.07 | 17.484 | 33.300 | 25.312 | 19.184 | 21.094 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g17P Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g17X Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g17XY Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g17Y Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g18P Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g18X Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g18XY Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g18Y Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g19P Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g19X Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g19XY Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g19Y Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g20P Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g20X Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g20XY Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g20Y Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g21P Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g21X Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g21XY Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g21Y Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g22P Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g22X Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g22XY Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g22Y Diag2 | 24.281 | L/r | 24.985 | Net Sect | 97 | 6.40 | 24.281 | 33.300 | 33.750 | 24.985 | 26.766 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g23P Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g23X Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g23XY Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g23Y Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g24P Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g24X Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g24XY Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g24Y Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g25P Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g25X Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g25XY Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g25Y Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g26P Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g26X Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g26XY Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g26Y Diag3 | 29.096 | L/r | 28.846 | Net Sect | 86 | 7.07 | 29.096 | 49.950 | 50.625 | 28.846 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g27P Diag4 | 31.837 | L/r | 33.300 | Shear | 105 | 7.61 | 31.837 | 33.300 | 42.187 | 35.241 | 35.156 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g27X Diag4 | 31.837 | L/r | 33.300 | Shear | 105 | 7.61 | 31.837 | 33.300 | 42.187 | 35.241 | 35.156 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g27XY Diag4 | 31.837 | L/r | 33.300 | Shear | 105 | 7.61 | 31.837 | 33.300 | 42.187 | 35.241 | 35.156 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g27Y Diag4 | 31.837 | L/r | 33.300 | Shear | 105 | 7.61 | 31.837 | 33.300 | 42.187 | 35.241 | 35.156 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g28P Diag4 | 31.837 | L/r | 33.300 | Shear | 105 | 7.61 | 31.837 | 33.300 | 42.187 | 35.241 | 35.156 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g28X Diag4 | 31.837 | L/r | 33.300 | Shear | 105 | 7.61 | 31.837 | 33.300 | 42.187 | 35.241 | 35.156 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g28XY Diag4 | 31.837 | L/r | 33.300 | Shear | 105 | 7.61 | 31.837 | 33.300 | 42.187 | 35.241 | 35.156 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g28Y Diag4 | 31.837 | L/r | 33.300 | Shear | 105 | 7.61 | 31.837 | 33.300 | 42.187 | 35.241 | 35.156 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g29P Diag3 | 18.150 | L/r | 28.125 | Rupture | 142 | 10.21 | 18.150 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g29X Diag3 | 18.150 | L/r | 28.125 | Rupture | 142 | 10.21 | 18.150 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g29XY Diag3 | 18.150 | L/r | 28.125 | Rupture | 142 | 10.21 | 18.150 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |
| g29Y Diag3 | 18.150 | L/r | 28.125 | Rupture | 142 | 10.21 | 18.150 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g30P Diag3 | 18.150 | L/r | 28.125 | Rupture | 142 | 10.21 | 18.150 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g30X Diag3 | 18.150 | L/r | 28.125 | Rupture | 142 | 10.21 | 18.150 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g30XY Diag3 | 18.150 | L/r | 28.125 | Rupture | 142 | 10.21 | 18.150 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g30Y Diag3 | 18.150 | L/r | 28.125 | Rupture | 142 | 10.21 | 18.150 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g31P Diag3 | 13.601 | L/r | 28.125 | Rupture | 170 | 12.43 | 13.601 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g31X Diag3 | 13.601 | L/r | 28.125 | Rupture | 170 | 12.43 | 13.601 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g31XY Diag3 | 13.601 | L/r | 28.125 | Rupture | 170 | 12.43 | 13.601 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g31Y Diag3 | 13.601 | L/r | 28.125 | Rupture | 170 | 12.43 | 13.601 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g32P Diag3 | 13.601 | L/r | 28.125 | Rupture | 170 | 12.43 | 13.601 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g32X Diag3 | 13.601 | L/r | 28.125 | Rupture | 170 | 12.43 | 13.601 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g32XY Diag3 | 13.601 | L/r | 28.125 | Rupture | 170 | 12.43 | 13.601 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g32Y Diag3 | 13.601 | L/r | 28.125 | Rupture | 170 | 12.43 | 13.601 | 33.300 | 33.750 | 28.846 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g33P Diag5 | 4.330 | L/r | 24.985 | Net Sect | 310 | 18.88 | 4.330 | 33.300 | 33.750 | 24.985 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g33X Diag5 | 4.330 | L/r | 24.985 | Net Sect | 310 | 18.88 | 4.330 | 33.300 | 33.750 | 24.985 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g33XY Diag5 | 4.330 | L/r | 24.985 | Net Sect | 310 | 18.88 | 4.330 | 33.300 | 33.750 | 24.985 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g33Y Diag5 | 4.330 | L/r | 24.985 | Net Sect | 310 | 18.88 | 4.330 | 33.300 | 33.750 | 24.985 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g34P Diag5 | 4.330 | L/r | 24.985 | Net Sect | 310 | 18.88 | 4.330 | 33.300 | 33.750 | 24.985 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g34X Diag5 | 4.330 | L/r | 24.985 | Net Sect | 310 | 18.88 | 4.330 | 33.300 | 33.750 | 24.985 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g34XY Diag5 | 4.330 | L/r | 24.985 | Net Sect | 310 | 18.88 | 4.330 | 33.300 | 33.750 | 24.985 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g34Y Diag5 | 4.330 | L/r | 24.985 | Net Sect | 310 | 18.88 | 4.330 | 33.300 | 33.750 | 24.985 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g35P Diag5 | 2.442 | L/r | 21.984 | Rupture | 425 | 26.54 | 2.442 | 33.300 | 33.750 | 24.985 | 21.984 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g35X Diag5 | 2.442 | L/r | 21.984 | Rupture | 425 | 26.54 | 2.442 | 33.300 | 33.750 | 24.985 | 21.984 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g35XY Diag5 | 2.442 | L/r | 21.984 | Rupture | 425 | 26.54 | 2.442 | 33.300 | 33.750 | 24.985 | 21.984 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g35Y Diag5 | 2.442 | L/r | 21.984 | Rupture | 425 | 26.54 | 2.442 | 33.300 | 33.750 | 24.985 | 21.984 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g36P Diag5 | 2.442 | L/r | 21.984 | Rupture | 425 | 26.54 | 2.442 | 33.300 | 33.750 | 24.985 | 21.984 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g36X Diag5 | 2.442 | L/r | 21.984 | Rupture | 425 | 26.54 | 2.442 | 33.300 | 33.750 | 24.985 | 21.984 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g36XY Diag5 | 2.442 | L/r | 21.984 | Rupture | 425 | 26.54 | 2.442 | 33.300 | 33.750 | 24.985 | 21.984 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g36Y Diag5 | 2.442 | L/r | 21.984 | Rupture | 425 | 26.54 | 2.442 | 33.300 | 33.750 | 24.985 | 21.984 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g37P Diag5 | 1.312 | L/r | 11.859 | Rupture | 481 | 30.42 | 1.312 | 16.650 | 16.875 | 24.985 | 11.859 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | Automatic | | | | | | | | | | | | | | |
| g37X Diag5 | 1.312 | L/r | 11.859 | Rupture | 481 | 30.42 | 1.312 | 16.650 | 16.875 | 24.985 | 11.859 | 0.000 | 0.000 | 0.000 | 0.000 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g37XY | Diag5 | 1.312 | L/r | 11.859 | Rupture | 481 | 30.42 | 1.312 | 16.650 | 16.875 | 24.985 | 11.859 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g37Y | Diag5 | 1.312 | L/r | 11.859 | Rupture | 481 | 30.42 | 1.312 | 16.650 | 16.875 | 24.985 | 11.859 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g38P | Diag5 | 1.312 | L/r | 11.859 | Rupture | 481 | 30.42 | 1.312 | 16.650 | 16.875 | 24.985 | 11.859 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g38X | Diag5 | 1.312 | L/r | 11.859 | Rupture | 481 | 30.42 | 1.312 | 16.650 | 16.875 | 24.985 | 11.859 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g38XY | Diag5 | 1.312 | L/r | 11.859 | Rupture | 481 | 30.42 | 1.312 | 16.650 | 16.875 | 24.985 | 11.859 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g38Y | Diag5 | 1.312 | L/r | 11.859 | Rupture | 481 | 30.42 | 1.312 | 16.650 | 16.875 | 24.985 | 11.859 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g39P | M4 | 28.318 | L/r | 28.125 | Rupture | 117 | 11.52 | 28.318 | 33.300 | 33.750 | 36.271 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g39X | M4 | 28.318 | L/r | 28.125 | Rupture | 117 | 11.52 | 28.318 | 33.300 | 33.750 | 36.271 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g39XY | M4 | 28.318 | L/r | 28.125 | Rupture | 117 | 11.52 | 28.318 | 33.300 | 33.750 | 36.271 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g39Y | M4 | 28.318 | L/r | 28.125 | Rupture | 117 | 11.52 | 28.318 | 33.300 | 33.750 | 36.271 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g40P | M4 | 30.742 | L/r | 47.520 | Net Sect | 101 | 5.00 | 30.742 | 0.000 | 0.000 | 47.520 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g40Y | M4 | 30.742 | L/r | 47.520 | Net Sect | 101 | 5.00 | 30.742 | 0.000 | 0.000 | 47.520 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g41P | M3 | 26.226 | L/r | 29.412 | Rupture | 114 | 5.00 | 26.226 | 33.300 | 33.750 | 32.410 | 29.412 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g41X | M3 | 26.226 | L/r | 29.412 | Rupture | 114 | 5.00 | 26.226 | 33.300 | 33.750 | 32.410 | 29.412 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g42P | M4 | 31.104 | L/r | 36.271 | Net Sect | 99 | 7.67 | 31.104 | 49.950 | 50.625 | 36.271 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g42X | M4 | 31.104 | L/r | 36.271 | Net Sect | 99 | 7.67 | 31.104 | 49.950 | 50.625 | 36.271 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g42XY | M4 | 31.104 | L/r | 36.271 | Net Sect | 99 | 7.67 | 31.104 | 49.950 | 50.625 | 36.271 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g42Y | M4 | 31.104 | L/r | 36.271 | Net Sect | 99 | 7.67 | 31.104 | 49.950 | 50.625 | 36.271 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g43P | M4 | 30.742 | L/r | 47.520 | Net Sect | 101 | 5.00 | 30.742 | 0.000 | 0.000 | 47.520 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g43Y | M4 | 30.742 | L/r | 47.520 | Net Sect | 101 | 5.00 | 30.742 | 0.000 | 0.000 | 47.520 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g44P | M3 | 26.226 | L/r | 29.412 | Rupture | 114 | 5.00 | 26.226 | 33.300 | 33.750 | 32.410 | 29.412 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g44X | M3 | 26.226 | L/r | 29.412 | Rupture | 114 | 5.00 | 26.226 | 33.300 | 33.750 | 32.410 | 29.412 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g45P | M7 | 7.160 | L/r | 8.895 | Rupture | 180 | 6.40 | 7.160 | 16.650 | 12.656 | 19.184 | 8.895 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g45X | M7 | 7.160 | L/r | 8.895 | Rupture | 180 | 6.40 | 7.160 | 16.650 | 12.656 | 19.184 | 8.895 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| **g46P** | **M7** | **4.594** | **L/r** | **18.035** | **Rupture** | **257** | **9.15** | **4.594** | **33.300** | **25.312** | **19.184** | **18.035** | **0.000** | **0.000** | **0.000** | **0.000** |
| **0.000** | | **Automatic** | | | | | | | | | | | | | | |
| **KL/R value of 224.65 exceeds maximum of 200.00 for member "g46P" ??** | | | | | | | | | | | | | | | | |
| **g46X** | **M7** | **4.594** | **L/r** | **18.035** | **Rupture** | **257** | **9.15** | **4.594** | **33.300** | **25.312** | **19.184** | **18.035** | **0.000** | **0.000** | **0.000** | **0.000** |
| **0.000** | | **Automatic** | | | | | | | | | | | | | | |
| **KL/R value of 224.65 exceeds maximum of 200.00 for member "g46X" ??** | | | | | | | | | | | | | | | | |
| **g46XY** | **M7** | **4.594** | **L/r** | **18.035** | **Rupture** | **257** | **9.15** | **4.594** | **33.300** | **25.312** | **19.184** | **18.035** | **0.000** | **0.000** | **0.000** | **0.000** |
| **0.000** | | **Automatic** | | | | | | | | | | | | | | |
| **KL/R value of 224.65 exceeds maximum of 200.00 for member "g46XY" ??** | | | | | | | | | | | | | | | | |
| **g46Y** | **M7** | **4.594** | **L/r** | **18.035** | **Rupture** | **257** | **9.15** | **4.594** | **33.300** | **25.312** | **19.184** | **18.035** | **0.000** | **0.000** | **0.000** | **0.000** |

**0.000 Automatic**
**KL/R value of 224.65 exceeds maximum of 200.00 for member "g46Y" ??**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g47P | M13 | 34.023 | L/r | 43.696 | Net Sect | 113 | 12.01 | 34.023 | 66.600 | 67.500 | 43.696 | 56.250 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g47X | M13 | 34.023 | L/r | 43.696 | Net Sect | 113 | 12.01 | 34.023 | 66.600 | 67.500 | 43.696 | 56.250 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g47XY | M13 | 34.023 | L/r | 43.696 | Net Sect | 113 | 12.01 | 34.023 | 66.600 | 67.500 | 43.696 | 56.250 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g47Y | M13 | 34.023 | L/r | 43.696 | Net Sect | 113 | 12.01 | 34.023 | 66.600 | 67.500 | 43.696 | 56.250 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g48P | M13 | 37.680 | L/r | 55.770 | Net Sect | 92 | 5.00 | 37.680 | 0.000 | 0.000 | 55.770 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g48Y | M13 | 37.680 | L/r | 55.770 | Net Sect | 92 | 5.00 | 37.680 | 0.000 | 0.000 | 55.770 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g49P | M3 | 26.226 | L/r | 29.412 | Rupture | 114 | 5.00 | 26.226 | 33.300 | 33.750 | 32.410 | 29.412 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g49X | M3 | 26.226 | L/r | 29.412 | Rupture | 114 | 5.00 | 26.226 | 33.300 | 33.750 | 32.410 | 29.412 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| **g50P** | **M8** | **3.334** | **L/r** | **21.984** | **Rupture** | **358** | **12.66** | **3.334** | **33.300** | **33.750** | **24.985** | **21.984** | **0.000** | **0.000** | **0.000** | **0.000** |
| **0.000** | | **Automatic** | | | | | | | | | | | | | | |
| **KL/R value of 301.66 exceeds maximum of 200.00 for member "g50P" ??** | | | | | | | | | | | | | | | | |
| **g50X** | **M8** | **3.334** | **L/r** | **21.984** | **Rupture** | **358** | **12.66** | **3.334** | **33.300** | **33.750** | **24.985** | **21.984** | **0.000** | **0.000** | **0.000** | **0.000** |
| **0.000** | | **Automatic** | | | | | | | | | | | | | | |
| **KL/R value of 301.66 exceeds maximum of 200.00 for member "g50X" ??** | | | | | | | | | | | | | | | | |
| **g50XY** | **M8** | **3.334** | **L/r** | **21.984** | **Rupture** | **358** | **12.66** | **3.334** | **33.300** | **33.750** | **24.985** | **21.984** | **0.000** | **0.000** | **0.000** | **0.000** |
| **0.000** | | **Automatic** | | | | | | | | | | | | | | |
| **KL/R value of 301.66 exceeds maximum of 200.00 for member "g50XY" ??** | | | | | | | | | | | | | | | | |
| **g50Y** | **M8** | **3.334** | **L/r** | **21.984** | **Rupture** | **358** | **12.66** | **3.334** | **33.300** | **33.750** | **24.985** | **21.984** | **0.000** | **0.000** | **0.000** | **0.000** |
| **0.000** | | **Automatic** | | | | | | | | | | | | | | |
| **KL/R value of 301.66 exceeds maximum of 200.00 for member "g50Y" ??** | | | | | | | | | | | | | | | | |
| g51P | M14 | 14.788 | L/r | 9.281 | Net Sect | 60 | 5.00 | 14.788 | 33.300 | 33.750 | 9.281 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g51Y | M14 | 14.788 | L/r | 9.281 | Net Sect | 60 | 5.00 | 14.788 | 33.300 | 33.750 | 9.281 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g52P | M9 | 11.742 | L/r | 8.895 | Rupture | 141 | 5.00 | 11.742 | 16.650 | 12.656 | 19.184 | 8.895 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g52X | M9 | 11.742 | L/r | 8.895 | Rupture | 141 | 5.00 | 11.742 | 16.650 | 12.656 | 19.184 | 8.895 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g53P | M4 | 30.173 | L/r | 36.271 | Net Sect | 105 | 8.14 | 30.173 | 49.950 | 50.625 | 36.271 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g53X | M4 | 30.173 | L/r | 36.271 | Net Sect | 105 | 8.14 | 30.173 | 49.950 | 50.625 | 36.271 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g53XY | M4 | 30.173 | L/r | 36.271 | Net Sect | 105 | 8.14 | 30.173 | 49.950 | 50.625 | 36.271 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g53Y | M4 | 30.173 | L/r | 36.271 | Net Sect | 105 | 8.14 | 30.173 | 49.950 | 50.625 | 36.271 | 42.187 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g54P | M4 | 30.742 | L/r | 47.520 | Net Sect | 101 | 5.00 | 30.742 | 0.000 | 0.000 | 47.520 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g54Y | M4 | 30.742 | L/r | 47.520 | Net Sect | 101 | 5.00 | 30.742 | 0.000 | 0.000 | 47.520 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g55P | M3 | 26.226 | L/r | 28.125 | Rupture | 114 | 5.00 | 26.226 | 33.300 | 33.750 | 32.410 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g55X | M3 | 26.226 | L/r | 28.125 | Rupture | 114 | 5.00 | 26.226 | 33.300 | 33.750 | 32.410 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| **g56P** | **M7** | **4.262** | **L/r** | **16.488** | **Rupture** | **269** | **9.56** | **4.262** | **33.300** | **25.312** | **19.184** | **16.488** | **0.000** | **0.000** | **0.000** | **0.000** |
| **0.000** | | **Automatic** | | | | | | | | | | | | | | |
| **KL/R value of 233.23 exceeds maximum of 200.00 for member "g56P" ??** | | | | | | | | | | | | | | | | |
| **g56X** | **M7** | **4.262** | **L/r** | **16.488** | **Rupture** | **269** | **9.56** | **4.262** | **33.300** | **25.312** | **19.184** | **16.488** | **0.000** | **0.000** | **0.000** | **0.000** |
| **0.000** | | **Automatic** | | | | | | | | | | | | | | |

**KL/R value of 233.23 exceeds maximum of 200.00 for member "g56X" ??**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **g56XY** | **M7** | **4.262** | **L/r** | **16.488** | **Rupture** | **269** | **9.56** | **4.262** | **33.300** | **25.312** | **19.184** | **16.488** | **0.000** | **0.000** | **0.000** | **0.000** |
| **0.000** | | **Automatic** | | | | | | | | | | | | | | |

**KL/R value of 233.23 exceeds maximum of 200.00 for member "g56XY" ??**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **g56Y** | **M7** | **4.262** | **L/r** | **16.488** | **Rupture** | **269** | **9.56** | **4.262** | **33.300** | **25.312** | **19.184** | **16.488** | **0.000** | **0.000** | **0.000** | **0.000** |
| **0.000** | | **Automatic** | | | | | | | | | | | | | | |

**KL/R value of 233.23 exceeds maximum of 200.00 for member "g56Y" ??**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g57P | M9 | 11.742 | L/r | 8.895 | Rupture | 141 | 5.00 | 11.742 | 16.650 | 12.656 | 19.184 | 8.895 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g57X | M9 | 11.742 | L/r | 8.895 | Rupture | 141 | 5.00 | 11.742 | 16.650 | 12.656 | 19.184 | 8.895 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g58P | M14 | 14.788 | L/r | 9.281 | Net Sect | 60 | 5.00 | 14.788 | 33.300 | 33.750 | 9.281 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g58Y | M14 | 14.788 | L/r | 9.281 | Net Sect | 60 | 5.00 | 14.788 | 33.300 | 33.750 | 9.281 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g59P | M2 | 15.646 | L/r | 21.984 | Rupture | 165 | 10.56 | 15.646 | 33.300 | 33.750 | 28.846 | 21.984 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g59Y | M2 | 15.646 | L/r | 21.984 | Rupture | 165 | 10.56 | 15.646 | 33.300 | 33.750 | 28.846 | 21.984 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g60P | M2 | 15.646 | L/r | 21.984 | Rupture | 165 | 10.56 | 15.646 | 33.300 | 33.750 | 28.846 | 21.984 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g60X | M2 | 15.646 | L/r | 21.984 | Rupture | 165 | 10.56 | 15.646 | 33.300 | 33.750 | 28.846 | 21.984 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g61P | M5 | 28.782 | L/r | 25.078 | Rupture | 136 | 14.46 | 28.782 | 33.300 | 33.750 | 36.271 | 25.078 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g61Y | M5 | 28.782 | L/r | 25.078 | Rupture | 136 | 14.46 | 28.782 | 33.300 | 33.750 | 36.271 | 25.078 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g62P | M5 | 28.782 | L/r | 25.078 | Rupture | 136 | 14.46 | 28.782 | 33.300 | 33.750 | 36.271 | 25.078 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g62X | M5 | 28.782 | L/r | 25.078 | Rupture | 136 | 14.46 | 28.782 | 33.300 | 33.750 | 36.271 | 25.078 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g63P | M6 | 20.575 | L/r | 28.125 | Rupture | 192 | 20.00 | 20.575 | 33.300 | 33.750 | 44.624 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g63Y | M6 | 20.575 | L/r | 28.125 | Rupture | 192 | 20.00 | 20.575 | 33.300 | 33.750 | 44.624 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g64P | M6 | 20.575 | L/r | 28.125 | Rupture | 192 | 20.00 | 20.575 | 33.300 | 33.750 | 44.624 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g64X | M6 | 20.575 | L/r | 28.125 | Rupture | 192 | 20.00 | 20.575 | 33.300 | 33.750 | 44.624 | 28.125 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g65P | M11 | 16.800 | Shear | 16.800 | Shear | 171 | 14.14 | 35.163 | 16.800 | 21.094 | 99.560 | 23.437 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g65X | M11 | 16.800 | Shear | 16.800 | Shear | 171 | 14.14 | 35.163 | 16.800 | 21.094 | 99.560 | 23.437 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g65XY | M11 | 16.800 | Shear | 16.800 | Shear | 171 | 14.14 | 35.163 | 16.800 | 21.094 | 99.560 | 23.437 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g65Y | M11 | 16.800 | Shear | 16.800 | Shear | 171 | 14.14 | 35.163 | 16.800 | 21.094 | 99.560 | 23.437 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g66P | M12 | 14.062 | Bearing | 14.062 | Bearing | 177 | 10.22 | 15.475 | 16.800 | 14.062 | 45.088 | 15.625 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g66X | M12 | 14.062 | Bearing | 14.062 | Bearing | 177 | 10.22 | 15.475 | 16.800 | 14.062 | 45.088 | 15.625 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g66XY | M12 | 14.062 | Bearing | 14.062 | Bearing | 177 | 10.22 | 15.475 | 16.800 | 14.062 | 45.088 | 15.625 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g66Y | M12 | 14.062 | Bearing | 14.062 | Bearing | 177 | 10.22 | 15.475 | 16.800 | 14.062 | 45.088 | 15.625 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g67P | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g67X | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g67XY | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g67Y | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g68P | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g68X | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g68XY | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g68Y | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g69P | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g69X | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g69XY | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g69Y | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g70P | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g70X | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g70XY | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g70Y | M10 | 10.547 | Bearing | 10.547 | Bearing | 86 | 3.54 | 20.689 | 16.800 | 10.547 | 22.961 | 11.719 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g71P | PM | 907.332 | L/r | 969.998 | Net Sect | 38 | 20.00 | 907.332 | 0.000 | 0.000 | 969.998 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g72P | PM | 907.332 | L/r | 969.998 | Net Sect | 38 | 20.00 | 907.332 | 0.000 | 0.000 | 969.998 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g73P | PM | 788.892 | L/r | 969.998 | Net Sect | 65 | 34.00 | 788.892 | 0.000 | 0.000 | 969.998 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g74P | PM | 954.332 | L/r | 969.998 | Net Sect | 19 | 10.00 | 954.332 | 0.000 | 0.000 | 969.998 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g75P | PM | 947.438 | L/r | 969.998 | Net Sect | 23 | 12.00 | 947.438 | 0.000 | 0.000 | 969.998 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g76P | PM | 966.082 | L/r | 969.998 | Net Sect | 10 | 5.00 | 966.082 | 0.000 | 0.000 | 969.998 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g77P | PM | 959.972 | L/r | 969.998 | Net Sect | 15 | 8.00 | 959.972 | 0.000 | 0.000 | 969.998 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |
| g78P | PM | 934.748 | L/r | 969.998 | Net Sect | 29 | 15.00 | 934.748 | 0.000 | 0.000 | 969.998 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | | Automatic | | | | | | | | | | | | | | |

The model contains 242 angle members.

**Sum of Unfactored Dead Load and Drag Areas From Equipment, Input and Calculated:**

| Joint Label | Dead Load (kips) | X-Drag Area (ft^2) | Y-Drag Area (ft^2) |
|---|---|---|---|
| 1P | 0.115 | 5.508 | 4.079 |
| 2P | 0.137 | 6.008 | 5.414 |
| 3P | 0.0876 | 3.834 | 3.834 |
| 4P | 0.122 | 5.544 | 4.846 |
| 5P | 0.165 | 7.268 | 5.518 |
| 6P | 0.134 | 5.976 | 5.701 |

| | | | |
|---|---|---|---|
| 7P | 0.174 | 6.731 | 6.075 |
| 8P | 0.156 | 6.140 | 6.140 |
| 9P | 0.198 | 7.712 | 7.712 |
| 10P | 0.33 | 12.212 | 12.212 |
| 12P | 0.536 | 20.327 | 20.327 |
| 15P | 0.729 | 25.623 | 25.623 |
| 18P | 0.262 | 10.305 | 10.305 |
| 19P | 0.0653 | 3.479 | 1.146 |
| 20P | 0.0716 | 4.314 | 2.310 |
| 21P | 0.116 | 6.503 | 1.816 |
| 22P | 0.0662 | 3.859 | 1.790 |
| 23P | 0.707 | 15.000 | 15.000 |
| 24P | 0.813 | 17.250 | 17.250 |
| 25P | 0.53 | 11.250 | 11.250 |
| 1X | 0.115 | 5.508 | 4.079 |
| 1XY | 0.115 | 5.508 | 4.079 |
| 1Y | 0.115 | 5.508 | 4.079 |
| 2X | 0.137 | 6.008 | 5.414 |
| 2XY | 0.137 | 6.008 | 5.414 |
| 2Y | 0.137 | 6.008 | 5.414 |
| 3X | 0.0876 | 3.834 | 3.834 |
| 3XY | 0.0876 | 3.834 | 3.834 |
| 3Y | 0.0876 | 3.834 | 3.834 |
| 4X | 0.122 | 5.544 | 4.846 |
| 4XY | 0.122 | 5.544 | 4.846 |
| 4Y | 0.122 | 5.544 | 4.846 |
| 5X | 0.165 | 7.268 | 5.518 |
| 5XY | 0.165 | 7.268 | 5.518 |
| 5Y | 0.165 | 7.268 | 5.518 |
| 6X | 0.134 | 5.976 | 5.701 |
| 6XY | 0.134 | 5.976 | 5.701 |
| 6Y | 0.134 | 5.976 | 5.701 |
| 7X | 0.174 | 6.731 | 6.075 |
| 7XY | 0.174 | 6.731 | 6.075 |
| 7Y | 0.174 | 6.731 | 6.075 |
| 8X | 0.156 | 6.140 | 6.140 |
| 8XY | 0.156 | 6.140 | 6.140 |
| 8Y | 0.156 | 6.140 | 6.140 |
| 9X | 0.198 | 7.712 | 7.712 |
| 9XY | 0.198 | 7.712 | 7.712 |
| 9Y | 0.198 | 7.712 | 7.712 |
| 10X | 0.33 | 12.212 | 12.212 |
| 10XY | 0.33 | 12.212 | 12.212 |
| 10Y | 0.33 | 12.212 | 12.212 |
| 12X | 0.536 | 20.327 | 20.327 |
| 12XY | 0.536 | 20.327 | 20.327 |
| 12Y | 0.536 | 20.327 | 20.327 |
| 15X | 0.729 | 25.623 | 25.623 |
| 15XY | 0.729 | 25.623 | 25.623 |
| 15Y | 0.729 | 25.623 | 25.623 |
| 18X | 0.262 | 10.305 | 10.305 |
| 18XY | 0.262 | 10.305 | 10.305 |
| 18Y | 0.262 | 10.305 | 10.305 |
| 19X | 0.0653 | 3.479 | 1.146 |
| 20X | 0.0716 | 4.314 | 2.310 |
| 21X | 0.116 | 6.503 | 1.816 |
| 22X | 0.0662 | 3.859 | 1.790 |
| i0.50E20S | 1.76 | 38.333 | 38.333 |
| i0.50E40S | 2.03 | 44.718 | 44.718 |

| | | | |
|---|---|---|---|
| i0.50E74S | 1.58 | 34.042 | 34.042 |
| i0.50E84S | 0.799 | 17.542 | 17.542 |
| i0.50E96S | 0.622 | 13.792 | 13.792 |
| i0.50E101S | 0.481 | 10.792 | 10.792 |
| Total | 22.5 | 731.776 | 687.987 |

**Unadjusted Dead Load and Drag Areas by Section:**

| Section Label | Unfactored Dead Load (kips) | X-Drag Area All (ft^2) | Y-Drag Area All (ft^2) | X-Drag Area Face (ft^2) | Y-Drag Area Face (ft^2) |
|---|---|---|---|---|---|
| 3 | 7.708 | 268.639 | 224.850 | 157.737 | 122.008 |
| 2 | 6.690 | 211.489 | 211.489 | 112.724 | 112.724 |
| 1 | 8.129 | 251.649 | 251.649 | 130.666 | 130.666 |
| Total | 22.526 | 731.776 | 687.987 | 401.127 | 365.399 |

**Angle Member Weights and Surface Areas by Section:**

| Section Label | Unfactored Weight (kips) | Factored Weight (kips) | Unfactored Surface Area (ft^2) | Factored Surface Area (ft^2) |
|---|---|---|---|---|
| 3 | 7.708 | 8.093 | 1083.852 | 1138.044 |
| 2 | 6.690 | 6.690 | 902.796 | 902.796 |
| 1 | 8.129 | 8.942 | 1057.235 | 1162.959 |
| Total | 22.526 | 23.725 | 3043.883 | 3203.799 |

**Section Joint Information:**

| Section Label | Joint Label | Joint Elevation (ft) |
|---|---|---|
| 3 | 1X | 101.000 |
| 3 | 2X | 96.000 |
| 3 | 1P | 101.000 |
| 3 | 2P | 96.000 |
| 3 | 1Y | 101.000 |
| 3 | 2Y | 96.000 |
| 3 | 1XY | 101.000 |
| 3 | 2XY | 96.000 |
| 3 | 3X | 92.000 |
| 3 | 3P | 92.000 |
| 3 | 3Y | 92.000 |
| 3 | 3XY | 92.000 |
| 3 | 4X | 88.000 |
| 3 | 4P | 88.000 |
| 3 | 4Y | 88.000 |
| 3 | 4XY | 88.000 |
| 3 | 5X | 84.000 |
| 3 | 5P | 84.000 |
| 3 | 5Y | 84.000 |
| 3 | 5XY | 84.000 |
| 3 | 6X | 79.000 |
| 3 | 6P | 79.000 |
| 3 | 6Y | 79.000 |
| 3 | 6XY | 79.000 |
| 3 | 7X | 74.000 |

| | | |
|---|---|---|
| 3 | 7P | 74.000 |
| 3 | 7Y | 74.000 |
| 3 | 7XY | 74.000 |
| 3 | 19P | 101.000 |
| 3 | 19X | 101.000 |
| 3 | 20P | 96.000 |
| 3 | 20X | 96.000 |
| 3 | 21P | 84.000 |
| 3 | 21X | 84.000 |
| 3 | 22P | 74.000 |
| 3 | 22X | 74.000 |
| 3 | i0.50E74S | 74.000 |
| 3 | i0.50E84S | 84.000 |
| 3 | i0.50E96S | 96.000 |
| 3 | i0.50E101S | 101.000 |
| 3 | 24P | 109.000 |
| 3 | 25P | 124.000 |
| 2 | 7X | 74.000 |
| 2 | 8X | 69.000 |
| 2 | 7P | 74.000 |
| 2 | 8P | 69.000 |
| 2 | 7Y | 74.000 |
| 2 | 8Y | 69.000 |
| 2 | 7XY | 74.000 |
| 2 | 8XY | 69.000 |
| 2 | 9X | 62.000 |
| 2 | 9P | 62.000 |
| 2 | 9Y | 62.000 |
| 2 | 9XY | 62.000 |
| 2 | 10X | 54.000 |
| 2 | 10P | 54.000 |
| 2 | 10Y | 54.000 |
| 2 | 10XY | 54.000 |
| 2 | 12X | 40.000 |
| 2 | 12P | 40.000 |
| 2 | 12Y | 40.000 |
| 2 | 12XY | 40.000 |
| 2 | i0.50E40S | 40.000 |
| 2 | i0.50E74S | 74.000 |
| 1 | 12X | 40.000 |
| 1 | 15X | 20.000 |
| 1 | 12P | 40.000 |
| 1 | 15P | 20.000 |
| 1 | 12Y | 40.000 |
| 1 | 15Y | 20.000 |
| 1 | 12XY | 40.000 |
| 1 | 15XY | 20.000 |
| 1 | 18X | 0.000 |
| 1 | 18P | 0.000 |
| 1 | 18Y | 0.000 |
| 1 | 18XY | 0.000 |
| 1 | i0.50E20S | 20.000 |
| 1 | 23P | 0.000 |
| 1 | i0.50E40S | 40.000 |

**Sections Information:**

| Section Label | Top Z | Bottom Z | Joint Count | Member Count | Tran. Face Top Width | Tran. Face Bot Width | Tran. Face Gross Area | Long. Face Top Width | Long. Face Bot Width | Long. Face Gross Area |
|---|---|---|---|---|---|---|---|---|---|---|

| | (ft) | (ft) | | | (ft) | (ft) | (ft^2) | (ft) | (ft) | (ft^2) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 124.000 | 74.000 | 42 | 147 | 0.00 | 5.00 | 192.500 | 0.00 | 20.50 | 629.500 | Problem calculating gross area of longitudinal face for section "3": width is zero at elevation 101.00 (ft) which is not the top of the section. ?? |
| 2 | 74.000 | 40.000 | 22 | 61 | 5.00 | 14.46 | 330.830 | 5.00 | 14.46 | 330.830 | |
| 1 | 40.000 | 0.000 | 15 | 34 | 14.46 | 25.50 | 799.600 | 14.46 | 25.50 | 799.600 | |

*** Insulator Data

**Clamp Properties:**

| Label | Stock Number | Holding Capacity (lbs) |
|---|---|---|
| C-EX1 | | 5e+004 |

**Clamp Insulator Connectivity:**

| Clamp Label | Structure And Tip Attach | Property Set | Min. Required Vertical Load (uplift) (lbs) |
|---|---|---|---|
| Clamp1 | 19P | C-EX1 | No Limit |
| Clamp2 | 19X | C-EX1 | No Limit |
| Clamp3 | 20P | C-EX1 | No Limit |
| Clamp4 | 20X | C-EX1 | No Limit |
| Clamp5 | 21P | C-EX1 | No Limit |
| Clamp6 | 21X | C-EX1 | No Limit |
| Clamp7 | 22P | C-EX1 | No Limit |
| Clamp8 | 22X | C-EX1 | No Limit |
| Clamp9 | 3X | C-EX1 | No Limit |
| Clamp10 | 5X | C-EX1 | No Limit |
| Clamp11 | 7X | C-EX1 | No Limit |
| Clamp12 | 9X | C-EX1 | No Limit |
| Clamp13 | 10X | C-EX1 | No Limit |
| Clamp14 | 12X | C-EX1 | No Limit |
| Clamp15 | 15X | C-EX1 | No Limit |
| Clamp17 | i0.50E101S | C-EX1 | No Limit |
| Clamp18 | i0.50E96S | C-EX1 | No Limit |
| Clamp19 | i0.50E84S | C-EX1 | No Limit |
| Clamp20 | i0.50E74S | C-EX1 | No Limit |
| Clamp21 | i0.50E40S | C-EX1 | No Limit |
| Clamp22 | i0.50E20S | C-EX1 | No Limit |
| Clamp23 | 1X | C-EX1 | No Limit |
| Clamp24 | 1XY | C-EX1 | No Limit |
| Clamp25 | 2X | C-EX1 | No Limit |
| Clamp26 | 2XY | C-EX1 | No Limit |
| Clamp27 | 24P | C-EX1 | No Limit |
| Clamp28 | 25P | C-EX1 | No Limit |

*** Loads Data

Loads from file: j:\jobs\1331700.wi\04_structural\backup documentation\calcs\rev (3) - ret cables added\pls tower\cl&p # 1321.lca

Insulator dead and wind loads are already included in the point loads printed below.

Loading Method Parameters:

Structure Height Summary (used for calculating wind/ice adjust with height):

| | | | |
|---|---|---|---|
| Z of ground for wind height adjust | 0.00 | (ft) | and structure Z coordinate that will be put on the centerline ground profile in PLS-CADD. |
| Ground elevation shift | 0.00 | (ft) | |
| Z of ground with shift | 0.00 | (ft) | |
| Z of structure top (highest joint) | 124.00 | (ft) | |
| Structure height | 124.00 | (ft) | |
| Structure height above ground | 124.00 | (ft) | |
| Tower Shape | Rectangular | | |

Load distributed evenly among joints in section for section based load cases

**Vector Load Cases:**

| Load Case Description | Dead Load Factor | Wind Area Factor | SF for Steel Poles Tubular Arms and Towers | SF for Guys and Cables | SF for Insuls. | SF For Found. | Point Loads | Wind/Ice Model | Trans. Wind Pressure (psf) | Longit. Wind Pressure (psf) | Ice Thick. (in) | Ice Density (lbs/ft^3) | Temperature (deg F) | Joint Displ. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NESC Heavy | 1.5000 | 2.5000 | 1.00000 | 1.0000 | 1.0000 | 1.0000 | 25 loads | Wind on Face | 4 | 0 | 0.000 | 56.000 | 0.0 | |
| NESC Extreme | 1.0000 | 1.0000 | 1.00000 | 1.0000 | 1.0000 | 1.0000 | 25 loads | NESC 2007 | 31 | 0 | 0.000 | 0.000 | 0.0 | |

**Point Loads for Load Case "NESC Heavy":**

| Joint Label | Vertical Load (lbs) | Transverse Load (lbs) | Longitudinal Load (lbs) | Load Comment |
|---|---|---|---|---|
| 19P | 1282 | 1147 | 0 | Shield Wire |
| 19X | 1191 | 1135 | 0 | Shield Wire |
| 20P | 2739 | 1785 | 0 | Conductor |
| 20X | 2739 | 1785 | 0 | Conductor |
| 21P | 2739 | 1785 | 0 | Conductor |
| 21X | 2739 | 1785 | 0 | Conductor |
| 22P | 2739 | 1785 | 0 | Conductor |
| 22X | 2739 | 1785 | 0 | Conductor |
| 1X | 199 | 131 | 0 | Coax Cables - Tower |
| 3X | 318 | 209 | 0 | Coax Cables - Tower |
| 5X | 358 | 235 | 0 | Coax Cables - Tower |
| 7X | 437 | 287 | 0 | Coax Cables - Tower |
| 9X | 398 | 261 | 0 | Coax Cables - Tower |
| 10X | 437 | 287 | 0 | Coax Cables - Tower |
| 12X | 676 | 444 | 0 | Coax Cables - Tower |
| 15X | 1193 | 784 | 0 | Coax Cables - Tower |
| 24P | 205 | 0 | 0 | Coax Cables - Powermount |
| i0.50E101S | 249 | 0 | 0 | Coax Cables - Powermount |
| i0.50E96S | 151 | 0 | 0 | Coax Cables - Powermount |
| i0.50E84S | 196 | 0 | 0 | Coax Cables - Powermount |

| | | | | |
|---|---|---|---|---|
| i0.50E74S | 392 | 0 | 0 | Coax Cables - Powermount |
| i0.50E40S | 481 | 0 | 0 | Coax Cables - Powermount |
| i0.50E20S | 535 | 0 | 0 | Coax Cables - Powermount |
| 25P | 7563 | 1200 | 0 | AT&T Loading |
| 24P | 467 | 266 | 0 | T-Mobile Loading |

**Section Load Case Information (Standard) for "NESC Heavy":**

| Section Label | Z of Top (ft) | Z of Bottom (ft) | Ave. Elev. Above Ground (ft) | Res. Adj. Wind Pres. (psf) | Tran Adj. Wind Pres. (psf) | Tran Drag Coef | Tran Wind Load (lbs) | Long Adj. Wind Pres. (psf) | Long Drag Coef | Long Wind Load (lbs) | Ice Weight (lbs) | Total Weight (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 124.00 | 74.00 | 99.00 | 10.00 | 10.00 | 3.300 | 4026.3 | 0.00 | 3.300 | 0.0 | 0 | 12140 |
| 2 | 74.00 | 40.00 | 57.00 | 10.00 | 10.00 | 3.200 | 3607.2 | 0.00 | 3.200 | 0.0 | 0 | 10035 |
| 1 | 40.00 | 0.00 | 20.00 | 10.00 | 10.00 | 3.400 | 4442.7 | 0.00 | 3.400 | 0.0 | 0 | 13412 |

**Point Loads for Load Case "NESC Extreme":**

| Joint Label | Vertical Load (lbs) | Transverse Load (lbs) | Longitudinal Load (lbs) | Load Comment |
|---|---|---|---|---|
| 19P | 364 | 705 | 26 | Shield Wire |
| 19X | 294 | 697 | 9 | Shield Wire |
| 20P | 1007 | 1917 | 772 | Conductor |
| 20X | 1007 | 1917 | 772 | Conductor |
| 21P | 1007 | 1917 | 772 | Conductor |
| 21X | 1007 | 1917 | 772 | Conductor |
| 22P | 1007 | 1917 | 772 | Conductor |
| 22X | 1007 | 1917 | 772 | Conductor |
| 1X | 41 | 430 | 0 | Coax Cables - Tower |
| 3X | 66 | 688 | 0 | Coax Cables - Tower |
| 5X | 75 | 775 | 0 | Coax Cables - Tower |
| 7X | 91 | 947 | 0 | Coax Cables - Tower |
| 9X | 83 | 861 | 0 | Coax Cables - Tower |
| 10X | 91 | 947 | 0 | Coax Cables - Tower |
| 12X | 141 | 1463 | 0 | Coax Cables - Tower |
| 15X | 248 | 2582 | 0 | Coax Cables - Tower |
| 24P | 137 | 0 | 0 | Coax Cables - Powermount |
| i0.50E101S | 166 | 0 | 0 | Coax Cables - Powermount |
| i0.50E96S | 101 | 0 | 0 | Coax Cables - Powermount |
| i0.50E84S | 131 | 0 | 0 | Coax Cables - Powermount |
| i0.50E74S | 261 | 0 | 0 | Coax Cables - Powermount |
| i0.50E40S | 321 | 0 | 0 | Coax Cables - Powermount |
| i0.50E20S | 356 | 0 | 0 | Coax Cables - Powermount |
| 25P | 3557 | 4566 | 0 | AT&T Loading |
| 24P | 182 | 1059 | 0 | T-Mobile Loading |

**Section Load Case Information (Code) for "NESC Extreme":**

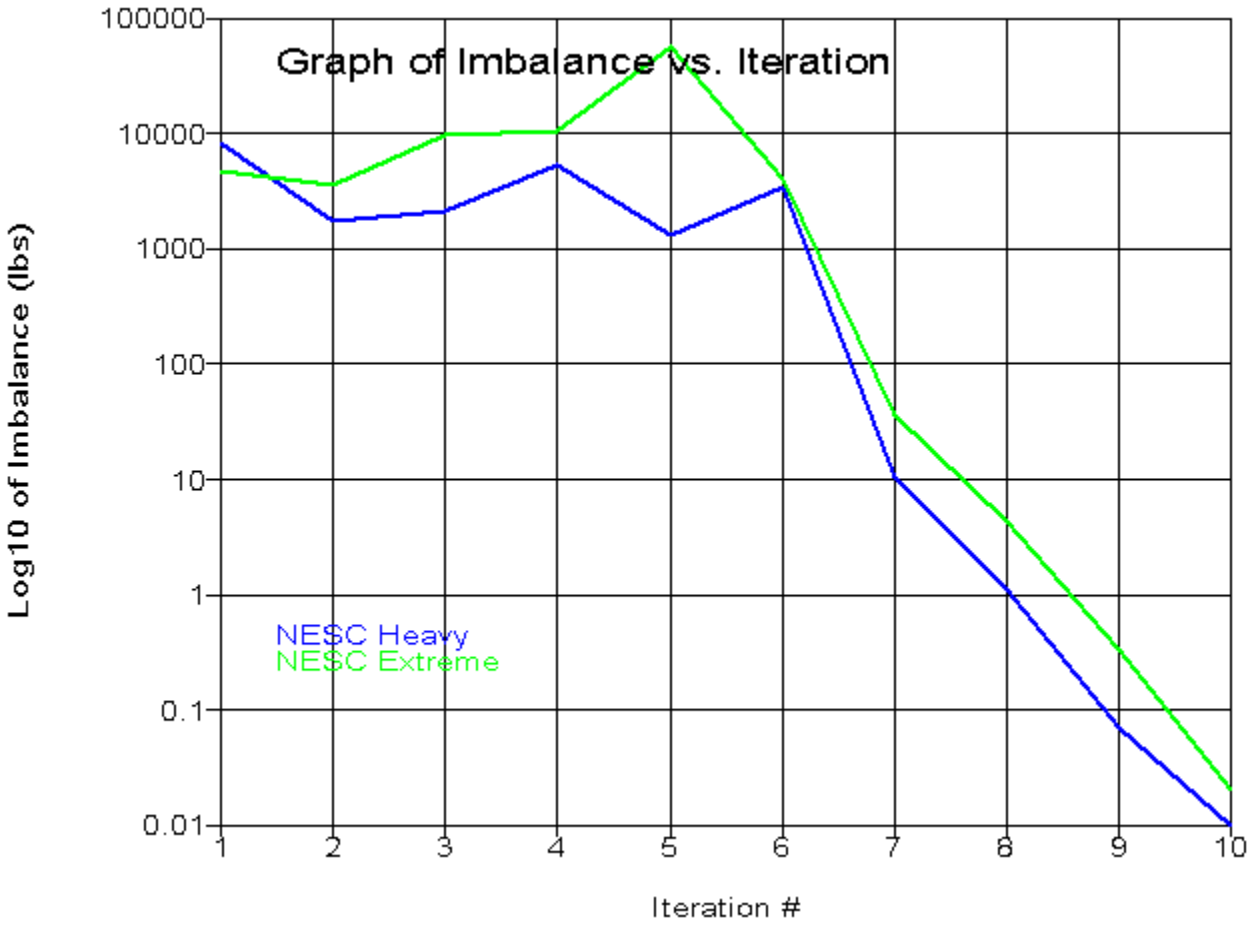
| Section Label | Z of Top (ft) | Z of Bottom (ft) | Ave. Elev. Above Ground (ft) | Res. Adj. Wind Pres. (psf) | Tran Adj. Wind Pres. (psf) | Tran Angle Face Area (ft^2) | Tran Round Face Area (ft^2) | Tran Gross Area (ft^2) | Tran Soli- dity Ratio | Tran Angle Drag Coef | Tran Round Drag Coef | Tran Wind Load (lbs) | Long Adj. Wind Pres. (psf) | Long Angle Face Area (ft^2) | Long Round Face Area (ft^2) | Long Gross Area (ft^2) | Long Soli- dity Ratio | Long Angle Drag Coef | Long Round Drag Coef | Long Wind Load (lbs) | Ice Weight (lbs) | Total Weight (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 124.00 | 74.00 | 99.00 | 10.00 | 10.00 | 3.300 | 4026.3 | 0.00 | 3.300 | 0.0 | 0 | 12140 | | | | | | | | | | |
| 2 | 74.00 | 40.00 | 57.00 | 10.00 | 10.00 | 3.200 | 3607.2 | 0.00 | 3.200 | 0.0 | 0 | 10035 | | | | | | | | | | |
| 1 | 40.00 | 0.00 | 20.00 | 10.00 | 10.00 | 3.400 | 4442.7 | 0.00 | 3.400 | 0.0 | 0 | 13412 | | | | | | | | | | |

**(lbs)**

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 124.00 | 74.00 | 99.00 | 32.15 | 32.15 | 54.51 | 67.50 | 192.50 | 0.634 | 3.200 | 2.000 | 9947.9 | 0.00 | 82.74 | 75.00 | 629.50 | 0.251 | 3.200 | 2.000 | 0.0 | 0 |
| 8093 | | | | | | | | | | | | | | | | | | | | | |
| 2 | 74.00 | 40.00 | 57.00 | 32.15 | 32.15 | 61.72 | 51.00 | 330.83 | 0.341 | 3.200 | 2.000 | 9629.3 | 0.00 | 61.72 | 51.00 | 330.83 | 0.341 | 3.200 | 2.000 | 0.0 | 0 |
| 6690 | | | | | | | | | | | | | | | | | | | | | |
| 1 | 40.00 | 0.00 | 20.00 | 32.15 | 32.15 | 70.67 | 60.00 | 799.60 | 0.163 | 3.200 | 2.000 | 11128.0 | 0.00 | 70.67 | 60.00 | 799.60 | 0.163 | 3.200 | 2.000 | 0.0 | 0 |
| 8942 | | | | | | | | | | | | | | | | | | | | | |

*** Analysis Results:

Maximum element usage is 94.03% for Angle "g37X" in load case "NESC Extreme"
Maximum insulator usage is 17.09% for Clamp "Clamp28" in load case "NESC Heavy"




**Angle Forces For All Load Cases:**
**Positive for tension - negative for compression**

| Group Label | Angle Label | Max. Usage For All LC % | Max. Tens. For All LC (kips) | Max. Comp. For All LC (kips) | LC 1 (kips) | LC 2 (kips) |
|---|---|---|---|---|---|---|
| Leg1 | g3P | 9.37 | 5.986 | 0.000 | 0.732 | 5.986 |
| Leg1 | g3X | 8.15 | 0.000 | -7.296 | -4.670 | -7.296 |
| Leg1 | g3XY | 8.49 | 0.000 | -7.594 | -4.613 | -7.594 |
| Leg1 | g3Y | 8.98 | 5.740 | 0.000 | 0.869 | 5.740 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Leg1 | g4P | 24.82 | 15.859 | 0.000 | 5.796 | 15.859 |
| Leg1 | g4X | 19.23 | 0.000 | -17.937 | -9.515 | -17.937 |
| Leg1 | g4XY | 18.58 | 0.000 | -17.330 | -9.444 | -17.330 |
| Leg1 | g4Y | 25.86 | 16.520 | 0.000 | 5.883 | 16.520 |
| Leg1 | g5P | 34.49 | 22.039 | 0.000 | 8.489 | 22.039 |
| Leg1 | g5X | 28.47 | 0.000 | -26.555 | -14.767 | -26.555 |
| Leg1 | g5XY | 26.36 | 0.000 | -24.584 | -14.664 | -24.584 |
| Leg1 | g5Y | 37.13 | 23.726 | 0.000 | 8.872 | 23.726 |
| Leg1 | g6P | 42.22 | 26.977 | 0.000 | 10.601 | 26.977 |
| Leg1 | g6X | 35.88 | 0.000 | -33.460 | -19.428 | -33.460 |
| Leg1 | g6XY | 32.68 | 0.000 | -30.476 | -19.217 | -30.476 |
| Leg1 | g6Y | 45.31 | 28.951 | 0.000 | 10.934 | 28.951 |
| Leg1 | g7P | 54.02 | 34.517 | 0.000 | 15.315 | 34.517 |
| Leg1 | g7X | 48.28 | 0.000 | -43.203 | -23.809 | -43.203 |
| Leg1 | g7XY | 40.81 | 0.000 | -36.519 | -23.844 | -36.519 |
| Leg1 | g7Y | 58.93 | 37.654 | 0.000 | 16.138 | 37.654 |
| Leg1 | g8P | 61.06 | 42.814 | 0.000 | 19.403 | 42.814 |
| Leg1 | g8X | 61.73 | 0.000 | -55.238 | -30.425 | -55.238 |
| Leg1 | g8XY | 48.96 | 0.000 | -43.810 | -31.099 | -43.810 |
| Leg1 | g8Y | 65.89 | 46.201 | 0.000 | 20.708 | 46.201 |
| Leg2 | g9P | 51.37 | 50.938 | 0.000 | 24.906 | 50.938 |
| Leg2 | g9X | 69.04 | 0.000 | -67.631 | -37.436 | -67.631 |
| Leg2 | g9XY | 54.62 | 0.000 | -53.508 | -38.254 | -53.508 |
| Leg2 | g9Y | 58.83 | 58.334 | 0.000 | 26.780 | 58.334 |
| Leg2 | g10P | 56.50 | 51.183 | 0.000 | 26.954 | 51.183 |
| Leg2 | g10X | 78.32 | 0.000 | -71.601 | -41.155 | -71.601 |
| Leg2 | g10XY | 64.43 | 0.000 | -58.905 | -41.784 | -58.905 |
| Leg2 | g10Y | 70.59 | 63.942 | 0.000 | 28.376 | 63.942 |
| Leg3 | g11P | 45.30 | 50.466 | 0.000 | 27.373 | 50.466 |
| Leg3 | g11X | 60.85 | 0.000 | -70.495 | -41.399 | -70.495 |
| Leg3 | g11XY | 51.79 | 0.000 | -59.995 | -41.819 | -59.995 |
| Leg3 | g11Y | 58.97 | 65.691 | 0.000 | 28.652 | 65.691 |
| Leg3 | g12P | 42.17 | 45.564 | 0.000 | 26.962 | 45.564 |
| Leg3 | g12X | 62.60 | 0.000 | -76.628 | -43.515 | -76.628 |
| Leg3 | g12XY | 52.13 | 0.000 | -63.814 | -43.449 | -63.814 |
| Leg3 | g12Y | 60.39 | 65.239 | 0.000 | 27.834 | 65.239 |
| Leg3 | g13P | 43.60 | 47.110 | 0.000 | 25.662 | 47.110 |
| Leg3 | g13X | 68.61 | 0.000 | -85.389 | -49.323 | -85.389 |
| Leg3 | g13XY | 56.21 | 0.000 | -69.957 | -47.413 | -69.957 |
| Leg3 | g13Y | 60.98 | 65.885 | 0.000 | 26.550 | 65.885 |
| Leg3 | g14P | 50.77 | 54.851 | 0.000 | 27.108 | 54.851 |
| Leg3 | g14X | 75.61 | 0.000 | -94.104 | -53.743 | -94.104 |
| Leg3 | g14XY | 59.54 | 0.000 | -74.110 | -50.522 | -74.110 |
| Leg3 | g14Y | 65.31 | 70.562 | 0.000 | 27.477 | 70.562 |
| Diag1 | g15P | 56.35 | 0.000 | -9.852 | -4.249 | -9.852 |
| Diag1 | g15X | 49.36 | 9.469 | 0.000 | 3.923 | 9.469 |
| Diag1 | g15XY | 50.08 | 9.608 | 0.000 | 3.869 | 9.608 |
| Diag1 | g15Y | 54.26 | 0.000 | -9.487 | -4.166 | -9.487 |
| Diag1 | g16P | 3.60 | 0.000 | -0.471 | -0.471 | -0.433 |
| Diag1 | g16X | 3.06 | 0.588 | -0.028 | -0.028 | 0.588 |
| Diag1 | g16XY | 0.80 | 0.153 | -0.020 | -0.020 | 0.153 |
| Diag1 | g16Y | 5.57 | 0.000 | -0.728 | -0.492 | -0.728 |
| Diag2 | g17P | 24.85 | 0.000 | -6.033 | -4.282 | -6.033 |
| Diag2 | g17X | 18.93 | 4.730 | 0.000 | 2.009 | 4.730 |
| Diag2 | g17XY | 19.43 | 4.854 | 0.000 | 2.077 | 4.854 |
| Diag2 | g17Y | 23.62 | 0.000 | -5.735 | -4.229 | -5.735 |
| Diag2 | g18P | 0.47 | 0.119 | 0.000 | 0.119 | 0.039 |
| Diag2 | g18X | 4.57 | 1.142 | 0.000 | 0.478 | 1.142 |
| Diag2 | g18XY | 1.75 | 0.436 | 0.000 | 0.436 | 0.052 |

| | | | | | |
|---|---|---|---|---|---|
| Diag2 | g18Y | 4.11 | 0.148 | -0.779 | 0.148 | -0.779 |
| Diag2 | g19P | 23.79 | 0.000 | -5.778 | -2.254 | -5.778 |
| Diag2 | g19X | 24.97 | 6.239 | 0.000 | 4.379 | 6.239 |
| Diag2 | g19XY | 24.04 | 6.007 | 0.000 | 4.323 | 6.007 |
| Diag2 | g19Y | 20.58 | 0.000 | -4.996 | -2.070 | -4.996 |
| Diag2 | g20P | 1.75 | 0.437 | -0.328 | -0.328 | 0.437 |
| Diag2 | g20X | 1.78 | 0.263 | -0.338 | -0.338 | 0.263 |
| Diag2 | g20XY | 3.50 | 0.000 | -0.850 | -0.381 | -0.850 |
| Diag2 | g20Y | 1.64 | 0.000 | -0.397 | -0.299 | -0.397 |
| Diag2 | g21P | 26.61 | 0.000 | -6.460 | -2.930 | -6.460 |
| Diag2 | g21X | 23.90 | 5.972 | 0.000 | 3.801 | 5.972 |
| Diag2 | g21XY | 25.73 | 6.428 | 0.000 | 3.738 | 6.428 |
| Diag2 | g21Y | 21.57 | 0.000 | -5.237 | -2.816 | -5.237 |
| Diag2 | g22P | 10.40 | 0.000 | -1.972 | -1.506 | -1.972 |
| Diag2 | g22X | 11.97 | 2.990 | 0.000 | 0.912 | 2.990 |
| Diag2 | g22XY | 6.34 | 1.584 | 0.000 | 0.868 | 1.584 |
| Diag2 | g22Y | 16.66 | 0.000 | -3.160 | -1.485 | -3.160 |
| Diag3 | g23P | 30.55 | 0.000 | -8.888 | -4.995 | -8.888 |
| Diag3 | g23X | 27.31 | 7.878 | 0.000 | 4.537 | 7.878 |
| Diag3 | g23XY | 25.26 | 7.286 | 0.000 | 4.608 | 7.286 |
| Diag3 | g23Y | 23.04 | 0.000 | -6.703 | -4.941 | -6.703 |
| Diag3 | g24P | 11.82 | 0.000 | -2.868 | -2.564 | -2.868 |
| Diag3 | g24X | 16.70 | 4.817 | 0.000 | 1.792 | 4.817 |
| Diag3 | g24XY | 9.47 | 2.731 | 0.000 | 1.533 | 2.731 |
| Diag3 | g24Y | 22.09 | 0.000 | -5.359 | -2.203 | -5.359 |
| Diag3 | g25P | 32.46 | 0.000 | -9.444 | -4.983 | -9.444 |
| Diag3 | g25X | 26.70 | 7.703 | 0.000 | 4.509 | 7.703 |
| Diag3 | g25XY | 26.81 | 7.733 | 0.000 | 4.691 | 7.733 |
| Diag3 | g25Y | 22.65 | 0.000 | -6.589 | -5.049 | -6.589 |
| Diag3 | g26P | 23.41 | 0.000 | -5.679 | -4.586 | -5.679 |
| Diag3 | g26X | 26.20 | 7.556 | 0.000 | 2.935 | 7.556 |
| Diag3 | g26XY | 17.70 | 5.105 | 0.000 | 2.702 | 5.105 |
| Diag3 | g26Y | 34.77 | 0.000 | -8.434 | -4.280 | -8.434 |
| Diag4 | g27P | 5.35 | 0.000 | -1.704 | -1.704 | -1.185 |
| Diag4 | g27X | 2.30 | 0.766 | -0.090 | 0.766 | -0.090 |
| Diag4 | g27XY | 3.45 | 1.150 | 0.000 | 0.416 | 1.150 |
| Diag4 | g27Y | 4.46 | 0.000 | -1.421 | -1.421 | -1.145 |
| Diag4 | g28P | 10.05 | 0.000 | -2.832 | -1.409 | -2.832 |
| Diag4 | g28X | 10.01 | 3.334 | 0.000 | 0.894 | 3.334 |
| Diag4 | g28XY | 2.71 | 0.903 | 0.000 | 0.903 | 0.228 |
| Diag4 | g28Y | 6.13 | 0.000 | -1.726 | -1.266 | -1.726 |
| Diag3 | g29P | 5.69 | 0.000 | -1.033 | -1.033 | -0.668 |
| Diag3 | g29X | 4.46 | 1.255 | 0.000 | 1.184 | 1.255 |
| Diag3 | g29XY | 4.69 | 1.320 | 0.000 | 0.961 | 1.320 |
| Diag3 | g29Y | 9.08 | 0.000 | -1.647 | -0.730 | -1.647 |
| Diag3 | g30P | 4.04 | 1.137 | 0.000 | 0.919 | 1.137 |
| Diag3 | g30X | 4.00 | 0.026 | -0.655 | -0.655 | 0.026 |
| Diag3 | g30XY | 15.31 | 0.000 | -2.508 | -0.649 | -2.508 |
| Diag3 | g30Y | 7.56 | 2.128 | 0.000 | 0.999 | 2.128 |
| Diag3 | g31P | 19.14 | 0.000 | -2.604 | -1.481 | -2.604 |
| Diag3 | g31X | 3.28 | 0.923 | 0.000 | 0.719 | 0.923 |
| Diag3 | g31XY | 5.69 | 1.601 | 0.000 | 0.491 | 1.601 |
| Diag3 | g31Y | 11.69 | 0.000 | -1.590 | -0.960 | -1.590 |
| Diag3 | g32P | 12.20 | 0.000 | -1.517 | -0.858 | -1.517 |
| Diag3 | g32X | 6.18 | 1.739 | 0.000 | 0.336 | 1.739 |
| Diag3 | g32XY | 1.43 | 0.403 | -0.134 | 0.403 | -0.134 |
| Diag3 | g32Y | 7.94 | 0.000 | -0.987 | -0.691 | -0.987 |
| Diag5 | g33P | 58.26 | 0.000 | -2.522 | -2.522 | 0.000 |
| Diag5 | g33X | 21.11 | 5.275 | 0.000 | 0.250 | 5.275 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Diag5 | g33XY | 7.81 | 1.950 | -0.147 | -0.147 | 1.950 |
| Diag5 | g33Y | 44.71 | 0.000 | -1.936 | -1.791 | -1.936 |
| Diag5 | g34P | 16.68 | 0.000 | -0.722 | 0.000 | -0.722 |
| Diag5 | g34X | 26.63 | 6.653 | 0.000 | 2.781 | 6.653 |
| Diag5 | g34XY | 20.07 | 5.015 | 0.000 | 2.921 | 5.015 |
| Diag5 | g34Y | 0.18 | 0.046 | 0.000 | 0.046 | 0.000 |
| Diag5 | g35P | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| Diag5 | g35X | 46.51 | 10.226 | 0.000 | 4.028 | 10.226 |
| Diag5 | g35XY | 22.87 | 5.027 | 0.000 | 2.291 | 5.027 |
| Diag5 | g35Y | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| Diag5 | g36P | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| Diag5 | g36X | 30.75 | 6.760 | 0.000 | 2.817 | 6.760 |
| Diag5 | g36XY | 29.22 | 6.423 | 0.000 | 3.155 | 6.423 |
| Diag5 | g36Y | 34.02 | 0.000 | -0.831 | 0.000 | -0.831 |
| Diag5 | g37P | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| Diag5 | g37X | 94.03 | 11.151 | 0.000 | 4.772 | 11.151 |
| Diag5 | g37XY | 46.32 | 5.493 | 0.000 | 2.786 | 5.493 |
| Diag5 | g37Y | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| Diag5 | g38P | 0.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| Diag5 | g38X | 53.39 | 6.332 | 0.000 | 2.479 | 6.332 |
| Diag5 | g38XY | 47.43 | 5.624 | 0.000 | 2.665 | 5.624 |
| Diag5 | g38Y | 21.42 | 0.000 | -0.281 | 0.000 | -0.281 |
| M4 | g39P | 1.16 | 0.000 | -0.328 | -0.051 | -0.328 |
| M4 | g39X | 3.94 | 1.109 | 0.000 | 1.109 | 0.653 |
| M4 | g39XY | 3.95 | 1.112 | 0.000 | 1.112 | 0.700 |
| M4 | g39Y | 0.69 | 0.000 | -0.196 | -0.044 | -0.196 |
| M4 | g40P | 6.70 | 3.183 | 0.000 | 3.183 | 0.928 |
| M4 | g40Y | 6.80 | 3.233 | 0.000 | 3.233 | 1.557 |
| M3 | g41P | 25.77 | 0.000 | -6.760 | -3.626 | -6.760 |
| M3 | g41X | 19.60 | 5.763 | 0.000 | 0.979 | 5.763 |
| M4 | g42P | 15.45 | 0.000 | -4.805 | -4.805 | -3.635 |
| M4 | g42X | 8.82 | 0.000 | -2.744 | -2.744 | -1.181 |
| M4 | g42XY | 8.80 | 0.551 | -2.738 | -2.738 | 0.551 |
| M4 | g42Y | 15.40 | 0.000 | -4.791 | -4.791 | -1.764 |
| M4 | g43P | 8.03 | 0.000 | -2.468 | -2.468 | -1.650 |
| M4 | g43Y | 8.16 | 0.000 | -2.507 | -2.507 | -0.230 |
| M3 | g44P | 13.89 | 4.085 | 0.000 | 2.781 | 4.085 |
| M3 | g44X | 11.75 | 0.000 | -3.082 | -0.083 | -3.082 |
| M7 | g45P | 24.59 | 0.000 | -1.760 | -1.760 | -0.700 |
| M7 | g45X | 22.94 | 0.000 | -1.643 | -1.643 | -0.609 |
| M7 | g46P | 21.38 | 3.855 | 0.000 | 3.855 | 1.276 |
| M7 | g46X | 20.87 | 3.763 | 0.000 | 3.763 | 1.119 |
| M7 | g46XY | 20.85 | 3.761 | 0.000 | 3.761 | 1.884 |
| M7 | g46Y | 21.33 | 3.847 | 0.000 | 3.847 | 1.886 |
| M13 | g47P | 15.61 | 0.000 | -5.310 | -5.310 | -4.179 |
| M13 | g47X | 9.98 | 0.000 | -3.396 | -3.396 | -1.821 |
| M13 | g47XY | 10.10 | 0.539 | -3.437 | -3.437 | 0.539 |
| M13 | g47Y | 15.56 | 0.000 | -5.293 | -5.293 | -1.584 |
| M13 | g48P | 10.84 | 0.000 | -4.083 | -4.083 | -2.501 |
| M13 | g48Y | 10.63 | 0.000 | -4.004 | -4.004 | -1.027 |
| M3 | g49P | 11.35 | 0.000 | -2.976 | -0.249 | -2.976 |
| M3 | g49X | 14.96 | 4.399 | 0.000 | 3.627 | 4.399 |
| M8 | g50P | 20.88 | 4.591 | 0.000 | 4.591 | 1.274 |
| M8 | g50X | 20.68 | 4.546 | 0.000 | 4.546 | 1.125 |
| M8 | g50XY | 20.91 | 4.597 | 0.000 | 4.597 | 2.558 |
| M8 | g50Y | 20.85 | 4.584 | 0.000 | 4.584 | 2.469 |
| M14 | g51P | 30.33 | 2.815 | 0.000 | 2.815 | 1.049 |
| M14 | g51Y | 29.88 | 2.773 | 0.000 | 2.773 | 1.388 |
| M9 | g52P | 17.01 | 0.000 | -1.998 | -1.300 | -1.998 |

| | | | | | | |
|---|---|---|---|---|---|---|
| M9 | g52X | 20.08 | 1.786 | 0.000 | 0.620 | 1.786 |
| M4 | g53P | 11.00 | 0.000 | -3.319 | -3.319 | -2.953 |
| M4 | g53X | 4.26 | 0.000 | -1.286 | -1.286 | -0.667 |
| M4 | g53XY | 4.66 | 1.058 | -1.406 | -1.406 | 1.058 |
| M4 | g53Y | 10.78 | 0.000 | -3.254 | -3.254 | -1.280 |
| M4 | g54P | 7.52 | 0.000 | -2.312 | -2.312 | -2.118 |
| M4 | g54Y | 7.13 | 0.000 | -2.193 | -2.193 | -0.109 |
| M3 | g55P | 3.90 | 1.097 | 0.000 | 1.097 | 0.997 |
| M3 | g55X | 2.13 | 0.600 | -0.203 | 0.600 | -0.203 |
| M7 | g56P | 16.67 | 2.748 | 0.000 | 2.748 | 0.651 |
| M7 | g56X | 15.86 | 2.614 | 0.000 | 2.614 | 0.636 |
| M7 | g56XY | 16.74 | 2.760 | 0.000 | 2.760 | 1.570 |
| M7 | g56Y | 16.24 | 2.678 | 0.000 | 2.678 | 1.652 |
| M9 | g57P | 83.05 | 7.387 | 0.000 | 4.005 | 7.387 |
| M9 | g57X | 61.16 | 0.000 | -7.181 | -3.728 | -7.181 |
| M14 | g58P | 23.98 | 2.226 | 0.000 | 2.226 | 1.330 |
| M14 | g58Y | 23.46 | 2.178 | 0.000 | 2.178 | 0.611 |
| M2 | g59P | 12.81 | 0.693 | -2.004 | 0.693 | -2.004 |
| M2 | g59Y | 2.92 | 0.642 | -0.114 | 0.642 | -0.114 |
| M2 | g60P | 4.90 | 1.078 | 0.000 | 0.443 | 1.078 |
| M2 | g60X | 32.23 | 0.000 | -5.043 | -2.522 | -5.043 |
| M5 | g61P | 15.46 | 0.000 | -4.449 | -0.873 | -4.449 |
| M5 | g61Y | 1.71 | 0.000 | -0.491 | -0.044 | -0.491 |
| M5 | g62P | 8.34 | 2.093 | 0.000 | 0.713 | 2.093 |
| M5 | g62X | 23.29 | 0.000 | -6.702 | -3.526 | -6.702 |
| M6 | g63P | 28.32 | 0.000 | -5.826 | -2.533 | -5.826 |
| M6 | g63Y | 4.33 | 0.000 | -0.890 | -0.842 | -0.890 |
| M6 | g64P | 11.77 | 3.309 | 0.000 | 1.512 | 3.309 |
| M6 | g64X | 27.84 | 0.000 | -5.727 | -2.692 | -5.727 |
| M11 | g65P | 25.84 | 0.000 | -4.342 | -2.326 | -4.342 |
| M11 | g65X | 23.71 | 0.000 | -3.983 | -1.792 | -3.983 |
| M11 | g65XY | 27.30 | 0.000 | -4.586 | -2.064 | -4.586 |
| M11 | g65Y | 24.30 | 0.000 | -4.082 | -2.290 | -4.082 |
| M12 | g66P | 11.83 | 0.000 | -1.663 | -1.117 | -1.663 |
| M12 | g66X | 20.40 | 0.000 | -2.868 | -0.756 | -2.868 |
| M12 | g66XY | 13.57 | 0.000 | -1.909 | -0.638 | -1.909 |
| M12 | g66Y | 22.05 | 0.000 | -3.101 | -1.215 | -3.101 |
| M10 | g67P | 23.94 | 0.000 | -2.524 | -1.446 | -2.524 |
| M10 | g67X | 18.69 | 1.971 | 0.000 | 0.709 | 1.971 |
| M10 | g67XY | 5.35 | 0.564 | 0.000 | 0.564 | 0.408 |
| M10 | g67Y | 13.63 | 0.000 | -1.438 | -1.438 | -0.639 |
| M10 | g68P | 11.17 | 1.178 | -0.283 | -0.283 | 1.178 |
| M10 | g68X | 13.99 | 0.000 | -1.475 | -0.748 | -1.475 |
| M10 | g68XY | 12.02 | 0.000 | -1.267 | -0.974 | -1.267 |
| M10 | g68Y | 6.90 | 0.728 | 0.000 | 0.065 | 0.728 |
| M10 | g69P | 56.13 | 5.920 | 0.000 | 1.858 | 5.920 |
| M10 | g69X | 56.88 | 0.000 | -5.999 | -2.454 | -5.999 |
| M10 | g69XY | 57.33 | 0.000 | -6.046 | -2.392 | -6.046 |
| M10 | g69Y | 54.17 | 5.713 | 0.000 | 1.786 | 5.713 |
| M10 | g70P | 79.98 | 0.000 | -8.435 | -2.703 | -8.435 |
| M10 | g70X | 83.84 | 8.843 | 0.000 | 3.822 | 8.843 |
| M10 | g70XY | 85.54 | 9.022 | 0.000 | 3.828 | 9.022 |
| M10 | g70Y | 80.39 | 0.000 | -8.478 | -2.694 | -8.478 |
| PM | g71P | 2.80 | 0.000 | -25.425 | -25.425 | -10.050 |
| PM | g72P | 2.42 | 0.000 | -21.951 | -21.951 | -9.058 |
| PM | g73P | 2.32 | 0.000 | -18.289 | -18.289 | -7.793 |
| PM | g74P | 1.59 | 0.000 | -15.137 | -15.137 | -6.597 |
| PM | g75P | 1.40 | 0.000 | -13.299 | -13.299 | -5.829 |
| PM | g76P | 1.22 | 0.000 | -11.761 | -11.761 | -5.099 |

| | | | | | | |
|---|---|---|---|---|---|---|
| PM | g77P | 1.08 | 0.000 | -10.332 | -10.332 | -4.168 |
| PM | g78P | 0.90 | 0.000 | -8.383 | -8.383 | -3.653 |

*** Analysis Results for Load Case No. 1 "NESC Heavy" - Number of iterations in SAPS 10

**Equilibrium Joint Positions and Rotations for Load Case "NESC Heavy":**

| Joint Label | X-Displ (ft) | Y-Displ (ft) | Z-Displ (ft) | X-Rot (deg) | Y-Rot (deg) | Z-Rot (deg) | X-Pos (ft) | Y-Pos (ft) | Z-Pos (ft) |
|---|---|---|---|---|---|---|---|---|---|
| 1P | 0.002457 | 0.2354 | -0.0208 | -0.3194 | 0.0155 | 0.0372 | 2.502 | 2.735 | 101 |
| 2P | 0.001485 | 0.2078 | -0.02045 | -0.3105 | 0.0076 | 0.0406 | 2.501 | 2.708 | 95.98 |
| 3P | 0.001164 | 0.187 | -0.01997 | -0.2854 | 0.0098 | 0.0394 | 2.501 | 2.687 | 91.98 |
| 4P | 0.0001338 | 0.1674 | -0.01925 | -0.2852 | 0.0129 | 0.0382 | 2.5 | 2.667 | 87.98 |
| 5P | -0.0003988 | 0.1475 | -0.01831 | -0.2735 | 0.0071 | 0.0371 | 2.5 | 2.647 | 83.98 |
| 6P | -0.001042 | 0.1256 | -0.01691 | -0.2453 | 0.0141 | 0.0383 | 2.499 | 2.626 | 78.98 |
| 7P | -0.002289 | 0.1051 | -0.01514 | -0.2035 | 0.0020 | 0.0396 | 2.498 | 2.605 | 73.98 |
| 8P | -0.002263 | 0.09004 | -0.01538 | -0.1592 | -0.0082 | 0.0388 | 3.198 | 3.29 | 68.98 |
| 9P | -0.003984 | 0.0721 | -0.01525 | -0.1340 | 0.0198 | 0.0384 | 4.166 | 4.242 | 61.98 |
| 10P | -0.007864 | 0.05617 | -0.01526 | -0.1010 | 0.0073 | 0.0338 | 5.272 | 5.336 | 53.98 |
| 12P | -0.00538 | 0.03573 | -0.01275 | -0.0762 | -0.0189 | 0.0206 | 7.225 | 7.266 | 39.99 |
| 15P | -0.002848 | 0.01255 | -0.007492 | -0.0528 | -0.0142 | 0.0053 | 9.997 | 10.01 | 19.99 |
| 18P | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 12.75 | 12.75 | 0 |
| 19P | 0.01319 | 0.2336 | 0.06017 | -0.2688 | 0.0107 | 0.0372 | 0.01319 | -13.52 | 101.1 |
| 20P | 0.009597 | 0.2076 | 0.04015 | -0.2623 | 0.0108 | 0.0372 | 0.009597 | -9.542 | 96.04 |
| 21P | 0.01036 | 0.1477 | 0.04938 | -0.2003 | 0.0104 | 0.0373 | 0.01036 | -14.1 | 84.05 |
| 22P | 0.00587 | 0.1045 | 0.03031 | -0.2085 | 0.0078 | 0.0370 | 0.00587 | -10.15 | 74.03 |
| 23P | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 24P | 0.005515 | 0.2928 | -0.004215 | -0.4643 | 0.0107 | 0.0238 | 0.005515 | 0.2928 | 109 |
| 25P | 0.00827 | 0.4266 | -0.005035 | -0.5340 | 0.0108 | 0.0239 | 0.00827 | 0.4266 | 124 |
| 1X | 0.005474 | 0.2351 | 0.004884 | -0.3007 | 0.0106 | 0.0349 | 2.505 | -2.265 | 101 |
| 1XY | 0.005952 | 0.2318 | 0.005828 | -0.3004 | 0.0109 | 0.0445 | -2.494 | -2.268 | 101 |
| 1Y | 0.00233 | 0.2321 | -0.01988 | -0.3195 | 0.0057 | 0.0422 | -2.498 | 2.732 | 101 |
| 2X | 0.004975 | 0.2082 | 0.004915 | -0.2991 | 0.0147 | 0.0398 | 2.505 | -2.292 | 96 |
| 2XY | 0.00461 | 0.2049 | 0.005851 | -0.2995 | 0.0068 | 0.0391 | -2.495 | -2.295 | 96.01 |
| 2Y | 0.001497 | 0.2045 | -0.01954 | -0.3104 | 0.0134 | 0.0383 | -2.499 | 2.705 | 95.98 |
| 3X | 0.003778 | 0.1873 | 0.004706 | -0.3023 | 0.0145 | 0.0389 | 2.504 | -2.313 | 92 |
| 3XY | 0.004327 | 0.1839 | 0.005639 | -0.3023 | 0.0070 | 0.0396 | -2.496 | -2.316 | 92.01 |
| 3Y | 0.000393 | 0.1837 | -0.01905 | -0.2856 | 0.0110 | 0.0391 | -2.5 | 2.684 | 91.98 |
| 4X | 0.003183 | 0.1665 | 0.004373 | -0.2826 | 0.0054 | 0.0380 | 2.503 | -2.333 | 88 |
| 4XY | 0.00346 | 0.1632 | 0.005288 | -0.2821 | 0.0157 | 0.0400 | -2.497 | -2.337 | 88.01 |
| 4Y | 2.96e-006 | 0.1641 | -0.01834 | -0.2850 | 0.0079 | 0.0398 | -2.5 | 2.664 | 87.98 |
| 5X | 0.002585 | 0.148 | 0.003934 | -0.2569 | 0.0167 | 0.0370 | 2.503 | -2.352 | 84 |
| 5XY | 0.002619 | 0.1447 | 0.004834 | -0.2568 | 0.0043 | 0.0406 | -2.497 | -2.355 | 84 |
| 5Y | -0.0008749 | 0.1442 | -0.01741 | -0.2733 | 0.0130 | 0.0406 | -2.501 | 2.644 | 83.98 |
| 6X | 0.001305 | 0.1248 | 0.003116 | -0.2520 | 0.0055 | 0.0349 | 2.501 | -2.375 | 79 |
| 6XY | 0.0021 | 0.1216 | 0.003969 | -0.2521 | 0.0151 | 0.0409 | -2.498 | -2.378 | 79 |
| 6Y | -0.001893 | 0.1223 | -0.01601 | -0.2451 | 0.0051 | 0.0379 | -2.502 | 2.622 | 78.98 |
| 7X | 0.0009373 | 0.1054 | 0.00205 | -0.1976 | 0.0193 | 0.0326 | 2.501 | -2.395 | 74 |
| 7XY | 0.0007941 | 0.1022 | 0.002828 | -0.1949 | -0.0015 | 0.0413 | -2.499 | -2.398 | 74 |
| 7Y | -0.002366 | 0.1019 | -0.0142 | -0.2016 | 0.0193 | 0.0352 | -2.502 | 2.602 | 73.99 |
| 8X | -0.0005208 | 0.08935 | 0.002894 | -0.1694 | 0.0188 | 0.0316 | 3.199 | -3.111 | 69 |
| 8XY | 0.00171 | 0.08561 | 0.003733 | -0.1653 | -0.0036 | 0.0378 | -3.198 | -3.114 | 69 |
| 8Y | -0.005143 | 0.0862 | -0.0141 | -0.1551 | 0.0295 | 0.0314 | -3.205 | 3.286 | 68.99 |
| 9X | -0.0006234 | 0.07191 | 0.003467 | -0.1282 | 0.0026 | 0.0327 | 4.169 | -4.098 | 62 |
| 9XY | 0.001244 | 0.06746 | 0.004387 | -0.1240 | 0.0101 | 0.0305 | -4.169 | -4.103 | 62 |
| 9Y | -0.00736 | 0.06774 | -0.01346 | -0.1288 | 0.0091 | 0.0268 | -4.177 | 4.238 | 61.99 |
| 10X | -0.0002985 | 0.05598 | 0.00394 | -0.1032 | 0.0053 | 0.0291 | 5.28 | -5.224 | 54 |
| 10XY | 0.0004744 | 0.05108 | 0.004901 | -0.0981 | 0.0053 | 0.0279 | -5.28 | -5.229 | 54 |
| 10Y | -0.007998 | 0.05125 | -0.01289 | -0.0970 | -0.0027 | 0.0226 | -5.288 | 5.331 | 53.99 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 12X | -0.0006483 | 0.036 | 0.003586 | -0.0713 | 0.0065 | 0.0217 | 7.229 | -7.194 | 40 |
| 12XY | 0.000393 | 0.03055 | 0.004583 | -0.0646 | 0.0007 | 0.0245 | -7.23 | -7.199 | 40 |
| 12Y | -0.00559 | 0.03053 | -0.0111 | -0.0671 | -0.0109 | 0.0204 | -7.236 | 7.261 | 39.99 |
| 15X | -0.000565 | 0.01345 | 0.002518 | -0.0500 | 0.0094 | 0.0082 | 9.999 | -9.987 | 20 |
| 15XY | 0.0003923 | 0.01009 | 0.003067 | -0.0397 | -0.0049 | 0.0135 | -10 | -9.99 | 20 |
| 15Y | -0.003385 | 0.009791 | -0.006484 | -0.0379 | -0.0020 | 0.0121 | -10 | 10.01 | 19.99 |
| 18X | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 12.75 | -12.75 | 0 |
| 18XY | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | -12.75 | -12.75 | 0 |
| 18Y | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | -12.75 | 12.75 | 0 |
| 19X | -0.005068 | 0.2339 | -0.0871 | -0.3508 | 0.0104 | 0.0371 | -0.005068 | 13.98 | 100.9 |
| 20X | -0.003317 | 0.2055 | -0.0637 | -0.3608 | 0.0103 | 0.0372 | -0.003317 | 9.956 | 95.94 |
| 21X | -0.008394 | 0.1447 | -0.08584 | -0.3595 | 0.0101 | 0.0372 | -0.008394 | 14.39 | 83.91 |
| 22X | -0.007328 | 0.1031 | -0.05046 | -0.2916 | 0.0113 | 0.0367 | -0.007328 | 10.35 | 73.95 |
| i0.50E20S | -0.00174 | 0.01188 | -0.0009074 | -0.0544 | -0.0058 | 0.0064 | -0.00174 | 0.01188 | 20 |
| i0.50E40S | -0.002869 | 0.03359 | -0.0017 | -0.0683 | -0.0007 | 0.0122 | -0.002869 | 0.03359 | 40 |
| i0.50E74S | -0.0007276 | 0.1038 | -0.002877 | -0.2109 | 0.0087 | 0.0204 | -0.0007276 | 0.1038 | 74 |
| i0.50E84S | 0.0009752 | 0.1462 | -0.003236 | -0.2652 | 0.0104 | 0.0222 | 0.0009752 | 0.1462 | 84 |
| i0.50E96S | 0.003143 | 0.2059 | -0.003669 | -0.3079 | 0.0105 | 0.0235 | 0.003143 | 0.2059 | 96 |
| i0.50E101S | 0.004053 | 0.2344 | -0.003855 | -0.3600 | 0.0106 | 0.0238 | 0.004053 | 0.2344 | 101 |

**Joint Support Reactions for Load Case "NESC Heavy":**

| Joint Label | X Force (kips) | X Usage % | Y Force (kips) | Y Usage % | H-Shear Usage % | Z Force (kips) | Comp. Usage % | Uplift Usage % | Result. Force (kips) | Result. Usage % | X Moment (ft-k) | X-M. Usage % | Y Moment (ft-k) | Y-M. Usage % | H-Bend-M Usage % | Z Moment (ft-k) | Z-M. Usage % | Max. Usage % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18P | -7.26 | 0.0 | -7.23 | 0.0 | 0.0 | -53.19 | 0.0 | 0.0 | 54.17 | 0.0 | 0.24 | 0.0 | 0.1 | 0.0 | 0.0 | 0.02 | 0.0 | 0.0 |
| 23P | 0.16 | 0.0 | -1.03 | 0.0 | 0.0 | -26.59 | 0.0 | 0.0 | 26.61 | 0.0 | 12.55 | 0.0 | 2.4 | 0.0 | 0.0 | -0.65 | 0.0 | 0.0 |
| 18X | 6.09 | 0.0 | -7.79 | 0.0 | 0.0 | 31.06 | 0.0 | 0.0 | 32.60 | 0.0 | 0.33 | 0.0 | 0.0 | 0.0 | 0.0 | 0.01 | 0.0 | 0.0 |
| 18XY | -5.82 | 0.0 | -6.32 | 0.0 | 0.0 | 30.00 | 0.0 | 0.0 | 31.20 | 0.0 | 0.21 | 0.0 | -0.0 | 0.0 | 0.0 | -0.04 | 0.0 | 0.0 |
| 18Y | 6.82 | 0.0 | -6.81 | 0.0 | 0.0 | -50.03 | 0.0 | 0.0 | 50.95 | 0.0 | 0.18 | 0.0 | 0.1 | 0.0 | 0.0 | -0.03 | 0.0 | 0.0 |

**Joint Displacements, Loads and Member Forces on Joints for Load Case "NESC Heavy":**

| Joint Label | X External Load (kips) | Y External Load (kips) | Z External Load (kips) | X Member Force (kips) | Y Member Force (kips) | Z Member Force (kips) | X Disp. (ft) | Y Disp. (ft) | Z Disp. (ft) |
|---|---|---|---|---|---|---|---|---|---|
| 1P | 0.0000 | 0.0000 | -0.1810 | 0.0000 | 0.0000 | 0.1810 | 0.0025 | 0.2354 | -0.0208 |
| 2P | 0.0000 | 0.0000 | -0.2153 | 0.0000 | 0.0000 | 0.2153 | 0.0015 | 0.2078 | -0.0205 |
| 3P | 0.0000 | 0.0000 | -0.1379 | -0.0000 | 0.0000 | 0.1379 | 0.0012 | 0.1870 | -0.0200 |
| 4P | 0.0000 | 0.0000 | -0.1915 | -0.0000 | 0.0000 | 0.1915 | 0.0001 | 0.1674 | -0.0192 |
| 5P | 0.0000 | 0.0000 | -0.2591 | 0.0000 | 0.0000 | 0.2591 | -0.0004 | 0.1475 | -0.0183 |
| 6P | 0.0000 | 0.0000 | -0.2107 | -0.0000 | 0.0000 | 0.2107 | -0.0010 | 0.1256 | -0.0169 |
| 7P | 0.0000 | 0.0000 | -0.2681 | 0.0000 | 0.0000 | 0.2681 | -0.0023 | 0.1051 | -0.0151 |
| 8P | 0.0000 | 0.0000 | -0.2346 | -0.0000 | 0.0000 | 0.2346 | -0.0023 | 0.0900 | -0.0154 |
| 9P | 0.0000 | 0.0000 | -0.2972 | -0.0000 | 0.0000 | 0.2972 | -0.0040 | 0.0721 | -0.0153 |
| 10P | 0.0000 | 0.0000 | -0.4945 | 0.0000 | 0.0000 | 0.4945 | -0.0079 | 0.0562 | -0.0153 |
| 12P | 0.0000 | 0.0000 | -0.8413 | -0.0000 | 0.0000 | 0.8413 | -0.0054 | 0.0357 | -0.0127 |
| 15P | 0.0000 | 0.0000 | -1.2025 | -0.0000 | 0.0000 | 1.2025 | -0.0028 | 0.0126 | -0.0075 |
| 18P | 0.0000 | 0.0000 | -0.4321 | 7.2571 | 7.2339 | -52.7574 | 0.0000 | 0.0000 | 0.0000 |
| 19P | 0.0000 | 1.1848 | -1.3848 | 0.0000 | -1.1848 | 1.3848 | 0.0132 | 0.2336 | 0.0602 |
| 20P | 0.0000 | 1.8612 | -2.8517 | 0.0000 | -1.8612 | 2.8517 | 0.0096 | 0.2076 | 0.0401 |
| 21P | 0.0000 | 1.8449 | -2.9209 | 0.0000 | -1.8449 | 2.9209 | 0.0104 | 0.1477 | 0.0494 |
| 22P | 0.0000 | 1.8441 | -2.8432 | 0.0000 | -1.8441 | 2.8432 | 0.0059 | 0.1045 | 0.0303 |
| 23P | 0.0000 | 0.5100 | -1.1659 | -0.1617 | 0.5170 | -25.4250 | 0.0000 | 0.0000 | 0.0000 |
| 24P | 0.0000 | 0.8352 | -1.9518 | -0.0000 | -0.8352 | 1.9518 | 0.0055 | 0.2928 | -0.0042 |
| 25P | 0.0000 | 1.5712 | -8.3977 | -0.0000 | -1.5712 | 8.3977 | 0.0083 | 0.4266 | -0.0050 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1X | 0.0000 | 0.2192 | -0.3800 | 0.0000 | -0.2192 | 0.3800 | 0.0055 | 0.2351 | 0.0049 |
| 1XY | 0.0000 | 0.0882 | -0.1810 | -0.0000 | -0.0882 | 0.1810 | 0.0060 | 0.2318 | 0.0058 |
| 1Y | 0.0000 | 0.0000 | -0.1810 | -0.0000 | 0.0000 | 0.1810 | 0.0023 | 0.2321 | -0.0199 |
| 2X | 0.0000 | 0.1185 | -0.2153 | 0.0000 | -0.1185 | 0.2153 | 0.0050 | 0.2082 | 0.0049 |
| 2XY | 0.0000 | 0.1185 | -0.2153 | 0.0000 | -0.1185 | 0.2153 | 0.0046 | 0.2049 | 0.0059 |
| 2Y | 0.0000 | 0.0000 | -0.2153 | 0.0000 | 0.0000 | 0.2153 | 0.0015 | 0.2045 | -0.0195 |
| 3X | 0.0000 | 0.3080 | -0.4559 | -0.0000 | -0.3080 | 0.4559 | 0.0038 | 0.1873 | 0.0047 |
| 3XY | 0.0000 | 0.0990 | -0.1379 | -0.0000 | -0.0990 | 0.1379 | 0.0043 | 0.1839 | 0.0056 |
| 3Y | 0.0000 | 0.0000 | -0.1379 | -0.0000 | 0.0000 | 0.1379 | 0.0004 | 0.1837 | -0.0191 |
| 4X | 0.0000 | 0.1324 | -0.1915 | -0.0000 | -0.1324 | 0.1915 | 0.0032 | 0.1665 | 0.0044 |
| 4XY | 0.0000 | 0.1324 | -0.1915 | -0.0000 | -0.1324 | 0.1915 | 0.0035 | 0.1632 | 0.0053 |
| 4Y | 0.0000 | 0.0000 | -0.1915 | -0.0000 | 0.0000 | 0.1915 | 0.0000 | 0.1641 | -0.0183 |
| 5X | 0.0000 | 0.3569 | -0.6171 | 0.0000 | -0.3569 | 0.6171 | 0.0026 | 0.1480 | 0.0039 |
| 5XY | 0.0000 | 0.1219 | -0.2591 | 0.0000 | -0.1219 | 0.2591 | 0.0026 | 0.1447 | 0.0048 |
| 5Y | 0.0000 | 0.0000 | -0.2591 | 0.0000 | 0.0000 | 0.2591 | -0.0009 | 0.1442 | -0.0174 |
| 6X | 0.0000 | 0.1538 | -0.2107 | -0.0000 | -0.1538 | 0.2107 | 0.0013 | 0.1248 | 0.0031 |
| 6XY | 0.0000 | 0.1538 | -0.2107 | -0.0000 | -0.1538 | 0.2107 | 0.0021 | 0.1216 | 0.0040 |
| 6Y | 0.0000 | 0.0000 | -0.2107 | -0.0000 | 0.0000 | 0.2107 | -0.0019 | 0.1223 | -0.0160 |
| 7X | 0.0000 | 0.4217 | -0.7051 | 0.0000 | -0.4217 | 0.7051 | 0.0009 | 0.1054 | 0.0020 |
| 7XY | 0.0000 | 0.1347 | -0.2681 | 0.0000 | -0.1347 | 0.2681 | 0.0008 | 0.1022 | 0.0028 |
| 7Y | 0.0000 | 0.0000 | -0.2681 | 0.0000 | 0.0000 | 0.2681 | -0.0024 | 0.1019 | -0.0142 |
| 8X | 0.0000 | 0.1561 | -0.2346 | -0.0000 | -0.1561 | 0.2346 | -0.0005 | 0.0893 | 0.0029 |
| 8XY | 0.0000 | 0.1561 | -0.2346 | -0.0000 | -0.1561 | 0.2346 | 0.0017 | 0.0856 | 0.0037 |
| 8Y | 0.0000 | 0.0000 | -0.2346 | -0.0000 | 0.0000 | 0.2346 | -0.0051 | 0.0862 | -0.0141 |
| 9X | 0.0000 | 0.4573 | -0.6952 | -0.0000 | -0.4573 | 0.6952 | -0.0006 | 0.0719 | 0.0035 |
| 9XY | 0.0000 | 0.1963 | -0.2972 | -0.0000 | -0.1963 | 0.2972 | 0.0012 | 0.0675 | 0.0044 |
| 9Y | 0.0000 | 0.0000 | -0.2972 | -0.0000 | 0.0000 | 0.2972 | -0.0074 | 0.0677 | -0.0135 |
| 10X | 0.0000 | 0.6037 | -0.9315 | 0.0000 | -0.6037 | 0.9315 | -0.0003 | 0.0560 | 0.0039 |
| 10XY | 0.0000 | 0.3167 | -0.4945 | 0.0000 | -0.3167 | 0.4945 | 0.0005 | 0.0511 | 0.0049 |
| 10Y | 0.0000 | 0.0000 | -0.4945 | -0.0000 | 0.0000 | 0.4945 | -0.0080 | 0.0513 | -0.0129 |
| 12X | 0.0000 | 0.9619 | -1.5173 | 0.0000 | -0.9619 | 1.5173 | -0.0006 | 0.0360 | 0.0036 |
| 12XY | 0.0000 | 0.5179 | -0.8413 | 0.0000 | -0.5179 | 0.8413 | 0.0004 | 0.0306 | 0.0046 |
| 12Y | 0.0000 | 0.0000 | -0.8413 | -0.0000 | 0.0000 | 0.8413 | -0.0056 | 0.0305 | -0.0111 |
| 15X | 0.0000 | 1.4413 | -2.3955 | 0.0000 | -1.4413 | 2.3955 | -0.0006 | 0.0135 | 0.0025 |
| 15XY | 0.0000 | 0.6573 | -1.2025 | 0.0000 | -0.6573 | 1.2025 | 0.0004 | 0.0101 | 0.0031 |
| 15Y | 0.0000 | 0.0000 | -1.2025 | -0.0000 | 0.0000 | 1.2025 | -0.0034 | 0.0098 | -0.0065 |
| 18X | 0.0000 | 0.2789 | -0.4321 | -6.0902 | 7.5073 | 31.4924 | 0.0000 | 0.0000 | 0.0000 |
| 18XY | 0.0000 | 0.2789 | -0.4321 | 5.8180 | 6.0408 | 30.4295 | 0.0000 | 0.0000 | 0.0000 |
| 18Y | 0.0000 | 0.0000 | -0.4321 | -6.8232 | 6.8053 | -49.5942 | 0.0000 | 0.0000 | 0.0000 |
| 19X | 0.0000 | 1.1350 | -1.2938 | -0.0000 | -1.1350 | 1.2938 | -0.0051 | 0.2339 | -0.0871 |
| 20X | 0.0000 | 1.7850 | -2.8517 | -0.0000 | -1.7850 | 2.8517 | -0.0033 | 0.2055 | -0.0637 |
| 21X | 0.0000 | 1.7850 | -2.9209 | -0.0000 | -1.7850 | 2.9209 | -0.0084 | 0.1447 | -0.0858 |
| 22X | 0.0000 | 1.7850 | -2.8432 | -0.0000 | -1.7850 | 2.8432 | -0.0073 | 0.1031 | -0.0505 |
| i0.50E20S | 0.0000 | 1.0200 | -3.4408 | 0.0000 | -1.0200 | 3.4408 | -0.0017 | 0.0119 | -0.0009 |
| i0.50E40S | 0.0000 | 1.3260 | -3.6266 | 0.0000 | -1.3260 | 3.6266 | -0.0029 | 0.0336 | -0.0017 |
| i0.50E74S | 0.0000 | 1.0635 | -2.7845 | 0.0000 | -1.0635 | 2.7845 | -0.0007 | 0.1038 | -0.0029 |
| i0.50E84S | 0.0000 | 0.5445 | -1.4544 | -0.0000 | -0.5445 | 1.4544 | 0.0010 | 0.1462 | -0.0032 |
| i0.50E96S | 0.0000 | 0.2970 | -1.1312 | 0.0000 | -0.2970 | 1.1312 | 0.0031 | 0.2059 | -0.0037 |
| i0.50E101S | 0.0000 | 0.1980 | -1.0066 | -0.0000 | -0.1980 | 1.0066 | 0.0041 | 0.2344 | -0.0039 |

**Crossing Diagonal Check for Load Case "NESC Heavy" (RLOUT controls):**

| Comp. Member Label | Tens. Member Label | Connect Leg for Comp. Member | Force In Comp. Member (kips) | Force In Tens. Member (kips) | Original Supported L/R Cap. (kips) | Original Supported RLX | Original Supported RLY | Original Supported RLZ | Original Supported L/R | Original Supported KL/R | Original Supported Curve No. | Alternate Unsupported L/R Cap. (kips) | Alternate Unsupported RLOUT | Alternate Unsupported L/R | Alternate Unsupported KL/R | Alternate Unsupported Curve No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g16P | g16Y | Long only | -0.47 | -0.49 | 17.48 | 0.500 | 0.750 | 0.500 | 106.07 | 109.55 | 2 | 13.07 | 1.000 | 141.42 | 133.17 | 6 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g16X | g16XY | Long only | -0.03 | -0.02 | 17.48 | 0.500 | 0.750 | 0.500 | 106.07 | 109.55 | 2 | 13.07 | 1.000 | 141.42 | 133.17 | 6 |
| g16XY | g16X | Long only | -0.02 | -0.03 | 17.48 | 0.500 | 0.750 | 0.500 | 106.07 | 109.55 | 2 | 13.07 | 1.000 | 141.42 | 133.17 | 6 |
| g16Y | g16P | Long only | -0.49 | -0.47 | 17.48 | 0.500 | 0.750 | 0.500 | 106.07 | 109.55 | 2 | 13.07 | 1.000 | 141.42 | 133.17 | 6 |
| g20P | g20Y | Long only | -0.33 | -0.30 | 24.28 | 0.500 | 0.750 | 0.500 | 97.34 | 103.01 | 2 | 18.97 | 1.000 | 129.79 | 126.02 | 6 |
| g20X | g20XY | Long only | -0.34 | -0.38 | 24.28 | 0.500 | 0.750 | 0.500 | 97.34 | 103.01 | 2 | 18.97 | 1.000 | 129.79 | 126.02 | 6 |
| g20XY | g20X | Long only | -0.38 | -0.34 | 24.28 | 0.500 | 0.750 | 0.500 | 97.34 | 103.01 | 2 | 18.97 | 1.000 | 129.79 | 126.02 | 6 |
| g20Y | g20P | Long only | -0.30 | -0.33 | 24.28 | 0.500 | 0.750 | 0.500 | 97.34 | 103.01 | 2 | 18.97 | 1.000 | 129.79 | 126.02 | 6 |
| g22P | g22Y | Long only | -1.51 | -1.48 | 24.28 | 0.500 | 0.750 | 0.500 | 97.34 | 103.01 | 2 | 18.97 | 1.000 | 129.79 | 126.02 | 6 |
| g22Y | g22P | Long only | -1.48 | -1.51 | 24.28 | 0.500 | 0.750 | 0.500 | 97.34 | 103.01 | 2 | 18.97 | 1.000 | 129.79 | 126.02 | 6 |
| g24P | g24Y | Short only | -2.56 | -2.20 | 29.10 | 0.750 | 0.500 | 0.500 | 86.41 | 94.81 | 2 | 24.26 | 1.000 | 110.34 | 115.17 | 3 |
| g24Y | g24P | Short only | -2.20 | -2.56 | 29.10 | 0.750 | 0.500 | 0.500 | 86.41 | 94.81 | 2 | 24.26 | 1.000 | 110.34 | 115.17 | 3 |
| g26P | g26Y | Short only | -4.59 | -4.28 | 29.10 | 0.750 | 0.500 | 0.500 | 86.41 | 94.81 | 2 | 24.26 | 1.000 | 110.34 | 115.17 | 3 |
| g26Y | g26P | Short only | -4.28 | -4.59 | 29.10 | 0.750 | 0.500 | 0.500 | 86.41 | 94.81 | 2 | 24.26 | 1.000 | 110.34 | 115.17 | 3 |
| g28P | g28Y | Short only | -1.41 | -1.27 | 31.84 | 0.780 | 0.560 | 0.560 | 104.64 | 108.48 | 2 | 28.17 | 1.000 | 120.07 | 120.04 | 6 |
| g28Y | g28P | Short only | -1.27 | -1.41 | 31.84 | 0.780 | 0.560 | 0.560 | 104.64 | 108.48 | 2 | 28.17 | 1.000 | 120.07 | 120.04 | 6 |
| g30X | g30XY | Short only | -0.65 | -0.65 | 18.15 | 0.780 | 0.570 | 0.570 | 142.24 | 136.99 | 5 | 16.38 | 1.000 | 159.33 | 144.19 | 6 |
| g30XY | g30X | Short only | -0.65 | -0.65 | 18.15 | 0.780 | 0.570 | 0.570 | 142.24 | 136.99 | 5 | 16.38 | 1.000 | 159.33 | 144.19 | 6 |
| g32P | g32Y | Short only | -0.86 | -0.69 | 13.60 | 0.780 | 0.560 | 0.560 | 170.14 | 158.24 | 5 | 12.43 | 1.000 | 193.98 | 165.50 | 6 |
| g32Y | g32P | Short only | -0.69 | -0.86 | 13.60 | 0.780 | 0.560 | 0.560 | 170.14 | 158.24 | 5 | 12.43 | 1.000 | 193.98 | 165.50 | 6 |

**Summary of Clamp Capacities and Usages for Load Case "NESC Heavy":**

| Clamp Label | Force (kips) | Input Holding Capacity (kips) | Factored Holding Capacity (kips) | Usage % |
|---|---|---|---|---|
| Clamp1 | 1.822 | 50.00 | 50.00 | 3.64 |
| Clamp2 | 1.721 | 50.00 | 50.00 | 3.44 |
| Clamp3 | 3.405 | 50.00 | 50.00 | 6.81 |
| Clamp4 | 3.364 | 50.00 | 50.00 | 6.73 |
| Clamp5 | 3.455 | 50.00 | 50.00 | 6.91 |
| Clamp6 | 3.423 | 50.00 | 50.00 | 6.85 |
| Clamp7 | 3.389 | 50.00 | 50.00 | 6.78 |
| Clamp8 | 3.357 | 50.00 | 50.00 | 6.71 |
| Clamp9 | 0.550 | 50.00 | 50.00 | 1.10 |
| Clamp10 | 0.713 | 50.00 | 50.00 | 1.43 |
| Clamp11 | 0.822 | 50.00 | 50.00 | 1.64 |
| Clamp12 | 0.832 | 50.00 | 50.00 | 1.66 |
| Clamp13 | 1.110 | 50.00 | 50.00 | 2.22 |
| Clamp14 | 1.797 | 50.00 | 50.00 | 3.59 |
| Clamp15 | 2.796 | 50.00 | 50.00 | 5.59 |
| Clamp17 | 1.026 | 50.00 | 50.00 | 2.05 |
| Clamp18 | 1.169 | 50.00 | 50.00 | 2.34 |
| Clamp19 | 1.553 | 50.00 | 50.00 | 3.11 |
| Clamp20 | 2.981 | 50.00 | 50.00 | 5.96 |
| Clamp21 | 3.861 | 50.00 | 50.00 | 7.72 |
| Clamp22 | 3.589 | 50.00 | 50.00 | 7.18 |
| Clamp23 | 0.439 | 50.00 | 50.00 | 0.88 |
| Clamp24 | 0.201 | 50.00 | 50.00 | 0.40 |
| Clamp25 | 0.246 | 50.00 | 50.00 | 0.49 |
| Clamp26 | 0.246 | 50.00 | 50.00 | 0.49 |
| Clamp27 | 2.123 | 50.00 | 50.00 | 4.25 |
| Clamp28 | 8.543 | 50.00 | 50.00 | 17.09 |

*** Analysis Results for Load Case No. 2 "NESC Extreme" - Number of iterations in SAPS 10

**Equilibrium Joint Positions and Rotations for Load Case "NESC Extreme":**

| Joint Label | X-Displ (ft) | Y-Displ (ft) | Z-Displ (ft) | X-Rot (deg) | Y-Rot (deg) | Z-Rot (deg) | X-Pos (ft) | Y-Pos (ft) | Z-Pos (ft) |
|---|---|---|---|---|---|---|---|---|---|
| 1P | 0.04416 | 0.4282 | -0.03299 | -0.5882 | 0.0680 | 0.0738 | 2.544 | 2.928 | 101 |
| 2P | 0.03859 | 0.377 | -0.03231 | -0.5661 | 0.0524 | 0.0844 | 2.539 | 2.877 | 95.97 |
| 3P | 0.0355 | 0.339 | -0.03131 | -0.5295 | 0.0543 | 0.0817 | 2.535 | 2.839 | 91.97 |
| 4P | 0.03094 | 0.3026 | -0.02993 | -0.5160 | 0.0654 | 0.0790 | 2.531 | 2.803 | 87.97 |
| 5P | 0.02708 | 0.2675 | -0.02826 | -0.4817 | 0.0513 | 0.0766 | 2.527 | 2.767 | 83.97 |
| 6P | 0.02271 | 0.2276 | -0.02564 | -0.4413 | 0.0632 | 0.0758 | 2.523 | 2.728 | 78.97 |
| 7P | 0.01752 | 0.192 | -0.02236 | -0.3491 | 0.0275 | 0.0753 | 2.518 | 2.692 | 73.98 |
| 8P | 0.01581 | 0.1661 | -0.02283 | -0.2702 | 0.0035 | 0.0769 | 3.216 | 3.366 | 68.98 |
| 9P | 0.01122 | 0.1367 | -0.02257 | -0.2206 | 0.0309 | 0.0790 | 4.181 | 4.307 | 61.98 |
| 10P | 0.003985 | 0.1097 | -0.02264 | -0.1847 | 0.0493 | 0.0782 | 5.284 | 5.39 | 53.98 |
| 12P | -0.01247 | 0.07 | -0.02159 | -0.1509 | 0.0265 | 0.0653 | 7.218 | 7.3 | 39.98 |
| 15P | -0.008034 | 0.02527 | -0.01309 | -0.1082 | -0.0449 | 0.0212 | 9.992 | 10.03 | 19.99 |
| 18P | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 12.75 | 12.75 | 0 |
| 19P | 0.06697 | 0.4253 | 0.1282 | -0.5655 | 0.0577 | 0.0799 | 0.06697 | -13.32 | 101.1 |
| 20P | 0.05669 | 0.3749 | 0.08854 | -0.5702 | 0.0569 | 0.0849 | 0.05669 | -9.375 | 96.09 |
| 21P | 0.05139 | 0.2656 | 0.112 | -0.4788 | 0.0555 | 0.0869 | 0.05139 | -13.98 | 84.11 |
| 22P | 0.03489 | 0.1896 | 0.06482 | -0.4296 | 0.0532 | 0.0821 | 0.03489 | -10.06 | 74.06 |
| 23P | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 0 | 0 | 0 |
| 24P | 0.05536 | 0.5491 | -0.003812 | -1.0090 | 0.0586 | 0.0532 | 0.05536 | 0.5491 | 109 |
| 25P | 0.07045 | 0.8496 | -0.006928 | -1.2156 | 0.0588 | 0.0534 | 0.07045 | 0.8496 | 124 |
| 1X | 0.0504 | 0.4283 | 0.01429 | -0.5721 | 0.0565 | 0.0745 | 2.55 | -2.072 | 101 |
| 1XY | 0.0513 | 0.4212 | 0.01928 | -0.5726 | 0.0597 | 0.0952 | -2.449 | -2.079 | 101 |
| 1Y | 0.04341 | 0.4212 | -0.028 | -0.5868 | 0.0472 | 0.0920 | -2.457 | 2.921 | 101 |
| 2X | 0.04609 | 0.3774 | 0.01421 | -0.5599 | 0.0670 | 0.0870 | 2.546 | -2.123 | 96.01 |
| 2XY | 0.04556 | 0.3703 | 0.01922 | -0.5583 | 0.0508 | 0.0829 | -2.454 | -2.13 | 96.02 |
| 2Y | 0.03901 | 0.3701 | -0.02731 | -0.5671 | 0.0647 | 0.0789 | -2.461 | 2.87 | 95.97 |
| 3X | 0.04104 | 0.3393 | 0.01367 | -0.5373 | 0.0649 | 0.0847 | 2.541 | -2.161 | 92.01 |
| 3XY | 0.04244 | 0.3324 | 0.01865 | -0.5358 | 0.0536 | 0.0840 | -2.458 | -2.168 | 92.02 |
| 3Y | 0.03401 | 0.332 | -0.02634 | -0.5288 | 0.0629 | 0.0798 | -2.466 | 2.832 | 91.97 |
| 4X | 0.03748 | 0.3024 | 0.01284 | -0.5143 | 0.0492 | 0.0826 | 2.537 | -2.198 | 88.01 |
| 4XY | 0.03791 | 0.2955 | 0.01774 | -0.5147 | 0.0680 | 0.0849 | -2.462 | -2.205 | 88.02 |
| 4Y | 0.03057 | 0.2958 | -0.02505 | -0.5125 | 0.0504 | 0.0809 | -2.469 | 2.796 | 87.97 |
| 5X | 0.03347 | 0.2679 | 0.01176 | -0.4726 | 0.0697 | 0.0801 | 2.533 | -2.232 | 84.01 |
| 5XY | 0.03387 | 0.261 | 0.01657 | -0.4694 | 0.0462 | 0.0861 | -2.466 | -2.239 | 84.02 |
| 5Y | 0.0265 | 0.2608 | -0.02351 | -0.4826 | 0.0627 | 0.0817 | -2.473 | 2.761 | 83.98 |
| 6X | 0.02793 | 0.2273 | 0.009966 | -0.4441 | 0.0471 | 0.0781 | 2.528 | -2.273 | 79.01 |
| 6XY | 0.02947 | 0.2209 | 0.01459 | -0.4431 | 0.0675 | 0.0834 | -2.471 | -2.279 | 79.01 |
| 6Y | 0.02115 | 0.2209 | -0.02127 | -0.4365 | 0.0484 | 0.0782 | -2.479 | 2.721 | 78.98 |
| 7X | 0.02392 | 0.1923 | 0.007654 | -0.3467 | 0.0749 | 0.0758 | 2.524 | -2.308 | 74.01 |
| 7XY | 0.02379 | 0.1856 | 0.01209 | -0.3498 | 0.0339 | 0.0810 | -2.476 | -2.314 | 74.01 |
| 7Y | 0.01755 | 0.1855 | -0.01865 | -0.3607 | 0.0562 | 0.0745 | -2.482 | 2.685 | 73.98 |
| 8X | 0.01788 | 0.1654 | 0.008149 | -0.2849 | 0.0758 | 0.0775 | 3.218 | -3.035 | 69.01 |
| 8XY | 0.02244 | 0.1565 | 0.01357 | -0.2901 | 0.0280 | 0.0773 | -3.178 | -3.044 | 69.01 |
| 8Y | 0.01108 | 0.1562 | -0.01913 | -0.2909 | 0.0632 | 0.0708 | -3.189 | 3.356 | 68.98 |
| 9X | 0.01355 | 0.136 | 0.008173 | -0.2136 | 0.0384 | 0.0835 | 4.184 | -4.034 | 62.01 |
| 9XY | 0.01745 | 0.1229 | 0.01461 | -0.2313 | 0.0522 | 0.0706 | -4.153 | -4.047 | 62.01 |
| 9Y | 0.006065 | 0.1226 | -0.01896 | -0.2325 | 0.0118 | 0.0630 | -4.164 | 4.293 | 61.98 |
| 10X | 0.01031 | 0.1104 | 0.008003 | -0.1788 | 0.0389 | 0.0794 | 5.29 | -5.17 | 54.01 |
| 10XY | 0.01187 | 0.0922 | 0.01539 | -0.1814 | 0.0389 | 0.0705 | -5.268 | -5.188 | 54.02 |
| 10Y | 0.00367 | 0.0921 | -0.01886 | -0.1802 | 0.0351 | 0.0658 | -5.276 | 5.372 | 53.98 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 12X | 0.004335 | 0.07135 | 0.007422 | -0.1503 | 0.0332 | 0.0687 | 7.234 | -7.159 | 40.01 |
| 12XY | 0.006326 | 0.05303 | 0.01416 | -0.1178 | 0.0209 | 0.0727 | -7.224 | -7.177 | 40.01 |
| 12Y | -0.01308 | 0.05285 | -0.01459 | -0.1239 | 0.0396 | 0.0705 | -7.243 | 7.283 | 39.99 |
| 15X | 0.0004096 | 0.02736 | 0.005282 | -0.0996 | 0.0275 | 0.0314 | 10 | -9.973 | 20.01 |
| 15XY | 0.002449 | 0.01635 | 0.008993 | -0.0655 | 0.0017 | 0.0412 | -9.998 | -9.984 | 20.01 |
| 15Y | -0.009208 | 0.01602 | -0.008704 | -0.0576 | -0.0227 | 0.0353 | -10.01 | 10.02 | 19.99 |
| 18X | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | 12.75 | -12.75 | 0 |
| 18XY | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | -12.75 | -12.75 | 0 |
| 18Y | 0 | 0 | 0 | 0.0000 | 0.0000 | 0.0000 | -12.75 | 12.75 | 0 |
| 19X | 0.02795 | 0.4242 | -0.1467 | -0.5956 | 0.0575 | 0.0787 | 0.02795 | 14.17 | 100.9 |
| 20X | 0.02919 | 0.3732 | -0.1052 | -0.6079 | 0.0570 | 0.0729 | 0.02919 | 10.12 | 95.89 |
| 21X | 0.01233 | 0.2634 | -0.1332 | -0.5427 | 0.0554 | 0.0659 | 0.01233 | 14.51 | 83.87 |
| 22X | 0.007958 | 0.1885 | -0.07885 | -0.4637 | 0.0376 | 0.0690 | 0.007958 | 10.44 | 73.92 |
| i0.50E20S | -0.004018 | 0.02205 | -0.0003698 | -0.1014 | -0.0121 | 0.0170 | -0.004018 | 0.02205 | 20 |
| i0.50E40S | -0.003977 | 0.06246 | -0.0007327 | -0.1265 | 0.0171 | 0.0305 | -0.003977 | 0.06246 | 40 |
| i0.50E74S | 0.02062 | 0.1891 | -0.001448 | -0.3752 | 0.0545 | 0.0460 | 0.02062 | 0.1891 | 74 |
| i0.50E84S | 0.03021 | 0.2644 | -0.001853 | -0.4719 | 0.0567 | 0.0495 | 0.03021 | 0.2644 | 84 |
| i0.50E96S | 0.04227 | 0.3724 | -0.00247 | -0.5717 | 0.0585 | 0.0522 | 0.04227 | 0.3724 | 96 |
| i0.50E101S | 0.04731 | 0.4268 | -0.002814 | -0.7143 | 0.0584 | 0.0529 | 0.04731 | 0.4268 | 101 |

**Joint Support Reactions for Load Case "NESC Extreme":**

| Joint Label | X Force (kips) | X Usage % | Y Force (kips) | Y Usage % | H-Shear Usage % | Z Force (kips) | Comp. Usage % | Uplift Usage % | Result. Force (kips) | Result. Usage % | X Moment (ft-k) | X-M. Usage % | Y Moment (ft-k) | Y-M. Usage % | H-Bend-M Usage % | Z Moment (ft-k) | Z-M. Usage % | Max. Usage % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18P | -12.95 | 0.0 | -13.38 | 0.0 | 0.0 | -93.16 | 0.0 | 0.0 | 95.00 | 0.0 | 0.50 | 0.0 | 0.2 | 0.0 | 0.0 | 0.01 | 0.0 | 0.0 |
| 23P | 0.42 | 0.0 | -1.70 | 0.0 | 0.0 | -10.65 | 0.0 | 0.0 | 10.79 | 0.0 | 23.20 | 0.0 | 5.8 | 0.0 | 0.0 | -1.74 | 0.0 | 0.0 |
| 18X | 12.63 | 0.0 | -17.12 | 0.0 | 0.0 | 64.25 | 0.0 | 0.0 | 67.68 | 0.0 | 0.69 | 0.0 | 0.0 | 0.0 | 0.0 | -0.01 | 0.0 | 0.0 |
| 18XY | -14.76 | 0.0 | -15.02 | 0.0 | 0.0 | 76.43 | 0.0 | 0.0 | 79.28 | 0.0 | 0.29 | 0.0 | -0.1 | 0.0 | 0.0 | -0.10 | 0.0 | 0.0 |
| 18Y | 9.99 | 0.0 | -10.71 | 0.0 | 0.0 | -73.35 | 0.0 | 0.0 | 74.80 | 0.0 | 0.32 | 0.0 | 0.3 | 0.0 | 0.0 | -0.07 | 0.0 | 0.0 |

**Joint Displacements, Loads and Member Forces on Joints for Load Case "NESC Extreme":**

| Joint Label | X External Load (kips) | Y External Load (kips) | Z External Load (kips) | X Member Force (kips) | Y Member Force (kips) | Z Member Force (kips) | X Disp. (ft) | Y Disp. (ft) | Z Disp. (ft) |
|---|---|---|---|---|---|---|---|---|---|
| 1P | 0.0000 | 0.2369 | -0.1927 | 0.0000 | -0.2369 | 0.1927 | 0.0442 | 0.4282 | -0.0330 |
| 2P | 0.0000 | 0.2369 | -0.1927 | 0.0000 | -0.2369 | 0.1927 | 0.0386 | 0.3770 | -0.0323 |
| 3P | 0.0000 | 0.2369 | -0.1927 | -0.0000 | -0.2369 | 0.1927 | 0.0355 | 0.3390 | -0.0313 |
| 4P | 0.0000 | 0.2369 | -0.1927 | -0.0000 | -0.2369 | 0.1927 | 0.0309 | 0.3026 | -0.0299 |
| 5P | 0.0000 | 0.2369 | -0.1927 | 0.0000 | -0.2369 | 0.1927 | 0.0271 | 0.2675 | -0.0283 |
| 6P | 0.0000 | 0.2369 | -0.1927 | -0.0000 | -0.2369 | 0.1927 | 0.0227 | 0.2276 | -0.0256 |
| 7P | 0.0000 | 0.6745 | -0.4968 | 0.0000 | -0.6745 | 0.4968 | 0.0175 | 0.1920 | -0.0224 |
| 8P | 0.0000 | 0.4377 | -0.3041 | -0.0000 | -0.4377 | 0.3041 | 0.0158 | 0.1661 | -0.0228 |
| 9P | 0.0000 | 0.4377 | -0.3041 | -0.0000 | -0.4377 | 0.3041 | 0.0112 | 0.1367 | -0.0226 |
| 10P | 0.0000 | 0.4377 | -0.3041 | 0.0000 | -0.4377 | 0.3041 | 0.0040 | 0.1097 | -0.0226 |
| 12P | 0.0000 | 1.1796 | -0.9002 | 0.0000 | -1.1796 | 0.9002 | -0.0125 | 0.0700 | -0.0216 |
| 15P | 0.0000 | 0.7419 | -0.5961 | 0.0000 | -0.7419 | 0.5961 | -0.0080 | 0.0253 | -0.0131 |
| 18P | 0.0000 | 0.7419 | -0.5961 | 12.9462 | 12.6408 | -92.5658 | 0.0000 | 0.0000 | 0.0000 |
| 19P | 0.0260 | 0.9419 | -0.5567 | -0.0260 | -0.9419 | 0.5567 | 0.0670 | 0.4253 | 0.1282 |
| 20P | 0.7720 | 2.1539 | -1.1997 | -0.7720 | -2.1539 | 1.1997 | 0.0567 | 0.3749 | 0.0885 |
| 21P | 0.7720 | 2.1539 | -1.1997 | -0.7720 | -2.1539 | 1.1997 | 0.0514 | 0.2656 | 0.1120 |
| 22P | 0.7720 | 2.1539 | -1.1997 | -0.7720 | -2.1539 | 1.1997 | 0.0349 | 0.1896 | 0.0648 |
| 23P | 0.0000 | 0.7419 | -0.5961 | -0.4220 | 0.9627 | -10.0510 | 0.0000 | 0.0000 | 0.0000 |
| 24P | 0.0000 | 1.2959 | -0.5117 | -0.0000 | -1.2959 | 0.5117 | 0.0554 | 0.5491 | -0.0038 |
| 25P | 0.0000 | 4.8029 | -3.7497 | -0.0000 | -4.8029 | 3.7497 | 0.0705 | 0.8496 | -0.0069 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1X | 0.0000 | 0.6669 | -0.2337 | 0.0000 | -0.6669 | 0.2337 | 0.0504 | 0.4283 | 0.0143 |
| 1XY | 0.0000 | 0.2369 | -0.1927 | -0.0000 | -0.2369 | 0.1927 | 0.0513 | 0.4212 | 0.0193 |
| 1Y | 0.0000 | 0.2369 | -0.1927 | -0.0000 | -0.2369 | 0.1927 | 0.0434 | 0.4212 | -0.0280 |
| 2X | 0.0000 | 0.2369 | -0.1927 | 0.0000 | -0.2369 | 0.1927 | 0.0461 | 0.3774 | 0.0142 |
| 2XY | 0.0000 | 0.2369 | -0.1927 | 0.0000 | -0.2369 | 0.1927 | 0.0456 | 0.3703 | 0.0192 |
| 2Y | 0.0000 | 0.2369 | -0.1927 | 0.0000 | -0.2369 | 0.1927 | 0.0390 | 0.3701 | -0.0273 |
| 3X | 0.0000 | 0.9249 | -0.2587 | -0.0000 | -0.9249 | 0.2587 | 0.0410 | 0.3393 | 0.0137 |
| 3XY | 0.0000 | 0.2369 | -0.1927 | -0.0000 | -0.2369 | 0.1927 | 0.0424 | 0.3324 | 0.0186 |
| 3Y | 0.0000 | 0.2369 | -0.1927 | -0.0000 | -0.2369 | 0.1927 | 0.0340 | 0.3320 | -0.0263 |
| 4X | 0.0000 | 0.2369 | -0.1927 | -0.0000 | -0.2369 | 0.1927 | 0.0375 | 0.3024 | 0.0128 |
| 4XY | 0.0000 | 0.2369 | -0.1927 | -0.0000 | -0.2369 | 0.1927 | 0.0379 | 0.2955 | 0.0177 |
| 4Y | 0.0000 | 0.2369 | -0.1927 | -0.0000 | -0.2369 | 0.1927 | 0.0306 | 0.2958 | -0.0251 |
| 5X | 0.0000 | 1.0119 | -0.2677 | 0.0000 | -1.0119 | 0.2677 | 0.0335 | 0.2679 | 0.0118 |
| 5XY | 0.0000 | 0.2369 | -0.1927 | 0.0000 | -0.2369 | 0.1927 | 0.0339 | 0.2610 | 0.0166 |
| 5Y | 0.0000 | 0.2369 | -0.1927 | 0.0000 | -0.2369 | 0.1927 | 0.0265 | 0.2608 | -0.0235 |
| 6X | 0.0000 | 0.2369 | -0.1927 | -0.0000 | -0.2369 | 0.1927 | 0.0279 | 0.2273 | 0.0100 |
| 6XY | 0.0000 | 0.2369 | -0.1927 | -0.0000 | -0.2369 | 0.1927 | 0.0295 | 0.2209 | 0.0146 |
| 6Y | 0.0000 | 0.2369 | -0.1927 | -0.0000 | -0.2369 | 0.1927 | 0.0211 | 0.2209 | -0.0213 |
| 7X | 0.0000 | 1.6215 | -0.5878 | 0.0000 | -1.6215 | 0.5878 | 0.0239 | 0.1923 | 0.0077 |
| 7XY | 0.0000 | 0.6745 | -0.4968 | 0.0000 | -0.6745 | 0.4968 | 0.0238 | 0.1856 | 0.0121 |
| 7Y | 0.0000 | 0.6745 | -0.4968 | 0.0000 | -0.6745 | 0.4968 | 0.0176 | 0.1855 | -0.0186 |
| 8X | 0.0000 | 0.4377 | -0.3041 | -0.0000 | -0.4377 | 0.3041 | 0.0179 | 0.1654 | 0.0081 |
| 8XY | 0.0000 | 0.4377 | -0.3041 | -0.0000 | -0.4377 | 0.3041 | 0.0224 | 0.1565 | 0.0136 |
| 8Y | 0.0000 | 0.4377 | -0.3041 | -0.0000 | -0.4377 | 0.3041 | 0.0111 | 0.1562 | -0.0191 |
| 9X | 0.0000 | 1.2987 | -0.3871 | -0.0000 | -1.2987 | 0.3871 | 0.0136 | 0.1360 | 0.0082 |
| 9XY | 0.0000 | 0.4377 | -0.3041 | -0.0000 | -0.4377 | 0.3041 | 0.0175 | 0.1229 | 0.0146 |
| 9Y | 0.0000 | 0.4377 | -0.3041 | -0.0000 | -0.4377 | 0.3041 | 0.0061 | 0.1226 | -0.0190 |
| 10X | 0.0000 | 1.3847 | -0.3951 | 0.0000 | -1.3847 | 0.3951 | 0.0103 | 0.1104 | 0.0080 |
| 10XY | 0.0000 | 0.4377 | -0.3041 | 0.0000 | -0.4377 | 0.3041 | 0.0119 | 0.0922 | 0.0154 |
| 10Y | 0.0000 | 0.4377 | -0.3041 | 0.0000 | -0.4377 | 0.3041 | 0.0037 | 0.0921 | -0.0189 |
| 12X | 0.0000 | 2.6426 | -1.0412 | 0.0000 | -2.6426 | 1.0412 | 0.0043 | 0.0714 | 0.0074 |
| 12XY | 0.0000 | 1.1796 | -0.9002 | 0.0000 | -1.1796 | 0.9002 | 0.0063 | 0.0530 | 0.0142 |
| 12Y | 0.0000 | 1.1796 | -0.9002 | -0.0000 | -1.1796 | 0.9002 | -0.0131 | 0.0528 | -0.0146 |
| 15X | 0.0000 | 3.3239 | -0.8441 | 0.0000 | -3.3239 | 0.8441 | 0.0004 | 0.0274 | 0.0053 |
| 15XY | 0.0000 | 0.7419 | -0.5961 | 0.0000 | -0.7419 | 0.5961 | 0.0024 | 0.0164 | 0.0090 |
| 15Y | 0.0000 | 0.7419 | -0.5961 | -0.0000 | -0.7419 | 0.5961 | -0.0092 | 0.0160 | -0.0087 |
| 18X | 0.0000 | 0.7419 | -0.5961 | -12.6262 | 16.3740 | 64.8507 | 0.0000 | 0.0000 | 0.0000 |
| 18XY | 0.0000 | 0.7419 | -0.5961 | 14.7639 | 14.2744 | 77.0278 | 0.0000 | 0.0000 | 0.0000 |
| 18Y | 0.0000 | 0.7419 | -0.5961 | -9.9949 | 9.9659 | -72.7539 | 0.0000 | 0.0000 | 0.0000 |
| 19X | 0.0090 | 0.9339 | -0.4867 | -0.0090 | -0.9339 | 0.4867 | 0.0279 | 0.4242 | -0.1467 |
| 20X | 0.7720 | 2.1539 | -1.1997 | -0.7720 | -2.1539 | 1.1997 | 0.0292 | 0.3732 | -0.1052 |
| 21X | 0.7720 | 2.1539 | -1.1997 | -0.7720 | -2.1539 | 1.1997 | 0.0123 | 0.2634 | -0.1332 |
| 22X | 0.7720 | 2.1539 | -1.1997 | -0.7720 | -2.1539 | 1.1997 | 0.0080 | 0.1885 | -0.0789 |
| i0.50E20S | 0.0000 | 0.7419 | -0.9521 | 0.0000 | -0.7419 | 0.9521 | -0.0040 | 0.0220 | -0.0004 |
| i0.50E40S | 0.0000 | 1.1796 | -1.2212 | 0.0000 | -1.1796 | 1.2212 | -0.0040 | 0.0625 | -0.0007 |
| i0.50E74S | 0.0000 | 0.6745 | -0.7578 | 0.0000 | -0.6745 | 0.7578 | 0.0206 | 0.1891 | -0.0014 |
| i0.50E84S | 0.0000 | 0.2369 | -0.3237 | -0.0000 | -0.2369 | 0.3237 | 0.0302 | 0.2644 | -0.0019 |
| i0.50E96S | 0.0000 | 0.2369 | -0.2937 | 0.0000 | -0.2369 | 0.2937 | 0.0423 | 0.3724 | -0.0025 |
| i0.50E101S | 0.0000 | 0.2369 | -0.3587 | -0.0000 | -0.2369 | 0.3587 | 0.0473 | 0.4268 | -0.0028 |

**Crossing Diagonal Check for Load Case "NESC Extreme" (RLOUT controls):**

| Comp. Member Label | Tens. Member Label | Connect Leg for Comp. Member | Force In Comp. Member (kips) | Force In Tens. Member (kips) | Original Supported L/R Cap. (kips) | Original Supported RLX | Original Supported RLY | Original Supported RLZ | Original Supported L/R | Original Supported KL/R | Original Supported Curve No. | Alternate Unsupported L/R Cap. (kips) | Alternate Unsupported RLOUT | Alternate Unsupported L/R | Alternate Unsupported KL/R | Alternate Unsupported Curve No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g16P | g16Y | Long only | -0.43 | -0.73 | 17.48 | 0.500 | 0.750 | 0.500 | 106.07 | 109.55 | 2 | 13.07 | 1.000 | 141.42 | 133.17 | 6 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| g16Y | g16P | Long only | -0.73 | -0.43 | 17.48 | 0.500 | 0.750 | 0.500 | 106.07 | 109.55 | 2 | 13.07 | 1.000 | 141.42 | 133.17 | 6 |
| g18Y | g18P | Long only | -0.78 | 0.04 | 24.28 | 0.500 | 0.750 | 0.500 | 97.34 | 103.01 | 2 | 18.97 | 1.000 | 129.79 | 126.02 | 6 |
| g22P | g22Y | Long only | -1.97 | -3.16 | 24.28 | 0.500 | 0.750 | 0.500 | 97.34 | 103.01 | 2 | 18.97 | 1.000 | 129.79 | 126.02 | 6 |
| g22Y | g22P | Long only | -3.16 | -1.97 | 24.28 | 0.500 | 0.750 | 0.500 | 97.34 | 103.01 | 2 | 18.97 | 1.000 | 129.79 | 126.02 | 6 |
| g24P | g24Y | Short only | -2.87 | -5.36 | 29.10 | 0.750 | 0.500 | 0.500 | 86.41 | 94.81 | 2 | 24.26 | 1.000 | 110.34 | 115.17 | 3 |
| g24Y | g24P | Short only | -5.36 | -2.87 | 29.10 | 0.750 | 0.500 | 0.500 | 86.41 | 94.81 | 2 | 24.26 | 1.000 | 110.34 | 115.17 | 3 |
| g26P | g26Y | Short only | -5.68 | -8.43 | 29.10 | 0.750 | 0.500 | 0.500 | 86.41 | 94.81 | 2 | 24.26 | 1.000 | 110.34 | 115.17 | 3 |
| g26Y | g26P | Short only | -8.43 | -5.68 | 29.10 | 0.750 | 0.500 | 0.500 | 86.41 | 94.81 | 2 | 24.26 | 1.000 | 110.34 | 115.17 | 3 |
| g27P | g27X | Short only | -1.18 | -0.09 | 31.84 | 0.780 | 0.560 | 0.560 | 104.64 | 108.48 | 2 | 28.17 | 1.000 | 120.07 | 120.04 | 6 |
| g27X | g27P | Short only | -0.09 | -1.18 | 31.84 | 0.780 | 0.560 | 0.560 | 104.64 | 108.48 | 2 | 28.17 | 1.000 | 120.07 | 120.04 | 6 |
| g28P | g28Y | Short only | -2.83 | -1.73 | 31.84 | 0.780 | 0.560 | 0.560 | 104.64 | 108.48 | 2 | 28.17 | 1.000 | 120.07 | 120.04 | 6 |
| g28Y | g28P | Short only | -1.73 | -2.83 | 31.84 | 0.780 | 0.560 | 0.560 | 104.64 | 108.48 | 2 | 28.17 | 1.000 | 120.07 | 120.04 | 6 |
| g30XY | g30X | Short only | -2.51 | 0.03 | 18.15 | 0.780 | 0.570 | 0.570 | 142.24 | 136.99 | 5 | 16.38 | 1.000 | 159.33 | 144.19 | 6 |
| g32P | g32Y | Short only | -1.52 | -0.99 | 13.60 | 0.780 | 0.560 | 0.560 | 170.14 | 158.24 | 5 | 12.43 | 1.000 | 193.98 | 165.50 | 6 |
| g32Y | g32P | Short only | -0.99 | -1.52 | 13.60 | 0.780 | 0.560 | 0.560 | 170.14 | 158.24 | 5 | 12.43 | 1.000 | 193.98 | 165.50 | 6 |

**Summary of Clamp Capacities and Usages for Load Case "NESC Extreme":**

| Clamp Label | Force (kips) | Input Holding Capacity (kips) | Factored Holding Capacity (kips) | Usage % |
|---|---|---|---|---|
| Clamp1 | 1.094 | 50.00 | 50.00 | 2.19 |
| Clamp2 | 1.053 | 50.00 | 50.00 | 2.11 |
| Clamp3 | 2.583 | 50.00 | 50.00 | 5.17 |
| Clamp4 | 2.583 | 50.00 | 50.00 | 5.17 |
| Clamp5 | 2.583 | 50.00 | 50.00 | 5.17 |
| Clamp6 | 2.583 | 50.00 | 50.00 | 5.17 |
| Clamp7 | 2.583 | 50.00 | 50.00 | 5.17 |
| Clamp8 | 2.583 | 50.00 | 50.00 | 5.17 |
| Clamp9 | 0.960 | 50.00 | 50.00 | 1.92 |
| Clamp10 | 1.047 | 50.00 | 50.00 | 2.09 |
| Clamp11 | 1.725 | 50.00 | 50.00 | 3.45 |
| Clamp12 | 1.355 | 50.00 | 50.00 | 2.71 |
| Clamp13 | 1.440 | 50.00 | 50.00 | 2.88 |
| Clamp14 | 2.840 | 50.00 | 50.00 | 5.68 |
| Clamp15 | 3.429 | 50.00 | 50.00 | 6.86 |
| Clamp17 | 0.430 | 50.00 | 50.00 | 0.86 |
| Clamp18 | 0.377 | 50.00 | 50.00 | 0.75 |
| Clamp19 | 0.401 | 50.00 | 50.00 | 0.80 |
| Clamp20 | 1.015 | 50.00 | 50.00 | 2.03 |
| Clamp21 | 1.698 | 50.00 | 50.00 | 3.40 |
| Clamp22 | 1.207 | 50.00 | 50.00 | 2.41 |
| Clamp23 | 0.707 | 50.00 | 50.00 | 1.41 |
| Clamp24 | 0.305 | 50.00 | 50.00 | 0.61 |
| Clamp25 | 0.305 | 50.00 | 50.00 | 0.61 |
| Clamp26 | 0.305 | 50.00 | 50.00 | 0.61 |
| Clamp27 | 1.393 | 50.00 | 50.00 | 2.79 |
| Clamp28 | 6.093 | 50.00 | 50.00 | 12.19 |

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress
Printed capacities do not include the strength factor entered for each load case.
The Group Summary reports on the member and load case that resulted in maximum usage
which may not necessarily be the same as that which produces maximum force.

**Group Summary (Compression Portion):**

| Group Label | Group Desc. | Angle Type | Angle Size | Steel Strength (ksi) | Max Usage % | Cont-rol | Max Use In Comp. % | Comp. Control Member | Comp. Force (kips) | Comp. Control Load Case | L/R Capacity (kips) | Comp. Connect. Shear Capacity (kips) | Comp. Connect. Bearing Capacity (kips) | RLX | RLY | RLZ | L/R KL/R Comp. | Length (ft) | Curve No. | No. Of Member Bolts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Leg1 | L5x5x5/16 | SAE | 5X5X0.3125 | 33.0 | 65.89 | Tens | 61.73 | g8X | -55.238 | NESC Ext | 89.489 | 166.500 | 210.937 | 1.000 | 1.000 | 1.000 | 60.36 | 60.36 | 5.000 | 1 10 |
| Leg2 | L6x6x5/16 | SAE | 6X6X0.3125 | 33.0 | 78.32 | Comp | 78.32 | g10X | -71.601 | NESC Ext | 91.422 | 166.500 | 210.937 | 1.000 | 1.000 | 1.000 | 71.33 | 71.33 | 7.133 | 1 10 |
| Leg3 | L6x6x3/8 | SAE | 6X6X0.375 | 33.0 | 75.61 | Comp | 75.61 | g14X | -94.104 | NESC Ext | 124.467 | 199.800 | 303.750 | 0.333 | 0.333 | 0.333 | 68.42 | 68.42 | 20.375 | 1 12 |
| Diag1 | L2.5x2x3/16 | SAU | 2.5X2X0.1875 | 33.0 | 56.35 | Comp | 56.35 | g15P | -9.852 | NESC Ext | 17.484 | 33.300 | 25.312 | 0.500 | 0.750 | 0.500 | 106.07 | 109.55 | 7.071 | 2 2 |
| Diag2 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | 33.0 | 26.61 | Comp | 26.61 | g21P | -6.460 | NESC Ext | 24.281 | 33.300 | 33.750 | 0.500 | 0.750 | 0.500 | 97.34 | 103.01 | 6.403 | 2 2 |
| Diag3 | L2.5x2.5x1/4 | SAE | 2.5X2.5X0.25 | 33.0 | 34.77 | Cross | 34.77 | g26Y | -8.434 | NESC Ext | 24.256 | 49.950 | 50.625 | 1.000 | 0.500 | 0.500 | 110.34 | 115.17 | 7.071 | 3 3 |
| Diag4 | L2.5x2.5x5/16 | SAE | 2.5X2.5X0.3125 | 33.0 | 10.05 | Cross | 10.05 | g28P | -2.832 | NESC Ext | 28.168 | 33.300 | 42.187 | 1.000 | 0.560 | 0.560 | 120.07 | 120.04 | 7.614 | 6 2 |
| M1 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | 33.0 | 0.00 | | 0.00 | | 0.000 | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 | 0.00 | 0.000 | 0 0 |
| M2 | L2.5x2.5x1/4 | SAE | 2.5X2.5X0.25 | 33.0 | 32.23 | Comp | 32.23 | g60X | -5.043 | NESC Ext | 15.646 | 33.300 | 33.750 | 1.000 | 0.500 | 0.500 | 164.79 | 147.54 | 10.560 | 6 2 |
| M3 | L3x2.5x1/4 | SAU | 3X2.5X0.25 | 33.0 | 25.77 | Comp | 25.77 | g41P | -6.760 | NESC Ext | 26.226 | 33.300 | 33.750 | 1.000 | 1.000 | 1.000 | 113.64 | 116.82 | 5.000 | 3 2 |
| M4 | L3x3x1/4 | SAE | 3X3X0.25 | 33.0 | 15.45 | Comp | 15.45 | g42P | -4.805 | NESC Hea | 31.104 | 49.950 | 50.625 | 1.000 | 0.500 | 0.500 | 98.95 | 109.48 | 7.669 | 3 3 |
| M5 | L4x3x1/4 | SAU | 4X3X0.25 | 33.0 | 23.29 | Comp | 23.29 | g62X | -6.702 | NESC Ext | 28.782 | 33.300 | 33.750 | 1.000 | 0.500 | 0.500 | 135.56 | 129.57 | 14.460 | 6 2 |
| M6 | L4x4x1/4 | SAE | 4X4X0.25 | 33.0 | 28.32 | Comp | 28.32 | g63P | -5.826 | NESC Ext | 20.575 | 33.300 | 33.750 | 1.000 | 0.500 | 0.500 | 192.00 | 164.28 | 20.000 | 6 2 |
| M7 | L2.5x2x3/16 | SAU | 2.5X2X0.1875 | 33.0 | 24.59 | Comp | 24.59 | g45P | -1.760 | NESC Hea | 7.160 | 16.650 | 12.656 | 1.000 | 1.000 | 1.000 | 179.95 | 179.95 | 6.403 | 4 1 |
| M8 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | 33.0 | 20.91 | Tens | 0.00 | g50Y | 0.000 | | 3.334 | 33.300 | 33.750 | 1.000 | 1.000 | 1.000 | 358.34 | 301.66 | 12.661 | 5 2 |
| Diag5 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | 33.0 | 94.03 | Tens | 58.26 | g33P | -2.522 | NESC Hea | 4.330 | 33.300 | 33.750 | 0.580 | 0.790 | 0.580 | 309.85 | 264.71 | 18.876 | 5 2 |
| M9 | L2.5x2x3/16 | SAU | 2.5X2X0.1875 | 33.0 | 83.05 | Tens | 61.16 | g57X | -7.181 | NESC Ext | 11.742 | 16.650 | 12.656 | 1.000 | 1.000 | 1.000 | 140.52 | 140.52 | 5.000 | 4 1 |
| **M10** | **L2.5x2.5x3/16** | **SAE** | **2.5X2.5X0.1875** | **33.0** | **85.54** | **Tens** | **80.39** | **g70Y** | **-8.478** | **NESC Ext** | **20.689** | **16.800** | **10.547** | **1.000** | **1.000** | **1.000** | **85.71** | **102.85** | **3.536** | **3 1 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g70X g70XY ??** |

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M11 | L5x5x3/8 | SAE | 5X5X0.375 | 33.0 | 27.30 | Comp | 27.30 | g65XY | -4.586 | NESC | Ext | 35.163 | 16.800 | 21.094 | 1.000 | 1.000 | 1.000 | 171.42 | 171.42 | 14.142 | 4 | 1 |
| M12 | L3.5x3.5x1/4 | SAE | 3.5X3.5X0.25 | 33.0 | 22.05 | Comp | 22.05 | g66Y | -3.101 | NESC | Ext | 15.475 | 16.800 | 14.062 | 1.000 | 1.000 | 1.000 | 176.80 | 176.80 | 10.225 | 4 | 1 |
| PM | Powermount | Pwmnt | Pipe 18" Std. | 50.0 | 2.80 | Comp | 2.80 | g71P | -25.425 | NESC | Hea | 907.332 | 0.000 | 0.000 | 1.000 | 1.000 | 1.000 | 38.46 | 38.46 | 20.000 | 1 | 0 |
| M13 | L4x3x1/4 | SAU | 4X3X0.25 | 33.0 | 15.61 | Comp | 15.61 | g47P | -5.310 | NESC | Hea | 34.023 | 66.600 | 67.500 | 1.000 | 0.500 | 0.500 | 112.62 | 116.31 | 12.013 | 3 | 4 |
| M14 | Bar 2-1/2 x 1/4 | Bar | 2x1/4 | 33.0 | 30.33 | Tens | 0.00 | g58Y | 0.000 | | | 14.788 | 33.300 | 33.750 | 1.000 | 1.000 | 1.000 | 60.00 | 60.00 | 5.000 | 1 | 2 |

**Group Summary (Tension Portion):**

| Group Label | Group Desc. | Angle Type | Angle Size | Steel Strength (ksi) | Max Usage % | Usage Control | Max Tension Use % | Tension Control Member | Tension Force (kips) | Tension Control Load Case | Net Section Capacity (kips) | Tension Connect. Shear Capacity (kips) | Tension Connect. Bearing Capacity (kips) | Tension Connect. Rupture Capacity (kips) | Length Tens. Member (ft) | No. Of Bolts | No. Of Holes | Hole Diameter (in) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Leg1 | L5x5x5/16 | SAE | 5X5X0.3125 | 33.0 | 65.89 | Tens | 65.89 | g8Y | 46.201 | NESC Ext | 70.122 | 166.500 | 210.937 | 183.823 | 5.000 | 10 | 3.310 | 0.875 |
| Leg2 | L6x6x5/16 | SAE | 6X6X0.3125 | 33.0 | 78.32 | Comp | 70.59 | g10Y | 63.942 | NESC Ext | 90.582 | 166.500 | 210.937 | 183.823 | 7.133 | 10 | 3.310 | 0.875 |
| Leg3 | L6x6x3/8 | SAE | 6X6X0.375 | 33.0 | 75.61 | Comp | 65.31 | g14Y | 70.562 | NESC Ext | 108.039 | 199.800 | 303.750 | 281.250 | 20.375 | 12 | 3.310 | 0.875 |
| Diag1 | L2.5x2x3/16 | SAU | 2.5X2X0.1875 | 33.0 | 56.35 | Comp | 50.08 | g15XY | 9.608 | NESC Ext | 19.184 | 33.300 | 25.312 | 21.094 | 7.071 | 2 | 1.000 | 0.875 |
| Diag2 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | 33.0 | 26.61 | Comp | 25.73 | g21XY | 6.428 | NESC Ext | 24.985 | 33.300 | 33.750 | 26.766 | 6.403 | 2 | 1.000 | 0.875 |
| Diag3 | L2.5x2.5x1/4 | SAE | 2.5X2.5X0.25 | 33.0 | 34.77 | Cross | 27.31 | g23X | 7.878 | NESC Ext | 28.846 | 49.950 | 50.625 | 42.187 | 7.071 | 3 | 1.000 | 0.875 |
| Diag4 | L2.5x2.5x5/16 | SAE | 2.5X2.5X0.3125 | 33.0 | 10.05 | Cross | 10.01 | g28X | 3.334 | NESC Ext | 35.241 | 33.300 | 42.187 | 35.156 | 7.614 | 2 | 1.000 | 0.875 |
| M1 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | 33.0 | 0.00 | | 0.00 | | 0.000 | | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0 | 0.000 | 0 |
| M2 | L2.5x2.5x1/4 | SAE | 2.5X2.5X0.25 | 33.0 | 32.23 | Comp | 4.90 | g60P | 1.078 | NESC Ext | 28.846 | 33.300 | 33.750 | 21.984 | 10.560 | 2 | 1.000 | 0.875 |
| M3 | L3x2.5x1/4 | SAU | 3X2.5X0.25 | 33.0 | 25.77 | Comp | 19.60 | g41X | 5.763 | NESC Ext | 32.410 | 33.300 | 33.750 | 29.412 | 5.000 | 2 | 1.000 | 0.875 |
| M4 | L3x3x1/4 | SAE | 3X3X0.25 | 33.0 | 15.45 | Comp | 6.80 | g40Y | 3.233 | NESC Hea | 47.520 | 0.000 | 0.000 | 0.000 | 5.000 | 0 | 0.000 | 0 |
| M5 | L4x3x1/4 | SAU | 4X3X0.25 | 33.0 | 23.29 | Comp | 8.34 | g62P | 2.093 | NESC Ext | 36.271 | 33.300 | 33.750 | 25.078 | 14.460 | 2 | 1.000 | 0.875 |
| M6 | L4x4x1/4 | SAE | 4X4X0.25 | 33.0 | 28.32 | Comp | 11.77 | g64P | 3.309 | NESC Ext | 44.624 | 33.300 | 33.750 | 28.125 | 20.000 | 2 | 2.000 | 0.875 |
| M7 | L2.5x2x3/16 | SAU | 2.5X2X0.1875 | 33.0 | 24.59 | Comp | 21.38 | g46P | 3.855 | NESC Hea | 19.184 | 33.300 | 25.312 | 18.035 | 9.155 | 2 | 1.000 | 0.875 |
| M8 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | 33.0 | 20.91 | Tens | 20.91 | g50XY | 4.597 | NESC Hea | 24.985 | 33.300 | 33.750 | 21.984 | 12.661 | 2 | 1.000 | 0.875 |
| Diag5 | L2.5x2x1/4 | SAU | 2.5X2X0.25 | 33.0 | 94.03 | Tens | 94.03 | g37X | 11.151 | NESC Ext | 24.985 | 16.650 | 16.875 | 11.859 | 30.416 | 1 | 1.000 | 0.875 |
| M9 | L2.5x2x3/16 | SAU | 2.5X2X0.1875 | 33.0 | 83.05 | Tens | 83.05 | g57P | 7.387 | NESC Ext | 19.184 | 16.650 | 12.656 | 8.895 | 5.000 | 1 | 1.000 | 0.875 |
| **M10** | **L2.5x2.5x3/16** | **SAE** | **2.5X2.5X0.1875** | **33.0** | **85.54** | **Tens** | **85.54** | **g70XY** | **9.022** | **NESC Ext** | **22.961** | **16.800** | **10.547** | **11.719** | **3.536** | **1** | **1.000** | **0.875** |

**0.6875 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g70X g70XY ??**

```
   M11        L5x5x3/8   SAE      5X5X0.375     33.0 27.30  Comp  0.00    g65Y   0.000           99.560   16.800   21.094   23.437 14.142     1 1.000
0.6875
   M12    L3.5x3.5x1/4   SAE   3.5X3.5X0.25     33.0 22.05  Comp  0.00    g66Y   0.000           45.088   16.800   14.062   15.625 10.225     1 1.000
0.6875
    PM      Powermount Pwmnt   Pipe 18" Std.     50.0  2.80  Comp  0.00    g78P   0.000          969.998    0.000    0.000    0.000 15.000     0 0.000
0
   M13        L4x3x1/4   SAU       4X3X0.25     33.0 15.61  Comp  1.23   g47XY   0.539NESC Ext   43.696   66.600   67.500   56.250 12.013     4 1.000
0.875
   M14 Bar 2-1/2 x 1/4   Bar          2x1/4     33.0 30.33  Tens 30.33    g51P   2.815NESC Hea    9.281   33.300   33.750   28.125  5.000     2 1.000
0.875
```

*** Maximum Stress Summary for Each Load Case

**Summary of Maximum Usages by Load Case:**

| Load Case | Maximum Usage % | Element Label | Element Type |
|---|---|---|---|
| NESC Heavy | 58.26 | g33P | Angle |
| NESC Extreme | 94.03 | g37X | Angle |

**Summary of Insulator Usages:**

| Insulator Label | Insulator Type | Maximum Usage % | Load Case | Weight (lbs) |
|---|---|---|---|---|
| Clamp1 | Clamp | 3.64 | NESC Heavy | 0.0 |
| Clamp2 | Clamp | 3.44 | NESC Heavy | 0.0 |
| Clamp3 | Clamp | 6.81 | NESC Heavy | 0.0 |
| Clamp4 | Clamp | 6.73 | NESC Heavy | 0.0 |
| Clamp5 | Clamp | 6.91 | NESC Heavy | 0.0 |
| Clamp6 | Clamp | 6.85 | NESC Heavy | 0.0 |
| Clamp7 | Clamp | 6.78 | NESC Heavy | 0.0 |
| Clamp8 | Clamp | 6.71 | NESC Heavy | 0.0 |
| Clamp9 | Clamp | 1.92 | NESC Extreme | 0.0 |
| Clamp10 | Clamp | 2.09 | NESC Extreme | 0.0 |
| Clamp11 | Clamp | 3.45 | NESC Extreme | 0.0 |
| Clamp12 | Clamp | 2.71 | NESC Extreme | 0.0 |
| Clamp13 | Clamp | 2.88 | NESC Extreme | 0.0 |
| Clamp14 | Clamp | 5.68 | NESC Extreme | 0.0 |
| Clamp15 | Clamp | 6.86 | NESC Extreme | 0.0 |
| Clamp17 | Clamp | 2.05 | NESC Heavy | 0.0 |
| Clamp18 | Clamp | 2.34 | NESC Heavy | 0.0 |
| Clamp19 | Clamp | 3.11 | NESC Heavy | 0.0 |
| Clamp20 | Clamp | 5.96 | NESC Heavy | 0.0 |
| Clamp21 | Clamp | 7.72 | NESC Heavy | 0.0 |
| Clamp22 | Clamp | 7.18 | NESC Heavy | 0.0 |
| Clamp23 | Clamp | 1.41 | NESC Extreme | 0.0 |
| Clamp24 | Clamp | 0.61 | NESC Extreme | 0.0 |
| Clamp25 | Clamp | 0.61 | NESC Extreme | 0.0 |
| Clamp26 | Clamp | 0.61 | NESC Extreme | 0.0 |
| Clamp27 | Clamp | 4.25 | NESC Heavy | 0.0 |
| Clamp28 | Clamp | 17.09 | NESC Heavy | 0.0 |

**Loads At Insulator Attachments For All Load Cases:**

| Load Case | Insulator Label | Insulator Type | Structure Attach Label | Structure Attach Load X (kips) | Structure Attach Load Y (kips) | Structure Attach Load Z (kips) | Structure Attach Load Res. (kips) |
|---|---|---|---|---|---|---|---|
| NESC Heavy | Clamp1 | Clamp | 19P | 0.000 | 1.185 | 1.385 | 1.822 |
| NESC Heavy | Clamp2 | Clamp | 19X | 0.000 | 1.135 | 1.294 | 1.721 |
| NESC Heavy | Clamp3 | Clamp | 20P | 0.000 | 1.861 | 2.852 | 3.405 |
| NESC Heavy | Clamp4 | Clamp | 20X | 0.000 | 1.785 | 2.852 | 3.364 |
| NESC Heavy | Clamp5 | Clamp | 21P | 0.000 | 1.845 | 2.921 | 3.455 |
| NESC Heavy | Clamp6 | Clamp | 21X | 0.000 | 1.785 | 2.921 | 3.423 |
| NESC Heavy | Clamp7 | Clamp | 22P | 0.000 | 1.844 | 2.843 | 3.389 |
| NESC Heavy | Clamp8 | Clamp | 22X | 0.000 | 1.785 | 2.843 | 3.357 |
| NESC Heavy | Clamp9 | Clamp | 3X | 0.000 | 0.308 | 0.456 | 0.550 |
| NESC Heavy | Clamp10 | Clamp | 5X | 0.000 | 0.357 | 0.617 | 0.713 |
| NESC Heavy | Clamp11 | Clamp | 7X | 0.000 | 0.422 | 0.705 | 0.822 |
| NESC Heavy | Clamp12 | Clamp | 9X | 0.000 | 0.457 | 0.695 | 0.832 |
| NESC Heavy | Clamp13 | Clamp | 10X | 0.000 | 0.604 | 0.931 | 1.110 |
| NESC Heavy | Clamp14 | Clamp | 12X | 0.000 | 0.962 | 1.517 | 1.797 |
| NESC Heavy | Clamp15 | Clamp | 15X | 0.000 | 1.441 | 2.396 | 2.796 |
| NESC Heavy | Clamp17 | Clamp | i0.50E101S | 0.000 | 0.198 | 1.007 | 1.026 |
| NESC Heavy | Clamp18 | Clamp | i0.50E96S | 0.000 | 0.297 | 1.131 | 1.169 |
| NESC Heavy | Clamp19 | Clamp | i0.50E84S | 0.000 | 0.544 | 1.454 | 1.553 |
| NESC Heavy | Clamp20 | Clamp | i0.50E74S | 0.000 | 1.063 | 2.784 | 2.981 |
| NESC Heavy | Clamp21 | Clamp | i0.50E40S | 0.000 | 1.326 | 3.627 | 3.861 |
| NESC Heavy | Clamp22 | Clamp | i0.50E20S | 0.000 | 1.020 | 3.441 | 3.589 |
| NESC Heavy | Clamp23 | Clamp | 1X | 0.000 | 0.219 | 0.380 | 0.439 |
| NESC Heavy | Clamp24 | Clamp | 1XY | 0.000 | 0.088 | 0.181 | 0.201 |
| NESC Heavy | Clamp25 | Clamp | 2X | 0.000 | 0.119 | 0.215 | 0.246 |
| NESC Heavy | Clamp26 | Clamp | 2XY | 0.000 | 0.119 | 0.215 | 0.246 |
| NESC Heavy | Clamp27 | Clamp | 24P | 0.000 | 0.835 | 1.952 | 2.123 |
| NESC Heavy | Clamp28 | Clamp | 25P | 0.000 | 1.571 | 8.398 | 8.543 |
| NESC Extreme | Clamp1 | Clamp | 19P | 0.026 | 0.942 | 0.557 | 1.094 |
| NESC Extreme | Clamp2 | Clamp | 19X | 0.009 | 0.934 | 0.487 | 1.053 |
| NESC Extreme | Clamp3 | Clamp | 20P | 0.772 | 2.154 | 1.200 | 2.583 |
| NESC Extreme | Clamp4 | Clamp | 20X | 0.772 | 2.154 | 1.200 | 2.583 |
| NESC Extreme | Clamp5 | Clamp | 21P | 0.772 | 2.154 | 1.200 | 2.583 |
| NESC Extreme | Clamp6 | Clamp | 21X | 0.772 | 2.154 | 1.200 | 2.583 |
| NESC Extreme | Clamp7 | Clamp | 22P | 0.772 | 2.154 | 1.200 | 2.583 |
| NESC Extreme | Clamp8 | Clamp | 22X | 0.772 | 2.154 | 1.200 | 2.583 |
| NESC Extreme | Clamp9 | Clamp | 3X | 0.000 | 0.925 | 0.259 | 0.960 |
| NESC Extreme | Clamp10 | Clamp | 5X | 0.000 | 1.012 | 0.268 | 1.047 |
| NESC Extreme | Clamp11 | Clamp | 7X | 0.000 | 1.622 | 0.588 | 1.725 |
| NESC Extreme | Clamp12 | Clamp | 9X | 0.000 | 1.299 | 0.387 | 1.355 |
| NESC Extreme | Clamp13 | Clamp | 10X | 0.000 | 1.385 | 0.395 | 1.440 |
| NESC Extreme | Clamp14 | Clamp | 12X | 0.000 | 2.643 | 1.041 | 2.840 |
| NESC Extreme | Clamp15 | Clamp | 15X | 0.000 | 3.324 | 0.844 | 3.429 |
| NESC Extreme | Clamp17 | Clamp | i0.50E101S | 0.000 | 0.237 | 0.359 | 0.430 |
| NESC Extreme | Clamp18 | Clamp | i0.50E96S | 0.000 | 0.237 | 0.294 | 0.377 |
| NESC Extreme | Clamp19 | Clamp | i0.50E84S | 0.000 | 0.237 | 0.324 | 0.401 |
| NESC Extreme | Clamp20 | Clamp | i0.50E74S | 0.000 | 0.675 | 0.758 | 1.015 |
| NESC Extreme | Clamp21 | Clamp | i0.50E40S | 0.000 | 1.180 | 1.221 | 1.698 |
| NESC Extreme | Clamp22 | Clamp | i0.50E20S | 0.000 | 0.742 | 0.952 | 1.207 |
| NESC Extreme | Clamp23 | Clamp | 1X | 0.000 | 0.667 | 0.234 | 0.707 |
| NESC Extreme | Clamp24 | Clamp | 1XY | 0.000 | 0.237 | 0.193 | 0.305 |
| NESC Extreme | Clamp25 | Clamp | 2X | 0.000 | 0.237 | 0.193 | 0.305 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| NESC Extreme | Clamp26 | Clamp | 2XY | 0.000 | 0.237 | 0.193 | 0.305 |
| NESC Extreme | Clamp27 | Clamp | 24P | 0.000 | 1.296 | 0.512 | 1.393 |
| NESC Extreme | Clamp28 | Clamp | 25P | 0.000 | 4.803 | 3.750 | 6.093 |

**Overturning Moments For User Input Concentrated Loads:**

**Moments are static equivalents based on central axis of 0,0 (i.e. a single pole).**

| Load Case | Total Tran. Load (kips) | Total Long. Load (kips) | Total Vert. Load (kips) | Transverse Overturning Moment (ft-k) | Longitudinal Overturning Moment (ft-k) | Torsional Moment (ft-k) |
|---|---|---|---|---|---|---|
| NESC Heavy | 17.096 | 0.000 | 33.162 | 1428.297 | 24.064 | 15.809 |
| NESC Extreme | 27.222 | 4.667 | 12.748 | 2247.666 | 400.720 | 52.322 |

*** Weight of structure (lbs):
Weight of Angles*Section DLF: 23724.7
Total: 23724.7

*** End of Report

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

| | |
|---|---|
| Subject: | Anchor Bolt Analysis for CL&P Tower # 1321 |
| Location: | Startford, CT |
| Rev. 3: 10/21/15 | Prepared by: T.J.L. Checked by: C.F.C.<br>Job No. 13317.000 |

## Tower Anchor Bolt Analysis

**Max Leg Reactions:**

Uplift = $Uplift := 76.43 \cdot kips$ (User Input)

Shear = $Shear := 21.27 \cdot kips$ (User Input)

Compression = $Compression := 93.16 \cdot kips$ (User Input)

**Anchor Bolt Data:**

Use ASTM A36 (Assumed Conservative Value - Actual Grade Unknown)

Number of Anchor Bolts = $N := 4$ (User Input)

Bolt Ultimate Strength = $F_u := 58ksi$ (User Input)

Bolt Yield Strength = $F_y := 36ksi$ (User Input)

Diameter of Bolts = $D := 1.25in$ (User Input)

Threads per Inch = $n := 7$ (User Input)

Coefficient of Friction = $\mu := 0.55$ (User Input)

**Anchor Bolt Area:**

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left( D - \frac{0.9743 \cdot in}{n} \right)^2 = 0.969 \cdot in^2$ (AISC 13th Ed. pg. 7-83)

**Check Anchor Bolt Area:**

Based on the ASCE 10-97 Design of Latticed Steel Transmission Structures

Required Area = $A_{s1} := \frac{Uplift}{F_y} + \frac{Shear}{\mu \cdot .85 \cdot F_y} = 3.4 \cdot in^2$

$A_{s2} := \left[ \frac{Shear - (0.3 \cdot Compression)}{\mu \cdot .85 \cdot F_y} \right] = -0.397 \cdot in^2$

Provided Area = $A_{sprovided} := A_n \cdot N = 3.9 \cdot in^2$

$Condition2 := if\left( \frac{A_{s1}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right)$

Condition2 = "OK"

$Condition3 := if\left( \frac{A_{s2}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right)$

Condition3 = "OK"

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| | |
|---|---|
| Subject: | Foundation Analysis CL&P Tower # 1321 |
| Location: | Stratford, CT |
| Rev. 3: 10/21/15 | Prepared by: T.J.L. Checked by: C.F.C.<br>Job No. 13317.000 |

## Foundation Analysis

### Input Data:

Max. Reactions at Tower Leg:

| | | |
|---|---|---|
| Shear = | Shear := 21.27·1.1·kips = 23.4·kips | (User Input) |
| Compression = | Comp := 93.16·1.1·kips = 102.5·kips | (User Input) |
| Uplift = | Uplift := 76.43·1.1·kips = 84.1·kips | (User Input) |

Tower Properties:

| | | |
|---|---|---|
| Tower Height = | $H_t := 101 \cdot ft$ | (User Input) |

Foundation Properties:

| | | |
|---|---|---|
| Pier Height = | $P_H := 5.67 \cdot ft$ | (User Input) |
| Pier Width Top = | $P_{w1} := 2 \cdot ft$ | (User Input) |
| Pier Width Botttom = | $P_{w2} := 5 \cdot ft$ | (User Input) |
| Pier Projection Above Grade = | $P_P := 0.5 \cdot ft$ | (User Input) |
| Pad Width = | $Pd_w := 8 \cdot ft$ | (User Input) |
| Pad Thickness = | $Pd_t := 2.0 \cdot ft$ | (User Input) |
| Mat Width = | $Mat_w := 33.5 \cdot ft$ | (User Input) |
| Mat Thickness = | $Mat_t := 3.5 \cdot ft$ | (User Input) |

Subgrade Properties:

| | | |
|---|---|---|
| Concrete Unit Weight = | $\gamma c := 150 \cdot pcf$ | (User Input) |
| Water Unit Weight = | $\gamma w := 62.4 \cdot pcf$ | (User Input) |
| Soil Unit Weight = | $\gamma s := 100 \cdot pcf$ | (User Input) |
| Uplift Angle = | $\psi := 30.0 \cdot deg$ | (User Input) |
| Soil Bearing Capacity = | $BC_{soil} := 4000 \cdot psf$ | (User Input) |

## Calculated Data:

Volume of the Concrete Pad = $V_{pad} := Pd_w^2 \cdot Pd_t = 128 \cdot ft^3$

Volume of the Concrete Mat = $V_{mat} := \frac{\left(Mat_w^2 \cdot Mat_t\right)}{4} = 982 \cdot ft^3$

Resisting Pyramid Base 1 = $B_1 := P_{w2}^2 = 25 ft^2$

Resisting Pyramid Base 2 = $B_2 := \left[P_{w2} - \frac{\left(P_{w2} - P_{w1}\right)}{P_H} \cdot \left(P_H - Mat_t\right)\right]^2 = 14.84 ft^2$

Volume of the Concrete Pier = $V_{pier} := \frac{\left(P_H - Mat_t\right)}{3} \cdot \left(B_1 + B_2 + \sqrt{B_1 \cdot B_2}\right) = 42.75 \cdot ft^3$

Total Volume of Concrete = $V_{Conc} := V_{pad} + V_{mat} + V_{pier} = 1153 \cdot ft^3$

Mass of Concrete = $Mass_{Conc} := V_{Conc} \cdot \gamma c = 172.9 \cdot kips$

Check Uplift:

Required Factor of Safety = $F_S := 1.0$

$ActualFS := \frac{Mass_{Conc}}{Uplift} = 2.06$

$Uplift\_Check := if\left(\frac{Mass_{Conc}}{Uplift} \geq F_S, "OK", "Overstressed"\right)$

Uplift_Check = "OK"

Cross Sectional Area of Mat = $A_{mat} := \frac{Mat_w^2}{4} = 281 ft^2$

Section Modulus of Mat = $S_{mat} := \frac{\left(\frac{Mat_w}{2}\right)^3}{6} = 783 \cdot ft^3$

Check Bearing:

$Bearing := \frac{Comp + Mass_{Conc}}{A_{mat}} + \frac{Shear \cdot \left(Mat_t\right)}{S_{mat}} = 1.09 \cdot ksf$

$Bearing\_Check := if\left(Bearing \leq BC_{soil}, "OK", "No Good"\right)$

Bearing_Check = "OK"

# Network Modernization RFDS v3.0

| | | | |
|---|---|---|---|
| **Site ID** | **CT11426A** | **Latitude** | 41.23785 |
| | | **Longitude** | -73.12244 |
| **Site Name** | Stratford/MP/James Farm | **Site Type** | Structure (Non-Building) |
| **Address** | 670 Chapel St, Stratford, CT 06614 | **Site Class** | Utility Lattice Tower |
| **Market** | Connecticut | **Landlord** | CL&P |

**Configuration**

**4B**

| **Approvals** | |
|---|---|
| **Market RF** | |
| **Market Development** | |

| | | | |
|---|---|---|---|
| **RFDS Revision** | | **Date** | 10/15/2013 |
| **RFDS Final** | | | |
| **Work Order #** | | **NOC#** | (888) 218-6664 |

## Site Information

| Existing Configuration | | | | | Proposed Configuration | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | Cabinet # | 1 | 2 | 3 | 4 |
| GSM | | | | Technology | GSM/UMTS/LTE | | | |
| S8000 | | | | Cabinet type | 6102 | | | |
| | | | | CBU | | | | |
| | | | | DUW30 | 2 | | | |
| | | | | DUL20 | 1 | | | |
| | | | | DUG20 | 1 | | | |
| | | | | DUS41 | | | | |
| | | | | RBS6601 | | | | |
| 6 | | | | dTRU/TRX | | | | |
| | | | | RU22 B4 | | | | |
| | | | | RUS01 B2 | 6 | | | |
| | | | | RUS01 B4 | 6 | | | |

| | |
|---|---|
| | Relocate cabinet |
| | Add cabinet |
| X | Swap cabinet |
| | Remove cabinet |
| | Make cabinet dark |

**Scope of Work**

Replace existing S8000 GSM cabinet with 6102 cabinet. Add 2 DUW30, DUL20, DUG20, 6 RUS01 B2 and 6 RUS01 B4 radios to 6102 cabinet. Relocate LMU and 7705 in 6102.

## ALPHA - Scope of Work

| | | | |
|---|---|---|---|
| | Add new mount | | Add RRU |
| | Relocate antenna | | Swap existing RRU |
| | Add antenna | | Remove RRU |
| X | Swap antenna | | Consolidate coax cables |
| | Remove antenna | X | Add coax cables |
| | Add TMA | | Add fiber cables |
| | Swap TMA | | Add hybrid combiner |
| X | Remove TMA | | Add filter combiner |

Swap existing quad pole antenna at position 1. Remove/disconnect obsolete PCS TMAs. Keep existing coax lines at position 1/left for PCS GSM/UMTS. Add 2 coax lines at position 1/right for AWS UMTS/LTE. Connect PCS GSM/UMTS and AWS LTE/UMTS in cabinet radio units to passive antenna at position 1 via coax lines.

## BETA - Scope of Work

| | | | |
|---|---|---|---|
| | Add new mount | | Add RRU |
| | Relocate antenna | | Swap existing RRU |
| | Add antenna | | Remove RRU |
| X | Swap antenna | | Consolidate coax cables |
| | Remove antenna | X | Add coax cables |
| | Add TMA | | Add fiber cables |
| | Swap TMA | | Add hybrid combiner |
| X | Remove TMA | | Add filter combiner |

Swap existing quad pole antenna at position 1. Remove/disconnect obsolete PCS TMAs. Keep existing coax lines at position 1/left for PCS GSM/UMTS. Add 2 coax lines at position 1/right for AWS UMTS/LTE. Connect PCS GSM/UMTS and AWS LTE/UMTS in cabinet radio units to passive antenna at position 1 via coax lines.

## GAMMA - Scope of Work

| | | | |
|---|---|---|---|
| | Add new mount | | Add RRU |
| | Relocate antenna | | Swap existing RRU |
| | Add antenna | | Remove RRU |
| X | Swap antenna | | Consolidate coax cables |
| | Remove antenna | X | Add coax cables |
| | Add TMA | | Add fiber cables |
| | Swap TMA | | Add hybrid combiner |
| X | Remove TMA | | Add filter combiner |

Swap existing quad pole antenna at position 1. Remove/disconnect obsolete PCS TMAs. Keep existing coax lines at position 1/left for PCS GSM/UMTS. Add 2 coax lines at position 1/right for AWS UMTS/LTE. Connect PCS GSM/UMTS and AWS LTE/UMTS in cabinet radio units to passive antenna at position 1 via coax lines.

## DELTA - Scope of Work

| | | | |
|---|---|---|---|
| | Add new mount | | Add RRU |
| | Relocate antenna | | Swap existing RRU |
| | Add antenna | | Remove RRU |
| | Swap antenna | | Consolidate coax cables |
| | Remove antenna | | Add coax cables |
| | Add TMA | | Add fiber cables |
| | Swap TMA | | Add hybrid combiner |
| | Remove TMA | | Add filter combiner |

# Network Modernization RFDS v3.0

T-Mobile

| | | | |
|---|---|---|---|
| **Site ID** | **CT11426A** | **Latitude** | 41.23785 |
| | | **Longitude** | -73.12244 |
| **Site Name** | Stratford/MP/James Farm | **Site Type** | Structure (Non-Building) |
| **Address** | 670 Chapel St, Stratford, CT 06614 | **Site Class** | Utility Lattice Tower |
| **Market** | Connecticut | **Landlord** | CL&P |

| Configuration |
|---|
| **4B** |

| Approvals | |
|---|---|
| **Market RF** | |
| **Market Development** | |

| | |
|---|---|
| **RFDS Revision** | |
| **RFDS Final** | |

**Date** 10/15/2013

## ALPHA (view from behind)

| Existing Configuration | | | | Mount | Proposed Configuration | | | |
|---|---|---|---|---|---|---|---|---|
| X | | | | | X | | | |
| GSM | | | | Technology | GSM/UMTS | UMTS/LTE | | |
| B2 | | | | Band | B2 | B4 | | |
| P | | | | Active/Passive | P | P | | |
| Quad pole | | | | Ant. Type | Quad pole | | | |
| RR90-17-02DP | | | | Ant. Model | PX16DWV-16DWVS-A2 | | | |
| EMS | | | | Ant. Vendor | RFS | | | |
| 109 | | | | Ant. Height | 109 | | | |
| 70 | | | | Azimuth | 70 | | | |
| Yes | | | | RET deployed | Yes | Yes | | |
| 2 | | | | E-Tilt | 2 | 2 | | |
| 0 | | | | M-Tilt | 0 | 0 | | |
| 1 | | | | TMA # | | | | |
| d B2 | | | | TMA Type | | | | |
| | | | | RRU # | | | | |
| | | | | RRU Type | | | | |
| 2 | | | | Used Coax # | 2 | 2 | | |
| 1-1/4" | | | | Coax Type | 1-1/4" | 1-1/4" | | |
| 120 | | | | Coax Length (ft) | 120 | | | |
| | | | | Fiber (CPRI) # | | | | |
| | | | | Splitter # | | | | |
| | | | | Combiner # | | | | |
| | | | | Combiner Type | | | | |

| | | | |
|---|---|---|---|
| | Add new mount | | Add RRU |
| | Relocate antenna | | Swap existing RRU |
| | Add antenna | | Remove RRU |
| X | Swap antenna | | Consolidate coax cables |
| | Remove antenna | X | Add coax cables |
| | Add TMA | | Add fiber cables |
| | Swap TMA | | Add hybrid combiner |
| X | Remove TMA | | Add filter combiner |

**Scope of work**

Swap existing quad pole antenna at position 1. Remove/disconnect obsolete PCS TMAs. Keep existing coax lines at position 1/left for PCS GSM/UMTS. Add 2 coax lines at position 1/right for AWS UMTS/LTE. Connect PCS GSM/UMTS and AWS LTE/UMTS in cabinet radio units to passive antenna at position 1 via coax lines.

## BETA (view from behind)

| Existing Configuration | | | | Mount | Proposed Configuration | | | |
|---|---|---|---|---|---|---|---|---|
| X | | | | | X | | | |
| GSM | | | | Technology | GSM/UMTS | UMTS/LTE | | |
| B2 | | | | Band | B2 | B4 | | |
| P | | | | Active/Passive | P | P | | |
| Quad pole | | | | Ant. Type | Quad pole | | | |
| RR90-17-02DP | | | | Ant. Model | PX16DWV-16DWVS-A2 | | | |
| EMS | | | | Ant. Vendor | RFS | | | |
| 109 | | | | Ant. Height | 109 | | | |
| 230 | | | | Azimuth | 230 | | | |
| Yes | | | | RET deployed | Yes | Yes | | |
| 2 | | | | E-Tilt | 2 | 2 | | |
| 0 | | | | M-Tilt | 0 | 0 | | |
| 1 | | | | TMA # | | | | |
| d B2 | | | | TMA Type | | | | |
| | | | | RRU # | | | | |
| | | | | RRU Type | | | | |
| 2 | | | | Used Coax # | 2 | 2 | | |
| 1-1/4" | | | | Coax Type | 1-1/4" | 1-1/4" | | |
| 120 | | | | Coax Length (ft) | 120 | | | |
| | | | | Fiber (CPRI) # | | | | |
| | | | | Splitter # | | | | |
| | | | | Combiner # | | | | |
| | | | | Combiner Type | | | | |

| | | | |
|---|---|---|---|
| | Add new mount | | Add RRU |
| | Relocate antenna | | Swap existing RRU |
| | Add antenna | | Remove RRU |
| X | Swap antenna | | Consolidate coax cables |
| | Remove antenna | X | Add coax cables |
| | Add TMA | | Add fiber cables |
| | Swap TMA | | Add hybrid combiner |
| X | Remove TMA | | Add filter combiner |

**Scope of work**

Swap existing quad pole antenna at position 1. Remove/disconnect obsolete PCS TMAs. Keep existing coax lines at position 1/left for PCS GSM/UMTS. Add 2 coax lines at position 1/right for AWS UMTS/LTE. Connect PCS GSM/UMTS and AWS LTE/UMTS in cabinet radio units to passive antenna at position 1 via coax lines.

# Network Modernization RFDS v3.0

| | | | |
|---|---|---|---|
| **Site ID** | **CT11426A** | **Latitude** | 41.23785 |
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| **Site Name** | Stratford/MP/James Farm | **Site Type** | Structure (Non-Building) |
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| **Market** | Connecticut | **Landlord** | CL&P |

**Configuration**

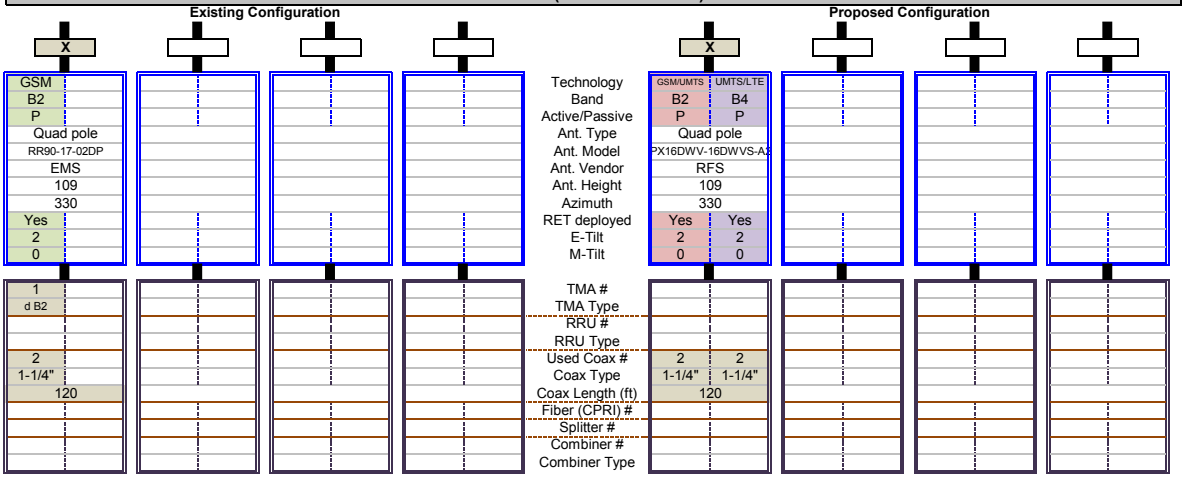
**4B**

| **Approvals** | |
|---|---|
| **Market RF** | |
| **Market Development** | |

| | |
|---|---|
| **RFDS Revision** | |
| **RFDS Final** | |

**Date** 10/15/2013

## GAMMA (view from behind)




| | | | |
|---|---|---|---|
| | Add new mount | | Add RRU |
| | Relocate antenna | | Swap existing RRU |
| | Add antenna | | Remove RRU |
| X | Swap antenna | | Consolidate coax cables |
| | Remove antenna | X | Add coax cables |
| | Add TMA | | Add fiber cables |
| | Swap TMA | | Add hybrid combiner |
| X | Remove TMA | | Add filter combiner |

**Scope of work**

Swap existing quad pole antenna at position 1. Remove/disconnect obsolete PCS TMAs. Keep existing coax lines at position 1/left for PCS GSM/UMTS. Add 2 coax lines at position 1/right for AWS UMTS/LTE. Connect PCS GSM/UMTS and AWS LTE/UMTS in cabinet radio units to passive antenna at position 1 via coax lines.

**Product Data Sheet** **APX16DWV-16DWVS-E-A20**

Optimizer® Side-by-Side Dual Polarized Antenna, 1710-2200, 65deg, 18.4dBi, 1.4m, VET, 0-10deg RET

## Product Description

A combination of two X-Polarized antennas in a single radome, this pair of variable tilt antennas provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features a wide downtilt range. This antenna is optimized for performance across the entire frequency band (1710-2200 MHz). The antenna comes pre-connected with two antenna control units (ACU).

## Features/Benefits

- **Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.**
- **High Suppression of all Upper Sidelobes (Typically <-20dB).**
- **Gain tracking – difference between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz) <1dB.**
- **Two X-Polarised panels in a single radome.**
- **Azimuth horizontal beamwidth difference <4deg between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz).**
- **Low profile for low visual impact.**
- **Dual polarization; Broadband design.**
- **Includes (2) AISG 2.0 Compatible ACU-A20-N antenna control units.**

## Technical Specifications

### Electrical Specifications

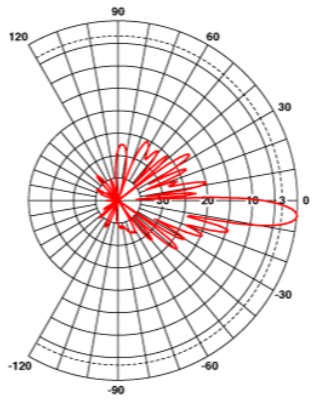
| | |
|---|---|
| Frequency Range, MHz | 1710-2200 |
| Horizontal Beamwidth, deg | 65 |
| Vertical Beamwidth, deg | 5.9 to 7.7 |
| Electrical Downtilt, deg | 0-10 |
| Gain, dBi (dBd) | 18.4 (16.3) |
| 1st Upper Sidelobe Suppression, dB | > 18 (typically > 20) |
| Upper Sidelobe Suppression, dB | > 18 all (typically > 20) |
| Front-To-Back Ratio, dB | >26 (typically 28) |
| Polarization | Dual pol +/-45° |
| VSWR | < 1.5:1 |
| Isolation between Ports, dB | > 30 |
| 3rd Order IMP @ 2 x 43 dBm, dBc | > 150 (155 Typical) |
| Impedance, Ohms | 50 |
| Maximum Power Input, W | 300 |
| Lightning Protection | Direct Ground |
| Connector Type | (4) 7-16 Long Neck Female |

### Mechanical Specifications

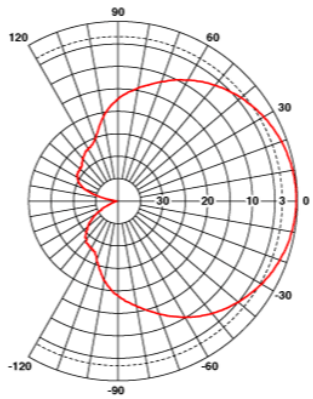
| | |
|---|---|
| Dimensions - HxWxD, mm (in) | 1420 x 331 x 80 (55.9 x 13 x 3.15) |
| Weight w/o Mtg Hardware, kg (lb) | 18.5 (40.7) |
| Survival Wind Speed, km/h (mph) | 200 (125) |
| Rated Wind Speed, km/h (mph) | 160 (100) |
| Max Wind Loading Area, m² (ft²) | 0.47 (5.03) |
| Front Thrust @ Rated Wind, N (lbf) | 756 (170) |
| Maximum Thrust @ Rated Wind, N (lbf) | 756 (170) |
| Wind Load - Side @ Rated Wind, N (lbf) | 231 (52) |
| Wind Load - Rear @ Rated Wind, N (lbf) | 408 (92) |
| Radome Material | Fiberglass |
| Radome Color | Light Grey RAL7035 |
| Mounting Hardware Material | Diecasted Aluminum |
| Shipping Weight, kg (lb) | 24.5 (53.9) |
| Packing Dimensions, HxWxD, mm (in) | 1520 x 408 x 198 (59.8 x 16 x 7.8) |

### Ordering Information

| | |
|---|---|
| Mounting Hardware | APM40-2 + APM40-E2 |




**Vertical Pattern**




**Horizontal Pattern**