HPC Wireless Services
22 Shelter Rock Lane.
Building C
Danbury, CT, 06810
P.: 203.797.1112

August 5, 2014

VIA OVERNIGHT COURIER

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051
Attn: Ms. Melanie Bachman, Acting Executive Director

Re: Sprint Spectrum, L.P. –Exempt Modification
742 Chapel Street, Stratford, Connecticut

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Sprint Spectrum, L.P. ("Sprint"). Sprint is undertaking modifications to certain existing sites in its Connecticut system in order to implement updated technology. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the Mayor of the Town of Stratford.

Sprint plans to modify the existing wireless communications facility owned by the Connecticut Light and Power Company and located at 742 Chapel Street, Stratford (coordinates 41°-14'-11.23" N, 73°-07'-19.37" W). Attached are plan and elevation drawings depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration. Also included is a power density report reflecting the modification to Sprint's operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. Sprint will remove the existing three (3) antennas and add three (3) dual-band panel LTE antennas to the existing platform on new pipe masts, at a centerline height of approximately 85' AGL, the height of the existing antennas. Sprint will also install six

(6) new fiber and power cables along the existing concrete pad and cable bridge for a limited Interim Period; and reroute the six (6) new cables and remove the existing six (6) coaxial cables as part of the Final Configuration. The proposed modifications will not extend the height of the approximately 78' AGL structure.

2. Sprint will replace the two (2) existing cabinets with two (2) similar cabinets, add a DC Fiber/Power Management Enclosure; and add six (6) RRHs (remote radio heads) and three (3) Notch Filters on two (2) new Unistrut Frames; all on the existing Concrete Equipment Pad. The existing GPS antenna on the Ice Canopy will be replaced by another GPS antenna. There will be no increase in the dimensions of the leased area. These changes will have no effect on the site boundaries.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible.

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by EBI Consulting, Sprint's operations will result in a power density of power density of approximately 35.854% for this location, as Sprint is the only carrier at this facility.

Please contact me by phone at (203) 610-1071 or by e-mail at mjhowlett@optonline.net with questions concerning this matter. Thank you for your consideration.

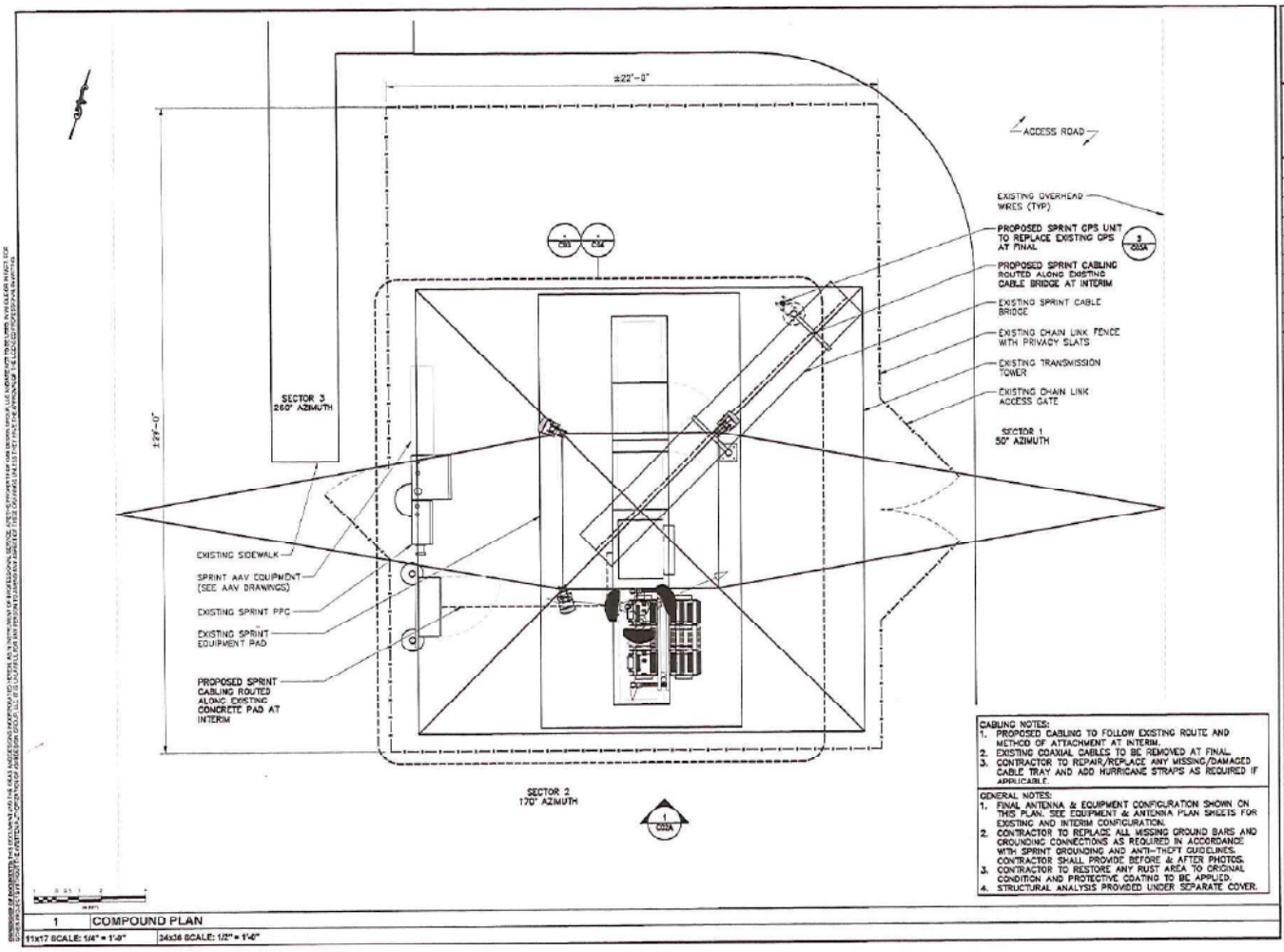
Respectfully yours,

Melanie J. Howlett

Attachments

cc: Honorable Mayor Harkins, Town of Stratford
The Connecticut Light & Power Company (underlying property owner)

NV_CT43XC837



CABLING NOTES:
1. PROPOSED CABLING TO FOLLOW EXISTING ROUTE AND METHOD OF ATTACHMENT AT INTERIM.
2. EXISTING COAXIAL CABLES TO BE REMOVED AT FINAL.
3. CONTRACTOR TO REPAIR/REPLACE ANY MISSING/DAMAGED CABLE TRAY AND ADD HURRICANE STRAPS AS REQUIRED IF APPLICABLE.

GENERAL NOTES:
1. FINAL ANTENNA & EQUIPMENT CONFIGURATION SHOWN ON THIS PLAN. SEE EQUIPMENT & ANTENNA PLAN SHEETS FOR EXISTING AND INTERIM CONFIGURATION.
2. CONTRACTOR TO REPLACE ALL MISSING GROUND BARS AND GROUNDING CONNECTIONS AS REQUIRED IN ACCORDANCE WITH SPRINT GROUNDING AND ANTI-THEFT GUIDELINES. CONTRACTOR SHALL PROVIDE BEFORE & AFTER PHOTOS.
3. CONTRACTOR TO RESTORE ANY RUST AREA TO ORIGINAL CONDITION AND PROTECTIVE COATING TO BE APPLIED.
4. STRUCTURAL ANALYSIS PROVIDED UNDER SEPARATE COVER.

1 COMPOUND PLAN
11x17 SCALE: 1/4" = 1'-0" | 24x36 SCALE: 1/2" = 1'-0"

Sprint
Alcatel·Lucent

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
4	04/21/14	REVISED PER CLIENT COMMENTS	JAF	MAB
3	03/11/14	REVISED PER CLIENT COMMENTS	JAF	MJD
2	03/06/14	REVISED PER CLIENT COMMENTS	JAF	MJD
1	03/03/14	REVISED PER CLIENT COMMENTS	DFS	MJD
0	02/24/14	ISSUED FOR CONSTRUCTION	ALL	MJD

KMB DESIGN GROUP kmbdg.com

Stephen A. Bray
PROFESSIONAL ENGINEER

CT LICENSE: 20657 4/21/14

PROJECT NUMBER: 332.1524

SITE INFORMATION:
742 CHAPEL STREET
STRATFORD, CT 06614
FAIRFIELD COUNTY
CL&P STRUCTURE No 280
CT43XC837

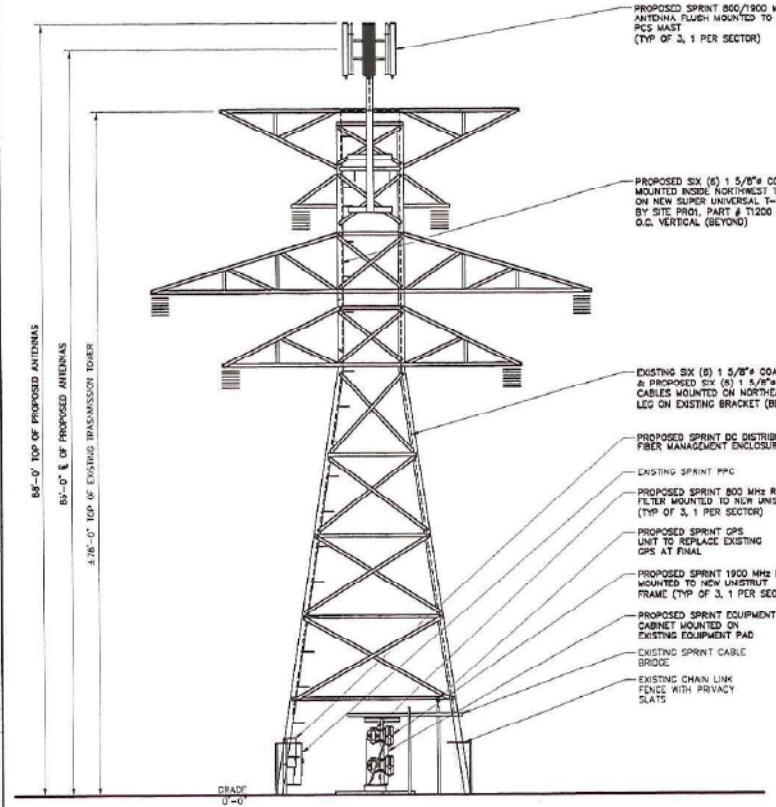
PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-26-12

SHEET TITLE: COMPOUND PLAN

SHEET NUMBER: C02 | REV.: 4

NV_CT43XC837



THE STRUCTURAL ENGINEERING CONCERNING THE STRUCTURAL STABILITY OF THE TOWER/POLE AND FOUNDATION IS BEING COMPLETED BY OTHERS. KMB DESIGN GROUP, LLC HAS NOT BEEN REQUESTED TO PERFORM ANY STRUCTURAL ANALYSIS SERVICES TO VERIFY THAT THE TOWER/POLE AND/OR FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT DEPICTED WITHIN THESE SIGNED AND SEALED DRAWINGS. SIGNED AND SEALED DRAWINGS REVISED TO STATE "ISSUED FOR CONSTRUCTION" SHALL BE PROVIDED TO THE PROFESSIONAL ENGINEERS RESPONSIBLE FOR THE STRUCTURAL ANALYSIS OF THE TOWER/POLE AND FOUNDATION. KMB DESIGN GROUP, LLC SHALL BE NOTIFIED SHOULD THE STRUCTURAL ANALYSIS RESULT IN SOME ELEMENTS NOT BEING STRUCTURALLY CAPABLE OF SUPPORTING THE PROPOSED DESIGN DEPICTED. THE CONTRACTOR SHALL NOT COMMENCE CONSTRUCTION WITHOUT OBTAINING (A) A SIGNED AND SEALED COPY OF THE PLANS "ISSUED FOR CONSTRUCTION"; (B) STRUCTURAL ANALYSIS REPORT STATING THAT THE TOWER/POLE/FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED LOADING REFERENCING THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC; (C) SPRINT PLATFORM ANALYSIS STATING THAT THE SPRINT PLATFORM IS CAPABLE OF SUPPORTING THE PROPOSED DESIGN AS REFERENCED WITHIN THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC.

NOTES:
1. FINAL ANTENNA & EQUIPMENT CONFIGURATION SHOWN ON THIS PLAN. SEE EQUIPMENT & ANTENNA PLAN SHEETS FOR EXISTING AND INTERIM CONFIGURATION.
2. ALL WORK TO BE COMPLETED IN CONFORMANCE WITH LATEST STRUCTURAL ANALYSIS BY CENTEK ENGINEERING.

1 SOUTHEAST ELEVATION

11x17 SCALE: 3/32" = 1'-0" | 24x36 SCALE: 3/16" = 1'-0"

Sprint

Alcatel·Lucent

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
1	9/23/14	REVISED PER CLIENT COMMENTS	JRF	KMB
2	10/1/13	REVISED PER CLIENT COMMENTS	JRF	KCD
3	10/9/13	REVISED PER CLIENT COMMENTS	JRF	KCD
4	10/23/13	REVISED PER CLIENT COMMENTS	DPD	KCD
5	11/4/13	ISSUED FOR CONSTRUCTION	ML	KCD

KMB DESIGN GROUP
www.kmbdg.com
1881 ROUTE 9A, SUITE 204
WILTON, NY 12831
(518) 580-0505

Stephen A. Bray
PROFESSIONAL ENGINEER

STATE OF CONNECTICUT · STEPHEN A. BRAY · 20557 · REGISTERED PROFESSIONAL ENGINEER

CT LICENSE: 20557 4/21/14

PROJECT NUMBER: 332.1524

SITE INFORMATION:
742 CHAPEL STREET
STRATFORD, CT 06614
FAIRFIELD COUNTY
CL&P STRUCTURE No 280
CT43XC837

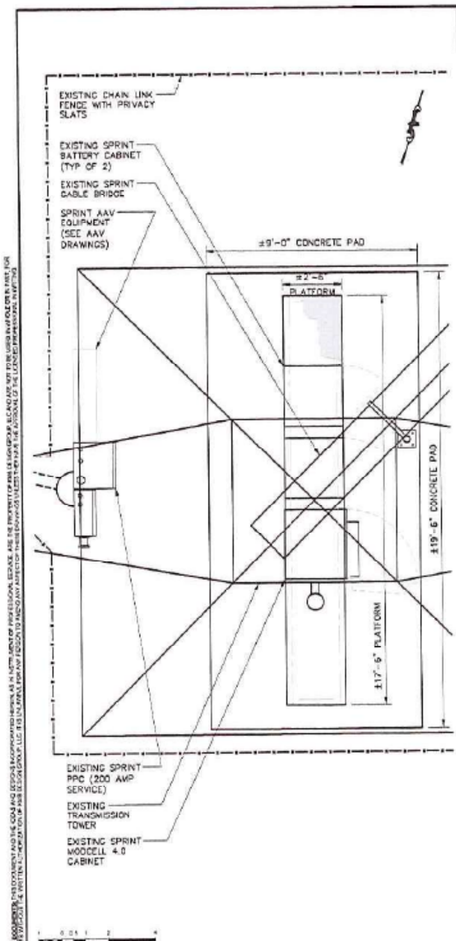
PROJECT TYPE: NETWORK VISION

DRAWN BY	CHECKED BY	DATE
JLS		03-28-12

SHEET TITLE: ELEVATION

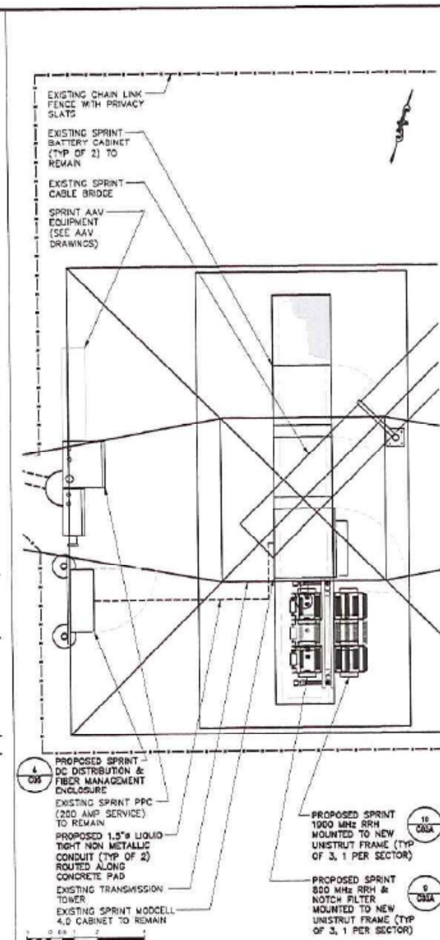
SHEET NUMBER: C02A | REV.: 4

NV_CT43XC837



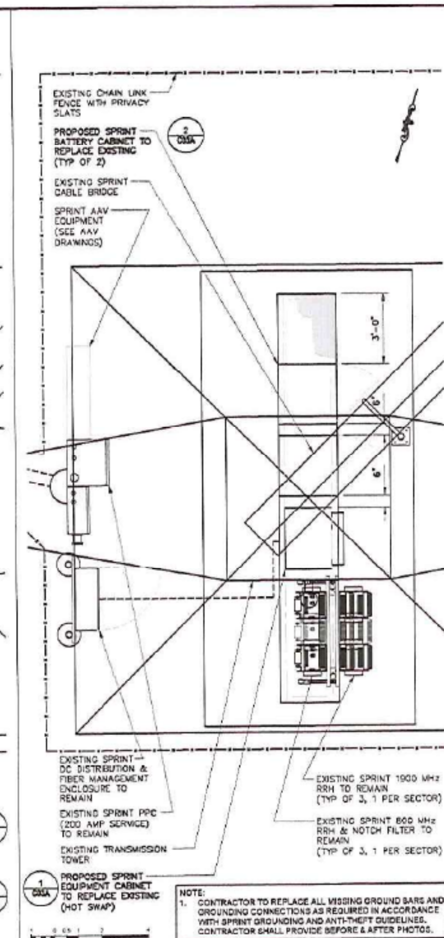
1 EXISTING EQUIPMENT PLAN

11x17 SCALE: 1/4" = 1'-0" 24x36 SCALE: 1/2" = 1'-0"



2 INTERIM EQUIPMENT PLAN

11x17 SCALE: 1/4" = 1'-0" 24x36 SCALE: 1/2" = 1'-0"



NOTE:
1. CONTRACTOR TO REPLACE ALL MISSING GROUND BARS AND GROUNDING CONNECTIONS AS REQUIRED IN ACCORDANCE WITH SPRINT GROUNDING AND ANTI-THEFT GUIDELINES. CONTRACTOR SHALL PROVIDE BEFORE & AFTER PHOTOS.

3 FINAL EQUIPMENT PLAN

11x17 SCALE: 1/4" = 1'-0" 24x36 SCALE: 1/2" = 1'-0"

Sprint

Alcatel·Lucent

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
[illegible]	[illegible]	REVISED PER CLIENT COMMENTS	[illegible]	[illegible]
[illegible]	[illegible]	REVISED PER CLIENT COMMENTS	[illegible]	[illegible]
[illegible]	[illegible]	REVISED PER CLIENT COMMENTS	[illegible]	[illegible]
[illegible]	[illegible]	REVISED PER CLIENT COMMENTS	[illegible]	[illegible]
[illegible]	[illegible]	ISSUED FOR CONSTRUCTION	AJL	[illegible]

KMB DESIGN GROUP
kmbdg.com

Stephen A. Bray
PROFESSIONAL ENGINEER

CT LICENSE: 28657 4/21/14

PROJECT NUMBER: 332.1524

SITE INFORMATION:
742 CHAPEL STREET
STRATFORD, CT 06614
FAIRFIELD COUNTY
CL&P STRUCTURE No 280
CT43XC837

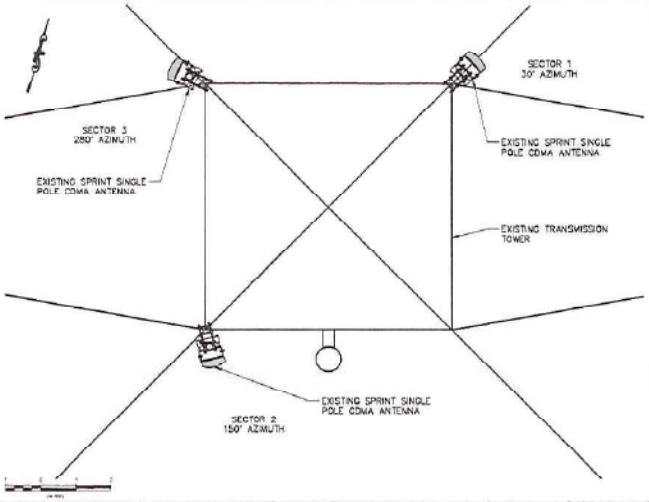
PROJECT TYPE: NETWORK VISION

DRAWN BY: JLS | CHECKED BY: | DATE: 03-28-12

SHEET TITLE: EQUIPMENT PLANS

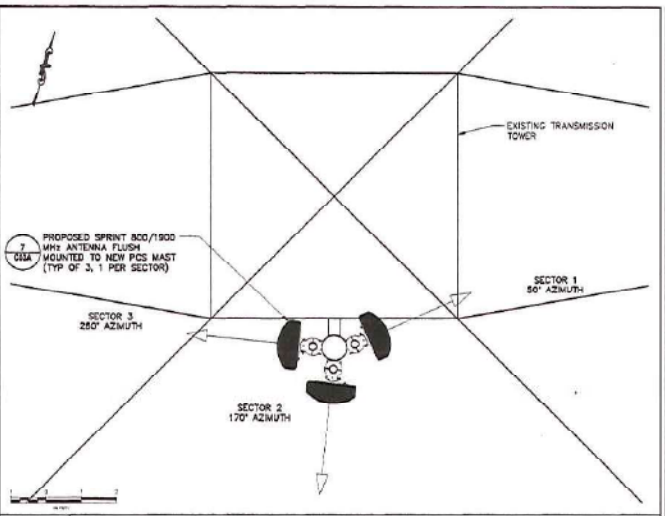
SHEET NUMBER: C03 REV: 4

NV_CT43XC837



1 EXISTING ANTENNA PLAN @ ±85'-2" AGL (ALL SECTORS)

11x17 SCALE: 3/8" = 1'-0" | 24x36 SCALE: 3/4" = 1'-0"



2 FINAL ANTENNA PLAN @ ±85'-2" AGL (ALL SECTORS)

11x17 SCALE: 3/8" = 1'-0" | 24x36 SCALE: 3/4" = 1'-0"

NOTE:
1. CONTRACTOR TO REPLACE ALL MISSING GROUND BARS AND GROUNDING CONNECTIONS AS REQUIRED IN ACCORDANCE WITH SPRINT GROUNDING AND ANTI-THEFT GUIDELINES. CONTRACTOR SHALL PROVIDE BEFORE & AFTER PHOTOS.
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Sprint

Alcatel-Lucent

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD BY
5	04/21/14	ISSUED FOR CONSTRUCTION	AA	KMB
4	04/11/13	REVISED PER CLIENT COMMENTS	JAP	KMB
3	03/26/13	REVISED PER CLIENT COMMENTS	JAP	KMB
2	03/25/13	REVISED PER CLIENT COMMENTS	JAP	KMB
1	03/21/13	REVISED PER CLIENT COMMENTS	DRS	KMB
0	03/12/13	ISSUED FOR CONSTRUCTION	JAP	KMB

KMB DESIGN GROUP
kmbdg.com
1468 ROUTE 34, SUITE 204
WALL, NJ 07719
(732) 359-5410

Stephen A. Bray
PROFESSIONAL ENGINEER

CT LICENSE: 28657 4/21/14

PROJECT NUMBER: 332.1524

SITE INFORMATION:
742 CHAPEL STREET
STRATFORD, CT 06614
FAIRFIELD COUNTY
CL&P STRUCTURE No 280
CT43XC837

PROJECT TYPE: NETWORK VISION

DRAWN BY: JLS | CHECKED BY: | DATE: 03-28-12

SHEET TITLE: ANTENNA & RRH PLANS (ALL SECTORS)

SHEET NUMBER: C04 | REV: 4

Northeast Utilities System

56 Prospect Street, Hartford, CT 06103

Northeast Utilities Service Company
P.O. Box 270
Hartford, CT 06141-0270
(203) 665-5000

May 5, 2014

Ms. Jennifer Gaudet
HPC Development

Sprint,
1 International Blvd.
Suite 300
Mahwah NJ
07495

RE: Sprint Antenna Site, CT-43XC837, 742 Chapel St., Stratford CT, structure 280.

Dear Ms. Gaudet:

Based on our reviews of the site drawings, the structural analysis and foundation review provided by Centek Engineering, along with a third party review performed by Commonwealth Associates Solutions we have reviewed for acceptance this modification.

Since there are no outstanding structural issues to resolve at this time please contact Mr. O'Brien (860-665-6987) to resolve any lease issues; once the lease amendment is secured you may then contact Mr. John Landry directly (860-665-5425) to begin the construction arrangements.

Sincerely,

Robert Gray
Transmission Line Engineering

REF: NV_CT43XC837_04.21.14_Final CD_Rev 4.pdf
12047.CO12 - CT43XC837-Stratford.pdf

Northeast Utilities System

56 Prospect Street, Hartford, CT 06103

Northeast Utilities Service Company
P.O. Box 270
Hartford, CT 06141-0270
(203) 665-5000

May 5, 2014

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Sincerely,

Robert Gray
Transmission Line Engineering

REF: NV_CT43XC837_04.21.14_Final CD_Rev 4.pdf
12047.CO12 - CT43XC837-Stratford.pdf

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

Sprint Existing Facility

Site ID: CT43XC837

Stratford - NU Pole
742 Chapel Street
Stratford, Connecticut 06614

August 9, 2013

EBI Project Number: 62136524

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

August 9, 2013

Sprint
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Re: Emissions Values for Site: **CT43XC837 – Stratford - NU Pole**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 742 Chapel Street, Stratford, Connecticut, for the purpose of determining whether the emissions from the proposed Sprint equipment upgrades on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (µW/cm2). The number of µW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the cellular band is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the PCS band is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at 742 Chapel Street, Stratford, Connecticut, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

1) 2 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
2) 1 CDMA Carrier (850 MHz) was considered for each sector of the proposed installation
3) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
5) The antenna used in this modeling is the APXVSPP18-C-A20. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.

6) The antenna mounting height centerline of the proposed antennas is **85 feet** above ground level (AGL)
7) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT43XC837 - Stratford - NU Pole
Site Addresss	742 Chapel Street, Stratford, Connecticut, 06614
Site Type	Utility Transmission Tower

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	85	79	1/2 "	0.5	0	1386.9474	79.89356	7.98936%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	85	79	1/2 "	0.5	0	389.96892	22.46373	3.96186%
														Sector total Power Density Value:		11.951%	

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	85	79	1/2 "	0.5	0	1386.9474	79.89356	7.98936%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	85	79	1/2 "	0.5	0	389.96892	22.46373	3.96186%
														Sector total Power Density Value:		11.951%	

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	85	79	1/2 "	0.5	0	1386.9474	79.89356	7.98936%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	85	79	1/2 "	0.5	0	389.96892	22.46373	3.96186%
														Sector total Power Density Value:		11.951%	

Site Composite MPE %

Carrier	MPE %
Sprint	35.854%
Total Site MPE %	**35.854%**

EBI Consulting
environmental | engineering | due diligence

Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public exposure to RF Emissions.

The anticipated Maximum Composite contributions from the Sprint facility are **35.854% (11.951% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **35.854%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

CENTEK engineering

Centered on Solutions℠

Structural Analysis of PCS Mast and CL&P Tower

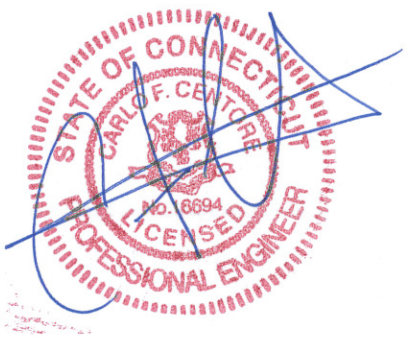
Sprint Site Ref: CT43XC837

CL&P Structure No. 280
78' Electric Transmission Lattice Tower

742 Chapel Street
Stratford, CT

CENTEK Project No. 12047.CO12

~~Date: March 12, 2013~~
Rev 1: July 2, 2013



Prepared for:
Sprint Nextel
8 Airline Drive, Suite 105
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Introduction

The purpose of this report is to analyze the existing PCS mast and 78' CL&P tower located at 742 Chapel Street in Stratford, CT for the proposed antenna and equipment upgrade by Sprint.

The proposed loads consist of the following:

- SPRINT (Existing to Remain):
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on a leg of the existing tower as indicated in section 4 of this report.
- **SPRINT (Existing to Remove)**
  Antennas: Three (3) EMS RR65-16-02DP panel antennas mounted on three (3) existing pipe masts with a RAD center elevation of 85-ft above grade level.
  Mast: Three (3) 3-in Sch. 40 pipe masts.
- **SPRINT (Proposed):**
  Antennas: Three (3) RFS APXVSPP18-C panel antennas mounted on a proposed 8-in Sch. 80 pipe mast with RAD center elevation of 85-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables mounted on a Site Pro Super Universal T-Brackets p/n T1200 running on a leg of the existing 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 PCS Mast 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 pipe mast unless specified otherwise.
- Pipe mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Pipe mast 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 *PCS Mast Structure* 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 Sprint masts consisting of three (3) 21-ft long 3-in SCH. 40 (O.D. = 3.5-in) pipes connected to the legs of the existing tower was analyzed for their ability to resist loads prescribed by the TIA/EIA standard. The existing masts were determined to be structurally inadequate to support the proposed loading.

A proposed Sprint mast consisting of a 21-ft long 8-in SCH. 80 (O.D. = 8.63-in) pipe connected at four points to the existing tower was design to resist loads prescribed by the TIA/EIA standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were also applied to the proposed Sprint mast structure in order to obtain reactions needed for analyzing the CL&P tower structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA/EIA loading and for NESC/NU loading are listed in report Sections 6 and 8, respectively.

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 78-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 Sprint mast and associated appurtenances.

Based on field observations conducted at the subject site prior to the tower analysis it was determined that the existing diagonal members in the bottom section of the tower are bent and should be replaced prior to the Sprint antenna upgrade. Refer to the pictures attached below



This is analysis is based on the fact that the subject members will be replaced in accordance with the tower modification drawings included in section 4 of this report. Additionally, tower leg overstress encountered in a preliminary analysis of the existing tower confirmed the need for reconfiguration of the aforementioned bracing members.

Design Basis

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 pcs mast 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)

- PCS MAST ANALYSIS

  The pcs mast, 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

- PCS MAST

  The proposed PCS mast was determined to be structurally **adequate**.

Component	Design Limit	Stress Ratio (percentage of capacity)	Result
12" Sch. 40 Pipe	Bending	40.8%	**PASS**
L2x2x3/16 Brace	Bending	26.2%	**PASS**
Connection	Shear	8.5%	**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 9 of this report. The analysis results are summarized as follows:

  With the proposed tower reinforcements detailed in Section 4 of this report a maximum usage of **96.29%** occurs in the utility tower under the **NESC Extreme** loading condition.

  TOWER SECTION:

  The utility structure **with the proposed tower reinforcements detailed in Section 4 of this report** was found to be within allowable limits.

Tower Member	Stress Ratio (% of capacity)	Result
Angle g26XY	96.29%	**PASS**

- FOUNDATION AND ANCHORS

  Information for the existing steel grillage foundation was obtained from NUSCO drawing # 01021-60003B.

  Review of the foundation design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

  BASE REACTIONS:

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

Load Case	Shear	Uplift	Compression
NESC Heavy Wind	5.35 kips	10.24 kips	23.38 kips
NESC Extreme Wind	8.27 kips	27.75 kips	33.84 kips

Note 1 – 10% increase applied to tower base reactions per OTRM 051

FOUNDATION:

The foundation was found to be within allowable limits.

Foundation	Design Limit	Allowable Loading	Proposed Loading (2)	Result
Steel Grillage	Uplift	40.8 kips	37.2 kips	**PASS**

Note 1: Allowable uplift taken from NUSCO drawing no. 01021-60003B.
Note 2: 10% increase to PLS base reactions used in foundation analysis per OTRM 051.

Conclusions and Recommendations

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 AT&T equipment upgrade.

- Replacement of eight (8) L2x1.5x3/16 diagonals with sixteen (16) L2x2x3/16 diagonals.
- Installation of eight (8) L2x2x3/16 secondary horizontals.

The analysis is based, in part on the information provided to this office by Northeast Utilities and Sprint. If the existing conditions are different than the information in this report, CENTEK engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer

Prepared by:

Timothy J. Lynn, EIT
Structural Engineer

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Principal ~ Structural Engineer

STATE OF CONNECTICUT
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LICENSED
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Prepared by:

Timothy J. Lynn, EIT
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.

Northeast Utilities

Northeast Utilities
Overhead Transmission Standards

NU Transmission Group

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 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 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 1.25 x Gust Response Factor Height above ground level based on top of Mast/Antenna					1.6 Flat Surfaces 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 Height above ground level based on top of Tower/Pole					1.6 Flat Surfaces 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 4PSF Wind Load 1.25 x Gust Response Factor Height above ground level based on top of Mast/Antenna					1.6 Flat Surfaces 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 4PSF Wind Load Height above ground level based on top of Tower/Pole					1.6 Flat Surfaces 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.

Site No: CT43XC837

Northeast Utilities System

Job :	Spec. Number	Page	of
Description:	Computed by	Sheet	of
	Checked by	Date	3/11/13
		Date	

INPUT DATA

TOWER ID: 280

Structure Height (ft) : 78

Wind Zone : Central CT (green) **Wind Speed :** 110 mph

Tower Type : (●) Suspension ( ) Strain **Extreme Wind Model :** PCS Addition

Conductor

~~Shield Wire~~ Properties:

	BACK	AHEAD
NAME =	*4/0 Cu*	*4/0 Cu*
DESCRIPTION =	4/0	4/0
STRANDING =	7.000 Cu	7.000 Cu
DIAMETER =	0.522 in	0.522 in
WEIGHT =	0.653 lb/ft	0.653 lb/ft

~~Conductor Properties:~~

	BACK	AHEAD		
NAME =	*BITTERN*	*BITTERN*		
Number of Conductors per phase: 0	1272.000 45/7 ACSR	1272.000 45/7 ACSR	0	Number of Conductors per phase
DIAMETER =	1.345 in	1.345 in		
WEIGHT =	1.432 lb/ft	1.432 lb/ft		

Insulator Weight = 200 lbs Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

Conductor Conductor

	BACK		AHEAD	
	~~Shield~~	~~Conductor~~	~~Shield~~	~~Conductor~~
NESC HEAVY =	4,500	0	4,500	0
EXTREME WIND =	3,805	0	3,805	0
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 =	1,869	0	1,869	0

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	0	AHEAD:	0	**0**
WIND SPAN (ft) =	BACK:	310	AHEAD:	310	**620**
WEIGHT SPAN (ft) =	BACK:	293	AHEAD:	293	**586**

Northeast Utilities System

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WIRE LOADING AT ATTACHMENTS

TOWER ID: 280

Wind Span =	620 ft	Broken Wire Span =	AHEAD SPAN
Weight Span =	586 ft	Type of Insulator Attachment =	SUSPENSION
Total Angle =	0 degrees		

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	786 lb	0 lb	1,133 lb	393 lb	7,425 lb	566 lb
Conductor =	0 lb	0 lb	600 lb	0 lb	0 lb	300 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	769 lb	0 lb	383 lb
Conductor =	0 lb	0 lb	400 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	383 lb
Conductor =	#VALUE!	#VALUE!	400 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,492 lb
Conductor =	#VALUE!	#VALUE!	400 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	755 lb
Conductor =	#VALUE!	#VALUE!	400 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	0 lb	383 lb
Conductor =	0 lb	0 lb	400 lb

7. Construction

	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	0 lb	383 lb
Conductor =	0 lb	0 lb	400 lb

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NOTE: All loads include required overload factors (OLF's).

LC 1		HORIZONTAL	LONGITUDINAL	VERTICAL
NESC Heavy	shield - back	393.1833333	7425	566.4067519
	shield - ahead	393.1833333	-7425	566.4067519
	SHIELD - SUM	**786.3666667**	**0**	**1132.813504**
	conductor - back	0	0	300
	conductor - ahead	0	0	300
	CONDUCTOR - SUM	**0**	**0**	**600**
LC 2		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Extreme Wind	shield - back	384.3315238	3805	191.4169
	shield - ahead	384.3315238	-3805	191.4169
	SHIELD - SUM	**768.6630476**	**0**	**382.8338**
	conductor - back	0	0	200
	conductor - ahead	0	0	200
	CONDUCTOR - SUM	**0**	**0**	**400**
LC 3		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Long. Wind	shield - back	#VALUE!	#VALUE!	191.4169
	shield - ahead	#VALUE!	#VALUE!	191.4169
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**382.8338**
	conductor - back	#VALUE!	#VALUE!	200
	conductor - ahead	#VALUE!	#VALUE!	200
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**400**
LC 4		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
RULE 250D	shield - back	#VALUE!	#VALUE!	745.9717515
	shield - ahead	#VALUE!	#VALUE!	745.9717515
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**1491.943503**
	conductor - back	#VALUE!	#VALUE!	200
	conductor - ahead	#VALUE!	#VALUE!	200
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**400**
LC 5		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
NESC w/o OLF's	shield - back	#VALUE!	#VALUE!	377.6045013
	shield - ahead	#VALUE!	#VALUE!	377.6045013
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**755.2090025**
	conductor - back	#VALUE!	#VALUE!	200
	conductor - ahead	#VALUE!	#VALUE!	200
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**400**
LC 6		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Raking	shield - back	0	1869	191.4169
	shield - ahead	0	-1869	191.4169
	SHIELD - SUM	**0**	**0**	**382.8338**
	conductor - back	0	0	200
	conductor - ahead	0	0	200
	CONDUCTOR - SUM	**0**	**0**	**400**
LC 6		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
60 DEG F NO WIND	shield - back	0	1869	191.4169
	shield - ahead	0	-1869	191.4169
	SHIELD - SUM	**0**	**0**	**382.8338**
	conductor - back	0	0	200
	conductor - ahead	0	0	200
	CONDUCTOR - SUM	**0**	**0**	**400**

Northeast Utilities System

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INPUT DATA

TOWER ID: 280

Structure Height (ft) : 78

Wind Zone : Central CT (green)

Wind Speed : 110 mph

Tower Type : (●) Suspension ( ) Strain

Extreme Wind Model : PCS Addition

Shield Wire Properties:

	BACK	AHEAD
NAME =	*3/8 CW*	*3/8 AW*
DESCRIPTION =	3/8	3/8
STRANDING =	7 #8 Cu Weld	7 #8 Al Weld
DIAMETER =	0.385 in	0.385 in
WEIGHT =	0.324 lb/ft	0.262 lb/ft

Conductor Properties:

	BACK	AHEAD	
NAME =	*BITTERN*	*BITTERN*	
Number of Conductors per phase	0	0	Number of Conductors per phase
DIAMETER =	1272.000	1272.000	
WEIGHT =	45/7 ACSR	45/7 ACSR	
	1.345 in	1.345 in	
	1.432 lb/ft	1.432 lb/ft	

Insulator Weight = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	3,800	0	3,800	0
EXTREME WIND =	3,047	0	3,047	0
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 =	1,187	0	1,187	0

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	0	AHEAD:	0	**0**
WIND SPAN (ft) =	BACK:	310	AHEAD:	310	**620**
WEIGHT SPAN (ft) =	BACK:	293	AHEAD:	293	**586**

Northeast Utilities System

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WIRE LOADING AT ATTACHMENTS

TOWER ID: 280

Wind Span =	620 ft
Weight Span =	586 ft
Total Angle =	0 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 =	716 lb	0 lb	741 lb	358 lb	6,270 lb	384 lb
Conductor =	0 lb	0 lb	600 lb	0 lb	0 lb	300 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	567 lb	0 lb	172 lb
Conductor =	0 lb	0 lb	400 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	172 lb
Conductor =	#VALUE!	#VALUE!	400 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,181 lb
Conductor =	#VALUE!	#VALUE!	400 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	494 lb
Conductor =	#VALUE!	#VALUE!	400 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	0 lb	172 lb
Conductor =	0 lb	0 lb	400 lb

7. Construction

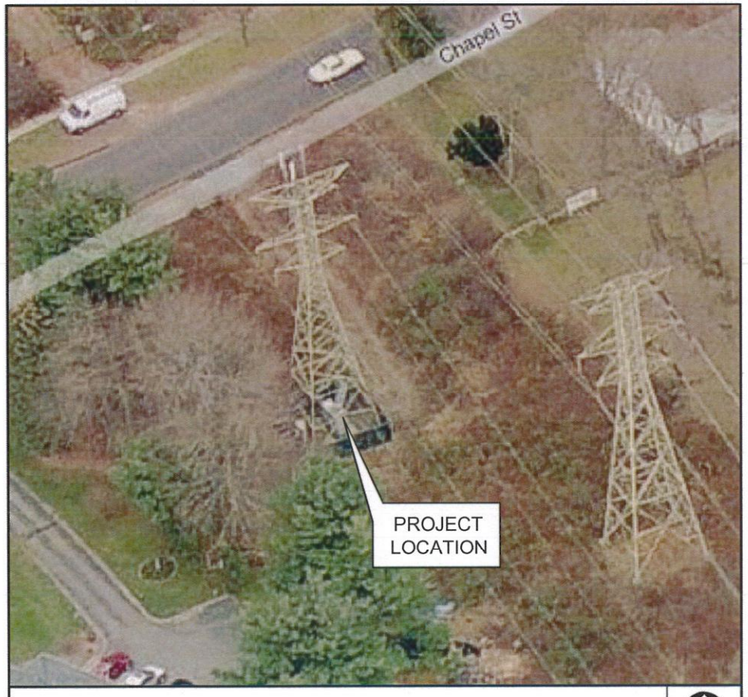
	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	0 lb	172 lb
Conductor =	0 lb	0 lb	400 lb

LC 1		HORIZONTAL	LONGITUDINAL	VERTICAL
NESC Heavy	shield - back	357.7916667	6270	384.197534
	shield - ahead	357.7916667	-6270	356.904584
	SHIELD - SUM	**715.5833333**	**0**	**741.1021181**
	conductor - back	0	0	300
	conductor - ahead	0	0	300
	CONDUCTOR - SUM	**0**	**0**	**600**
LC 2		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Extreme Wind	shield - back	283.6070547	3047	94.9027
	shield - ahead	283.6070547	-3047	76.7074
	SHIELD - SUM	**567.2141094**	**0**	**171.6101**
	conductor - back	0	0	200
	conductor - ahead	0	0	200
	CONDUCTOR - SUM	**0**	**0**	**400**
LC 3		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Long. Wind	shield - back	#VALUE!	#VALUE!	94.9027
	shield - ahead	#VALUE!	#VALUE!	76.7074
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**171.6101**
	conductor - back	#VALUE!	#VALUE!	200
	conductor - ahead	#VALUE!	#VALUE!	200
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**400**
LC 4		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
RULE 250D	shield - back	#VALUE!	#VALUE!	599.5403277
	shield - ahead	#VALUE!	#VALUE!	581.3450277
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**1180.885355**
	conductor - back	#VALUE!	#VALUE!	200
	conductor - ahead	#VALUE!	#VALUE!	200
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**400**
LC 5		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
NESC w/o OLF's	shield - back	#VALUE!	#VALUE!	256.1316894
	shield - ahead	#VALUE!	#VALUE!	237.9363894
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**494.0680787**
	conductor - back	#VALUE!	#VALUE!	200
	conductor - ahead	#VALUE!	#VALUE!	200
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**400**
LC 6		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Raking	shield - back	0	1187	94.9027
	shield - ahead	0	-1187	76.7074
	SHIELD - SUM	**0**	**0**	**171.6101**
	conductor - back	0	0	200
	conductor - ahead	0	0	200
	CONDUCTOR - SUM	**0**	**0**	**400**
LC 6		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
60 DEG F NO WIND	shield - back	0	1187	94.9027
	shield - ahead	0	-1187	76.7074
	SHIELD - SUM	**0**	**0**	**171.6101**
	conductor - back	0	0	200
	conductor - ahead	0	0	200
	CONDUCTOR - SUM	**0**	**0**	**400**

Connecticut Light & Power

TOWER REINFORCEMENT DESIGN

CL&P STRUCT. NO. 280
742 CHAPEL STREET
STRATFORD, CT 06614



VICINITY MAP — NORTH

SITE INFO

CL&P STRUCT. NO.	280
SITE ADDRESS:	742 CHAPEL STREET STRATFORD, CT 06614
PROJECT COORDINATES:	LAT: 41°–14'–11.18"N LON.: 73–07'–19.27"W ELEV.: 147' AMSL
CL&P CONTACT:	ROBERT GRAY 860.665.3175

CO-LOCATOR INFO

SPRINT	
CONTACT:	JENNIFER GAUDET 860.798.7454
SITE NO.:	CT43XC837
ANTENNA ℄ HEIGHT:	85'–0" A.T.B.
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD ROAD BRANFORD, CT 06405
CONTACT:	CARLO F. CENTORE, PE 203.488.0580, EXT 102

SHEET INDEX

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		0
S–1	TOWER ELEVATION AND FEEDLINE PLAN	0
S–2	TOWER REINFORCEMENT DETAILS	0
S–3	PCS MAST DETAILS	

DESIGNED BY:	TJL
DRAWN BY:	TJL
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
A	3/12/13	TJL	CFC	ISSUED FOR NU REVIEW

PROFESSIONAL ENGINEER SEAL — CARLO F. CENTORE — No. 16654 — LICENSED PROFESSIONAL ENGINEER

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
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Branford, CT 06405
www.CentekEng.com

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TOWER REINFORCEMENT DESIGN
CT43XC837
CL&P STRUCTURE 280
742 CHAPEL STREET
STRATFORD, CT 06614

DATE:	3/7/13
SCALE:	AS SHOWN
JOB NO.	12047.C012

TITLE SHEET

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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 AND REINFORCEMENT DESIGN PREPARED BY CENTEK ENGINEERING, INC., FOR SPRINT, REVISION #0, DATED 3/7/13.

2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM THE ORIGINAL TOWER DESIGN DOCUMENTS PREPARED BY BLAW-KNOX DIVISION CONTRACT NOS. KA-1796 AND KA-1797, CIRCA 1948.

3. THE TEMPORARY DETACHMENT AND/OR REPLACEMENT OF TOWER MEMBERS SHALL BE DONE ONE AT A TIME AND SHALL BE CONDUCTED ON DAYS WITH LESS THAN 15 MPH WIND PRESENT. NO MEMBER SHALL BE LEFT DISCONNECTED FOR THE NEXT WORKING DAY.

4. ALL STEEL REINFORCEMENT SHOWN HEREIN APPLIES TO ALL SIDES OF THE TOWER.

5. ALL REPLACEMENT STEEL MEMBERS SHALL BE INSTALLED WITH A325-N BOLTS (SIZE TO MATCH EXISTING). UNLESS OTHERWISE NOTED BELOW.

6. THE TOWER STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER REINFORCEMENTS ARE COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE & SEQUENCE AND TO INSURE THE SAFETY OF THE TOWER STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, UNDERPINNING, TEMPORARY ANCHORS, GUYING, BARRICADES, ETC. AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY. MAINTAIN EXISTING SITE OPERATIONS AND COORDINATE WORK WITH TOWER OWNER.

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

8. 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.

9. 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.

10. TOWER REINFORCEMENTS 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.

11. EXISTING COAXIAL CABLES AND ALL ACCESSORIES SHALL BE RELOCATED AS NECESSARY AND REINSTALLED BY THE CONTRACTOR WITHOUT INTERRUPTION IN SERVICE WHERE THEY ARE IN CONFLICT WITH THE TOWER REINFORCEMENT WORK.

12. 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.

13. 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.

DESIGNED BY:	TJL
DRAWN BY:	TJL
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
A	3/12/13	TJL	CFC	ISSUED FOR NU REVIEW

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DESIGN BASIS AND GENERAL NOTES

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Sheet No. 2 of 7

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.

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DRAWN BY:	TJL
CHK'D BY:	CFC

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DATE:	3/7/13
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STRUCTURAL NOTES

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Sheet No. 3 of 7

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

DESIGNED BY:	TJL
DRAWN BY:	TJL
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
A	3/12/13	TJL	CFC	ISSUED FOR NU REVIEW

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MODIFICATION INSPECTION REQUIREMENTS

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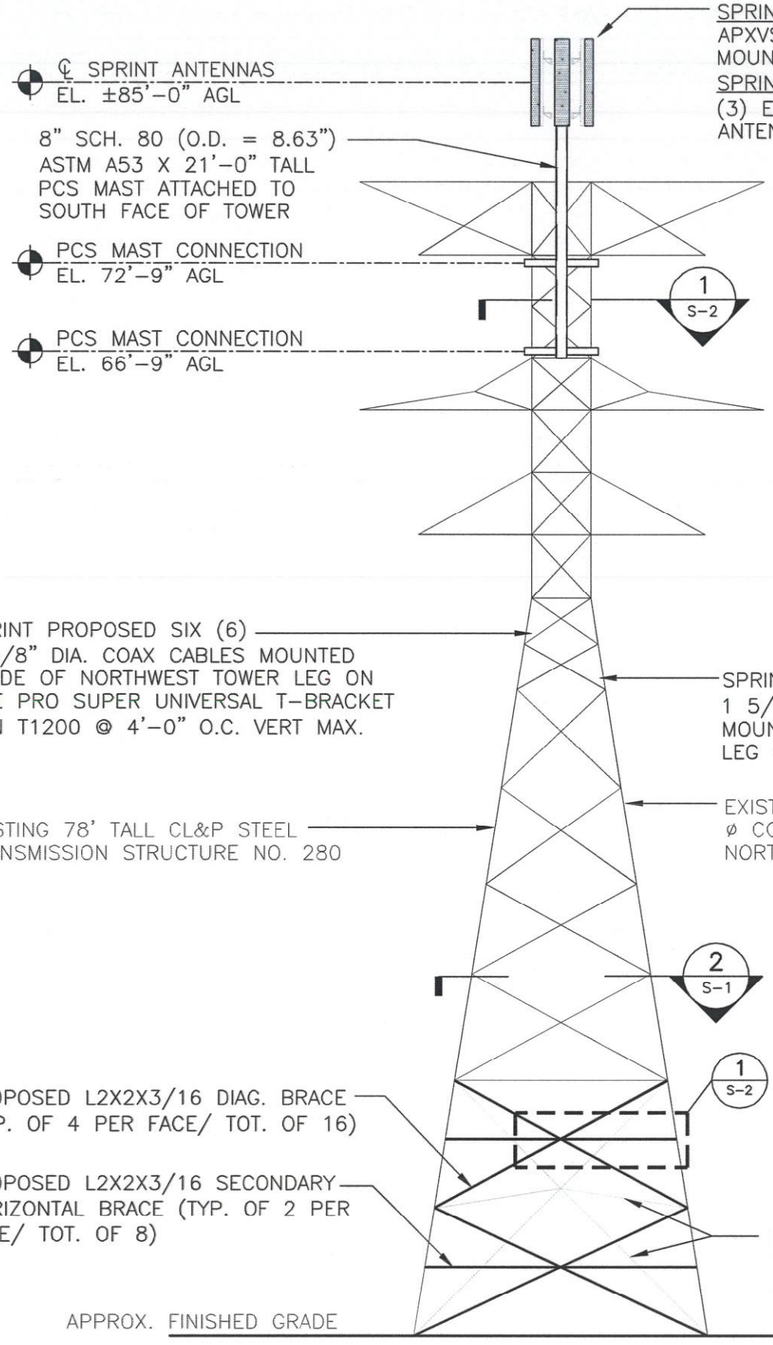
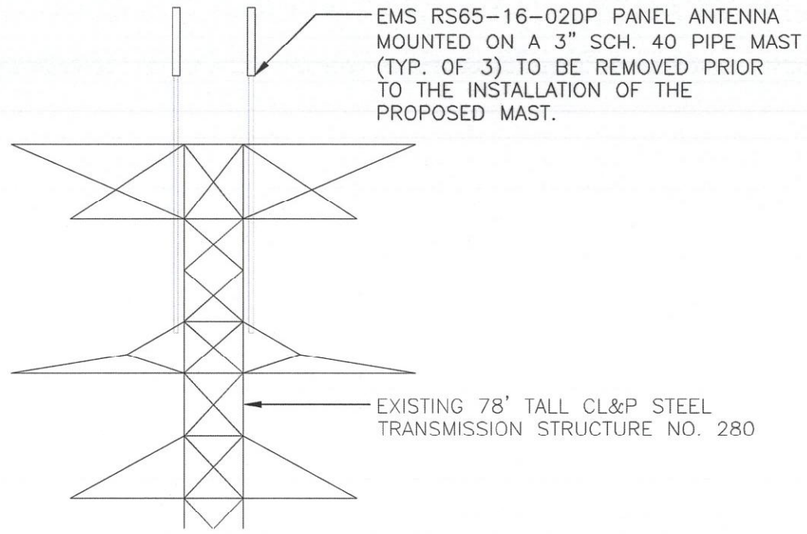
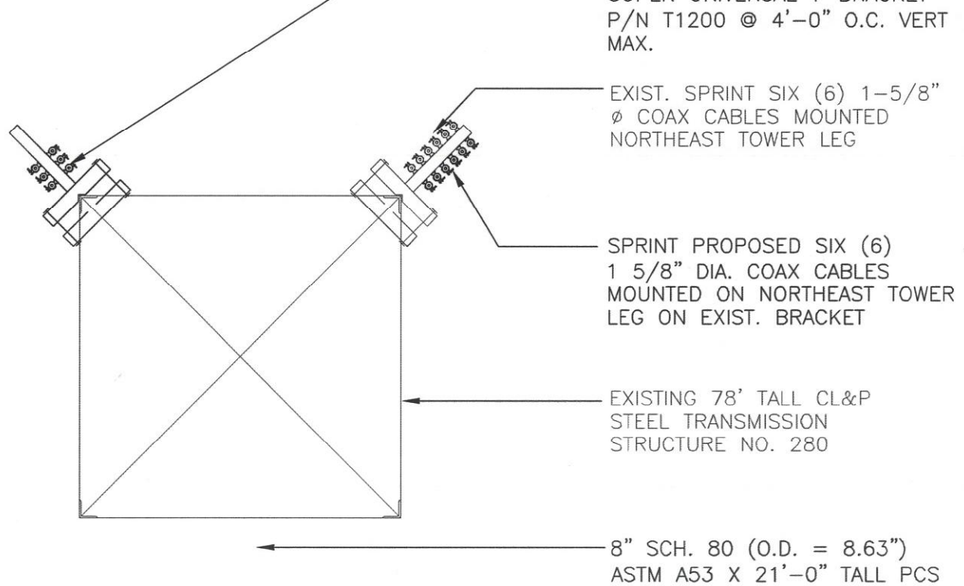
Sheet No. 4 of 7



1a / S-1 **TOWER & PROPOSED MAST ELEVATION**
SCALE: 1" = 10'-0"



1b / S-1 **PARTIAL TOWER & EXISTING MAST ELEVATION**
SCALE: 1" = 10'-0"



2 / S-1 **FEEDLINE PLAN - TOWER**
SCALE: NOT TO SCALE

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TOWER ELEVATION AND FEEDLINE PLAN

SHEET NO.
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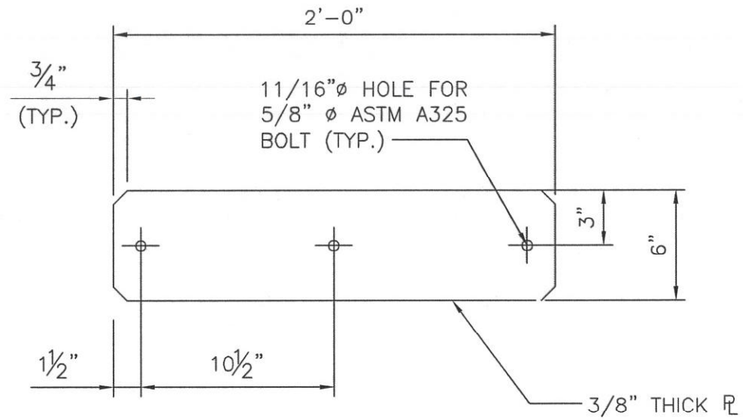
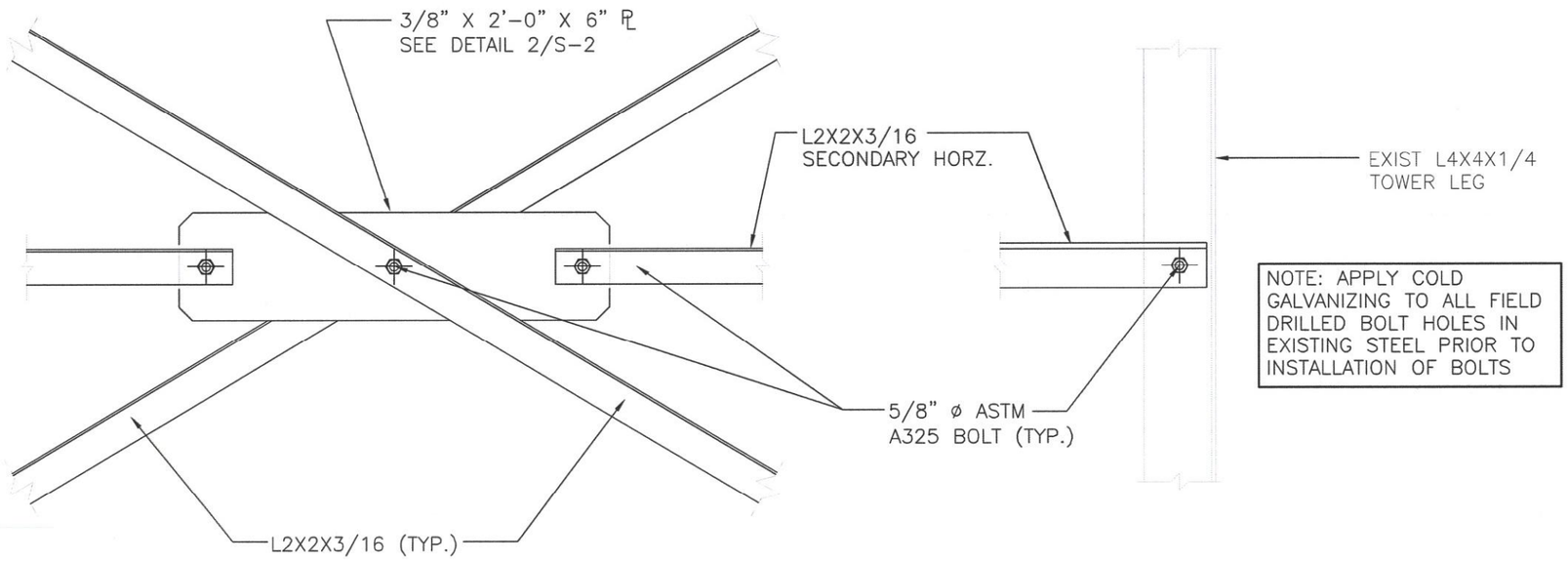


2 / S-2 PLATE P1 DETAIL

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



NOTE: APPLY COLD GALVANIZING TO ALL FIELD DRILLED BOLT HOLES IN EXISTING STEEL PRIOR TO INSTALLATION OF BOLTS

1 / S-2 SECONDARY HORIZONTAL ELEVATION

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

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TOWER REINFORCEMENT DETAILS

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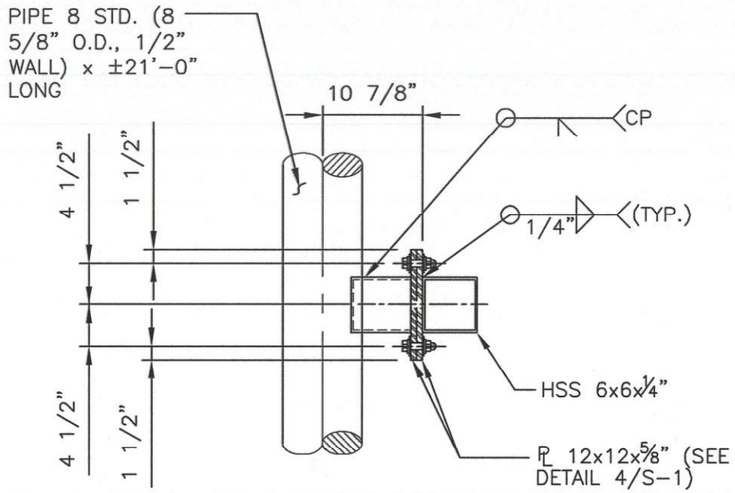
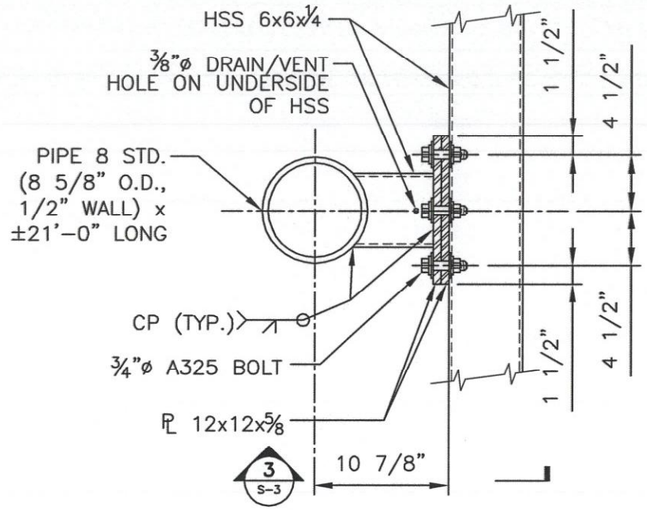
Sheet No. 6 of 7



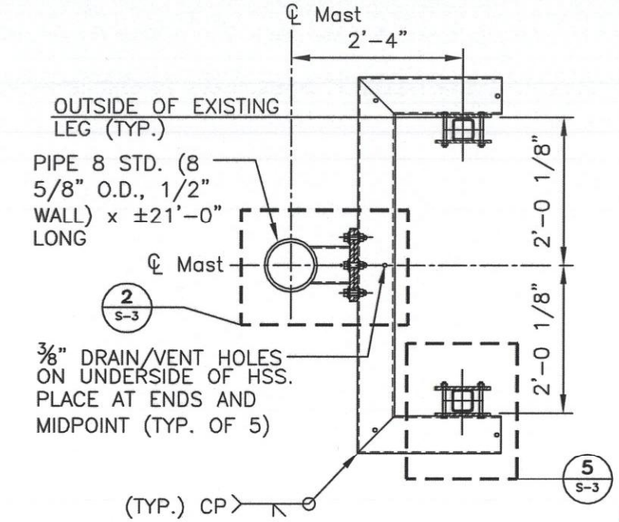
3 / S-3 MAST CONNECTION SECTION

SCALE: 3/4" = 1'-0"



2 / S-3 MAST CONNECTION DETAIL

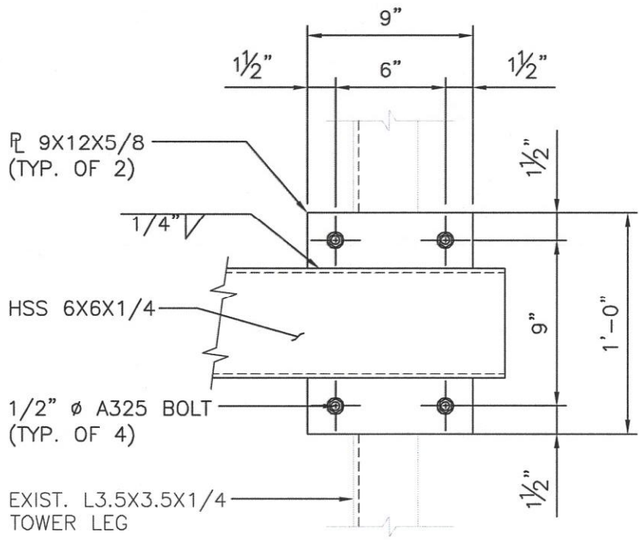
SCALE: 1" = 1'-0"



1 / S-3 MAST CONNECTION PLAN

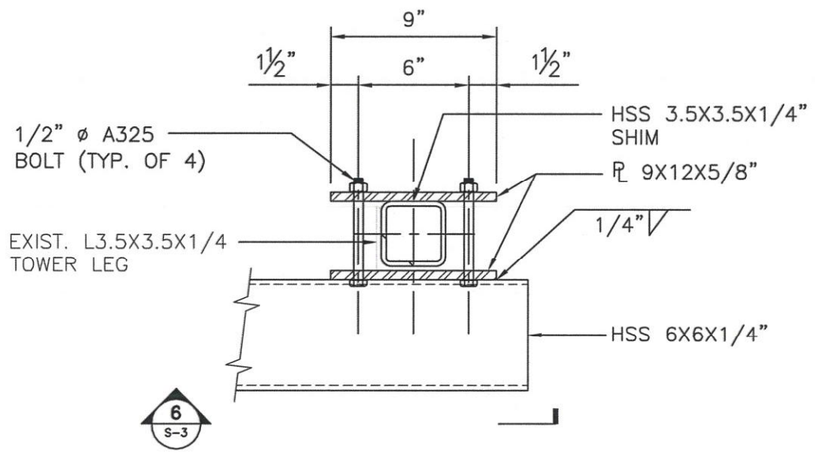
SCALE: 1/2" = 1'-0"

SLIP CRITICAL JOINT



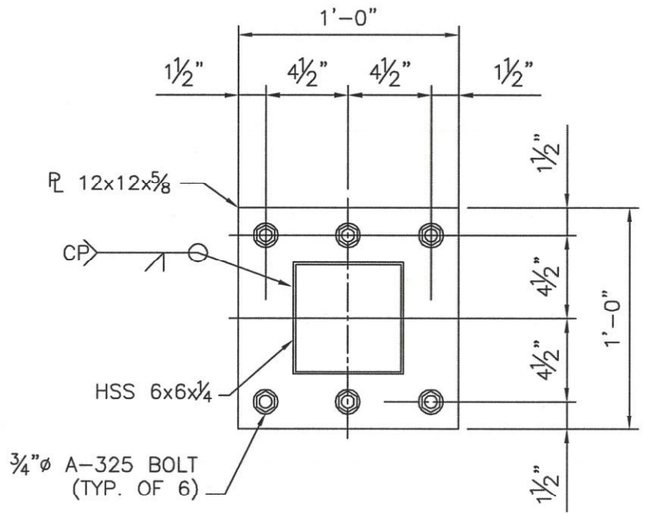
6 / S-3 CONNECTION DETAIL

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



5 / S-3 CONNECTION DETAIL

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



4 / S-3 PLATE DETAIL

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

1. ALL SLIP CRITICAL CONNECTIONS TO BE INSTALLED W/ SQUIRTER A325 GALVANIZED LOAD INDICATING WASHERS OR ENGINEER APPROVED EQUAL.
2. SLIP-CRITICAL CONECTIONS SHALL BE TIGHTENED TO A BOLT TENSION NOT LESS THAN THAT GIVEN IN TABLE J3.1 OF AISC 14TH EDITION.
3. ROUGHEN SURFACES OF EXISTING AND PROPOSED STEEL AT LOCATION OF CONNECTION WITH WIRE BRUSH.

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PCS MAST DETAILS

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S-3
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Subject:	Load Analysis of PCS Mast on CL&P Tower # 280
Location:	Stratford, CT
Rev. 0: 3/4/13	Prepared by: T.J.L. Checked by: C.F.C. Job No. 12047.CO12

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

Mast	$z_{mast} := 76.5$	ft	(User Input)
Sprint	$z_{spt} := 85$	ft	(User Input)
Coax	$z_{coax} := 76.5$	ft	(User Input)

Exposure Coefficients, kz

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

Mast $Kz_{mast} := \left(\frac{z_{mast}}{33}\right)^{\frac{2}{7}} = 1.272$

Sprint $Kz_{spt} := \left(\frac{z_{spt}}{33}\right)^{\frac{2}{7}} = 1.31$

Coax $Kz_{coax} := \left(\frac{z_{coax}}{33}\right)^{\frac{2}{7}} = 1.272$

Velocity Pressure without ice, qz

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

Mast $qz_{mast} := 0.00256 \cdot Kz_{mast} \cdot V^2 = 23.518$

Sprint $qz_{spt} := 0.00256 \cdot Kz_{spt} \cdot V^2 = 24.237$

Coax $qz_{coax} := 0.00256 \cdot Kz_{coax} \cdot V^2 = 23.518$

Velocity Pressure with ice, qzICE

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

Mast $qzICE_{mast} := 0.00256 \cdot Kz_{mast} \cdot V_i^2 = 17.825$

Sprint $qzICE_{spt} := 0.00256 \cdot Kz_{spt} \cdot V_i^2 = 18.37$

Coax $qzICE_{coax} := 0.00256 \cdot Kz_{coax} \cdot V_i^2 = 17.825$

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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Subject:	Load Analysis of PCS Mast on CL&P Tower # 280
Location:	Stratford, CT
Rev. 0: 3/4/13	Prepared by: T.J.L. Checked by: C.F.C. Job No. 12047.CO12

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

Mast Data: (8" Sch. 80) (User Input)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 8.63$ in (User Input)

Mast Length = $L_{mast} := 21$ ft (User Input)

Mast Thickness = $t_{mast} := 0.5$ in (User Input)

Mast Aspect Ratio = $Ar_{mast} := \frac{12 L_{mast}}{D_{mast}} = 29.2$

Mast Force Coefficient = $Ca_{mast} = 1.2$ (per TIA/EIA-222-F Table 3)

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

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.719$ sf/ft

Total Mast Wind Force = $qz_{mast} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 34$ plf **BLC 5,7**

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

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.803$ sf/ft

Total Mast Wind Force w/ Ice = $qzICE_{mast} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 29$ plf **BLC 4,6**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2\right] = 14.3$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 6$ plf **BLC 3**

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Subject: Load Analysis of PCS Mast on CL&P Tower # 280

Location: Stratford, CT

Rev. 0: 3/4/13

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 12047.CO12

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

Antenna Data: (Sprint)

Antenna Model =	RFS APXVSPP18-C			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 72$	in	(User Input)	
Antenna Width =	$W_{ant} := 11.8$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 7$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 57$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 3$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.1$			
Antenna Force Coefficient =	$Ca_{ant} = 1.4$		(per TIA/EIA-222-F-1996 Table 3)	

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

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.9$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 17.7$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{spt} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 1015$	lbs	**BLC 5,7**

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 =	$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.5$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19.5$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qzICE_{spt} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 846$	lbs	**BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 171$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5947$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1528$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 50$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 149$	lbs	**BLC 3**

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Subject: Load Analysis of PCS Mast on CL&P Tower # 280

Location: Stratford, CT

Rev. 0: 3/4/13 Prepared by: T.J.L. Checked by: C.F.C.
Job No. 12047.CO12

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

Mount Data: (Sprint)

Mount Type: Tri-Sector Chain Mount

Mount Shape = Flat

Mount Weight = $WT_{mnt} := 160$ lbs (User Input)

Mount Weight w/ Ice = $WT_{mnt.ice} := 200$ lbs (User Input)

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

Total Platform Wind Force = $F_{plt} := 0$ (Mount Shielded by Antennas) lbs **BLC 5,7**

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

Total Platform Wind Force w/ Ice = $Fi_{plt} := 0$ (Mount Shielded by Antennas) lbs **BLC 4,6**

Gravity Load (without ice)

Weight of Platform = $WT_{mnt} = 160$ lbs **BLC 2**

Gravity Loads (ice only)

Weight of Ice on Platform = $WT_{mnt.ice} - WT_{mnt} = 40$ lbs **BLC 3**

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Subject:	Load Analysis of PCS Mast on CL&P Tower # 280
Location:	Stratford, CT
Rev. 0: 3/4/13	Prepared by: T.J.L. Checked by: C.F.C. Job No. 12047.CO12

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

Coax Cable Data:

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 18$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 18$		(User Input)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 4$		(User Input)
Coax aspect ratio,	$Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 109.1$		
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 =	$A_{coax} := \frac{NP_{coax} \cdot D_{coax}}{12} = 0.7$	sf/ft	
Total Coax Wind Force =	$F_{coax} := Ca_{coax} \cdot qz_{coax} \cdot G_H \cdot A_{coax} = 31$	plf	**BLC 5,7**

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

Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{NP_{coax} \cdot (D_{coax} + 2 \cdot Ir)}{12} = 1$	sf/ft	
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qzICE_{coax} \cdot G_H \cdot AICE_{coax} = 36$	plf	**BLC 4,6**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot =	$Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}^2\right] = 3.9$	sq in	
Ice Weight All Coax per foot =	$WTi_{coax} := Id \cdot \left(N_{coax} \cdot \frac{Ai_{coax}}{144}\right) = 27$	plf	**BLC 3**

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	Load Analysis of PCS Mast on CL&P Tower # 280
Location:	Stratford, CT
Rev. 0: 3/4/13	Prepared by: T.J.L. Checked by: C.F.C. Job No. 12047.CO12

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

Member Data: HSS 6x6x1/4

Shape = Flat (User Input)

Height = $H_{mem} := 6$ in (User Input)

Width = $W_{mem} := 6$ in (User Input)

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

Member Aspect Ratio = $Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 7.0$

Member Force Coefficient = $Ca_{mem} = 1.4$ (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 = $A_{mem} := \frac{H_{mem}}{12} = 0.5$ sf/ft

Total Member Wind Force = $F_{mem} := qz_{mast} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 28$ lbs **BLC 5,7**

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

Member Projected Surface Area w/ Ice = $A_{ICEmem} := \frac{(H_{mem} + 2 \cdot Ir)}{12} = 0.6$ sf/ft

Total Member Wind Force w/ Ice = $Fi_{mem} := qzICE_{mast} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 25$ lbs **BLC 4,6**

Gravity Load (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear foot = $Ai_{mem} := (W_{mem} + 2 \cdot Ir) \cdot (H_{mem} + 2 \cdot Ir) - W_{mem} \cdot H_{mem} = 13$ sq in

Weight of Ice on Member = $W_{ICE.mem} := Id \cdot \frac{Ai_{mem}}{144} = 5$ lbs **BLC 3**

CENTEK engineering, INC.
Consulting Engineers
63-2 North Branford Road
Branford, CT 06405
Ph. 203-488-0580 / Fax. 203-488-8587

Subject: **Analysis of TIA/EIA Wind and Ice Loads for Analysis of Mast Only**
Tabulated Load Cases
Location: **Stratford, CT**
Date: 3/4/13 Prepared by: T.J.L. Checked by: C.F.C. Job No. 12047.CO12

Load Case	Description
1	Self Weight (Mast)
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: Mast and Appurtenances

CENTEK engineering, INC.
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63-2 North Branford Road
Branford, CT 06405
Ph. 203-488-0580 / Fax. 203-488-8587

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

Location: **Stratford, CT**

Date: 3/4/13 Prepared by: T.J.L. Checked by: C.F.C. Job No. 12047.CO12

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: Mast and Appurtenances

Global

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation	Yes
Include Warping	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Vertical Axis	Y
Global Member Orientation Plane	XZ

Hot Rolled Steel Code	AISC 9th: 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 530-05/08: ASD
Aluminum Code	AA ADM1-05: ASD

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

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ct Exp. X	.75
Ct Exp. Z	.75
Ca	.36
Cv	.54
Nv	1
SD1	1
SDS	1
S1	1
Occupancy Code	4
Seismic Zone	3
Use Group	I
Use Gravity Self Wt in Diaphragm Mass	Yes
Use Deck Self Wt in Diaphragm Mass	Yes
Use Lateral Self Wt in Diaphragm Mass	Yes
Seismic Detailing Code	None
Om X	1
Om Z	1
Rho X	1
Rho Z	1

Company : CENTEK Engineering, INC.
Designer : tjl, cfc
Job Number : 12047.CO12 - CT43XC837 CL&P Tower # 280 - PCS Mast

Mar 6, 2013
6:32 PM
Checked By:_____

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	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	Lengt...	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	Kyy	Kzz	Cm-...	Cm-...	Cb	y sw...	z sw...	Function
1	M1	Mast	21	Segment	Segment										Lateral
2	M2	Brace	1												Lateral
3	M3	Brace	4.5												Lateral
4	M4	Brace	1												Lateral
5	M5	Brace	1												Lateral
6	M6	Brace	4.5												Lateral
7	M7	Brace	1												Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	PIPE 8.0X	Beam	Pipe	A53 Gr. B	Typical	11.9	100	100	199
2	Brace	HSS6X6X4	Beam	Tube	A500 Gr.46	Typical	5.225	28.569	28.569	45.507

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N4			Mast	Beam	Pipe	A53 Gr. B	Typical
2	M2	N8	N12			Brace	Beam	Tube	A500 Gr.46	Typical
3	M3	N12	N11			Brace	Beam	Tube	A500 Gr.46	Typical
4	M4	N11	N7			Brace	Beam	Tube	A500 Gr.46	Typical
5	M5	N6	N10			Brace	Beam	Tube	A500 Gr.46	Typical
6	M6	N10	N9			Brace	Beam	Tube	A500 Gr.46	Typical
7	M7	N9	N5			Brace	Beam	Tube	A500 Gr.46	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	.5	0	0	
3	N3	0	6	0	0	
4	N4	0	21	0	0	
5	N5	2.25	.5	1	0	
6	N6	-2.25	.5	1	0	
7	N7	2.25	6	1	0	
8	N8	-2.25	6	1	0	
9	N9	2.25	.5	0	0	
10	N10	-2.25	.5	0	0	
11	N11	2.25	6	0	0	
12	N12	-2.25	6	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]	Footing
1	N8	Reaction	Reaction	Reaction				
2	N7	Reaction	Reaction	Reaction				
3	N5	Reaction	Reaction	Reaction				
4	N6	Reaction	Reaction	Reaction				

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 Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.171	18
2	M1	Y	-.16	18

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.149	18
2	M1	Y	-.04	18

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.846	18

Member Point Loads (BLC 5 : x-dir TIA/EIA Wind on PCS Struct)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	1.015	18

Member Point Loads (BLC 6 : z-dir TIA/EIA Wind with Ice on P)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	.846	18

Member Point Loads (BLC 7 : z-dir TIA/EIA Wind on PCS Struct)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	1.015	18

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.019	-.019	0	18

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

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.006	-.006	0	0
2	M1	Y	-.027	-.027	0	18
3	M2	Y	-.005	-.005	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
4	M3	Y	-.005	-.005	0	0
5	M4	Y	-.005	-.005	0	0
6	M5	Y	-.005	-.005	0	0
7	M6	Y	-.005	-.005	0	0
8	M7	Y	-.005	-.005	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.029	.029	0	0
2	M1	X	.036	.036	0	18
3	M2	X	.025	.025	0	0
4	M5	X	.025	.025	0	0

Member Distributed Loads (BLC 5 : x-dir TIA/EIA Wind on PCS Struct)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.034	.034	0	0
2	M1	X	.031	.031	0	18
3	M2	X	.028	.028	0	0
4	M5	X	.028	.028	0	0

Member Distributed Loads (BLC 6 : z-dir TIA/EIA Wind with Ice on P)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.029	.029	0	0
2	M1	Z	.036	.036	0	18
3	M2	Z	.025	.025	0	0
4	M5	Z	.025	.025	0	0

Member Distributed Loads (BLC 7 : z-dir TIA/EIA Wind on PCS Struct)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.034	.034	0	0
2	M1	Z	.031	.031	0	18
3	M2	Z	.028	.028	0	0
4	M5	Z	.028	.028	0	0

Basic Load Cases

	BLC Description	Category	X Gr...	Y Gr...	Z Grav...	Joint	Point	Distri...	Area(...	Surfa...
1	Self Weight (PCS Mast)	None		-1						
2	Weight of Appurtenances	None					2	1		
3	Weight of Ice Only on PCS Struct	None					2	8		
4	x-dir TIA/EIA Wind with Ice on P	None					1	4		
5	x-dir TIA/EIA Wind on PCS Struct	None					1	4		
6	z-dir TIA/EIA Wind with Ice on P	None					1	4		
7	z-dir TIA/EIA Wind on PCS Struct	None					1	4		

Load Combinations

	Description	So...	PDelta	SRSS	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	x-dir TIA/EIA Wind + Ice on P...	Yes			1	1	2	1	3	1	4	1								
2	x-dir TIA/EIA Wind on PCS S...	Yes			1	1	2	1	5	1										

Load Combinations (Continued)

	Description	So...	PDelta	SRSS	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
3	z-dir TIA/EIA Wind + Ice on P...	Yes			1	1	2	1	3	1	6	1								
4	z-dir TIA/EIA Wind on PCS S...	Yes			1	1	2	1	7	1										
5	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	0	1	0	1	0	1	0	1	0	1	0	1
2			min	0	1	0	1	0	1	0	1	0	1	0	1
3		2	max	.669	1	0	3	3.132	4	0	3	13.62	4	9.063	2
4			min	-.941	4	-2.323	2	-.468	1	-.293	2	-.944	1	0	3
5		3	max	1.353	3	1.604	2	0	1	0	1	10.359	4	10.359	2
6			min	.899	2	0	3	-1.604	4	0	1	0	1	0	3
7		4	max	.868	3	1.263	2	0	1	0	1	2.831	4	2.831	2
8			min	.586	2	0	3	-1.263	4	0	1	0	1	0	3
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	2.567	4	1.265	3	2.229	4	0	1	0	1	0	1
12			min	-1.173	2	-1.206	2	-2.293	2	0	1	0	1	0	1
13		2	max	2.56	4	1.26	3	2.229	4	0	1	.557	4	.302	2
14			min	-1.173	2	-1.211	2	-2.286	2	0	1	-.572	2	-.316	3
15		3	max	2.553	4	1.254	3	2.229	4	0	1	1.114	4	.605	2
16			min	-1.173	2	-1.215	2	-2.279	2	0	1	-1.143	2	-.63	3
17		4	max	2.546	4	1.248	3	2.229	4	0	1	1.671	4	.91	2
18			min	-1.173	2	-1.22	2	-2.272	2	0	1	-1.712	2	-.943	3
19		5	max	2.539	4	1.242	3	2.229	4	0	1	2.229	4	1.215	2
20			min	-1.173	2	-1.224	2	-2.265	2	0	1	-2.279	2	-1.254	3
21	M3	1	max	2.229	4	1.242	3	1.173	2	1.215	2	2.229	4	0	1
22			min	-2.265	2	-1.224	2	-2.539	4	-1.254	3	-2.279	2	0	1
23		2	max	2.229	4	1.217	3	1.173	2	1.215	2	-.535	3	1.388	2
24			min	-2.265	2	-1.244	2	-2.539	4	-1.254	3	-.959	2	-1.383	3
25		3	max	2.229	4	-1.076	4	1.173	2	2.092	1	.451	1	-2.466	4
26			min	-2.265	2	-2.031	2	-2.539	4	-1.254	3	-3.484	4	-4.625	1
27		4	max	2.229	4	-1.096	4	2.539	4	2.092	1	1.036	2	-1.244	4
28			min	1.708	1	-2.055	1	.674	1	1.125	4	-.628	4	-2.327	1
29		5	max	2.229	4	-1.116	4	2.539	4	2.092	1	2.229	4	0	1
30			min	1.708	1	-2.081	1	.674	1	1.125	4	1.708	1	0	1
31	M4	1	max	2.539	4	-1.116	4	-1.708	1	0	1	2.229	4	-1.125	4
32			min	.674	1	-2.081	1	-2.229	4	0	1	1.708	1	-2.092	1
33		2	max	2.539	4	-1.12	4	-1.708	1	0	1	1.671	4	-.845	4
34			min	.674	1	-2.087	1	-2.229	4	0	1	1.281	1	-1.571	1
35		3	max	2.539	4	-1.125	4	-1.708	1	0	1	1.114	4	-.565	4
36			min	.674	1	-2.092	1	-2.229	4	0	1	.854	1	-1.049	1
37		4	max	2.539	4	-1.129	4	-1.708	1	0	1	.557	4	-.283	4
38			min	.674	1	-2.098	1	-2.229	4	0	1	.427	1	-.525	1
39		5	max	2.539	4	-1.134	4	-1.708	1	0	1	0	1	0	1
40			min	.674	1	-2.104	1	-2.229	4	0	1	0	1	0	1
41	M5	1	max	.669	1	.892	1	1.107	2	0	1	0	1	0	1
42			min	-1.367	4	-.256	4	-1.225	4	0	1	0	1	0	1
43		2	max	.669	1	.886	1	1.114	2	0	1	.278	2	.065	4
44			min	-1.374	4	-.261	4	-1.225	4	0	1	-.306	4	-.222	1
45		3	max	.669	1	.88	1	1.121	2	0	1	.557	2	.13	4

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
46			min	-1.381	4	-.265	4	-1.225	4	0	1	-.612	4	-.443	1
47		4	max	.669	1	.874	1	1.128	2	0	1	.838	2	.197	4
48			min	-1.388	4	-.27	4	-1.225	4	0	1	-.919	4	-.662	1
49		5	max	.669	1	.869	1	1.135	2	0	1	1.121	2	.265	4
50			min	-1.395	4	-.274	4	-1.225	4	0	1	-1.225	4	-.88	1
51	M6	1	max	1.135	2	.869	1	1.395	4	.265	4	1.121	2	0	1
52			min	-1.225	4	-.274	4	-.669	1	-.88	1	-1.225	4	0	1
53		2	max	1.135	2	.843	1	1.395	4	.265	4	.38	2	.32	4
54			min	-1.225	4	-.294	4	-.669	1	-.88	1	.276	3	-.963	1
55		3	max	1.135	2	.817	1	1.395	4	.265	4	1.915	4	.662	4
56			min	-1.225	4	-.314	4	-.669	1	-.88	1	-.451	1	-1.897	1
57		4	max	-.644	1	.294	4	-.201	1	.4	1	.345	4	.32	4
58			min	-1.225	4	-.363	1	-1.395	4	-.265	4	-.458	2	-.422	1
59		5	max	-.644	1	.274	4	-.201	1	.4	1	-.644	1	0	1
60			min	-1.225	4	-.388	1	-1.395	4	-.265	4	-1.225	4	0	1
61	M7	1	max	-.201	1	.274	4	1.225	4	0	1	-.644	1	.265	4
62			min	-1.395	4	-.388	1	.644	1	0	1	-1.225	4	-.4	1
63		2	max	-.201	1	.27	4	1.225	4	0	1	-.483	1	.197	4
64			min	-1.395	4	-.394	1	.644	1	0	1	-.919	4	-.302	1
65		3	max	-.201	1	.265	4	1.225	4	0	1	-.322	1	.13	4
66			min	-1.395	4	-.4	1	.644	1	0	1	-.612	4	-.203	1
67		4	max	-.201	1	.261	4	1.225	4	0	1	-.161	1	.065	4
68			min	-1.395	4	-.405	1	.644	1	0	1	-.306	4	-.102	1
69		5	max	-.201	1	.256	4	1.225	4	0	1	0	1	0	1
70			min	-1.395	4	-.411	1	.644	1	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	0	1	0	1	0	1	0	1	0	1	0	1	0	1
2			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
3		2	max	.056	1	0	3	.526	4	0	3	4.69	2	7.049	4	.489	1
4			min	-.079	4	-.39	2	-.079	1	-4.69	2	0	3	-.489	1	-7.049	4
5		3	max	.114	3	.27	2	0	1	0	3	5.361	2	5.361	4	0	1
6			min	.076	2	0	3	-.27	4	-5.361	2	0	3	0	1	-5.361	4
7		4	max	.073	3	.212	2	0	1	0	3	1.465	2	1.465	4	0	1
8			min	.049	2	0	3	-.212	4	-1.465	2	0	3	0	1	-1.465	4
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	.491	4	.454	3	.799	4	0	1	0	1	0	1	0	1
12			min	-.225	2	-.432	2	-.822	2	0	1	0	1	0	1	0	1
13		2	max	.49	4	.451	3	.799	4	.398	3	.381	2	.702	4	.721	2
14			min	-.225	2	-.434	2	-.819	2	-.381	2	-.398	3	-.721	2	-.702	4
15		3	max	.489	4	.449	3	.799	4	.794	3	.763	2	1.404	4	1.44	2
16			min	-.225	2	-.436	2	-.817	2	-.763	2	-.794	3	-1.44	2	-1.404	4
17		4	max	.487	4	.447	3	.799	4	1.188	3	1.146	2	2.106	4	2.157	2
18			min	-.225	2	-.437	2	-.814	2	-1.146	2	-1.188	3	-2.157	2	-2.106	4
19		5	max	.486	4	.445	3	.799	4	1.58	3	1.531	2	2.808	4	2.871	2
20			min	-.225	2	-.439	2	-.812	2	-1.531	2	-1.58	3	-2.871	2	-2.808	4
21	M3	1	max	.427	4	.445	3	.42	2	0	1	0	1	2.808	4	2.871	2
22			min	-.433	2	-.439	2	-.91	4	0	1	0	1	-2.871	2	-2.808	4
23		2	max	.427	4	.436	3	.42	2	1.743	3	1.749	2	-.675	3	1.208	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
24			min	-.433	2	-.446	2	-.91	4	-1.749	2	-1.743	3	-1.208	2	.675	3
25		3	max	.427	4	-.386	4	.42	2	5.828	1	-3.107	4	.568	1	4.39	4
26			min	-.433	2	-.728	2	-.91	4	3.107	4	-5.828	1	-4.39	4	-.568	1
27		4	max	.427	4	-.393	4	.91	4	2.932	1	-1.568	4	1.306	2	.791	4
28			min	.327	1	-.737	1	.242	1	1.568	4	-2.932	1	-.791	4	-1.306	2
29		5	max	.427	4	-.4	4	.91	4	0	1	0	1	2.808	4	-2.153	1
30			min	.327	1	-.746	1	.242	1	0	1	0	1	2.153	1	-2.808	4
31	M4	1	max	.486	4	-.4	4	-.612	1	2.637	1	-1.417	4	2.808	4	-2.153	1
32			min	.129	1	-.746	1	-.799	4	1.417	4	-2.637	1	2.153	1	-2.808	4
33		2	max	.486	4	-.402	4	-.612	1	1.98	1	-1.065	4	2.106	4	-1.614	1
34			min	.129	1	-.748	1	-.799	4	1.065	4	-1.98	1	1.614	1	-2.106	4
35		3	max	.486	4	-.403	4	-.612	1	1.322	1	-.711	4	1.404	4	-1.076	1
36			min	.129	1	-.75	1	-.799	4	.711	4	-1.322	1	1.076	1	-1.404	4
37		4	max	.486	4	-.405	4	-.612	1	.662	1	-.356	4	.702	4	-.538	1
38			min	.129	1	-.752	1	-.799	4	.356	4	-.662	1	.538	1	-.702	4
39		5	max	.486	4	-.406	4	-.612	1	0	1	0	1	0	1	0	1
40			min	.129	1	-.754	1	-.799	4	0	1	0	1	0	1	0	1
41	M5	1	max	.128	1	.32	1	.397	2	0	1	0	1	0	1	0	1
42			min	-.262	4	-.092	4	-.439	4	0	1	0	1	0	1	0	1
43		2	max	.128	1	.317	1	.399	2	.28	1	.081	4	.35	2	.386	4
44			min	-.263	4	-.094	4	-.439	4	-.081	4	-.28	1	-.386	4	-.35	2
45		3	max	.128	1	.315	1	.402	2	.558	1	.164	4	.702	2	.772	4
46			min	-.264	4	-.095	4	-.439	4	-.164	4	-.558	1	-.772	4	-.702	2
47		4	max	.128	1	.313	1	.404	2	.834	1	.249	4	1.056	2	1.157	4
48			min	-.266	4	-.097	4	-.439	4	-.249	4	-.834	1	-1.157	4	-1.056	2
49		5	max	.128	1	.311	1	.407	2	1.109	1	.334	4	1.413	2	1.543	4
50			min	-.267	4	-.098	4	-.439	4	-.334	4	-1.109	1	-1.543	4	-1.413	2
51	M6	1	max	.217	2	.311	1	.5	4	0	1	0	1	1.413	2	1.543	4
52			min	-.234	4	-.098	4	-.24	1	0	1	0	1	-1.543	4	-1.413	2
53		2	max	.217	2	.302	1	.5	4	1.213	1	.403	4	.479	2	-.347	3
54			min	-.234	4	-.105	4	-.24	1	-.403	4	-1.213	1	.347	3	-.479	2
55		3	max	.217	2	.293	1	.5	4	2.39	1	.834	4	2.413	4	.568	1
56			min	-.234	4	-.113	4	-.24	1	-.834	4	-2.39	1	-.568	1	-2.413	4
57		4	max	-.123	1	.105	4	-.072	1	.532	1	.403	4	.435	4	.577	2
58			min	-.234	4	-.13	1	-.5	4	-.403	4	-.532	1	-.577	2	-.435	4
59		5	max	-.123	1	.098	4	-.072	1	0	1	0	1	-.812	1	1.543	4
60			min	-.234	4	-.139	1	-.5	4	0	1	0	1	-1.543	4	.812	1
61	M7	1	max	-.038	1	.098	4	.439	4	.503	1	.334	4	-.812	1	1.543	4
62			min	-.267	4	-.139	1	.231	1	-.334	4	-.503	1	-1.543	4	.812	1
63		2	max	-.038	1	.097	4	.439	4	.38	1	.249	4	-.609	1	1.157	4
64			min	-.267	4	-.141	1	.231	1	-.249	4	-.38	1	-1.157	4	.609	1
65		3	max	-.038	1	.095	4	.439	4	.255	1	.164	4	-.406	1	.772	4
66			min	-.267	4	-.143	1	.231	1	-.164	4	-.255	1	-.772	4	.406	1
67		4	max	-.038	1	.094	4	.439	4	.129	1	.081	4	-.203	1	.386	4
68			min	-.267	4	-.145	1	.231	1	-.081	4	-.129	1	-.386	4	.203	1
69		5	max	-.038	1	.092	4	.439	4	0	1	0	1	0	1	0	1
70			min	-.267	4	-.147	1	.231	1	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	N8	max	2.229	4	1.265	3	1.173	2	0	1	0	1	0	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
2		min	-2.293	2	-1.206	2	-2.567	4	0	1	0	1	0	1
3	N7	max	-1.708	1	2.104	1	-.674	1	0	1	0	1	0	1
4		min	-2.229	4	1.134	4	-2.539	4	0	1	0	1	0	1
5	N5	max	1.225	4	.411	1	1.395	4	0	1	0	1	0	1
6		min	.644	1	-.256	4	.201	1	0	1	0	1	0	1
7	N6	max	1.107	2	.892	1	1.367	4	0	1	0	1	0	1
8		min	-1.225	4	-.256	4	-.669	1	0	1	0	1	0	1
9	Totals:	max	0	4	2.62	3	0	2						
10		min	-2.343	2	1.754	2	-2.343	4						

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	3	0	4	.002	1	-6.354e-5	2	2.053e-8	4	1.822e-4	2
2		min	-.002	2	-.012	1	-.004	4	-3.548e-4	4	-2.483e-5	2	0	4
3	N2	max	0	3	0	4	.001	1	-6.354e-5	2	2.053e-8	4	1.821e-4	2
4		min	-.003	2	-.012	1	-.006	4	-3.547e-4	4	-2.483e-5	2	0	4
5	N3	max	.007	2	0	4	.011	4	1.712e-3	4	7.956e-5	2	0	3
6		min	0	4	-.012	1	-.001	1	-9.729e-5	1	1.833e-8	3	-1.082e-3	2
7	N4	max	.876	2	0	4	.994	4	6.734e-3	4	7.956e-5	2	0	3
8		min	0	4	-.013	1	-.019	1	-9.729e-5	1	1.833e-8	3	-6.104e-3	2
9	N5	max	0	1	0	4	0	1	-1.626e-4	4	2.277e-4	2	3.211e-4	1
10		min	0	4	0	1	0	4	-3.853e-4	1	-2.843e-5	4	-1.265e-4	4
11	N6	max	0	4	0	4	0	1	-1.626e-4	4	2.209e-4	2	1.265e-4	4
12		min	0	2	0	1	0	4	-7.338e-4	1	2.275e-5	3	-2.169e-4	1
13	N7	max	0	4	0	4	0	4	8.963e-4	4	5.179e-5	4	5.391e-4	3
14		min	0	1	0	1	0	1	-1.615e-3	1	-4.999e-4	2	-1.767e-4	2
15	N8	max	0	2	0	2	0	4	8.963e-4	4	-4.415e-5	3	-4.851e-4	4
16		min	0	4	0	3	0	2	4.805e-4	1	-4.939e-4	2	-5.855e-4	1
17	N9	max	0	4	-.002	4	0	1	-1.592e-4	2	1.541e-4	2	3.211e-4	1
18		min	-.003	2	-.005	1	0	4	-3.685e-4	3	-1.349e-4	4	-1.265e-4	4
19	N10	max	0	3	-.002	4	0	1	-1.854e-4	4	1.349e-4	4	1.265e-4	4
20		min	-.003	2	-.009	1	0	4	-6.57e-4	1	9.724e-5	1	-2.169e-4	1
21	N11	max	.006	2	.011	4	0	4	9.943e-4	4	2.455e-4	4	5.391e-4	3
22		min	0	4	-.02	1	0	1	-1.433e-3	1	-3.257e-4	2	-1.767e-4	2
23	N12	max	.006	2	.011	4	0	4	9.943e-4	4	-2.094e-4	3	-4.851e-4	4
24		min	0	3	.006	1	0	2	4.116e-4	1	-2.955e-4	2	-5.855e-4	1

Envelope AISC ASD Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Sh...	Loc[ft]	...	...Fa...	Ft [ksi]	Fb y-y [ksi]	Fb.....	...	AS...
1	M1	PIPE_8...	.408	6.125	4	.038	5.906	4	16...	21	23.1	23.1	.6	H1...
2	M2	HSS6X...	.157	1	4	.045	0	z 2	27...	27.6	30.36	30.	.6	H1...
3	M3	HSS6X...	.262	2.25	4	.129	4.5	y 1	25...	27.6	30.36	30. 1	1	H1...
4	M4	HSS6X...	.175	0	2	.043	0	z 4	27...	27.6	30.36	30.	.6	H1...
5	M5	HSS6X...	.085	1	1	.024	0	z 4	27...	27.6	30.36	30.		H1...
6	M6	HSS6X...	.115	2.25	4	.054	0	y 1	25...	27.6	30.36	30. 1	1	H2...
7	M7	HSS6X...	.072	0	4	.024	0	z 4	27...	27.6	30.36	30.	.6	H2...

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N8	-2.132	-.786	1.142	0	0	0
2	1	N7	-1.708	2.104	-.674	0	0	0
3	1	N5	.644	.411	.201	0	0	0
4	1	N6	1.043	.892	-.669	0	0	0
5	1	Totals:	-2.153	2.62	0			
6	1	COG (ft):	X: 0	Y: 10.695	Z: .017			

Joint Reactions

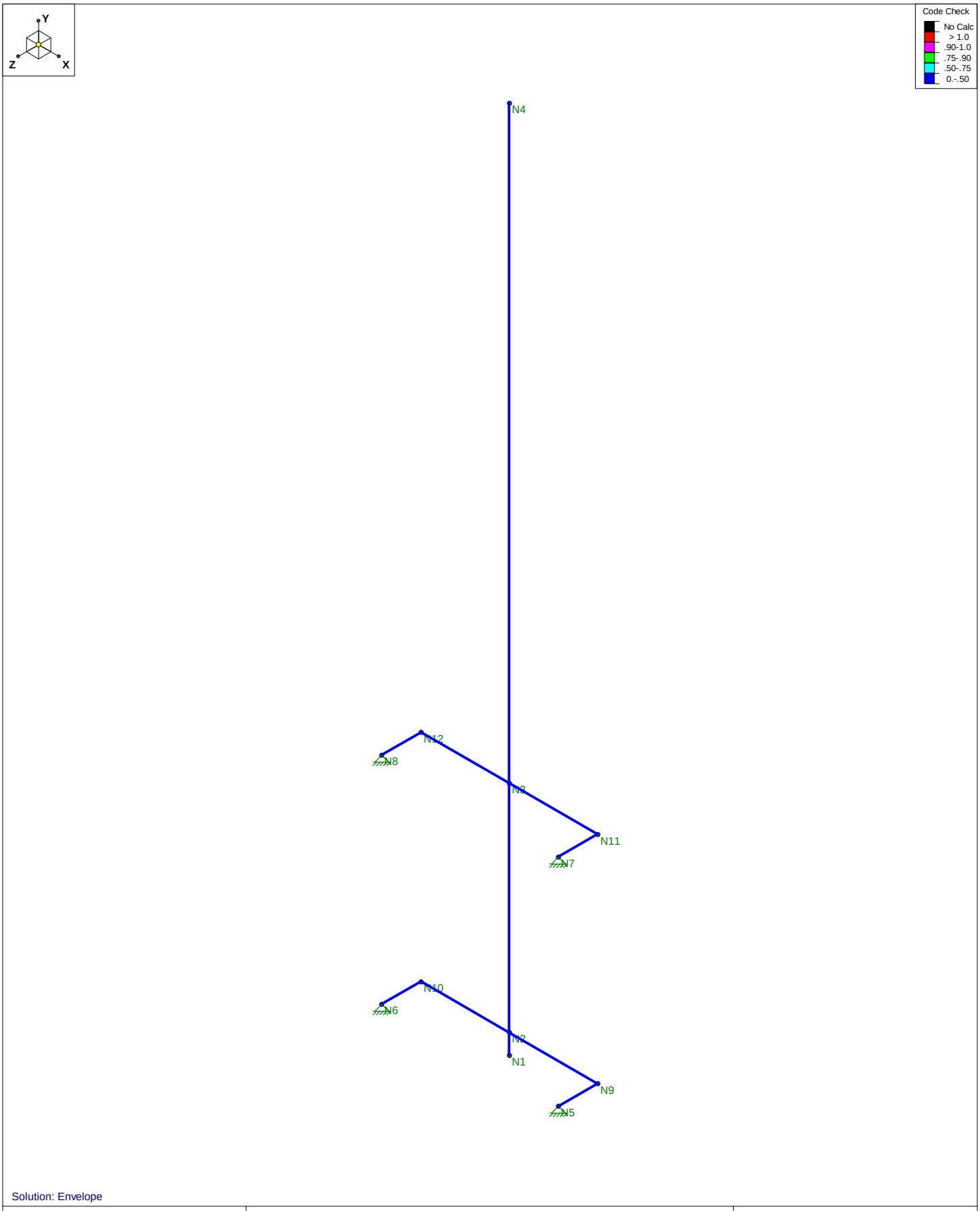
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N8	-2.293	-1.206	1.173	0	0	0
2	2	N7	-2.004	2.089	-.861	0	0	0
3	2	N5	.847	.159	.346	0	0	0
4	2	N6	1.107	.713	-.659	0	0	0
5	2	Totals:	-2.343	1.754	0			
6	2	COG (ft):	X: 0	Y: 10.668	Z: .02			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	N8	1.901	1.265	-2.191	0	0	0
2	3	N7	-1.901	1.265	-2.166	0	0	0
3	3	N5	.978	.045	1.115	0	0	0
4	3	N6	-.978	.045	1.09	0	0	0
5	3	Totals:	0	2.62	-2.153			
6	3	COG (ft):	X: 0	Y: 10.695	Z: .017			

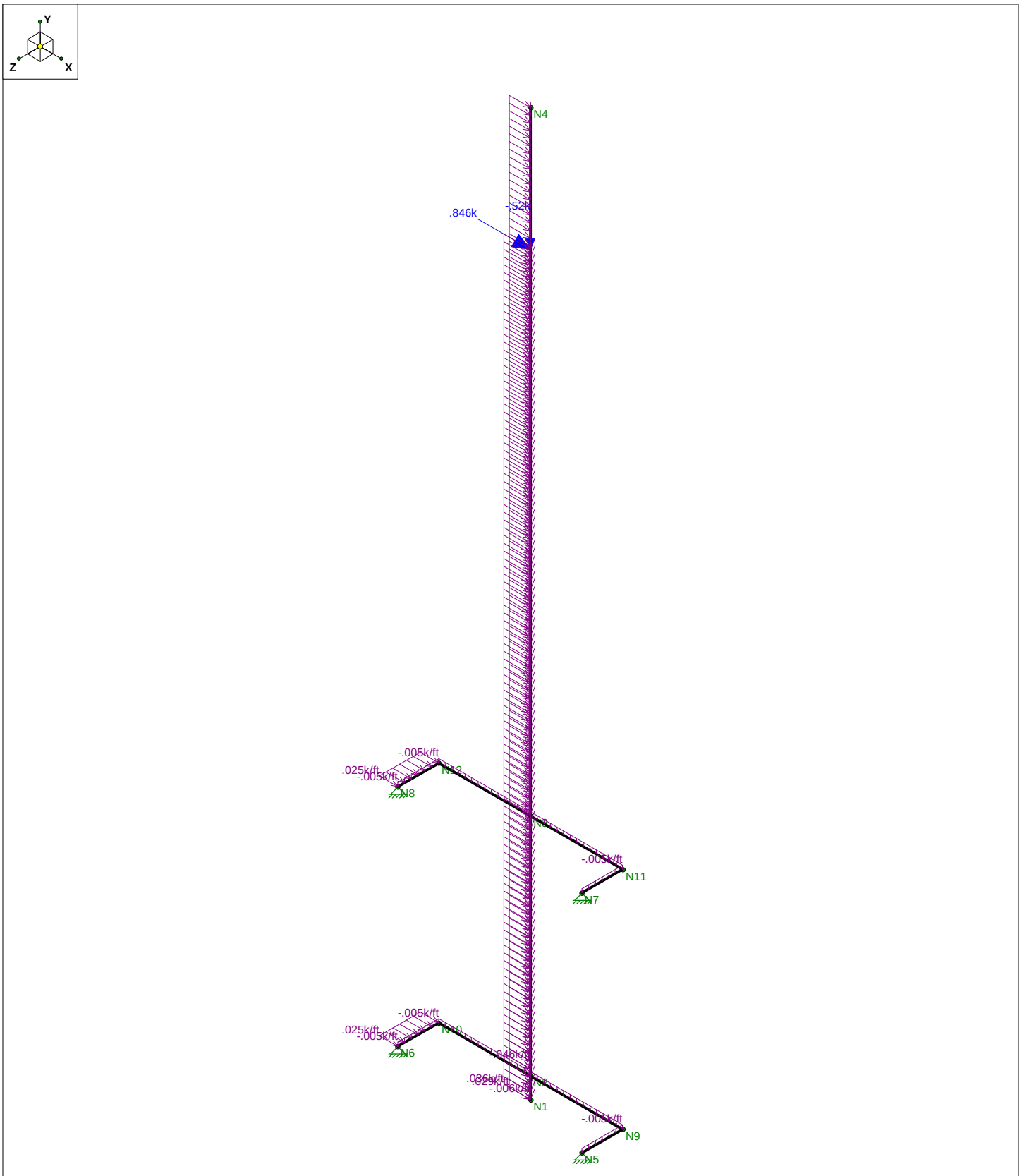
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	N8	2.229	1.134	-2.567	0	0	0
2	4	N7	-2.229	1.134	-2.539	0	0	0
3	4	N5	1.225	-.256	1.395	0	0	0
4	4	N6	-1.225	-.256	1.367	0	0	0
5	4	Totals:	0	1.754	-2.343			
6	4	COG (ft):	X: 0	Y: 10.668	Z: .02			



Solution: Envelope

CENTEK Engineering, INC.		
tjl, cfc	CL&P Tower # 280 - PCS Mast	Mar 6, 2013 at 6:33 PM
12047.CO12 - CT43XC837	Unity Check	TIA-EIA.r3d



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

CENTEK Engineering, INC.		
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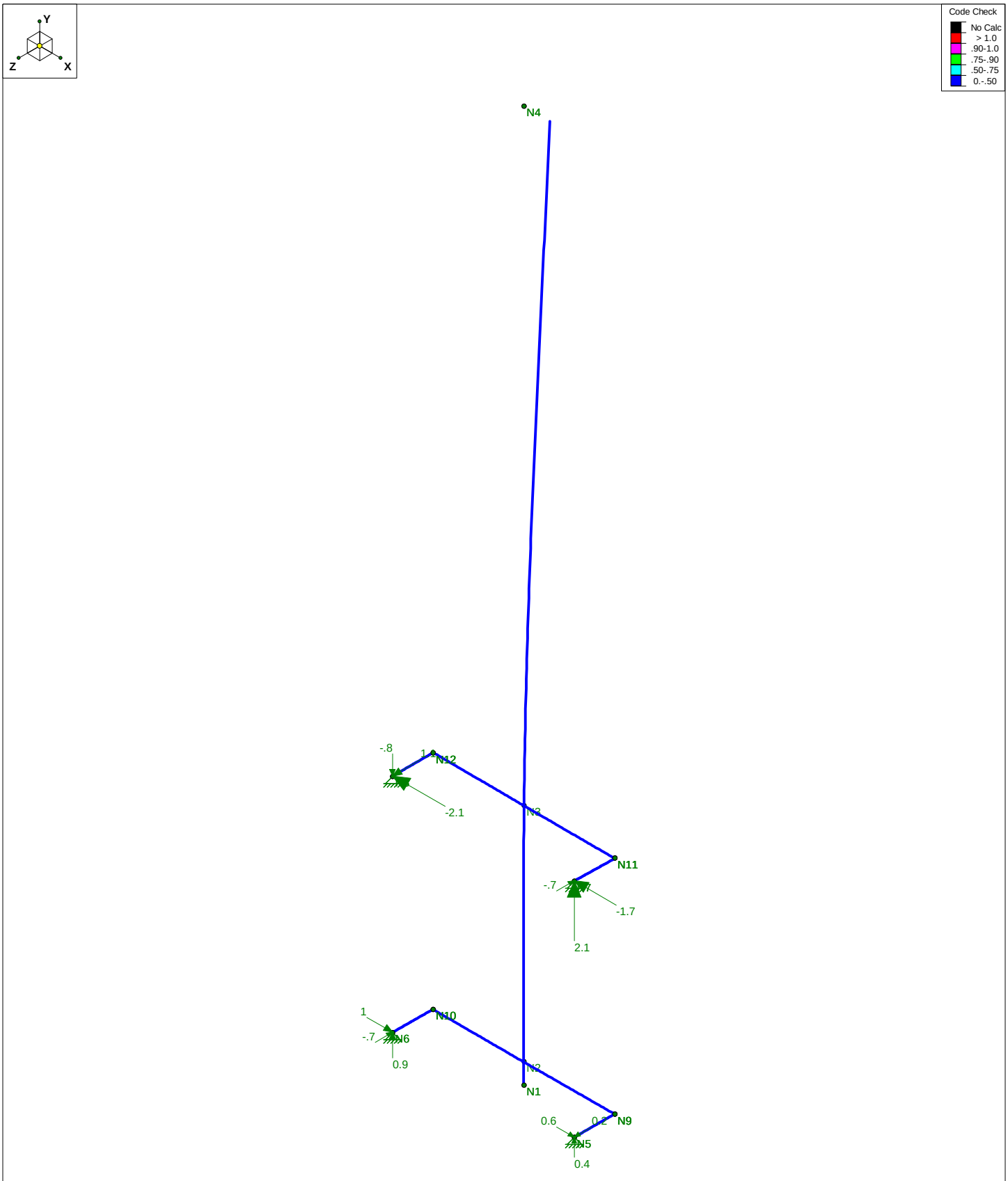
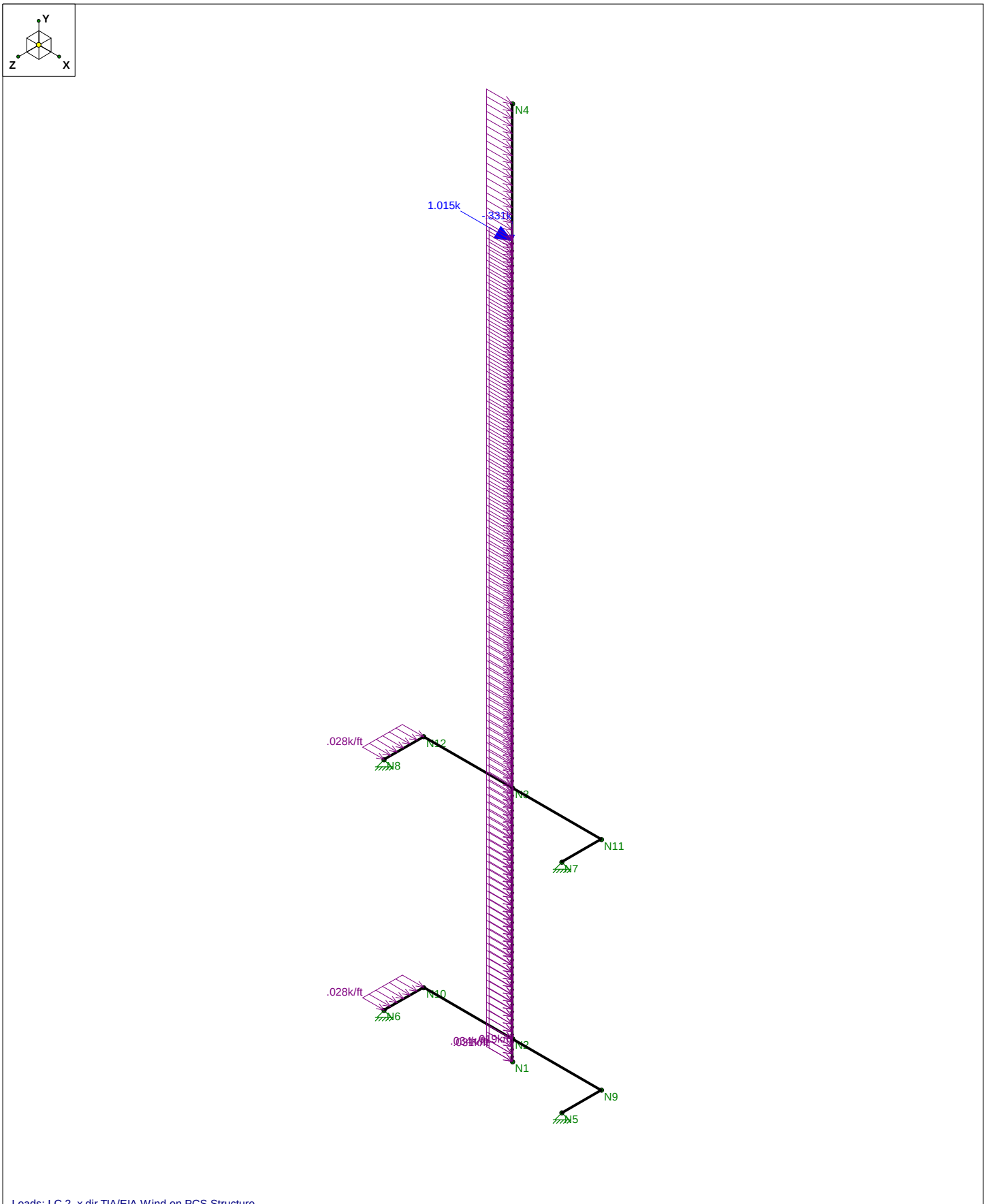
12047.CO12 - CT43XC837	LC #1 Loads	TIA-EIA.r3d



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

CENTEK Engineering, INC.		
tjl, cfc	CL&P Tower # 280 - PCS Mast	Mar 6, 2013 at 6:35 PM
12047.CO12 - CT43XC837	LC # 1 Reactions and Deflected Shape	TIA-EIA.r3d



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

CENTEK Engineering, INC.		
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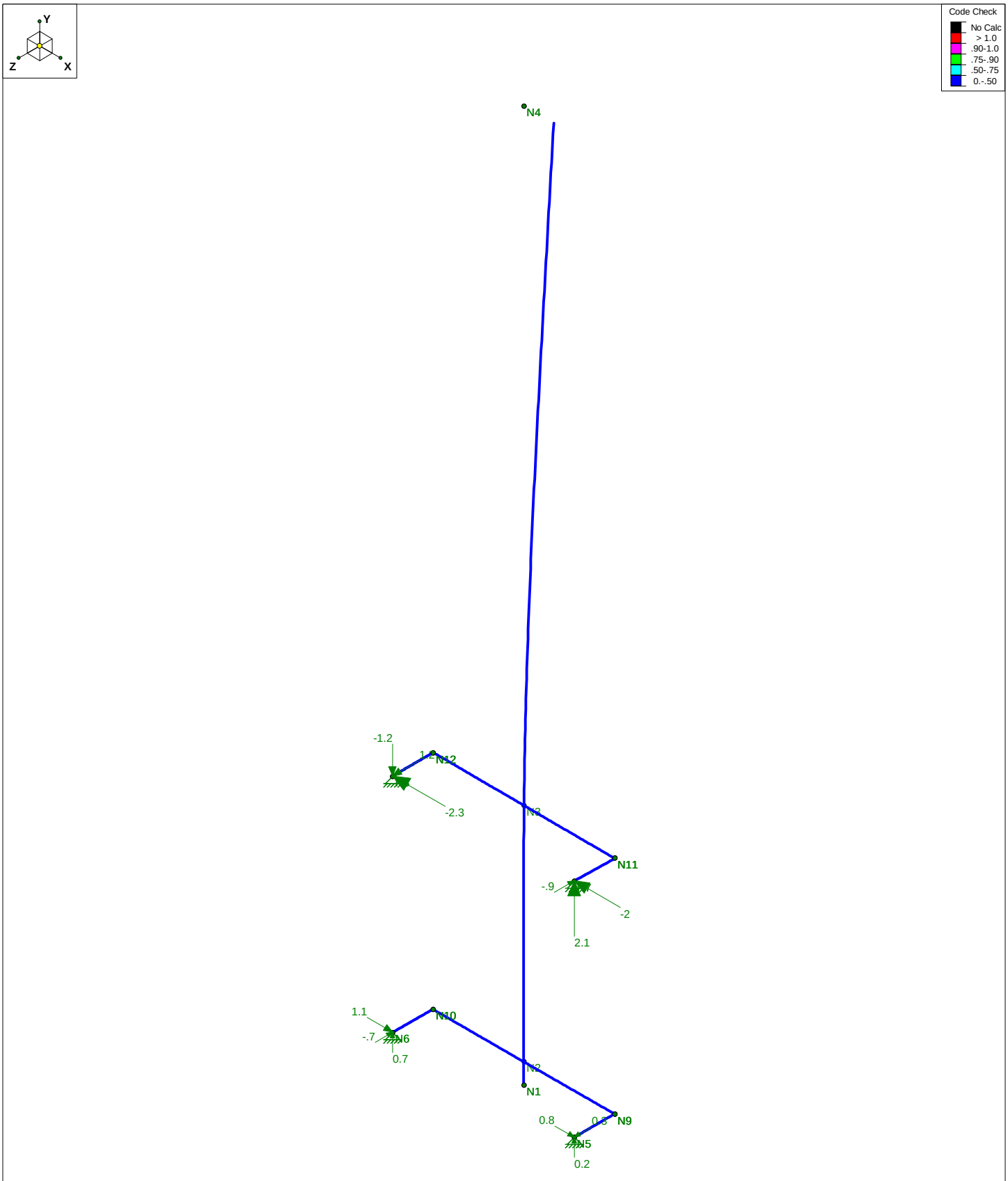

Results for LC 2, x-dir TIA/EIA Wind on PCS Structure
Z-direction Reaction units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	CL&P Tower # 280 - PCS Mast	Mar 6, 2013 at 6:35 PM
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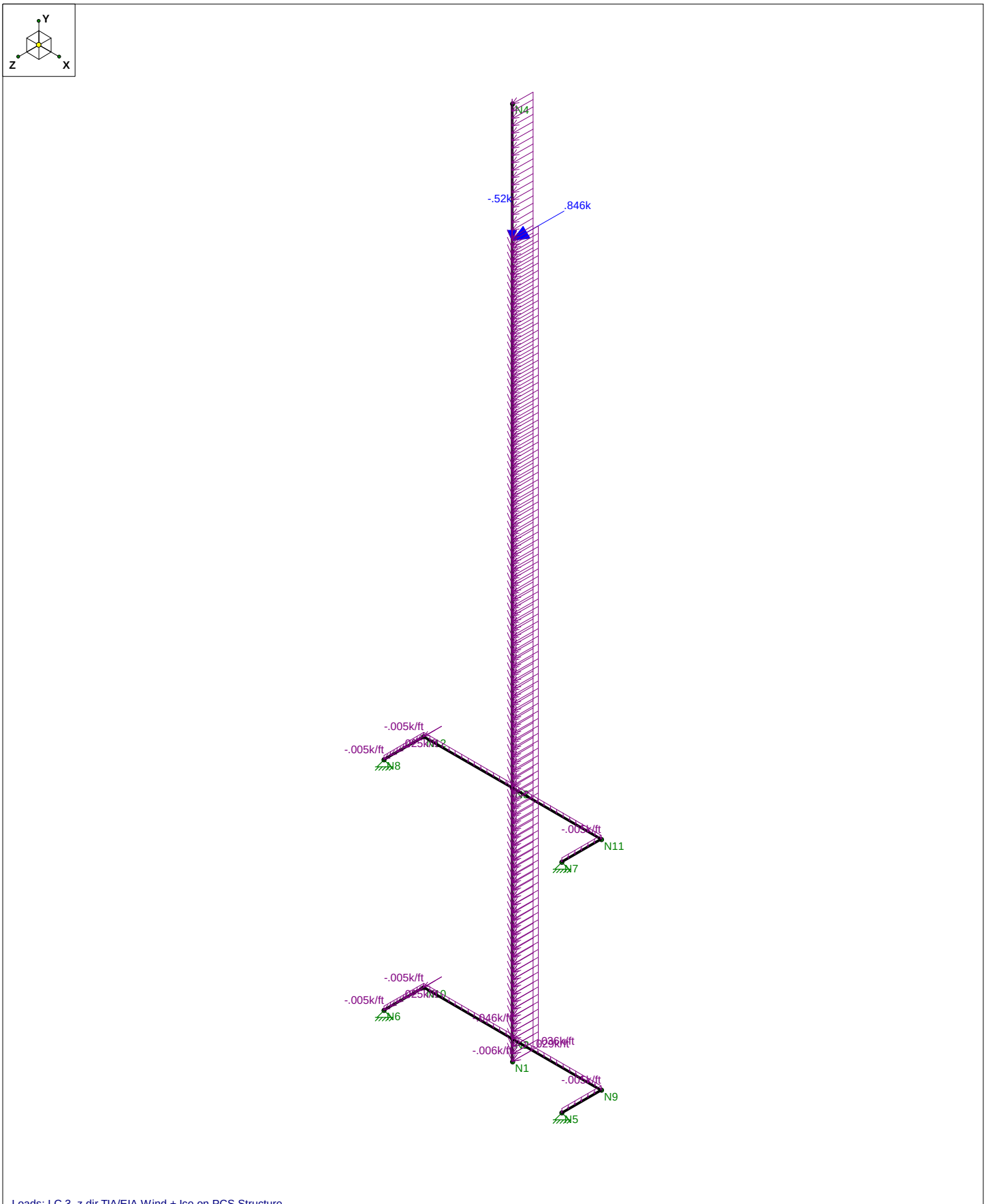

Loads: LC 3, z-dir TIA/EIA Wind + Ice on PCS Structure

CENTEK Engineering, INC.		
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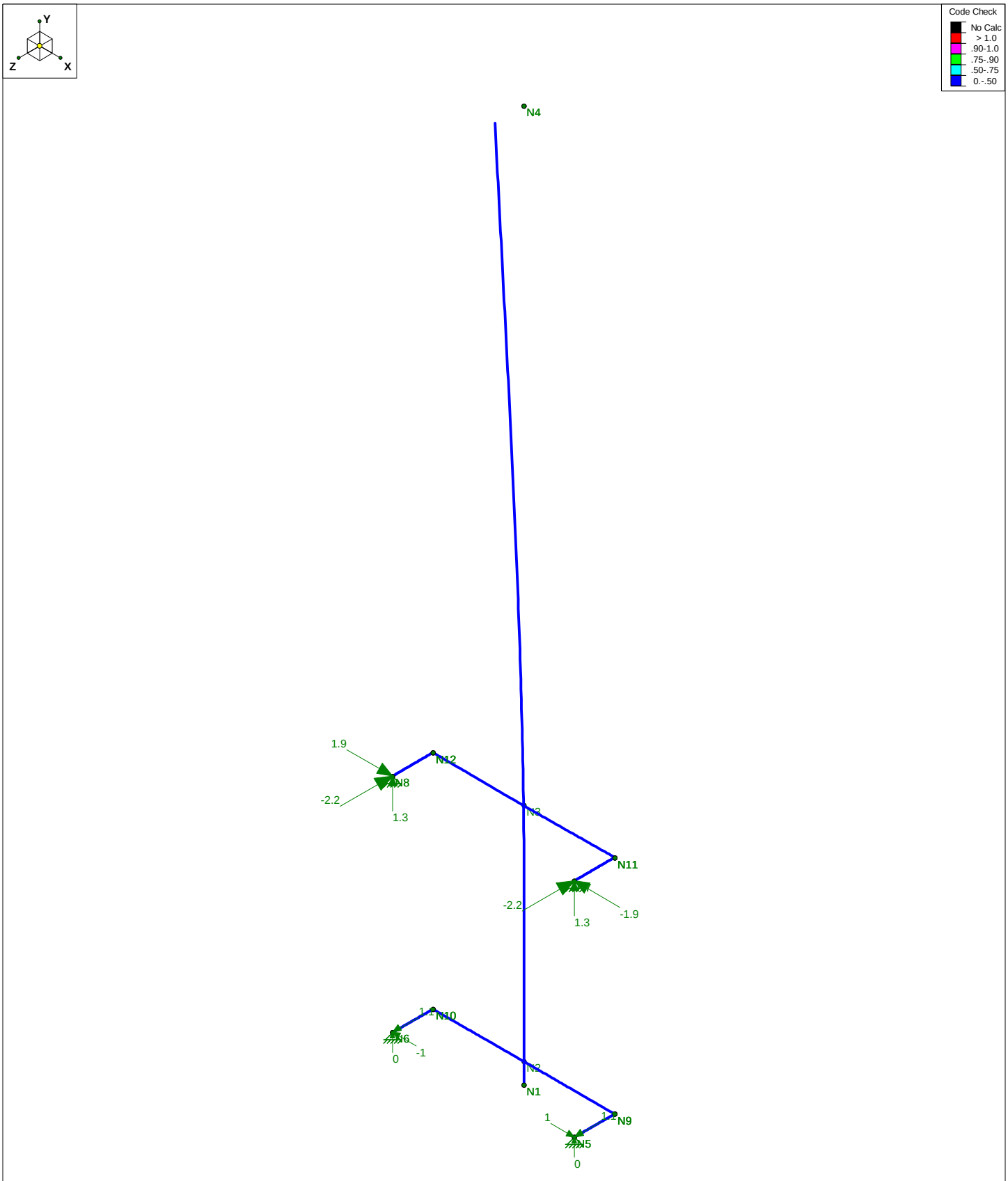
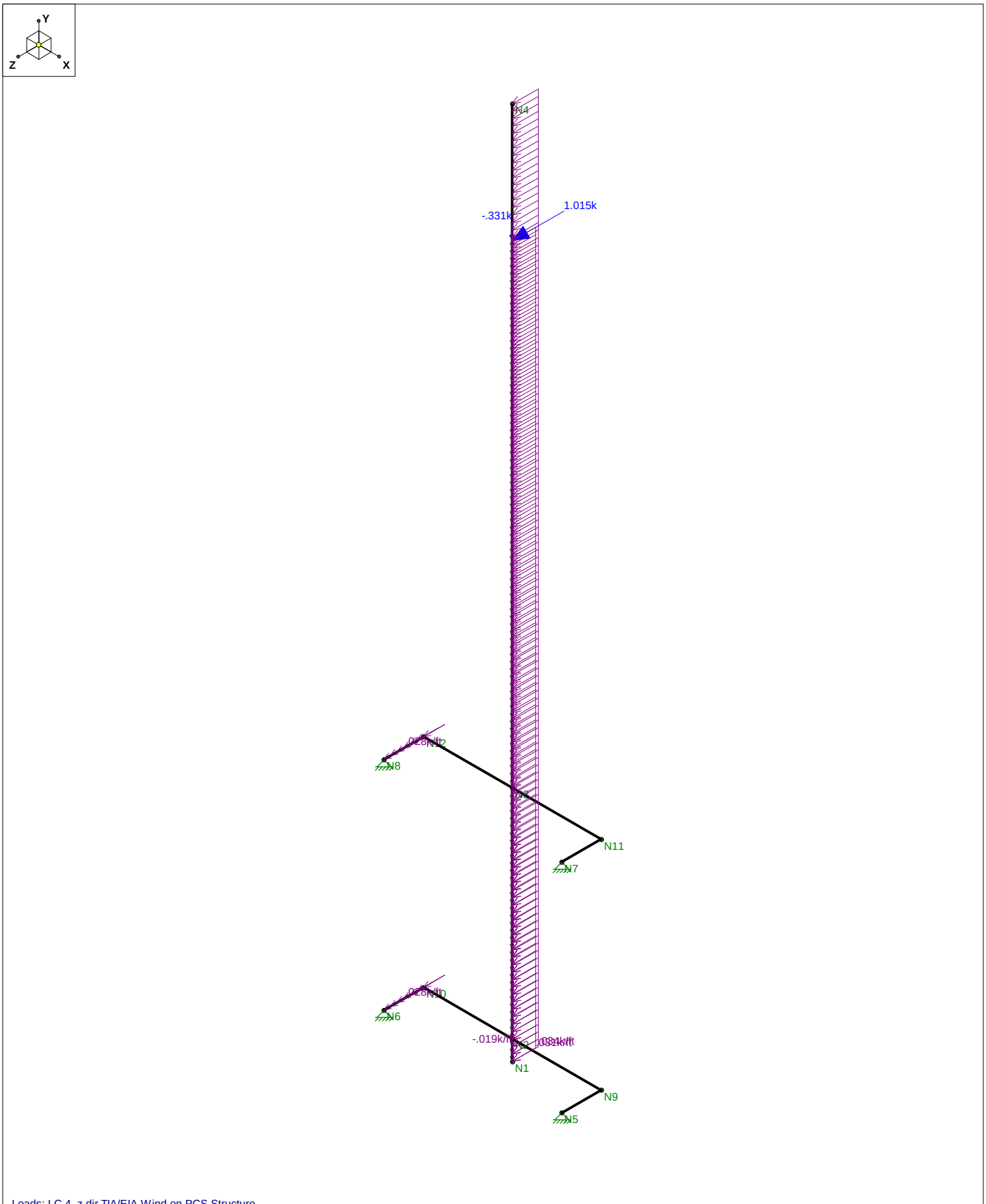
12047.CO12 - CT43XC837	LC #3 Loads	TIA-EIA.r3d



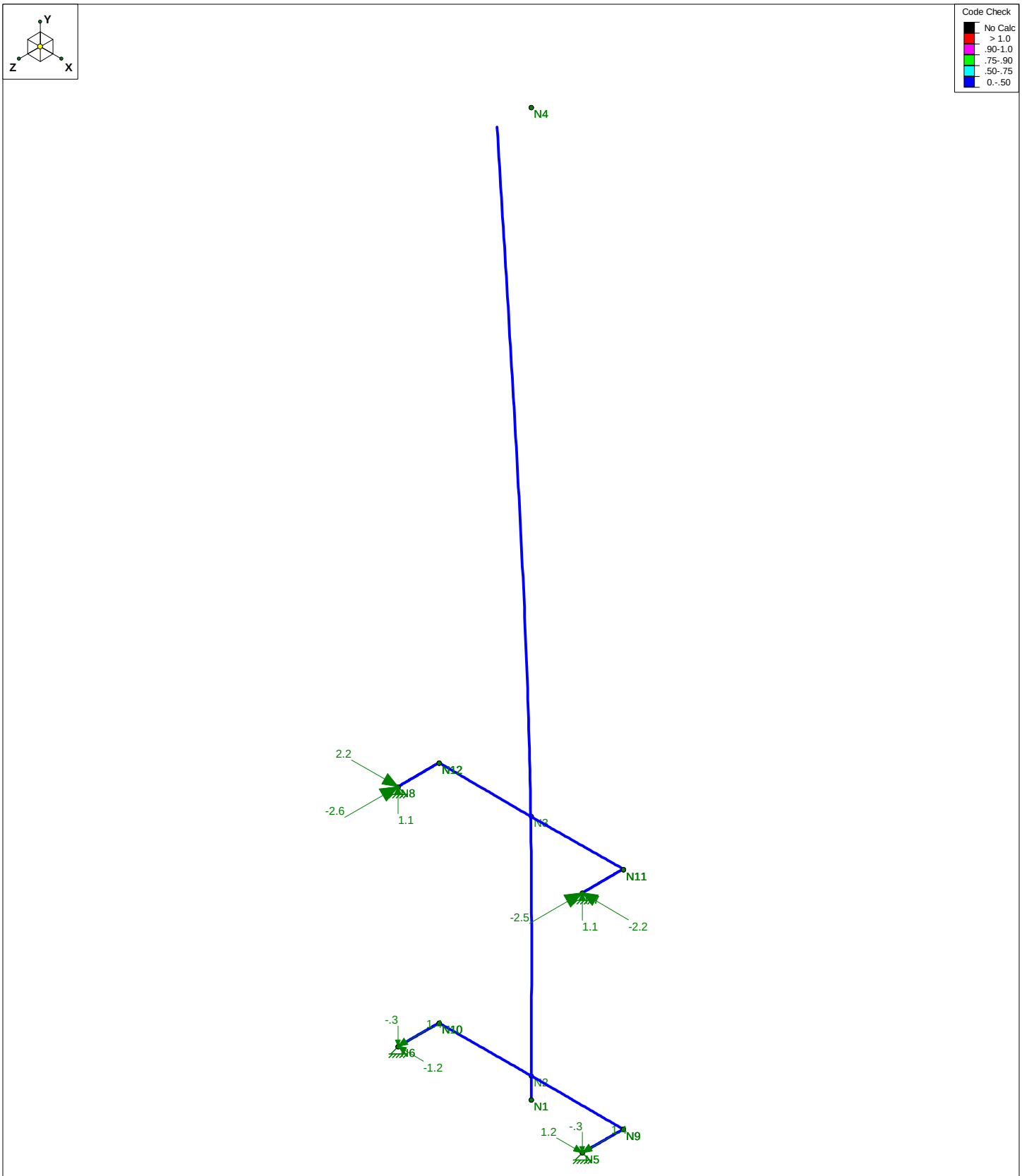
Results for LC 3, z-dir TIA/EIA Wind + Ice on PCS Structure
Z-direction Reaction units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	CL&P Tower # 280 - PCS Mast	Mar 6, 2013 at 6:36 PM
12047.CO12 - CT43XC837	LC # 3 Reactions and Deflected Shape	TIA-EIA.r3d



Loads: LC 4, z-dir TIA/EIA Wind on PCS Structure

CENTEK Engineering, INC.		
tjl, cfc	CL&P Tower # 280 - PCS Mast	Mar 6, 2013 at 6:34 PM
12047.CO12 - CT43XC837	LC #4 Loads	TIA-EIA.r3d



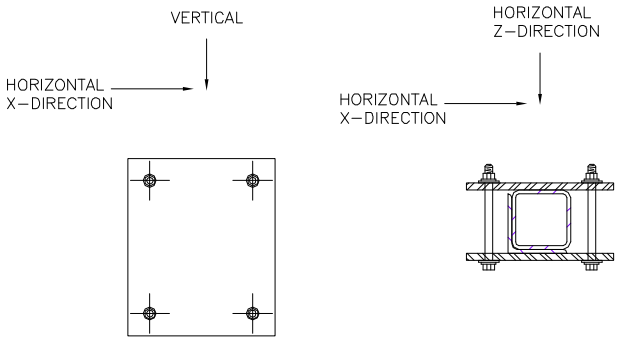
Results for LC 4, z-dir TIA/EIA Wind on PCS Structure
Z-direction Reaction units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	CL&P Tower # 280 - PCS Mast	Mar 6, 2013 at 6:36 PM
12047.CO12 - CT43XC837	LC # 4 Reactions and Deflected Shape	TIA-EIA.r3d

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	Connection of Mast to CL&P Tower # 280
Location:	Stratford, CT
Rev. 0: 3/7/13	Prepared by: T.J.L. Checked by: C.F.C. Job No. 12047.CO12

Mast Connection to CL&P Tower:



Reactions:

Moment = $Moment := 0 \cdot kips$ (Input From Risa-3D LC #4)

Vertical = $Vertical := 1.14 \cdot kips$ (Input From Risa-3D LC #4)

Horizontal x-dir = $Horizontal_x := 2.23 \cdot kips$ (Input From Risa-3D LC #4)

Horizontal z-dir = $Horizontal_z := 2.57 \cdot kips$ (Input From Risa-3D LC #4)

Bolt Data:

Bolt Type = ASTM A325 (User Input)

Bolt Diameter = $D := 0.5 \cdot in$ (User Input)

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

Allowable Tensile Strength = $F_t := 8.82 \cdot kips$ (User Input)

Allowable Shear Strength (Slip-Critical Bolt) = $F_v := 2.7 \cdot kips$ (User Input)

Shear Force = $f_v := \frac{\sqrt{Horizontal_z^2 + Vertical^2}}{N_b} = 0.7 \cdot kips$

Bolt Shear % of Capacity = $\frac{f_v}{F_v} = 26.03 \cdot \%$

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

$Bolt\_Shear = "OK"$

Tension Force = $f_t := \frac{Horizontal_x}{N_b} = 0.6 \cdot kips$

Bolt Tenison % of Capacity = $\frac{f_t}{F_t} = 6.32 \cdot \%$

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

$Bolt\_Tension = "OK"$

CENTEK engineering
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Subject: Load Analysis of PCS Mast on CL&P Tower #280

Location: Stratford, CT

Rev. 0: 3/4/13

Prepared by: T.J.L Checked by: C.F.C.
Job No. 12047.CO12

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 := 85	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 = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.223$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.32$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.873$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.884$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 33.5$ 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 PCS Mast on CL&P Tower #280
Location:	Stratford, CT
Rev. 0: 3/4/13	Prepared by: T.J.L Checked by: C.F.C. Job No. 12047.CO12

Development of Wind & Ice Load on PCS Mast

PCS Mast Data: (Pipe 8" SCH. 80)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 8.63$	in	(User Input)
Mast Length =	$L_{mast} := 21$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.5$	in	(User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.719$ sf/ft

Total Mast Wind Force (Above NU Structure) =	$qz \cdot Cd_R \cdot A_{mast} \cdot m = 39$	plf	**BLC 5**
Total Mast Wind Force (Below NU Structure) =	$qz \cdot Cd_R \cdot A_{mast} = 31$	plf	**BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.803$ sf/ft

Total Mast Wind Force w/ Ice =	$p \cdot Cd_R \cdot AICE_{mast} = 4$	plf	**BLC 4**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2\right] = 14.3$ sq in

Weight of Ice on Mast =	$W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 6$	plf	**BLC 3**

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Location:	Stratford, CT
Rev. 0: 3/4/13	Prepared by: T.J.L Checked by: C.F.C. Job No. 12047.CO12

Development of Wind & Ice Load on Antennas

Antenna Data: (Sprint)

Antenna Model =	RFS APXVSPP18-C		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72$	in	(User Input)
Antenna Width =	$W_{ant} := 11.8$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 57$	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 =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.9$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 17.7$	sf	
Total Antenna Wind Force =	$F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1186$	lbs	**BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.5$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19.5$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 125$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 171$	lbs	**BLC 2**

Gravity Load (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5947$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1528$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 50$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 149$	lbs	**BLC 3**

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Development of Wind & Ice Load on Mounts

Mount Data: (Sprint)

Mount Type = Tri-Sector Chain Mount

Platform Shape = Flat (User Input)

Mount Weight = $WT_{mnt} := 160$ lbs (User Input)

Mount Weight w/ Ice = $WT_{mnt.ice} := 200$ lbs (User Input)

Wind Load (NESC Extreme)

Total Platform Wind Force = $F_{plt} := 0$ (Mount Shielded by Antennas) lbs **BLC 5**

Wind Load (NESC Heavy)

Total Platform Wind Force w/ Ice = $Fi_{plt} := 0$ (Mount Shielded by Antennas) lbs **BLC 4**

Gravity Load (without ice)

Weight of Platform = $WT_{mnt} = 160$ lbs **BLC 2**

Gravity Loads (ice only)

Weight of Ice on Platform = $WT_{mnt.ice} - WT_{mnt} = 40$ lbs **BLC 3**

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Subject:	Load Analysis of PCS Mast on CL&P Tower #280
Location:	Stratford, CT
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Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 18$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 18$		(User Input)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 4$		(User Input)

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.7$ sf/ft

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 40$ plf **BLC 5**

Total Coax Wind Force (Below NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 32$ plf **BLC 5**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{NP_{coax} \cdot (D_{coax} + 2 \cdot Ir)}{12} = 1$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 6$ plf **BLC 4**

Gravity Loads (without ice)

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

Gravity Load (ice only)

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

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 27$ plf **BLC 3**

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Subject:	Load Analysis of PCS Mast on CL&P Tower #280
Location:	Stratford, CT
Rev. 0: 3/4/13	Prepared by: T.J.L Checked by: C.F.C. Job No. 12047.CO12

Development of Wind & Ice Load on Brace Member

Member Data: HSS6x6x1/4

Shape =	Flat		(User Input)
Width =	$W_{mem} := 6$	in	(User Input)
Length =	$L_{mem} := 4.5$	ft	(User Input)
Height =	$H_{mem} := 6$	in	(User Input)

Wind Load (NESC Extreme)

Member Projected Surface Area = $A_{mem} := \frac{W_{mem}}{12} = 0.5$

Total Member Wind Force = $qz \cdot Cd_F \cdot A_{mem} = 27$ plf **BLC 5**

Wind Load (NESE Heavy)

Member Projected Surface Area w/ Ice = $AICE_{mem} := \frac{(W_{mem} + 2 \cdot Ir)}{12} = 0.583$

Total Member Wind Force w/ Ice = $p \cdot Cd_F \cdot AICE_{mem} = 4$ plf **BLC 4**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mem} := (W_{mem} + 2 \cdot Ir) \cdot (H_{mem} + 2 \cdot Ir) - W_{mem} \cdot H_{mem} = 13$ sq in

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

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Subject: **Analysis of NESC Heavy Wind and NESC Extreme Wind for Obtaining PCS Structure Reactions Applied to CL&P Tower Tabulated Load Cases**

Location: **Stratford, CT**

Date:3/4/13 Prepared by: T.J.L. Checked by: C.F.C. Job No. 12047.CO12

Load Case	Description
1	Self Weight (PCS Mast)
2	Weight of Appurtenances
3	Weight of Ice Only on PCS Structure (1)
4	NESC Heavy Wind on PCS Structure(1)
5	NESC Extreme Wind on PCS Structure(1)

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

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Subject: **Analysis of NESC Heavy Wind and NESC Extreme Wind for Obtaining PCS Structure Reactions Applied to CL&P Pole Load Combinations Table**

Location: **Stratford, CT**

Date: 3/4/13 Prepared by: T.J.L. Checked by: C.F.C. Job No. 12047.CO12

Load Combination	Description	Envelope Soultion	Wind Factor	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	NESC Heavy Wind on PCS Structure		1		1	1.5	2	1.5	3	1.5	4	2.5		
2	NESC Extreme Wind on PCS Structure		1		1	1	2	1	5	1				

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

Global

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation	Yes
Include Warping	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Vertical Axis	Y
Global Member Orientation Plane	XZ

Hot Rolled Steel Code	AISC 9th: 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 530-05/08: ASD
Aluminum Code	AA ADM1-05: ASD

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

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ct Exp. X	.75
Ct Exp. Z	.75
Ca	.36
Cv	.54
Nv	1
SD1	1
SDS	1
S1	1
Occupancy Code	4
Seismic Zone	3
Use Group	I
Use Gravity Self Wt in Diaphragm Mass	Yes
Use Deck Self Wt in Diaphragm Mass	Yes
Use Lateral Self Wt in Diaphragm Mass	Yes
Seismic Detailing Code	None
Om X	1
Om Z	1
Rho X	1
Rho Z	1

Company : CENTEK Engineering, Inc.
Designer : tjl, cfc
Job Number : 12047.CO12 - CT43XC837 CL&P Tower # 280 - PCS Mast

Mar 6, 2013
6:39 PM
Checked By:_____

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	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	Lengt...	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	Kyy	Kzz	Cm-...	Cm-...	Cb	y sw...	z sw...	Function
1	M1	Mast	21												Lateral
2	M2	Brace	1												Lateral
3	M3	Brace	4.5												Lateral
4	M4	Brace	1												Lateral
5	M5	Brace	1												Lateral
6	M6	Brace	4.5												Lateral
7	M7	Brace	1												Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	PIPE 8.0X	Beam	Pipe	A53 Gr. B	Typical	11.9	100	100	199
2	Brace	HSS6X6X4	Beam	Tube	A500 Gr.46	Typical	5.225	28.569	28.569	45.507

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N4			Mast	Beam	Pipe	A53 Gr. B	Typical
2	M2	N8	N12			Brace	Beam	Tube	A500 Gr.46	Typical
3	M3	N12	N11			Brace	Beam	Tube	A500 Gr.46	Typical
4	M4	N11	N7			Brace	Beam	Tube	A500 Gr.46	Typical
5	M5	N6	N10			Brace	Beam	Tube	A500 Gr.46	Typical
6	M6	N10	N9			Brace	Beam	Tube	A500 Gr.46	Typical
7	M7	N9	N5			Brace	Beam	Tube	A500 Gr.46	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	.5	0	0	
3	N3	0	6	0	0	
4	N4	0	21	0	0	
5	N5	2.25	.5	1	0	
6	N6	-2.25	.5	1	0	
7	N7	2.25	6	1	0	
8	N8	-2.25	6	1	0	
9	N9	2.25	.5	0	0	
10	N10	-2.25	.5	0	0	
11	N11	2.25	6	0	0	
12	N12	-2.25	6	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]	Footing
1	N8	Reaction	Reaction	Reaction				
2	N7	Reaction	Reaction	Reaction				
3	N5	Reaction	Reaction	Reaction				
4	N6	Reaction	Reaction	Reaction				

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 Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.171	18
2	M1	Y	-.16	18

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.149	18
2	M1	Y	-.04	18

Member Point Loads (BLC 4 : x-dir NESC Heavy Wind on PCS Str)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.125	18

Member Point Loads (BLC 5 : x-dir NESC Extreme Wind on PCS S)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	1.186	18

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.019	-.019	0	18

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

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.006	-.006	0	0
2	M1	Y	-.027	-.027	0	18
3	M2	Y	-.005	-.005	0	0
4	M3	Y	-.005	-.005	0	0
5	M4	Y	-.005	-.005	0	0
6	M6	Y	-.005	-.005	0	0
7	M5	Y	-.005	-.005	0	0
8	M7	Y	-.005	-.005	0	0

Member Distributed Loads (BLC 4 : x-dir NESC Heavy Wind on PCS Str)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.004	.004	0	0

Member Distributed Loads (BLC 4 : x-dir NESC Heavy Wind on PCS Str) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
2	M1	X	.006	.006	0	18
3	M2	X	.004	.004	0	0
4	M5	X	.004	.004	0	0

Member Distributed Loads (BLC 5 : x-dir NESC Extreme Wind on PCS S)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.031	.031	0	11
2	M1	X	.039	.039	11	0
3	M1	X	.032	.032	0	11
4	M1	X	.04	.04	11	18
5	M2	X	.027	.027	0	0
6	M5	X	.027	.027	0	0

Basic Load Cases

	BLC Description	Category	X Gr...	Y Gr...	Z Grav...	Joint	Point	Distri...	Area(...	Surfa...
1	Self Weight (PCS Mast)	None		-1						
2	Weight of Appurtenances	None					2	1		
3	Weight of Ice Only on PCS Struct	None					2	8		
4	x-dir NESC Heavy Wind on PCS Str	None					1	4		
5	x-dir NESC Extreme Wind on PCS S	None					1	6		

Load Combinations

	Description	So...	PDelta	SRSS	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	x-dir NESC Heavy Wind on P...	Yes			1	1.5	2	1.5	3	1.5	4	2.5								
2	x-dir NESC Extreme Wind on...	Yes			1	1	2	1	5	1										
3	Self Weight				1	1														

Envelope Member Section Forces

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
1	M1	1	max	0	1	0	1	0	1	0	1	0	1	0	1
2			min	0	1	0	1	0	1	0	1	0	1	0	1
3		2	max	1.003	1	-.765	1	-.313	2	-.096	1	-.63	2	10.595	2
4			min	.444	2	-2.689	2	-.702	1	-.34	2	-1.416	1	2.956	1
5		3	max	2.03	1	1.888	2	0	1	0	1	0	1	12.168	2
6			min	.899	2	.53	1	0	1	0	1	0	1	3.317	1
7		4	max	1.301	1	1.481	2	0	1	0	1	0	1	3.307	2
8			min	.586	2	.399	1	0	1	0	1	0	1	.879	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	-.691	1	.451	1	-1.029	1	0	1	0	1	0	1
12			min	-1.325	2	-1.485	2	-2.611	2	0	1	0	1	0	1
13		2	max	-.691	1	.443	1	-1.027	1	0	1	-.257	1	.372	2
14			min	-1.325	2	-1.49	2	-2.604	2	0	1	-.652	2	-.112	1
15		3	max	-.691	1	.434	1	-1.024	1	0	1	-.513	1	.745	2
16			min	-1.325	2	-1.494	2	-2.598	2	0	1	-1.302	2	-.221	1
17		4	max	-.691	1	.425	1	-1.022	1	0	1	-.769	1	1.119	2
18			min	-1.325	2	-1.499	2	-2.591	2	0	1	-1.951	2	-.329	1
19		5	max	-.691	1	.417	1	-1.019	1	0	1	-1.024	1	1.494	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
20			min	-1.325	2	-1.503	2	-2.584	2	0	1	-2.598	2	-.434	1
21	M3	1	max	-1.019	1	.417	1	1.325	2	1.494	2	-1.024	1	0	1
22			min	-2.584	2	-1.503	2	.691	1	-.434	1	-2.598	2	0	1
23		2	max	-1.019	1	.378	1	1.325	2	1.494	2	-.247	1	1.702	2
24			min	-2.584	2	-1.523	2	.691	1	-.434	1	-1.107	2	-.447	1
25		3	max	-1.019	1	-1.415	1	1.325	2	2.359	2	.53	1	-3.27	1
26			min	-2.584	2	-2.31	2	.691	1	1.509	1	.384	2	-5.242	2
27		4	max	2.323	2	-1.453	1	1.013	2	2.359	2	1.184	2	-1.657	1
28			min	.408	1	-2.33	2	-.012	1	1.509	1	.421	1	-2.632	2
29		5	max	2.323	2	-1.492	1	1.013	2	2.359	2	2.323	2	0	1
30			min	.408	1	-2.35	2	-.012	1	1.509	1	.408	1	0	1
31	M4	1	max	1.013	2	-1.492	1	-.408	1	0	1	2.323	2	-1.509	1
32			min	-.012	1	-2.35	2	-2.323	2	0	1	.408	1	-2.359	2
33		2	max	1.013	2	-1.5	1	-.408	1	0	1	1.743	2	-1.135	1
34			min	-.012	1	-2.354	2	-2.323	2	0	1	.306	1	-1.771	2
35		3	max	1.013	2	-1.509	1	-.408	1	0	1	1.162	2	-.759	1
36			min	-.012	1	-2.359	2	-2.323	2	0	1	.204	1	-1.182	2
37		4	max	1.013	2	-1.517	1	-.408	1	0	1	.581	2	-.38	1
38			min	-.012	1	-2.363	2	-2.323	2	0	1	.102	1	-.591	2
39		5	max	1.013	2	-1.526	1	-.408	1	0	1	0	1	0	1
40			min	-.012	1	-2.368	2	-2.323	2	0	1	0	1	0	1
41	M5	1	max	.753	2	1.066	1	1.296	2	0	1	0	1	0	1
42			min	.512	1	.764	2	.618	1	0	1	0	1	0	1
43		2	max	.753	2	1.057	1	1.303	2	0	1	.325	2	-.19	2
44			min	.512	1	.76	2	.62	1	0	1	.155	1	-.265	1
45		3	max	.753	2	1.049	1	1.31	2	0	1	.651	2	-.38	2
46			min	.512	1	.755	2	.623	1	0	1	.31	1	-.529	1
47		4	max	.753	2	1.04	1	1.316	2	0	1	.98	2	-.568	2
48			min	.512	1	.751	2	.625	1	0	1	.466	1	-.79	1
49		5	max	.753	2	1.032	1	1.323	2	0	1	1.31	2	-.755	2
50			min	.512	1	.746	2	.628	1	0	1	.623	1	-1.049	1
51	M6	1	max	1.323	2	1.032	1	-.512	1	-.755	2	1.31	2	0	1
52			min	.628	1	.746	2	-.753	2	-1.049	1	.623	1	0	1
53		2	max	1.323	2	.993	1	-.512	1	-.755	2	.463	2	-.828	2
54			min	.628	1	.726	2	-.753	2	-1.049	1	.046	1	-1.139	1
55		3	max	1.323	2	.955	1	-.512	1	-.755	2	-.384	2	-1.634	2
56			min	.628	1	.706	2	-.753	2	-1.049	1	-.53	1	-2.235	1
57		4	max	-.006	1	-.07	2	.19	1	.871	1	-.22	1	-.09	2
58			min	-1.035	2	-.815	1	-.44	2	.099	2	-.54	2	-.939	1
59		5	max	-.006	1	-.09	2	.19	1	.871	1	-.006	1	0	1
60			min	-1.035	2	-.854	1	-.44	2	.099	2	-1.035	2	0	1
61	M7	1	max	.19	1	-.09	2	1.035	2	0	1	-.006	1	-.099	2
62			min	-.44	2	-.854	1	.006	1	0	1	-1.035	2	-.871	1
63		2	max	.19	1	-.095	2	1.035	2	0	1	-.005	1	-.076	2
64			min	-.44	2	-.862	1	.006	1	0	1	-.777	2	-.656	1
65		3	max	.19	1	-.099	2	1.035	2	0	1	-.003	1	-.052	2
66			min	-.44	2	-.871	1	.006	1	0	1	-.518	2	-.44	1
67		4	max	.19	1	-.103	2	1.035	2	0	1	-.002	1	-.026	2
68			min	-.44	2	-.879	1	.006	1	0	1	-.259	2	-.221	1
69		5	max	.19	1	-.108	2	1.035	2	0	1	0	1	0	1
70			min	-.44	2	-.888	1	.006	1	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	0	1	0	1	0	1	0	1	0	1	0	1	0	1
2			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
3		2	max	.084	1	-.129	1	-.053	2	-1.53	1	5.483	2	-.326	2	.733	1
4			min	.037	2	-.452	2	-.118	1	-5.483	2	1.53	1	-.733	1	.326	2
5		3	max	.171	1	.317	2	0	1	-1.717	1	6.297	2	0	1	0	1
6			min	.076	2	.089	1	0	1	-6.297	2	1.717	1	0	1	0	1
7		4	max	.109	1	.249	2	0	1	-.455	1	1.712	2	0	1	0	1
8			min	.049	2	.067	1	0	1	-1.712	2	.455	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	-.132	1	.162	1	-.369	1	0	1	0	1	0	1	0	1
12			min	-.254	2	-.532	2	-.936	2	0	1	0	1	0	1	0	1
13		2	max	-.132	1	.159	1	-.368	1	.141	1	.469	2	-.324	1	.822	2
14			min	-.254	2	-.534	2	-.934	2	-.469	2	-.141	1	-.822	2	.324	1
15		3	max	-.132	1	.156	1	-.367	1	.279	1	.939	2	-.647	1	1.641	2
16			min	-.254	2	-.536	2	-.931	2	-.939	2	-.279	1	-1.641	2	.647	1
17		4	max	-.132	1	.152	1	-.366	1	.414	1	1.41	2	-.969	1	2.458	2
18			min	-.254	2	-.537	2	-.929	2	-1.41	2	-.414	1	-2.458	2	.969	1
19		5	max	-.132	1	.149	1	-.365	1	.547	1	1.883	2	-1.29	1	3.273	2
20			min	-.254	2	-.539	2	-.926	2	-1.883	2	-.547	1	-3.273	2	1.29	1
21	M3	1	max	-.195	1	.149	1	.475	2	0	1	0	1	-1.29	1	3.273	2
22			min	-.495	2	-.539	2	.248	1	0	1	0	1	-3.273	2	1.29	1
23		2	max	-.195	1	.136	1	.475	2	.564	1	2.145	2	-.311	1	1.394	2
24			min	-.495	2	-.546	2	.248	1	-2.145	2	-.564	1	-1.394	2	.311	1
25		3	max	-.195	1	-.507	1	.475	2	6.606	2	-4.121	1	.668	1	-.484	2
26			min	-.495	2	-.828	2	.248	1	4.121	1	-6.606	2	.484	2	-.668	1
27		4	max	.445	2	-.521	1	.363	2	3.317	2	-2.087	1	1.492	2	-.53	1
28			min	.078	1	-.835	2	-.004	1	2.087	1	-3.317	2	.53	1	-1.492	2
29		5	max	.445	2	-.535	1	.363	2	0	1	0	1	2.928	2	-.514	1
30			min	.078	1	-.842	2	-.004	1	0	1	0	1	.514	1	-2.928	2
31	M4	1	max	.194	2	-.535	1	-.146	1	2.972	2	-1.901	1	2.928	2	-.514	1
32			min	-.002	1	-.842	2	-.833	2	1.901	1	-2.972	2	.514	1	-2.928	2
33		2	max	.194	2	-.538	1	-.146	1	2.231	2	-1.43	1	2.196	2	-.385	1
34			min	-.002	1	-.844	2	-.833	2	1.43	1	-2.231	2	.385	1	-2.196	2
35		3	max	.194	2	-.541	1	-.146	1	1.489	2	-.956	1	1.464	2	-.257	1
36			min	-.002	1	-.845	2	-.833	2	.956	1	-1.489	2	.257	1	-1.464	2
37		4	max	.194	2	-.544	1	-.146	1	.745	2	-.479	1	.732	2	-.128	1
38			min	-.002	1	-.847	2	-.833	2	.479	1	-.745	2	.128	1	-.732	2
39		5	max	.194	2	-.547	1	-.146	1	0	1	0	1	0	1	0	1
40			min	-.002	1	-.849	2	-.833	2	0	1	0	1	0	1	0	1
41	M5	1	max	.144	2	.382	1	.465	2	0	1	0	1	0	1	0	1
42			min	.098	1	.274	2	.221	1	0	1	0	1	0	1	0	1
43		2	max	.144	2	.379	1	.467	2	.334	1	-.24	2	.409	2	-.195	1
44			min	.098	1	.272	2	.222	1	.24	2	-.334	1	.195	1	-.409	2
45		3	max	.144	2	.376	1	.469	2	.666	1	-.479	2	.821	2	-.391	1
46			min	.098	1	.271	2	.223	1	.479	2	-.666	1	.391	1	-.821	2
47		4	max	.144	2	.373	1	.472	2	.995	1	-.716	2	1.235	2	-.587	1
48			min	.098	1	.269	2	.224	1	.716	2	-.995	1	.587	1	-1.235	2
49		5	max	.144	2	.37	1	.474	2	1.322	1	-.952	2	1.65	2	-.785	1
50			min	.098	1	.268	2	.225	1	.952	2	-1.322	1	.785	1	-1.65	2
51	M6	1	max	.253	2	.37	1	-.184	1	0	1	0	1	1.65	2	-.785	1
52			min	.12	1	.268	2	-.27	2	0	1	0	1	.785	1	-1.65	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
53		2	max	.253	2	.356	1	-.184	1	1.435	1	-1.044	2	.583	2	-.058	1
54			min	.12	1	.26	2	-.27	2	1.044	2	-1.435	1	.058	1	-.583	2
55		3	max	.253	2	.342	1	-.184	1	2.816	1	-2.06	2	-.484	2	.668	1
56			min	.12	1	.253	2	-.27	2	2.06	2	-2.816	1	-.668	1	.484	2
57		4	max	-.001	1	-.025	2	.068	1	1.183	1	-.114	2	-.277	1	.68	2
58			min	-.198	2	-.292	1	-.158	2	.114	2	-1.183	1	-.68	2	.277	1
59		5	max	-.001	1	-.032	2	.068	1	0	1	0	1	-.008	1	1.305	2
60			min	-.198	2	-.306	1	-.158	2	0	1	0	1	-1.305	2	.008	1
61	M7	1	max	.036	1	-.032	2	.371	2	1.097	1	-.125	2	-.008	1	1.305	2
62			min	-.084	2	-.306	1	.002	1	.125	2	-1.097	1	-1.305	2	.008	1
63		2	max	.036	1	-.034	2	.371	2	.827	1	-.096	2	-.006	1	.979	2
64			min	-.084	2	-.309	1	.002	1	.096	2	-.827	1	-.979	2	.006	1
65		3	max	.036	1	-.035	2	.371	2	.554	1	-.065	2	-.004	1	.652	2
66			min	-.084	2	-.312	1	.002	1	.065	2	-.554	1	-.652	2	.004	1
67		4	max	.036	1	-.037	2	.371	2	.278	1	-.033	2	-.002	1	.326	2
68			min	-.084	2	-.315	1	.002	1	.033	2	-.278	1	-.326	2	.002	1
69		5	max	.036	1	-.039	2	.371	2	0	1	0	1	0	1	0	1
70			min	-.084	2	-.318	1	.002	1	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	N8	max	-1.029	1	.451	1	1.325	2	0	1	0	1	0	1
2		min	-2.611	2	-1.485	2	.691	1	0	1	0	1	0	1
3	N7	max	-.408	1	2.368	2	.012	1	0	1	0	1	0	1
4		min	-2.323	2	1.526	1	-1.013	2	0	1	0	1	0	1
5	N5	max	1.035	2	.888	1	.44	2	0	1	0	1	0	1
6		min	.006	1	.108	2	-.19	1	0	1	0	1	0	1
7	N6	max	1.296	2	1.066	1	-.512	1	0	1	0	1	0	1
8		min	.618	1	.764	2	-.753	2	0	1	0	1	0	1
9	Totals:	max	-.813	1	3.931	1	0	2						
10		min	-2.603	2	1.754	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	1	-.008	2	.002	1	-6.354e-5	2	-7.721e-6	1	2.156e-4	2
2		min	-.002	2	-.018	1	.001	2	-1.428e-4	1	-3.023e-5	2	5.851e-5	1
3	N2	max	0	1	-.008	2	.002	1	-6.354e-5	2	-7.721e-6	1	2.155e-4	2
4		min	-.004	2	-.018	1	0	2	-1.428e-4	1	-3.023e-5	2	5.849e-5	1
5	N3	max	.008	2	-.008	2	0	2	-6.494e-5	2	9.112e-5	2	-3.529e-4	1
6		min	.002	1	-.019	1	-.002	1	-1.459e-4	1	2.669e-5	1	-1.265e-3	2
7	N4	max	1.026	2	-.009	2	-.012	2	-6.494e-5	2	9.112e-5	2	-1.964e-3	1
8		min	.283	1	-.019	1	-.028	1	-1.459e-4	1	2.669e-5	1	-7.15e-3	2
9	N5	max	0	1	0	2	0	1	-1.356e-4	2	2.709e-4	2	4.228e-4	1
10		min	0	2	0	1	0	2	-7.747e-4	1	7.885e-5	1	2.493e-4	2
11	N6	max	0	1	0	2	0	2	-6.116e-4	2	2.641e-4	2	-1.07e-4	2
12		min	0	2	0	1	0	1	-9.039e-4	1	6.438e-5	1	-3.842e-4	1
13	N7	max	0	2	0	1	0	2	-1.241e-3	1	-1.732e-4	1	2.921e-4	1
14		min	0	1	0	2	0	1	-1.776e-3	2	-5.738e-4	2	-2.372e-4	2
15	N8	max	0	2	0	2	0	1	1.019e-3	2	-1.59e-4	1	-5.251e-4	1
16		min	0	1	0	1	0	2	-4.612e-4	1	-5.678e-4	2	-5.98e-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
17	N9	max	0	1	-.002	2	0	1	-1.267e-4	2	1.809e-4	2	4.228e-4	1
18		min	-.003	2	-.009	1	0	2	-6.985e-4	1	7.83e-5	1	2.493e-4	2
19	N10	max	0	1	-.007	2	0	2	-5.457e-4	2	1.507e-4	2	-1.07e-4	2
20		min	-.003	2	-.011	1	0	1	-8.122e-4	1	1.041e-5	1	-3.842e-4	1
21	N11	max	.007	2	-.015	1	0	2	-1.109e-3	1	-1.378e-4	1	2.921e-4	1
22		min	.002	1	-.022	2	0	1	-1.571e-3	2	-3.719e-4	2	-2.372e-4	2
23	N12	max	.007	2	.012	2	0	1	8.889e-4	2	-6.99e-5	1	-5.251e-4	1
24		min	.002	1	-.006	1	0	2	-4.23e-4	1	-3.417e-4	2	-5.98e-4	2

Envelope AISC ASD Steel Code Checks

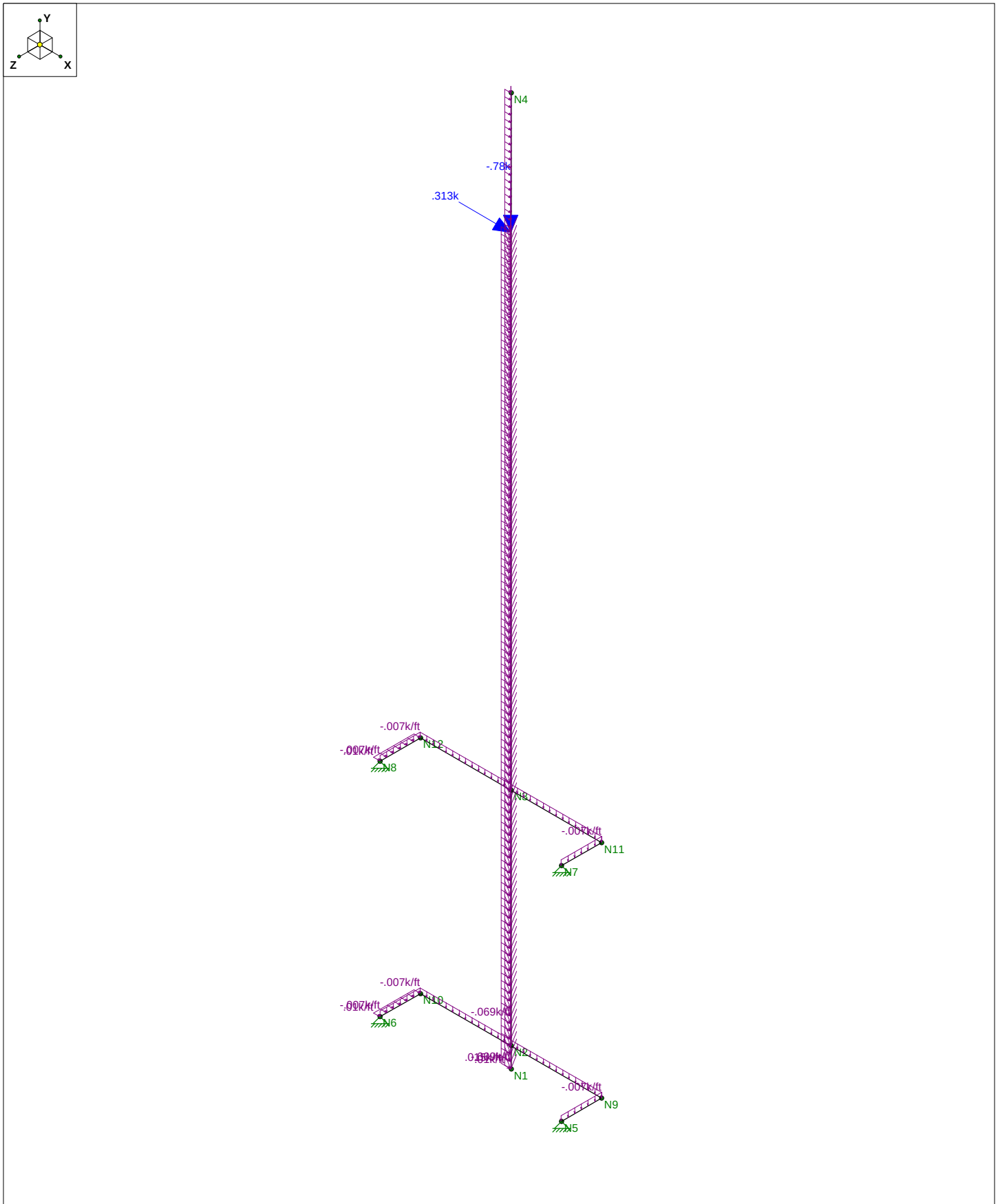
	Member	Shape	Code Check	Loc[ft]	LC	Sh...	Loc[ft]	...	Fa...	Ft [ksi]	Fb y-y [ksi]	Fb...	...	AS...
1	M1	PIPE_8...	.476	6.125	2	.039	5.906	2	14...	21	23.1	23.1	1 .6	H1...
2	M2	HSS6X...	.179	1	2	.051	0	z 2	27...	27.6	30.36	30...		H2...
3	M3	HSS6X...	.251	2.25	2	.145	4.5	y 2	25...	27.6	30.36	30...	1	H2...
4	M4	HSS6X...	.201	0	2	.046	1	y 2	27...	27.6	30.36	30...	.6	H1...
5	M5	HSS6X...	.091	1	2	.026	1	z 2	27...	27.6	30.36	30...		H1...
6	M6	HSS6X...	.119	2.25	1	.064	0	y 1	25...	27.6	30.36	30...	1	H1...
7	M7	HSS6X...	.050	0	2	.020	0	z 2	27...	27.6	30.36	30...	.6	H2...

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N8	-1.029	.451	.691	0	0	0
2	1	N7	-.408	1.526	.012	0	0	0
3	1	N5	.006	.888	-.19	0	0	0
4	1	N6	.618	1.066	-.512	0	0	0
5	1	Totals:	-.813	3.931	0			
6	1	COG (ft):	X: 0	Y: 10.695	Z: .017			

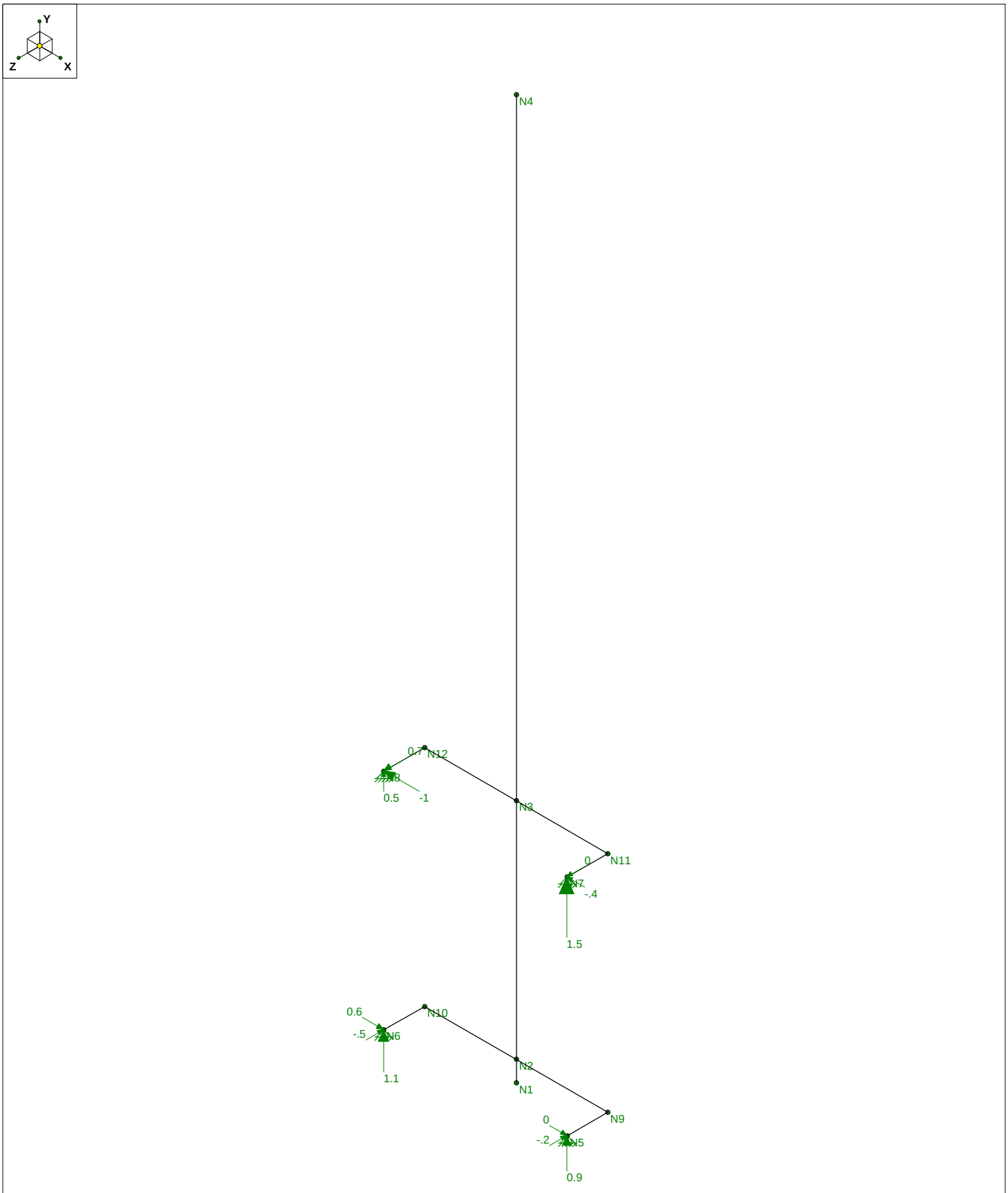
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N8	-2.611	-1.485	1.325	0	0	0
2	2	N7	-2.323	2.368	-1.013	0	0	0
3	2	N5	1.035	.108	.44	0	0	0
4	2	N6	1.296	.764	-.753	0	0	0
5	2	Totals:	-2.603	1.754	0			
6	2	COG (ft):	X: 0	Y: 10.668	Z: .02			



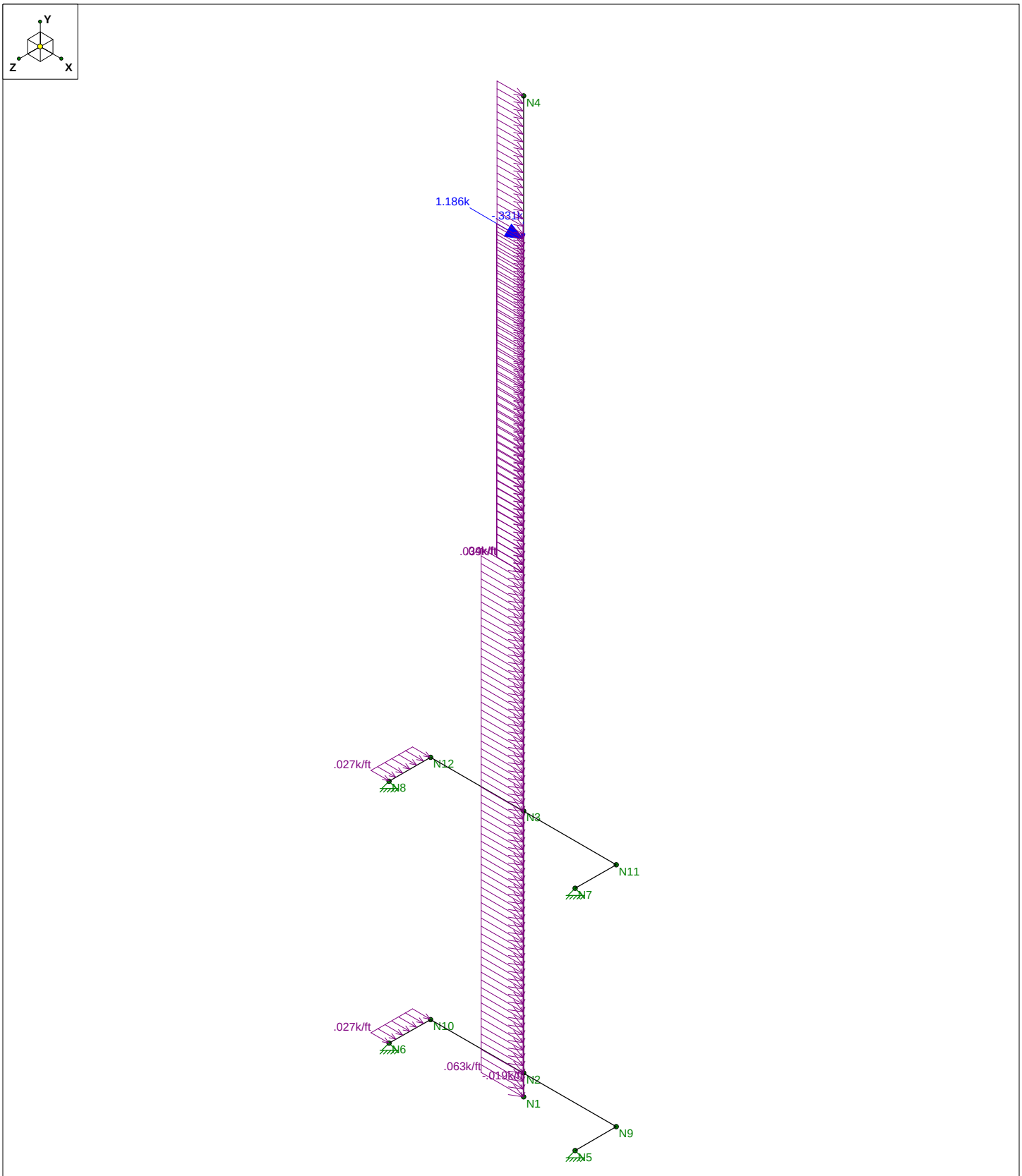
Loads: LC 1, x-dir NESC Heavy Wind on PCS Structure

CENTEK Engineering, Inc.		
tjl, cfc	CL&P Tower # 280 - PCS Mast	Mar 6, 2013 at 6:39 PM
12047.CO12 - CT43XC837	LC #1 Loads	NESC.r3d



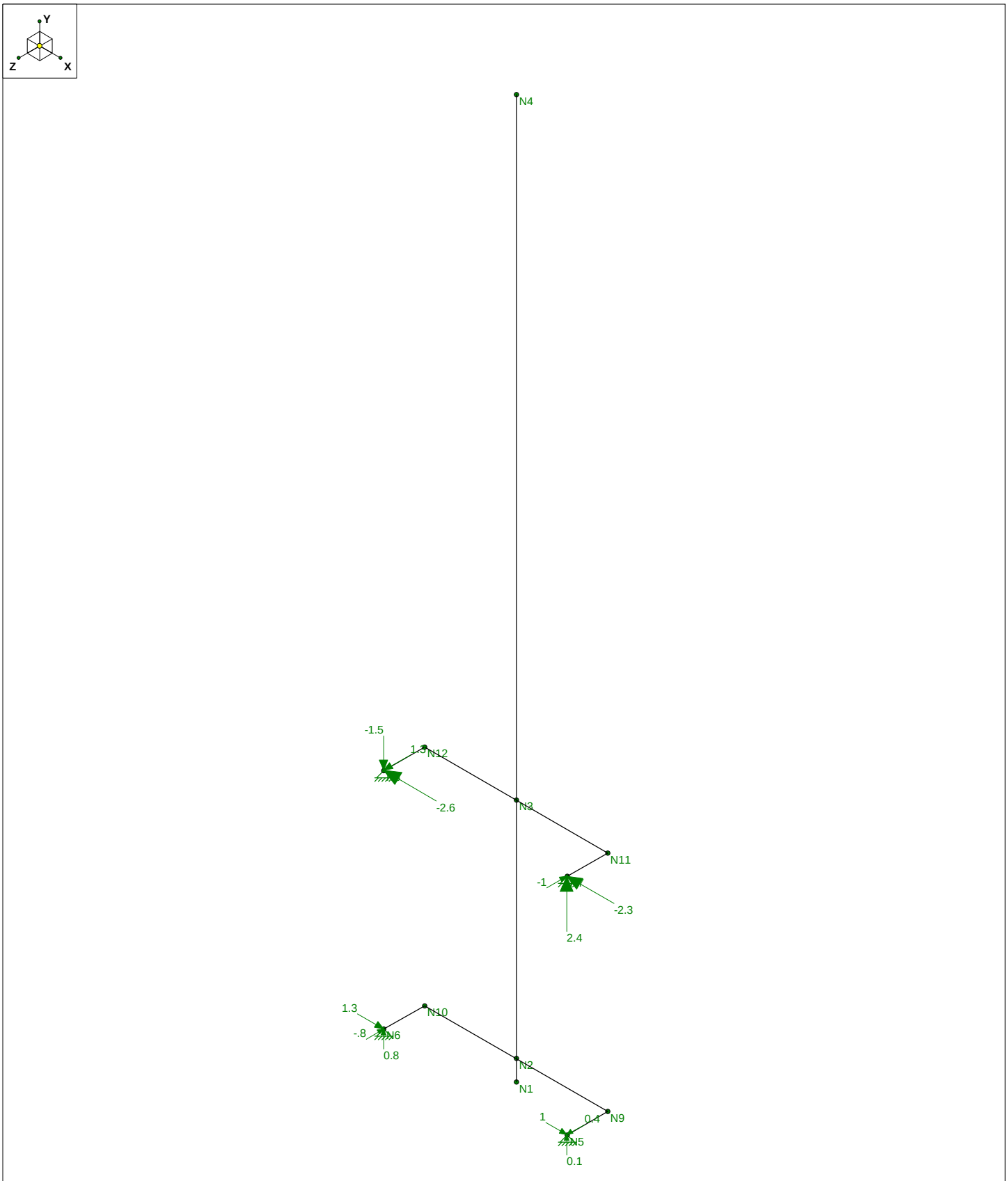
Results for LC 1, x-dir NESC Heavy Wind on PCS Structure
Z-direction Reaction units are k and k-ft

CENTEK Engineering, Inc.		
tjl, cfc	CL&P Tower # 280 - PCS Mast	Mar 6, 2013 at 6:40 PM
12047.CO12 - CT43XC837	LC #1 Reactions	NESC.r3d



Loads: LC 2, x-dir NESC Extreme Wind on PCS Structure

CENTEK Engineering, Inc.		
tjl, cfc	CL&P Tower # 280 - PCS Mast	Mar 6, 2013 at 6:40 PM
12047.CO12 - CT43XC837	LC #2 Loads	NESC.r3d



Results for LC 2, x-dir NESC Extreme Wind on PCS Structure
Z-direction Reaction units are k and k-ft

CENTEK Engineering, Inc.		
tjl, cfc	CL&P Tower # 280 - PCS Mast	Mar 6, 2013 at 6:41 PM
12047.CO12 - CT43XC837	LC #2 Reactions	NESC.r3d

CENTEK engineering
Centered on Solutions℠
63-2 North Branford Road
Branford, CT 06405
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P: (203) 488-0580
F: (203) 488-8587

Subject:	Sprint Coax Cable on CL&P Tower # 280
Location:	Stratford, CT
Rev. 0: 3/5/13	Prepared by: T.J.L Checked by: C.F.C. Job No. 12047.CO12

Coax Cable on CL&P Tower

Coaxial Cable Span =

$$Coax_{Span} := \begin{pmatrix} 3.5 \\ 7.375 \\ 8.125 \\ 7.375 \\ 9.75 \\ 13.25 \\ 15 \end{pmatrix} \cdot ft \quad \textit{(User Input)}$$

Diameter of Coax Cable = $D_{coax1} := 1.98 \cdot in$ *(User Input)*

Weight of Coax Cable = $W_{coax1} := 1.04 \cdot plf$ *(User Input)*

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

Number of Projected Coax Cables = $NP_{coax1} := 6$ *(User Input)*

Extreme Wind Pressure = $qz := 33.5 \cdot psf$ *(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 = $A_{ice} := \left(NP_{coax1} \cdot D_{coax1} + 2 \cdot Ir\right) = 12.88 \cdot in$

Wind Area without Ice = $A := \left(NP_{coax1} \cdot D_{coax1}\right) = 11.88 \cdot in$

Ice Area per Liner Ft = $Ai_{coax1} := \frac{\pi}{4} \cdot \left[\left(D_{coax1} + 2 \cdot Ir\right)^2 - D_{coax1}^2\right] = 0.027\,ft^2$

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax1} \cdot Id \cdot N_{coax1} = 18 \cdot plf$

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

Subject:	Sprint Coax Cable on CL&P Tower # 280
Location:	Stratford, CT
Rev. 0: 3/5/13	Prepared by: T.J.L Checked by: C.F.C. Job No. 12047.CO12

Heavy Vertical Load =

$$Heavy_{Vert} := \overrightarrow{\left[\left(N_{coax1} \cdot W_{coax1} + W_{ice}\right) \cdot Coax_{Span} \cdot OF_{HV}\right]}$$

Heavy Transverse Load =

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

$$Heavy_{Vert} = \begin{pmatrix} 161 \\ 339 \\ 374 \\ 339 \\ 448 \\ 609 \\ 690 \end{pmatrix} lb \qquad Heavy_{Trans} = \begin{pmatrix} 60 \\ 127 \\ 140 \\ 127 \\ 167 \\ 228 \\ 258 \end{pmatrix} lb$$

Extreme Vertical Load =

$$Extreme_{Vert} := \overrightarrow{\left[\left(N_{coax1} \cdot W_{coax1}\right) \cdot Coax_{Span} \cdot OF_{EV}\right]}$$

Extreme Transverse Load =

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

$$Extreme_{Vert} = \begin{pmatrix} 44 \\ 92 \\ 101 \\ 92 \\ 122 \\ 165 \\ 187 \end{pmatrix} lb \qquad Extreme_{Trans} = \begin{pmatrix} 186 \\ 391 \\ 431 \\ 391 \\ 517 \\ 703 \\ 796 \end{pmatrix} lb$$

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Subject:	Sprint Coax Cable on CL&P Tower # 280
Location:	Stratford, CT
Rev. 0: 3/5/13	Prepared by: T.J.L Checked by: C.F.C. Job No. 12047.CO12

Coax Cable on CL&P Tower

Coaxial Cable Span =

$$Coax_{Span} := \begin{pmatrix} 3.5 \\ 7.375 \\ 8.125 \\ 7.375 \\ 9.75 \\ 13.25 \\ 15 \end{pmatrix} \cdot ft \quad \textit{(User Input)}$$

Diameter of Coax Cable =	$D_{coax1} := 1.98 \cdot in$	*(User Input)*
Weight of Coax Cable =	$W_{coax1} := 1.04 \cdot plf$	*(User Input)*
Number of Coax Cables =	$N_{coax1} := 6$	*(User Input)*
Number of Projected Coax Cables =	$NP_{coax1} := 3$	*(User Input)*
Extreme Wind Pressure =	$qz := 33.5 \cdot psf$	*(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 =	$A_{ice} := \left(NP_{coax1} \cdot D_{coax1} + 2 \cdot Ir\right) = 6.94 \cdot in$	
Wind Area without Ice =	$A := \left(NP_{coax1} \cdot D_{coax1}\right) = 5.94 \cdot in$	
Ice Area per Liner Ft =	$Ai_{coax1} := \frac{\pi}{4} \cdot \left[\left(D_{coax1} + 2 \cdot Ir\right)^2 - D_{coax1}^2\right] = 0.027\,ft^2$	
Weight of Ice on All Coax Cables =	$W_{ice} := Ai_{coax1} \cdot Id \cdot N_{coax1} = 9 \cdot plf$	

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Subject:	Sprint Coax Cable on CL&P Tower # 280
Location:	Stratford, CT
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Heavy Vertical Load =

$$\overrightarrow{Heavy_{Vert} := \left[\left(N_{coax1} \cdot W_{coax1} + W_{ice}\right) \cdot Coax_{Span} \cdot OF_{HV}\right]}$$

Heavy Transverse Load =

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

$$Heavy_{Vert} = \begin{pmatrix} 80 \\ 170 \\ 187 \\ 170 \\ 224 \\ 305 \\ 345 \end{pmatrix} lb \qquad Heavy_{Trans} = \begin{pmatrix} 32 \\ 68 \\ 75 \\ 68 \\ 90 \\ 123 \\ 139 \end{pmatrix} lb$$

Extreme Vertical Load =

$$\overrightarrow{Extreme_{Vert} := \left[\left(N_{coax1} \cdot W_{coax1}\right) \cdot Coax_{Span} \cdot OF_{EV}\right]}$$

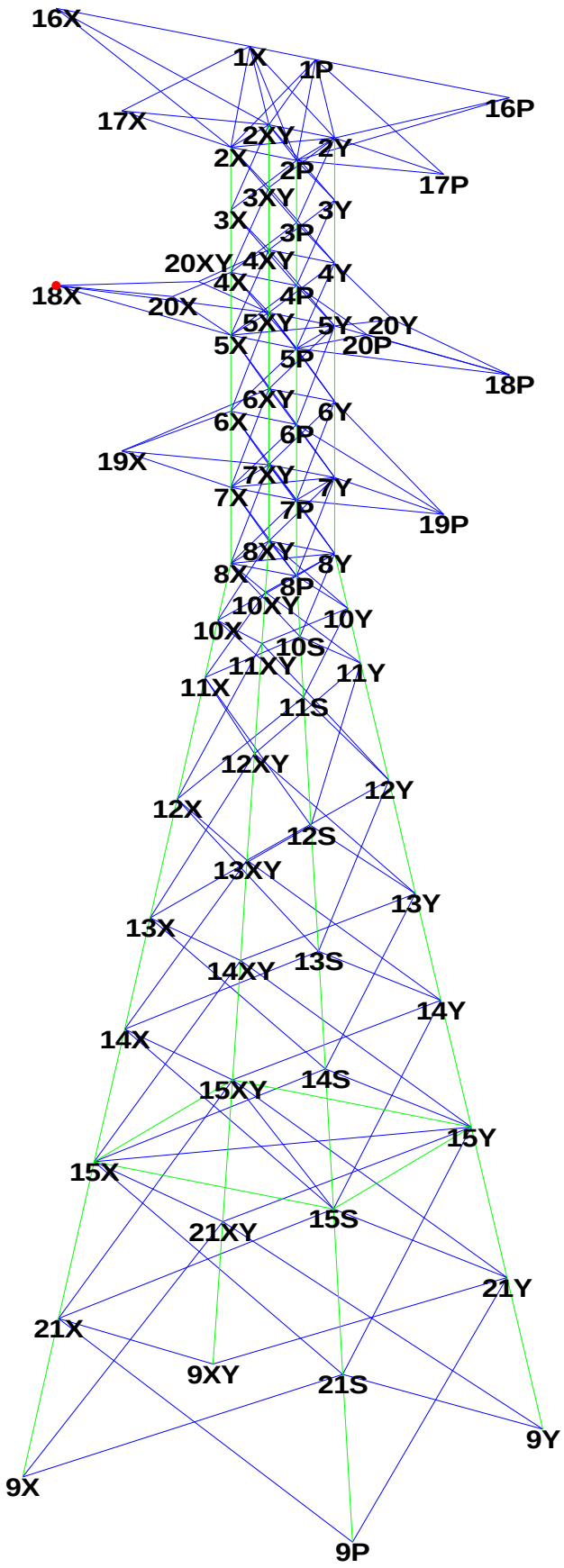
Extreme Transverse Load =

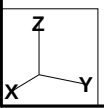
$$\overrightarrow{Extreme_{Trans} := \left[\left(qz \cdot A \cdot Cd_{coax}\right) \cdot Coax_{Span} \cdot OF_{EW}\right]}$$

$$Extreme_{Vert} = \begin{pmatrix} 22 \\ 46 \\ 51 \\ 46 \\ 61 \\ 83 \\ 94 \end{pmatrix} lb \qquad Extreme_{Trans} = \begin{pmatrix} 93 \\ 196 \\ 216 \\ 196 \\ 259 \\ 352 \\ 398 \end{pmatrix} lb$$

Centek Engineering Inc, Project: "cl&p tower #280 - reinforced"
Tower Version 11.11, 5:52:30 PM Wednesday, March 06, 2013
Undeformed geometry displayed

Site No: CT43XC837





Project Name : 12014.CO12 - Stratford, CT
Project Notes: CL&P Structure # 280/ Sprint CT43XC837
Project File : J:\Jobs\1204700.WI\CO12 - CT43XC837\Calcs\PLS Tower\cl&p tower #280 - reinforced.tow
Date run : 5:47:01 PM Wednesday, March 06, 2013
by : Tower Version 11.11
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

KL/R value of 301.27 exceeds maximum of 200.00 for member "g40P" ??
KL/R value of 301.27 exceeds maximum of 200.00 for member "g40X" ??
KL/R value of 301.27 exceeds maximum of 200.00 for member "g40XY" ??
KL/R value of 301.27 exceeds maximum of 200.00 for member "g40Y" ??
KL/R value of 301.27 exceeds maximum of 200.00 for member "g41P" ??
KL/R value of 301.27 exceeds maximum of 200.00 for member "g41X" ??
KL/R value of 301.27 exceeds maximum of 200.00 for member "g41XY" ??
KL/R value of 301.27 exceeds maximum of 200.00 for member "g41Y" ??
KL/R value of 230.76 exceeds maximum of 200.00 for member "g49P" ??
KL/R value of 230.76 exceeds maximum of 200.00 for member "g49Y" ??
KL/R value of 230.76 exceeds maximum of 200.00 for member "g50P" ??
KL/R value of 230.76 exceeds maximum of 200.00 for member "g50X" ??
KL/R value of 418.86 exceeds maximum of 200.00 for member "g55P" ??
KL/R value of 418.86 exceeds maximum of 200.00 for member "g55X" ??
Member "g60P" 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 "g60X" 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 "g60XY" 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 "g60Y" 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 "g61P" 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 "g61Y" 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 "g64P" 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 "g64X" 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 "g64XY" 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 "g64Y" 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 339.17 exceeds maximum of 200.00 for member "g71P" ??
KL/R value of 339.17 exceeds maximum of 200.00 for member "g71X" ??
KL/R value of 339.17 exceeds maximum of 200.00 for member "g71XY" ??
KL/R value of 339.17 exceeds maximum of 200.00 for member "g71Y" ??
KL/R value of 339.17 exceeds maximum of 200.00 for member "g72P" ??
KL/R value of 339.17 exceeds maximum of 200.00 for member "g72X" ??
KL/R value of 339.17 exceeds maximum of 200.00 for member "g72XY" ??
KL/R value of 339.17 exceeds maximum of 200.00 for member "g72Y" ??
The model has 32 warnings. ??

Member check option: ASCE 10
Connection rupture check: ASCE 10
Crossing diagonal check: ASCE 10 [Alternate Unsupported RLOUT = 1]
Included angle check: None

Loads from file: j:\jobs\1204700.wi\co12 - ct43xc837\calcs\pls tower\cl&p # 280.lca

*** Analysis Results:

Maximum element usage is 96.29% for Angle "g26XY" in load case "NESC Extreme"
Maximum insulator usage is 7.13% for Clamp "24" in load case "NESC Extreme"

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)	Vert. Moment (ft-k)	Bending Moment (ft-k)	Found. Usage %
NESC Heavy	9P	-3.47	-4.07	23.24	5.34	0.04	-0.07	-0.01	0.08	0.00
NESC Heavy	9X	1.53	-2.12	-10.24	2.62	-0.00	0.03	-0.01	0.03	0.00
NESC Heavy	9XY	-1.51	-1.87	-9.73	2.40	-0.00	-0.03	0.01	0.03	0.00
NESC Heavy	9Y	3.61	-3.95	23.38	5.35	0.03	0.07	0.01	0.08	0.00
NESC Extreme	9P	-5.01	-6.59	33.84	8.27	0.05	-0.10	-0.02	0.11	0.00
NESC Extreme	9X	4.12	-5.72	-27.75	7.05	0.03	0.08	-0.02	0.08	0.00
NESC Extreme	9XY	-4.30	-5.22	-27.13	6.76	0.02	-0.08	0.02	0.09	0.00
NESC Extreme	9Y	5.19	-6.15	33.30	8.05	0.04	0.10	0.02	0.11	0.00

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

Load Case	Support Joint	Origin Joint	Member	Leg 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	9P	21S	g70X	23.845	0.428	0.428	-0.250	0.348	-3.47	-4.07	23.24
NESC Heavy	9X	21X	g70P	-10.559	0.492	0.495	0.105	0.484	1.53	-2.12	-10.24
NESC Heavy	9XY	21XY	g70Y	-10.022	0.316	0.318	-0.052	0.314	-1.51	-1.87	-9.73
NESC Heavy	9Y	21Y	g70XY	23.988	0.246	0.246	0.128	0.210	3.61	-3.95	23.38
NESC Extreme	9P	21S	g70X	34.815	1.236	1.242	-0.407	1.173	-5.01	-6.59	33.84
NESC Extreme	9X	21X	g70P	-28.598	1.316	1.324	0.321	1.285	4.12	-5.72	-27.75
NESC Extreme	9XY	21XY	g70Y	-27.944	0.871	0.880	-0.039	0.880	-4.30	-5.22	-27.13
NESC Extreme	9Y	21Y	g70XY	34.251	0.829	0.836	0.139	0.824	5.19	-6.15	33.30

Overturning Moment Summary For All Load Cases:

Load Case	Transverse Moment (ft-k)	Longitudinal Moment (ft-k)	Resultant Moment (ft-k)
NESC Heavy	666.015	-6.477	666.046
NESC Extreme	1220.154	-0.825	1220.154

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)
1	78.250	50.000	42	145	0.00	4.00	103.000	27.50	4.00	271.740
2	50.000	0.000	36	102	4.00	20.00	600.000	4.00	20.00	600.000

*** 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 %	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 Comp. (ft)	No. Member	No. Of Bolts
Leg1	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	33.0	62.23	62.23	g5XY	-22.651	NESC Ext	47.089	36.400	56.250	1.000	1.000	1.000	73.49	73.49	4.250
Leg2	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	33.0	92.82	92.82	g9XY	-30.921	NESC Ext	33.313	0.000	0.000	1.000	1.000	1.000	118.19	118.19	6.836
Leg3	L4x4x1/4	SAE	4X4X0.25	33.0	78.53	78.53	g12X	-32.032	NESC Ext	40.789	0.000	0.000	1.000	1.000	1.000	112.20	112.20	7.433
Leg4	L2.5x2x3/16	SAU	2.5X2X0.1875	33.0	11.10	11.10	g14X	-1.124	NESC Hea	10.122	18.200	21.094	1.000	1.000	1.000	151.34	151.34	5.385
Diag1	L1.75x1.75x3/16	SAE	1.75X1.75X0.1875	33.0	96.29	59.68	g26Y	-5.431	NESC Ext	13.762	9.100	10.547	0.750	0.500	0.500	102.09	106.57	5.836
Diag2	L2x2x1/4	SAE	2X2X0.25	33.0	33.52	33.52	g20Y	-3.051	NESC Ext	23.588	9.100	14.062	0.750	0.500	0.500	81.56	91.17	5.315
Diag3	L2X2X3/16	SAE	2X2X0.1875	33.0	19.13	19.13	g33Y	-1.076	NESC Ext	5.624	9.100	10.547	1.000	0.576	0.576	190.09	190.09	9.774
Diag4	L2.25X2.25X3/16	SAE	2.25X2.25X0.1875	33.0	14.06	14.06	g36P	-0.923	NESC Ext	6.568	9.100	10.547	0.772	0.544	0.544	187.77	187.77	12.771
Diag5	L2.75X2.75X3/16	SAE	2.75X2.75X0.1875	33.0	11.28	7.62	g38P	-0.659	NESC Ext	8.653	9.100	10.547	0.771	0.543	0.543	181.51	181.51	15.210
Diag6	L2X1.5X3/16	SAU	2X1.5X0.1875	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
Horz1	BAR2X3/16	Bar	2x3/16	33.0	31.41	0.00	g43Y	0.000		26.288	9.100	10.547	1.000	1.000	1.000	48.00	84.00	4.000
Horz2	L2X2X3/16	SAE	2X2X0.1875	33.0	56.93	29.85	g46X	-2.716	NESC Ext	13.406	9.100	10.547	1.000	1.000	1.000	121.83	121.83	4.000
Horz3	L3X2.5X1/4	SAU	3X2.5X0.25	33.0	4.64	4.64	g50X	-0.326	NESC Ext	7.041	9.100	14.062	0.500	1.000	0.500	230.76	230.76	14.480
Inner1	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	33.0	6.90	3.96	g52P	-0.361	NESC Ext	13.392	9.100	10.547	0.750	0.500	0.500	98.95	109.48	5.657
Inner2	L2X1-1/2X3/16	SAU	2X1.5X0.1875	33.0	32.53	32.53	g55P	-0.329	NESC Ext	1.011	9.100	10.547	0.500	0.750	0.500	418.86	418.86	20.478
TopCrArm	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	33.0	9.72	9.72	g59Y	-1.768	NESC Hea	19.668	18.200	21.094	1.000	1.000	1.000	96.97	108.48	4.000
TopArmBr	BAR2X3/16	Bar	2x3/16	33.0	24.26	0.00	g65X	0.000		20.853	9.100	10.547	1.000	1.000	1.000	110.68	113.01	9.223
MidCrArm	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	33.0	23.88	23.88	g60P	-4.346	NESC Hea	25.411	18.200	28.125	1.000	0.500	0.500	131.46	127.05	11.919
MidArmBr	BAR2X3/16	Bar	2x3/16	33.0	44.91	0.00	g69Y	0.000		28.221	9.100	10.547	1.000	1.000	1.000	54.50	70.88	4.542
BotCrArm	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	33.0	9.16	9.16	g62Y	-1.554	NESC Hea	16.970	18.200	21.094	1.000	0.500	0.500	123.45	122.12	8.004
BotArmBr	BAR2X3/16	Bar	2x3/16	33.0	14.91	0.00	g67Y	0.000		21.162	9.100	10.547	1.000	1.000	1.000	108.75	111.56	9.062

ShArmBr	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	33.0	9.92	9.92	g64Y	-1.139NESC Hea	11.489	27.300	42.187	0.500	1.000	0.500	211.02	189.40	12.925	5	3
ShieldAr	LL2.5X2X3/16	DAL	2.5X2X0.1875	33.0	44.87	1.28	g56P	-0.116NESC Ext	14.666	9.100	21.094	1.000	1.000	1.000	177.81	177.81	11.750	4	1
Diag6(R)	L2x2x1/4	SAE	2X2X0.25	36.0	51.50	51.50	g71P	-1.204NESC Ext	2.339	16.800	13.594	0.768	0.537	0.537	339.17	339.17	20.580	4	1

Group Summary (Tension Portion):

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (ksi)	Max Usage %	Max Tension In Tens. %	Tension Control Member	Tension Control 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	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	33.0	62.23	55.07	g5P	20.044NESC Ext	43.395	36.400	56.250	91.912	4.250	4	2.000	0.75	
Leg2	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	33.0	92.82	71.46	g11Y	26.011NESC Ext	43.395	36.400	56.250	50.000	6.237	4	2.000	0.75	
Leg3	L4x4x1/4	SAE	4X4X0.25	33.0	78.53	54.61	g70P	28.205NESC Ext	51.645	72.800	112.500	100.000	8.889	8	2.000	0.75	
Leg4	L2.5x2x3/16	SAU	2.5X2X0.1875	33.0	11.10	3.57	g14P	0.503NESC Ext	17.096	18.200	21.094	14.062	5.385	2	1.000	0.75	
Diag1	L1.75x1.75x3/16	SAE	1.75X1.75X0.1875	33.0	96.29	96.29	g26XY	4.671NESC Ext	14.237	9.100	10.547	4.852	5.836	1	1.000	0.75	
Diag2	L2x2x1/4	SAE	2X2X0.25	33.0	33.52	29.53	g20XY	2.547NESC Ext	22.349	9.100	14.062	8.625	5.315	1	1.000	0.75	
Diag3	L2X2X3/16	SAE	2X2X0.1875	33.0	19.13	13.22	g33X	0.855NESC Ext	16.910	9.100	10.547	6.469	9.774	1	1.000	0.75	
Diag4	L2.25X2.25X3/16	SAE	2.25X2.25X0.1875	33.0	14.06	6.61	g36X	0.479NESC Ext	19.851	9.100	10.547	7.242	12.771	1	1.000	0.75	
Diag5	L2.75X2.75X3/16	SAE	2.75X2.75X0.1875	33.0	11.28	11.28	g38X	0.925NESC Ext	25.405	9.100	10.547	8.203	15.210	1	1.000	0.75	
Diag6	L2X1.5X3/16	SAU	2X1.5X0.1875	33.0	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0	0.000
Horz1	BAR2X3/16	Bar	2x3/16	33.0	31.41	31.41	g42Y	2.540NESC Hea	25.523	9.100	10.547	8.086	4.000	1	1.000	0.75	
Horz2	L2X2X3/16	SAE	2X2X0.1875	33.0	56.93	56.93	g46P	3.242NESC Ext	16.910	9.100	10.547	5.695	4.000	1	1.000	0.75	
Horz3	L3X2.5X1/4	SAU	3X2.5X0.25	33.0	4.64	3.25	g50P	0.296NESC Ext	33.338	9.100	14.062	10.687	14.480	1	1.000	0.75	
Inner1	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	33.0	6.90	6.90	g52X	0.393NESC Ext	14.237	9.100	10.547	5.695	5.657	1	1.000	0.75	
Inner2	L2X1-1/2X3/16	SAU	2X1.5X0.1875	33.0	32.53	4.84	g55X	0.276NESC Ext	14.237	9.100	10.547	5.695	20.478	1	1.000	0.75	
TopCrArm	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	33.0	9.72	0.51	g58X	0.093NESC Ext	22.613	18.200	21.094	21.094	8.004	2	1.000	0.75	
TopArmBr	BAR2X3/16	Bar	2x3/16	33.0	24.26	24.26	g65P	2.166NESC Hea	25.523	9.100	10.547	8.930	9.223	1	1.000	0.75	
MidCrArm	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	33.0	23.88	0.00	g61Y	0.000		33.301	18.200	28.125	18.750	4.000	2	1.700	0.75
MidArmBr	BAR2X3/16	Bar	2x3/16	33.0	44.91	44.91	g66X	4.011NESC Hea	25.523	9.100	10.547	8.930	8.071	1	1.000	0.75	
BotCrArm	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	33.0	9.16	1.13	g62XY	0.205NESC Ext	22.613	18.200	21.094	21.094	8.004	2	1.000		

0.75															
BotArmBr	BAR2X3/16	Bar	2x3/16	33.0	14.91	14.91	g67X	1.331NESC Hea	25.523	9.100	10.547	8.930	9.062	1	1.000
0.75															
ShArmBr	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	33.0	9.92	0.00	g64Y	0.000	34.136	27.300	42.187	42.187	12.925	3	1.550
0.75															
ShieldAr	LL2.5X2X3/16	DAL	2.5X2X0.1875	33.0	44.87	44.87	g57P	4.084NESC Hea	43.937	9.100	21.094	16.312	4.000	1	1.000
0.75															
Diag6(R)	L2x2x1/4	SAE	2X2X0.25	36.0	51.50	13.61	g71X	1.280NESC Ext	24.887	16.800	13.594	9.403	20.580	1	1.000
0.6875															

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	67.61	g9XY	Angle
NESC Extreme	96.29	g26XY	Angle

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
1	Clamp	2.28	NESC Heavy	0.0
2	Clamp	2.34	NESC Heavy	0.0
3	Clamp	2.83	NESC Heavy	0.0
4	Clamp	2.86	NESC Heavy	0.0
5	Clamp	2.93	NESC Heavy	0.0
6	Clamp	2.96	NESC Heavy	0.0
7	Clamp	2.85	NESC Heavy	0.0
8	Clamp	2.89	NESC Heavy	0.0
9	Clamp	0.46	NESC Heavy	0.0
10	Clamp	0.59	NESC Extreme	0.0
11	Clamp	0.63	NESC Extreme	0.0
12	Clamp	1.03	NESC Extreme	0.0
13	Clamp	0.96	NESC Extreme	0.0
14	Clamp	1.15	NESC Extreme	0.0
15	Clamp	1.50	NESC Heavy	0.0
16	Clamp	0.66	NESC Heavy	0.0
17	Clamp	0.99	NESC Extreme	0.0
18	Clamp	1.07	NESC Extreme	0.0
19	Clamp	1.43	NESC Extreme	0.0
20	Clamp	1.49	NESC Extreme	0.0
21	Clamp	1.87	NESC Extreme	0.0
22	Clamp	2.39	NESC Heavy	0.0
23	Clamp	6.64	NESC Extreme	0.0
24	Clamp	7.13	NESC Extreme	0.0
25	Clamp	3.30	NESC Extreme	0.0
26	Clamp	2.13	NESC Extreme	0.0

*** Weight of structure (lbs):
Weight of Angles*Section DLF: 6666.0

Total:	6666.0

*** End of Report

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*****************************************************************************
*                                                                           *
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*                                                                           *
*****************************************************************************

Project Name : 12014.CO12 - Stratford, CT
Project Notes: CL&P Structure # 280/ Sprint CT43XC837
Project File : J:\Jobs\1204700.WI\CO12 - CT43XC837\Calcs\PLS Tower\cl&p tower #280 - reinforced.tow
Date run     : 5:47:00 PM Wednesday, March 06, 2013
by           : Tower Version 11.11
Licensed to  : Centek Engineering Inc

Successfully performed nonlinear analysis

KL/R value of 301.27 exceeds maximum of 200.00 for member "g40P" ??
KL/R value of 301.27 exceeds maximum of 200.00 for member "g40X" ??
KL/R value of 301.27 exceeds maximum of 200.00 for member "g40XY" ??
KL/R value of 301.27 exceeds maximum of 200.00 for member "g40Y" ??
KL/R value of 301.27 exceeds maximum of 200.00 for member "g41P" ??
KL/R value of 301.27 exceeds maximum of 200.00 for member "g41X" ??
KL/R value of 301.27 exceeds maximum of 200.00 for member "g41XY" ??
KL/R value of 301.27 exceeds maximum of 200.00 for member "g41Y" ??
KL/R value of 230.76 exceeds maximum of 200.00 for member "g49P" ??
KL/R value of 230.76 exceeds maximum of 200.00 for member "g49Y" ??
KL/R value of 230.76 exceeds maximum of 200.00 for member "g50P" ??
KL/R value of 230.76 exceeds maximum of 200.00 for member "g50X" ??
KL/R value of 418.86 exceeds maximum of 200.00 for member "g55P" ??
KL/R value of 418.86 exceeds maximum of 200.00 for member "g55X" ??
Member "g60P" 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 "g60X" 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 "g60XY" 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 "g60Y" 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 "g61P" 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 "g61Y" 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 "g64P" 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 "g64X" 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 "g64XY" 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 "g64Y" 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 339.17 exceeds maximum of 200.00 for member "g71P" ??
KL/R value of 339.17 exceeds maximum of 200.00 for member "g71X" ??
KL/R value of 339.17 exceeds maximum of 200.00 for member "g71XY" ??
KL/R value of 339.17 exceeds maximum of 200.00 for member "g71Y" ??
KL/R value of 339.17 exceeds maximum of 200.00 for member "g72P" ??
KL/R value of 339.17 exceeds maximum of 200.00 for member "g72X" ??
KL/R value of 339.17 exceeds maximum of 200.00 for member "g72XY" ??
KL/R value of 339.17 exceeds maximum of 200.00 for member "g72Y" ??
The model has 32 warnings.  ??
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Nonlinear convergence parameters: Use Standard Parameters
Member check option: ASCE 10
Connection rupture check: ASCE 10
Crossing diagonal check: ASCE 10 [Alternate Unsupported RLOUT = 1]
Included angle check: None

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	X-Symmetry	0	2	78.25	Free	Free	Free	Free	Free	Free
2P	XY-Symmetry	2	2	73.25	Free	Free	Free	Free	Free	Free
3P	XY-Symmetry	2	2	69.75	Free	Free	Free	Free	Free	Free
4P	XY-Symmetry	2	2	66.25	Free	Free	Free	Free	Free	Free
5P	XY-Symmetry	2	2	62.75	Free	Free	Free	Free	Free	Free
6P	XY-Symmetry	2	2	58.5	Free	Free	Free	Free	Free	Free
7P	XY-Symmetry	2	2	54.25	Free	Free	Free	Free	Free	Free
8P	XY-Symmetry	2	2	50	Free	Free	Free	Free	Free	Free
9P	XY-Symmetry	10	10	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
16P	X-Symmetry	0	13.75	78.25	Free	Free	Free	Free	Free	Free
17P	X-Symmetry	0	9.75	73.25	Free	Free	Free	Free	Free	Free
18P	X-Symmetry	0	13.75	62.75	Free	Free	Free	Free	Free	Free
19P	X-Symmetry	0	9.75	54.25	Free	Free	Free	Free	Free	Free
20P	XY-Symmetry	1.34	5.89	64	Free	Free	Free	Free	Free	Free
1X	X-Gen	0	-2	78.25	Free	Free	Free	Free	Free	Free
2X	X-GenXY	2	-2	73.25	Free	Free	Free	Free	Free	Free
2XY	XY-GenXY	-2	-2	73.25	Free	Free	Free	Free	Free	Free
2Y	Y-GenXY	-2	2	73.25	Free	Free	Free	Free	Free	Free
3X	X-GenXY	2	-2	69.75	Free	Free	Free	Free	Free	Free
3XY	XY-GenXY	-2	-2	69.75	Free	Free	Free	Free	Free	Free
3Y	Y-GenXY	-2	2	69.75	Free	Free	Free	Free	Free	Free
4X	X-GenXY	2	-2	66.25	Free	Free	Free	Free	Free	Free
4XY	XY-GenXY	-2	-2	66.25	Free	Free	Free	Free	Free	Free
4Y	Y-GenXY	-2	2	66.25	Free	Free	Free	Free	Free	Free

5X	X-GenXY	2	-2	62.75	Free	Free	Free	Free	Free	Free
5XY	XY-GenXY	-2	-2	62.75	Free	Free	Free	Free	Free	Free
5Y	Y-GenXY	-2	2	62.75	Free	Free	Free	Free	Free	Free
6X	X-GenXY	2	-2	58.5	Free	Free	Free	Free	Free	Free
6XY	XY-GenXY	-2	-2	58.5	Free	Free	Free	Free	Free	Free
6Y	Y-GenXY	-2	2	58.5	Free	Free	Free	Free	Free	Free
7X	X-GenXY	2	-2	54.25	Free	Free	Free	Free	Free	Free
7XY	XY-GenXY	-2	-2	54.25	Free	Free	Free	Free	Free	Free
7Y	Y-GenXY	-2	2	54.25	Free	Free	Free	Free	Free	Free
8X	X-GenXY	2	-2	50	Free	Free	Free	Free	Free	Free
8XY	XY-GenXY	-2	-2	50	Free	Free	Free	Free	Free	Free
8Y	Y-GenXY	-2	2	50	Free	Free	Free	Free	Free	Free
9X	X-GenXY	10	-10	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
9XY	XY-GenXY	-10	-10	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
9Y	Y-GenXY	-10	10	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
16X	X-Gen	0	-13.75	78.25	Free	Free	Free	Free	Free	Free
17X	X-Gen	0	-9.75	73.25	Free	Free	Free	Free	Free	Free
18X	X-Gen	0	-13.75	62.75	Free	Free	Free	Free	Free	Free
19X	X-Gen	0	-9.75	54.25	Free	Free	Free	Free	Free	Free
20X	X-GenXY	1.34	-5.89	64	Free	Free	Free	Free	Free	Free
20XY	XY-GenXY	-1.34	-5.89	64	Free	Free	Free	Free	Free	Free
20Y	Y-GenXY	-1.34	5.89	64	Free	Free	Free	Free	Free	Free

Secondary Joints:

Joint Label	Symmetry Code	Origin Joint	End Joint	Fraction	Elevation X (ft)	Disp. Y Rest.	Disp. Z Rest.	Disp. Rest.	X Rot. Rest.	Y Rot. Rest.	Z Rot. Rest.
10S	XY-Symmetry	8P	9P	0	46.88	Free	Free	Free	Free	Free	Free
11S	XY-Symmetry	8P	9P	0	43.75	Free	Free	Free	Free	Free	Free
12S	XY-Symmetry	8P	9P	0	37.08	Free	Free	Free	Free	Free	Free
13S	XY-Symmetry	8P	9P	0	30.58	Free	Free	Free	Free	Free	Free
14S	XY-Symmetry	8P	9P	0	24.5	Free	Free	Free	Free	Free	Free
15S	XY-Symmetry	8P	9P	0	17.25	Free	Free	Free	Free	Free	Free
21S	XY-Symmetry	8P	9P	0	8.67	Free	Free	Free	Free	Free	Free
10X	X-GenXY	8P	9P	0	46.88	Free	Free	Free	Free	Free	Free
10XY	XY-GenXY	8P	9P	0	46.88	Free	Free	Free	Free	Free	Free
10Y	Y-GenXY	8P	9P	0	46.88	Free	Free	Free	Free	Free	Free
11X	X-GenXY	8P	9P	0	43.75	Free	Free	Free	Free	Free	Free
11XY	XY-GenXY	8P	9P	0	43.75	Free	Free	Free	Free	Free	Free
11Y	Y-GenXY	8P	9P	0	43.75	Free	Free	Free	Free	Free	Free
12X	X-GenXY	8P	9P	0	37.08	Free	Free	Free	Free	Free	Free
12XY	XY-GenXY	8P	9P	0	37.08	Free	Free	Free	Free	Free	Free
12Y	Y-GenXY	8P	9P	0	37.08	Free	Free	Free	Free	Free	Free
13X	X-GenXY	8P	9P	0	30.58	Free	Free	Free	Free	Free	Free
13XY	XY-GenXY	8P	9P	0	30.58	Free	Free	Free	Free	Free	Free
13Y	Y-GenXY	8P	9P	0	30.58	Free	Free	Free	Free	Free	Free
14X	X-GenXY	8P	9P	0	24.5	Free	Free	Free	Free	Free	Free
14XY	XY-GenXY	8P	9P	0	24.5	Free	Free	Free	Free	Free	Free
14Y	Y-GenXY	8P	9P	0	24.5	Free	Free	Free	Free	Free	Free
15X	X-GenXY	8P	9P	0	17.25	Free	Free	Free	Free	Free	Free
15XY	XY-GenXY	8P	9P	0	17.25	Free	Free	Free	Free	Free	Free
15Y	Y-GenXY	8P	9P	0	17.25	Free	Free	Free	Free	Free	Free
21X	X-GenXY	8P	9P	0	8.67	Free	Free	Free	Free	Free	Free
21XY	XY-GenXY	8P	9P	0	8.67	Free	Free	Free	Free	Free	Free
21Y	Y-GenXY	8P	9P	0	8.67	Free	Free	Free	Free	Free	Free

The model contains 46 primary and 28 secondary joints for a total of 74 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)
A 36	2.9e+004	36	58	0	0	0	0	0	0
A7	2.9e+004	33	60	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)
5/8 A394	0.625	0.75	9.1	1.125	1.5	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
5/8 A394	269
5/8 A325	16

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	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	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
SAE	2X2X0.25	2	2	0.25	3.19	0.94	5	0.609	0.609	0.391	1	2	1	0	1.0000	0
SAE	2X2X0.1875	2	2	0.1875	2.44	0.71	8	0.617	0.617	0.394	1	2	1	0	1.0000	0
SAE	1.75X1.75X0.1875	1.75	1.75	0.1875	2.12	0.62	6	0.537	0.537	0.343	1	1.75	0.875	0	1.0000	0
SAU	3.5X2.5X0.25	3.5	2.5	0.25	4.9	1.44	11.25	1.12	0.735	0.544	1	3.5	1.25	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	2.5X2X0.1875	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
SAU	2X1.5X0.1875	2	1.5	0.1875	2.12	0.62	8.33	0.632	0.44	0.322	1	2	0.75	0	1.0000	0
DAL	2.5X2X0.1875	2.5	2	0.1875	5.5	1.62	10.67	0.793	0.923	0.793	2	2.5	1	0	1.0000	0
Bar	2x3/16	2	0	0.1875	1.28	1	3	1	1	1	1	2	0	0	0.0000	0
SAE	2.25X2.25X0.1875	2.25	2.25	0.1875	2.75	0.809	9.5	0.698	0.698	0.444	1	2.25	1	0	1.0000	0
SAE	2.75X2.75X0.1875	2.75	2.75	0.1875	3.39	0.996	12.33	0.859	0.859	0.546	1	2.75	1.25	0	1.0000	0

Angle Groups:

Group Label	Group Description	Angle Type	Angle Material Size	Element Type	Group Type	Optimize Group	Allow. Add. Angle Width For Optimize (in)

Leg1	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	A7	Beam	Leg	None	0.000
Leg2	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	A7	Beam	Leg	None	0.000
Leg3	L4x4x1/4	SAE	4X4X0.25	A7	Beam	Leg	None	0.000
Leg4	L2.5x2x3/16	SAU	2.5X2X0.1875	A7	Truss	Other	None	0.000
Diag1	L1.75x1.75x3/16	SAE	1.75X1.75X0.1875	A7	Truss	Crossing Diagonal	None	0.000
Diag2	L2x2x1/4	SAE	2X2X0.25	A7	Truss	Crossing Diagonal	None	0.000
Diag3	L2X2X3/16	SAE	2X2X0.1875	A7	Truss	Crossing Diagonal	None	0.000
Diag4	L2.25X2.25X3/16	SAE	2.25X2.25X0.1875	A7	Truss	Crossing Diagonal	None	0.000
Diag5	L2.75X2.75X3/16	SAE	2.75X2.75X0.1875	A7	Truss	Crossing Diagonal	None	0.000
Diag6	L2X1.5X3/16	SAU	2X1.5X0.1875	A7	T-Only	Other	None	0.000
Horz1	BAR2X3/16	Bar	2x3/16	A7	Truss	Other	None	0.000
Horz2	L2X2X3/16	SAE	2X2X0.1875	A7	Truss	Other	None	0.000
Horz3	L3X2.5X1/4	SAU	3X2.5X0.25	A7	Beam	Other	None	0.000
Inner1	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	A7	Truss	Crossing Diagonal	None	0.000
Inner2	L2X1-1/2X3/16	SAU	2X1.5X0.1875	A7	Truss	Other	None	0.000
TopCrArm	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	A7	Truss	Other	None	0.000
TopArmBr	BAR2X3/16	Bar	2x3/16	A7	Truss	Other	None	0.000
MidCrArm	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	A7	Truss	Other	None	0.000
MidArmBr	BAR2X3/16	Bar	2x3/16	A7	Truss	Other	None	0.000
BotCrArm	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	A7	Truss	Other	None	0.000
BotArmBr	BAR2X3/16	Bar	2x3/16	A7	Truss	Other	None	0.000
ShArmBr	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	A7	Truss	Other	None	0.000
ShieldAr	LL2.5X2X3/16	DAL	2.5X2X0.1875	A7	Truss	Other	None	0.000
Diag6(R)	L2x2x1/4	SAE	2X2X0.25	A 36	Truss	Crossing Diagonal	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	3.5X3.5X0.25	A7	197.58	230.51	1145.96
SAE	4X4X0.25	A7	100.48	133.97	663.15
SAU	2.5X2X0.1875	A7	21.54	16.16	59.24
SAE	1.75X1.75X0.1875	A7	391.98	228.65	830.99
SAE	2X2X0.25	A7	42.52	28.35	135.64
SAE	2X2X0.1875	A7	208.52	139.01	508.78
SAE	2.25X2.25X0.1875	A7	102.17	76.62	280.96
SAE	2.75X2.75X0.1875	A7	121.68	111.54	412.48
SAE	2X2X0.25	A 36	309.26	206.17	986.55
Bar	2x3/16	A7	137.70	45.90	176.26
SAU	3X2.5X0.25	A7	57.92	53.09	260.64
SAU	2X1.5X0.1875	A7	40.96	23.89	86.83
DAL	2.5X2X0.1875	A7	27.50	20.63	151.25
SAE	2.5X2.5X0.1875	A7	80.03	66.69	245.70
SAU	3.5X2.5X0.25	A7	107.38	107.38	526.15

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 Ar Round Factor For Face EIA Only	Af Flat 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 Force Drag x Area Factor	Solid Face

1	8P	1.000	3.200	3.200	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	None
2	9P	1.050	3.200	3.200	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 Dist. (in)	Bolt Spacing (in)	Rest. Coef.
g1P	Leg1		XY-Symmetry	2X	3X	1	4	1	1	1		0	0	0		0	0	0	0	0
g1X	Leg1		X-GenXY	2P	3P	1	4	1	1	1		0	0	0		0	0	0	0	0
g1XY	Leg1		XY-GenXY	2Y	3Y	1	4	1	1	1		0	0	0		0	0	0	0	0
g1Y	Leg1		Y-GenXY	2XY	3XY	1	4	1	1	1		0	0	0		0	0	0	0	0
g2P	Leg1		XY-Symmetry	3X	4X	1	4	1	1	1		0	0	0		0	0	0	0	0
g2X	Leg1		X-GenXY	3P	4P	1	4	1	1	1		0	0	0		0	0	0	0	0
g2XY	Leg1		XY-GenXY	3Y	4Y	1	4	1	1	1		0	0	0		0	0	0	0	0
g2Y	Leg1		Y-GenXY	3XY	4XY	1	4	1	1	1		0	0	0		0	0	0	0	0
g3P	Leg1		XY-Symmetry	4X	5X	1	4	1	1	1		0	0	0		0	0	0	0	0
g3X	Leg1		X-GenXY	4P	5P	1	4	1	1	1		0	0	0		0	0	0	0	0
g3XY	Leg1		XY-GenXY	4Y	5Y	1	4	1	1	1		0	0	0		0	0	0	0	0
g3Y	Leg1		Y-GenXY	4XY	5XY	1	4	1	1	1		0	0	0		0	0	0	0	0
g4P	Leg1		XY-Symmetry	5X	6X	1	4	1	1	1		0	0	0		0	0	0	0	0
g4X	Leg1		X-GenXY	5P	6P	1	4	1	1	1		0	0	0		0	0	0	0	0
g4XY	Leg1		XY-GenXY	5Y	6Y	1	4	1	1	1		0	0	0		0	0	0	0	0
g4Y	Leg1		Y-GenXY	5XY	6XY	1	4	1	1	1		0	0	0		0	0	0	0	0
g5P	Leg1		XY-Symmetry	6X	7X	1	4	1	1	1	5/8 A394	4	2	0	Both	1.5625	0	3.625	4	0
g5X	Leg1		X-GenXY	6P	7P	1	4	1	1	1	5/8 A394	4	2	0	Both	1.5625	0	3.625	4	0
g5XY	Leg1		XY-GenXY	6Y	7Y	1	4	1	1	1	5/8 A394	4	2	0	Both	1.5625	0	3.625	4	0
g5Y	Leg1		Y-GenXY	6XY	7XY	1	4	1	1	1	5/8 A394	4	2	0	Both	1.5625	0	3.625	4	0
g6P	Leg2		XY-Symmetry	7X	8X	1	4	1	1	1		0	0	0		0	0	0	0	0
g6X	Leg2		X-GenXY	7P	8P	1	4	1	1	1		0	0	0		0	0	0	0	0
g6XY	Leg2		XY-GenXY	7Y	8Y	1	4	1	1	1		0	0	0		0	0	0	0	0

g6Y	Leg2	Y-GenXY	7XY	8XY	1	4	1	1	1		0	0	0		0	0	0	0
g7P	Leg2	XY-Symmetry	8X	10X	1	4	1	1	1		0	0	0		0	0	0	0
g7X	Leg2	X-GenXY	8P	10S	1	4	1	1	1		0	0	0		0	0	0	0
g7XY	Leg2	XY-GenXY	8Y	10Y	1	4	1	1	1		0	0	0		0	0	0	0
g7Y	Leg2	Y-GenXY	8XY	10XY	1	4	1	1	1		0	0	0		0	0	0	0
g8P	Leg2	XY-Symmetry	10X	11X	1	4	1	1	1		0	0	0		0	0	0	0
g8X	Leg2	X-GenXY	10S	11S	1	4	1	1	1		0	0	0		0	0	0	0
g8XY	Leg2	XY-GenXY	10Y	11Y	1	4	1	1	1		0	0	0		0	0	0	0
g8Y	Leg2	Y-GenXY	10XY	11XY	1	4	1	1	1		0	0	0		0	0	0	0
g9P	Leg2	XY-Symmetry	11X	12X	1	4	1	1	1		0	0	0		0	0	0	0
g9X	Leg2	X-GenXY	11S	12S	1	4	1	1	1		0	0	0		0	0	0	0
g9XY	Leg2	XY-GenXY	11Y	12Y	1	4	1	1	1		0	0	0		0	0	0	0
g9Y	Leg2	Y-GenXY	11XY	12XY	1	4	1	1	1		0	0	0		0	0	0	0
g10P	Leg2	XY-Symmetry	12X	13X	1	4	1	1	1		0	0	0		0	0	0	0
g10X	Leg2	X-GenXY	12S	13S	1	4	1	1	1		0	0	0		0	0	0	0
g10XY	Leg2	XY-GenXY	12Y	13Y	1	4	1	1	1		0	0	0		0	0	0	0
g10Y	Leg2	Y-GenXY	12XY	13XY	1	4	1	1	1		0	0	0		0	0	0	0
g11P	Leg2	XY-Symmetry	13X	14X	1	4	1	1	1	5/8 A394	4	2	1	Both	1.5625	0	1	5
g11X	Leg2	X-GenXY	13S	14S	1	4	1	1	1	5/8 A394	4	2	1	Both	1.5625	0	1	5
g11XY	Leg2	XY-GenXY	13Y	14Y	1	4	1	1	1	5/8 A394	4	2	1	Both	1.5625	0	1	5
g11Y	Leg2	Y-GenXY	13XY	14XY	1	4	1	1	1	5/8 A394	4	2	1	Both	1.5625	0	1	5
g12P	Leg3	XY-Symmetry	14X	15X	1	4	1	1	1		0	0	0		0	0	0	0
g12X	Leg3	X-GenXY	14S	15S	1	4	1	1	1		0	0	0		0	0	0	0
g12XY	Leg3	XY-GenXY	14Y	15Y	1	4	1	1	1		0	0	0		0	0	0	0
g12Y	Leg3	Y-GenXY	14XY	15XY	1	4	1	1	1		0	0	0		0	0	0	0
g13P	Leg3	XY-Symmetry	15X	21X	1	4	0.5	0.5	0.5		0	0	0		0	0	0	0
g13X	Leg3	X-GenXY	15S	21S	1	4	0.5	0.5	0.5		0	0	0		0	0	0	0
g13XY	Leg3	XY-GenXY	15Y	21Y	1	4	0.5	0.5	0.5		0	0	0		0	0	0	0
g13Y	Leg3	Y-GenXY	15XY	21XY	1	4	0.5	0.5	0.5		0	0	0		0	0	0	0
g14P	Leg4	XY-Symmetry	1X	2X	1	4	1	1	1	5/8 A394	2	1	1	Short only	0.875	0	0.875	1.875

0																			
	g14X	Leg4	X-GenXY	1P	2P	1	4	1	1	1	5/8	A394	2	1	1	Short only	0.875	0	0.875	1.875
0																				
	g14XY	Leg4	XY-GenXY	1P	2Y	1	4	1	1	1	5/8	A394	2	1	1	Short only	0.875	0	0.875	1.875
0																				
	g14Y	Leg4	Y-GenXY	1X	2XY	1	4	1	1	1	5/8	A394	2	1	1	Short only	0.875	0	0.875	1.875
0																				
	g15P	Diag1	XY-Symmetry	1X	2P	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g15X	Diag1	X-GenXY	1P	2X	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g15XY	Diag1	XY-GenXY	1P	2XY	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g15Y	Diag1	Y-GenXY	1X	2Y	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g16P	Diag1	XY-Symmetry	2X	3P	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g16X	Diag1	X-GenXY	2P	3X	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g16XY	Diag1	XY-GenXY	2Y	3XY	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g16Y	Diag1	Y-GenXY	2XY	3Y	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g17P	Diag1	XY-Symmetry	2P	3Y	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g17X	Diag1	X-GenXY	2X	3XY	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g17XY	Diag1	XY-GenXY	2XY	3X	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g17Y	Diag1	Y-GenXY	2Y	3P	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g18P	Diag1	XY-Symmetry	3X	4P	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g18X	Diag1	X-GenXY	3P	4X	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g18XY	Diag1	XY-GenXY	3Y	4XY	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g18Y	Diag1	Y-GenXY	3XY	4Y	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g19P	Diag1	XY-Symmetry	3P	4Y	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g19X	Diag1	X-GenXY	3X	4XY	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g19XY	Diag1	XY-GenXY	3XY	4X	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g19Y	Diag1	Y-GenXY	3Y	4P	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																				
	g20P	Diag2	XY-Symmetry	4X	5P	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	0.875	0
0																				
	g20X	Diag2	X-GenXY	4P	5X	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	0.875	0
0																				
	g20XY	Diag2	XY-GenXY	4Y	5XY	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	0.875	0
0																				
	g20Y	Diag2	Y-GenXY	4XY	5Y	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	0.875	0
0																				
	g21P	Diag2	XY-Symmetry	4P	5Y	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	0.875	0
0																				
	g21X	Diag2	X-GenXY	4X	5XY	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	0.875	0
0																				

g21XY	Diag2	XY-GenXY	4XY	5X	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	0.875	0
0																			
g21Y	Diag2	Y-GenXY	4Y	5P	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	0.875	0
0																			
g22P	Diag1	XY-Symmetry	5X	6P	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g22X	Diag1	X-GenXY	5P	6X	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g22XY	Diag1	XY-GenXY	5Y	6XY	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g22Y	Diag1	Y-GenXY	5XY	6Y	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g23P	Diag1	XY-Symmetry	5P	6Y	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g23X	Diag1	X-GenXY	5X	6XY	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g23XY	Diag1	XY-GenXY	5XY	6X	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g23Y	Diag1	Y-GenXY	5Y	6P	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g24P	Diag1	XY-Symmetry	6X	7P	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g24X	Diag1	X-GenXY	6P	7X	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g24XY	Diag1	XY-GenXY	6Y	7XY	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g24Y	Diag1	Y-GenXY	6XY	7Y	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g25P	Diag1	XY-Symmetry	6P	7Y	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g25X	Diag1	X-GenXY	6X	7XY	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g25XY	Diag1	XY-GenXY	6XY	7X	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g25Y	Diag1	Y-GenXY	6Y	7P	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
0																			
g26P	Diag1	XY-Symmetry	7X	8P	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.75	0
0																			
g26X	Diag1	X-GenXY	7P	8X	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.75	0
0																			
g26XY	Diag1	XY-GenXY	7Y	8XY	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.75	0
0																			
g26Y	Diag1	Y-GenXY	7XY	8Y	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.75	0
0																			
g27P	Diag1	XY-Symmetry	7P	8Y	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.75	0
0																			
g27X	Diag1	X-GenXY	7X	8XY	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.75	0
0																			
g27XY	Diag1	XY-GenXY	7XY	8X	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.75	0
0																			
g27Y	Diag1	Y-GenXY	7Y	8P	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.75	0
0																			
g28P	Diag1	XY-Symmetry	8X	10S	2	4	0.777	0.555	0.555	5/8	A394	1	1	1	Short only	0.875	0	0.75	0
0																			
g28X	Diag1	X-GenXY	8P	10X	2	4	0.777	0.555	0.555	5/8	A394	1	1	1	Short only	0.875	0	0.75	0
0																			
g28XY	Diag1	XY-GenXY	8Y	10XY	2	4	0.777	0.555	0.555	5/8	A394	1	1	1	Short only	0.875	0	0.75	0
0																			
g28Y	Diag1	Y-GenXY	8XY	10Y	2	4	0.777	0.555	0.555	5/8	A394	1	1	1	Short only	0.875	0	0.75	0

0																			
	g29P	Diag1	XY-Symmetry	8P	10Y	2	4	0.777	0.555	0.555	5/8 A394	1	1	1	Short only	0.875	0	0.75	0
0																			
	g29X	Diag1	X-GenXY	8X	10XY	2	4	0.777	0.555	0.555	5/8 A394	1	1	1	Short only	0.875	0	0.75	0
0																			
	g29XY	Diag1	XY-GenXY	8XY	10X	2	4	0.777	0.555	0.555	5/8 A394	1	1	1	Short only	0.875	0	0.75	0
0																			
	g29Y	Diag1	Y-GenXY	8Y	10S	2	4	0.777	0.555	0.555	5/8 A394	1	1	1	Short only	0.875	0	0.75	0
0																			
	g30P	Diag1	XY-Symmetry	10X	11S	2	4	0.774	0.548	0.548	5/8 A394	1	1	1	Short only	0.875	0	0.75	0
0																			
	g30X	Diag1	X-GenXY	10S	11X	2	4	0.774	0.548	0.548	5/8 A394	1	1	1	Short only	0.875	0	0.75	0
0																			
	g30XY	Diag1	XY-GenXY	10Y	11XY	2	4	0.774	0.548	0.548	5/8 A394	1	1	1	Short only	0.875	0	0.75	0
0																			
	g30Y	Diag1	Y-GenXY	10XY	11Y	2	4	0.774	0.548	0.548	5/8 A394	1	1	1	Short only	0.875	0	0.75	0
0																			
	g31P	Diag1	XY-Symmetry	10S	11Y	2	4	0.774	0.548	0.548	5/8 A394	1	1	1	Short only	0.875	0	0.75	0
0																			
	g31X	Diag1	X-GenXY	10X	11XY	2	4	0.774	0.548	0.548	5/8 A394	1	1	1	Short only	0.875	0	0.75	0
0																			
	g31XY	Diag1	XY-GenXY	10XY	11X	2	4	0.774	0.548	0.548	5/8 A394	1	1	1	Short only	0.875	0	0.75	0
0																			
	g31Y	Diag1	Y-GenXY	10Y	11S	2	4	0.774	0.548	0.548	5/8 A394	1	1	1	Short only	0.875	0	0.75	0
0																			
	g32P	Diag3	XY-Symmetry	11X	12S	2	4	0.788	0.576	0.576	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g32X	Diag3	X-GenXY	11S	12X	2	4	0.788	0.576	0.576	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g32XY	Diag3	XY-GenXY	11Y	12XY	2	4	0.788	0.576	0.576	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g32Y	Diag3	Y-GenXY	11XY	12Y	2	4	0.788	0.576	0.576	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g33P	Diag3	XY-Symmetry	11S	12Y	2	4	0.788	0.576	0.576	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g33X	Diag3	X-GenXY	11X	12XY	2	4	0.788	0.576	0.576	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g33XY	Diag3	XY-GenXY	11XY	12X	2	4	0.788	0.576	0.576	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g33Y	Diag3	Y-GenXY	11Y	12S	2	4	0.788	0.576	0.576	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g34P	Diag3	XY-Symmetry	12X	13S	2	4	0.779	0.558	0.558	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g34X	Diag3	X-GenXY	12S	13X	2	4	0.779	0.558	0.558	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g34XY	Diag3	XY-GenXY	12Y	13XY	2	4	0.779	0.558	0.558	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g34Y	Diag3	Y-GenXY	12XY	13Y	2	4	0.779	0.558	0.558	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g35P	Diag3	XY-Symmetry	12S	13Y	2	4	0.779	0.558	0.558	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g35X	Diag3	X-GenXY	12X	13XY	2	4	0.779	0.558	0.558	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g35XY	Diag3	XY-GenXY	12XY	13X	2	4	0.779	0.558	0.558	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g35Y	Diag3	Y-GenXY	12Y	13S	2	4	0.779	0.558	0.558	5/8 A394	1	1	1	Short only	0.875	0	0.875	0
0																			
	g36P	Diag4	XY-Symmetry	13X	14S	2	4	0.772	0.544	0.544	5/8 A394	1	1	1	Short only	1	0	0.875	0
0																			

g36X	Diag4	X-GenXY	13S	14X	2	4	0.772	0.544	0.544	5/8	A394	1	1	1	Short only	1	0	0.875	0	0
g36XY	Diag4	XY-GenXY	13Y	14XY	2	4	0.772	0.544	0.544	5/8	A394	1	1	1	Short only	1	0	0.875	0	0
g36Y	Diag4	Y-GenXY	13XY	14Y	2	4	0.772	0.544	0.544	5/8	A394	1	1	1	Short only	1	0	0.875	0	0
g37P	Diag4	XY-Symmetry	13S	14Y	2	4	0.772	0.544	0.544	5/8	A394	1	1	1	Short only	1	0	0.875	0	0
g37X	Diag4	X-GenXY	13X	14XY	2	4	0.772	0.544	0.544	5/8	A394	1	1	1	Short only	1	0	0.875	0	0
g37XY	Diag4	XY-GenXY	13XY	14X	2	4	0.772	0.544	0.544	5/8	A394	1	1	1	Short only	1	0	0.875	0	0
g37Y	Diag4	Y-GenXY	13Y	14S	2	4	0.772	0.544	0.544	5/8	A394	1	1	1	Short only	1	0	0.875	0	0
g38P	Diag5	XY-Symmetry	14X	15S	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.25	0	0.875	0	0
g38X	Diag5	X-GenXY	14S	15X	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.25	0	0.875	0	0
g38XY	Diag5	XY-GenXY	14Y	15XY	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.25	0	0.875	0	0
g38Y	Diag5	Y-GenXY	14XY	15Y	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.25	0	0.875	0	0
g39P	Diag5	XY-Symmetry	14S	15Y	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.25	0	0.875	0	0
g39X	Diag5	X-GenXY	14X	15XY	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.25	0	0.875	0	0
g39XY	Diag5	XY-GenXY	14XY	15X	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.25	0	0.875	0	0
g39Y	Diag5	Y-GenXY	14Y	15S	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.25	0	0.875	0	0
g40P	Diag6(R)	XY-Symmetry	15X	21S	2	4	0.772	0.543	0.543	5/8	A325	1	1	1	Short only	0.875	0	0.875	0	0
g40X	Diag6(R)	X-GenXY	15S	21X	2	4	0.772	0.543	0.543	5/8	A325	1	1	1	Short only	0.875	0	0.875	0	0
g40XY	Diag6(R)	XY-GenXY	15Y	21XY	2	4	0.772	0.543	0.543	5/8	A325	1	1	1	Short only	0.875	0	0.875	0	0
g40Y	Diag6(R)	Y-GenXY	15XY	21Y	2	4	0.772	0.543	0.543	5/8	A325	1	1	1	Short only	0.875	0	0.875	0	0
g41P	Diag6(R)	XY-Symmetry	15S	21Y	2	4	0.772	0.543	0.543	5/8	A325	1	1	1	Short only	0.875	0	0.875	0	0
g41X	Diag6(R)	X-GenXY	15X	21XY	2	4	0.772	0.543	0.543	5/8	A325	1	1	1	Short only	0.875	0	0.875	0	0
g41XY	Diag6(R)	XY-GenXY	15XY	21X	2	4	0.772	0.543	0.543	5/8	A325	1	1	1	Short only	0.875	0	0.875	0	0
g41Y	Diag6(R)	Y-GenXY	15Y	21S	2	4	0.772	0.543	0.543	5/8	A325	1	1	1	Short only	0.875	0	0.875	0	0
g42P	Horz1	Y-Symmetry	4X	4P	3	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0
g42Y	Horz1	Y-Gen	4XY	4Y	3	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0
g43P	Horz1	Y-Symmetry	6X	6P	3	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0
g43Y	Horz1	Y-Gen	6XY	6Y	3	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0
g44P	Horz2	X-Symmetry	2P	2Y	3	4	1	1	1	5/8	A394	1	1	1	Short only	0.875	0	0.875	0	0
g44X	Horz2	X-Gen	2X	2XY	3	4	1	1	1	5/8	A394	1	1	1	Short only	0.875	0	0.875	0	0
g45P	Horz2	X-Symmetry	5P	5Y	3	4	1	1	1	5/8	A394	1	1	1	Short only	0.875	0	0.875	0	0

g45X	Horz2	X-Gen	5X	5XY	3	4	1	1	1	5/8	A394	1	1	1	Short only	0.875	0	0.875	0
g46P	Horz2	X-Symmetry	7P	7Y	3	4	1	1	1	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
g46X	Horz2	X-Gen	7X	7XY	3	4	1	1	1	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
g47P	Horz2	Y-Symmetry	8X	8P	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.875	0	0.875	0
g47Y	Horz2	Y-Gen	8XY	8Y	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.875	0	0.875	0
g48P	Horz2	X-Symmetry	8P	8Y	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.875	0	0.875	0
g48X	Horz2	X-Gen	8X	8XY	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.875	0	0.875	0
g49P	Horz3	Y-Symmetry	15X	15S	3	4	0.5	1	0.5	5/8	A394	1	1	1	Long only	1.125	0	0.875	0
g49Y	Horz3	Y-Gen	15XY	15Y	3	4	0.5	1	0.5	5/8	A394	1	1	1	Long only	1.125	0	0.875	0
g50P	Horz3	X-Symmetry	15S	15Y	3	4	0.5	1	0.5	5/8	A394	1	1	1	Long only	1.125	0	0.875	0
g50X	Horz3	X-Gen	15X	15XY	3	4	0.5	1	0.5	5/8	A394	1	1	1	Long only	1.125	0	0.875	0
g51P	Inner1	X-Symmetry	2X	2Y	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
g51X	Inner1	X-Gen	2P	2XY	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
g52P	Inner1	X-Symmetry	5X	5Y	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
g52X	Inner1	X-Gen	5P	5XY	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
g53P	Inner1	X-Symmetry	7X	7Y	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
g53X	Inner1	X-Gen	7P	7XY	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
g54P	Inner1	X-Symmetry	8X	8Y	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
g54X	Inner1	X-Gen	8P	8XY	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0
g55P	Inner2	X-Symmetry	15X	15Y	3	4	0.5	0.75	0.5	5/8	A394	1	1	1	Long only	0.75	0	0.875	0
g55X	Inner2	X-Gen	15S	15XY	3	4	0.5	0.75	0.5	5/8	A394	1	1	1	Long only	0.75	0	0.875	0
g56P	ShieldAr	X-Symmetry	16X	1X	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.875	0	0	0
g56X	ShieldAr	X-Gen	16P	1P	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.875	0	0	0
g57P	ShieldAr	None	1X	1P	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.875	0	0	0
g58P	TopCrArm	XY-Symmetry	17X	2X	3	6	1	0.5	0.5	5/8	A394	2	1	1	Long only	1.25	0	0	2.75
g58X	TopCrArm	X-GenXY	17P	2P	3	6	1	0.5	0.5	5/8	A394	2	1	1	Long only	1.25	0	0	2.75
g58XY	TopCrArm	XY-GenXY	17P	2Y	3	6	1	0.5	0.5	5/8	A394	2	1	1	Long only	1.25	0	0	2.75
g58Y	TopCrArm	Y-GenXY	17X	2XY	3	6	1	0.5	0.5	5/8	A394	2	1	1	Long only	1.25	0	0	2.75
g59P	TopCrArm	Y-Symmetry	2X	2P	3	4	1	1	1	5/8	A394	2	1	1	Long only	1.25	0	0	2.75

g59Y	TopCrArm	Y-Gen	2XY	2Y	3	4	1	1	1	5/8	A394	2	1	1	Long only	1.25	0	0	2.75
0																			
g60P	MidCrArm	XY-Symmetry	18X	5X	3	6	1	0.5	0.5	5/8	A394	2	1.7	1	Long only	0.75	2.25	0	1.125
0																			
g60X	MidCrArm	X-GenXY	18P	5P	3	6	1	0.5	0.5	5/8	A394	2	1.7	1	Long only	0.75	2.25	0	1.125
0																			
g60XY	MidCrArm	XY-GenXY	18P	5Y	3	6	1	0.5	0.5	5/8	A394	2	1.7	1	Long only	0.75	2.25	0	1.125
0																			
g60Y	MidCrArm	Y-GenXY	18X	5XY	3	6	1	0.5	0.5	5/8	A394	2	1.7	1	Long only	0.75	2.25	0	1.125
0																			
g61P	MidCrArm	Y-Symmetry	5X	5P	3	4	1	1	1	5/8	A394	2	1.7	1	Long only	0.75	2.25	0	1.125
0																			
g61Y	MidCrArm	Y-Gen	5XY	5Y	3	4	1	1	1	5/8	A394	2	1.7	1	Long only	0.75	2.25	0	1.125
0																			
g62P	BotCrArm	XY-Symmetry	19X	7X	3	6	1	0.5	0.5	5/8	A394	2	1	1	Long only	1.25	0	0	3
0																			
g62X	BotCrArm	X-GenXY	19P	7P	3	6	1	0.5	0.5	5/8	A394	2	1	1	Long only	1.25	0	0	3
0																			
g62XY	BotCrArm	XY-GenXY	19P	7Y	3	6	1	0.5	0.5	5/8	A394	2	1	1	Long only	1.25	0	0	3
0																			
g62Y	BotCrArm	Y-GenXY	19X	7XY	3	6	1	0.5	0.5	5/8	A394	2	1	1	Long only	1.25	0	0	3
0																			
g63P	BotCrArm	Y-Symmetry	7X	7P	3	4	1	1	1	5/8	A394	2	1	1	Long only	1.25	0	0	3
0																			
g63Y	BotCrArm	Y-Gen	7XY	7Y	3	4	1	1	1	5/8	A394	2	1	1	Long only	1.25	0	0	3
0																			
g64P	ShArmBr	XY-Symmetry	16X	2X	2	5	0.5	1	0.5	5/8	A394	3	1.55	1	Long only	1	2.25	0	2.4375
0																			
g64X	ShArmBr	X-GenXY	16P	2P	2	5	0.5	1	0.5	5/8	A394	3	1.55	1	Long only	1	2.25	0	2.4375
0																			
g64XY	ShArmBr	XY-GenXY	16P	2Y	2	5	0.5	1	0.5	5/8	A394	3	1.55	1	Long only	1	2.25	0	2.4375
0																			
g64Y	ShArmBr	Y-GenXY	16X	2XY	2	5	0.5	1	0.5	5/8	A394	3	1.55	1	Long only	1	2.25	0	2.4375
0																			
g65P	TopArmBr	X-Symmetry	17X	1X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	0	1
0																			
g65X	TopArmBr	X-Gen	17P	1P	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	0	1
0																			
g66P	MidArmBr	XY-Symmetry	18X	20X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	0	1
0																			
g66X	MidArmBr	X-GenXY	18P	20P	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	0	1
0																			
g66XY	MidArmBr	XY-GenXY	18P	20Y	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	0	1
0																			
g66Y	MidArmBr	Y-GenXY	18X	20XY	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	0	1
0																			
g67P	BotArmBr	XY-Symmetry	19X	6X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	0	1
0																			
g67X	BotArmBr	X-GenXY	19P	6P	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	0	1
0																			
g67XY	BotArmBr	XY-GenXY	19P	6Y	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	0	1
0																			
g67Y	BotArmBr	Y-GenXY	19X	6XY	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	0	1
0																			
g68P	MidArmBr	XY-Symmetry	20X	5X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	0	1
0																			
g68X	MidArmBr	X-GenXY	20P	5P	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	0	1
0																			
g68XY	MidArmBr	XY-GenXY	20Y	5Y	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	0	1

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0
   g68Y MidArmBr              Y-GenXY   20XY   5XY    2     4     1     1     1 5/8 A394     1      1       1  Long only      1     0     0       1
0
   g69P MidArmBr          XY-Symmetry    20X    4X    2     4     1     1     1 5/8 A394     1      1       1  Long only      1     0     0       1
0
   g69X MidArmBr              X-GenXY    20P    4P    2     4     1     1     1 5/8 A394     1      1       1  Long only      1     0     0       1
0
  g69XY MidArmBr             XY-GenXY    20Y    4Y    2     4     1     1     1 5/8 A394     1      1       1  Long only      1     0     0       1
0
   g69Y MidArmBr              Y-GenXY   20XY   4XY    2     4     1     1     1 5/8 A394     1      1       1  Long only      1     0     0       1
0
   g70P     Leg3          XY-Symmetry    21X    9X    1     4   0.5   0.5   0.5 5/8 A394     8      2       1       Both   1.75     0     1    2.75
0
   g70X     Leg3              X-GenXY    21S    9P    1     4   0.5   0.5   0.5 5/8 A394     8      2       1       Both   1.75     0     1    2.75
0
  g70XY     Leg3             XY-GenXY    21Y    9Y    1     4   0.5   0.5   0.5 5/8 A394     8      2       1       Both   1.75     0     1    2.75
0
   g70Y     Leg3              Y-GenXY   21XY   9XY    1     4   0.5   0.5   0.5 5/8 A394     8      2       1       Both   1.75     0     1    2.75
0
   g71P Diag6(R)          XY-Symmetry    21X    9P    2     4 0.768 0.537 0.537 5/8 A325     1      1       1 Short only  0.875     0 0.875       0
0
   g71X Diag6(R)              X-GenXY    21S    9X    2     4 0.768 0.537 0.537 5/8 A325     1      1       1 Short only  0.875     0 0.875       0
0
  g71XY Diag6(R)             XY-GenXY    21Y   9XY    2     4 0.768 0.537 0.537 5/8 A325     1      1       1 Short only  0.875     0 0.875       0
0
   g71Y Diag6(R)              Y-GenXY   21XY    9Y    2     4 0.768 0.537 0.537 5/8 A325     1      1       1 Short only  0.875     0 0.875       0
0
   g72P Diag6(R)          XY-Symmetry    21S    9Y    2     4 0.768 0.537 0.537 5/8 A325     1      1       1 Short only  0.875     0 0.875       0
0
   g72X Diag6(R)              X-GenXY    21X   9XY    2     4 0.768 0.537 0.537 5/8 A325     1      1       1 Short only  0.875     0 0.875       0
0
  g72XY Diag6(R)             XY-GenXY   21XY    9X    2     4 0.768 0.537 0.537 5/8 A325     1      1       1 Short only  0.875     0 0.875       0
0
   g72Y Diag6(R)              Y-GenXY    21Y    9P    2     4 0.768 0.537 0.537 5/8 A325     1      1       1 Short only  0.875     0 0.875       0
0
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Member Capacities and Overrides:

Member Label	Group Label	Design Comp. Capacity	Override Control	Comp. Capacity Criterion	Design Override Tension Control	Tension Capacity Criterion	Override Face	L/r Length (ft)	Comp. Capacity (kips)	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)	Warnings or Errors
g1P	Leg1	49.882	L/r Automatic	55.770	Net Sect	61	3.50	49.882	0.000	0.000	55.770	0.000	0.000	0.000	0.000	0.000	
g1X	Leg1	49.882	L/r Automatic	55.770	Net Sect	61	3.50	49.882	0.000	0.000	55.770	0.000	0.000	0.000	0.000	0.000	
g1XY	Leg1	49.882	L/r Automatic	55.770	Net Sect	61	3.50	49.882	0.000	0.000	55.770	0.000	0.000	0.000	0.000	0.000	

g1Y	Leg1	49.882	L/r	55.770	Net Sect	61	3.50	49.882	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g2P	Leg1	49.882	L/r	55.770	Net Sect	61	3.50	49.882	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g2X	Leg1	49.882	L/r	55.770	Net Sect	61	3.50	49.882	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g2XY	Leg1	49.882	L/r	55.770	Net Sect	61	3.50	49.882	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g2Y	Leg1	49.882	L/r	55.770	Net Sect	61	3.50	49.882	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g3P	Leg1	49.882	L/r	55.770	Net Sect	61	3.50	49.882	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g3X	Leg1	49.882	L/r	55.770	Net Sect	61	3.50	49.882	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g3XY	Leg1	49.882	L/r	55.770	Net Sect	61	3.50	49.882	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g3Y	Leg1	49.882	L/r	55.770	Net Sect	61	3.50	49.882	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g4P	Leg1	47.089	L/r	55.770	Net Sect	73	4.25	47.089	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g4X	Leg1	47.089	L/r	55.770	Net Sect	73	4.25	47.089	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g4XY	Leg1	47.089	L/r	55.770	Net Sect	73	4.25	47.089	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g4Y	Leg1	47.089	L/r	55.770	Net Sect	73	4.25	47.089	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g5P	Leg1	36.400	Shear	36.400	Shear	73	4.25	47.089	36.400	56.250	43.395	91.912	0.000	0.000	0.000
0.000		0.000	Automatic												
g5X	Leg1	36.400	Shear	36.400	Shear	73	4.25	47.089	36.400	56.250	43.395	91.912	0.000	0.000	0.000
0.000		0.000	Automatic												
g5XY	Leg1	36.400	Shear	36.400	Shear	73	4.25	47.089	36.400	56.250	43.395	91.912	0.000	0.000	0.000
0.000		0.000	Automatic												
g5Y	Leg1	36.400	Shear	36.400	Shear	73	4.25	47.089	36.400	56.250	43.395	91.912	0.000	0.000	0.000
0.000		0.000	Automatic												
g6P	Leg2	47.089	L/r	55.770	Net Sect	73	4.25	47.089	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g6X	Leg2	47.089	L/r	55.770	Net Sect	73	4.25	47.089	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g6XY	Leg2	47.089	L/r	55.770	Net Sect	73	4.25	47.089	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g6Y	Leg2	47.089	L/r	55.770	Net Sect	73	4.25	47.089	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g7P	Leg2	50.836	L/r	55.770	Net Sect	55	3.20	50.836	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g7X	Leg2	50.836	L/r	55.770	Net Sect	55	3.20	50.836	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g7XY	Leg2	50.836	L/r	55.770	Net Sect	55	3.20	50.836	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g7Y	Leg2	50.836	L/r	55.770	Net Sect	55	3.20	50.836	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g8P	Leg2	50.836	L/r	55.770	Net Sect	55	3.20	50.836	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g8X	Leg2	50.836	L/r	55.770	Net Sect	55	3.20	50.836	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g8XY	Leg2	50.836	L/r	55.770	Net Sect	55	3.20	50.836	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g8Y	Leg2	50.836	L/r	55.770	Net Sect	55	3.20	50.836	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000	Automatic												
g9P	Leg2	33.313	L/r	55.770	Net Sect	118	6.84	33.313	0.000	0.000	55.770	0.000	0.000	0.000	0.000

0.000		0.000		Automatic											
g9X	Leg2	33.313	L/r	55.770	Net Sect	118	6.84	33.313	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g9XY	Leg2	33.313	L/r	55.770	Net Sect	118	6.84	33.313	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g9Y	Leg2	33.313	L/r	55.770	Net Sect	118	6.84	33.313	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g10P	Leg2	34.424	L/r	55.770	Net Sect	115	6.66	34.424	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g10X	Leg2	34.424	L/r	55.770	Net Sect	115	6.66	34.424	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g10XY	Leg2	34.424	L/r	55.770	Net Sect	115	6.66	34.424	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g10Y	Leg2	34.424	L/r	55.770	Net Sect	115	6.66	34.424	0.000	0.000	55.770	0.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g11P	Leg2	36.400	Shear	36.400	Shear	108	6.24	37.075	36.400	56.250	43.395	50.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g11X	Leg2	36.400	Shear	36.400	Shear	108	6.24	37.075	36.400	56.250	43.395	50.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g11XY	Leg2	36.400	Shear	36.400	Shear	108	6.24	37.075	36.400	56.250	43.395	50.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g11Y	Leg2	36.400	Shear	36.400	Shear	108	6.24	37.075	36.400	56.250	43.395	50.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g12P	Leg3	40.789	L/r	64.020	Net Sect	112	7.43	40.789	0.000	0.000	64.020	0.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g12X	Leg3	40.789	L/r	64.020	Net Sect	112	7.43	40.789	0.000	0.000	64.020	0.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g12XY	Leg3	40.789	L/r	64.020	Net Sect	112	7.43	40.789	0.000	0.000	64.020	0.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g12Y	Leg3	40.789	L/r	64.020	Net Sect	112	7.43	40.789	0.000	0.000	64.020	0.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g13P	Leg3	55.886	L/r	64.020	Net Sect	66	8.80	55.886	0.000	0.000	64.020	0.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g13X	Leg3	55.886	L/r	64.020	Net Sect	66	8.80	55.886	0.000	0.000	64.020	0.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g13XY	Leg3	55.886	L/r	64.020	Net Sect	66	8.80	55.886	0.000	0.000	64.020	0.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g13Y	Leg3	55.886	L/r	64.020	Net Sect	66	8.80	55.886	0.000	0.000	64.020	0.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g14P	Leg4	10.122	L/r	14.062	Rupture	151	5.39	10.122	18.200	21.094	17.096	14.062	0.000	0.000	0.000
0.000		0.000		Automatic											
g14X	Leg4	10.122	L/r	14.062	Rupture	151	5.39	10.122	18.200	21.094	17.096	14.062	0.000	0.000	0.000
0.000		0.000		Automatic											
g14XY	Leg4	10.122	L/r	14.062	Rupture	151	5.39	10.122	18.200	21.094	17.096	14.062	0.000	0.000	0.000
0.000		0.000		Automatic											
g14Y	Leg4	10.122	L/r	14.062	Rupture	151	5.39	10.122	18.200	21.094	17.096	14.062	0.000	0.000	0.000
0.000		0.000		Automatic											
g15P	Diag1	9.100	Shear	5.695	Rupture	117	6.71	12.247	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g15X	Diag1	9.100	Shear	5.695	Rupture	117	6.71	12.247	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g15XY	Diag1	9.100	Shear	5.695	Rupture	117	6.71	12.247	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g15Y	Diag1	9.100	Shear	5.695	Rupture	117	6.71	12.247	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g16P	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g16X	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											

g16XY	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g16Y	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g17P	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g17X	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g17XY	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g17Y	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g18P	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g18X	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g18XY	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g18Y	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g19P	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g19X	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g19XY	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g19Y	Diag1	9.100	Shear	5.695	Rupture	93	5.32	14.594	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g20P	Diag2	9.100	Shear	8.625	Rupture	82	5.32	23.588	9.100	14.062	22.349	8.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g20X	Diag2	9.100	Shear	8.625	Rupture	82	5.32	23.588	9.100	14.062	22.349	8.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g20XY	Diag2	9.100	Shear	8.625	Rupture	82	5.32	23.588	9.100	14.062	22.349	8.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g20Y	Diag2	9.100	Shear	8.625	Rupture	82	5.32	23.588	9.100	14.062	22.349	8.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g21P	Diag2	9.100	Shear	8.625	Rupture	82	5.32	23.588	9.100	14.062	22.349	8.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g21X	Diag2	9.100	Shear	8.625	Rupture	82	5.32	23.588	9.100	14.062	22.349	8.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g21XY	Diag2	9.100	Shear	8.625	Rupture	82	5.32	23.588	9.100	14.062	22.349	8.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g21Y	Diag2	9.100	Shear	8.625	Rupture	82	5.32	23.588	9.100	14.062	22.349	8.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g22P	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g22X	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g22XY	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g22Y	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g23P	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g23X	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g23XY	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g23Y	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000

0.000		0.000		Automatic											
g24P	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g24X	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g24XY	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g24Y	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g25P	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g25X	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g25XY	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g25Y	Diag1	9.100	Shear	5.695	Rupture	102	5.84	13.762	9.100	10.547	14.237	5.695	0.000	0.000	0.000
0.000		0.000		Automatic											
g26P	Diag1	9.100	Shear	4.852	Rupture	102	5.84	13.762	9.100	10.547	14.237	4.852	0.000	0.000	0.000
0.000		0.000		Automatic											
g26X	Diag1	9.100	Shear	4.852	Rupture	102	5.84	13.762	9.100	10.547	14.237	4.852	0.000	0.000	0.000
0.000		0.000		Automatic											
g26XY	Diag1	9.100	Shear	4.852	Rupture	102	5.84	13.762	9.100	10.547	14.237	4.852	0.000	0.000	0.000
0.000		0.000		Automatic											
g26Y	Diag1	9.100	Shear	4.852	Rupture	102	5.84	13.762	9.100	10.547	14.237	4.852	0.000	0.000	0.000
0.000		0.000		Automatic											
g27P	Diag1	9.100	Shear	4.852	Rupture	102	5.84	13.762	9.100	10.547	14.237	4.852	0.000	0.000	0.000
0.000		0.000		Automatic											
g27X	Diag1	9.100	Shear	4.852	Rupture	102	5.84	13.762	9.100	10.547	14.237	4.852	0.000	0.000	0.000
0.000		0.000		Automatic											
g27XY	Diag1	9.100	Shear	4.852	Rupture	102	5.84	13.762	9.100	10.547	14.237	4.852	0.000	0.000	0.000
0.000		0.000		Automatic											
g27Y	Diag1	9.100	Shear	4.852	Rupture	102	5.84	13.762	9.100	10.547	14.237	4.852	0.000	0.000	0.000
0.000		0.000		Automatic											
g28P	Diag1	9.100	Shear	5.625	Rupture	107	5.50	13.309	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g28X	Diag1	9.100	Shear	5.625	Rupture	107	5.50	13.309	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g28XY	Diag1	9.100	Shear	5.625	Rupture	107	5.50	13.309	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g28Y	Diag1	9.100	Shear	5.625	Rupture	107	5.50	13.309	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g29P	Diag1	9.100	Shear	5.625	Rupture	107	5.50	13.309	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g29X	Diag1	9.100	Shear	5.625	Rupture	107	5.50	13.309	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g29XY	Diag1	9.100	Shear	5.625	Rupture	107	5.50	13.309	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g29Y	Diag1	9.100	Shear	5.625	Rupture	107	5.50	13.309	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g30P	Diag1	9.100	Shear	5.625	Rupture	122	6.35	11.732	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g30X	Diag1	9.100	Shear	5.625	Rupture	122	6.35	11.732	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g30XY	Diag1	9.100	Shear	5.625	Rupture	122	6.35	11.732	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g30Y	Diag1	9.100	Shear	5.625	Rupture	122	6.35	11.732	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g31P	Diag1	9.100	Shear	5.625	Rupture	122	6.35	11.732	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											

g31X	Diag1	9.100	Shear	5.625	Rupture	122	6.35	11.732	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g31XY	Diag1	9.100	Shear	5.625	Rupture	122	6.35	11.732	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g31Y	Diag1	9.100	Shear	5.625	Rupture	122	6.35	11.732	9.100	10.547	14.237	5.625	0.000	0.000	0.000
0.000		0.000		Automatic											
g32P	Diag3	6.912	L/r	6.469	Rupture	171	9.77	6.912	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g32X	Diag3	6.912	L/r	6.469	Rupture	171	9.77	6.912	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g32XY	Diag3	6.912	L/r	6.469	Rupture	171	9.77	6.912	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g32Y	Diag3	6.912	L/r	6.469	Rupture	171	9.77	6.912	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g33P	Diag3	6.912	L/r	6.469	Rupture	171	9.77	6.912	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g33X	Diag3	6.912	L/r	6.469	Rupture	171	9.77	6.912	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g33XY	Diag3	6.912	L/r	6.469	Rupture	171	9.77	6.912	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g33Y	Diag3	6.912	L/r	6.469	Rupture	171	9.77	6.912	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g34P	Diag3	5.519	L/r	6.469	Rupture	192	11.29	5.519	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g34X	Diag3	5.519	L/r	6.469	Rupture	192	11.29	5.519	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g34XY	Diag3	5.519	L/r	6.469	Rupture	192	11.29	5.519	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g34Y	Diag3	5.519	L/r	6.469	Rupture	192	11.29	5.519	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g35P	Diag3	5.519	L/r	6.469	Rupture	192	11.29	5.519	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g35X	Diag3	5.519	L/r	6.469	Rupture	192	11.29	5.519	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g35XY	Diag3	5.519	L/r	6.469	Rupture	192	11.29	5.519	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g35Y	Diag3	5.519	L/r	6.469	Rupture	192	11.29	5.519	9.100	10.547	16.910	6.469	0.000	0.000	0.000
0.000		0.000		Automatic											
g36P	Diag4	6.568	L/r	7.242	Rupture	188	12.77	6.568	9.100	10.547	19.851	7.242	0.000	0.000	0.000
0.000		0.000		Automatic											
g36X	Diag4	6.568	L/r	7.242	Rupture	188	12.77	6.568	9.100	10.547	19.851	7.242	0.000	0.000	0.000
0.000		0.000		Automatic											
g36XY	Diag4	6.568	L/r	7.242	Rupture	188	12.77	6.568	9.100	10.547	19.851	7.242	0.000	0.000	0.000
0.000		0.000		Automatic											
g36Y	Diag4	6.568	L/r	7.242	Rupture	188	12.77	6.568	9.100	10.547	19.851	7.242	0.000	0.000	0.000
0.000		0.000		Automatic											
g37P	Diag4	6.568	L/r	7.242	Rupture	188	12.77	6.568	9.100	10.547	19.851	7.242	0.000	0.000	0.000
0.000		0.000		Automatic											
g37X	Diag4	6.568	L/r	7.242	Rupture	188	12.77	6.568	9.100	10.547	19.851	7.242	0.000	0.000	0.000
0.000		0.000		Automatic											
g37XY	Diag4	6.568	L/r	7.242	Rupture	188	12.77	6.568	9.100	10.547	19.851	7.242	0.000	0.000	0.000
0.000		0.000		Automatic											
g37Y	Diag4	6.568	L/r	7.242	Rupture	188	12.77	6.568	9.100	10.547	19.851	7.242	0.000	0.000	0.000
0.000		0.000		Automatic											
g38P	Diag5	8.653	L/r	8.203	Rupture	182	15.21	8.653	9.100	10.547	25.405	8.203	0.000	0.000	0.000
0.000		0.000		Automatic											
g38X	Diag5	8.653	L/r	8.203	Rupture	182	15.21	8.653	9.100	10.547	25.405	8.203	0.000	0.000	0.000
0.000		0.000		Automatic											
g38XY	Diag5	8.653	L/r	8.203	Rupture	182	15.21	8.653	9.100	10.547	25.405	8.203	0.000	0.000	0.000

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0.000              0.000           Automatic
   g38Y    Diag5    8.653       L/r    8.203   Rupture  182  15.21    8.653      9.100     10.547   25.405    8.203    0.000    0.000    0.000
0.000              0.000           Automatic
   g39P    Diag5    8.653       L/r    8.203   Rupture  182  15.21    8.653      9.100     10.547   25.405    8.203    0.000    0.000    0.000
0.000              0.000           Automatic
   g39X    Diag5    8.653       L/r    8.203   Rupture  182  15.21    8.653      9.100     10.547   25.405    8.203    0.000    0.000    0.000
0.000              0.000           Automatic
  g39XY    Diag5    8.653       L/r    8.203   Rupture  182  15.21    8.653      9.100     10.547   25.405    8.203    0.000    0.000    0.000
0.000              0.000           Automatic
   g39Y    Diag5    8.653       L/r    8.203   Rupture  182  15.21    8.653      9.100     10.547   25.405    8.203    0.000    0.000    0.000
0.000              0.000           Automatic
   g40P Diag6(R)    2.964       L/r    9.403   Rupture  301  18.08    2.964     16.800     13.594   24.887    9.403    0.000    0.000    0.000
0.000              0.000           Automatic
KL/R value of 301.27 exceeds maximum of 200.00 for member "g40P"  ??
   g40X Diag6(R)    2.964       L/r    9.403   Rupture  301  18.08    2.964     16.800     13.594   24.887    9.403    0.000    0.000    0.000
0.000              0.000           Automatic
KL/R value of 301.27 exceeds maximum of 200.00 for member "g40X"  ??
  g40XY Diag6(R)    2.964       L/r    9.403   Rupture  301  18.08    2.964     16.800     13.594   24.887    9.403    0.000    0.000    0.000
0.000              0.000           Automatic
KL/R value of 301.27 exceeds maximum of 200.00 for member "g40XY"  ??
   g40Y Diag6(R)    2.964       L/r    9.403   Rupture  301  18.08    2.964     16.800     13.594   24.887    9.403    0.000    0.000    0.000
0.000              0.000           Automatic
KL/R value of 301.27 exceeds maximum of 200.00 for member "g40Y"  ??
   g41P Diag6(R)    2.964       L/r    9.403   Rupture  301  18.08    2.964     16.800     13.594   24.887    9.403    0.000    0.000    0.000
0.000              0.000           Automatic
KL/R value of 301.27 exceeds maximum of 200.00 for member "g41P"  ??
   g41X Diag6(R)    2.964       L/r    9.403   Rupture  301  18.08    2.964     16.800     13.594   24.887    9.403    0.000    0.000    0.000
0.000              0.000           Automatic
KL/R value of 301.27 exceeds maximum of 200.00 for member "g41X"  ??
  g41XY Diag6(R)    2.964       L/r    9.403   Rupture  301  18.08    2.964     16.800     13.594   24.887    9.403    0.000    0.000    0.000
0.000              0.000           Automatic
KL/R value of 301.27 exceeds maximum of 200.00 for member "g41XY"  ??
   g41Y Diag6(R)    2.964       L/r    9.403   Rupture  301  18.08    2.964     16.800     13.594   24.887    9.403    0.000    0.000    0.000
0.000              0.000           Automatic
KL/R value of 301.27 exceeds maximum of 200.00 for member "g41Y"  ??
   g42P    Horz1    9.100     Shear    8.086   Rupture   48   4.00   26.288      9.100     10.547   25.523    8.086    0.000    0.000    0.000
0.000              0.000           Automatic
   g42Y    Horz1    9.100     Shear    8.086   Rupture   48   4.00   26.288      9.100     10.547   25.523    8.086    0.000    0.000    0.000
0.000              0.000           Automatic
   g43P    Horz1    9.100     Shear    8.086   Rupture   48   4.00   26.288      9.100     10.547   25.523    8.086    0.000    0.000    0.000
0.000              0.000           Automatic
   g43Y    Horz1    9.100     Shear    8.086   Rupture   48   4.00   26.288      9.100     10.547   25.523    8.086    0.000    0.000    0.000
0.000              0.000           Automatic
   g44P    Horz2    9.100     Shear    6.469   Rupture  122   4.00   13.406      9.100     10.547   16.910    6.469    0.000    0.000    0.000
0.000              0.000           Automatic
   g44X    Horz2    9.100     Shear    6.469   Rupture  122   4.00   13.406      9.100     10.547   16.910    6.469    0.000    0.000    0.000
0.000              0.000           Automatic
   g45P    Horz2    9.100     Shear    6.469   Rupture  122   4.00   13.406      9.100     10.547   16.910    6.469    0.000    0.000    0.000
0.000              0.000           Automatic
   g45X    Horz2    9.100     Shear    6.469   Rupture  122   4.00   13.406      9.100     10.547   16.910    6.469    0.000    0.000    0.000
0.000              0.000           Automatic
   g46P    Horz2    9.100     Shear    5.695   Rupture  122   4.00   13.406      9.100     10.547   16.910    5.695    0.000    0.000    0.000
0.000              0.000           Automatic
   g46X    Horz2    9.100     Shear    5.695   Rupture  122   4.00   13.406      9.100     10.547   16.910    5.695    0.000    0.000    0.000
0.000              0.000           Automatic
   g47P    Horz2    9.100     Shear    6.469   Rupture  122   4.00   13.406      9.100     10.547   16.910    6.469    0.000    0.000    0.000
0.000              0.000           Automatic
   g47Y    Horz2    9.100     Shear    6.469   Rupture  122   4.00   13.406      9.100     10.547   16.910    6.469    0.000    0.000    0.000
0.000              0.000           Automatic
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   g48P    Horz2    9.100     Shear    6.469   Rupture  122   4.00   13.406      9.100     10.547   16.910    6.469    0.000    0.000    0.000
0.000              0.000           Automatic
   g48X    Horz2    9.100     Shear    6.469   Rupture  122   4.00   13.406      9.100     10.547   16.910    6.469    0.000    0.000    0.000
0.000              0.000           Automatic
   g49P    Horz3    7.041       L/r    9.100     Shear  231  14.48    7.041      9.100     14.062   33.338   10.687    0.000    0.000    0.000
0.000              0.000           Automatic
KL/R value of 230.76 exceeds maximum of 200.00 for member "g49P"  ??
   g49Y    Horz3    7.041       L/r    9.100     Shear  231  14.48    7.041      9.100     14.062   33.338   10.687    0.000    0.000    0.000
0.000              0.000           Automatic
KL/R value of 230.76 exceeds maximum of 200.00 for member "g49Y"  ??
   g50P    Horz3    7.041       L/r    9.100     Shear  231  14.48    7.041      9.100     14.062   33.338   10.687    0.000    0.000    0.000
0.000              0.000           Automatic
KL/R value of 230.76 exceeds maximum of 200.00 for member "g50P"  ??
   g50X    Horz3    7.041       L/r    9.100     Shear  231  14.48    7.041      9.100     14.062   33.338   10.687    0.000    0.000    0.000
0.000              0.000           Automatic
KL/R value of 230.76 exceeds maximum of 200.00 for member "g50X"  ??
   g51P   Inner1    9.100     Shear    5.695   Rupture   99   5.66   13.392      9.100     10.547   14.237    5.695    0.000    0.000    0.000
0.000              0.000           Automatic
   g51X   Inner1    9.100     Shear    5.695   Rupture   99   5.66   13.392      9.100     10.547   14.237    5.695    0.000    0.000    0.000
0.000              0.000           Automatic
   g52P   Inner1    9.100     Shear    5.695   Rupture   99   5.66   13.392      9.100     10.547   14.237    5.695    0.000    0.000    0.000
0.000              0.000           Automatic
   g52X   Inner1    9.100     Shear    5.695   Rupture   99   5.66   13.392      9.100     10.547   14.237    5.695    0.000    0.000    0.000
0.000              0.000           Automatic
   g53P   Inner1    9.100     Shear    5.695   Rupture   99   5.66   13.392      9.100     10.547   14.237    5.695    0.000    0.000    0.000
0.000              0.000           Automatic
   g53X   Inner1    9.100     Shear    5.695   Rupture   99   5.66   13.392      9.100     10.547   14.237    5.695    0.000    0.000    0.000
0.000              0.000           Automatic
   g54P   Inner1    9.100     Shear    5.695   Rupture   99   5.66   13.392      9.100     10.547   14.237    5.695    0.000    0.000    0.000
0.000              0.000           Automatic
   g54X   Inner1    9.100     Shear    5.695   Rupture   99   5.66   13.392      9.100     10.547   14.237    5.695    0.000    0.000    0.000
0.000              0.000           Automatic
   g55P   Inner2    1.011       L/r    5.695   Rupture  419  20.48    1.011      9.100     10.547   14.237    5.695    0.000    0.000    0.000
0.000              0.000           Automatic
KL/R value of 418.86 exceeds maximum of 200.00 for member "g55P"  ??
   g55X   Inner2    1.011       L/r    5.695   Rupture  419  20.48    1.011      9.100     10.547   14.237    5.695    0.000    0.000    0.000
0.000              0.000           Automatic
KL/R value of 418.86 exceeds maximum of 200.00 for member "g55X"  ??
   g56P ShieldAr    9.100     Shear    9.100     Shear  178  11.75   14.666      9.100     21.094   43.937   16.312    0.000    0.000    0.000
0.000              0.000           Automatic
   g56X ShieldAr    9.100     Shear    9.100     Shear  178  11.75   14.666      9.100     21.094   43.937   16.312    0.000    0.000    0.000
0.000              0.000           Automatic
   g57P ShieldAr    9.100     Shear    9.100     Shear   61   4.00   40.905      9.100     21.094   43.937   16.312    0.000    0.000    0.000
0.000              0.000           Automatic
   g58P TopCrArm   16.970       L/r   18.200     Shear  123   8.00   16.970     18.200     21.094   22.613   21.094    0.000    0.000    0.000
0.000              0.000           Automatic
   g58X TopCrArm   16.970       L/r   18.200     Shear  123   8.00   16.970     18.200     21.094   22.613   21.094    0.000    0.000    0.000
0.000              0.000           Automatic
  g58XY TopCrArm   16.970       L/r   18.200     Shear  123   8.00   16.970     18.200     21.094   22.613   21.094    0.000    0.000    0.000
0.000              0.000           Automatic
   g58Y TopCrArm   16.970       L/r   18.200     Shear  123   8.00   16.970     18.200     21.094   22.613   21.094    0.000    0.000    0.000
0.000              0.000           Automatic
   g59P TopCrArm   18.200     Shear   18.200     Shear   97   4.00   19.668     18.200     21.094   22.613   21.094    0.000    0.000    0.000
0.000              0.000           Automatic
   g59Y TopCrArm   18.200     Shear   18.200     Shear   97   4.00   19.668     18.200     21.094   22.613   21.094    0.000    0.000    0.000
0.000              0.000           Automatic
   g60P MidCrArm   18.200     Shear   18.200     Shear  131  11.92   25.411     18.200     28.125   33.301   18.750    0.000    0.000    0.000
0.000              0.000           Automatic  Member "g60P" 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.  ??
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g60X MidCrArm	18.200	Shear	18.200	Shear	131	11.92	25.411	18.200	28.125	33.301	18.750	0.000	0.000	0.000
0.000	0.000	Automatic Member "g60X" 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. ??												
g60XY MidCrArm	18.200	Shear	18.200	Shear	131	11.92	25.411	18.200	28.125	33.301	18.750	0.000	0.000	0.000
0.000	0.000	Automatic Member "g60XY" 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. ??												
g60Y MidCrArm	18.200	Shear	18.200	Shear	131	11.92	25.411	18.200	28.125	33.301	18.750	0.000	0.000	0.000
0.000	0.000	Automatic Member "g60Y" 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. ??												
g61P MidCrArm	18.200	Shear	18.200	Shear	88	4.00	32.671	18.200	28.125	33.301	18.750	0.000	0.000	0.000
0.000	0.000	Automatic Member "g61P" 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. ??												
g61Y MidCrArm	18.200	Shear	18.200	Shear	88	4.00	32.671	18.200	28.125	33.301	18.750	0.000	0.000	0.000
0.000	0.000	Automatic Member "g61Y" 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. ??												
g62P BotCrArm	16.970	L/r	18.200	Shear	123	8.00	16.970	18.200	21.094	22.613	21.094	0.000	0.000	0.000
0.000	0.000	Automatic												
g62X BotCrArm	16.970	L/r	18.200	Shear	123	8.00	16.970	18.200	21.094	22.613	21.094	0.000	0.000	0.000
0.000	0.000	Automatic												
g62XY BotCrArm	16.970	L/r	18.200	Shear	123	8.00	16.970	18.200	21.094	22.613	21.094	0.000	0.000	0.000
0.000	0.000	Automatic												
g62Y BotCrArm	16.970	L/r	18.200	Shear	123	8.00	16.970	18.200	21.094	22.613	21.094	0.000	0.000	0.000
0.000	0.000	Automatic												
g63P BotCrArm	18.200	Shear	18.200	Shear	97	4.00	19.668	18.200	21.094	22.613	21.094	0.000	0.000	0.000
0.000	0.000	Automatic												
g63Y BotCrArm	18.200	Shear	18.200	Shear	97	4.00	19.668	18.200	21.094	22.613	21.094	0.000	0.000	0.000
0.000	0.000	Automatic												
g64P ShArmBr	11.489	L/r	27.300	Shear	211	12.93	11.489	27.300	42.187	34.136	42.187	0.000	0.000	0.000
0.000	0.000	Automatic Member "g64P" 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. ??												
g64X ShArmBr	11.489	L/r	27.300	Shear	211	12.93	11.489	27.300	42.187	34.136	42.187	0.000	0.000	0.000
0.000	0.000	Automatic Member "g64X" 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. ??												
g64XY ShArmBr	11.489	L/r	27.300	Shear	211	12.93	11.489	27.300	42.187	34.136	42.187	0.000	0.000	0.000
0.000	0.000	Automatic Member "g64XY" 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. ??												
g64Y ShArmBr	11.489	L/r	27.300	Shear	211	12.93	11.489	27.300	42.187	34.136	42.187	0.000	0.000	0.000
0.000	0.000	Automatic Member "g64Y" 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. ??												
g65P TopArmBr	9.100	Shear	8.930	Rupture	111	9.22	20.853	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000	0.000	Automatic												
g65X TopArmBr	9.100	Shear	8.930	Rupture	111	9.22	20.853	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000	0.000	Automatic												
g66P MidArmBr	9.100	Shear	8.930	Rupture	97	8.07	22.980	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000	0.000	Automatic												
g66X MidArmBr	9.100	Shear	8.930	Rupture	97	8.07	22.980	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000	0.000	Automatic												
g66XY MidArmBr	9.100	Shear	8.930	Rupture	97	8.07	22.980	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000	0.000	Automatic												
g66Y MidArmBr	9.100	Shear	8.930	Rupture	97	8.07	22.980	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000	0.000	Automatic												
g67P BotArmBr	9.100	Shear	8.930	Rupture	109	9.06	21.162	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000	0.000	Automatic												
g67X BotArmBr	9.100	Shear	8.930	Rupture	109	9.06	21.162	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000	0.000	Automatic												
g67XY BotArmBr	9.100	Shear	8.930	Rupture	109	9.06	21.162	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000	0.000	Automatic												
g67Y BotArmBr	9.100	Shear	8.930	Rupture	109	9.06	21.162	9.100	10.547	25.523	8.930	0.000	0.000	0.000

0.000		0.000		Automatic											
g68P	MidArmBr	9.100	Shear	8.930	Rupture	50	4.14	28.698	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000		0.000		Automatic											
g68X	MidArmBr	9.100	Shear	8.930	Rupture	50	4.14	28.698	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000		0.000		Automatic											
g68XY	MidArmBr	9.100	Shear	8.930	Rupture	50	4.14	28.698	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000		0.000		Automatic											
g68Y	MidArmBr	9.100	Shear	8.930	Rupture	50	4.14	28.698	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000		0.000		Automatic											
g69P	MidArmBr	9.100	Shear	8.930	Rupture	55	4.54	28.221	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000		0.000		Automatic											
g69X	MidArmBr	9.100	Shear	8.930	Rupture	55	4.54	28.221	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000		0.000		Automatic											
g69XY	MidArmBr	9.100	Shear	8.930	Rupture	55	4.54	28.221	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000		0.000		Automatic											
g69Y	MidArmBr	9.100	Shear	8.930	Rupture	55	4.54	28.221	9.100	10.547	25.523	8.930	0.000	0.000	0.000
0.000		0.000		Automatic											
g70P	Leg3	55.714	L/r	51.645	Net Sect	67	8.89	55.714	72.800	112.500	51.645	100.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g70X	Leg3	55.714	L/r	51.645	Net Sect	67	8.89	55.714	72.800	112.500	51.645	100.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g70XY	Leg3	55.714	L/r	51.645	Net Sect	67	8.89	55.714	72.800	112.500	51.645	100.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g70Y	Leg3	55.714	L/r	51.645	Net Sect	67	8.89	55.714	72.800	112.500	51.645	100.000	0.000	0.000	0.000
0.000		0.000		Automatic											
g71P	**Diag6(R)**	**2.339**	**L/r**	**9.403**	**Rupture**	**339**	**20.58**	**2.339**	**16.800**	**13.594**	**24.887**	**9.403**	**0.000**	**0.000**	**0.000**
0.000		**0.000**		**Automatic**											
KL/R value of 339.17 exceeds maximum of 200.00 for member "g71P" ??															
g71X	**Diag6(R)**	**2.339**	**L/r**	**9.403**	**Rupture**	**339**	**20.58**	**2.339**	**16.800**	**13.594**	**24.887**	**9.403**	**0.000**	**0.000**	**0.000**
0.000		**0.000**		**Automatic**											
KL/R value of 339.17 exceeds maximum of 200.00 for member "g71X" ??															
g71XY	**Diag6(R)**	**2.339**	**L/r**	**9.403**	**Rupture**	**339**	**20.58**	**2.339**	**16.800**	**13.594**	**24.887**	**9.403**	**0.000**	**0.000**	**0.000**
0.000		**0.000**		**Automatic**											
KL/R value of 339.17 exceeds maximum of 200.00 for member "g71XY" ??															
g71Y	**Diag6(R)**	**2.339**	**L/r**	**9.403**	**Rupture**	**339**	**20.58**	**2.339**	**16.800**	**13.594**	**24.887**	**9.403**	**0.000**	**0.000**	**0.000**
0.000		**0.000**		**Automatic**											
KL/R value of 339.17 exceeds maximum of 200.00 for member "g71Y" ??															
g72P	**Diag6(R)**	**2.339**	**L/r**	**9.403**	**Rupture**	**339**	**20.58**	**2.339**	**16.800**	**13.594**	**24.887**	**9.403**	**0.000**	**0.000**	**0.000**
0.000		**0.000**		**Automatic**											
KL/R value of 339.17 exceeds maximum of 200.00 for member "g72P" ??															
g72X	**Diag6(R)**	**2.339**	**L/r**	**9.403**	**Rupture**	**339**	**20.58**	**2.339**	**16.800**	**13.594**	**24.887**	**9.403**	**0.000**	**0.000**	**0.000**
0.000		**0.000**		**Automatic**											
KL/R value of 339.17 exceeds maximum of 200.00 for member "g72X" ??															
g72XY	**Diag6(R)**	**2.339**	**L/r**	**9.403**	**Rupture**	**339**	**20.58**	**2.339**	**16.800**	**13.594**	**24.887**	**9.403**	**0.000**	**0.000**	**0.000**
0.000		**0.000**		**Automatic**											
KL/R value of 339.17 exceeds maximum of 200.00 for member "g72XY" ??															
g72Y	**Diag6(R)**	**2.339**	**L/r**	**9.403**	**Rupture**	**339**	**20.58**	**2.339**	**16.800**	**13.594**	**24.887**	**9.403**	**0.000**	**0.000**	**0.000**
0.000		**0.000**		**Automatic**											
KL/R value of 339.17 exceeds maximum of 200.00 for member "g72Y" ??															

The model contains 247 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	0.0782	4.385	2.324
2P	0.0969	5.519	3.725
3P	0.0428	2.306	2.306
4P	0.054	3.106	2.594
5P	0.104	5.529	3.635
6P	0.0578	3.780	3.102
7P	0.0787	4.226	3.544
8P	0.0614	3.072	3.072
9P	0.095	3.906	3.906
16P	0.0956	4.948	1.571
17P	0.0305	2.383	0.833
18P	0.0687	4.754	0.889
19P	0.0362	3.088	1.200
20P	0.0107	1.378	0.466
1X	0.0782	4.385	2.324
2X	0.0969	5.519	3.725
2XY	0.0969	5.519	3.725
2Y	0.0969	5.519	3.725
3X	0.0428	2.306	2.306
3XY	0.0428	2.306	2.306
3Y	0.0428	2.306	2.306
4X	0.054	3.106	2.594
4XY	0.054	3.106	2.594
4Y	0.054	3.106	2.594
5X	0.104	5.529	3.635
5XY	0.104	5.529	3.635
5Y	0.104	5.529	3.635
6X	0.0578	3.780	3.102
6XY	0.0578	3.780	3.102
6Y	0.0578	3.780	3.102
7X	0.0787	4.226	3.544
7XY	0.0787	4.226	3.544
7Y	0.0787	4.226	3.544
8X	0.0614	3.072	3.072
8XY	0.0614	3.072	3.072
8Y	0.0614	3.072	3.072
9X	0.095	3.906	3.906
9XY	0.095	3.906	3.906
9Y	0.095	3.906	3.906
16X	0.0956	4.948	1.571
17X	0.0305	2.383	0.833
18X	0.0687	4.754	0.889
19X	0.0362	3.088	1.200
20X	0.0107	1.378	0.466
20XY	0.0107	1.378	0.466
20Y	0.0107	1.378	0.466
10S	0.0437	2.245	2.245
11S	0.0664	3.510	3.510
12S	0.0905	4.802	4.802
13S	0.1	5.115	5.115
14S	0.129	6.472	6.472
15S	0.25	10.494	10.494
21S	0.182	7.581	7.581
10X	0.0437	2.245	2.245
10XY	0.0437	2.245	2.245
10Y	0.0437	2.245	2.245
11X	0.0664	3.510	3.510
11XY	0.0664	3.510	3.510
11Y	0.0664	3.510	3.510

12X	0.0905	4.802	4.802
12XY	0.0905	4.802	4.802
12Y	0.0905	4.802	4.802
13X	0.1	5.115	5.115
13XY	0.1	5.115	5.115
13Y	0.1	5.115	5.115
14X	0.129	6.472	6.472
14XY	0.129	6.472	6.472
14Y	0.129	6.472	6.472
15X	0.25	10.494	10.494
15XY	0.25	10.494	10.494
15Y	0.25	10.494	10.494
21X	0.182	7.581	7.581
21XY	0.182	7.581	7.581
21Y	0.182	7.581	7.581
Total	6.47	331.288	279.912

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)
1	2.561	150.417	99.041	70.350	34.445
2	3.909	180.872	180.872	70.233	70.233
Total	6.471	331.288	279.912	140.583	104.678

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)
1	2.561	2.561	593.631	593.631
2	3.909	4.105	894.929	939.675
Total	6.471	6.666	1488.560	1533.307

Section Joint Information:

Section Label	Joint Label	Joint Elevation (ft)
1	2X	73.250
1	3X	69.750
1	2P	73.250
1	3P	69.750
1	2Y	73.250
1	3Y	69.750
1	2XY	73.250
1	3XY	69.750
1	4X	66.250
1	4P	66.250
1	4Y	66.250
1	4XY	66.250
1	5X	62.750
1	5P	62.750
1	5Y	62.750
1	5XY	62.750

1	6X	58.500
1	6P	58.500
1	6Y	58.500
1	6XY	58.500
1	7X	54.250
1	7P	54.250
1	7Y	54.250
1	7XY	54.250
1	8X	50.000
1	8P	50.000
1	8Y	50.000
1	8XY	50.000
1	1X	78.250
1	1P	78.250
1	16X	78.250
1	16P	78.250
1	17X	73.250
1	17P	73.250
1	18X	62.750
1	18P	62.750
1	19X	54.250
1	19P	54.250
1	20X	64.000
1	20P	64.000
1	20Y	64.000
1	20XY	64.000
2	8X	50.000
2	10X	46.875
2	8P	50.000
2	10S	46.875
2	8Y	50.000
2	10Y	46.875
2	8XY	50.000
2	10XY	46.875
2	11X	43.750
2	11S	43.750
2	11Y	43.750
2	11XY	43.750
2	12X	37.083
2	12S	37.083
2	12Y	37.083
2	12XY	37.083
2	13X	30.583
2	13S	30.583
2	13Y	30.583
2	13XY	30.583
2	14X	24.500
2	14S	24.500
2	14Y	24.500
2	14XY	24.500
2	15X	17.250
2	15S	17.250
2	15Y	17.250
2	15XY	17.250
2	21X	8.670
2	21S	8.670
2	21Y	8.670
2	21XY	8.670
2	9X	0.000

2	9P	0.000
2	9Y	0.000
2	9XY	0.000

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)
1	78.250	50.000	42	145	0.00	4.00	103.000	27.50	4.00	271.740
2	50.000	0.000	36	102	4.00	20.00	600.000	4.00	20.00	600.000

*** 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)
1	16P	C-EX1	No Limit
2	16X	C-EX1	No Limit
3	17P	C-EX1	No Limit
4	17X	C-EX1	No Limit
5	18P	C-EX1	No Limit
6	18X	C-EX1	No Limit
7	19P	C-EX1	No Limit
8	19X	C-EX1	No Limit
9	2P	C-EX1	No Limit
10	4P	C-EX1	No Limit
11	6P	C-EX1	No Limit
12	8P	C-EX1	No Limit
13	11S	C-EX1	No Limit
14	13S	C-EX1	No Limit
15	15S	C-EX1	No Limit
16	2X	C-EX1	No Limit
17	4X	C-EX1	No Limit
18	6X	C-EX1	No Limit
19	8X	C-EX1	No Limit
20	11X	C-EX1	No Limit
21	13X	C-EX1	No Limit
22	15X	C-EX1	No Limit
23	2XY	C-EX1	No Limit
24	2Y	C-EX1	No Limit
25	4XY	C-EX1	No Limit
26	4Y	C-EX1	No Limit

*** Loads Data

Loads from file: j:\jobs\1204700.wi\co12 - ct43xc837\calcs\pls tower\cl&p # 280.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)	78.25 (ft)	
Structure height	78.25 (ft)	
Structure height above ground	78.25 (ft)	
Tower Shape	Rectangular	

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	26 loads	Wind on Face	4	0	0.000	0.000	0.0	
NESC Extreme	1.0000	1.0000	1.00000	1.0000	1.0000	1.0000	26 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
16P	741	716	0	Shield Wire
16X	741	716	0	Shield Wire
17P	1133	786	0	Conductor
17X	1133	786	0	Conductor
18P	1133	786	0	Conductor
18X	1133	786	0	Conductor
19P	1133	786	0	Conductor
19X	1133	786	0	Conductor
2X	161	60	0	Coax Cables
4X	339	127	0	Coax Cables
6X	374	140	0	Coax Cables
8X	339	127	0	Coax Cables
11X	448	167	0	Coax Cables
13X	609	228	0	Coax Cables
15X	690	258	0	Coax Cables
2P	80	32	0	Coax Cables
4P	170	68	0	Coax Cables
6P	187	75	0	Coax Cables
8P	170	68	0	Coax Cables
11S	224	90	0	Coax Cables
13S	305	123	0	Coax Cables
15S	345	139	0	Coax Cables

2XY	451	1029	-691	Top Connection
2Y	1526	408	-12	Top Connection
4XY	1066	-618	512	Bottom Connection
4Y	888	-6	19	Bottom Connection

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)
1	78.25	50.00	64.13	10.00	10.00	3.200	1102.3	0.00	3.200	0.0	0	3842
2	50.00	0.00	25.00	10.00	10.00	3.200	2247.5	0.00	3.200	0.0	0	6157

Point Loads for Load Case "NESC Extreme":

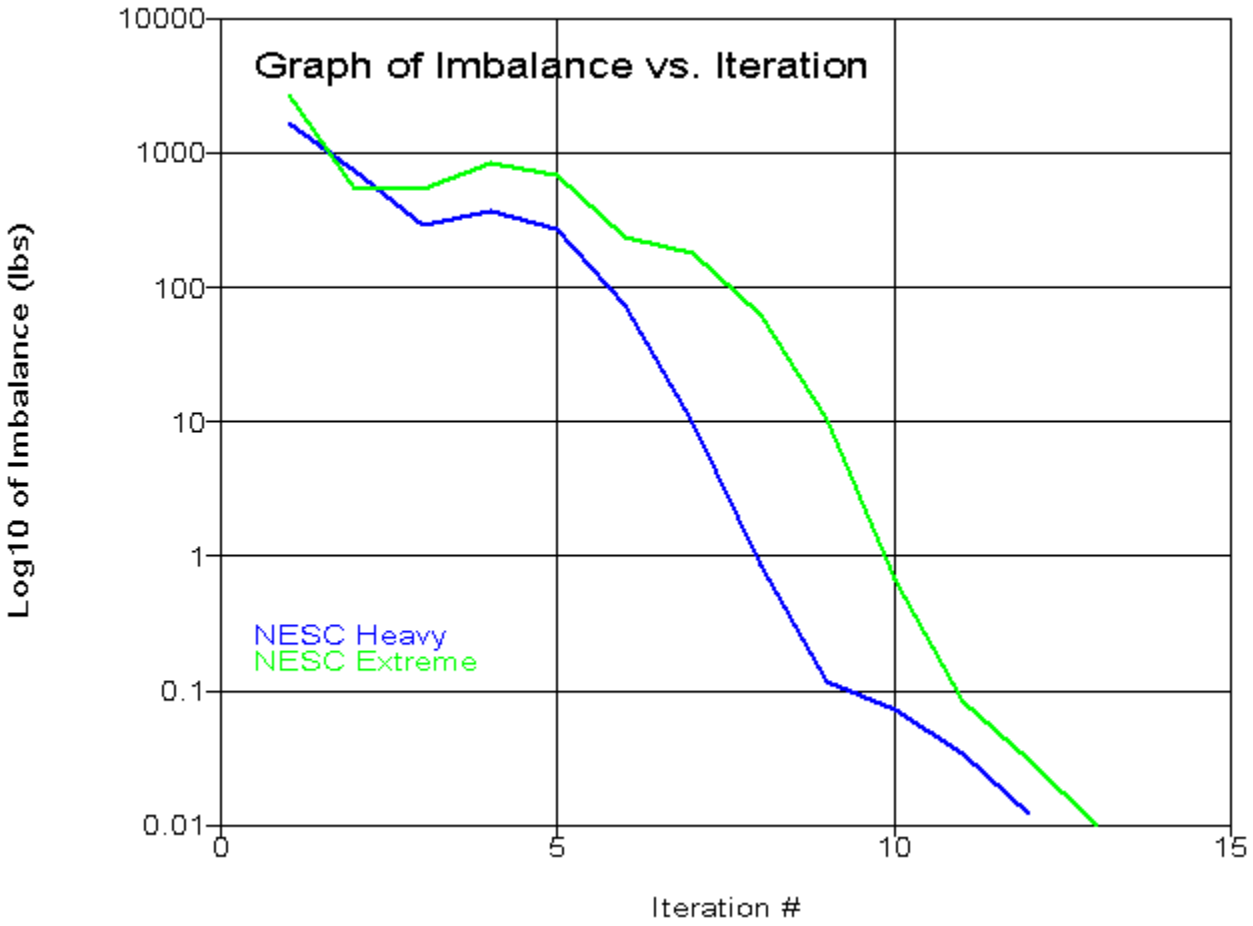
Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
16P	172	567	0	Shield Wire
16X	172	567	0	Shield Wire
17P	383	769	0	Conductor
17X	383	769	0	Conductor
18P	383	769	0	Conductor
18X	383	769	0	Conductor
19P	383	769	0	Conductor
19X	383	769	0	Conductor
2X	44	186	0	Coax Cables
4X	92	391	0	Coax Cables
6X	101	431	0	Coax Cables
8X	92	391	0	Coax Cables
11X	122	517	0	Coax Cables
13X	165	703	0	Coax Cables
15X	187	796	0	Coax Cables
2P	22	93	0	Coax Cables
4P	46	196	0	Coax Cables
6P	51	216	0	Coax Cables
8P	46	196	0	Coax Cables
11S	61	259	0	Coax Cables
13S	83	352	0	Coax Cables
15S	94	398	0	Coax Cables
2XY	-1485	2611	-1325	Top Connection
2Y	2368	2323	1013	Top Connection
4XY	764	-1296	753	Bottom Connection
4Y	108	-1035	-440	Bottom Connection

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 Gross Area (ft^2)	Tran Soli-dity Ratio	Tran Angle Drag Coef	Tran Wind Load (lbs)	Long Adj. Wind Pres. (psf)	Long Angle Face Area (ft^2)	Long Gross Area (ft^2)	Long Soli-dity Ratio	Long Angle Drag Coef	Long Wind Load (lbs)	Ice Weight (lbs)	Total Weight (lbs)
1	78.25	50.00	64.13	30.48	30.48	34.45	103.00	0.334	3.200	3359.1	0.00	70.35	271.74	0.259	3.200	0.0	0	2561
2	50.00	0.00	25.00	30.48	30.48	70.23	600.00	0.117	3.200	6849.2	0.00	70.23	600.00	0.117	3.200	0.0	0	4105

*** Analysis Results:

Maximum element usage is 96.29% for Angle "g26XY" in load case "NESC Extreme"
Maximum insulator usage is 7.13% for Clamp "24" in load case "NESC Extreme"



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	g1P	4.61	2.572	0.000	0.881	2.572
Leg1	g1X	6.55	0.000	-3.269	-3.014	-3.269
Leg1	g1XY	9.96	0.000	-4.966	-4.491	-4.966
Leg1	g1Y	5.80	3.233	0.000	0.048	3.233

Leg1	g2P	12.49	6.966	0.000	3.302	6.966
Leg1	g2X	15.32	0.000	-7.642	-5.420	-7.642
Leg1	g2XY	19.51	0.000	-9.734	-7.500	-9.734
Leg1	g2Y	13.35	7.443	0.000	1.781	7.443
Leg1	g3P	18.33	10.220	0.000	4.376	10.220
Leg1	g3X	23.01	0.000	-11.478	-8.028	-11.478
Leg1	g3XY	26.01	0.000	-12.973	-10.732	-12.973
Leg1	g3Y	16.68	9.302	0.000	1.811	9.302
Leg1	g4P	26.97	15.042	0.000	7.635	15.042
Leg1	g4X	34.46	0.000	-16.227	-10.661	-16.227
Leg1	g4XY	36.71	0.000	-17.285	-13.386	-17.285
Leg1	g4Y	24.57	13.705	0.000	4.813	13.705
Leg1	g5P	55.07	20.044	0.000	10.183	20.044
Leg1	g5X	59.95	0.000	-21.822	-14.634	-21.822
Leg1	g5XY	62.23	0.000	-22.651	-17.270	-22.651
Leg1	g5Y	51.12	18.608	0.000	7.412	18.608
Leg2	g6P	42.62	23.769	0.000	12.884	23.769
Leg2	g6X	53.86	0.000	-25.360	-16.762	-25.360
Leg2	g6XY	54.91	0.000	-25.854	-19.354	-25.854
Leg2	g6Y	39.44	21.994	0.000	9.804	21.994
Leg2	g7P	50.96	28.423	0.000	15.191	28.423
Leg2	g7X	61.57	0.000	-31.298	-21.217	-31.298
Leg2	g7XY	62.91	0.000	-31.980	-23.805	-31.980
Leg2	g7Y	48.66	27.139	0.000	12.387	27.139
Leg2	g8P	50.60	28.222	0.000	14.713	28.222
Leg2	g8X	62.02	0.000	-31.530	-21.797	-31.530
Leg2	g8XY	64.56	0.000	-32.818	-24.365	-32.818
Leg2	g8Y	49.46	27.585	0.000	12.298	27.585
Leg2	g9P	46.53	25.952	0.000	12.854	25.952
Leg2	g9X	89.16	0.000	-29.701	-20.619	-29.701
Leg2	g9XY	92.82	0.000	-30.921	-22.523	-30.921
Leg2	g9Y	46.51	25.940	0.000	11.394	25.940
Leg2	g10P	47.18	26.314	0.000	12.459	26.314
Leg2	g10X	89.19	0.000	-30.703	-21.300	-30.703
Leg2	g10XY	92.32	0.000	-31.781	-22.920	-31.781
Leg2	g10Y	47.40	26.433	0.000	11.145	26.433
Leg2	g11P	71.46	26.010	0.000	11.420	26.010
Leg2	g11X	84.20	0.000	-30.649	-21.275	-30.649
Leg2	g11XY	86.16	0.000	-31.362	-22.322	-31.362
Leg2	g11Y	71.46	26.011	0.000	10.676	26.011
Leg3	g12P	41.62	26.648	0.000	11.293	26.648
Leg3	g12X	78.53	0.000	-32.032	-21.993	-32.032
Leg3	g12XY	78.52	0.000	-32.029	-22.664	-32.029
Leg3	g12Y	41.14	26.338	0.000	10.439	26.338
Leg3	g13P	42.33	27.100	0.000	10.446	27.100
Leg3	g13X	58.55	0.000	-32.723	-22.641	-32.723
Leg3	g13XY	57.94	0.000	-32.381	-22.853	-32.381
Leg3	g13Y	41.56	26.608	0.000	10.089	26.608
Leg4	g14P	3.57	0.503	0.000	0.019	0.503
Leg4	g14X	11.10	0.000	-1.124	-1.124	-0.918
Leg4	g14XY	9.66	0.000	-0.978	-0.978	-0.475
Leg4	g14Y	0.90	0.069	-0.091	-0.091	0.069
Diag1	g15P	10.54	0.000	-0.959	-0.890	-0.959
Diag1	g15X	14.24	0.811	0.000	0.533	0.811
Diag1	g15XY	6.15	0.351	0.000	0.351	0.259
Diag1	g15Y	8.29	0.000	-0.754	-0.754	-0.419
Diag1	g16P	19.89	0.000	-1.810	-1.590	-1.810
Diag1	g16X	28.00	1.595	0.000	0.921	1.595
Diag1	g16XY	69.42	3.954	0.000	1.554	3.954

Diag1	g16Y	46.08	0.000	-4.193	-2.279	-4.193
Diag1	g17P	12.21	0.696	0.000	0.056	0.696
Diag1	g17X	8.74	0.000	-0.796	-0.250	-0.796
Diag1	g17XY	29.88	1.702	0.000	0.911	1.702
Diag1	g17Y	15.18	0.000	-1.382	-0.168	-1.382
Diag1	g18P	18.62	0.000	-1.694	-0.983	-1.694
Diag1	g18X	33.60	1.914	0.000	1.594	1.914
Diag1	g18XY	74.97	4.270	0.000	2.269	4.270
Diag1	g18Y	44.27	0.000	-4.029	-1.616	-4.029
Diag1	g19P	25.36	1.444	0.000	0.203	1.444
Diag1	g19X	19.48	0.000	-1.773	-0.959	-1.773
Diag1	g19XY	12.31	0.701	0.000	0.191	0.701
Diag1	g19Y	6.80	0.000	-0.619	-0.020	-0.619
Diag2	g20P	27.30	0.000	-2.484	-1.744	-2.484
Diag2	g20X	26.65	2.298	0.000	1.254	2.298
Diag2	g20XY	29.53	2.547	0.000	0.984	2.547
Diag2	g20Y	33.52	0.000	-3.051	-2.223	-3.051
Diag2	g21P	5.85	0.301	-0.532	-0.532	0.301
Diag2	g21X	8.08	0.000	-0.736	-0.575	-0.736
Diag2	g21XY	8.83	0.761	-0.082	-0.082	0.761
Diag2	g21Y	13.01	0.000	-1.184	-0.768	-1.184
Diag1	g22P	34.13	0.000	-3.106	-2.440	-3.106
Diag1	g22X	50.47	2.875	0.000	1.905	2.875
Diag1	g22XY	69.17	3.940	0.000	1.795	3.940
Diag1	g22Y	49.51	0.000	-4.506	-3.141	-4.506
Diag1	g23P	9.35	0.533	0.000	0.024	0.533
Diag1	g23X	6.67	0.000	-0.607	-0.402	-0.607
Diag1	g23XY	4.37	0.249	-0.044	-0.044	0.249
Diag1	g23Y	3.58	0.000	-0.326	-0.080	-0.326
Diag1	g24P	43.69	0.000	-3.976	-2.806	-3.976
Diag1	g24X	64.73	3.687	0.000	2.130	3.687
Diag1	g24XY	68.34	3.892	0.000	1.815	3.892
Diag1	g24Y	49.04	0.000	-4.463	-3.204	-4.463
Diag1	g25P	4.69	0.000	-0.427	-0.427	-0.017
Diag1	g25X	2.95	0.000	-0.268	-0.268	-0.188
Diag1	g25XY	10.06	0.573	0.000	0.087	0.573
Diag1	g25Y	8.28	0.000	-0.754	-0.487	-0.754
Diag1	g26P	49.42	0.000	-4.497	-3.505	-4.497
Diag1	g26X	83.17	4.035	0.000	2.496	4.035
Diag1	g26XY	96.29	4.671	0.000	2.200	4.671
Diag1	g26Y	59.68	0.000	-5.431	-4.097	-5.431
Diag1	g27P	43.88	0.000	-3.993	-3.031	-3.993
Diag1	g27X	73.24	3.553	0.000	1.848	3.553
Diag1	g27XY	90.60	4.396	0.000	2.195	4.396
Diag1	g27Y	53.19	0.000	-4.840	-3.132	-4.840
Diag1	g28P	30.96	1.741	0.000	0.815	1.741
Diag1	g28X	18.52	0.000	-1.685	-1.017	-1.685
Diag1	g28XY	11.84	0.000	-1.077	-1.051	-1.077
Diag1	g28Y	13.92	0.783	0.000	0.415	0.783
Diag1	g29P	16.97	0.000	-1.544	-1.009	-1.544
Diag1	g29X	28.46	1.601	0.000	1.016	1.601
Diag1	g29XY	27.24	1.532	0.000	0.582	1.532
Diag1	g29Y	20.74	0.000	-1.888	-1.427	-1.888
Diag1	g30P	19.15	1.077	0.000	0.713	1.077
Diag1	g30X	14.04	0.000	-1.277	-0.717	-1.277
Diag1	g30XY	5.76	0.000	-0.524	-0.411	-0.524
Diag1	g30Y	13.20	0.742	0.000	0.742	0.640
Diag1	g31P	22.33	1.256	0.000	0.961	1.256
Diag1	g31X	11.70	0.000	-1.033	-0.383	-1.033

Diag1 g31XY	12.36	0.000	-1.091	-0.722	-1.091
Diag1 g31Y	17.74	0.998	0.000	0.635	0.998
Diag3 g32P	4.85	0.314	0.000	0.281	0.314
Diag3 g32X	8.80	0.000	-0.608	-0.608	-0.505
Diag3 g32XY	10.23	0.000	-0.707	-0.707	-0.410
Diag3 g32Y	4.19	0.271	0.000	0.271	0.208
Diag3 g33P	14.92	0.000	-0.839	-0.561	-0.839
Diag3 g33X	13.22	0.855	0.000	0.522	0.855
Diag3 g33XY	12.72	0.823	0.000	0.287	0.823
Diag3 g33Y	19.13	0.000	-1.076	-0.829	-1.076
Diag3 g34P	3.53	0.229	0.000	0.229	0.062
Diag3 g34X	4.49	0.000	-0.248	-0.248	-0.071
Diag3 g34XY	4.34	0.005	-0.240	-0.240	0.005
Diag3 g34Y	4.68	0.302	0.000	0.302	0.017
Diag3 g35P	9.93	0.642	0.000	0.483	0.642
Diag3 g35X	11.48	0.000	-0.484	-0.184	-0.484
Diag3 g35XY	11.99	0.000	-0.505	-0.343	-0.505
Diag3 g35Y	7.44	0.481	0.000	0.301	0.481
Diag4 g36P	14.06	0.000	-0.923	-0.297	-0.923
Diag4 g36X	6.61	0.479	-0.114	-0.114	0.479
Diag4 g36XY	5.23	0.150	-0.251	-0.251	0.150
Diag4 g36Y	3.58	0.034	-0.235	0.034	-0.235
Diag4 g37P	6.77	0.000	-0.325	-0.248	-0.325
Diag4 g37X	3.29	0.238	0.000	0.095	0.238
Diag4 g37XY	3.43	0.249	0.000	0.077	0.249
Diag4 g37Y	9.05	0.000	-0.435	-0.337	-0.435
Diag5 g38P	7.62	0.000	-0.659	-0.134	-0.659
Diag5 g38X	11.28	0.925	0.000	0.192	0.925
Diag5 g38XY	4.29	0.352	-0.084	-0.084	0.352
Diag5 g38Y	4.26	0.000	-0.369	-0.013	-0.369
Diag5 g39P	3.36	0.276	0.000	0.194	0.276
Diag5 g39X	2.24	0.000	-0.141	-0.068	-0.141
Diag5 g39XY	2.10	0.000	-0.133	-0.083	-0.133
Diag5 g39Y	2.26	0.185	0.000	0.121	0.185
Diag6(R) g40P	46.15	0.000	-1.368	-0.601	-1.368
Diag6(R) g40X	12.49	1.174	0.000	0.218	1.174
Diag6(R) g40XY	7.13	0.671	0.000	0.020	0.671
Diag6(R) g40Y	26.29	0.000	-0.779	-0.355	-0.779
Diag6(R) g41P	30.98	0.000	-0.657	-0.441	-0.657
Diag6(R) g41X	6.14	0.577	0.000	0.166	0.577
Diag6(R) g41XY	1.80	0.169	0.000	0.089	0.169
Diag6(R) g41Y	12.65	0.000	-0.268	-0.265	-0.268
Horz1 g42P	24.38	1.971	0.000	1.971	0.687
Horz1 g42Y	31.41	2.540	0.000	2.540	1.005
Horz1 g43P	17.61	1.424	0.000	1.424	0.470
Horz1 g43Y	23.89	1.932	0.000	1.932	0.751
Horz2 g44P	17.22	1.114	0.000	1.114	0.259
Horz2 g44X	9.79	0.633	0.000	0.633	0.348
Horz2 g45P	13.11	0.848	0.000	0.848	0.432
Horz2 g45X	11.21	0.725	0.000	0.725	0.173
Horz2 g46P	56.93	3.242	0.000	2.481	3.242
Horz2 g46X	29.85	0.000	-2.716	-1.073	-2.716
Horz2 g47P	1.96	0.000	-0.179	-0.072	-0.179
Horz2 g47Y	0.16	0.000	-0.015	-0.014	-0.015
Horz2 g48P	5.39	0.000	-0.490	-0.379	-0.490
Horz2 g48X	6.00	0.388	0.000	0.168	0.388
Horz3 g49P	3.43	0.000	-0.242	-0.150	-0.242
Horz3 g49Y	0.52	0.048	0.000	0.029	0.048
Horz3 g50P	3.25	0.296	0.000	0.169	0.296

Horz3	g50X	4.64	0.000	-0.326	-0.190	-0.326
Inner1	g51P	1.93	0.110	-0.121	-0.121	0.110
Inner1	g51X	2.66	0.000	-0.242	-0.242	-0.205
Inner1	g52P	3.96	0.000	-0.361	-0.058	-0.361
Inner1	g52X	6.90	0.393	0.000	0.106	0.393
Inner1	g53P	2.92	0.166	0.000	0.166	0.069
Inner1	g53X	3.09	0.176	0.000	0.176	0.081
Inner1	g54P	3.51	0.000	-0.319	-0.159	-0.319
Inner1	g54X	3.34	0.190	0.000	0.029	0.190
Inner2	g55P	32.53	0.000	-0.329	-0.139	-0.329
Inner2	g55X	4.84	0.276	0.000	0.105	0.276
ShieldAr	g56P	14.26	1.297	-0.116	1.297	-0.116
ShieldAr	g56X	30.66	2.790	0.000	2.790	1.182
ShieldAr	g57P	44.87	4.084	0.000	4.084	1.300
TopCrArm	g58P	8.02	0.000	-1.362	-1.362	-0.788
TopCrArm	g58X	3.12	0.093	-0.529	-0.529	0.093
TopCrArm	g58XY	3.13	0.090	-0.532	-0.532	0.090
TopCrArm	g58Y	8.04	0.000	-1.364	-1.364	-0.791
TopCrArm	g59P	8.28	0.000	-1.506	-1.506	-0.489
TopCrArm	g59Y	9.72	0.000	-1.768	-1.768	-0.559
MidCrArm	g60P	23.88	0.000	-4.346	-4.346	-1.796
MidCrArm	g60X	19.55	0.000	-3.557	-3.557	-1.013
MidCrArm	g60XY	18.98	0.000	-3.455	-3.455	-0.897
MidCrArm	g60Y	23.71	0.000	-4.315	-4.315	-1.852
MidCrArm	g61P	9.77	0.000	-1.779	-1.779	-0.665
MidCrArm	g61Y	6.52	0.000	-1.186	-1.186	-0.413
BotCrArm	g62P	9.02	0.000	-1.531	-1.531	-0.712
BotCrArm	g62X	4.51	0.000	-0.766	-0.766	-0.148
BotCrArm	g62XY	3.80	0.205	-0.645	-0.645	0.205
BotCrArm	g62Y	9.16	0.000	-1.554	-1.554	-0.991
BotCrArm	g63P	3.80	0.000	-0.693	-0.693	-0.234
BotCrArm	g63Y	0.55	0.003	-0.101	-0.101	0.003
ShArmBr	g64P	9.89	0.000	-1.136	-1.136	-0.291
ShArmBr	g64X	9.89	0.000	-1.136	-1.136	-0.291
ShArmBr	g64XY	9.92	0.000	-1.139	-1.139	-0.295
ShArmBr	g64Y	9.92	0.000	-1.139	-1.139	-0.295
TopArmBr	g65P	24.26	2.166	0.000	2.166	0.804
TopArmBr	g65X	24.25	2.166	0.000	2.166	0.804
MidArmBr	g66P	44.58	3.981	0.000	3.981	1.380
MidArmBr	g66X	44.91	4.011	0.000	4.011	1.465
MidArmBr	g66XY	43.72	3.904	0.000	3.904	1.345
MidArmBr	g66Y	44.19	3.946	0.000	3.946	1.435
BotArmBr	g67P	13.99	1.249	0.000	1.249	0.308
BotArmBr	g67X	14.91	1.331	0.000	1.331	0.666
BotArmBr	g67XY	13.36	1.193	0.000	1.193	0.266
BotArmBr	g67Y	14.27	1.274	0.000	1.274	0.624
MidArmBr	g68P	21.09	1.884	0.000	1.884	0.541
MidArmBr	g68X	21.37	1.908	0.000	1.908	0.689
MidArmBr	g68XY	20.80	1.857	0.000	1.857	0.631
MidArmBr	g68Y	20.90	1.867	0.000	1.867	0.567
MidArmBr	g69P	27.34	2.442	0.000	2.442	0.884
MidArmBr	g69X	27.61	2.466	0.000	2.466	1.002
MidArmBr	g69XY	26.89	2.401	0.000	2.401	0.929
MidArmBr	g69Y	27.10	2.420	0.000	2.420	0.918
Leg3	g70P	54.61	28.205	0.000	10.538	28.205
Leg3	g70X	61.51	0.000	-34.270	-23.611	-34.270
Leg3	g70XY	60.60	0.000	-33.760	-23.764	-33.760
Leg3	g70Y	53.51	27.633	0.000	10.079	27.633
Diag6(R)	g71P	51.50	0.000	-1.204	-0.444	-1.204

Diag6(R)	g71X	13.61	1.280	0.000	0.433	1.280
Diag6(R)	g71XY	8.48	0.797	0.000	0.231	0.797
Diag6(R)	g71Y	33.67	0.000	-0.788	-0.280	-0.788
Diag6(R)	g72P	1.76	0.166	0.000	0.142	0.166
Diag6(R)	g72X	6.17	0.000	-0.101	-0.101	-0.100
Diag6(R)	g72XY	26.59	0.000	-0.435	-0.165	-0.435
Diag6(R)	g72Y	5.17	0.486	0.000	0.287	0.486

Moments for Angles Modeled as Beams For All Load Cases

Load Case	Angle Label	Torsion (ft-lbs)	Origin X Moment (ft-lbs)	Origin Y Moment (ft-lbs)	End X Moment (ft-lbs)	End Y Moment (ft-lbs)	X Shear (lbs)	Y Shear (lbs)
NESC Heavy	g1P	-0.01	-0.00	0.01	-8.84	-35.46	-2.53	-10.13
NESC Heavy	g1X	-0.01	-0.00	0.01	-11.76	19.20	-3.36	5.49
NESC Heavy	g1XY	0.01	0.00	-0.01	-2.08	-27.98	-0.59	-8.00
NESC Heavy	g1Y	0.01	0.00	-0.01	-15.09	34.60	-4.31	9.88
NESC Heavy	g2P	-0.01	8.84	35.48	-56.50	55.92	-13.62	26.11
NESC Heavy	g2X	-0.02	11.76	-19.17	-12.45	-53.00	-0.20	-20.62
NESC Heavy	g2XY	0.01	2.08	27.96	-31.07	44.43	-8.28	20.69
NESC Heavy	g2Y	0.01	15.09	-34.63	-67.88	-82.72	-15.08	-33.53
NESC Heavy	g3P	-0.03	56.50	-55.89	21.49	-87.77	22.28	-41.04
NESC Heavy	g3X	-0.02	12.45	53.03	-32.15	72.23	-5.63	35.79
NESC Heavy	g3XY	0.01	31.07	-44.46	-22.64	-83.23	2.41	-36.49
NESC Heavy	g3Y	0.03	67.88	82.68	30.16	81.32	28.01	46.85
NESC Heavy	g4P	-0.02	-21.49	87.80	-74.45	68.47	-22.57	36.76
NESC Heavy	g4X	-0.04	32.15	-72.20	-34.36	-84.46	-0.52	-36.87
NESC Heavy	g4XY	0.03	22.64	83.20	-42.47	73.79	-4.67	36.95
NESC Heavy	g4Y	0.03	-30.16	-81.36	-79.95	-82.19	-25.90	-38.48
NESC Heavy	g5P	-0.04	74.45	-68.44	-15.24	-25.36	13.93	-22.07
NESC Heavy	g5X	-0.03	34.36	84.49	-33.85	7.52	0.12	21.66
NESC Heavy	g5XY	0.02	42.47	-73.82	-25.62	-17.27	3.97	-21.44
NESC Heavy	g5Y	0.05	79.95	82.15	-15.79	17.14	15.09	23.36
NESC Heavy	g6P	-0.04	15.24	25.39	-142.81	-73.17	-30.01	-11.24
NESC Heavy	g6X	-0.04	33.85	-7.49	-160.69	87.47	-29.86	18.82
NESC Heavy	g6XY	0.03	25.62	17.24	-168.36	-105.00	-33.60	-20.66
NESC Heavy	g6Y	0.05	15.79	-17.17	-131.00	46.60	-27.10	6.92
NESC Heavy	g7P	10.83	152.73	-48.02	-10.04	83.18	44.53	10.97
NESC Heavy	g7X	11.36	-175.46	-50.52	-64.00	88.77	-74.77	11.95
NESC Heavy	g7XY	-9.83	-193.29	43.71	-57.34	-84.70	-78.26	-12.80
NESC Heavy	g7Y	-13.13	125.60	58.21	-3.91	-85.43	37.98	-8.50
NESC Heavy	g8P	10.81	10.05	-83.18	-47.66	-16.16	-11.74	-30.99
NESC Heavy	g8X	11.39	64.00	-88.78	119.65	-9.37	57.34	-30.65
NESC Heavy	g8XY	-9.86	57.35	84.71	120.98	15.32	55.69	31.24
NESC Heavy	g8Y	-13.10	3.91	85.43	-53.06	6.08	-15.34	28.55
NESC Heavy	g9P	10.82	47.67	16.16	-10.05	77.72	5.50	13.73
NESC Heavy	g9X	11.35	-119.65	9.37	-74.71	77.10	-28.44	12.66
NESC Heavy	g9XY	-9.82	-120.98	-15.33	-69.09	-77.54	-27.82	-13.59
NESC Heavy	g9Y	-13.11	53.07	-6.09	-2.98	-75.37	7.33	-11.91
NESC Heavy	g10P	10.80	10.05	-77.72	-29.53	-42.04	-2.92	-17.96
NESC Heavy	g10X	11.39	74.70	-77.10	117.95	-38.10	28.92	-17.30
NESC Heavy	g10XY	-9.86	69.08	77.54	116.38	41.15	27.84	17.82
NESC Heavy	g10Y	-13.09	2.97	75.37	-36.36	35.39	-5.01	16.62
NESC Heavy	g11P	10.81	29.53	42.04	-7.70	71.84	3.50	18.26
NESC Heavy	g11X	11.36	-117.95	38.11	-77.97	69.87	-31.42	17.32
NESC Heavy	g11XY	-9.83	-116.38	-41.16	-73.39	-71.81	-30.44	-18.12
NESC Heavy	g11Y	-13.10	36.36	-35.39	-1.47	-67.97	5.60	-16.57

NESC Heavy	g12P	10.80	7.69	-71.84	-27.41	-32.39	-2.65	-14.02
NESC Heavy	g12X	11.38	77.96	-69.88	101.77	-32.16	24.19	-13.73
NESC Heavy	g12XY	-9.85	73.39	71.81	97.88	33.09	23.05	14.12
NESC Heavy	g12Y	-13.09	1.47	67.97	-28.63	29.47	-3.65	13.11
NESC Heavy	g13P	5.00	28.88	31.27	-4.22	56.09	2.80	9.93
NESC Heavy	g13X	4.90	-103.51	31.43	-60.45	57.99	-18.64	10.17
NESC Heavy	g13XY	-3.90	-100.94	-30.79	-59.27	-58.98	-18.22	-10.21
NESC Heavy	g13Y	-4.87	30.97	-27.31	-3.19	-56.15	3.16	-9.49
NESC Heavy	g49P	-0.56	0.93	5.35	0.98	5.21	0.13	0.73
NESC Heavy	g49Y	0.57	1.83	-5.39	2.58	-4.71	0.30	-0.70
NESC Heavy	g50P	-0.25	-1.17	1.25	0.93	-1.59	-0.02	-0.02
NESC Heavy	g50X	-0.03	0.61	0.55	-0.88	-3.11	-0.02	-0.18
NESC Heavy	g70P	5.00	4.22	-56.09	-21.12	-23.60	-1.90	-8.96
NESC Heavy	g70X	4.92	60.45	-58.00	73.74	-25.20	15.10	-9.36
NESC Heavy	g70XY	-3.91	59.27	58.98	72.65	30.12	14.85	10.03
NESC Heavy	g70Y	-4.86	3.18	56.15	-19.62	26.52	-1.85	9.30
NESC Extreme	g1P	-0.00	-0.00	0.01	-16.66	-46.29	-4.76	-13.22
NESC Extreme	g1X	-0.00	-0.00	0.01	-17.96	38.17	-5.13	10.91
NESC Extreme	g1XY	0.00	0.00	-0.01	-9.89	-53.44	-2.83	-15.27
NESC Extreme	g1Y	0.00	0.00	-0.01	-13.77	57.48	-3.93	16.42
NESC Extreme	g2P	0.00	16.66	46.31	-57.25	91.41	-11.60	39.34
NESC Extreme	g2X	-0.01	17.96	-38.15	-41.95	-90.27	-6.86	-36.70
NESC Extreme	g2XY	0.01	9.89	53.42	-97.53	106.14	-25.04	45.60
NESC Extreme	g2Y	-0.01	13.77	-57.50	-111.78	-124.55	-28.00	-52.01
NESC Extreme	g3P	-0.02	57.25	-91.39	-17.09	-140.26	11.47	-66.17
NESC Extreme	g3X	0.00	41.95	90.29	-35.00	134.08	1.99	64.12
NESC Extreme	g3XY	-0.01	97.53	-106.16	-0.37	-143.14	27.77	-71.25
NESC Extreme	g3Y	0.03	111.78	124.52	19.19	140.91	37.42	75.82
NESC Extreme	g4P	0.01	17.09	140.28	-85.51	125.08	-16.09	62.42
NESC Extreme	g4X	-0.04	35.00	-134.05	-73.75	-132.94	-9.12	-62.84
NESC Extreme	g4XY	0.03	0.37	143.12	-98.22	133.30	-23.03	65.06
NESC Extreme	g4Y	-0.01	-19.19	-140.94	-111.51	-135.08	-30.75	-64.93
NESC Extreme	g5P	-0.03	85.51	-125.06	-53.84	-32.57	7.45	-37.07
NESC Extreme	g5X	0.00	73.75	132.96	-54.24	25.10	4.59	37.21
NESC Extreme	g5XY	-0.00	98.22	-133.33	-39.84	-33.17	13.74	-39.19
NESC Extreme	g5Y	0.03	111.51	135.06	-37.27	31.41	17.46	39.15
NESC Extreme	g6P	-0.01	53.84	32.59	-229.60	-126.10	-41.34	-21.99
NESC Extreme	g6X	-0.01	54.24	-25.08	-252.75	139.14	-46.73	26.85
NESC Extreme	g6XY	0.02	39.84	33.15	-246.45	-130.24	-48.64	-22.86
NESC Extreme	g6Y	0.01	37.27	-31.44	-230.75	105.90	-45.50	17.51
NESC Extreme	g7P	16.19	251.52	-71.38	13.72	151.96	82.75	25.13
NESC Extreme	g7X	17.66	-277.10	-78.36	-79.49	130.49	-111.36	16.28
NESC Extreme	g7XY	-18.07	-266.36	80.15	-60.02	-139.98	-101.92	-18.69
NESC Extreme	g7Y	-19.51	238.05	86.11	30.53	-135.12	83.79	-15.28
NESC Extreme	g8P	16.11	-13.73	-151.96	-104.49	-38.53	-36.88	-59.42
NESC Extreme	g8X	17.74	79.48	-130.49	170.34	-14.64	78.02	-45.34
NESC Extreme	g8XY	-18.15	60.01	139.98	163.53	25.28	69.82	51.62
NESC Extreme	g8Y	-19.44	-30.54	135.11	-127.97	14.81	-49.45	46.76
NESC Extreme	g9P	16.17	104.49	38.52	22.49	141.82	18.57	26.37
NESC Extreme	g9X	17.66	-170.34	14.65	-88.35	123.38	-37.86	20.21
NESC Extreme	g9XY	-18.06	-163.53	-25.29	-75.05	-132.92	-34.92	-23.16
NESC Extreme	g9Y	-19.50	127.97	-14.80	37.77	-126.57	24.24	-20.67
NESC Extreme	g10P	16.10	-22.51	-141.82	-91.20	-81.14	-17.06	-33.43
NESC Extreme	g10X	17.75	88.33	-123.38	158.87	-62.47	37.11	-27.91
NESC Extreme	g10XY	-18.16	75.03	132.92	152.17	70.30	34.11	30.52
NESC Extreme	g10Y	-19.43	-37.79	126.57	-110.67	62.37	-22.27	28.33
NESC Extreme	g11P	16.15	91.21	81.13	30.32	132.84	19.48	34.29
NESC Extreme	g11X	17.68	-158.87	62.49	-91.14	117.54	-40.11	28.89
NESC Extreme	g11XY	-18.08	-152.16	-70.32	-81.47	-125.26	-37.48	-31.38

NESC Extreme	g11Y	-19.49	110.68	-62.35	43.29	-119.53	24.68	-29.15
NESC Extreme	g12P	16.11	-30.34	-132.84	-92.97	-61.46	-16.58	-26.12
NESC Extreme	g12X	17.73	91.13	-117.54	139.33	-53.43	31.02	-23.02
NESC Extreme	g12XY	-18.14	81.46	125.26	129.33	56.02	28.37	24.41
NESC Extreme	g12Y	-19.44	-43.31	119.53	-95.68	52.27	-18.69	23.10
NESC Extreme	g13P	8.33	94.56	62.20	33.63	103.04	14.57	18.77
NESC Extreme	g13X	8.62	-139.85	54.95	-69.03	100.01	-23.76	17.63
NESC Extreme	g13XY	-6.96	-132.93	-53.66	-66.70	-103.80	-22.70	-17.91
NESC Extreme	g13Y	-7.21	98.81	-50.23	36.83	-101.86	15.41	-17.28
NESC Extreme	g49P	-0.99	-0.44	7.57	-1.49	7.72	-0.13	1.06
NESC Extreme	g49Y	1.14	1.52	-7.58	1.84	-7.45	0.23	-1.04
NESC Extreme	g50P	-0.60	-1.83	0.79	1.51	-3.93	-0.02	-0.22
NESC Extreme	g50X	-0.17	1.87	-0.11	-1.58	-4.83	0.02	-0.34
NESC Extreme	g70P	8.30	-33.64	-103.04	-76.90	-37.30	-12.43	-15.78
NESC Extreme	g70X	8.66	69.02	-100.01	105.69	-35.68	19.67	-15.28
NESC Extreme	g70XY	-7.00	66.69	103.80	101.63	47.78	18.95	17.06
NESC Extreme	g70Y	-7.18	-36.83	101.86	-76.56	46.28	-12.75	16.66

*** Analysis Results for Load Case No. 1 "NESC Heavy" - Number of iterations in SAPS 12

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	-0.01108	0.2101	-0.01898	0.0000	0.0000	0.0000	-0.01108	2.21	78.23
2P	-0.008722	0.1806	-0.01767	-0.3277	-0.0230	0.0399	1.991	2.181	73.23
3P	-0.007209	0.1606	-0.0174	-0.3248	-0.0277	0.0400	1.993	2.161	69.73
4P	-0.005571	0.141	-0.01695	-0.3188	-0.0193	0.0399	1.994	2.141	66.23
5P	-0.004553	0.1218	-0.01633	-0.3077	-0.0241	0.0400	1.995	2.122	62.73
6P	-0.002297	0.09969	-0.01535	-0.2877	-0.0204	0.0400	1.998	2.1	58.48
7P	-0.001977	0.07912	-0.01403	-0.2672	0.0028	0.0399	1.998	2.079	54.24
8P	-0.001415	0.061	-0.01253	-0.2086	-0.0258	0.0401	1.999	2.061	49.99
9P	0	0	0	0.0000	0.0000	0.0000	10	10	0
16P	-0.008773	0.2106	-0.08977	0.0000	0.0000	0.0000	-0.008773	13.96	78.16
17P	-0.007277	0.1806	-0.06565	0.0000	0.0000	0.0000	-0.007277	9.931	73.18
18P	-0.003873	0.1206	-0.09845	0.0000	0.0000	0.0000	-0.003873	13.87	62.65
19P	-0.001993	0.07876	-0.0543	0.0000	0.0000	0.0000	-0.001993	9.829	54.2
20P	-0.006888	0.1287	-0.03841	0.0000	0.0000	0.0000	1.333	6.019	63.96
1X	-0.01184	0.2098	0.003914	0.0000	0.0000	0.0000	-0.01184	-1.79	78.25
2X	-0.009564	0.1809	0.004905	-0.3329	-0.0307	0.0395	1.99	-1.819	73.25
2XY	-0.009686	0.1817	0.003153	-0.3402	-0.0262	-0.0490	-2.01	-1.818	73.25
2Y	-0.008938	0.1814	-0.01951	-0.3305	-0.0274	-0.0313	-2.009	2.181	73.23
3X	-0.007855	0.1606	0.004902	-0.3307	-0.0219	0.0395	1.992	-1.839	69.75
3XY	-0.007933	0.161	0.003211	-0.3365	-0.0347	-0.0490	-2.008	-1.839	69.75
3Y	-0.007417	0.1612	-0.01913	-0.3299	-0.0204	-0.0314	-2.007	2.161	69.73
4X	-0.006587	0.1407	0.004722	-0.3145	-0.0269	0.0395	1.993	-1.859	66.25
4XY	-0.005889	0.1409	0.003142	-0.3159	-0.0228	-0.0491	-2.006	-1.859	66.25
4Y	-0.006241	0.1412	-0.01854	-0.3217	-0.0245	-0.0314	-2.006	2.141	66.23
5X	-0.004801	0.122	0.004461	-0.3058	-0.0190	0.0395	1.995	-1.878	62.75
5XY	-0.004942	0.1222	0.003063	-0.3066	-0.0225	-0.0491	-2.005	-1.878	62.75
5Y	-0.004718	0.122	-0.01772	-0.3084	-0.0149	-0.0314	-2.005	2.122	62.73
6X	-0.004182	0.09954	0.003858	-0.2899	-0.0132	0.0395	1.996	-1.9	58.5
6XY	-0.002683	0.09956	0.002706	-0.2916	-0.0223	-0.0491	-2.003	-1.9	58.5
6Y	-0.004321	0.09978	-0.0165	-0.2888	-0.0121	-0.0315	-2.004	2.1	58.48
7X	-0.002356	0.07926	0.003024	-0.2629	-0.0261	0.0396	1.998	-1.921	54.25
7XY	-0.002148	0.07924	0.002112	-0.2627	-0.0027	-0.0492	-2.002	-1.921	54.25
7Y	-0.002459	0.07919	-0.01495	-0.2683	-0.0291	-0.0314	-2.002	2.079	54.24
8X	-0.001327	0.06104	0.001945	-0.2153	0.0036	0.0395	1.999	-1.939	50
8XY	-0.001359	0.06095	0.001301	-0.2185	-0.0220	-0.0492	-2.001	-1.939	50
8Y	-0.001341	0.06092	-0.01323	-0.2099	0.0076	-0.0316	-2.001	2.061	49.99
9X	0	0	0	0.0000	0.0000	0.0000	10	-10	0
9XY	0	0	0	0.0000	0.0000	0.0000	-10	-10	0
9Y	0	0	0	0.0000	0.0000	0.0000	-10	10	0
16X	-0.01429	0.2097	0.06935	0.0000	0.0000	0.0000	-0.01429	-13.54	78.32
17X	-0.01126	0.1818	0.04628	0.0000	0.0000	0.0000	-0.01126	-9.568	73.3
18X	-0.005342	0.1234	0.0496	0.0000	0.0000	0.0000	-0.005342	-13.63	62.8
19X	-0.002241	0.07979	0.03831	0.0000	0.0000	0.0000	-0.002241	-9.67	54.29
20X	-0.00948	0.1292	0.02496	0.0000	0.0000	0.0000	1.331	-5.761	64.02
20XY	-0.001544	0.1292	0.02398	0.0000	0.0000	0.0000	-1.342	-5.761	64.02
20Y	-0.002794	0.1289	-0.03948	0.0000	0.0000	0.0000	-1.343	6.019	63.96
10S	-0.000283	0.05117	-0.01249	-0.1679	-0.0207	0.0405	2.5	2.551	46.86
11S	-0.0002532	0.04262	-0.01238	-0.1455	-0.0162	0.0379	3	3.043	43.74
12S	0.00189	0.02894	-0.01126	-0.1052	-0.0067	0.0312	4.069	4.096	37.07
13S	-0.0002723	0.01823	-0.01034	-0.0759	-0.0062	0.0217	5.106	5.125	30.57

14S	0.00143	0.01179	-0.008322	-0.0517	-0.0070	0.0121	6.081	6.092	24.49
15S	-0.0001022	0.005625	-0.006572	-0.0351	-0.0022	0.0049	7.24	7.246	17.24
21S	0.001768	0.001994	-0.003223	-0.0142	-0.0063	0.0022	8.615	8.615	8.667
10X	-0.0014	0.05094	0.002547	-0.1677	0.0082	0.0398	2.499	-2.449	46.88
10XY	-0.0005879	0.05068	0.002007	-0.1741	-0.0191	-0.0488	-2.501	-2.449	46.88
10Y	-0.001707	0.051	-0.01315	-0.1670	0.0084	-0.0324	-2.502	2.551	46.86
11X	-0.001083	0.04264	0.00295	-0.1469	0.0060	0.0369	2.999	-2.957	43.75
11XY	-0.0004312	0.04216	0.002533	-0.1513	-0.0147	-0.0452	-3	-2.958	43.75
11Y	-0.001192	0.0424	-0.01297	-0.1450	0.0068	-0.0301	-3.001	3.042	43.74
12X	-0.001587	0.02797	0.003395	-0.1045	0.0031	0.0302	4.065	-4.039	37.09
12XY	0.0007586	0.02746	0.003082	-0.1064	-0.0082	-0.0365	-4.066	-4.039	37.09
12Y	-0.002615	0.02854	-0.01172	-0.1046	0.0019	-0.0247	-4.069	4.095	37.07
13X	-0.0002748	0.0185	0.00339	-0.0776	0.0027	0.0210	5.106	-5.088	30.59
13XY	-0.000188	0.01785	0.003224	-0.0777	-0.0058	-0.0250	-5.107	-5.089	30.59
13Y	-0.0001384	0.01783	-0.01063	-0.0750	0.0039	-0.0167	-5.107	5.125	30.57
14X	-0.0008536	0.01099	0.003013	-0.0549	0.0033	0.0118	6.079	-6.069	24.5
14XY	0.0006431	0.0106	0.002863	-0.0536	-0.0054	-0.0135	-6.079	-6.069	24.5
14Y	-0.001719	0.01136	-0.008495	-0.0505	0.0062	-0.0087	-6.082	6.091	24.49
15X	-5.328e-005	0.005685	0.002462	-0.0352	0.0010	0.0053	7.24	-7.234	17.25
15XY	1.898e-005	0.005337	0.002392	-0.0351	-0.0017	-0.0049	-7.24	-7.235	17.25
15Y	-0.0001665	0.005346	-0.006633	-0.0338	0.0015	-0.0030	-7.24	7.245	17.24
21X	-0.0008185	0.001085	0.001402	-0.0177	0.0027	0.0023	8.612	-8.612	8.671
21XY	0.0008357	0.0009252	0.001351	-0.0161	-0.0026	-0.0024	-8.612	-8.612	8.671
21Y	-0.001892	0.001848	-0.003252	-0.0129	0.0050	-0.0015	-8.615	8.615	8.667

Joint Support Reactions for Load Case "NESC Heavy":

Joint Label	X Force (kips)	X Usage %(kips)	Y Force (kips)	Y 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 %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
9P	-3.47	0.0	-4.07	0.0	23.24	0.0	0.0	23.85	0.0	0.04	0.0	-0.1	0.0	-0.01	0.0	0.0
9X	1.53	0.0	-2.12	0.0	-10.24	0.0	0.0	10.57	0.0	-0.00	0.0	0.0	0.0	-0.01	0.0	0.0
9XY	-1.51	0.0	-1.87	0.0	-9.73	0.0	0.0	10.03	0.0	-0.00	0.0	-0.0	0.0	0.01	0.0	0.0
9Y	3.61	0.0	-3.95	0.0	23.38	0.0	0.0	23.99	0.0	0.03	0.0	0.1	0.0	0.01	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	-0.1174	-0.0000	0.0000	0.1174	-0.0111	0.2101	-0.0190
2P	0.0000	0.0320	-0.2254	-0.0000	-0.0320	0.2254	-0.0087	0.1806	-0.0177
3P	0.0000	0.0000	-0.0643	-0.0000	-0.0000	0.0643	-0.0072	0.1606	-0.0174
4P	0.0000	0.0680	-0.2510	-0.0000	-0.0680	0.2510	-0.0056	0.1410	-0.0170
5P	0.0000	0.0000	-0.1565	0.0000	0.0000	0.1565	-0.0046	0.1218	-0.0163
6P	0.0000	0.0750	-0.2736	0.0000	-0.0750	0.2736	-0.0023	0.0997	-0.0153
7P	0.0000	0.0000	-0.1180	0.0000	-0.0000	0.1180	-0.0020	0.0791	-0.0140
8P	0.0000	0.0680	-0.2637	0.0000	-0.0680	0.2637	-0.0014	0.0610	-0.0125
9P	0.0000	0.0000	-0.1496	3.4686	4.0665	-23.0926	0.0000	0.0000	0.0000
16P	0.0000	0.7160	-0.8845	-0.0000	-0.7160	0.8845	-0.0088	0.2106	-0.0898
17P	0.0000	0.7860	-1.1787	-0.0000	-0.7860	1.1787	-0.0073	0.1806	-0.0656
18P	0.0000	0.7860	-1.2361	-0.0000	-0.7860	1.2361	-0.0039	0.1206	-0.0985
19P	0.0000	0.7860	-1.1873	-0.0000	-0.7860	1.1873	-0.0020	0.0788	-0.0543
20P	0.0000	0.0000	-0.0161	0.0000	0.0000	0.0161	-0.0069	0.1287	-0.0384
1X	0.0000	0.0133	-0.1174	-0.0000	-0.0133	0.1174	-0.0118	0.2098	0.0039
2X	0.0000	0.1205	-0.3064	-0.0000	-0.1205	0.3064	-0.0096	0.1809	0.0049

2XY	-0.6910	1.0895	-0.5964	0.6910	-1.0895	0.5964	-0.0097	0.1817	0.0032
2Y	-0.0120	0.4080	-1.6714	0.0120	-0.4080	1.6714	-0.0089	0.1814	-0.0195
3X	0.0000	0.0575	-0.0643	-0.0000	-0.0575	0.0643	-0.0079	0.1606	0.0049
3XY	0.0000	0.0575	-0.0643	0.0000	-0.0575	0.0643	-0.0079	0.1610	0.0032
3Y	0.0000	0.0000	-0.0643	0.0000	0.0000	0.0643	-0.0074	0.1612	-0.0191
4X	0.0000	0.1925	-0.4200	-0.0000	-0.1925	0.4200	-0.0066	0.1407	0.0047
4XY	0.5120	-0.5525	-1.1470	-0.5120	0.5525	1.1470	-0.0059	0.1409	0.0031
4Y	0.0190	-0.0060	-0.9690	-0.0190	0.0060	0.9690	-0.0062	0.1412	-0.0185
5X	0.0000	0.0771	-0.1565	0.0000	-0.0771	0.1565	-0.0048	0.1220	0.0045
5XY	0.0000	0.0771	-0.1565	-0.0000	-0.0771	0.1565	-0.0049	0.1222	0.0031
5Y	0.0000	0.0000	-0.1565	-0.0000	-0.0000	0.1565	-0.0047	0.1220	-0.0177
6X	0.0000	0.2194	-0.4606	0.0000	-0.2194	0.4606	-0.0042	0.0995	0.0039
6XY	0.0000	0.0794	-0.0866	-0.0000	-0.0794	0.0866	-0.0027	0.0996	0.0027
6Y	0.0000	0.0000	-0.0866	-0.0000	-0.0000	0.0866	-0.0043	0.0998	-0.0165
7X	0.0000	0.0736	-0.1180	0.0000	-0.0736	0.1180	-0.0024	0.0793	0.0030
7XY	0.0000	0.0736	-0.1180	-0.0000	-0.0736	0.1180	-0.0021	0.0792	0.0021
7Y	0.0000	0.0000	-0.1180	-0.0000	-0.0000	0.1180	-0.0025	0.0792	-0.0150
8X	0.0000	0.1987	-0.4327	0.0000	-0.1987	0.4327	-0.0013	0.0610	0.0019
8XY	0.0000	0.0717	-0.0937	-0.0000	-0.0717	0.0937	-0.0014	0.0610	0.0013
8Y	0.0000	0.0000	-0.0937	-0.0000	-0.0000	0.0937	-0.0013	0.0609	-0.0132
9X	0.0000	0.1016	-0.1496	-1.5331	2.0210	10.3901	0.0000	0.0000	0.0000
9XY	0.0000	0.1016	-0.1496	1.5056	1.7702	9.8843	0.0000	0.0000	0.0000
9Y	0.0000	0.0000	-0.1496	-3.6132	3.9518	-23.2344	0.0000	0.0000	0.0000
16X	0.0000	0.7663	-0.8845	-0.0000	-0.7663	0.8845	-0.0143	0.2097	0.0693
17X	0.0000	0.8127	-1.1787	-0.0000	-0.8127	1.1787	-0.0113	0.1818	0.0463
18X	0.0000	0.8144	-1.2361	-0.0000	-0.8144	1.2361	-0.0053	0.1234	0.0496
19X	0.0000	0.8244	-1.1873	-0.0000	-0.8244	1.1873	-0.0022	0.0798	0.0383
20X	0.0000	0.0149	-0.0161	-0.0000	-0.0149	0.0161	-0.0095	0.1292	0.0250
20XY	0.0000	0.0149	-0.0161	0.0000	-0.0149	0.0161	-0.0015	0.1292	0.0240
20Y	0.0000	0.0000	-0.0161	-0.0000	0.0000	0.0161	-0.0028	0.1289	-0.0395
10S	0.0000	0.0000	-0.0688	-0.0000	0.0000	0.0688	-0.0003	0.0512	-0.0125
11S	0.0000	0.0900	-0.3286	0.0000	-0.0900	0.3286	-0.0003	0.0426	-0.0124
12S	0.0000	0.0000	-0.1426	0.0000	-0.0000	0.1426	0.0019	0.0289	-0.0113
13S	0.0000	0.1230	-0.4626	0.0000	-0.1230	0.4626	-0.0003	0.0182	-0.0103
14S	0.0000	0.0000	-0.2036	0.0000	0.0000	0.2036	0.0014	0.0118	-0.0083
15S	0.0000	0.1390	-0.7382	0.0000	-0.1390	0.7382	-0.0001	0.0056	-0.0066
21S	0.0000	0.0000	-0.2861	0.0000	0.0000	0.2861	0.0018	0.0020	-0.0032
10X	0.0000	0.0571	-0.0688	-0.0000	-0.0571	0.0688	-0.0014	0.0509	0.0025
10XY	0.0000	0.0571	-0.0688	0.0000	-0.0571	0.0688	-0.0006	0.0507	0.0020
10Y	0.0000	0.0000	-0.0688	0.0000	-0.0000	0.0688	-0.0017	0.0510	-0.0132
11X	0.0000	0.2539	-0.5526	0.0000	-0.2539	0.5526	-0.0011	0.0426	0.0029
11XY	0.0000	0.0869	-0.1046	-0.0000	-0.0869	0.1046	-0.0004	0.0422	0.0025
11Y	0.0000	0.0000	-0.1046	-0.0000	0.0000	0.1046	-0.0012	0.0424	-0.0130
12X	0.0000	0.1181	-0.1426	0.0000	-0.1181	0.1426	-0.0016	0.0280	0.0034
12XY	0.0000	0.1181	-0.1426	-0.0000	-0.1181	0.1426	0.0008	0.0275	0.0031
12Y	0.0000	0.0000	-0.1426	-0.0000	-0.0000	0.1426	-0.0026	0.0285	-0.0117
13X	0.0000	0.3556	-0.7666	0.0000	-0.3556	0.7666	-0.0003	0.0185	0.0034
13XY	0.0000	0.1276	-0.1576	-0.0000	-0.1276	0.1576	-0.0002	0.0179	0.0032
13Y	0.0000	0.0000	-0.1576	-0.0000	-0.0000	0.1576	-0.0001	0.0178	-0.0106
14X	0.0000	0.1617	-0.2036	0.0000	-0.1617	0.2036	-0.0009	0.0110	0.0030
14XY	0.0000	0.1617	-0.2036	-0.0000	-0.1617	0.2036	0.0006	0.0106	0.0029
14Y	0.0000	0.0000	-0.2036	-0.0000	0.0000	0.2036	-0.0017	0.0114	-0.0085
15X	0.0000	0.5051	-1.0832	0.0000	-0.5051	1.0832	-0.0001	0.0057	0.0025
15XY	0.0000	0.2471	-0.3932	-0.0000	-0.2471	0.3932	0.0000	0.0053	0.0024
15Y	0.0000	0.0000	-0.3932	-0.0000	0.0000	0.3932	-0.0002	0.0053	-0.0066
21X	0.0000	0.1960	-0.2861	0.0000	-0.1960	0.2861	-0.0008	0.0011	0.0014
21XY	0.0000	0.1960	-0.2861	-0.0000	-0.1960	0.2861	0.0008	0.0009	0.0014
21Y	0.0000	0.0000	-0.2861	-0.0000	0.0000	0.2861	-0.0019	0.0018	-0.0033

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)	RLX	RLY	RLZ	L/R	KL/R	Curve No.	Alternate Unsupported L/R Cap. (kips)	RLOUT	L/R	KL/R	Curve No.
g19X	g19XY	Short only	-0.96	0.19	14.59	0.750	0.500	0.500	92.98	99.73	2	12.05	1.000	118.77	119.39	3
g21P	g21Y	Short only	-0.53	-0.77	23.59	0.750	0.500	0.500	81.56	91.17	2	19.73	1.000	104.73	112.37	3
g21X	g21XY	Short only	-0.58	-0.08	23.59	0.750	0.500	0.500	81.56	91.17	2	19.73	1.000	104.73	112.37	3
g21XY	g21X	Short only	-0.08	-0.58	23.59	0.750	0.500	0.500	81.56	91.17	2	19.73	1.000	104.73	112.37	3
g21Y	g21P	Short only	-0.77	-0.53	23.59	0.750	0.500	0.500	81.56	91.17	2	19.73	1.000	104.73	112.37	3
g23X	g23XY	Short only	-0.40	-0.04	13.76	0.750	0.500	0.500	102.09	106.57	2	10.43	1.000	130.42	130.42	4
g23XY	g23X	Short only	-0.04	-0.40	13.76	0.750	0.500	0.500	102.09	106.57	2	10.43	1.000	130.42	130.42	4
g25P	g25Y	Short only	-0.43	-0.49	13.76	0.750	0.500	0.500	102.09	106.57	2	10.43	1.000	130.42	130.42	4
g25Y	g25P	Short only	-0.49	-0.43	13.76	0.750	0.500	0.500	102.09	106.57	2	10.43	1.000	130.42	130.42	4
g27P	g27Y	Short only	-3.03	-3.13	13.76	0.750	0.500	0.500	102.09	106.57	2	10.43	1.000	130.42	130.42	4
g27Y	g27P	Short only	-3.13	-3.03	13.76	0.750	0.500	0.500	102.09	106.57	2	10.43	1.000	130.42	130.42	4
g29P	g29Y	Short only	-1.01	-1.43	13.31	0.777	0.555	0.555	106.82	110.12	2	11.55	1.000	122.94	122.94	4
g29Y	g29P	Short only	-1.43	-1.01	13.31	0.777	0.555	0.555	106.82	110.12	2	11.55	1.000	122.94	122.94	4
g31X	g31XY	Short only	-0.38	-0.72	11.73	0.774	0.548	0.548	121.66	121.66	4	8.83	1.000	141.80	141.80	4
g31XY	g31X	Short only	-0.72	-0.38	11.73	0.774	0.548	0.548	121.66	121.66	4	8.83	1.000	141.80	141.80	4
g33P	g33Y	Short only	-0.56	-0.83	6.91	0.788	0.576	0.576	171.46	171.46	4	5.62	1.000	190.09	190.09	4
g33Y	g33P	Short only	-0.83	-0.56	6.91	0.788	0.576	0.576	171.46	171.46	4	5.62	1.000	190.09	190.09	4
g35X	g35XY	Short only	-0.18	-0.34	5.52	0.779	0.558	0.558	191.89	191.89	4	4.21	1.000	219.60	219.60	4
g35XY	g35X	Short only	-0.34	-0.18	5.52	0.779	0.558	0.558	191.89	191.89	4	4.21	1.000	219.60	219.60	4
g36P	g36X	Short only	-0.30	-0.11	6.57	0.772	0.544	0.544	187.77	187.77	4	4.80	1.000	219.55	219.55	4
g36X	g36P	Short only	-0.11	-0.30	6.57	0.772	0.544	0.544	187.77	187.77	4	4.80	1.000	219.55	219.55	4
g36XY	g36Y	Short only	-0.25	0.03	6.57	0.772	0.544	0.544	187.77	187.77	4	4.80	1.000	219.55	219.55	4
g37P	g37Y	Short only	-0.25	-0.34	6.57	0.772	0.544	0.544	187.77	187.77	4	4.80	1.000	219.55	219.55	4
g37Y	g37P	Short only	-0.34	-0.25	6.57	0.772	0.544	0.544	187.77	187.77	4	4.80	1.000	219.55	219.55	4
g38XY	g38Y	Short only	-0.08	-0.01	8.65	0.771	0.543	0.543	181.51	181.51	4	6.31	1.000	212.47	212.47	4
g38Y	g38XY	Short only	-0.01	-0.08	8.65	0.771	0.543	0.543	181.51	181.51	4	6.31	1.000	212.47	212.47	4
g39X	g39XY	Short only	-0.07	-0.08	8.65	0.771	0.543	0.543	181.51	181.51	4	6.31	1.000	212.47	212.47	4
g39XY	g39X	Short only	-0.08	-0.07	8.65	0.771	0.543	0.543	181.51	181.51	4	6.31	1.000	212.47	212.47	4
g40Y	g40XY	Short only	-0.35	0.02	2.96	0.772	0.543	0.543	301.27	301.27	4	2.12	1.000	356.22	356.22	4
g41P	g41Y	Short only	-0.44	-0.26	2.96	0.772	0.543	0.543	301.27	301.27	4	2.12	1.000	356.22	356.22	4
g41Y	g41P	Short only	-0.26	-0.44	2.96	0.772	0.543	0.543	301.27	301.27	4	2.12	1.000	356.22	356.22	4
g51P	g51X	Short only	-0.12	-0.24	13.39	0.750	0.500	0.500	98.95	109.48	3	11.04	1.000	126.41	126.41	4
g51X	g51P	Short only	-0.24	-0.12	13.39	0.750	0.500	0.500	98.95	109.48	3	11.04	1.000	126.41	126.41	4
g54P	g54X	Short only	-0.16	0.03	13.39	0.750	0.500	0.500	98.95	109.48	3	11.04	1.000	126.41	126.41	4
g72X	g72XY	Short only	-0.10	-0.16	2.34	0.768	0.537	0.537	339.17	339.17	4	1.64	1.000	405.51	405.51	4
g72XY	g72X	Short only	-0.16	-0.10	2.34	0.768	0.537	0.537	339.17	339.17	4	1.64	1.000	405.51	405.51	4

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
1	1.138	50.00	50.00	2.28
2	1.170	50.00	50.00	2.34
3	1.417	50.00	50.00	2.83
4	1.432	50.00	50.00	2.86
5	1.465	50.00	50.00	2.93

6	1.480	50.00	50.00	2.96
7	1.424	50.00	50.00	2.85
8	1.445	50.00	50.00	2.89
9	0.228	50.00	50.00	0.46
10	0.260	50.00	50.00	0.52
11	0.284	50.00	50.00	0.57
12	0.272	50.00	50.00	0.54
13	0.341	50.00	50.00	0.68
14	0.479	50.00	50.00	0.96
15	0.751	50.00	50.00	1.50
16	0.329	50.00	50.00	0.66
17	0.462	50.00	50.00	0.92
18	0.510	50.00	50.00	1.02
19	0.476	50.00	50.00	0.95
20	0.608	50.00	50.00	1.22
21	0.845	50.00	50.00	1.69
22	1.195	50.00	50.00	2.39
23	1.421	50.00	50.00	2.84
24	1.720	50.00	50.00	3.44
25	1.372	50.00	50.00	2.74
26	0.969	50.00	50.00	1.94

*** Analysis Results for Load Case No. 2 "NESC Extreme" - Number of iterations in SAPS 13

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	-0.002805	0.3585	-0.02371	0.0000	0.0000	0.0000	-0.002805	2.358	78.23
2P	-0.001804	0.3084	-0.02283	-0.5538	-0.0027	0.0622	1.998	2.308	73.23
3P	-0.001413	0.2747	-0.02244	-0.5494	-0.0121	0.0623	1.999	2.275	69.73
4P	-0.0006995	0.2415	-0.02173	-0.5345	0.0008	0.0622	1.999	2.242	66.23
5P	-0.000961	0.2095	-0.02077	-0.5154	-0.0100	0.0622	1.999	2.209	62.73
6P	0.0008424	0.1723	-0.0192	-0.4827	-0.0103	0.0623	2.001	2.172	58.48
7P	-0.0001562	0.138	-0.01717	-0.4442	0.0222	0.0620	2	2.138	54.23
8P	-0.0003685	0.1078	-0.01486	-0.3517	-0.0272	0.0624	2	2.108	49.99
9P	0	0	0	0.0000	0.0000	0.0000	10	10	0
16P	0.006777	0.3582	-0.1382	0.0000	0.0000	0.0000	0.006777	14.11	78.11
17P	0.004583	0.3097	-0.09895	0.0000	0.0000	0.0000	0.004583	10.06	73.15
18P	0.002448	0.2092	-0.1345	0.0000	0.0000	0.0000	0.002448	13.96	62.62
19P	0.0006647	0.1379	-0.08167	0.0000	0.0000	0.0000	0.0006647	9.888	54.17
20P	0.02154	0.2248	-0.05705	0.0000	0.0000	0.0000	1.362	6.115	63.94
1X	-0.005914	0.3585	0.01476	0.0000	0.0000	0.0000	-0.005914	-1.641	78.26
2X	-0.00504	0.3087	0.01523	-0.5555	-0.0186	0.0533	1.995	-1.691	73.27
2XY	-0.005106	0.312	0.01464	-0.5746	-0.0136	-0.0676	-2.005	-1.688	73.26
2Y	-0.001853	0.3117	-0.02376	-0.5712	-0.0090	-0.0602	-2.002	2.312	73.23
3X	-0.004105	0.2748	0.01521	-0.5514	-0.0071	0.0532	1.996	-1.725	69.77
3XY	-0.00403	0.2769	0.01458	-0.5712	-0.0278	-0.0675	-2.004	-1.723	69.76
3Y	-0.001607	0.2769	-0.02323	-0.5688	0.0043	-0.0604	-2.002	2.277	69.73
4X	-0.003654	0.2416	0.01487	-0.5330	-0.0183	0.0533	1.996	-1.758	66.26
4XY	-0.002407	0.2427	0.01422	-0.5400	-0.0113	-0.0676	-2.002	-1.757	66.26
4Y	-0.001914	0.2427	-0.02237	-0.5421	-0.0088	-0.0602	-2.002	2.243	66.23
5X	-0.002282	0.2097	0.01429	-0.5146	-0.0061	0.0532	1.998	-1.79	62.76
5XY	-0.002316	0.2108	0.0137	-0.5171	-0.0153	-0.0676	-2.002	-1.789	62.76
5Y	-0.001045	0.2106	-0.02129	-0.5179	0.0003	-0.0603	-2.001	2.211	62.73
6X	-0.002966	0.1724	0.01315	-0.4837	-0.0015	0.0532	1.997	-1.828	58.51
6XY	-0.0001132	0.173	0.01268	-0.4893	-0.0171	-0.0676	-2	-1.827	58.51
6Y	-0.002259	0.1729	-0.01963	-0.4882	0.0032	-0.0604	-2.002	2.173	58.48
7X	-0.001194	0.1382	0.01155	-0.4418	-0.0293	0.0534	1.999	-1.862	54.26
7XY	-0.0006661	0.1386	0.0112	-0.4444	0.0140	-0.0678	-2.001	-1.861	54.26
7Y	-0.000786	0.1385	-0.01752	-0.4466	-0.0270	-0.0601	-2.001	2.138	54.23
8X	-0.000411	0.1079	0.009596	-0.3565	0.0185	0.0531	2	-1.892	50.01
8XY	-0.0004864	0.1079	0.009408	-0.3638	-0.0274	-0.0676	-2	-1.892	50.01
8Y	-0.0002732	0.1078	-0.01517	-0.3604	0.0221	-0.0605	-2	2.108	49.98
9X	0	0	0	0.0000	0.0000	0.0000	10	-10	0
9XY	0	0	0	0.0000	0.0000	0.0000	-10	-10	0
9Y	0	0	0	0.0000	0.0000	0.0000	-10	10	0
16X	-0.01554	0.3591	0.1278	0.0000	0.0000	0.0000	-0.01554	-13.39	78.38
17X	-0.01151	0.3109	0.08886	0.0000	0.0000	0.0000	-0.01151	-9.439	73.34
18X	-0.005626	0.2112	0.1164	0.0000	0.0000	0.0000	-0.005626	-13.54	62.87
19X	-0.00195	0.1388	0.0742	0.0000	0.0000	0.0000	-0.00195	-9.611	54.32
20X	-0.03288	0.2265	0.04975	0.0000	0.0000	0.0000	1.307	-5.663	64.05
20XY	0.02437	0.227	0.04947	0.0000	0.0000	0.0000	-1.316	-5.663	64.05
20Y	-0.02359	0.2259	-0.05761	0.0000	0.0000	0.0000	-1.364	6.116	63.94
10S	0.0008279	0.09108	-0.0152	-0.2857	-0.0244	0.0627	2.501	2.591	46.86
11S	0.000607	0.07649	-0.01542	-0.2513	-0.0192	0.0583	3.001	3.076	43.73
12S	0.003235	0.05234	-0.01457	-0.1835	-0.0074	0.0482	4.07	4.119	37.07
13S	-5.099e-005	0.03391	-0.01374	-0.1367	-0.0076	0.0333	5.107	5.141	30.57

14S	0.002203	0.0218	-0.01131	-0.0956	-0.0088	0.0189	6.082	6.102	24.49
15S	-0.0001139	0.01092	-0.009073	-0.0657	-0.0028	0.0082	7.24	7.251	17.24
21S	0.002535	0.0034	-0.004603	-0.0308	-0.0092	0.0033	8.615	8.616	8.665
10X	-0.001192	0.09093	0.01032	-0.2818	0.0204	0.0549	2.499	-2.409	46.89
10XY	0.0004936	0.09057	0.01025	-0.2940	-0.0245	-0.0674	-2.5	-2.409	46.89
10Y	-0.00116	0.09064	-0.01558	-0.2911	0.0190	-0.0611	-2.501	2.591	46.86
11X	-0.0009257	0.07677	0.01077	-0.2480	0.0158	0.0513	2.999	-2.923	43.76
11XY	0.0003412	0.0758	0.01082	-0.2578	-0.0195	-0.0622	-3	-2.924	43.76
11Y	-0.0007118	0.07585	-0.01579	-0.2549	0.0159	-0.0564	-3.001	3.076	43.73
12X	-0.002802	0.05164	0.01083	-0.1823	0.0062	0.0425	4.064	-4.015	37.09
12XY	0.002432	0.05061	0.01086	-0.1857	-0.0094	-0.0502	-4.064	-4.016	37.09
12Y	-0.003124	0.05106	-0.0149	-0.1851	0.0066	-0.0458	-4.07	4.118	37.07
13X	-0.0001045	0.03439	0.01037	-0.1365	0.0064	0.0296	5.107	-5.072	30.59
13XY	-4.526e-005	0.0328	0.01044	-0.1368	-0.0091	-0.0336	-5.107	-5.074	30.59
13Y	0.0001204	0.03277	-0.01389	-0.1355	0.0085	-0.0305	-5.107	5.139	30.57
14X	-0.001778	0.02122	0.008833	-0.0988	0.0068	0.0165	6.078	-6.059	24.51
14XY	0.001863	0.02024	0.008764	-0.0948	-0.0093	-0.0173	-6.078	-6.06	24.51
14Y	-0.002301	0.02058	-0.01135	-0.0934	0.0105	-0.0157	-6.082	6.101	24.49
15X	0.0001064	0.01102	0.007164	-0.0639	0.0028	0.0077	7.24	-7.229	17.26
15XY	0.0002309	0.01014	0.007079	-0.0629	-0.0033	-0.0053	-7.24	-7.23	17.26
15Y	-0.0002266	0.01015	-0.009004	-0.0624	0.0031	-0.0050	-7.24	7.25	17.24
21X	-0.002059	0.002917	0.003773	-0.0331	0.0076	0.0027	8.611	-8.61	8.674
21XY	0.002279	0.002553	0.003703	-0.0289	-0.0055	-0.0025	-8.611	-8.61	8.674
21Y	-0.002748	0.00299	-0.004552	-0.0276	0.0070	-0.0023	-8.616	8.616	8.665

Joint Support Reactions for Load Case "NESC Extreme":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y 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 %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
9P	-5.01	0.0	-6.59	0.0	33.84	0.0	0.0	34.84	0.0	0.05	0.0	-0.1	0.0	-0.02	0.0	0.0
9X	4.12	0.0	-5.72	0.0	-27.75	0.0	0.0	28.63	0.0	0.03	0.0	0.1	0.0	-0.02	0.0	0.0
9XY	-4.30	0.0	-5.22	0.0	-27.13	0.0	0.0	27.96	0.0	0.02	0.0	-0.1	0.0	0.02	0.0	0.0
9Y	5.19	0.0	-6.15	0.0	33.30	0.0	0.0	34.26	0.0	0.04	0.0	0.1	0.0	0.02	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	0.0800	-0.0610	-0.0000	-0.0800	0.0610	-0.0028	0.3585	-0.0237
2P	0.0000	0.1730	-0.0830	-0.0000	-0.1730	0.0830	-0.0018	0.3084	-0.0228
3P	0.0000	0.0800	-0.0610	-0.0000	-0.0800	0.0610	-0.0014	0.2747	-0.0224
4P	0.0000	0.2760	-0.1070	-0.0000	-0.2760	0.1070	-0.0007	0.2415	-0.0217
5P	0.0000	0.0800	-0.0610	0.0000	-0.0800	0.0610	-0.0010	0.2095	-0.0208
6P	0.0000	0.2960	-0.1120	0.0000	-0.2960	0.1120	0.0008	0.1723	-0.0192
7P	0.0000	0.0800	-0.0610	0.0000	-0.0800	0.0610	-0.0002	0.1380	-0.0172
8P	0.0000	0.4662	-0.2210	0.0000	-0.4662	0.2210	-0.0004	0.1078	-0.0149
9P	0.0000	0.1903	-0.1140	5.0073	6.3973	-33.7258	0.0000	0.0000	0.0000
16P	0.0000	0.6470	-0.2330	-0.0000	-0.6470	0.2330	0.0068	0.3582	-0.1382
17P	0.0000	0.8490	-0.4440	-0.0000	-0.8490	0.4440	0.0046	0.3097	-0.0990
18P	0.0000	0.8490	-0.4440	-0.0000	-0.8490	0.4440	0.0024	0.2092	-0.1345
19P	0.0000	0.8490	-0.4440	0.0000	-0.8490	0.4440	0.0007	0.1379	-0.0817
20P	0.0000	0.0800	-0.0610	0.0000	-0.0800	0.0610	0.0215	0.2248	-0.0570
1X	0.0000	0.0800	-0.0610	-0.0000	-0.0800	0.0610	-0.0059	0.3585	0.0148
2X	0.0000	0.2660	-0.1050	-0.0000	-0.2660	0.1050	-0.0050	0.3087	0.0152

2XY	-1.3250	2.6910	1.4240	1.3250	-2.6910	-1.4240	-0.0051	0.3120	0.0146
2Y	1.0130	2.4030	-2.4290	-1.0130	-2.4030	2.4290	-0.0019	0.3117	-0.0238
3X	0.0000	0.0800	-0.0610	-0.0000	-0.0800	0.0610	-0.0041	0.2748	0.0152
3XY	0.0000	0.0800	-0.0610	0.0000	-0.0800	0.0610	-0.0040	0.2769	0.0146
3Y	0.0000	0.0800	-0.0610	0.0000	-0.0800	0.0610	-0.0016	0.2769	-0.0232
4X	0.0000	0.4710	-0.1530	-0.0000	-0.4710	0.1530	-0.0037	0.2416	0.0149
4XY	0.7530	-1.2160	-0.8250	-0.7530	1.2160	0.8250	-0.0024	0.2427	0.0142
4Y	-0.4400	-0.9550	-0.1690	0.4400	0.9550	0.1690	-0.0019	0.2427	-0.0224
5X	0.0000	0.0800	-0.0610	0.0000	-0.0800	0.0610	-0.0023	0.2097	0.0143
5XY	0.0000	0.0800	-0.0610	-0.0000	-0.0800	0.0610	-0.0023	0.2108	0.0137
5Y	0.0000	0.0800	-0.0610	-0.0000	-0.0800	0.0610	-0.0010	0.2106	-0.0213
6X	0.0000	0.5110	-0.1620	0.0000	-0.5110	0.1620	-0.0030	0.1724	0.0131
6XY	0.0000	0.0800	-0.0610	-0.0000	-0.0800	0.0610	-0.0001	0.1730	0.0127
6Y	0.0000	0.0800	-0.0610	-0.0000	-0.0800	0.0610	-0.0023	0.1729	-0.0196
7X	0.0000	0.0800	-0.0610	0.0000	-0.0800	0.0610	-0.0012	0.1382	0.0115
7XY	0.0000	0.0800	-0.0610	-0.0000	-0.0800	0.0610	-0.0007	0.1386	0.0112
7Y	0.0000	0.0800	-0.0610	-0.0000	-0.0800	0.0610	-0.0008	0.1385	-0.0175
8X	0.0000	0.6612	-0.2670	0.0000	-0.6612	0.2670	-0.0004	0.1079	0.0096
8XY	0.0000	0.2702	-0.1750	-0.0000	-0.2702	0.1750	-0.0005	0.1079	0.0094
8Y	0.0000	0.2702	-0.1750	-0.0000	-0.2702	0.1750	-0.0003	0.1078	-0.0152
9X	0.0000	0.1903	-0.1140	-4.1182	5.5341	27.8606	0.0000	0.0000	0.0000
9XY	0.0000	0.1903	-0.1140	4.3014	5.0296	27.2406	0.0000	0.0000	0.0000
9Y	0.0000	0.1903	-0.1140	-5.1894	5.9623	-33.1883	0.0000	0.0000	0.0000
16X	0.0000	0.6470	-0.2330	-0.0000	-0.6470	0.2330	-0.0155	0.3591	0.1278
17X	0.0000	0.8490	-0.4440	-0.0000	-0.8490	0.4440	-0.0115	0.3109	0.0889
18X	0.0000	0.8490	-0.4440	-0.0000	-0.8490	0.4440	-0.0056	0.2112	0.1164
19X	0.0000	0.8490	-0.4440	-0.0000	-0.8490	0.4440	-0.0020	0.1388	0.0742
20X	0.0000	0.0800	-0.0610	-0.0000	-0.0800	0.0610	-0.0329	0.2265	0.0497
20XY	0.0000	0.0800	-0.0610	0.0000	-0.0800	0.0610	0.0244	0.2270	0.0495
20Y	0.0000	0.0800	-0.0610	-0.0000	-0.0800	0.0610	-0.0236	0.2259	-0.0576
10S	0.0000	0.1903	-0.1140	-0.0000	-0.1903	0.1140	0.0008	0.0911	-0.0152
11S	0.0000	0.4493	-0.1750	0.0000	-0.4493	0.1750	0.0006	0.0765	-0.0154
12S	0.0000	0.1903	-0.1140	0.0000	-0.1903	0.1140	0.0032	0.0523	-0.0146
13S	0.0000	0.5423	-0.1970	0.0000	-0.5423	0.1970	-0.0001	0.0339	-0.0137
14S	0.0000	0.1903	-0.1140	0.0000	-0.1903	0.1140	0.0022	0.0218	-0.0113
15S	0.0000	0.5883	-0.2080	0.0000	-0.5883	0.2080	-0.0001	0.0109	-0.0091
21S	0.0000	0.1903	-0.1140	0.0000	-0.1903	0.1140	0.0025	0.0034	-0.0046
10X	0.0000	0.1903	-0.1140	-0.0000	-0.1903	0.1140	-0.0012	0.0909	0.0103
10XY	0.0000	0.1903	-0.1140	0.0000	-0.1903	0.1140	0.0005	0.0906	0.0102
10Y	0.0000	0.1903	-0.1140	0.0000	-0.1903	0.1140	-0.0012	0.0906	-0.0156
11X	0.0000	0.7073	-0.2360	0.0000	-0.7073	0.2360	-0.0009	0.0768	0.0108
11XY	0.0000	0.1903	-0.1140	-0.0000	-0.1903	0.1140	0.0003	0.0758	0.0108
11Y	0.0000	0.1903	-0.1140	-0.0000	-0.1903	0.1140	-0.0007	0.0759	-0.0158
12X	0.0000	0.1903	-0.1140	0.0000	-0.1903	0.1140	-0.0028	0.0516	0.0108
12XY	0.0000	0.1903	-0.1140	-0.0000	-0.1903	0.1140	0.0024	0.0506	0.0109
12Y	0.0000	0.1903	-0.1140	-0.0000	-0.1903	0.1140	-0.0031	0.0511	-0.0149
13X	0.0000	0.8933	-0.2790	0.0000	-0.8933	0.2790	-0.0001	0.0344	0.0104
13XY	0.0000	0.1903	-0.1140	-0.0000	-0.1903	0.1140	-0.0000	0.0328	0.0104
13Y	0.0000	0.1903	-0.1140	-0.0000	-0.1903	0.1140	0.0001	0.0328	-0.0139
14X	0.0000	0.1903	-0.1140	0.0000	-0.1903	0.1140	-0.0018	0.0212	0.0088
14XY	0.0000	0.1903	-0.1140	-0.0000	-0.1903	0.1140	0.0019	0.0202	0.0088
14Y	0.0000	0.1903	-0.1140	-0.0000	-0.1903	0.1140	-0.0023	0.0206	-0.0113
15X	0.0000	0.9863	-0.3010	0.0000	-0.9863	0.3010	0.0001	0.0110	0.0072
15XY	0.0000	0.1903	-0.1140	-0.0000	-0.1903	0.1140	0.0002	0.0101	0.0071
15Y	0.0000	0.1903	-0.1140	-0.0000	-0.1903	0.1140	-0.0002	0.0101	-0.0090
21X	0.0000	0.1903	-0.1140	0.0000	-0.1903	0.1140	-0.0021	0.0029	0.0038
21XY	0.0000	0.1903	-0.1140	-0.0000	-0.1903	0.1140	0.0023	0.0026	0.0037
21Y	0.0000	0.1903	-0.1140	-0.0000	-0.1903	0.1140	-0.0027	0.0030	-0.0046

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.
g25P	g25Y	Short only	-0.02	-0.75	13.76	0.750	0.500	0.500	102.09	106.57	2	10.43	1.000	130.42	130.42	4
g25Y	g25P	Short only	-0.75	-0.02	13.76	0.750	0.500	0.500	102.09	106.57	2	10.43	1.000	130.42	130.42	4
g27P	g27Y	Short only	-3.99	-4.84	13.76	0.750	0.500	0.500	102.09	106.57	2	10.43	1.000	130.42	130.42	4
g27Y	g27P	Short only	-4.84	-3.99	13.76	0.750	0.500	0.500	102.09	106.57	2	10.43	1.000	130.42	130.42	4
g29P	g29Y	Short only	-1.54	-1.89	13.31	0.777	0.555	0.555	106.82	110.12	2	11.55	1.000	122.94	122.94	4
g29Y	g29P	Short only	-1.89	-1.54	13.31	0.777	0.555	0.555	106.82	110.12	2	11.55	1.000	122.94	122.94	4
g31X	g31XY	Short only	-1.03	-1.09	11.73	0.774	0.548	0.548	121.66	121.66	4	8.83	1.000	141.80	141.80	4
g31XY	g31X	Short only	-1.09	-1.03	11.73	0.774	0.548	0.548	121.66	121.66	4	8.83	1.000	141.80	141.80	4
g33P	g33Y	Short only	-0.84	-1.08	6.91	0.788	0.576	0.576	171.46	171.46	4	5.62	1.000	190.09	190.09	4
g33Y	g33P	Short only	-1.08	-0.84	6.91	0.788	0.576	0.576	171.46	171.46	4	5.62	1.000	190.09	190.09	4
g35X	g35XY	Short only	-0.48	-0.51	5.52	0.779	0.558	0.558	191.89	191.89	4	4.21	1.000	219.60	219.60	4
g35XY	g35X	Short only	-0.51	-0.48	5.52	0.779	0.558	0.558	191.89	191.89	4	4.21	1.000	219.60	219.60	4
g37P	g37Y	Short only	-0.33	-0.43	6.57	0.772	0.544	0.544	187.77	187.77	4	4.80	1.000	219.55	219.55	4
g37Y	g37P	Short only	-0.43	-0.33	6.57	0.772	0.544	0.544	187.77	187.77	4	4.80	1.000	219.55	219.55	4
g39X	g39XY	Short only	-0.14	-0.13	8.65	0.771	0.543	0.543	181.51	181.51	4	6.31	1.000	212.47	212.47	4
g39XY	g39X	Short only	-0.13	-0.14	8.65	0.771	0.543	0.543	181.51	181.51	4	6.31	1.000	212.47	212.47	4
g41P	g41Y	Short only	-0.66	-0.27	2.96	0.772	0.543	0.543	301.27	301.27	4	2.12	1.000	356.22	356.22	4
g41Y	g41P	Short only	-0.27	-0.66	2.96	0.772	0.543	0.543	301.27	301.27	4	2.12	1.000	356.22	356.22	4
g72X	g72XY	Short only	-0.10	-0.44	2.34	0.768	0.537	0.537	339.17	339.17	4	1.64	1.000	405.51	405.51	4
g72XY	g72X	Short only	-0.44	-0.10	2.34	0.768	0.537	0.537	339.17	339.17	4	1.64	1.000	405.51	405.51	4

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
1	0.688	50.00	50.00	1.38
2	0.688	50.00	50.00	1.38
3	0.958	50.00	50.00	1.92
4	0.958	50.00	50.00	1.92
5	0.958	50.00	50.00	1.92
6	0.958	50.00	50.00	1.92
7	0.958	50.00	50.00	1.92
8	0.958	50.00	50.00	1.92
9	0.192	50.00	50.00	0.38
10	0.296	50.00	50.00	0.59
11	0.316	50.00	50.00	0.63
12	0.516	50.00	50.00	1.03
13	0.482	50.00	50.00	0.96
14	0.577	50.00	50.00	1.15
15	0.624	50.00	50.00	1.25
16	0.286	50.00	50.00	0.57
17	0.495	50.00	50.00	0.99
18	0.536	50.00	50.00	1.07
19	0.713	50.00	50.00	1.43
20	0.746	50.00	50.00	1.49
21	0.936	50.00	50.00	1.87

22	1.031	50.00	50.00	2.06
23	3.320	50.00	50.00	6.64
24	3.564	50.00	50.00	7.13
25	1.651	50.00	50.00	3.30
26	1.065	50.00	50.00	2.13

*** 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 %	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 Comp. (ft)	KL/R	Length	Curve No.	No. Of Bolts	Member Comp.
Leg1	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	33.0	62.23	62.23	g5XY	-22.651	NESC Ext	47.089	36.400	56.250	1.000	1.000	1.000	73.49	73.49	4.250	1	4	
Leg2	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	33.0	92.82	92.82	g9XY	-30.921	NESC Ext	33.313	0.000	0.000	1.000	1.000	1.000	118.19	118.19	6.836	1	0	
Leg3	L4x4x1/4	SAE	4X4X0.25	33.0	78.53	78.53	g12X	-32.032	NESC Ext	40.789	0.000	0.000	1.000	1.000	1.000	112.20	112.20	7.433	1	0	
Leg4	L2.5x2x3/16	SAU	2.5X2X0.1875	33.0	11.10	11.10	g14X	-1.124	NESC Hea	10.122	18.200	21.094	1.000	1.000	1.000	151.34	151.34	5.385	4	2	
Diag1	L1.75x1.75x3/16	SAE	1.75X1.75X0.1875	33.0	96.29	59.68	g26Y	-5.431	NESC Ext	13.762	9.100	10.547	0.750	0.500	0.500	102.09	106.57	5.836	2	1	
Diag2	L2x2x1/4	SAE	2X2X0.25	33.0	33.52	33.52	g20Y	-3.051	NESC Ext	23.588	9.100	14.062	0.750	0.500	0.500	81.56	91.17	5.315	2	1	
Diag3	L2X2X3/16	SAE	2X2X0.1875	33.0	19.13	19.13	g33Y	-1.076	NESC Ext	5.624	9.100	10.547	1.000	0.576	0.576	190.09	190.09	9.774	4	1	
Diag4	L2.25X2.25X3/16	SAE	2.25X2.25X0.1875	33.0	14.06	14.06	g36P	-0.923	NESC Ext	6.568	9.100	10.547	0.772	0.544	0.544	187.77	187.77	12.771	4	1	
Diag5	L2.75X2.75X3/16	SAE	2.75X2.75X0.1875	33.0	11.28	7.62	g38P	-0.659	NESC Ext	8.653	9.100	10.547	0.771	0.543	0.543	181.51	181.51	15.210	4	1	
Diag6	L2X1.5X3/16	SAU	2X1.5X0.1875	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	
Horz1	BAR2X3/16	Bar	2x3/16	33.0	31.41	0.00	g43Y	0.000		26.288	9.100	10.547	1.000	1.000	1.000	48.00	84.00	4.000	3	1	
Horz2	L2X2X3/16	SAE	2X2X0.1875	33.0	56.93	29.85	g46X	-2.716	NESC Ext	13.406	9.100	10.547	1.000	1.000	1.000	121.83	121.83	4.000	4	1	
Horz3	L3X2.5X1/4	SAU	3X2.5X0.25	33.0	4.64	4.64	g50X	-0.326	NESC Ext	7.041	9.100	14.062	0.500	1.000	0.500	230.76	230.76	14.480	4	1	
Inner1	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	33.0	6.90	3.96	g52P	-0.361	NESC Ext	13.392	9.100	10.547	0.750	0.500	0.500	98.95	109.48	5.657	3	1	
Inner2	L2X1-1/2X3/16	SAU	2X1.5X0.1875	33.0	32.53	32.53	g55P	-0.329	NESC Ext	1.011	9.100	10.547	0.500	0.750	0.500	418.86	418.86	20.478	4	1	
TopCrArm	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	33.0	9.72	9.72	g59Y	-1.768	NESC Hea	19.668	18.200	21.094	1.000	1.000	1.000	96.97	108.48	4.000	3	2	
TopArmBr	BAR2X3/16	Bar	2x3/16	33.0	24.26	0.00	g65X	0.000		20.853	9.100	10.547	1.000	1.000	1.000	110.68	113.01	9.223	2	1	
MidCrArm	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	33.0	23.88	23.88	g60P	-4.346	NESC Hea	25.411	18.200	28.125	1.000	0.500	0.500	131.46	127.05	11.919	6	2	
MidArmBr	BAR2X3/16	Bar	2x3/16	33.0	44.91	0.00	g69Y	0.000		28.221	9.100	10.547	1.000	1.000	1.000	54.50					

70.88 4.542 2 1
BotCrArm L2.5x2.5x3/16 SAE 2.5X2.5X0.1875 33.0 9.16 9.16 g62Y -1.554NESC Hea 16.970 18.200 21.094 1.000 0.500 0.500 123.45
122.12 8.004 6 2
BotArmBr BAR2X3/16 Bar 2x3/16 33.0 14.91 0.00 g67Y 0.000 21.162 9.100 10.547 1.000 1.000 1.000 108.75
111.56 9.062 2 1
ShArmBr L3.5X2.5X1/4 SAU 3.5X2.5X0.25 33.0 9.92 9.92 g64Y -1.139NESC Hea 11.489 27.300 42.187 0.500 1.000 0.500 211.02
189.40 12.925 5 3
ShieldAr LL2.5X2X3/16 DAL 2.5X2X0.1875 33.0 44.87 1.28 g56P -0.116NESC Ext 14.666 9.100 21.094 1.000 1.000 1.000 177.81
177.81 11.750 4 1
Diag6(R) L2x2x1/4 SAE 2X2X0.25 36.0 51.50 51.50 g71P -1.204NESC Ext 2.339 16.800 13.594 0.768 0.537 0.537 339.17
339.17 20.580 4 1

Group Summary (Tension Portion):

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (ksi)	Max Usage %	Max Use In Tens. %	Tension Control Member	Tension Force Control (kips)	Tension Control Load Case	Net Section Capacity (kips)	Tension Connect. 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	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	33.0	62.23	55.07	g5P	20.044NESC	Ext	43.395	36.400	56.250	91.912	4.250	4	2.000	0.75
Leg2	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	33.0	92.82	71.46	g11Y	26.011NESC	Ext	43.395	36.400	56.250	50.000	6.237	4	2.000	0.75
Leg3	L4x4x1/4	SAE	4X4X0.25	33.0	78.53	54.61	g70P	28.205NESC	Ext	51.645	72.800	112.500	100.000	8.889	8	2.000	0.75
Leg4	L2.5x2x3/16	SAU	2.5X2X0.1875	33.0	11.10	3.57	g14P	0.503NESC	Ext	17.096	18.200	21.094	14.062	5.385	2	1.000	0.75
Diag1	L1.75x1.75x3/16	SAE	1.75X1.75X0.1875	33.0	96.29	96.29	g26XY	4.671NESC	Ext	14.237	9.100	10.547	4.852	5.836	1	1.000	0.75
Diag2	L2x2x1/4	SAE	2X2X0.25	33.0	33.52	29.53	g20XY	2.547NESC	Ext	22.349	9.100	14.062	8.625	5.315	1	1.000	0.75
Diag3	L2X2X3/16	SAE	2X2X0.1875	33.0	19.13	13.22	g33X	0.855NESC	Ext	16.910	9.100	10.547	6.469	9.774	1	1.000	0.75
Diag4	L2.25X2.25X3/16	SAE	2.25X2.25X0.1875	33.0	14.06	6.61	g36X	0.479NESC	Ext	19.851	9.100	10.547	7.242	12.771	1	1.000	0.75
Diag5	L2.75X2.75X3/16	SAE	2.75X2.75X0.1875	33.0	11.28	11.28	g38X	0.925NESC	Ext	25.405	9.100	10.547	8.203	15.210	1	1.000	0.75
Diag6	L2X1.5X3/16	SAU	2X1.5X0.1875	33.0	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0
Horz1	BAR2X3/16	Bar	2x3/16	33.0	31.41	31.41	g42Y	2.540NESC	Hea	25.523	9.100	10.547	8.086	4.000	1	1.000	0.75
Horz2	L2X2X3/16	SAE	2X2X0.1875	33.0	56.93	56.93	g46P	3.242NESC	Ext	16.910	9.100	10.547	5.695	4.000	1	1.000	0.75
Horz3	L3X2.5X1/4	SAU	3X2.5X0.25	33.0	4.64	3.25	g50P	0.296NESC	Ext	33.338	9.100	14.062	10.687	14.480	1	1.000	0.75
Inner1	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	33.0	6.90	6.90	g52X	0.393NESC	Ext	14.237	9.100	10.547	5.695	5.657	1	1.000	0.75
Inner2	L2X1-1/2X3/16	SAU	2X1.5X0.1875	33.0	32.53	4.84	g55X	0.276NESC	Ext	14.237	9.100	10.547	5.695	20.478	1	1.000	0.75
TopCrArm	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	33.0	9.72	0.51	g58X	0.093NESC	Ext	22.613	18.200	21.094	21.094	8.004	2	1.000	0.75
TopArmBr	BAR2X3/16	Bar	2x3/16	33.0	24.26	24.26	g65P	2.166NESC	Hea	25.523	9.100	10.547	8.930	9.223	1	1.000	0.75

MidCrArm	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	33.0	23.88	0.00	g61Y	0.000	33.301	18.200	28.125	18.750	4.000	2	1.700
0.75															
MidArmBr	BAR2X3/16	Bar	2x3/16	33.0	44.91	44.91	g66X	4.011NESC Hea	25.523	9.100	10.547	8.930	8.071	1	1.000
0.75															
BotCrArm	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	33.0	9.16	1.13	g62XY	0.205NESC Ext	22.613	18.200	21.094	21.094	8.004	2	1.000
0.75															
BotArmBr	BAR2X3/16	Bar	2x3/16	33.0	14.91	14.91	g67X	1.331NESC Hea	25.523	9.100	10.547	8.930	9.062	1	1.000
0.75															
ShArmBr	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	33.0	9.92	0.00	g64Y	0.000	34.136	27.300	42.187	42.187	12.925	3	1.550
0.75															
ShieldAr	LL2.5X2X3/16	DAL	2.5X2X0.1875	33.0	44.87	44.87	g57P	4.084NESC Hea	43.937	9.100	21.094	16.312	4.000	1	1.000
0.75															
Diag6(R)	L2x2x1/4	SAE	2X2X0.25	36.0	51.50	13.61	g71X	1.280NESC Ext	24.887	16.800	13.594	9.403	20.580	1	1.000
0.6875															

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	67.61	g9XY	Angle
NESC Extreme	96.29	g26XY	Angle

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
1	Clamp	2.28	NESC Heavy	0.0
2	Clamp	2.34	NESC Heavy	0.0
3	Clamp	2.83	NESC Heavy	0.0
4	Clamp	2.86	NESC Heavy	0.0
5	Clamp	2.93	NESC Heavy	0.0
6	Clamp	2.96	NESC Heavy	0.0
7	Clamp	2.85	NESC Heavy	0.0
8	Clamp	2.89	NESC Heavy	0.0
9	Clamp	0.46	NESC Heavy	0.0
10	Clamp	0.59	NESC Extreme	0.0
11	Clamp	0.63	NESC Extreme	0.0
12	Clamp	1.03	NESC Extreme	0.0
13	Clamp	0.96	NESC Extreme	0.0
14	Clamp	1.15	NESC Extreme	0.0
15	Clamp	1.50	NESC Heavy	0.0
16	Clamp	0.66	NESC Heavy	0.0
17	Clamp	0.99	NESC Extreme	0.0
18	Clamp	1.07	NESC Extreme	0.0
19	Clamp	1.43	NESC Extreme	0.0
20	Clamp	1.49	NESC Extreme	0.0
21	Clamp	1.87	NESC Extreme	0.0
22	Clamp	2.39	NESC Heavy	0.0
23	Clamp	6.64	NESC Extreme	0.0
24	Clamp	7.13	NESC Extreme	0.0

25	Clamp	3.30 NESC Extreme	0.0
26	Clamp	2.13 NESC Extreme	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	1	Clamp	16P	0.000	0.716	0.884	1.138
NESC Heavy	2	Clamp	16X	0.000	0.766	0.884	1.170
NESC Heavy	3	Clamp	17P	0.000	0.786	1.179	1.417
NESC Heavy	4	Clamp	17X	0.000	0.813	1.179	1.432
NESC Heavy	5	Clamp	18P	0.000	0.786	1.236	1.465
NESC Heavy	6	Clamp	18X	0.000	0.814	1.236	1.480
NESC Heavy	7	Clamp	19P	0.000	0.786	1.187	1.424
NESC Heavy	8	Clamp	19X	0.000	0.824	1.187	1.445
NESC Heavy	9	Clamp	2P	0.000	0.032	0.225	0.228
NESC Heavy	10	Clamp	4P	0.000	0.068	0.251	0.260
NESC Heavy	11	Clamp	6P	0.000	0.075	0.274	0.284
NESC Heavy	12	Clamp	8P	0.000	0.068	0.264	0.272
NESC Heavy	13	Clamp	11S	0.000	0.090	0.329	0.341
NESC Heavy	14	Clamp	13S	0.000	0.123	0.463	0.479
NESC Heavy	15	Clamp	15S	0.000	0.139	0.738	0.751
NESC Heavy	16	Clamp	2X	0.000	0.121	0.306	0.329
NESC Heavy	17	Clamp	4X	0.000	0.192	0.420	0.462
NESC Heavy	18	Clamp	6X	0.000	0.219	0.461	0.510
NESC Heavy	19	Clamp	8X	0.000	0.199	0.433	0.476
NESC Heavy	20	Clamp	11X	0.000	0.254	0.553	0.608
NESC Heavy	21	Clamp	13X	0.000	0.356	0.767	0.845
NESC Heavy	22	Clamp	15X	0.000	0.505	1.083	1.195
NESC Heavy	23	Clamp	2XY	-0.691	1.090	0.596	1.421
NESC Heavy	24	Clamp	2Y	-0.012	0.408	1.671	1.720
NESC Heavy	25	Clamp	4XY	0.512	-0.553	1.147	1.372
NESC Heavy	26	Clamp	4Y	0.019	-0.006	0.969	0.969
NESC Extreme	1	Clamp	16P	0.000	0.647	0.233	0.688
NESC Extreme	2	Clamp	16X	0.000	0.647	0.233	0.688
NESC Extreme	3	Clamp	17P	0.000	0.849	0.444	0.958
NESC Extreme	4	Clamp	17X	0.000	0.849	0.444	0.958
NESC Extreme	5	Clamp	18P	0.000	0.849	0.444	0.958
NESC Extreme	6	Clamp	18X	0.000	0.849	0.444	0.958
NESC Extreme	7	Clamp	19P	0.000	0.849	0.444	0.958
NESC Extreme	8	Clamp	19X	0.000	0.849	0.444	0.958
NESC Extreme	9	Clamp	2P	0.000	0.173	0.083	0.192
NESC Extreme	10	Clamp	4P	0.000	0.276	0.107	0.296
NESC Extreme	11	Clamp	6P	0.000	0.296	0.112	0.316
NESC Extreme	12	Clamp	8P	0.000	0.466	0.221	0.516
NESC Extreme	13	Clamp	11S	0.000	0.449	0.175	0.482
NESC Extreme	14	Clamp	13S	0.000	0.542	0.197	0.577
NESC Extreme	15	Clamp	15S	0.000	0.588	0.208	0.624
NESC Extreme	16	Clamp	2X	0.000	0.266	0.105	0.286
NESC Extreme	17	Clamp	4X	0.000	0.471	0.153	0.495
NESC Extreme	18	Clamp	6X	0.000	0.511	0.162	0.536
NESC Extreme	19	Clamp	8X	0.000	0.661	0.267	0.713
NESC Extreme	20	Clamp	11X	0.000	0.707	0.236	0.746
NESC Extreme	21	Clamp	13X	0.000	0.893	0.279	0.936
NESC Extreme	22	Clamp	15X	0.000	0.986	0.301	1.031
NESC Extreme	23	Clamp	2XY	-1.325	2.691	-1.424	3.320

NESC Extreme	24	Clamp	2Y	1.013	2.403	2.429	3.564
NESC Extreme	25	Clamp	4XY	0.753	-1.216	0.825	1.651
NESC Extreme	26	Clamp	4Y	-0.440	-0.955	0.169	1.065

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)
NESC Heavy	8.663	-0.172	16.652	541.719	-6.361
NESC Extreme	13.476	0.001	5.603	806.454	-0.790

*** Weight of structure (lbs):
Weight of Angles*Section DLF: 6666.0
Total: 6666.0

*** End of Report

Product Data Sheet APXVSPP18-C

Triple Band Dual Polarized Antenna, 806-1995, 65deg, 16-18dBi, 1.8m, VET, 0-10deg, 0.5m AISG Cable

Product Description

This antenna is an ideal choice for dual band site upgrade for high traffic areas. It features 4 ports in 1900 MHz and 2 ports in 800 MHz.

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 < 18 dB)**
- **Independent control of electrical downtilt for 800 and PCS bands**
- **Remote tilt – AISG compatible**
- **Low profile for low visual impact**
- **Quick and easy to adjust**
- **High front-to-back ratio**

Technical Specifications

Electrical Specifications

Frequency Range, MHz	806-869	1850-1995	1850-1995
Horizontal Beamwidth, deg	65	65	65
Vertical Beamwidth, deg	11.5	5.5	5.5
Electrical Downtilt, deg		0-10	
Gain, dBi (dBd)	15.5 (13.4)	18.0 (15.9)	18.0 (15.9)
1st Upper Sidelobe Suppression, dB, typ. @ T0° & T8°		>18	
Front-To-Back Ratio, dB, @ 180° ± 15°	>30	>27	>27
Polarization		Dual pol +/-45°	
Return Loss, dB		> 14	
Isolation between Ports, dB		>28	
3rd Order IMP @ 2 x 43 dBm, @ 2 min. duration		>110	
Cross Polar Discrimination (XPD) 0°, dB	>15	>20	>20
Cross Polar Discrimination (XPD) ± 60°, dB	>9.5	>11	>11
HBW Squint accross same band ports, °		±5	
Impedance, Ohms		50	
Maximum Power Input, W		250	
Lightning Protection		Direct Ground	
Connector Type		(6) 7-16 DIN Female	

Mechanical Specifications

Dimensions - HxWxD, mm (in)	1829 x 302 x 178 (72.0 x 11.8 x 7)
Weight w/o Mtg Hardware, kg (lb)	25.8 (57)
Radome Material	ASA
Radome Color	Light Grey RAL7035
Mounting Hardware Material	Diecasted Aluminum and Galvanized Steel

Ordering Information

Mounting Hardware	APM40-2 Downtilt Kit
AISG System Cable	0.5 m, included
Mounting Pipe Diameter, mm (in)	60-120 (2.4-4.7)
Mounting Hardware Weight, kg (lb)	3.4 (7.5)