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

Daniel F. Caruso
Chairman

March 21, 2011

Jennifer Young Gaudet
HPC Development LLC
46 Mill Plain Road, 2nd Floor
Danbury, CT 06811

RE: **EM-SPRINT-018-110303** – Sprint Spectrum LP notice of intent to modify an existing telecommunications facility located at 20 Vale Road, Brookfield, Connecticut.

Dear Ms. Gaudet:

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

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

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated March 2, 2011. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

Very truly yours,

Linda Roberts

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Bill Davidson, First Selectman, Town of Brookfield
Heather Paton, Land Use Office, Town of Brookfield
Clare Ann Walsh, Land Use Enforcement Officer, Town of Brookfield
Robert D. Gray, Transmission Projects, Northeast Utilities Service Company

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

Daniel F. Caruso
Chairman

March 7, 2011

The Honorable Bill Davidson
First Selectman
Town of Brookfield
Brookfield Municipal Center
Pocono Road
P. O. Box 5106
Brookfield, CT 06804-5106

RE: **EM-SPRINT-018-110303** – Sprint Spectrum LP notice of intent to modify an existing telecommunications facility located at 20 Vale Road, Brookfield, Connecticut.

Dear First Selectman Davidson:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by March 21, 2011.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Heather Paton, Land Use Office, Town of Brookfield
Clare Ann Walsh, Land Use Enforcement Officer, Town of Brookfield

HPC DEVELOPMENT LLC

EM-SPRINT-018-110303

March 2, 2011

ORIGINAL

RECEIVED
MAR - 3 2011
CONNECTICUT SITING COUNCIL

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051
Attn: Ms. Linda Roberts, Executive Director

Re: Sprint Spectrum LP – exempt modification
20 Vale Road, Brookfield, Connecticut

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of Sprint Spectrum LP ("Sprint"). Sprint is making modifications to certain existing sites in its Connecticut system in order to enhance system performance. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which 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 First Selectman of the Town of Brookfield.

Sprint plans to modify the existing wireless communications facility on CL&P structure No. 10246 located at 20 Vale Road in the Town of Brookfield (coordinates 41-25-51.3 N, 73-24-9.46 W). Attached are a compound plan and elevation 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 calculation 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. The height of the structure will not be increased. Sprint will replace three (3) of the six (6) existing antennas and add two (2) TMAs. Both Sprints's existing and proposed antennas will be mounted at the 132'6" centerline height on the mast attached to the structure. The proposed modifications will not extend the height of the structure with attachments.

2. The proposed changes will not extend the site boundaries. Sprint will install one additional cabinet on the existing concrete pad within the existing compound. Thus, there will be 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 power density calculation, Sprint's operations at the site will result in a power density of 21.20%.

Please feel free to call me at (860) 798-7454 with questions concerning this matter. Thank you for your consideration.

Respectfully yours,

Jennifer Young Gaudet EW

Jennifer Young Gaudet

cc: Honorable William Davidson, First Selectman, Town of Brookfield
Berkshire North, LLC (underlying property owner)

Attachments

ALL-POINTS TECHNOLOGY CORPORATION, P.C.
3 SADDELBROOK DRIVE
KILLINGWORTH, CT. 06419
PHONE: (860)-663-1697
FAX: (860)-663-0935
www.allpointstech.com

APT FILING NUMBER: NY-241-410	
LE-1	
SCALE: AS NOTED	DRAWN BY: RCB
DATE: 10/04/10	CHECKED BY: SMC

Sprint
Together with NEXTEL
1 INTERNATIONAL BLVD.
SUITE 800
MAHWAH, NJ 07495

SPRINT / NEXTEL
SITE NUMBER: CT33XC525
BROOKFIELD NU
20 VALE ROAD
BROOKFIELD, CT 06084

APPROVALS:

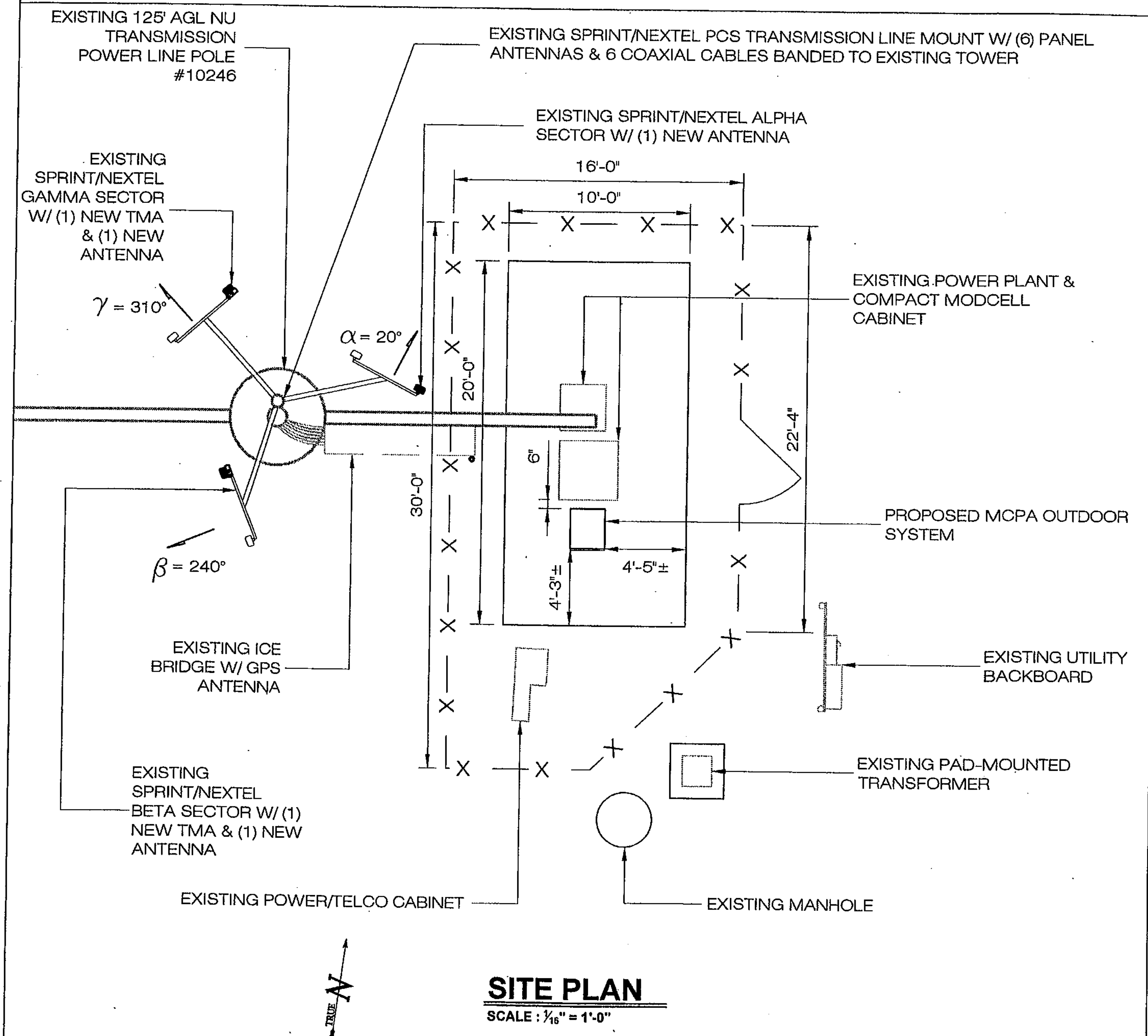
LANDLORD ____________ DATE: ________
RF ENGINEER ____________ DATE: ________
OPERATIONS ____________ DATE: ________
PROJECT MGR ____________ DATE: ________

TOTALS:

- (6) PANELS & (1) GPS ANTENNA
- SCOPE: REMOVE AND REPLACE 3 PANEL ANTENNAS, ADD (2) TMA AND (1) MCPA OUTDOOR CABINET
- SQUARE FOOTAGE OF EXISTING LEASE AREA = 750 SF±

NOTICE:

THIS IS A REPRESENTATION OF THE EXISTING STRUCTURE AND PROPOSED MODIFICATIONS. ALL SCALED DIMENSIONS SHOWN ARE NO BETTER THAN APPROXIMATE. FINAL LOCATIONS PENDING FURTHER ENGINEERING ANALYSIS AND DESIGN.



SITE PLAN
SCALE : 1/16" = 1'-0"

ALL-POINTS TECHNOLOGY CORPORATION, P.C.
3 SADDELBROOK DRIVE
KILLINGWORTH, CT. 06419
PHONE: (860)-663-1697
FAX: (860)-663-0935
www.allpointstech.com

APT FILING NUMBER: NY-241-410	
LE-2	
SCALE: AS NOTED	DRAWN BY: RCB
DATE: 10/04/10	CHECKED BY: SMC

Sprint
Together with NEXTEL
1 INTERNATIONAL BLVD.
SUITE 800
MAHWAH, NJ 07495

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- SQUARE FOOTAGE OF EXISTING LEASE AREA = 750 SF±

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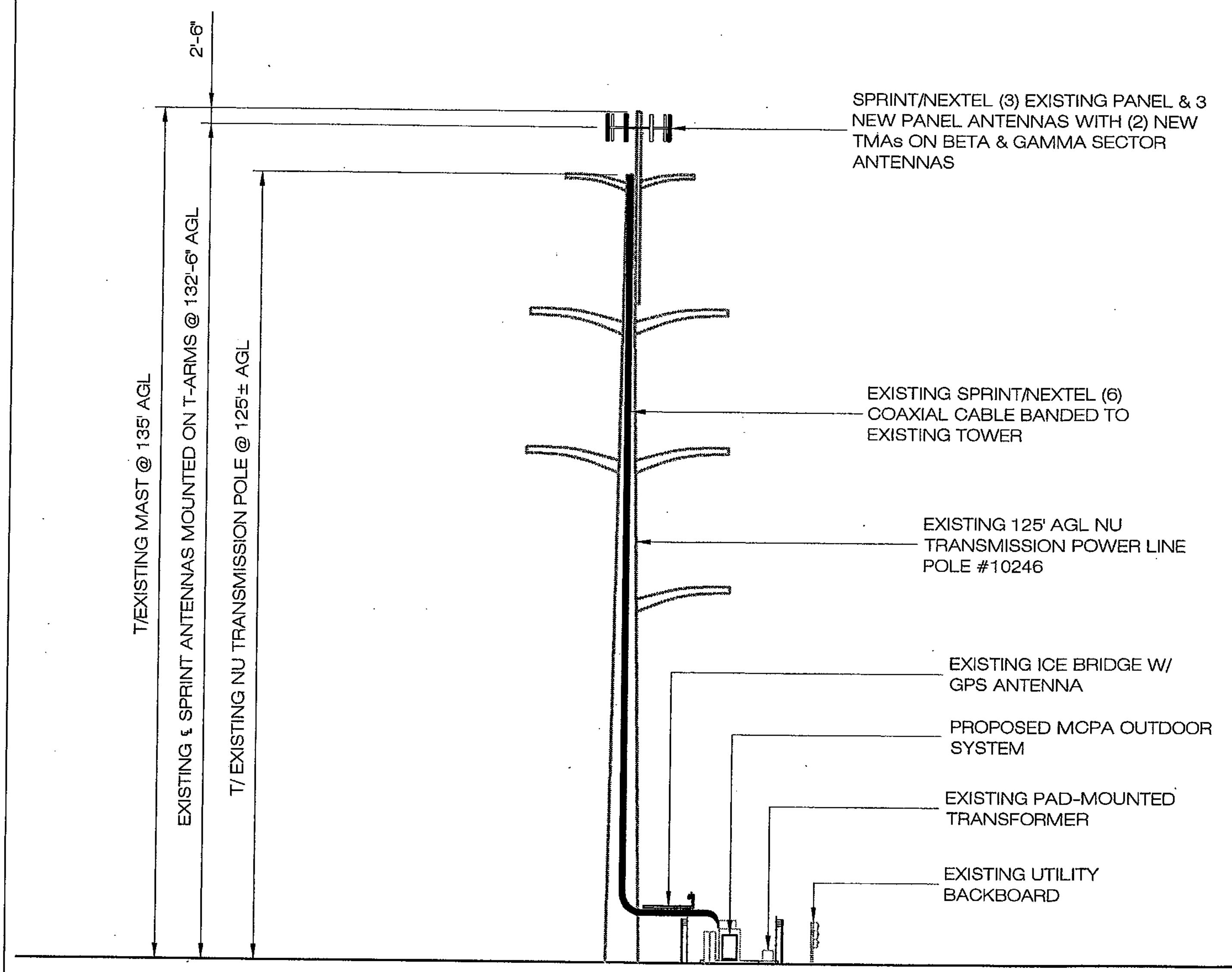

SOUTHERN ELEVATION

SCALE : 1" = 25'-0"

C Squared Systems, LLC
920 Candia Road
Manchester, NH 03109
Phone: (603) 657 9702
support@csquaredsystems.com

Calculated Radio Frequency Emissions

CT33XC525

20 Vale Rd, Brookfield, CT 06804

February 9, 2011

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List of Tables

List of Figures

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing Sprint antenna arrays mounted on the CL&P transmission line tower (Pole #10246) located at 20 Vale Road in Brookfield, CT. Sprint is the only carrier on the tower. The coordinates of the transmission line tower are 41-25-51.3 N, 73-24-09.46 W.

Sprint is proposing the following modifications:

1) Remove one panel antenna per sector, 3 total;
2) Install one replacement panel antenna per sector, 3 total;
3) Install a tower-mounted amplifier on the beta and gamma sectors, 2 total;
4) Install a multi-carrier power amplifier (MCPA) system on the existing Sprint equipment pad.

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{1.6^2 \times EIRP}{4\pi \times R^2} \right)$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

These calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the finished modifications.

4. Calculation Results

Table 1 below outlines the power density information for the site.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	%MPE
Sprint	132.5	1962.5	11	941	0.2120	1.0000	21.20%
						Total	**21.20%**

Table 1: Carrier Information

5. Conclusion

The above analysis verifies that emissions from the existing site will be well below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed and existing transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at the base of the tower is 21.2% of the FCC limit.

As noted in the introduction, obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.

Daniel L. Goulet
C Squared Systems, LLC

February 9, 2011
Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure[1]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	$(900/f^2)$*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure[2]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	$(180/f^2)$*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

[1] Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure

[2] General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

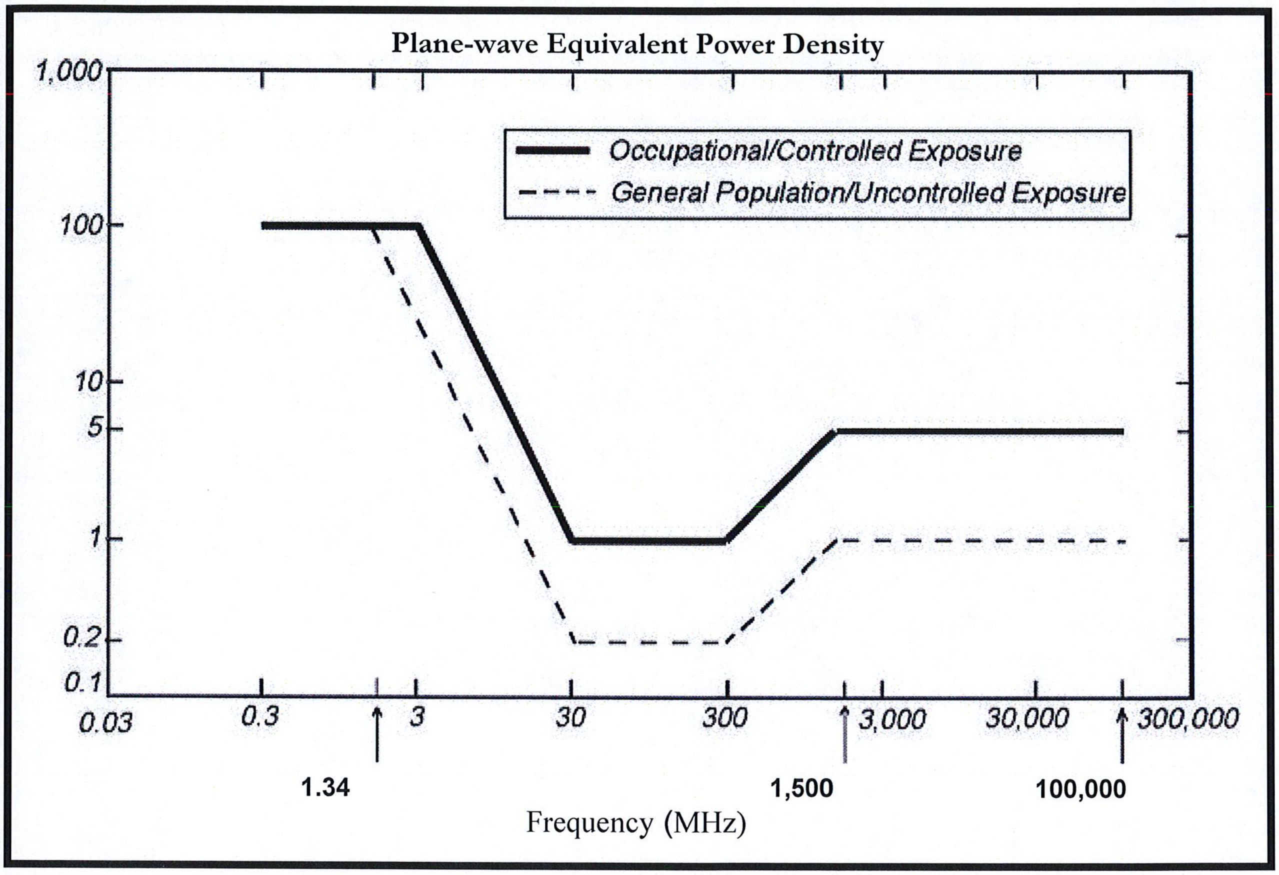


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

EM-SPRINT-018-110303

CENTEK engineering

Centered on Solutions℠

Structural Analysis of PCS Structure and CL&P Pole

Sprint: CT33XC525

CL&P Structure No. 10246
125' Electric Transmission Pole

Vale Road
Brookfield, CT

CENTEK Project No. 10151.CO3

~~Date: December 28, 2010~~
~~Rev 1: January 24, 2011~~
Rev 2: February 3, 2011

STATE OF CONNECTICUT PROFESSIONAL ENGINEER LICENSED No. 16694
2-7-2011

Prepared for:
Sprint Nextel
8 Airline Drive, Suite 105
Albany, NY 12205

Table of Contents

Introduction

The purpose of this report is to analyze the existing PCS mast and 125' CL&P pole located on Vale Road in Brookfield, CT for the proposed antenna and equipment upgrade by Sprint.

The proposed loads consist of the following:

- SPRINT (Existing to Remain):

  Antennas: Three (3) Andrew DB980F65E-M panel antennas mounted on an existing Tri-Sector standoff mount to a 8-in Sch. 80 pipe mast with RAD center elevation of 132-ft 6-in above tower base plate.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on the outside of the existing tower as indicated in section 4 of this report.
  Mast: 8-in Sch. 80 pipe mast.

- SPRINT (Existing to Remove):

  Antennas: Three (3) Andrew DB980F65E-M panel antennas mounted on an existing Tri-Sector standoff mount to a 8-in Sch. 80 pipe mast with RAD center elevation of 132-ft 6-in above tower base plate.

- **SPRINT (Proposed):**

  Antennas: Three (3) Andrew HBX-6516DS panel antennas and two (2) CCI TMAs mounted on an existing Tri-Sector standoff mount to a 8-in Sch. 80 pipe mast with RAD center elevation of 132-ft 6-in above tower base plate.

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. 72, "Design of Steel Transmission Pole Structures Second Edition", defines allowable steel stresses for evaluation of the CL&P utility pole.
- All utility pole members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- 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 pole will be in plumb condition.
- Utility pole 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.
- Existing Sprint mast was taken Natcomm LLC. construction drawings project no. 519A dated 10/30/2002.

Analysis

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 existing Sprint mast consisting of a 31-ft long pipe 8-in SCH. 80 (O.D. = 12.8-in) connected at two points to the existing pole was analyzed for its ability to resist loads prescribed by the TIA/EIA standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were applied to the existing Sprint mast structure in order to obtain reactions needed for analyzing the CL&P pole 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.

An envelope solution was first made to determine maximum and minimum forces, stresses, and deflections to confirm the selected section as adequate. Additional analyses were then made to determine the NESC forces to be applied to the CL&P pole structure.

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 forces calculated in RISA-3D using NESC guidelines were then applied to the CL&P pole using PLS-Pole. Maximum usage for the pole was calculated considering the additional forces from the mast and associated appurtenances.

Design Basis

Our analysis was performed in accordance with 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.

The CL&P pole structure, considering existing and future conductor and shield wire loading, with the pcs antenna mast was analyzed under two conditions:

- UTILITY POLE ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility pole 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. 72.

  Load cases considered:

  Load Case 1: NESC Heavy
  Wind Pressure.................................. 4.0 psf
  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 pole 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.

Results

- PCS MAST

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

Pipe Mast	Stress Ratio (% of capacity)	Result
12-in SCH. 80	39.8%	PASS

- UTILITY POLE

This analysis finds that the subject utility pole is adequate to support the proposed antenna mast and related appurtenances. The pole stresses meet the requirements set forth by the ASCE Manual No. 72, "Design of Steel Transmission Pole Structures Second Edition", 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:

A maximum usage of **61.8%** occurs in the utility pole under the **NESC Extreme** loading condition.

POLE SECTION:

The utility pole was found to be within allowable limits.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Tube Number 4	0'-40' (AGL)	53.4%	PASS

BASE PLATE:

The base plate was found to be within allowable limits from the PLS output based on 16 bend lines.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	61.8%	PASS

- FOUNDATION AND ANCHORS

The existing foundation consists of a 8-ft ∅ x 20.5-ft long reinforced concrete caisson. The base of the tower is connected to the foundation by means of (24) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 8.25-ft into the concrete foundation structure. Foundation information was obtained from NUSCO drawing # 01143-60001 Sh. 6.

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

BASE REACTIONS:

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

Load Case	Shear	Axial	Moment
NESC Heavy Wind	41.6 kips	72.1 kips	3685.8 ft-kips
NESC Extreme Wind	52.5 kips	41.0 kips	4235.4 ft-kips

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

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (% of capacity)	Result
Anchor Bolts	Tension	46.0%	**PASS**

FOUNDATION:

The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	52.0%	**PASS**
	Lateral Deflection	2.32 in.(1)	**PASS**

(1) Lateral deflection limited to L/100 per OTRM 059 Rev 4 dated 2/01/10. (L/100 = 20.5'*12/100=2.46-in)

Conclusions and Recommendations

This analysis shows that the subject utility pole **is adequate** to support the proposed Sprint equipment upgrade.

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

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

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-POLE

PLS-POLE provides all of the capabilities a structural engineer requires to design transmission, substation or communications structures. It does so using a simple easy to use graphical interface that rests upon our time tested finite element engine. Regardless of whether you want to model a simple wood pole or a guyed steel X-Frame; PLS-POLE can handle the job simply, reliably and efficiently.

Modeling Features:

- Structures are made of standard reusable components that are available in libraries. You can easily create your own libraries or get them from a manufacturer
- Structure models are built interactively using interactive menus and graphical commands
- Automatic generation of underlying finite element model of structure
- Steel poles can have circular, 4, 6, 8, 12, 16, or 18-sided, regular, elliptical or user input cross sections (flat-to-flat or tip-to-tip orientations)
- Steel and concrete poles can be selected from standard sizes available from manufacturers
- Automatic pole class selection
- Cross brace position optimizer
- Capability to specify pole ground line rotations
- Capability to model foundation displacements
- Can optionally model foundation stiffness
- Guys are easily handled (modeled as exact cable elements in nonlinear analysis)
- Powerful graphics module (members color-coded by stress usage)
- Graphical selection of joints and components allows graphical editing and checking
- Poles can be shown as lines, wire frames or can be rendered as 3-d polygon surfaces

Analysis Features:

- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Design checks for ASCE, ANSI/TIA/EIA 222 (Revisions F and G) or other requirements
- Automatic calculation of dead and wind loads
- Automated loading on structure (wind, ice and 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
- Detects buckling by nonlinear analysis

Results Features:

- Detects buckling by nonlinear analysis
- 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
- Automatic tracking of part numbers and costs

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.*

PCS Mast

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.

ELECTRIC TRANSMISSION TOWER

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

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

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

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

Attachment A

NU Design Criteria

Condition	Standard	Item	Basic Wind Speed V (MPH)	Pressure Q (PSF)	Height Factor Kz	Gust Factor Gh	Load or Stress Factor	Force Coef - Shape Factor
Ice Condition	TIA/EIA	Antenna Mount	TIA	TIA (.75Wi)	TIA	TIA	TIA Section 3.1.1.1 disallowed for connection design	TIA
Ice Condition	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
Ice Condition	NESC Heavy	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
Ice Condition	NESC Heavy	Conductors:	Conductor loads provided by NU					
High Wind Condition	TIA/EIA	Antenna Mount	85	TIA	TIA	TIA	TIA Section 3.1.1.1 disallowed for connection design	TIA
High Wind Condition	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
High Wind Condition	NESC Extreme Wind	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
High Wind Condition	NESC Extreme Wind	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
NESC Extreme Ice with Wind Conditon*		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
NESC Extreme Ice with Wind Conditon*		Conductors:	Conductor loads provided by NU					

* Only for Structures Installed after 2007

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.

If the electric transmission structure is not sufficient to support the additional loadings of the wireless communication mast, reinforcement will be required to upgrade the strength of the overstressed members. Any reinforcement design will be reviewed by NU TL&CE to determine the feasibility of construction and its impact on the use of the structure as a transmission structure.

Northeast Utilities System

Job :	Spec. Number	Page	of
Description:	Computed by	Sheet	of
	Checked by	Date	10/26/10
		Date	

INPUT DATA

TOWER ID: 10246

Structure Height (ft) : 135

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 AW*	*3/8 AW*
DESCRIPTION =	3/8	3/8
STRANDING =	7 #8 Al Weld	7 #8 Al Weld
DIAMETER =	0.385 in	0.385 in
WEIGHT =	0.262 lb/ft	0.262 lb/ft

Conductor Properties:

	BACK	AHEAD
NAME =	*BITTERN*	*BITTERN*
	1272.000	1272.000
	45/7 ACSR	45/7 ACSR
DIAMETER =	1.345 in	1.345 in
WEIGHT =	1.432 lb/ft	1.432 lb/ft
Number of Conductors per phase	2	2

Insulator Weight = 0 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	4,200	10,000	4,200	10,000
EXTREME WIND =	3,439	10,723	3,439	10,723
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 =	1,243	4,615	1,243	4,615

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	6	AHEAD:	6	**13**
WIND SPAN (ft) =	BACK:	387	AHEAD:	257	**644**
WEIGHT SPAN (ft) =	BACK:	549	AHEAD:	0	**549**

WIRE LOADING AT ATTACHMENTS

TOWER ID: 10246

Wind Span =	644 ft
Weight Span =	549 ft
Total Angle =	13 degrees

Broken Wire Span =	AHEAD SPAN
Type of Insulator Attachment =	STRAIN

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	2,276 lb	0 lb	669 lb	1,213 lb	6,887 lb	669 lb
Conductor =	9,815 lb	0 lb	4,249 lb	5,162 lb	32,798 lb	4,249 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	1,599 lb	0 lb	165 lb
Conductor =	10,512 lb	0 lb	1,809 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	165 lb
Conductor =	#VALUE!	#VALUE!	1,809 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,089 lb
Conductor =	#VALUE!	#VALUE!	4,775 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	446 lb
Conductor =	#VALUE!	#VALUE!	2,832 lb

6. 60 Deg. F. No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	275 lb	0 lb	144 lb
Conductor =	2,042 lb	0 lb	1,573 lb

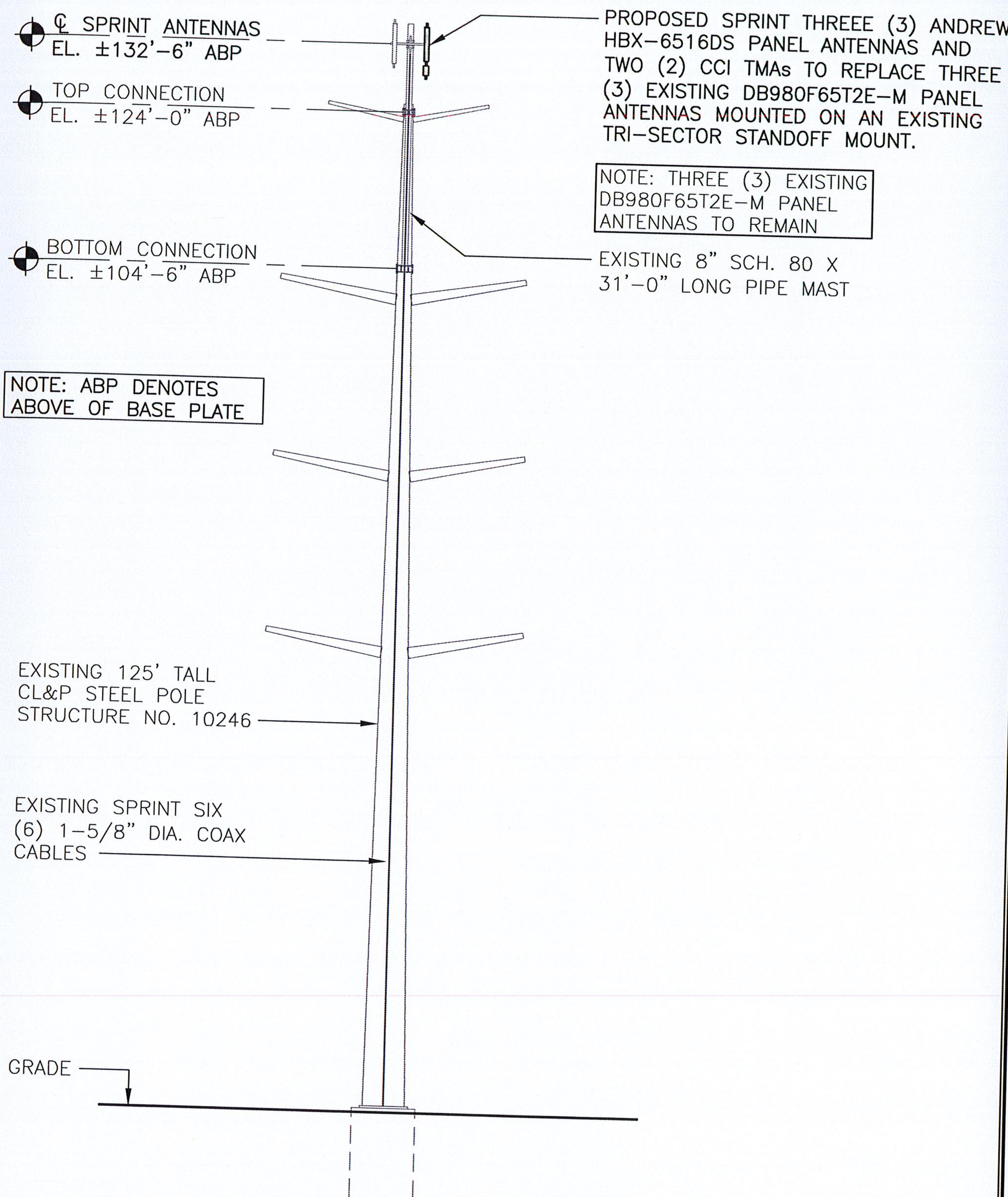
7. Construction

	Horizontal	Longitudinal	Vertical
Shield Wire =	412 lb	0 lb	216 lb
Conductor =	3,063 lb	0 lb	2,359 lb

Job :	Spec. Number	Page	of
Description:	Computed by	Sheet	of
	Checked by	Date	10/26/10
		Date	

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

LC 1		HORIZONTAL	LONGITUDINAL	VERTICAL
NESC Heavy	shield - back	1213.016613	6887.483173	668.8611163
	shield - ahead	1062.755655	-6887.483173	0
	SHIELD - SUM	**2275.772268**	**0**	**668.8611163**
	conductor - back	5161.989071	32797.53892	4248.670353
	conductor - ahead	4653.163154	-32797.53892	0
	CONDUCTOR - SUM	**9815.152225**	**0**	**4248.670353**
LC 2		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Extreme Wind	shield - back	872.4763984	3930.586267	165.317537
	shield - ahead	726.0796417	-3930.586267	0
	SHIELD - SUM	**1598.55604**	**0**	**165.317537**
	conductor - back	5767.551458	24511.58856	1808.51576
	conductor - ahead	4744.675418	-24511.58856	0
	CONDUCTOR - SUM	**10512.22688**	**0**	**1808.51576**
LC 3		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Long. Wind	shield - back	#VALUE!	#VALUE!	165.317537
	shield - ahead	#VALUE!	#VALUE!	0
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**165.317537**
	conductor - back	#VALUE!	#VALUE!	1808.51576
	conductor - ahead	#VALUE!	#VALUE!	0
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**1808.51576**
LC 4		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
RULE 250D	shield - back	#VALUE!	#VALUE!	1089.476296
	shield - ahead	#VALUE!	#VALUE!	0
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**1089.476296**
	conductor - back	#VALUE!	#VALUE!	4775.103112
	conductor - ahead	#VALUE!	#VALUE!	0
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**4775.103112**
LC 5		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
NESC w/o OLF's	shield - back	#VALUE!	#VALUE!	445.9074109
	shield - ahead	#VALUE!	#VALUE!	0
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**445.9074109**
	conductor - back	#VALUE!	#VALUE!	2832.446902
	conductor - ahead	#VALUE!	#VALUE!	0
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**2832.446902**
LC 6		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Raking	shield - back	137.4778681	1235.373966	143.75438
	shield - ahead	137.4778681	-1235.373966	0
	SHIELD - SUM	**274.9557361**	**0**	**143.75438**
	conductor - back	1020.853357	9173.372249	1572.6224
	conductor - ahead	1020.853357	-9173.372249	0
	CONDUCTOR - SUM	**2041.706713**	**0**	**1572.6224**
LC 6		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
60 DEG F NO WIND	shield - back	206.2168021	1853.060949	215.63157
	shield - ahead	206.2168021	-1853.060949	0
	SHIELD - SUM	**412.4336042**	**0**	**215.63157**
	conductor - back	1531.280035	13760.05837	2358.9336
	conductor - ahead	1531.280035	-13760.05837	0
	CONDUCTOR - SUM	**3062.56007**	**0**	**2358.9336**



1 / EL-1 **TOWER & MAST ELEVATION**

SCALE: NOT TO SCALE

REVISIONS		
00	12/28/10	ISSUED FOR NU REVIEW
01	1/20/11	ISSUED FINAL

CENTEK engineering
Centered on Solutions℠
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CT33XC525
CL&P 10246

VALE ROAD
BROOKFIELD, CT 06804

PROJECT NO:	10151.CO3
DRAWN BY:	TJL
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	12/16/10

TOWER AND MAST ELEVATION

EL-1

DWG. 1 OF 1

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	$z_{mast} := 119.75$	ft	(User Input)
Antenna	$z_{ant} := 132.5$	ft	(User Input)
TMA	$z_{tma} := 132.5$	ft	(User Input)
Mount	$z_{mnt} := 132.5$	ft	(User Input)
Coax Cable	$z_{coax} := 119.75$	ft	(User Input)

Exposure Coefficients, kz

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

Mast $$Kz_{mast} := \left(\frac{z_{mast}}{33}\right)^{\frac{2}{7}} = 1.445$$

Antenna $$Kz_{ant} := \left(\frac{z_{ant}}{33}\right)^{\frac{2}{7}} = 1.488$$

TMA $$Kz_{tma} := \left(\frac{z_{tma}}{33}\right)^{\frac{2}{7}} = 1.488$$

Mount $$Kz_{mnt} := \left(\frac{z_{mnt}}{33}\right)^{\frac{2}{7}} = 1.488$$

Coax Cable $$Kz_{coax} := \left(\frac{z_{coax}}{33}\right)^{\frac{2}{7}} = 1.445$$

Velocity Pressure without ice, qz

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

Mast $$qz_{mast} := 0.00256 \cdot Kz_{mast} \cdot V^2 = 26.731$$

Antenna $$qz_{ant} := 0.00256 \cdot Kz_{ant} \cdot V^2 = 27.515$$

TMA $$qz_{tma} := 0.00256 \cdot Kz_{tma} \cdot V^2 = 27.515$$

Mount $$qz_{mnt} := 0.00256 \cdot Kz_{mnt} \cdot V^2 = 27.515$$

Coax Cable $$qz_{coax} := 0.00256 \cdot Kz_{coax} \cdot V^2 = 26.731$$

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

Mast $qzICE_{mast} := 0.00256 \cdot Kz_{mast} \cdot V_i^2 = 20.26$

Antenna $qzICE_{ant} := 0.00256 \cdot Kz_{ant} \cdot V_i^2 = 20.854$

TMA $qzICE_{tma} := 0.00256 \cdot Kz_{tma} \cdot V_i^2 = 20.854$

Mount $qzICE_{mnt} := 0.00256 \cdot Kz_{mnt} \cdot V_i^2 = 20.854$

Coax Cable $qzICE_{coax} := 0.00256 \cdot Kz_{coax} \cdot V_i^2 = 20.26$

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)

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

Mast Data: (Pipe 8.0" SCH. 80) (User Input)

Mast Shape = Round (User Input)

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

Mast Length = $L_{mast} := 31$ ft (User Input)

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

Mast Aspect Ratio = $Ar_{mast} := \frac{12L_{mast}}{D_{mast}} = 43.1$

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 = $A_{mast} := \frac{D_{mast}}{12} = 0.719$

Total Mast Wind Force = $qz_{mast} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 39$ plf **BLC 5**

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

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

Total Mast Wind Force w/ Ice = $qzICE_{mast} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 33$ 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**

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

Antenna Data:

Antenna Model =	Andrew HBX-6516DS		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 51.4$	in	(User Input)
Antenna Width =	$W_{ant} := 6.5$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.3$	in	(User Input)
Antenna Weight =	$WT_{ant} := 9.9$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 7.9$		
Antenna Force Coefficient =	$Ca_{ant} = 1.43$		(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 =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 2.3$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 7$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 463$	lbs	**BLC 5**

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

Assumes Maximum Possible Wind Pressure Applied to All Antennas Simultaneously

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant}+1) \cdot (W_{ant}+1)}{144} = 2.7$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 8.2$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qzICE_{ant} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 413$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 30$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1103$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant}+1)(W_{ant}+1) \cdot (T_{ant}+1) - V_{ant} = 587$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 19$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 57$	lbs	**BLC 3**

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

Antenna Data:

Antenna Model = Andrew DB980F65E-M

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 60$ in (User Input)

Antenna Width = $W_{ant} := 6.3$ in (User Input)

Antenna Thickness = $T_{ant} := 3$ in (User Input)

Antenna Weight = $WT_{ant} := 8.5$ lbs (User Input)

Number of Antennas = $N_{ant} := 3$ (User Input)

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 9.5$

Antenna Force Coefficient = $Ca_{ant} = 1.48$ (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 = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 2.6$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 7.9$ sf

Total Antenna Wind Force = $F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 543$ lbs **BLC 5**

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

Assumes Maximum Possible Wind Pressure Applied to All Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 3.1$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 9.3$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{ant} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 485$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 26$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1134$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 647$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 21$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 63$ lbs **BLC 3**

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

TMA Data:

TMA Model = CCI TMA

TMA Shape = Flat (User Input)

TMA Height = $L_{tma} := 14.3$ in (User Input)

TMA Width = $W_{tma} := 8.3$ in (User Input)

TMA Thickness = $T_{tma} := 3.2$ in (User Input)

TMA Weight = $WT_{tma} := 13.3$ lbs (User Input)

Number of TMAs = $N_{tma} := 2$ (User Input)

TMA Aspect Ratio = $Ar_{tma} := \frac{L_{tma}}{W_{tma}} = 1.7$

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

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

Assumes Maximum Possible Wind Pressure Applied to ALL TMAs Simultaneously

Surface Area for One TMA = $SA_{tma} := \frac{L_{tma} \cdot W_{tma}}{144} = 0.8$ sf

TMA Projected Surface Area = $A_{tma} := SA_{tma} \cdot N_{tma} = 1.6$ sf

Total TMA Wind Force = $F_{tma} := qz_{tma} \cdot G_H \cdot Ca_{tma} \cdot A_{tma} = 107$ lbs **BLC 5**

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

Assumes Maximum Possible Wind Pressure Applied to ALL TMAs Simultaneously

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

TMA Projected Surface Area w/ Ice = $A_{ICEtma} := SA_{ICEtma} \cdot N_{tma} = 2$ sf

Total TMA Wind Force w/ Ice = $Fi_{tma} := qzICE_{tma} \cdot G_H \cdot Ca_{tma} \cdot A_{ICEtma} = 98$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All TMAs = $WT_{tma} \cdot N_{tma} = 27$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each TMA = $V_{tma} := L_{tma} \cdot W_{tma} \cdot T_{tma} = 380$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{tma} + 1)(W_{tma} + 1) \cdot (T_{tma} + 1) - V_{tma} = 218$ cu in

Weight of Ice on Each TMA = $W_{ICEtma} := \frac{V_{ice}}{1728} \cdot Id = 7$ lbs

Weight of Ice on All TMAs = $W_{ICEtma} \cdot N_{tma} = 14$ lbs **BLC 3**

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

Mount Data:

Mount Type: Valmont Tri-Sector Standoff Chain Mount p/n B1622

Platform Shape = Flat (User Input)

Platform Area = $A_{plt} := 13.5$ sq ft (User Input) (Force Coefficient Included)

Platform Area w/ Ice = $A_{ICE.plt} := 18.4$ sq ft (User Input) (Force Coefficient Included)

Platform Weight = $WT_{plt} := 470$ lbs (User Input)

Platform Weight w/ Ice = $WT_{ICE.plt} := 616$ lbs (User Input)

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

Total Platform Wind Force = $F_{plt} := qz_{mnt} \cdot G_H \cdot A_{plt} = 628$ lbs **BLC 5**

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

Total Platform Wind Force w/ Ice = $Fi_{plt} := qzICE_{mnt} \cdot G_H \cdot A_{ICE.plt} = 648$ lbs **BLC 4**

Gravity Load (without ice)

Weight of Platform = $WT_{plt} = 470$ lbs **BLC 2**

Gravity Loads (ice only)

Weight of Ice on Platform = $WT_{ICE.plt} - WT_{plt} = 146$ lbs **BLC 3**

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 = $L_{coax} := 28$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 1.04$ plf (User Input)

Total Number of Coax = $N_{coax} := 6$ (User Input)

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

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 169.7$

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 = $A_{coax} := \frac{NP_{coax} \cdot D_{coax}}{12} = 0.3$ ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{coax} \cdot G_H \cdot A_{coax} = 18$ plf **BLC 5**

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

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{NP_{coax} \cdot (D_{coax} + 2 \cdot Ir)}{12} = 0.5$ ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qzICE_{coax} \cdot G_H \cdot AICE_{coax} = 20$ plf **BLC 4**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 6$ 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 = $WTi_{coax} := Id \cdot \left(N_{coax} \cdot \frac{Ai_{coax}}{144}\right) = 9$ plf **BLC 3**

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Subject: **Analysis of TIA/EIA Wind and Ice Loads for Analysis of Mast Only**
Tabulated Load Cases
Location: **Brookfield, CT**
Date: 12/15/10 Prepared by: T.J.L. Checked by: C.F.C. Job No. 10151.CO3

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

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

Location: **Brookfield, CT**

Date: 12/15/10 Prepared by: T.J.L. Checked by: C.F.C. Job No. 10151.CO3

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

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: 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

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[...	Yield[ksi]
1	A36 Gr.36	29000	11154	.3	.65	.49	36
2	A572 Gr.50	29000	11154	.3	.65	.49	50
3	A992	29000	11154	.3	.65	.49	50
4	A500 Gr.42	29000	11154	.3	.65	.49	42
5	A500 Gr.46	29000	11154	.3	.65	.49	46
6	A53 Gr. B	29000	11154	.3	.65	.49	35

Hot Rolled Steel Design Parameters

	Label	Shape	Lengt...	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	Kyy	Kzz	Cm-...	Cm-...	Cb	y s...	z s...	Functi...
1	M1	Mast	30.5												Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	PIPE_8.0X	Beam	Pipe	A53 Gr. B	Typical	11.9	100	100	199

Member Primary Data

	Label	I Joint	J Joint	K ...	Rotate(deg)	Section/Shape	Type	Design Li...	Material	Design Rules
1	M1	N1	N3			Mast	Beam	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Di...
1	N1	0	0	0	0	
2	N2	0	19.5	0	0	
3	N3	0	30.5	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	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
2	N2	Reaction		Reaction				

Joint Loads and Enforced Displacements

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

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.03	28
2	M1	Y	-.026	28
3	M1	Y	-.027	28
4	M1	Y	-.47	28

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.057	28
2	M1	Y	-.063	28
3	M1	Y	-.014	28

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
4	M1	Y	-.146	28

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.413	28
2	M1	X	.485	28
3	M1	X	.098	28
4	M1	X	.648	28

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.463	28
2	M1	X	.543	28
3	M1	X	.107	28
4	M1	X	.628	28

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.006	-.006	0	28

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

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.006	-.006	0	0
2	M1	Y	-.009	-.009	0	28

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

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.033	.033	0	0
2	M1	X	.02	.02	0	28

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

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.039	.039	0	0
2	M1	X	.018	.018	0	28

Basic Load Cases

	BLC Description	Category	X Gr...	Y Gra...	Z Gr...	Joint	Poi...	Distribut...	Area (Me...	Surf...
1	Self Weight	None		-1						
2	Weight of Appurtenances	None					4	1		
3	Weight of Ice Only on PCS Struct	None					4	2		
4	TIA/EIA Wind with Ice on P	None					4	2		
5	TIA/EIA Wind on PCS Struct	None					4	2		

Load Combinations

	Description	Solve	PDel...	SR...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	TIA/EIA Wind + Ice on PCS Structure	Yes			1	1	2	1	3	1	4	1								
2	TIA/EIA Wind on PCS Structure	Yes			1	1	2	1	5	1										
3	Self Weight																			

Envelope Member Section Forces

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear...	LC	Torque[...	LC	y-y Mo...	LC	z-z Mom...	LC
1	M1	1	max	2.671	1	-.636	1	0	1	0	1	0	1	-5.777	1
2			min	1.956	2	-.672	2	0	1	0	1	0	1	-6.141	2
3		2	max	2.202	1	-1.04	1	0	1	0	1	0	1	.643	2
4			min	1.602	2	-1.107	2	0	1	0	1	0	1	.61	1
5		3	max	1.733	1	-1.444	1	0	1	0	1	0	1	10.741	2
6			min	1.247	2	-1.542	2	0	1	0	1	0	1	10.078	1
7		4	max	1.264	1	2.131	2	0	1	0	1	0	1	10.293	2
8			min	.893	2	1.998	1	0	1	0	1	0	1	9.648	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

Envelope Member Section Stresses

	Member	Sec		Axial[...	LC	y Shear[ksi]	LC	z Shear[ksi]	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
1	M1	1	max	.224	1	-.107	1	0	1	3.178	2	-2.99	1	0	1	0	1
2			min	.164	2	-.113	2	0	1	2.99	1	-3.178	2	0	1	0	1
3		2	max	.185	1	-.175	1	0	1	-.316	1	.333	2	0	1	0	1
4			min	.135	2	-.186	2	0	1	-.333	2	.316	1	0	1	0	1
5		3	max	.146	1	-.243	1	0	1	-5.215	1	5.559	2	0	1	0	1
6			min	.105	2	-.259	2	0	1	-5.559	2	5.215	1	0	1	0	1
7		4	max	.106	1	.358	2	0	1	-4.993	1	5.327	2	0	1	0	1
8			min	.075	2	.336	1	0	1	-5.327	2	4.993	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

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	.672	2	2.671	1	0	1	0	1	0	1	-5.777	1
2		min	.636	1	1.956	2	0	1	0	1	0	1	-6.141	2
3	N2	max	-3.846	1	0	1	0	1	0	1	0	1	0	1
4		min	-4.107	2	0	1	0	1	0	1	0	1	0	1
5	Totals:	max	-3.21	1	2.671	1	0	1						
6		min	-3.434	2	1.956	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	0	2	0	1	0	1	0	1	0	2
2		min	0	2	0	1	0	1	0	1	0	1	0	1
3	N2	max	0	2	-.001	2	0	1	0	1	0	1	-3.659e-3	1
4		min	0	1	-.001	1	0	1	0	1	0	1	-3.9e-3	2
5	N3	max	.876	2	-.001	2	0	1	0	1	0	1	-7.073e-3	1
6		min	.822	1	-.002	1	0	1	0	1	0	1	-7.544e-3	2

Envelope AISC ASD Steel Code Checks

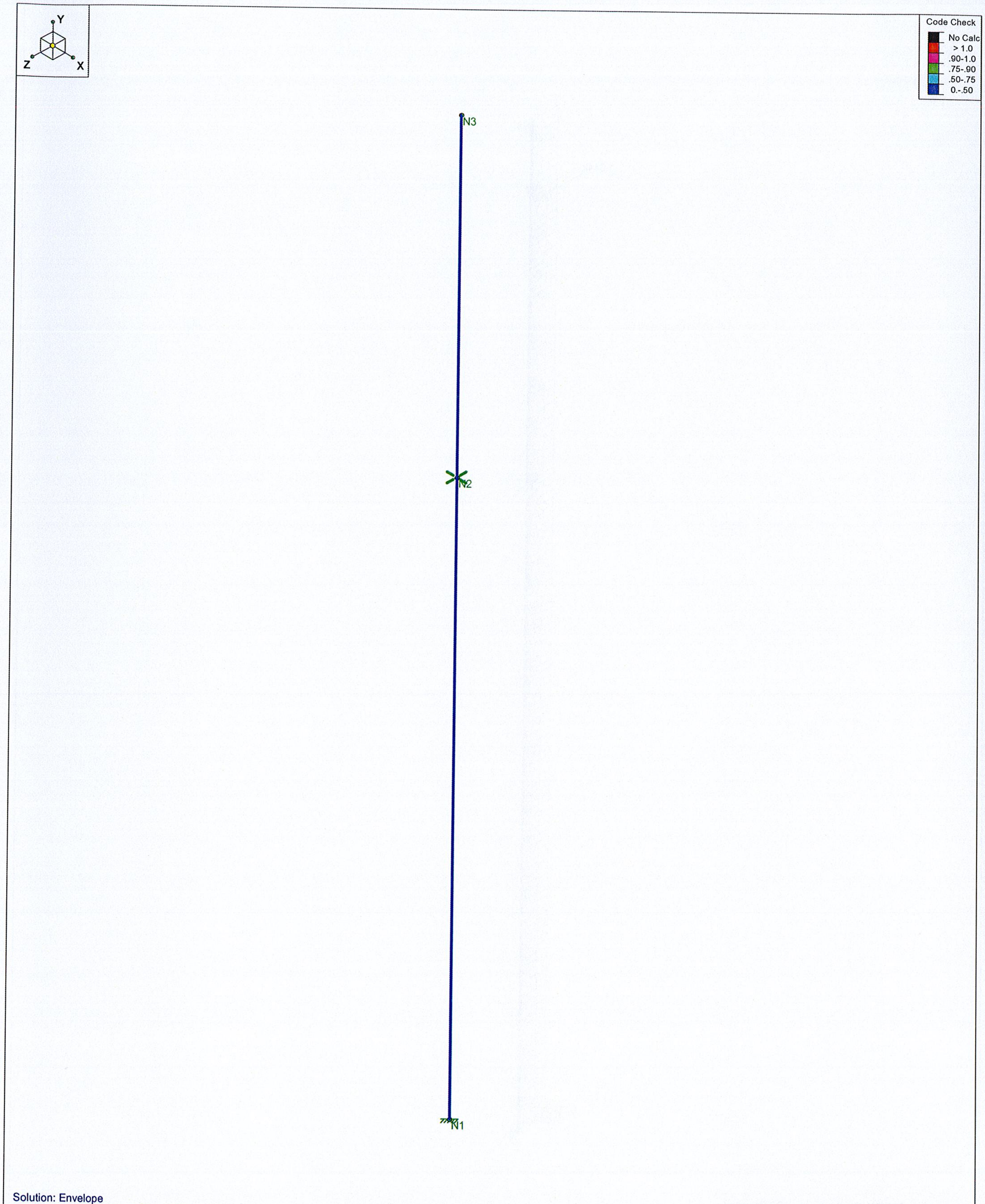
	Member	Shape	Code Check	Loc[ft]	L...	Shear Ch...	Loc[ft]	...LC	Fa...	Ft ...	Fb y-y [ksi]	Fb...	...	...	AS...
1	M1	PIPE_8.0X	.398	19.38	2	.028	19.698	2	9....	21	23.1	23.1	1	.6	... H1..

Joint Reactions

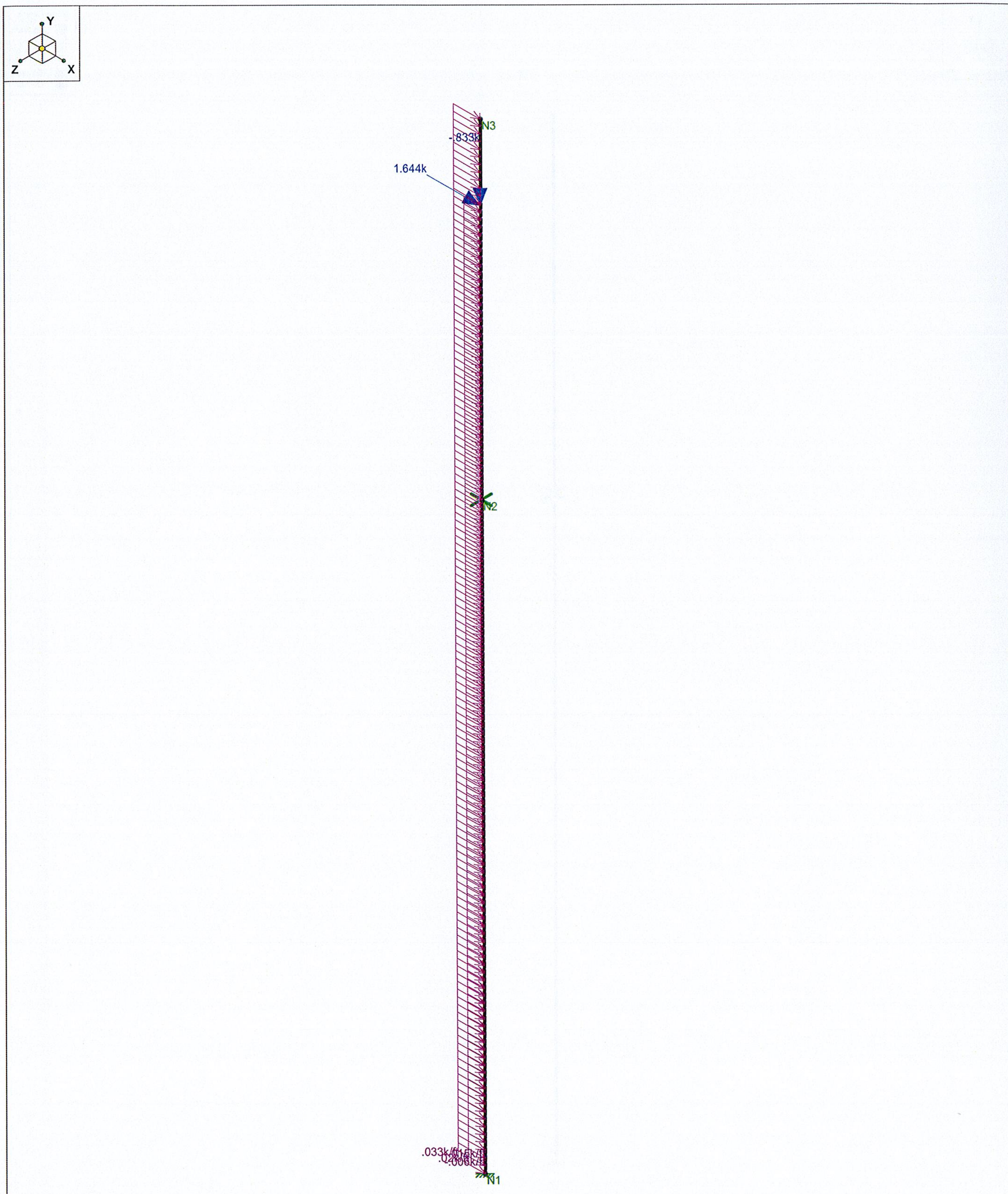
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N1	.636	2.671	0	0	0	-5.777
2	1	N2	-3.846	0	0	0	0	0
3	1	Totals:	-3.21	2.671	0			
4	1	COG (ft):	X: 0	Y: 19.03	Z: 0			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N1	.672	1.956	0	0	0	-6.141
2	2	N2	-4.107	0	0	0	0	0
3	2	Totals:	-3.434	1.956	0			
4	2	COG (ft):	X: 0	Y: 18.747	Z: 0			

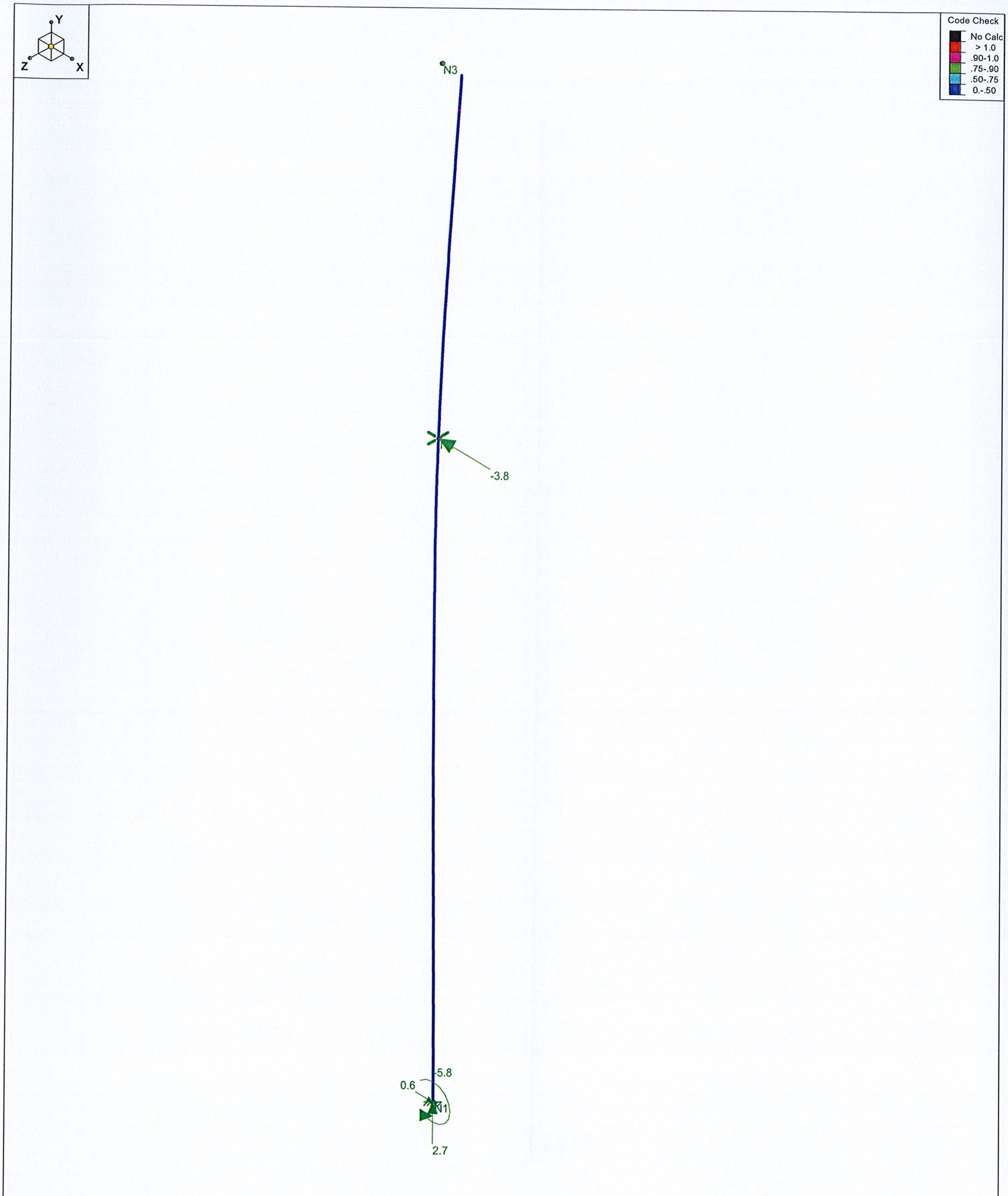


CENTEK Engineering, INC.	CL&P Pole # 10246 - PCS Mast Unity Check	
tjl, cfc		Dec 28, 2010 at 6:13 PM
10151.CO3 - CT33XC525		EIA-TIA.r3d



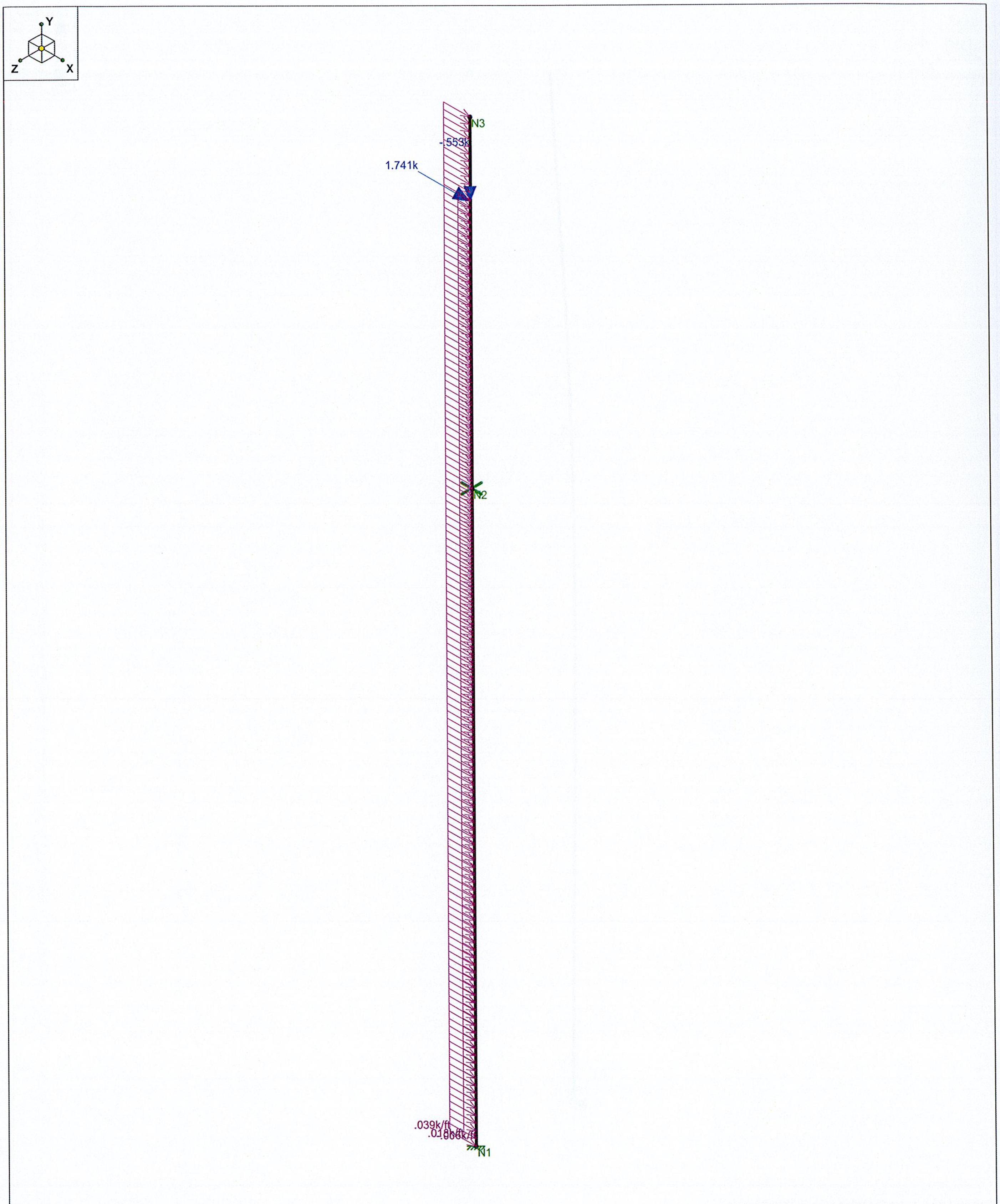
Loads: LC 1, TIA/EIA Wind + Ice on PCS Structure

CENTEK Engineering, INC.	CL&P Pole # 10246 - PCS Mast	
tjl, cfc		Dec 28, 2010 at 6:14 PM
10151.CO3 - CT33XC525	LC # 1 Loads	EIA-TIA.r3d



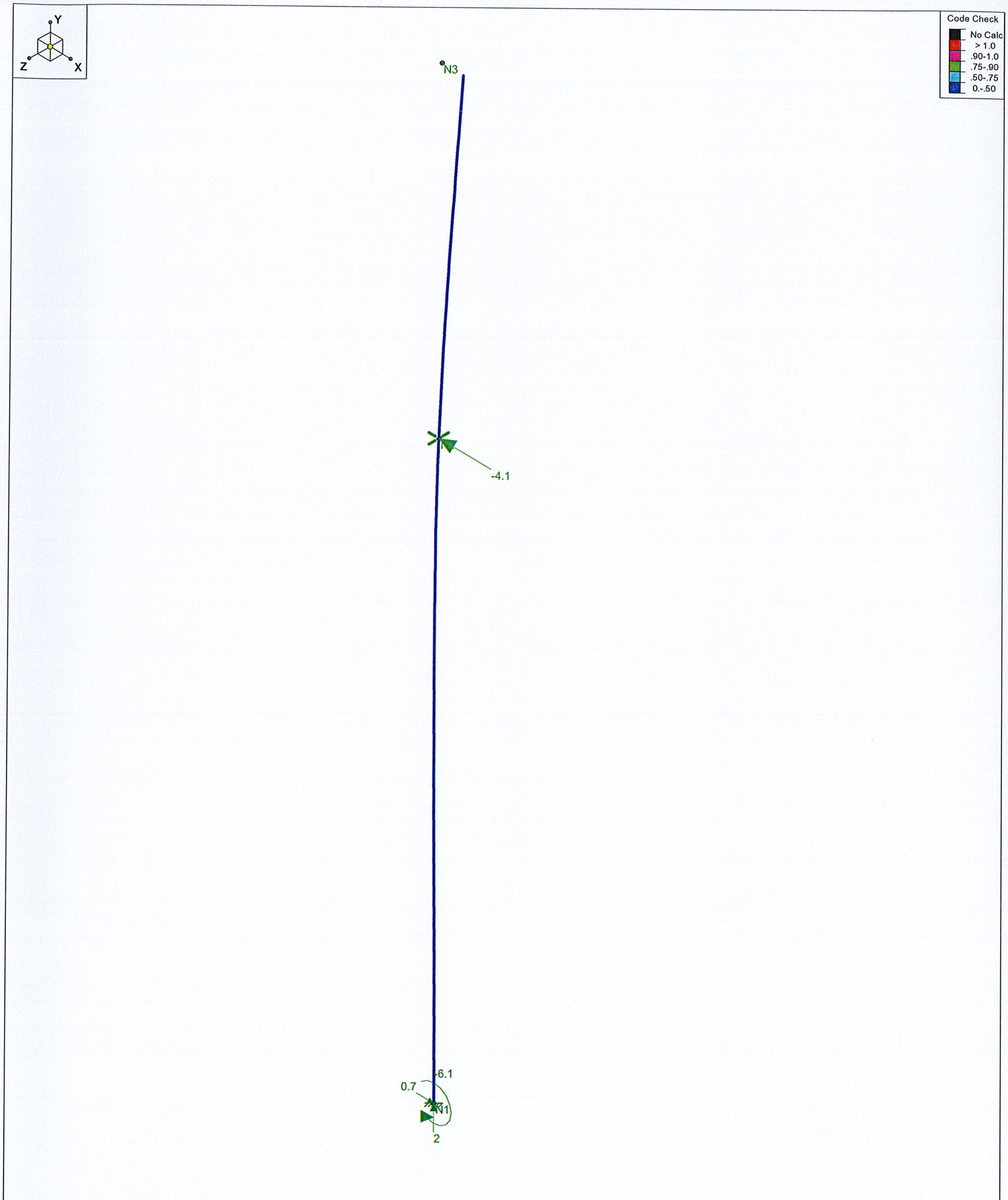
Results for LC 1, TIA/EIA Wind + Ice on PCS Structure
Z-moment Reaction units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	CL&P Pole # 10246 - PCS Mast	Dec 28, 2010 at 6:15 PM
10151.CO3 - CT33XC525	LC # 1 Reactions and Deflected Shape	EIA-TIA.r3d



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

CENTEK Engineering, INC.		
tjl, cfc	CL&P Pole # 10246 - PCS Mast	Dec 28, 2010 at 6:14 PM
10151.CO3 - CT33XC525	LC # 2 Loads	EIA-TIA.r3d



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

CENTEK Engineering, INC.		
tjl, cfc	CL&P Pole # 10246 - PCS Mast	Dec 28, 2010 at 6:16 PM
10151.CO3 - CT33XC525	LC # 2 Reactions and Deflected Shape	EIA-TIA.r3d

PCS Mast Top Connection:

Maximum Design Reactions at Brace:

Vertical = $Vert := 0 \cdot kips$ (User Input)

Horizontal = $Horz := 4.11 \cdot kips$ (User Input)

Moment = $Moment := 0$ (User Input)

Bolt Data:

Bolt Grade = A325 (User Input)

Number of Bolts = $n_b := 6$ (User Input)

Bolt Diameter = $d_b := 0.75in$ (User Input)

Allowable Tensile Stress = $F_{t.all} := 44.0 \cdot ksi$ (User Input)

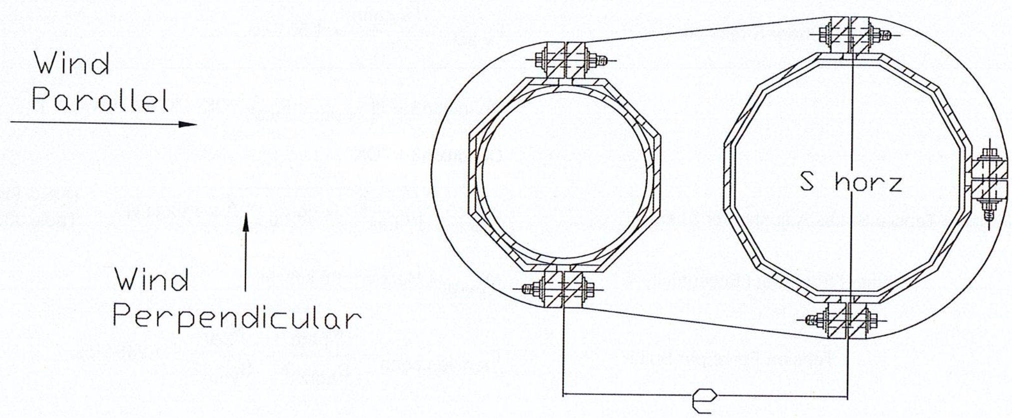
Allowable Shear Stress = $F_{v.all} := 21 \cdot ksi$ (User Input)

Bolt Eccentricity from C.L. Mast = $e := 16.125 \cdot in$ (User Input)

Vetical Spacing Between Top and Bottom Bolts = $S_{vert} := 9 \cdot in$ (User Input)

Horizontal Spacing Between Bolts = $S_{horz} := 17.75 \cdot in$ (User Input)

Bolt Area = $a_b := \frac{1}{4} \cdot \pi \cdot d_b^{\ 2} = 0.442 \cdot in^2$



Check Bolt Stresses:

Wind Acting Parallel to Stiffiner Plate:

Shear Force per Bolt = $F_{v.conn} := \frac{Vert}{n_b} = 0 \cdot kips$

Shear Stress per Bolt = $F_{v.act} := \frac{F_{v.conn}}{a_b} = 0 \cdot ksi$

$Condition1 := if(F_{v.act} < F_{v.all}, "OK", "Overstressed")$

$Condition1 = "OK"$

Allowable Tensile Stress Adjusted for Shear = $F_{t.adj} := \sqrt{F_{t.all}^2 - 4.39 \cdot F_{v.act}^2} = 44 \cdot ksi$ (AISC 9th Ed. Table J3.3)

Moment From Mast Eccentricity = $M_{par} := Vert \cdot e = 0 \cdot kips \cdot in$

Total Tension Force = $F_{tension} := Horz = 4.11 \cdot kips$

Tension Force Each Bolt = $F_{tension.bolt} := \frac{F_{tension}}{n_b} + \frac{M_{par}}{S_{vert} \cdot 2} = 0.685 \cdot kips$

Tension Stress Each Bolt = $F_{t.act} := \frac{F_{tension.bolt}}{a_b} = 1.6 \cdot ksi$

$Condition2 := if(F_{t.act} < F_{t.adj}, "OK", "Overstressed")$

$Condition2 = "OK"$

Wind Acting Perpendicular to Stiffiner Plate:

Shear Force per Bolt = $F_{v.conn} := \frac{\sqrt{Vert^2 + Horz^2}}{n_b} = 0.685 \cdot kips$

Shear Stress per Bolt = $F_{v.act} := \frac{F_{v.conn}}{a_b} = 1.551 \cdot ksi$

$Condition3 := if(F_{v.act} < F_{v.all}, "OK", "Overstressed")$

$Condition3 = "OK"$

Allowable Tensile Stress Adjusted for Shear = $F_{t.adj} := \sqrt{F_{t.all}^2 - 4.39 \cdot F_{v.act}^2} = 43.88 \cdot ksi$ (AISC 9th Ed. Table J3.3)

Moment from Mast Eccentricity = $M_{perp} := Horz \cdot e = 66 \cdot kips \cdot in$

Tension Force per Bolt = $F_{tension.conn} := \frac{M_{perp}}{S_{horz} \cdot 3} + \frac{M_{par}}{S_{vert} \cdot 2} = 1.245 \cdot kips$

Tension Stress Each Bolt = $F_{tension.act} := \frac{F_{tension.conn}}{a_b} = 2.817 \cdot ksi$

$Condition4 := if(F_{tension.act} < F_{t.adj}, "OK", "Overstressed")$

$Condition4 = "OK"$

Mast Connection to Bottom Bracket:

Design Reactions at Brace:

Axial =	$Axial := 1.96 \cdot kips$	(User Input)
Shear =	$Shear := 0.67 \cdot kips$	(User Input)
Moment =	$Moment := 6.14 \cdot kips \cdot ft$	(User Input)

Anchor Bolt Data:

Bolt Grade =	A325	(User Input)
Allowable Shear Stress =	$F_v := 21 \cdot ksi$	(User Input)
Allowable Tension Stress =	$F_T := 44 \cdot ksi$	(User Input)
Total Number of Bolts =	$n_b := 4$	(User Input)
Number of Bolts Tension Side Parallel =	$n_{b.par} := 2$	(User Input)
Number of Bolts Tension Side Diagonal =	$n_{b.diag} := 1$	(User Input)
Bolt Diameter =	$d_b := 0.75in$	(User Input)
Bolt Spacing X Direction =	$S_x := 7.5 \cdot in$	(User Input)
Bolt Spacing Z Direction =	$S_z := 7.5 \cdot in$	(User Input)

Base Plate Data:

Base Plate Steel =	A36	(User Input)
Allowable Yield Stress =	$F_y := 36 \cdot ksi$	(User Input)
Base Plate Width =	$Pl_w := 10.5 \cdot in$	(User Input)
Base Plate Thickness =	$Pl_t := 0.75 \cdot in$	(User Input)
Bolt Edge Distance =	$B_E := 1.5 \cdot in$	(User Input)
Pole Diameter =	$D_p := 8.625 \cdot in$	(User Input)

Base Plate Data:

Weld Grade	E70XX	(User Input)
Weld Yield Stress =	$F_{yw} := 70 \cdot ksi$	(User Input)
Weld Size =	$sw := .375 \cdot in$	(User Input)

Anchor Bolt Check:

Bolt Area = $a_b := \frac{1}{4}\cdot\pi\cdot d_b^{\,2} = 0.442\cdot in^2$

Bolt Spacing Diag. Direction = $S_{diag} := \sqrt{S_x^{\,2} + S_z^{\,2}} = 10.61\cdot in$

Tension Load per Bolt Parallel = $T_{par} := \frac{Moment}{S_x\cdot n_{b.par}} - \frac{Axial}{n_b} = 4.42\cdot kips$

Tension Load per Bolt Diagonal = $T_{diag} := \frac{Moment}{S_{diag}\cdot n_{b.diag}} - \frac{Axial}{n_b} = 6.46\cdot kips$

Actual Shear Stress = $f_v := \frac{Shear}{a_b\cdot n_b} = 0.38\cdot ksi$

Condition1 := if($f_v < F_v$,"OK" ,"Overstressed")

Condition1 = "OK"

Allowable Tensile Stress Adjusted for Shear = $F_{t.adj} := \sqrt{F_T^{\,2} - 4.39\cdot f_v^{\,2}} = 43.993\cdot ksi$

Tension per bolt = $T := if\left(T_{par} > T_{diag}, T_{par}, T_{diag}\right) = 6.457\cdot kips$

Actual Tensile Stress = $f_t := \frac{T}{a_b} = 14.61\cdot ksi$

Condition2 := if($f_t < F_{t.adj}$,"OK" ,"Overstressed")

Condition2 = "OK"

Base Plate Check:

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

Plate Bending Width = $Z := \left(Pl_w\cdot\sqrt{2} - D_p\right) = 6.22\cdot in$

Moment Arm = $K := \frac{\left(S_{diag} - D_p\right)}{2} = 0.99\cdot in$

Moment in Base Plate = $M := K\cdot T = 6.4\cdot kips\cdot in$

Section Modulus = $S_Z := \frac{1}{6}\cdot Z\cdot Pl_t^{\,2} = 0.58\cdot in^3$

Bending Stress = $f_b := \frac{M}{S_Z} = 10.96\cdot ksi$

Condition3 := if($f_b < F_b$,"OK" ,"Overstressed")

Condition3 = "OK"

Base Plate to PCS Mast Weld Check:

Allowable Weld Stress = $F_w := 0.3 \cdot F_{yw} = 21 \cdot ksi$

$c := \frac{D_p}{2} + sw \cdot 0.707 = 4.58 \cdot in$

Weld Moment of Inertia = $I_w := \frac{\pi}{64} \cdot \left[\left(D_p + 2sw \cdot 0.707\right)^4 - D_p^{\ 4}\right] = 73.22 \cdot in^4$

Section Modulus of Weld = $S_w := \frac{I_w}{c} = 15.99 \cdot in^3$

Weld Stress = $f_w := \frac{Moment}{S_w} = 4.61 \cdot ksi$

Condition4 := if($f_w < F_w$,"OK","Overstressed")

Condition4 = "OK"

PCS Mast Bottom Connection:

Maximum Design Reactions at Brace:

Vertical = $Vert := 1.96 \cdot kips$ (User Input)

Horizontal = $Horz := 0.67 \cdot kips$ (User Input)

Moment = $Moment := 6.14 \cdot ft \cdot kips$ (User Input)

Bolt Data:

Bolt Grade = A325 (User Input)

Number of Bolts = $n_b := 8$ (User Input)

Bolt Diameter = $d_b := 0.75in$ (User Input)

Allowable Tensile Stress = $F_{t.all} := 44.0 \cdot ksi$ (User Input)

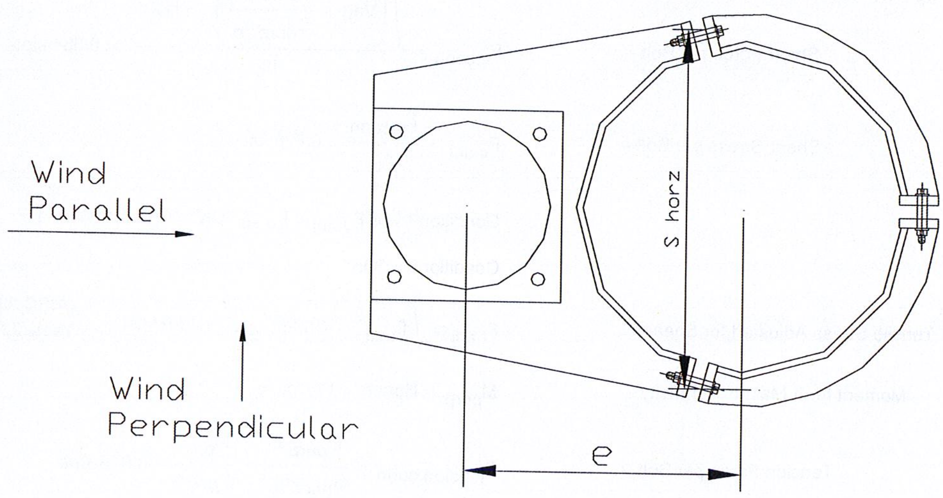
Allowable Shear Stress = $F_{v.all} := 21 \cdot ksi$ (User Input)

Bolt Eccentricity from C.L. Mast = $e := 16.125 \cdot in$ (User Input)

Vetical Spacing Between Top and Bottom Bolts = $S_{vert} := 9.125 \cdot in$ (User Input)

Horizontal Spacing Between Bolts = $S_{horz} := 21 \cdot in$ (User Input)

Bolt Area = $a_b := \frac{1}{4} \cdot \pi \cdot d_b^{\ 2} = 0.442 \cdot in^2$



Check Bolt Stresses:

Wind Acting Parallel to Stiffiner Plate:

Shear Force per Bolt = $F_{v.conn} := \frac{Vert}{n_b} = 0.245 \cdot kips$

Shear Stress per Bolt = $F_{v.act} := \frac{F_{v.conn}}{a_b} = 0.555 \cdot ksi$

$Condition1 := if(F_{v.act} < F_{v.all}, "OK", "Overstressed")$

$Condition1 = "OK"$

Allowable Tensile Stress Adjusted for Shear = $F_{t.adj} := \sqrt{F_{t.all}^2 - 4.39 \cdot F_{v.act}^2} = 43.98 \cdot ksi$ (AISC 9th Ed. Table J3.3)

Moment From Mast Eccentricity = $M_{par} := Vert \cdot e + Moment = 105.3 \cdot kips \cdot in$

Total Tension Force = $F_{tension} := Horz = 0.67 \cdot kips$

Tension Force Each Bolt = $F_{tension.bolt} := \frac{F_{tension}}{n_b} + \frac{M_{par}}{S_{vert} \cdot 4} = 2.968 \cdot kips$

Tension Stress Each Bolt = $F_{t.act} := \frac{F_{tension.bolt}}{a_b} = 6.7 \cdot ksi$

$Condition2 := if(F_{t.act} < F_{t.adj}, "OK", "Overstressed")$

$Condition2 = "OK"$

Wind Acting Perpendicular to Stiffiner Plate:

Shear Force per Bolt = $F_{v.conn} := \frac{\sqrt{\left(Vert + \frac{Moment \cdot 2}{S_{horz} \cdot n_b}\right)^2 + Horz^2}}{n_b} = 0.364 \cdot kips$

Shear Stress per Bolt = $F_{v.act} := \frac{F_{v.conn}}{a_b} = 0.825 \cdot ksi$

$Condition3 := if(F_{v.act} < F_{v.all}, "OK", "Overstressed")$

$Condition3 = "OK"$

Allowable Tensile Stress Adjusted for Shear = $F_{t.adj} := \sqrt{F_{t.all}^2 - 4.39 \cdot F_{v.act}^2} = 43.97 \cdot ksi$ (AISC 9th Ed. Table J3.3)

Moment from Mast Eccentricity = $M_{perp} := Horz \cdot e = 11 \cdot kips \cdot in$

Tension Force per Bolt = $F_{tension.conn} := \frac{M_{perp} \cdot 2}{S_{horz} \cdot n_b} + \frac{M_{par}}{S_{vert} \cdot 4} = 3.013 \cdot kips$

Tension Stress Each Bolt = $F_{tension.act} := \frac{F_{tension.conn}}{a_b} = 6.82 \cdot ksi$

$Condition4 := if(F_{tension.act} < F_{t.adj}, "OK", "Overstressed")$

$Condition4 = "OK"$

CENTEK engineering
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Subject:	Load Analysis of Pipe Mast and Sprint Equipment on CL&P Structure #10246
Location:	Brookfield, CT
Rev. 0: 12/28/10	Prepared by: T.J.L Checked by: C.F.C. Job No. 10151.CO3

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 = $TME := 135$ 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 = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.348$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.3$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.813$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.846$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 35.3$ 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

Development of Wind & Ice Load on PCS Mast

PCS Mast Data: (Pipe 8.0" SCH. 80)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 8.63$	in	(User Input)
Mast Length =	$L_{mast} := 31$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.5$	in	(User Input)

Wind Load (NESC Extreme)

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

Total Mast Wind Force = $qz \cdot Cd_R \cdot A_{mast} = 33$ plf **BLC 5**

Wind Load (NESE Heavy)

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

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

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

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = Andrew HBX-6516DS

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 51.4$ in (User Input)

Antenna Width = $W_{ant} := 6.5$ in (User Input)

Antenna Thickness = $T_{ant} := 3.3$ in (User Input)

Antenna Weight = $WT_{ant} := 9.9$ 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 = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 2.3$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 7$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 492$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 2.7$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 8.2$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 52$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 30$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1103$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 587$ cu in

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

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 57$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = Andrew DB980F65E-M

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 60$ in (User Input)

Antenna Width = $W_{ant} := 6.3$ in (User Input)

Antenna Thickness = $T_{ant} := 3$ in (User Input)

Antenna Weight = $WT_{ant} := 8.5$ 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 = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 2.6$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 7.9$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 556$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 3.1$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 9.3$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 59$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 26$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1134$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 647$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 21$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 63$ lbs **BLC 3**

Development of Wind & Ice Load on TMAs

TMA Data:

TMA Model =	CCI TMA		
TMA Shape =	Flat		(User Input)
TMA Height =	$L_{tma} := 14.3$	in	(User Input)
TMA Width =	$W_{tma} := 8.3$	in	(User Input)
TMA Thickness =	$T_{tma} := 3.2$	in	(User Input)
TMA Weight =	$WT_{tma} := 13.3$	lbs	(User Input)
Number of TMAs =	$N_{tma} := 2$		(User Input)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to ALL TMAs Simultaneously

Surface Area for One TMA = $SA_{tma} := \frac{L_{tma} \cdot W_{tma}}{144} = 0.8$ sf

TMA Projected Surface Area = $A_{tma} := SA_{tma} \cdot N_{tma} = 1.6$ sf

Total TMA Wind Force = $F_{tma} := qz \cdot Cd_F \cdot A_{tma} \cdot m = 116$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to ALL TMAs Simultaneously

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

TMA Projected Surface Area w/ Ice = $A_{ICEtma} := SA_{ICEtma} \cdot N_{tma} = 2$ sf

Total TMA Wind Force w/ Ice = $Fi_{tma} := p \cdot Cd_F \cdot A_{ICEtma} = 13$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All TMAs = $WT_{tma} \cdot N_{tma} = 27$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each TMA = $V_{tma} := L_{tma} \cdot W_{tma} \cdot T_{tma} = 380$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{tma} + 1)(W_{tma} + 1) \cdot (T_{tma} + 1) - V_{tma} = 218$ cu in

Weight of Ice on Each TMA = $W_{ICEtma} := \frac{V_{ice}}{1728} \cdot Id = 7$ lbs

Weight of Ice on All TMAs = $W_{ICEtma} \cdot N_{tma} = 14$ lbs **BLC 3**

Development of Wind & Ice Load on Mounts

Mount Data:

Mount Type = Valmont Tri-Sector Standoff Chain Mount p/n B1622

Platform Shape = Flat (User Input)

Platform Area = $A_{plt} := 13.5$ sq ft (User Input) (Shape Factor Included)

Platform Area w/ Ice = $A_{ICEplt} := 18.4$ sq ft (User Input) (Shape Factor Included)

Platform Weight = $WT_{plt} := 470$ lbs (User Input)

Platform Weight w/ Ice = $WT_{ICEplt} := 616$ lbs (User Input)

Wind Load (NESC Extreme)

Total Platform Wind Force = $F_{plt} := qz \cdot A_{plt} \cdot m = 596$ lbs **BLC 5**

Wind Load (NESC Heavy)

Total Platform Wind Force w/ Ice = $Fi_{plt} := p \cdot A_{ICEplt} = 74$ lbs **BLC 4**

Gravity Load (without ice)

Weight of Platform = $WT_{plt} = 470$ lbs **BLC 2**

Gravity Load (ice only)

Weight of Ice on Platform = $WT_{ICEplt} - WT_{plt} = 146$ lbs **BLC 3**

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 = $L_{coax} := 28$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 1.04$ plf (User Input)

Total Number of Coax = $N_{coax} := 6$ (User Input)

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

Wind Load (NESC Extreme)

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

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 21$ plf **BLC 5**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{NP_{coax} \cdot (D_{coax} + 2 \cdot Ir)}{12} = 0.5$ ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 3$ plf **BLC 4**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 6$ 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 = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 9$ plf **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 NESC Heavy Wind and NESC Extreme Wind for Obtaining PCS Structure Reactions Applied to CL&P Pole Tabulated Load Cases**

Location: **Brookfield, CT**

Date:12/15/10 Prepared by: T.J.L. Checked by: C.F.C. Job No. 10151.CO3

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

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

Date: 12/15/10 Prepared by: T.J.L. Checked by: C.F.C. Job No. 10151.CO3

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

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: 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

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[...	Yield[ksi]
1	A36 Gr.36	29000	11154	.3	.65	.49	36
2	A572 Gr.50	29000	11154	.3	.65	.49	50
3	A992	29000	11154	.3	.65	.49	50
4	A500 Gr.42	29000	11154	.3	.65	.49	42
5	A500 Gr.46	29000	11154	.3	.65	.49	46
6	A53 Gr. B	29000	11154	.3	.65	.49	35

Hot Rolled Steel Design Parameters

	Label	Shape	Lengt...	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	Kyy	Kzz	Cm-...	Cm-...	Cb	y s...	z s...	Functi...
1	M1	Mast	30.5												Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	PIPE_8.0X	Beam	Pipe	A53 Gr. B	Typical	11.9	100	100	199

Member Primary Data

	Label	I Joint	J Joint	K ...	Rotate(deg)	Section/Shape	Type	Design Li...	Material	Design Rules
1	M1	N1	N3			Mast	Beam	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Di...
1	N1	0	0	0	0	
2	N2	0	19.5	0	0	
3	N3	0	30.5	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	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
2	N2	Reaction		Reaction				

Joint Loads and Enforced Displacements

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

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.03	28
2	M1	Y	-.026	28
3	M1	Y	-.027	28
4	M1	Y	-.47	28

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.057	28
2	M1	Y	-.063	28
3	M1	Y	-.014	28

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
4	M1	Y	-.146	28

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.052	28
2	M1	X	.059	28
3	M1	X	.013	28
4	M1	X	.074	28

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.492	28
2	M1	X	.556	28
3	M1	X	.116	28
4	M1	X	.596	28

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.006	-.006	0	28

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

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.006	-.006	0	0
2	M1	Y	-.009	-.009	0	28

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

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.004	.004	0	0
2	M1	X	.003	.003	0	28

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

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.033	.033	0	0
2	M1	X	.021	.021	0	28

Basic Load Cases

	BLC Description	Category	X Gr...	Y Gra...	Z Gr...	Joint	Poi...	Distribut...	Area (Me...	Surf...
1	Self Weight (PCS Mast)	None		-1						
2	Weight of Appurtenances	None					4	1		
3	Weight of Ice Only on PCS Struct	None					4	2		
4	NESC Heavy Wind on PCS Str	None					4	2		
5	NESC Extreme Wind on PCS S	None					4	2		

Load Combinations

	Description	Solve	PDel...	SR...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	NESC Heavy Wind on PCS Structure	Yes			1	1.5	2	1.5	3	1.5	4	2.5								
2	NESC Extreme Wind on PCS Struct...	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...	LC	Torque[...	LC	y-y Mo...	LC	z-z Mom...	LC
1	M1	1	max	4.007	1	-.177	1	0	1	0	1	0	1	-1.695	1
2			min	1.956	2	-.702	2	0	1	0	1	0	1	-6.237	2
3		2	max	3.303	1	-.31	1	0	1	0	1	0	1	.684	2
4			min	1.602	2	-1.114	2	0	1	0	1	0	1	.164	1
5		3	max	2.6	1	-.444	1	0	1	0	1	0	1	10.745	2
6			min	1.247	2	-1.525	2	0	1	0	1	0	1	3.039	1
7		4	max	1.897	1	2.119	2	0	1	0	1	0	1	10.255	2
8			min	.893	2	.61	1	0	1	0	1	0	1	2.926	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

Envelope Member Section Stresses

	Member	Sec		Axial[...	LC	y Shear[ksi]	LC	z Shear[ksi]	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
1	M1	1	max	.337	1	-.03	1	0	1	3.228	2	-.877	1	0	1	0	1
2			min	.164	2	-.118	2	0	1	.877	1	-3.228	2	0	1	0	1
3		2	max	.278	1	-.052	1	0	1	-.085	1	.354	2	0	1	0	1
4			min	.135	2	-.187	2	0	1	-.354	2	.085	1	0	1	0	1
5		3	max	.218	1	-.075	1	0	1	-1.573	1	5.56	2	0	1	0	1
6			min	.105	2	-.256	2	0	1	-5.56	2	1.573	1	0	1	0	1
7		4	max	.159	1	.356	2	0	1	-1.514	1	5.307	2	0	1	0	1
8			min	.075	2	.102	1	0	1	-5.307	2	1.514	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

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	.702	2	4.007	1	0	1	0	1	0	1	-1.695	1
2		min	.177	1	1.956	2	0	1	0	1	0	1	-6.237	2
3	N2	max	-1.187	1	0	1	0	1	0	1	0	1	0	1
4		min	-4.056	2	0	1	0	1	0	1	0	1	0	1
5	Totals:	max	-1.01	1	4.007	1	0	1						
6		min	-3.354	2	1.956	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	0	2	0	1	0	1	0	1	0	2
2		min	0	2	0	1	0	1	0	1	0	1	0	1
3	N2	max	0	2	-.001	2	0	1	0	1	0	1	-1.104e-3	1
4		min	0	1	-.002	1	0	1	0	1	0	1	-3.9e-3	2
5	N3	max	.875	2	-.001	2	0	1	0	1	0	1	-2.14e-3	1
6		min	.249	1	-.003	1	0	1	0	1	0	1	-7.527e-3	2

Envelope AISC ASD Steel Code Checks

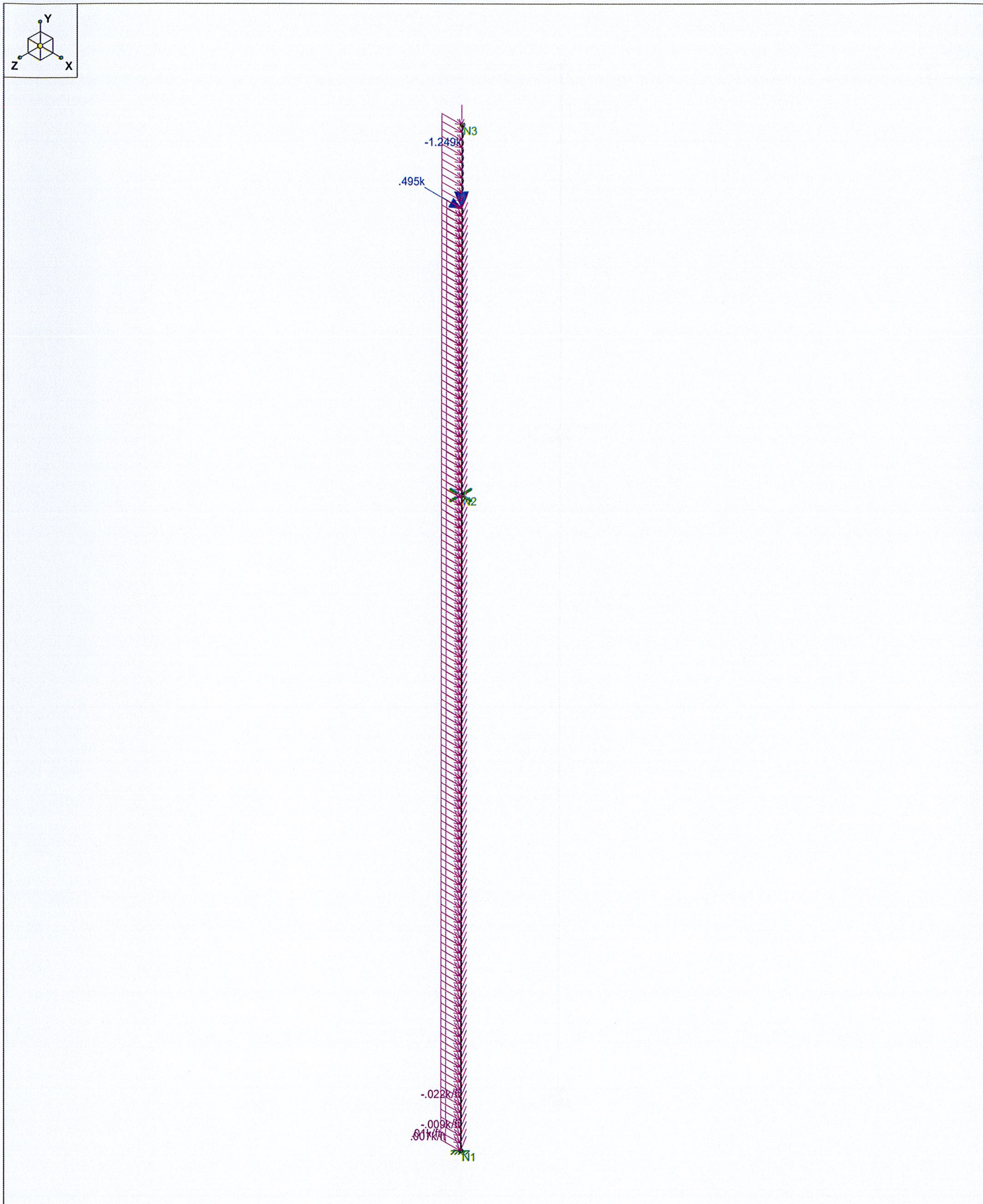
	Member	Shape	Code Check	Loc[ft]	L...	Shear Ch...	Loc[ft]	...	LC	Fa...	Ft ...	Fb y-y [ksi]	Fb........		...		AS...
1	M1	PIPE_8.0X	.396	19.38	2	.028	19.698		2	9....	21	23.1	23.1	1	.6	....	H1..

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N1	.177	4.007	0	0	0	-1.695
2	1	N2	-1.187	0	0	0	0	0
3	1	Totals:	-1.01	4.007	0			
4	1	COG (ft):	X: 0	Y: 19.03	Z: 0			

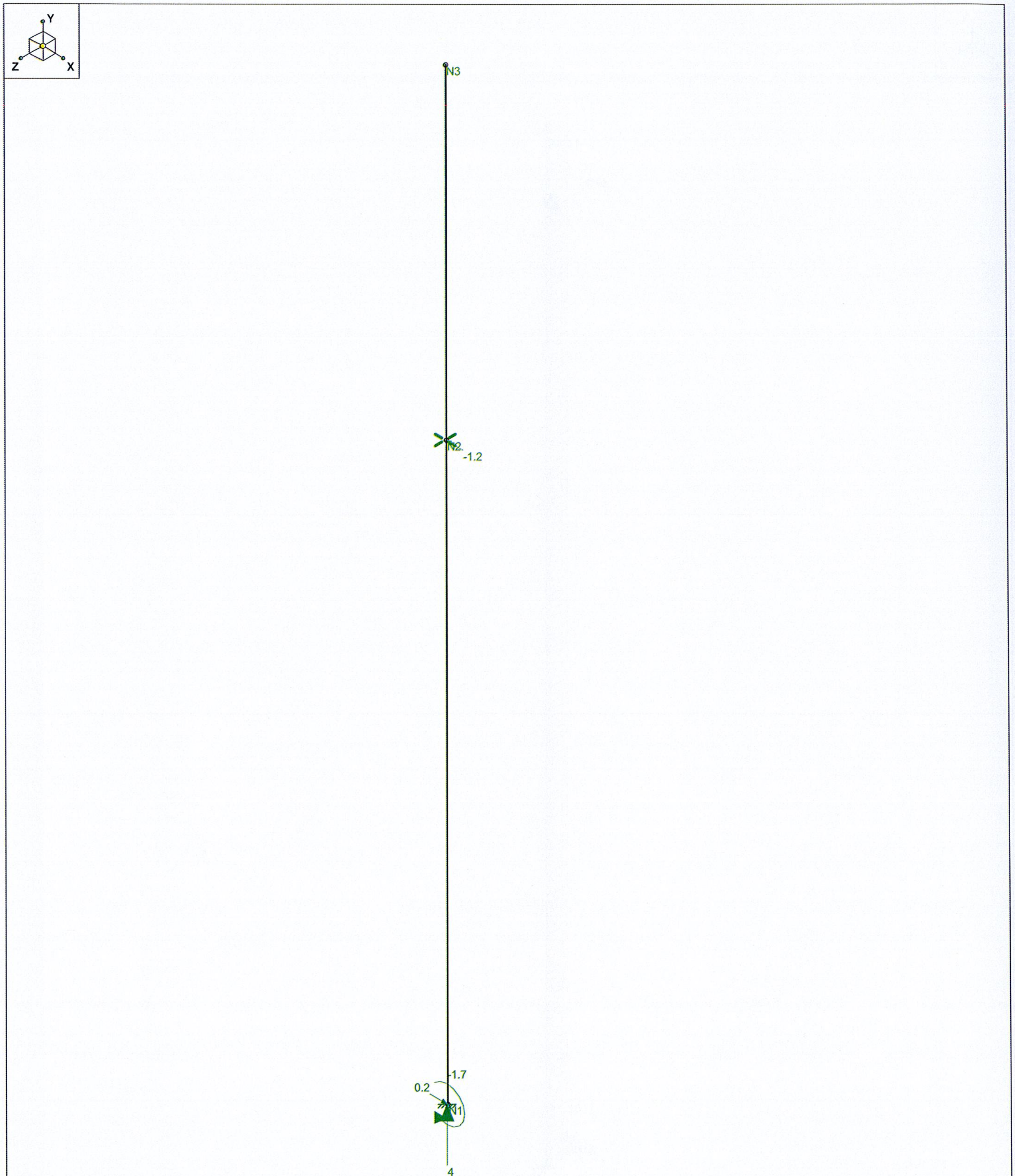
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N1	.702	1.956	0	0	0	-6.237
2	2	N2	-4.056	0	0	0	0	0
3	2	Totals:	-3.354	1.956	0			
4	2	COG (ft):	X: 0	Y: 18.747	Z: 0			



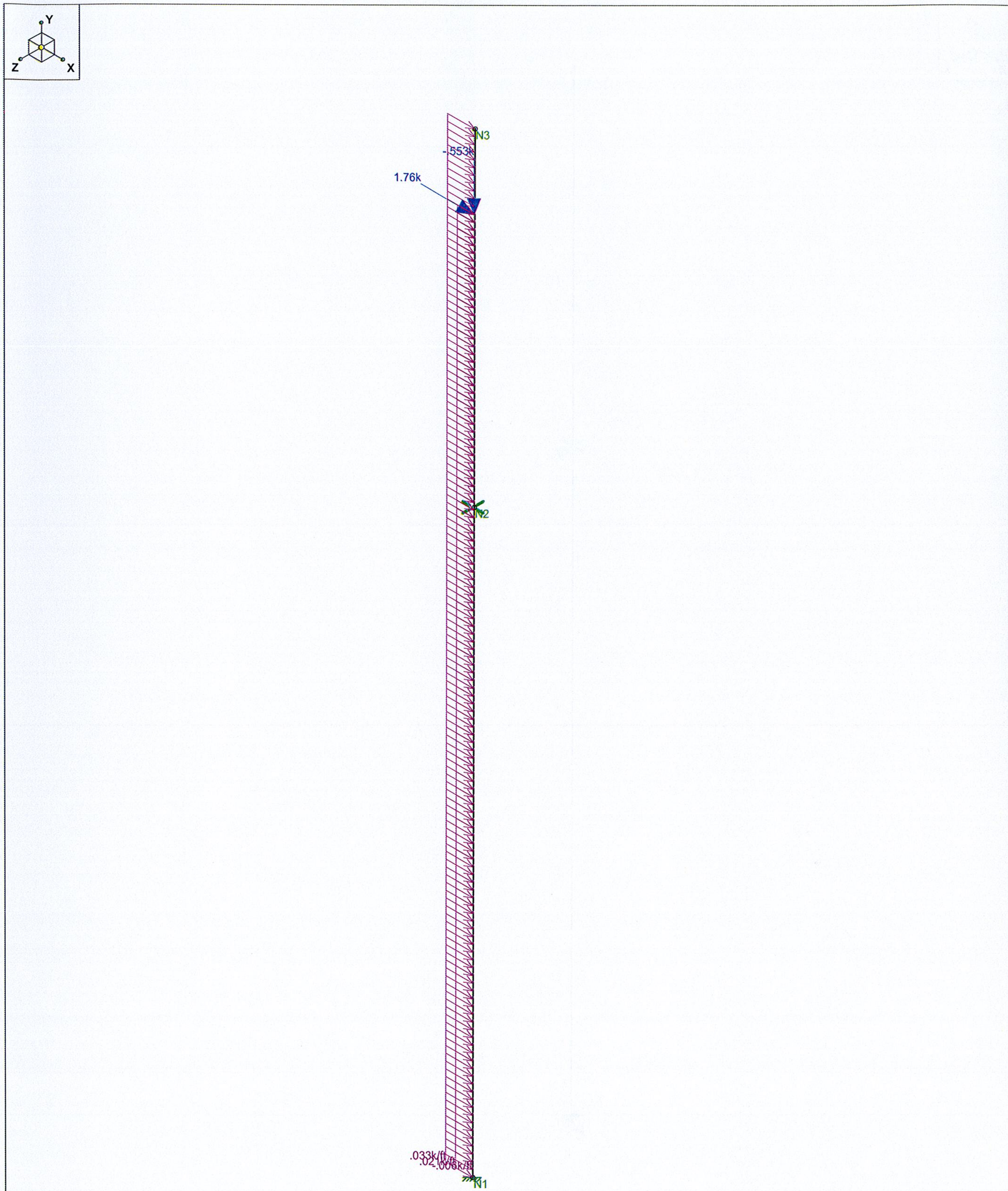
Loads: LC 1, NESC Heavy Wind on PCS Structure

CENTEK Engineering, Inc.		
tjl, cfc	CL&P Tower # 10246 - PCS Mast	Dec 28, 2010 at 6:28 PM
10151.CO3 - CT33XC525	LC # 1 Loads	NESC.r3d



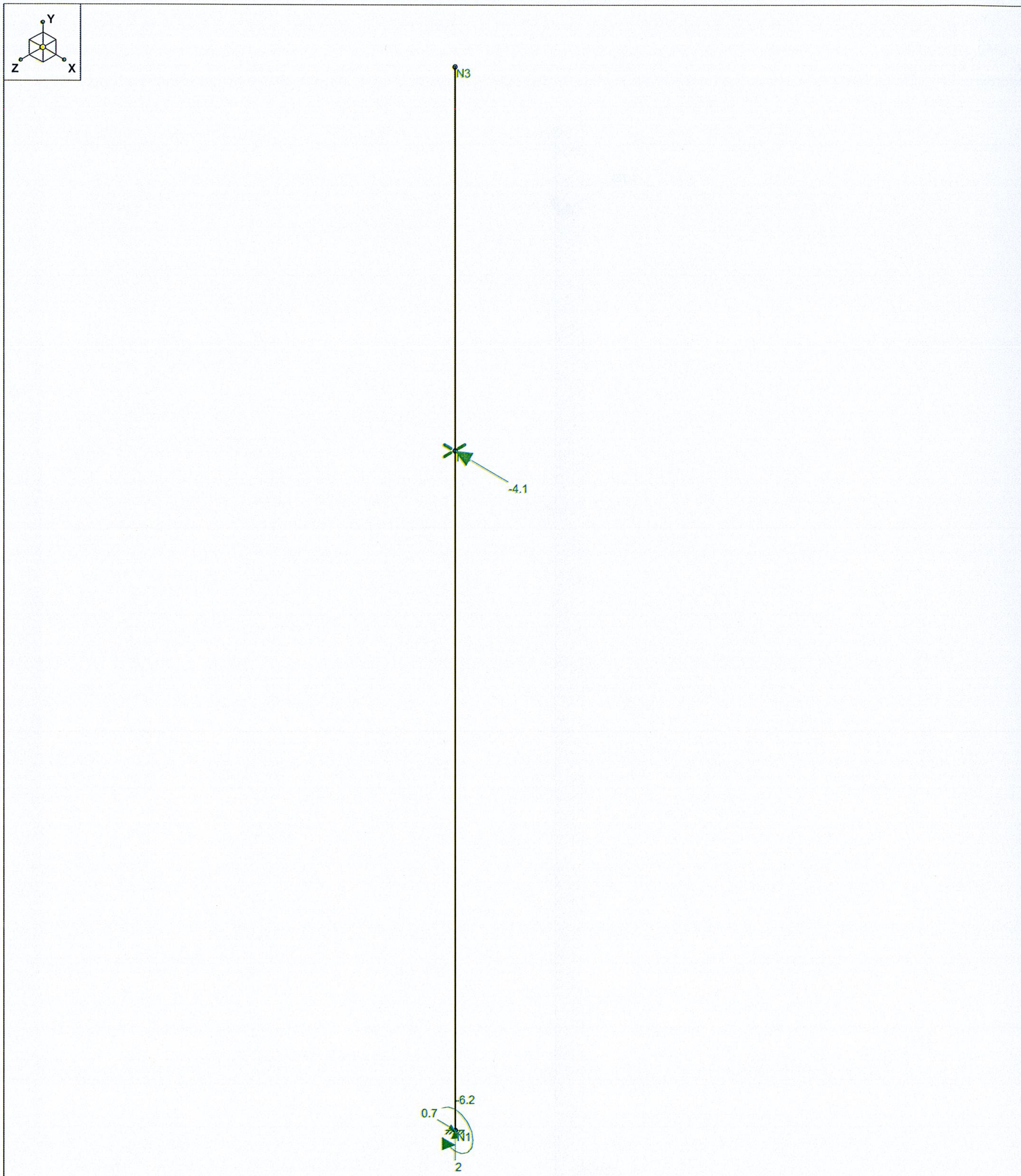
Results for LC 1, NESC Heavy Wind on PCS Structure
Z-moment Reaction units are k and k-ft

CENTEK Engineering, Inc.		
tjl, cfc	CL&P Tower # 10246 - PCS Mast	Dec 28, 2010 at 6:30 PM
10151.CO3 - CT33XC525	LC # 1 Reactions	NESC.r3d



Loads: LC 2, NESC Extreme Wind on PCS Structure

CENTEK Engineering, Inc.		
tjl, cfc	CL&P Tower # 10246 - PCS Mast	Dec 28, 2010 at 6:29 PM
10151.CO3 - CT33XC525	LC # 2 Loads	NESC.r3d



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

CENTEK Engineering, Inc.		
tjl, cfc	CL&P Tower # 10246 - PCS Mast	Dec 28, 2010 at 6:30 PM
10151.CO3 - CT33XC525	LC # 2 Reactions	NESC.r3d

Coax Cable on CL&P Pole

Distance Between Coax Cable Attach Points =

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

Notes:
1. Cables attached to Pole @ 10-ft AGL
2. Cables attached to PCS Mast @ 105-ft AGL

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 = $NP_{coax1} := 2$ *(User Input)*

Extreme Wind Pressure = $qz := 35.3 \cdot psf$ *(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 = $Cd_{coax} := 1.45$ *(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 = $A_{ice} := (NP_{coax1} \cdot D_{coax1} + 2 \cdot Ir) = 4.96 \cdot in$

Wind Area without Ice = $A := (NP_{coax1} \cdot D_{coax1}) = 3.96 \cdot in$

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

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax1} \cdot Id \cdot N_{coax1} = 9 \cdot plf$

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 =

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

$Heavy_{Vert}$ = (lb)

	0
0	115
1	230
2	230
3	230
4	230
5	230
6	230
7	230
8	230
9	230

$Heavy_{Trans}$ = (lb)

	0
0	30
1	60
2	60
3	60
4	60
5	60
6	60
7	60
8	60
9	60

Extreme Vertical Load =

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

Extreme Transverse Load =

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

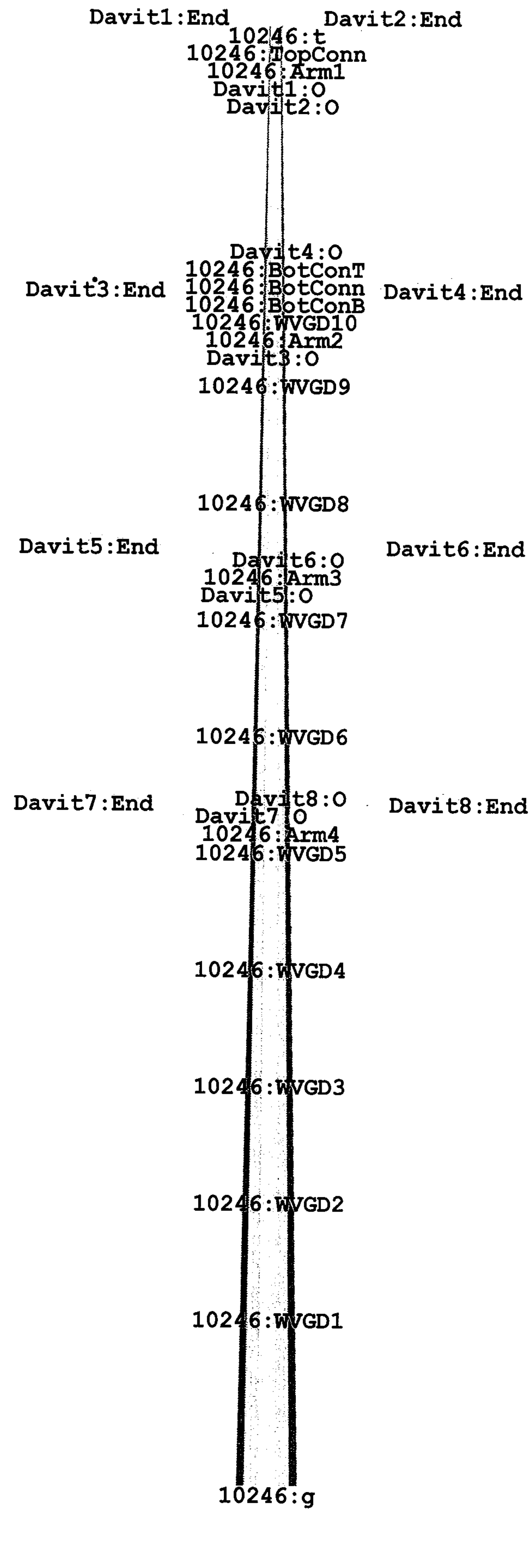
$Extreme_{Vert}$ = (lb)

	0
0	31
1	62
2	62
3	62
4	62
5	62
6	62
7	62
8	62
9	62

$Extreme_{Trans}$ = (lb)

	0
0	84
1	169
2	169
3	169
4	169
5	169
6	169
7	169
8	169
9	169

ntek Engineering Inc, Project: "cl&p structure # 10246"
S-POLE Version 10.40, 9:01:18 AM Monday, January 24, 2011
Undeformed geometry displayed



Project Name : 10151.C03 - Brookfield, CT
Project Notes: CL&P # 10246/ Sprint CT33XC525
Project File : J:\Jobs\1015100.WI\CO3 - CT33XC525\Rev (1)\Calcs\PLS-Pole\cl&p structure # 10246.pol
Date run : 9:00:08 AM Monday, January 24, 2011
by : PLS-POLE Version 10.40
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: j:\jobs\1015100.wi\co3 - ct33xc525\rev (1)\calcs\pls-pole\cl&p #10246.lca

*** Analysis Results:

Maximum element usage is 61.78% for Base Plate "10246" in load case "NESC Extreme"
Maximum insulator usage is 13.37% for Clamp "Clamp4" in load case "NESC Heavy"

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kips)	Tran. Force (kips)	Vert. Force (kips)	Shear Force (kips)	Tran. Moment (ft-k)	Long. Moment (ft-k)	Vert. Moment (ft-k)	Bending Moment (ft-k)	Found. Usage %
NESC Heavy	10246:g	-0.16	-41.58	72.08	41.58	3685.75	-8.27	0.00	3685.76	0.00
NESC Extreme	10246:g	-0.05	-52.54	41.02	52.54	4235.43	-2.34	-0.00	4235.43	0.00

Summary of Tip Deflections For All Load Cases:

Note: postive tip load results in positive rotation

Load Case	Joint Label	Long. Defl. (in)	Tran. Defl. (in)	Vert. Defl. (in)	Resultant Defl. (in)	Long. Rot. (deg)	Tran. Rot. (deg)	Twist (deg)
NESC Heavy	10246:t	0.07	44.29	-0.94	44.30	0.00	-3.59	0.00
NESC Extreme	10246:t	0.02	48.81	-1.12	48.83	0.00	-4.00	0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
10246	1	638	NESC Extreme	40.34	117.36
10246	2	5242	NESC Extreme	43.58	879.48
10246	3	9064	NESC Extreme	50.25	2251.84
10246	4	11962	NESC Extreme	53.42	3214.37

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
10246	53.42	NESC Extreme	33	31359.1

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	2.89	NESC Extreme	1	156.1
Davit2	13.55	NESC Heavy	1	156.1
Davit3	1.33	NESC Heavy	1	873.6
Davit4	14.37	NESC Heavy	1	873.6
Davit5	1.34	NESC Heavy	1	873.6
Davit6	14.63	NESC Heavy	1	873.6

Davit7	1.34	NESC Heavy	1	873.6
Davit8	14.87	NESC Heavy	1	873.6

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	54.77	10246	Base Plate
NESC Extreme	61.78	10246	Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	48.75	10246	30
NESC Extreme	53.42	10246	33

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC Heavy	10246	11	23.979	72.079	3685.748	-8.267	32.862	98.500	4	99.114	2.220	54.77
NESC Extreme	10246	11	23.979	41.019	4235.433	-2.341	37.067	111.106	4	112.085	2.358	61.78

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	14.87	Davit8	1
NESC Extreme	9.16	Davit8	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	2.97	NESC Heavy	0.0
Clamp2	Clamp	2.97	NESC Heavy	0.0
Clamp3	Clamp	0.00	NESC Heavy	0.0
Clamp4	Clamp	13.37	NESC Heavy	0.0
Clamp5	Clamp	0.00	NESC Heavy	0.0
Clamp6	Clamp	13.37	NESC Heavy	0.0
Clamp7	Clamp	0.00	NESC Heavy	0.0
Clamp8	Clamp	13.37	NESC Heavy	0.0
Clamp9	Clamp	0.15	NESC Heavy	0.0
Clamp10	Clamp	0.30	NESC Heavy	0.0
Clamp11	Clamp	0.30	NESC Heavy	0.0
Clamp12	Clamp	0.30	NESC Heavy	0.0
Clamp13	Clamp	0.30	NESC Heavy	0.0
Clamp14	Clamp	0.30	NESC Heavy	0.0
Clamp15	Clamp	0.30	NESC Heavy	0.0
Clamp16	Clamp	0.30	NESC Heavy	0.0
Clamp17	Clamp	0.30	NESC Heavy	0.0
Clamp18	Clamp	0.30	NESC Heavy	0.0
Clamp21	Clamp	5.07	NESC Extreme	0.0
Clamp22	Clamp	7.80	NESC Extreme	0.0
Clamp23	Clamp	5.01	NESC Heavy	0.0
Clamp24	Clamp	7.80	NESC Extreme	0.0

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*** Weight of structure (lbs):
    Weight of Tubular Davit Arms:      5553.7
    Weight of Steel Poles:            31359.1
    Total:                            36912.8

*** End of Report
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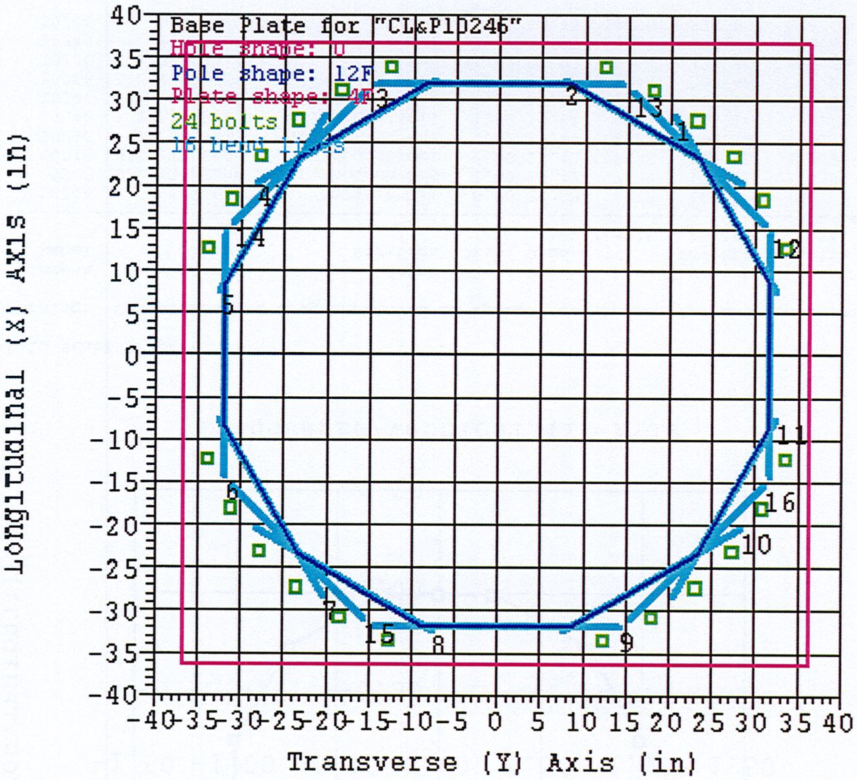
Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)
CL&P10246	1	18.583	0.1875	2.670	0.000	60.000	0.000	638	0.42300	13.00	20.86	2.56
CL&P10246	2	40	0.4375	4.583	0.000	60.000	0.000	5242	0.42300	19.36	36.28	4.43
CL&P10246	3	40	0.5	6.330	0.000	60.000	0.000	9064	0.42300	33.46	50.38	6.17
CL&P10246	4	40	0.5	0.000	0.000	60.000	0.000	11962	0.42300	46.70	63.62	0.00

Base Plate Properties:

Pole Property	Plate Diam. (in)	Plate Shape	Plate Thick. (in)	Plate Weight (lbs)	Bend Line Length Override (in)	Hole Diam. (in)	Hole Shape	Steel Density (lbs/ft^3)	Steel Yield Stress (ksi)	Bolt Diam. (in)	Bolt Pattern Diam. (in)	Num. Of Bolts	Bolt Cage X Inertia (in^4)	Bolt Cage Y Inertia (in^4)
CL&P10246	73.000	4F	3.000	4452	0.000	0.000	0	490.00	60.000	2.250	72.000	24	61804.96	61804.96

Base Plate Bolt Coordinates for Property "CL&P10246":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0.3472	0.9375	0
0.5069	0.8611	0
0.6458	0.7639	0
0.7639	0.6458	0
0.8611	0.5069	0
0.9375	0.3472	0



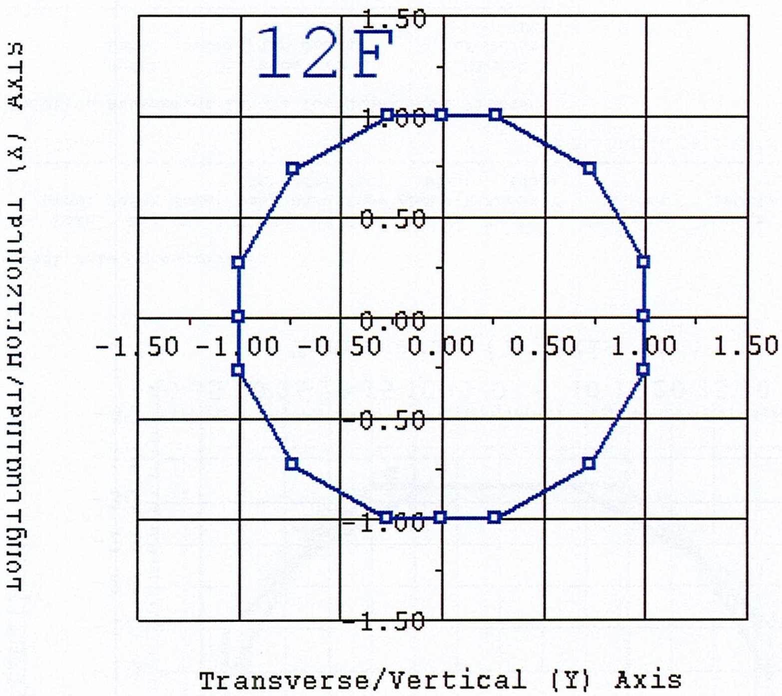
Steel Pole Connectivity:

Pole Label	Tip Joint	Base Joint	X of Base (ft)	Y of Base (ft)	Z of Base (ft)	Inclin. About X (deg)	Inclin. About Y (deg)	Property Set	Attach. Labels	Base Connect	Embed % Override	Embed C. Override (ft)
10246			0	0	0	0	0	CL&P10246	18 labels		0.00	0

Relative Attachment Labels for Steel Pole "10246":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
10246:Arm1	0.00	123.08
10246:Arm2	0.00	100.66
10246:Arm3	0.00	78.66
10246:Arm4	0.00	56.66
10246:WVGD1	0.00	15.00
10246:WVGD2	0.00	25.00
10246:WVGD3	0.00	35.00
10246:WVGD4	0.00	45.00

10246:WVGD5	0.00	55.00
10246:WVGD6	0.00	65.00
10246:WVGD7	0.00	75.00
10246:WVGD8	0.00	85.00
10246:WVGD9	0.00	95.00
10246:WVGD10	0.00	102.50
10246:TopConn	0.00	124.00
10246:BotConT	0.00	105.00
10246:BotConn	0.00	104.50
10246:BotConB	0.00	104.00



Pole Steel Properties:

Warning: Capacities and usages printed in splices are listed for the inner tube except at the splice top which uses the outer tube. ??

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	T-Moment Inertia (in^4)	L-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	ASCE Cap Trans. (ft-k)	ASCE Cap Long. (ft-k)
10246	10246:t	10246:t Ori	0.00	13.00	7.72	162.33	162.33	0.00	15.9	60.00	60.00	124.87	124.87
10246	10246:TopConn	10246:TopConn End	1.00	13.42	7.98	178.95	178.95	0.00	16.5	60.00	60.00	133.31	133.31
10246	10246:TopConn	10246:TopConn Ori	1.00	13.42	7.98	178.95	178.95	0.00	16.5	60.00	60.00	133.31	133.31
10246	10246:Arm1	10246:Arm1 End	1.92	13.81	8.21	195.14	195.14	0.00	17.1	60.00	60.00	141.30	141.30
10246	10246:Arm1	10246:Arm1 Ori	1.92	13.81	8.21	195.14	195.14	0.00	17.1	60.00	60.00	141.30	141.30
10246	#10246:0	Tube 1 End	6.92	15.93	9.49	300.85	300.85	0.00	20.1	60.00	60.00	188.91	188.91
10246	#10246:0	Tube 1 Ori	6.92	15.93	9.49	300.86	300.86	0.00	20.1	60.00	60.00	188.91	188.91
10246	#10246:1	Tube 1 End	11.42	17.83	10.64	423.68	423.68	0.00	22.8	60.00	60.00	237.64	237.64
10246	#10246:1	Tube 1 Ori	11.42	17.83	10.64	423.68	423.68	0.00	22.8	60.00	60.00	237.64	237.64
10246	#10246:2	SpliceT End	15.91	19.73	11.78	576.07	576.07	0.00	25.5	60.00	60.00	291.96	291.96

10246	#10246:2	SpliceT	Ori	15.91	19.73	11.78	576.07	576.07	0.00	25.5	60.00	60.00	291.96	291.96
10246	#10246:3	SpliceB	End	18.58	20.49	28.20	1451.48	1451.48	0.00	9.9	60.00	60.00	708.54	708.54
10246	#10246:3	SpliceB	Ori	18.58	20.49	28.20	1451.48	1451.48	0.00	9.9	60.00	60.00	708.54	708.54
10246	10246:BotConT	10246:BotConT	End	20.00	21.08	29.05	1585.56	1585.56	0.00	10.2	60.00	60.00	751.98	751.98
10246	10246:BotConT	10246:BotConT	Ori	20.00	21.09	29.05	1585.56	1585.56	0.00	10.2	60.00	60.00	751.98	751.98
10246	10246:BotConn	10246:BotConn	End	20.50	21.30	29.34	1634.77	1634.77	0.00	10.4	60.00	60.00	767.62	767.62
10246	10246:BotConn	10246:BotConn	Ori	20.50	21.30	29.34	1634.77	1634.77	0.00	10.4	60.00	60.00	767.62	767.62
10246	10246:BotConB	10246:BotConB	End	21.00	21.51	29.64	1684.99	1684.99	0.00	10.5	60.00	60.00	783.42	783.42
10246	10246:BotConB	10246:BotConB	Ori	21.00	21.51	29.64	1684.99	1684.99	0.00	10.5	60.00	60.00	783.43	783.43
10246	10246:WVGD10	10246:WVGD10	End	22.50	22.14	30.53	1841.80	1841.80	0.00	10.9	60.00	60.00	831.79	831.79
10246	10246:WVGD10	10246:WVGD10	Ori	22.50	22.14	30.53	1841.80	1841.80	0.00	10.9	60.00	60.00	831.79	831.79
10246	10246:Arm2	10246:Arm2	End	24.34	22.92	31.63	2047.53	2047.53	0.00	11.4	60.00	60.00	893.24	893.24
10246	10246:Arm2	10246:Arm2	Ori	24.34	22.92	31.63	2047.54	2047.54	0.00	11.4	60.00	60.00	893.24	893.24
10246	#10246:4	Tube 2	End	27.17	24.12	33.31	2391.94	2391.94	0.00	12.1	60.00	60.00	991.73	991.73
10246	#10246:4	Tube 2	Ori	27.17	24.12	33.31	2391.94	2391.94	0.00	12.1	60.00	60.00	991.73	991.73
10246	10246:WVGD9	10246:WVGD9	End	30.00	25.31	35.00	2772.96	2772.96	0.00	12.8	60.00	60.00	1095.38	1095.38
10246	10246:WVGD9	10246:WVGD9	Ori	30.00	25.32	35.00	2772.96	2772.96	0.00	12.8	60.00	60.00	1095.38	1095.38
10246	#10246:5	Tube 2	End	35.00	27.43	37.97	3541.87	3541.87	0.00	14.1	60.00	60.00	1291.24	1291.24
10246	#10246:5	Tube 2	Ori	35.00	27.43	37.97	3541.87	3541.87	0.00	14.1	60.00	60.00	1291.24	1291.24
10246	10246:WVGD8	10246:WVGD8	End	40.00	29.54	40.95	4441.23	4441.23	0.00	15.4	60.00	60.00	1503.21	1503.21
10246	10246:WVGD8	10246:WVGD8	Ori	40.00	29.55	40.95	4441.23	4441.23	0.00	15.4	60.00	60.00	1503.21	1503.21
10246	#10246:6	Tube 2	End	43.17	30.89	42.83	5084.06	5084.06	0.00	16.2	60.00	60.00	1646.03	1646.03
10246	#10246:6	Tube 2	Ori	43.17	30.89	42.83	5084.06	5084.06	0.00	16.2	60.00	60.00	1646.03	1646.03
10246	10246:Arm3	10246:Arm3	End	46.34	32.23	44.72	5786.10	5786.10	0.00	17.1	60.00	60.00	1795.33	1795.33
10246	10246:Arm3	10246:Arm3	Ori	46.34	32.23	44.72	5786.10	5786.10	0.00	17.1	60.00	60.00	1795.33	1795.33
10246	10246:WVGD7	10246:WVGD7	End	50.00	33.77	46.90	6672.14	6672.14	0.00	18.0	60.00	60.00	1975.46	1975.46
10246	10246:WVGD7	10246:WVGD7	Ori	50.00	33.78	46.90	6672.14	6672.14	0.00	18.0	60.00	60.00	1975.46	1975.46
10246	#10246:7	SpliceT	End	51.33	34.34	47.69	7015.62	7015.62	0.00	18.4	60.00	60.00	2043.13	2043.13
10246	#10246:7	SpliceT	Ori	51.33	34.34	47.69	7015.62	7015.62	0.00	18.4	60.00	60.00	2043.13	2043.13
10246	#10246:8	SpliceB	End	55.91	35.40	56.11	8749.69	8749.69	0.00	16.3	60.00	60.00	2471.58	2471.58
10246	#10246:8	SpliceB	Ori	55.91	35.40	56.11	8749.69	8749.69	0.00	16.3	60.00	60.00	2471.58	2471.58
10246	10246:WVGD6	10246:WVGD6	End	60.00	37.13	58.89	10115.20	10115.20	0.00	17.2	60.00	60.00	2724.26	2724.26
10246	10246:WVGD6	10246:WVGD6	Ori	60.00	37.13	58.89	10115.20	10115.20	0.00	17.2	60.00	60.00	2724.26	2724.26
10246	#10246:9	Tube 3	End	64.17	38.89	61.73	11648.56	11648.56	0.00	18.2	60.00	60.00	2994.89	2994.89
10246	#10246:9	Tube 3	Ori	64.17	38.89	61.73	11648.57	11648.57	0.00	18.2	60.00	60.00	2994.89	2994.89
10246	10246:Arm4	10246:Arm4	End	68.34	40.66	64.56	13329.56	13329.56	0.00	19.1	60.00	60.00	3278.33	3278.33
10246	10246:Arm4	10246:Arm4	Ori	68.34	40.66	64.56	13329.56	13329.56	0.00	19.1	60.00	60.00	3278.33	3278.33
10246	10246:WVGD5	10246:WVGD5	End	70.00	41.36	65.69	14039.23	14039.23	0.00	19.5	60.00	60.00	3394.39	3394.39
10246	10246:WVGD5	10246:WVGD5	Ori	70.00	41.36	65.69	14039.24	14039.24	0.00	19.5	60.00	60.00	3394.39	3394.39
10246	#10246:10	Tube 3	End	75.00	43.47	69.09	16333.90	16333.90	0.00	20.6	60.00	60.00	3757.07	3757.07
10246	#10246:10	Tube 3	Ori	75.00	43.48	69.09	16333.90	16333.90	0.00	20.6	60.00	60.00	3757.07	3757.07
10246	10246:WVGD4	10246:WVGD4	End	80.00	45.59	72.49	18865.91	18865.91	0.00	21.8	60.00	60.00	4138.16	4138.16
10246	10246:WVGD4	10246:WVGD4	Ori	80.00	45.59	72.49	18865.91	18865.91	0.00	21.8	60.00	60.00	4138.16	4138.16
10246	#10246:11	SpliceT	End	85.00	47.70	75.89	21646.94	21646.94	0.00	22.9	60.00	60.00	4537.66	4537.66
10246	#10246:11	SpliceT	Ori	85.00	47.71	75.89	21646.94	21646.94	0.00	22.9	60.00	60.00	4537.66	4537.66
10246	10246:WVGD3	10246:WVGD3	End	90.00	48.82	77.68	23217.27	23217.27	0.00	23.5	60.00	60.00	4755.68	4755.68
10246	10246:WVGD3	10246:WVGD3	Ori	90.00	48.82	77.68	23217.27	23217.27	0.00	23.5	60.00	60.00	4755.68	4755.68
10246	#10246:12	SpliceB	End	91.33	49.38	78.59	24037.64	24037.64	0.00	23.8	60.00	60.00	4867.63	4867.63
10246	#10246:12	SpliceB	Ori	91.33	49.38	78.59	24037.65	24037.65	0.00	23.8	60.00	60.00	4867.63	4867.63
10246	#10246:13	Tube 4	End	95.66	51.22	81.54	26845.33	26845.33	0.00	24.8	60.00	60.00	5241.55	5241.55
10246	#10246:13	Tube 4	Ori	95.66	51.22	81.54	26845.33	26845.33	0.00	24.8	60.00	60.00	5241.55	5241.55
10246	10246:WVGD2	10246:WVGD2	End	100.00	53.05	84.48	29863.55	29863.55	0.00	25.7	60.00	60.00	5629.31	5629.31
10246	10246:WVGD2	10246:WVGD2	Ori	100.00	53.05	84.48	29863.56	29863.56	0.00	25.7	60.00	60.00	5629.31	5629.31
10246	#10246:14	Tube 4	End	105.00	55.16	87.88	33616.19	33616.19	0.00	26.9	60.00	60.00	6093.74	6093.74
10246	#10246:14	Tube 4	Ori	105.00	55.17	87.88	33616.19	33616.19	0.00	26.9	60.00	60.00	6093.74	6093.74
10246	10246:WVGD1	10246:WVGD1	End	110.00	57.28	91.28	37670.72	37670.72	0.00	28.0	60.00	60.00	6576.58	6576.58
10246	10246:WVGD1	10246:WVGD1	Ori	110.00	57.28	91.28	37670.73	37670.73	0.00	28.0	60.00	60.00	6576.58	6576.58
10246	#10246:15	Tube 4	End	115.00	59.39	94.69	42038.84	42038.84	0.00	29.2	60.00	60.00	7077.83	7077.83
10246	#10246:15	Tube 4	Ori	115.00	59.40	94.69	42038.85	42038.85	0.00	29.2	60.00	60.00	7077.83	7077.83
10246	#10246:16	Tube 4	End	120.00	61.51	98.09	46732.23	46732.23	0.00	30.3	60.00	60.00	7597.49	7597.49
10246	#10246:16	Tube 4	Ori	120.00	61.51	98.09	46732.23	46732.23	0.00	30.3	60.00	60.00	7597.49	7597.49
10246	10246:g	10246:g	End	125.00	63.62	101.49	51762.55	51762.55	0.00	31.4	60.00	59.69	8093.27	8093.27

Tubular Davit Properties:

Davit Property Label	Stock Number	Steel Shape	Thickness	Base Diameter or Depth	Tip Diameter or Depth	Taper	Drag Coef.	Modulus of Elasticity	Geometry	Strength Check Type	Vertical Capacity	Tension Capacity	Compres. Capacity	Long. Capacity	Yield Stress	Weight Density Override	Steel Shape At End

		(in)	(in)	(in)	(in/ft)		(ksi)			(lbs)	(lbs)	(lbs)	(lbs)	(ksi)	(lbs/ft^3)
ARM A	4F	0.1875	8	5	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0
ARM B	4F	0.375	16	8	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0

Intermediate Joints for Davit Property "ARM A":

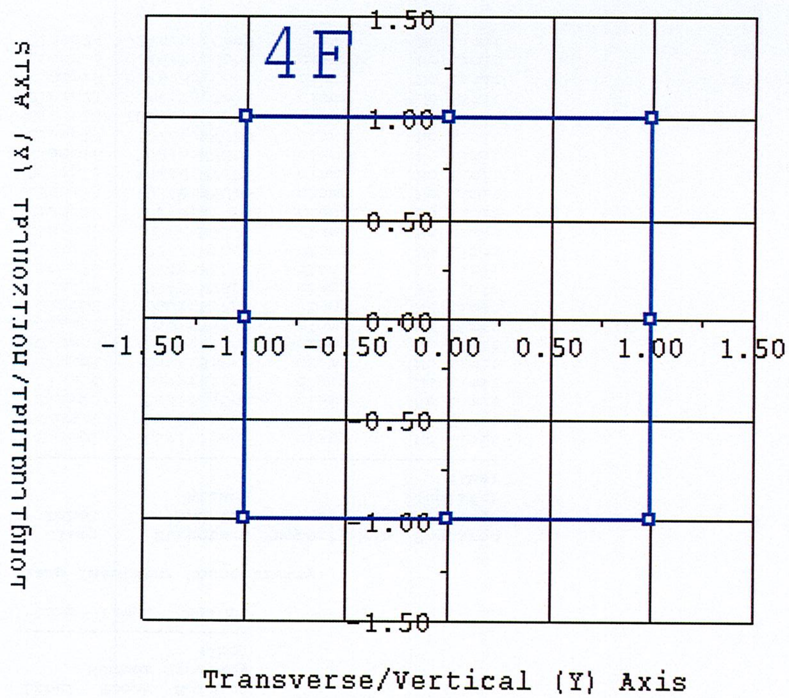
Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	9.5	-1.917

Intermediate Joints for Davit Property "ARM B":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	14.5	-2.55

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
Davit1	10246:Arm1	ARM A	180
Davit2	10246:Arm1	ARM A	0
Davit3	10246:Arm2	ARM B	180
Davit4	10246:Arm2	ARM B	0
Davit5	10246:Arm3	ARM B	180
Davit6	10246:Arm3	ARM B	0
Davit7	10246:Arm4	ARM B	180
Davit8	10246:Arm4	ARM B	0



Tubular Davit Arm Steel Properties:

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	V-Moment Inertia (in^4)	H-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	ASCE Cap V-Mom. (ft-k)	ASCE Cap H-Mom. (ft-k)
Davit1	Davit1:O	Origin	0.00	8.00	5.86	59.64	59.64	0.00	32.7	65.00	64.59	80.25	80.25
Davit1	#Davit1:0	End	4.85	6.50	4.73	31.47	31.47	0.00	24.7	65.00	65.00	52.45	52.45
Davit1	#Davit1:0	Origin	4.85	6.50	4.73	31.47	31.47	0.00	24.7	65.00	65.00	52.45	52.45
Davit1	Davit1:End	End	9.69	5.00	3.61	13.95	13.95	0.00	16.7	65.00	65.00	30.23	30.23
Davit2	Davit2:O	Origin	0.00	8.00	5.86	59.64	59.64	0.00	32.7	65.00	64.59	80.25	80.25
Davit2	#Davit2:0	End	4.85	6.50	4.73	31.47	31.47	0.00	24.7	65.00	65.00	52.45	52.45
Davit2	#Davit2:0	Origin	4.85	6.50	4.73	31.47	31.47	0.00	24.7	65.00	65.00	52.45	52.45
Davit2	Davit2:End	End	9.69	5.00	3.61	13.95	13.95	0.00	16.7	65.00	65.00	30.23	30.23
Davit3	Davit3:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	65.00	64.59	641.99	641.99
Davit3	#Davit3:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	65.00	65.00	438.89	438.89
Davit3	#Davit3:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	65.00	65.00	438.89	438.89
Davit3	#Davit3:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	65.00	65.00	275.77	275.77
Davit3	#Davit3:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	65.00	65.00	275.77	275.77
Davit3	Davit3:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	65.00	65.00	150.45	150.45
Davit4	Davit4:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	65.00	64.59	641.99	641.99
Davit4	#Davit4:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	65.00	65.00	438.89	438.89
Davit4	#Davit4:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	65.00	65.00	438.89	438.89
Davit4	#Davit4:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	65.00	65.00	275.77	275.77
Davit4	#Davit4:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	65.00	65.00	275.77	275.77

Davit4	Davit4:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	65.00	65.00	150.45	150.45
Davit5	Davit5:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	65.00	64.59	641.99	641.99
Davit5	#Davit5:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	65.00	65.00	438.89	438.89
Davit5	#Davit5:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	65.00	65.00	438.89	438.89
Davit5	#Davit5:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	65.00	65.00	275.77	275.77
Davit5	#Davit5:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	65.00	65.00	275.77	275.77
Davit5	Davit5:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	65.00	65.00	150.45	150.45
Davit6	Davit6:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	65.00	64.59	641.99	641.99
Davit6	#Davit6:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	65.00	65.00	438.89	438.89
Davit6	#Davit6:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	65.00	65.00	438.89	438.89
Davit6	#Davit6:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	65.00	65.00	275.77	275.77
Davit6	#Davit6:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	65.00	65.00	275.77	275.77
Davit6	Davit6:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	65.00	65.00	150.45	150.45
Davit7	Davit7:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	65.00	64.59	641.99	641.99
Davit7	#Davit7:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	65.00	65.00	438.89	438.89
Davit7	#Davit7:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	65.00	65.00	438.89	438.89
Davit7	#Davit7:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	65.00	65.00	275.77	275.77
Davit7	#Davit7:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	65.00	65.00	275.77	275.77
Davit7	Davit7:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	65.00	65.00	150.45	150.45
Davit8	Davit8:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	65.00	64.59	641.99	641.99
Davit8	#Davit8:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	65.00	65.00	438.89	438.89
Davit8	#Davit8:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	65.00	65.00	438.89	438.89
Davit8	#Davit8:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	65.00	65.00	275.77	275.77
Davit8	#Davit8:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	65.00	65.00	275.77	275.77
Davit8	Davit8:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	65.00	65.00	150.45	150.45

*** Insulator Data

Clamp Properties:

Label	Stock Number	Holding Capacity (lbs)
clamp	clamp1	8e+004

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
Clamp1	Davit1:End	clamp	No Limit
Clamp2	Davit2:End	clamp	No Limit
Clamp3	Davit3:End	clamp	No Limit
Clamp4	Davit4:End	clamp	No Limit
Clamp5	Davit5:End	clamp	No Limit
Clamp6	Davit6:End	clamp	No Limit
Clamp7	Davit7:End	clamp	No Limit
Clamp8	Davit8:End	clamp	No Limit
Clamp9	10246:WVGD1	clamp	No Limit
Clamp10	10246:WVGD2	clamp	No Limit
Clamp11	10246:WVGD3	clamp	No Limit
Clamp12	10246:WVGD4	clamp	No Limit
Clamp13	10246:WVGD5	clamp	No Limit
Clamp14	10246:WVGD6	clamp	No Limit
Clamp15	10246:WVGD7	clamp	No Limit
Clamp16	10246:WVGD8	clamp	No Limit
Clamp17	10246:WVGD9	clamp	No Limit
Clamp18	10246:WVGD10	clamp	No Limit
Clamp21	10246:TopConn	clamp	No Limit
Clamp22	10246:BotConT	clamp	No Limit
Clamp23	10246:BotConn	clamp	No Limit
Clamp24	10246:BotConB	clamp	No Limit

*** Loads Data

Loads from file: j:\jobs\1015100.wi\co3 - ct33xc525\rev (1)\calcs\pls-pole\cl&p #10246.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)	125.00 (ft)	
Structure height	125.00 (ft)	
Structure height above ground	125.00 (ft)	

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Pole Area Factor	SF for Pole Steel Poles Tubular Arms and Towers	SF for Wood Poles	SF for Conc. Ult.	SF for Conc. First Crack	SF for Conc. Zero Tens.	SF for Guys Cables	SF for Non Tubular Arms	SF for Braces	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)	Deflection Check	Deflection Limit % or (ft)
NESC Heavy	1.5000	2.5000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	19 loads	Wind on All	4	0	0.500	56.000	0.0	No Limit	0
NESC Extreme	1.0000	1.0000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	19 loads	NESC 2007	31	0	0.000	0.000	0.0	No Limit	0

Point Loads for Load Case "NESC Heavy":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	669	2276	0	
Davit2:End	669	2276	0	
Davit4:End	4249	9815	0	
Davit6:End	4249	9815	0	
Davit8:End	4249	9815	0	
10246:TopConn	0	1187	0	
10246:BotConT	0	1695	0	
10246:BotConn	4007	-117	0	
10246:BotConB	0	-1695	0	
10246:WVGD1	115	30	0	
10246:WVGD2	230	60	0	
10246:WVGD3	230	60	0	
10246:WVGD4	230	60	0	
10246:WVGD5	230	60	0	
10246:WVGD6	230	60	0	
10246:WVGD7	230	60	0	
10246:WVGD8	230	60	0	
10246:WVGD9	230	60	0	
10246:WVGD10	230	60	0	

Detailed Pole Loading Data for Load Case "NESC Heavy":

Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Top Bottom Section Section Section Outer Reynolds Drag Adjusted Adjusted Pole Pole Pole Ice Pole Ice Tran. Long.

Label	Joint	Joint	Top Z (ft)	Bottom Z (ft)	Average Elevation (ft)	Diameter (in)	Number	Coef.	Wind Pressure (psf)	Ice Thickness (in)	Vert. Load (lbs)	Wind Load (lbs)	Vertical Load (lbs)	Wind Load (lbs)	Wind Load (lbs)	Wind Load (lbs)
10246	10246:t	10246:TopConn	125.00	124.00	124.50	13.211	6.26e+005	1.450	10.00	0.50	40.08	15.96	8.26	1.21	17.17	0.00
10246	10246:TopConn	10246:Arm1	124.00	123.08	123.54	13.617	6.45e+005	1.450	10.00	0.50	37.90	15.09	7.81	1.11	16.20	0.00
10246	10246:Arm1		123.08	118.08	120.58	14.868	7.04e+005	1.450	10.00	0.50	225.88	89.83	46.48	6.04	95.88	0.00
10246			118.08	113.59	115.83	16.877	7.99e+005	1.450	10.00	0.50	231.01	91.73	47.46	5.44	97.17	0.00
10246			113.59	109.09	111.34	18.780	8.89e+005	1.450	10.00	0.50	257.34	102.08	52.81	5.44	107.51	0.00
10246			109.09	106.42	107.75	20.108	9.52e+005	1.450	10.00	0.50	538.61	64.88	33.57	3.23	68.10	0.00
10246		10246:BotConT	106.42	105.00	105.71	20.785	9.84e+005	1.450	10.00	0.50	207.11	35.59	18.41	1.71	37.30	0.00
10246	10246:BotConT	10246:BotConn	105.00	104.50	104.75	21.191	1e+006	1.450	10.00	0.50	74.51	12.80	6.62	0.60	13.41	0.00
10246	10246:BotConn	10246:BotConB	104.50	104.00	104.25	21.402	1.01e+006	1.450	10.00	0.50	75.27	12.93	6.69	0.60	13.54	0.00
10246	10246:BotConB	10246:WVGD10	104.00	102.50	103.25	21.825	1.03e+006	1.450	10.00	0.50	230.35	39.56	20.47	1.81	41.37	0.00
10246	10246:WVGD10	10246:Arm2	102.50	100.66	101.58	22.533	1.07e+006	1.450	10.00	0.50	292.54	50.21	25.98	2.23	52.44	0.00
10246	10246:Arm2		100.66	97.83	99.24	23.521	1.11e+006	1.450	10.00	0.50	468.72	80.38	41.59	3.42	83.80	0.00
10246		10246:WVGD9	97.83	95.00	96.41	24.717	1.17e+006	1.450	10.00	0.50	493.01	84.47	43.70	3.42	87.88	0.00
10246	10246:WVGD9		95.00	90.00	92.50	26.372	1.25e+006	1.450	10.00	0.50	931.09	159.34	82.44	6.04	165.38	0.00
10246		10246:WVGD8	90.00	85.00	87.50	28.487	1.35e+006	1.450	10.00	0.50	1007.02	172.12	89.05	6.04	178.16	0.00
10246	10246:WVGD8		85.00	81.83	83.41	30.216	1.43e+006	1.450	10.00	0.50	678.22	115.82	59.92	3.83	119.65	0.00
10246		10246:Arm3	81.83	78.66	80.24	31.558	1.49e+006	1.450	10.00	0.50	708.78	120.96	62.58	3.83	124.79	0.00
10246	10246:Arm3	10246:WVGD7	78.66	75.00	76.83	33.002	1.56e+006	1.450	10.00	0.50	854.84	145.80	75.43	4.42	150.22	0.00
10246	10246:WVGD7		75.00	73.67	74.34	34.056	1.61e+006	1.450	10.00	0.50	321.05	54.73	28.32	1.61	56.34	0.00
10246			73.67	69.09	71.38	34.869	1.65e+006	1.450	10.00	0.50	2423.55	193.11	99.91	5.54	198.65	0.00
10246		10246:WVGD6	69.09	65.00	67.04	36.266	1.72e+006	1.450	10.00	0.50	1199.73	179.11	92.67	4.94	184.04	0.00
10246	10246:WVGD6		65.00	60.83	62.91	38.012	1.8e+006	1.450	10.00	0.50	1284.24	191.64	99.15	5.04	196.68	0.00
10246		10246:Arm4	60.83	56.66	58.74	39.777	1.88e+006	1.450	10.00	0.50	1344.66	200.53	103.75	5.04	205.58	0.00
10246	10246:Arm4	10246:WVGD5	56.66	55.00	55.83	41.010	1.94e+006	1.450	10.00	0.50	550.49	82.06	42.46	2.00	84.07	0.00
10246	10246:WVGD5		55.00	50.00	52.50	42.417	2.01e+006	1.450	10.00	0.50	1719.86	256.29	132.60	6.04	262.33	0.00
10246		10246:WVGD4	50.00	45.00	47.50	44.532	2.11e+006	1.450	10.00	0.50	1806.64	269.06	139.21	6.04	275.11	0.00
10246	10246:WVGD4		45.00	40.00	42.50	46.648	2.21e+006	1.450	10.00	0.50	1893.42	281.84	145.82	6.04	287.89	0.00
10246		10246:WVGD3	40.00	35.00	37.50	48.262	2.29e+006	1.450	10.00	0.50	3919.36	291.60	150.87	6.04	297.64	0.00
10246	10246:WVGD3		35.00	33.67	34.33	49.101	2.32e+006	1.450	10.00	0.50	1071.77	78.91	40.83	1.61	80.52	0.00
10246			33.67	29.34	31.50	50.299	2.38e+006	1.450	10.00	0.50	1771.77	263.49	136.33	5.24	268.73	0.00
10246		10246:WVGD2	29.34	25.00	27.17	52.133	2.47e+006	1.450	10.00	0.50	1836.73	273.09	141.30	5.24	278.33	0.00
10246	10246:WVGD2		25.00	20.00	22.50	54.107	2.56e+006	1.450	10.00	0.50	2199.50	326.92	169.14	6.04	332.96	0.00
10246		10246:WVGD1	20.00	15.00	17.50	56.222	2.66e+006	1.450	10.00	0.50	2286.28	339.70	175.76	6.04	345.74	0.00
10246	10246:WVGD1		15.00	10.00	12.50	58.337	2.76e+006	1.450	10.00	0.50	2373.06	352.47	182.37	6.04	358.52	0.00
10246			10.00	5.00	7.50	60.452	2.86e+006	1.450	10.00	0.50	2459.83	365.25	188.98	6.04	371.30	0.00
10246		10246:g	5.00	0.00	2.50	62.568	2.96e+006	1.450	10.00	0.50	2546.61	378.03	195.59	6.04	384.07	0.00

Point Loads for Load Case "NESC Extreme":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	165	1599	0	
Davit2:End	165	1599	0	
Davit4:End	1809	10512	0	
Davit6:End	1809	10512	0	
Davit8:End	1809	10512	0	
10246:TopConn	0	4056	0	
10246:BotConT	0	6237	0	
10246:BotConn	1956	-702	0	
10246:BotConB	0	-6237	0	
10246:WVGD1	31	84	0	
10246:WVGD2	62	169	0	
10246:WVGD3	62	169	0	
10246:WVGD4	62	169	0	
10246:WVGD5	62	169	0	
10246:WVGD6	62	169	0	
10246:WVGD7	62	169	0	
10246:WVGD8	62	169	0	
10246:WVGD9	62	169	0	
10246:WVGD10	62	169	0	

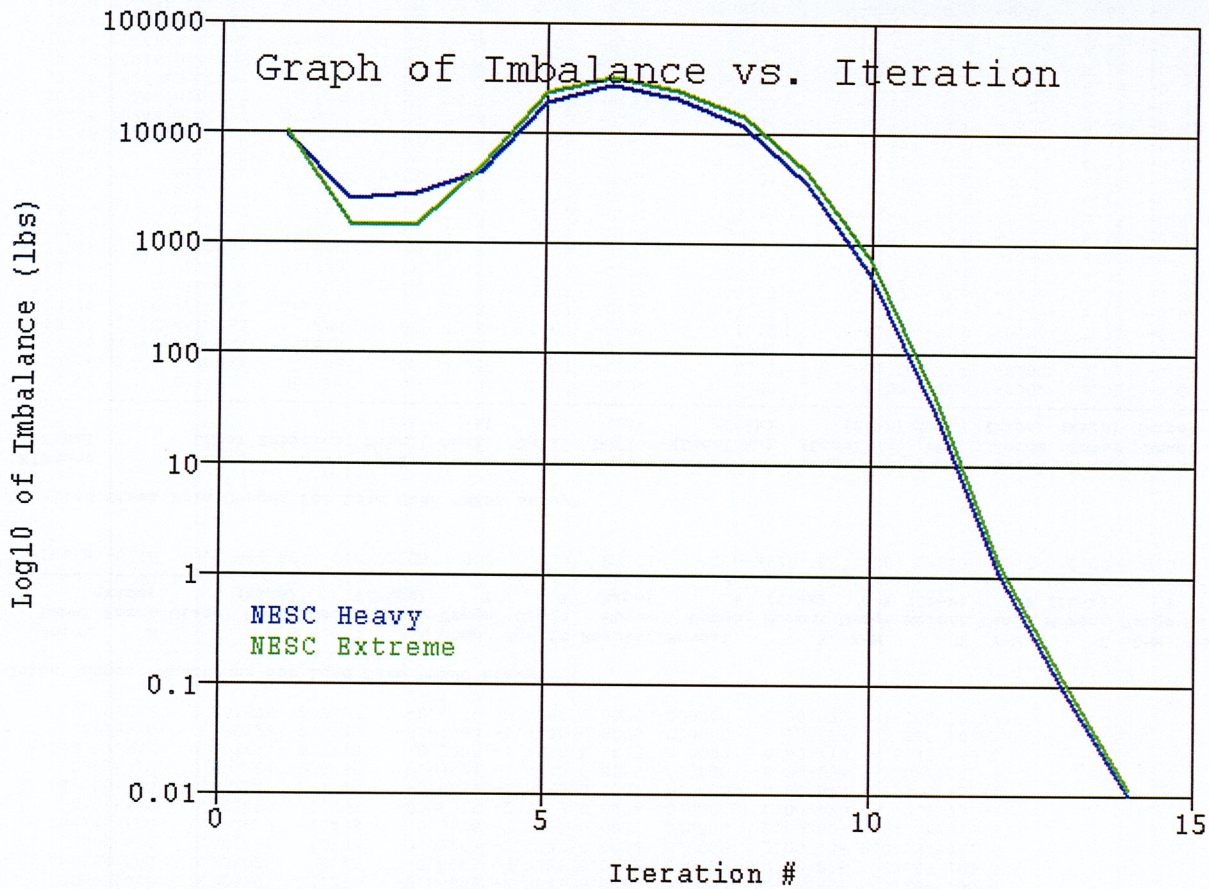
Detailed Pole Loading Data for Load Case "NESC Extreme":

Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Label	Top Joint	Bottom Joint	Section Top Z (ft)	Section Bottom Z (ft)	Section Average Elevation (ft)	Outer Diameter (in)	Reynolds Number	Drag Coef.	Adjusted Wind Pressure (psf)	Adjusted Ice Thickness (in)	Pole Vert. Load (lbs)	Pole Wind Load (lbs)	Pole Ice Vertical Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)
10246	10246:t	10246:TopConn	125.00	124.00	124.50	13.211	1.12e+006	1.000	32.18	0.00	26.72	35.43	0.00	0.00	35.43	0.00
10246	10246:TopConn	10246:Arm1	124.00	123.08	123.54	13.617	1.16e+006	1.000	32.18	0.00	25.26	33.48	0.00	0.00	33.48	0.00
10246	10246:Arm1		123.08	118.08	120.58	14.868	1.26e+006	1.000	32.18	0.00	150.59	199.35	0.00	0.00	199.35	0.00
10246			118.08	113.59	115.83	16.877	1.43e+006	1.000	32.18	0.00	154.01	203.57	0.00	0.00	203.57	0.00
10246			113.59	109.09	111.34	18.780	1.59e+006	1.000	32.18	0.00	171.56	226.52	0.00	0.00	226.52	0.00
10246			109.09	106.42	107.75	20.108	1.71e+006	1.000	32.18	0.00	359.07	143.97	0.00	0.00	143.97	0.00
10246		10246:BotConT	106.42	105.00	105.71	20.785	1.77e+006	1.000	32.18	0.00	138.07	78.98	0.00	0.00	78.98	0.00
10246	10246:BotConT	10246:BotConn	105.00	104.50	104.75	21.191	1.8e+006	1.000	32.18	0.00	49.67	28.41	0.00	0.00	28.41	0.00
10246	10246:BotConn	10246:BotConB	104.50	104.00	104.25	21.402	1.82e+006	1.000	32.18	0.00	50.18	28.70	0.00	0.00	28.70	0.00
10246	10246:BotConB	10246:WVGD10	104.00	102.50	103.25	21.825	1.85e+006	1.000	32.18	0.00	153.57	87.79	0.00	0.00	87.79	0.00
10246	10246:WVGD10	10246:Arm2	102.50	100.66	101.58	22.533	1.91e+006	1.000	32.18	0.00	195.03	111.42	0.00	0.00	111.42	0.00
10246	10246:Arm2		100.66	97.83	99.24	23.521	2e+006	1.000	32.18	0.00	312.48	178.37	0.00	0.00	178.37	0.00
10246		10246:WVGD9	97.83	95.00	96.41	24.717	2.1e+006	1.000	32.18	0.00	328.67	187.44	0.00	0.00	187.44	0.00
10246	10246:WVGD9		95.00	90.00	92.50	26.372	2.24e+006	1.000	32.18	0.00	620.73	353.60	0.00	0.00	353.60	0.00
10246		10246:WVGD8	90.00	85.00	87.50	28.487	2.42e+006	1.000	32.18	0.00	671.35	381.95	0.00	0.00	381.95	0.00
10246	10246:WVGD8		85.00	81.83	83.41	30.216	2.57e+006	1.000	32.18	0.00	452.15	257.01	0.00	0.00	257.01	0.00
10246		10246:Arm3	81.83	78.66	80.24	31.558	2.68e+006	1.000	32.18	0.00	472.52	268.43	0.00	0.00	268.43	0.00
10246	10246:Arm3	10246:WVGD7	78.66	75.00	76.83	33.002	2.8e+006	1.000	32.18	0.00	569.89	323.54	0.00	0.00	323.54	0.00
10246	10246:WVGD7		75.00	73.67	74.34	34.056	2.89e+006	1.000	32.18	0.00	214.03	121.46	0.00	0.00	121.46	0.00
10246			73.67	69.09	71.38	34.869	2.96e+006	1.000	32.18	0.00	1615.70	428.53	0.00	0.00	428.53	0.00
10246		10246:WVGD6	69.09	65.00	67.04	36.266	3.08e+006	1.000	32.18	0.00	799.82	397.45	0.00	0.00	397.45	0.00
10246	10246:WVGD6		65.00	60.83	62.91	38.012	3.23e+006	1.000	32.18	0.00	856.16	425.26	0.00	0.00	425.26	0.00
10246		10246:Arm4	60.83	56.66	58.74	39.777	3.38e+006	1.000	32.18	0.00	896.44	445.01	0.00	0.00	445.01	0.00
10246	10246:Arm4	10246:WVGD5	56.66	55.00	55.83	41.010	3.48e+006	1.000	32.18	0.00	366.99	182.11	0.00	0.00	182.11	0.00
10246	10246:WVGD5		55.00	50.00	52.50	42.417	3.6e+006	1.000	32.18	0.00	1146.58	568.73	0.00	0.00	568.73	0.00
10246		10246:WVGD4	50.00	45.00	47.50	44.532	3.78e+006	1.000	32.18	0.00	1204.43	597.08	0.00	0.00	597.08	0.00
10246	10246:WVGD4		45.00	40.00	42.50	46.648	3.96e+006	1.000	32.18	0.00	1262.28	625.44	0.00	0.00	625.44	0.00
10246		10246:WVGD3	40.00	35.00	37.50	48.262	4.1e+006	1.000	32.18	0.00	2612.91	647.09	0.00	0.00	647.09	0.00
10246	10246:WVGD3		35.00	33.67	34.33	49.101	4.17e+006	1.000	32.18	0.00	714.52	175.12	0.00	0.00	175.12	0.00
10246			33.67	29.34	31.50	50.299	4.27e+006	1.000	32.18	0.00	1181.18	584.71	0.00	0.00	584.71	0.00
10246		10246:WVGD2	29.34	25.00	27.17	52.133	4.43e+006	1.000	32.18	0.00	1224.49	606.02	0.00	0.00	606.02	0.00
10246	10246:WVGD2		25.00	20.00	22.50	54.107	4.6e+006	1.000	32.18	0.00	1466.33	725.46	0.00	0.00	725.46	0.00
10246		10246:WVGD1	20.00	15.00	17.50	56.222	4.77e+006	1.000	32.18	0.00	1524.19	753.82	0.00	0.00	753.82	0.00
10246	10246:WVGD1		15.00	10.00	12.50	58.337	4.95e+006	1.000	32.18	0.00	1582.04	782.18	0.00	0.00	782.18	0.00
10246			10.00	5.00	7.50	60.452	5.13e+006	1.000	32.18	0.00	1639.89	810.53	0.00	0.00	810.53	0.00
10246		10246:g	5.00	0.00	2.50	62.568	5.31e+006	1.000	32.18	0.00	1697.74	838.89	0.00	0.00	838.89	0.00

*** Analysis Results:

Maximum element usage is 61.78% for Base Plate "10246" in load case "NESC Extreme"
Maximum insulator usage is 13.37% for Clamp "Clamp4" in load case "NESC Heavy"



*** Analysis Results for Load Case No. 1 "NESC Heavy" - Number of iterations in SAPS 14

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)
10246:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
10246:t	0.005811	3.69	-0.07864	-3.5923	0.0047	0.0001	0.005811	3.69	124.9
10246:TopConn	0.005729	3.628	-0.07667	-3.5923	0.0047	0.0001	0.005729	3.628	123.9
10246:Arm1	0.005654	3.57	-0.07487	-3.5915	0.0047	0.0001	0.005654	3.57	123
10246:BotConT	0.004226	2.535	-0.045	-2.9470	0.0043	0.0000	0.004226	2.535	105
10246:BotConn	0.004189	2.51	-0.04434	-2.9362	0.0043	0.0000	0.004189	2.51	104.5
10246:BotConB	0.004152	2.484	-0.04368	-2.9254	0.0043	0.0000	0.004152	2.484	104

10246:WVGD10	0.00404	2.408	-0.04173	-2.8931	0.0042	0.0000	0.00404	2.408	102.5
10246:Arm2	0.003905	2.315	-0.03939	-2.8543	0.0042	0.0000	0.003905	2.315	100.6
10246:WVGD9	0.0035	2.043	-0.03272	-2.6659	0.0040	0.0000	0.0035	2.043	94.97
10246:WVGD8	0.002827	1.606	-0.023	-2.3351	0.0037	0.0000	0.002827	1.606	84.98
10246:Arm3	0.002433	1.358	-0.01806	-2.1377	0.0034	0.0000	0.002433	1.358	78.64
10246:WVGD7	0.002218	1.225	-0.01558	-2.0125	0.0033	0.0000	0.002218	1.225	74.98
10246:WVGD6	0.001678	0.9018	-0.01014	-1.6915	0.0029	0.0000	0.001678	0.9018	64.99
10246:Arm4	0.001282	0.673	-0.006844	-1.4470	0.0025	0.0000	0.001282	0.673	56.65
10246:WVGD5	0.00121	0.6318	-0.006295	-1.3974	0.0025	0.0000	0.00121	0.6318	54.99
10246:WVGD4	0.0008147	0.4127	-0.003664	-1.1071	0.0020	0.0000	0.0008147	0.4127	45
10246:WVGD3	0.0004945	0.2429	-0.001988	-0.8321	0.0016	0.0000	0.0004945	0.2429	35
10246:WVGD2	0.0002532	0.1205	-0.0009934	-0.5670	0.0011	-0.0000	0.0002532	0.1205	25
10246:WVGD1	9.205e-005	0.04239	-0.0004423	-0.3248	0.0007	-0.0000	9.205e-005	0.04239	15
Davit1:O	0.005657	3.571	-0.03882	-3.5915	0.0047	0.0001	0.005657	2.996	123
Davit1:End	0.005884	3.709	0.5475	-3.5439	0.0047	0.0001	0.005884	-6.366	125.5
Davit2:O	0.00565	3.569	-0.1109	-3.5915	0.0047	0.0001	0.00565	4.145	123
Davit2:End	0.005744	3.676	-0.7485	-3.9717	0.0047	0.0001	0.005744	13.75	124.3
Davit3:O	0.003909	2.317	0.008168	-2.8543	0.0042	0.0000	0.003909	1.362	100.7
Davit3:End	0.004158	2.461	0.7235	-2.8331	0.0042	0.0000	0.004158	-12.99	103.9
Davit4:O	0.003901	2.314	-0.08695	-2.8543	0.0042	0.0000	0.003901	3.269	100.6
Davit4:End	0.004025	2.43	-0.8661	-3.2305	0.0042	0.0000	0.004025	17.89	102.3
Davit5:O	0.002436	1.359	0.03203	-2.1377	0.0034	0.0000	0.002436	0.01594	78.69
Davit5:End	0.002627	1.463	0.5676	-2.1165	0.0034	0.0000	0.002627	-14.38	81.77
Davit6:O	0.002429	1.357	-0.06815	-2.1377	0.0034	0.0000	0.002429	2.7	78.59
Davit6:End	0.002545	1.45	-0.6657	-2.5215	0.0034	0.0000	0.002545	17.29	80.54
Davit7:O	0.001284	0.6735	0.03594	-1.4470	0.0025	0.0000	0.001284	-1.021	56.69
Davit7:End	0.001417	0.7418	0.3977	-1.4258	0.0025	0.0000	0.001417	-15.45	59.6
Davit8:O	0.00128	0.6725	-0.04963	-1.4470	0.0025	0.0000	0.00128	2.367	56.61
Davit8:End	0.001375	0.7407	-0.4725	-1.8380	0.0025	-0.0000	0.001375	16.93	58.73

Joint Support Reactions for Load Case "NESC Heavy":

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 %
10246:g	-0.16	0.0	-41.58	0.0	72.08	0.0	0.0	83.21	0.0	3685.75	0.0	-8.3	0.0	0.00	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC Heavy":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
10246	10246:t	Origin	0.00	44.29	0.07	-0.94	-0.00	-0.00	0.0	-0.02	0.01	-0.00	-0.00	0.00	0.00	0.00	0.01	0.0	5
10246	10246:TopConn	End	1.00	43.53	0.07	-0.92	0.01	-0.00	0.0	-0.02	0.01	-0.00	-0.00	0.00	0.00	0.00	0.01	0.0	2
10246	10246:TopConn	Origin	1.00	43.53	0.07	-0.92	0.01	-0.00	0.0	0.00	1.21	-0.00	0.00	0.00	0.31	0.00	0.54	0.9	5
10246	10246:Arm1	End	1.92	42.84	0.07	-0.90	1.12	-0.00	0.0	0.00	1.21	-0.00	0.00	0.00	0.30	0.00	0.52	0.9	5
10246	10246:Arm1	Origin	1.92	42.84	0.07	-0.90	9.95	-0.00	0.0	-1.68	5.94	-0.00	-0.20	4.23	0.38	0.00	4.48	7.5	2
10246	Tube 1	End	6.92	39.14	0.06	-0.78	39.63	-0.02	0.0	-1.68	5.94	-0.00	-0.18	12.59	0.33	0.00	12.78	21.3	2
10246	Tube 1	Origin	6.92	39.14	0.06	-0.78	39.63	-0.02	0.0	-1.97	6.04	-0.01	-0.21	12.59	0.34	0.00	12.81	21.3	2
10246	Tube 1	End	11.42	35.97	0.06	-0.69	66.81	-0.04	0.0	-1.97	6.04	-0.01	-0.19	16.87	0.30	0.00	17.07	28.4	2
10246	Tube 1	Origin	11.42	35.97	0.06	-0.69	66.81	-0.04	0.0	-2.28	6.15	-0.01	-0.21	16.87	0.31	0.00	17.10	28.5	2
10246	SpliceT	End	15.91	32.99	0.05	-0.61	94.50	-0.08	0.0	-2.28	6.15	-0.01	-0.19	19.42	0.28	0.00	19.62	32.7	2
10246	SpliceT	Origin	15.91	32.99	0.05	-0.61	94.50	-0.08	0.0	-2.74	6.26	-0.01	-0.23	19.42	0.28	0.00	19.66	32.8	2
10246	SpliceB	End	18.58	31.30	0.05	-0.56	111.21	-0.11	0.0	-2.74	6.26	-0.01	-0.10	9.42	0.12	0.00	9.52	15.9	2
10246	SpliceB	Origin	18.58	31.30	0.05	-0.56	111.21	-0.11	0.0	-3.14	6.33	-0.01	-0.11	9.42	0.12	0.00	9.53	15.9	2
10246	10246:BotConT	End	20.00	30.42	0.05	-0.54	120.18	-0.12	0.0	-3.14	6.33	-0.01	-0.11	9.59	0.12	0.00	9.70	16.2	2
10246	10246:BotConT	Origin	20.00	30.42	0.05	-0.54	120.18	-0.12	0.0	-3.21	8.05	-0.01	-0.11	9.59	0.15	0.00	9.71	16.2	2
10246	10246:BotConn	End	20.50	30.12	0.05	-0.53	124.21	-0.13	0.0	-3.21	8.05	-0.01	-0.11	9.71	0.15	0.00	9.82	16.4	2
10246	10246:BotConn	Origin	20.50	30.12	0.05	-0.53	124.21	-0.13	0.0	-7.30	8.16	-0.01	-0.25	9.71	0.15	0.00	9.96	16.6	2
10246	10246:BotConB	End	21.00	29.81	0.05	-0.52	128.29	-0.14	0.0	-7.30	8.16	-0.01	-0.25	9.83	0.15	0.00	10.08	16.8	2
10246	10246:BotConB	Origin	21.00	29.81	0.05	-0.52	128.29	-0.14	0.0	-7.56	6.50	-0.01	-0.26	9.83	0.12	0.00	10.08	16.8	2
10246	10246:WVGD10	End	22.50	28.90	0.05	-0.50	138.04	-0.16	0.0	-7.56	6.50	-0.01	-0.25	9.96	0.11	0.00	10.21	17.0	2
10246	10246:WVGD10	Origin	22.50	28.90	0.05	-0.50	138.04	-0.16	0.0	-8.07	6.63	-0.02	-0.26	9.96	0.12	0.00	10.23	17.0	2
10246	10246:Arm2	End	24.34	27.79	0.05	-0.47	150.26	-0.19	0.0	-8.07	6.63	-0.02	-0.26	10.10	0.11	0.00	10.35	17.3	2
10246	10246:Arm2	Origin	24.34	27.79	0.05	-0.47	233.57	-0.19	0.0	-14.87	16.85	-0.02	-0.47	15.69	0.28	0.00	16.17	27.0	2
10246	Tube 2	End	27.17	26.12	0.04	-0.43	281.22	-0.24	0.0	-14.87	16.85	-0.02	-0.45	17.02	0.27	0.00	17.47	29.1	2

10246	Tube 2	Origin	27.17	26.12	0.04	-0.43	281.22	-0.24	0.0	-15.42	16.94	-0.02	-0.46	17.02	0.27	0.00	17.49	29.1	2
10246	10246:WVGD9	End	30.00	24.51	0.04	-0.39	329.12	-0.30	0.0	-15.42	16.94	-0.02	-0.44	18.03	0.26	0.00	18.48	30.8	2
10246	10246:WVGD9	Origin	30.00	24.51	0.04	-0.39	329.12	-0.30	0.0	-16.46	17.13	-0.02	-0.47	18.03	0.26	0.00	18.51	30.8	2
10246	Tube 2	End	35.00	21.80	0.04	-0.33	414.77	-0.43	0.0	-16.46	17.13	-0.02	-0.43	19.28	0.24	0.00	19.72	32.9	2
10246	Tube 2	Origin	35.00	21.80	0.04	-0.33	414.77	-0.43	0.0	-17.56	17.30	-0.03	-0.46	19.28	0.24	0.00	19.75	32.9	2
10246	10246:WVGD8	End	40.00	19.27	0.03	-0.28	501.28	-0.57	0.0	-17.56	17.30	-0.03	-0.43	20.01	0.22	0.00	20.45	34.1	2
10246	10246:WVGD8	Origin	40.00	19.27	0.03	-0.28	501.28	-0.57	0.0	-18.75	17.51	-0.03	-0.46	20.01	0.23	0.00	20.48	34.1	2
10246	Tube 2	End	43.17	17.75	0.03	-0.25	556.83	-0.68	0.0	-18.75	17.51	-0.03	-0.44	20.30	0.22	0.00	20.74	34.6	2
10246	Tube 2	Origin	43.17	17.75	0.03	-0.25	556.83	-0.68	0.0	-19.53	17.63	-0.04	-0.46	20.30	0.22	0.00	20.76	34.6	2
10246	10246:Arm3	End	46.34	16.29	0.03	-0.22	612.76	-0.80	0.0	-19.53	17.63	-0.04	-0.44	20.49	0.21	0.00	20.93	34.9	2
10246	10246:Arm3	Origin	46.34	16.29	0.03	-0.22	699.34	-0.80	-0.0	-26.92	27.82	-0.04	-0.60	23.38	0.33	0.00	23.99	40.0	2
10246	10246:WVGD7	End	50.00	14.70	0.03	-0.19	801.06	-0.95	-0.0	-26.92	27.82	-0.04	-0.57	24.34	0.31	0.00	24.92	41.5	2
10246	10246:WVGD7	Origin	50.00	14.70	0.03	-0.19	801.06	-0.95	-0.0	-27.83	27.98	-0.04	-0.59	24.34	0.32	0.00	24.94	41.6	2
10246	SpliceT	End	51.33	14.15	0.03	-0.18	838.27	-1.01	-0.0	-27.83	27.98	-0.04	-0.58	24.63	0.31	0.00	25.21	42.0	2
10246	SpliceT	Origin	51.33	14.15	0.03	-0.18	838.27	-1.01	-0.0	-29.31	28.10	-0.05	-0.61	24.63	0.31	0.00	25.25	42.1	2
10246	SpliceB	End	55.91	12.33	0.02	-0.15	967.07	-1.23	-0.0	-29.31	28.10	-0.05	-0.52	23.48	0.27	0.00	24.01	40.0	2
10246	SpliceB	Origin	55.91	12.33	0.02	-0.15	967.07	-1.23	-0.0	-31.29	28.28	-0.05	-0.56	23.48	0.27	0.00	24.05	40.1	2
10246	10246:WVGD6	End	60.00	10.82	0.02	-0.12	1082.66	-1.45	-0.0	-31.29	28.28	-0.05	-0.53	23.85	0.25	0.00	24.39	40.6	2
10246	10246:WVGD6	Origin	60.00	10.82	0.02	-0.12	1082.66	-1.45	-0.0	-32.91	28.51	-0.06	-0.56	23.85	0.26	0.00	24.42	40.7	2
10246	Tube 3	End	64.17	9.40	0.02	-0.10	1201.59	-1.69	-0.0	-32.91	28.51	-0.06	-0.53	24.08	0.24	0.00	24.62	41.0	2
10246	Tube 3	Origin	64.17	9.40	0.02	-0.10	1201.59	-1.69	-0.0	-34.39	28.68	-0.06	-0.56	24.08	0.25	0.00	24.64	41.1	2
10246	10246:Arm4	End	68.34	8.08	0.02	-0.08	1321.23	-1.96	-0.0	-34.39	28.68	-0.06	-0.53	24.19	0.24	0.00	24.73	41.2	2
10246	10246:Arm4	Origin	68.34	8.08	0.02	-0.08	1410.96	-1.96	-0.0	-42.07	38.78	-0.07	-0.65	25.83	0.32	0.00	26.49	44.2	2
10246	10246:WVGD5	End	70.00	7.58	0.01	-0.08	1475.18	-2.07	-0.0	-42.07	38.78	-0.07	-0.64	26.09	0.31	0.00	26.73	44.6	2
10246	10246:WVGD5	Origin	70.00	7.58	0.01	-0.08	1475.18	-2.07	-0.0	-43.59	38.98	-0.07	-0.66	26.09	0.31	0.00	26.75	44.6	2
10246	Tube 3	End	75.00	6.19	0.01	-0.06	1670.05	-2.44	-0.0	-43.59	38.98	-0.07	-0.63	26.68	0.30	0.00	27.32	45.5	2
10246	Tube 3	Origin	75.00	6.19	0.01	-0.06	1670.05	-2.44	-0.0	-45.59	39.17	-0.08	-0.66	26.68	0.30	0.00	27.35	45.6	2
10246	10246:WVGD4	End	80.00	4.95	0.01	-0.04	1865.91	-2.84	-0.0	-45.59	39.17	-0.08	-0.63	27.07	0.29	0.00	27.70	46.2	2
10246	10246:WVGD4	Origin	80.00	4.95	0.01	-0.04	1865.91	-2.84	-0.0	-47.91	39.44	-0.09	-0.66	27.07	0.29	0.00	27.73	46.2	2
10246	SpliceT	End	85.00	3.86	0.01	-0.03	2063.12	-3.28	-0.0	-47.91	39.44	-0.09	-0.63	27.29	0.27	0.00	27.93	46.5	2
10246	SpliceT	Origin	85.00	3.86	0.01	-0.03	2063.12	-3.28	-0.0	-51.06	39.67	-0.10	-0.67	27.29	0.28	0.00	27.97	46.6	2
10246	10246:WVGD3	End	90.00	2.91	0.01	-0.02	2261.46	-3.76	-0.0	-51.06	39.67	-0.10	-0.66	28.54	0.27	0.00	29.21	48.7	2
10246	10246:WVGD3	Origin	90.00	2.91	0.01	-0.02	2261.46	-3.76	-0.0	-53.94	39.88	-0.10	-0.69	28.54	0.27	0.00	29.24	48.7	2
10246	SpliceB	End	91.33	2.69	0.01	-0.02	2314.50	-3.89	-0.0	-53.94	39.88	-0.10	-0.69	28.54	0.27	0.00	29.23	48.7	2
10246	SpliceB	Origin	91.33	2.69	0.01	-0.02	2314.50	-3.89	-0.0	-55.50	40.00	-0.10	-0.71	28.54	0.27	0.00	29.25	48.8	2
10246	Tube 4	End	95.66	2.01	0.00	-0.02	2487.90	-4.35	-0.0	-55.50	40.00	-0.10	-0.68	28.49	0.26	0.00	29.18	48.6	2
10246	Tube 4	Origin	95.66	2.01	0.00	-0.02	2487.90	-4.35	-0.0	-57.52	40.19	-0.11	-0.71	28.49	0.26	0.00	29.20	48.7	2
10246	10246:WVGD2	End	100.00	1.45	0.00	-0.01	2662.10	-4.83	-0.0	-57.52	40.19	-0.11	-0.68	28.39	0.25	0.00	29.07	48.5	2
10246	10246:WVGD2	Origin	100.00	1.45	0.00	-0.01	2662.10	-4.83	-0.0	-60.01	40.45	-0.12	-0.71	28.39	0.25	0.00	29.10	48.5	2
10246	Tube 4	End	105.00	0.91	0.00	-0.01	2864.36	-5.43	-0.0	-60.01	40.45	-0.12	-0.68	28.22	0.24	0.00	28.90	48.2	2
10246	Tube 4	Origin	105.00	0.91	0.00	-0.01	2864.36	-5.43	-0.0	-62.51	40.68	-0.13	-0.71	28.22	0.24	0.00	28.93	48.2	2
10246	10246:WVGD1	End	110.00	0.51	0.00	-0.01	3067.77	-6.07	-0.0	-62.51	40.68	-0.13	-0.68	28.00	0.24	0.00	28.69	47.8	2
10246	10246:WVGD1	Origin	110.00	0.51	0.00	-0.01	3067.77	-6.07	-0.0	-65.22	40.95	-0.14	-0.71	28.00	0.24	0.00	28.72	47.9	2
10246	Tube 4	End	115.00	0.22	0.00	-0.00	3272.52	-6.75	-0.0	-65.22	40.95	-0.14	-0.69	27.76	0.23	0.00	28.45	47.4	2
10246	Tube 4	Origin	115.00	0.22	0.00	-0.00	3272.52	-6.75	-0.0	-67.90	41.20	-0.15	-0.72	27.76	0.23	0.00	28.48	47.5	2
10246	Tube 4	End	120.00	0.06	0.00	-0.00	3478.50	-7.49	-0.0	-67.90	41.20	-0.15	-0.69	27.49	0.22	0.00	28.18	47.0	2
10246	Tube 4	Origin	120.00	0.06	0.00	-0.00	3478.50	-7.49	-0.0	-70.67	41.45	-0.16	-0.72	27.49	0.22	0.00	28.21	47.0	2
10246	10246:g	End	125.00	0.00	0.00	0.00	3685.75	-8.27	-0.0	-70.67	41.45	-0.16	-0.70	27.20	0.22	0.00	27.90	46.7	2

Detailed Tubular Davit Arm Usages for Load Case "NESC Heavy":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	42.86	0.07	-0.47	-1.58	0.00	0.0	-2.42	0.22	-0.00	-0.41	1.27	0.06	0.00	1.69	2.6	2
Davit1	#Davit1:O	End	4.85	43.69	0.07	3.06	-0.52	0.00	0.0	-2.42	0.22	-0.00	-0.51	0.65	0.07	0.00	1.16	1.8	2
Davit1	#Davit1:O	Origin	4.85	43.69	0.07	3.06	-0.52	0.00	0.0	-2.38	0.11	-0.00	-0.50	0.65	0.04	0.00	1.15	1.8	2
Davit1	Davit1:End	End	9.69	44.51	0.07	6.57	-0.00	0.00	0.0	-2.38	0.11	-0.00	-0.66	0.00	0.07	0.00	0.67	1.0	3
Davit2	Davit2:O	Origin	0.00	42.83	0.07	-1.33	-10.40	-0.00	-0.0	2.14	1.14	0.00	0.37	8.37	0.30	0.00	8.75	13.6	2
Davit2	#Davit2:O	End	4.85	43.46	0.07	-5.06	-4.90	-0.00	-0.0	2.14	1.14	0.00	0.45	6.07	0.37	0.00	6.56	10.1	2
Davit2	#Davit2:O	Origin	4.85	43.46	0.07	-5.06	-4.90	-0.00	0.0	2.16	1.01	0.00	0.46	6.07	0.33	0.00	6.55	10.1	2
Davit2	Davit2:End	End	9.69	44.11	0.07	-8.98	0.00	0.00	0.0	2.16	1.01	0.00	0.60	0.00	0.65	0.00	1.27	2.0	3
Davit3	Davit3:O	Origin	0.00	27.80	0.05	0.10	-8.38	0.01	0.0	-0.23	1.00	-0.00	-0.01	0.84	0.07	0.00	0.86	1.3	2
Davit3	#Davit3:O	End	5.00	28.39	0.05	3.02	-3.36	0.00	0.0	-0.23	1.00	-0.00	-0.01	0.50	0.08	0.00	0.53	0.8	2
Davit3	#Davit3:O	Origin	5.00	28.39	0.05	3.02	-3.36	0.00	0.0	-0.12	0.53	-0.00	-0.01	0.50	0.04	0.00	0.51	0.8	2

Davit3	#Davit3:1	End	9.86	28.96	0.05	5.85	-0.78	0.00	0.0	-0.12	0.53	-0.00	-0.01	0.18	0.05	0.00	0.21	0.3	2
Davit3	#Davit3:1	Origin	9.86	28.96	0.05	5.85	-0.78	0.00	0.0	-0.04	0.16	-0.00	-0.00	0.18	0.02	0.00	0.19	0.3	2
Davit3	Davit3:End	End	14.72	29.53	0.05	8.68	-0.00	0.00	0.0	-0.04	0.16	-0.00	-0.00	0.00	0.03	0.00	0.06	0.1	3
Davit4	Davit4:O	Origin	0.00	27.77	0.05	-1.04	-88.10	-0.01	-0.0	9.09	6.45	0.00	0.39	8.86	0.42	0.00	9.28	14.4	2
Davit4	#Davit4:0	End	5.00	28.23	0.05	-4.08	-55.84	-0.00	-0.0	9.09	6.45	0.00	0.47	8.27	0.51	0.00	8.79	13.5	2
Davit4	#Davit4:0	Origin	5.00	28.23	0.05	-4.08	-55.84	-0.00	-0.0	9.17	5.94	0.00	0.47	8.27	0.47	0.00	8.78	13.5	2
Davit4	#Davit4:1	End	9.86	28.69	0.05	-7.17	-26.95	-0.00	-0.0	9.17	5.94	0.00	0.60	6.35	0.60	0.00	7.02	10.8	2
Davit4	#Davit4:1	Origin	9.86	28.69	0.05	-7.17	-26.95	-0.00	0.0	9.23	5.54	0.00	0.60	6.35	0.56	0.00	7.02	10.8	2
Davit4	Davit4:End	End	14.72	29.16	0.05	-10.39	-0.00	0.00	0.0	9.23	5.54	0.00	0.81	0.00	1.12	0.00	2.10	3.2	3
Davit5	Davit5:O	Origin	0.00	16.31	0.03	0.38	-8.41	0.01	0.0	-0.22	1.01	-0.00	-0.01	0.85	0.07	0.00	0.86	1.3	2
Davit5	#Davit5:0	End	5.00	16.73	0.03	2.57	-3.38	0.00	0.0	-0.22	1.01	-0.00	-0.01	0.50	0.08	0.00	0.53	0.8	2
Davit5	#Davit5:0	Origin	5.00	16.73	0.03	2.57	-3.38	0.00	0.0	-0.11	0.53	-0.00	-0.01	0.50	0.04	0.00	0.51	0.8	2
Davit5	#Davit5:1	End	9.86	17.15	0.03	4.70	-0.79	0.00	0.0	-0.11	0.53	-0.00	-0.01	0.19	0.05	0.00	0.21	0.3	2
Davit5	#Davit5:1	Origin	9.86	17.15	0.03	4.70	-0.79	0.00	0.0	-0.03	0.16	-0.00	-0.00	0.19	0.02	0.00	0.19	0.3	2
Davit5	Davit5:End	End	14.72	17.56	0.03	6.81	-0.00	0.00	0.0	-0.03	0.16	-0.00	-0.00	0.00	0.03	0.00	0.06	0.1	3
Davit6	Davit6:O	Origin	0.00	16.28	0.03	-0.82	-89.77	-0.01	-0.0	9.01	6.57	0.00	0.38	9.03	0.43	0.00	9.45	14.6	2
Davit6	#Davit6:0	End	5.00	16.64	0.03	-3.11	-56.95	-0.00	-0.0	9.01	6.57	0.00	0.47	8.43	0.52	0.00	8.95	13.8	2
Davit6	#Davit6:0	Origin	5.00	16.64	0.03	-3.11	-56.95	-0.00	-0.0	9.09	6.06	0.00	0.47	8.43	0.48	0.00	8.94	13.8	2
Davit6	#Davit6:1	End	9.86	17.01	0.03	-5.48	-27.50	-0.00	-0.0	9.09	6.06	0.00	0.59	6.48	0.61	0.00	7.15	11.0	2
Davit6	#Davit6:1	Origin	9.86	17.01	0.03	-5.48	-27.50	-0.00	0.0	9.16	5.66	0.00	0.59	6.48	0.57	0.00	7.15	11.0	2
Davit6	Davit6:End	End	14.72	17.40	0.03	-7.99	-0.00	0.00	0.0	9.16	5.66	0.00	0.80	0.00	1.15	0.00	2.14	3.3	3
Davit7	Davit7:O	Origin	0.00	8.08	0.02	0.43	-8.44	0.01	0.0	-0.21	1.01	-0.00	-0.01	0.85	0.07	0.00	0.87	1.3	2
Davit7	#Davit7:0	End	5.00	8.36	0.02	1.91	-3.39	0.00	0.0	-0.21	1.01	-0.00	-0.01	0.50	0.08	0.00	0.53	0.8	2
Davit7	#Davit7:0	Origin	5.00	8.36	0.02	1.91	-3.39	0.00	0.0	-0.11	0.53	-0.00	-0.01	0.50	0.04	0.00	0.51	0.8	2
Davit7	#Davit7:1	End	9.86	8.63	0.02	3.35	-0.79	0.00	0.0	-0.11	0.53	-0.00	-0.01	0.19	0.05	0.00	0.21	0.3	2
Davit7	#Davit7:1	Origin	9.86	8.63	0.02	3.35	-0.79	0.00	0.0	-0.03	0.16	-0.00	-0.00	0.19	0.02	0.00	0.19	0.3	2
Davit7	Davit7:End	End	14.72	8.90	0.02	4.77	-0.00	0.00	0.0	-0.03	0.16	-0.00	-0.00	0.00	0.03	0.00	0.06	0.1	3
Davit8	Davit8:O	Origin	0.00	8.07	0.02	-0.60	-91.38	-0.01	-0.0	8.93	6.67	0.00	0.38	9.19	0.44	0.00	9.60	14.9	2
Davit8	#Davit8:0	End	5.00	8.33	0.02	-2.17	-58.00	-0.00	-0.0	8.93	6.67	0.00	0.46	8.59	0.53	0.00	9.10	14.0	2
Davit8	#Davit8:0	Origin	5.00	8.33	0.02	-2.17	-58.00	-0.00	-0.0	9.02	6.17	0.00	0.47	8.59	0.49	0.00	9.10	14.0	2
Davit8	#Davit8:1	End	9.86	8.60	0.02	-3.85	-28.03	-0.00	-0.0	9.02	6.17	0.00	0.59	6.61	0.62	0.00	7.27	11.2	2
Davit8	#Davit8:1	Origin	9.86	8.60	0.02	-3.85	-28.03	-0.00	0.0	9.09	5.77	0.00	0.59	6.61	0.58	0.00	7.27	11.2	2
Davit8	Davit8:End	End	14.72	8.89	0.02	-5.67	-0.00	0.00	0.0	9.09	5.77	0.00	0.79	0.00	1.17	0.00	2.17	3.3	3

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
Clamp1	2.372	80.00	80.00	2.97
Clamp2	2.372	80.00	80.00	2.97
Clamp3	0.000	80.00	80.00	0.00
Clamp4	10.695	80.00	80.00	13.37
Clamp5	0.000	80.00	80.00	0.00
Clamp6	10.695	80.00	80.00	13.37
Clamp7	0.000	80.00	80.00	0.00
Clamp8	10.695	80.00	80.00	13.37
Clamp9	0.119	80.00	80.00	0.15
Clamp10	0.238	80.00	80.00	0.30
Clamp11	0.238	80.00	80.00	0.30
Clamp12	0.238	80.00	80.00	0.30
Clamp13	0.238	80.00	80.00	0.30
Clamp14	0.238	80.00	80.00	0.30
Clamp15	0.238	80.00	80.00	0.30
Clamp16	0.238	80.00	80.00	0.30
Clamp17	0.238	80.00	80.00	0.30
Clamp18	0.238	80.00	80.00	0.30
Clamp21	1.187	80.00	80.00	1.48
Clamp22	1.695	80.00	80.00	2.12
Clamp23	4.009	80.00	80.00	5.01
Clamp24	1.695	80.00	80.00	2.12

*** Analysis Results for Load Case No. 2 "NESC Extreme" - Number of iterations in SAPS 14

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)
10246:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
10246:t	0.001638	4.068	-0.09364	-4.0003	0.0013	0.0000	0.001638	4.068	124.9
10246:TopConn	0.001615	3.998	-0.09121	-4.0002	0.0013	0.0000	0.001615	3.998	123.9
10246:Arm1	0.001594	3.934	-0.08897	-3.9976	0.0013	0.0000	0.001594	3.934	123
10246:BotConT	0.001192	2.79	-0.05256	-3.2153	0.0012	0.0000	0.001192	2.79	104.9
10246:BotConn	0.001182	2.762	-0.05178	-3.2017	0.0012	0.0000	0.001182	2.762	104.4
10246:BotConB	0.001171	2.734	-0.051	-3.1879	0.0012	0.0000	0.001171	2.734	103.9
10246:WVGD10	0.00114	2.651	-0.0487	-3.1466	0.0012	0.0000	0.00114	2.651	102.5
10246:Arm2	0.001102	2.551	-0.04595	-3.0969	0.0012	0.0000	0.001102	2.551	100.6
10246:WVGD9	0.0009879	2.255	-0.03813	-2.9021	0.0011	0.0000	0.0009879	2.255	94.96
10246:WVGD8	0.0007984	1.778	-0.02669	-2.5491	0.0010	0.0000	0.0007984	1.778	84.97
10246:Arm3	0.0006873	1.507	-0.02086	-2.3340	0.0010	0.0000	0.0006873	1.507	78.64
10246:WVGD7	0.0006267	1.362	-0.01795	-2.2039	0.0009	0.0000	0.0006267	1.362	74.98
10246:WVGD6	0.0004745	1.007	-0.01152	-1.8639	0.0008	0.0000	0.0004745	1.007	64.99
10246:Arm4	0.0003627	0.7545	-0.007613	-1.5995	0.0007	0.0000	0.0003627	0.7545	56.65
10246:WVGD5	0.0003422	0.709	-0.006967	-1.5468	0.0007	0.0000	0.0003422	0.709	54.99
10246:WVGD4	0.0002305	0.4655	-0.003874	-1.2356	0.0006	0.0000	0.0002305	0.4655	45
10246:WVGD3	0.0001399	0.2752	-0.001935	-0.9353	0.0005	0.0000	0.0001399	0.2752	35
10246:WVGD2	7.168e-005	0.1372	-0.0008418	-0.6418	0.0003	0.0000	7.168e-005	0.1372	25
10246:WVGD1	2.606e-005	0.04849	-0.0003074	-0.3700	0.0002	0.0000	2.606e-005	0.04849	15
Davit1:O	0.001595	3.936	-0.04885	-3.9976	0.0013	0.0000	0.001595	3.36	123
Davit1:End	0.001664	4.095	0.6166	-4.0799	0.0013	0.0001	0.001664	-5.981	125.6
Davit2:O	0.001593	3.933	-0.1291	-3.9976	0.0013	0.0000	0.001593	4.508	123
Davit2:End	0.001616	4.045	-0.8118	-4.1508	0.0013	0.0000	0.001616	14.12	124.2
Davit3:O	0.001103	2.552	0.005648	-3.0969	0.0012	0.0000	0.001103	1.597	100.7
Davit3:End	0.001177	2.711	0.783	-3.0833	0.0012	0.0000	0.001177	-12.74	104
Davit4:O	0.001101	2.55	-0.09755	-3.0969	0.0012	0.0000	0.001101	3.505	100.6
Davit4:End	0.001132	2.67	-0.9154	-3.3107	0.0012	0.0000	0.001132	18.13	102.3
Davit5:O	0.0006884	1.509	0.03382	-2.3340	0.0010	0.0000	0.0006884	0.1657	78.69
Davit5:End	0.0007448	1.624	0.6199	-2.3203	0.0010	0.0000	0.0007448	-14.22	81.83
Davit6:O	0.0006862	1.506	-0.07555	-2.3340	0.0010	0.0000	0.0006862	2.849	78.58
Davit6:End	0.0007172	1.603	-0.7001	-2.5567	0.0010	0.0000	0.0007172	17.45	80.51
Davit7:O	0.0003634	0.7552	0.03967	-1.5995	0.0007	0.0000	0.0003634	-0.9389	56.7
Davit7:End	0.0004025	0.8316	0.4411	-1.5856	0.0007	0.0000	0.0004025	-15.36	59.65
Davit8:O	0.000362	0.7539	-0.0549	-1.5995	0.0007	0.0000	0.000362	2.448	56.6
Davit8:End	0.0003881	0.8245	-0.4937	-1.8306	0.0007	0.0000	0.0003881	17.02	58.71

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 %
10246:g	-0.05	0.0	-52.54	0.0	41.02	0.0	0.0	66.66	0.0	4235.43	0.0	-2.3	0.0	-0.00	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC Extreme":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
10246	10246:t	Origin	0.00	48.81	0.02	-1.12	-0.00	0.00	0.0	-0.01	0.02	-0.00	-0.00	0.00	0.00	0.00	0.01	0.0	5
10246	10246:TopConn	End	1.00	47.98	0.02	-1.09	0.02	-0.00	0.0	-0.01	0.02	-0.00	-0.00	0.01	0.00	0.00	0.01	0.0	2
10246	10246:TopConn	Origin	1.00	47.98	0.02	-1.09	0.02	-0.00	0.0	0.24	4.10	-0.00	0.03	0.00	1.05	0.00	1.81	3.0	5
10246	10246:Arm1	End	1.92	47.21	0.02	-1.07	3.78	-0.00	0.0	0.24	4.10	-0.00	0.03	0.43	0.98	0.00	1.76	2.9	4
10246	10246:Arm1	Origin	1.92	47.21	0.02	-1.07	10.05	-0.00	0.0	-0.26	7.46	-0.00	-0.03	4.27	0.48	0.00	4.38	7.3	2
10246	Tube 1	End	6.92	43.09	0.02	-0.93	47.35	-0.00	0.0	-0.26	7.46	-0.00	-0.03	15.04	0.42	0.00	15.08	25.1	2
10246	Tube 1	Origin	6.92	43.09	0.02	-0.93	47.35	-0.00	0.0	-0.44	7.67	-0.00	-0.05	15.04	0.43	0.00	15.10	25.2	2
10246	Tube 1	End	11.42	39.58	0.02	-0.81	81.85	-0.01	0.0	-0.44	7.67	-0.00	-0.04	20.67	0.38	0.00	20.72	34.5	2

10246	Tube 1	Origin	11.42	39.58	0.02	-0.81	81.85	-0.01	0.0	-0.63	7.89	-0.00	-0.06	20.67	0.39	0.00	20.74	34.6	2
10246	SpliceT	End	15.91	36.29	0.02	-0.71	117.36	-0.02	0.0	-0.63	7.89	-0.00	-0.05	24.12	0.35	0.00	24.18	40.3	2
10246	SpliceT	Origin	15.91	36.29	0.02	-0.71	117.36	-0.02	0.0	-0.92	8.09	-0.00	-0.08	24.12	0.36	0.00	24.21	40.3	2
10246	SpliceB	End	18.58	34.44	0.01	-0.66	138.96	-0.03	0.0	-0.92	8.09	-0.00	-0.03	11.77	0.15	0.00	11.80	19.7	2
10246	SpliceB	Origin	18.58	34.44	0.01	-0.66	138.96	-0.03	0.0	-1.18	8.21	-0.00	-0.04	11.77	0.16	0.00	11.81	19.7	2
10246	10246:BotConT	End	20.00	33.48	0.01	-0.63	150.60	-0.03	0.0	-1.18	8.21	-0.00	-0.04	12.02	0.15	0.00	12.06	20.1	2
10246	10246:BotConT	Origin	20.00	33.48	0.01	-0.63	150.60	-0.03	0.0	-0.93	14.50	-0.00	-0.03	12.02	0.27	0.00	12.06	20.1	2
10246	10246:BotConn	End	20.50	33.15	0.01	-0.62	157.85	-0.04	0.0	-0.93	14.50	-0.00	-0.03	12.34	0.26	0.00	12.38	20.6	2
10246	10246:BotConn	Origin	20.50	33.15	0.01	-0.62	157.85	-0.04	0.0	-2.97	13.94	-0.00	-0.10	12.34	0.25	0.00	12.45	20.7	2
10246	10246:BotConB	End	21.00	32.81	0.01	-0.61	164.82	-0.04	0.0	-2.97	13.94	-0.00	-0.10	12.62	0.25	0.00	12.73	21.2	2
10246	10246:BotConB	Origin	21.00	32.81	0.01	-0.61	164.82	-0.04	0.0	-3.43	7.77	-0.00	-0.12	12.62	0.14	0.00	12.74	21.2	2
10246	10246:WVGD10	End	22.50	31.82	0.01	-0.58	176.48	-0.04	0.0	-3.43	7.77	-0.00	-0.11	12.73	0.14	0.00	12.85	21.4	2
10246	10246:WVGD10	Origin	22.50	31.82	0.01	-0.58	176.48	-0.04	0.0	-3.66	8.05	-0.00	-0.12	12.73	0.14	0.00	12.85	21.4	2
10246	10246:Arm2	End	24.34	30.61	0.01	-0.55	191.33	-0.05	0.0	-3.66	8.05	-0.00	-0.12	12.85	0.14	0.00	12.97	21.6	2
10246	10246:Arm2	Origin	24.34	30.61	0.01	-0.55	237.58	-0.05	0.0	-6.89	18.90	-0.01	-0.22	15.96	0.32	0.00	16.19	27.0	2
10246	Tube 2	End	27.17	28.80	0.01	-0.50	291.03	-0.07	0.0	-6.89	18.90	-0.01	-0.21	17.61	0.30	0.00	17.82	29.7	2
10246	Tube 2	Origin	27.17	28.80	0.01	-0.50	291.03	-0.07	0.0	-7.25	19.09	-0.01	-0.22	17.61	0.31	0.00	17.83	29.7	2
10246	10246:WVGD9	End	30.00	27.05	0.01	-0.46	345.00	-0.08	0.0	-7.25	19.09	-0.01	-0.21	18.90	0.29	0.00	19.11	31.9	2
10246	10246:WVGD9	Origin	30.00	27.05	0.01	-0.46	345.00	-0.08	0.0	-7.82	19.53	-0.01	-0.22	18.90	0.30	0.00	19.13	31.9	2
10246	Tube 2	End	35.00	24.10	0.01	-0.38	442.68	-0.12	0.0	-7.82	19.53	-0.01	-0.21	20.57	0.27	0.00	20.78	34.6	2
10246	Tube 2	Origin	35.00	24.10	0.01	-0.38	442.68	-0.12	0.0	-8.52	19.91	-0.01	-0.22	20.57	0.28	0.00	20.80	34.7	2
10246	10246:WVGD8	End	40.00	21.34	0.01	-0.32	542.21	-0.16	0.0	-8.52	19.91	-0.01	-0.21	21.64	0.26	0.00	21.86	36.4	2
10246	10246:WVGD8	Origin	40.00	21.34	0.01	-0.32	542.21	-0.16	0.0	-9.19	20.40	-0.01	-0.22	21.64	0.26	0.00	21.87	36.5	2
10246	Tube 2	End	43.17	19.68	0.01	-0.28	606.92	-0.19	0.0	-9.19	20.40	-0.01	-0.21	22.12	0.25	0.00	22.34	37.2	2
10246	Tube 2	Origin	43.17	19.68	0.01	-0.28	606.92	-0.19	0.0	-9.69	20.66	-0.01	-0.23	22.12	0.26	0.00	22.36	37.3	2
10246	10246:Arm3	End	46.34	18.09	0.01	-0.25	672.46	-0.22	0.0	-9.69	20.66	-0.01	-0.22	22.48	0.25	0.00	22.70	37.8	2
10246	10246:Arm3	Origin	46.34	18.09	0.01	-0.25	721.35	-0.22	0.0	-13.37	31.61	-0.01	-0.30	24.11	0.37	0.00	24.42	40.7	2
10246	10246:WVGD7	End	50.00	16.35	0.01	-0.22	836.92	-0.27	0.0	-13.37	31.61	-0.01	-0.29	25.42	0.36	0.00	25.71	42.9	2
10246	10246:WVGD7	Origin	50.00	16.35	0.01	-0.22	836.92	-0.27	0.0	-13.87	32.00	-0.01	-0.30	25.42	0.36	0.00	25.73	42.9	2
10246	SpliceT	End	51.33	15.74	0.01	-0.20	879.48	-0.28	0.0	-13.87	32.00	-0.01	-0.29	25.83	0.36	0.00	26.13	43.5	2
10246	SpliceT	Origin	51.33	15.74	0.01	-0.20	879.48	-0.28	0.0	-14.84	32.28	-0.01	-0.31	25.83	0.36	0.00	26.15	43.6	2
10246	SpliceB	End	55.91	13.74	0.01	-0.17	1027.43	-0.35	0.0	-14.84	32.28	-0.01	-0.26	24.94	0.31	0.00	25.21	42.0	2
10246	SpliceB	Origin	55.91	13.74	0.01	-0.17	1027.43	-0.35	0.0	-16.13	32.70	-0.02	-0.29	24.94	0.31	0.00	25.24	42.1	2
10246	10246:WVGD6	End	60.00	12.09	0.01	-0.14	1161.07	-0.41	0.0	-16.13	32.70	-0.02	-0.27	25.57	0.29	0.00	25.85	43.1	2
10246	10246:WVGD6	Origin	60.00	12.09	0.01	-0.14	1161.07	-0.41	0.0	-17.09	33.27	-0.02	-0.29	25.57	0.30	0.00	25.87	43.1	2
10246	Tube 3	End	64.17	10.51	0.01	-0.11	1299.86	-0.48	0.0	-17.09	33.27	-0.02	-0.28	26.04	0.29	0.00	26.33	43.9	2
10246	Tube 3	Origin	64.17	10.51	0.01	-0.11	1299.86	-0.48	0.0	-18.05	33.69	-0.02	-0.29	26.04	0.29	0.00	26.34	43.9	2
10246	10246:Arm4	End	68.34	9.05	0.00	-0.09	1440.40	-0.55	0.0	-18.05	33.69	-0.02	-0.28	26.36	0.28	0.00	26.65	44.4	2
10246	10246:Arm4	Origin	68.34	9.05	0.00	-0.09	1491.89	-0.55	0.0	-21.99	44.60	-0.02	-0.34	27.31	0.37	0.00	27.66	46.1	2
10246	10246:WVGD5	End	70.00	8.51	0.00	-0.08	1565.75	-0.58	0.0	-21.99	44.60	-0.02	-0.33	27.68	0.36	0.00	28.02	46.7	2
10246	10246:WVGD5	Origin	70.00	8.51	0.00	-0.08	1565.75	-0.58	0.0	-22.88	45.13	-0.02	-0.35	27.68	0.36	0.00	28.03	46.7	2
10246	Tube 3	End	75.00	6.96	0.00	-0.06	1791.39	-0.69	0.0	-22.88	45.13	-0.02	-0.33	28.61	0.35	0.00	28.95	48.2	2
10246	Tube 3	Origin	75.00	6.96	0.00	-0.06	1791.39	-0.69	0.0	-24.18	45.67	-0.02	-0.35	28.61	0.35	0.00	28.97	48.3	2
10246	10246:WVGD4	End	80.00	5.59	0.00	-0.05	2019.76	-0.80	0.0	-24.18	45.67	-0.02	-0.33	29.29	0.33	0.00	29.63	49.4	2
10246	10246:WVGD4	Origin	80.00	5.59	0.00	-0.05	2019.76	-0.80	0.0	-25.59	46.42	-0.02	-0.35	29.29	0.34	0.00	29.65	49.4	2
10246	SpliceT	End	85.00	4.37	0.00	-0.03	2251.84	-0.93	0.0	-25.59	46.42	-0.02	-0.34	29.78	0.32	0.00	30.12	50.2	2
10246	SpliceT	Origin	85.00	4.37	0.00	-0.03	2251.84	-0.93	0.0	-27.65	47.02	-0.03	-0.36	29.78	0.33	0.00	30.15	50.2	2
10246	10246:WVGD3	End	90.00	3.30	0.00	-0.02	2486.93	-1.06	0.0	-27.65	47.02	-0.03	-0.36	31.38	0.32	0.00	31.74	52.9	2
10246	10246:WVGD3	Origin	90.00	3.30	0.00	-0.02	2486.93	-1.06	0.0	-29.46	47.58	-0.03	-0.38	31.38	0.32	0.00	31.76	52.9	2
10246	SpliceB	End	91.33	3.05	0.00	-0.02	2550.22	-1.10	0.0	-29.46	47.58	-0.03	-0.37	31.44	0.32	0.00	31.82	53.0	2
10246	SpliceB	Origin	91.33	3.05	0.00	-0.02	2550.22	-1.10	0.0	-30.47	47.93	-0.03	-0.39	31.44	0.32	0.00	31.83	53.1	2
10246	Tube 4	End	95.66	2.29	0.00	-0.01	2757.99	-1.23	0.0	-30.47	47.93	-0.03	-0.37	31.57	0.31	0.00	31.95	53.3	2
10246	Tube 4	Origin	95.66	2.29	0.00	-0.01	2757.99	-1.23	0.0	-31.78	48.47	-0.03	-0.39	31.57	0.31	0.00	31.97	53.3	2
10246	10246:WVGD2	End	100.00	1.65	0.00	-0.01	2968.13	-1.37	0.0	-31.78	48.47	-0.03	-0.38	31.64	0.30	0.00	32.02	53.4	2
10246	10246:WVGD2	Origin	100.00	1.65	0.00	-0.01	2968.13	-1.37	0.0	-33.30	49.25	-0.03	-0.39	31.64	0.31	0.00	32.04	53.4	2
10246	Tube 4	End	105.00	1.04	0.00	-0.01	3214.37	-1.54	0.0	-33.30	49.25	-0.03	-0.38	31.65	0.30	0.00	32.04	53.4	2
10246	Tube 4	Origin	105.00	1.04	0.00	-0.01	3214.37	-1.54	0.0	-34.91	49.92	-0.04	-0.40	31.65	0.30	0.00	32.05	53.4	2
10246	10246:WVGD1	End	110.00	0.58	0.00	-0.00	3463.98	-1.72	0.0	-34.91	49.92	-0.04	-0.38	31.61	0.29	0.00	31.99	53.3	2
10246	10246:WVGD1	Origin	110.00	0.58	0.00	-0.00	3463.98	-1.72	0.0	-36.61	50.70	-0.04	-0.40	31.61	0.29	0.00	32.01	53.4	2
10246	Tube 4	End	115.00	0.26	0.00	-0.00	3717.48	-1.91	0.0	-36.61	50.70	-0.04	-0.39	31.52	0.28	0.00	31.91	53.2	2
10246	Tube 4	Origin	115.00	0.26	0.00	-0.00	3717.48	-1.91	0.0	-38.33	51.42	-0.04	-0.40	31.52	0.29	0.00	31.93	53.2	2
10246	Tube 4	End	120.00	0.07	0.00	-0.00	3974.59	-2.12	0.0	-38.33	51.42	-0.04	-0.39	31.39	0.28	0.00	31.79	53.0	2
10246	Tube 4	Origin	120.00	0.07	0.00	-0.00	3974.59	-2.12	0.0	-40.11	52.17	-0.04	-0.41	31.39	0.28	0.00	31.81	53.0	2
10246	10246:g	End	125.00	0.00	0.00	0.00	4235.43	-2.34	0.0	-40.11	52.17	-0.04	-0.40	31.24	0.27	0.00	31.64	53.0	2

Detailed Tubular Davit Arm Usages for Load Case "NESC Extreme":

Element Joint Joint Rel. Trans. Long. Vert. Vert. Horz. Tors. Axial Vert. Horz. P/A M/S. V/Q. T/R. Res. Max. At

Label	Label	Position	Dist. (ft)	Defl. (in)	Defl. (in)	Defl. (in)	Mom. (ft-k)	Mom. (ft-k)	Mom. (ft-k)	Force (kips)	Shear (kips)	Shear (kips)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	Usage %	Pt.
Davit1	Davit1:O	Origin	0.00	47.23	0.02	-0.59	1.97	0.00	0.0	-1.62	-0.17	-0.00	-0.28	1.59	0.04	0.00	1.87	2.9	2
Davit1	#Davit1:0	End	4.85	48.17	0.02	3.38	1.15	0.00	0.0	-1.62	-0.17	-0.00	-0.34	1.43	0.06	0.00	1.77	2.7	2
Davit1	#Davit1:0	Origin	4.85	48.17	0.02	3.38	1.15	0.00	0.0	-1.59	-0.24	-0.00	-0.34	1.43	0.08	0.00	1.77	2.7	2
Davit1	Davit1:End	End	9.69	49.13	0.02	7.40	-0.00	0.00	0.0	-1.59	-0.24	-0.00	-0.44	0.00	0.15	0.00	0.51	0.8	3
Davit2	Davit2:O	Origin	0.00	47.19	0.02	-1.55	-4.28	-0.00	-0.0	1.55	0.48	0.00	0.26	3.45	0.13	0.00	3.72	5.8	2
Davit2	#Davit2:0	End	4.85	47.86	0.02	-5.60	-1.94	-0.00	-0.0	1.55	0.48	0.00	0.33	2.41	0.16	0.00	2.75	4.2	2
Davit2	#Davit2:0	Origin	4.85	47.86	0.02	-5.60	-1.94	-0.00	0.0	1.56	0.40	0.00	0.33	2.41	0.13	0.00	2.75	4.2	2
Davit2	Davit2:End	End	9.69	48.54	0.02	-9.74	0.00	0.00	0.0	1.56	0.40	0.00	0.43	0.00	0.26	0.00	0.62	1.0	3
Davit3	Davit3:O	Origin	0.00	30.63	0.01	0.07	-5.42	0.00	0.0	-0.16	0.65	-0.00	-0.01	0.55	0.04	0.00	0.56	0.9	2
Davit3	#Davit3:0	End	5.00	31.28	0.01	3.24	-2.17	0.00	0.0	-0.16	0.65	-0.00	-0.01	0.32	0.05	0.00	0.34	0.5	2
Davit3	#Davit3:0	Origin	5.00	31.28	0.01	3.24	-2.17	0.00	0.0	-0.08	0.34	-0.00	-0.00	0.32	0.03	0.00	0.33	0.5	2
Davit3	#Davit3:1	End	9.86	31.90	0.01	6.32	-0.51	0.00	0.0	-0.08	0.34	-0.00	-0.01	0.12	0.03	0.00	0.14	0.2	2
Davit3	#Davit3:1	Origin	9.86	31.90	0.01	6.32	-0.51	0.00	0.0	-0.03	0.10	-0.00	-0.00	0.12	0.01	0.00	0.12	0.2	2
Davit3	Davit3:End	End	14.72	32.53	0.01	9.40	-0.00	0.00	0.0	-0.03	0.10	-0.00	-0.00	0.00	0.02	0.00	0.04	0.1	3
Davit4	Davit4:O	Origin	0.00	30.60	0.01	-1.17	-50.45	-0.00	-0.0	10.14	3.74	0.00	0.43	5.08	0.24	0.00	5.52	8.6	2
Davit4	#Davit4:0	End	5.00	31.08	0.01	-4.42	-31.75	-0.00	-0.0	10.14	3.74	0.00	0.52	4.70	0.30	0.00	5.25	8.1	2
Davit4	#Davit4:0	Origin	5.00	31.08	0.01	-4.42	-31.75	-0.00	-0.0	10.18	3.40	0.00	0.53	4.70	0.27	0.00	5.25	8.1	2
Davit4	#Davit4:1	End	9.86	31.56	0.01	-7.67	-15.22	-0.00	-0.0	10.18	3.40	0.00	0.66	3.59	0.34	0.00	4.29	6.6	2
Davit4	#Davit4:1	Origin	9.86	31.56	0.01	-7.67	-15.22	-0.00	0.0	10.22	3.13	0.00	0.66	3.59	0.32	0.00	4.29	6.6	2
Davit4	Davit4:End	End	14.72	32.04	0.01	-10.98	-0.00	0.00	0.0	10.22	3.13	0.00	0.89	0.00	0.63	0.00	1.42	2.2	3
Davit5	Davit5:O	Origin	0.00	18.10	0.01	0.41	-5.46	0.00	0.0	-0.15	0.65	-0.00	-0.01	0.55	0.04	0.00	0.56	0.9	2
Davit5	#Davit5:0	End	5.00	18.57	0.01	2.80	-2.19	0.00	0.0	-0.15	0.65	-0.00	-0.01	0.32	0.05	0.00	0.34	0.5	2
Davit5	#Davit5:0	Origin	5.00	18.57	0.01	2.80	-2.19	0.00	0.0	-0.08	0.35	-0.00	-0.00	0.32	0.03	0.00	0.33	0.5	2
Davit5	#Davit5:1	End	9.86	19.03	0.01	5.12	-0.51	0.00	0.0	-0.08	0.35	-0.00	-0.01	0.12	0.03	0.00	0.14	0.2	2
Davit5	#Davit5:1	Origin	9.86	19.03	0.01	5.12	-0.51	0.00	0.0	-0.02	0.10	-0.00	-0.00	0.12	0.01	0.00	0.12	0.2	2
Davit5	Davit5:End	End	14.72	19.49	0.01	7.44	-0.00	0.00	0.0	-0.02	0.10	-0.00	-0.00	0.00	0.02	0.00	0.04	0.1	3
Davit6	Davit6:O	Origin	0.00	18.08	0.01	-0.91	-52.44	-0.00	-0.0	10.09	3.88	0.00	0.43	5.28	0.25	0.00	5.72	8.9	2
Davit6	#Davit6:0	End	5.00	18.46	0.01	-3.37	-33.06	-0.00	-0.0	10.09	3.88	0.00	0.52	4.90	0.31	0.00	5.44	8.4	2
Davit6	#Davit6:0	Origin	5.00	18.46	0.01	-3.37	-33.06	-0.00	-0.0	10.14	3.53	0.00	0.52	4.90	0.28	0.00	5.44	8.4	2
Davit6	#Davit6:1	End	9.86	18.84	0.01	-5.85	-15.87	-0.00	-0.0	10.14	3.53	0.00	0.66	3.74	0.36	0.00	4.44	6.8	2
Davit6	#Davit6:1	Origin	9.86	18.84	0.01	-5.85	-15.87	-0.00	0.0	10.18	3.27	0.00	0.66	3.74	0.33	0.00	4.44	6.8	2
Davit6	Davit6:End	End	14.72	19.23	0.01	-8.40	-0.00	0.00	0.0	10.18	3.27	0.00	0.89	0.00	0.66	0.00	1.45	2.2	3
Davit7	Davit7:O	Origin	0.00	9.06	0.00	0.48	-5.49	0.00	0.0	-0.14	0.66	-0.00	-0.01	0.55	0.04	0.00	0.56	0.9	2
Davit7	#Davit7:0	End	5.00	9.37	0.00	2.12	-2.20	0.00	0.0	-0.14	0.66	-0.00	-0.01	0.33	0.05	0.00	0.35	0.5	2
Davit7	#Davit7:0	Origin	5.00	9.37	0.00	2.12	-2.20	0.00	0.0	-0.07	0.35	-0.00	-0.00	0.33	0.03	0.00	0.33	0.5	2
Davit7	#Davit7:1	End	9.86	9.68	0.00	3.71	-0.51	0.00	0.0	-0.07	0.35	-0.00	-0.00	0.12	0.04	0.00	0.14	0.2	2
Davit7	#Davit7:1	Origin	9.86	9.68	0.00	3.71	-0.51	0.00	0.0	-0.02	0.11	-0.00	-0.00	0.12	0.01	0.00	0.12	0.2	2
Davit7	Davit7:End	End	14.72	9.98	0.00	5.29	-0.00	0.00	0.0	-0.02	0.11	-0.00	-0.00	0.00	0.02	0.00	0.04	0.1	3
Davit8	Davit8:O	Origin	0.00	9.05	0.00	-0.66	-54.35	-0.00	-0.0	10.04	4.01	0.00	0.43	5.47	0.26	0.00	5.91	9.2	2
Davit8	#Davit8:0	End	5.00	9.32	0.00	-2.36	-34.32	-0.00	-0.0	10.04	4.01	0.00	0.52	5.08	0.32	0.00	5.63	8.7	2
Davit8	#Davit8:0	Origin	5.00	9.32	0.00	-2.36	-34.32	-0.00	-0.0	10.09	3.66	0.00	0.52	5.08	0.29	0.00	5.63	8.7	2
Davit8	#Davit8:1	End	9.86	9.60	0.00	-4.10	-16.50	-0.00	-0.0	10.09	3.66	0.00	0.66	3.89	0.37	0.00	4.59	7.1	2
Davit8	#Davit8:1	Origin	9.86	9.60	0.00	-4.10	-16.50	-0.00	0.0	10.13	3.39	0.00	0.66	3.89	0.34	0.00	4.59	7.1	2
Davit8	Davit8:End	End	14.72	9.89	0.00	-5.92	-0.00	0.00	0.0	10.13	3.39	0.00	0.89	0.00	0.69	0.00	1.48	2.3	3

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
Clamp1	1.607	80.00	80.00	2.01
Clamp2	1.607	80.00	80.00	2.01
Clamp3	0.000	80.00	80.00	0.00
Clamp4	10.667	80.00	80.00	13.33
Clamp5	0.000	80.00	80.00	0.00
Clamp6	10.667	80.00	80.00	13.33

Clamp7	0.000	80.00	80.00	0.00
Clamp8	10.667	80.00	80.00	13.33
Clamp9	0.090	80.00	80.00	0.11
Clamp10	0.180	80.00	80.00	0.23
Clamp11	0.180	80.00	80.00	0.23
Clamp12	0.180	80.00	80.00	0.23
Clamp13	0.180	80.00	80.00	0.23
Clamp14	0.180	80.00	80.00	0.23
Clamp15	0.180	80.00	80.00	0.23
Clamp16	0.180	80.00	80.00	0.23
Clamp17	0.180	80.00	80.00	0.23
Clamp18	0.180	80.00	80.00	0.23
Clamp21	4.056	80.00	80.00	5.07
Clamp22	6.237	80.00	80.00	7.80
Clamp23	2.078	80.00	80.00	2.60
Clamp24	6.237	80.00	80.00	7.80

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
10246	53.42	NESC Extreme	33	31359.1

Base Plate Results by Bend Line:

Pole Label	Load Case	Bend Line #	Start X (ft)	Start Y (ft)	End X (ft)	End Y (ft)	Length (in)	Bending Stress (ksi)	Bolt Mom. Sum (ft-k)	# Bolts Acting	Bolt Max Load (kips)	Min Plate Thickness (in)	Actual Thickness (in)	Usage %
10246	NESC Heavy	1	2.355	1.702	0.624	2.701	23.979	32.768	98.220	4	98.955	2.217	3.000	54.61
10246	NESC Heavy	2	2.701	0.624	1.702	2.355	23.979	21.864	65.536	4	81.104	1.811	3.000	36.44
10246	NESC Heavy	3	2.651	-1.203	2.651	1.203	28.873	3.182	11.484	2	38.353	0.691	3.000	5.30
10246	NESC Heavy	4	1.702	-2.355	2.701	-0.624	23.979	19.748	59.193	4	-75.394	1.721	3.000	32.91
10246	NESC Heavy	5	0.624	-2.701	2.355	-1.702	23.979	30.603	91.731	4	-93.108	2.143	3.000	51.01
10246	NESC Heavy	6	-1.203	-2.651	1.203	-2.651	28.873	8.323	30.040	2	-93.108	1.117	3.000	13.87
10246	NESC Heavy	7	-2.355	-1.702	-0.624	-2.701	23.979	30.510	91.451	4	-92.948	2.139	3.000	50.85
10246	NESC Heavy	8	-2.701	-0.624	-1.702	-2.355	23.979	19.606	58.767	4	-75.097	1.715	3.000	32.68
10246	NESC Heavy	9	-2.651	1.203	-2.651	-1.203	28.873	3.182	11.484	2	38.784	0.691	3.000	5.30
10246	NESC Heavy	10	-1.702	2.355	-2.701	0.624	23.979	22.007	65.962	4	81.400	1.817	3.000	36.68
10246	NESC Heavy	11	-0.624	2.701	-2.355	1.702	23.979	32.862	98.500	4	99.114	2.220	3.000	54.77
10246	NESC Heavy	12	1.203	2.651	-1.203	2.651	28.873	8.861	31.980	2	99.114	1.153	3.000	14.77
10246	NESC Heavy	13	2.583	1.298	1.298	2.583	21.811	21.954	59.854	4	91.092	1.815	3.000	36.59
10246	NESC Heavy	14	1.298	-2.583	2.583	-1.298	21.811	20.272	55.268	4	-85.318	1.744	3.000	33.79
10246	NESC Heavy	15	-2.583	-1.298	-1.298	-2.583	21.811	20.177	55.009	4	-85.086	1.740	3.000	33.63
10246	NESC Heavy	16	-1.298	2.583	-2.583	1.298	21.811	22.049	60.112	4	91.325	1.819	3.000	36.75
10246	NESC Extreme	1	2.355	1.702	0.624	2.701	23.979	37.041	111.026	4	112.040	2.357	3.000	61.73
10246	NESC Extreme	2	2.701	0.624	1.702	2.355	23.979	24.532	73.532	4	91.586	1.918	3.000	40.89
10246	NESC Extreme	3	2.651	-1.203	2.651	1.203	28.873	3.657	13.197	2	42.517	0.741	3.000	6.09
10246	NESC Extreme	4	1.702	-2.355	2.701	-0.624	23.979	23.287	69.800	4	-88.252	1.869	3.000	38.81
10246	NESC Extreme	5	0.624	-2.701	2.355	-1.702	23.979	35.782	107.253	4	-108.667	2.317	3.000	59.64
10246	NESC Extreme	6	-1.203	-2.651	1.203	-2.651	28.873	9.721	35.083	2	-108.667	1.208	3.000	16.20
10246	NESC Extreme	7	-2.355	-1.702	-0.624	-2.701	23.979	35.756	107.174	4	-108.621	2.316	3.000	59.59
10246	NESC Extreme	8	-2.701	-0.624	-1.702	-2.355	23.979	23.247	69.679	4	-88.167	1.867	3.000	38.74
10246	NESC Extreme	9	-2.651	1.203	-2.651	-1.203	28.873	3.657	13.197	2	42.639	0.741	3.000	6.09
10246	NESC Extreme	10	-1.702	2.355	-2.701	0.624	23.979	24.572	73.652	4	91.670	1.920	3.000	40.95
10246	NESC Extreme	11	-0.624	2.701	-2.355	1.702	23.979	37.067	111.106	4	112.085	2.358	3.000	61.78
10246	NESC Extreme	12	1.203	2.651	-1.203	2.651	28.873	10.026	36.187	2	112.085	1.226	3.000	16.71
10246	NESC Extreme	13	2.583	1.298	1.298	2.583	21.811	24.754	67.487	4	103.036	1.927	3.000	41.26
10246	NESC Extreme	14	1.298	-2.583	2.583	-1.298	21.811	23.769	64.803	4	-99.684	1.888	3.000	39.62
10246	NESC Extreme	15	-2.583	-1.298	-1.298	-2.583	21.811	23.743	64.730	4	-99.618	1.887	3.000	39.57
10246	NESC Extreme	16	-1.298	2.583	-2.583	1.298	21.811	24.781	67.560	4	103.102	1.928	3.000	41.30

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	2.89	NESC Extreme	1	156.1
Davit2	13.55	NESC Heavy	1	156.1
Davit3	1.33	NESC Heavy	1	873.6
Davit4	14.37	NESC Heavy	1	873.6
Davit5	1.34	NESC Heavy	1	873.6
Davit6	14.63	NESC Heavy	1	873.6
Davit7	1.34	NESC Heavy	1	873.6
Davit8	14.87	NESC Heavy	1	873.6

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	54.77	10246	Base Plate
NESC Extreme	61.78	10246	Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	48.75	10246	30
NESC Extreme	53.42	10246	33

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC Heavy	10246	11	23.979	72.079	3685.748	-8.267	32.862	98.500	4	99.114	2.220	54.77
NESC Extreme	10246	11	23.979	41.019	4235.433	-2.341	37.067	111.106	4	112.085	2.358	61.78

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	14.87	Davit8	1
NESC Extreme	9.16	Davit8	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	2.97	NESC Heavy	0.0
Clamp2	Clamp	2.97	NESC Heavy	0.0
Clamp3	Clamp	0.00	NESC Heavy	0.0
Clamp4	Clamp	13.37	NESC Heavy	0.0
Clamp5	Clamp	0.00	NESC Heavy	0.0
Clamp6	Clamp	13.37	NESC Heavy	0.0
Clamp7	Clamp	0.00	NESC Heavy	0.0
Clamp8	Clamp	13.37	NESC Heavy	0.0
Clamp9	Clamp	0.15	NESC Heavy	0.0
Clamp10	Clamp	0.30	NESC Heavy	0.0
Clamp11	Clamp	0.30	NESC Heavy	0.0
Clamp12	Clamp	0.30	NESC Heavy	0.0
Clamp13	Clamp	0.30	NESC Heavy	0.0
Clamp14	Clamp	0.30	NESC Heavy	0.0
Clamp15	Clamp	0.30	NESC Heavy	0.0
Clamp16	Clamp	0.30	NESC Heavy	0.0
Clamp17	Clamp	0.30	NESC Heavy	0.0
Clamp18	Clamp	0.30	NESC Heavy	0.0
Clamp21	Clamp	5.07	NESC Extreme	0.0
Clamp22	Clamp	7.80	NESC Extreme	0.0
Clamp23	Clamp	5.01	NESC Heavy	0.0
Clamp24	Clamp	7.80	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	Clamp1	Clamp	Davit1:End	0.000	2.276	0.669	2.372
NESC Heavy	Clamp2	Clamp	Davit2:End	0.000	2.276	0.669	2.372
NESC Heavy	Clamp3	Clamp	Davit3:End	0.000	0.000	-0.000	0.000
NESC Heavy	Clamp4	Clamp	Davit4:End	0.000	9.815	4.249	10.695
NESC Heavy	Clamp5	Clamp	Davit5:End	0.000	0.000	-0.000	0.000
NESC Heavy	Clamp6	Clamp	Davit6:End	0.000	9.815	4.249	10.695
NESC Heavy	Clamp7	Clamp	Davit7:End	0.000	0.000	-0.000	0.000
NESC Heavy	Clamp8	Clamp	Davit8:End	0.000	9.815	4.249	10.695
NESC Heavy	Clamp9	Clamp	10246:WVGD1	0.000	0.030	0.115	0.119
NESC Heavy	Clamp10	Clamp	10246:WVGD2	0.000	0.060	0.230	0.238
NESC Heavy	Clamp11	Clamp	10246:WVGD3	0.000	0.060	0.230	0.238
NESC Heavy	Clamp12	Clamp	10246:WVGD4	0.000	0.060	0.230	0.238
NESC Heavy	Clamp13	Clamp	10246:WVGD5	0.000	0.060	0.230	0.238
NESC Heavy	Clamp14	Clamp	10246:WVGD6	0.000	0.060	0.230	0.238
NESC Heavy	Clamp15	Clamp	10246:WVGD7	0.000	0.060	0.230	0.238
NESC Heavy	Clamp16	Clamp	10246:WVGD8	0.000	0.060	0.230	0.238
NESC Heavy	Clamp17	Clamp	10246:WVGD9	0.000	0.060	0.230	0.238
NESC Heavy	Clamp18	Clamp	10246:WVGD10	0.000	0.060	0.230	0.238
NESC Heavy	Clamp21	Clamp	10246:TopConn	0.000	1.187	0.000	1.187
NESC Heavy	Clamp22	Clamp	10246:BotConT	0.000	1.695	0.000	1.695
NESC Heavy	Clamp23	Clamp	10246:BotConn	0.000	-0.117	4.007	4.009
NESC Heavy	Clamp24	Clamp	10246:BotConB	0.000	-1.695	0.000	1.695
NESC Extreme	Clamp1	Clamp	Davit1:End	0.000	1.599	0.165	1.607
NESC Extreme	Clamp2	Clamp	Davit2:End	0.000	1.599	0.165	1.607
NESC Extreme	Clamp3	Clamp	Davit3:End	0.000	0.000	-0.000	0.000
NESC Extreme	Clamp4	Clamp	Davit4:End	0.000	10.512	1.809	10.667
NESC Extreme	Clamp5	Clamp	Davit5:End	0.000	0.000	-0.000	0.000
NESC Extreme	Clamp6	Clamp	Davit6:End	0.000	10.512	1.809	10.667
NESC Extreme	Clamp7	Clamp	Davit7:End	0.000	0.000	-0.000	0.000
NESC Extreme	Clamp8	Clamp	Davit8:End	0.000	10.512	1.809	10.667
NESC Extreme	Clamp9	Clamp	10246:WVGD1	0.000	0.084	0.031	0.090
NESC Extreme	Clamp10	Clamp	10246:WVGD2	0.000	0.169	0.062	0.180
NESC Extreme	Clamp11	Clamp	10246:WVGD3	0.000	0.169	0.062	0.180
NESC Extreme	Clamp12	Clamp	10246:WVGD4	0.000	0.169	0.062	0.180
NESC Extreme	Clamp13	Clamp	10246:WVGD5	0.000	0.169	0.062	0.180
NESC Extreme	Clamp14	Clamp	10246:WVGD6	0.000	0.169	0.062	0.180
NESC Extreme	Clamp15	Clamp	10246:WVGD7	0.000	0.169	0.062	0.180
NESC Extreme	Clamp16	Clamp	10246:WVGD8	0.000	0.169	0.062	0.180
NESC Extreme	Clamp17	Clamp	10246:WVGD9	0.000	0.169	0.062	0.180
NESC Extreme	Clamp18	Clamp	10246:WVGD10	0.000	0.169	0.062	0.180
NESC Extreme	Clamp21	Clamp	10246:TopConn	0.000	4.056	0.000	4.056
NESC Extreme	Clamp22	Clamp	10246:BotConT	0.000	6.237	0.000	6.237
NESC Extreme	Clamp23	Clamp	10246:BotConn	0.000	-0.702	1.956	2.078
NESC Extreme	Clamp24	Clamp	10246:BotConB	0.000	-6.237	0.000	6.237

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	35.637	0.000	20.277	3333.961	-0.000
NESC Extreme	39.693	0.000	8.302	3582.100	-0.000

*** Weight of structure (lbs):
Weight of Tubular Davit Arms: 5553.7
Weight of Steel Poles: 31359.1
Total: 36912.8

*** End of Report

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Subject:	Anchor Bolt Analysis CL&P Pole #10246
Location:	Brookfield, CT
Rev. 1: 1/24/11	Prepared by: T.J.L. Checked by: C.F.C. Job No. 10151.CO3

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tensile Force = $T_{Max} := 112 \cdot kips$ (User Input from PLS-Pole)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts = $N := 24$ (User Input)

Bolt "Column" Distance = $l := 3.0 \cdot in$ (User Input)

Bolt Ultimate Strength = $F_u := 100 \cdot ksi$ (User Input)

Bolt Yeild Strength= $F_y := 75 \cdot ksi$ (User Input)

Bolt Modulus = $E := 29000 \cdot ksi$ (User Input)

Diameter of Anchor Bolts = $D := 2.25 \cdot in$ (User Input)

Threads per Inch = $n := 4.5$ (User Input)

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Bolt Tension Check:

Allowable Tensile Force (Net Area) = $T_{ALL.Net} := 1.0 \cdot \left(A_n \cdot F_y\right) = 243.576 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} = 45.98 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Net}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

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Subject: CAISSON FOUNDATION - CL&P POLE # 10246

Location: Brookfield, CT

Rev. 1: 2/3/11

Prepared by: TJL Checked by: C.F.C.
Job No. 10151.CO3

Caisson Foundation:

Input Data:

Shear Force =	$S := 52.5 \cdot 1.1k = 57.8\,k$	*USER INPUT-FROM PLS-Pole*
Overturning Moment =	$M := 4235 \cdot 1.1ft \cdot k = 4659ft \cdot k$	*USER INPUT-FROM PLS-Pole*
Applied Axial Load =	$A1 := 41.0 \cdot 1.1k = 45.1\,k$	*USER INPUT-FROM PLS-Pole*
Bending Moment =	$Mu := 4843ft \cdot k$	*USER INPUT--FROM LPILE*
Moment Capacity =	$Mn := 12030ft \cdot k$	*USER INPUT--FROM LPILE*
Foundation Diameter =	$d := 8.0ft$	*USER INPUT*
Overall Length of Caisson =	$L_c := 20.5ft$	*USER INPUT*
Depth From Top of Caisson to Grade =	$L_{pag} := 0.5ft$	*USER INPUT*
Number of Rebar =	$n := 39$	*USER INPUT*
Area of Rebar =	$Ar := 1.56in^2$	*USER INPUT*
Rebar Yield Strength =	$fy := 60ksi$	*USER INPUT*
Concrete Comp Strength =	$f'c := 3ksi$	*USER INPUT*

Check Foundation Depth:

Depth of Caisson Below Ground Level = $LD := L_c - L_{pag} = 20ft$ (TIA/EIA-222-F 7.2.5)

Depth Required = $$LD1 := 2.0ft + \left(\frac{S \cdot ft^2}{3k \cdot d}\right) + 2ft^{.5}\left(\frac{M \cdot ft}{3 \cdot k\,d} + \frac{S \cdot ft}{2k} + \frac{S^2 ft^3}{18k^2 d^2}\right)^{.5} = 34.46ft$$

DepthCheck := if(LD1 ≤ LD,"OK" ,"NO GOOD")

DepthCheck = "NO GOOD"

Note: Result not applicable. Actual soil is better than normal soil as defined in TIA/EIA 222 F. Refer to L-Pile analysis.

Check Moment Capacity:

Factor of Safety = $FS := \frac{Mn}{Mu} = 2.5$

Factor of Safety Required = $FS_{reqd} := 1.3$

FOSCheck := if$(FS \ge FS_{reqd}$,"OK" ,"NO GOOD")

FOSCheck = "OK"

Check Axial Capacity:

Concrete Weight = $A2 := .150 \frac{k}{ft^3} \cdot LD \cdot \pi \frac{d^2}{4} = 150.8 \cdot kips$

Total Axial Load = $AT := A1 + A2 = 195.9 \cdot kips$

Area of Concrete = $Ag := \pi \cdot \frac{d^2}{4} = 50.27ft^2$

Axial Capacity = $Po := n \cdot Ar \cdot fy + (Ag - n \cdot Ar) \cdot 0.85 \cdot f'c = 21952.7 \cdot kips$

AxialCheck := if(AT ≤ Po,"OK" ,"NO GOOD")

AxialCheck = "OK"

==

LPILE Plus for Windows, Version 5.0 (5.0.39)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

==

This program is licensed to:

Staff
Natcomm, Inc.

```
Path to file locations:      J:\Jobs\1015100.WI\C03 - CT33XC525\Rev
(1)\Calcs\MathCAD\Foundation\Not Reinforced\
Name of input data file:     10246 Caisson Analysis.lpd
Name of output file:         10246 Caisson Analysis.lpo
Name of plot output file:    10246 Caisson Analysis.lpp
Name of runtime file:        10246 Caisson Analysis.lpr
```

Time and Date of Analysis

Date: January 24, 2011   Time: 9:14:04

Problem Title

CT33XC525 - CL&P # 10246

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment
  Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 100

- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 8

Pile Structural Properties and Geometry

Pile Length = 246.00 in

Depth of ground surface below top of pile = 6.00 in

Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	96.00000000	4169220.	7238.2000	3600000.
2	246.0000	96.00000000	4169220.	7238.2000	3600000.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of moment of inertia and modulus of are not used for any computations other than total stress due to combined axial loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 3 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 6.000 in
Distance from top of pile to bottom of layer = 126.000 in
p-y subgrade modulus k for top of soil layer = 54.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 98.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 126.000 in
Distance from top of pile to bottom of layer = 186.000 in
p-y subgrade modulus k for top of soil layer = 98.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 130.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 186.000 in
Distance from top of pile to bottom of layer = 246.000 in
p-y subgrade modulus k for top of soil layer = 130.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 130.000 lbs/in**3

(Depth of lowest layer extends .00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 6 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	6.00	.06700
2	126.00	.07000
3	126.00	.07000
4	186.00	.07300
5	186.00	.07300
6	246.00	.07300

Shear Strength of Soils

Shear strength parameters with depth defined using 6 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	6.000	.00000	33.00	------	------
2	126.000	.00000	35.00	------	------
3	126.000	.00000	35.00	------	------
4	186.000	.00000	37.00	------	------
5	186.000	.00000	37.00	------	------
6	246.000	.00000	37.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 57794.000 lbs
Bending moment at pile head = 55907676.000 in-lbs
Axial load at pile head = 45122.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

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Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 96.0000 in

Material Properties:

Compressive Strength of Concrete	=	3.000	kip/in**2
Yield Stress of Reinforcement	=	60.	kip/in**2
Modulus of Elasticity of Reinforcement	=	29000.	kip/in**2
Number of Reinforcing Bars	=	39	
Area of Single Bar	=	1.56000	in**2
Number of Rows of Reinforcing Bars	=	39	
Area of Steel	=	60.840	in**2
Area of Shaft	=	7238.229	in**2
Percentage of Steel Reinforcement	=	.841	percent
Cover Thickness (edge to bar center)	=	4.000	in

Unfactored Axial Squash Load Capacity = 21952.74 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	1.560	43.964
2	1.560	43.679
3	1.560	43.111
4	1.560	42.263
5	1.560	41.141
6	1.560	39.752
7	1.560	38.105
8	1.560	36.211
9	1.560	34.083
10	1.560	31.733
11	1.560	29.177
12	1.560	26.433
13	1.560	23.516
14	1.560	20.448
15	1.560	17.247
16	1.560	13.933
17	1.560	10.530
18	1.560	7.058
19	1.560	3.541
20	1.560	0.000
21	1.560	-3.541
22	1.560	-7.058
23	1.560	-10.530
24	1.560	-13.933
25	1.560	-17.247
26	1.560	-20.448
27	1.560	-23.516
28	1.560	-26.433
29	1.560	-29.177

30	1.560	-31.733
31	1.560	-34.083
32	1.560	-36.211
33	1.560	-38.105
34	1.560	-39.752
35	1.560	-41.141
36	1.560	-42.263
37	1.560	-43.111
38	1.560	-43.679
39	1.560	-43.964

Axial Thrust Force = 45122.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
9243665.	1.478986E+13	6.250000E-07	.00003197	51.15403891	98.15264830	854.02018
18382019.	1.470562E+13	.00000125	.00006206	49.64973307	188.68370	1653.50928
27419696.	1.462384E+13	.00000188	.00009221	49.18090010	277.69353	2454.77112
36352245.	1.454090E+13	.00000250	.00012233	48.93000269	364.87325	3254.83810
36352245.	1.163272E+13	.00000313	.00008255	26.41730261	245.89072	5940.19808
36352245.	9.693932E+12	.00000375	.00009775	26.06760550	289.68652	7166.26726
36352245.	8.309085E+12	.00000438	.00011298	25.82291651	333.12753	8391.69005
36352245.	7.270449E+12	.00000500	.00012822	25.64389372	376.21238	9616.46122
36352245.	6.462621E+12	.00000563	.00014377	25.55887556	419.75247	10832.38746
36352245.	5.816359E+12	.00000625	.00015904	25.44707251	462.07223	12056.25037
36352245.	5.287599E+12	.00000688	.00017434	25.35917044	504.03670	13279.40088
36352245.	4.846966E+12	.00000750	.00018967	25.28922129	545.64433	14501.83308
36352245.	4.474123E+12	.00000813	.00020502	25.23310518	586.89349	15723.54153
36352245.	4.154542E+12	.00000875	.00022039	25.18788958	627.78278	16944.51818
36352245.	3.877573E+12	.00000938	.00023579	25.15141153	668.31044	18164.75838
36352245.	3.635225E+12	.00001000	.00025122	25.12206030	708.47500	19384.25413
36674877.	3.451753E+12	.00001063	.00026667	25.09859419	748.27468	20603.00051
38741445.	3.443684E+12	.00001125	.00028215	25.08006048	787.70804	21820.98834
40805049.	3.436215E+12	.00001188	.00029766	25.06569242	826.77318	23038.21347
42865679.	3.429254E+12	.00001250	.00031319	25.05489206	865.46866	24254.66615
44923303.	3.422728E+12	.00001313	.00032874	25.04716158	903.79253	25470.34187
46977907.	3.416575E+12	.00001375	.00034433	25.04210615	941.74325	26685.23114

49029458.	3.410745E+12	.00001438	.00035994	25.03938818	979.31884	27899.32925
51077945.	3.405196E+12	.00001500	.00037558	25.03873873	1016.51775	29112.62608
53123337.	3.399894E+12	.00001563	.00039125	25.03992319	1053.33804	30325.11546
55165612.	3.394807E+12	.00001625	.00040694	25.04274702	1089.77793	31536.78934
57204747.	3.389911E+12	.00001688	.00042267	25.04704428	1125.83555	32747.63981
59240709.	3.385183E+12	.00001750	.00043842	25.05266905	1161.50887	33957.66079
61273489.	3.380606E+12	.00001813	.00045420	25.05950689	1196.79630	35166.84024
63303043.	3.376162E+12	.00001875	.00047001	25.06744337	1231.69553	36375.17445
65329366.	3.371838E+12	.00001938	.00048586	25.07639551	1266.20499	37582.65028
67352410.	3.367621E+12	.00002000	.00050173	25.08627462	1300.32231	38789.26395
69372167.	3.363499E+12	.00002063	.00051763	25.09701777	1334.04577	39995.00271
71388599.	3.359463E+12	.00002125	.00053356	25.10855913	1367.37314	41199.86012
73401678.	3.355505E+12	.00002188	.00054952	25.12084436	1400.30234	42403.82727
75411383.	3.351617E+12	.00002250	.00056551	25.13382769	1432.83136	43606.89357
77417675.	3.347791E+12	.00002313	.00058154	25.14746332	1464.95790	44809.05177
79420536.	3.344023E+12	.00002375	.00059759	25.16171694	1496.67995	46010.29005
81419934.	3.340305E+12	.00002438	.00061368	25.17655420	1527.99528	47210.59906
85408216.	3.333004E+12	.00002563	.00064595	25.20785952	1589.39661	49608.39166
89382268.	3.325852E+12	.00002688	.00067836	25.24117327	1649.14345	52002.34930
93341832.	3.318821E+12	.00002813	.00071090	25.27632952	1707.21675	54392.38891
97286654.	3.311886E+12	.00002938	.00074358	25.31319952	1763.59711	56778.41978
1.012165E+08	3.305027E+12	.00003063	.00077640	25.35167456	1818.26422	59160.35211
1.047563E+08	3.286472E+12	.00003188	.00080826	25.35721064	1869.41126	60000.00000
1.075318E+08	3.246245E+12	.00003313	.00083801	25.29831934	1915.37847	60000.00000
1.098847E+08	3.196647E+12	.00003438	.00086656	25.20897532	1957.92797	60000.00000
1.119671E+08	3.142937E+12	.00003563	.00089434	25.10429621	1997.87379	60000.00000
1.138271E+08	3.086836E+12	.00003688	.00092147	24.98906565	2035.50439	60000.00000
1.155119E+08	3.029820E+12	.00003813	.00094808	24.86776686	2071.09828	60000.00000
1.170559E+08	2.972847E+12	.00003938	.00097428	24.74355555	2104.86667	60000.00000
1.184238E+08	2.915048E+12	.00004063	.00099989	24.61259794	2136.65967	60000.00000
1.197195E+08	2.858973E+12	.00004188	.00102529	24.48464727	2167.02897	60000.00000
1.208983E+08	2.803440E+12	.00004313	.00105031	24.35506010	2195.78147	60000.00000
1.220031E+08	2.749366E+12	.00004438	.00107509	24.22745562	2223.14609	60000.00000

1.230201E+08	2.696331E+12	.00004563	.00109957	24.10025740	2249.08579	60000.00000
1.237479E+08	2.639955E+12	.00004688	.00112500	23.99999857	2274.93134	60000.00000
1.249302E+08	2.595952E+12	.00004813	.00115125	23.92205286	2300.42826	60000.00000
1.257866E+08	2.547577E+12	.00004938	.00117476	23.79256296	2322.11306	60000.00000
1.265625E+08	2.500001E+12	.00005063	.00119790	23.66220903	2342.48249	60000.00000
1.272874E+08	2.453734E+12	.00005188	.00122083	23.53413248	2361.72071	60000.00000
1.280087E+08	2.409576E+12	.00005313	.00124382	23.41315413	2380.06954	60000.00000
1.286627E+08	2.366211E+12	.00005438	.00126648	23.29164076	2397.22239	60000.00000
1.292681E+08	2.323921E+12	.00005563	.00128892	23.17160368	2413.30129	60000.00000
1.298702E+08	2.283431E+12	.00005688	.00131141	23.05780077	2428.52385	60000.00000
1.304689E+08	2.244625E+12	.00005813	.00133396	22.94983721	2442.88351	60000.00000
1.309717E+08	2.205838E+12	.00005938	.00135594	22.83682966	2455.99625	60000.00000
1.314698E+08	2.168573E+12	.00006063	.00137796	22.72916079	2468.27635	60000.00000
1.319648E+08	2.132764E+12	.00006188	.00140003	22.62669611	2479.72487	60000.00000
1.324567E+08	2.098324E+12	.00006313	.00142215	22.52913523	2490.33559	60000.00000
1.328921E+08	2.064343E+12	.00006438	.00144393	22.42996359	2499.92511	60000.00000
1.337751E+08	2.038477E+12	.00006563	.00147000	22.40000010	2510.37864	60000.00000
1.337845E+08	2.000516E+12	.00006688	.00149277	22.32178545	2518.46394	60000.00000
1.341734E+08	1.969518E+12	.00006813	.00151385	22.22159243	2525.10356	60000.00000
1.345596E+08	1.939598E+12	.00006938	.00153497	22.12575388	2530.97330	60000.00000
1.349194E+08	1.910363E+12	.00007063	.00155593	22.03085661	2536.01476	60000.00000
1.352316E+08	1.881483E+12	.00007188	.00157651	21.93400240	2540.20815	60000.00000
1.355413E+08	1.853557E+12	.00007313	.00159713	21.84113646	2543.66392	60000.00000
1.358487E+08	1.826537E+12	.00007438	.00161781	21.75206423	2546.37646	60000.00000
1.364559E+08	1.775036E+12	.00007688	.00165931	21.58458281	2549.54894	60000.00000
1.369918E+08	1.725881E+12	.00007938	.00170040	21.42231131	2546.92312	60000.00000
1.374617E+08	1.678922E+12	.00008188	.00174107	21.26502657	2544.56227	60000.00000
1.379261E+08	1.634680E+12	.00008438	.00178195	21.11943769	2548.45187	60000.00000
1.383848E+08	1.592918E+12	.00008688	.00182304	20.98458338	2549.97750	60000.00000
1.387832E+08	1.552819E+12	.00008938	.00186374	20.85303926	2544.75782	60000.00000
1.389397E+08	1.512269E+12	.00009188	.00191100	20.79999876	2544.40492	60000.00000
1.395854E+08	1.479051E+12	.00009438	.00195423	20.70708132	2548.23345	60000.00000
1.399177E+08	1.444311E+12	.00009688	.00199350	20.57806063	2549.82666	60000.00000

1.402447E+08	1.411267E+12	.00009938	.00203301	20.45792627	2547.16685	60000.00000
1.405339E+08	1.379474E+12	.00010188	.00207211	20.33971453	2542.06216	60000.00000
1.407828E+08	1.348817E+12	.00010438	.00211065	20.22177458	2541.55226	60000.00000
1.410298E+08	1.319577E+12	.00010688	.00214931	20.11047506	2545.43098	60000.00000
1.412749E+08	1.291656E+12	.00010938	.00218809	20.00537539	2548.13745	60000.00000
1.415180E+08	1.264965E+12	.00011188	.00222699	19.90608644	2549.65417	60000.00000
1.417583E+08	1.239417E+12	.00011438	.00226606	19.81254816	2548.91149	60000.00000
1.419897E+08	1.214885E+12	.00011688	.00230523	19.72389364	2544.49652	60000.00000
1.421707E+08	1.190959E+12	.00011938	.00234341	19.63066435	2540.25510	60000.00000
1.423508E+08	1.168006E+12	.00012188	.00238167	19.54194117	2537.09953	60000.00000
1.425299E+08	1.145969E+12	.00012438	.00242002	19.45746374	2541.25500	60000.00000
1.427079E+08	1.124791E+12	.00012688	.00245846	19.37698603	2544.61754	60000.00000
1.428850E+08	1.104425E+12	.00012938	.00249697	19.30028486	2547.17713	60000.00000
1.430609E+08	1.084822E+12	.00013188	.00253558	19.22715425	2548.92352	60000.00000
1.436089E+08	1.068717E+12	.00013438	.00258000	19.20000029	2549.95439	60000.00000
1.443491E+08	1.054605E+12	.00013688	.00262800	19.20000029	2545.94012	60000.00000
1.443491E+08	1.035689E+12	.00013938	.00267327	19.18038511	2541.15746	60000.00000
1.443491E+08	1.017438E+12	.00014188	.00271106	19.10877657	2537.68590	60000.00000
1.443491E+08	9.998205E+11	.00014438	.00274891	19.04006624	2534.20374	60000.00000
1.443491E+08	9.828023E+11	.00014688	.00278682	18.97410822	2534.79824	60000.00000
1.443491E+08	9.663537E+11	.00014938	.00282562	18.91630697	2538.60926	60000.00000
1.443491E+08	9.504467E+11	.00015188	.00286451	18.86094618	2541.88579	60000.00000
1.443491E+08	9.350548E+11	.00015438	.00290346	18.80785704	2544.61868	60000.00000
1.443491E+08	9.201535E+11	.00015688	.00294250	18.75694513	2546.80085	60000.00000
1.443491E+08	9.057198E+11	.00015938	.00298161	18.70811605	2548.42486	60000.00000
1.443959E+08	8.920208E+11	.00016188	.00302159	18.66620493	2549.51815	60000.00000
1.444601E+08	8.788445E+11	.00016438	.00306173	18.62649679	2549.98354	60000.00000
1.445220E+08	8.660496E+11	.00016688	.00310212	18.58950377	2547.49714	60000.00000
1.445831E+08	8.536272E+11	.00016938	.00314262	18.55423021	2544.25224	60000.00000
1.446212E+08	8.414326E+11	.00017188	.00318193	18.51307154	2541.21570	60000.00000
1.446573E+08	8.295758E+11	.00017438	.00322119	18.47278833	2538.18847	60000.00000
1.447283E+08	8.068479E+11	.00017938	.00329987	18.39649057	2532.10571	60000.00000
1.447795E+08	7.852445E+11	.00018438	.00338048	18.33478117	2526.22015	60000.00000

```
 1.448292E+08  7.647746E+11     .00018938     .00346132    18.27761221
2534.18441   60000.00000
 1.448775E+08  7.453505E+11     .00019438     .00354242    18.22467470
2540.57826   60000.00000
 1.449243E+08  7.268932E+11     .00019938     .00362378    18.17569399
2545.36032   60000.00000
 1.449697E+08  7.093317E+11     .00020438     .00370541    18.13042402
2548.48681   60000.00000
 1.450134E+08  6.926015E+11     .00020938     .00378731    18.08865023
2549.91152   60000.00000
 1.450405E+08  6.765737E+11     .00021438     .00387125    18.05832624
2546.07104   60000.00000
```

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 =
144370.60586 in-kip

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head = 57794.000 lbs
Specified moment at pile head = 55907676.000 in-lbs
Specified axial load at pile head = 45122.000 lbs

Non-zero moment for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment)condition.

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Flx. Rig. EI lbs-in**2	Soil Res. p lbs/in	Es*h F/L
0.000	2.317	5.59E+07	57794.	-.014429	649.896	3.39E+12	0.000	0.000
19.680	2.036	5.70E+07	53195.	-.014102	662.901	3.39E+12	-678.155	819.220
39.360	1.762	5.79E+07	29458.	-.013768	672.818	3.39E+12	-1748.185	2440.492
59.040	1.495	5.81E+07	-15961.	-.013430	674.916	3.39E+12	-2872.262	4727.754
78.720	1.234	5.72E+07	-83508.	-.013095	664.209	3.39E+12	-3981.450	7940.124
98.400	.979042	5.47E+07	-1.72E+05	-.012770	635.787	3.40E+12	-4972.810	12495.
118.080	.730773	5.03E+07	-2.78E+05	-.012465	585.262	3.41E+12	-5756.649	19379.
137.760	.488199	4.37E+07	-3.94E+05	-.012193	509.332	3.43E+12	-6041.213	30441.
157.440	.250422	3.48E+07	-5.01E+05	-.012012	407.305	1.46E+13	-4227.744	41531.
177.120	.014450	2.44E+07	-5.48E+05	-.011972	287.053	1.46E+13	-301.892	51393.
196.800	-.220876	1.39E+07	-5.03E+05	-.011946	166.023	1.47E+13	5080.164	56580.
216.480	-.455833	5.36E+06	-3.47E+05	-.011934	67.931	1.48E+13	9948.777	53691.
236.160	-.690642	6.29E+05	-1.27E+05	-.011930	13.476	1.48E+13	12344.	43970.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

```
Pile-head deflection             =     2.31715557 in
Computed slope at pile head      =     -.01442927
Maximum bending moment           =      58122566. lbs-in
Maximum shear force              =  -548406.76572 lbs
Depth of maximum bending moment  =    54.12000000 in
Depth of maximum shear force     =      177.12000 in
Number of iterations             =             31
Number of zero deflection points =              1
```

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

```
Type 1 = Shear and Moment,          y = pile-head displacment in
Type 2 = Shear and Slope,           M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness,  V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment,     S = Pile-head Slope, radians
Type 5 = Deflection and Slope,      R = Rot. Stiffness of Pile-head in-lbs/rad
```

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 57794.	M= 5.59E+07	45122.0000	2.3172	5.8123E+07	-548407.

Computed Pile-head Stiffness Matrix Members
K22, K23, K32, K33 for Superstructure

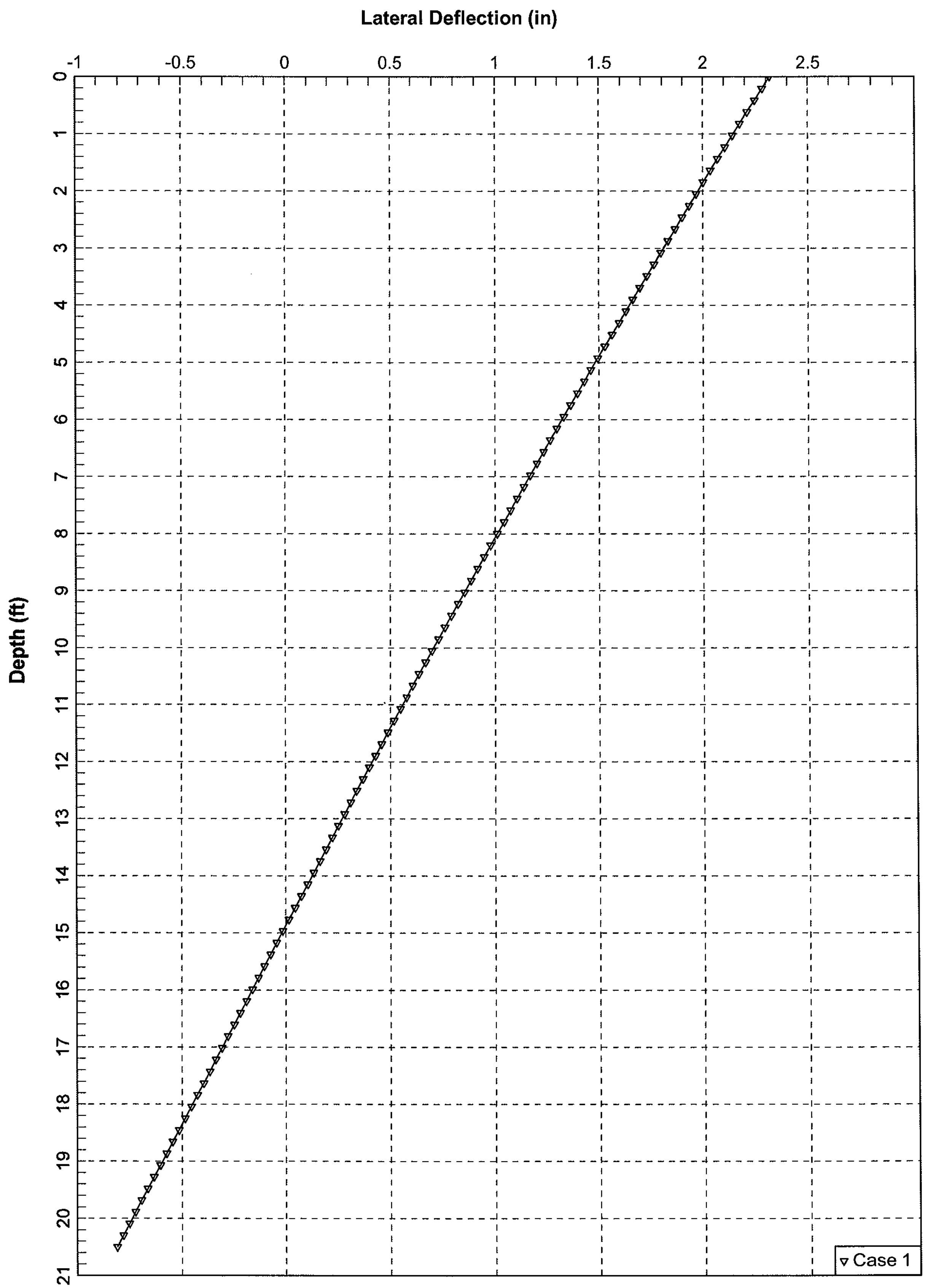
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
.00251523	5779.40009	961828.91985	2297760.	3.824017E+08
.00757160	17397.72757	2895394.	2297760.	3.824017E+08
.01200071	27574.74580	4589090.	2297760.	3.824017E+08
.01514320	34795.45514	5790787.	2297760.	3.824017E+08
.01758072	40396.27243	6722896.	2297760.	3.824017E+08
.01957231	44972.47336	7484484.	2297760.	3.824017E+08
.02125617	48841.59612	8128397.	2297760.	3.824017E+08
.02271481	52193.18271	8686181.	2297760.	3.824017E+08
.02400141	55149.49159	9178180.	2297760.	3.824017E+08
.02515250	57794.00000	9618280.	2297744.	3.823986E+08

Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad

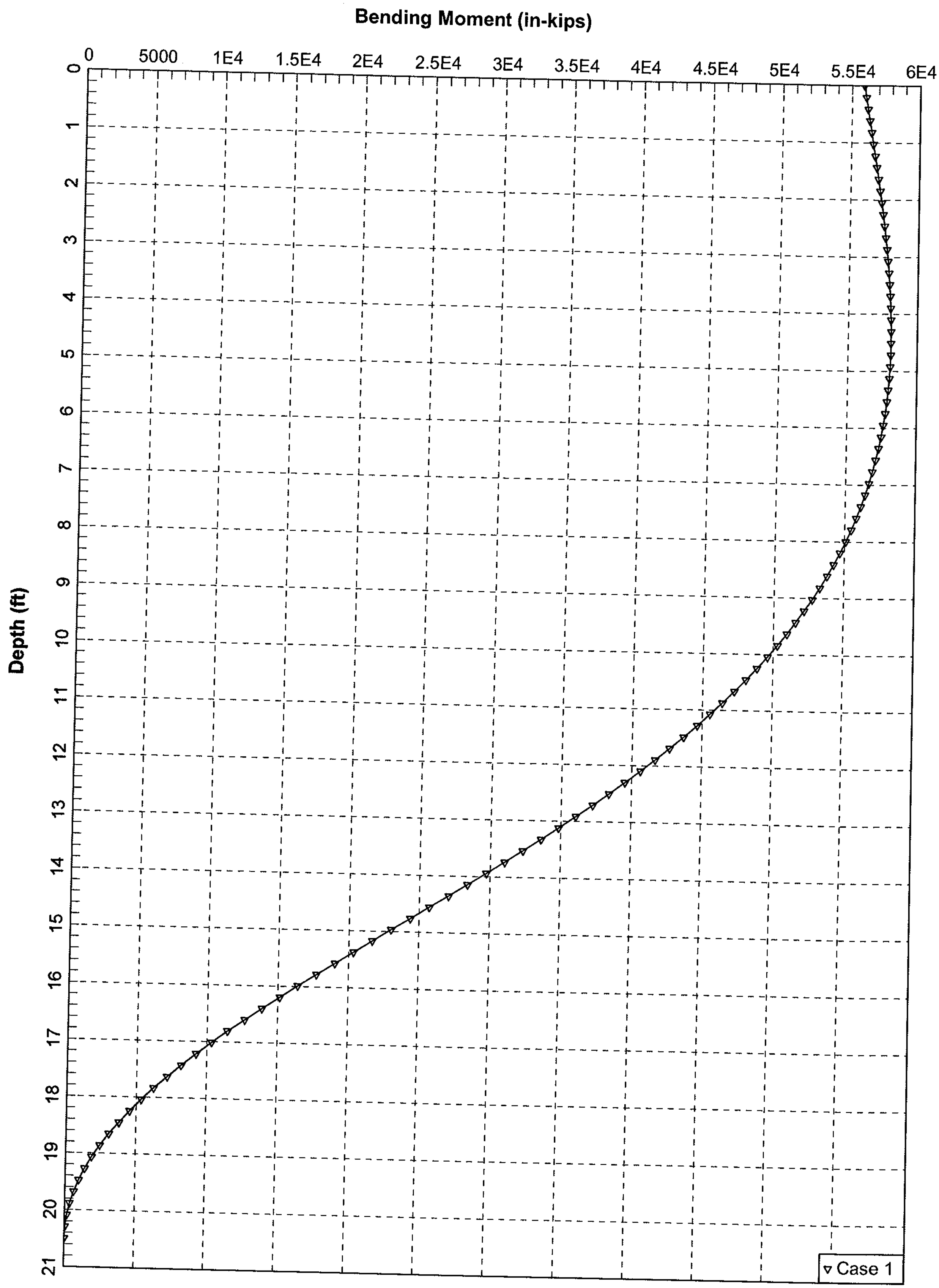
.00007806	29852.09546	5590768.	3.824017E+08	7.161705E+10
.00023521	89865.47895	16829887.	3.820633E+08	7.155230E+10
.00037328	142439.40984	26674741.	3.815850E+08	7.145973E+10
.00047149	179744.35427	33659775.	3.812262E+08	7.139021E+10
.00055313	208687.99774	39077789.	3.772882E+08	7.064895E+10
.00079429	232867.99540	43504628.	2.931772E+08	5.477165E+10
.00096554	253749.96716	47247467.	2.628063E+08	4.893373E+10
.00109451	271923.07883	50489662.	2.484433E+08	4.613002E+10
.00121533	288231.29710	53349481.	2.371629E+08	4.389710E+10
.00130533	302625.88368	55907676.	2.318388E+08	4.283033E+10

K22 = abs(Shear Reaction/Top y)
K23 = abs(Shear Reaction/Top Rotation)
K32 = abs(Moment Reaction/Top y)
K33 = abs(Moment Reaction/Top Rotation)

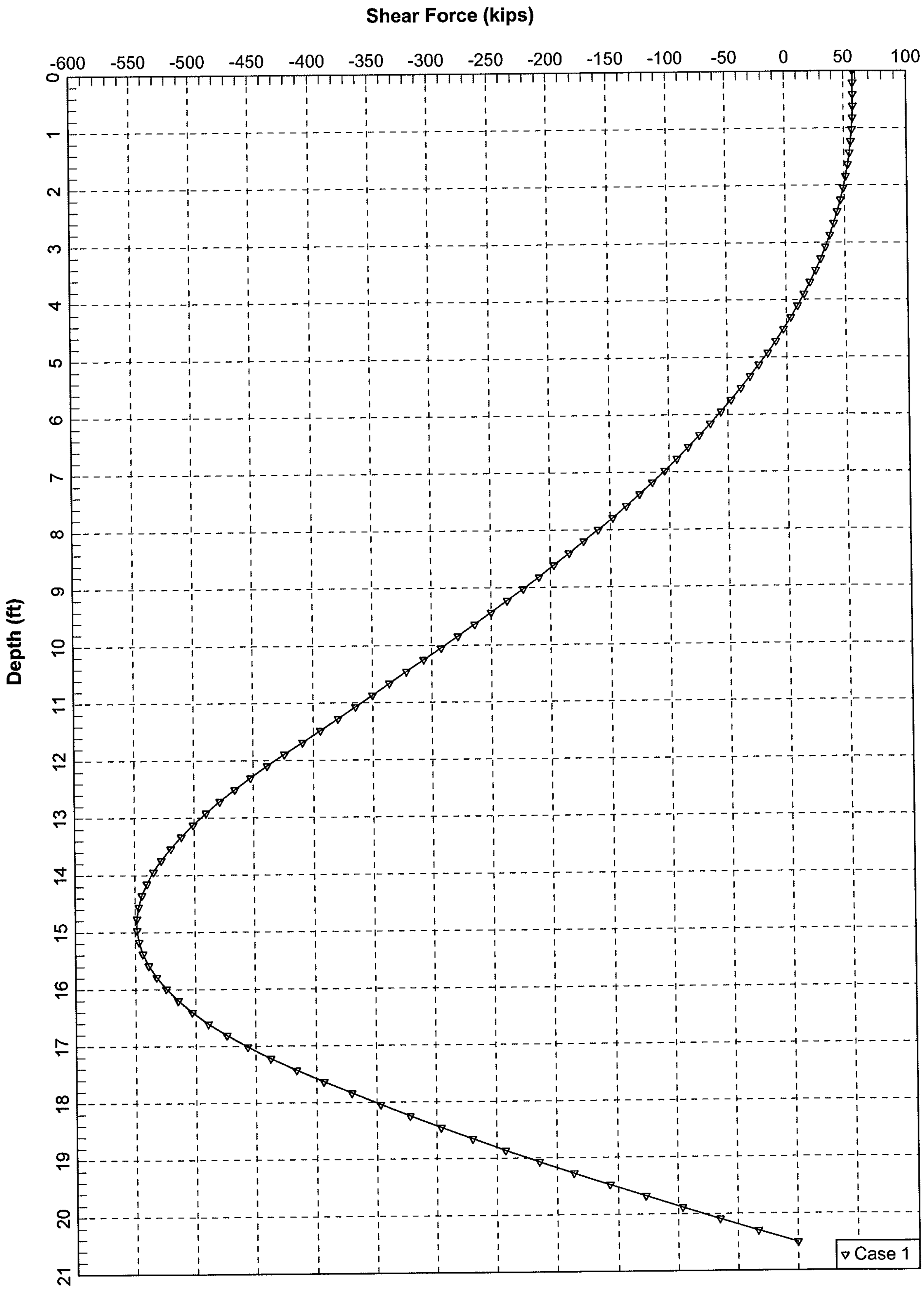
The analysis ended normally.



Lateral Deflection (in)
-1
-0.5
0
0.5
1
1.5
2
2.5
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
Case 1



Bending Moment (in-kips)
0
5000
1E4
1.5E4
2E4
2.5E4
3E4
3.5E4
4E4
4.5E4
5E4
5.5E4
6E4
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
Case 1


Shear Force (kips)
-600
-550
-500
-450
-400
-350
-300
-250
-200
-150
-100
-50
0
50
100
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
Case 1

Track 2 Only EBTS WORKSHEET

Sprint + ERICSSON TAKING YOU FORWARD

Revision and Contact Information:

Date:	7/21/2010
EBTS Issue Number:	Final
CDMA/EV-DO RF Engineer:	Joe Sutherland
iDEN RF Engineer:	
Wi-Max RF Engineer:	
Site Development Engineer:	
Configuration Engineer:	

Consolidation Information (If Required):

Host Site ID (Cascade)	
Donor Site ID (Cascade)	
Donor Site ID (Cascade)	

Site Information: RF to Populate and Site Dev to Verify and Confirm

Existing Site Owner (Landlord Name):		Latitude (Dec):	41.4323
Existing Site Lease Entitlements:		Longitude (Dec):	-73.403
Site Cascade/ID #:	CT33XC525	NAD Projection:	
Site Name:		Type of Structure:	Transmission Tower
Address (Street, City, State and Zip):		No. of Sectors:	1
		Ground Elevation (AMSL) in feet:	
		Structure Height (in feet): (AGL) in feet:	
County/Parish:		Morphology (Majority):	Suburban

Track 2 Project Information: RF to Populate and Site Dev to Verify and Confirm

New Build?	NO	Is this a new build in Track2?
MCPA Install?	YES	Is there an MCPA install required?
Vert Pol Replacement Project?	YES	Is this asset on the Vert Pol RET Replacement Project?
Track 2 Opto work? (Antenna, RAD Change, Sector work, etc...)	NO	Any Capex Opto work approved in Track 2 scheduled for this asset?
Golden BTS?	No	Please indicate if the asset is currently a Golden BTS.
SixMa Conflict?	No	SixMa is the 6 month forward EVDO capacity plan.
BTS Replacement (L2B) Conflict?	No	Legacy BTS Replacement Project
Cool J Conflict?	No	Boost Mobile on CDMA
WiMax (4G) Conflict?	NO	Does the asset have any current or Proposed WiMax equipment?

Detailed Track 2 Project Information:

Site Dev to populate and provide project level work activities for the Vendor/GC in this box

Wi-Max ANTENNA & EBTS SPECIFICATIONS: No WiMAX

iDEN ANTENNA & EBTS SPECIFICATIONS: No iDEN

CDMA ANTENNA & EBTS SPECIFICATIONS:

Sector Level Information	Repeater Donor Info Only		Alpha		Beta		Gamma		Split Sector	
	Current	Proposed	CT33XC525-1	Proposed	CT33XC525-2	Proposed	CT33XC525-3	Proposed	CT33XC525-4	Proposed
Orientation (degrees)	N/A	N/A	20°	20°	240°	240°	310°	310°	#N/A	#N/A
Coaxial Cable Line Length (feet)	N/A	N/A								
Number of Coaxial Cable Runs (quantity)	N/A	N/A								
Coaxial Cable Manufacturer and Size	N/A	N/A								
Cross Band Coupler (Manufacture, Model)	N/A	N/A								
Other Unique Combiner, Splitter, Connector	N/A	N/A								
Number of Cross Band Coupled Coaxial Cables	N/A	N/A								
Antenna Height (Rad Center) in feet	N/A	N/A	132.64	132.64	132.64	132.64	132.64	132.64	#N/A	#N/A
Number of Antennas (quantity) - RET's and Dual Pol only need 1/sector	N/A	N/A	2	1	2	1	2	1		
Antenna Manufacturer	N/A	N/A								
Antenna Model #	N/A	N/A	DB980F65E-M	HBX-6516DS-R2M	DB980F65E-M	HBX-6516DS-R2M	DB980F65E-M	HBX-6516DS-R2M	#N/A	#N/A
Antenna Gain (dBd)	N/A	N/A								
RET Antenna Electrical Downtilt	N/A	N/A		0°		3°		0°		#N/A
RET Antenna Horizontal Setting (if required)	N/A	N/A								
RET Antenna Vertical Setting (if required)	N/A	N/A								
Mechanical Tilt (degrees) - Non RET Only	N/A	N/A	0°	0°	-3°	0°	0°	0°	#N/A	#N/A
MCPA on Sector (Yes / No)	N/A	N/A		NO		YES		YES		
Type of MCPA System (Balanced Link Only)						CCI MCPA - 200W		CCI MCPA - 200W		
Expected Balanced Link Gain Improvement from MCPA	N/A	N/A				6		6		
Type of Reverse Link Mercury Equipment TTA/LNA (Type)						CCI - TMA		CCI - TMA		

**Antennas should be ordered with 7/16-DIN Female connector, unless stated otherwise.

CDMA BTS Carrier and Port Configuration Information

Total Number of Carriers	Number of Voice Carriers	Number of DO Carriers	Is Port 0 TX/RX or RX?	Is Port 1 TX/RX or RX?	What is the Carrier Port Configuration?	
5	3	2	TX/RX	TX/RX	Port 0 (3), Port 1 (2)	Example only
2	1	1				Enter current config on this line
						Enter future config on this line (if changing)

CDMA/EVDO Cell Level Information	Current	Proposed	Comments
# of T1's (1xRTT, EV-DO)			
Backhaul Type			
BTS equipment Model	MODCELL 3.0		
Repeater Equipment Model			
Back-up Power Type			
Donor site for In-building DAS/Repeater (Yes/No)			
Donor site for Macro Repeater or DAS system (Yes/No)			
GPS Cable Length Need (estimated in feet)			
GPS Antenna Type Need			

CDMA/EVDO Regulatory Analysis Information	Is it Required? Does the MCPA or Opto work install require a NEPA/MEPE recalculation or e911 radius update/add?	Comments
e911		
NEPA/MEPE		

CDMA/EVDO Network Impact	After	Comments
Additional Carrier Need Triggered (Modified Site or Neighbor) (Yes/No)	No	
Additional Channel Element Card Needed (Modified Site or Neighbor)	No	

Specify in the section below any special instructions or notes specific for the site or sector, such as:
Horizontal Seperation between antennas | Antenna Type/Technology/Position | Cable Type/Diameter | Which Cables are Coupled | Lease/Access Issues
Note (if Required): Create design in Visio/Paint and Paste it below.

Alpha/Sector 1	Note any special instructions or configurations:
Beta/Sector 2	Note any special instructions or configurations:
Gamma/Sector 3	Note any special instructions or configurations:

Product Specifications

ANDREW®
A CommScope Company

HBX-6516DS-T2M

DualPol® Antenna, 1710–2180 MHz, 65° horizontal beamwidth, fixed tilt

- Superior azimuth tracking and pattern symmetry to minimize any sector overlap
- Rugged, reliable design with excellent passive intermodulation suppression
- Exceptional upper sidelobe suppression and front-to-back ratio

CHARACTERISTICS

General Specifications

Antenna Type	DualPol®
Brand	DualPol®
Operating Frequency Band	1710 – 2180 MHz

Electrical Specifications

Frequency Band, MHz	**1710–1880**	**1850–1990**	**1920–2180**
Beamwidth, Horizontal, degrees	65	65	65
Gain, dBd	15.8	15.9	16.0
Gain, dBi	17.9	18.0	18.1
Beamwidth, Vertical, degrees	7.8	7.4	7.0
Beam Tilt, degrees	2	2	2
Upper Sidelobe Suppression (USLS), typical, dB	18	18	18
Front-to-Back Ratio at 180°, dB	30	30	30
Isolation, dB	30	30	30
VSWR | Return Loss, db	1.4:1 | 15.6	1.4:1 | 15.6	1.4:1 | 15.6
Intermodulation Products, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power, maximum, watts	300	300	300
Polarization	±45°	±45°	±45°
Impedance, ohms	50	50	50
Lightning Protection	dc Ground	dc Ground	dc Ground

Product Specifications

HBX-6516DS-T2M

Mechanical Specifications

Color	Light gray
Connector Interface	7-16 DIN Female
Connector Location	Bottom
Connector Quantity	2
Wind Loading, maximum	256.8 N @ 150 km/h 57.7 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	83.0 mm | 3.3 in
Length	1306.0 mm | 51.4 in
Width	166.0 mm | 6.5 in
Net Weight	4.5 kg | 9.9 lb

Regulatory Compliance/Certifications

Agency	**Classification**
RoHS 2002/95/EC	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)

INCLUDED PRODUCTS

DB390
Pipe Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members

DB5098
Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members

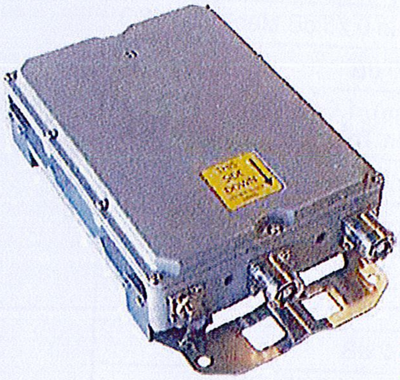
DTMA1819VG 12A

CCI EXTENDING WIRELESS PERFORMANCE

1900 PCS Full-Band AISG Twin Tower Mounted Amplifier

Tel: 201-342-3338 Fax: 201-342-3339 www.cciproducts.com

General Information



CCI's Twin TMA contains two TMA's in a single housing. Each TMA is full band and fully duplexed. High linearity improves the uplink sensitivity and the receive performance of base stations. The TMA is fully compliant with the latest AISG 2.0 specification and supports CDMA, EDGE/GSM and UMTS BTS equipment. It provides a convenient package for sites upgraded to dual or quad antenna configurations. The twin TMA package reduces tower loading, leasing, and installation costs. Unit count on the tower is cut in half . An excellent match for two branch receive diversity applications using dual polarization antennas. The input and output connectors are located inline for ease of installation in space constrained areas such as uni-pole structures and stealth antennas. Gain is remotely adjustable via AISG connection.

Model DTMA1819VG12A

Contents:

Features:

- Adjustable Gain via AISG
- Small, lightweight, twin unit
- AISG 2.0 compliant
- Dual duplexed
- High linearity
- Lightning protected
- High reliability
- Full PCS band

Technical Description

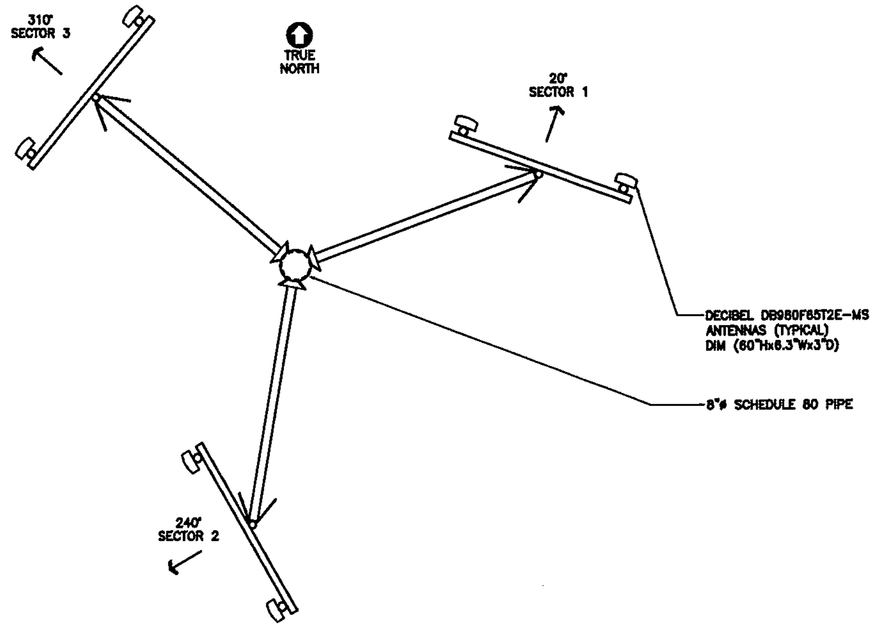
The TMA system consists of a twin outdoor tower mount unit with two antenna inputs. The tower mount unit is dual duplexed to separate the low-power uplink signal from the high-power downlink signal at the antenna port, amplifies the low-level uplink signal using an ultra-low noise amplifier (LNA), and recombines the two paths at the BTS port. The tower mount units consist of six band-pass filters, four redundant low-noise amplifiers, bypass failure circuitry, and bias tee's which are all housed in an IP65 moisture proof enclosure, with IP68 Immersion proof connectors suited to long-life masthead mounting. The unit provides protection against lightning strikes via a multi-stage surge protection circuit. DC power and control is provided via the feeder cable from the BTS using the AISG 2.0 and 3GPP standard. A separate AISG connector is also provided to allow direct AISG connection or "Daisy Chaining" multiple AISG products at the top of the tower.

An optional indoor site control unit (SCU) is available to power up to up to 32 AISG modules per sector and to provide all the monitoring and alarm functions for the system. The SCU is housed in a single (1U) 1.75" x 19" rack and contains dual redundant power supplies capable of being "hot swapped" that provide a regulated DC supply voltage on the RF coax for the tower mount amplifiers.

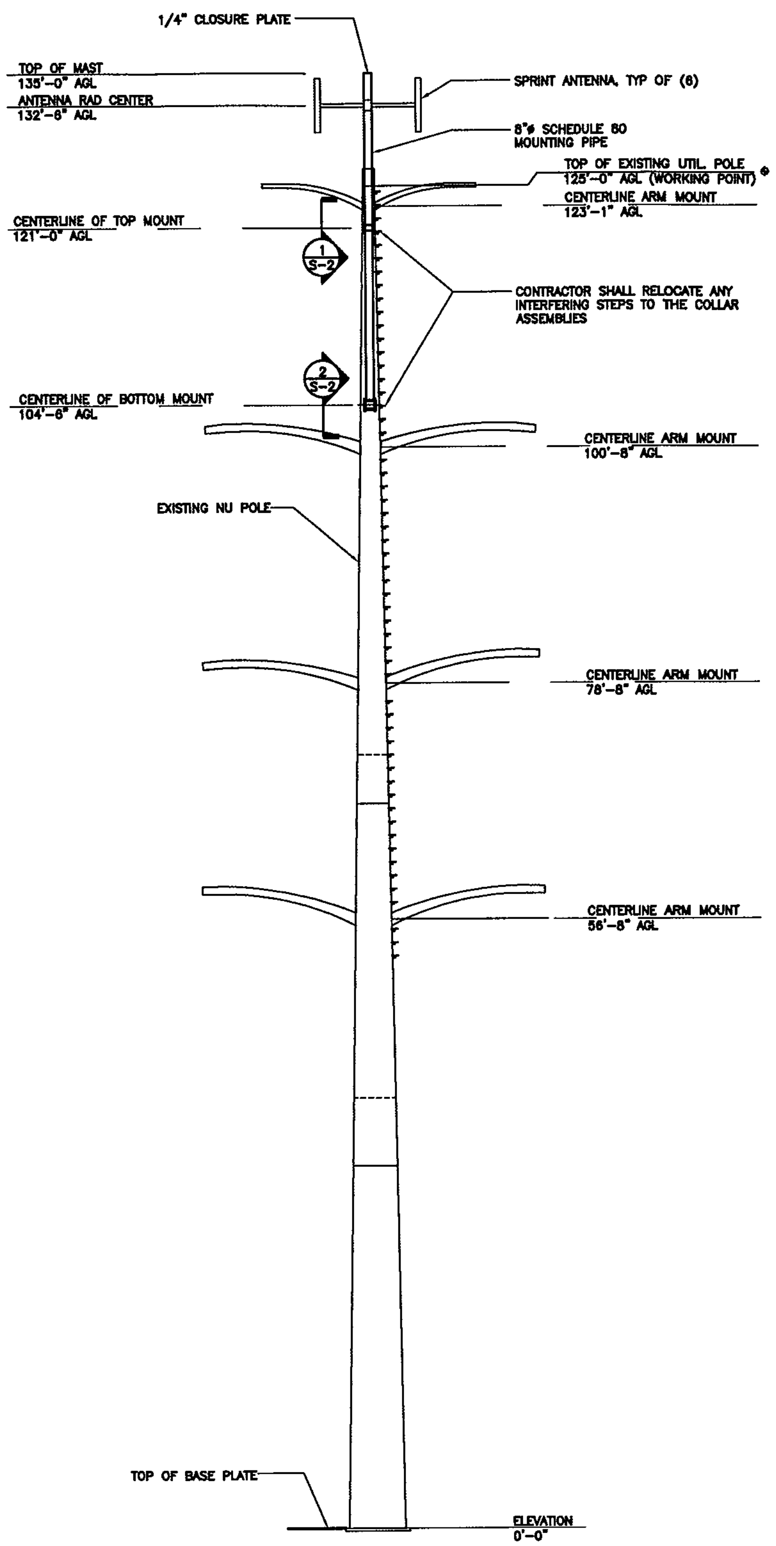
CCI 1900 Full-Band AISG Twin TMA Typical Specifications

Description	Typical Specifications
Electrical Specifications	
Receive Frequency Range	1850 – 1910 MHz
Transmit Frequency Range	1930 - 1990 MHz
Amplifier Gain	6 dB to 12 dB Adjustable in 0.25 dB steps via AISG
Gain Variation	±1.0 dB
System Noise Figure (at Max Gain)	1.4 dB (Room Temp), 1.6 dB @ +65°C At 1910 MHz: 1.7 dB (Room Temp), 1.9 dB @ +65°C
Input Third Order Intercept Point	+12 dBm Min at Max. Gain
Input/Output Return Loss	18 dB Min all ports, 15 dB Bypass Mode
Insertion Loss	
Transmit Passband	0.4 dB
Transmit Passband Ripple	±0.2 dB
Bypass Mode, Rx Passband	1.6 dB (Room Temp), 1.8 dB @ +65°C At 1910 MHz: 2.3 dB (Room Temp), 2.5 dB @ +65°C
Bypass Mode, Rx Passband Ripple	±1 dB
Filter Characteristics	
Continuous Average Power	200 Watts max
Peak Envelope Power	2 KW max
Intermodulation Performance	
IMD at ANT port in Rx Band	-118 dBm (2 tones at +43 dBm)
Operating Voltage	+10V to +30V DC provided via coax or AISG
Power Consumption	<2.1 Watts
Mechanical Specifications	
Connectors	DIN 7-16 Female x 4, AISG x 1
Dimensions (Without Brackets)	10.6" (H) x 7.9" (W) x 2.9" (D)
Dimensions (Including Brackets)	14.3" (H) x 8.3" (W) x 3.2" (D)
Weight	13.3 lbs. Max with Brackets (12.6 lbs. w/o Brackets)
Mounting	Pole/Wall Mounting Bracket
Environmental Specifications	
Operating Temperature	-40° C to +65°C
Enclosure	IP65 (Unit Body), IP68 (Connector)
Lightning Protection	8/20us, ±2KA max, 10 strikes each, IEC61000-4-5
MTBF	>500,000 hours

Communication Components Inc.
Tel: 201-342-3338
Fax: 201-342-3339



2 / S-1 **ANTENNA ORIENTATION**
NOT TO SCALE



1 / S-1 **POLE PROFILE**
SCALE: 1/8"= 1'-0"

GENERAL NOTES:

1. INFORMATION WAS PROVIDED BY THE OWNER (FROM FIELD MEASUREMENTS. AND/OR FROM THE EXISTING MONOPOLE DRAWINGS). IF THE EXISTING CONDITIONS ARE NOT AS REPRESENTED ON THESE DRAWINGS, NATCOMM, LLC. SHOULD BE CONTACTED IMMEDIATELY TO REEVALUATE THE STRUCTURAL INTEGRITY OF THE MONOPOLE.
2. IT IS ASSUMED THAT ANY STRUCTURAL MODIFICATION WORK SPECIFIED ON THESE DRAWINGS WILL BE ACCOMPLISHED BY KNOWLEDGEABLE WORKMEN WITH MONOPOLE CONSTRUCTION EXPERIENCE.
3. THIS DRAWING DOES NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTORS SHALL SUPERVISE AND DIRECT THE WORK AND HE SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES.
4. CONTRACTOR SHALL FIELD VERIFY PLACEMENT OF ALL NEW PIECES FOR: ADEQUATE FIT, CLEARANCE, AND DESIGN INTENT PRIOR TO FABRICATION.
5. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE THE ERECTION PROCEDURE AND SEQUENCE TO INSURE THE STABILITY AND SAFETY OF THE MONOPOLE AND THE ADEQUACY OF TEMPORARY OR INCOMPLETE CONNECTIONS DURING THE CONSTRUCTION.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THIS INCLUDES WHATEVER PROVISIONS NEED TO BE TAKEN TO PROTECT THE PROPERTY IN THE VICINITY OF THE MONOPOLE DURING CONSTRUCTION
7. THE STRUCTURAL ANALYSIS ASSUMES THAT ALL MONOPOLE COMPONENTS ARE IN BRAND-NEW CONDITION. NO ALLOWANCE WAS MADE FOR ANY DAMAGED, MISSING OR RUSTED MEMBERS. IF ANY OF THESE CONDITIONS ARE DISCOVERED THE CONTRACTOR SHALL BRING THEM TO THE ATTENTION OF THE ENGINEER.
8. DURING CONSTRUCTION THE CONTRACTOR SHALL COORDINATE WITH THE ELECTRIC UTILITY COMPANY AND CORDON OFF AREAS BELOW AND AROUND THE WORK TO PREVENT INJURY TO PERSONS AND/OR PROPERTY BELOW. DAMAGE RESULTING FROM THE CONTRACTORS WORK SHALL BE REPAIRED AT THE CONTRACTORS EXPENSE.
9. ALL MATERIAL FABRICATED FROM THESE DRAWINGS SHALL BE FIELD VERIFIED FOR THE EXISTING CONDITIONS AS TO PROPER FIT AND CLEARANCE IN THE FIELD BY THE CONTRACTOR.
10. ALL PARTS ARE TO BE MARKED WITH ITEM NO'S USING 3/4" HIGH STEEL STENCILS.
11. INSPECTION WILL BE PROVIDED BY NORTHEAST UTILITIES.
12. ERECTION BY OTHERS
13. INSERT ALL BOLTS FROM THE THIN MEMBER SIDE OF LAP.
14. THE CONTRACTOR SHALL ROTATE ANTENNA RISER PIPE TO APPROPRIATE MONOPOLE FACE AS TO AVOID INTERFERENCE WITH STEP RUNGS EXTENDING THROUGHOUT MONOPOLE FACES.
15. THE CONTRACTOR SHALL REMOVE STEP RUNGS AND STEP RUNG RECEPTACLES AS TO NOT INTERFERE WITH NEW PIPE CLAMPING COLLAR INSTALLATION. ALL EXPOSED SURFACES SHALL BE CLEANED AND PREPARED FOR REGALVANIZING.
16. THE CONTRACTOR SHALL REGALVANIZE ALL DISTURBED AREAS IN STRICT ACCORDANCE WITH ORIGINAL MONOPOLE FINISH SPECIFICATIONS. GALVANIZING SHALL BE DRY AND INSPECTED BY NORTHEAST UTILITIES PRIOR TO THE INSTALLATION OF THE PIPE CLAMPING COLLARS.
17. THE CONTRACTOR SHALL CUT, ADJUST OR MODIFY THE MONOPOLE TOP PLATE AS TO NOT INTERFERE WITH THE INSTALLATION OF THE ANTENNA RISER PIPE. DO NOT REMOVE TOP PLATE.
18. THE CONTRACTOR SHALL REMOVE AND REPLACE ALL OBSTRUCTIONS (I.E. SIGN AGE, LIFTING LEGS, ETC.) INTERFERING WITH ANTENNA RISER PIPE INSTALLATION AS DIRECTED BY NORTHEAST UTILITIES. FINISH MONOPOLE AS SPECIFIED ABOVE.
19. NO WELDING IS PERMITTED ON THE MONOPOLE WITHOUT WRITTEN PERMISSION FROM NORTHEAST UTILITIES.

STEEL GENERAL NOTES:

1. STEEL (EXCEPT PIPE) SHALL CONFORM TO THE REQUIREMENTS OF THE – STANDARD SPECIFICATION FOR ASTM A36 STRUCTURAL STEEL, FY=36 KSI. (EXCEPT AS NOTED)
2. STEEL PIPE SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR ASTM A53 TYPE E OR S FY=35KSI. PIPE SHALL BE GALVANIZED INSIDE AND OUTSIDE.
3. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF THE ASTM A325 UNLESS NOTED OTHERWISE. ALL HOLES FOR BOLTS SHALL BE 1/16 INCH LARGER THAN THE BOLT DIAMETER WITH AN EDGE DISTANCE OF AT LEAST 1 3/4 TIMES THE BOLT DIAMETER AND A SPACING OF AT LEAST 3 TIMES THE BOLT DIAMETER U.N.O. ALL BOLTS SHALL BE PROVIDED WITH LOCK WASHERS, PALNUTS, OR LOCK NUTS.
4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY A.W.S. D1.1. ALL STEEL SURFACES TO RECEIVE WELD METAL SHALL BE WIRE BRUSHED DOWN TO BARE METAL BEFORE WELDING.
5. ALL STEEL SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION. GALVANIZING SHALL CONFORM TO THE REQUIREMENTS OF THE SPECIFICATION FOR ZINC (HOT-GALVANIZED) COATING ON PRODUCTS FABRICATED FROM ROLLED, PRESSED AND FORGED STEEL SHAPES, PLATES, BARS AND STRIP: ASTM A123. AND THE SPECIFICATION FOR ZINC-COATING (HOT-DIP) ON ASSEMBLED STEEL PRODUCTS. ASTM A386.
6. ALL STEEL FABRICATION AND ERECTION SHALL BE IN ACCORDANCE WITH AISC SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS. (LATEST EDITION)
7. BOLTS SHALL BE GALVANIZED ACCORDING TO THE STANDARD SPECIFICATIONS FOR ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE" ASTM A153.
8. ONLY AFTER WELDING AND INSPECTION IS COMPLETED, SHALL GALVANIZING BE DONE TO ASSEMBLIES.
9. ALL SHOP WELDS SHALL BE INSPECTED BY USING MAGNETIC PARTICLE METHOD.
10. SEE DRAWING S-2 FOR COLLAR ASSEMBLY REQUIREMENTS.

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Mahwah, NJ 07495

NO.	DATE	REVISIONS	BY	CHK	APPV.
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1	10/30/02	ISSUED FOR FINAL CONSTRUCTION	CMS	JJP	CFC
0	10/15/02	ISSUED FOR PRELIMINARY CONSTRUCTION	CMS	JJP	CFC

DRAWN BY: JBA | CHECKED BY: EM | SCALE: AS NOTED | DATE: 08/12/02

PROFESSIONAL ENGINEER SEAL

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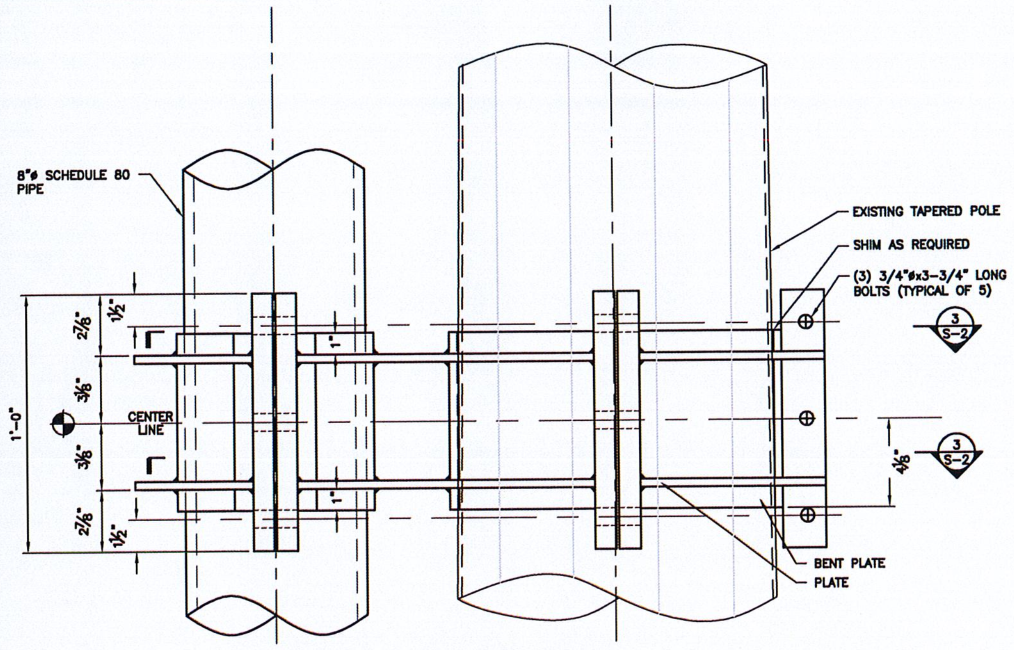
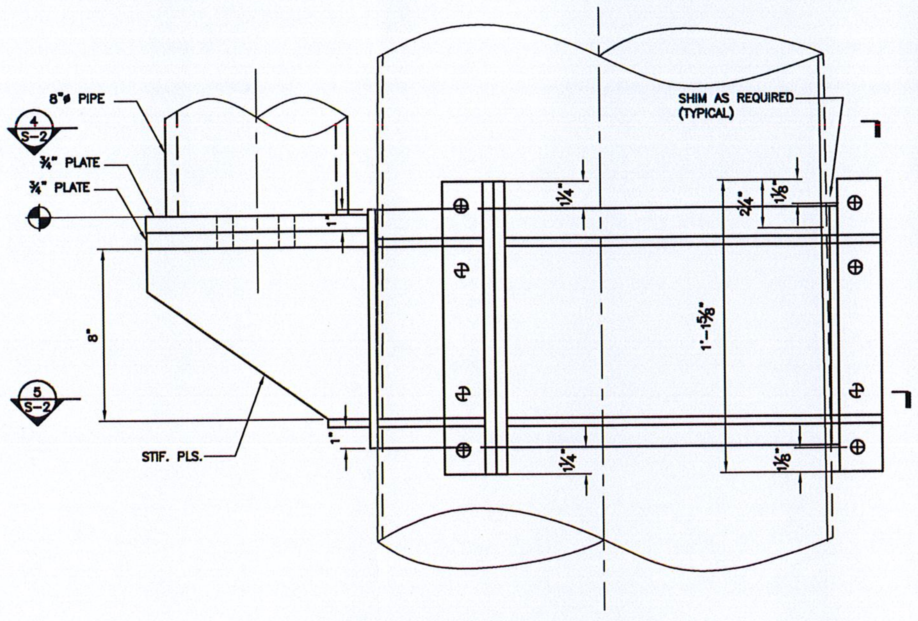
POLE ELEVATION AND NOTES

JOB NO.	DRAWING NUMBER	REV.
519A	S-1	1



1 S-2 TOP CLAMP ASSEMBLY
SCALE: 3"= 1'-0"



2 S-2 SECTION
SCALE: 3"= 1'-0"

COLLAR ASSEMBLY:

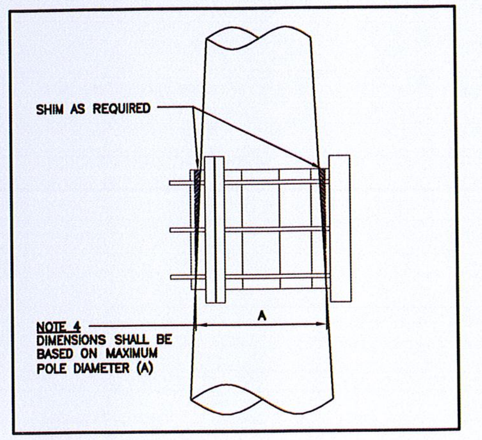
- THE TOP ASSEMBLY AND THE BOTTOM ASSEMBLY SHALL HAVE AN 1/8" GAP BETWEEN THE END PLATE OF EACH ASSEMBLY.
- INSTALL 1/16" AND/OR 1/8" SHIM PACKS BETWEEN THE CLAMPING COLLAR AND POLE AS NEEDED TO MAINTAIN UNIFORM CONTACT AND NO BINDING OR PINCHING OF THE POLE AND THE GAP BETWEEN ASSEMBLED PIECES.
- REPEAT THE FOLLOWING IN 1/4 TORQUE INCREMENTS UNTIL THE FULL TORQUE HAS BEEN ACHIEVED.
- FROM SNUG TIGHT, TORQUE UP THE TOP THREE BOLTS IN AN INCREMENT OF 1/4 THE FULL TORQUE.
- FROM SNUG TIGHT, TORQUE UP THE SECOND FROM THE TOP THREE BOLTS IN AN INCREMENT OF 1/4 THE FULL TORQUE.
- FROM SNUG TIGHT, TORQUE UP THE SECOND FROM THE BOTTOM THREE BOLTS IN AN INCREMENT OF 1/4 THE FULL TORQUE.
- FROM SNUG TIGHT, TORQUE UP THE BOTTOM THREE BOLTS IN AN INCREMENT OF 1/4 THE FULL TORQUE.
- THE CLAMPING COLLAR ASSEMBLY CLAMPING TO THE POLE MUST BE INSTALLED WITH THE PIPE ASSEMBLY IN A TRUE PLUMB (VERTICAL) POSITION WITHOUT ANY SKEW.

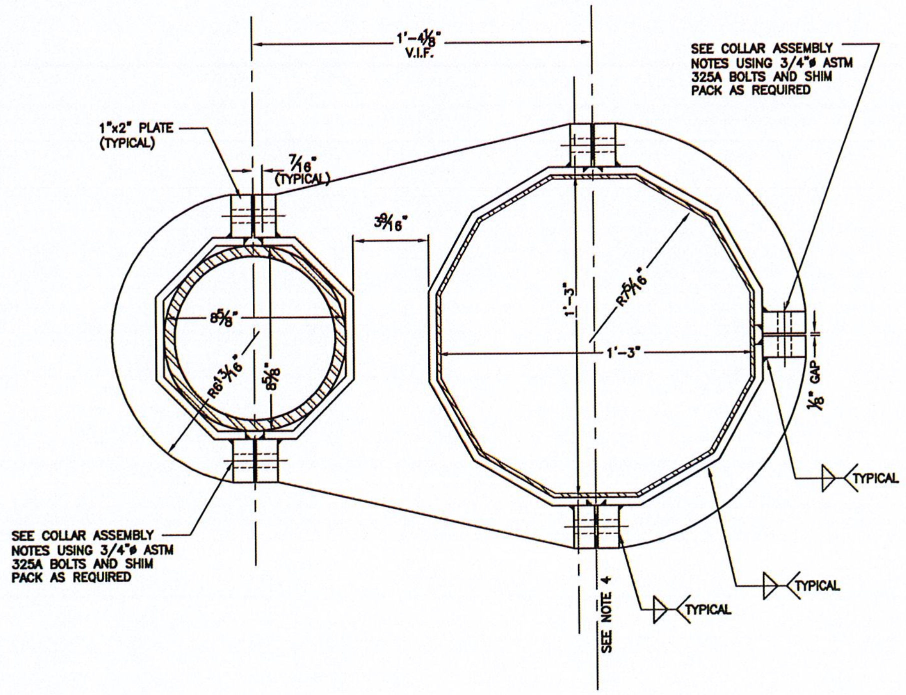
NOTES

1. ALL DIMENSIONS MUST BE FIELD VERIFIED PRIOR TO STEEL FABRICATION
2. ALL WELDS SHALL BE FILLET WELDS SIZE 5/16" U.N.O.
3. ALL PLATE THICKNESS SHALL BE 3/8" U.N.O.

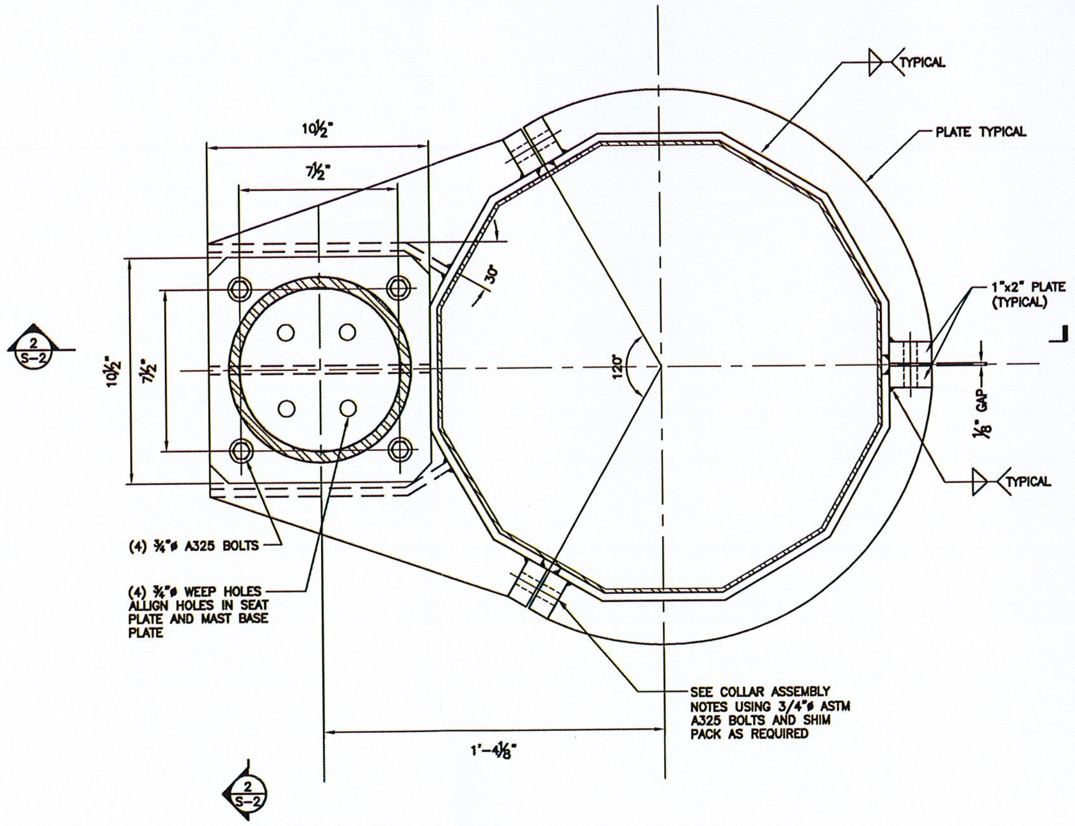
LEGEND

⊕ WORKING POINT

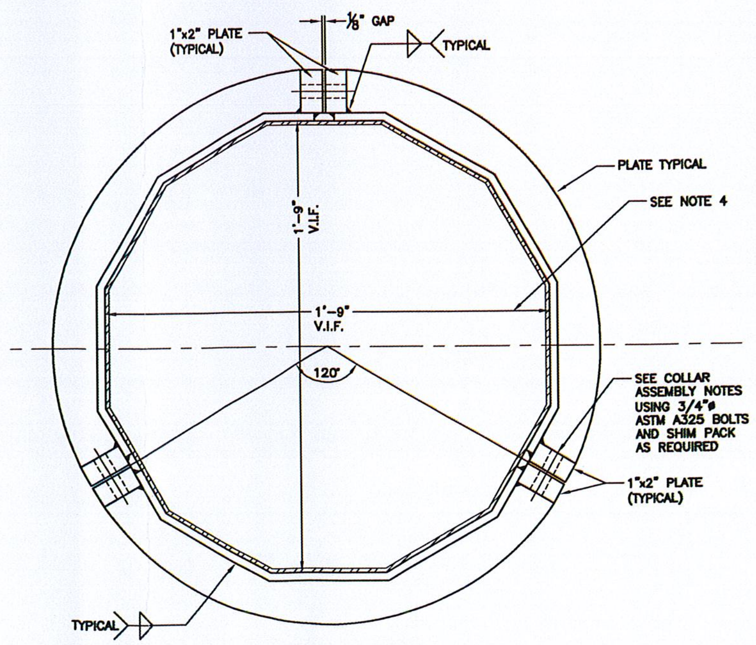




3 S-2 SECTION
SCALE: 3"= 1'-0"



4 S-2 SECTION
SCALE: 3"= 1'-0"



5 S-2 SECTION
SCALE: 3"= 1'-0"

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CONNECTION DETAILS AND SECTIONS

JOB NO.	DRAWING NUMBER	REV.
519A	S-2	1