STRAIN POLE STRUCTURAL CALCULATIONS

SW 44th Ave at SW 20th St.

MAY 2024

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This document has been digitally signed and sealed by:

Nolan B Villatoro
Digitally signed by Nolan B Villatoro
Date: 2024.05.27 17:34:22-04'00'

on the date adjacent to the seal.
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1.0 EXECUTIVE SUMMARY

Kimley-Horn and Associates have been retained to design four new strain poles at the intersection of SW 44th Ave and SW 20th St. Structural analyses for these new strain poles were performed in accordance with the 2024-2025 FDOT Standard Plans. Using Atlas V7.2 to analyze the signal's effect on the spans, a model was run with wind directions at 0, 45, and 90 degrees per FDOT Modification to LRFDTS-1 C4.7. The 90-degree wind direction model controlled for all poles. A Geotech report was provided for this intersection by Geo-Tech, Inc. on January 22, 2022. Table 1 below shows the results of the structural analysis.

For detailed calculations showing all CSR, CD Ratios, and CFIs, see the calculations following this summary. A table is provided to summarize the designs. All ratios are below the 0.95 requirement per FDOT Modification to LRFDTS-1.

The following design standards/codes were used for the analysis:

- 2024 FDOT Design Manual
- AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, First Edition, 2015 (LRFDLTS-1)
- 2024 FDOT Structures Manual Volume 3: FDOT Modifications to LRFDLTS-1, January 2023
- 2024 FDOT Structures Manual, January 2024
- FY 2024-25 Standard Plans for Road Construction

Table 1: Strain Pole Design Summary Table

Pole Name	Pole Type	Pole Length (ft)	Embedment Depth (ft)	Attachment Point Dist.A (ft)	Cat. Wire Dia. (in)	Mes. Wire Dia. (in)
Pole A	P-VIII	52	18	8.0	1/2	1/2
Pole B	P-VIII	52	18	8.0	1/2	1/2
Pole C	P-VIII	52	18	8.0	1/2	1/2
Pole D	P-VIII	52	18	8.0	1/2	1/2

*

2.0 FDOT DESIGN STANDARDS & REFERENCES

GENERAL NOTES:

1. Work these Index Sheets with the Strain Pole Schedule in the Plans. See Index 634-001 for corresponding signal cable and span wire installation details.

2. Shop Drawings:

   This Index is considered fully detailed and no shop drawing are necessary. Submit shop drawings only for minor modifications not detailed in the Plans.

3. Materials:

A. Concrete:	Class V with 4 ksi minimum strength at transfer or Class VI with 6.5 ksi minimum strength at transfer
B. Prestress Strands & Spiral Reinforcing:	Specification 641
C. Hand and coupler cover plates:	Non-corrosive material
D. Screws:	Round headed, chrome plated

4. Fabrication:

   A. Pole Total Taper shown is for pole width, strands, reinforcing and void (0.081 in/ft per face).
   B. Concrete Cover: 1" minimum.
   C. Spiral Reinforcing: Place as shown, and add one turn for splices and two turns at both the tip and butt ends of the pole.
   D. The design dimensions for Front Face (FF) and Back Face (BF) of the poles may vary transversely from the section shown by ± ¼" to assist with removal from forms. Balance addition and subtraction of the face widths to maintain section areas shown.
   E. Tie ground wires to the interior of reinforcing steel to prevent displacement during concreting operations.
   F. Cut the tip end of the prestressed strand either first or simultaneously with the butt end.
   G. Provide cover plates and screws for hand hole and couplers. Attach cover plates to the poles using lead anchors or embedded threaded inserts.
   H. Provide Aluminum Identification Tag on the pole with the following information:

      a. Financial Project ID.
      b. Pole Manufacturer
      c. Standard Pole Type Number
      d. Pole Length (L)

5. Support Points:
   Support Points shown may vary within a tolerance of ±3".

   Horizontal Pole Support Points shown are for strand release, storage, handling and transport of the horizontal pole. Keep Back Face oriented downward until final erection.

6. Two point attachment: Provide an eye bolt hole for the messenger wire.

7. Tether Wire: When required, field-drill the eyebolt hole prior to installation.

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3	Service Pole – Type P-IIB (36 Ft.)
4	Pedestal Pole – Type P-IIC (12 Ft.)
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6	Pole – Type P-III
7	Strain Pole – Type P-IV
8	Strain Pole – Type P-V
9	Strain Pole – Type P-VI
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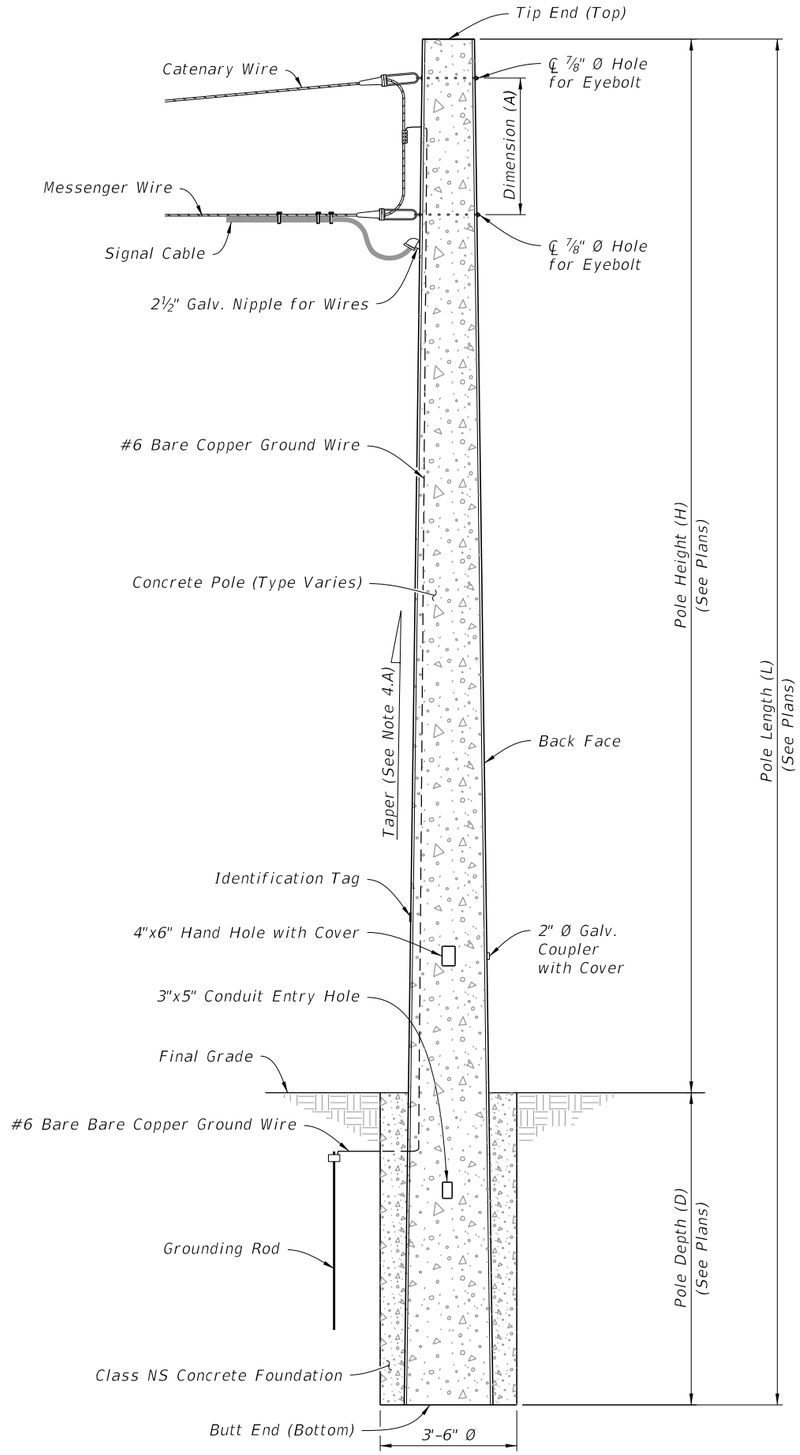

CONCRETE POLE ASSEMBLY
(Type P-VII Shown, Others Similar)

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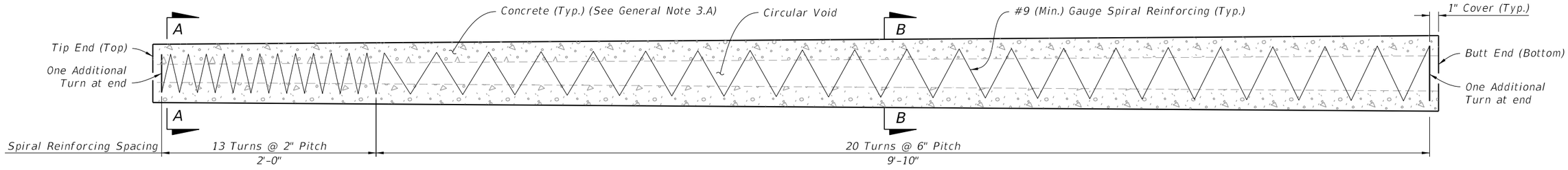

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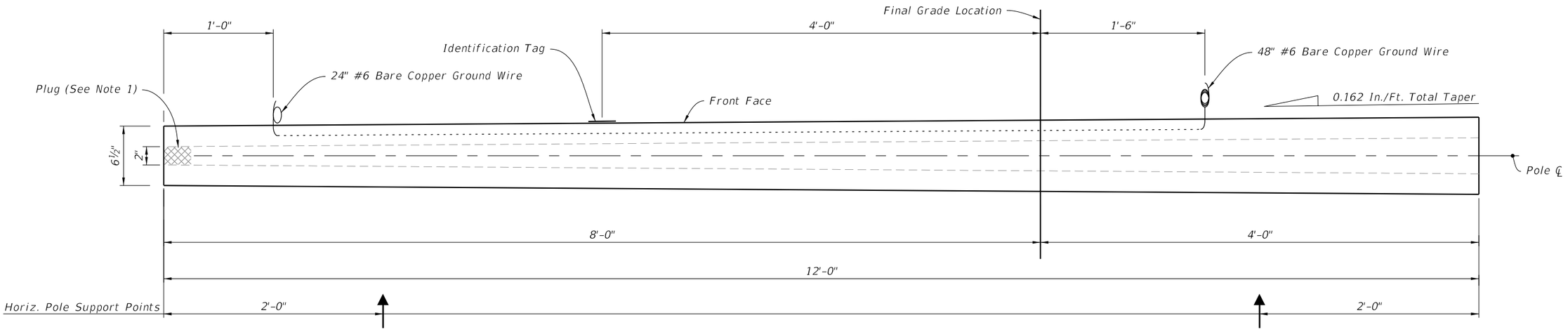

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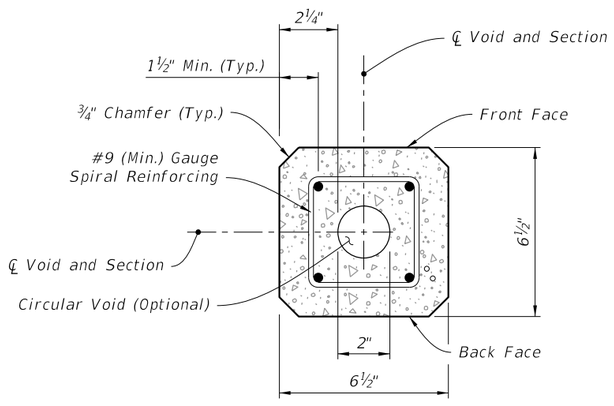
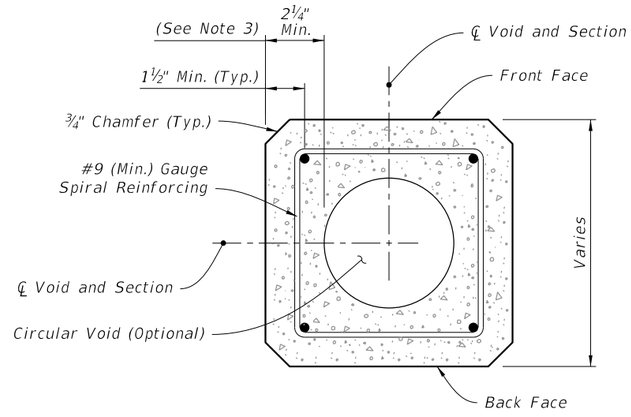


SECTION A-A - (Tip End)



SECTION B-B (Typical Square Section)

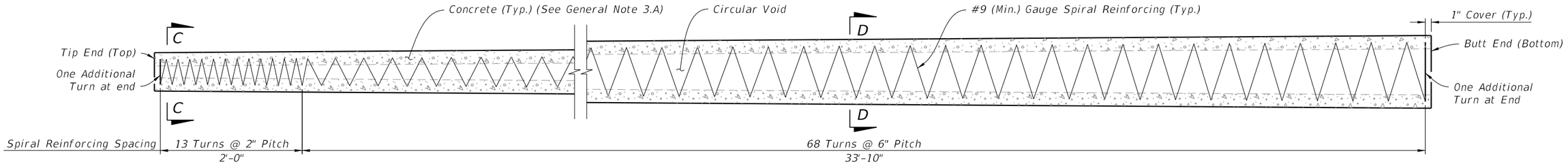
NOTES:

1. Provide a minimum 3" concrete plug at the Tip End.
2. For final erection, tilt pole upright with single point attachment located a distance of 4 feet from the Tip End.
3. Dimension may vary from 2¼" to 3½" to accommodate smaller radius of optional stepped (PVC) void. The minimum void diameter is 2".
4. Strands shown are continuous from Tip End to Butt End.
5. Strands are not shown in the elevation views for clarity.

LEGEND:

- Prestressed Strand:
  0.5 in. ~ 24 kips before transfer or
  0.375 in. ~ 14 kips before transfer (4 strands total)

SERVICE POLE - TYPE P-IIA (12 Ft.)



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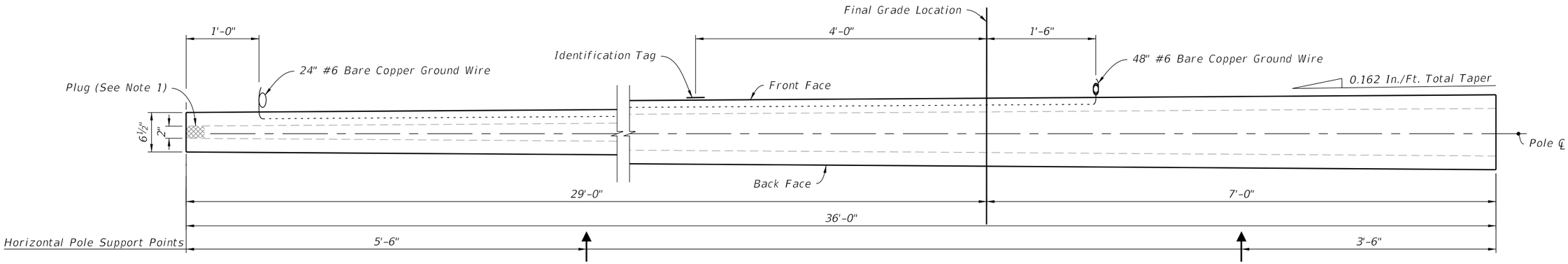

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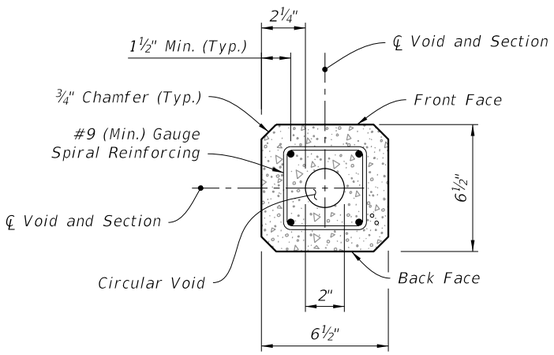
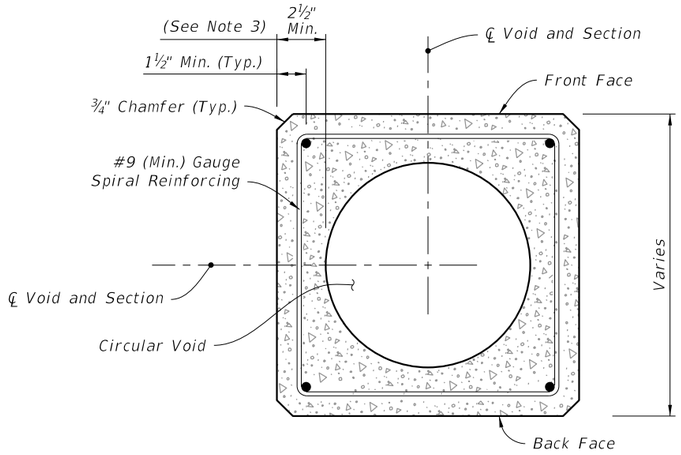


SECTION C-C (Tip End)



SECTION D-D (Typical Square Section)

NOTES:

1. Provide a minimum 3" concrete plug at the Tip End.
2. For final erection, tilt pole upright with single point attachment located a distance of 10 feet from the Tip End.
3. Dimension may vary from 2¼" to 3½" to accommodate smaller radius of optional stepped (PVC) void. The minimum void diameter is 2".
4. Strands shown are continuous from Tip End to Butt End.
5. Strands are not shown in the elevation views for clarity.

LEGEND:

- Prestressed Strand:
  0.5 in. ~ 24 kips before transfer or
  0.375 in. ~ 14 kips before transfer
  (4 strands total)

SERVICE POLE TYPE P-IIB (36 Ft.)

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LAST REVISION	REVISION	DESCRIPTION:	FY 2024-25 STANDARD PLANS	Page 5 of 198	CONCRETE POLES	INDEX	SHEET
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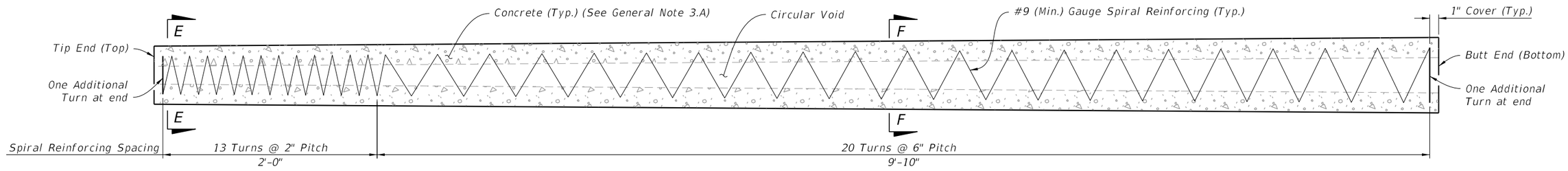

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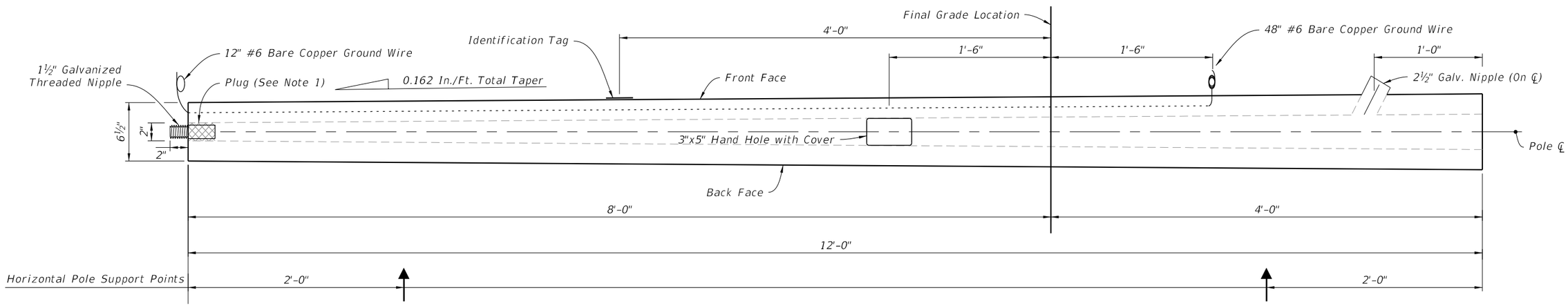

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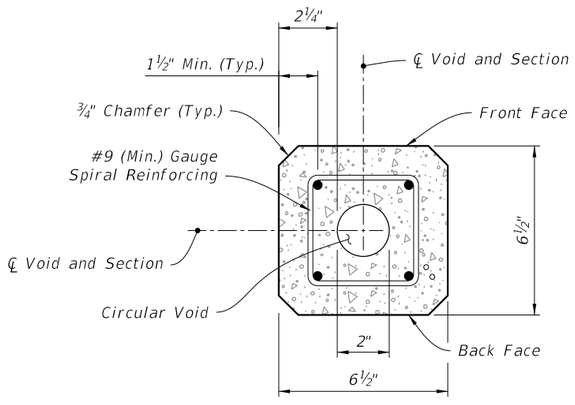
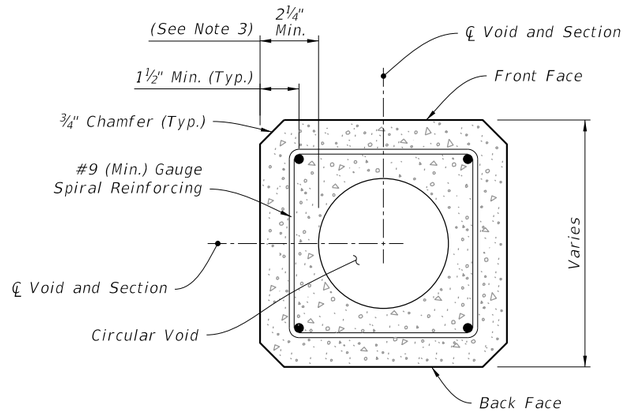


SECTION E-E (Tip End)



SECTION F-F (Typical Square Section)

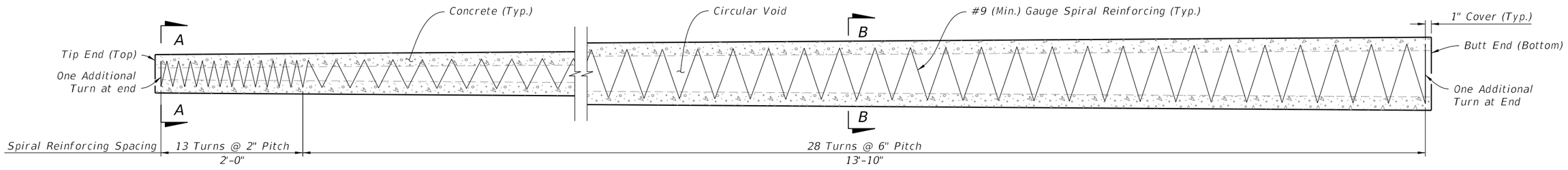
NOTES:

1. Provide a minimum 3" concrete plug at the Tip End.
2. For final erection, tilt pole upright with single point attachment located a distance of 4 feet from the Tip End.
3. Dimension may vary from 2¼" to 3½" to accommodate smaller radius of optional stepped (PVC) void. The minimum void diameter is 2".
4. Strands shown are continuous from Tip End to Butt End.
5. Strands are not shown in the elevation views for clarity.

LEGEND:

- Prestressed Strand:
  0.5 in. ~ 24 kips before transfer or
  0.375 in. ~ 14 kips before transfer
  (4 strands total)

PEDESTAL - TYPE P-IIC (12 Ft.)



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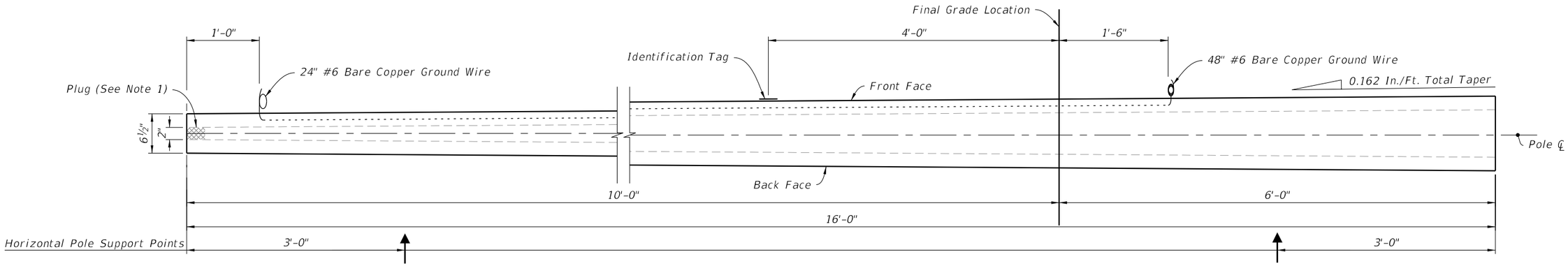

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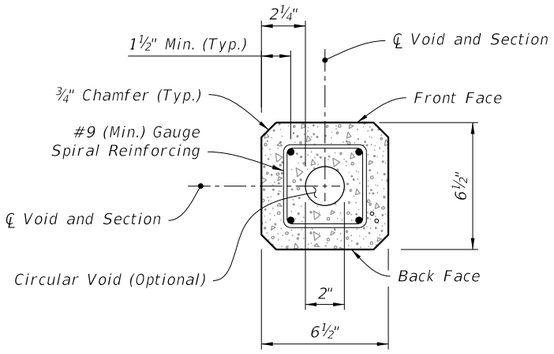
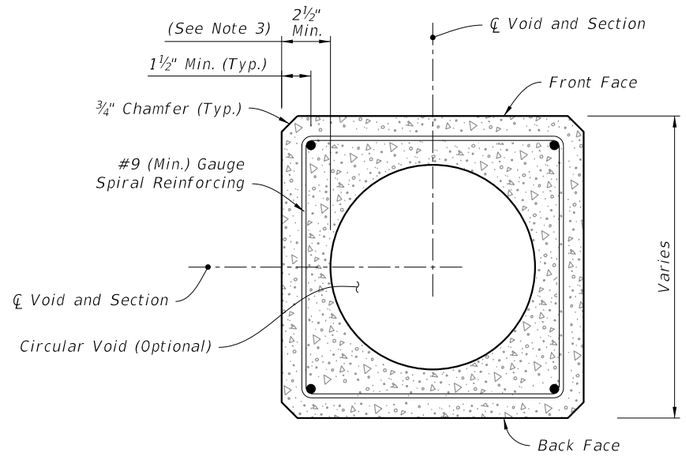


SECTION A-A (Tip End)



SECTION B-B (Typical Square Section)

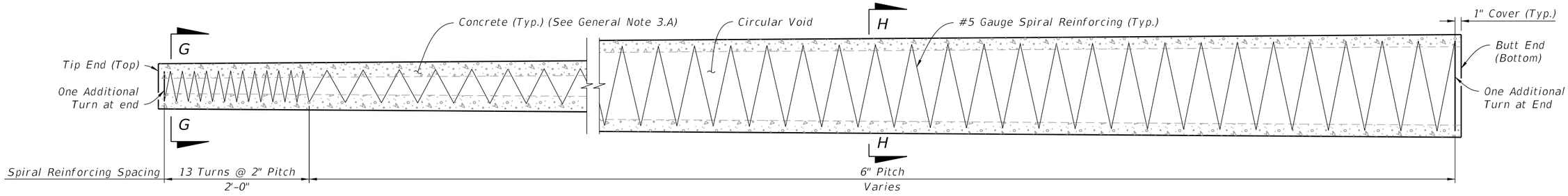
NOTES:

1. Provide a minimum 3" concrete plug at the Tip End.
2. For final erection, tilt pole upright with single point attachment located a distance of 5 feet from the Tip End.
3. Dimension may vary from 2¼" to 3½" to accommodate smaller radius of optional stepped (PVC) void. The minimum void diameter is 2".
4. Strands shown are continuous from Tip End to Butt End.
5. Strands are not shown in the elevation views for clarity.

LEGEND:

- Prestressed Strand:
  0.5 in. ~ 24 kips before transfer or
  0.375 in. ~ 14 kips before transfer
  (4 strands total)

SERVICE POLE TYPE P-IID (16 Ft.)



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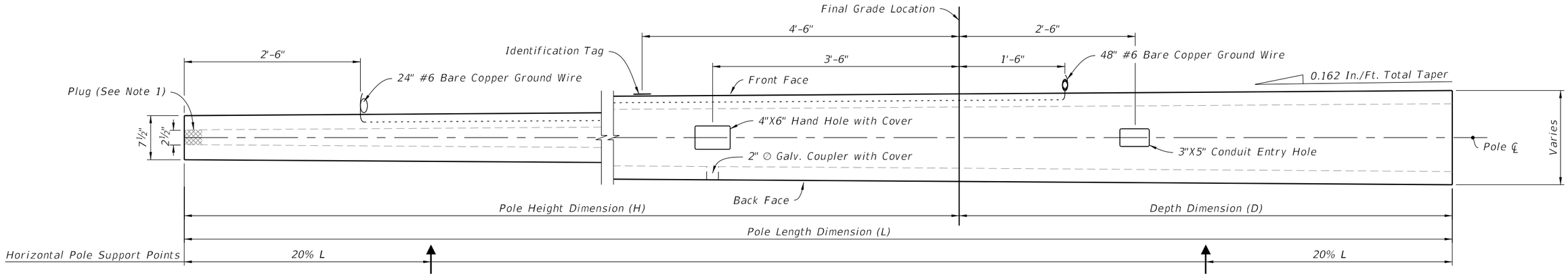

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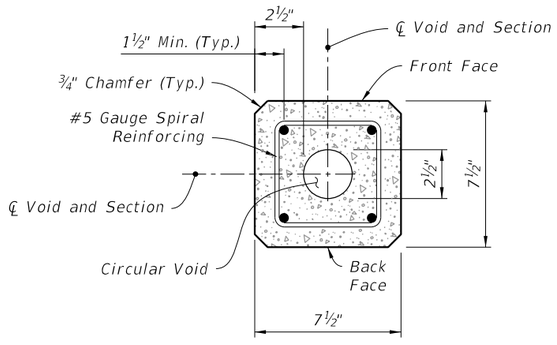
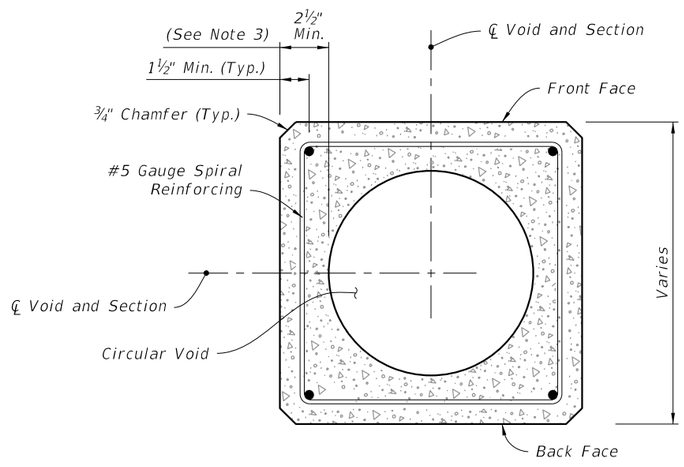


SECTION G-G (Tip End)



SECTION H-H (Typical Square Section)

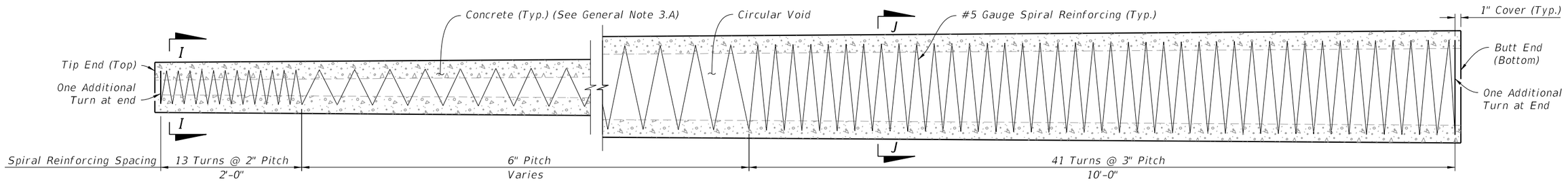
NOTES:

1. Provide a minimum 3" concrete plug at the Tip End.
2. For final erection, tilt pole upright with single point attachment located a distance of 33% L from the Tip End.
3. Dimension may vary from 2½" to 3¾" to accommodate smaller radius of optional stepped (PVC) void. The minimum void diameter is 2½".
4. Strands shown are continuous from Tip End to Butt End.
5. Strands are not shown in the elevation views for clarity.

LEGEND:

- Prestressed Strand: 0.5 in. ~ 31 kips before transfer (4 strands total)

POLE TYPE P-III



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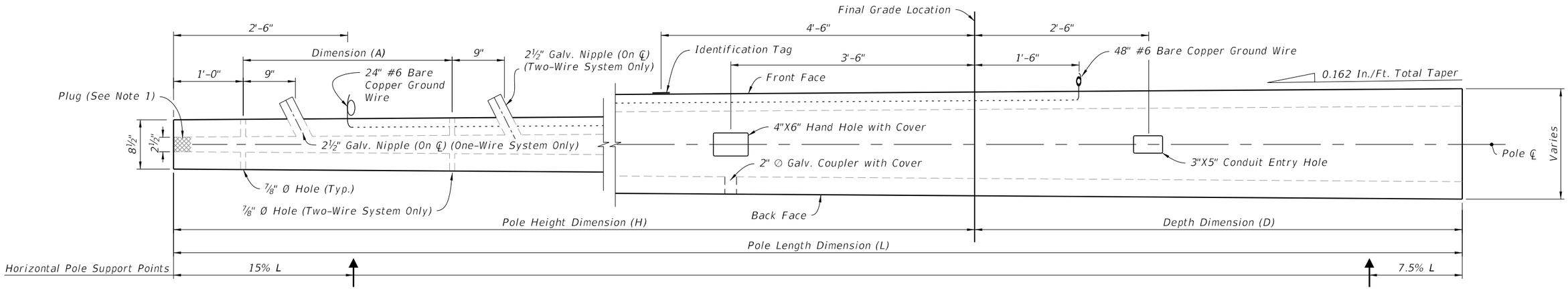

POLE ELEVATION
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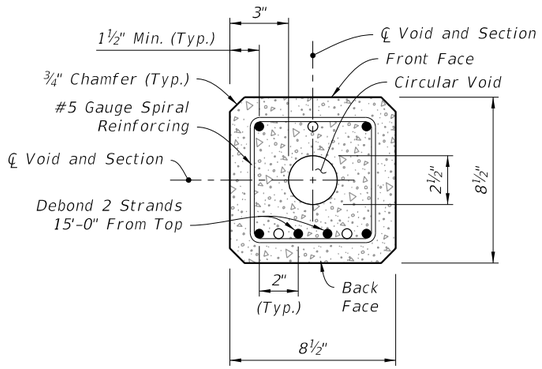

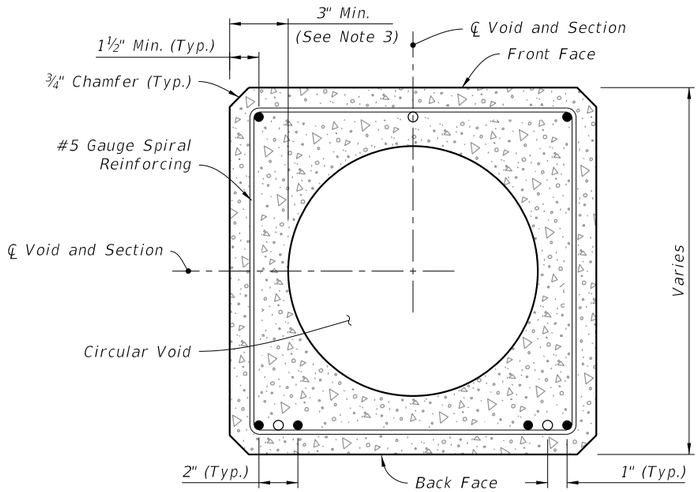

NOTES:

1. Provide a minimum 3" concrete plug at the Tip End.
2. For final erection, tilt pole upright with single point attachment located a distance of 20% L from the Tip End.
3. Dimension may vary from 3" to 4¼" to accommodate smaller radius of optional stepped (PVC) void. The minimum void diameter is 2½".
4. Strands shown are continuous from Tip End to Butt End.
5. Strands are not shown in the elevation views for clarity.

LEGEND:

- ● Prestressed Strand: 0.5 in. ~ 31 kips before transfer (6 strands total)
- ○ Dormant Strand: 0.5 in. (3 strands total) One 24" splice allowed per strand

SECTION I-I (Tip End)

SECTION J-J (Typical Square Section)

STRAIN POLE TYPE P-IV

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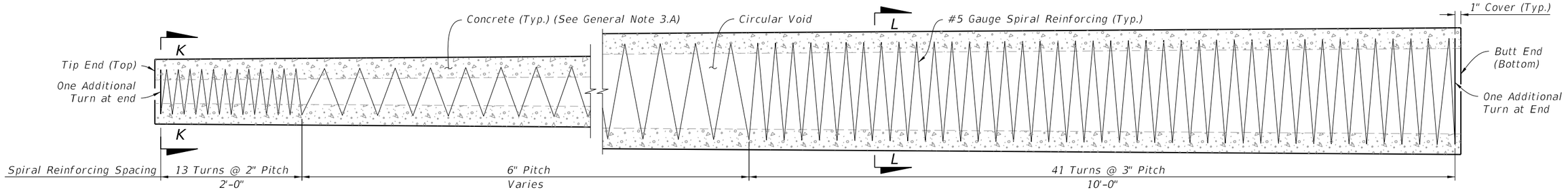

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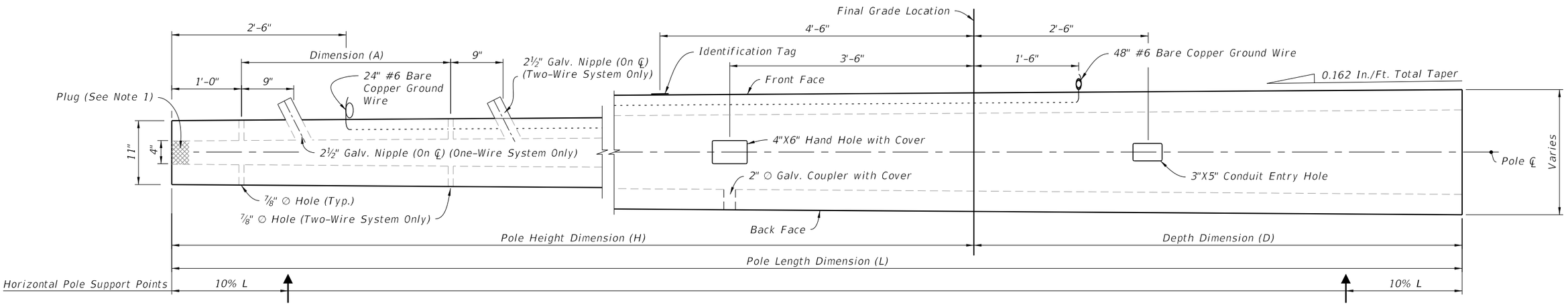

POLE ELEVATION
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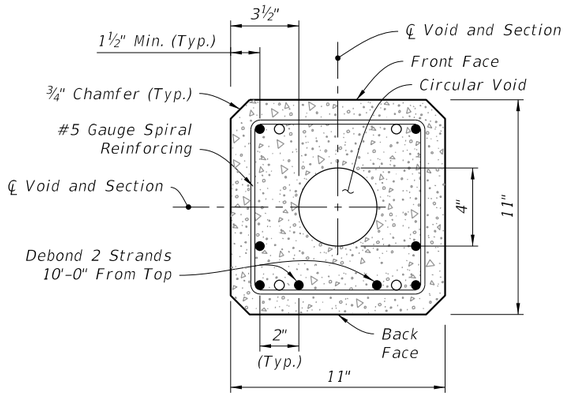

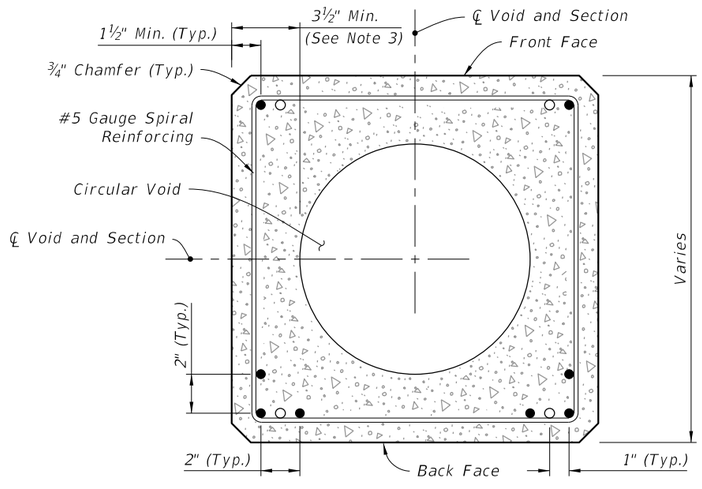

NOTES:

1. Provide a minimum 3" concrete plug at the Tip End.
2. For final erection, tilt pole upright with single point attachment located a distance of 12.5% L from the Tip End.
3. Dimension may vary from 3½" to 4¾" to accommodate smaller radius of optional stepped (PVC) void. The minimum void diameter is 4".
4. Strands shown are continuous from Tip End to Butt End.
5. Strands are not shown in the elevation views for clarity.

LEGEND:

- ● Prestressed Strand: 0.5 in. ~ 31 kips before transfer (8 strands total)
- ○ Dormant Strand: 0.5 in. (4 strands total) One 24" splice allowed per strand

SECTION K-K (Tip End)

SECTION L-L (Typical Square Section)

STRAIN POLE TYPE P-V

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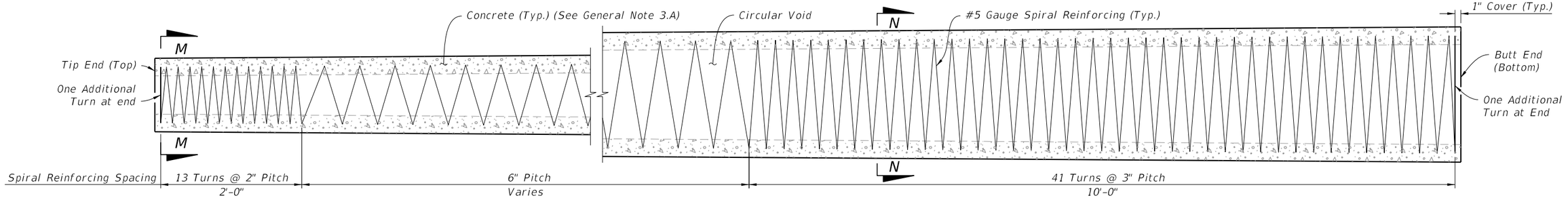

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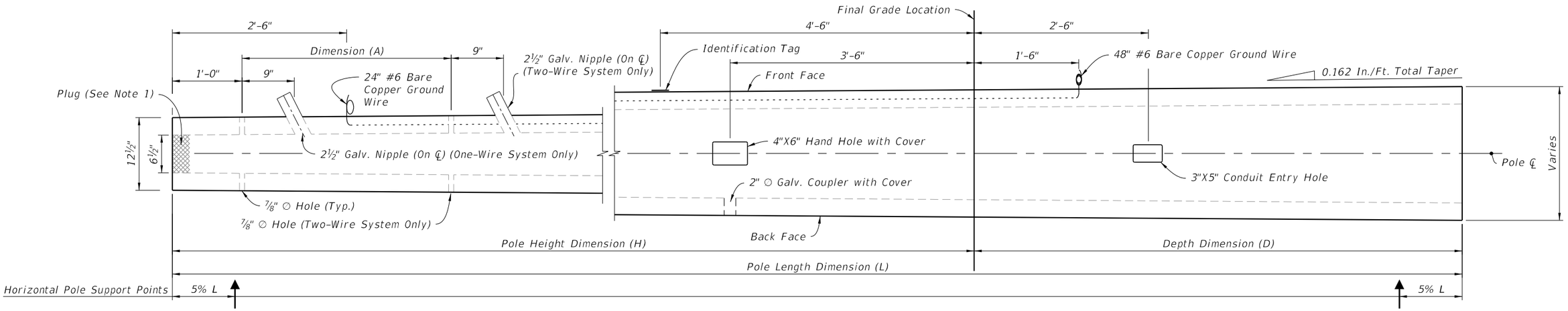
(Strands, Holes, and Fixtures Not Shown)



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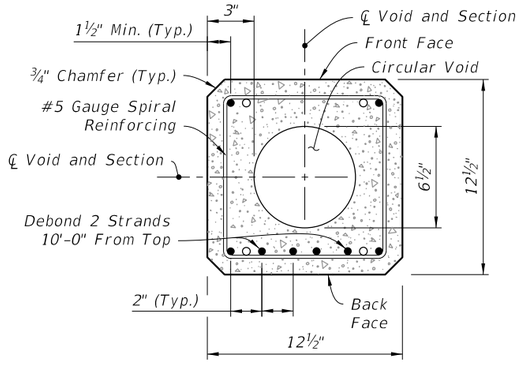
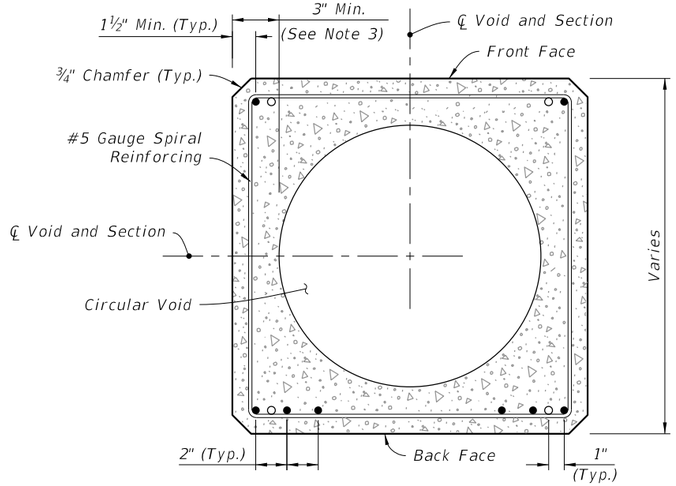


SECTION M-M (Tip End)



SECTION N-N (Typical Square Section)

NOTES:

1. Provide a minimum 3" concrete plug at the Tip End.
2. For final erection, tilt pole upright with single point attachment located a distance of 10% L from the Tip End.
3. Dimension may vary from 3" to 4¼" to accommodate smaller radius of optional stepped (PVC) void. The minimum void diameter is 6½".
4. Strands shown are continuous from Tip End to Butt End.
5. Strands are not shown in the elevation views for clarity.

LEGEND:

- ● Prestressed Strand: 0.5 in. ~ 31 kips before transfer (8 strands total)
- ○ Dormant Strand: 0.5 in. (4 strands total) One 24" splice allowed per strand

STRAIN POLE TYPE P-VI

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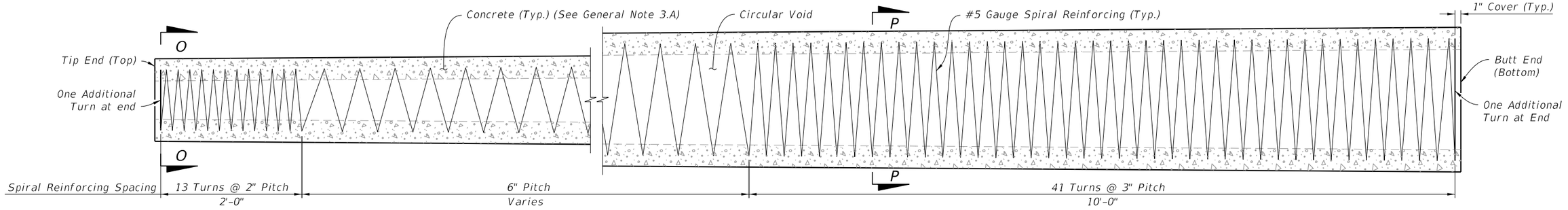
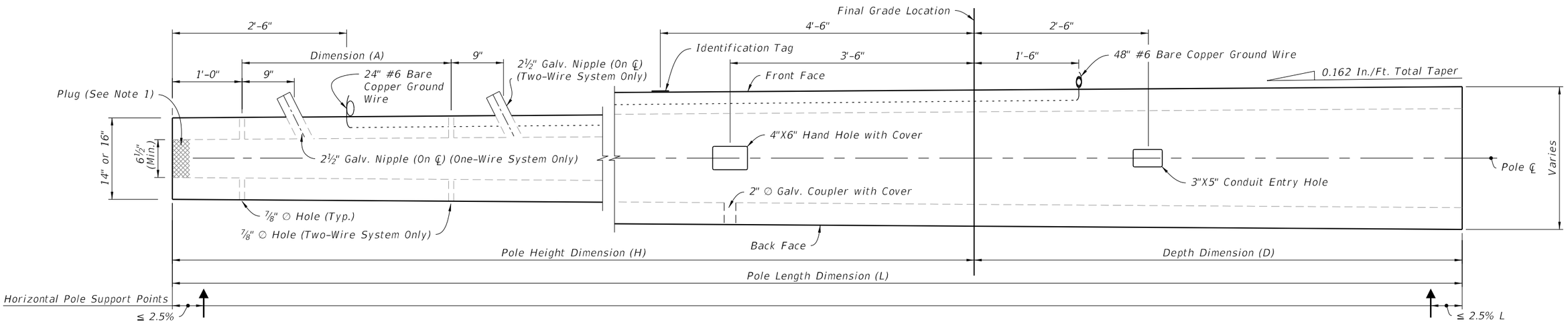
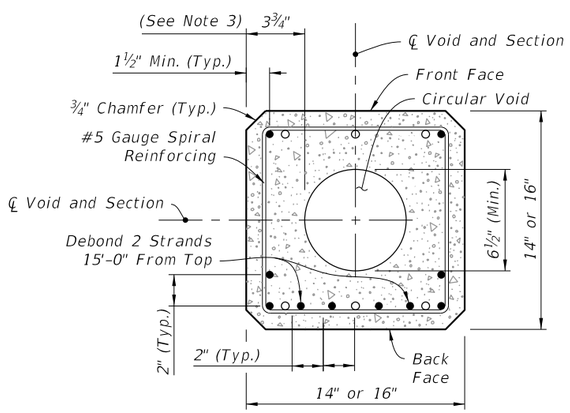
LAST REVISION	REVISION	DESCRIPTION:	FY 2024-25 STANDARD PLANS	CONCRETE POLES	INDEX	SHEET
11/01/22					641-010	9 of 11



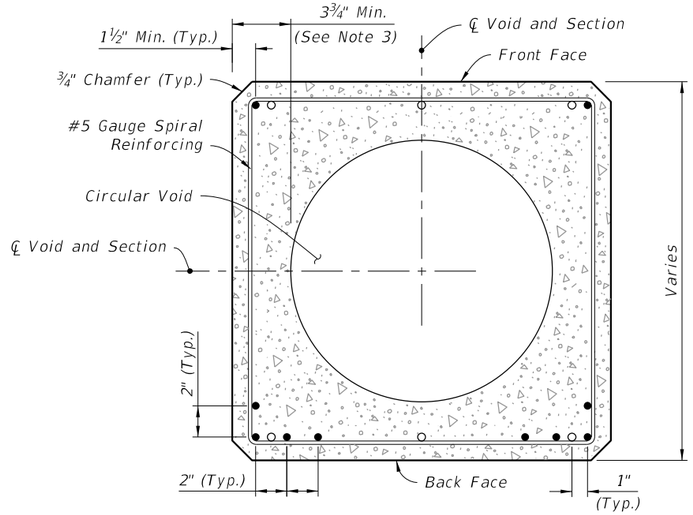
SPIRAL REINFORCING ELEVATION
(Strands, Holes, and Fixtures Not Shown)



POLE ELEVATION
(Strands And Reinforcing Not Shown)



SECTION O-O (Tip End)



SECTION P-P (Typical Square Section)

NOTES:

1. Provide a minimum 3" concrete plug at the Tip End.
2. For final erection, tilt pole upright with single point attachment located a distance of 10% L from the Tip End.
3. Dimension may vary from 3¾" to 5" to accommodate smaller radius of optional stepped (PVC) void. The minimum void diameter is 6½".
4. Strands shown are continuous from Tip End to Butt End.
5. Strands are not shown in the elevation views for clarity.

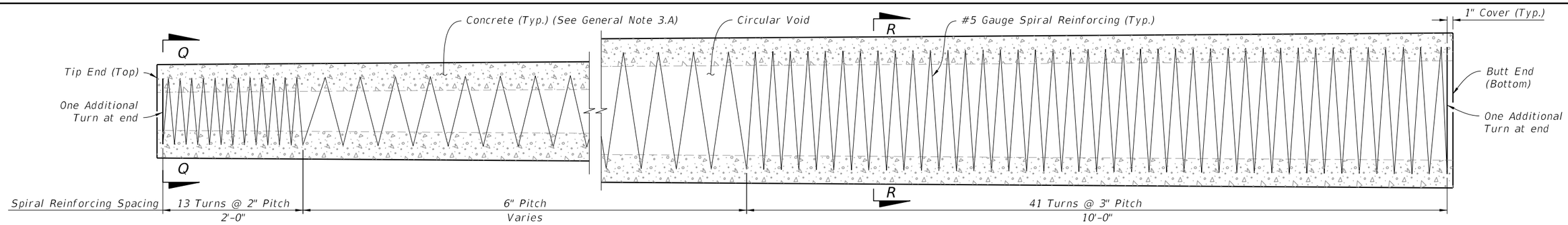
LEGEND:

- ● Prestressed Strand: 0.5 in. ~ 31 kips before transfer (10 strands total)
- ○ Dormant Strand: 0.5 in. (6 strands total) One 24" splice allowed per strand

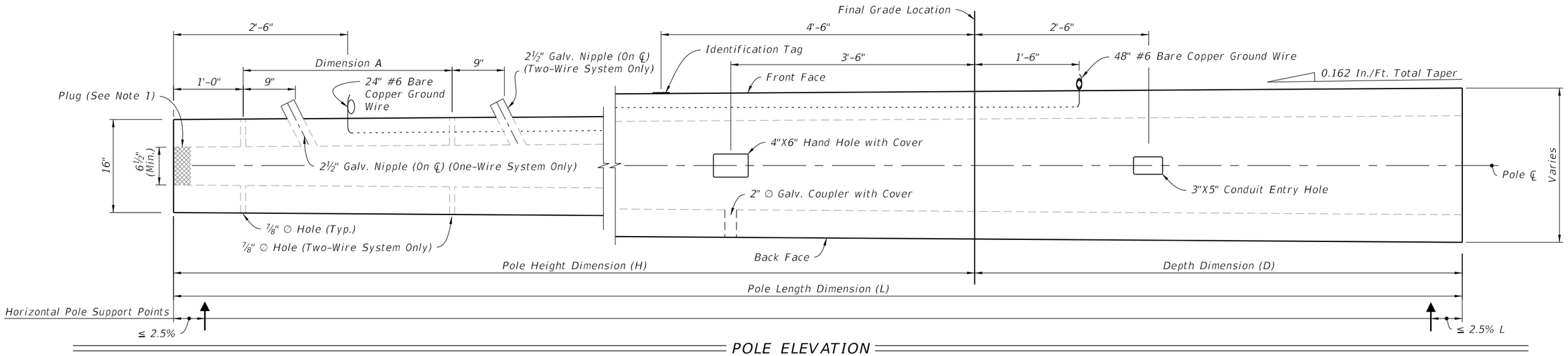
STRAIN POLE TYPE P-VII

10/3/2023 2:09:08 PM

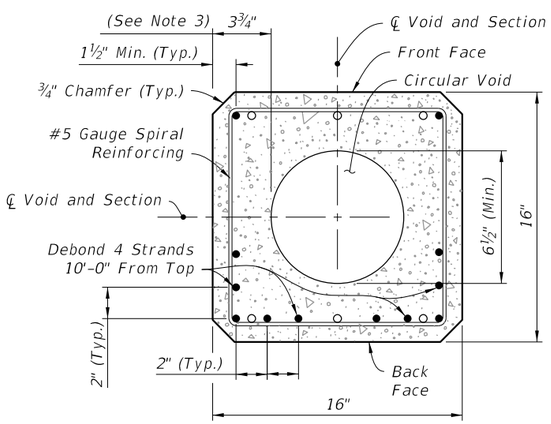
LAST REVISION	REVISION	DESCRIPTION:	FY 2024-25 STANDARD PLANS	CONCRETE POLES	INDEX	SHEET
11/01/22					641-010	10 of 11



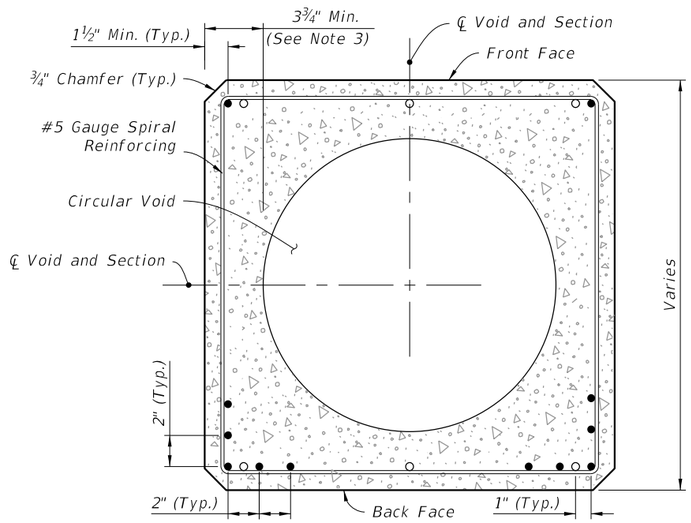
SPIRAL REINFORCING ELEVATION
(Strands, Holes, and Fixtures Not Shown)



POLE ELEVATION
(Strands And Reinforcing Not Shown)



SECTION Q-Q (Tip End)



SECTION R-R (Typical Square Section)

NOTES:

1. Provide a minimum 3" concrete plug at the Tip End.
2. For final erection, tilt pole upright with single point attachment located a distance of 10% L from the Tip End.
3. Dimension may vary from 3¾" to 5" to accommodate smaller radius of optional stepped (PVC) void. The minimum void diameter is 6½".
4. Strands shown are continuous from Tip End to Butt End.
5. Strands are not shown in the elevation views for clarity.

LEGEND:

- ● Prestressed Strand: 0.5 in. ~ 31 kips before transfer (12 strands total)
- ○ Dormant Strand: 0.5 in. (6 strands total) One 24" splice allowed per strand

STRAIN POLE TYPE P-VIII

10/3/2023 2:09:15 PM

LAST REVISION	REVISION	DESCRIPTION:	FY 2024-25 STANDARD PLANS	CONCRETE POLES	INDEX	SHEET
11/01/22					641-010	11 of 11

3.0 PROPOSED SIGNALIZATION PLANS

CONTROLLER TIMINGS								
TIMING FUNCTION	1	2	3	4	5	6	7	8
MOVEMENT(S)	1	2	3	4	5	6	7	8
MINIMUM GREEN (INITIAL)	5	15	5	10	5	15	5	10
EXTENSION (PASSAGE)	3.0	1.0	3.0	3.0	3.0	1.0	3.0	3.0
MAXIMUM GREEN I	20	45	20	25	20	45	20	25
MAXIMUM GREEN II	30	60	30	30	30	60	30	30
YELLOW	5.1	5.1	4.4	4.8	5.1	5.1	4.4	4.8
ALL RED	2.0	2.0	2.2	2.0	2.0	2.0	2.2	2.0
RECALL	–	MIN	–	–	–	MIN	–	–
NON–LOCK	ON	ON	OFF	ON	ON	ON	OFF	ON
PEDESTRIAN WALK		7		7		7		7
PEDESTRIAN CLEARANCE		30		28		28		28

NOTES:

1. MAIN STREET = SW 20th STREET
   SIDE STREET = SW 44th AVENUE
2. FLASHING OPERATION: SIGNAL HEADS 2 AND 6 YELLOW, SIGNAL HEADS 1, 3, 4, 5, 7, AND 8 RED.
3. EXISTING STOP SIGN AND STREET SIGN ASSEMBLIES ON SW 44th AVENUE SHALL BE REMOVED ONCE SIGNAL IS OPERATIONAL.
4. POSTED SPEED ON SW 20th STREET IS 45 MPH AND ON SW 44th AVENUE IS 40 MPH

SW 44th AVENUE

650–1–36 (2 AS)

3–SECT., 1–WAY
650–1–36 (8 AS)

PED. SIGNAL COUNT–DOWN
1–SECT., 1–WAY
653–1–11 (8 AS)

SIGNAL HEAD DETAILS

1" = 40'

145+80.18 [65.04' LT]
630–2–11 [10 LF]
635–2–15 [1 EA]
653–1–11 [2 AS]
635–2–11 [2 EA]
649–21–6 [1 EA]
665–1–11 [2 EA]
ELEV. 77.53

145+81.84 [65.51' RT]
630–2–11 [7 LF]
635–2–11 [2 EA]
649–21–15 [1 EA]
653–1–11 [2 AS]
665–1–11 [2 EA]
ELEV. 78.03

VDZ–8B (6'x330')
VDZ–8A (6'x330')
VDZ–3 (6'x80')
VDZ–2B (6'x330')
VDZ–2A (6'x330')
VDZ–5 (6'x80')
VDZ–6 (6'x80')
VDZ–6B (6'x330')
VDZ–6A (6'x330')
VDZ–7 (6'x80')
VDZ–4A (6'x330')
VDZ–4B (6'x330')

EL 77.53 MAST ARM C
EL 77.18
EL 78.03 MAST ARM D
EL 77.87
EL 77.83
EL 77.62
EL 77.06 MAST ARM A
EL 77.16 MAST ARM B
EL 76.76

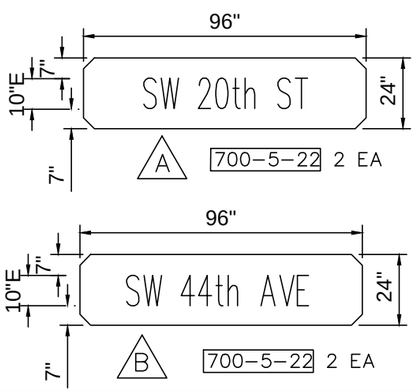
330'

630–2–12 [119 LF] (SEE NOTE 12)
[110 LF] 630–2–12 [2 CONDUITS]
[2 CONDUITS] [99 LF] 630–2–12

SW 20th STREET

SIGNS A & B

ALL STREET NAME SIGNS SHALL BE WHITE LEGEND ON GREEN BACKGROUND.
CORNER RAIDUS = 1.5"
BORDER WIDTH = 0.75"
BORDER COLOR = WHITE
(SIGNS MUST BE DOUBLE SIDED, FREE SWINGING)



C1
682–1–113 [1 EA] C

V1 V2 V3 V4
660–4–12 [4 EA] V

144+77.50 [64.22' LT]
[2 EA] 635–1–11
[22 LF] 630–2–11
[1 AS] 653–1–11
[1 EA] 665–1–11
[1 EA] 649–21–15
ELEV. 77.16

TRAFFIC CONTROL CAB.
670–5111 [1 AS]

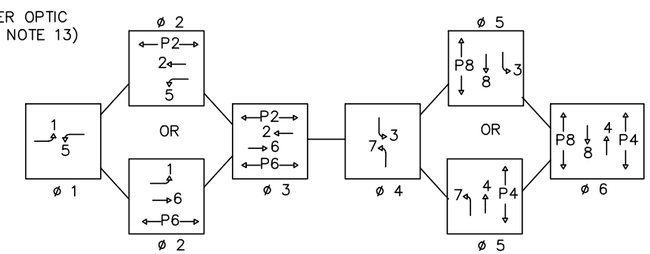
ELECTRIC SERVICE
[1 EA] 635–1–11
[1 AS] 639–1–22
[10 LF] 639–2–1
[1 EA] 639–3–11
[1 EA] 641–2–12

646–1–11 [1 EA]
653–1–11 [1 AS]
665–1–11 [1 EA]

144+81.31 [66.67' RT]
630–2–11 [24 LF]
635–2–11 [3 EA]
635–2–15 [1 EA]
649–21–6 [1 EA]
653–1–11 [1 AS]
665–1–11 [1 EA]
782–1–11 [1 EA]
ELEV. 77.06

FIBER OPTIC (SEE NOTE 13)

VIDEO DETECTION ASSIGNMENTS			
VIDEO DETECTOR UNIT #	ASSIGNED TO MOVEMENT	VIDEO ZONE	DELAY (SEC)
V1	2	2A	–
	2	2B	–
	5	5	5
V2	4	7	–
	4	4A	–
	4	4B	–
V3	1	1	5
	6	6A	–
	6	6B	–
V4	8	3	–
	8	8A	–
	8	8B	–



SIGNAL OPERATING PLAN SOP IO

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION
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NOEL JOHN COOPER, P.E.
P.E. LICENSE NUMBER 69534
STATE OF FLORIDA, DATE: _____
VALID ONLY WITH EMBOSSED SEAL.

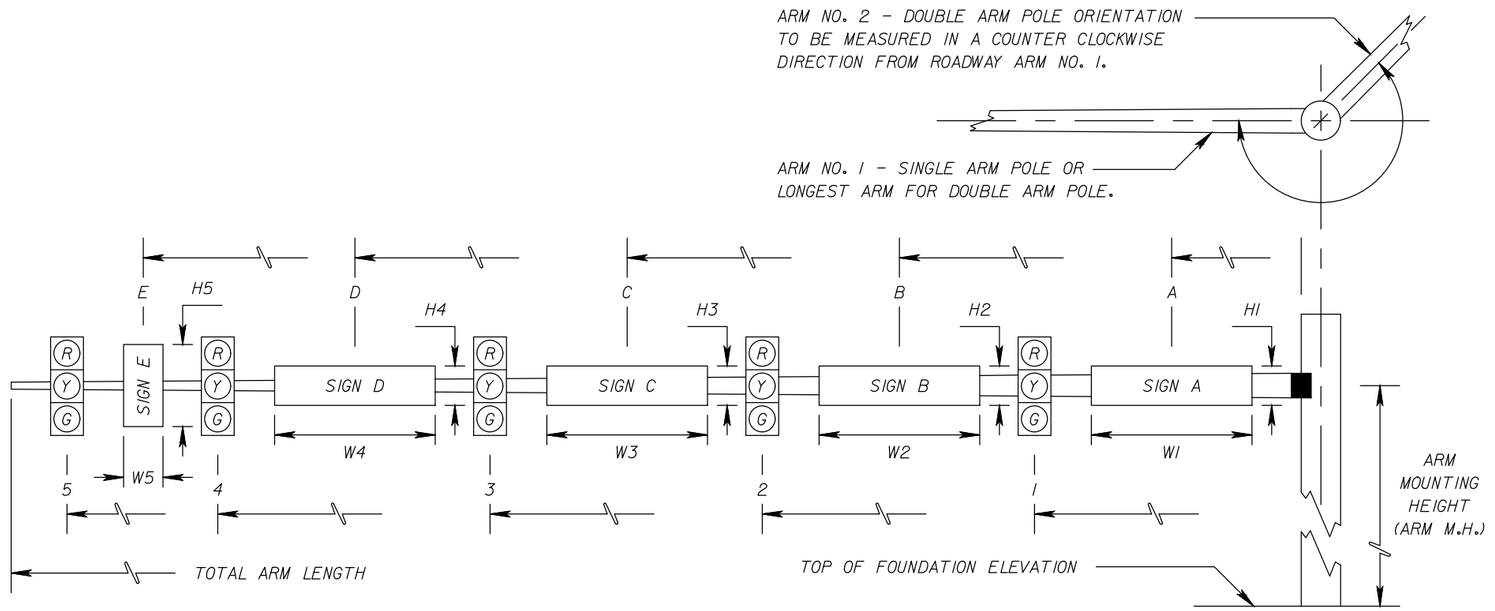
PREPARED BY
OCALA
CITY ENGINEER'S OFFICE

PROJECT NAME: SW 44TH AVE. AT SW 20TH ST SIGNALIZATION

SIGNALIZATION PLAN

SHEET NO. T7

Gary Anson 12/12/2023 4:26:49 PM T:_sd-ENG-Transportation\Projects\2022\600 TRAFFIC\22602 SW 44th Avenue and SW 20th Street Signal Design\02260211111\Signals\PLANSG01.dwg



* DENOTES NUMBER OF SECTIONS IN SIGNAL HEAD ASSEMBLY

KH to confirm / provide

FOR VEHICLE DETECTION VIDEO CAMERA IN LIEU OF SIGN

ID NO.	SHEET NO.	LOCATION BY STA.	TOP OF FOUNDATION ELEVATION	RDWY ARM NO.	CROWN ELEV.	SIGNAL DATA													SIGN DATA														
						SIGNAL V/H	BACK PLATES Y/N	PED. SIGNAL Y/N	DISTANCE FROM POLE										TOTAL ARM LENGTH	ARM M.H.	∠ BETWEEN DUAL ARMS 90/270	DISTANCE FROM POLE / HEIGHT AND WIDTH OF SIGN													PAINT COLOR
									1	*	2	*	3	*	4	*	5	*				A	H1	W1	Ⓑ	H2	W2	C	H3	W3	D	H4	W4	E	H5	W5	
A	T-7	144+81.31, 66.67'RT	77.06	1	77.62	V	Y	Y	22'	3	34'	3	45'	4					50	22		12.5'	2'	8'	37'	VDC	VDC									BLACK
				2																																
B	T-7	144+77.50, 64.22'LT	77.16	1	76.76	V	Y	Y	39'	3	50'	3	62'	4					70	21		18'	2'	8'	54'	VDC	VDC									BLACK
				2																																
C	T-7	145+80.18, 65.04'LT	77.53	1	77.87	V	Y	Y	26'	3	39'	3	48'	4					50	22		14'	2'	8'	32'	VDC	VDC									BLACK
				2																																
D	T-7	145+81.84, 65.51'RT	78.03	1	77.18	V	Y	Y	39'	3	53'	3	62'	4					70	21		28'	2'	8'	50'	VDC	VDC	8'	ITS							BLACK
				2					37'		50'													44'											

ANY MODIFICATION TO THE "DISTANCE FROM POLE" VALUES FOR THE SIGNAL HEADS MUST BE REVIEWED BY THE EOR AND A STRUCTURAL ENGINEER TO VERIFY THAT THE STANDARD DESIGN WILL ACCOMMODATE THESE NEW VALUES.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION
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NOEL JOHN COOPER, P.E.
P.E. LICENSE NUMBER 69534
STATE OF FLORIDA, DATE: _____
VALID ONLY WITH EMBOSSED SEAL.

PREPARED BY

OCALA
CITY ENGINEER'S OFFICE

PROJECT NAME: SW 44TH AVE. AT SW 20TH ST SIGNALIZATION

MAST ARM TABULATION

SHEET NO. T11

Gary Anson 12/12/2023 4:31:42 PM T:_sd-ENG-Transportation\Projects\2022\600 TRAFFIC\22602 SW 44th Avenue and SW 20th Street Signal Design\02260211111\Signals\MSSGSG01.dwg

STRAIN POLE SCHEDULE

SHEET NO.	SPAN NO.	POLE NO.	POLE LOCATION		FINAL GRADE ELEVATION	CROWN ELEVATION	POLE TYPE	POLE HEIGHT (H)	POLE LENGTH (L)	SHAFT LENGTH (DA)	SHAFT DIAMETER (DB)	DIMENSION (A)	CATENARY WIRE DIA. (IN.) / GRADE	MESSENGER WIRE DIA. (IN.) / GRADE
			STATION	OFFSET										
T-7	1	A	144+81.31	66.67' RT	77.06	76.76'	P-VIII	34'	52'	18'	4.5'	8.0'	1/2" UTILITY GRADE	1/2" UTILITY GRADE
T-7		B	144+77.50	64.22' LT	77.16		P-VIII	34'	52'	18'	4.5'	8.0'	1/2" UTILITY GRADE	1/2" UTILITY GRADE
T-7	2	B	144+77.50	64.22' LT	77.16	77.87'	P-VIII	34'	52'	18'	4.5'	8.0'	1/2" UTILITY GRADE	1/2" UTILITY GRADE
T-7		C	145+80.18	65.04' LT	77.53		P-VIII	34'	52'	18'	4.5'	8.0'	1/2" UTILITY GRADE	1/2" UTILITY GRADE
T-7	3	C	145+80.18	65.04' LT	77.53	77.18'	P-VIII	34'	52'	18'	4.5'	8.0'	1/2" UTILITY GRADE	1/2" UTILITY GRADE
T-7		D	145+81.84	65.51' RT	78.03		P-VIII	34'	52'	18'	4.5'	8.0'	1/2" UTILITY GRADE	1/2" UTILITY GRADE
T-7	4	D	145+81.84	65.51' RT	78.03	77.62'	P-VIII	34'	52'	18'	4.5'	8.0'	1/2" UTILITY GRADE	1/2" UTILITY GRADE
T-7		A	144+81.31	66.67' RT	77.06		P-VIII	34'	52'	18'	4.5'	8.0'	1/2" UTILITY GRADE	1/2" UTILITY GRADE

NOTES:

1. WORK WITH INDEX 634-001 AND 649-010 (FY 2024-25).
2. DESIGN WIND SPEED = 140 MPH (MARION COUNTY).

FOUNDATION NOTES:

1. DESIGN BASED ON BORINGS PROVIDED BY GEO-TECHNOLOGIES INC, DATED JANUARYY 25, 2022.
2. GEO-TECH, INC. HAS RECOMMENDED REMEDIATION OF THE SINKHOLE TYPE ACTIVITY UNDERNEATH MAST ARM D TO CONSIST OF DEEP SOIL STABILIZATION BY MEANS OF LOW SLUMP, SAND-CEMENT GROUT. IF REMEDIATION NOT DONE PER THE GEOTECHNICAL REPORT, CONTRACTOR IS TO PROVIDE SIGNED AND SEALED FOUNDATION REDESIGN PERFORMED BY SPECIALTY ENGINER TO ENGINEER OF RECORD OF REVIEW.
3. IF EXISTING SOILS VARY FROM THE CRITERIA PRESENTED BELOW, CONTACT THE ENGINEER PRIOR TO CONSTRUCTION OF THE DRILLED SHAFT.
4. FOUNDATION ASSUMPTIONS AND VALUES USED IN DESIGN:

POLE A:
BORING: SPT-04
CLASSIFICATION: COHESIONLESS SOIL (SAND)
FRICTION ANGLE: 21.7 deg
UNIT WEIGHT: 38.3 PCF
N-SPT #: 12.1
SOIL LAYER THICKNESS: 18 FT
DESIGN WATER TABLE: 0' BELOW SURFACE (ASSUMED)

POLE B:
BORING: SPT-03
CLASSIFICATION: COHESIONLESS SOIL (SAND)
FRICTION ANGLE: 26 DEG
UNIT WEIGHT: 47 PCF
N-SPT #: 13
SOIL LAYER THICKNESS: 18 FT
DESIGN WATER TABLE: 0' BELOW SURFACE (ASSUMED)

POLE C:
BORING: SPT-1
CLASSIFICATION: COHESIONLESS SOIL (SAND)
FRICTION ANGLE: 28.7 DEG
UNIT WEIGHT: 47.1 PCF
N-SPT #: 10.7
SOIL LAYER THICKNESS: 18 FT
DESIGN WATER TABLE: 0' BELOW SURFACE (ASSUMED)

POLE D:
BORING: SPT-2
CLASSIFICATION: COHESIONLESS SOIL (SAND)
FRICTION ANGLE: 26 DEG
UNIT WEIGHT: 42 PCF
N-SPT #: 7
SOIL LAYER THICKNESS: 18 FT
DESIGN WATER TABLE: 0' BELOW SURFACE (ASSUMED)

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

Kimley»Horn
NOLAN B. VILLATORO
P.E. LICENSE NUMBER: 93862
200 SOUTH ORANGE AVENUE, SUITE 600
ORLANDO, FL 32801
REGISTRY 35106

DRAWN BY: IPG
CHECKED BY: NBV
DESIGNED BY: IPG
CHECKED BY: NBV

SW 44TH AVE .AND
SW 20TH ST.
MAST ARM SCHEDULE

STRAIN POLE SCHEDULE

SHT. NO.

Nolan.Villatoro 5/27/2024 5:31:59 PM K:\ORL_Structures_Projects-Structures_Strain Poles\142371064 SW 44th and SW 20th\06_CADD\(Project #)\struct\StrainPoleSchedule.dgn

4.0 GEOTECHNICAL REPORT

January 25, 2022
Project No. 21-3006.193.1

Eric Smith
Traffic Engineering
City Engineer's Office
1805 NE 30th Avenue, Building 300
Ocala, Florida 34470

Reference: Proposed Traffic Signal Mast Arms (4)
Intersection of SW 44th Avenue and SW 20th Street, Ocala, Florida
Geotechnical Site Exploration

Dear Mr. Smith:

As requested, Geo-Technologies, Inc. (Geo-Tech) has performed a site exploration at the project site. Services were conducted in accordance with our Proposal No. 11875 dated October 18, 2021.

The following report summarizes our findings, evaluations and recommendations. Generally accepted soils and foundation engineering practices were employed in the preparation of this report.

Geo-Tech appreciates the opportunity to provide our services for this project. Should you have any questions regarding the contents of this report or if we may be of further assistance, please do not hesitate to contact the undersigned.

Sincerely,

Gerald W. Green, Jr.
Soil & Water Scientist

GWG/CAH/ca

CRAIG AUSTIN HAMPY LICENSE No. 83240 STATE OF FLORIDA PROFESSIONAL ENGINEER
1/25/22

Craig A. Hampy, P.E.
Florida Registration No. 83240

1016 S.E. 3RD AVENUE, OCALA, FLORIDA 34471 • PHONE: (352) 694-7711 • FAX: (352) 694-7733

Purposes
Purposes of this study were to explore the subsurface conditions in the proposed traffic signal mast arm areas and provide geotechnical engineering site preparation recommendations to guide design and construction of the foundations systems.

Site Description
The project site is located at the intersection of SW 44th Avenue and SW 20th Street in Ocala, Florida. At the time of our site exploration, the project site was cleared of native vegetation.

Exploration Program
Field exploration services for the geotechnical exploration consisted of the following:

- Four (4) Standard Penetration Test (SPT) borings to depths ranging from approximately nineteen (19) to thirty-five (35) feet below existing site grade in the proposed traffic signal mast arm areas (ASTM D-1586). SPT borings were performed on December 22, 2021.

Sampling & Testing Descriptions

Atterberg Limits Testing
Atterberg Limits are used to determine the state of consistency for fine grain soils. There are four (4) states which are used to define the consistency of the soil. These states are liquid, plastic, semi-solid, and solid. The point of transition from one state to the next is identified as the Liquid Limit (LL), Plastic Limit (PL), and Shrinkage Limit (SL), respectively. Clay soils which are initially very high in moisture content transition from a liquid state to a plastic state as moisture content decreases.

Generally, soils with high liquid limits are clays and have poor engineering properties. Soils with a high clay content are cohesive (stick together), plastic (moldable), very compressible (able to consolidate), and nearly impervious (impenetrable by water).

Clay soils become unstable with changes in moisture content. Soils with high clay content also are subject to swelling and shrinking during normal changes in moisture content. The swell/shrinkage cycle will lead to foundation failure.

The range of moisture contents at which a soil is considered to be plastic are those which fall between the liquid limit and the plastic limit. The Liquid Limit test measures the moisture content at which a cohesive or clay soil changes from a plastic to a liquid state. The Plastic Limit tests measures the moisture content at which the clay soil changes from a semi-solid state to a plastic state. Plasticity Index (PI) is the difference between the liquid limit and the plastic limit. Plasticity Index is an indication of the tendency of a soil to absorb water on the particle surfaces. Some clayey soils swell when wetted and shrink when dried. The larger the plastic index the greater the shrink/swell tendency. Plasticity Index is an indicator of the suitability of the clay fraction of a soil or soil-aggregate for use in construction.

Gradation (-200) Testing
A specimen of soil is washed over a seventy-five (75) µm (No. 200) sieve. Clay and other particles that are dispersed by the wash water, as well as water-soluble materials, are removed from the soil during the test. The loss in mass resulting from the wash treatment is calculated as mass percent of the original sample and is reported as the percentage of material finer than a seventy-five (75) µm (No. 200) sieve by washing.

Standard Penetration Testing
A Standard Penetration Test (SPT) boring (ASTM D-1586) is defined as a standard split-barrel sampler driven into the soil by a one hundred and forty (140) pound hammer falling thirty (30) inches. The number of blows required to drive the sampler one (1) foot, after seating six (6) inches, is designated resistance, or "N"-Value is an index to soil strength and consistency.

Samples recovered during performance of our SPT borings were visually classified in the field and representative portions of the samples were placed in containers and transported to our laboratory for further analysis.

Findings
General subsurface conditions found in our soil borings are graphically presented on the soil profiles in Appendix I. Horizontal lines designating the interface between differing materials found represent approximate boundaries. Transition between soil layers is typically gradual.

Soils found in boring B-1 generally consisted of a surficial layer of loose fine sand approximately nine (9) feet thick underlain by loose to medium dense clayey sand and medium dense to dense fine sand to the depth drilled.

Soils found in boring B-2 generally consisted of a surficial layer of loose to medium dense fine sand approximately eighteen and one-half (18½) feet thick underlain by loose to medium dense clayey sand and limestone to the depth drilled. A Weight-of-Hammer (WOH) zone was found at depths of approximately thirty and one-half (30½) to thirty-two (32) feet below existing site grade.

Soils found in boring B-3 generally consisted of a surficial layer of loose to medium dense fine sand approximately eighteen and one-half (18½) feet thick underlain by medium dense to dense clayey sand to the depth drilled.

Soils found in boring B-4 generally consisted of a surficial layer of limestone approximately three (3) feet thick underlain by loose fine sand, medium dense clayey sand and limestone to the depth drilled.

Ground water table levels were not found at our boring locations within ten (10) feet below the existing site grade. In Geo-Tech's opinion, ground water levels are not expected to influence near surface construction. After periods of prolonged rainfall water may become perched above the clayey soils and deeper foundation systems may encounter a perched water condition.

Laboratory Testing Results

Gradation (-200)

Clayey sand soils found at our boring locations yielded passing fines ranging from twenty-seven and three-tenths (27.3) to thirty-seven and two-tenths (37.2) percent on the samples tested. We refer the reader to the attached soil profiles for the various soils found.

Atterberg Limits

Clayey sand soils found at our boring locations were moderately plastic with liquid limits of forty-four (44) and plasticity indices ranging from eighteen (18) to twenty-eight (28) on the samples tested. We refer the reader to the attached soil profiles for the various soils found.

Evaluations

Geo-Tech observed indications of sinkhole type activity in borings B-2 at depths of approximately thirty and one-half (30½) to thirty-two (32) feet below existing site grade. As a sinkhole develops the loose zones propagate upward to the ground surface. Upward movement can cause very loose zones such as those found at our boring locations. These very loose zones can cause settlement to structures found above them.

Most sinkhole activity in Florida is the result of subterranean erosion or "raveling" of the soils into solution channels and cavities in the underlying limestone formation. The process of internal erosion is generally caused by downward seepage of groundwater (recharge) into the limestone aquifer. Recharge occurs when there is a hydraulic connection through the confining beds and a difference in piezometer level between the surficial and limestone aquifers. Under certain circumstances, soil particles will migrate downward during the groundwater recharge process and a subsoil structure will erode. With time, "raveled" conditions can propagate upward and cause a sinkhole at the surface. In some instances, sinkhole activity is manifested at the surface as a shallow depression or minor settlement of the foundation soils which develop gradually rather than a sudden collapse. Typical indicators of sinkhole conditions encountered during the drilling of Standard Penetration Test borings are zones of abnormally soft and/or "raveled" subsoil generally accompanied by loss of drilling fluid circulation.

Soil parameters for the mast arm signal poles based on data obtained from our SPT borings are presented in Table 1 below.

Table 1: Soil Parameters

Boring No.	Depth Below Ground Surface (ft.)	USCS Soil Type	Average N-Value	Unit Weight (pcf)		Angle of Internal Friction (degrees)	Cohesion (psf)	Modulus of Lateral Subgrade Reaction, k (pci)
				γ_{sat}	γ_{sub}			
B-1	0.0 to 9.0	SP	8	105	42	26	0	25
	9.0 to 18.5	SC	16	110	47	28	0	100
	18.5 to 30.0	SP	33	120	57	29	0	100
B-2*	0.0 to 18.5	SP	7	105	42	26	0	25
	18.5 to 33.5	SC	13	110	47	27	0	100
	33.5 to 35.0	LS	50	135	72	-	0	-
B-3	0.0 to 18.5	SP	13	110	47	27	0	100
	18.5 to 30.0	SC	21	115	52	28	0	100
B-4	0.0 to 3.0	LS	-	-	-	-	0	-
	3.0 to 8.0	SP	6	105	42	26	0	25
	8.0 to 18.0	SC	22	115	52	28	0	100
	18.0 to 19.0	LS	50	135	72	-	0	-

*Soil parameters based on soil consistencies prior to compaction grouting.

Recommendations

Geo-Tech recommends remediation of the sinkhole type activity found to consist of deep soil stabilization by means of low slump, sand-cement grout. Nine (9) injection pipes should be installed on ten (10) foot centers on a three (3) by three (3) grout pin grid centered on soil boring B-2. Grout shall be utilized to seal the loose zones extending to the limestone strata to depths ranging from about thirty-five (35) to forty (40) feet below the existing site grade. Depending on grout intakes additional injection points may be added. Grout mix specifications and pumping procedures are presented in Appendix I. The Grouting Contractor should make all submittals to Geo-Tech for approval. Grouting should terminate five (5) feet below the bottom of the signal pole foundation.

Based on preliminary estimations, Geo-Tech would expect grout quantities for this project to range between fifty (50) to eighty (80) cubic yards.

Closure/General Qualifications

This report has been prepared in order to aid evaluation of the project site and to assist various design professionals in the design of the proposed traffic signal mast arm foundations systems. The scope is limited to the specific project and the location described herein, and our description of the project represents our understanding of the significant aspects relevant to soil and

foundation characteristics. In the event that any changes in present project concepts as outlined in this report are planned, we should be informed so the changes can be reviewed and the conclusions of this report modified as necessary in writing by the soils and foundation engineer.

It is recommended that all construction operations dealing with earthwork and foundations be reviewed by our soil engineer to provide information on which to base a decision whether the design requirements are fulfilled in the actual construction. Evaluations and recommendations submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated on the Boring Location Map, and from any other information discussed in this report. This report does not reflect any variations, which may occur between these borings. In the performance of subsurface investigations, specific information is obtained at specific locations at specific times. Variations in soil and rock conditions exist on most sites between boring locations. Groundwater levels may also vary from time to time. The nature and extent of variations may not become evident until the course of construction. If variations then appear evident, it will be necessary for a re-evaluation of the recommendations of this report after performing on-site observations during the construction period and noting the characteristics of any variations.

APPENDIX I

COMPACTION GROUTING SPECIFICATIONS
&
GROUT INJECTION PLAN

Compaction Grouting Specifications

General
The following grouting specifications are for stabilization and improvement of deep subsurface soil conditions at the project site as indicated in the Recommendations section of this report.

Scope
The scope of work consists of furnishing all labor, equipment and materials and performing all work connected with the injection of the cementaceous grout to fill, seal and stabilize soft soils.

Subsurface Soil Stabilization
The subsurface soils stabilization program shall consist of pumping sand-cement grout with suitable chemical additives at the depths indicated and at pressures necessary to fill, stabilize and cement the soft soil to minimize the potential for future subsidence.

Contractor
The Pressure Grouting Contractor shall submit his qualifications to the Soil Engineer and Owner. The Contractor shall have at least five (5) years of experience in similar deep and shallow grouting jobs, and shall submit references of his activities. If requested by the Engineer, the resume of the field superintendent will also be provided. Prior to mobilization to the site and beginning work, the Contractor shall submit a project schedule and injection layout plan to Geo-Tech for approval. The Contractor shall also provide sufficient labor and equipment to ensure the project site is protected from pedestrians and non-essential construction vehicles by means of caution tape and/or protective fencing in order to provide a safe working environment for construction and non-construction personnel.

Equipment
a. **Grout Injection Equipment**: A continuous flow, positive displacement model with a pugmill type mixing vat having a minimum shaft speed of sixty (60) rpm and incorporated as an integral part of the "mudjack" equipment. Alternate equipment may be used at the discretion of the Soil Engineer.

b. **Mixer**: (If On-Site Mixing is Used) Machine driven rotary mixer with a minimum seven (7) cubic foot capacity; agitate during pumping operations.

c. **Injection Pipes**: Minimum diameter two (2) inch I.D., Maximum Diameter four (4) inch I.D.

d. **Pressure Gauge**: Sufficient size (4-inch face) in order to be legible while monitoring grouting pressures from a safe distance.

Grout Mixture
a. The mixture used for grouting shall be a creamy consistency which will permit the grout mixture, when set aside in a standard concrete test mold, to show less than one percent of the mixture height of free water on the surface after standing not less than twelve (12) hours. The grout mixture shall have a time of efflux (ASTM C939-81) greater than thirty-

five (35) seconds. Either of the following mixtures may be used, subject to minor variation of any of the constituents if found necessary to meet the above requirements.

For 1 c.y. yield

		Mix A		Mix B	
Fly Ash (Gs = 2.5)	-	500	pounds	---	
Cement (Gs = 3.15)	-	500	pounds	900	pounds
Water	-	55	gallons	55	gallons
Sand (Gs = 2.65)	-	2,300	pounds	2,300	pounds
Darex (or equal)	-	1	ounce	1	ounce
WRDA-79 (or equal)	-	45	ounces	45	ounces

b. One set of three (3) 4"x8" sample test cylinders shall be made for each mix preparation.

Grout Mixture and Placing

If on-site mixing is used, facilities shall be provided for accurately measured the ingredients in each batch of grout. Ingredients shall be thoroughly mixed and immediately pumped to the grouting needles through a flexible hose connection not more than two hundred fifty (250) feet long.

Pressure Grouting Procedure

a. The scope of this stabilization program includes vertical and angled grout injections at locations on about ten (10) centers. However, the program may be modified by the Soil Engineer as dictated by the actual field conditions encountered. If directed by the Soil Engineer, some injection locations may be deleted and/or alternate locations may be added to the program.

b. Grout needles shall be installed to a depth sufficient to encounter refusal conditions. The Contractor shall rotary drill (using a Bentonite slurry) the injection pipes to a minimum depth of fifteen (15) feet and then either drill or drive, at the discretion of the Soil Engineer, to the refusal depth. Any other method of installation shall not be accepted unless approved by the Engineer.

c. Following satisfactory installation of the injection pipes, grouting operations may begin. The rate of pumping shall not exceed six (6) cubic feet per minute. Pumping pressures are planned to be in the range of one-hundred (100) to one-hundred fifty (150) psi at the tip of the casing. The in-line pressure gauge is to be of sufficient size, in order to be legible while monitoring grouting pressures from a safe distance (4-inch face).

d. Upon completion of the deep stabilization, shallow grouting may be performed, at the discretion of the soil engineer, to re-level concrete slabs, footings, or other structures.

e. All grouting operations shall be monitored by a representative of Geo-Technologies, Inc.

Monitoring by Soil Engineer

The Soil Engineer will monitor the pressure grouting operations and will represent the Owner to assure compliance with the specifications outlined above and the duties discussed below. The Soil Engineer (Geo-Technologies, Inc.) shall recommend intervals of grouting and shall decide if additional or less grout is necessary.

a. The Soil Engineer can stop the grouting operation at any time, if, in his judgment, the operation does not comply with the specifications or the work is unsuitable and will not be responsible for damage to the lawn; landscape areas or structures due to grouting procedures.

b. The Soil Engineer will make all measurements of grout heave, settlement, and quantity pumped. The Soil Engineer will maintain records of each day's grouting operation for the benefit of the Owner and Contractor. The quantity recorded by the Engineer shall be considered the final amount of grout pumped for pay purposes. The Contractor will be responsible for laser equipment necessary to monitor at least three (3) locations continuously during the grout procedure for each injection point.

c. During grouting, the Soil Engineer shall observe any vertical movement of the ground. If a momentary downward movement is observed, the grouting operation shall cease and observations shall continue for thirty (30) minutes. If the ground does not return to its original grade, pumping shall be resumed at a lower rate of discharge. If upward movement is observed, the grouting operation shall cease.

d. The Contractor shall exercise care when grouting beneath and adjacent to existing structures. The Contractor is responsible for ensuring that the grouting operation does not cause unnecessary damage to existing structures.

e. When grout injection points are fifteen (15) feet or shallower, measured from existing grade, the Engineer should be notified. These points may be abandoned or relocated after meeting with the Engineer.

f. Pressure grouting will continue until the bottom of the pin is within fifteen (15) feet of the existing ground surface. At this point, pressure grouting will be stopped unless otherwise directed by the Engineer or his representative.

Method of Payment

Unit prices per cubic yard of grout, per foot for pipe installation/removal, and per day of shallow grouting shall be applicable to quantities over or under the estimated amounts.

CITY OF OCALA ENGINEERING DEPARTMENT

PROPOSED TRAFFIC SIGNAL MAST ARMS
SW 44TH AVENUE AND SW 20TH STREET
OCALA, FLORIDA

GROUT INJECTION PLAN

GEO-TECH, INC.

■GEOTECHNICAL ■ENVIRONMENTAL
■CONSTRUCTION MATERIALS TESTING ■GEOPHYSICAL EXPLORATION

1016 SE 3rd AVENUE, OCALA, FLORIDA 34471 ~ (352) 894-7711

PROJECT NO.	21-3006.193.1
SCALE:	N.T.S.
DATE:	12-30-21
FIGURE:	1

APPENDIX II

SOIL PROFILES

Log of Borehole: B-1

Project: TRAFFIC SIGNAL ARMS, SE 44 AVE AND SW 20 ST, OCALA

Project No: 21-3006.193.1

Boring Location: NW CORNER OF SE 44 AVE AND SW 20 ST

Engineer: NJH/DAC

Client: CITY OF OCALA ENGINEERING DEPARTMENT

Enclosure: SITE PLAN

GEO-TECH, INC.
ENGINEERING CONSULTANTS
1016 SE 3rd Avenue
Ocala, Florida
352.694.7711
WWW.GEOTECHFL.COM

Depth (ft)	Symbol	Description	Consistency	Depth/Elev.	Number	Type	Blows/ft	Standard Penetration Test N-Values (0 20 40 60 80 100)
0		Ground Surface		0.0				
0–9		**FINE SAND** BROWN TO LIGHT BROWN FINE SAND (SP)	HAND AUGERED POSSIBLE UTILITIES					
			LOOSE		1		8	8
			LOOSE	9.0	2		7	7
9–18		**CLAYEY SAND** YELLOWISH BROWN TO GREY AND YELLOWISH BROWN CLAYEY SAND (SC) LABORATORY TESTING AT 9.5 FEET % PASS -200 = 27.3 ATTERBERG LIMITS: PL=16, LL=44, PI=28	MEDIUM DENSE		3		26	26
				18.5				
18–30		**FINE SAND** LIGHT GREY FINE SAND (SP)	DENSE		4		47	47
			MEDIUM DENSE		5		24	24
			MEDIUM DENSE	30.0	6		27	27
30		End of Borehole						

Ground Water Depth: GREATER THAN 10.0 FEET

Drill Date: DECEMBER 22, 2021

Drilled By: WH/CC/LE

Drill Method: ASTM D-1586

Remarks: (SP) UNIFIED SOIL CLASSIFICATION SYMBOL AS DETERMINED BY VISUAL REVIEW

Soil Profile : 1 OF 4

Log of Borehole: B-2

Project: TRAFFIC SIGNAL ARMS, SE 44 AVE AND SW 20 ST, OCALA
Project No: 21-3006.193.1

Boring Location: NE CORNER OF SE 44 AVE AND SW 20 ST
Engineer: NJH/DAC

Client: CITY OF OCALA ENGINEERING DEPARTMENT
Enclosure: SITE PLAN

GEO-TECH, INC.
ENGINEERING CONSULTANTS
1016 SE 3rd Avenue
Ocala, Florida
352.694.7711
WWW.GEOTECHFL.COM

Depth (ft)	Symbol	Description	Consistency	Depth/Elev.	Number	Type	Blows/ft	Standard Penetration Test N-Values (0 20 40 60 80 100)
0		Ground Surface		0.0				
0–18		**FINE SAND** BROWN TO LIGHT BROWN FINE SAND (SP)	HAND AUGERED POSSIBLE UTILITIES					
6–7			LOOSE		1		6	6
8–9			LOOSE		2		5	5
13–14			MEDIUM DENSE		3		11	11
18				18.5				
18–33		**CLAYEY SAND** GREY AND BROWN CLAYEY SAND (SC)	MEDIUM DENSE		4		26	26
23–24			MEDIUM DENSE		5		23	23
28–29			LOOSE		6		4	4
30–32			WOH (30.5'-32.0')		7		0	0
33				33.5				
34–35		**LIMESTONE** LIGHT BROWN LIMESTONE	50 BLOWS - 5"	35.0	8		50	50
36		End of Borehole						

Ground Water Depth: GREATER THAN 10.0 FEET
Drill Date: DECEMBER 22, 2021

Drilled By: WH/CC/LE
Drill Method: ASTM D-1586

Remarks: (SP) UNIFIED SOIL CLASSIFICATION SYMBOL AS DETERMINED BY VISUAL REVIEW

Soil Profile : 2 OF 4

Log of Borehole: B-3

Project: TRAFFIC SIGNAL ARMS, SE 44 AVE AND SW 20 ST, OCALA
Project No: 21-3006.193.1

Boring Location: SW CORNER OF SE 44 AVE AND SW 20 ST
Engineer: NJH/DAC

Client: CITY OF OCALA ENGINEERING DEPARTMENT
Enclosure: SITE PLAN

GEO-TECH, INC.
ENGINEERING CONSULTANTS
1016 SE 3rd Avenue
Ocala, Florida
352.694.7711
WWW.GEOTECHFL.COM

Depth (ft)	Symbol	Description	Consistency	Depth/Elev.	Number	Type	Blows/ft	Standard Penetration Test N-Values (0 20 40 60 80 100)
0		Ground Surface		0.0				
0–18		**FINE SAND** BROWN TO LIGHT BROWN FINE SAND (SP)	HAND AUGERED POSSIBLE UTILITIES					
6–7			LOOSE		1		9	9
8–9			LOOSE		2		7	7
13–14			MEDIUM DENSE		3		23	23
18				18.5				
19–20		**CLAYEY SAND** GREY AND BROWN CLAYEY SAND (SC)	DENSE		4		31	31
24–25			MEDIUM DENSE		5		19	19
29			MEDIUM DENSE	30.0	6		13	13
30		End of Borehole						

Ground Water Depth: GREATER THAN 10.0 FEET
Drill Date: DECEMBER 22, 2021

Drilled By: WH/CC/LE
Drill Method: ASTM D-1586

Remarks: (SP) UNIFIED SOIL CLASSIFICATION SYMBOL AS DETERMINED BY VISUAL REVIEW

Soil Profile : 3 OF 4

Log of Borehole: B-4

Project: TRAFFIC SIGNAL ARMS, SE 44 AVE AND SW 20 ST, OCALA
Project No: 21-3006.193.1

Boring Location: SE CORNER OF SE 44 AVE AND SW 20 ST
Engineer: NJH/DAC

Client: CITY OF OCALA ENGINEERING DEPARTMENT
Enclosure: SITE PLAN

GEO-TECH, INC.
ENGINEERING CONSULTANTS
1016 SE 3rd Avenue
Ocala, Florida
352.694.7711
WWW.GEOTECHFL.COM

Depth (ft)	Symbol	Description	Consistency	Depth/Elev.	Number	Type	Blows/ft	Standard Penetration Test N-Values (0 20 40 60 80 100)
0		Ground Surface		0.0				
0–3		**LIMESTONE** LIGHT BROWN LIMESTONE	HAND AUGERED POSSIBLE UTILITIES	3.0				
3–8		**FINE SAND** BROWN FINE SAND (SP)	LOOSE		1		4	4
			LOOSE	8.0	2		8	8
8–18		**CLAYEY SAND** GREY AND YELLOWISH BROWN LABORATORY TESTING AT 9.0 FEET % PASS -200 = 37.2 ATTERBERG LIMITS: PL=26, LL=44, PI=18	MEDIUM DENSE		3		14	14
			MEDIUM DENSE		4		29	29
18–19		**LIMESTONE** LIGHT BROWN LIMESTONE	50 BLOWS - 5"	18.0 19.0	5		50	50
		End of Borehole						

Ground Water Depth: GREATER THAN 10.0 FEET
Drill Date: DECEMBER 22, 2021

Drilled By: WH/CC/LE
Drill Method: ASTM D-1586

Remarks: (SP) UNIFIED SOIL CLASSIFICATION SYMBOL AS DETERMINED BY VISUAL REVIEW

Soil Profile : 4 OF 4

APPENDIX III

BORING LOCATION MAP

CITY OF OCALA ENGINEERING DEPARTMENT

PROPOSED TRAFFIC SIGNAL MAST ARMS
SW 44TH AVENUE AND SW 20TH STREET
OCALA, FLORIDA

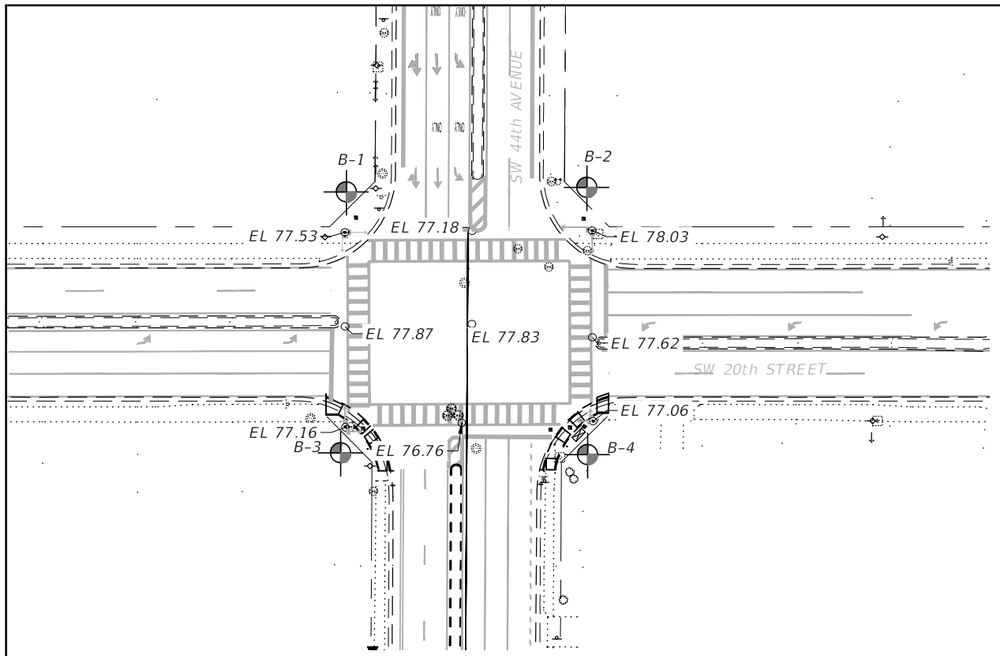
BORING LOCATION MAP

GEO-TECH, INC.

■GEOTECHNICAL ■ENVIRONMENTAL
■CONSTRUCTION MATERIALS TESTING ■GEOPHYSICAL EXPLORATION

1016 SE 3rd AVENUE, OCALA, FLORIDA 34471 ~ (352) 694-7711

PROJECT NO.	21-3006.193.1
SCALE:	N.T.S.
DATE:	12-30-21
FIGURE:	2



BORING LOCATION PLAN

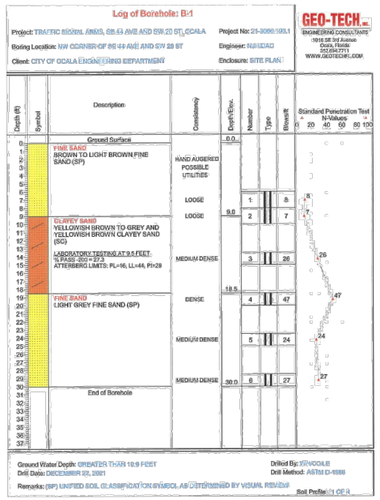
Table 1: Soil Parameters

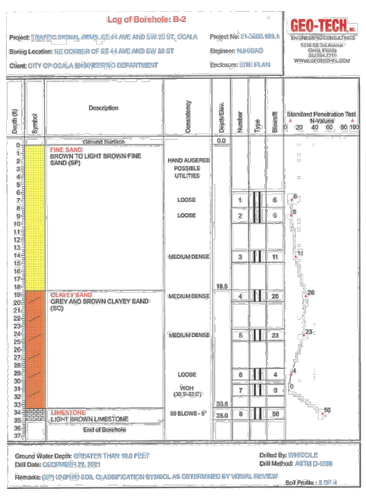
Boring No.	Depth Below Ground Surface (ft.)	USCS Soil Type	Average N-Value	Unit Weight (pcf)		Angle of Internal Friction (degrees)	Cohesion (psf)	Modulus of Lateral Subgrade Reaction, k (pci)
				γ_{sat}	γ_{sub}			
B-1	0.0 to 9.0	SP	8	105	42	26	0	25
	9.0 to 18.5	SC	16	110	47	28	0	100
	18.5 to 30.0	SP	33	120	57	29	0	100
B-2*	0.0 to 18.5	SP	7	105	42	26	0	25
	18.5 to 33.5	SC	13	110	47	27	0	100
	33.5 to 35.0	LS	50	135	72	-	0	-
B-3	0.0 to 18.5	SP	13	110	47	27	0	100
	18.5 to 30.0	SC	21	115	52	28	0	100
B-4	0.0 to 3.0	LS	-	-	-	-	0	-
	3.0 to 8.0	SP	6	105	42	26	0	25
	8.0 to 18.0	SC	22	115	52	28	0	100
	18.0 to 19.0	LS	50	135	72	-	0	-

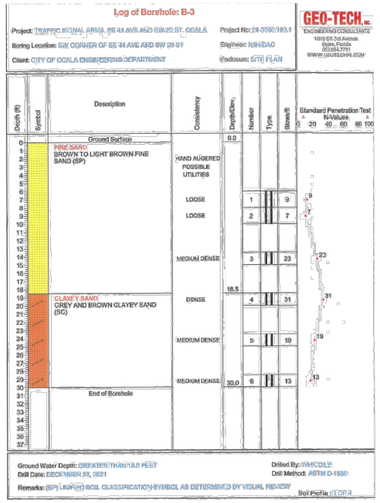
*Soil parameters based on soil consistencies prior to compaction grouting.

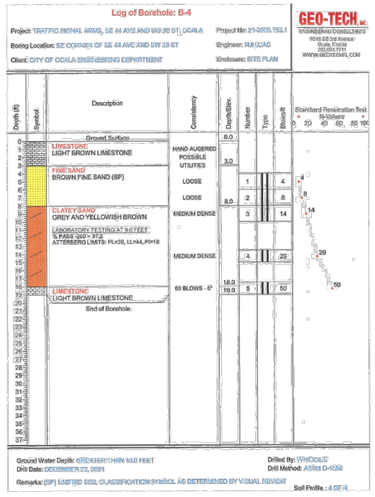
1" = 80'

N









LEGEND

- FINE SAND
- CLAYEY SAND
- LIMESTONE
- SP — UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487) GROUND SYMBOL AS DETERMINED BY VISUAL REVIEW FOR CONFIRMATION OF VISUAL REVIEW
- N — NUMBER TO THE LEFT OF BORINGS INDICATE SPT VALUE FOR 12 INCHES OF PENETRATON (UNLESS OTHERWISE NOTED)
- 50/4 — NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION
- HA — HAND AUGERED TO VERIFY UTILITY CLEARANCE
- WH — SPLIT-SPOON SAMPLER ADVANCED UNDER WEIGHT OF ROD AND HAMMER
- -200 — PERCENT PASSING#200 SIEVE
- NMC — NATURAL MOISTURE CONTENT (%)
- LL — LIQUID LIMIT (%)
- PI — PLASTICITY INDEX(%)
- APPROXIMATE SPT BORING LOCATION
- GNA — GROUNDWATER NOT APPARENT DUE TO THE INTRODUCTION OF DRILLING FLUID
- CASING

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION
----	----		

NOEL JOHN COOPER, P.E.
P.E. LICENSE NUMBER 69534
STATE OF FLORIDA, DATE: _____
VALID ONLY WITH EMBOSSED SEAL.

PREPARED BY
OCALA
CITY ENGINEER'S OFFICE

PROJECT NAME: SW 44TH AVE. AT SW 20TH ST SIGNALIZATION

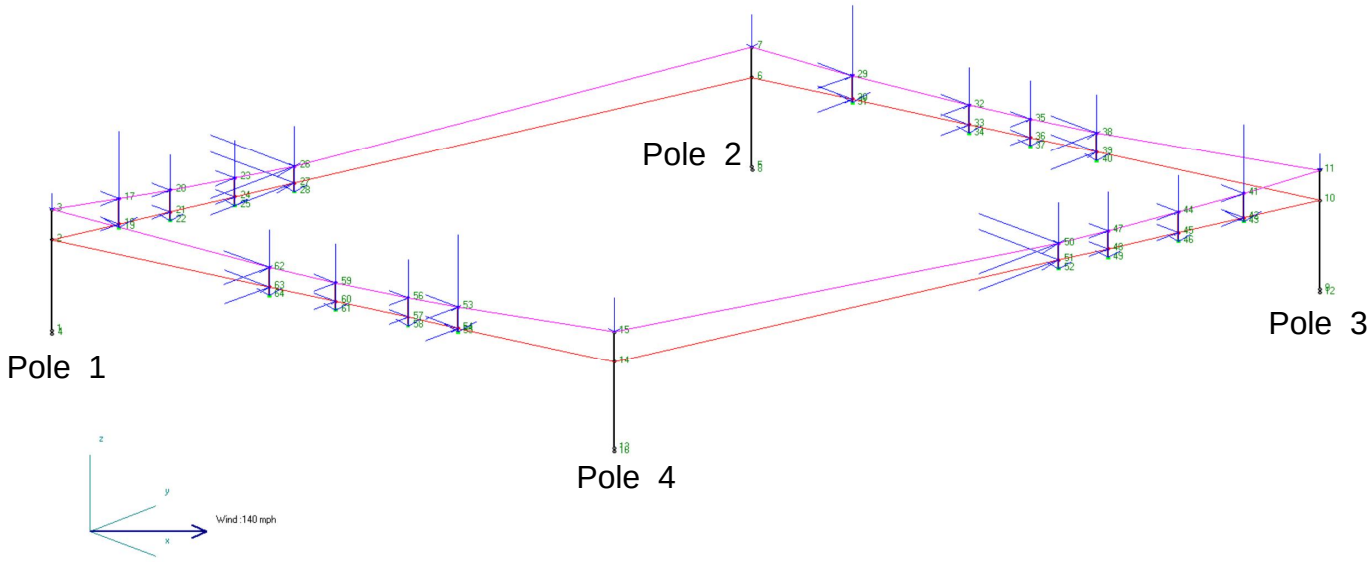
SOIL BORING DATA

SHEET NO. T13

Gary Anson 12/12/2023 4:28:34 PM T:_sd-ENG-Transportation\Projects\2022\600 TRAFFIC\22602 SW 44th Avenue and SW 20th Street Signal Design\02260211111\Signals\PLANSG01.dwg

5.0 SW 44th Ave and SW 20th St.

5.1 ATLAS MODEL



5.1.1 INPUT AT 0º

```
VERSION NUMBER 7.2.0

CONTROL
TITLE = Box Model @0deg.in
MODEL = TWO
NODES = 64
CLEAR = 307.12
TOPDIST = 12.00
CABLE = 8
SPEED = 140.00
ANGLE = 0.00
STATUS = CHECK
KZFAC = 1
GUST = 1.14
DIRECT = 0.85
DEADLOADFAC = 1.10
WINLOADFAC = 1.00
COEFFFLAG = 1
DRAG = 0.6
UPLIFT = 0
CUSTOMFLAG = 0
:
CABLES
   1   3   7   S= 5.00   W= 4.333E-05   P= 0
   2   2   6   T= 1.00   W= 4.333E-05   P= 1
   3   7  11   S= 5.00   W= 4.333E-05   P= 0
   4   6  10   T= 1.00   W= 4.333E-05   P= 1
   5  11  15   S= 5.00   W= 4.333E-05   P= 0
   6  10  14   T= 1.00   W= 4.333E-05   P= 1
   7  15   3   S= 5.00   W= 4.333E-05   P= 0
   8  14   2   T= 1.00   W= 4.333E-05   P= 1
:
COORDINATE
    1 X= 3.6000000E+01 Y= 0.0000000E+00 Z= 0.0000000E+00
    2 X= 3.6000000E+01 Y= 0.0000000E+00 Z= 2.8912000E+02
    3 X= 3.6000000E+01 Y= 0.0000000E+00 Z= 3.8514077E+02
    4 X= 5.3248033E+01 Y= -1.6688480E+01 Z= 0.0000000E+00
    5 X= 0.0000000E+00 Y= 1.5600000E+03 Z= 1.2000000E+00
    6 X= 0.0000000E+00 Y= 1.5600000E+03 Z= 2.8912000E+02
    7 X= 0.0000000E+00 Y= 1.5600000E+03 Z= 3.8514077E+02
    8 X= 1.7247223E+01 Y= 1.5433107E+03 Z= 1.2000000E+00
    9 X= 1.2240000E+03 Y= 1.5720000E+03 Z= 5.6400000E+00
   10 X= 1.2240000E+03 Y= 1.5720000E+03 Z= 2.8912000E+02
   11 X= 1.2240000E+03 Y= 1.5720000E+03 Z= 3.8514077E+02
   12 X= 1.2411829E+03 Y= 1.5552445E+03 Z= 5.6400000E+00
   13 X= 1.2480000E+03 Y= 1.2000000E+01 Z= 1.1640000E+01
   14 X= 1.2480000E+03 Y= 1.2000000E+01 Z= 2.8912000E+02
   15 X= 1.2480000E+03 Y= 1.2000000E+01 Z= 3.8514077E+02
   16 X= 1.2651837E+03 Y= -4.7546699E+00 Z= 1.1640000E+01
   17 X= 3.2400000E+01 Y= 1.5000000E+02 C=    1
   18 X= 3.2400000E+01 Y= 1.5000000E+02 Z= 2.8912000E+02
```

```
   19 X= 3.2400000E+01 Y= 1.5000000E+02 Z= 2.7712000E+02
   20 X= 3.0000000E+01 Y= 2.6400000E+02 C=    1
   21 X= 3.0000000E+01 Y= 2.6400000E+02 Z= 2.8912000E+02
   22 X= 3.0000000E+01 Y= 2.6400000E+02 Z= 2.6106000E+02
   23 X= 2.6400000E+01 Y= 4.0800000E+02 C=    1
   24 X= 2.6400000E+01 Y= 4.0800000E+02 Z= 2.8912000E+02
   25 X= 2.6400000E+01 Y= 4.0800000E+02 Z= 2.6106000E+02
   26 X= 2.4000000E+01 Y= 5.4000000E+02 C=    1
   27 X= 2.4000000E+01 Y= 5.4000000E+02 Z= 2.8912000E+02
   28 X= 2.4000000E+01 Y= 5.4000000E+02 Z= 2.6106000E+02
   29 X= 2.1600000E+02 Y= 1.5624000E+03 C=    3
   30 X= 2.1600000E+02 Y= 1.5624000E+03 Z= 2.8912000E+02
   31 X= 2.1600000E+02 Y= 1.5624000E+03 Z= 2.7712000E+02
   32 X= 4.6800000E+02 Y= 1.5648000E+03 C=    3
   33 X= 4.6800000E+02 Y= 1.5648000E+03 Z= 2.8912000E+02
   34 X= 4.6800000E+02 Y= 1.5648000E+03 Z= 2.6106000E+02
   35 X= 6.0000000E+02 Y= 1.5660000E+03 C=    3
   36 X= 6.0000000E+02 Y= 1.5660000E+03 Z= 2.8912000E+02
   37 X= 6.0000000E+02 Y= 1.5660000E+03 Z= 2.6106000E+02
   38 X= 7.4400000E+02 Y= 1.5672000E+03 C=    3
   39 X= 7.4400000E+02 Y= 1.5672000E+03 Z= 2.8912000E+02
   40 X= 7.4400000E+02 Y= 1.5672000E+03 Z= 2.6106000E+02
   41 X= 1.2264000E+03 Y= 1.4040000E+03 C=    5
   42 X= 1.2264000E+03 Y= 1.4040000E+03 Z= 2.8912000E+02
   43 X= 1.2264000E+03 Y= 1.4040000E+03 Z= 2.7712000E+02
   44 X= 1.2288000E+03 Y= 1.2600000E+03 C=    5
   45 X= 1.2288000E+03 Y= 1.2600000E+03 Z= 2.8912000E+02
   46 X= 1.2288000E+03 Y= 1.2600000E+03 Z= 2.6106000E+02
   47 X= 1.2312000E+03 Y= 1.1040000E+03 C=    5
   48 X= 1.2312000E+03 Y= 1.1040000E+03 Z= 2.8912000E+02
   49 X= 1.2312000E+03 Y= 1.1040000E+03 Z= 2.6106000E+02
   50 X= 1.2324000E+03 Y= 9.9600000E+02 C=    5
   51 X= 1.2324000E+03 Y= 9.9600000E+02 Z= 2.8912000E+02
   52 X= 1.2324000E+03 Y= 9.9600000E+02 Z= 2.6106000E+02
   53 X= 9.1200000E+02 Y= 8.4000000E+00 C=    7
   54 X= 9.1200000E+02 Y= 8.4000000E+00 Z= 2.8912000E+02
   55 X= 9.1200000E+02 Y= 8.4000000E+00 Z= 2.7712000E+02
   56 X= 8.0400000E+02 Y= 7.2000000E+00 C=    7
   57 X= 8.0400000E+02 Y= 7.2000000E+00 Z= 2.8912000E+02
   58 X= 8.0400000E+02 Y= 7.2000000E+00 Z= 2.6106000E+02
   59 X= 6.4800000E+02 Y= 6.0000000E+00 C=    7
   60 X= 6.4800000E+02 Y= 6.0000000E+00 Z= 2.8912000E+02
   61 X= 6.4800000E+02 Y= 6.0000000E+00 Z= 2.6106000E+02
   62 X= 5.0400000E+02 Y= 4.8000000E+00 C=    7
   63 X= 5.0400000E+02 Y= 4.8000000E+00 Z= 2.8912000E+02
   64 X= 5.0400000E+02 Y= 4.8000000E+00 Z= 2.6106000E+02
:
BOUNDARY
    1 DOF= f f f f f f
    2 DOF= r r r r r r
    3 DOF= r r r r r r
```

```
 4 DOF= f f f f f f
 5 DOF= f f f f f f
 6 DOF= r r r r r r
 7 DOF= r r r r r r
 8 DOF= f f f f f f
 9 DOF= f f f f f f
10 DOF= r r r r r r
11 DOF= r r r r r r
12 DOF= f f f f f f
13 DOF= f f f f f f
14 DOF= r r r r r r
15 DOF= r r r r r r
16 DOF= f f f f f f
17 DOF= r r r r r r
18 DOF= r r r r r r
19 DOF= r r r r r r
20 DOF= r r r r r r
21 DOF= r r r r r r
22 DOF= r r r r r r
23 DOF= r r r r r r
24 DOF= r r r r r r
25 DOF= r r r r r r
26 DOF= r r r r r r
27 DOF= r r r r r r
28 DOF= r r r r r r
29 DOF= r r r r r r
30 DOF= r r r r r r
31 DOF= r r r r r r
32 DOF= r r r r r r
33 DOF= r r r r r r
34 DOF= r r r r r r
35 DOF= r r r r r r
36 DOF= r r r r r r
37 DOF= r r r r r r
38 DOF= r r r r r r
39 DOF= r r r r r r
40 DOF= r r r r r r
41 DOF= r r r r r r
42 DOF= r r r r r r
43 DOF= r r r r r r
44 DOF= r r r r r r
45 DOF= r r r r r r
46 DOF= r r r r r r
47 DOF= r r r r r r
48 DOF= r r r r r r
49 DOF= r r r r r r
50 DOF= r r r r r r
51 DOF= r r r r r r
52 DOF= r r r r r r
53 DOF= r r r r r r
54 DOF= r r r r r r
```

```
   55 DOF= r r r r r r
   56 DOF= r r r r r r
   57 DOF= r r r r r r
   58 DOF= r r r r r r
   59 DOF= r r r r r r
   60 DOF= r r r r r r
   61 DOF= r r r r r r
   62 DOF= r r r r r r
   63 DOF= r r r r r r
   64 DOF= r r r r r r
:
PRIMARY
    20,    1
  1 A= 0.1500 E= 2.45000E+04
   1     3,  17 M= 1 C= 1
   2    17,  20 M= 1 C= 1
   3    20,  23 M= 1 C= 1
   4    23,  26 M= 1 C= 1
   5    26 ,  7 M= 1 C= 1
   6     7,  29 M= 1 C= 3
   7    29,  32 M= 1 C= 3
   8    32,  35 M= 1 C= 3
   9    35,  38 M= 1 C= 3
  10    38,  11 M= 1 C= 3
  11    11,  41 M= 1 C= 5
  12    41,  44 M= 1 C= 5
  13    44,  47 M= 1 C= 5
  14    47,  50 M= 1 C= 5
  15    50,  15 M= 1 C= 5
  16    15,  53 M= 1 C= 7
  17    53,  56 M= 1 C= 7
  18    56,  59 M= 1 C= 7
  19    59,  62 M= 1 C= 7
  20    62 ,  3 M= 1 C= 7
:
SECONDARY
    20,    1
  1 A= 0.1500 E= 2.45000E+04
   1     2,  18 M= 1 C= 2
   2    18,  21 M= 1 C= 2
   3    21,  24 M= 1 C= 2
   4    24,  27 M= 1 C= 2
   5    27 ,  6 M= 1 C= 2
   6     6,  30 M= 1 C= 4
   7    30,  33 M= 1 C= 4
   8    33,  36 M= 1 C= 4
   9    36,  39 M= 1 C= 4
  10    39,  10 M= 1 C= 4
  11    10,  42 M= 1 C= 6
  12    42,  45 M= 1 C= 6
  13    45,  48 M= 1 C= 6
```

```
  14    48,  51 M= 1 C= 6
  15    51,  14 M= 1 C= 6
  16    14,  54 M= 1 C= 8
  17    54,  57 M= 1 C= 8
  18    57,  60 M= 1 C= 8
  19    60,  63 M= 1 C= 8
  20    63 ,  2 M= 1 C= 8
:
CONNECTORS
   16,    2
 1 A= 0.5966 E= 1.00000E+04 I= 2.84200E-01, 4.60000E-03  \\
    J= 2.88800E-01 G= 3.75940E+03
 2 A= 0.5966 E= 1.00000E+04 I= 2.84200E-01, 4.60000E-03  \\
    J= 2.88800E-01 G= 3.75940E+03
   1    17,  18,   3 M= 1
   2    20,  21,   3 M= 2
   3    23,  24,   3 M= 2
   4    26,  27,   3 M= 2
   5    29,  30,   7 M= 1
   6    32,  33,   7 M= 2
   7    35,  36,   7 M= 2
   8    38,  39,   7 M= 2
   9    41,  42,  11 M= 1
  10    44,  45,  11 M= 2
  11    47,  48,  11 M= 2
  12    50,  51,  11 M= 2
  13    53,  54,  15 M= 1
  14    56,  57,  15 M= 2
  15    59,  60,  15 M= 2
  16    62,  63,  15 M= 2
:
LIGHTS
   16,    2
  1 A= 0.5966 E= 1.00000E+04 I= 2.84200E-01, 4.60000E-03  \\
    J= 2.88800E-01 G= 3.75940E+03 S= 0 B= 0 P= 2.30400E+03, 0.00000E+00
  2 A= 0.5966 E= 1.00000E+04 I= 2.84200E-01, 4.60000E-03  \\
    J= 2.88800E-01 G= 3.75940E+03 S= 1 B= 6 P= 1.55328E+03, 1.55328E+03
   1    18,  19,   3 M= 1
   2    21,  22,   3 M= 2
   3    24,  25,   3 M= 2
   4    27,  28,   3 M= 2
   5    30,  31,   7 M= 1
   6    33,  34,   7 M= 2
   7    36,  37,   7 M= 2
   8    39,  40,   7 M= 2
   9    42,  43,  11 M= 1
  10    45,  46,  11 M= 2
  11    48,  49,  11 M= 2
  12    51,  52,  11 M= 2
  13    54,  55,  15 M= 1
  14    57,  58,  15 M= 2
```

```
  15    60,  61,  15 M= 2
  16    63,  64,  15 M= 2
:
BEAM
    8,    1
  1 S= 1 T= NVIII X= PVIII FC= 6000.0
   1     1,   2,   4  M= 1
   2     2,   3,   4  M= 1
   3     5,   6,   8  M= 1
   4     6,   7,   8  M= 1
   5     9,  10,  12  M= 1
   6    10,  11,  12  M= 1
   7    13,  14,  16  M= 1
   8    14,  15,  16  M= 1
:
SIGNS
  17 F= 0.00000E+00, 0.00000E+00, -9.23957E-02
  20 F= 0.00000E+00, 0.00000E+00, -6.59599E-02
  23 F= 0.00000E+00, 0.00000E+00, -6.55234E-02
  26 F= 0.00000E+00, 0.00000E+00, -8.40024E-02
  29 F= 0.00000E+00, 0.00000E+00, -9.63938E-02
  32 F= 0.00000E+00, 0.00000E+00, -6.79829E-02
  35 F= 0.00000E+00, 0.00000E+00, -6.54671E-02
  38 F= 0.00000E+00, 0.00000E+00, -7.31760E-02
  41 F= 0.00000E+00, 0.00000E+00, -9.32949E-02
  44 F= 0.00000E+00, 0.00000E+00, -6.65667E-02
  47 F= 0.00000E+00, 0.00000E+00, -6.49974E-02
  50 F= 0.00000E+00, 0.00000E+00, -8.25972E-02
  53 F= 0.00000E+00, 0.00000E+00, -9.52231E-02
  56 F= 0.00000E+00, 0.00000E+00, -6.54545E-02
  59 F= 0.00000E+00, 0.00000E+00, -6.60164E-02
  62 F= 0.00000E+00, 0.00000E+00, -7.29607E-02
:
WIND
  17 F= 2.46356E-02, 0.00000E+00, 0.00000E+00
  18 F= 2.45129E-02, 0.00000E+00, 0.00000E+00
  20 F= 2.40280E-02, 0.00000E+00, 0.00000E+00
  21 F= 2.39557E-02, 0.00000E+00, 0.00000E+00
  23 F= 2.56718E-02, 0.00000E+00, 0.00000E+00
  24 F= 2.56271E-02, 0.00000E+00, 0.00000E+00
  26 F= 1.07060E-01, 0.00000E+00, 0.00000E+00
  27 F= 1.06965E-01, 0.00000E+00, 0.00000E+00
  29 F= 4.47086E-04, 0.00000E+00, 0.00000E+00
  30 F= 4.45688E-04, 0.00000E+00, 0.00000E+00
  32 F= 3.34591E-04, 0.00000E+00, 0.00000E+00
  33 F= 3.34266E-04, 0.00000E+00, 0.00000E+00
  35 F= 2.22865E-04, 0.00000E+00, 0.00000E+00
  36 F= 2.22844E-04, 0.00000E+00, 0.00000E+00
  38 F= 5.58302E-04, 0.00000E+00, 0.00000E+00
  39 F= 5.57110E-04, 0.00000E+00, 0.00000E+00
  41 F= 2.91050E-02, 0.00000E+00, 0.00000E+00
```

```
  42 F= 2.89697E-02, 0.00000E+00, 0.00000E+00
  44 F= 2.79276E-02, 0.00000E+00, 0.00000E+00
  45 F= 2.78555E-02, 0.00000E+00, 0.00000E+00
  47 F= 2.45468E-02, 0.00000E+00, 0.00000E+00
  48 F= 2.45129E-02, 0.00000E+00, 0.00000E+00
  50 F= 1.01492E-01, 0.00000E+00, 0.00000E+00
  51 F= 1.01394E-01, 0.00000E+00, 0.00000E+00
  53 F= 4.47045E-04, 0.00000E+00, 0.00000E+00
  54 F= 4.45688E-04, 0.00000E+00, 0.00000E+00
  56 F= 2.22961E-04, 0.00000E+00, 0.00000E+00
  57 F= 2.22844E-04, 0.00000E+00, 0.00000E+00
  59 F= 2.22869E-04, 0.00000E+00, 0.00000E+00
  60 F= 2.22844E-04, 0.00000E+00, 0.00000E+00
  62 F= 5.58327E-04, 0.00000E+00, 0.00000E+00
  63 F= 5.57110E-04, 0.00000E+00, 0.00000E+00
:
LOADS
   3 F= 0.00000E+00, 0.00000E+00, -1.34380E-02
   7 F= 0.00000E+00, 0.00000E+00, -2.68283E-02
  11 F= 0.00000E+00, 0.00000E+00, -1.40893E-02
  15 F= 0.00000E+00, 0.00000E+00, -2.86513E-02
  17 F= 0.00000E+00, 0.00000E+00, -9.07292E-03
  18 F= 0.00000E+00, 0.00000E+00, -3.32279E-03
  19 F= 0.00000E+00, 0.00000E+00, -8.00000E-02
  20 F= 0.00000E+00, 0.00000E+00, -8.51234E-03
  21 F= 0.00000E+00, 0.00000E+00, -2.90396E-03
  22 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  23 F= 0.00000E+00, 0.00000E+00, -8.48588E-03
  24 F= 0.00000E+00, 0.00000E+00, -2.49399E-03
  25 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  26 F= 0.00000E+00, 0.00000E+00, -2.72238E-02
  27 F= 0.00000E+00, 0.00000E+00, -2.23503E-03
  28 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  29 F= 0.00000E+00, 0.00000E+00, -1.32824E-02
  30 F= 0.00000E+00, 0.00000E+00, -3.11140E-03
  31 F= 0.00000E+00, 0.00000E+00, -8.00000E-02
  32 F= 0.00000E+00, 0.00000E+00, -1.08838E-02
  33 F= 0.00000E+00, 0.00000E+00, -2.55550E-03
  34 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  35 F= 0.00000E+00, 0.00000E+00, -8.45216E-03
  36 F= 0.00000E+00, 0.00000E+00, -2.47138E-03
  37 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  38 F= 0.00000E+00, 0.00000E+00, -1.60904E-02
  39 F= 0.00000E+00, 0.00000E+00, -2.54197E-03
  40 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  41 F= 0.00000E+00, 0.00000E+00, -1.00436E-02
  42 F= 0.00000E+00, 0.00000E+00, -3.25125E-03
  43 F= 0.00000E+00, 0.00000E+00, -8.00000E-02
  44 F= 0.00000E+00, 0.00000E+00, -9.27038E-03
  45 F= 0.00000E+00, 0.00000E+00, -2.75272E-03
  46 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
```

```
  47 F= 0.00000E+00, 0.00000E+00, -8.09114E-03
  48 F= 0.00000E+00, 0.00000E+00, -2.36267E-03
  49 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  50 F= 0.00000E+00, 0.00000E+00, -2.58696E-02
  51 F= 0.00000E+00, 0.00000E+00, -2.18404E-03
  52 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  53 F= 0.00000E+00, 0.00000E+00, -1.24366E-02
  54 F= 0.00000E+00, 0.00000E+00, -2.78654E-03
  55 F= 0.00000E+00, 0.00000E+00, -8.00000E-02
  56 F= 0.00000E+00, 0.00000E+00, -8.31691E-03
  57 F= 0.00000E+00, 0.00000E+00, -2.59406E-03
  58 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  59 F= 0.00000E+00, 0.00000E+00, -8.98688E-03
  60 F= 0.00000E+00, 0.00000E+00, -2.48594E-03
  61 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  62 F= 0.00000E+00, 0.00000E+00, -1.58527E-02
  63 F= 0.00000E+00, 0.00000E+00, -2.56436E-03
  64 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
:
GENERATE
CLEAR=19.50 VELOCITY=140.0 ANGLE=0.0 STAT=2 SAG=0.050 DIFF=1.50 TOPDIST=1.00
:
SYSTEM
MODEL TYPE= TWO - POINT
:
POLES
M=1 S=1 TYPE=NVIII XTYPE=PVIII FC=6000.0
P=1 X=3.0 Y=0.0 Z=0.00 M=1
P=2 X=0.0 Y=130.0 Z=0.10 M=1
P=3 X=102.0 Y=131.0 Z=0.47 M=1
P=4 X=104.0 Y=1.0 Z=0.97 M=1
:
WIRES
M=1 D=8,8 E=24500,24500 T=1.00
W=1 POLES=1,2 M=1
W=2 POLES=2,3 M=1
W=3 POLES=3,4 M=1
W=4 POLES=4,1 M=1
:
SIGNAL
M=1 R=3.00 S=1 D=12 E=W6 L=AL G=3
M=2 R=3.00 N=YES A=OTHER ,2304.0 C=12.0 W=5.000 D=Y
S=1 X=2.5 Y=22.0 M=1 C=1
S=2 X=2.2 Y=34.0 M=1 C=1
S=3 X=2.0 Y=45.0 M=1 C=1
S=4 X=39.0 Y=130.4 M=1 C=2
S=5 X=50.0 Y=130.5 M=1 C=2
S=6 X=62.0 Y=130.6 M=1 C=2
S=7 X=102.4 Y=105.0 M=1 C=3
S=8 X=102.6 Y=92.0 M=1 C=3
S=9 X=102.7 Y=83.0 M=1 C=3
```

```
S=10 X=67.0 Y=0.6 M=1 C=4
S=11 X=54.0 Y=0.5 M=1 C=4
S=12 X=42.0 Y=0.4 M=1 C=4
S=13 X=2.7 Y=12.5 M=2 C=1
S=14 X=18.0 Y=130.2 M=2 C=2
S=15 X=102.2 Y=117.0 M=2 C=3
S=16 X=76.0 Y=0.7 M=2 C=4
:
GRIDDIM
G=200 D=10
:
DESIGN
S=2 F=0.00 W=0.600 G=38.40 P=21.70 WR=0.500
:
```

5.1.2 OUTPUT AT 0º

```
*************************************************************************
|       ##          #####        #                ##           ####     |
|      #  #           #          #               #  #         #         |
|     #    #          #          #              #    #         ####     |
|     ######          #          #              ######             #    |
|     #    #          #          #              #    #         #    #   |
|     #    #          #          ######         #    #          ####    |
|                                                                       |
|                 Analysis of Traffic Lights And Signs                  |
|                                                                       |
|                             Version 7.2.0                             |
|                                                                       |
|       Developed by :                                                  |
|                                                                       |
|                         Bridge Software Institute                     |
|                                                                       |
|       No warranty, expressed or implied, is made by the Florida       |
|       Department of Transportation or the University of Florida       |
|       as to the accuracy and functioning of any programs or the       |
|       results they produce,nor shall the fact of distribution         |
|       constitute any such warranty, and no responsibility is          |
|       assumed by the Florida Department of Transportation or          |
|       the University of Florida in any connection therewith.          |
|                                                                       |
|                                                                       |
|                   Department of Civil Engineering                     |
|                        University of Florida                          |
|                        Gainesville, Fl 32611                          |
|                                                                       |
*************************************************************************


     *** NOTE - Pole convergence increased to 2.0*default
         for wind speeds > 85 mph:
         Tolerance =     0.200000


  Input Data File = K:\ORL_Structures\_Projects-Structures\_Strain Poles\142371064
SW 44th and SW 20th\03_Calculations\Box Model @0deg.in


  ATLAS EXECUTION STATUS

   - Check the Model for Adequacy


  CONTROL DATA (More Information found in ATLAS HELP)

   - Problem Title
```

BOX MODEL @0DEG.IN

- Structural Parameters :

Number of Nodes = 64
Number of Cables = 8
Lowest Point of Catenary = 25.59 ft

- Wind Data :

Wind Speed (Miles per Hour) = 140.00
Wind Direction (Angle from +ve X axis) = 0.0

- Nonlinear iteration Parameters :

Number of Iterations (Shape Finder) = 200
Number of Iterations (Gravity Solution) = 200
Number of Iterations (Wind Solution) = 200
Number of Loops for Shape Calculation = 5
Number of Cycles (Shape-Stiffness Iteration) = 1800
Force Tolerance for Gravity Solution (%) = 5.00
Force Tolerance for Wind Solution (%) = 5.00
Pole Displacement Tolerance = 0.200000

ECHO OF NODAL POINT INPUT DATA

Node	Nodal Point Coordinates X (in)	Y (in)	Z (in)	Boundary Conditions Tx	Ty	Tz	Rx	Ry	Rz
1	36.000	0.000	0.000	F	F	F	F	F	F
2	36.000	0.000	289.120	R	R	R	R	R	R
3	36.000	0.000	385.141	R	R	R	R	R	R
4	53.248	-16.688	0.000	F	F	F	F	F	F
5	0.000	1560.000	1.200	F	F	F	F	F	F
6	0.000	1560.000	289.120	R	R	R	R	R	R
7	0.000	1560.000	385.141	R	R	R	R	R	R
8	17.247	1543.311	1.200	F	F	F	F	F	F
9	1224.000	1572.000	5.640	F	F	F	F	F	F
10	1224.000	1572.000	289.120	R	R	R	R	R	R
11	1224.000	1572.000	385.141	R	R	R	R	R	R
12	1241.183	1555.245	5.640	F	F	F	F	F	F
13	1248.000	12.000	11.640	F	F	F	F	F	F
14	1248.000	12.000	289.120	R	R	R	R	R	R
15	1248.000	12.000	385.141	R	R	R	R	R	R
16	1265.184	-4.755	11.640	F	F	F	F	F	F
17	32.400	150.000	358.018	R	R	R	R	R	R
18	32.400	150.000	289.120	R	R	R	R	R	R
19	32.400	150.000	277.120	R	R	R	R	R	R
20	30.000	264.000	341.265	R	R	R	R	R	R

21	30.000	264.000	289.120	R	R	R	R	R	R
22	30.000	264.000	261.060	R	R	R	R	R	R
23	26.400	408.000	324.866	R	R	R	R	R	R
24	26.400	408.000	289.120	R	R	R	R	R	R
25	26.400	408.000	261.060	R	R	R	R	R	R
26	24.000	540.000	314.507	R	R	R	R	R	R
27	24.000	540.000	289.120	R	R	R	R	R	R
28	24.000	540.000	261.060	R	R	R	R	R	R
29	216.000	1562.400	349.562	R	R	R	R	R	R
30	216.000	1562.400	289.120	R	R	R	R	R	R
31	216.000	1562.400	277.120	R	R	R	R	R	R
32	468.000	1564.800	327.326	R	R	R	R	R	R
33	468.000	1564.800	289.120	R	R	R	R	R	R
34	468.000	1564.800	261.060	R	R	R	R	R	R
35	600.000	1566.000	323.961	R	R	R	R	R	R
36	600.000	1566.000	289.120	R	R	R	R	R	R
37	600.000	1566.000	261.060	R	R	R	R	R	R
38	744.000	1567.200	326.785	R	R	R	R	R	R
39	744.000	1567.200	289.120	R	R	R	R	R	R
40	744.000	1567.200	261.060	R	R	R	R	R	R
41	1226.400	1404.000	355.156	R	R	R	R	R	R
42	1226.400	1404.000	289.120	R	R	R	R	R	R
43	1226.400	1404.000	277.120	R	R	R	R	R	R
44	1228.800	1260.000	335.215	R	R	R	R	R	R
45	1228.800	1260.000	289.120	R	R	R	R	R	R
46	1228.800	1260.000	261.060	R	R	R	R	R	R
47	1231.200	1104.000	319.613	R	R	R	R	R	R
48	1231.200	1104.000	289.120	R	R	R	R	R	R
49	1231.200	1104.000	261.060	R	R	R	R	R	R
50	1232.400	996.000	312.468	R	R	R	R	R	R
51	1232.400	996.000	289.120	R	R	R	R	R	R
52	1232.400	996.000	261.060	R	R	R	R	R	R
53	912.000	8.400	336.568	R	R	R	R	R	R
54	912.000	8.400	289.120	R	R	R	R	R	R
55	912.000	8.400	277.120	R	R	R	R	R	R
56	804.000	7.200	328.868	R	R	R	R	R	R
57	804.000	7.200	289.120	R	R	R	R	R	R
58	804.000	7.200	261.060	R	R	R	R	R	R
59	648.000	6.000	324.544	R	R	R	R	R	R
60	648.000	6.000	289.120	R	R	R	R	R	R
61	648.000	6.000	261.060	R	R	R	R	R	R
62	504.000	4.800	327.680	R	R	R	R	R	R
63	504.000	4.800	289.120	R	R	R	R	R	R
64	504.000	4.800	261.060	R	R	R	R	R	R

ECHO OF ELEMENT INPUT DATA

1. Pole/Beam Element Data

   Number of Property Sets = 1

Property Set = 1
Pole type = PVIII
Concrete Strength, F`c (psi) = 6000.00

NOTE : The properties used in the analysis were obtained at the effective heights of the poles and are provided below. For more information refer to the report that accompanies the program.

Pole/Beam Connectivity and Properties Used

Mem	Nodes I	J	K	Mat	Properties Area in^2	E ksi	I33 in^4	I22 in^4	J in^4	G ksi
1	1	2	4	1	263.36	4415.20	12859.03	12859.03	25718.07	1698.15
2	2	3	4	1	214.27	4415.20	6745.44	6745.44	13490.88	1698.15
3	5	6	8	1	263.21	4415.20	12831.56	12831.56	25663.12	1698.15
4	6	7	8	1	214.27	4415.20	6745.44	6745.44	13490.88	1698.15
5	9	10	12	1	262.67	4415.20	12730.22	12730.22	25460.43	1698.15
6	10	11	12	1	214.27	4415.20	6745.44	6745.44	13490.88	1698.15
7	13	14	16	1	261.93	4415.20	12594.07	12594.07	25188.13	1698.15
8	14	15	16	1	214.27	4415.20	6745.44	6745.44	13490.88	1698.15

2. Primary Cable Element Data

Number of Property Sets = 1

Primary Cable Connectivity and Properties

Mem	Nodes I	J	Mat	Cable	Properties Area in^2	E ksi
1	3	17	1	1	0.1500	24500.0
2	17	20	1	1	0.1500	24500.0
3	20	23	1	1	0.1500	24500.0
4	23	26	1	1	0.1500	24500.0
5	26	7	1	1	0.1500	24500.0
6	7	29	1	3	0.1500	24500.0
7	29	32	1	3	0.1500	24500.0
8	32	35	1	3	0.1500	24500.0
9	35	38	1	3	0.1500	24500.0
10	38	11	1	3	0.1500	24500.0
11	11	41	1	5	0.1500	24500.0
12	41	44	1	5	0.1500	24500.0
13	44	47	1	5	0.1500	24500.0
14	47	50	1	5	0.1500	24500.0
15	50	15	1	5	0.1500	24500.0
16	15	53	1	7	0.1500	24500.0

17	53	56	1	7	0.1500	24500.0
18	56	59	1	7	0.1500	24500.0
19	59	62	1	7	0.1500	24500.0
20	62	3	1	7	0.1500	24500.0

3. Secondary Cable Element Data

Number of Property Sets = 1

Secondary Cable Connectivity and Properties

	Nodes				Properties	
Mem	I	J	Mat	Cable	Area	E
					in^2	ksi
1	2	18	1	2	0.1500	24500.0
2	18	21	1	2	0.1500	24500.0
3	21	24	1	2	0.1500	24500.0
4	24	27	1	2	0.1500	24500.0
5	27	6	1	2	0.1500	24500.0
6	6	30	1	4	0.1500	24500.0
7	30	33	1	4	0.1500	24500.0
8	33	36	1	4	0.1500	24500.0
9	36	39	1	4	0.1500	24500.0
10	39	10	1	4	0.1500	24500.0
11	10	42	1	6	0.1500	24500.0
12	42	45	1	6	0.1500	24500.0
13	45	48	1	6	0.1500	24500.0
14	48	51	1	6	0.1500	24500.0
15	51	14	1	6	0.1500	24500.0
16	14	54	1	8	0.1500	24500.0
17	54	57	1	8	0.1500	24500.0
18	57	60	1	8	0.1500	24500.0
19	60	63	1	8	0.1500	24500.0
20	63	2	1	8	0.1500	24500.0

4. Connector Element Data

Number of Property Sets = 2

Connector Connectivity and Properties

	Nodes				Properties					
Mem	I	J	K	Mat	Area	E	I33	I22	J	G
					in^2	ksi	in^4	in^4	in^4	ksi
1	17	18	3	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
2	20	21	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
3	23	24	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
4	26	27	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
5	29	30	7	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4

6	32	33	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
7	35	36	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
8	38	39	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
9	41	42	11	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
10	44	45	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
11	47	48	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
12	50	51	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
13	53	54	15	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
14	56	57	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
15	59	60	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
16	62	63	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4

5. Light Element Data

Number of Property Sets = 2

Property Line = 1
Projected area on X-Z plane = 2304.00 in^2
Projected area on Y-Z plane = 0.00 in^2

Property Line = 2
Projected area on X-Z plane = 1553.28 in^2
Projected area on Y-Z plane = 1553.28 in^2

Light Connectivity and Properties

	Nodes				Properties					
Mem	I	J	K	Mat	Area	E	I33	I22	J	G
					in^2	ksi	in^4	in^4	in^4	ksi
1	18	19	3	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
2	21	22	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
3	24	25	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
4	27	28	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
5	30	31	7	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
6	33	34	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
7	36	37	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
8	39	40	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
9	42	43	11	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
10	45	46	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
11	48	49	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
12	51	52	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
13	54	55	15	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
14	57	58	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
15	60	61	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
16	63	64	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4

6. Wind Load Factors

Directionality Factor = 0.85
Drag Coefficient = 0.60

Uplift Coefficient = 0.00

CONCENTRATED APPLIED LOADS

- Sign/Cable/Light weights (Kips)

Node	X	Y	Z
3	0.00000	0.00000	-0.01344
7	0.00000	0.00000	-0.02683
11	0.00000	0.00000	-0.01409
15	0.00000	0.00000	-0.02865
17	0.00000	0.00000	-0.00907
18	0.00000	0.00000	-0.00332
19	0.00000	0.00000	-0.08000
20	0.00000	0.00000	-0.00851
21	0.00000	0.00000	-0.00290
22	0.00000	0.00000	-0.05454
23	0.00000	0.00000	-0.00849
24	0.00000	0.00000	-0.00249
25	0.00000	0.00000	-0.05454
26	0.00000	0.00000	-0.02722
27	0.00000	0.00000	-0.00224
28	0.00000	0.00000	-0.05454
29	0.00000	0.00000	-0.01328
30	0.00000	0.00000	-0.00311
31	0.00000	0.00000	-0.08000
32	0.00000	0.00000	-0.01088
33	0.00000	0.00000	-0.00256
34	0.00000	0.00000	-0.05454
35	0.00000	0.00000	-0.00845
36	0.00000	0.00000	-0.00247
37	0.00000	0.00000	-0.05454
38	0.00000	0.00000	-0.01609
39	0.00000	0.00000	-0.00254
40	0.00000	0.00000	-0.05454
41	0.00000	0.00000	-0.01004
42	0.00000	0.00000	-0.00325
43	0.00000	0.00000	-0.08000
44	0.00000	0.00000	-0.00927
45	0.00000	0.00000	-0.00275
46	0.00000	0.00000	-0.05454
47	0.00000	0.00000	-0.00809
48	0.00000	0.00000	-0.00236
49	0.00000	0.00000	-0.05454
50	0.00000	0.00000	-0.02587
51	0.00000	0.00000	-0.00218
52	0.00000	0.00000	-0.05454
53	0.00000	0.00000	-0.01244
54	0.00000	0.00000	-0.00279

55	0.00000	0.00000	-0.08000
56	0.00000	0.00000	-0.00832
57	0.00000	0.00000	-0.00259
58	0.00000	0.00000	-0.05454
59	0.00000	0.00000	-0.00899
60	0.00000	0.00000	-0.00249
61	0.00000	0.00000	-0.05454
62	0.00000	0.00000	-0.01585
63	0.00000	0.00000	-0.00256
64	0.00000	0.00000	-0.05454

- Wind loads on Cables

NOTE : The wind forces on the cables are applied as shown below. The wind forces on the lights and signs are calculated during the analysis. For more information, refer to Atlas Help Manual.

Node	X	Y	Z	XX	YY	ZZ
17	0.02464	0.00000	0.00000	0.00000	0.00000	0.00000
18	0.02451	0.00000	0.00000	0.00000	0.00000	0.00000
20	0.02403	0.00000	0.00000	0.00000	0.00000	0.00000
21	0.02396	0.00000	0.00000	0.00000	0.00000	0.00000
23	0.02567	0.00000	0.00000	0.00000	0.00000	0.00000
24	0.02563	0.00000	0.00000	0.00000	0.00000	0.00000
26	0.10706	0.00000	0.00000	0.00000	0.00000	0.00000
27	0.10697	0.00000	0.00000	0.00000	0.00000	0.00000
29	0.00045	0.00000	0.00000	0.00000	0.00000	0.00000
30	0.00045	0.00000	0.00000	0.00000	0.00000	0.00000
32	0.00033	0.00000	0.00000	0.00000	0.00000	0.00000
33	0.00033	0.00000	0.00000	0.00000	0.00000	0.00000
35	0.00022	0.00000	0.00000	0.00000	0.00000	0.00000
36	0.00022	0.00000	0.00000	0.00000	0.00000	0.00000
38	0.00056	0.00000	0.00000	0.00000	0.00000	0.00000
39	0.00056	0.00000	0.00000	0.00000	0.00000	0.00000
41	0.02910	0.00000	0.00000	0.00000	0.00000	0.00000
42	0.02897	0.00000	0.00000	0.00000	0.00000	0.00000
44	0.02793	0.00000	0.00000	0.00000	0.00000	0.00000
45	0.02786	0.00000	0.00000	0.00000	0.00000	0.00000
47	0.02455	0.00000	0.00000	0.00000	0.00000	0.00000
48	0.02451	0.00000	0.00000	0.00000	0.00000	0.00000
50	0.10149	0.00000	0.00000	0.00000	0.00000	0.00000
51	0.10139	0.00000	0.00000	0.00000	0.00000	0.00000
53	0.00045	0.00000	0.00000	0.00000	0.00000	0.00000
54	0.00045	0.00000	0.00000	0.00000	0.00000	0.00000
56	0.00022	0.00000	0.00000	0.00000	0.00000	0.00000
57	0.00022	0.00000	0.00000	0.00000	0.00000	0.00000
59	0.00022	0.00000	0.00000	0.00000	0.00000	0.00000
60	0.00022	0.00000	0.00000	0.00000	0.00000	0.00000
62	0.00056	0.00000	0.00000	0.00000	0.00000	0.00000

63	0.00056	0.00000	0.00000	0.00000	0.00000

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*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
|                                                                       |
|              D E S I G N   S E C T I O N                              |
|                  Units: Kips, Feet                                    |
|                                                                       |
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- CABLE DESIGN
  --*-*-*-*-*

A resistance factor is used in the calculation of
factored cable resistance, which is given below:
Wire resistance factor = 0.50

Cable Number = 1

* Catenary Cable *

Starting Node = 3
Ending Node = 7
Cable Tension (k) = 2.074
Cable Sag (%) = 5.143
Cable Diameter (in) = 0.500
Cable Area (sq. in) = 0.150
Cable Weight (lb/in) = 0.043
Factored Cable Resistance (k) = 12.500

Cable Size is Adequate for current Tensile Force
Load Combination 2: 1.10*(DL) + 1.00*(WL)
controls

Cable Number = 2

* Messenger Cable *

Starting Node = 2
Ending Node = 6
Cable Tension (k) = 7.127
Cable Diameter (in) = 0.500
Cable Area (sq. in) = 0.150
Cable Weight (lb/in) = 0.043
Factored Cable Resistance (k) = 12.500

Cable Size is Adequate for current Tensile Force
Load Combination 2: 1.10*(DL) + 1.00*(WL)
controls

```
Cable Number  =   3

* Catenary Cable *

Starting Node =   7
Ending Node   =  11
Cable Tension (k)             =     1.577
Cable Sag (%)                 =     6.046
Cable Diameter (in)           =     0.500
Cable Area (sq. in)           =     0.150
Cable Weight (lb/in)          =     0.043
Factored Cable Resistance (k) =    12.500

Cable Size is Adequate for current Tensile Force
Load Combination 2: 1.10*(DL) + 1.00*(WL)
controls

Cable Number  =   4

* Messenger Cable *

Starting Node =   6
Ending Node   =  10
Cable Tension (k)             =     4.386
Cable Diameter (in)           =     0.500
Cable Area (sq. in)           =     0.150
Cable Weight (lb/in)          =     0.043
Factored Cable Resistance (k) =    12.500

Cable Size is Adequate for current Tensile Force
Load Combination 2: 1.10*(DL) + 1.00*(WL)
controls

Cable Number  =   5

* Catenary Cable *

Starting Node =  11
Ending Node   =  15
Cable Tension (k)             =     2.036
Cable Sag (%)                 =     5.001
Cable Diameter (in)           =     0.500
Cable Area (sq. in)           =     0.150
Cable Weight (lb/in)          =     0.043
Factored Cable Resistance (k) =    12.500

Cable Size is Adequate for current Tensile Force
Load Combination 2: 1.10*(DL) + 1.00*(WL)
controls

Cable Number  =   6
```

```
  * Messenger Cable *

  Starting Node =  10
  Ending Node   =  14
  Cable Tension (k)             =     6.938
  Cable Diameter (in)           =     0.500
  Cable Area (sq. in)           =     0.150
  Cable Weight (lb/in)          =     0.043
  Factored Cable Resistance (k) =    12.500

  Cable Size is Adequate for current Tensile Force
  Load Combination 2: 1.10*(DL) + 1.00*(WL)
  controls

  Cable Number  =   7

  * Catenary Cable *

  Starting Node =  15
  Ending Node   =   3
  Cable Tension (k)             =     1.529
  Cable Sag (%)                 =     6.130
  Cable Diameter (in)           =     0.500
  Cable Area (sq. in)           =     0.150
  Cable Weight (lb/in)          =     0.043
  Factored Cable Resistance (k) =    12.500

  Cable Size is Adequate for current Tensile Force
  Load Combination 2: 1.10*(DL) + 1.00*(WL)
  controls

  Cable Number  =   8

  * Messenger Cable *

  Starting Node =  14
  Ending Node   =   2
  Cable Tension (k)             =     4.600
  Cable Diameter (in)           =     0.500
  Cable Area (sq. in)           =     0.150
  Cable Weight (lb/in)          =     0.043
  Factored Cable Resistance (k) =    12.500

  Cable Size is Adequate for current Tensile Force
  Load Combination 2: 1.10*(DL) + 1.00*(WL)
  controls


- POLE DESIGN
  *-*-*-*-*-*
```

```
Load Combination 2 (LRFD Extreme Event I):  1.10*(DL) + 1.00*(WL)
is used for design of this pole

Pole Number                              =         1
Pole Node Numbers                        =   1  2  3
Input Pole Type                          =    PVIII
Input Wind Speed (mph)                   =   140.000
Input Wind Angle (deg)                   =     0.000
Applied Wind Angle (deg)                 =    32.000

Resultant Base Shear (kips)              =     5.233

Resultant Base Moment (kip-ft)           =   263.283
Resultant Base Moment Angle (deg)        =    58.876
Pole Strong Axis Angle (deg)             =    44.055
Biaxial Moment Reduction Factor          =     0.912
Required Pole Phi * Mn (kip-ft)          =   288.772

Input Pole Capacity (kip-ft)             =   411.032

Required Embedment Length (ft)           =    15.806
Minimum Embedment Length (ft)            =     9.000
 (= 0.000 if custom pole, and requires separate check)
Pole Height Above Ground (ft)            =    33.095

The Pole specified in the INPUT is adequate to support
the base moment.


Load Combination 2 (LRFD Extreme Event I):  1.10*(DL) + 1.00*(WL)
is used for design of this pole

Pole Number                              =         2
Pole Node Numbers                        =   5  6  7
Input Pole Type                          =    PVIII
Input Wind Speed (mph)                   =   140.000
Input Wind Angle (deg)                   =     0.000
Applied Wind Angle (deg)                 =    32.000

Resultant Base Shear (kips)              =     5.080

Resultant Base Moment (kip-ft)           =   254.933
Resultant Base Moment Angle (deg)        =    58.846
Pole Strong Axis Angle (deg)             =    44.058
Biaxial Moment Reduction Factor          =     0.912
Required Pole Phi * Mn (kip-ft)          =   279.530

Input Pole Capacity (kip-ft)             =   410.565

Required Embedment Length (ft)           =    15.626
```

```
Minimum Embedment Length (ft)              =     9.000
 (= 0.000 if custom pole, and requires separate check)
Pole Height Above Ground (ft)              =    32.995

The Pole specified in the INPUT is adequate to support
the base moment.


Load Combination 2 (LRFD Extreme Event I):  1.10*(DL) + 1.00*(WL)
is used for design of this pole

Pole Number                                =         3
Pole Node Numbers                          =   9 10 11
Input Pole Type                            =    PVIII
Input Wind Speed (mph)                     =   140.000
Input Wind Angle (deg)                     =     0.000
Applied Wind Angle (deg)                   =    32.000

Resultant Base Shear (kips)                =     8.579

Resultant Base Moment (kip-ft)             =   248.381
Resultant Base Moment Angle (deg)          =    61.393
Pole Strong Axis Angle (deg)               =    44.278
Biaxial Moment Reduction Factor            =     0.892
Required Pole Phi * Mn (kip-ft)            =   278.390

Input Pole Capacity (kip-ft)               =   408.834

Required Embedment Length (ft)             =    16.441
Minimum Embedment Length (ft)              =     9.000
 (= 0.000 if custom pole, and requires separate check)
Pole Height Above Ground (ft)              =    32.625

The Pole specified in the INPUT is adequate to support
the base moment.


Load Combination 2 (LRFD Extreme Event I):  1.10*(DL) + 1.00*(WL)
is used for design of this pole

Pole Number                                =         4
Pole Node Numbers                          =  13 14 15
Input Pole Type                            =    PVIII
Input Wind Speed (mph)                     =   140.000
Input Wind Angle (deg)                     =     0.000
Applied Wind Angle (deg)                   =    32.000

Resultant Base Shear (kips)                =     4.564

Resultant Base Moment (kip-ft)             =   252.664
Resultant Base Moment Angle (deg)          =    61.579
```

Pole Strong Axis Angle (deg) = 44.276
Biaxial Moment Reduction Factor = 0.891
Required Pole Phi * Mn (kip-ft) = 283.717

Input Pole Capacity (kip-ft) = 406.495

Required Embedment Length (ft) = 15.450
Minimum Embedment Length (ft) = 9.000
(= 0.000 if custom pole, and requires separate check)
Pole Height Above Ground (ft) = 32.125

The Pole specified in the INPUT is adequate to support the base moment.

L O A D C O M B I N A T I O N 1
[DL] only
Units: Kips, Inches

Final Coordinates

Node	X	Y	Z
1	36.0000	0.0000	0.0000
2	36.3178	0.3272	289.1199
3	36.4944	0.5089	385.1406
4	53.2480	-16.6885	0.0000
5	0.0000	1560.0000	1.2000
6	0.3203	1559.6820	289.1199
7	0.4987	1559.5045	385.1407
8	17.2472	1543.3107	1.2000
9	1224.0000	1572.0000	5.6400
10	1223.7035	1571.6750	289.1199
11	1223.5356	1571.4900	385.1406
12	1241.1829	1555.2445	5.6400
13	1248.0000	12.0000	11.6400
14	1247.6987	12.3039	289.1199
15	1247.5234	12.4812	385.1407
16	1265.1837	-4.7547	11.6400
17	32.6116	146.9094	343.7946
18	32.6112	146.9084	289.1230
19	32.6111	146.9082	277.1228
20	29.9881	260.5157	324.0111
21	29.9881	260.5155	289.1196
22	29.9881	260.5154	261.0593
23	26.6571	404.8583	309.9430
24	26.6571	404.8582	289.1193

25	26.6571	404.8581	261.0591
26	23.6016	537.2751	307.1208
27	23.6015	537.2751	289.1206
28	23.6015	537.2750	261.0604
29	215.0343	1562.1070	337.0319
30	215.0337	1562.1073	289.1224
31	215.0335	1562.1073	277.1223
32	467.1874	1564.5803	310.2214
33	467.1874	1564.5803	289.1190
34	467.1873	1564.5803	261.0587
35	599.2521	1565.8750	307.1195
36	599.2521	1565.8750	289.1194
37	599.2520	1565.8750	261.0591
38	743.1088	1567.2848	315.2158
39	743.1089	1567.2850	289.1215
40	743.1091	1567.2851	261.0612
41	1226.5433	1406.5788	343.0072
42	1226.5438	1406.5797	289.1233
43	1226.5439	1406.5799	277.1232
44	1228.7562	1262.8461	320.9499
45	1228.7562	1262.8463	289.1197
46	1228.7562	1262.8464	261.0594
47	1231.1609	1106.5397	308.2649
48	1231.1609	1106.5397	289.1195
49	1231.1609	1106.5398	261.0593
50	1232.8260	998.2904	307.1209
51	1232.8261	998.2905	289.1207
52	1232.8262	998.2906	261.0604
53	912.9694	8.6836	318.7279
54	912.9697	8.6834	289.1218
55	912.9699	8.6834	277.1216
56	804.9486	7.6134	309.1644
57	804.9487	7.6134	289.1198
58	804.9487	7.6134	261.0596
59	648.8188	6.0675	307.1200
60	648.8188	6.0675	289.1198
61	648.8188	6.0675	261.0596
62	505.0059	4.6442	316.1787
63	505.0057	4.6440	289.1219
64	505.0055	4.6439	261.0617

Dead Load Applied to the Structure

Node	Fx	Fy	Fz	Mom-X	Mom-Y	Mom-Z
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-0.0134	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	-0.0268	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11	0.0000	0.0000	-0.0141	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15	0.0000	0.0000	-0.0287	0.0000	0.0000	0.0000
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	0.0000	0.0000	-0.0091	0.0000	0.0000	0.0000
18	0.0000	0.0000	-0.0033	0.0000	0.0000	0.0000
19	0.0000	0.0000	-0.0800	0.0000	0.0000	0.0000
20	0.0000	0.0000	-0.0085	0.0000	0.0000	0.0000
21	0.0000	0.0000	-0.0029	0.0000	0.0000	0.0000
22	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
23	0.0000	0.0000	-0.0085	0.0000	0.0000	0.0000
24	0.0000	0.0000	-0.0025	0.0000	0.0000	0.0000
25	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
26	0.0000	0.0000	-0.0272	0.0000	0.0000	0.0000
27	0.0000	0.0000	-0.0022	0.0000	0.0000	0.0000
28	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
29	0.0000	0.0000	-0.0133	0.0000	0.0000	0.0000
30	0.0000	0.0000	-0.0031	0.0000	0.0000	0.0000
31	0.0000	0.0000	-0.0800	0.0000	0.0000	0.0000
32	0.0000	0.0000	-0.0109	0.0000	0.0000	0.0000
33	0.0000	0.0000	-0.0026	0.0000	0.0000	0.0000
34	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
35	0.0000	0.0000	-0.0085	0.0000	0.0000	0.0000
36	0.0000	0.0000	-0.0025	0.0000	0.0000	0.0000
37	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
38	0.0000	0.0000	-0.0161	0.0000	0.0000	0.0000
39	0.0000	0.0000	-0.0025	0.0000	0.0000	0.0000
40	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
41	0.0000	0.0000	-0.0100	0.0000	0.0000	0.0000
42	0.0000	0.0000	-0.0033	0.0000	0.0000	0.0000
43	0.0000	0.0000	-0.0800	0.0000	0.0000	0.0000
44	0.0000	0.0000	-0.0093	0.0000	0.0000	0.0000
45	0.0000	0.0000	-0.0028	0.0000	0.0000	0.0000
46	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
47	0.0000	0.0000	-0.0081	0.0000	0.0000	0.0000
48	0.0000	0.0000	-0.0024	0.0000	0.0000	0.0000
49	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
50	0.0000	0.0000	-0.0259	0.0000	0.0000	0.0000
51	0.0000	0.0000	-0.0022	0.0000	0.0000	0.0000
52	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
53	0.0000	0.0000	-0.0124	0.0000	0.0000	0.0000
54	0.0000	0.0000	-0.0028	0.0000	0.0000	0.0000
55	0.0000	0.0000	-0.0800	0.0000	0.0000	0.0000
56	0.0000	0.0000	-0.0083	0.0000	0.0000	0.0000

57	0.0000	0.0000	-0.0026	0.0000	0.0000	0.0000
58	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
59	0.0000	0.0000	-0.0090	0.0000	0.0000	0.0000
60	0.0000	0.0000	-0.0025	0.0000	0.0000	0.0000
61	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
62	0.0000	0.0000	-0.0159	0.0000	0.0000	0.0000
63	0.0000	0.0000	-0.0026	0.0000	0.0000	0.0000
64	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000

Final Displacements

Node	Tx	Ty	Tz	Rot-X	Rot-Y	Rot-Z
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.3178	0.3272	-0.0001	-0.0018	0.0018	0.0000
3	0.4944	0.5089	-0.0001	-0.0019	0.0019	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.3203	-0.3180	-0.0001	0.0018	0.0018	0.0000
7	0.4987	-0.4955	-0.0001	0.0019	0.0019	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	-0.2965	-0.3250	-0.0001	0.0018	-0.0017	0.0000
11	-0.4644	-0.5100	-0.0001	0.0020	-0.0018	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	-0.3013	0.3039	-0.0001	-0.0018	-0.0017	0.0000
15	-0.4766	0.4812	-0.0001	-0.0019	-0.0019	0.0000
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	0.0018	0.0012	0.0038	-0.0000	0.0000	-0.0000
18	0.0014	0.0002	0.0030	-0.0000	0.0000	-0.0000
19	0.0013	-0.0000	0.0028	-0.0000	0.0000	-0.0000
20	0.0000	0.0001	-0.0001	-0.0000	-0.0000	-0.0000
21	0.0000	-0.0001	-0.0004	-0.0000	-0.0000	-0.0000
22	0.0000	-0.0002	-0.0007	-0.0000	-0.0000	-0.0000
23	0.0000	0.0000	-0.0005	-0.0000	-0.0000	-0.0000
24	0.0000	-0.0000	-0.0007	-0.0000	-0.0000	0.0000
25	0.0000	-0.0001	-0.0009	-0.0000	-0.0000	0.0000
26	0.0003	-0.0000	0.0008	-0.0000	0.0000	-0.0000
27	0.0002	-0.0001	0.0006	-0.0000	0.0000	0.0000
28	0.0001	-0.0001	0.0004	-0.0000	0.0000	0.0000
29	0.0007	-0.0012	0.0031	0.0000	0.0000	-0.0000
30	0.0001	-0.0009	0.0024	0.0000	0.0000	-0.0000
31	-0.0000	-0.0009	0.0023	0.0000	0.0000	-0.0000
32	0.0000	-0.0000	-0.0008	-0.0000	0.0000	0.0000
33	-0.0000	-0.0000	-0.0010	-0.0000	0.0000	-0.0000
34	-0.0001	-0.0000	-0.0013	-0.0000	0.0000	-0.0000
35	0.0000	-0.0000	-0.0005	-0.0000	0.0000	-0.0000
36	-0.0000	-0.0000	-0.0006	-0.0000	0.0000	0.0000
37	-0.0001	-0.0000	-0.0009	-0.0000	0.0000	0.0000

38	-0.0002	-0.0005	0.0018	0.0000	-0.0000	0.0000
39	-0.0001	-0.0004	0.0015	0.0000	-0.0000	0.0000
40	0.0001	-0.0003	0.0012	0.0000	-0.0000	0.0000
41	-0.0016	-0.0011	0.0041	0.0000	-0.0000	-0.0000
42	-0.0011	-0.0002	0.0033	0.0000	-0.0000	-0.0000
43	-0.0010	0.0000	0.0032	0.0000	-0.0000	-0.0000
44	-0.0000	-0.0001	-0.0000	0.0000	0.0000	-0.0000
45	-0.0000	0.0001	-0.0003	0.0000	0.0000	-0.0000
46	-0.0000	0.0002	-0.0006	0.0000	0.0000	-0.0000
47	-0.0000	-0.0000	-0.0003	0.0000	0.0000	0.0000
48	-0.0000	0.0000	-0.0005	0.0000	0.0000	0.0000
49	-0.0000	0.0001	-0.0007	0.0000	0.0000	0.0000
50	-0.0003	0.0000	0.0009	0.0000	-0.0000	0.0000
51	-0.0002	0.0001	0.0007	0.0000	-0.0000	0.0000
52	-0.0001	0.0001	0.0004	0.0000	-0.0000	0.0000
53	-0.0004	0.0008	0.0022	-0.0000	-0.0000	0.0000
54	-0.0001	0.0006	0.0018	-0.0000	-0.0000	-0.0000
55	0.0000	0.0005	0.0016	-0.0000	-0.0000	-0.0000
56	-0.0000	0.0000	0.0000	-0.0000	-0.0000	0.0000
57	0.0000	0.0000	-0.0002	-0.0000	-0.0000	-0.0000
58	0.0001	0.0000	-0.0004	-0.0000	-0.0000	-0.0000
59	-0.0000	0.0000	-0.0000	-0.0000	-0.0000	-0.0000
60	0.0000	0.0000	-0.0002	-0.0000	-0.0000	0.0000
61	0.0000	0.0000	-0.0004	-0.0000	-0.0000	0.0000
62	0.0003	0.0006	0.0022	-0.0000	0.0000	0.0000
63	0.0001	0.0004	0.0019	-0.0000	0.0000	0.0000
64	-0.0001	0.0003	0.0017	-0.0000	0.0000	0.0000

- Frame Member Forces

Member # 1

	Node I	Node J
Axial Force =	0.3833	-0.3833
Shear Xm - Ym =	-0.0036	0.0036
Shear Xm - Zm =	-2.6125	2.6125
Torsion =	0.0000	0.0000
Moment About Ym =	871.4000	-116.0869
Moment About Zm =	-1.5257	0.4843

Unit conversion:
Pole Absolute Resultant Moment = 0.1334 (ft-kips)

Member # 2

	Node I	Node J
Axial Force =	0.3833	-0.3833
Shear Xm - Ym =	-0.0050	0.0050
Shear Xm - Zm =	-1.2090	1.2090

Torsion	=	0.0000	0.0000
Moment About Ym	=	116.0869	-0.0000
Moment About Zm	=	-0.4843	-0.0000

Unit conversion:
Pole Absolute Resultant Moment = 0.0404 (ft-kips)

Member # 3

		Node I	Node J
Axial Force	=	0.2761	-0.2761
Shear Xm - Ym	=	-2.6167	2.6167
Shear Xm - Zm	=	0.0271	-0.0271
Torsion	=	0.0000	0.0000
Moment About Ym	=	-10.5113	2.7070
Moment About Zm	=	-868.0434	114.6496

Unit conversion:
Pole Absolute Resultant Moment = 72.9652 (ft-kips)

Member # 4

		Node I	Node J
Axial Force	=	0.2762	-0.2762
Shear Xm - Ym	=	-1.1940	1.1940
Shear Xm - Zm	=	0.0282	-0.0282
Torsion	=	0.0000	0.0000
Moment About Ym	=	-2.7070	-0.0000
Moment About Zm	=	-114.6496	-0.0000

Unit conversion:
Pole Absolute Resultant Moment = 9.5541 (ft-kips)

Member # 5

		Node I	Node J
Axial Force	=	0.3680	-0.3680
Shear Xm - Ym	=	-0.0721	0.0721
Shear Xm - Zm	=	2.6326	-2.6326
Torsion	=	0.0000	0.0000
Moment About Ym	=	-863.7763	117.4786
Moment About Zm	=	-27.2347	6.8023

Unit conversion:
Pole Absolute Resultant Moment = 2.3393 (ft-kips)

Member # 6

	Node I	Node J
Axial Force =	0.3681	-0.3681
Shear Xm - Ym =	-0.0708	0.0708
Shear Xm - Zm =	1.2235	-1.2235
Torsion =	0.0000	0.0000
Moment About Ym =	-117.4786	0.0000
Moment About Zm =	-6.8023	-0.0000

Unit conversion:
Pole Absolute Resultant Moment = 0.5669 (ft-kips)

Member # 7

	Node I	Node J
Axial Force =	0.2736	-0.2736
Shear Xm - Ym =	2.6838	-2.6838
Shear Xm - Zm =	-0.0371	0.0371
Torsion =	0.0000	0.0000
Moment About Ym =	13.8992	-3.6158
Moment About Zm =	866.3085	-121.5941

Unit conversion:
Pole Absolute Resultant Moment = 72.9000 (ft-kips)

Member # 8

	Node I	Node J
Axial Force =	0.2736	-0.2736
Shear Xm - Ym =	1.2663	-1.2663
Shear Xm - Zm =	-0.0377	0.0377
Torsion =	0.0000	0.0000
Moment About Ym =	3.6158	0.0000
Moment About Zm =	121.5941	0.0000

Unit conversion:
Pole Absolute Resultant Moment = 10.1328 (ft-kips)

- Primary (Catenary) Cable Forces Primary Cable Reactions on Poles

Member	Force	Stress	Node	Fx	Fy	Fz
1	0.8943	5.9617	3	-0.0228	0.8603	-0.2430
2	0.8738	5.8251				
3	0.8649	5.7660				
4	0.8610	5.7401				
5	0.8636	5.7572	7	0.0195	-0.8608	-0.0657

6	0.8412	5.6080	7	0.8208	0.0100	-0.1841
7	0.8255	5.5036				
8	0.8211	5.4742				
9	0.8222	5.4813				
10	0.8296	5.5306	11	-0.8209	-0.0072	-0.1195
11	0.9505	6.3367	11	0.0168	-0.9208	-0.2353
12	0.9319	6.2125				
13	0.9241	6.1608				
14	0.9211	6.1409				
15	0.9242	6.1613	15	-0.0137	0.9211	-0.0729
16	0.8848	5.8988	15	-0.8678	-0.0099	-0.1723
17	0.8713	5.8087				
18	0.8680	5.7866				
19	0.8696	5.7975				
20	0.8773	5.8486	3	0.8679	0.0077	-0.1277

- Secondary (Messenger) Cable Forces Secondary Cable Reactions on Poles

Member	Force	Stress	Node	Fx	Fy	Fz
1	1.0000	6.6667	2	-0.0253	0.9997	0.0000
2	1.0000	6.6667				
3	1.0000	6.6667				
4	1.0000	6.6667				
5	1.0000	6.6667	6	0.0228	-0.9997	0.0000
6	1.0000	6.6667	6	0.9999	0.0113	0.0000
7	1.0000	6.6667				
8	1.0000	6.6667				
9	1.0000	6.6667				
10	1.0000	6.6667	10	-0.9999	-0.0091	0.0000
11	1.0000	6.6667	10	0.0172	-0.9998	0.0000
12	1.0000	6.6667				
13	1.0000	6.6667				
14	1.0000	6.6667				
15	1.0000	6.6667	14	-0.0151	0.9998	0.0000
16	1.0000	6.6667	14	-0.9999	-0.0108	0.0000
17	1.0000	6.6667				
18	1.0000	6.6667				
19	1.0000	6.6667				
20	1.0000	6.6667	2	0.9999	0.0092	0.0000

- Light Member Forces

Member # 1

	Node I	Node J
Axial Force =	-0.0800	0.0800
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	0.0000	-0.0000

Torsion	=	0.0000	-0.0000
Moment About Ym	=	-0.0003	-0.0000
Moment About Zm	=	-0.0000	0.0000

Member # 2

		Node I	Node J
Axial Force	=	-0.0545	0.0545
Shear Xm - Ym	=	0.0000	-0.0000
Shear Xm - Zm	=	0.0000	-0.0000
Torsion	=	0.0000	-0.0000
Moment About Ym	=	-0.0000	-0.0000
Moment About Zm	=	0.0000	0.0000

Member # 3

		Node I	Node J
Axial Force	=	-0.0545	0.0545
Shear Xm - Ym	=	0.0000	-0.0000
Shear Xm - Zm	=	0.0000	-0.0000
Torsion	=	0.0000	-0.0000
Moment About Ym	=	-0.0000	-0.0000
Moment About Zm	=	0.0000	0.0000

Member # 4

		Node I	Node J
Axial Force	=	-0.0545	0.0545
Shear Xm - Ym	=	0.0000	-0.0000
Shear Xm - Zm	=	0.0000	-0.0000
Torsion	=	0.0000	-0.0000
Moment About Ym	=	-0.0002	-0.0000
Moment About Zm	=	0.0000	0.0000

Member # 5

		Node I	Node J
Axial Force	=	-0.0800	0.0800
Shear Xm - Ym	=	-0.0000	0.0000
Shear Xm - Zm	=	0.0000	-0.0000
Torsion	=	0.0000	-0.0000
Moment About Ym	=	-0.0002	-0.0000
Moment About Zm	=	-0.0000	0.0000

Member # 6

		Node I	Node J
Axial Force	=	-0.0545	0.0545
Shear Xm - Ym	=	0.0000	-0.0000
Shear Xm - Zm	=	0.0000	-0.0000
Torsion	=	0.0000	-0.0000

Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 7

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	-0.0000
Moment About Zm =	0.0000	0.0000

Member # 8

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	-0.0000	0.0000
Moment About Ym =	-0.0002	-0.0000
Moment About Zm =	0.0000	-0.0000

Member # 9

	Node I	Node J
Axial Force =	-0.0800	0.0800
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0003	-0.0000
Moment About Zm =	-0.0000	0.0000

Member # 10

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 11

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000

Moment About Zm =	0.0000	0.0000

Member # 12

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0002	-0.0000
Moment About Zm =	0.0000	0.0000

Member # 13

	Node I	Node J
Axial Force =	-0.0800	0.0800
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0002	-0.0000
Moment About Zm =	-0.0000	0.0000

Member # 14

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	-0.0000
Moment About Zm =	0.0000	0.0000

Member # 15

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	-0.0000
Moment About Zm =	0.0000	0.0000

Member # 16

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	-0.0000	0.0000
Moment About Ym =	-0.0003	-0.0000
Moment About Zm =	0.0000	-0.0000

- Hanger (Connector) Member Forces

Member # 1

	Node I	Node J
Axial Force =	-0.0834	0.0834
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0003
Moment About Zm =	0.0000	0.0000

Member # 2

	Node I	Node J
Axial Force =	-0.0574	0.0574
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 3

	Node I	Node J
Axial Force =	-0.0570	0.0570
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 4

	Node I	Node J
Axial Force =	-0.0568	0.0568
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0002
Moment About Zm =	0.0000	-0.0000

Member # 5

	Node I	Node J
Axial Force =	-0.0831	0.0831
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0002

Moment About Zm =	0.0000	0.0000

Member # 6

	Node I	Node J
Axial Force =	-0.0571	0.0571
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 7

	Node I	Node J
Axial Force =	-0.0570	0.0570
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 8

	Node I	Node J
Axial Force =	-0.0571	0.0571
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	-0.0000	0.0000
Moment About Ym =	-0.0000	0.0002
Moment About Zm =	-0.0000	-0.0000

Member # 9

	Node I	Node J
Axial Force =	-0.0833	0.0833
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0003
Moment About Zm =	0.0000	0.0000

Member # 10

	Node I	Node J
Axial Force =	-0.0573	0.0573
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 11

	Node I	Node J
Axial Force =	-0.0569	0.0569
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 12

	Node I	Node J
Axial Force =	-0.0567	0.0567
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0002
Moment About Zm =	0.0000	-0.0000

Member # 13

	Node I	Node J
Axial Force =	-0.0828	0.0828
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0002
Moment About Zm =	0.0000	0.0000

Member # 14

	Node I	Node J
Axial Force =	-0.0571	0.0571
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 15

	Node I	Node J
Axial Force =	-0.0570	0.0570
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 16

	Node I	Node J
Axial Force =	-0.0571	0.0571
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	-0.0000	0.0000
Moment About Ym =	-0.0000	0.0003
Moment About Zm =	-0.0000	-0.0000

L O A D C O M B I N A T I O N 2

Dead Load Factor * [DL] + Wind Load Factor * [WL]

1.10 * [DL] + 1.00 * [WL]

Units: Kips, Inches

Wind Velocity Input (mph) = 140.000
Wind Angle Input (deg) = 0.000
Wind Angle Applied (deg) = 32.000

Final Coordinates

Node	X	Y	Z
1	36.0000	0.0000	0.0000
2	36.8665	1.3885	289.1199
3	37.3123	2.1161	385.1406
4	53.2480	-16.6885	0.0000
5	0.0000	1560.0000	1.2000
6	0.8261	1558.7331	289.1199
7	1.2557	1558.0552	385.1407
8	17.2472	1543.3107	1.2000
9	1224.0000	1572.0000	5.6400
10	1223.4344	1570.7351	289.1199
11	1223.1164	1570.0500	385.1406
12	1241.1829	1555.2445	5.6400
13	1248.0000	12.0000	11.6400
14	1247.3436	13.2874	289.1199
15	1246.9710	13.9974	385.1406
16	1265.1837	-4.7547	11.6400
17	39.9672	147.8227	346.8850
18	47.7468	146.7296	292.7805
19	48.7684	146.6214	280.8105
20	39.4320	261.2541	325.8206
21	56.7530	260.1604	295.5518
22	122.6921	259.6788	300.9032
23	42.5394	405.1443	307.3745
24	61.5531	404.6497	298.8968

25	91.1235	404.0410	296.3409
26	43.7708	537.6416	305.2639
27	60.8518	537.2977	299.5955
28	88.4401	537.0076	293.6838
29	214.8173	1564.3094	336.2204
30	214.7532	1574.3700	289.3794
31	214.6738	1583.5923	279.0864
32	466.8236	1571.9850	309.1217
33	466.9832	1583.3895	291.3671
34	468.2148	1608.3954	274.0565
35	598.8896	1575.2225	307.7378
36	599.1289	1585.5604	293.0041
37	600.5013	1609.9808	275.8333
38	742.6510	1575.1866	317.7722
39	743.0796	1585.4568	293.7876
40	744.6636	1612.8206	274.9493
41	1234.8180	1405.8696	347.1709
42	1242.5123	1407.4444	293.8620
43	1243.5364	1407.9303	281.8865
44	1240.7297	1262.4180	323.7269
45	1258.4094	1264.3943	297.3317
46	1318.8525	1268.9204	304.1059
47	1249.8447	1106.8025	306.0290
48	1268.0827	1108.1523	300.3607
49	1295.9672	1110.7394	295.7807
50	1253.6318	998.5767	304.8758
51	1271.0485	999.7580	300.4834
52	1298.2870	1001.9922	293.9870
53	912.4695	18.3680	321.1146
54	913.1544	28.0238	293.1354
55	913.4313	35.8468	283.1420
56	804.5113	18.8831	310.6260
57	805.0721	28.9092	293.2779
58	806.9783	54.4438	275.5882
59	648.4201	16.7025	306.3422
60	648.8440	27.1123	291.6634
61	650.5691	51.8052	274.7408
62	504.6445	11.4184	314.5085
63	504.9658	23.0757	290.0941
64	506.4264	50.3513	271.9951

Factored Loads Applied to the Structure

Node	Fx	Fy	Fz	Mom-X	Mom-Y	Mom-Z
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-0.0148	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	-0.0295	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11	0.0000	0.0000	-0.0155	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15	0.0000	0.0000	-0.0315	0.0000	0.0000	0.0000
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	0.0246	0.0000	-0.0100	0.0000	0.0000	0.0000
18	0.0245	0.0000	-0.0037	0.0000	0.0000	0.0000
19	0.0000	0.1311	-0.0880	0.0000	0.0000	0.0000
20	0.0240	0.0000	-0.0094	0.0000	0.0000	0.0000
21	0.0240	0.0000	-0.0032	0.0000	0.0000	0.0000
22	0.2263	0.0884	-0.0600	0.0000	0.0000	0.0000
23	0.0257	0.0000	-0.0093	0.0000	0.0000	0.0000
24	0.0256	0.0000	-0.0027	0.0000	0.0000	0.0000
25	0.2263	0.0884	-0.0600	0.0000	0.0000	0.0000
26	0.1071	0.0000	-0.0299	0.0000	0.0000	0.0000
27	0.1070	0.0000	-0.0025	0.0000	0.0000	0.0000
28	0.2263	0.0884	-0.0600	0.0000	0.0000	0.0000
29	0.0004	0.0000	-0.0146	0.0000	0.0000	0.0000
30	0.0004	0.0000	-0.0034	0.0000	0.0000	0.0000
31	0.0000	0.1311	-0.0880	0.0000	0.0000	0.0000
32	0.0003	0.0000	-0.0120	0.0000	0.0000	0.0000
33	0.0003	0.0000	-0.0028	0.0000	0.0000	0.0000
34	0.2263	0.0884	-0.0600	0.0000	0.0000	0.0000
35	0.0002	0.0000	-0.0093	0.0000	0.0000	0.0000
36	0.0002	0.0000	-0.0027	0.0000	0.0000	0.0000
37	0.2263	0.0884	-0.0600	0.0000	0.0000	0.0000
38	0.0006	0.0000	-0.0177	0.0000	0.0000	0.0000
39	0.0006	0.0000	-0.0028	0.0000	0.0000	0.0000
40	0.2263	0.0884	-0.0600	0.0000	0.0000	0.0000
41	0.0291	0.0000	-0.0110	0.0000	0.0000	0.0000
42	0.0290	0.0000	-0.0036	0.0000	0.0000	0.0000
43	0.0000	0.1311	-0.0880	0.0000	0.0000	0.0000
44	0.0279	0.0000	-0.0102	0.0000	0.0000	0.0000
45	0.0279	0.0000	-0.0030	0.0000	0.0000	0.0000
46	0.2263	0.0884	-0.0600	0.0000	0.0000	0.0000
47	0.0245	0.0000	-0.0089	0.0000	0.0000	0.0000
48	0.0245	0.0000	-0.0026	0.0000	0.0000	0.0000
49	0.2263	0.0884	-0.0600	0.0000	0.0000	0.0000
50	0.1015	0.0000	-0.0285	0.0000	0.0000	0.0000
51	0.1014	0.0000	-0.0024	0.0000	0.0000	0.0000
52	0.2263	0.0884	-0.0600	0.0000	0.0000	0.0000
53	0.0004	0.0000	-0.0137	0.0000	0.0000	0.0000
54	0.0004	0.0000	-0.0031	0.0000	0.0000	0.0000
55	0.0000	0.1311	-0.0880	0.0000	0.0000	0.0000
56	0.0002	0.0000	-0.0091	0.0000	0.0000	0.0000

57	0.0002	0.0000	-0.0029	0.0000	0.0000	0.0000
58	0.2263	0.0884	-0.0600	0.0000	0.0000	0.0000
59	0.0002	0.0000	-0.0099	0.0000	0.0000	0.0000
60	0.0002	0.0000	-0.0027	0.0000	0.0000	0.0000
61	0.2263	0.0884	-0.0600	0.0000	0.0000	0.0000
62	0.0006	0.0000	-0.0174	0.0000	0.0000	0.0000
63	0.0006	0.0000	-0.0028	0.0000	0.0000	0.0000
64	0.2263	0.0884	-0.0600	0.0000	0.0000	0.0000

Final Displacements

Node	Tx	Ty	Tz	Rot-X	Rot-Y	Rot-Z
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.8665	1.3885	-0.0001	-0.0074	0.0046	0.0000
3	1.3123	2.1161	-0.0001	-0.0077	0.0047	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.8261	-1.2669	-0.0001	0.0068	0.0044	0.0000
7	1.2557	-1.9448	-0.0001	0.0072	0.0045	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	-0.5656	-1.2649	-0.0001	0.0069	-0.0032	0.0000
11	-0.8836	-1.9500	-0.0002	0.0072	-0.0034	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	-0.6564	1.2874	-0.0001	-0.0072	-0.0037	0.0000
15	-1.0290	1.9974	-0.0001	-0.0075	-0.0040	0.0000
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	7.3574	0.9145	3.0942	-0.0247	-0.1665	0.0000
18	15.1370	-0.1786	3.6605	-0.0116	-0.0955	0.0038
19	16.1586	-0.2869	3.6905	-0.0088	-0.0800	0.0046
20	9.4439	0.7385	1.8094	-0.0406	0.0723	-0.0000
21	26.7649	-0.3552	6.4318	0.0123	-1.7000	-0.0690
22	92.7040	-0.8368	39.8432	0.0549	-3.1254	-0.1244
23	15.8823	0.2861	-2.5690	-0.0594	-1.0777	0.0000
24	34.8960	-0.2085	9.7768	-0.0510	-1.2986	-0.0023
25	64.4664	-0.8173	35.2809	-0.0396	-1.5962	-0.0055
26	20.1694	0.3665	-1.8561	-0.0662	-1.2291	0.0000
27	37.2505	0.0226	10.4755	-0.0624	-1.2934	0.0042
28	64.8388	-0.2675	32.6238	-0.0566	-1.3936	0.0107
29	-0.2163	2.2013	-0.8084	-0.0169	-0.0008	0.0000
30	-0.2804	12.2618	0.2594	0.6684	0.0058	-0.0005
31	-0.3598	21.4841	1.9664	0.8400	0.0074	-0.0007
32	-0.3639	7.4047	-1.1006	0.4815	0.0003	0.0000
33	-0.2042	18.8092	2.2471	0.7496	-0.0171	-0.0163
34	1.0274	43.8151	12.9965	1.1060	-0.0402	-0.0379
35	-0.3625	9.3474	0.6178	0.5412	-0.0077	0.0000
36	-0.1231	19.6854	3.8841	0.7527	-0.0223	-0.0156
37	1.2492	44.1058	14.7733	1.0825	-0.0449	-0.0400

38	-0.4580	7.9013	2.5582	0.2521	-0.0074	0.0000
39	-0.0294	18.1714	4.6676	0.7090	-0.0299	-0.0208
40	1.5546	45.5352	13.8893	1.2002	-0.0542	-0.0432
41	8.2730	-0.7103	4.1678	0.0249	-0.1671	-0.0000
42	15.9674	0.8646	4.7420	0.0388	-0.0958	0.0003
43	16.9915	1.3504	4.7665	0.0419	-0.0800	0.0003
44	11.9735	-0.4282	2.7770	0.0429	-0.0779	-0.0000
45	29.6532	1.5481	8.2117	0.0780	-1.6108	0.0897
46	90.0963	6.0742	43.0459	0.1089	-2.9621	0.1687
47	18.6838	0.2628	-2.2362	0.2195	-1.2412	0.0000
48	36.9217	1.6126	11.2407	0.2233	-1.3258	0.0127
49	64.8063	4.1997	34.7207	0.2288	-1.4498	0.0312
50	20.8055	0.2863	-2.2442	0.2524	-1.3213	-0.0000
51	38.2222	1.4676	11.3634	0.2544	-1.3288	0.0080
52	65.4607	3.7018	32.9270	0.2576	-1.3406	0.0204
53	-0.5003	9.6851	2.3889	0.2097	-0.0245	-0.0000
54	0.1845	19.3409	4.0154	0.5773	-0.0211	-0.0098
55	0.4614	27.1639	6.0220	0.7263	-0.0197	-0.0137
56	-0.4374	11.2697	1.4616	0.4254	-0.0227	-0.0000
57	0.1235	21.2958	4.1579	0.7205	-0.0394	-0.0210
58	2.0297	46.8304	14.5282	1.1336	-0.0628	-0.0505
59	-0.3987	10.6349	-0.7778	0.5446	-0.0198	-0.0000
60	0.0252	21.0448	2.5434	0.7608	-0.0342	-0.0181
61	1.7502	45.7377	13.6808	1.0978	-0.0568	-0.0463
62	-0.3612	6.7748	-1.6680	0.2983	-0.0022	-0.0000
63	-0.0399	18.4321	0.9741	0.7395	-0.0254	-0.0202
64	1.4207	45.7077	10.9351	1.1970	-0.0494	-0.0412

- Frame (Pole) Member Forces

Member # 1

	Node I	Node J
Axial Force =	0.3527	-0.3527
Shear Xm - Ym =	2.0753	-2.0753
Shear Xm - Zm =	-10.4594	10.4594
Torsion =	0.0000	0.0000
Moment About Ym =	3181.9990	-157.9857
Moment About Zm =	665.5881	-65.5860

Unit conversion :
Pole Absolute Resultant Moment = 270.9054 (ft-kips)

Member # 2

	Node I	Node J
Axial Force =	0.5409	-0.5409
Shear Xm - Ym =	0.6830	-0.6830
Shear Xm - Zm =	-1.6453	1.6453

Torsion	=	0.0000	0.0000
Moment About Ym	=	157.9857	0.0000
Moment About Zm	=	65.5860	-0.0000

Unit conversion :
Pole Absolute Resultant Moment = 14.2549 (ft-kips)

Member # 3

		Node I	Node J
Axial Force	=	0.2754	-0.2754
Shear Xm - Ym	=	-9.5180	9.5180
Shear Xm - Zm	=	1.9233	-1.9233
Torsion	=	0.0000	0.0000
Moment About Ym	=	-643.8685	90.0997
Moment About Zm	=	-2929.0674	188.6494

Unit conversion :
Pole Absolute Resultant Moment = 249.9167 (ft-kips)

Member # 4

		Node I	Node J
Axial Force	=	0.3451	-0.3451
Shear Xm - Ym	=	-1.9647	1.9647
Shear Xm - Zm	=	0.9383	-0.9383
Torsion	=	0.0000	0.0000
Moment About Ym	=	-90.0997	-0.0000
Moment About Zm	=	-188.6494	0.0000

Unit conversion :
Pole Absolute Resultant Moment = 17.4218 (ft-kips)

Member # 5

		Node I	Node J
Axial Force	=	0.4795	-0.4795
Shear Xm - Ym	=	-3.3562	3.3562
Shear Xm - Zm	=	8.4044	-8.4044
Torsion	=	0.0000	0.0000
Moment About Ym	=	-2613.3619	230.8892
Moment About Zm	=	-985.9466	34.5227

Unit conversion :
Pole Absolute Resultant Moment = 232.7635 (ft-kips)

Member # 6

	Node I	Node J
Axial Force =	0.6947	-0.6947
Shear Xm - Ym =	-0.3595	0.3595
Shear Xm - Zm =	2.4046	-2.4046
Torsion =	0.0000	0.0000
Moment About Ym =	-230.8892	0.0000
Moment About Zm =	-34.5227	-0.0000

Unit conversion :
Pole Absolute Resultant Moment = 19.4547 (ft-kips)

Member # 7

	Node I	Node J
Axial Force =	0.3603	-0.3603
Shear Xm - Ym =	9.4262	-9.4262
Shear Xm - Zm =	-3.4355	3.4355
Torsion =	0.0000	0.0000
Moment About Ym =	987.3171	-34.0274
Moment About Zm =	2848.7742	-233.2030

Unit conversion :
Pole Absolute Resultant Moment = 251.2512 (ft-kips)

Member # 8

	Node I	Node J
Axial Force =	0.4768	-0.4768
Shear Xm - Ym =	2.4287	-2.4287
Shear Xm - Zm =	-0.3544	0.3544
Torsion =	0.0000	0.0000
Moment About Ym =	34.0274	-0.0000
Moment About Zm =	233.2030	-0.0000

Unit conversion :
Pole Absolute Resultant Moment = 19.6394 (ft-kips)

- Primary (Catenary) Cable Forces Primary Cable Forces on Poles

Member	Force	Stress	Node	Fx	Fy	Fz
1	1.6971	11.3141	3	0.0299	1.6412	-0.4309
2	1.7027	11.3513				
3	1.7711	11.8076				
4	1.9018	12.6783				
5	2.0738	13.8256	7	0.0861	-2.0657	-0.1617

6	0.6936	4.6238	7	0.6758	0.0198	-0.1548
7	0.6800	4.5331				
8	0.9755	6.5033				
9	1.3273	8.8486				
10	1.5773	10.5154	11	-1.5619	0.0167	-0.2190
11	2.0355	13.5703	11	0.1410	-1.9784	-0.4575
12	1.9833	13.2221				
13	1.9199	12.7994				
14	1.9196	12.7976				
15	1.9546	13.0305	15	0.0132	1.9480	-0.1588
16	1.5292	10.1948	15	-1.5018	0.0196	-0.2875
17	1.5151	10.1006				
18	1.2020	8.0130				
19	0.8590	5.7268				
20	0.6326	4.2170	3	0.6253	0.0124	-0.0945

- Secondary (Messenger) Cable Forces Secondary Cable Forces on Poles

Member	Force	Stress	Node	Fx	Fy	Fz
1	7.1271	47.5137	2	0.5319	7.1049	0.1789
2	6.9570	46.3802				
3	6.7673	45.1153				
4	6.5279	43.5193				
5	6.2859	41.9059	6	0.3687	-6.2747	0.0644
6	4.3859	29.2396	6	4.3743	0.3197	0.0053
7	4.3780	29.1865				
8	3.8476	25.6508				
9	3.2692	21.7944				
10	2.8035	18.6901	10	-2.8021	0.0859	0.0272
11	6.5431	43.6208	10	0.7590	-6.4962	0.1887
12	6.7031	44.6872				
13	6.8149	45.4325				
14	6.8785	45.8565				
15	6.9382	46.2545	14	0.1667	6.9357	0.0799
16	3.0347	20.2310	14	-3.0315	0.1337	0.0364
17	3.0258	20.1723				
18	3.5614	23.7426				
19	4.1360	27.5731				
20	4.6004	30.6691	2	4.5954	0.2129	0.0096

- Light Member Forces

Member # 1
Rotation Angle in Y-Z Plane (Degrees) = 0.52
Rotation Angle in X-Z Plane (Degrees) = 4.88

Member # 2
Rotation Angle in Y-Z Plane (Degrees) = 5.14

```
Rotation Angle in X-Z Plane (Degrees) =   85.36

Member #   3
Rotation Angle in Y-Z Plane (Degrees) =   13.40
Rotation Angle in X-Z Plane (Degrees) =   85.06

Member #   4
Rotation Angle in Y-Z Plane (Degrees) =    2.81
Rotation Angle in X-Z Plane (Degrees) =   77.91

Member #   5
Rotation Angle in Y-Z Plane (Degrees) =   41.86
Rotation Angle in X-Z Plane (Degrees) =    0.44

Member #   6
Rotation Angle in Y-Z Plane (Degrees) =   55.31
Rotation Angle in X-Z Plane (Degrees) =    4.07

Member #   7
Rotation Angle in Y-Z Plane (Degrees) =   54.89
Rotation Angle in X-Z Plane (Degrees) =    4.57

Member #   8
Rotation Angle in Y-Z Plane (Degrees) =   55.46
Rotation Angle in X-Z Plane (Degrees) =    4.81

Member #   9
Rotation Angle in Y-Z Plane (Degrees) =    2.32
Rotation Angle in X-Z Plane (Degrees) =    4.89

Member #  10
Rotation Angle in Y-Z Plane (Degrees) =   33.75
Rotation Angle in X-Z Plane (Degrees) =   83.61

Member #  11
Rotation Angle in Y-Z Plane (Degrees) =   29.46
Rotation Angle in X-Z Plane (Degrees) =   80.67

Member #  12
Rotation Angle in Y-Z Plane (Degrees) =   18.98
Rotation Angle in X-Z Plane (Degrees) =   76.59

Member #  13
Rotation Angle in Y-Z Plane (Degrees) =   38.05
Rotation Angle in X-Z Plane (Degrees) =    1.59

Member #  14
Rotation Angle in Y-Z Plane (Degrees) =   55.29
Rotation Angle in X-Z Plane (Degrees) =    6.15

Member #  15
```

Rotation Angle in Y-Z Plane (Degrees) = 55.58
Rotation Angle in X-Z Plane (Degrees) = 5.82

Member # 16
Rotation Angle in Y-Z Plane (Degrees) = 56.43
Rotation Angle in X-Z Plane (Degrees) = 4.61

- Hanger (Connector) Member Forces

Member # 1

	Node I	Node J
Axial Force =	-0.1138	0.1138
Shear Xm - Ym =	-0.0004	0.0004
Shear Xm - Zm =	0.1346	-0.1346
Torsion =	0.0009	-0.0009
Moment About Ym =	-0.0001	-7.3588
Moment About Zm =	-0.0000	-0.0245

Member # 2

	Node I	Node J
Axial Force =	-0.0498	0.0498
Shear Xm - Ym =	0.0071	-0.0071
Shear Xm - Zm =	-8.2943	8.2943
Torsion =	1.9136	-1.9136
Moment About Ym =	0.4515	288.9480
Moment About Zm =	-0.0004	0.2472

Member # 3

	Node I	Node J
Axial Force =	-0.1250	0.1250
Shear Xm - Ym =	-0.0017	0.0017
Shear Xm - Zm =	-2.8965	2.8965
Torsion =	0.0026	-0.0026
Moment About Ym =	0.0090	60.3082
Moment About Zm =	0.0003	-0.0362

Member # 4

	Node I	Node J
Axial Force =	-0.1079	0.1079
Shear Xm - Ym =	-0.0019	0.0019
Shear Xm - Zm =	-1.1239	1.1239
Torsion =	0.0265	-0.0265
Moment About Ym =	-0.0098	20.2409
Moment About Zm =	0.0006	-0.0353

Member # 5

	Node I	Node J

Axial Force	=	-0.0596	0.0596
Shear Xm - Ym	=	-0.0000	0.0000
Shear Xm - Zm	=	1.6970	-1.6970
Torsion	=	0.0022	-0.0022
Moment About Ym	=	-0.0000	-81.3035
Moment About Zm	=	0.0000	-0.0011

Member # 6

		Node I	Node J
Axial Force	=	-0.0465	0.0465
Shear Xm - Ym	=	-0.0056	0.0056
Shear Xm - Zm	=	3.4214	-3.4214
Torsion	=	0.1093	-0.1093
Moment About Ym	=	-0.0415	-72.1593
Moment About Zm	=	0.0000	-0.1179

Member # 7

		Node I	Node J
Axial Force	=	-0.1024	0.1024
Shear Xm - Ym	=	-0.0064	0.0064
Shear Xm - Zm	=	3.7137	-3.7137
Torsion	=	0.0962	-0.0962
Moment About Ym	=	-0.0460	-66.8025
Moment About Zm	=	0.0000	-0.1152

Member # 8

		Node I	Node J
Axial Force	=	-0.1134	0.1134
Shear Xm - Ym	=	-0.0053	0.0053
Shear Xm - Zm	=	3.8112	-3.8112
Torsion	=	0.1749	-0.1749
Moment About Ym	=	-0.0457	-99.4069
Moment About Zm	=	0.0000	-0.1383

Member # 9

		Node I	Node J
Axial Force	=	-0.1357	0.1357
Shear Xm - Ym	=	0.0005	-0.0005
Shear Xm - Zm	=	-0.1390	0.1390
Torsion	=	0.0001	-0.0001
Moment About Ym	=	0.0000	7.4899
Moment About Zm	=	0.0000	0.0259

Member # 10

		Node I	Node J

Axial Force	=	-0.1295	0.1295
Shear Xm - Ym	=	0.0106	-0.0106
Shear Xm - Zm	=	8.6380	-8.6380
Torsion	=	-2.3643	2.3643
Moment About Ym	=	-0.8801	-274.0718
Moment About Zm	=	-0.0009	0.3382

Member # 11

		Node I	Node J
Axial Force	=	-0.3120	0.3120
Shear Xm - Ym	=	0.0022	-0.0022
Shear Xm - Zm	=	1.3010	-1.3010
Torsion	=	0.0854	-0.0854
Moment About Ym	=	0.2017	-25.1100
Moment About Zm	=	0.0028	0.0403

Member # 12

		Node I	Node J
Axial Force	=	-0.2594	0.2594
Shear Xm - Ym	=	0.0026	-0.0026
Shear Xm - Zm	=	0.1252	-0.1252
Torsion	=	0.0074	-0.0074
Moment About Ym	=	0.1377	-2.3916
Moment About Zm	=	0.0035	0.0432

Member # 13

		Node I	Node J
Axial Force	=	-0.1335	0.1335
Shear Xm - Ym	=	0.0005	-0.0005
Shear Xm - Zm	=	-2.3854	2.3854
Torsion	=	0.0520	-0.0520
Moment About Ym	=	0.0073	70.6146
Moment About Zm	=	-0.0000	0.0134

Member # 14

		Node I	Node J
Axial Force	=	-0.1310	0.1310
Shear Xm - Ym	=	0.0064	-0.0064
Shear Xm - Zm	=	-4.1806	4.1806
Torsion	=	0.1651	-0.1651
Moment About Ym	=	0.0725	83.7264
Moment About Zm	=	-0.0001	0.1281

Member # 15

		Node I	Node J
Axial Force	=	-0.0923	0.0923

Shear Xm - Ym	=	0.0065	-0.0065
Shear Xm - Zm	=	-3.7995	3.7995
Torsion	=	0.1140	-0.1140
Moment About Ym	=	0.0625	68.3297
Moment About Zm	=	-0.0001	0.1174

Member # 16

		Node I	Node J
Axial Force	=	-0.0265	0.0265
Shear Xm - Ym	=	0.0049	-0.0049
Shear Xm - Zm	=	-3.4235	3.4235
Torsion	=	0.1661	-0.1661
Moment About Ym	=	0.0448	92.5846
Moment About Zm	=	-0.0000	0.1331

5.1.3 INPUT AT 45º

```
VERSION NUMBER 7.2.0

CONTROL
TITLE = Box Model @45deg.in
MODEL = TWO
NODES = 64
CLEAR = 307.12
TOPDIST = 12.00
CABLE = 8
SPEED = 140.00
ANGLE = 45.00
STATUS = CHECK
KZFAC = 1
GUST = 1.14
DIRECT = 0.85
DEADLOADFAC = 1.10
WINLOADFAC = 1.00
COEFFFLAG = 1
DRAG = 0.6
UPLIFT = 0
CUSTOMFLAG = 0
:
CABLES
   1   3   7   S= 5.00   W= 4.333E-05   P= 0
   2   2   6   T= 1.00   W= 4.333E-05   P= 1
   3   7  11   S= 5.00   W= 4.333E-05   P= 0
   4   6  10   T= 1.00   W= 4.333E-05   P= 1
   5  11  15   S= 5.00   W= 4.333E-05   P= 0
   6  10  14   T= 1.00   W= 4.333E-05   P= 1
   7  15   3   S= 5.00   W= 4.333E-05   P= 0
   8  14   2   T= 1.00   W= 4.333E-05   P= 1
:
COORDINATE
    1 X= 3.6000000E+01 Y= 0.0000000E+00 Z= 0.0000000E+00
    2 X= 3.6000000E+01 Y= 0.0000000E+00 Z= 2.8912000E+02
    3 X= 3.6000000E+01 Y= 0.0000000E+00 Z= 3.8514077E+02
    4 X= 5.3248033E+01 Y= -1.6688480E+01 Z= 0.0000000E+00
    5 X= 0.0000000E+00 Y= 1.5600000E+03 Z= 1.2000000E+00
    6 X= 0.0000000E+00 Y= 1.5600000E+03 Z= 2.8912000E+02
    7 X= 0.0000000E+00 Y= 1.5600000E+03 Z= 3.8514077E+02
    8 X= 1.7247223E+01 Y= 1.5433107E+03 Z= 1.2000000E+00
    9 X= 1.2240000E+03 Y= 1.5720000E+03 Z= 5.6400000E+00
   10 X= 1.2240000E+03 Y= 1.5720000E+03 Z= 2.8912000E+02
   11 X= 1.2240000E+03 Y= 1.5720000E+03 Z= 3.8514077E+02
   12 X= 1.2411829E+03 Y= 1.5552445E+03 Z= 5.6400000E+00
   13 X= 1.2480000E+03 Y= 1.2000000E+01 Z= 1.1640000E+01
   14 X= 1.2480000E+03 Y= 1.2000000E+01 Z= 2.8912000E+02
   15 X= 1.2480000E+03 Y= 1.2000000E+01 Z= 3.8514077E+02
   16 X= 1.2651837E+03 Y= -4.7546699E+00 Z= 1.1640000E+01
   17 X= 3.2400000E+01 Y= 1.5000000E+02 C=    1
   18 X= 3.2400000E+01 Y= 1.5000000E+02 Z= 2.8912000E+02
```

```
   19 X= 3.2400000E+01 Y= 1.5000000E+02 Z= 2.7712000E+02
   20 X= 3.0000000E+01 Y= 2.6400000E+02 C=    1
   21 X= 3.0000000E+01 Y= 2.6400000E+02 Z= 2.8912000E+02
   22 X= 3.0000000E+01 Y= 2.6400000E+02 Z= 2.6106000E+02
   23 X= 2.6400000E+01 Y= 4.0800000E+02 C=    1
   24 X= 2.6400000E+01 Y= 4.0800000E+02 Z= 2.8912000E+02
   25 X= 2.6400000E+01 Y= 4.0800000E+02 Z= 2.6106000E+02
   26 X= 2.4000000E+01 Y= 5.4000000E+02 C=    1
   27 X= 2.4000000E+01 Y= 5.4000000E+02 Z= 2.8912000E+02
   28 X= 2.4000000E+01 Y= 5.4000000E+02 Z= 2.6106000E+02
   29 X= 2.1600000E+02 Y= 1.5624000E+03 C=    3
   30 X= 2.1600000E+02 Y= 1.5624000E+03 Z= 2.8912000E+02
   31 X= 2.1600000E+02 Y= 1.5624000E+03 Z= 2.7712000E+02
   32 X= 4.6800000E+02 Y= 1.5648000E+03 C=    3
   33 X= 4.6800000E+02 Y= 1.5648000E+03 Z= 2.8912000E+02
   34 X= 4.6800000E+02 Y= 1.5648000E+03 Z= 2.6106000E+02
   35 X= 6.0000000E+02 Y= 1.5660000E+03 C=    3
   36 X= 6.0000000E+02 Y= 1.5660000E+03 Z= 2.8912000E+02
   37 X= 6.0000000E+02 Y= 1.5660000E+03 Z= 2.6106000E+02
   38 X= 7.4400000E+02 Y= 1.5672000E+03 C=    3
   39 X= 7.4400000E+02 Y= 1.5672000E+03 Z= 2.8912000E+02
   40 X= 7.4400000E+02 Y= 1.5672000E+03 Z= 2.6106000E+02
   41 X= 1.2264000E+03 Y= 1.4040000E+03 C=    5
   42 X= 1.2264000E+03 Y= 1.4040000E+03 Z= 2.8912000E+02
   43 X= 1.2264000E+03 Y= 1.4040000E+03 Z= 2.7712000E+02
   44 X= 1.2288000E+03 Y= 1.2600000E+03 C=    5
   45 X= 1.2288000E+03 Y= 1.2600000E+03 Z= 2.8912000E+02
   46 X= 1.2288000E+03 Y= 1.2600000E+03 Z= 2.6106000E+02
   47 X= 1.2312000E+03 Y= 1.1040000E+03 C=    5
   48 X= 1.2312000E+03 Y= 1.1040000E+03 Z= 2.8912000E+02
   49 X= 1.2312000E+03 Y= 1.1040000E+03 Z= 2.6106000E+02
   50 X= 1.2324000E+03 Y= 9.9600000E+02 C=    5
   51 X= 1.2324000E+03 Y= 9.9600000E+02 Z= 2.8912000E+02
   52 X= 1.2324000E+03 Y= 9.9600000E+02 Z= 2.6106000E+02
   53 X= 9.1200000E+02 Y= 8.4000000E+00 C=    7
   54 X= 9.1200000E+02 Y= 8.4000000E+00 Z= 2.8912000E+02
   55 X= 9.1200000E+02 Y= 8.4000000E+00 Z= 2.7712000E+02
   56 X= 8.0400000E+02 Y= 7.2000000E+00 C=    7
   57 X= 8.0400000E+02 Y= 7.2000000E+00 Z= 2.8912000E+02
   58 X= 8.0400000E+02 Y= 7.2000000E+00 Z= 2.6106000E+02
   59 X= 6.4800000E+02 Y= 6.0000000E+00 C=    7
   60 X= 6.4800000E+02 Y= 6.0000000E+00 Z= 2.8912000E+02
   61 X= 6.4800000E+02 Y= 6.0000000E+00 Z= 2.6106000E+02
   62 X= 5.0400000E+02 Y= 4.8000000E+00 C=    7
   63 X= 5.0400000E+02 Y= 4.8000000E+00 Z= 2.8912000E+02
   64 X= 5.0400000E+02 Y= 4.8000000E+00 Z= 2.6106000E+02
:
BOUNDARY
    1 DOF= f f f f f f
    2 DOF= r r r r r r
    3 DOF= r r r r r r
```

```
 4 DOF= f f f f f f
 5 DOF= f f f f f f
 6 DOF= r r r r r r
 7 DOF= r r r r r r
 8 DOF= f f f f f f
 9 DOF= f f f f f f
10 DOF= r r r r r r
11 DOF= r r r r r r
12 DOF= f f f f f f
13 DOF= f f f f f f
14 DOF= r r r r r r
15 DOF= r r r r r r
16 DOF= f f f f f f
17 DOF= r r r r r r
18 DOF= r r r r r r
19 DOF= r r r r r r
20 DOF= r r r r r r
21 DOF= r r r r r r
22 DOF= r r r r r r
23 DOF= r r r r r r
24 DOF= r r r r r r
25 DOF= r r r r r r
26 DOF= r r r r r r
27 DOF= r r r r r r
28 DOF= r r r r r r
29 DOF= r r r r r r
30 DOF= r r r r r r
31 DOF= r r r r r r
32 DOF= r r r r r r
33 DOF= r r r r r r
34 DOF= r r r r r r
35 DOF= r r r r r r
36 DOF= r r r r r r
37 DOF= r r r r r r
38 DOF= r r r r r r
39 DOF= r r r r r r
40 DOF= r r r r r r
41 DOF= r r r r r r
42 DOF= r r r r r r
43 DOF= r r r r r r
44 DOF= r r r r r r
45 DOF= r r r r r r
46 DOF= r r r r r r
47 DOF= r r r r r r
48 DOF= r r r r r r
49 DOF= r r r r r r
50 DOF= r r r r r r
51 DOF= r r r r r r
52 DOF= r r r r r r
53 DOF= r r r r r r
54 DOF= r r r r r r
```

```
   55 DOF= r r r r r r
   56 DOF= r r r r r r
   57 DOF= r r r r r r
   58 DOF= r r r r r r
   59 DOF= r r r r r r
   60 DOF= r r r r r r
   61 DOF= r r r r r r
   62 DOF= r r r r r r
   63 DOF= r r r r r r
   64 DOF= r r r r r r
:
PRIMARY
    20,    1
  1 A= 0.1500 E= 2.45000E+04
   1     3,  17 M= 1 C= 1
   2    17,  20 M= 1 C= 1
   3    20,  23 M= 1 C= 1
   4    23,  26 M= 1 C= 1
   5    26 ,  7 M= 1 C= 1
   6     7,  29 M= 1 C= 3
   7    29,  32 M= 1 C= 3
   8    32,  35 M= 1 C= 3
   9    35,  38 M= 1 C= 3
  10    38,  11 M= 1 C= 3
  11    11,  41 M= 1 C= 5
  12    41,  44 M= 1 C= 5
  13    44,  47 M= 1 C= 5
  14    47,  50 M= 1 C= 5
  15    50,  15 M= 1 C= 5
  16    15,  53 M= 1 C= 7
  17    53,  56 M= 1 C= 7
  18    56,  59 M= 1 C= 7
  19    59,  62 M= 1 C= 7
  20    62 ,  3 M= 1 C= 7
:
SECONDARY
    20,    1
  1 A= 0.1500 E= 2.45000E+04
   1     2,  18 M= 1 C= 2
   2    18,  21 M= 1 C= 2
   3    21,  24 M= 1 C= 2
   4    24,  27 M= 1 C= 2
   5    27 ,  6 M= 1 C= 2
   6     6,  30 M= 1 C= 4
   7    30,  33 M= 1 C= 4
   8    33,  36 M= 1 C= 4
   9    36,  39 M= 1 C= 4
  10    39,  10 M= 1 C= 4
  11    10,  42 M= 1 C= 6
  12    42,  45 M= 1 C= 6
  13    45,  48 M= 1 C= 6
```

```
  14    48,  51 M= 1 C= 6
  15    51,  14 M= 1 C= 6
  16    14,  54 M= 1 C= 8
  17    54,  57 M= 1 C= 8
  18    57,  60 M= 1 C= 8
  19    60,  63 M= 1 C= 8
  20    63 ,  2 M= 1 C= 8
:
CONNECTORS
   16,    2
 1 A= 0.5966 E= 1.00000E+04 I= 2.84200E-01, 4.60000E-03  \\
    J= 2.88800E-01 G= 3.75940E+03
 2 A= 0.5966 E= 1.00000E+04 I= 2.84200E-01, 4.60000E-03  \\
    J= 2.88800E-01 G= 3.75940E+03
   1    17,  18,   3 M= 1
   2    20,  21,   3 M= 2
   3    23,  24,   3 M= 2
   4    26,  27,   3 M= 2
   5    29,  30,   7 M= 1
   6    32,  33,   7 M= 2
   7    35,  36,   7 M= 2
   8    38,  39,   7 M= 2
   9    41,  42,  11 M= 1
  10    44,  45,  11 M= 2
  11    47,  48,  11 M= 2
  12    50,  51,  11 M= 2
  13    53,  54,  15 M= 1
  14    56,  57,  15 M= 2
  15    59,  60,  15 M= 2
  16    62,  63,  15 M= 2
:
LIGHTS
   16,    2
  1 A= 0.5966 E= 1.00000E+04 I= 2.84200E-01, 4.60000E-03  \\
    J= 2.88800E-01 G= 3.75940E+03 S= 0 B= 0 P= 2.30400E+03, 0.00000E+00
  2 A= 0.5966 E= 1.00000E+04 I= 2.84200E-01, 4.60000E-03  \\
    J= 2.88800E-01 G= 3.75940E+03 S= 1 B= 6 P= 1.55328E+03, 1.55328E+03
   1    18,  19,   3 M= 1
   2    21,  22,   3 M= 2
   3    24,  25,   3 M= 2
   4    27,  28,   3 M= 2
   5    30,  31,   7 M= 1
   6    33,  34,   7 M= 2
   7    36,  37,   7 M= 2
   8    39,  40,   7 M= 2
   9    42,  43,  11 M= 1
  10    45,  46,  11 M= 2
  11    48,  49,  11 M= 2
  12    51,  52,  11 M= 2
  13    54,  55,  15 M= 1
  14    57,  58,  15 M= 2
```

```
  15    60,  61,  15 M= 2
  16    63,  64,  15 M= 2
:
BEAM
    8,    1
  1 S= 1 T= NVIII X= PVIII FC= 6000.0
   1     1,   2,   4  M= 1
   2     2,   3,   4  M= 1
   3     5,   6,   8  M= 1
   4     6,   7,   8  M= 1
   5     9,  10,  12  M= 1
   6    10,  11,  12  M= 1
   7    13,  14,  16  M= 1
   8    14,  15,  16  M= 1
:
SIGNS
  17 F= 0.00000E+00, 0.00000E+00, -9.23957E-02
  20 F= 0.00000E+00, 0.00000E+00, -6.59599E-02
  23 F= 0.00000E+00, 0.00000E+00, -6.55234E-02
  26 F= 0.00000E+00, 0.00000E+00, -8.40024E-02
  29 F= 0.00000E+00, 0.00000E+00, -9.63938E-02
  32 F= 0.00000E+00, 0.00000E+00, -6.79829E-02
  35 F= 0.00000E+00, 0.00000E+00, -6.54671E-02
  38 F= 0.00000E+00, 0.00000E+00, -7.31760E-02
  41 F= 0.00000E+00, 0.00000E+00, -9.32949E-02
  44 F= 0.00000E+00, 0.00000E+00, -6.65667E-02
  47 F= 0.00000E+00, 0.00000E+00, -6.49974E-02
  50 F= 0.00000E+00, 0.00000E+00, -8.25972E-02
  53 F= 0.00000E+00, 0.00000E+00, -9.52231E-02
  56 F= 0.00000E+00, 0.00000E+00, -6.54545E-02
  59 F= 0.00000E+00, 0.00000E+00, -6.60164E-02
  62 F= 0.00000E+00, 0.00000E+00, -7.29607E-02
:
WIND
  17 F= 1.20378E-02, 1.20378E-02, 0.00000E+00
  18 F= 1.19779E-02, 1.19779E-02, 0.00000E+00
  20 F= 1.17346E-02, 1.17346E-02, 0.00000E+00
  21 F= 1.16993E-02, 1.16993E-02, 0.00000E+00
  23 F= 1.25568E-02, 1.25568E-02, 0.00000E+00
  24 F= 1.25350E-02, 1.25350E-02, 0.00000E+00
  26 F= 5.23035E-02, 5.23035E-02, 0.00000E+00
  27 F= 5.22570E-02, 5.22570E-02, 0.00000E+00
  29 F= 2.15690E-02, 2.15690E-02, 0.00000E+00
  30 F= 2.15045E-02, 2.15045E-02, 0.00000E+00
  32 F= 1.76773E-02, 1.76773E-02, 0.00000E+00
  33 F= 1.76604E-02, 1.76604E-02, 0.00000E+00
  35 F= 1.27033E-02, 1.27033E-02, 0.00000E+00
  36 F= 1.27021E-02, 1.27021E-02, 0.00000E+00
  38 F= 2.87503E-02, 2.87503E-02, 0.00000E+00
  39 F= 2.86912E-02, 2.86912E-02, 0.00000E+00
  41 F= 1.43286E-02, 1.43286E-02, 0.00000E+00
```

```
  42 F= 1.42620E-02, 1.42620E-02, 0.00000E+00
  44 F= 1.37404E-02, 1.37404E-02, 0.00000E+00
  45 F= 1.37049E-02, 1.37049E-02, 0.00000E+00
  47 F= 1.21060E-02, 1.21060E-02, 0.00000E+00
  48 F= 1.20893E-02, 1.20893E-02, 0.00000E+00
  50 F= 4.99651E-02, 4.99651E-02, 0.00000E+00
  51 F= 4.99171E-02, 4.99171E-02, 0.00000E+00
  53 F= 2.04527E-02, 2.04527E-02, 0.00000E+00
  54 F= 2.03902E-02, 2.03902E-02, 0.00000E+00
  56 F= 1.21505E-02, 1.21505E-02, 0.00000E+00
  57 F= 1.21450E-02, 1.21450E-02, 0.00000E+00
  59 F= 1.38179E-02, 1.38179E-02, 0.00000E+00
  60 F= 1.38163E-02, 1.38163E-02, 0.00000E+00
  62 F= 2.81929E-02, 2.81929E-02, 0.00000E+00
  63 F= 2.81341E-02, 2.81341E-02, 0.00000E+00
:
LOADS
   3 F= 0.00000E+00, 0.00000E+00, -1.34380E-02
   7 F= 0.00000E+00, 0.00000E+00, -2.68283E-02
  11 F= 0.00000E+00, 0.00000E+00, -1.40893E-02
  15 F= 0.00000E+00, 0.00000E+00, -2.86513E-02
  17 F= 0.00000E+00, 0.00000E+00, -9.07292E-03
  18 F= 0.00000E+00, 0.00000E+00, -3.32279E-03
  19 F= 0.00000E+00, 0.00000E+00, -8.00000E-02
  20 F= 0.00000E+00, 0.00000E+00, -8.51234E-03
  21 F= 0.00000E+00, 0.00000E+00, -2.90396E-03
  22 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  23 F= 0.00000E+00, 0.00000E+00, -8.48588E-03
  24 F= 0.00000E+00, 0.00000E+00, -2.49399E-03
  25 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  26 F= 0.00000E+00, 0.00000E+00, -2.72238E-02
  27 F= 0.00000E+00, 0.00000E+00, -2.23503E-03
  28 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  29 F= 0.00000E+00, 0.00000E+00, -1.32824E-02
  30 F= 0.00000E+00, 0.00000E+00, -3.11140E-03
  31 F= 0.00000E+00, 0.00000E+00, -8.00000E-02
  32 F= 0.00000E+00, 0.00000E+00, -1.08838E-02
  33 F= 0.00000E+00, 0.00000E+00, -2.55550E-03
  34 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  35 F= 0.00000E+00, 0.00000E+00, -8.45216E-03
  36 F= 0.00000E+00, 0.00000E+00, -2.47138E-03
  37 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  38 F= 0.00000E+00, 0.00000E+00, -1.60904E-02
  39 F= 0.00000E+00, 0.00000E+00, -2.54197E-03
  40 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  41 F= 0.00000E+00, 0.00000E+00, -1.00436E-02
  42 F= 0.00000E+00, 0.00000E+00, -3.25125E-03
  43 F= 0.00000E+00, 0.00000E+00, -8.00000E-02
  44 F= 0.00000E+00, 0.00000E+00, -9.27038E-03
  45 F= 0.00000E+00, 0.00000E+00, -2.75272E-03
  46 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
```

```
  47 F= 0.00000E+00, 0.00000E+00, -8.09114E-03
  48 F= 0.00000E+00, 0.00000E+00, -2.36267E-03
  49 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  50 F= 0.00000E+00, 0.00000E+00, -2.58696E-02
  51 F= 0.00000E+00, 0.00000E+00, -2.18404E-03
  52 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  53 F= 0.00000E+00, 0.00000E+00, -1.24366E-02
  54 F= 0.00000E+00, 0.00000E+00, -2.78654E-03
  55 F= 0.00000E+00, 0.00000E+00, -8.00000E-02
  56 F= 0.00000E+00, 0.00000E+00, -8.31691E-03
  57 F= 0.00000E+00, 0.00000E+00, -2.59406E-03
  58 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  59 F= 0.00000E+00, 0.00000E+00, -8.98688E-03
  60 F= 0.00000E+00, 0.00000E+00, -2.48594E-03
  61 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  62 F= 0.00000E+00, 0.00000E+00, -1.58527E-02
  63 F= 0.00000E+00, 0.00000E+00, -2.56436E-03
  64 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
:
GENERATE
CLEAR=19.50 VELOCITY=140.0 ANGLE=45.0 STAT=2 SAG=0.050 DIFF=1.50 TOPDIST=1.00
:
SYSTEM
MODEL TYPE= TWO - POINT
:
POLES
M=1 S=1 TYPE=NVIII XTYPE=PVIII FC=6000.0
P=1 X=3.0 Y=0.0 Z=0.00 M=1
P=2 X=0.0 Y=130.0 Z=0.10 M=1
P=3 X=102.0 Y=131.0 Z=0.47 M=1
P=4 X=104.0 Y=1.0 Z=0.97 M=1
:
WIRES
M=1 D=8,8 E=24500,24500 T=1.00
W=1 POLES=1,2 M=1
W=2 POLES=2,3 M=1
W=3 POLES=3,4 M=1
W=4 POLES=4,1 M=1
:
SIGNAL
M=1 R=3.00 S=1 D=12 E=W6 L=AL G=3
M=2 R=3.00 N=YES A=OTHER ,2304.0 C=12.0 W=5.000 D=Y
S=1 X=2.5 Y=22.0 M=1 C=1
S=2 X=2.2 Y=34.0 M=1 C=1
S=3 X=2.0 Y=45.0 M=1 C=1
S=4 X=39.0 Y=130.4 M=1 C=2
S=5 X=50.0 Y=130.5 M=1 C=2
S=6 X=62.0 Y=130.6 M=1 C=2
S=7 X=102.4 Y=105.0 M=1 C=3
S=8 X=102.6 Y=92.0 M=1 C=3
S=9 X=102.7 Y=83.0 M=1 C=3
```

```
S=10 X=67.0 Y=0.6 M=1 C=4
S=11 X=54.0 Y=0.5 M=1 C=4
S=12 X=42.0 Y=0.4 M=1 C=4
S=13 X=2.7 Y=12.5 M=2 C=1
S=14 X=18.0 Y=130.2 M=2 C=2
S=15 X=102.2 Y=117.0 M=2 C=3
S=16 X=76.0 Y=0.7 M=2 C=4
:
GRIDDIM
G=200 D=10
:
DESIGN
S=2 F=0.00 W=0.600 G=38.40 P=21.70 WR=0.500
:
```

5.1.4 OUTPUT AT 45º

```
*************************************************************************
|       ##          #####        #                ##           ####     |
|      #  #           #          #               #  #         #         |
|     #    #          #          #              #    #         ####     |
|     ######          #          #              ######             #    |
|     #    #          #          #              #    #         #    #   |
|     #    #          #          ######         #    #          ####    |
|                                                                       |
|                 Analysis of Traffic Lights And Signs                  |
|                                                                       |
|                              Version 7.2.0                            |
|                                                                       |
|       Developed by :                                                  |
|                                                                       |
|                         Bridge Software Institute                     |
|                                                                       |
|       No warranty, expressed or implied, is made by the Florida       |
|       Department of Transportation or the University of Florida       |
|       as to the accuracy and functioning of any programs or the       |
|       results they produce,nor shall the fact of distribution         |
|       constitute any such warranty, and no responsibility is          |
|       assumed by the Florida Department of Transportation or          |
|       the University of Florida in any connection therewith.          |
|                                                                       |
|                                                                       |
|                   Department of Civil Engineering                     |
|                        University of Florida                          |
|                        Gainesville, Fl 32611                          |
|                                                                       |
*************************************************************************


      *** NOTE - Pole convergence increased to 2.0*default
          for wind speeds > 85 mph:
          Tolerance =     0.200000


  Input Data File = K:\ORL_Structures\_Projects-Structures\_Strain Poles\142371064
SW 44th and SW 20th\03_Calculations\Box Model @45deg.in


  ATLAS EXECUTION STATUS

   - Check the Model for Adequacy


  CONTROL DATA (More Information found in ATLAS HELP)

   - Problem Title
```

BOX MODEL @45DEG.IN

- Structural Parameters :

Number of Nodes = 64
Number of Cables = 8
Lowest Point of Catenary = 25.59 ft

- Wind Data :

Wind Speed (Miles per Hour) = 140.00
Wind Direction (Angle from +ve X axis) = 45.0

- Nonlinear iteration Parameters :

Number of Iterations (Shape Finder) = 200
Number of Iterations (Gravity Solution) = 200
Number of Iterations (Wind Solution) = 200
Number of Loops for Shape Calculation = 5
Number of Cycles (Shape-Stiffness Iteration) = 1800
Force Tolerance for Gravity Solution (%) = 5.00
Force Tolerance for Wind Solution (%) = 5.00
Pole Displacement Tolerance = 0.200000

ECHO OF NODAL POINT INPUT DATA

Node	Nodal Point Coordinates X (in)	Y (in)	Z (in)	Boundary Conditions Tx	Ty	Tz	Rx	Ry	Rz
1	36.000	0.000	0.000	F	F	F	F	F	F
2	36.000	0.000	289.120	R	R	R	R	R	R
3	36.000	0.000	385.141	R	R	R	R	R	R
4	53.248	-16.688	0.000	F	F	F	F	F	F
5	0.000	1560.000	1.200	F	F	F	F	F	F
6	0.000	1560.000	289.120	R	R	R	R	R	R
7	0.000	1560.000	385.141	R	R	R	R	R	R
8	17.247	1543.311	1.200	F	F	F	F	F	F
9	1224.000	1572.000	5.640	F	F	F	F	F	F
10	1224.000	1572.000	289.120	R	R	R	R	R	R
11	1224.000	1572.000	385.141	R	R	R	R	R	R
12	1241.183	1555.245	5.640	F	F	F	F	F	F
13	1248.000	12.000	11.640	F	F	F	F	F	F
14	1248.000	12.000	289.120	R	R	R	R	R	R
15	1248.000	12.000	385.141	R	R	R	R	R	R
16	1265.184	-4.755	11.640	F	F	F	F	F	F
17	32.400	150.000	358.018	R	R	R	R	R	R
18	32.400	150.000	289.120	R	R	R	R	R	R
19	32.400	150.000	277.120	R	R	R	R	R	R
20	30.000	264.000	341.265	R	R	R	R	R	R

21	30.000	264.000	289.120	R	R	R	R	R	R
22	30.000	264.000	261.060	R	R	R	R	R	R
23	26.400	408.000	324.866	R	R	R	R	R	R
24	26.400	408.000	289.120	R	R	R	R	R	R
25	26.400	408.000	261.060	R	R	R	R	R	R
26	24.000	540.000	314.507	R	R	R	R	R	R
27	24.000	540.000	289.120	R	R	R	R	R	R
28	24.000	540.000	261.060	R	R	R	R	R	R
29	216.000	1562.400	349.562	R	R	R	R	R	R
30	216.000	1562.400	289.120	R	R	R	R	R	R
31	216.000	1562.400	277.120	R	R	R	R	R	R
32	468.000	1564.800	327.326	R	R	R	R	R	R
33	468.000	1564.800	289.120	R	R	R	R	R	R
34	468.000	1564.800	261.060	R	R	R	R	R	R
35	600.000	1566.000	323.961	R	R	R	R	R	R
36	600.000	1566.000	289.120	R	R	R	R	R	R
37	600.000	1566.000	261.060	R	R	R	R	R	R
38	744.000	1567.200	326.785	R	R	R	R	R	R
39	744.000	1567.200	289.120	R	R	R	R	R	R
40	744.000	1567.200	261.060	R	R	R	R	R	R
41	1226.400	1404.000	355.156	R	R	R	R	R	R
42	1226.400	1404.000	289.120	R	R	R	R	R	R
43	1226.400	1404.000	277.120	R	R	R	R	R	R
44	1228.800	1260.000	335.215	R	R	R	R	R	R
45	1228.800	1260.000	289.120	R	R	R	R	R	R
46	1228.800	1260.000	261.060	R	R	R	R	R	R
47	1231.200	1104.000	319.613	R	R	R	R	R	R
48	1231.200	1104.000	289.120	R	R	R	R	R	R
49	1231.200	1104.000	261.060	R	R	R	R	R	R
50	1232.400	996.000	312.468	R	R	R	R	R	R
51	1232.400	996.000	289.120	R	R	R	R	R	R
52	1232.400	996.000	261.060	R	R	R	R	R	R
53	912.000	8.400	336.568	R	R	R	R	R	R
54	912.000	8.400	289.120	R	R	R	R	R	R
55	912.000	8.400	277.120	R	R	R	R	R	R
56	804.000	7.200	328.868	R	R	R	R	R	R
57	804.000	7.200	289.120	R	R	R	R	R	R
58	804.000	7.200	261.060	R	R	R	R	R	R
59	648.000	6.000	324.544	R	R	R	R	R	R
60	648.000	6.000	289.120	R	R	R	R	R	R
61	648.000	6.000	261.060	R	R	R	R	R	R
62	504.000	4.800	327.680	R	R	R	R	R	R
63	504.000	4.800	289.120	R	R	R	R	R	R
64	504.000	4.800	261.060	R	R	R	R	R	R

ECHO OF ELEMENT INPUT DATA

1. Pole/Beam Element Data

   Number of Property Sets = 1

Property Set = 1
Pole type = PVIII
Concrete Strength, F`c (psi) = 6000.00

NOTE : The properties used in the analysis were obtained at the effective heights of the poles and are provided below. For more information refer to the report that accompanies the program.

Pole/Beam Connectivity and Properties Used

	Nodes				Properties					
Mem	I	J	K	Mat	Area in^2	E ksi	I33 in^4	I22 in^4	J in^4	G ksi
1	1	2	4	1	263.36	4415.20	12859.03	12859.03	25718.07	1698.15
2	2	3	4	1	214.27	4415.20	6745.44	6745.44	13490.88	1698.15
3	5	6	8	1	263.21	4415.20	12831.56	12831.56	25663.12	1698.15
4	6	7	8	1	214.27	4415.20	6745.44	6745.44	13490.88	1698.15
5	9	10	12	1	262.67	4415.20	12730.22	12730.22	25460.43	1698.15
6	10	11	12	1	214.27	4415.20	6745.44	6745.44	13490.88	1698.15
7	13	14	16	1	261.93	4415.20	12594.07	12594.07	25188.13	1698.15
8	14	15	16	1	214.27	4415.20	6745.44	6745.44	13490.88	1698.15

2. Primary Cable Element Data

Number of Property Sets = 1

Primary Cable Connectivity and Properties

	Nodes				Properties	
Mem	I	J	Mat	Cable	Area in^2	E ksi
1	3	17	1	1	0.1500	24500.0
2	17	20	1	1	0.1500	24500.0
3	20	23	1	1	0.1500	24500.0
4	23	26	1	1	0.1500	24500.0
5	26	7	1	1	0.1500	24500.0
6	7	29	1	3	0.1500	24500.0
7	29	32	1	3	0.1500	24500.0
8	32	35	1	3	0.1500	24500.0
9	35	38	1	3	0.1500	24500.0
10	38	11	1	3	0.1500	24500.0
11	11	41	1	5	0.1500	24500.0
12	41	44	1	5	0.1500	24500.0
13	44	47	1	5	0.1500	24500.0
14	47	50	1	5	0.1500	24500.0
15	50	15	1	5	0.1500	24500.0
16	15	53	1	7	0.1500	24500.0

17	53	56	1	7	0.1500	24500.0
18	56	59	1	7	0.1500	24500.0
19	59	62	1	7	0.1500	24500.0
20	62	3	1	7	0.1500	24500.0

3. Secondary Cable Element Data

Number of Property Sets = 1

Secondary Cable Connectivity and Properties

	Nodes				Properties	
Mem	I	J	Mat	Cable	Area	E
					in^2	ksi
1	2	18	1	2	0.1500	24500.0
2	18	21	1	2	0.1500	24500.0
3	21	24	1	2	0.1500	24500.0
4	24	27	1	2	0.1500	24500.0
5	27	6	1	2	0.1500	24500.0
6	6	30	1	4	0.1500	24500.0
7	30	33	1	4	0.1500	24500.0
8	33	36	1	4	0.1500	24500.0
9	36	39	1	4	0.1500	24500.0
10	39	10	1	4	0.1500	24500.0
11	10	42	1	6	0.1500	24500.0
12	42	45	1	6	0.1500	24500.0
13	45	48	1	6	0.1500	24500.0
14	48	51	1	6	0.1500	24500.0
15	51	14	1	6	0.1500	24500.0
16	14	54	1	8	0.1500	24500.0
17	54	57	1	8	0.1500	24500.0
18	57	60	1	8	0.1500	24500.0
19	60	63	1	8	0.1500	24500.0
20	63	2	1	8	0.1500	24500.0

4. Connector Element Data

Number of Property Sets = 2

Connector Connectivity and Properties

	Nodes				Properties					
Mem	I	J	K	Mat	Area	E	I33	I22	J	G
					in^2	ksi	in^4	in^4	in^4	ksi
1	17	18	3	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
2	20	21	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
3	23	24	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
4	26	27	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
5	29	30	7	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4

6	32	33	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
7	35	36	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
8	38	39	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
9	41	42	11	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
10	44	45	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
11	47	48	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
12	50	51	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
13	53	54	15	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
14	56	57	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
15	59	60	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
16	62	63	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4

5. Light Element Data

Number of Property Sets = 2

Property Line = 1
Projected area on X-Z plane = 2304.00 in^2
Projected area on Y-Z plane = 0.00 in^2

Property Line = 2
Projected area on X-Z plane = 1553.28 in^2
Projected area on Y-Z plane = 1553.28 in^2

Light Connectivity and Properties

	Nodes				Properties					
Mem	I	J	K	Mat	Area	E	I33	I22	J	G
					in^2	ksi	in^4	in^4	in^4	ksi
1	18	19	3	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
2	21	22	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
3	24	25	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
4	27	28	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
5	30	31	7	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
6	33	34	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
7	36	37	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
8	39	40	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
9	42	43	11	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
10	45	46	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
11	48	49	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
12	51	52	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
13	54	55	15	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
14	57	58	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
15	60	61	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
16	63	64	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4

6. Wind Load Factors

Directionality Factor = 0.85
Drag Coefficient = 0.60

Uplift Coefficient = 0.00

CONCENTRATED APPLIED LOADS

- Sign/Cable/Light weights (Kips)

Node	X	Y	Z
3	0.00000	0.00000	-0.01344
7	0.00000	0.00000	-0.02683
11	0.00000	0.00000	-0.01409
15	0.00000	0.00000	-0.02865
17	0.00000	0.00000	-0.00907
18	0.00000	0.00000	-0.00332
19	0.00000	0.00000	-0.08000
20	0.00000	0.00000	-0.00851
21	0.00000	0.00000	-0.00290
22	0.00000	0.00000	-0.05454
23	0.00000	0.00000	-0.00849
24	0.00000	0.00000	-0.00249
25	0.00000	0.00000	-0.05454
26	0.00000	0.00000	-0.02722
27	0.00000	0.00000	-0.00224
28	0.00000	0.00000	-0.05454
29	0.00000	0.00000	-0.01328
30	0.00000	0.00000	-0.00311
31	0.00000	0.00000	-0.08000
32	0.00000	0.00000	-0.01088
33	0.00000	0.00000	-0.00256
34	0.00000	0.00000	-0.05454
35	0.00000	0.00000	-0.00845
36	0.00000	0.00000	-0.00247
37	0.00000	0.00000	-0.05454
38	0.00000	0.00000	-0.01609
39	0.00000	0.00000	-0.00254
40	0.00000	0.00000	-0.05454
41	0.00000	0.00000	-0.01004
42	0.00000	0.00000	-0.00325
43	0.00000	0.00000	-0.08000
44	0.00000	0.00000	-0.00927
45	0.00000	0.00000	-0.00275
46	0.00000	0.00000	-0.05454
47	0.00000	0.00000	-0.00809
48	0.00000	0.00000	-0.00236
49	0.00000	0.00000	-0.05454
50	0.00000	0.00000	-0.02587
51	0.00000	0.00000	-0.00218
52	0.00000	0.00000	-0.05454
53	0.00000	0.00000	-0.01244
54	0.00000	0.00000	-0.00279

55	0.00000	0.00000	-0.08000
56	0.00000	0.00000	-0.00832
57	0.00000	0.00000	-0.00259
58	0.00000	0.00000	-0.05454
59	0.00000	0.00000	-0.00899
60	0.00000	0.00000	-0.00249
61	0.00000	0.00000	-0.05454
62	0.00000	0.00000	-0.01585
63	0.00000	0.00000	-0.00256
64	0.00000	0.00000	-0.05454

- Wind loads on Cables

NOTE : The wind forces on the cables are applied as shown below. The wind forces on the lights and signs are calculated during the analysis. For more information, refer to Atlas Help Manual.

Node	X	Y	Z	XX	YY	ZZ
17	0.01204	0.01204	0.00000	0.00000	0.00000	0.00000
18	0.01198	0.01198	0.00000	0.00000	0.00000	0.00000
20	0.01173	0.01173	0.00000	0.00000	0.00000	0.00000
21	0.01170	0.01170	0.00000	0.00000	0.00000	0.00000
23	0.01256	0.01256	0.00000	0.00000	0.00000	0.00000
24	0.01253	0.01253	0.00000	0.00000	0.00000	0.00000
26	0.05230	0.05230	0.00000	0.00000	0.00000	0.00000
27	0.05226	0.05226	0.00000	0.00000	0.00000	0.00000
29	0.02157	0.02157	0.00000	0.00000	0.00000	0.00000
30	0.02150	0.02150	0.00000	0.00000	0.00000	0.00000
32	0.01768	0.01768	0.00000	0.00000	0.00000	0.00000
33	0.01766	0.01766	0.00000	0.00000	0.00000	0.00000
35	0.01270	0.01270	0.00000	0.00000	0.00000	0.00000
36	0.01270	0.01270	0.00000	0.00000	0.00000	0.00000
38	0.02875	0.02875	0.00000	0.00000	0.00000	0.00000
39	0.02869	0.02869	0.00000	0.00000	0.00000	0.00000
41	0.01433	0.01433	0.00000	0.00000	0.00000	0.00000
42	0.01426	0.01426	0.00000	0.00000	0.00000	0.00000
44	0.01374	0.01374	0.00000	0.00000	0.00000	0.00000
45	0.01370	0.01370	0.00000	0.00000	0.00000	0.00000
47	0.01211	0.01211	0.00000	0.00000	0.00000	0.00000
48	0.01209	0.01209	0.00000	0.00000	0.00000	0.00000
50	0.04997	0.04997	0.00000	0.00000	0.00000	0.00000
51	0.04992	0.04992	0.00000	0.00000	0.00000	0.00000
53	0.02045	0.02045	0.00000	0.00000	0.00000	0.00000
54	0.02039	0.02039	0.00000	0.00000	0.00000	0.00000
56	0.01215	0.01215	0.00000	0.00000	0.00000	0.00000
57	0.01214	0.01214	0.00000	0.00000	0.00000	0.00000
59	0.01382	0.01382	0.00000	0.00000	0.00000	0.00000
60	0.01382	0.01382	0.00000	0.00000	0.00000	0.00000
62	0.02819	0.02819	0.00000	0.00000	0.00000	0.00000

63	0.02813	0.02813	0.00000	0.00000	0.00000	0.00000

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|                                                                         |
|                    D E S I G N   S E C T I O N                          |
|                        Units: Kips, Feet                                |
|                                                                         |
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- CABLE DESIGN

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A resistance factor is used in the calculation of
factored cable resistance, which is given below:
Wire resistance factor = 0.50

Cable Number = 1

* Catenary Cable *

Starting Node = 3
Ending Node = 7
Cable Tension (k) = 1.630
Cable Sag (%) = 5.143
Cable Diameter (in) = 0.500
Cable Area (sq. in) = 0.150
Cable Weight (lb/in) = 0.043
Factored Cable Resistance (k) = 12.500

Cable Size is Adequate for current Tensile Force
Load Combination 2: 1.10*(DL) + 1.00*(WL)
controls

Cable Number = 2

* Messenger Cable *

Starting Node = 2
Ending Node = 6
Cable Tension (k) = 5.153
Cable Diameter (in) = 0.500
Cable Area (sq. in) = 0.150
Cable Weight (lb/in) = 0.043
Factored Cable Resistance (k) = 12.500

Cable Size is Adequate for current Tensile Force
Load Combination 2: 1.10*(DL) + 1.00*(WL)
controls

```
Cable Number  =   3

* Catenary Cable *

Starting Node =   7
Ending Node   =  11
Cable Tension (k)             =     1.618
Cable Sag (%)                 =     6.046
Cable Diameter (in)           =     0.500
Cable Area (sq. in)           =     0.150
Cable Weight (lb/in)          =     0.043
Factored Cable Resistance (k) =    12.500

Cable Size is Adequate for current Tensile Force
Load Combination 2: 1.10*(DL) + 1.00*(WL)
controls

Cable Number  =   4

* Messenger Cable *

Starting Node =   6
Ending Node   =  10
Cable Tension (k)             =     5.697
Cable Diameter (in)           =     0.500
Cable Area (sq. in)           =     0.150
Cable Weight (lb/in)          =     0.043
Factored Cable Resistance (k) =    12.500

Cable Size is Adequate for current Tensile Force
Load Combination 2: 1.10*(DL) + 1.00*(WL)
controls

Cable Number  =   5

* Catenary Cable *

Starting Node =  11
Ending Node   =  15
Cable Tension (k)             =     1.559
Cable Sag (%)                 =     5.001
Cable Diameter (in)           =     0.500
Cable Area (sq. in)           =     0.150
Cable Weight (lb/in)          =     0.043
Factored Cable Resistance (k) =    12.500

Cable Size is Adequate for current Tensile Force
Load Combination 2: 1.10*(DL) + 1.00*(WL)
controls

Cable Number  =   6
```

```
  * Messenger Cable *

  Starting Node =  10
  Ending Node   =  14
  Cable Tension (k)             =     4.921
  Cable Diameter (in)           =     0.500
  Cable Area (sq. in)           =     0.150
  Cable Weight (lb/in)          =     0.043
  Factored Cable Resistance (k) =    12.500

  Cable Size is Adequate for current Tensile Force
  Load Combination 2: 1.10*(DL) + 1.00*(WL)
  controls

  Cable Number  =   7

  * Catenary Cable *

  Starting Node =  15
  Ending Node   =   3
  Cable Tension (k)             =     1.651
  Cable Sag (%)                 =     6.130
  Cable Diameter (in)           =     0.500
  Cable Area (sq. in)           =     0.150
  Cable Weight (lb/in)          =     0.043
  Factored Cable Resistance (k) =    12.500

  Cable Size is Adequate for current Tensile Force
  Load Combination 2: 1.10*(DL) + 1.00*(WL)
  controls

  Cable Number  =   8

  * Messenger Cable *

  Starting Node =  14
  Ending Node   =   2
  Cable Tension (k)             =     5.924
  Cable Diameter (in)           =     0.500
  Cable Area (sq. in)           =     0.150
  Cable Weight (lb/in)          =     0.043
  Factored Cable Resistance (k) =    12.500

  Cable Size is Adequate for current Tensile Force
  Load Combination 2: 1.10*(DL) + 1.00*(WL)
  controls


- POLE DESIGN
  *-*-*-*-*-*
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Load Combination 2 (LRFD Extreme Event I): 1.10*(DL) + 1.00*(WL)
is used for design of this pole

Pole Number	=	1
Pole Node Numbers	=	1 2 3
Input Pole Type	=	PVIII
Input Wind Speed (mph)	=	140.000
Input Wind Angle (deg)	=	45.000
Applied Wind Angle (deg)	=	45.000
Resultant Base Shear (kips)	=	7.054
Resultant Base Moment (kip-ft)	=	242.811
Resultant Base Moment Angle (deg)	=	41.357
Pole Strong Axis Angle (deg)	=	44.055
Biaxial Moment Reduction Factor	=	0.996
Required Pole Phi * Mn (kip-ft)	=	243.858
Input Pole Capacity (kip-ft)	=	411.032
Required Embedment Length (ft)	=	15.946
Minimum Embedment Length (ft)	=	9.000
(= 0.000 if custom pole, and requires separate check)		
Pole Height Above Ground (ft)	=	33.095

The Pole specified in the INPUT is adequate to support
the base moment.

Load Combination 2 (LRFD Extreme Event I): 1.10*(DL) + 1.00*(WL)
is used for design of this pole

Pole Number	=	2
Pole Node Numbers	=	5 6 7
Input Pole Type	=	PVIII
Input Wind Speed (mph)	=	140.000
Input Wind Angle (deg)	=	45.000
Applied Wind Angle (deg)	=	45.000
Resultant Base Shear (kips)	=	6.770
Resultant Base Moment (kip-ft)	=	224.451
Resultant Base Moment Angle (deg)	=	39.404
Pole Strong Axis Angle (deg)	=	44.058
Biaxial Moment Reduction Factor	=	0.984
Required Pole Phi * Mn (kip-ft)	=	228.020
Input Pole Capacity (kip-ft)	=	410.565
Required Embedment Length (ft)	=	15.554

```
Minimum Embedment Length (ft)              =     9.000
 (= 0.000 if custom pole, and requires separate check)
Pole Height Above Ground (ft)              =    32.995

The Pole specified in the INPUT is adequate to support
the base moment.


Load Combination 2 (LRFD Extreme Event I):  1.10*(DL) + 1.00*(WL)
is used for design of this pole

Pole Number                                =         3
Pole Node Numbers                          =   9 10 11
Input Pole Type                            =    PVIII
Input Wind Speed (mph)                     =   140.000
Input Wind Angle (deg)                     =    45.000
Applied Wind Angle (deg)                   =    45.000

Resultant Base Shear (kips)                =     5.471

Resultant Base Moment (kip-ft)             =   212.745
Resultant Base Moment Angle (deg)          =    41.767
Pole Strong Axis Angle (deg)               =    44.278
Biaxial Moment Reduction Factor            =     0.997
Required Pole Phi * Mn (kip-ft)            =   213.439

Input Pole Capacity (kip-ft)               =   408.834

Required Embedment Length (ft)             =    14.983
Minimum Embedment Length (ft)              =     9.000
 (= 0.000 if custom pole, and requires separate check)
Pole Height Above Ground (ft)              =    32.625

The Pole specified in the INPUT is adequate to support
the base moment.


Load Combination 2 (LRFD Extreme Event I):  1.10*(DL) + 1.00*(WL)
is used for design of this pole

Pole Number                                =         4
Pole Node Numbers                          =  13 14 15
Input Pole Type                            =    PVIII
Input Wind Speed (mph)                     =   140.000
Input Wind Angle (deg)                     =    45.000
Applied Wind Angle (deg)                   =    45.000

Resultant Base Shear (kips)                =     6.446

Resultant Base Moment (kip-ft)             =   227.784
Resultant Base Moment Angle (deg)          =    44.096
```

Pole Strong Axis Angle (deg) = 44.276
Biaxial Moment Reduction Factor = 1.000
Required Pole Phi * Mn (kip-ft) = 227.784

Input Pole Capacity (kip-ft) = 406.495

Required Embedment Length (ft) = 15.524
Minimum Embedment Length (ft) = 9.000
(= 0.000 if custom pole, and requires separate check)
Pole Height Above Ground (ft) = 32.125

The Pole specified in the INPUT is adequate to support the base moment.

L O A D C O M B I N A T I O N 1
[DL] only
Units: Kips, Inches

Final Coordinates

Node	X	Y	Z
1	36.0000	0.0000	0.0000
2	36.3178	0.3272	289.1199
3	36.4944	0.5089	385.1406
4	53.2480	-16.6885	0.0000
5	0.0000	1560.0000	1.2000
6	0.3203	1559.6820	289.1199
7	0.4987	1559.5045	385.1407
8	17.2472	1543.3107	1.2000
9	1224.0000	1572.0000	5.6400
10	1223.7035	1571.6750	289.1199
11	1223.5356	1571.4900	385.1406
12	1241.1829	1555.2445	5.6400
13	1248.0000	12.0000	11.6400
14	1247.6987	12.3039	289.1199
15	1247.5234	12.4812	385.1407
16	1265.1837	-4.7547	11.6400
17	32.6116	146.9094	343.7946
18	32.6112	146.9084	289.1230
19	32.6111	146.9082	277.1228
20	29.9881	260.5157	324.0111
21	29.9881	260.5155	289.1196
22	29.9881	260.5154	261.0593
23	26.6571	404.8583	309.9430
24	26.6571	404.8582	289.1193

25	26.6571	404.8581	261.0591
26	23.6016	537.2751	307.1208
27	23.6015	537.2751	289.1206
28	23.6015	537.2750	261.0604
29	215.0343	1562.1070	337.0319
30	215.0337	1562.1073	289.1224
31	215.0335	1562.1073	277.1223
32	467.1874	1564.5803	310.2214
33	467.1874	1564.5803	289.1190
34	467.1873	1564.5803	261.0587
35	599.2521	1565.8750	307.1195
36	599.2521	1565.8750	289.1194
37	599.2520	1565.8750	261.0591
38	743.1088	1567.2848	315.2158
39	743.1089	1567.2850	289.1215
40	743.1091	1567.2851	261.0612
41	1226.5433	1406.5788	343.0072
42	1226.5438	1406.5797	289.1233
43	1226.5439	1406.5799	277.1232
44	1228.7562	1262.8461	320.9499
45	1228.7562	1262.8463	289.1197
46	1228.7562	1262.8464	261.0594
47	1231.1609	1106.5397	308.2649
48	1231.1609	1106.5397	289.1195
49	1231.1609	1106.5398	261.0593
50	1232.8260	998.2904	307.1209
51	1232.8261	998.2905	289.1207
52	1232.8262	998.2906	261.0604
53	912.9694	8.6836	318.7279
54	912.9697	8.6834	289.1218
55	912.9699	8.6834	277.1216
56	804.9486	7.6134	309.1644
57	804.9487	7.6134	289.1198
58	804.9487	7.6134	261.0596
59	648.8188	6.0675	307.1200
60	648.8188	6.0675	289.1198
61	648.8188	6.0675	261.0596
62	505.0059	4.6442	316.1787
63	505.0057	4.6440	289.1219
64	505.0055	4.6439	261.0617

Dead Load Applied to the Structure

Node	Fx	Fy	Fz	Mom-X	Mom-Y	Mom-Z
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-0.0134	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	-0.0268	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11	0.0000	0.0000	-0.0141	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15	0.0000	0.0000	-0.0287	0.0000	0.0000	0.0000
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	0.0000	0.0000	-0.0091	0.0000	0.0000	0.0000
18	0.0000	0.0000	-0.0033	0.0000	0.0000	0.0000
19	0.0000	0.0000	-0.0800	0.0000	0.0000	0.0000
20	0.0000	0.0000	-0.0085	0.0000	0.0000	0.0000
21	0.0000	0.0000	-0.0029	0.0000	0.0000	0.0000
22	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
23	0.0000	0.0000	-0.0085	0.0000	0.0000	0.0000
24	0.0000	0.0000	-0.0025	0.0000	0.0000	0.0000
25	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
26	0.0000	0.0000	-0.0272	0.0000	0.0000	0.0000
27	0.0000	0.0000	-0.0022	0.0000	0.0000	0.0000
28	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
29	0.0000	0.0000	-0.0133	0.0000	0.0000	0.0000
30	0.0000	0.0000	-0.0031	0.0000	0.0000	0.0000
31	0.0000	0.0000	-0.0800	0.0000	0.0000	0.0000
32	0.0000	0.0000	-0.0109	0.0000	0.0000	0.0000
33	0.0000	0.0000	-0.0026	0.0000	0.0000	0.0000
34	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
35	0.0000	0.0000	-0.0085	0.0000	0.0000	0.0000
36	0.0000	0.0000	-0.0025	0.0000	0.0000	0.0000
37	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
38	0.0000	0.0000	-0.0161	0.0000	0.0000	0.0000
39	0.0000	0.0000	-0.0025	0.0000	0.0000	0.0000
40	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
41	0.0000	0.0000	-0.0100	0.0000	0.0000	0.0000
42	0.0000	0.0000	-0.0033	0.0000	0.0000	0.0000
43	0.0000	0.0000	-0.0800	0.0000	0.0000	0.0000
44	0.0000	0.0000	-0.0093	0.0000	0.0000	0.0000
45	0.0000	0.0000	-0.0028	0.0000	0.0000	0.0000
46	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
47	0.0000	0.0000	-0.0081	0.0000	0.0000	0.0000
48	0.0000	0.0000	-0.0024	0.0000	0.0000	0.0000
49	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
50	0.0000	0.0000	-0.0259	0.0000	0.0000	0.0000
51	0.0000	0.0000	-0.0022	0.0000	0.0000	0.0000
52	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
53	0.0000	0.0000	-0.0124	0.0000	0.0000	0.0000
54	0.0000	0.0000	-0.0028	0.0000	0.0000	0.0000
55	0.0000	0.0000	-0.0800	0.0000	0.0000	0.0000
56	0.0000	0.0000	-0.0083	0.0000	0.0000	0.0000

57	0.0000	0.0000	-0.0026	0.0000	0.0000	0.0000
58	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
59	0.0000	0.0000	-0.0090	0.0000	0.0000	0.0000
60	0.0000	0.0000	-0.0025	0.0000	0.0000	0.0000
61	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
62	0.0000	0.0000	-0.0159	0.0000	0.0000	0.0000
63	0.0000	0.0000	-0.0026	0.0000	0.0000	0.0000
64	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000

Final Displacements

Node	Tx	Ty	Tz	Rot-X	Rot-Y	Rot-Z
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.3178	0.3272	-0.0001	-0.0018	0.0018	0.0000
3	0.4944	0.5089	-0.0001	-0.0019	0.0019	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.3203	-0.3180	-0.0001	0.0018	0.0018	0.0000
7	0.4987	-0.4955	-0.0001	0.0019	0.0019	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	-0.2965	-0.3250	-0.0001	0.0018	-0.0017	0.0000
11	-0.4644	-0.5100	-0.0001	0.0020	-0.0018	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	-0.3013	0.3039	-0.0001	-0.0018	-0.0017	0.0000
15	-0.4766	0.4812	-0.0001	-0.0019	-0.0019	0.0000
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	0.0018	0.0012	0.0038	-0.0000	0.0000	-0.0000
18	0.0014	0.0002	0.0030	-0.0000	0.0000	-0.0000
19	0.0013	-0.0000	0.0028	-0.0000	0.0000	-0.0000
20	0.0000	0.0001	-0.0001	-0.0000	-0.0000	-0.0000
21	0.0000	-0.0001	-0.0004	-0.0000	-0.0000	-0.0000
22	0.0000	-0.0002	-0.0007	-0.0000	-0.0000	-0.0000
23	0.0000	0.0000	-0.0005	-0.0000	-0.0000	-0.0000
24	0.0000	-0.0000	-0.0007	-0.0000	-0.0000	0.0000
25	0.0000	-0.0001	-0.0009	-0.0000	-0.0000	0.0000
26	0.0003	-0.0000	0.0008	-0.0000	0.0000	-0.0000
27	0.0002	-0.0001	0.0006	-0.0000	0.0000	0.0000
28	0.0001	-0.0001	0.0004	-0.0000	0.0000	0.0000
29	0.0007	-0.0012	0.0031	0.0000	0.0000	-0.0000
30	0.0001	-0.0009	0.0024	0.0000	0.0000	-0.0000
31	-0.0000	-0.0009	0.0023	0.0000	0.0000	-0.0000
32	0.0000	-0.0000	-0.0008	-0.0000	0.0000	-0.0000
33	-0.0000	-0.0000	-0.0010	-0.0000	0.0000	-0.0000
34	-0.0001	-0.0000	-0.0013	-0.0000	0.0000	-0.0000
35	0.0000	-0.0000	-0.0005	-0.0000	0.0000	-0.0000
36	-0.0000	-0.0000	-0.0006	-0.0000	0.0000	0.0000
37	-0.0001	-0.0000	-0.0009	-0.0000	0.0000	0.0000

38	-0.0002	-0.0005	0.0018	0.0000	-0.0000	0.0000
39	-0.0001	-0.0004	0.0015	0.0000	-0.0000	0.0000
40	0.0001	-0.0003	0.0012	0.0000	-0.0000	0.0000
41	-0.0016	-0.0011	0.0041	0.0000	-0.0000	-0.0000
42	-0.0011	-0.0002	0.0033	0.0000	-0.0000	-0.0000
43	-0.0010	0.0000	0.0032	0.0000	-0.0000	-0.0000
44	-0.0000	-0.0001	-0.0000	0.0000	0.0000	0.0000
45	-0.0000	0.0001	-0.0003	0.0000	0.0000	-0.0000
46	-0.0000	0.0002	-0.0006	0.0000	0.0000	-0.0000
47	-0.0000	-0.0000	-0.0003	0.0000	0.0000	0.0000
48	-0.0000	0.0000	-0.0005	0.0000	0.0000	0.0000
49	-0.0000	0.0001	-0.0007	0.0000	0.0000	0.0000
50	-0.0003	0.0000	0.0009	0.0000	-0.0000	0.0000
51	-0.0002	0.0001	0.0007	0.0000	-0.0000	0.0000
52	-0.0001	0.0001	0.0004	0.0000	-0.0000	0.0000
53	-0.0004	0.0008	0.0022	-0.0000	-0.0000	0.0000
54	-0.0001	0.0006	0.0018	-0.0000	-0.0000	-0.0000
55	0.0000	0.0005	0.0016	-0.0000	-0.0000	-0.0000
56	-0.0000	0.0000	0.0000	-0.0000	-0.0000	0.0000
57	0.0000	0.0000	-0.0002	-0.0000	-0.0000	-0.0000
58	0.0001	0.0000	-0.0004	-0.0000	-0.0000	-0.0000
59	-0.0000	0.0000	-0.0000	-0.0000	-0.0000	-0.0000
60	0.0000	0.0000	-0.0002	-0.0000	-0.0000	0.0000
61	0.0000	0.0000	-0.0004	-0.0000	-0.0000	0.0000
62	0.0003	0.0006	0.0022	-0.0000	0.0000	0.0000
63	0.0001	0.0004	0.0019	-0.0000	0.0000	0.0000
64	-0.0001	0.0003	0.0017	-0.0000	0.0000	0.0000

- Frame Member Forces

Member # 1

	Node I	Node J
Axial Force =	0.3833	-0.3833
Shear Xm - Ym =	-0.0036	0.0036
Shear Xm - Zm =	-2.6125	2.6125
Torsion =	0.0000	0.0000
Moment About Ym =	871.4000	-116.0869
Moment About Zm =	-1.5257	0.4843

Unit conversion:
Pole Absolute Resultant Moment = 0.1334 (ft-kips)

Member # 2

	Node I	Node J
Axial Force =	0.3833	-0.3833
Shear Xm - Ym =	-0.0050	0.0050
Shear Xm - Zm =	-1.2090	1.2090

Torsion	=	0.0000	0.0000
Moment About Ym	=	116.0869	-0.0000
Moment About Zm	=	-0.4843	-0.0000

Unit conversion:
Pole Absolute Resultant Moment = 0.0404 (ft-kips)

Member # 3

		Node I	Node J
Axial Force	=	0.2761	-0.2761
Shear Xm - Ym	=	-2.6167	2.6167
Shear Xm - Zm	=	0.0271	-0.0271
Torsion	=	0.0000	0.0000
Moment About Ym	=	-10.5113	2.7070
Moment About Zm	=	-868.0434	114.6496

Unit conversion:
Pole Absolute Resultant Moment = 72.9652 (ft-kips)

Member # 4

		Node I	Node J
Axial Force	=	0.2762	-0.2762
Shear Xm - Ym	=	-1.1940	1.1940
Shear Xm - Zm	=	0.0282	-0.0282
Torsion	=	0.0000	0.0000
Moment About Ym	=	-2.7070	-0.0000
Moment About Zm	=	-114.6496	-0.0000

Unit conversion:
Pole Absolute Resultant Moment = 9.5541 (ft-kips)

Member # 5

		Node I	Node J
Axial Force	=	0.3680	-0.3680
Shear Xm - Ym	=	-0.0721	0.0721
Shear Xm - Zm	=	2.6326	-2.6326
Torsion	=	0.0000	0.0000
Moment About Ym	=	-863.7763	117.4786
Moment About Zm	=	-27.2347	6.8023

Unit conversion:
Pole Absolute Resultant Moment = 2.3393 (ft-kips)

Member # 6

	Node I	Node J
Axial Force =	0.3681	-0.3681
Shear Xm - Ym =	-0.0708	0.0708
Shear Xm - Zm =	1.2235	-1.2235
Torsion =	0.0000	0.0000
Moment About Ym =	-117.4786	0.0000
Moment About Zm =	-6.8023	-0.0000

Unit conversion:
Pole Absolute Resultant Moment = 0.5669 (ft-kips)

Member # 7

	Node I	Node J
Axial Force =	0.2736	-0.2736
Shear Xm - Ym =	2.6838	-2.6838
Shear Xm - Zm =	-0.0371	0.0371
Torsion =	0.0000	0.0000
Moment About Ym =	13.8992	-3.6158
Moment About Zm =	866.3085	-121.5941

Unit conversion:
Pole Absolute Resultant Moment = 72.9000 (ft-kips)

Member # 8

	Node I	Node J
Axial Force =	0.2736	-0.2736
Shear Xm - Ym =	1.2663	-1.2663
Shear Xm - Zm =	-0.0377	0.0377
Torsion =	0.0000	0.0000
Moment About Ym =	3.6158	-0.0000
Moment About Zm =	121.5941	-0.0000

Unit conversion:
Pole Absolute Resultant Moment = 10.1328 (ft-kips)

- Primary (Catenary) Cable Forces Primary Cable Reactions on Poles

Member	Force	Stress	Node	Fx	Fy	Fz
1	0.8943	5.9617	3	-0.0228	0.8603	-0.2430
2	0.8738	5.8251				
3	0.8649	5.7660				
4	0.8610	5.7401				
5	0.8636	5.7572	7	0.0195	-0.8608	-0.0657

6	0.8412	5.6080	7	0.8208	0.0100	-0.1841
7	0.8255	5.5036				
8	0.8211	5.4742				
9	0.8222	5.4813				
10	0.8296	5.5306	11	-0.8209	-0.0072	-0.1195
11	0.9505	6.3367	11	0.0168	-0.9208	-0.2353
12	0.9319	6.2125				
13	0.9241	6.1608				
14	0.9211	6.1409				
15	0.9242	6.1613	15	-0.0137	0.9211	-0.0729
16	0.8848	5.8988	15	-0.8678	-0.0099	-0.1723
17	0.8713	5.8087				
18	0.8680	5.7866				
19	0.8696	5.7975				
20	0.8773	5.8486	3	0.8679	0.0077	-0.1277

- Secondary (Messenger) Cable Forces Secondary Cable Reactions on Poles

Member	Force	Stress	Node	Fx	Fy	Fz
1	1.0000	6.6667	2	-0.0253	0.9997	0.0000
2	1.0000	6.6667				
3	1.0000	6.6667				
4	1.0000	6.6667				
5	1.0000	6.6667	6	0.0228	-0.9997	0.0000
6	1.0000	6.6667	6	0.9999	0.0113	0.0000
7	1.0000	6.6667				
8	1.0000	6.6667				
9	1.0000	6.6667				
10	1.0000	6.6667	10	-0.9999	-0.0091	0.0000
11	1.0000	6.6667	10	0.0172	-0.9998	0.0000
12	1.0000	6.6667				
13	1.0000	6.6667				
14	1.0000	6.6667				
15	1.0000	6.6667	14	-0.0151	0.9998	0.0000
16	1.0000	6.6667	14	-0.9999	-0.0108	0.0000
17	1.0000	6.6667				
18	1.0000	6.6667				
19	1.0000	6.6667				
20	1.0000	6.6667	2	0.9999	0.0092	0.0000

- Light Member Forces

Member # 1

	Node I	Node J
Axial Force =	-0.0800	0.0800
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	0.0000	-0.0000

Torsion	=	0.0000	-0.0000
Moment About Ym	=	-0.0003	-0.0000
Moment About Zm	=	-0.0000	0.0000

Member # 2

		Node I	Node J
Axial Force	=	-0.0545	0.0545
Shear Xm - Ym	=	0.0000	-0.0000
Shear Xm - Zm	=	0.0000	-0.0000
Torsion	=	0.0000	-0.0000
Moment About Ym	=	-0.0000	-0.0000
Moment About Zm	=	0.0000	0.0000

Member # 3

		Node I	Node J
Axial Force	=	-0.0545	0.0545
Shear Xm - Ym	=	0.0000	-0.0000
Shear Xm - Zm	=	0.0000	-0.0000
Torsion	=	0.0000	-0.0000
Moment About Ym	=	-0.0000	-0.0000
Moment About Zm	=	0.0000	0.0000

Member # 4

		Node I	Node J
Axial Force	=	-0.0545	0.0545
Shear Xm - Ym	=	0.0000	-0.0000
Shear Xm - Zm	=	0.0000	-0.0000
Torsion	=	0.0000	-0.0000
Moment About Ym	=	-0.0002	-0.0000
Moment About Zm	=	0.0000	0.0000

Member # 5

		Node I	Node J
Axial Force	=	-0.0800	0.0800
Shear Xm - Ym	=	-0.0000	0.0000
Shear Xm - Zm	=	0.0000	-0.0000
Torsion	=	0.0000	-0.0000
Moment About Ym	=	-0.0002	-0.0000
Moment About Zm	=	-0.0000	0.0000

Member # 6

		Node I	Node J
Axial Force	=	-0.0545	0.0545
Shear Xm - Ym	=	0.0000	-0.0000
Shear Xm - Zm	=	0.0000	-0.0000
Torsion	=	0.0000	-0.0000

Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 7

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	-0.0000
Moment About Zm =	0.0000	0.0000

Member # 8

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	-0.0000	0.0000
Moment About Ym =	-0.0002	-0.0000
Moment About Zm =	0.0000	-0.0000

Member # 9

	Node I	Node J
Axial Force =	-0.0800	0.0800
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0003	-0.0000
Moment About Zm =	-0.0000	0.0000

Member # 10

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 11

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000

Moment About Zm =	0.0000	0.0000

Member # 12

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0002	-0.0000
Moment About Zm =	0.0000	0.0000

Member # 13

	Node I	Node J
Axial Force =	-0.0800	0.0800
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0002	-0.0000
Moment About Zm =	-0.0000	0.0000

Member # 14

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	-0.0000
Moment About Zm =	0.0000	0.0000

Member # 15

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	-0.0000
Moment About Zm =	0.0000	0.0000

Member # 16

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	-0.0000	0.0000
Moment About Ym =	-0.0003	-0.0000
Moment About Zm =	0.0000	-0.0000

- Hanger (Connector) Member Forces

Member # 1

	Node I	Node J
Axial Force =	-0.0834	0.0834
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0003
Moment About Zm =	0.0000	0.0000

Member # 2

	Node I	Node J
Axial Force =	-0.0574	0.0574
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 3

	Node I	Node J
Axial Force =	-0.0570	0.0570
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 4

	Node I	Node J
Axial Force =	-0.0568	0.0568
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0002
Moment About Zm =	0.0000	-0.0000

Member # 5

	Node I	Node J
Axial Force =	-0.0831	0.0831
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0002

Moment About Zm =	0.0000	0.0000

Member # 6

	Node I	Node J
Axial Force =	-0.0571	0.0571
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 7

	Node I	Node J
Axial Force =	-0.0570	0.0570
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 8

	Node I	Node J
Axial Force =	-0.0571	0.0571
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	-0.0000	0.0000
Moment About Ym =	-0.0000	0.0002
Moment About Zm =	-0.0000	-0.0000

Member # 9

	Node I	Node J
Axial Force =	-0.0833	0.0833
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0003
Moment About Zm =	0.0000	0.0000

Member # 10

	Node I	Node J
Axial Force =	-0.0573	0.0573
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 11

	Node I	Node J
Axial Force =	-0.0569	0.0569
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 12

	Node I	Node J
Axial Force =	-0.0567	0.0567
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0002
Moment About Zm =	0.0000	-0.0000

Member # 13

	Node I	Node J
Axial Force =	-0.0828	0.0828
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0002
Moment About Zm =	0.0000	0.0000

Member # 14

	Node I	Node J
Axial Force =	-0.0571	0.0571
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 15

	Node I	Node J
Axial Force =	-0.0570	0.0570
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 16

	Node I	Node J
Axial Force =	-0.0571	0.0571
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	-0.0000	0.0000
Moment About Ym =	-0.0000	0.0003
Moment About Zm =	-0.0000	-0.0000

L O A D C O M B I N A T I O N 2

Dead Load Factor * [DL] + Wind Load Factor * [WL]

1.10 * [DL] + 1.00 * [WL]

Units: Kips, Inches

Wind Velocity Input (mph) = 140.000
Wind Angle Input (deg) = 45.000
Wind Angle Applied (deg) = 45.000

Final Coordinates

Node	X	Y	Z
1	36.0000	0.0000	0.0000
2	37.1278	1.0246	289.1199
3	37.7140	1.5590	385.1406
4	53.2480	-16.6885	0.0000
5	0.0000	1560.0000	1.2000
6	1.0587	1559.2308	289.1199
7	1.6123	1558.8118	385.1407
8	17.2472	1543.3107	1.2000
9	1224.0000	1572.0000	5.6400
10	1223.1509	1571.2044	289.1199
11	1222.6873	1570.7677	385.1406
12	1241.1829	1555.2445	5.6400
13	1248.0000	12.0000	11.6400
14	1247.0891	12.9531	289.1199
15	1246.5819	13.4777	385.1406
16	1265.1837	-4.7547	11.6400
17	39.6758	147.9184	344.8174
18	47.1116	147.2056	290.6587
19	48.2474	147.3000	278.7081
20	38.6206	261.1844	322.9949
21	55.6602	260.6244	292.5525
22	103.5666	261.3245	287.2170
23	41.2300	405.0007	304.0686
24	60.3332	405.0330	295.7806

25	86.7427	405.7493	286.2007
26	42.2542	537.4831	301.9758
27	59.5112	537.5919	296.8584
28	85.3336	538.4439	285.2913
29	215.7421	1567.4340	337.5070
30	214.6577	1581.4503	291.7066
31	214.1997	1596.7570	283.8465
32	466.9786	1575.6074	303.9360
33	466.7558	1594.9325	295.4623
34	467.1694	1621.4557	286.0662
35	599.0045	1580.3079	302.1284
36	598.9536	1597.3864	296.4422
37	599.5460	1623.4470	285.8574
38	742.5870	1578.6122	314.4058
39	742.9628	1596.6297	295.5342
40	744.3383	1632.4638	290.9204
41	1233.8462	1405.6687	345.9584
42	1242.1253	1407.2231	292.7367
43	1243.3498	1407.8193	280.7812
44	1239.8581	1262.3370	321.9265
45	1257.6158	1264.2135	295.5761
46	1302.4808	1268.1771	292.0091
47	1247.9219	1106.8715	302.6565
48	1266.5388	1108.0230	298.3362
49	1292.8601	1110.1977	287.8279
50	1251.0881	998.6593	300.4004
51	1268.9647	999.6806	298.5520
52	1295.8370	1001.5325	285.9234
53	912.2058	21.9612	319.5021
54	913.2351	38.4831	294.9562
55	913.7458	50.3912	288.5080
56	804.6551	22.8061	305.4230
57	805.1453	40.9866	296.9957
58	806.6582	68.2659	289.1054
59	648.5495	21.9293	300.8269
60	648.8378	39.4582	296.7444
61	649.8544	65.6441	285.4218
62	505.0884	14.2100	312.2164
63	504.9253	34.8673	294.7435
64	505.4745	67.4557	289.8148

Factored Loads Applied to the Structure

Node	Fx	Fy	Fz	Mom-X	Mom-Y	Mom-Z
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-0.0148	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	-0.0295	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11	0.0000	0.0000	-0.0155	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15	0.0000	0.0000	-0.0315	0.0000	0.0000	0.0000
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	0.0120	0.0120	-0.0100	0.0000	0.0000	0.0000
18	0.0120	0.0120	-0.0037	0.0000	0.0000	0.0000
19	0.0000	0.2334	-0.0880	0.0000	0.0000	0.0000
20	0.0117	0.0117	-0.0094	0.0000	0.0000	0.0000
21	0.0117	0.0117	-0.0032	0.0000	0.0000	0.0000
22	0.1573	0.1573	-0.0600	0.0000	0.0000	0.0000
23	0.0126	0.0126	-0.0093	0.0000	0.0000	0.0000
24	0.0125	0.0125	-0.0027	0.0000	0.0000	0.0000
25	0.1573	0.1573	-0.0600	0.0000	0.0000	0.0000
26	0.0523	0.0523	-0.0299	0.0000	0.0000	0.0000
27	0.0523	0.0523	-0.0025	0.0000	0.0000	0.0000
28	0.1573	0.1573	-0.0600	0.0000	0.0000	0.0000
29	0.0216	0.0216	-0.0146	0.0000	0.0000	0.0000
30	0.0215	0.0215	-0.0034	0.0000	0.0000	0.0000
31	0.0000	0.2334	-0.0880	0.0000	0.0000	0.0000
32	0.0177	0.0177	-0.0120	0.0000	0.0000	0.0000
33	0.0177	0.0177	-0.0028	0.0000	0.0000	0.0000
34	0.1573	0.1573	-0.0600	0.0000	0.0000	0.0000
35	0.0127	0.0127	-0.0093	0.0000	0.0000	0.0000
36	0.0127	0.0127	-0.0027	0.0000	0.0000	0.0000
37	0.1573	0.1573	-0.0600	0.0000	0.0000	0.0000
38	0.0288	0.0288	-0.0177	0.0000	0.0000	0.0000
39	0.0287	0.0287	-0.0028	0.0000	0.0000	0.0000
40	0.1573	0.1573	-0.0600	0.0000	0.0000	0.0000
41	0.0143	0.0143	-0.0110	0.0000	0.0000	0.0000
42	0.0143	0.0143	-0.0036	0.0000	0.0000	0.0000
43	0.0000	0.2334	-0.0880	0.0000	0.0000	0.0000
44	0.0137	0.0137	-0.0102	0.0000	0.0000	0.0000
45	0.0137	0.0137	-0.0030	0.0000	0.0000	0.0000
46	0.1573	0.1573	-0.0600	0.0000	0.0000	0.0000
47	0.0121	0.0121	-0.0089	0.0000	0.0000	0.0000
48	0.0121	0.0121	-0.0026	0.0000	0.0000	0.0000
49	0.1573	0.1573	-0.0600	0.0000	0.0000	0.0000
50	0.0500	0.0500	-0.0285	0.0000	0.0000	0.0000
51	0.0499	0.0499	-0.0024	0.0000	0.0000	0.0000
52	0.1573	0.1573	-0.0600	0.0000	0.0000	0.0000
53	0.0205	0.0205	-0.0137	0.0000	0.0000	0.0000
54	0.0204	0.0204	-0.0031	0.0000	0.0000	0.0000
55	0.0000	0.2334	-0.0880	0.0000	0.0000	0.0000
56	0.0122	0.0122	-0.0091	0.0000	0.0000	0.0000

57	0.0121	0.0121	-0.0029	0.0000	0.0000	0.0000
58	0.1573	0.1573	-0.0600	0.0000	0.0000	0.0000
59	0.0138	0.0138	-0.0099	0.0000	0.0000	0.0000
60	0.0138	0.0138	-0.0027	0.0000	0.0000	0.0000
61	0.1573	0.1573	-0.0600	0.0000	0.0000	0.0000
62	0.0282	0.0282	-0.0174	0.0000	0.0000	0.0000
63	0.0281	0.0281	-0.0028	0.0000	0.0000	0.0000
64	0.1573	0.1573	-0.0600	0.0000	0.0000	0.0000

Final Displacements

Node	Tx	Ty	Tz	Rot-X	Rot-Y	Rot-Z
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	1.1278	1.0246	-0.0001	-0.0055	0.0060	0.0000
3	1.7140	1.5590	-0.0001	-0.0056	0.0062	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	1.0587	-0.7692	-0.0001	0.0042	0.0057	0.0000
7	1.6123	-1.1882	-0.0001	0.0044	0.0058	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	-0.8491	-0.7956	-0.0001	0.0044	-0.0047	0.0000
11	-1.3127	-1.2323	-0.0002	0.0046	-0.0049	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	-0.9109	0.9531	-0.0001	-0.0053	-0.0051	0.0000
15	-1.4181	1.4777	-0.0001	-0.0055	-0.0054	0.0000
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	7.0660	1.0101	1.0266	-0.0218	-0.1536	0.0000
18	14.5018	0.2974	1.5387	0.0035	-0.1023	0.0045
19	15.6376	0.3917	1.5881	0.0091	-0.0910	0.0054
20	8.6325	0.6688	-1.0163	-0.0314	-0.1231	-0.0000
21	25.6721	0.1088	3.4325	0.0182	-1.2838	-0.0189
22	73.5785	0.8089	26.1570	0.0581	-2.2172	-0.0342
23	14.5729	0.1425	-5.8749	-0.0090	-1.1487	0.0000
24	33.6761	0.1747	6.6606	-0.0018	-1.1879	0.0136
25	60.0856	0.8910	25.1407	0.0078	-1.2408	0.0320
26	18.6528	0.2080	-5.1442	0.0046	-1.3091	-0.0000
27	35.9099	0.3168	7.7384	0.0066	-1.2308	0.0143
28	61.7322	1.1688	24.2313	0.0098	-1.1088	0.0365
29	0.7085	5.3258	0.4781	-0.1142	0.0172	-0.0000
30	-0.3758	19.3422	2.5866	1.1189	0.0292	0.0244
31	-0.8339	34.6488	6.7265	1.4277	0.0322	0.0305
32	-0.2088	11.0272	-6.2863	1.1418	0.0399	0.0000
33	-0.4316	30.3522	6.3423	1.1888	0.0337	-0.0151
34	-0.0180	56.8754	25.0062	1.2512	0.0255	-0.0351
35	-0.2476	14.4329	-4.9916	1.2618	0.0238	0.0000
36	-0.2985	31.5114	7.3222	1.2240	0.0190	-0.0132
37	0.2939	57.5720	24.7974	1.1651	0.0115	-0.0337

38	-0.5220	11.3268	-0.8082	0.5668	-0.0084	0.0000
39	-0.1462	29.3443	6.4142	1.1522	-0.0176	-0.0266
40	1.2293	65.1784	29.8604	1.7817	-0.0274	-0.0553
41	7.3013	-0.9112	2.9553	0.0206	-0.1757	-0.0000
42	15.5804	0.6432	3.6167	0.0461	-0.1115	0.0024
43	16.8048	1.2394	3.6612	0.0517	-0.0972	0.0030
44	11.1019	-0.5092	0.9766	0.0447	-0.2589	-0.0000
45	28.8596	1.3673	6.4561	0.0806	-1.2587	0.0641
46	73.7245	5.3310	30.9491	0.1123	-2.1402	0.1205
47	16.7610	0.3318	-5.6086	0.2462	-1.3738	-0.0000
48	35.3779	1.4833	9.2162	0.2482	-1.2809	0.0104
49	61.6992	3.6580	26.7679	0.2510	-1.1447	0.0256
50	18.2618	0.3689	-6.7196	0.4949	-1.5361	-0.0000
51	36.1384	1.3902	9.4320	0.4932	-1.3314	0.0056
52	63.0107	3.2421	24.8634	0.4905	-1.0123	0.0144
53	-0.7640	13.2783	0.7763	0.4061	-0.0386	-0.0000
54	0.2653	29.8002	5.8362	0.9641	-0.0333	-0.0227
55	0.7760	41.7083	11.3880	1.1903	-0.0312	-0.0319
56	-0.2935	15.1927	-3.7414	1.1044	-0.0436	0.0000
57	0.1966	33.3733	7.8757	1.2005	-0.0493	-0.0176
58	1.7096	60.6526	28.0454	1.3349	-0.0573	-0.0423
59	-0.2693	15.8618	-6.2931	1.3772	-0.0533	-0.0000
60	0.0190	33.3907	7.6244	1.2709	-0.0576	-0.0112
61	1.0356	59.5766	24.3618	1.1052	-0.0643	-0.0286
62	0.0827	9.5664	-3.9601	0.7175	0.0191	0.0000
63	-0.0803	30.2236	5.6235	1.1710	0.0098	-0.0169
64	0.4688	62.8121	28.7548	1.6413	0.0003	-0.0344

- Frame (Pole) Member Forces

Member # 1

	Node I	Node J
Axial Force =	0.3605	-0.3605
Shear Xm - Ym =	-0.6729	0.6729
Shear Xm - Zm =	-9.9291	9.9291
Torsion =	0.0000	0.0000
Moment About Ym =	3022.4162	-151.7141
Moment About Zm =	-198.0483	3.5109

Unit conversion :
Pole Absolute Resultant Moment = 252.4082 (ft-kips)

Member # 2

	Node I	Node J
Axial Force =	0.4856	-0.4856
Shear Xm - Ym =	-0.0366	0.0366
Shear Xm - Zm =	-1.5800	1.5800

Torsion	=	0.0000	0.0000
Moment About Ym	=	151.7141	-0.0000
Moment About Zm	=	-3.5109	0.0000

Unit conversion :
Pole Absolute Resultant Moment = 12.6462 (ft-kips)

Member # 3

		Node I	Node J
Axial Force	=	0.2976	-0.2976
Shear Xm - Ym	=	-8.2785	8.2785
Shear Xm - Zm	=	-1.4874	1.4874
Torsion	=	0.0000	0.0000
Moment About Ym	=	393.4430	34.8014
Moment About Zm	=	-2565.5768	182.0266

Unit conversion :
Pole Absolute Resultant Moment = 216.2975 (ft-kips)

Member # 4

		Node I	Node J
Axial Force	=	0.3941	-0.3941
Shear Xm - Ym	=	-1.8957	1.8957
Shear Xm - Zm	=	0.3624	-0.3624
Torsion	=	0.0000	0.0000
Moment About Ym	=	-34.8014	0.0000
Moment About Zm	=	-182.0266	-0.0000

Unit conversion :
Pole Absolute Resultant Moment = 15.4436 (ft-kips)

Member # 5

		Node I	Node J
Axial Force	=	0.4713	-0.4713
Shear Xm - Ym	=	0.3799	-0.3799
Shear Xm - Zm	=	7.5236	-7.5236
Torsion	=	0.0000	0.0000
Moment About Ym	=	-2336.9342	204.1379
Moment About Zm	=	109.2960	-1.5943

Unit conversion :
Pole Absolute Resultant Moment = 194.9574 (ft-kips)

Member # 6

	Node I	Node J
Axial Force =	0.6159	-0.6159
Shear Xm - Ym =	0.0166	-0.0166
Shear Xm - Zm =	2.1260	-2.1260
Torsion =	0.0000	0.0000
Moment About Ym =	-204.1379	-0.0000
Moment About Zm =	1.5943	-0.0000

Unit conversion :
Pole Absolute Resultant Moment = 17.0120 (ft-kips)

Member # 7

	Node I	Node J
Axial Force =	0.3336	-0.3336
Shear Xm - Ym =	9.1848	-9.1848
Shear Xm - Zm =	-0.4268	0.4268
Torsion =	0.0000	0.0000
Moment About Ym =	106.6287	11.7917
Moment About Zm =	2752.5593	-203.9593

Unit conversion :
Pole Absolute Resultant Moment = 229.5520 (ft-kips)

Member # 8

	Node I	Node J
Axial Force =	0.4646	-0.4646
Shear Xm - Ym =	2.1241	-2.1241
Shear Xm - Zm =	0.1228	-0.1228
Torsion =	0.0000	0.0000
Moment About Ym =	-11.7917	0.0000
Moment About Zm =	203.9593	0.0000

Unit conversion :
Pole Absolute Resultant Moment = 17.0250 (ft-kips)

- Primary (Catenary) Cable Forces Primary Cable Forces on Poles

Member	Force	Stress	Node	Fx	Fy	Fz
1	1.1189	7.4595	3	0.0145	1.0786	-0.2972
2	1.1402	7.6013				
3	1.2496	8.3308				
4	1.4376	9.5840				
5	1.6296	10.8638	7	0.0646	-1.6229	-0.1321

6	1.0731	7.1537	7	1.0466	0.0421	-0.2328
7	1.0388	6.9252				
8	1.2306	8.2042				
9	1.4721	9.8142				
10	1.6181	10.7871	11	-1.6006	0.0262	-0.2358
11	1.5588	10.3920	11	0.1023	-1.5134	-0.3592
12	1.5024	10.0161				
13	1.3882	9.2546				
14	1.3722	9.1480				
15	1.3904	9.2695	15	0.0063	1.3852	-0.1192
16	1.6383	10.9223	15	-1.6072	0.0408	-0.3155
17	1.6514	11.0092				
18	1.4546	9.6976				
19	1.2600	8.4000				
20	1.1301	7.5341	3	1.1162	0.0302	-0.1742

- Secondary (Messenger) Cable Forces Secondary Cable Forces on Poles

Member	Force	Stress	Node	Fx	Fy	Fz
1	5.1525	34.3502	2	0.3511	5.1403	0.0541
2	4.8431	32.2876				
3	4.5311	30.2076				
4	4.1458	27.6389				
5	3.7036	24.6905	6	0.2115	-3.6974	0.0280
6	5.6968	37.9785	6	5.6658	0.5894	0.0686
7	5.6495	37.6631				
8	5.2475	34.9835				
9	4.8260	32.1730				
10	4.4825	29.8832	10	-4.4758	0.2370	0.0598
11	3.9122	26.0814	10	0.4496	-3.8853	0.0857
12	4.2192	28.1277				
13	4.4926	29.9507				
14	4.6745	31.1636				
15	4.9209	32.8060	14	0.1091	4.9195	0.0470
16	4.8074	32.0491	14	-4.7926	0.3665	0.0838
17	4.8050	32.0330				
18	5.1691	34.4603				
19	5.5579	37.0530				
20	5.9235	39.4901	2	5.9076	0.4274	0.0710

- Light Member Forces

Member # 1
Rotation Angle in Y-Z Plane (Degrees) = 0.45
Rotation Angle in X-Z Plane (Degrees) = 5.43

Member # 2
Rotation Angle in Y-Z Plane (Degrees) = 7.48

```
Rotation Angle in X-Z Plane (Degrees) =   83.64

Member #   3
Rotation Angle in Y-Z Plane (Degrees) =    4.28
Rotation Angle in X-Z Plane (Degrees) =   70.06

Member #   4
Rotation Angle in Y-Z Plane (Degrees) =    4.21
Rotation Angle in X-Z Plane (Degrees) =   65.87

Member #   5
Rotation Angle in Y-Z Plane (Degrees) =   62.82
Rotation Angle in X-Z Plane (Degrees) =    3.34

Member #   6
Rotation Angle in Y-Z Plane (Degrees) =   70.49
Rotation Angle in X-Z Plane (Degrees) =    2.52

Member #   7
Rotation Angle in Y-Z Plane (Degrees) =   67.90
Rotation Angle in X-Z Plane (Degrees) =    3.20

Member #   8
Rotation Angle in Y-Z Plane (Degrees) =   82.66
Rotation Angle in X-Z Plane (Degrees) =   16.60

Member #   9
Rotation Angle in Y-Z Plane (Degrees) =    2.85
Rotation Angle in X-Z Plane (Degrees) =    5.85

Member #  10
Rotation Angle in Y-Z Plane (Degrees) =   48.02
Rotation Angle in X-Z Plane (Degrees) =   85.45

Member #  11
Rotation Angle in Y-Z Plane (Degrees) =   11.69
Rotation Angle in X-Z Plane (Degrees) =   68.24

Member #  12
Rotation Angle in Y-Z Plane (Degrees) =    8.34
Rotation Angle in X-Z Plane (Degrees) =   64.83

Member #  13
Rotation Angle in Y-Z Plane (Degrees) =   61.56
Rotation Angle in X-Z Plane (Degrees) =    4.53

Member #  14
Rotation Angle in Y-Z Plane (Degrees) =   73.87
Rotation Angle in X-Z Plane (Degrees) =   10.85

Member #  15
```

```
  Rotation Angle in Y-Z Plane (Degrees) =   66.62
  Rotation Angle in X-Z Plane (Degrees) =    5.13

  Member #  16
  Rotation Angle in Y-Z Plane (Degrees) =   81.40
  Rotation Angle in X-Z Plane (Degrees) =    6.36

- Hanger (Connector) Member Forces

  Member #   1
                          Node I        Node J

  Axial Force     =      -0.0723        0.0723
  Shear Xm - Ym   =      -0.0008        0.0008
  Shear Xm - Zm   =       0.0968       -0.0968
  Torsion         =       0.0007       -0.0007
  Moment About Ym =       0.0001       -5.2907
  Moment About Zm =      -0.0000       -0.0445

  Member #   2
                          Node I        Node J

  Axial Force     =      -0.0164        0.0164
  Shear Xm - Ym   =      -0.0005        0.0005
  Shear Xm - Zm   =      -5.4264        5.4264
  Torsion         =       0.3522       -0.3522
  Moment About Ym =       0.0346      189.3004
  Moment About Zm =      -0.0000       -0.0158

  Member #   3
                          Node I        Node J

  Axial Force     =      -0.0549        0.0549
  Shear Xm - Ym   =      -0.0033        0.0033
  Shear Xm - Zm   =      -0.5036        0.5036
  Torsion         =       0.0235       -0.0235
  Moment About Ym =      -0.1021       10.5898
  Moment About Zm =       0.0001       -0.0683

  Member #   4
                          Node I        Node J

  Axial Force     =      -0.0620        0.0620
  Shear Xm - Ym   =      -0.0040        0.0040
  Shear Xm - Zm   =       1.4150       -1.4150
  Torsion         =      -0.1123        0.1123
  Moment About Ym =      -0.3714      -25.0993
  Moment About Zm =       0.0000       -0.0722

  Member #   5
                          Node I        Node J
```

Axial Force	=	-0.0691	0.0691
Shear Xm - Ym	=	0.0014	-0.0014
Shear Xm - Zm	=	3.0539	-3.0539
Torsion	=	-0.2448	0.2448
Moment About Ym	=	-0.0266	-146.2846
Moment About Zm	=	-0.0000	0.0676

Member # 6

		Node I	Node J
Axial Force	=	-0.0237	0.0237
Shear Xm - Ym	=	-0.0033	0.0033
Shear Xm - Zm	=	0.5876	-0.5876
Torsion	=	-0.0294	0.0294
Moment About Ym	=	0.1215	-12.5211
Moment About Zm	=	0.0003	-0.0708

Member # 7

		Node I	Node J
Axial Force	=	-0.0962	0.0962
Shear Xm - Ym	=	-0.0041	0.0041
Shear Xm - Zm	=	-0.6884	0.6884
Torsion	=	0.0418	-0.0418
Moment About Ym	=	0.2469	12.1448
Moment About Zm	=	0.0003	-0.0733

Member # 8

		Node I	Node J
Axial Force	=	-0.0567	0.0567
Shear Xm - Ym	=	-0.0036	0.0036
Shear Xm - Zm	=	4.8933	-4.8933
Torsion	=	0.2540	-0.2540
Moment About Ym	=	-0.0839	-127.6038
Moment About Zm	=	0.0000	-0.0952

Member # 9

		Node I	Node J
Axial Force	=	-0.1194	0.1194
Shear Xm - Ym	=	0.0008	-0.0008
Shear Xm - Zm	=	-0.1248	0.1248
Torsion	=	0.0008	-0.0008
Moment About Ym	=	-0.0002	6.7261
Moment About Zm	=	0.0000	0.0454

Member # 10

		Node I	Node J

Axial Force	=	-0.1839	0.1839
Shear Xm - Ym	=	0.0065	-0.0065
Shear Xm - Zm	=	5.6351	-5.6351
Torsion	=	-1.0981	1.0981
Moment About Ym	=	-0.4500	-178.9209
Moment About Zm	=	-0.0005	0.2084

Member # 11

		Node I	Node J
Axial Force	=	-0.3619	0.3619
Shear Xm - Ym	=	0.0044	-0.0044
Shear Xm - Zm	=	-1.4600	1.4600
Torsion	=	-0.1234	0.1234
Moment About Ym	=	0.2891	27.6651
Moment About Zm	=	0.0047	0.0790

Member # 12

		Node I	Node J
Axial Force	=	-0.3002	0.3002
Shear Xm - Ym	=	0.0055	-0.0055
Shear Xm - Zm	=	-3.6065	3.6065
Torsion	=	-0.2754	0.2754
Moment About Ym	=	0.2221	64.6982
Moment About Zm	=	0.0123	0.0872

Member # 13

		Node I	Node J
Axial Force	=	-0.0993	0.0993
Shear Xm - Ym	=	0.0010	-0.0010
Shear Xm - Zm	=	-3.6247	3.6247
Torsion	=	0.2367	-0.2367
Moment About Ym	=	0.0583	107.2570
Moment About Zm	=	-0.0001	0.0307

Member # 14

		Node I	Node J
Axial Force	=	-0.1250	0.1250
Shear Xm - Ym	=	0.0036	-0.0036
Shear Xm - Zm	=	-1.3540	1.3540
Torsion	=	-0.0588	0.0588
Moment About Ym	=	-0.1271	27.2682
Moment About Zm	=	0.0005	0.0712

Member # 15

		Node I	Node J
Axial Force	=	-0.1115	0.1115

Shear Xm - Ym	=	0.0044	-0.0044
Shear Xm - Zm	=	1.9026	-1.9026
Torsion	=	0.1736	-0.1736
Moment About Ym	=	-0.4106	-33.8374
Moment About Zm	=	0.0011	0.0774

Member # 16

		Node I	Node J
Axial Force	=	0.0095	-0.0095
Shear Xm - Ym	=	0.0028	-0.0028
Shear Xm - Zm	=	-3.5216	3.5216
Torsion	=	0.0625	-0.0625
Moment About Ym	=	0.0204	95.2617
Moment About Zm	=	-0.0000	0.0766

5.1.5 INPUT AT 90º

```
VERSION NUMBER 7.2.0

CONTROL
TITLE = Box Model @90deg.in
MODEL = TWO
NODES = 64
CLEAR = 307.12
TOPDIST = 12.00
CABLE = 8
SPEED = 140.00
ANGLE = 90.00
STATUS = CHECK
KZFAC = 1
GUST = 1.14
DIRECT = 0.85
DEADLOADFAC = 1.10
WINLOADFAC = 1.00
COEFFFLAG = 1
DRAG = 0.6
UPLIFT = 0
CUSTOMFLAG = 0
:
CABLES
   1   3   7   S= 5.00   W= 4.333E-05   P= 0
   2   2   6   T= 1.00   W= 4.333E-05   P= 1
   3   7  11   S= 5.00   W= 4.333E-05   P= 0
   4   6  10   T= 1.00   W= 4.333E-05   P= 1
   5  11  15   S= 5.00   W= 4.333E-05   P= 0
   6  10  14   T= 1.00   W= 4.333E-05   P= 1
   7  15   3   S= 5.00   W= 4.333E-05   P= 0
   8  14   2   T= 1.00   W= 4.333E-05   P= 1
:
COORDINATE
    1 X= 3.6000000E+01 Y= 0.0000000E+00 Z= 0.0000000E+00
    2 X= 3.6000000E+01 Y= 0.0000000E+00 Z= 2.8912000E+02
    3 X= 3.6000000E+01 Y= 0.0000000E+00 Z= 3.8514077E+02
    4 X= 5.3248033E+01 Y= -1.6688480E+01 Z= 0.0000000E+00
    5 X= 0.0000000E+00 Y= 1.5600000E+03 Z= 1.2000000E+00
    6 X= 0.0000000E+00 Y= 1.5600000E+03 Z= 2.8912000E+02
    7 X= 0.0000000E+00 Y= 1.5600000E+03 Z= 3.8514077E+02
    8 X= 1.7247223E+01 Y= 1.5433107E+03 Z= 1.2000000E+00
    9 X= 1.2240000E+03 Y= 1.5720000E+03 Z= 5.6400000E+00
   10 X= 1.2240000E+03 Y= 1.5720000E+03 Z= 2.8912000E+02
   11 X= 1.2240000E+03 Y= 1.5720000E+03 Z= 3.8514077E+02
   12 X= 1.2411829E+03 Y= 1.5552445E+03 Z= 5.6400000E+00
   13 X= 1.2480000E+03 Y= 1.2000000E+01 Z= 1.1640000E+01
   14 X= 1.2480000E+03 Y= 1.2000000E+01 Z= 2.8912000E+02
   15 X= 1.2480000E+03 Y= 1.2000000E+01 Z= 3.8514077E+02
   16 X= 1.2651837E+03 Y= -4.7546699E+00 Z= 1.1640000E+01
   17 X= 3.2400000E+01 Y= 1.5000000E+02 C=    1
   18 X= 3.2400000E+01 Y= 1.5000000E+02 Z= 2.8912000E+02
```

```
   19 X= 3.2400000E+01 Y= 1.5000000E+02 Z= 2.7712000E+02
   20 X= 3.0000000E+01 Y= 2.6400000E+02 C=    1
   21 X= 3.0000000E+01 Y= 2.6400000E+02 Z= 2.8912000E+02
   22 X= 3.0000000E+01 Y= 2.6400000E+02 Z= 2.6106000E+02
   23 X= 2.6400000E+01 Y= 4.0800000E+02 C=    1
   24 X= 2.6400000E+01 Y= 4.0800000E+02 Z= 2.8912000E+02
   25 X= 2.6400000E+01 Y= 4.0800000E+02 Z= 2.6106000E+02
   26 X= 2.4000000E+01 Y= 5.4000000E+02 C=    1
   27 X= 2.4000000E+01 Y= 5.4000000E+02 Z= 2.8912000E+02
   28 X= 2.4000000E+01 Y= 5.4000000E+02 Z= 2.6106000E+02
   29 X= 2.1600000E+02 Y= 1.5624000E+03 C=    3
   30 X= 2.1600000E+02 Y= 1.5624000E+03 Z= 2.8912000E+02
   31 X= 2.1600000E+02 Y= 1.5624000E+03 Z= 2.7712000E+02
   32 X= 4.6800000E+02 Y= 1.5648000E+03 C=    3
   33 X= 4.6800000E+02 Y= 1.5648000E+03 Z= 2.8912000E+02
   34 X= 4.6800000E+02 Y= 1.5648000E+03 Z= 2.6106000E+02
   35 X= 6.0000000E+02 Y= 1.5660000E+03 C=    3
   36 X= 6.0000000E+02 Y= 1.5660000E+03 Z= 2.8912000E+02
   37 X= 6.0000000E+02 Y= 1.5660000E+03 Z= 2.6106000E+02
   38 X= 7.4400000E+02 Y= 1.5672000E+03 C=    3
   39 X= 7.4400000E+02 Y= 1.5672000E+03 Z= 2.8912000E+02
   40 X= 7.4400000E+02 Y= 1.5672000E+03 Z= 2.6106000E+02
   41 X= 1.2264000E+03 Y= 1.4040000E+03 C=    5
   42 X= 1.2264000E+03 Y= 1.4040000E+03 Z= 2.8912000E+02
   43 X= 1.2264000E+03 Y= 1.4040000E+03 Z= 2.7712000E+02
   44 X= 1.2288000E+03 Y= 1.2600000E+03 C=    5
   45 X= 1.2288000E+03 Y= 1.2600000E+03 Z= 2.8912000E+02
   46 X= 1.2288000E+03 Y= 1.2600000E+03 Z= 2.6106000E+02
   47 X= 1.2312000E+03 Y= 1.1040000E+03 C=    5
   48 X= 1.2312000E+03 Y= 1.1040000E+03 Z= 2.8912000E+02
   49 X= 1.2312000E+03 Y= 1.1040000E+03 Z= 2.6106000E+02
   50 X= 1.2324000E+03 Y= 9.9600000E+02 C=    5
   51 X= 1.2324000E+03 Y= 9.9600000E+02 Z= 2.8912000E+02
   52 X= 1.2324000E+03 Y= 9.9600000E+02 Z= 2.6106000E+02
   53 X= 9.1200000E+02 Y= 8.4000000E+00 C=    7
   54 X= 9.1200000E+02 Y= 8.4000000E+00 Z= 2.8912000E+02
   55 X= 9.1200000E+02 Y= 8.4000000E+00 Z= 2.7712000E+02
   56 X= 8.0400000E+02 Y= 7.2000000E+00 C=    7
   57 X= 8.0400000E+02 Y= 7.2000000E+00 Z= 2.8912000E+02
   58 X= 8.0400000E+02 Y= 7.2000000E+00 Z= 2.6106000E+02
   59 X= 6.4800000E+02 Y= 6.0000000E+00 C=    7
   60 X= 6.4800000E+02 Y= 6.0000000E+00 Z= 2.8912000E+02
   61 X= 6.4800000E+02 Y= 6.0000000E+00 Z= 2.6106000E+02
   62 X= 5.0400000E+02 Y= 4.8000000E+00 C=    7
   63 X= 5.0400000E+02 Y= 4.8000000E+00 Z= 2.8912000E+02
   64 X= 5.0400000E+02 Y= 4.8000000E+00 Z= 2.6106000E+02
:
BOUNDARY
    1 DOF= f f f f f f
    2 DOF= r r r r r r
    3 DOF= r r r r r r
```

```
 4 DOF= f f f f f f
 5 DOF= f f f f f f
 6 DOF= r r r r r r
 7 DOF= r r r r r r
 8 DOF= f f f f f f
 9 DOF= f f f f f f
10 DOF= r r r r r r
11 DOF= r r r r r r
12 DOF= f f f f f f
13 DOF= f f f f f f
14 DOF= r r r r r r
15 DOF= r r r r r r
16 DOF= f f f f f f
17 DOF= r r r r r r
18 DOF= r r r r r r
19 DOF= r r r r r r
20 DOF= r r r r r r
21 DOF= r r r r r r
22 DOF= r r r r r r
23 DOF= r r r r r r
24 DOF= r r r r r r
25 DOF= r r r r r r
26 DOF= r r r r r r
27 DOF= r r r r r r
28 DOF= r r r r r r
29 DOF= r r r r r r
30 DOF= r r r r r r
31 DOF= r r r r r r
32 DOF= r r r r r r
33 DOF= r r r r r r
34 DOF= r r r r r r
35 DOF= r r r r r r
36 DOF= r r r r r r
37 DOF= r r r r r r
38 DOF= r r r r r r
39 DOF= r r r r r r
40 DOF= r r r r r r
41 DOF= r r r r r r
42 DOF= r r r r r r
43 DOF= r r r r r r
44 DOF= r r r r r r
45 DOF= r r r r r r
46 DOF= r r r r r r
47 DOF= r r r r r r
48 DOF= r r r r r r
49 DOF= r r r r r r
50 DOF= r r r r r r
51 DOF= r r r r r r
52 DOF= r r r r r r
53 DOF= r r r r r r
54 DOF= r r r r r r
```

```
   55 DOF= r r r r r r
   56 DOF= r r r r r r
   57 DOF= r r r r r r
   58 DOF= r r r r r r
   59 DOF= r r r r r r
   60 DOF= r r r r r r
   61 DOF= r r r r r r
   62 DOF= r r r r r r
   63 DOF= r r r r r r
   64 DOF= r r r r r r
:
PRIMARY
    20,    1
  1 A= 0.1500 E= 2.45000E+04
   1     3,  17 M= 1 C= 1
   2    17,  20 M= 1 C= 1
   3    20,  23 M= 1 C= 1
   4    23,  26 M= 1 C= 1
   5    26 ,  7 M= 1 C= 1
   6     7,  29 M= 1 C= 3
   7    29,  32 M= 1 C= 3
   8    32,  35 M= 1 C= 3
   9    35,  38 M= 1 C= 3
  10    38,  11 M= 1 C= 3
  11    11,  41 M= 1 C= 5
  12    41,  44 M= 1 C= 5
  13    44,  47 M= 1 C= 5
  14    47,  50 M= 1 C= 5
  15    50,  15 M= 1 C= 5
  16    15,  53 M= 1 C= 7
  17    53,  56 M= 1 C= 7
  18    56,  59 M= 1 C= 7
  19    59,  62 M= 1 C= 7
  20    62 ,  3 M= 1 C= 7
:
SECONDARY
    20,    1
  1 A= 0.1500 E= 2.45000E+04
   1     2,  18 M= 1 C= 2
   2    18,  21 M= 1 C= 2
   3    21,  24 M= 1 C= 2
   4    24,  27 M= 1 C= 2
   5    27 ,  6 M= 1 C= 2
   6     6,  30 M= 1 C= 4
   7    30,  33 M= 1 C= 4
   8    33,  36 M= 1 C= 4
   9    36,  39 M= 1 C= 4
  10    39,  10 M= 1 C= 4
  11    10,  42 M= 1 C= 6
  12    42,  45 M= 1 C= 6
  13    45,  48 M= 1 C= 6
```

```
  14    48,  51 M= 1 C= 6
  15    51,  14 M= 1 C= 6
  16    14,  54 M= 1 C= 8
  17    54,  57 M= 1 C= 8
  18    57,  60 M= 1 C= 8
  19    60,  63 M= 1 C= 8
  20    63 ,  2 M= 1 C= 8
:
CONNECTORS
   16,    2
 1 A= 0.5966 E= 1.00000E+04 I= 2.84200E-01, 4.60000E-03  \\
    J= 2.88800E-01 G= 3.75940E+03
 2 A= 0.5966 E= 1.00000E+04 I= 2.84200E-01, 4.60000E-03  \\
    J= 2.88800E-01 G= 3.75940E+03
   1    17,  18,   3 M= 1
   2    20,  21,   3 M= 2
   3    23,  24,   3 M= 2
   4    26,  27,   3 M= 2
   5    29,  30,   7 M= 1
   6    32,  33,   7 M= 2
   7    35,  36,   7 M= 2
   8    38,  39,   7 M= 2
   9    41,  42,  11 M= 1
  10    44,  45,  11 M= 2
  11    47,  48,  11 M= 2
  12    50,  51,  11 M= 2
  13    53,  54,  15 M= 1
  14    56,  57,  15 M= 2
  15    59,  60,  15 M= 2
  16    62,  63,  15 M= 2
:
LIGHTS
   16,    2
  1 A= 0.5966 E= 1.00000E+04 I= 2.84200E-01, 4.60000E-03  \\
    J= 2.88800E-01 G= 3.75940E+03 S= 0 B= 0 P= 2.30400E+03, 0.00000E+00
  2 A= 0.5966 E= 1.00000E+04 I= 2.84200E-01, 4.60000E-03  \\
    J= 2.88800E-01 G= 3.75940E+03 S= 1 B= 6 P= 1.55328E+03, 1.55328E+03
   1    18,  19,   3 M= 1
   2    21,  22,   3 M= 2
   3    24,  25,   3 M= 2
   4    27,  28,   3 M= 2
   5    30,  31,   7 M= 1
   6    33,  34,   7 M= 2
   7    36,  37,   7 M= 2
   8    39,  40,   7 M= 2
   9    42,  43,  11 M= 1
  10    45,  46,  11 M= 2
  11    48,  49,  11 M= 2
  12    51,  52,  11 M= 2
  13    54,  55,  15 M= 1
  14    57,  58,  15 M= 2
```

```
  15    60,  61,  15 M= 2
  16    63,  64,  15 M= 2
:
BEAM
    8,    1
  1 S= 1 T= NVIII X= PVIII FC= 6000.0
   1     1,   2,   4  M= 1
   2     2,   3,   4  M= 1
   3     5,   6,   8  M= 1
   4     6,   7,   8  M= 1
   5     9,  10,  12  M= 1
   6    10,  11,  12  M= 1
   7    13,  14,  16  M= 1
   8    14,  15,  16  M= 1
:
SIGNS
  17 F= 0.00000E+00, 0.00000E+00, -9.23957E-02
  20 F= 0.00000E+00, 0.00000E+00, -6.59599E-02
  23 F= 0.00000E+00, 0.00000E+00, -6.55234E-02
  26 F= 0.00000E+00, 0.00000E+00, -8.40024E-02
  29 F= 0.00000E+00, 0.00000E+00, -9.63938E-02
  32 F= 0.00000E+00, 0.00000E+00, -6.79829E-02
  35 F= 0.00000E+00, 0.00000E+00, -6.54671E-02
  38 F= 0.00000E+00, 0.00000E+00, -7.31760E-02
  41 F= 0.00000E+00, 0.00000E+00, -9.32949E-02
  44 F= 0.00000E+00, 0.00000E+00, -6.65667E-02
  47 F= 0.00000E+00, 0.00000E+00, -6.49974E-02
  50 F= 0.00000E+00, 0.00000E+00, -8.25972E-02
  53 F= 0.00000E+00, 0.00000E+00, -9.52231E-02
  56 F= 0.00000E+00, 0.00000E+00, -6.54545E-02
  59 F= 0.00000E+00, 0.00000E+00, -6.60164E-02
  62 F= 0.00000E+00, 0.00000E+00, -7.29607E-02
:
WIND
  17 F= 0.00000E+00, 5.59935E-04, 0.00000E+00
  18 F= 0.00000E+00, 5.57110E-04, 0.00000E+00
  20 F= 0.00000E+00, 5.58754E-04, 0.00000E+00
  21 F= 0.00000E+00, 5.57110E-04, 0.00000E+00
  23 F= 0.00000E+00, 5.58136E-04, 0.00000E+00
  24 F= 0.00000E+00, 5.57110E-04, 0.00000E+00
  26 F= 0.00000E+00, 2.45345E-03, 0.00000E+00
  27 F= 0.00000E+00, 2.45129E-03, 0.00000E+00
  29 F= 0.00000E+00, 4.35851E-02, 0.00000E+00
  30 F= 0.00000E+00, 4.34546E-02, 0.00000E+00
  32 F= 0.00000E+00, 3.56893E-02, 0.00000E+00
  33 F= 0.00000E+00, 3.56551E-02, 0.00000E+00
  35 F= 0.00000E+00, 2.56294E-02, 0.00000E+00
  36 F= 0.00000E+00, 2.56271E-02, 0.00000E+00
  38 F= 0.00000E+00, 5.80588E-02, 0.00000E+00
  39 F= 0.00000E+00, 5.79395E-02, 0.00000E+00
  41 F= 0.00000E+00, 4.47730E-04, 0.00000E+00
```

```
  42 F= 0.00000E+00, 4.45688E-04, 0.00000E+00
  44 F= 0.00000E+00, 4.46857E-04, 0.00000E+00
  45 F= 0.00000E+00, 4.45688E-04, 0.00000E+00
  47 F= 0.00000E+00, 3.34755E-04, 0.00000E+00
  48 F= 0.00000E+00, 3.34266E-04, 0.00000E+00
  50 F= 0.00000E+00, 1.56142E-03, 0.00000E+00
  51 F= 0.00000E+00, 1.55991E-03, 0.00000E+00
  53 F= 0.00000E+00, 4.13525E-02, 0.00000E+00
  54 F= 0.00000E+00, 4.12262E-02, 0.00000E+00
  56 F= 0.00000E+00, 2.45240E-02, 0.00000E+00
  57 F= 0.00000E+00, 2.45129E-02, 0.00000E+00
  59 F= 0.00000E+00, 2.78587E-02, 0.00000E+00
  60 F= 0.00000E+00, 2.78555E-02, 0.00000E+00
  62 F= 0.00000E+00, 5.69441E-02, 0.00000E+00
  63 F= 0.00000E+00, 5.68253E-02, 0.00000E+00
:
LOADS
   3 F= 0.00000E+00, 0.00000E+00, -1.34380E-02
   7 F= 0.00000E+00, 0.00000E+00, -2.68283E-02
  11 F= 0.00000E+00, 0.00000E+00, -1.40893E-02
  15 F= 0.00000E+00, 0.00000E+00, -2.86513E-02
  17 F= 0.00000E+00, 0.00000E+00, -9.07292E-03
  18 F= 0.00000E+00, 0.00000E+00, -3.32279E-03
  19 F= 0.00000E+00, 0.00000E+00, -8.00000E-02
  20 F= 0.00000E+00, 0.00000E+00, -8.51234E-03
  21 F= 0.00000E+00, 0.00000E+00, -2.90396E-03
  22 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  23 F= 0.00000E+00, 0.00000E+00, -8.48588E-03
  24 F= 0.00000E+00, 0.00000E+00, -2.49399E-03
  25 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  26 F= 0.00000E+00, 0.00000E+00, -2.72238E-02
  27 F= 0.00000E+00, 0.00000E+00, -2.23503E-03
  28 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  29 F= 0.00000E+00, 0.00000E+00, -1.32824E-02
  30 F= 0.00000E+00, 0.00000E+00, -3.11140E-03
  31 F= 0.00000E+00, 0.00000E+00, -8.00000E-02
  32 F= 0.00000E+00, 0.00000E+00, -1.08838E-02
  33 F= 0.00000E+00, 0.00000E+00, -2.55550E-03
  34 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  35 F= 0.00000E+00, 0.00000E+00, -8.45216E-03
  36 F= 0.00000E+00, 0.00000E+00, -2.47138E-03
  37 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  38 F= 0.00000E+00, 0.00000E+00, -1.60904E-02
  39 F= 0.00000E+00, 0.00000E+00, -2.54197E-03
  40 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  41 F= 0.00000E+00, 0.00000E+00, -1.00436E-02
  42 F= 0.00000E+00, 0.00000E+00, -3.25125E-03
  43 F= 0.00000E+00, 0.00000E+00, -8.00000E-02
  44 F= 0.00000E+00, 0.00000E+00, -9.27038E-03
  45 F= 0.00000E+00, 0.00000E+00, -2.75272E-03
  46 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
```

```
  47 F= 0.00000E+00, 0.00000E+00, -8.09114E-03
  48 F= 0.00000E+00, 0.00000E+00, -2.36267E-03
  49 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  50 F= 0.00000E+00, 0.00000E+00, -2.58696E-02
  51 F= 0.00000E+00, 0.00000E+00, -2.18404E-03
  52 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  53 F= 0.00000E+00, 0.00000E+00, -1.24366E-02
  54 F= 0.00000E+00, 0.00000E+00, -2.78654E-03
  55 F= 0.00000E+00, 0.00000E+00, -8.00000E-02
  56 F= 0.00000E+00, 0.00000E+00, -8.31691E-03
  57 F= 0.00000E+00, 0.00000E+00, -2.59406E-03
  58 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  59 F= 0.00000E+00, 0.00000E+00, -8.98688E-03
  60 F= 0.00000E+00, 0.00000E+00, -2.48594E-03
  61 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
  62 F= 0.00000E+00, 0.00000E+00, -1.58527E-02
  63 F= 0.00000E+00, 0.00000E+00, -2.56436E-03
  64 F= 0.00000E+00, 0.00000E+00, -5.45436E-02
:
GENERATE
CLEAR=19.50 VELOCITY=140.0 ANGLE=90.0 STAT=2 SAG=0.050 DIFF=1.50 TOPDIST=1.00
:
SYSTEM
MODEL TYPE= TWO - POINT
:
POLES
M=1 S=1 TYPE=NVIII XTYPE=PVIII FC=6000.0
P=1 X=3.0 Y=0.0 Z=0.00 M=1
P=2 X=0.0 Y=130.0 Z=0.10 M=1
P=3 X=102.0 Y=131.0 Z=0.47 M=1
P=4 X=104.0 Y=1.0 Z=0.97 M=1
:
WIRES
M=1 D=8,8 E=24500,24500 T=1.00
W=1 POLES=1,2 M=1
W=2 POLES=2,3 M=1
W=3 POLES=3,4 M=1
W=4 POLES=4,1 M=1
:
SIGNAL
M=1 R=3.00 S=1 D=12 E=W6 L=AL G=3
M=2 R=3.00 N=YES A=OTHER ,2304.0 C=12.0 W=5.000 D=Y
S=1 X=2.5 Y=22.0 M=1 C=1
S=2 X=2.2 Y=34.0 M=1 C=1
S=3 X=2.0 Y=45.0 M=1 C=1
S=4 X=39.0 Y=130.4 M=1 C=2
S=5 X=50.0 Y=130.5 M=1 C=2
S=6 X=62.0 Y=130.6 M=1 C=2
S=7 X=102.4 Y=105.0 M=1 C=3
S=8 X=102.6 Y=92.0 M=1 C=3
S=9 X=102.7 Y=83.0 M=1 C=3
```

```
S=10 X=67.0 Y=0.6 M=1 C=4
S=11 X=54.0 Y=0.5 M=1 C=4
S=12 X=42.0 Y=0.4 M=1 C=4
S=13 X=2.7 Y=12.5 M=2 C=1
S=14 X=18.0 Y=130.2 M=2 C=2
S=15 X=102.2 Y=117.0 M=2 C=3
S=16 X=76.0 Y=0.7 M=2 C=4
:
GRIDDIM
G=200 D=10
:
DESIGN
S=2 F=0.00 W=0.600 G=38.40 P=21.70 WR=0.500
:
```

5.1.6 OUTPUT AT 90º

```
*************************************************************************
|       ##          #####        #               ##           ####     |
|      #  #           #          #              #  #         #         |
|     #    #          #          #             #    #         ####     |
|     ######          #          #             ######             #    |
|     #    #          #          #             #    #        #    #    |
|     #    #          #          ######        #    #         ####     |
|                                                                       |
|                 Analysis of Traffic Lights And Signs                  |
|                                                                       |
|                             Version 7.2.0                             |
|                                                                       |
|       Developed by :                                                  |
|                                                                       |
|                         Bridge Software Institute                     |
|                                                                       |
|       No warranty, expressed or implied, is made by the Florida       |
|       Department of Transportation or the University of Florida       |
|       as to the accuracy and functioning of any programs or the       |
|       results they produce,nor shall the fact of distribution         |
|       constitute any such warranty, and no responsibility is          |
|       assumed by the Florida Department of Transportation or          |
|       the University of Florida in any connection therewith.          |
|                                                                       |
|                                                                       |
|                   Department of Civil Engineering                     |
|                        University of Florida                          |
|                        Gainesville, Fl 32611                          |
|                                                                       |
*************************************************************************


      *** NOTE - Pole convergence increased to 2.0*default
          for wind speeds > 85 mph:
          Tolerance =     0.200000


  Input Data File = K:\ORL_Structures\_Projects-Structures\_Strain Poles\142371064
SW 44th and SW 20th\03_Calculations\Box Model @90deg.in


  ATLAS EXECUTION STATUS

   - Check the Model for Adequacy


  CONTROL DATA (More Information found in ATLAS HELP)

   - Problem Title
```

BOX MODEL @90DEG.IN

- Structural Parameters :

Number of Nodes = 64
Number of Cables = 8
Lowest Point of Catenary = 25.59 ft

- Wind Data :

Wind Speed (Miles per Hour) = 140.00
Wind Direction (Angle from +ve X axis) = 90.0

- Nonlinear iteration Parameters :

Number of Iterations (Shape Finder) = 200
Number of Iterations (Gravity Solution) = 200
Number of Iterations (Wind Solution) = 200
Number of Loops for Shape Calculation = 5
Number of Cycles (Shape-Stiffness Iteration) = 1800
Force Tolerance for Gravity Solution (%) = 5.00
Force Tolerance for Wind Solution (%) = 5.00
Pole Displacement Tolerance = 0.200000

ECHO OF NODAL POINT INPUT DATA

Node	Nodal Point Coordinates X (in)	Y (in)	Z (in)	Boundary Conditions Tx	Ty	Tz	Rx	Ry	Rz
1	36.000	0.000	0.000	F	F	F	F	F	F
2	36.000	0.000	289.120	R	R	R	R	R	R
3	36.000	0.000	385.141	R	R	R	R	R	R
4	53.248	-16.688	0.000	F	F	F	F	F	F
5	0.000	1560.000	1.200	F	F	F	F	F	F
6	0.000	1560.000	289.120	R	R	R	R	R	R
7	0.000	1560.000	385.141	R	R	R	R	R	R
8	17.247	1543.311	1.200	F	F	F	F	F	F
9	1224.000	1572.000	5.640	F	F	F	F	F	F
10	1224.000	1572.000	289.120	R	R	R	R	R	R
11	1224.000	1572.000	385.141	R	R	R	R	R	R
12	1241.183	1555.245	5.640	F	F	F	F	F	F
13	1248.000	12.000	11.640	F	F	F	F	F	F
14	1248.000	12.000	289.120	R	R	R	R	R	R
15	1248.000	12.000	385.141	R	R	R	R	R	R
16	1265.184	-4.755	11.640	F	F	F	F	F	F
17	32.400	150.000	358.018	R	R	R	R	R	R
18	32.400	150.000	289.120	R	R	R	R	R	R
19	32.400	150.000	277.120	R	R	R	R	R	R
20	30.000	264.000	341.265	R	R	R	R	R	R

21	30.000	264.000	289.120	R	R	R	R	R	R
22	30.000	264.000	261.060	R	R	R	R	R	R
23	26.400	408.000	324.866	R	R	R	R	R	R
24	26.400	408.000	289.120	R	R	R	R	R	R
25	26.400	408.000	261.060	R	R	R	R	R	R
26	24.000	540.000	314.507	R	R	R	R	R	R
27	24.000	540.000	289.120	R	R	R	R	R	R
28	24.000	540.000	261.060	R	R	R	R	R	R
29	216.000	1562.400	349.562	R	R	R	R	R	R
30	216.000	1562.400	289.120	R	R	R	R	R	R
31	216.000	1562.400	277.120	R	R	R	R	R	R
32	468.000	1564.800	327.326	R	R	R	R	R	R
33	468.000	1564.800	289.120	R	R	R	R	R	R
34	468.000	1564.800	261.060	R	R	R	R	R	R
35	600.000	1566.000	323.961	R	R	R	R	R	R
36	600.000	1566.000	289.120	R	R	R	R	R	R
37	600.000	1566.000	261.060	R	R	R	R	R	R
38	744.000	1567.200	326.785	R	R	R	R	R	R
39	744.000	1567.200	289.120	R	R	R	R	R	R
40	744.000	1567.200	261.060	R	R	R	R	R	R
41	1226.400	1404.000	355.156	R	R	R	R	R	R
42	1226.400	1404.000	289.120	R	R	R	R	R	R
43	1226.400	1404.000	277.120	R	R	R	R	R	R
44	1228.800	1260.000	335.215	R	R	R	R	R	R
45	1228.800	1260.000	289.120	R	R	R	R	R	R
46	1228.800	1260.000	261.060	R	R	R	R	R	R
47	1231.200	1104.000	319.613	R	R	R	R	R	R
48	1231.200	1104.000	289.120	R	R	R	R	R	R
49	1231.200	1104.000	261.060	R	R	R	R	R	R
50	1232.400	996.000	312.468	R	R	R	R	R	R
51	1232.400	996.000	289.120	R	R	R	R	R	R
52	1232.400	996.000	261.060	R	R	R	R	R	R
53	912.000	8.400	336.568	R	R	R	R	R	R
54	912.000	8.400	289.120	R	R	R	R	R	R
55	912.000	8.400	277.120	R	R	R	R	R	R
56	804.000	7.200	328.868	R	R	R	R	R	R
57	804.000	7.200	289.120	R	R	R	R	R	R
58	804.000	7.200	261.060	R	R	R	R	R	R
59	648.000	6.000	324.544	R	R	R	R	R	R
60	648.000	6.000	289.120	R	R	R	R	R	R
61	648.000	6.000	261.060	R	R	R	R	R	R
62	504.000	4.800	327.680	R	R	R	R	R	R
63	504.000	4.800	289.120	R	R	R	R	R	R
64	504.000	4.800	261.060	R	R	R	R	R	R

ECHO OF ELEMENT INPUT DATA

1. Pole/Beam Element Data

   Number of Property Sets = 1

Property Set = 1
Pole type = PVIII
Concrete Strength, F`c (psi) = 6000.00

NOTE : The properties used in the analysis were obtained at the effective heights of the poles and are provided below. For more information refer to the report that accompanies the program.

Pole/Beam Connectivity and Properties Used

Mem	Nodes I	J	K	Mat	Properties Area in^2	E ksi	I33 in^4	I22 in^4	J in^4	G ksi
1	1	2	4	1	263.36	4415.20	12859.03	12859.03	25718.07	1698.15
2	2	3	4	1	214.27	4415.20	6745.44	6745.44	13490.88	1698.15
3	5	6	8	1	263.21	4415.20	12831.56	12831.56	25663.12	1698.15
4	6	7	8	1	214.27	4415.20	6745.44	6745.44	13490.88	1698.15
5	9	10	12	1	262.67	4415.20	12730.22	12730.22	25460.43	1698.15
6	10	11	12	1	214.27	4415.20	6745.44	6745.44	13490.88	1698.15
7	13	14	16	1	261.93	4415.20	12594.07	12594.07	25188.13	1698.15
8	14	15	16	1	214.27	4415.20	6745.44	6745.44	13490.88	1698.15

2. Primary Cable Element Data

Number of Property Sets = 1

Primary Cable Connectivity and Properties

Mem	Nodes I	J	Mat	Cable	Properties Area in^2	E ksi
1	3	17	1	1	0.1500	24500.0
2	17	20	1	1	0.1500	24500.0
3	20	23	1	1	0.1500	24500.0
4	23	26	1	1	0.1500	24500.0
5	26	7	1	1	0.1500	24500.0
6	7	29	1	3	0.1500	24500.0
7	29	32	1	3	0.1500	24500.0
8	32	35	1	3	0.1500	24500.0
9	35	38	1	3	0.1500	24500.0
10	38	11	1	3	0.1500	24500.0
11	11	41	1	5	0.1500	24500.0
12	41	44	1	5	0.1500	24500.0
13	44	47	1	5	0.1500	24500.0
14	47	50	1	5	0.1500	24500.0
15	50	15	1	5	0.1500	24500.0
16	15	53	1	7	0.1500	24500.0

17	53	56	1	7	0.1500	24500.0
18	56	59	1	7	0.1500	24500.0
19	59	62	1	7	0.1500	24500.0
20	62	3	1	7	0.1500	24500.0

3. Secondary Cable Element Data

Number of Property Sets = 1

Secondary Cable Connectivity and Properties

	Nodes				Properties	
Mem	I	J	Mat	Cable	Area	E
					in^2	ksi
1	2	18	1	2	0.1500	24500.0
2	18	21	1	2	0.1500	24500.0
3	21	24	1	2	0.1500	24500.0
4	24	27	1	2	0.1500	24500.0
5	27	6	1	2	0.1500	24500.0
6	6	30	1	4	0.1500	24500.0
7	30	33	1	4	0.1500	24500.0
8	33	36	1	4	0.1500	24500.0
9	36	39	1	4	0.1500	24500.0
10	39	10	1	4	0.1500	24500.0
11	10	42	1	6	0.1500	24500.0
12	42	45	1	6	0.1500	24500.0
13	45	48	1	6	0.1500	24500.0
14	48	51	1	6	0.1500	24500.0
15	51	14	1	6	0.1500	24500.0
16	14	54	1	8	0.1500	24500.0
17	54	57	1	8	0.1500	24500.0
18	57	60	1	8	0.1500	24500.0
19	60	63	1	8	0.1500	24500.0
20	63	2	1	8	0.1500	24500.0

4. Connector Element Data

Number of Property Sets = 2

Connector Connectivity and Properties

	Nodes				Properties					
Mem	I	J	K	Mat	Area	E	I33	I22	J	G
					in^2	ksi	in^4	in^4	in^4	ksi
1	17	18	3	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
2	20	21	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
3	23	24	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
4	26	27	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
5	29	30	7	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4

6	32	33	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
7	35	36	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
8	38	39	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
9	41	42	11	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
10	44	45	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
11	47	48	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
12	50	51	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
13	53	54	15	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
14	56	57	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
15	59	60	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
16	62	63	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4

5. Light Element Data

Number of Property Sets = 2

Property Line = 1
Projected area on X-Z plane = 2304.00 in^2
Projected area on Y-Z plane = 0.00 in^2

Property Line = 2
Projected area on X-Z plane = 1553.28 in^2
Projected area on Y-Z plane = 1553.28 in^2

Light Connectivity and Properties

	Nodes				Properties					
Mem	I	J	K	Mat	Area	E	I33	I22	J	G
					in^2	ksi	in^4	in^4	in^4	ksi
1	18	19	3	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
2	21	22	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
3	24	25	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
4	27	28	3	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
5	30	31	7	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
6	33	34	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
7	36	37	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
8	39	40	7	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
9	42	43	11	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
10	45	46	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
11	48	49	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
12	51	52	11	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
13	54	55	15	1	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
14	57	58	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
15	60	61	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4
16	63	64	15	2	0.5966	10000.0	0.2842	0.0046	0.2888	3759.4

6. Wind Load Factors

Directionality Factor = 0.85
Drag Coefficient = 0.60

Uplift Coefficient = 0.00

CONCENTRATED APPLIED LOADS

- Sign/Cable/Light weights (Kips)

Node	X	Y	Z
3	0.00000	0.00000	-0.01344
7	0.00000	0.00000	-0.02683
11	0.00000	0.00000	-0.01409
15	0.00000	0.00000	-0.02865
17	0.00000	0.00000	-0.00907
18	0.00000	0.00000	-0.00332
19	0.00000	0.00000	-0.08000
20	0.00000	0.00000	-0.00851
21	0.00000	0.00000	-0.00290
22	0.00000	0.00000	-0.05454
23	0.00000	0.00000	-0.00849
24	0.00000	0.00000	-0.00249
25	0.00000	0.00000	-0.05454
26	0.00000	0.00000	-0.02722
27	0.00000	0.00000	-0.00224
28	0.00000	0.00000	-0.05454
29	0.00000	0.00000	-0.01328
30	0.00000	0.00000	-0.00311
31	0.00000	0.00000	-0.08000
32	0.00000	0.00000	-0.01088
33	0.00000	0.00000	-0.00256
34	0.00000	0.00000	-0.05454
35	0.00000	0.00000	-0.00845
36	0.00000	0.00000	-0.00247
37	0.00000	0.00000	-0.05454
38	0.00000	0.00000	-0.01609
39	0.00000	0.00000	-0.00254
40	0.00000	0.00000	-0.05454
41	0.00000	0.00000	-0.01004
42	0.00000	0.00000	-0.00325
43	0.00000	0.00000	-0.08000
44	0.00000	0.00000	-0.00927
45	0.00000	0.00000	-0.00275
46	0.00000	0.00000	-0.05454
47	0.00000	0.00000	-0.00809
48	0.00000	0.00000	-0.00236
49	0.00000	0.00000	-0.05454
50	0.00000	0.00000	-0.02587
51	0.00000	0.00000	-0.00218
52	0.00000	0.00000	-0.05454
53	0.00000	0.00000	-0.01244
54	0.00000	0.00000	-0.00279

55	0.00000	0.00000	-0.08000
56	0.00000	0.00000	-0.00832
57	0.00000	0.00000	-0.00259
58	0.00000	0.00000	-0.05454
59	0.00000	0.00000	-0.00899
60	0.00000	0.00000	-0.00249
61	0.00000	0.00000	-0.05454
62	0.00000	0.00000	-0.01585
63	0.00000	0.00000	-0.00256
64	0.00000	0.00000	-0.05454

- Wind loads on Cables

NOTE : The wind forces on the cables are applied as shown below. The wind forces on the lights and signs are calculated during the analysis. For more information, refer to Atlas Help Manual.

Node	X	Y	Z	XX	YY	ZZ
17	0.00000	0.00056	0.00000	0.00000	0.00000	0.00000
18	0.00000	0.00056	0.00000	0.00000	0.00000	0.00000
20	0.00000	0.00056	0.00000	0.00000	0.00000	0.00000
21	0.00000	0.00056	0.00000	0.00000	0.00000	0.00000
23	0.00000	0.00056	0.00000	0.00000	0.00000	0.00000
24	0.00000	0.00056	0.00000	0.00000	0.00000	0.00000
26	0.00000	0.00245	0.00000	0.00000	0.00000	0.00000
27	0.00000	0.00245	0.00000	0.00000	0.00000	0.00000
29	0.00000	0.04359	0.00000	0.00000	0.00000	0.00000
30	0.00000	0.04345	0.00000	0.00000	0.00000	0.00000
32	0.00000	0.03569	0.00000	0.00000	0.00000	0.00000
33	0.00000	0.03566	0.00000	0.00000	0.00000	0.00000
35	0.00000	0.02563	0.00000	0.00000	0.00000	0.00000
36	0.00000	0.02563	0.00000	0.00000	0.00000	0.00000
38	0.00000	0.05806	0.00000	0.00000	0.00000	0.00000
39	0.00000	0.05794	0.00000	0.00000	0.00000	0.00000
41	0.00000	0.00045	0.00000	0.00000	0.00000	0.00000
42	0.00000	0.00045	0.00000	0.00000	0.00000	0.00000
44	0.00000	0.00045	0.00000	0.00000	0.00000	0.00000
45	0.00000	0.00045	0.00000	0.00000	0.00000	0.00000
47	0.00000	0.00033	0.00000	0.00000	0.00000	0.00000
48	0.00000	0.00033	0.00000	0.00000	0.00000	0.00000
50	0.00000	0.00156	0.00000	0.00000	0.00000	0.00000
51	0.00000	0.00156	0.00000	0.00000	0.00000	0.00000
53	0.00000	0.04135	0.00000	0.00000	0.00000	0.00000
54	0.00000	0.04123	0.00000	0.00000	0.00000	0.00000
56	0.00000	0.02452	0.00000	0.00000	0.00000	0.00000
57	0.00000	0.02451	0.00000	0.00000	0.00000	0.00000
59	0.00000	0.02786	0.00000	0.00000	0.00000	0.00000
60	0.00000	0.02786	0.00000	0.00000	0.00000	0.00000
62	0.00000	0.05694	0.00000	0.00000	0.00000	0.00000

```
  63   0.00000   0.05683   0.00000   0.00000   0.00000   0.00000

      *-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
      |                                                     |
      |              D E S I G N   S E C T I O N            |
      |                  Units: Kips, Feet                  |
      |                                                     |
      *-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*



- CABLE  DESIGN
  *-*-*-*-*-*-*

  A resistance factor is used in the calculation of
  factored cable resistance, which is given below:
  Wire resistance factor = 0.50

  Cable Number  =   1

  * Catenary Cable *

  Starting Node =   3
  Ending Node   =   7
  Cable Tension (k)             =     1.665
  Cable Sag (%)                 =     5.143
  Cable Diameter (in)           =     0.500
  Cable Area (sq. in)           =     0.150
  Cable Weight (lb/in)          =     0.043
  Factored Cable Resistance (k) =    12.500

  Cable Size is Adequate for current Tensile Force
  Load Combination 2: 1.10*(DL) + 1.00*(WL)
  controls

  Cable Number  =   2

  * Messenger Cable *

  Starting Node =   2
  Ending Node   =   6
  Cable Tension (k)             =     3.819
  Cable Diameter (in)           =     0.500
  Cable Area (sq. in)           =     0.150
  Cable Weight (lb/in)          =     0.043
  Factored Cable Resistance (k) =    12.500

  Cable Size is Adequate for current Tensile Force
  Load Combination 2: 1.10*(DL) + 1.00*(WL)
  controls
```

```
Cable Number  =   3

* Catenary Cable *

Starting Node =   7
Ending Node   =  11
Cable Tension (k)             =     2.225
Cable Sag (%)                 =     6.046
Cable Diameter (in)           =     0.500
Cable Area (sq. in)           =     0.150
Cable Weight (lb/in)          =     0.043
Factored Cable Resistance (k) =    12.500

Cable Size is Adequate for current Tensile Force
Load Combination 2: 1.10*(DL) + 1.00*(WL)
controls

Cable Number  =   4

* Messenger Cable *

Starting Node =   6
Ending Node   =  10
Cable Tension (k)             =     8.624
Cable Diameter (in)           =     0.500
Cable Area (sq. in)           =     0.150
Cable Weight (lb/in)          =     0.043
Factored Cable Resistance (k) =    12.500

Cable Size is Adequate for current Tensile Force
Load Combination 2: 1.10*(DL) + 1.00*(WL)
controls

Cable Number  =   5

* Catenary Cable *

Starting Node =  11
Ending Node   =  15
Cable Tension (k)             =     1.638
Cable Sag (%)                 =     5.001
Cable Diameter (in)           =     0.500
Cable Area (sq. in)           =     0.150
Cable Weight (lb/in)          =     0.043
Factored Cable Resistance (k) =    12.500

Cable Size is Adequate for current Tensile Force
Load Combination 2: 1.10*(DL) + 1.00*(WL)
controls

Cable Number  =   6
```

```
  * Messenger Cable *

  Starting Node =  10
  Ending Node   =  14
  Cable Tension (k)             =     3.553
  Cable Diameter (in)           =     0.500
  Cable Area (sq. in)           =     0.150
  Cable Weight (lb/in)          =     0.043
  Factored Cable Resistance (k) =    12.500

  Cable Size is Adequate for current Tensile Force
  Load Combination 2: 1.10*(DL) + 1.00*(WL)
  controls

  Cable Number  =   7

  * Catenary Cable *

  Starting Node =  15
  Ending Node   =   3
  Cable Tension (k)             =     2.269
  Cable Sag (%)                 =     6.130
  Cable Diameter (in)           =     0.500
  Cable Area (sq. in)           =     0.150
  Cable Weight (lb/in)          =     0.043
  Factored Cable Resistance (k) =    12.500

  Cable Size is Adequate for current Tensile Force
  Load Combination 2: 1.10*(DL) + 1.00*(WL)
  controls

  Cable Number  =   8

  * Messenger Cable *

  Starting Node =  14
  Ending Node   =   2
  Cable Tension (k)             =     8.887
  Cable Diameter (in)           =     0.500
  Cable Area (sq. in)           =     0.150
  Cable Weight (lb/in)          =     0.043
  Factored Cable Resistance (k) =    12.500

  Cable Size is Adequate for current Tensile Force
  Load Combination 2: 1.10*(DL) + 1.00*(WL)
  controls


- POLE DESIGN
  *-*-*-*-*-*
```

Load Combination 2 (LRFD Extreme Event I): 1.10*(DL) + 1.00*(WL)
is used for design of this pole

Pole Number	=	1
Pole Node Numbers	=	1 2 3
Input Pole Type	=	PVIII
Input Wind Speed (mph)	=	140.000
Input Wind Angle (deg)	=	90.000
Applied Wind Angle (deg)	=	62.000
Resultant Base Shear (kips)	=	10.915
Resultant Base Moment (kip-ft)	=	304.520
Resultant Base Moment Angle (deg)	=	22.598
Pole Strong Axis Angle (deg)	=	44.055
Biaxial Moment Reduction Factor	=	0.852
Required Pole Phi * Mn (kip-ft)	=	357.390
Input Pole Capacity (kip-ft)	=	411.032
Required Embedment Length (ft)	=	17.863
Minimum Embedment Length (ft)	=	9.000

(= 0.000 if custom pole, and requires separate check)

Pole Height Above Ground (ft)	=	33.095

The Pole specified in the INPUT is adequate to support
the base moment.

Load Combination 2 (LRFD Extreme Event I): 1.10*(DL) + 1.00*(WL)
is used for design of this pole

Pole Number	=	2
Pole Node Numbers	=	5 6 7
Input Pole Type	=	PVIII
Input Wind Speed (mph)	=	140.000
Input Wind Angle (deg)	=	90.000
Applied Wind Angle (deg)	=	62.000
Resultant Base Shear (kips)	=	10.528
Resultant Base Moment (kip-ft)	=	285.499
Resultant Base Moment Angle (deg)	=	19.856
Pole Strong Axis Angle (deg)	=	44.058
Biaxial Moment Reduction Factor	=	0.825
Required Pole Phi * Mn (kip-ft)	=	346.245
Input Pole Capacity (kip-ft)	=	410.565
Required Embedment Length (ft)	=	17.502

```
Minimum Embedment Length (ft)              =     9.000
 (= 0.000 if custom pole, and requires separate check)
Pole Height Above Ground (ft)              =    32.995

The Pole specified in the INPUT is adequate to support
the base moment.


Load Combination 2 (LRFD Extreme Event I):  1.10*(DL) + 1.00*(WL)
is used for design of this pole

Pole Number                                =         3
Pole Node Numbers                          =   9 10 11
Input Pole Type                            =    PVIII
Input Wind Speed (mph)                     =   140.000
Input Wind Angle (deg)                     =    90.000
Applied Wind Angle (deg)                   =    62.000

Resultant Base Shear (kips)                =     3.652

Resultant Base Moment (kip-ft)             =   279.581
Resultant Base Moment Angle (deg)          =    21.027
Pole Strong Axis Angle (deg)               =    44.278
Biaxial Moment Reduction Factor            =     0.834
Required Pole Phi * Mn (kip-ft)            =   335.122

Input Pole Capacity (kip-ft)               =   408.834

Required Embedment Length (ft)             =    15.664
Minimum Embedment Length (ft)              =     9.000
 (= 0.000 if custom pole, and requires separate check)
Pole Height Above Ground (ft)              =    32.625

The Pole specified in the INPUT is adequate to support
the base moment.


Load Combination 2 (LRFD Extreme Event I):  1.10*(DL) + 1.00*(WL)
is used for design of this pole

Pole Number                                =         4
Pole Node Numbers                          =  13 14 15
Input Pole Type                            =    PVIII
Input Wind Speed (mph)                     =   140.000
Input Wind Angle (deg)                     =    90.000
Applied Wind Angle (deg)                   =    62.000

Resultant Base Shear (kips)                =    10.725

Resultant Base Moment (kip-ft)             =   293.114
Resultant Base Moment Angle (deg)          =    24.548
```

Pole Strong Axis Angle (deg) = 44.276
Biaxial Moment Reduction Factor = 0.869
Required Pole Phi * Mn (kip-ft) = 337.476

Input Pole Capacity (kip-ft) = 406.495

Required Embedment Length (ft) = 17.658
Minimum Embedment Length (ft) = 9.000
(= 0.000 if custom pole, and requires separate check)
Pole Height Above Ground (ft) = 32.125

The Pole specified in the INPUT is adequate to support the base moment.

L O A D C O M B I N A T I O N 1
[DL] only
Units: Kips, Inches

Final Coordinates

Node	X	Y	Z
1	36.0000	0.0000	0.0000
2	36.3178	0.3272	289.1199
3	36.4944	0.5089	385.1406
4	53.2480	-16.6885	0.0000
5	0.0000	1560.0000	1.2000
6	0.3203	1559.6820	289.1199
7	0.4987	1559.5045	385.1407
8	17.2472	1543.3107	1.2000
9	1224.0000	1572.0000	5.6400
10	1223.7035	1571.6750	289.1199
11	1223.5356	1571.4900	385.1406
12	1241.1829	1555.2445	5.6400
13	1248.0000	12.0000	11.6400
14	1247.6987	12.3039	289.1199
15	1247.5234	12.4812	385.1407
16	1265.1837	-4.7547	11.6400
17	32.6116	146.9094	343.7946
18	32.6112	146.9084	289.1230
19	32.6111	146.9082	277.1228
20	29.9881	260.5157	324.0111
21	29.9881	260.5155	289.1196
22	29.9881	260.5154	261.0593
23	26.6571	404.8583	309.9430
24	26.6571	404.8582	289.1193

25	26.6571	404.8581	261.0591
26	23.6016	537.2751	307.1208
27	23.6015	537.2751	289.1206
28	23.6015	537.2750	261.0604
29	215.0343	1562.1070	337.0319
30	215.0337	1562.1073	289.1224
31	215.0335	1562.1073	277.1223
32	467.1874	1564.5803	310.2214
33	467.1874	1564.5803	289.1190
34	467.1873	1564.5803	261.0587
35	599.2521	1565.8750	307.1195
36	599.2521	1565.8750	289.1194
37	599.2520	1565.8750	261.0591
38	743.1088	1567.2848	315.2158
39	743.1089	1567.2850	289.1215
40	743.1091	1567.2851	261.0612
41	1226.5433	1406.5788	343.0072
42	1226.5438	1406.5797	289.1233
43	1226.5439	1406.5799	277.1232
44	1228.7562	1262.8461	320.9499
45	1228.7562	1262.8463	289.1197
46	1228.7562	1262.8464	261.0594
47	1231.1609	1106.5397	308.2649
48	1231.1609	1106.5397	289.1195
49	1231.1609	1106.5398	261.0593
50	1232.8260	998.2904	307.1209
51	1232.8261	998.2905	289.1207
52	1232.8262	998.2906	261.0604
53	912.9694	8.6836	318.7279
54	912.9697	8.6834	289.1218
55	912.9699	8.6834	277.1216
56	804.9486	7.6134	309.1644
57	804.9487	7.6134	289.1198
58	804.9487	7.6134	261.0596
59	648.8188	6.0675	307.1200
60	648.8188	6.0675	289.1198
61	648.8188	6.0675	261.0596
62	505.0059	4.6442	316.1787
63	505.0057	4.6440	289.1219
64	505.0055	4.6439	261.0617

Dead Load Applied to the Structure

Node	Fx	Fy	Fz	Mom-X	Mom-Y	Mom-Z
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-0.0134	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	-0.0268	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11	0.0000	0.0000	-0.0141	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15	0.0000	0.0000	-0.0287	0.0000	0.0000	0.0000
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	0.0000	0.0000	-0.0091	0.0000	0.0000	0.0000
18	0.0000	0.0000	-0.0033	0.0000	0.0000	0.0000
19	0.0000	0.0000	-0.0800	0.0000	0.0000	0.0000
20	0.0000	0.0000	-0.0085	0.0000	0.0000	0.0000
21	0.0000	0.0000	-0.0029	0.0000	0.0000	0.0000
22	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
23	0.0000	0.0000	-0.0085	0.0000	0.0000	0.0000
24	0.0000	0.0000	-0.0025	0.0000	0.0000	0.0000
25	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
26	0.0000	0.0000	-0.0272	0.0000	0.0000	0.0000
27	0.0000	0.0000	-0.0022	0.0000	0.0000	0.0000
28	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
29	0.0000	0.0000	-0.0133	0.0000	0.0000	0.0000
30	0.0000	0.0000	-0.0031	0.0000	0.0000	0.0000
31	0.0000	0.0000	-0.0800	0.0000	0.0000	0.0000
32	0.0000	0.0000	-0.0109	0.0000	0.0000	0.0000
33	0.0000	0.0000	-0.0026	0.0000	0.0000	0.0000
34	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
35	0.0000	0.0000	-0.0085	0.0000	0.0000	0.0000
36	0.0000	0.0000	-0.0025	0.0000	0.0000	0.0000
37	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
38	0.0000	0.0000	-0.0161	0.0000	0.0000	0.0000
39	0.0000	0.0000	-0.0025	0.0000	0.0000	0.0000
40	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
41	0.0000	0.0000	-0.0100	0.0000	0.0000	0.0000
42	0.0000	0.0000	-0.0033	0.0000	0.0000	0.0000
43	0.0000	0.0000	-0.0800	0.0000	0.0000	0.0000
44	0.0000	0.0000	-0.0093	0.0000	0.0000	0.0000
45	0.0000	0.0000	-0.0028	0.0000	0.0000	0.0000
46	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
47	0.0000	0.0000	-0.0081	0.0000	0.0000	0.0000
48	0.0000	0.0000	-0.0024	0.0000	0.0000	0.0000
49	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
50	0.0000	0.0000	-0.0259	0.0000	0.0000	0.0000
51	0.0000	0.0000	-0.0022	0.0000	0.0000	0.0000
52	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
53	0.0000	0.0000	-0.0124	0.0000	0.0000	0.0000
54	0.0000	0.0000	-0.0028	0.0000	0.0000	0.0000
55	0.0000	0.0000	-0.0800	0.0000	0.0000	0.0000
56	0.0000	0.0000	-0.0083	0.0000	0.0000	0.0000

57	0.0000	0.0000	-0.0026	0.0000	0.0000	0.0000
58	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
59	0.0000	0.0000	-0.0090	0.0000	0.0000	0.0000
60	0.0000	0.0000	-0.0025	0.0000	0.0000	0.0000
61	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000
62	0.0000	0.0000	-0.0159	0.0000	0.0000	0.0000
63	0.0000	0.0000	-0.0026	0.0000	0.0000	0.0000
64	0.0000	0.0000	-0.0545	0.0000	0.0000	0.0000

Final Displacements

Node	Tx	Ty	Tz	Rot-X	Rot-Y	Rot-Z
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.3178	0.3272	-0.0001	-0.0018	0.0018	0.0000
3	0.4944	0.5089	-0.0001	-0.0019	0.0019	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.3203	-0.3180	-0.0001	0.0018	0.0018	0.0000
7	0.4987	-0.4955	-0.0001	0.0019	0.0019	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	-0.2965	-0.3250	-0.0001	0.0018	-0.0017	0.0000
11	-0.4644	-0.5100	-0.0001	0.0020	-0.0018	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	-0.3013	0.3039	-0.0001	-0.0018	-0.0017	0.0000
15	-0.4766	0.4812	-0.0001	-0.0019	-0.0019	0.0000
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	0.0018	0.0012	0.0038	-0.0000	0.0000	-0.0000
18	0.0014	0.0002	0.0030	-0.0000	0.0000	-0.0000
19	0.0013	-0.0000	0.0028	-0.0000	0.0000	-0.0000
20	0.0000	0.0001	-0.0001	-0.0000	-0.0000	-0.0000
21	0.0000	-0.0001	-0.0004	-0.0000	-0.0000	-0.0000
22	0.0000	-0.0002	-0.0007	-0.0000	-0.0000	-0.0000
23	0.0000	0.0000	-0.0005	-0.0000	-0.0000	-0.0000
24	0.0000	-0.0000	-0.0007	-0.0000	-0.0000	0.0000
25	0.0000	-0.0001	-0.0009	-0.0000	-0.0000	0.0000
26	0.0003	-0.0000	0.0008	-0.0000	0.0000	-0.0000
27	0.0002	-0.0001	0.0006	-0.0000	0.0000	0.0000
28	0.0001	-0.0001	0.0004	-0.0000	0.0000	0.0000
29	0.0007	-0.0012	0.0031	0.0000	0.0000	-0.0000
30	0.0001	-0.0009	0.0024	0.0000	0.0000	-0.0000
31	-0.0000	-0.0009	0.0023	0.0000	0.0000	-0.0000
32	0.0000	-0.0000	-0.0008	-0.0000	0.0000	0.0000
33	-0.0000	-0.0000	-0.0010	-0.0000	0.0000	-0.0000
34	-0.0001	-0.0000	-0.0013	-0.0000	0.0000	-0.0000
35	0.0000	-0.0000	-0.0005	-0.0000	0.0000	-0.0000
36	-0.0000	-0.0000	-0.0006	-0.0000	0.0000	0.0000
37	-0.0001	-0.0000	-0.0009	-0.0000	0.0000	0.0000

38	-0.0002	-0.0005	0.0018	0.0000	-0.0000	0.0000
39	-0.0001	-0.0004	0.0015	0.0000	-0.0000	0.0000
40	0.0001	-0.0003	0.0012	0.0000	-0.0000	0.0000
41	-0.0016	-0.0011	0.0041	0.0000	-0.0000	-0.0000
42	-0.0011	-0.0002	0.0033	0.0000	-0.0000	-0.0000
43	-0.0010	0.0000	0.0032	0.0000	-0.0000	-0.0000
44	-0.0000	-0.0001	-0.0000	0.0000	0.0000	-0.0000
45	-0.0000	0.0001	-0.0003	0.0000	0.0000	-0.0000
46	-0.0000	0.0002	-0.0006	0.0000	0.0000	-0.0000
47	-0.0000	-0.0000	-0.0003	0.0000	0.0000	0.0000
48	-0.0000	0.0000	-0.0005	0.0000	0.0000	0.0000
49	-0.0000	0.0001	-0.0007	0.0000	0.0000	0.0000
50	-0.0003	0.0000	0.0009	0.0000	-0.0000	0.0000
51	-0.0002	0.0001	0.0007	0.0000	-0.0000	0.0000
52	-0.0001	0.0001	0.0004	0.0000	-0.0000	0.0000
53	-0.0004	0.0008	0.0022	-0.0000	-0.0000	0.0000
54	-0.0001	0.0006	0.0018	-0.0000	-0.0000	-0.0000
55	0.0000	0.0005	0.0016	-0.0000	-0.0000	-0.0000
56	-0.0000	0.0000	0.0000	-0.0000	-0.0000	0.0000
57	0.0000	0.0000	-0.0002	-0.0000	-0.0000	-0.0000
58	0.0001	0.0000	-0.0004	-0.0000	-0.0000	-0.0000
59	-0.0000	0.0000	-0.0000	-0.0000	-0.0000	-0.0000
60	0.0000	0.0000	-0.0002	-0.0000	-0.0000	0.0000
61	0.0000	0.0000	-0.0004	-0.0000	-0.0000	0.0000
62	0.0003	0.0006	0.0022	-0.0000	0.0000	0.0000
63	0.0001	0.0004	0.0019	-0.0000	0.0000	0.0000
64	-0.0001	0.0003	0.0017	-0.0000	0.0000	0.0000

- Frame Member Forces

Member # 1

	Node I	Node J
Axial Force =	0.3833	-0.3833
Shear Xm - Ym =	-0.0036	0.0036
Shear Xm - Zm =	-2.6125	2.6125
Torsion =	0.0000	0.0000
Moment About Ym =	871.4000	-116.0869
Moment About Zm =	-1.5257	0.4843

Unit conversion:
Pole Absolute Resultant Moment = 0.1334 (ft-kips)

Member # 2

	Node I	Node J
Axial Force =	0.3833	-0.3833
Shear Xm - Ym =	-0.0050	0.0050
Shear Xm - Zm =	-1.2090	1.2090

Torsion	=	0.0000	0.0000
Moment About Ym	=	116.0869	-0.0000
Moment About Zm	=	-0.4843	-0.0000

Unit conversion:
Pole Absolute Resultant Moment = 0.0404 (ft-kips)

Member # 3

		Node I	Node J
Axial Force	=	0.2761	-0.2761
Shear Xm - Ym	=	-2.6167	2.6167
Shear Xm - Zm	=	0.0271	-0.0271
Torsion	=	0.0000	0.0000
Moment About Ym	=	-10.5113	2.7070
Moment About Zm	=	-868.0434	114.6496

Unit conversion:
Pole Absolute Resultant Moment = 72.9652 (ft-kips)

Member # 4

		Node I	Node J
Axial Force	=	0.2762	-0.2762
Shear Xm - Ym	=	-1.1940	1.1940
Shear Xm - Zm	=	0.0282	-0.0282
Torsion	=	0.0000	0.0000
Moment About Ym	=	-2.7070	-0.0000
Moment About Zm	=	-114.6496	-0.0000

Unit conversion:
Pole Absolute Resultant Moment = 9.5541 (ft-kips)

Member # 5

		Node I	Node J
Axial Force	=	0.3680	-0.3680
Shear Xm - Ym	=	-0.0721	0.0721
Shear Xm - Zm	=	2.6326	-2.6326
Torsion	=	0.0000	0.0000
Moment About Ym	=	-863.7763	117.4786
Moment About Zm	=	-27.2347	6.8023

Unit conversion:
Pole Absolute Resultant Moment = 2.3393 (ft-kips)

Member # 6

	Node I	Node J
Axial Force =	0.3681	-0.3681
Shear Xm - Ym =	-0.0708	0.0708
Shear Xm - Zm =	1.2235	-1.2235
Torsion =	0.0000	0.0000
Moment About Ym =	-117.4786	0.0000
Moment About Zm =	-6.8023	-0.0000

Unit conversion:
Pole Absolute Resultant Moment = 0.5669 (ft-kips)

Member # 7

	Node I	Node J
Axial Force =	0.2736	-0.2736
Shear Xm - Ym =	2.6838	-2.6838
Shear Xm - Zm =	-0.0371	0.0371
Torsion =	0.0000	0.0000
Moment About Ym =	13.8992	-3.6158
Moment About Zm =	866.3085	-121.5941

Unit conversion:
Pole Absolute Resultant Moment = 72.9000 (ft-kips)

Member # 8

	Node I	Node J
Axial Force =	0.2736	-0.2736
Shear Xm - Ym =	1.2663	-1.2663
Shear Xm - Zm =	-0.0377	0.0377
Torsion =	0.0000	0.0000
Moment About Ym =	3.6158	0.0000
Moment About Zm =	121.5941	0.0000

Unit conversion:
Pole Absolute Resultant Moment = 10.1328 (ft-kips)

- Primary (Catenary) Cable Forces Primary Cable Reactions on Poles

Member	Force	Stress	Node	Fx	Fy	Fz
1	0.8943	5.9617	3	-0.0228	0.8603	-0.2430
2	0.8738	5.8251				
3	0.8649	5.7660				
4	0.8610	5.7401				
5	0.8636	5.7572	7	0.0195	-0.8608	-0.0657

6	0.8412	5.6080	7	0.8208	0.0100	-0.1841
7	0.8255	5.5036				
8	0.8211	5.4742				
9	0.8222	5.4813				
10	0.8296	5.5306	11	-0.8209	-0.0072	-0.1195
11	0.9505	6.3367	11	0.0168	-0.9208	-0.2353
12	0.9319	6.2125				
13	0.9241	6.1608				
14	0.9211	6.1409				
15	0.9242	6.1613	15	-0.0137	0.9211	-0.0729
16	0.8848	5.8988	15	-0.8678	-0.0099	-0.1723
17	0.8713	5.8087				
18	0.8680	5.7866				
19	0.8696	5.7975				
20	0.8773	5.8486	3	0.8679	0.0077	-0.1277

- Secondary (Messenger) Cable Forces Secondary Cable Reactions on Poles

Member	Force	Stress	Node	Fx	Fy	Fz
1	1.0000	6.6667	2	-0.0253	0.9997	0.0000
2	1.0000	6.6667				
3	1.0000	6.6667				
4	1.0000	6.6667				
5	1.0000	6.6667	6	0.0228	-0.9997	0.0000
6	1.0000	6.6667	6	0.9999	0.0113	0.0000
7	1.0000	6.6667				
8	1.0000	6.6667				
9	1.0000	6.6667				
10	1.0000	6.6667	10	-0.9999	-0.0091	0.0000
11	1.0000	6.6667	10	0.0172	-0.9998	0.0000
12	1.0000	6.6667				
13	1.0000	6.6667				
14	1.0000	6.6667				
15	1.0000	6.6667	14	-0.0151	0.9998	0.0000
16	1.0000	6.6667	14	-0.9999	-0.0108	0.0000
17	1.0000	6.6667				
18	1.0000	6.6667				
19	1.0000	6.6667				
20	1.0000	6.6667	2	0.9999	0.0092	0.0000

- Light Member Forces

Member # 1

	Node I	Node J
Axial Force =	-0.0800	0.0800
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	0.0000	-0.0000

Torsion	=	0.0000	-0.0000
Moment About Ym	=	-0.0003	-0.0000
Moment About Zm	=	-0.0000	0.0000

Member # 2

		Node I	Node J
Axial Force	=	-0.0545	0.0545
Shear Xm - Ym	=	0.0000	-0.0000
Shear Xm - Zm	=	0.0000	-0.0000
Torsion	=	0.0000	-0.0000
Moment About Ym	=	-0.0000	-0.0000
Moment About Zm	=	0.0000	0.0000

Member # 3

		Node I	Node J
Axial Force	=	-0.0545	0.0545
Shear Xm - Ym	=	0.0000	-0.0000
Shear Xm - Zm	=	0.0000	-0.0000
Torsion	=	0.0000	-0.0000
Moment About Ym	=	-0.0000	-0.0000
Moment About Zm	=	0.0000	0.0000

Member # 4

		Node I	Node J
Axial Force	=	-0.0545	0.0545
Shear Xm - Ym	=	0.0000	-0.0000
Shear Xm - Zm	=	0.0000	-0.0000
Torsion	=	0.0000	-0.0000
Moment About Ym	=	-0.0002	-0.0000
Moment About Zm	=	0.0000	0.0000

Member # 5

		Node I	Node J
Axial Force	=	-0.0800	0.0800
Shear Xm - Ym	=	-0.0000	0.0000
Shear Xm - Zm	=	0.0000	-0.0000
Torsion	=	0.0000	-0.0000
Moment About Ym	=	-0.0002	-0.0000
Moment About Zm	=	-0.0000	0.0000

Member # 6

		Node I	Node J
Axial Force	=	-0.0545	0.0545
Shear Xm - Ym	=	0.0000	-0.0000
Shear Xm - Zm	=	0.0000	-0.0000
Torsion	=	0.0000	-0.0000

Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 7

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	-0.0000
Moment About Zm =	0.0000	0.0000

Member # 8

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	-0.0000	0.0000
Moment About Ym =	-0.0002	-0.0000
Moment About Zm =	0.0000	-0.0000

Member # 9

	Node I	Node J
Axial Force =	-0.0800	0.0800
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0003	-0.0000
Moment About Zm =	-0.0000	0.0000

Member # 10

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 11

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000

Moment About Zm =	0.0000	0.0000

Member # 12

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0002	-0.0000
Moment About Zm =	0.0000	0.0000

Member # 13

	Node I	Node J
Axial Force =	-0.0800	0.0800
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0002	-0.0000
Moment About Zm =	-0.0000	0.0000

Member # 14

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	-0.0000
Moment About Zm =	0.0000	0.0000

Member # 15

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	-0.0000
Moment About Zm =	0.0000	0.0000

Member # 16

	Node I	Node J
Axial Force =	-0.0545	0.0545
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	0.0000	-0.0000
Torsion =	-0.0000	0.0000
Moment About Ym =	-0.0003	-0.0000
Moment About Zm =	0.0000	-0.0000

- Hanger (Connector) Member Forces

Member # 1

	Node I	Node J
Axial Force =	-0.0834	0.0834
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0003
Moment About Zm =	0.0000	0.0000

Member # 2

	Node I	Node J
Axial Force =	-0.0574	0.0574
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 3

	Node I	Node J
Axial Force =	-0.0570	0.0570
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 4

	Node I	Node J
Axial Force =	-0.0568	0.0568
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0002
Moment About Zm =	0.0000	-0.0000

Member # 5

	Node I	Node J
Axial Force =	-0.0831	0.0831
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0002

Moment About Zm =	0.0000	0.0000

Member # 6

	Node I	Node J
Axial Force =	-0.0571	0.0571
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 7

	Node I	Node J
Axial Force =	-0.0570	0.0570
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 8

	Node I	Node J
Axial Force =	-0.0571	0.0571
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	-0.0000	0.0000
Moment About Ym =	-0.0000	0.0002
Moment About Zm =	-0.0000	-0.0000

Member # 9

	Node I	Node J
Axial Force =	-0.0833	0.0833
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0003
Moment About Zm =	0.0000	0.0000

Member # 10

	Node I	Node J
Axial Force =	-0.0573	0.0573
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 11

	Node I	Node J
Axial Force =	-0.0569	0.0569
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 12

	Node I	Node J
Axial Force =	-0.0567	0.0567
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0002
Moment About Zm =	0.0000	-0.0000

Member # 13

	Node I	Node J
Axial Force =	-0.0828	0.0828
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0002
Moment About Zm =	0.0000	0.0000

Member # 14

	Node I	Node J
Axial Force =	-0.0571	0.0571
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 15

	Node I	Node J
Axial Force =	-0.0570	0.0570
Shear Xm - Ym =	0.0000	-0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	0.0000	-0.0000
Moment About Ym =	-0.0000	0.0000
Moment About Zm =	0.0000	0.0000

Member # 16

	Node I	Node J
Axial Force =	-0.0571	0.0571
Shear Xm - Ym =	-0.0000	0.0000
Shear Xm - Zm =	-0.0000	0.0000
Torsion =	-0.0000	0.0000
Moment About Ym =	-0.0000	0.0003
Moment About Zm =	-0.0000	-0.0000

L O A D C O M B I N A T I O N 2

Dead Load Factor * [DL] + Wind Load Factor * [WL]

1.10 * [DL] + 1.00 * [WL]

Units: Kips, Inches

Wind Velocity Input (mph) = 140.000
Wind Angle Input (deg) = 90.000
Wind Angle Applied (deg) = 62.000

Final Coordinates

Node	X	Y	Z
1	36.0000	0.0000	0.0000
2	37.6883	0.7940	289.1199
3	38.5724	1.2058	385.1406
4	53.2480	-16.6885	0.0000
5	0.0000	1560.0000	1.2000
6	1.6148	1559.5563	289.1199
7	2.4639	1559.3002	385.1406
8	17.2472	1543.3107	1.2000
9	1224.0000	1572.0000	5.6400
10	1222.5045	1571.4689	289.1199
11	1221.6989	1571.1650	385.1406
12	1241.1829	1555.2445	5.6400
13	1248.0000	12.0000	11.6400
14	1246.4884	12.7772	289.1199
15	1245.6558	13.2066	385.1406
16	1265.1837	-4.7547	11.6400
17	35.9332	146.6400	342.6312
18	39.8176	147.0373	288.0995
19	40.8172	147.5383	276.1389
20	34.1794	260.1742	322.3617
21	43.1953	260.6963	288.6594
22	70.3538	263.0435	266.8834
23	34.8152	404.6580	309.3615
24	43.8694	405.1382	290.6153

25	66.7874	407.2037	270.5338
26	33.3257	537.1443	308.4676
27	41.7185	537.6073	292.5503
28	64.0787	539.6568	272.6305
29	215.6228	1568.6312	340.1632
30	214.2247	1582.5665	294.3462
31	213.5323	1605.3380	288.7385
32	467.0874	1576.8647	307.8887
33	466.4975	1596.1507	299.3436
34	465.7778	1626.6631	298.9829
35	599.1417	1581.1119	305.2145
36	598.8140	1598.3557	300.0610
37	598.5716	1626.1276	295.0055
38	742.8613	1577.7991	315.7362
39	742.9507	1597.5498	298.6831
40	743.4732	1642.0211	307.2432
41	1228.9980	1405.4001	348.0597
42	1236.0101	1407.0640	294.6595
43	1237.2540	1407.8358	282.7143
44	1231.8291	1261.6432	326.0616
45	1246.0706	1263.6416	297.6648
46	1272.1992	1267.3581	279.3790
47	1233.5599	1106.2286	304.8824
48	1252.3794	1107.4155	301.5671
49	1278.3101	1109.7723	287.2930
50	1235.6871	998.0199	301.6224
51	1253.6561	999.0959	301.6272
52	1281.6744	1001.2577	288.6134
53	912.3136	21.1373	321.8303
54	913.3531	38.0256	297.5355
55	913.9425	53.7433	293.8439
56	804.7075	22.4273	308.0739
57	805.1680	40.7265	299.9054
58	806.4633	71.5962	300.2189
59	648.5303	22.3506	305.0599
60	648.7122	39.6611	300.1277
61	649.3506	67.4084	295.0979
62	504.9856	15.2033	316.1856
63	504.6652	35.3926	298.1760
64	504.3292	80.9874	307.1453

Factored Loads Applied to the Structure

Node	Fx	Fy	Fz	Mom-X	Mom-Y	Mom-Z
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	-0.0148	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	-0.0295	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
11	0.0000	0.0000	-0.0155	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
15	0.0000	0.0000	-0.0315	0.0000	0.0000	0.0000
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	0.0000	0.0006	-0.0100	0.0000	0.0000	0.0000
18	0.0000	0.0006	-0.0037	0.0000	0.0000	0.0000
19	0.0000	0.3639	-0.0880	0.0000	0.0000	0.0000
20	0.0000	0.0006	-0.0094	0.0000	0.0000	0.0000
21	0.0000	0.0006	-0.0032	0.0000	0.0000	0.0000
22	0.0694	0.2453	-0.0600	0.0000	0.0000	0.0000
23	0.0000	0.0006	-0.0093	0.0000	0.0000	0.0000
24	0.0000	0.0006	-0.0027	0.0000	0.0000	0.0000
25	0.0694	0.2453	-0.0600	0.0000	0.0000	0.0000
26	0.0000	0.0025	-0.0299	0.0000	0.0000	0.0000
27	0.0000	0.0025	-0.0025	0.0000	0.0000	0.0000
28	0.0694	0.2453	-0.0600	0.0000	0.0000	0.0000
29	0.0000	0.0436	-0.0146	0.0000	0.0000	0.0000
30	0.0000	0.0435	-0.0034	0.0000	0.0000	0.0000
31	0.0000	0.3639	-0.0880	0.0000	0.0000	0.0000
32	0.0000	0.0357	-0.0120	0.0000	0.0000	0.0000
33	0.0000	0.0357	-0.0028	0.0000	0.0000	0.0000
34	0.0694	0.2453	-0.0600	0.0000	0.0000	0.0000
35	0.0000	0.0256	-0.0093	0.0000	0.0000	0.0000
36	0.0000	0.0256	-0.0027	0.0000	0.0000	0.0000
37	0.0694	0.2453	-0.0600	0.0000	0.0000	0.0000
38	0.0000	0.0581	-0.0177	0.0000	0.0000	0.0000
39	0.0000	0.0579	-0.0028	0.0000	0.0000	0.0000
40	0.0694	0.2453	-0.0600	0.0000	0.0000	0.0000
41	0.0000	0.0004	-0.0110	0.0000	0.0000	0.0000
42	0.0000	0.0004	-0.0036	0.0000	0.0000	0.0000
43	0.0000	0.3639	-0.0880	0.0000	0.0000	0.0000
44	0.0000	0.0004	-0.0102	0.0000	0.0000	0.0000
45	0.0000	0.0004	-0.0030	0.0000	0.0000	0.0000
46	0.0694	0.2453	-0.0600	0.0000	0.0000	0.0000
47	0.0000	0.0003	-0.0089	0.0000	0.0000	0.0000
48	0.0000	0.0003	-0.0026	0.0000	0.0000	0.0000
49	0.0694	0.2453	-0.0600	0.0000	0.0000	0.0000
50	0.0000	0.0016	-0.0285	0.0000	0.0000	0.0000
51	0.0000	0.0016	-0.0024	0.0000	0.0000	0.0000
52	0.0694	0.2453	-0.0600	0.0000	0.0000	0.0000
53	0.0000	0.0414	-0.0137	0.0000	0.0000	0.0000
54	0.0000	0.0412	-0.0031	0.0000	0.0000	0.0000
55	0.0000	0.3639	-0.0880	0.0000	0.0000	0.0000
56	0.0000	0.0245	-0.0091	0.0000	0.0000	0.0000

57	0.0000	0.0245	-0.0029	0.0000	0.0000	0.0000
58	0.0694	0.2453	-0.0600	0.0000	0.0000	0.0000
59	0.0000	0.0279	-0.0099	0.0000	0.0000	0.0000
60	0.0000	0.0279	-0.0027	0.0000	0.0000	0.0000
61	0.0694	0.2453	-0.0600	0.0000	0.0000	0.0000
62	0.0000	0.0569	-0.0174	0.0000	0.0000	0.0000
63	0.0000	0.0568	-0.0028	0.0000	0.0000	0.0000
64	0.0694	0.2453	-0.0600	0.0000	0.0000	0.0000

Final Displacements

Node	Tx	Ty	Tz	Rot-X	Rot-Y	Rot-Z
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	1.6883	0.7940	-0.0001	-0.0042	0.0090	0.0000
3	2.5724	1.2058	-0.0001	-0.0043	0.0093	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	1.6148	-0.4437	-0.0001	0.0025	0.0086	0.0000
7	2.4639	-0.6998	-0.0001	0.0027	0.0089	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	-1.4955	-0.5311	-0.0001	0.0030	-0.0082	0.0000
11	-2.3011	-0.8350	-0.0002	0.0032	-0.0085	0.0000
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
14	-1.5116	0.7772	-0.0001	-0.0043	-0.0084	0.0000
15	-2.3442	1.2066	-0.0001	-0.0045	-0.0088	0.0000
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
17	3.3234	-0.2682	-1.1596	-0.0069	-0.0661	0.0000
18	7.2077	0.1291	-1.0205	0.0354	-0.0812	0.0031
19	8.2074	0.6301	-0.9811	0.0447	-0.0845	0.0038
20	4.1913	-0.3414	-1.6494	-0.0042	-0.0578	0.0000
21	13.2072	0.1807	-0.4606	0.0505	-0.6684	0.0164
22	40.3657	2.5279	5.8234	0.0945	-1.1595	0.0296
23	8.1581	-0.2002	-0.5820	0.0136	-0.3596	0.0000
24	17.2123	0.2799	1.4953	0.0425	-0.6306	0.0145
25	40.1303	2.3455	9.4738	0.0815	-0.9959	0.0340
26	9.7244	-0.1308	1.3476	0.0186	-0.4122	-0.0000
27	18.1171	0.3322	3.4303	0.0429	-0.6313	0.0134
28	40.4774	2.3817	11.5705	0.0808	-0.9729	0.0343
29	0.5893	6.5230	3.1344	-0.3765	0.0186	-0.0000
30	-0.8089	20.4584	5.2262	1.6376	0.0382	0.0530
31	-1.5013	43.2298	11.6185	2.1421	0.0431	0.0663
32	-0.1000	12.2845	-2.3336	1.0617	0.0702	0.0000
33	-0.6899	31.5704	10.2236	1.3377	0.0700	-0.0015
34	-1.4096	62.0829	37.9229	1.7048	0.0696	-0.0035
35	-0.1104	15.2369	-1.9055	1.2587	0.0701	0.0000
36	-0.4380	32.4807	10.9410	1.3236	0.0690	-0.0055
37	-0.6805	60.2526	33.9455	1.4249	0.0671	-0.0141

38	-0.2476	10.5138	0.5222	0.5533	0.0004	-0.0000
39	-0.1583	30.2644	9.5631	1.4687	0.0032	-0.0170
40	0.3643	74.7357	46.1832	2.4531	0.0063	-0.0353
41	2.4531	-1.1797	5.0565	0.0173	-0.1415	-0.0000
42	9.4652	0.4841	5.5395	0.0582	-0.1086	0.0045
43	10.7090	1.2560	5.5943	0.0672	-0.1013	0.0055
44	3.0729	-1.2030	5.1117	0.0495	-0.3208	-0.0000
45	17.3144	0.7954	8.5448	0.0908	-0.7510	0.0415
46	43.4430	4.5119	18.3190	0.1273	-1.1303	0.0781
47	2.3990	-0.3111	-3.3828	0.3199	-1.4657	-0.0000
48	21.2185	0.8758	12.4471	0.3207	-1.2584	0.0134
49	47.1492	3.2326	26.2330	0.3219	-0.9547	0.0331
50	2.8608	-0.2705	-5.4976	-0.5967	-1.5127	0.0000
51	20.8298	0.8055	12.5072	-0.5925	-1.7847	-0.0101
52	48.8481	2.9673	27.5534	-0.5860	-2.2087	-0.0259
53	-0.6562	12.4545	3.1045	0.2869	-0.0367	-0.0000
54	0.3833	29.3428	8.4155	1.2467	-0.0276	-0.0394
55	0.9727	45.0604	16.7239	1.6357	-0.0239	-0.0553
56	-0.2412	14.8140	-1.0905	1.0551	-0.0445	0.0000
57	0.2194	33.1131	10.7854	1.3417	-0.0447	-0.0158
58	1.5146	63.9829	39.1589	1.7429	-0.0448	-0.0379
59	-0.2886	16.2831	-2.0601	1.2738	-0.0279	0.0000
60	-0.1066	33.5936	11.0077	1.3316	-0.0291	-0.0074
61	0.5318	61.3408	34.0379	1.4217	-0.0310	-0.0188
62	-0.0201	10.5597	0.0091	0.5184	0.0177	-0.0000
63	-0.3405	30.7490	9.0560	1.4905	0.0210	-0.0028
64	-0.6764	76.3438	46.0853	2.4986	0.0244	-0.0057

- Frame (Pole) Member Forces

Member # 1

	Node I	Node J
Axial Force =	0.3677	-0.3677
Shear Xm - Ym =	-4.2079	4.2079
Shear Xm - Zm =	-11.3367	11.3367
Torsion =	0.0000	0.0000
Moment About Ym =	3462.3773	-184.7128
Moment About Zm =	-1303.7009	87.1254

Unit conversion :
Pole Absolute Resultant Moment = 308.3073 (ft-kips)

Member # 2

	Node I	Node J
Axial Force =	0.5129	-0.5129
Shear Xm - Ym =	-0.9074	0.9074
Shear Xm - Zm =	-1.9237	1.9237

Torsion	=	0.0000	0.0000
Moment About Ym	=	184.7128	-0.0000
Moment About Zm	=	-87.1254	0.0000

Unit conversion :
Pole Absolute Resultant Moment = 17.0191 (ft-kips)

Member # 3

		Node I	Node J
Axial Force	=	0.3306	-0.3306
Shear Xm - Ym	=	-9.2237	9.2237
Shear Xm - Zm	=	-5.6280	5.6280
Torsion	=	0.0000	0.0000
Moment About Ym	=	1639.1298	-18.7207
Moment About Zm	=	-2893.0321	237.3466

Unit conversion :
Pole Absolute Resultant Moment = 277.0928 (ft-kips)

Member # 4

		Node I	Node J
Axial Force	=	0.5469	-0.5469
Shear Xm - Ym	=	-2.4718	2.4718
Shear Xm - Zm	=	-0.1950	0.1950
Torsion	=	0.0000	0.0000
Moment About Ym	=	18.7207	0.0000
Moment About Zm	=	-237.3466	-0.0000

Unit conversion :
Pole Absolute Resultant Moment = 19.8403 (ft-kips)

Member # 5

		Node I	Node J
Axial Force	=	0.4676	-0.4676
Shear Xm - Ym	=	4.9668	-4.9668
Shear Xm - Zm	=	9.2129	-9.2129
Torsion	=	0.0000	0.0000
Moment About Ym	=	-2862.9553	251.2855
Moment About Zm	=	1448.3872	-40.3997

Unit conversion :
Pole Absolute Resultant Moment = 267.3733 (ft-kips)

Member # 6

	Node I	Node J
Axial Force =	0.6945	-0.6945
Shear Xm - Ym =	0.4207	-0.4207
Shear Xm - Zm =	2.6170	-2.6170
Torsion =	0.0000	0.0000
Moment About Ym =	-251.2855	-0.0000
Moment About Zm =	40.3997	0.0000

Unit conversion :
Pole Absolute Resultant Moment = 21.2094 (ft-kips)

Member # 7

	Node I	Node J
Axial Force =	0.2956	-0.2956
Shear Xm - Ym =	11.4136	-11.4136
Shear Xm - Zm =	3.5316	-3.5316
Torsion =	0.0000	0.0000
Moment About Ym =	-1047.0673	67.1065
Moment About Zm =	3402.5674	-235.5224

Unit conversion :
Pole Absolute Resultant Moment = 296.6692 (ft-kips)

Member # 8

	Node I	Node J
Axial Force =	0.5538	-0.5538
Shear Xm - Ym =	2.4528	-2.4528
Shear Xm - Zm =	0.6989	-0.6989
Torsion =	0.0000	0.0000
Moment About Ym =	-67.1065	-0.0000
Moment About Zm =	235.5224	-0.0000

Unit conversion :
Pole Absolute Resultant Moment = 20.4080 (ft-kips)

- Primary (Catenary) Cable Forces Primary Cable Forces on Poles

Member	Force	Stress	Node	Fx	Fy	Fz
1	0.7213	4.8089	3	-0.0126	0.6923	-0.2023
2	0.7833	5.2219				
3	0.9693	6.4620				
4	1.2887	8.5914				
5	1.6652	11.1014	7	0.0501	-1.6598	-0.1245

6	1.9036	12.6906	7	1.8609	0.0815	-0.3927
7	1.8853	12.5689				
8	1.9936	13.2906				
9	2.1362	14.2413				
10	2.2254	14.8357	11	-2.2021	0.0305	-0.3192
11	1.6383	10.9218	11	0.0703	-1.5973	-0.3573
12	1.5410	10.2730				
13	1.3336	8.8907				
14	1.2387	8.2578				
15	1.1925	7.9503	15	-0.0120	1.1882	-0.1008
16	2.2692	15.1282	15	-2.2288	0.0530	-0.4233
17	2.2608	15.0722				
18	2.1755	14.5035				
19	2.0936	13.9574				
20	2.0279	13.5191	3	2.0052	0.0602	-0.2964

- Secondary (Messenger) Cable Forces Secondary Cable Forces on Poles

Member	Force	Stress	Node	Fx	Fy	Fz
1	3.8186	25.4572	2	0.0556	3.8181	-0.0266
2	3.3568	22.3783				
3	2.9134	19.4226				
4	2.3420	15.6136				
5	1.7197	11.4646	6	0.0674	-1.7183	0.0058
6	8.6243	57.4950	6	8.5716	0.9277	0.2107
7	8.5794	57.1960				
8	8.3736	55.8240				
9	8.1652	54.4345				
10	8.0356	53.5710	10	-8.0222	0.4363	0.1600
11	2.0139	13.4257	10	0.1648	-2.0060	0.0676
12	2.4732	16.4880				
13	2.9196	19.4642				
14	3.2506	21.6704				
15	3.5533	23.6887	14	0.0258	3.5529	0.0451
16	8.4555	56.3700	14	-8.4286	0.6388	0.2129
17	8.4189	56.1262				
18	8.5515	57.0102				
19	8.7161	58.1073				
20	8.8873	59.2487	2	8.8613	0.6565	0.1718

- Light Member Forces

Member # 1
Rotation Angle in Y-Z Plane (Degrees) = 2.40
Rotation Angle in X-Z Plane (Degrees) = 4.78

Member # 2
Rotation Angle in Y-Z Plane (Degrees) = 6.15

```
Rotation Angle in X-Z Plane (Degrees) =   51.28

Member #   3
Rotation Angle in Y-Z Plane (Degrees) =    5.87
Rotation Angle in X-Z Plane (Degrees) =   48.77

Member #   4
Rotation Angle in Y-Z Plane (Degrees) =    5.87
Rotation Angle in X-Z Plane (Degrees) =   48.30

Member #   5
Rotation Angle in Y-Z Plane (Degrees) =   76.17
Rotation Angle in X-Z Plane (Degrees) =    7.04

Member #   6
Rotation Angle in Y-Z Plane (Degrees) =   89.32
Rotation Angle in X-Z Plane (Degrees) =   63.38

Member #   7
Rotation Angle in Y-Z Plane (Degrees) =   79.68
Rotation Angle in X-Z Plane (Degrees) =    2.75

Member #   8
Rotation Angle in Y-Z Plane (Degrees) =   79.10
Rotation Angle in X-Z Plane (Degrees) =    3.49

Member #   9
Rotation Angle in Y-Z Plane (Degrees) =    3.70
Rotation Angle in X-Z Plane (Degrees) =    5.94

Member #  10
Rotation Angle in Y-Z Plane (Degrees) =   11.49
Rotation Angle in X-Z Plane (Degrees) =   55.01

Member #  11
Rotation Angle in Y-Z Plane (Degrees) =    9.38
Rotation Angle in X-Z Plane (Degrees) =   61.17

Member #  12
Rotation Angle in Y-Z Plane (Degrees) =    9.43
Rotation Angle in X-Z Plane (Degrees) =   65.09

Member #  13
Rotation Angle in Y-Z Plane (Degrees) =   76.78
Rotation Angle in X-Z Plane (Degrees) =    9.07

Member #  14
Rotation Angle in Y-Z Plane (Degrees) =   89.42
Rotation Angle in X-Z Plane (Degrees) =   76.39

Member #  15
```

Rotation Angle in Y-Z Plane (Degrees) = 79.73
Rotation Angle in X-Z Plane (Degrees) = 7.23

Member # 16
Rotation Angle in Y-Z Plane (Degrees) = 78.87
Rotation Angle in X-Z Plane (Degrees) = 2.15

- Hanger (Connector) Member Forces

Member # 1

	Node I	Node J
Axial Force =	-0.0530	0.0530
Shear Xm - Ym =	-0.0013	0.0013
Shear Xm - Zm =	-0.0303	0.0303
Torsion =	-0.0001	0.0001
Moment About Ym =	0.0001	1.6550
Moment About Zm =	0.0000	-0.0709

Member # 2

	Node I	Node J
Axial Force =	-0.0349	0.0349
Shear Xm - Ym =	-0.0041	0.0041
Shear Xm - Zm =	-2.8530	2.8530
Torsion =	-0.1002	0.1002
Moment About Ym =	0.0146	99.5293
Moment About Zm =	0.0000	-0.1427

Member # 3

	Node I	Node J
Axial Force =	-0.0711	0.0711
Shear Xm - Ym =	-0.0061	0.0061
Shear Xm - Zm =	-3.5608	3.5608
Torsion =	-0.0953	0.0953
Moment About Ym =	0.0295	74.1197
Moment About Zm =	0.0000	-0.1277

Member # 4

	Node I	Node J
Axial Force =	-0.1123	0.1123
Shear Xm - Ym =	-0.0069	0.0069
Shear Xm - Zm =	-3.8541	3.8541
Torsion =	-0.0852	0.0852
Moment About Ym =	0.0307	69.3447
Moment About Zm =	0.0000	-0.1247

Member # 5

	Node I	Node J

Axial Force	=	-0.1206	0.1206
Shear Xm - Ym	=	0.0050	-0.0050
Shear Xm - Zm	=	4.9844	-4.9844
Torsion	=	-0.8641	0.8641
Moment About Ym	=	-0.1251	-238.6763
Moment About Zm	=	-0.0001	0.2407

Member # 6

		Node I	Node J
Axial Force	=	-0.0624	0.0624
Shear Xm - Ym	=	-0.0014	0.0014
Shear Xm - Zm	=	3.5222	-3.5222
Torsion	=	-0.0322	0.0322
Moment About Ym	=	0.0019	-74.3299
Moment About Zm	=	0.0004	-0.0306

Member # 7

		Node I	Node J
Axial Force	=	-0.1554	0.1554
Shear Xm - Ym	=	-0.0017	0.0017
Shear Xm - Zm	=	1.1316	-1.1316
Torsion	=	-0.0380	0.0380
Moment About Ym	=	0.0601	-20.4297
Moment About Zm	=	0.0006	-0.0309

Member # 8

		Node I	Node J
Axial Force	=	-0.0338	0.0338
Shear Xm - Ym	=	-0.0017	0.0017
Shear Xm - Zm	=	7.6441	-7.6441
Torsion	=	0.1731	-0.1731
Moment About Ym	=	-0.0254	-199.4401
Moment About Zm	=	0.0000	-0.0456

Member # 9

		Node I	Node J
Axial Force	=	-0.1251	0.1251
Shear Xm - Ym	=	0.0013	-0.0013
Shear Xm - Zm	=	-0.0634	0.0634
Torsion	=	0.0007	-0.0007
Moment About Ym	=	-0.0004	3.4143
Moment About Zm	=	-0.0000	0.0708

Member # 10

		Node I	Node J

Axial Force	=	-0.1577	0.1577
Shear Xm - Ym	=	0.0050	-0.0050
Shear Xm - Zm	=	2.4260	-2.4260
Torsion	=	-0.2883	0.2883
Moment About Ym	=	-0.1672	-77.0539
Moment About Zm	=	-0.0003	0.1608

Member # 11

		Node I	Node J
Axial Force	=	-0.2839	0.2839
Shear Xm - Ym	=	0.0069	-0.0069
Shear Xm - Zm	=	-3.2945	3.2945
Torsion	=	-0.5307	0.5307
Moment About Ym	=	0.9674	62.1091
Moment About Zm	=	0.0054	0.1262

Member # 12

		Node I	Node J
Axial Force	=	-0.4063	0.4063
Shear Xm - Ym	=	-0.1437	0.1437
Shear Xm - Zm	=	-212.1494	212.1494
Torsion	=	-15.1823	15.1823
Moment About Ym	=	1893.1316	1925.8174
Moment About Zm	=	-1.3070	-1.2791

Member # 13

		Node I	Node J
Axial Force	=	-0.1091	0.1091
Shear Xm - Ym	=	0.0029	-0.0029
Shear Xm - Zm	=	-6.2378	6.2378
Torsion	=	0.7027	-0.7027
Moment About Ym	=	0.1816	184.4979
Moment About Zm	=	-0.0002	0.0868

Member # 14

		Node I	Node J
Axial Force	=	-0.1370	0.1370
Shear Xm - Ym	=	0.0014	-0.0014
Shear Xm - Zm	=	-4.0488	4.0488
Torsion	=	-0.1565	0.1565
Moment About Ym	=	-0.1065	81.2643
Moment About Zm	=	0.0003	0.0277

Member # 15

		Node I	Node J
Axial Force	=	-0.1500	0.1500

Shear Xm - Ym	=	0.0018	-0.0018
Shear Xm - Zm	=	-1.0042	1.0042
Torsion	=	-0.0454	0.0454
Moment About Ym	=	-0.1063	18.1820
Moment About Zm	=	0.0003	0.0323

Member # 16

		Node I	Node J
Axial Force	=	-0.0060	0.0060
Shear Xm - Ym	=	0.0012	-0.0012
Shear Xm - Zm	=	-7.5476	7.5476
Torsion	=	0.0131	-0.0131
Moment About Ym	=	0.0008	204.2114
Moment About Zm	=	-0.0000	0.0334

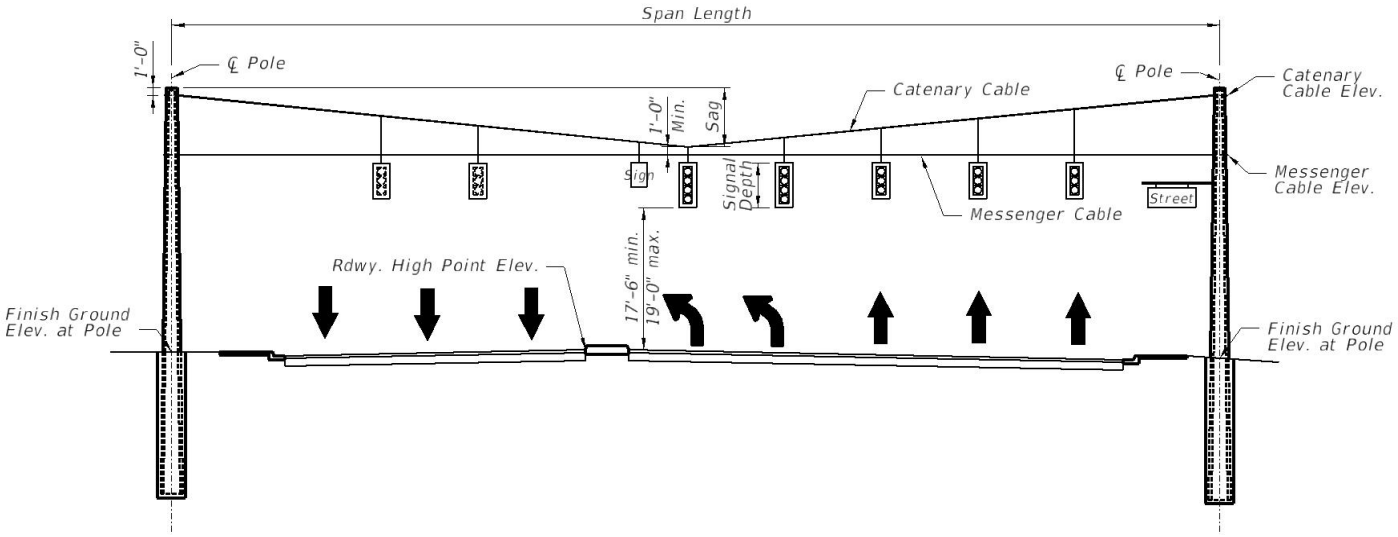
5.2 MATHCAD

STRAIN POLE LAYOUT AND CONCRETE POLE DESIGN CHECK AND DRILLED FOUNDATION FOR EMBEDMENT DESIGN

Assumptions:
1. This program sets the heights of the messenger and catenary wires relative to the intersection geometry.
2. It requires input from the ATLAS program for cable loadings at poles.
3. Specifies the minimum Concrete Pole Type P-IV thru PS-VIII and Embedment Depth.
4. Checks the Catenary and Messenger Cable sizes.
5. Summarize results for Strain Pole Schedule Data Sheet.

Specifications:
1. LRFD Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals (LRFDLTS-1) and Supplemental Revisions.
2. FDOT Structures Manual, Volume 3, FDOT Modifications to LRFDLTS-1, January 2023
3. FDOT Design Manual, 2023

A. Strain Pole Geometry:



TYPICAL ELEVATION

1. Pole 1 to 2:

$P_{1.Elev} := 77.06 \cdot ft$ Pole 1 Elevation at Finish Ground Surface (or Existing)

$P_{2.Elev} := 77.16 \cdot ft$ Pole 2 Elevation at Finish Ground Surface (or Existing)

$P_{12.RdwyElev} := 76.76 \cdot ft$ Highest Roadway Elevation between Poles A and B

$L_{AB} := 130.7ft$ Length between Poles 1 and 2

2. Pole 2 to 3:

$P_{2.Elev} = 77.16\,ft$ Pole 2 Elevation at Finish Ground Surface (or Existing)

$P_{3.Elev} := 77.53 \cdot ft$ Pole 3 Elevation at Finish Ground Surface (or Existing)

$P_{23.RdwyElev} := 77.87ft$ Highest Roadway Elevation between Poles 2 and 3

$L_{BC} := 102.6ft$ Length between Poles 2 and 3

3. Pole 3 to 4:

$P_{3.Elev} = 77.53\,ft$ Pole 3 Elevation at Finish Ground Surface (or Existing)

$P_{4.Elev} := 78.03 \cdot ft$ Pole 4 Elevation at Finish Ground Surface (or Existing)

$P_{34.RdwyElev} := 77.18 \cdot ft$ Highest Roadway Elevation between Poles 3 and 4

$L_{CD} := 130.8ft$ Length between Poles 3 and 4

4. Pole 4 to 1:

$P_{4.Elev} = 78.03\,ft$ Pole 4 Elevation at Finish Ground Surface (or Existing)

$P_{1.Elev} = 77.06\,ft$ Pole 1 Elevation at Finish Ground Surface (or Existing)

$P_{41.RdwyElev} := 77.62 \cdot ft$ Highest Roadway Elevation between Poles 4 and 1

$L_{DA} := 100.6ft$ Length between Poles 4 and 1

5. Vertical Clearance

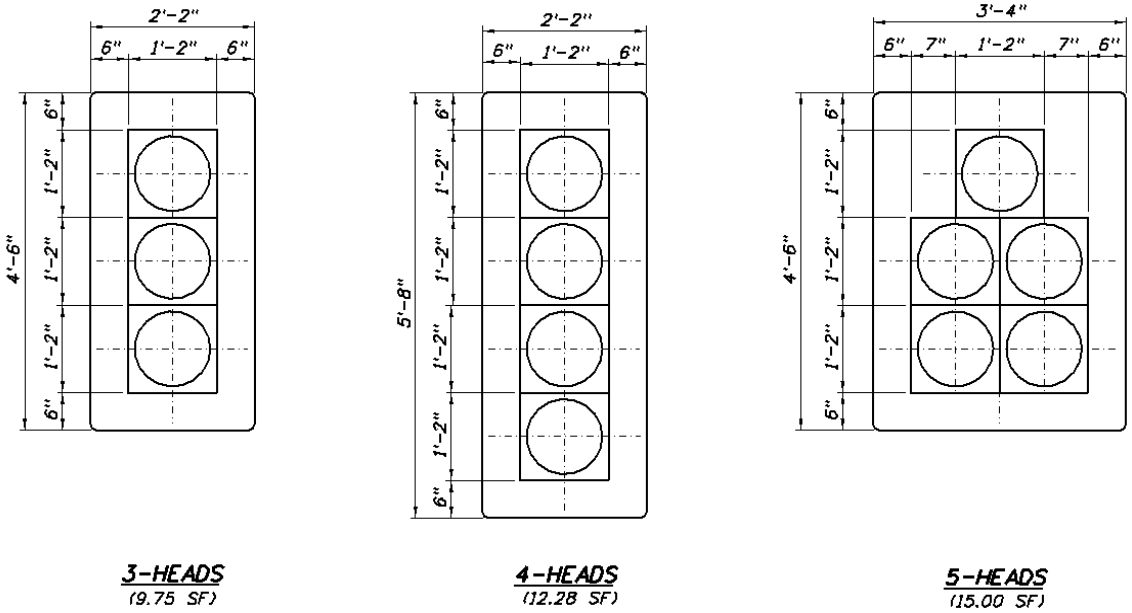
From FDM 210.10.3 (8) The Minimum Vertical Clearance to Signal Head or Sign Panel is 17.5 ft.
A maximum vertical clearance of 19.0 ft is specified in FDOT Standard Specifications 650-3.3.

$VertClr_{min} := 17.5 \cdot ft$ Minimum Vertical Clearance to Signal Head or Sign

$VertClr_{max} := 19.0 \cdot ft$ Maximum Vertical Clearance to Signal Head or Sign

6. Tallest Signal or Sign Panel

Tallest Signal or Sign Panel using back plates (6" border) on Signal Lights (14"x14" each).
Therefore a 3 head vertical signal H = 54", 4 head vertical signal H = 68" and 5 head horizontally stacked signal H = 54".



$H_{12.signal} := 68 \cdot in$ Span 1 to 2

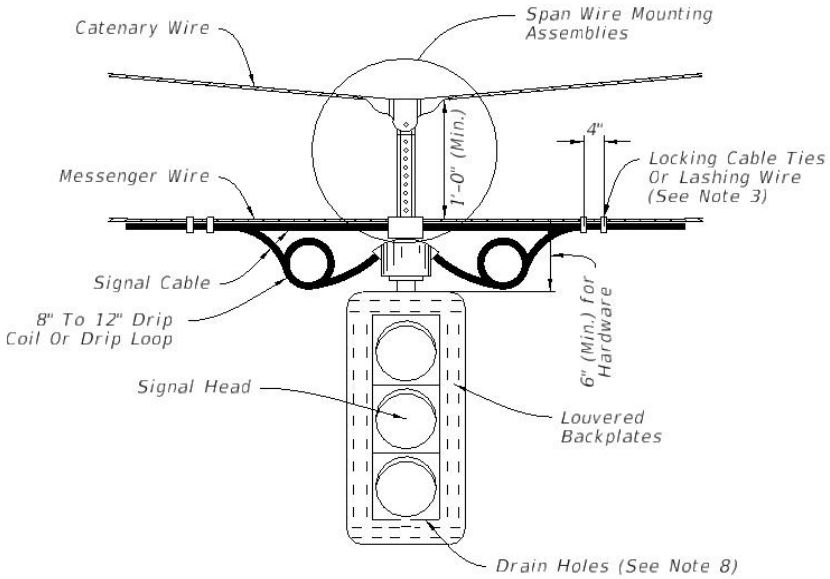
$H_{23.signal} := 68 \cdot in$ Span 2 to 3

$H_{34.signal} := 68 \cdot in$ Span 3 to 4

$H_{41.signal} := 68 \cdot in$ Span 4 to 1

7. Hardware Offset from top of Signal or Sign to Messenger Wire

Offset from top of Signal or Sign to the Messenger Wire (use 6" minimum and 3" increments on adjustments).



$Off_{12.signal} := 6 \cdot in$ Span 1 to 2

$Off_{23.signal} := 6 \cdot in$ Span 2 to 3

$Off_{34.signal} := 6 \cdot in$ Span 3 to 4

$Off_{41.signal} := 6 \cdot in$ Span 4 to 1

8. Messenger Wire Pole Elevations

Messenger Wire Minimum Elevations are set from the highest roadway elevation for entire span signal structure

$M_{12.Elev} := P_{12.RdwyElev} + VertClr_{min} + H_{12.signal} + Off_{12.signal} + (L_{AB})\cdot.01 = 101.73\,ft$ Span 1 to 2

$M_{23.Elev} := P_{23.RdwyElev} + VertClr_{min} + H_{23.signal} + Off_{23.signal} + (L_{BC})\cdot.01 = 102.56\,ft$ Span 2 to 3

$M_{34.Elev} := P_{34.RdwyElev} + VertClr_{min} + H_{34.signal} + Off_{34.signal} + (L_{CD})\cdot.01 = 102.15\,ft$ Span 3 to 4

$M_{41.Elev} := P_{41.RdwyElev} + VertClr_{min} + H_{41.signal} + Off_{41.signal} + (L_{DA})\cdot.01 = 102.29\,ft$ Span 4 to 1

Use the highest Elevation for Messenger Wire Attachment to the Poles, Round to nearest 1/10th of foot

$Mes_{Elev} := Ceil(max(M_{12.Elev}, M_{23.Elev}, M_{34.Elev}, M_{41.Elev}), 0.1\cdot ft) = 102.60\,ft$

9. Vertical Clearance Checks

If any of the Vertical Clearances are over 19.0 feet adjust the Offset from Messenger Wire to top of Signal Head in Section A.7 in 3" increments.

$Sag := 0.01$

$S_{12.VertClr} := Mes_{Elev} - H_{12.signal} - Off_{12.signal} - P_{12.RdwyElev} - (L_{AB})\cdot.01 = 18.37\,ft$

$S_{23.VertClr} := Mes_{Elev} - H_{23.signal} - Off_{23.signal} - P_{23.RdwyElev} - (L_{BC})\cdot.01 = 17.54\,ft$

Vertical clearance ok to be over 19ft geometric constraints require.

$S_{34.VertClr} := Mes_{Elev} - H_{34.signal} - Off_{34.signal} - P_{34.RdwyElev} - (L_{CD})\cdot.01 = 17.95\,ft$

$S_{41.VertClr} := Mes_{Elev} - H_{41.signal} - Off_{41.signal} - P_{41.RdwyElev} - (L_{DA})\cdot.01 = 17.81\,ft$

$Check_{12VertClr} := if(17.50\cdot ft \le S_{12.VertClr} \wedge S_{12.VertClr} \le 19.0\cdot ft, "OK", "VERIFY")$ $Check_{12VertClr} = "OK"$

$Check_{23VertClr} := if(17.50\cdot ft \le S_{23.VertClr} \wedge S_{23.VertClr} \le 19.0\cdot ft, "OK", "VERIFY")$ $Check_{23VertClr} = "OK"$

$Check_{34VertClr} := if(17.50\cdot ft \le S_{34.VertClr} \wedge S_{34.VertClr} \le 19.0\cdot ft, "OK", "VERIFY")$ $Check_{34VertClr} = "OK"$

$Check_{41VertClr} := if(17.50\cdot ft \le S_{41.VertClr} \wedge S_{41.VertClr} \le 19.0\cdot ft, "OK", "VERIFY")$ $Check_{41VertClr} = "OK"$

10. Catenary Wire Pole Elevations

Catenary Wire Elevation at Poles is based on the longest Span Length between poles and using a 5%+/- sag factor. Catenary Wire Low Elevation is 1 foot above Messenger Wire Elevation.

$Span_{max} := max(L_{AB}, L_{BC}, L_{CD}, L_{DA}) = 130.8\,ft$

$Sag_{max} := Round(0.05\cdot Span_{max}, 0.25\cdot ft) = 6.50\,ft$

$Cat_{Elev} := Mes_{Elev} + 1.0\cdot ft + Sag_{max} = 110.10\,ft$

11. Pole Minimum Heights

From FDOT Standard Plan Index 641-010, Top of Concrete Pole is 1'-0" above top of Centenary attachment.

$H_1 := Cat_{Elev} - P_{1.Elev} + 1.0\cdot ft = 34.04\,ft$ Pole 1

$H_2 := Cat_{Elev} - P_{2.Elev} + 1.0\cdot ft = 33.94\,ft$ Pole 2

$H_3 := Cat_{Elev} - P_{3.Elev} + 1.0\cdot ft = 33.57\,ft$ Pole 3

$H_4 := Cat_{Elev} - P_{4.Elev} + 1.0\cdot ft = 33.07\,ft$ Pole 4