Sabre Industries™
INNOVATION DELIVERED

Structural Design Report

250' S3TL Series HD1 Self-Supporting Tower
Site: 03 Northwest Tower, IA

Prepared for: RACOM CORPORATION
by: Sabre Industries ™

Job Number: 20-6096-TJH

March 25, 2020

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Maximum Leg Loads..... 3

Maximum Diagonal Loads..... 4

Maximum Foundation Loads..... 5

Calculations..... 6-18

LICENSED PROFESSIONAL ENGINEER
AMY R. HERBST
17555
IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the Laws of the State of Iowa.

(signature)

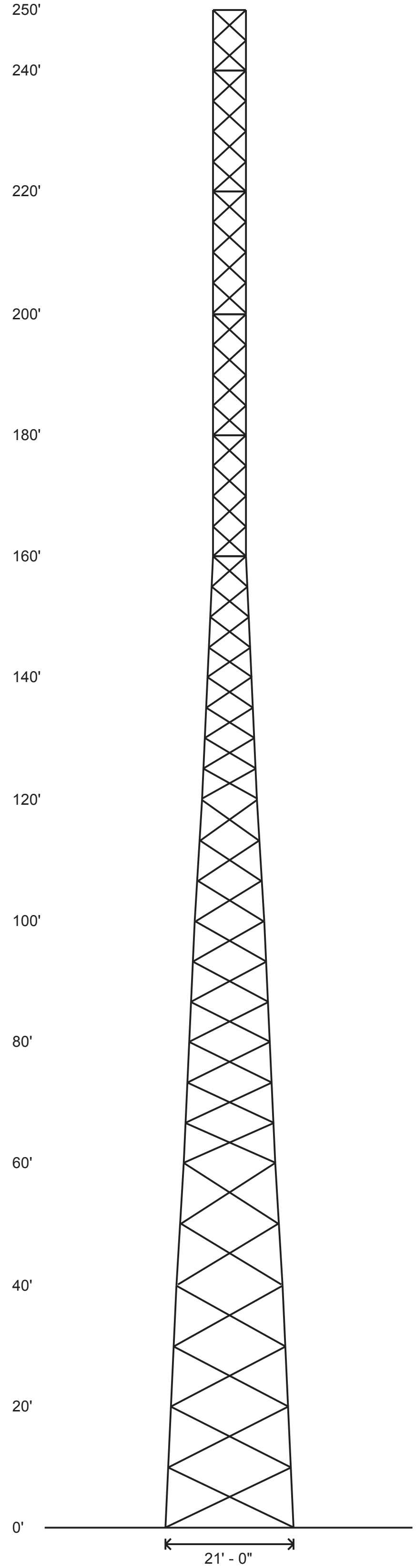
3/25/20 (dated)

AMY R. HERBST

My license renewal date is December 31, 2020.

Pages or sheets covered by this seal: 1-18

Section property	Values (from base upward)
Legs	8.625 OD X .322; A; 5.563 OD X .375; 4.500 OD X .337; B; C; D; 2.375 OD X .154
Diagonals	L 3 1/2 X 3 1/2 X 1/4; L 3 X 3 X 3/16; E; L 2 X 2 X 3/16; L 2 X 2 X 1/8
Horizontals	NONE; F; NONE; F; NONE; F; NONE; F; NONE; F; G; F
Brace Bolts	(1) 3/4"; (1) 5/8"
Top Face Width	19'; 17'; 15'; 13'; 11'; 9'; 7'; 5'
Panel Count/Height	6 @ 10'; 9 @ 6.6667'; 26 @ 5'
Section Weight	3790; 3597; 2931; 2587; 2309; 2082; 1598; 1554; 1372; 1021; 805; 721; 408



Design Criteria - ANSI/TIA-222-H

Wind Speed (No Ice)	118 mph
Wind Speed (Ice)	40 mph
Design Ice Thickness	1.50 in
Risk Category	III
Exposure Category	C
Topographic Factor Procedure	Method 1 (Simplified)
Topographic Category	1
Ground Elevation	998 ft

Base Reactions

Total Foundation		Individual Footing	
Shear (kips)	40.61	Shear (kips)	24.94
Axial (kips)	98.78	Compression (kips)	285
Moment (ft-kips)	4981	Uplift (kips)	251
Torsion (ft-kips)	22.1		

Material List

Display	Value
A	5.563 OD X .500
B	4.000 OD X .318
C	3.500 OD X .216
D	2.375 OD X .218
E	L 2 1/2 X 2 1/2 X 3/16
F	L 2 X 2 X 1/8
G	NONE

Notes

1) All legs are A500 (50 ksi Min. Yield).
2) All braces are A572 Grade 50.
3) All brace bolts are A325-X.
4) The tower model is S3TL Series HD1.
5) Transmission lines are to be attached to standard 12 hole waveguide ladders with stackable hangers.
6) Azimuths are relative (not based on true north).
7) Foundation loads shown are maximums.
8) (6) 1 1/2" dia. x 78"-long F1554 grade 105 anchor bolts per leg on a 13.25" bolt circle w/ 9.5" max. projection above concrete.
9) All unequal angles are oriented with the short leg vertical.
10) Weights shown are estimates. Final weights may vary.
11) This tower design and, if applicable, the foundation design(s) shown on the following page(s) also meet or exceed the requirements of the 2015 International Building Code.
12) Tower Rating: 93.22%
13) This structure has been designed with a 30% increase in antenna and line loading.

Sabre Industries
INNOVATION DELIVERED
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Job:	20-6096-TJH
Customer:	RACOM CORPORATION
Site Name:	03 Northwest Tower, IA
Description:	250' S3TL
Date:	3/25/2020 By: ARH

Designed Appurtenance Loading

Elev	Description	Tx-Line
234	(1) BLR12-H-B1	
234	(1) BPS10-H-B1	
227	6ft Sidearm	
227		(1) 1 1/4"
224	6ft Sidearm	
224		(1) 1 1/4"
224	(1) TTA (16" x 8" x 6")	(1) 1/2"
210	(3) 20' x 3in Omni	
200	(3) 3ft Sidearms	
200		(3) 7/8"
178.69	(1) DB222	
173.4	3ft Sidearm	
173.4		(1) 7/8"

Elev	Description	Tx-Line
160	(1) 6' Ice Shield	
150	Leg Dish Mount	
150	(1) 6' Ice Shield	
150	(1) 6' Solid Dish W/ Radome	(1) EW63
140	Leg Dish Mount	
140	(1) 6' Solid Dish W/ Radome	(1) EW63
130	(1) 4' Ice Shield	
120	Leg Dish Mount	
120	(1) 4' H.P. Dish	(1) EW63
98.62	(3) DB224A	
88	(3) 3ft Sidearms	
88		(3) 7/8"

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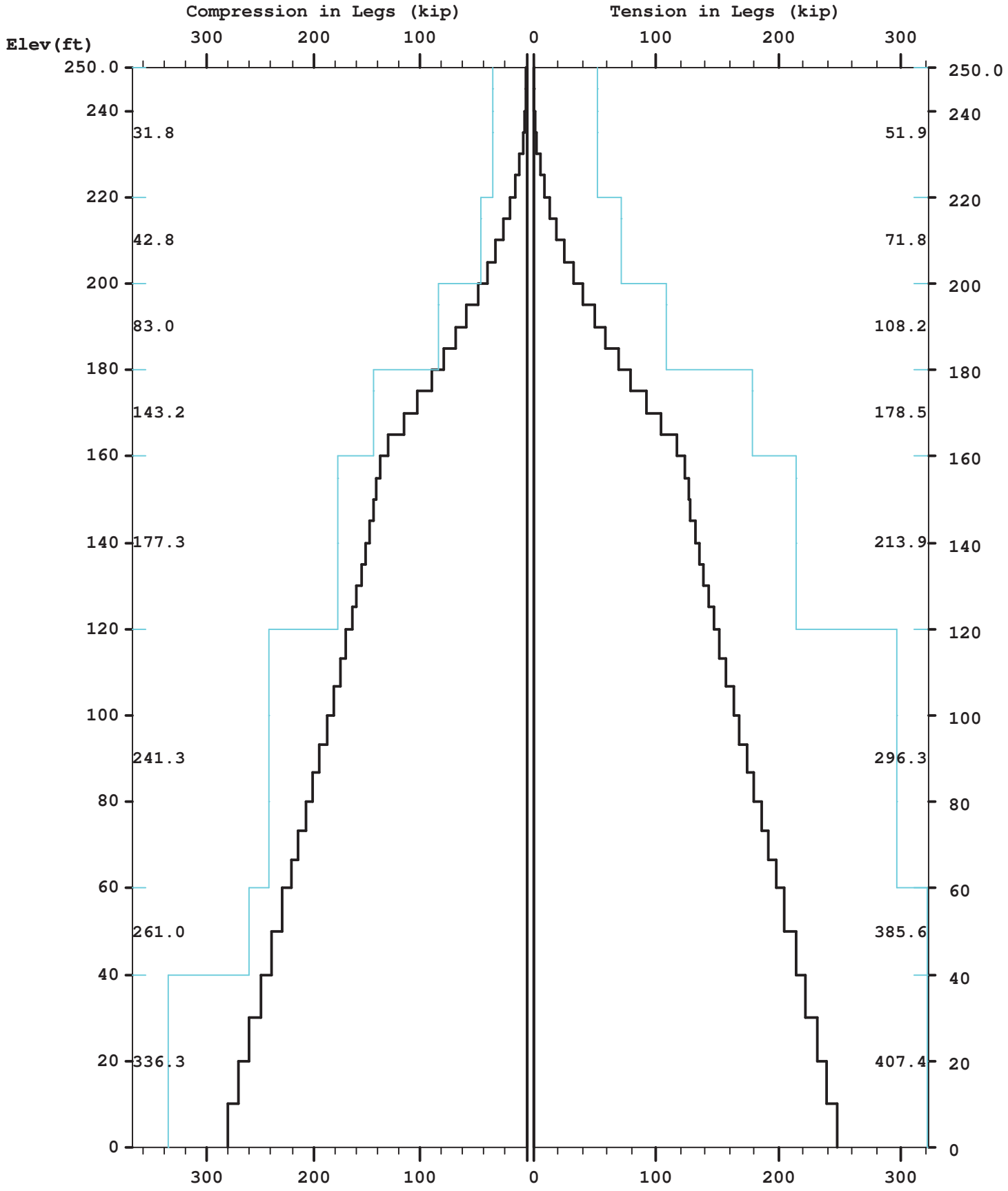
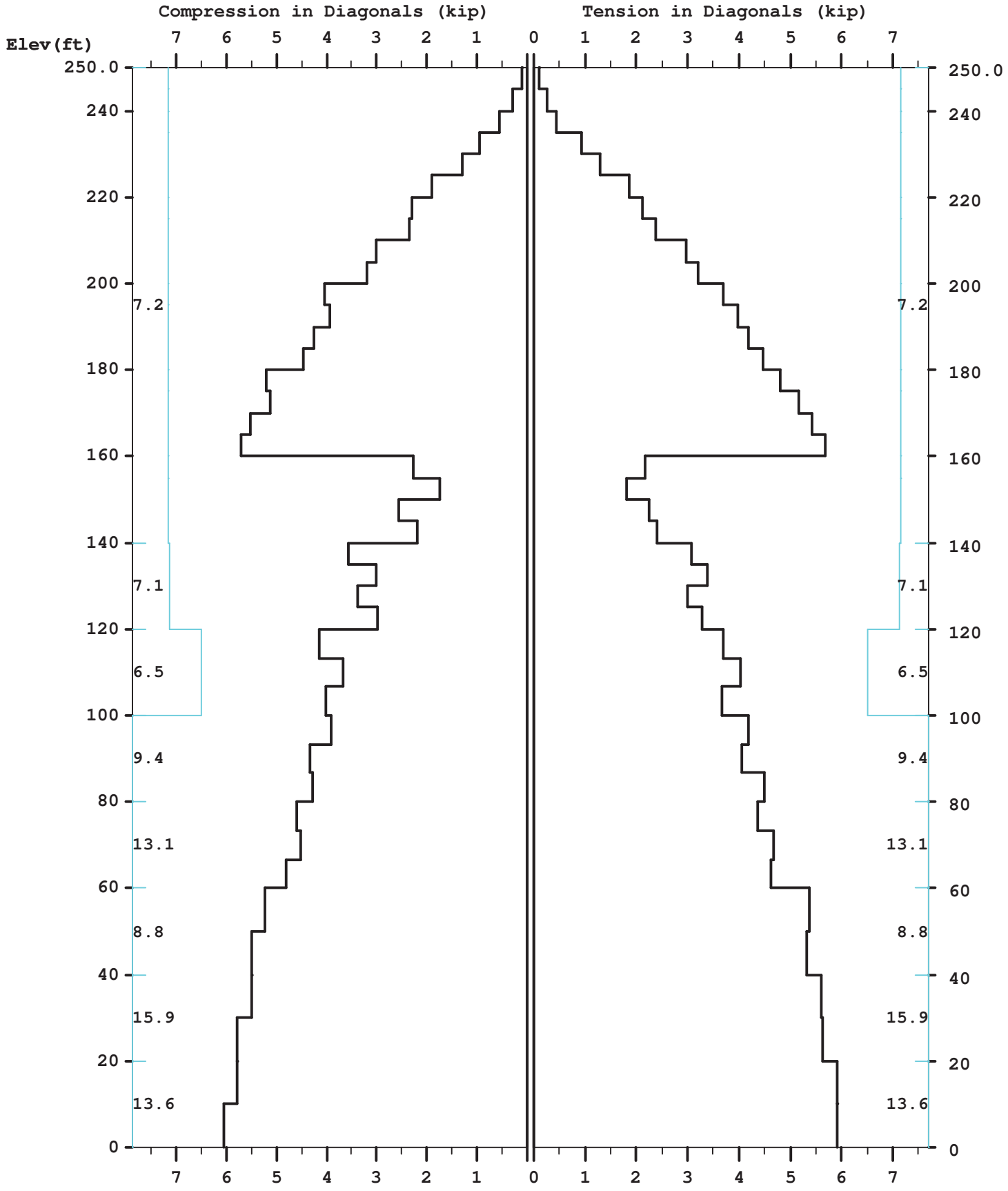
Job:	**20-6096-TJH**
Customer:	RACOM CORPORATION
Site Name:	03 Northwest Tower, IA
Description:	250' S3TL
Date:	3/25/2020 By: ARH

Maximum

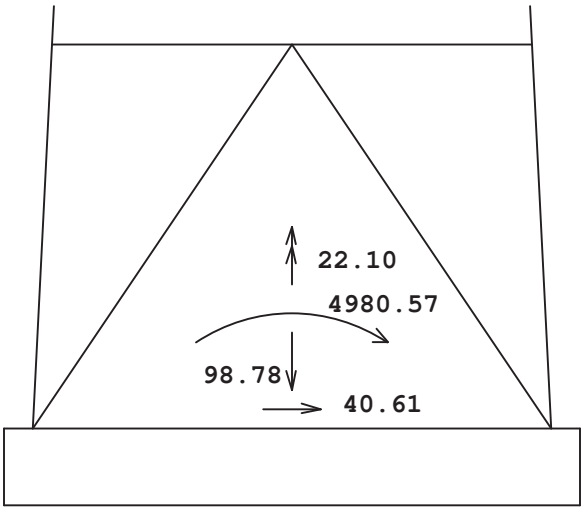

Compression in Legs (kip)
Tension in Legs (kip)
Elev(ft)
300
200
100
0
100
200
300
250.0
240
220
200
180
160
140
120
100
80
60
40
20
0
31.8
42.8
83.0
143.2
177.3
241.3
261.0
336.3
51.9
71.8
108.2
178.5
213.9
296.3
385.6
407.4

Maximum

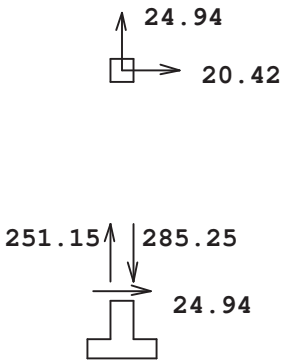

Compression in Diagonals (kip)
Tension in Diagonals (kip)
Elev(ft)
7 6 5 4 3 2 1 0 1 2 3 4 5 6 7
250.0
240
220
200
180
160
140
120
100
80
60
40
20
0
7.2
7.1
6.5
9.4
13.1
8.8
15.9
13.6

Maximum

TOTAL FOUNDATION LOADS (kip, ft-kip)



INDIVIDUAL FOOTING LOADS (kip)



MAST GEOMETRY (ft)
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PANEL TYPE	NO.OF LEGS	ELEV.AT BOTTOM	ELEV.AT TOP	F.W..AT BOTTOM	F.W..AT TOP	TYPICAL PANEL HEIGHT
X	3	245.00	250.00	5.00	5.00	5.00
X	3	240.00	245.00	5.00	5.00	5.00
X	3	235.00	240.00	5.00	5.00	5.00
X	3	220.00	235.00	5.00	5.00	5.00
X	3	215.00	220.00	5.00	5.00	5.00
X	3	200.00	215.00	5.00	5.00	5.00
X	3	195.00	200.00	5.00	5.00	5.00
X	3	180.00	195.00	5.00	5.00	5.00
X	3	175.00	180.00	5.00	5.00	5.00
X	3	160.00	175.00	5.00	5.00	5.00
X	3	155.00	160.00	5.50	5.00	5.00
X	3	140.00	155.00	7.00	5.50	5.00
X	3	120.00	140.00	9.00	7.00	5.00
X	3	100.00	120.00	11.00	9.00	6.67
X	3	80.00	100.00	13.00	11.00	6.67
X	3	60.00	80.00	15.00	13.00	6.67
X	3	40.00	60.00	17.00	15.00	10.00
X	3	20.00	40.00	19.00	17.00	10.00
X	3	0.00	20.00	21.00	19.00	10.00

MEMBER PROPERTIES
==========

MEMBER TYPE	BOTTOM ELEV ft	TOP ELEV ft	X-SECTN AREA in.sq	RADIUS OF GYRAT in	ELASTIC MODULUS ksi	THERMAL EXPANSN /deg
LE	220.00	250.00	1.075	0.787	29000.	0.0000117
LE	200.00	220.00	1.477	0.787	29000.	0.0000117
LE	180.00	200.00	2.228	0.787	29000.	0.0000117
LE	160.00	180.00	3.678	0.787	29000.	0.0000117
LE	120.00	160.00	4.407	0.787	29000.	0.0000117
LE	60.00	120.00	6.111	0.787	29000.	0.0000117
LE	40.00	60.00	7.952	0.787	29000.	0.0000117
LE	0.00	40.00	8.399	0.787	29000.	0.0000117
DI	120.00	250.00	0.484	0.626	29000.	0.0000117
DI	100.00	120.00	0.715	0.626	29000.	0.0000117
DI	80.00	100.00	0.902	0.626	29000.	0.0000117
DI	40.00	80.00	1.090	0.626	29000.	0.0000117
DI	0.00	40.00	1.688	0.626	29000.	0.0000117
HO	245.00	250.00	0.484	0.626	29000.	0.0000117
HO	235.00	240.00	0.484	0.626	29000.	0.0000117
HO	215.00	220.00	0.484	0.626	29000.	0.0000117
HO	195.00	200.00	0.484	0.626	29000.	0.0000117
HO	175.00	180.00	0.484	0.626	29000.	0.0000117
HO	155.00	160.00	0.484	0.626	29000.	0.0000117

FACTORED MEMBER RESISTANCES
==========

BOTTOM ELEV ft	TOP ELEV ft	LEGS COMP kip	LEGS TENS kip	DIAGONALS COMP kip	DIAGONALS TENS kip	HORIZONTALS COMP kip	HORIZONTALS TENS kip	INT BRACING COMP kip	INT BRACING TENS kip
245.0	250.0	31.84	51.90	7.16	7.16	7.16	7.16	0.00	0.00
240.0	245.0	31.84	51.90	7.16	7.16	0.00	0.00	0.00	0.00
235.0	240.0	31.84	51.90	7.16	7.16	7.16	7.16	0.00	0.00
220.0	235.0	31.84	51.90	7.16	7.16	0.00	0.00	0.00	0.00
215.0	220.0	42.85	71.78	7.16	7.16	7.16	7.16	0.00	0.00
200.0	215.0	42.85	71.78	7.16	7.16	0.00	0.00	0.00	0.00
195.0	200.0	83.04	108.15	7.16	7.16	7.16	7.16	0.00	0.00
180.0	195.0	83.04	108.15	7.16	7.16	0.00	0.00	0.00	0.00
175.0	180.0	143.18	178.48	7.16	7.16	7.16	7.16	0.00	0.00
160.0	175.0	143.18	178.48	7.16	7.16	0.00	0.00	0.00	0.00
155.0	160.0	177.29	213.88	7.16	7.16	7.16	7.16	0.00	0.00
140.0	155.0	177.29	213.88	7.16	7.16	0.00	0.00	0.00	0.00
120.0	140.0	177.29	213.88	7.13	7.13	0.00	0.00	0.00	0.00
100.0	120.0	241.28	296.33	6.51	6.51	0.00	0.00	0.00	0.00

80.0	100.0	241.28	296.33	9.45	9.45	0.00	0.00	0.00	0.00
60.0	80.0	241.28	296.33	13.10	13.10	0.00	0.00	0.00	0.00
40.0	60.0	260.96	385.58	8.84	8.84	0.00	0.00	0.00	0.00
20.0	40.0	336.31	407.40	15.88	15.88	0.00	0.00	0.00	0.00
0.0	20.0	336.31	407.40	13.59	13.59	0.00	0.00	0.00	0.00

==========
* Only 3 condition(s) shown in full
* Some wind loads may have been derived from full-scale wind tunnel testing

==========

LOADING CONDITION A ==========

118 mph wind with no ice. Wind Azimuth: 0◆ PL - 0

MAST LOADING
==========

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	234.0	0.00	0.0	0.0	0.58	0.16	0.00	0.00
C	234.0	0.00	0.0	0.0	0.39	0.10	0.00	0.00
C	227.0	0.00	0.0	0.0	0.55	0.47	0.00	0.00
C	224.0	0.00	0.0	0.0	0.60	0.50	0.00	0.00
C	210.0	0.00	0.0	0.0	0.86	0.14	0.00	0.00
C	200.0	0.00	0.0	0.0	0.54	0.70	0.00	0.00
C	178.7	0.00	0.0	0.0	0.13	0.03	0.00	0.00
C	173.4	0.00	0.0	0.0	0.30	0.23	0.00	0.00
C	160.0	0.00	0.0	0.0	0.27	0.94	0.00	0.00
C	150.0	0.00	0.0	0.0	0.27	0.94	0.00	0.00
C	130.0	0.00	0.0	0.0	0.17	0.62	0.00	0.00
C	98.6	0.00	0.0	0.0	0.60	0.16	0.00	0.00
C	88.0	0.00	0.0	0.0	0.45	0.70	0.00	0.00
D	250.0	0.00	180.0	0.0	0.07	0.04	0.00	0.00
D	245.0	0.00	180.0	0.0	0.07	0.04	0.00	0.00
D	245.0	0.00	180.0	0.0	0.06	0.03	0.00	0.00
D	240.0	0.00	180.0	0.0	0.06	0.03	0.00	0.00
D	240.0	0.00	180.0	0.0	0.07	0.04	0.00	0.00
D	235.0	0.00	180.0	0.0	0.07	0.04	0.00	0.00
D	235.0	0.00	180.0	0.0	0.06	0.03	0.00	0.00
D	230.0	0.00	180.0	0.0	0.06	0.03	0.00	0.00
D	230.0	0.00	42.0	0.0	0.07	0.03	0.00	0.01
D	225.0	0.00	42.0	0.0	0.07	0.03	0.00	0.01
D	225.0	0.00	42.0	0.0	0.08	0.04	0.01	0.03
D	220.0	0.00	42.0	0.0	0.08	0.04	0.01	0.03
D	220.0	0.00	42.0	0.0	0.10	0.05	0.01	0.04
D	215.0	0.00	42.0	0.0	0.10	0.05	0.01	0.04
D	215.0	0.00	42.0	0.0	0.08	0.04	0.01	0.04
D	200.0	0.00	42.0	0.0	0.08	0.04	0.01	0.04
D	200.0	0.00	42.0	0.0	0.11	0.06	0.02	0.05
D	180.0	0.00	42.0	0.0	0.10	0.05	0.02	0.05
D	180.0	0.00	42.0	0.0	0.11	0.08	0.02	0.05
D	160.0	0.00	42.0	0.0	0.10	0.07	0.02	0.05
D	160.0	0.00	38.3	0.0	0.11	0.09	0.02	0.05
D	130.0	0.00	32.3	0.0	0.12	0.09	0.03	0.06
D	130.0	0.00	27.7	0.0	0.13	0.09	0.03	0.06
D	120.0	0.00	29.1	0.0	0.13	0.09	0.03	0.06
D	120.0	0.00	23.5	0.0	0.13	0.12	0.04	0.07
D	100.0	0.00	26.4	0.0	0.13	0.12	0.03	0.07
D	100.0	0.00	21.7	0.0	0.14	0.13	0.04	0.06
D	80.0	0.00	20.5	0.0	0.15	0.14	0.05	0.07
D	80.0	0.00	17.6	0.0	0.16	0.15	0.06	0.07
D	60.0	0.00	19.2	0.0	0.16	0.15	0.05	0.07
D	60.0	0.00	15.8	0.0	0.14	0.16	0.07	0.06
D	40.0	0.00	16.7	0.0	0.14	0.16	0.06	0.07
D	40.0	0.00	14.2	0.0	0.14	0.20	0.07	0.06
D	20.0	0.00	14.9	0.0	0.14	0.20	0.07	0.06
D	20.0	0.00	12.9	0.0	0.13	0.21	0.08	0.05
D	0.0	0.00	13.5	0.0	0.13	0.21	0.08	0.05

ANTENNA LOADING
==========

.....ANTENNA..... TYPE	ELEV ft	AZI	ATTACHMENT RAD ft	AZI	.....ANTENNA FORCES..... AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
STD+R	150.0	0.0	5.0	0.0	1.09	0.00	0.24	0.00
STD+R	140.0	0.0	5.5	0.0	1.07	0.00	0.24	0.00

HP	120.0	0.0	6.7	0.0	0.67	0.00	0.20	0.00

LOADING CONDITION k

118 mph wind with no ice. Wind Azimuth: 0◆ PL - 0

MAST LOADING

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	234.0	0.00	0.0	0.0	0.58	0.12	0.00	0.00
C	234.0	0.00	0.0	0.0	0.39	0.08	0.00	0.00
C	227.0	0.00	0.0	0.0	0.55	0.35	0.00	0.00
C	224.0	0.00	0.0	0.0	0.60	0.37	0.00	0.00
C	210.0	0.00	0.0	0.0	0.86	0.11	0.00	0.00
C	200.0	0.00	0.0	0.0	0.54	0.53	0.00	0.00
C	178.7	0.00	0.0	0.0	0.13	0.02	0.00	0.00
C	173.4	0.00	0.0	0.0	0.30	0.18	0.00	0.00
C	160.0	0.00	0.0	0.0	0.27	0.70	0.00	0.00
C	150.0	0.00	0.0	0.0	0.27	0.70	0.00	0.00
C	130.0	0.00	0.0	0.0	0.17	0.47	0.00	0.00
C	98.6	0.00	0.0	0.0	0.60	0.12	0.00	0.00
C	88.0	0.00	0.0	0.0	0.45	0.53	0.00	0.00
D	250.0	0.00	180.0	0.0	0.07	0.03	0.00	0.00
D	245.0	0.00	180.0	0.0	0.07	0.03	0.00	0.00
D	245.0	0.00	180.0	0.0	0.06	0.02	0.00	0.00
D	240.0	0.00	180.0	0.0	0.06	0.02	0.00	0.00
D	240.0	0.00	180.0	0.0	0.07	0.03	0.00	0.00
D	235.0	0.00	180.0	0.0	0.07	0.03	0.00	0.00
D	235.0	0.00	180.0	0.0	0.06	0.02	0.00	0.00
D	230.0	0.00	180.0	0.0	0.06	0.02	0.00	0.00
D	230.0	0.00	42.0	0.0	0.07	0.03	0.00	0.01
D	225.0	0.00	42.0	0.0	0.07	0.03	0.00	0.01
D	225.0	0.00	42.0	0.0	0.08	0.03	0.01	0.03
D	220.0	0.00	42.0	0.0	0.08	0.03	0.01	0.03
D	220.0	0.00	42.0	0.0	0.10	0.04	0.01	0.04
D	215.0	0.00	42.0	0.0	0.10	0.04	0.01	0.04
D	215.0	0.00	42.0	0.0	0.08	0.03	0.01	0.04
D	200.0	0.00	42.0	0.0	0.08	0.03	0.01	0.04
D	200.0	0.00	42.0	0.0	0.11	0.04	0.01	0.05
D	180.0	0.00	42.0	0.0	0.10	0.04	0.01	0.05
D	180.0	0.00	42.0	0.0	0.11	0.06	0.01	0.05
D	160.0	0.00	42.0	0.0	0.10	0.05	0.01	0.05
D	160.0	0.00	38.3	0.0	0.11	0.07	0.02	0.05
D	130.0	0.00	32.3	0.0	0.12	0.07	0.02	0.06
D	130.0	0.00	27.7	0.0	0.13	0.07	0.02	0.06
D	120.0	0.00	29.1	0.0	0.13	0.07	0.02	0.06
D	120.0	0.00	23.5	0.0	0.13	0.09	0.03	0.07
D	100.0	0.00	26.4	0.0	0.13	0.09	0.03	0.07
D	100.0	0.00	21.7	0.0	0.14	0.10	0.03	0.06
D	80.0	0.00	20.5	0.0	0.15	0.10	0.04	0.07
D	80.0	0.00	17.6	0.0	0.16	0.11	0.04	0.07
D	60.0	0.00	19.2	0.0	0.16	0.12	0.04	0.07
D	60.0	0.00	15.8	0.0	0.14	0.12	0.05	0.06
D	40.0	0.00	16.7	0.0	0.14	0.12	0.05	0.07
D	40.0	0.00	14.2	0.0	0.14	0.15	0.06	0.06
D	20.0	0.00	14.9	0.0	0.14	0.15	0.05	0.06
D	20.0	0.00	12.9	0.0	0.13	0.16	0.06	0.05
D	0.0	0.00	13.5	0.0	0.13	0.16	0.06	0.05

ANTENNA LOADING

.....ANTENNA..... TYPE	ELEV ft	AZI	ATTACHMENT RAD ft	AZI	.....ANTENNA FORCES..... AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
STD+R	150.0	0.0	5.0	0.0	1.09	0.00	0.18	0.00
STD+R	140.0	0.0	5.5	0.0	1.07	0.00	0.18	0.00
HP	120.0	0.0	6.7	0.0	0.67	0.00	0.15	0.00

LOADING CONDITION AU

40 mph wind with 1.5 ice. Wind Azimuth: 0◆ PL - 0

MAST LOADING

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LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	234.0	0.00	0.0	0.0	0.16	0.81	0.00	0.00
C	234.0	0.00	0.0	0.0	0.10	0.54	0.00	0.00
C	227.0	0.00	0.0	0.0	0.14	1.01	0.00	0.00
C	224.0	0.00	0.0	0.0	0.15	1.10	0.00	0.00
C	210.0	0.00	0.0	0.0	0.24	0.38	0.00	0.00
C	200.0	0.00	0.0	0.0	0.14	1.51	0.00	0.00
C	178.7	0.00	0.0	0.0	0.08	0.14	0.00	0.00
C	173.4	0.00	0.0	0.0	0.07	0.50	0.00	0.00
C	160.0	0.00	0.0	0.0	0.05	1.46	0.00	0.00
C	150.0	0.00	0.0	0.0	0.05	1.46	0.00	0.00
C	130.0	0.00	0.0	0.0	0.04	1.14	0.00	0.00
C	98.6	0.00	0.0	0.0	0.32	0.93	0.00	0.00
C	88.0	0.00	0.0	0.0	0.11	1.44	0.00	0.00
D	250.0	0.00	180.0	0.0	0.02	0.21	0.00	0.00
D	245.0	0.00	180.0	0.0	0.02	0.21	0.00	0.00
D	245.0	0.00	180.0	0.0	0.01	0.16	0.00	0.00
D	240.0	0.00	180.0	0.0	0.01	0.16	0.00	0.00
D	240.0	0.00	180.0	0.0	0.02	0.21	0.00	0.00
D	235.0	0.00	180.0	0.0	0.02	0.21	0.00	0.00
D	235.0	0.00	180.0	0.0	0.01	0.16	0.00	0.00
D	230.0	0.00	180.0	0.0	0.01	0.16	0.00	0.00
D	230.0	0.00	42.0	0.0	0.02	0.18	0.03	0.00
D	225.0	0.00	42.0	0.0	0.02	0.18	0.03	0.00
D	225.0	0.00	42.0	0.0	0.02	0.20	0.08	0.01
D	220.0	0.00	42.0	0.0	0.02	0.20	0.08	0.01
D	220.0	0.00	42.0	0.0	0.02	0.25	0.09	0.01
D	215.0	0.00	42.0	0.0	0.02	0.25	0.09	0.01
D	215.0	0.00	42.0	0.0	0.02	0.21	0.09	0.01
D	200.0	0.00	42.0	0.0	0.02	0.21	0.09	0.01
D	200.0	0.00	42.0	0.0	0.03	0.28	0.12	0.01
D	195.0	0.00	42.0	0.0	0.03	0.28	0.12	0.01
D	195.0	0.00	42.0	0.0	0.02	0.24	0.12	0.01
D	180.0	0.00	42.0	0.0	0.02	0.24	0.12	0.02
D	180.0	0.00	42.0	0.0	0.03	0.30	0.12	0.01
D	175.0	0.00	42.0	0.0	0.03	0.30	0.12	0.01
D	175.0	0.00	42.0	0.0	0.03	0.26	0.12	0.02
D	160.0	0.00	42.0	0.0	0.03	0.26	0.13	0.02
D	160.0	0.00	38.3	0.0	0.03	0.31	0.13	0.02
D	155.0	0.00	38.3	0.0	0.03	0.31	0.13	0.02
D	155.0	0.00	40.8	0.0	0.03	0.28	0.13	0.02
D	150.0	0.00	40.8	0.0	0.03	0.28	0.13	0.02
D	150.0	0.00	34.1	0.0	0.03	0.29	0.16	0.02
D	140.0	0.00	36.1	0.0	0.03	0.30	0.16	0.02
D	140.0	0.00	30.6	0.0	0.03	0.31	0.19	0.01
D	130.0	0.00	32.3	0.0	0.03	0.31	0.18	0.02
D	130.0	0.00	27.7	0.0	0.03	0.32	0.21	0.01
D	120.0	0.00	29.1	0.0	0.03	0.33	0.20	0.01
D	120.0	0.00	23.5	0.0	0.03	0.34	0.25	0.01
D	113.3	0.00	23.5	0.0	0.03	0.34	0.25	0.01
D	113.3	0.00	24.9	0.0	0.03	0.35	0.24	0.01
D	106.7	0.00	24.9	0.0	0.03	0.35	0.24	0.01
D	106.7	0.00	26.3	0.0	0.03	0.36	0.23	0.01
D	100.0	0.00	26.3	0.0	0.03	0.36	0.23	0.01
D	100.0	0.00	21.5	0.0	0.03	0.39	0.27	0.01
D	86.7	0.00	21.5	0.0	0.03	0.40	0.28	0.01
D	86.7	0.00	20.3	0.0	0.03	0.41	0.33	0.01
D	80.0	0.00	20.3	0.0	0.03	0.41	0.33	0.01
D	80.0	0.00	17.6	0.0	0.03	0.45	0.38	0.01
D	60.0	0.00	19.2	0.0	0.03	0.46	0.35	0.01
D	60.0	0.00	15.8	0.0	0.03	0.42	0.41	0.01
D	40.0	0.00	16.7	0.0	0.03	0.42	0.39	0.01
D	40.0	0.00	14.2	0.0	0.03	0.49	0.43	0.01
D	20.0	0.00	14.9	0.0	0.03	0.49	0.42	0.01
D	20.0	0.00	12.9	0.0	0.02	0.44	0.18	0.01
D	10.0	0.00	12.9	0.0	0.02	0.44	0.18	0.01
D	10.0	0.00	13.5	0.0	0.02	0.45	0.35	0.01
D	0.0	0.00	13.5	0.0	0.02	0.45	0.35	0.01

ANTENNA LOADING
==========

.....ANTENNA..... TYPE	ELEV ft	AZI	ATTACHMENT RAD ft	AZI	.....ANTENNA FORCES..... AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
STD+R	150.0	0.0	5.0	0.0	0.14	0.00	0.88	0.00
STD+R	140.0	0.0	5.5	0.0	0.14	0.00	0.88	0.00
HP	120.0	0.0	6.7	0.0	0.09	0.00	0.83	0.00

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==============================================================================
MAXIMUM ANTENNA AND REFLECTOR ROTATIONS:
========================================

   ELEV    AZI  TYPE                    .....BEAM DEFLECTIONS (deg).........
    ft     deg     *                   ROLL         YAW      PITCH      TOTAL

  150.0    0.0  STD+R                 -1.316 S    0.103 A   -1.119 b    1.123 b
  140.0    0.0  STD+R                 -1.148 S    0.084 A   -0.971 b    0.974 b
  120.0    0.0  HP                    -0.856 S    0.059 P   -0.714 b    0.715 b


 MAXIMUM TENSION IN MAST MEMBERS (kip)
 =====================================

      ELEV      LEGS         DIAG        HORIZ        BRACE
        ft

     250.0  ---------------------         0.01 q       0.00 A
                0.05 k       0.09 A
     245.0  ---------------------         0.01 BA      0.00 A
                0.39 AI      0.25 z
     240.0  ---------------------         0.15 Y       0.00 A
                1.02 AI      0.45 AI
     235.0  ---------------------         0.04 BG      0.00 A
                2.60 AI      0.94 J
     230.0  ---------------------         0.00 AO      0.00 A
                5.17 AI      1.29 J
     225.0  ---------------------         0.07 M       0.00 A
                8.58 AI      1.85 n
     220.0  ---------------------         0.48 B       0.00 A
               13.21 AI      2.11 n
     215.0  ---------------------         0.22 B       0.00 A
               18.83 l       2.38 D
     210.0  ---------------------         0.05 AC      0.00 A
               24.89 k       2.98 n
     205.0  ---------------------         0.23 A       0.00 A
               32.35 k       3.20 D
     200.0  ---------------------         0.57 B       0.00 A
               39.79 k       3.70 k
     195.0  ---------------------         0.33 A       0.00 A
               49.59 k       3.98 D
     190.0  ---------------------         0.04 AC      0.00 A
               58.73 k       4.19 n
     185.0  ---------------------         0.32 A       0.00 A
               69.07 k       4.46 D
     180.0  ---------------------         0.77 A       0.00 A
               79.30 k       4.80 k
     175.0  ---------------------         0.36 A       0.00 A
               91.78 k       5.18 S
     170.0  ---------------------         0.06 AC      0.00 A
              103.62 k       5.43 n
     165.0  ---------------------         0.35 A       0.00 A
              116.82 k       5.69 D
     160.0  ---------------------         1.13 q       0.00 A
              123.29 k       2.18 AR
     155.0  ---------------------         0.35 Y       0.00 A
              126.60 k       1.81 U
     150.0  ---------------------         0.07 AH      0.00 A
              127.92 k       2.25 AH
     145.0  ---------------------         0.27 Y       0.00 A
              131.41 k       2.41 F
     140.0  ---------------------         0.07 AC      0.00 A
              135.07 k       3.07 AH
     135.0  ---------------------         0.20 Y       0.00 A
              138.60 k       3.40 F
     130.0  ---------------------         0.08 A       0.00 A
              142.82 k       3.00 AH
     125.0  ---------------------         0.15 J       0.00 A
              146.59 k       3.27 F
     120.0  ---------------------         0.08 A       0.00 A
              151.70 k       3.69 AH
     113.3  ---------------------         0.13 b       0.00 A
              156.77 k       4.04 F
     106.7  ---------------------         0.08 A       0.00 A
              162.83 k       3.67 AH
     100.0  ---------------------         0.10 M       0.00 A
              167.99 k       4.19 F
      93.3  ---------------------         0.08 A       0.00 A
              174.13 k       4.05 AH
      86.7  ---------------------         0.08 M       0.00 A
              179.59 k       4.50 F
      80.0  ---------------------         0.07 A       0.00 A
              185.87 k       4.37 AH
      73.3  ---------------------         0.11 A       0.00 A
              191.55 k       4.68 F
```

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 66.7  ---------------------          0.06 A       0.00 A
         197.74 k       4.63 AH
 60.0  ---------------------          0.09 A       0.00 A
         204.80 k       5.38 F
 50.0  ---------------------          0.10 A       0.00 A
         213.83 k       5.33 AH
 40.0  ---------------------          0.08 A       0.00 A
         222.19 k       5.61 F
 30.0  ---------------------          0.08 A       0.00 A
         230.85 k       5.63 AH
 20.0  ---------------------          0.01 b       0.00 A
         239.09 k       5.90 F
 10.0  ---------------------          0.08 A       0.00 A
         247.45 k       5.91 AH
  0.0  ---------------------          0.00 A       0.00 A
```

MAXIMUM COMPRESSION IN MAST MEMBERS (kip)
==========

```
 ELEV      LEGS         DIAG        HORIZ        BRACE
   ft

250.0  ---------------------         -0.01 A       0.00 A
          -0.21 BA     -0.10 AC
245.0  ---------------------          0.00 w       0.00 A
          -0.62 G      -0.28 e
240.0  ---------------------         -0.14 q       0.00 A
          -1.43 S      -0.54 G
235.0  ---------------------         -0.03 AO      0.00 A
          -3.47 G      -0.93 J
230.0  ---------------------          0.00 BD      0.00 A
          -6.52 G      -1.29 b
225.0  ---------------------         -0.06 q       0.00 A
         -10.69 S      -1.90 f
220.0  ---------------------         -0.44 AD      0.00 A
         -15.80 S      -2.29 f
215.0  ---------------------         -0.21 AD      0.00 A
         -22.16 T      -2.35 o
210.0  ---------------------         -0.05 M       0.00 A
         -28.81 S      -3.01 D
205.0  ---------------------         -0.23 AC      0.00 A
         -36.96 S      -3.21 D
200.0  ---------------------         -0.56 AD      0.00 A
         -45.39 S      -4.03 S
195.0  ---------------------         -0.33 AC      0.00 A
         -56.25 S      -3.94 n
190.0  ---------------------         -0.04 A       0.00 A
         -66.11 S      -4.26 S
185.0  ---------------------         -0.31 AC      0.00 A
         -77.41 S      -4.46 D
180.0  ---------------------         -0.77 AC      0.00 A
         -88.48 S      -5.20 S
175.0  ---------------------         -0.36 AC      0.00 A
        -102.35 S      -5.12 n
170.0  ---------------------         -0.06 A       0.00 A
        -115.22 S      -5.52 S
165.0  ---------------------         -0.35 AC      0.00 A
        -129.61 S      -5.70 D
160.0  ---------------------         -1.16 M       0.00 A
        -137.24 S      -2.27 h
155.0  ---------------------         -0.34 q       0.00 A
        -141.11 S      -1.72 m
150.0  ---------------------         -0.09 h       0.00 A
        -143.35 S      -2.57 F
145.0  ---------------------         -0.24 q       0.00 A
        -147.34 S      -2.20 AH
140.0  ---------------------         -0.11 h       0.00 A
        -151.14 S      -3.57 F
135.0  ---------------------         -0.18 q       0.00 A
        -155.19 S      -3.00 AH
130.0  ---------------------         -0.08 A       0.00 A
        -159.56 S      -3.37 F
125.0  ---------------------         -0.13 q       0.00 A
        -163.87 S      -2.98 AH
120.0  ---------------------         -0.09 D       0.00 A
        -169.26 S      -4.14 F
113.3  ---------------------         -0.11 AC      0.00 A
        -175.13 S      -3.67 AH
106.7  ---------------------         -0.08 AC      0.00 A
        -181.30 S      -4.02 F
100.0  ---------------------         -0.09 AC      0.00 A
```

```
          -187.37 S      -3.92 AH
    93.3  ---------------------        -0.07 AC      0.00 A
          -194.01 S      -4.33 F
    86.7  ---------------------        -0.07 AC      0.00 A
          -200.66 S      -4.28 AH
    80.0  ---------------------        -0.07 AC      0.00 A
          -207.55 S      -4.60 F
    73.3  ---------------------        -0.10 AC      0.00 A
          -214.18 S      -4.51 AH
    66.7  ---------------------        -0.06 AC      0.00 A
          -221.15 S      -4.82 F
    60.0  ---------------------        -0.09 AC      0.00 A
          -229.46 S      -5.24 X
    50.0  ---------------------        -0.09 AC      0.00 A
          -239.87 S      -5.51 F
    40.0  ---------------------        -0.08 AC      0.00 A
          -249.93 S      -5.50 X
    30.0  ---------------------        -0.07 AC      0.00 A
          -260.30 S      -5.79 F
    20.0  ---------------------        -0.01 AC      0.00 A
          -270.43 S      -5.80 X
    10.0  ---------------------        -0.07 AC      0.00 A
          -280.60 S      -6.06 F
     0.0  ---------------------         0.00 A       0.00 A
```

FORCE/RESISTANCE RATIO IN LEGS
==========

MAST ELEV ft	-- LEG COMPRESSION - MAX COMP	COMP RESIST	FORCE/ RESIST RATIO	---- LEG TENSION --- MAX TENS	TENS RESIST	FORCE/ RESIST RATIO
250.00	0.21	31.84	0.01	0.05	51.90	0.00
245.00	0.62	31.84	0.02	0.39	51.90	0.01
240.00	1.43	31.84	0.05	1.02	51.90	0.02
235.00	3.47	31.84	0.11	2.60	51.90	0.05
230.00	6.52	31.84	0.20	5.17	51.90	0.10
225.00	10.69	31.84	0.34	8.58	51.90	0.17
220.00	15.80	42.85	0.37	13.21	71.78	0.18
215.00	22.16	42.85	0.52	18.83	71.78	0.26
210.00	28.81	42.85	0.67	24.89	71.78	0.35
205.00	36.96	42.85	0.86	32.35	71.78	0.45
200.00	45.39	83.04	0.55	39.79	108.15	0.37
195.00	56.25	83.04	0.68	49.59	108.15	0.46
190.00	66.11	83.04	0.80	58.73	108.15	0.54
185.00	77.41	83.04	0.93	69.07	108.15	0.64
180.00	88.48	143.18	0.62	79.30	178.48	0.44
175.00	102.35	143.18	0.71	91.78	178.48	0.51
170.00	115.22	143.18	0.80	103.62	178.48	0.58
165.00	129.61	143.18	0.91	116.82	178.48	0.65
160.00	137.24	177.29	0.77	123.29	213.88	0.58
155.00	141.11	177.29	0.80	126.60	213.88	0.59
150.00	143.35	177.29	0.81	127.92	213.88	0.60
145.00	147.34	177.29	0.83	131.41	213.88	0.61
140.00	151.14	177.29	0.85	135.07	213.88	0.63
135.00	155.19	177.29	0.88	138.60	213.88	0.65
130.00	159.56	177.29	0.90	142.82	213.88	0.67
125.00	163.87	177.29	0.92	146.59	213.88	0.69

120.00	169.26	241.28	0.70	151.70	296.33	0.51
113.33	175.13	241.28	0.73	156.77	296.33	0.53
106.67	181.30	241.28	0.75	162.83	296.33	0.55
100.00	187.37	241.28	0.78	167.99	296.33	0.57
93.33	194.01	241.28	0.80	174.13	296.33	0.59
86.67	200.66	241.28	0.83	179.59	296.33	0.61
80.00	207.55	241.28	0.86	185.87	296.33	0.63
73.33	214.18	241.28	0.89	191.55	296.33	0.65
66.67	221.15	241.28	0.92	197.74	296.33	0.67
60.00	229.46	260.96	0.88	204.80	385.58	0.53
50.00	239.87	260.96	0.92	213.83	385.58	0.55
40.00	249.93	336.31	0.74	222.19	407.40	0.55
30.00	260.30	336.31	0.77	230.85	407.40	0.57
20.00	270.43	336.31	0.80	239.09	407.40	0.59
10.00	280.60	336.31	0.83	247.45	407.40	0.61
0.00						

FORCE/RESISTANCE RATIO IN DIAGONALS
==========

MAST ELEV ft	- DIAG COMPRESSION - MAX COMP	COMP RESIST	FORCE/ RESIST RATIO	--- DIAG TENSION -- MAX TENS	TENS RESIST	FORCE/ RESIST RATIO
250.00	0.10	7.16	0.01	0.09	7.16	0.01
245.00	0.28	7.16	0.04	0.25	7.16	0.03
240.00	0.54	7.16	0.07	0.45	7.16	0.06
235.00	0.93	7.16	0.13	0.94	7.16	0.13
230.00	1.29	7.16	0.18	1.29	7.16	0.18
225.00	1.90	7.16	0.27	1.85	7.16	0.26
220.00	2.29	7.16	0.32	2.11	7.16	0.29
215.00	2.35	7.16	0.33	2.38	7.16	0.33
210.00	3.01	7.16	0.42	2.98	7.16	0.42
205.00	3.21	7.16	0.45	3.20	7.16	0.45
200.00	4.03	7.16	0.56	3.70	7.16	0.52
195.00	3.94	7.16	0.55	3.98	7.16	0.56
190.00	4.26	7.16	0.60	4.19	7.16	0.59
185.00	4.46	7.16	0.62	4.46	7.16	0.62
180.00	5.20	7.16	0.73	4.80	7.16	0.67
175.00	5.12	7.16	0.72	5.18	7.16	0.72
170.00	5.52	7.16	0.77	5.43	7.16	0.76
165.00	5.70	7.16	0.80	5.69	7.16	0.80
160.00	2.27	7.16	0.32	2.18	7.16	0.30
155.00	1.72	7.16	0.24	1.81	7.16	0.25
150.00	2.57	7.16	0.36	2.25	7.16	0.31
145.00	2.20	7.16	0.31	2.41	7.16	0.34
140.00	3.57	7.13	0.50	3.07	7.13	0.43

```
135.00 ----------------------------------------------
          3.00    7.13    0.42    3.40    7.13    0.48
130.00 ----------------------------------------------
          3.37    7.13    0.47    3.00    7.13    0.42
125.00 ----------------------------------------------
          2.98    7.13    0.42    3.27    7.13    0.46
120.00 ----------------------------------------------
          4.14    6.51    0.64    3.69    6.51    0.57
113.33 ----------------------------------------------
          3.67    6.51    0.56    4.04    6.51    0.62
106.67 ----------------------------------------------
          4.02    6.51    0.62    3.67    6.51    0.56
100.00 ----------------------------------------------
          3.92    9.45    0.41    4.19    9.45    0.44
 93.33 ----------------------------------------------
          4.33    9.45    0.46    4.05    9.45    0.43
 86.67 ----------------------------------------------
          4.28    9.45    0.45    4.50    9.45    0.48
 80.00 ----------------------------------------------
          4.60   13.10    0.35    4.37   13.10    0.33
 73.33 ----------------------------------------------
          4.51   13.10    0.34    4.68   13.10    0.36
 66.67 ----------------------------------------------
          4.82   13.10    0.37    4.63   13.10    0.35
 60.00 ----------------------------------------------
          5.24    8.84    0.59    5.38    8.84    0.61
 50.00 ----------------------------------------------
          5.51    8.84    0.62    5.33    8.84    0.60
 40.00 ----------------------------------------------
          5.50   15.88    0.35    5.61   15.88    0.35
 30.00 ----------------------------------------------
          5.79   15.88    0.36    5.63   15.88    0.35
 20.00 ----------------------------------------------
          5.80   13.59    0.43    5.90   13.59    0.43
 10.00 ----------------------------------------------
          6.06   13.59    0.45    5.91   13.59    0.43
  0.00 ----------------------------------------------

MAXIMUM INDIVIDUAL FOUNDATION LOADS: (kip)
==========================================

    --------------LOAD---COMPONENTS-------------        TOTAL
    NORTH         EAST         DOWN       UPLIFT        SHEAR

    24.94 S      20.42 e     285.25 S    -251.15 k      24.94 S


MAXIMUM TOTAL LOADS ON FOUNDATION : (kip & kip-ft)
==================================================

  ------HORIZONTAL-----    DOWN       ---------OVERTURNING--------- TORSION
  NORTH    EAST   TOTAL                NORTH        EAST       TOTAL
                @   0.0                                        @   0.0

   40.6   -32.3    40.6    98.8      4980.6     -4032.2      4980.6    22.1
     AC      q       AC      BA          S           G           S       AR


==============================================================================


==============================================================================
Latticed Tower Analysis (Unguyed)            (c)2017 Guymast Inc. 416-736-7453
Processed under license at:

Sabre Towers and Poles                            on: 25 mar 2020  at: 14:24:09
==============================================================================




******************************************************************************
***************************  Service Load Condition  ***************************
******************************************************************************


==============================================================================
* Only 1 condition(s) shown in full
* Some wind loads may have been derived from full-scale wind tunnel testing

==============================================================================
 LOADING CONDITION  A   ======================================================

60 mph wind with no ice. Wind Azimuth: 0◆                                PL - 0
```

MAST LOADING
==========

LOAD TYPE	ELEV ft	APPLY..LOAD..AT RADIUS ft	AZI	LOAD AZI	.....FORCES..... HORIZ kip	DOWN kip	.....MOMENTS..... VERTICAL ft-kip	TORSNAL ft-kip
C	234.0	0.00	0.0	0.0	0.15	0.13	0.00	0.00
C	234.0	0.00	0.0	0.0	0.10	0.08	0.00	0.00
C	227.0	0.00	0.0	0.0	0.14	0.39	0.00	0.00
C	224.0	0.00	0.0	0.0	0.15	0.42	0.00	0.00
C	210.0	0.00	0.0	0.0	0.22	0.12	0.00	0.00
C	200.0	0.00	0.0	0.0	0.14	0.58	0.00	0.00
C	178.7	0.00	0.0	0.0	0.03	0.02	0.00	0.00
C	173.4	0.00	0.0	0.0	0.08	0.19	0.00	0.00
C	160.0	0.00	0.0	0.0	0.07	0.78	0.00	0.00
C	150.0	0.00	0.0	0.0	0.07	0.78	0.00	0.00
C	130.0	0.00	0.0	0.0	0.04	0.52	0.00	0.00
C	98.6	0.00	0.0	0.0	0.16	0.14	0.00	0.00
C	88.0	0.00	0.0	0.0	0.12	0.58	0.00	0.00
D	250.0	0.00	180.0	0.0	0.02	0.03	0.00	0.00
D	230.0	0.00	180.0	0.0	0.02	0.03	0.00	0.00
D	230.0	0.00	42.0	0.0	0.02	0.03	0.00	0.00
D	215.0	0.00	42.0	0.0	0.02	0.04	0.01	0.01
D	215.0	0.00	42.0	0.0	0.02	0.04	0.01	0.01
D	200.0	0.00	42.0	0.0	0.02	0.04	0.01	0.01
D	200.0	0.00	42.0	0.0	0.03	0.05	0.01	0.01
D	180.0	0.00	42.0	0.0	0.03	0.05	0.01	0.01
D	180.0	0.00	42.0	0.0	0.03	0.06	0.02	0.01
D	160.0	0.00	42.0	0.0	0.03	0.06	0.02	0.01
D	160.0	0.00	38.3	0.0	0.03	0.07	0.02	0.01
D	130.0	0.00	32.3	0.0	0.03	0.07	0.02	0.02
D	130.0	0.00	27.7	0.0	0.03	0.08	0.03	0.02
D	120.0	0.00	29.1	0.0	0.03	0.08	0.03	0.02
D	120.0	0.00	23.5	0.0	0.03	0.10	0.03	0.02
D	100.0	0.00	26.4	0.0	0.04	0.10	0.03	0.02
D	100.0	0.00	21.7	0.0	0.04	0.11	0.03	0.02
D	80.0	0.00	20.5	0.0	0.04	0.11	0.04	0.02
D	80.0	0.00	17.6	0.0	0.04	0.12	0.05	0.02
D	60.0	0.00	19.2	0.0	0.04	0.13	0.05	0.02
D	60.0	0.00	15.8	0.0	0.04	0.13	0.06	0.02
D	40.0	0.00	16.7	0.0	0.04	0.14	0.05	0.02
D	40.0	0.00	14.2	0.0	0.04	0.17	0.06	0.01
D	0.0	0.00	13.5	0.0	0.04	0.18	0.06	0.01

ANTENNA LOADING
==========

.....ANTENNA..... TYPE	ELEV ft	AZI	ATTACHMENT RAD ft	AZI	.....ANTENNA FORCES..... AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
STD+R	150.0	0.0	5.0	0.0	0.28	0.00	0.20	0.00
STD+R	140.0	0.0	5.5	0.0	0.28	0.00	0.20	0.00
HP	120.0	0.0	6.7	0.0	0.17	0.00	0.17	0.00

==========

MAXIMUM MAST DISPLACEMENTS:
==========

ELEV ft	------DEFLECTIONS (ft)----- NORTH	EAST	DOWN	--TILTS (DEG)--- NORTH	EAST	TWIST DEG
250.0	1.351 S	1.164 b	0.011 S	0.670 S	0.590 b	0.064 h
245.0	1.292 S	1.113 b	0.011 S	0.670 S	0.590 b	0.064 h
240.0	1.234 S	1.061 b	0.010 S	0.669 S	0.590 b	0.064 h
235.0	1.175 S	1.010 b	0.010 S	0.668 S	0.589 b	0.064 h
230.0	1.117 S	0.958 b	0.010 S	0.666 S	0.587 b	0.064 h
225.0	1.059 S	0.907 b	0.009 S	0.661 S	0.582 b	0.064 h
220.0	1.001 S	0.856 b	0.009 S	0.653 S	0.574 b	0.063 h
215.0	0.944 S	-0.806 J	0.009 S	0.643 S	0.566 b	0.063 h
210.0	0.889 S	-0.757 J	0.008 S	0.631 S	0.554 b	0.062 h
205.0	0.833 S	-0.709 J	0.008 S	0.614 S	0.538 b	0.061 h
200.0	0.780 S	-0.662 J	0.007 S	0.592 S	0.518 b	0.060 h
195.0	0.729 S	-0.617 J	0.007 S	0.575 S	-0.502 J	0.058 h
190.0	0.679 S	-0.574 J	0.007 S	0.553 S	-0.482 J	0.056 h
185.0	0.631 S	-0.532 J	0.006 S	0.527 S	-0.458 J	0.053 h
180.0	0.586 S	-0.492 J	0.006 S	0.497 S	-0.431 J	0.050 h
175.0	0.542 S	-0.455 J	0.006 S	0.476 S	-0.411 J	0.047 h
170.0	0.501 S	-0.419 J	0.006 S	0.452 S	-0.390 J	0.043 h
165.0	0.462 S	-0.385 J	0.005 S	0.425 S	-0.365 J	0.039 h
160.0	0.425 S	-0.354 J	0.005 S	0.394 S	-0.337 J	0.034 h
155.0	0.392 S	0.325 b	0.005 S	0.368 S	-0.314 J	0.030 h

150.0	0.361 S	0.299 b	0.005 S	0.344 S	-0.292 J	0.027 A
145.0	0.332 S	0.274 b	0.005 S	0.321 S	0.272 b	0.024 A
140.0	0.305 S	-0.252 J	0.004 S	0.300 S	0.254 b	0.022 A
135.0	0.279 S	-0.230 J	0.004 S	0.280 S	0.236 b	0.020 h
130.0	0.255 S	-0.210 J	0.004 S	0.261 S	0.219 b	0.019 h
125.0	0.233 S	-0.191 J	0.004 S	0.242 S	0.203 b	0.017 h
120.0	0.212 S	-0.175 J	0.004 S	0.224 S	0.187 b	0.016 h
113.3	0.187 S	-0.153 J	0.004 S	0.207 S	0.173 b	0.015 h
106.7	0.163 S	-0.134 J	0.003 S	0.191 S	0.159 b	0.014 h
100.0	0.142 S	-0.116 J	0.003 S	0.175 S	0.145 b	0.012 h
93.3	0.122 S	-0.100 J	0.003 S	0.160 S	0.132 b	0.011 h
86.7	0.104 S	-0.085 J	0.003 S	0.145 S	0.120 b	0.010 h
80.0	0.087 S	-0.071 J	0.003 D	0.130 S	-0.107 J	0.009 h
73.3	0.073 S	-0.059 J	0.002 S	0.116 S	-0.095 J	0.008 h
66.7	0.060 S	-0.049 J	0.002 D	0.102 S	-0.084 J	0.007 h
60.0	0.048 S	-0.039 J	0.002 S	0.088 S	-0.072 J	0.006 h
50.0	0.034 S	-0.027 G	0.002 D	0.072 S	-0.059 J	0.005 h
40.0	0.022 S	-0.018 G	0.001 S	0.057 S	-0.046 J	0.003 h
30.0	0.013 S	-0.010 G	0.001 D	0.042 S	-0.034 J	0.003 h
20.0	0.006 S	-0.005 G	0.001 R	0.028 S	-0.023 J	0.002 h
10.0	0.002 S	-0.001 G	0.000 R	0.014 S	-0.011 J	0.001 h
0.0	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A

MAXIMUM ANTENNA AND REFLECTOR ROTATIONS:
==========

ELEV ft	AZI deg	TYPE *	.....BEAM DEFLECTIONS (deg)..... ROLL	YAW	PITCH	TOTAL
150.0	0.0	STD+R	-0.344 S	0.027 A	0.292 J	0.293 J
140.0	0.0	STD+R	-0.300 S	0.022 A	-0.254 b	0.255 b
120.0	0.0	HP	-0.224 S	0.016 h	-0.187 b	0.187 b

MAXIMUM TENSION IN MAST MEMBERS (kip)
==========

ELEV ft	LEGS	DIAG	HORIZ	BRACE
250.0	----------		0.00 e	0.00 A
	0.00 A	0.02 Y		
245.0	----------		0.00 e	0.00 A
	0.05 Y	0.06 D		
240.0	----------		0.05 Y	0.00 A
	0.18 A	0.11 M		
235.0	----------		0.01 Y	0.00 A
	0.49 Y	0.25 V		
230.0	----------		0.00 A	0.00 A
	1.07 A	0.34 V		
225.0	----------		0.02 M	0.00 A
	1.80 M	0.48 V		
220.0	----------		0.15 N	0.00 A
	2.97 M	0.53 V		
215.0	----------		0.07 N	0.00 A
	4.33 B	0.63 E		
210.0	----------		0.01 S	0.00 A
	5.86 A	0.76 D		
205.0	----------		0.07 A	0.00 A
	7.74 A	0.83 D		
200.0	----------		0.17 B	0.00 A
	9.51 A	0.93 A		
195.0	----------		0.10 A	0.00 A
	11.93 A	1.05 D		
190.0	----------		0.01 S	0.00 A
	14.29 A	1.08 D		
185.0	----------		0.09 A	0.00 A
	16.90 A	1.16 D		
180.0	----------		0.22 A	0.00 A
	19.52 A	1.22 A		
175.0	----------		0.10 A	0.00 A
	22.59 A	1.35 S		
170.0	----------		0.01 S	0.00 A
	25.61 A	1.40 D		
165.0	----------		0.10 A	0.00 A
	28.96 A	1.48 D		
160.0	----------		0.26 G	0.00 A
	30.40 A	0.53 h		
155.0	----------		0.10 M	0.00 A
	31.11 A	0.48 U		
150.0	----------		0.01 X	0.00 A
	31.10 A	0.53 X		
145.0	----------		0.08 M	0.00 A
	31.86 A	0.66 F		
140.0	----------		0.02 A	0.00 A

	32.69 A	0.74 X		
135.0	----------		0.06 M	0.00 A
	33.46 A	0.93 F		
130.0	----------		0.02 A	0.00 A
	34.43 A	0.74 X		
125.0	----------		0.05 J	0.00 A
	35.26 A	0.88 F		
120.0	----------		0.02 A	0.00 A
	36.44 A	0.91 X		
113.3	----------		0.04 J	0.00 A
	37.55 A	1.10 F		
106.7	----------		0.02 A	0.00 A
	39.07 A	0.93 X		
100.0	----------		0.03 M	0.00 A
	40.19 A	1.13 F		
93.3	----------		0.02 A	0.00 A
	41.65 A	1.04 X		
86.7	----------		0.02 M	0.00 A
	42.77 A	1.21 F		
80.0	----------		0.02 A	0.00 A
	44.28 A	1.14 X		
73.3	----------		0.03 M	0.00 A
	45.57 A	1.26 F		
66.7	----------		0.02 A	0.00 A
	47.03 A	1.22 X		
60.0	----------		0.03 A	0.00 A
	48.64 A	1.44 F		
50.0	----------		0.03 A	0.00 A
	50.74 A	1.41 X		
40.0	----------		0.03 A	0.00 A
	52.59 A	1.50 F		
30.0	----------		0.02 A	0.00 A
	54.51 A	1.50 X		
20.0	----------		0.00 b	0.00 A
	56.29 A	1.60 F		
10.0	----------		0.02 A	0.00 A
	58.15 A	1.59 X		
0.0	----------		0.00 A	0.00 A

MAXIMUM COMPRESSION IN MAST MEMBERS (kip)
==========

ELEV ft	LEGS	DIAG	HORIZ	BRACE
250.0	----------		0.00 Y	0.00 A
	-0.05 e	-0.02 e		
245.0	----------		0.00 A	0.00 A
	-0.21 e	-0.08 e		
240.0	----------		-0.03 e	0.00 A
	-0.45 e	-0.15 e		
235.0	----------		0.00 e	0.00 A
	-1.06 e	-0.24 V		
230.0	----------		0.00 M	0.00 A
	-1.93 e	-0.34 V		
225.0	----------		-0.01 T	0.00 A
	-3.19 G	-0.51 W		
220.0	----------		-0.09 H	0.00 A
	-4.57 G	-0.62 f		
215.0	----------		-0.04 H	0.00 A
	-6.30 H	-0.60 E		
210.0	----------		-0.01 A	0.00 A
	-8.05 G	-0.79 D		
205.0	----------		-0.05 S	0.00 A
	-10.21 S	-0.83 D		
200.0	----------		-0.12 T	0.00 A
	-12.55 S	-1.07 e		
195.0	----------		-0.07 S	0.00 A
	-15.48 S	-1.01 D		
190.0	----------		-0.01 A	0.00 A
	-18.06 S	-1.12 S		
185.0	----------		-0.07 S	0.00 A
	-21.06 S	-1.16 D		
180.0	----------		-0.18 S	0.00 A
	-23.97 S	-1.37 S		
175.0	----------		-0.08 S	0.00 A
	-27.73 S	-1.32 D		
170.0	----------		-0.02 A	0.00 A
	-31.13 S	-1.44 S		
165.0	----------		-0.08 S	0.00 A
	-34.95 S	-1.48 D		

```
    160.0  ---------------------        -0.33 M       0.00 A
             -37.16 S      -0.63 h
    155.0  ---------------------        -0.08 S       0.00 A
             -38.31 S      -0.44 C
    150.0  ---------------------        -0.03 F       0.00 A
             -39.22 S      -0.72 F
    145.0  ---------------------        -0.05 G       0.00 A
             -40.41 S      -0.54 X
    140.0  ---------------------        -0.03 F       0.00 A
             -41.52 S      -0.99 F
    135.0  ---------------------        -0.04 G       0.00 A
             -42.73 S      -0.74 X
    130.0  ---------------------        -0.02 A       0.00 A
             -44.00 S      -0.92 F
    125.0  ---------------------        -0.03 S       0.00 A
             -45.28 S      -0.75 X
    120.0  ---------------------        -0.02 D       0.00 A
             -46.85 S      -1.14 F
    113.3  ---------------------        -0.03 S       0.00 A
             -48.62 S      -0.93 X
    106.7  ---------------------        -0.02 h       0.00 A
             -50.33 S      -1.10 F
    100.0  ---------------------        -0.02 S       0.00 A
             -52.18 S      -1.01 X
     93.3  ---------------------        -0.02 G       0.00 A
             -54.09 S      -1.18 F
     86.7  ---------------------        -0.02 S       0.00 A
             -56.18 S      -1.12 X
     80.0  ---------------------        -0.01 S       0.00 A
             -58.16 S      -1.25 F
     73.3  ---------------------        -0.02 S       0.00 A
             -60.15 S      -1.19 X
     66.7  ---------------------        -0.01 S       0.00 A
             -62.18 S      -1.30 F
     60.0  ---------------------        -0.02 S       0.00 A
             -64.66 S      -1.40 X
     50.0  ---------------------        -0.02 S       0.00 A
             -67.73 S      -1.49 F
     40.0  ---------------------        -0.02 S       0.00 A
             -70.78 S      -1.48 X
     30.0  ---------------------        -0.02 S       0.00 A
             -73.94 S      -1.58 F
     20.0  ---------------------         0.00 S       0.00 A
             -77.07 S      -1.57 X
     10.0  ---------------------        -0.01 S       0.00 A
             -80.20 S      -1.67 F
      0.0  ---------------------         0.00 A       0.00 A

MAXIMUM INDIVIDUAL FOUNDATION LOADS: (kip)
==========================================

    --------------LOAD---COMPONENTS-------------        TOTAL
    NORTH         EAST         DOWN       UPLIFT        SHEAR

     7.02 S       5.77 e      81.67 S     -58.94 A       7.02 S

MAXIMUM TOTAL LOADS ON FOUNDATION : (kip & kip-ft)
==================================================

  ------HORIZONTAL-----    DOWN       ---------OVERTURNING--------- TORSION
  NORTH    EAST   TOTAL                NORTH        EAST       TOTAL
                @   0.0                                        @   0.0

   10.8    -8.6    10.8    28.5      1312.6     -1064.8      1312.6     5.7
     S       G       S       D           S           J           S       h

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