Sabre Industries™
INNOVATION DELIVERED

Structural Design Report

260' S3TL Series HD1 Self-Supporting Tower
Site: 05 Northeast Tower, IA

Prepared for: RACOM CORPORATION
by: Sabre Industries ™

Job Number: 20-6098-TJH

March 18, 2020

Tower Profile..... 1-2

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)

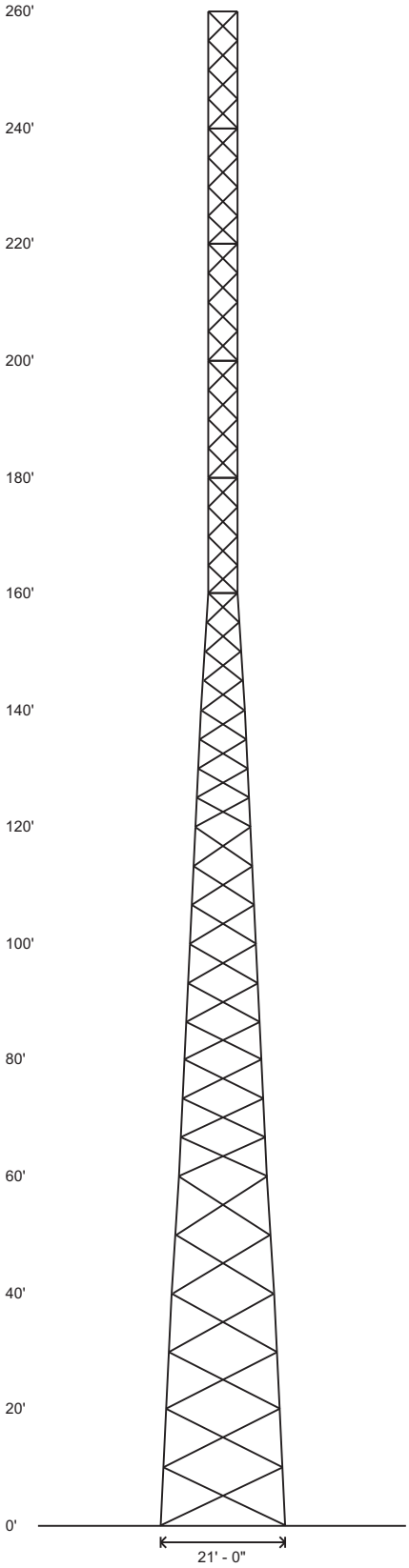
3/18/20 (dated)

AMY R. HERBST

My license renewal date is December 31, 2020.

Pages or sheets covered by this seal: 1-18

Legs	A	5.563 OD X .500	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
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'			28 @ 5'	
Section Weight	3790	3519	2763	2587	2309	2082	1598	1554	1372	1186	865	721	721



Design Criteria - ANSI/TIA-222-H

Wind Speed (No Ice)	117 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	1077 ft

Base Reactions

Total Foundation		Individual Footing	
Shear (kips)	37.7	Shear (kips)	23.37
Axial (kips)	97.08	Compression (kips)	268
Moment (ft-kips)	4661	Uplift (kips)	233
Torsion (ft-kips)	17.98		

Material List

Display	Value
A	8.625 OD X .322
B	4.000 OD X .318
C	3.500 OD X .300
D	2.875 OD X .203
E	L 2 1/2 X 2 1/2 X 3/16
F	L 2 X 2 X 1/8

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: 97.09%
13) This structure has been designed with a 30% increase in antenna and line loading.

Sabre Industries
INNOVATION DELIVERED

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7101 Southbridge Drive
P.O. Box 658
Sioux City, IA 51102-0658
Phone: (712) 258-6690
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Job:	**20-6098-TJH**
Customer:	RACOM CORPORATION
Site Name:	05 Northeast Tower, IA
Description:	260' S3TL
Date:	3/18/2020 By: ARH

Designed Appurtenance Loading

Elev	Description	Tx-Line
248	(2) BPS10-D-B1	
241	(3) 6ft Sidearms	
241		(2) 1 1/4"
241	(1) TTA (16" x 8" x 6")	(1) 1/2"
228.62	(1) DB224	
218	3ft Sidearm	
218		(1) 7/8"
185	(1) 6' Ice Shield	
175	Leg Dish Mount	
175	(1) 6' Solid Dish W/ Radome	(1) EW63

Elev	Description	Tx-Line
155	(1) 4' Ice Shield	
145	Leg Dish Mount	
145	(1) 4' H.P. Dish	(1) EW63
105	(1) 6' Ice Shield	
100	Leg Dish Mount	
100	(1) 6' Solid Dish W/ Radome	(1) EW63
98.62	(3) DB224A	
88	(3) 3ft Sidearms	
88		(3) 7/8"

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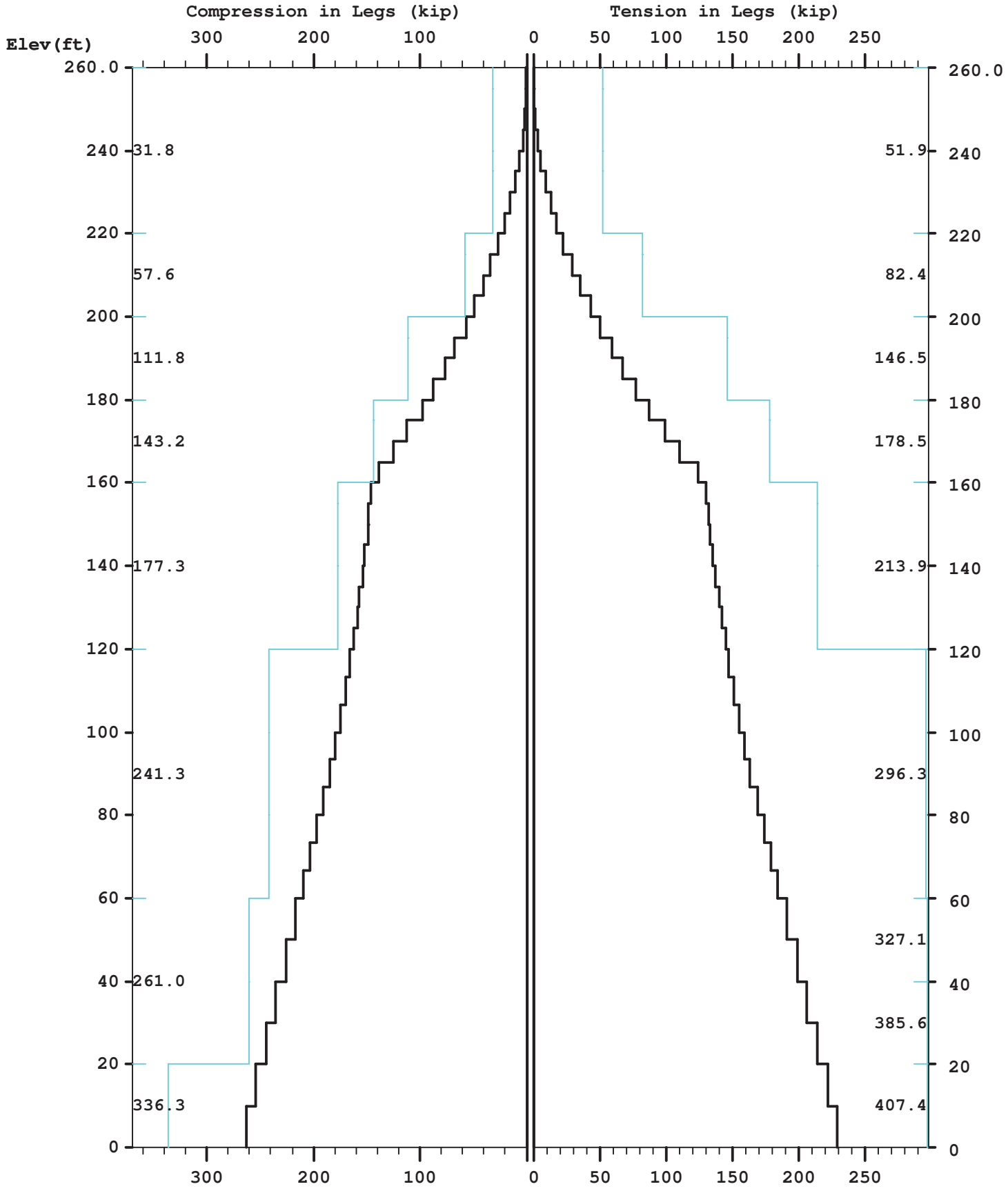
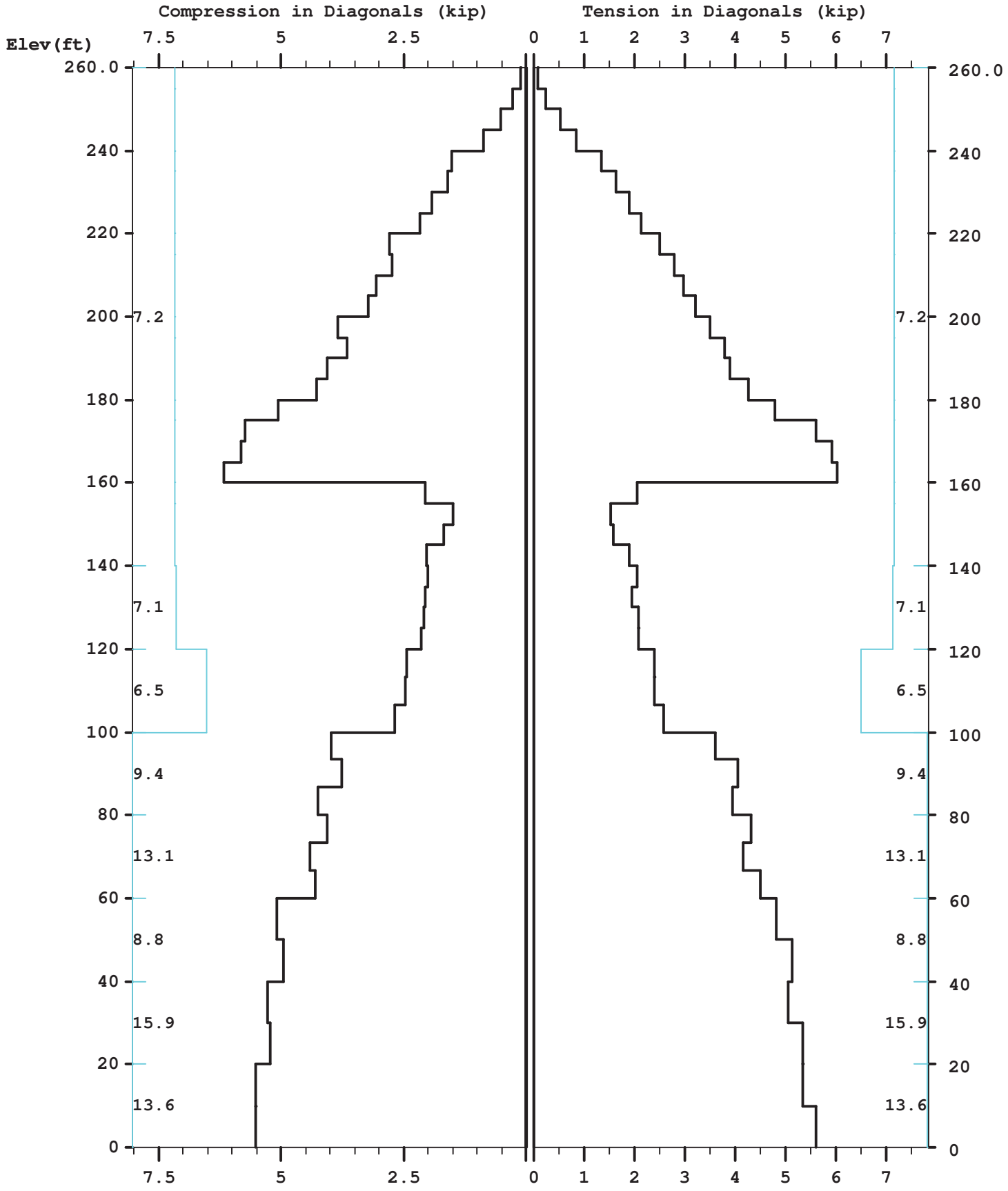
Job:	**20-6098-TJH**
Customer:	RACOM CORPORATION
Site Name:	05 Northeast Tower, IA
Description:	260' S3TL
Date:	3/18/2020 By: ARH

Maximum

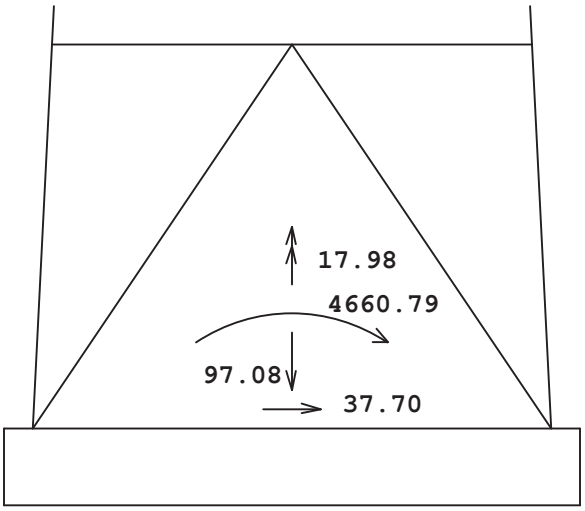

Compression in Legs (kip)
Tension in Legs (kip)
Elev(ft)
300 200 100 0 50 100 150 200 250
260.0 240 220 200 180 160 140 120 100 80 60 40 20 0
31.8
57.6
111.8
143.2
177.3
241.3
261.0
336.3
51.9
82.4
146.5
178.5
213.9
296.3
327.1
385.6
407.4

Maximum

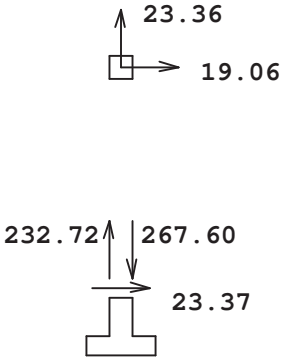

Compression in Diagonals (kip)
Tension in Diagonals (kip)
Elev(ft)
7.5
5
2.5
0
1
2
3
4
5
6
7
260.0
240
220
200
180
160
140
120
100
80
60
40
20
0
7.2
7.1
6.5
9.4
13.1
8.8
15.9
13.6

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	255.00	260.00	5.00	5.00	5.00
X	3	240.00	255.00	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	260.00	1.075	0.787	29000.	0.0000117
LE	200.00	220.00	1.704	0.787	29000.	0.0000117
LE	180.00	200.00	3.016	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	20.00	60.00	7.952	0.787	29000.	0.0000117
LE	0.00	20.00	8.399	0.787	29000.	0.0000117
DI	120.00	260.00	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	255.00	260.00	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
255.0	260.0	31.84	51.90	7.16	7.16	7.16	7.16	0.00	0.00
240.0	255.0	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	57.62	82.45	7.16	7.16	7.16	7.16	0.00	0.00
200.0	215.0	57.62	82.45	7.16	7.16	0.00	0.00	0.00	0.00
195.0	200.0	111.82	146.47	7.16	7.16	7.16	7.16	0.00	0.00
180.0	195.0	111.82	146.47	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	327.10	8.84	8.84	0.00	0.00	0.00	0.00
20.0	40.0	260.96	385.58	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 ==========

117 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	248.0	0.00	0.0	0.0	0.45	0.18	0.00	0.00
C	241.0	0.00	0.0	0.0	0.91	1.44	0.00	0.00
C	228.6	0.00	0.0	0.0	0.23	0.05	0.00	0.00
C	218.0	0.00	0.0	0.0	0.30	0.23	0.00	0.00
C	185.0	0.00	0.0	0.0	0.27	0.94	0.00	0.00
C	155.0	0.00	0.0	0.0	0.18	0.62	0.00	0.00
C	105.0	0.00	0.0	0.0	0.24	0.94	0.00	0.00
C	98.6	0.00	0.0	0.0	0.59	0.16	0.00	0.00
C	88.0	0.00	0.0	0.0	0.45	0.70	0.00	0.00
D	260.0	0.00	180.0	0.0	0.07	0.04	0.00	0.00
D	255.0	0.00	180.0	0.0	0.07	0.04	0.00	0.00
D	255.0	0.00	180.0	0.0	0.06	0.03	0.00	0.00
D	240.0	0.00	42.0	0.0	0.06	0.03	0.00	0.00
D	240.0	0.00	42.0	0.0	0.10	0.05	0.01	0.04
D	235.0	0.00	42.0	0.0	0.10	0.05	0.01	0.04
D	235.0	0.00	42.0	0.0	0.08	0.04	0.01	0.04
D	220.0	0.00	42.0	0.0	0.08	0.04	0.01	0.04
D	220.0	0.00	42.0	0.0	0.10	0.05	0.01	0.04
D	200.0	0.00	42.0	0.0	0.09	0.05	0.02	0.04
D	200.0	0.00	42.0	0.0	0.10	0.07	0.02	0.04
D	185.0	0.00	42.0	0.0	0.09	0.06	0.02	0.04
D	185.0	0.00	42.0	0.0	0.09	0.06	0.02	0.04
D	180.0	0.00	42.0	0.0	0.09	0.06	0.02	0.04
D	180.0	0.00	42.0	0.0	0.10	0.08	0.02	0.04
D	160.0	0.00	42.0	0.0	0.10	0.07	0.02	0.05
D	160.0	0.00	40.4	0.0	0.10	0.09	0.02	0.04
D	130.0	0.00	29.0	0.0	0.11	0.09	0.02	0.05
D	130.0	0.00	30.8	0.0	0.12	0.09	0.02	0.05
D	120.0	0.00	32.3	0.0	0.12	0.09	0.02	0.05
D	120.0	0.00	25.0	0.0	0.11	0.12	0.03	0.05
D	100.0	0.00	24.6	0.0	0.12	0.12	0.03	0.05
D	100.0	0.00	21.7	0.0	0.13	0.13	0.03	0.05
D	80.0	0.00	20.5	0.0	0.14	0.14	0.04	0.06
D	80.0	0.00	17.6	0.0	0.15	0.15	0.05	0.06
D	60.0	0.00	19.2	0.0	0.15	0.15	0.05	0.06
D	60.0	0.00	15.8	0.0	0.13	0.16	0.06	0.05
D	40.0	0.00	16.7	0.0	0.13	0.16	0.05	0.06
D	40.0	0.00	14.2	0.0	0.13	0.19	0.06	0.05
D	0.0	0.00	13.5	0.0	0.13	0.21	0.07	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	175.0	0.0	4.4	0.0	1.10	0.00	0.24	0.00
HP	145.0	0.0	5.2	0.0	0.69	0.00	0.20	0.00
STD+R	100.0	0.0	7.8	0.0	0.98	0.00	0.24	0.00

==========
LOADING CONDITION k ==========

117 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	248.0	0.00	0.0	0.0	0.45	0.13	0.00	0.00
C	241.0	0.00	0.0	0.0	0.91	1.08	0.00	0.00
C	228.6	0.00	0.0	0.0	0.23	0.04	0.00	0.00
C	218.0	0.00	0.0	0.0	0.30	0.18	0.00	0.00
C	185.0	0.00	0.0	0.0	0.27	0.70	0.00	0.00
C	155.0	0.00	0.0	0.0	0.18	0.47	0.00	0.00
C	105.0	0.00	0.0	0.0	0.24	0.70	0.00	0.00
C	98.6	0.00	0.0	0.0	0.59	0.12	0.00	0.00
C	88.0	0.00	0.0	0.0	0.45	0.53	0.00	0.00
D	260.0	0.00	180.0	0.0	0.07	0.03	0.00	0.00
D	255.0	0.00	180.0	0.0	0.07	0.03	0.00	0.00
D	255.0	0.00	180.0	0.0	0.06	0.02	0.00	0.00
D	240.0	0.00	42.0	0.0	0.06	0.03	0.00	0.00
D	240.0	0.00	42.0	0.0	0.10	0.03	0.01	0.04
D	235.0	0.00	42.0	0.0	0.10	0.03	0.01	0.04
D	235.0	0.00	42.0	0.0	0.08	0.03	0.01	0.04
D	220.0	0.00	42.0	0.0	0.08	0.03	0.01	0.04
D	220.0	0.00	42.0	0.0	0.10	0.04	0.01	0.04
D	200.0	0.00	42.0	0.0	0.09	0.03	0.01	0.04
D	200.0	0.00	42.0	0.0	0.10	0.05	0.01	0.04
D	185.0	0.00	42.0	0.0	0.09	0.05	0.01	0.04
D	185.0	0.00	42.0	0.0	0.09	0.05	0.01	0.04
D	180.0	0.00	42.0	0.0	0.09	0.05	0.01	0.04
D	180.0	0.00	42.0	0.0	0.10	0.06	0.01	0.04
D	160.0	0.00	42.0	0.0	0.10	0.05	0.01	0.05
D	160.0	0.00	40.4	0.0	0.10	0.06	0.01	0.04
D	130.0	0.00	29.0	0.0	0.11	0.06	0.02	0.05
D	130.0	0.00	30.8	0.0	0.12	0.07	0.02	0.05
D	120.0	0.00	32.3	0.0	0.12	0.07	0.02	0.05
D	120.0	0.00	25.0	0.0	0.11	0.09	0.02	0.05
D	100.0	0.00	24.6	0.0	0.12	0.09	0.02	0.05
D	100.0	0.00	22.4	0.0	0.13	0.10	0.03	0.05
D	73.3	0.00	18.4	0.0	0.15	0.11	0.04	0.06
D	73.3	0.00	18.4	0.0	0.15	0.11	0.04	0.06
D	60.0	0.00	19.2	0.0	0.15	0.11	0.04	0.06
D	60.0	0.00	15.8	0.0	0.13	0.12	0.04	0.05
D	40.0	0.00	16.7	0.0	0.13	0.12	0.04	0.06
D	40.0	0.00	14.2	0.0	0.13	0.15	0.05	0.05
D	0.0	0.00	13.5	0.0	0.13	0.16	0.05	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	175.0	0.0	4.4	0.0	1.10	0.00	0.18	0.00
HP	145.0	0.0	5.2	0.0	0.69	0.00	0.15	0.00
STD+R	100.0	0.0	7.8	0.0	0.98	0.00	0.18	0.00

==========
LOADING CONDITION AU ==========

40 mph wind with 1.5 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	248.0	0.00	0.0	0.0	0.17	0.49	0.00	0.00
C	241.0	0.00	0.0	0.0	0.23	3.13	0.00	0.00
C	228.6	0.00	0.0	0.0	0.14	0.33	0.00	0.00
C	218.0	0.00	0.0	0.0	0.08	0.50	0.00	0.00
C	185.0	0.00	0.0	0.0	0.05	1.47	0.00	0.00
C	155.0	0.00	0.0	0.0	0.04	1.15	0.00	0.00
C	105.0	0.00	0.0	0.0	0.05	1.44	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	260.0	0.00	180.0	0.0	0.02	0.21	0.00	0.00
D	255.0	0.00	180.0	0.0	0.02	0.21	0.00	0.00
D	255.0	0.00	180.0	0.0	0.01	0.17	0.00	0.00
D	245.0	0.00	180.0	0.0	0.01	0.16	0.00	0.00

D	245.0	0.00	42.0	0.0	0.02	0.17	0.02	0.00
D	240.0	0.00	42.0	0.0	0.02	0.17	0.02	0.00
D	240.0	0.00	42.0	0.0	0.02	0.25	0.09	0.01
D	235.0	0.00	42.0	0.0	0.02	0.25	0.09	0.01
D	235.0	0.00	42.0	0.0	0.02	0.21	0.09	0.01
D	220.0	0.00	42.0	0.0	0.02	0.21	0.09	0.01
D	220.0	0.00	42.0	0.0	0.03	0.26	0.09	0.01
D	215.0	0.00	42.0	0.0	0.03	0.26	0.09	0.01
D	215.0	0.00	42.0	0.0	0.02	0.22	0.10	0.01
D	200.0	0.00	42.0	0.0	0.02	0.22	0.10	0.01
D	200.0	0.00	42.0	0.0	0.03	0.28	0.10	0.01
D	195.0	0.00	42.0	0.0	0.03	0.28	0.10	0.01
D	195.0	0.00	42.0	0.0	0.02	0.24	0.10	0.01
D	180.0	0.00	42.0	0.0	0.02	0.24	0.10	0.01
D	180.0	0.00	42.0	0.0	0.03	0.29	0.10	0.01
D	175.0	0.00	42.0	0.0	0.03	0.29	0.10	0.01
D	175.0	0.00	42.0	0.0	0.02	0.25	0.11	0.01
D	160.0	0.00	42.0	0.0	0.02	0.25	0.11	0.01
D	160.0	0.00	40.7	0.0	0.03	0.30	0.11	0.01
D	155.0	0.00	40.7	0.0	0.03	0.30	0.11	0.01
D	155.0	0.00	36.1	0.0	0.02	0.27	0.12	0.01
D	145.0	0.00	38.3	0.0	0.02	0.28	0.12	0.01
D	145.0	0.00	34.0	0.0	0.03	0.29	0.14	0.01
D	140.0	0.00	34.0	0.0	0.03	0.29	0.14	0.01
D	140.0	0.00	27.8	0.0	0.03	0.29	0.17	0.01
D	125.0	0.00	30.9	0.0	0.03	0.31	0.15	0.01
D	125.0	0.00	32.3	0.0	0.03	0.31	0.15	0.01
D	120.0	0.00	32.3	0.0	0.03	0.31	0.15	0.01
D	120.0	0.00	24.5	0.0	0.03	0.32	0.18	0.01
D	106.7	0.00	26.0	0.0	0.03	0.33	0.18	0.01
D	106.7	0.00	24.1	0.0	0.03	0.34	0.19	0.01
D	100.0	0.00	24.1	0.0	0.03	0.34	0.19	0.01
D	100.0	0.00	21.5	0.0	0.03	0.37	0.22	0.01
D	86.7	0.00	21.5	0.0	0.03	0.38	0.23	0.01
D	86.7	0.00	20.3	0.0	0.03	0.40	0.28	0.01
D	80.0	0.00	20.3	0.0	0.03	0.40	0.28	0.01
D	80.0	0.00	17.6	0.0	0.03	0.43	0.31	0.01
D	60.0	0.00	19.2	0.0	0.03	0.45	0.29	0.01
D	60.0	0.00	15.8	0.0	0.03	0.40	0.34	0.01
D	40.0	0.00	16.7	0.0	0.03	0.41	0.33	0.01
D	40.0	0.00	14.2	0.0	0.03	0.45	0.36	0.01
D	20.0	0.00	14.9	0.0	0.03	0.46	0.35	0.01
D	20.0	0.00	12.9	0.0	0.02	0.44	0.15	0.01
D	10.0	0.00	12.9	0.0	0.02	0.44	0.15	0.01
D	10.0	0.00	13.5	0.0	0.02	0.44	0.29	0.01
D	0.0	0.00	13.5	0.0	0.02	0.44	0.29	0.01

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

.....ANTENNA.....			ATTACHMENT		.....	ANTENNA FORCES.....		
TYPE	ELEV ft	AZI	RAD ft	AZI	AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
STD+R	175.0	0.0	4.4	0.0	0.14	0.00	0.89	0.00
HP	145.0	0.0	5.2	0.0	0.09	0.00	0.84	0.00
STD+R	100.0	0.0	7.8	0.0	0.12	0.00	0.85	0.00

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

ELEV ft	AZI deg	TYPE *	.....BEAM DEFLECTIONS (deg)..... ROLL	YAW	PITCH	TOTAL
175.0	0.0	STD+R	-1.836 S	0.163 k	1.561 J	1.563 J
145.0	0.0	HP	-1.200 S	0.094 P	1.006 J	1.007 J
100.0	0.0	STD+R	-0.638 S	0.037 z	0.527 J	0.527 J

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

ELEV ft	LEGS	DIAG	HORIZ	BRACE
260.0	----------		0.02 BA	0.00 A
	0.06 k	0.09 k		
255.0	----------		0.02 BG	0.00 A
	0.38 k	0.25 J		
250.0	----------		0.01 AC	0.00 A
	1.20 k	0.52 b		
245.0	----------		0.03 BS	0.00 A
	2.67 k	0.84 n		
240.0	----------		0.17 AU	0.00 A
	4.90 k	1.35 n		

```
235.0  ---------------------          0.15 A       0.00 A
           8.62 k       1.63 V
230.0  ---------------------          0.03 AC      0.00 A
          12.65 l       1.89 o
225.0  ---------------------          0.17 B       0.00 A
          17.38 k       2.15 D
220.0  ---------------------          0.55 B       0.00 A
          22.41 k       2.51 l
215.0  ---------------------          0.26 B       0.00 A
          29.06 l       2.80 f
210.0  ---------------------          0.03 AC      0.00 A
          35.46 k       2.97 n
205.0  ---------------------          0.26 B       0.00 A
          42.74 k       3.20 D
200.0  ---------------------          0.63 A       0.00 A
          50.08 k       3.49 k
195.0  ---------------------          0.28 A       0.00 A
          59.06 k       3.79 S
190.0  ---------------------          0.02 AD      0.00 A
          67.44 k       3.90 n
185.0  ---------------------          0.26 A       0.00 A
          76.87 k       4.27 D
180.0  ---------------------          0.99 M       0.00 A
          86.84 k       4.79 AF
175.0  ---------------------          0.39 A       0.00 A
          98.90 k       5.62 V
170.0  ---------------------          0.06 AC      0.00 A
         110.52 k       5.94 D
165.0  ---------------------          0.38 A       0.00 A
         124.24 k       6.03 AF
160.0  ---------------------          1.11 AC      0.00 A
         130.44 k       2.07 AC
155.0  ---------------------          0.34 A       0.00 A
         132.61 k       1.54 U
150.0  ---------------------          0.06 J       0.00 A
         133.03 k       1.59 m
145.0  ---------------------          0.22 A       0.00 A
         135.62 k       1.89 AH
140.0  ---------------------          0.07 J       0.00 A
         137.04 k       2.06 C
135.0  ---------------------          0.16 A       0.00 A
         140.12 k       1.95 AH
130.0  ---------------------          0.09 A       0.00 A
         142.07 k       2.09 F
125.0  ---------------------          0.12 A       0.00 A
         145.05 k       2.07 AH
120.0  ---------------------          0.08 A       0.00 A
         147.69 k       2.40 F
113.3  ---------------------          0.12 A       0.00 A
         151.60 k       2.41 AH
106.7  ---------------------          0.09 Y       0.00 A
         154.88 k       2.58 p
100.0  ---------------------          0.09 A       0.00 A
         159.42 k       3.62 AH
 93.3  ---------------------          0.08 Y       0.00 A
         163.66 k       4.06 F
 86.7  ---------------------          0.07 A       0.00 A
         169.19 k       3.95 AH
 80.0  ---------------------          0.07 Y       0.00 A
         173.97 k       4.31 F
 73.3  ---------------------          0.10 A       0.00 A
         179.56 k       4.16 AH
 66.7  ---------------------          0.06 Y       0.00 A
         184.52 k       4.51 F
 60.0  ---------------------          0.09 A       0.00 A
         191.32 k       4.82 AH
 50.0  ---------------------          0.09 A       0.00 A
         198.86 k       5.13 F
 40.0  ---------------------          0.08 A       0.00 A
         206.82 k       5.06 AH
 30.0  ---------------------          0.08 A       0.00 A
         214.23 k       5.36 F
 20.0  ---------------------          0.01 A       0.00 A
         221.96 k       5.34 AH
 10.0  ---------------------          0.07 A       0.00 A
         229.23 k       5.62 F
  0.0  ---------------------          0.00 A       0.00 A
```

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

ELEV ft	LEGS	DIAG	HORIZ	BRACE
260.0	----------		0.00 k	0.00 A
	-0.16 BM	-0.11 G		
255.0	----------		-0.01 AO	0.00 A
	-0.62 G	-0.27 AO		
250.0	----------		-0.01 Y	0.00 A
	-1.72 G	-0.53 AO		
245.0	----------		-0.02 q	0.00 A
	-3.65 S	-0.87 e		
240.0	----------		-0.11 AC	0.00 A
	-6.77 S	-1.53 S		
235.0	----------		-0.13 AC	0.00 A
	-11.11 S	-1.59 n		
230.0	----------		-0.03 M	0.00 A
	-15.52 S	-1.93 D		
225.0	----------		-0.15 AC	0.00 A
	-20.80 T	-2.17 e		
220.0	----------		-0.53 AD	0.00 A
	-26.38 S	-2.80 T		
215.0	----------		-0.25 AD	0.00 A
	-33.98 T	-2.74 n		
210.0	----------		-0.03 A	0.00 A
	-40.96 S	-3.07 S		
205.0	----------		-0.25 AD	0.00 A
	-49.04 S	-3.22 S		
200.0	----------		-0.63 AC	0.00 A
	-57.10 S	-3.84 S		
195.0	----------		-0.28 AC	0.00 A
	-67.21 S	-3.66 n		
190.0	----------		-0.02 B	0.00 A
	-76.44 S	-4.07 S		
185.0	----------		-0.26 AC	0.00 A
	-87.45 S	-4.29 S		
180.0	----------		-0.93 AO	0.00 A
	-98.20 S	-5.07 e		
175.0	----------		-0.39 AC	0.00 A
	-111.98 S	-5.75 D		
170.0	----------		-0.06 A	0.00 A
	-124.43 S	-5.82 V		
165.0	----------		-0.38 AC	0.00 A
	-139.01 S	-6.17 D		
160.0	----------		-1.10 A	0.00 A
	-145.63 S	-2.07 A		
155.0	----------		-0.34 AC	0.00 A
	-148.58 S	-1.49 m		
150.0	----------		-0.05 AL	0.00 A
	-148.94 S	-1.69 U		
145.0	----------		-0.22 q	0.00 A
	-152.09 S	-2.04 F		
140.0	----------		-0.06 AL	0.00 A
	-153.67 S	-2.02 AE		
135.0	----------		-0.16 AO	0.00 A
	-156.87 S	-2.06 F		
130.0	----------		-0.08 AC	0.00 A
	-159.11 S	-2.09 AE		
125.0	----------		-0.12 AC	0.00 A
	-162.33 S	-2.15 F		
120.0	----------		-0.08 AC	0.00 A
	-165.42 S	-2.44 U		
113.3	----------		-0.11 AC	0.00 A
	-169.87 S	-2.48 F		
106.7	----------		-0.08 q	0.00 A
	-174.17 S	-2.68 U		
100.0	----------		-0.08 AC	0.00 A
	-179.82 S	-3.99 F		
93.3	----------		-0.08 q	0.00 A
	-184.92 S	-3.77 AH		
86.7	----------		-0.07 AC	0.00 A
	-191.24 S	-4.26 F		
80.0	----------		-0.07 q	0.00 A
	-196.91 S	-4.06 AH		
73.3	----------		-0.10 AC	0.00 A
	-203.14 S	-4.42 F		
66.7	----------		-0.05 q	0.00 A
	-209.09 S	-4.30 AH		
60.0	----------		-0.09 AC	0.00 A
	-216.87 S	-5.07 F		
50.0	----------		-0.08 AC	0.00 A
	-225.99 S	-4.95 AH		
40.0	----------		-0.07 AC	0.00 A
	-235.40 S	-5.27 F		
30.0	----------		-0.07 AC	0.00 A
	-244.63 S	-5.22 X		
20.0	----------		-0.01 AC	0.00 A

```
          -254.08 S      -5.51 F
    10.0  ---------------------        -0.06 AC      0.00 A
          -263.23 S      -5.51 X
     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
260.00						
	0.16	31.84	0.00	0.06	51.90	0.00
255.00						
	0.62	31.84	0.02	0.38	51.90	0.01
250.00						
	1.72	31.84	0.05	1.20	51.90	0.02
245.00						
	3.65	31.84	0.11	2.67	51.90	0.05
240.00						
	6.77	31.84	0.21	4.90	51.90	0.09
235.00						
	11.11	31.84	0.35	8.62	51.90	0.17
230.00						
	15.52	31.84	0.49	12.65	51.90	0.24
225.00						
	20.80	31.84	0.65	17.38	51.90	0.33
220.00						
	26.38	57.62	0.46	22.41	82.45	0.27
215.00						
	33.98	57.62	0.59	29.06	82.45	0.35
210.00						
	40.96	57.62	0.71	35.46	82.45	0.43
205.00						
	49.04	57.62	0.85	42.74	82.45	0.52
200.00						
	57.10	111.82	0.51	50.08	146.47	0.34
195.00						
	67.21	111.82	0.60	59.06	146.47	0.40
190.00						
	76.44	111.82	0.68	67.44	146.47	0.46
185.00						
	87.45	111.82	0.78	76.87	146.47	0.52
180.00						
	98.20	143.18	0.69	86.84	178.48	0.49
175.00						
	111.98	143.18	0.78	98.90	178.48	0.55
170.00						
	124.43	143.18	0.87	110.52	178.48	0.62
165.00						
	139.01	143.18	0.97	124.24	178.48	0.70
160.00						
	145.63	177.29	0.82	130.44	213.88	0.61
155.00						
	148.58	177.29	0.84	132.61	213.88	0.62
150.00						
	148.94	177.29	0.84	133.03	213.88	0.62
145.00						
	152.09	177.29	0.86	135.62	213.88	0.63
140.00						
	153.67	177.29	0.87	137.04	213.88	0.64
135.00						
	156.87	177.29	0.88	140.12	213.88	0.66
130.00						
	159.11	177.29	0.90	142.07	213.88	0.66
125.00						
	162.33	177.29	0.92	145.05	213.88	0.68
120.00						
	165.42	241.28	0.69	147.69	296.33	0.50
113.33						
	169.87	241.28	0.70	151.60	296.33	0.51
106.67						
	174.17	241.28	0.72	154.88	296.33	0.52
100.00						
	179.82	241.28	0.75	159.42	296.33	0.54
93.33						
	184.92	241.28	0.77	163.66	296.33	0.55
86.67						
	191.24	241.28	0.79	169.19	296.33	0.57
80.00						
	196.91	241.28	0.82	173.97	296.33	0.59
73.33						
	203.14	241.28	0.84	179.56	296.33	0.61

66.67	209.09	241.28	0.87	184.52	296.33	0.62
60.00	216.87	260.96	0.83	191.32	327.10	0.58
50.00	225.99	260.96	0.87	198.86	327.10	0.61
40.00	235.40	260.96	0.90	206.82	385.58	0.54
30.00	244.63	260.96	0.94	214.23	385.58	0.56
20.00	254.08	336.31	0.76	221.96	407.40	0.54
10.00	263.23	336.31	0.78	229.23	407.40	0.56
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
260.00	0.11	7.16	0.02	0.09	7.16	0.01
255.00	0.27	7.16	0.04	0.25	7.16	0.03
250.00	0.53	7.16	0.07	0.52	7.16	0.07
245.00	0.87	7.16	0.12	0.84	7.16	0.12
240.00	1.53	7.16	0.21	1.35	7.16	0.19
235.00	1.59	7.16	0.22	1.63	7.16	0.23
230.00	1.93	7.16	0.27	1.89	7.16	0.26
225.00	2.17	7.16	0.30	2.15	7.16	0.30
220.00	2.80	7.16	0.39	2.51	7.16	0.35
215.00	2.74	7.16	0.38	2.80	7.16	0.39
210.00	3.07	7.16	0.43	2.97	7.16	0.41
205.00	3.22	7.16	0.45	3.20	7.16	0.45
200.00	3.84	7.16	0.54	3.49	7.16	0.49
195.00	3.66	7.16	0.51	3.79	7.16	0.53
190.00	4.07	7.16	0.57	3.90	7.16	0.54
185.00	4.29	7.16	0.60	4.27	7.16	0.60
180.00	5.07	7.16	0.71	4.79	7.16	0.67
175.00	5.75	7.16	0.80	5.62	7.16	0.78
170.00	5.82	7.16	0.81	5.94	7.16	0.83
165.00	6.17	7.16	0.86	6.03	7.16	0.84
160.00	2.07	7.16	0.29	2.07	7.16	0.29
155.00	1.49	7.16	0.21	1.54	7.16	0.22
150.00	1.69	7.16	0.24	1.59	7.16	0.22
145.00	2.04	7.16	0.28	1.89	7.16	0.26
140.00	2.02	7.13	0.28	2.06	7.13	0.29
135.00	2.06	7.13	0.29	1.95	7.13	0.27
130.00	2.09	7.13	0.29	2.09	7.13	0.29
125.00	2.15	7.13	0.30	2.07	7.13	0.29
120.00	2.44	6.51	0.37	2.40	6.51	0.37
113.33	2.48	6.51	0.38	2.41	6.51	0.37
106.67	2.68	6.51	0.41	2.58	6.51	0.40

```
100.00 ----------------------------------------------
          3.99    9.45    0.42    3.62    9.45    0.38
 93.33 ----------------------------------------------
          3.77    9.45    0.40    4.06    9.45    0.43
 86.67 ----------------------------------------------
          4.26    9.45    0.45    3.95    9.45    0.42
 80.00 ----------------------------------------------
          4.06   13.10    0.31    4.31   13.10    0.33
 73.33 ----------------------------------------------
          4.42   13.10    0.34    4.16   13.10    0.32
 66.67 ----------------------------------------------
          4.30   13.10    0.33    4.51   13.10    0.34
 60.00 ----------------------------------------------
          5.07    8.84    0.57    4.82    8.84    0.55
 50.00 ----------------------------------------------
          4.95    8.84    0.56    5.13    8.84    0.58
 40.00 ----------------------------------------------
          5.27   15.88    0.33    5.06   15.88    0.32
 30.00 ----------------------------------------------
          5.22   15.88    0.33    5.36   15.88    0.34
 20.00 ----------------------------------------------
          5.51   13.59    0.41    5.34   13.59    0.39
 10.00 ----------------------------------------------
          5.51   13.59    0.41    5.62   13.59    0.41
  0.00 ----------------------------------------------

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

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

    23.36 S      19.06 e     267.60 S    -232.72 k      23.37 S


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

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

   37.7   -30.3    37.7    97.1      4660.8     -3788.7      4660.8    18.0
     S       q       S       AZ          S           G           S       h


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


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

Sabre Towers and Poles                            on: 18 mar 2020  at: 17:24:13
==============================================================================




******************************************************************************
***************************  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   ELEV  APPLY..LOAD..AT   LOAD  ......FORCES......  ......MOMENTS......
 TYPE           RADIUS    AZI    AZI     HORIZ      DOWN  VERTICAL   TORSNAL
          ft        ft                     kip       kip    ft-kip    ft-kip

 C     248.0      0.00    0.0    0.0      0.23      0.15      0.00      0.00
 C     241.0      0.00    0.0    0.0      0.24      1.20      0.00      0.00
 C     228.6      0.00    0.0    0.0      0.06      0.05      0.00      0.00
```

C	218.0	0.00	0.0	0.0	0.08	0.19	0.00	0.00
C	185.0	0.00	0.0	0.0	0.07	0.78	0.00	0.00
C	155.0	0.00	0.0	0.0	0.05	0.52	0.00	0.00
C	105.0	0.00	0.0	0.0	0.06	0.78	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	260.0	0.00	180.0	0.0	0.02	0.03	0.00	0.00
D	245.0	0.00	180.0	0.0	0.02	0.03	0.00	0.00
D	245.0	0.00	42.0	0.0	0.02	0.03	0.00	0.00
D	230.0	0.00	42.0	0.0	0.02	0.04	0.01	0.01
D	230.0	0.00	42.0	0.0	0.02	0.03	0.01	0.01
D	220.0	0.00	42.0	0.0	0.02	0.03	0.01	0.01
D	220.0	0.00	42.0	0.0	0.03	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	0.06	0.01	0.01
D	185.0	0.00	42.0	0.0	0.02	0.05	0.01	0.01
D	185.0	0.00	42.0	0.0	0.02	0.05	0.01	0.01
D	180.0	0.00	42.0	0.0	0.02	0.05	0.01	0.01
D	180.0	0.00	42.0	0.0	0.03	0.06	0.01	0.01
D	160.0	0.00	42.0	0.0	0.03	0.06	0.01	0.01
D	160.0	0.00	40.4	0.0	0.03	0.07	0.01	0.01
D	130.0	0.00	29.0	0.0	0.03	0.07	0.02	0.01
D	130.0	0.00	30.8	0.0	0.03	0.07	0.02	0.01
D	120.0	0.00	32.3	0.0	0.03	0.07	0.02	0.01
D	120.0	0.00	25.2	0.0	0.03	0.10	0.02	0.01
D	80.0	0.00	21.0	0.0	0.04	0.11	0.03	0.02
D	80.0	0.00	17.6	0.0	0.04	0.12	0.04	0.02
D	60.0	0.00	19.2	0.0	0.04	0.13	0.04	0.02
D	60.0	0.00	15.8	0.0	0.04	0.13	0.05	0.01
D	40.0	0.00	16.7	0.0	0.04	0.13	0.04	0.01
D	40.0	0.00	14.2	0.0	0.04	0.16	0.05	0.01
D	0.0	0.00	13.5	0.0	0.04	0.17	0.06	0.01

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

.....ANTENNA.....			ATTACHMENT		.....ANTENNA FORCES.....			
TYPE	ELEV ft	AZI	RAD ft	AZI	AXIAL kip	SHEAR kip	GRAVITY kip	TORSION ft-kip
STD+R	175.0	0.0	4.4	0.0	0.29	0.00	0.20	0.00
HP	145.0	0.0	5.2	0.0	0.18	0.00	0.17	0.00
STD+R	100.0	0.0	7.8	0.0	0.26	0.00	0.20	0.00

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

ELEV	------DEFLECTIONS (ft)-----			--TILTS (DEG)---		TWIST
ft	NORTH	EAST	DOWN	NORTH	EAST	DEG
260.0	1.570 S	-1.347 J	0.013 S	0.765 S	-0.668 J	0.071 h
255.0	1.503 S	-1.289 J	0.013 S	0.765 S	-0.668 J	0.071 h
250.0	1.436 S	-1.230 J	0.012 S	0.764 S	-0.668 J	0.071 h
245.0	1.370 S	-1.172 J	0.012 S	0.763 S	-0.667 J	0.071 h
240.0	1.303 S	-1.114 J	0.011 S	0.760 S	-0.664 J	0.071 h
235.0	1.237 S	-1.056 J	0.011 S	0.754 S	-0.658 J	0.071 h
230.0	1.171 S	-0.999 J	0.010 S	0.744 S	-0.649 J	0.071 h
225.0	1.106 S	-0.942 J	0.010 S	0.730 S	-0.636 J	0.070 h
220.0	1.043 S	-0.887 J	0.009 S	0.711 S	-0.619 J	0.069 h
215.0	0.981 S	0.833 b	0.009 S	0.696 S	-0.605 J	0.067 h
210.0	0.921 S	0.781 b	0.008 S	0.677 S	-0.587 J	0.066 h
205.0	0.862 S	0.730 b	0.008 S	0.654 S	-0.566 J	0.064 h
200.0	0.806 S	0.681 b	0.008 S	0.626 S	-0.541 J	0.061 h
195.0	0.751 S	0.634 b	0.007 S	0.608 S	-0.524 J	0.058 h
190.0	0.699 S	0.589 b	0.007 S	0.587 S	-0.505 J	0.055 h
185.0	0.647 S	0.545 b	0.007 S	0.562 S	-0.483 J	0.052 h
180.0	0.599 S	0.503 b	0.006 S	0.535 S	-0.459 J	0.048 h
175.0	0.552 S	0.463 b	0.006 S	0.510 S	-0.436 J	0.044 h
170.0	0.509 S	0.426 b	0.006 S	0.481 S	-0.411 J	0.041 h
165.0	0.467 S	0.390 b	0.005 S	0.449 S	-0.383 J	0.038 h
160.0	0.428 S	0.357 b	0.005 S	0.414 S	-0.351 J	0.035 h
155.0	0.393 S	0.328 b	0.005 S	0.383 S	-0.325 J	0.031 h
150.0	0.362 S	0.301 b	0.005 S	0.357 S	-0.302 J	0.028 h
145.0	0.331 S	0.275 b	0.005 S	0.331 S	-0.280 J	0.025 h
140.0	0.304 S	0.252 b	0.004 S	0.308 S	0.259 b	0.023 h
135.0	0.278 S	0.230 b	0.004 S	0.286 S	0.240 b	0.021 h
130.0	0.254 S	0.210 b	0.004 S	0.265 S	0.222 b	0.019 h
125.0	0.231 S	0.191 b	0.004 S	0.245 S	0.205 b	0.017 h
120.0	0.211 S	0.174 b	0.004 S	0.226 S	0.189 b	0.015 h
113.3	0.185 S	0.153 b	0.004 S	0.208 S	0.174 b	0.013 h
106.7	0.162 S	0.134 b	0.003 S	0.191 S	0.159 b	0.011 h
100.0	0.141 S	0.116 b	0.003 S	0.175 S	0.146 b	0.010 h
93.3	0.121 S	0.099 b	0.003 S	0.160 S	0.133 b	0.009 h
86.7	0.103 S	0.085 b	0.003 S	0.145 S	0.120 b	0.008 h

80.0	0.087 S	0.071 b	0.003 S	0.130 S	0.108 b	0.007 h
73.3	0.072 S	0.059 b	0.002 h	0.116 S	0.096 b	0.007 h
66.7	0.059 S	0.048 b	0.002 S	0.102 S	0.084 b	0.006 h
60.0	0.048 S	0.039 b	0.002 h	0.088 S	0.072 b	0.005 h
50.0	0.033 S	0.027 b	0.002 S	0.072 S	0.060 b	0.004 h
40.0	0.022 S	0.018 b	0.001 A	0.057 S	0.047 b	0.003 h
30.0	0.013 S	-0.010 G	0.001 S	0.042 S	0.035 b	0.002 h
20.0	0.006 S	-0.005 G	0.001 A	0.027 S	0.022 b	0.001 h
10.0	0.002 S	-0.001 G	0.000 j	0.013 S	0.011 b	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
175.0	0.0	STD+R	-0.510 S	0.043 S	0.436 J	0.437 J
145.0	0.0	HP	-0.331 S	0.025 h	0.280 J	0.280 J
100.0	0.0	STD+R	-0.175 S	0.010 h	-0.146 b	0.146 b

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

ELEV ft	LEGS	DIAG	HORIZ	BRACE
260.0	----------		0.01 S	0.00 A
	0.00 M	0.02 b		
255.0	----------		0.01 M	0.00 A
	0.04 A	0.06 Y		
250.0	----------		0.00 e	0.00 A
	0.23 Y	0.17 D		
245.0	----------		0.01 Y	0.00 A
	0.62 A	0.27 V		
240.0	----------		0.08 A	0.00 A
	1.09 A	0.38 D		
235.0	----------		0.06 A	0.00 A
	2.12 A	0.50 V		
230.0	----------		0.01 T	0.00 A
	3.29 A	0.54 D		
225.0	----------		0.06 A	0.00 A
	4.62 A	0.62 V		
220.0	----------		0.18 B	0.00 A
	6.03 A	0.69 B		
215.0	----------		0.09 B	0.00 A
	7.81 B	0.80 f		
210.0	----------		0.01 S	0.00 A
	9.60 A	0.82 D		
205.0	----------		0.08 B	0.00 A
	11.60 A	0.90 D		
200.0	----------		0.20 A	0.00 A
	13.62 A	0.95 A		
195.0	----------		0.09 A	0.00 A
	16.03 A	1.06 S		
190.0	----------		0.00 T	0.00 A
	18.32 A	1.07 D		
185.0	----------		0.08 A	0.00 A
	20.67 A	1.18 D		
180.0	----------		0.31 M	0.00 A
	23.41 A	1.27 V		
175.0	----------		0.12 A	0.00 A
	26.46 A	1.53 V		
170.0	----------		0.02 D	0.00 A
	29.61 A	1.62 D		
165.0	----------		0.12 A	0.00 A
	33.32 A	1.63 V		
160.0	----------		0.29 S	0.00 A
	34.92 A	0.53 S		
155.0	----------		0.10 A	0.00 A
	35.14 A	0.41 U		
150.0	----------		0.02 J	0.00 A
	35.13 A	0.39 C		
145.0	----------		0.07 A	0.00 A
	35.56 A	0.47 U		
140.0	----------		0.03 b	0.00 A
	35.80 A	0.54 C		
135.0	----------		0.05 A	0.00 A
	36.53 A	0.49 X		
130.0	----------		0.03 Y	0.00 A
	36.91 A	0.55 C		
125.0	----------		0.04 A	0.00 A
	37.59 A	0.53 X		
120.0	----------		0.03 Y	0.00 A

	38.14 A	0.63 F		
113.3	----------		0.04 A	0.00 A
	39.01 A	0.63 X		
106.7	----------		0.03 Y	0.00 A
	39.56 A	0.69 F		
100.0	----------		0.03 A	0.00 A
	40.39 A	0.94 X		
93.3	----------		0.03 M	0.00 A
	41.30 A	1.10 F		
86.7	----------		0.02 A	0.00 A
	42.53 A	1.03 X		
80.0	----------		0.02 Y	0.00 A
	43.58 A	1.17 F		
73.3	----------		0.03 A	0.00 A
	44.91 A	1.09 X		
66.7	----------		0.02 Y	0.00 A
	46.01 A	1.23 F		
60.0	----------		0.03 A	0.00 A
	47.61 A	1.28 X		
50.0	----------		0.03 M	0.00 A
	49.29 A	1.39 F		
40.0	----------		0.02 A	0.00 A
	51.10 A	1.35 X		
30.0	----------		0.03 A	0.00 A
	52.68 A	1.46 F		
20.0	----------		0.00 A	0.00 A
	54.38 A	1.44 X		
10.0	----------		0.02 A	0.00 A
	55.93 A	1.53 F		
0.0	----------		0.00 A	0.00 A

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

ELEV ft	LEGS	DIAG	HORIZ	BRACE
260.0	----------		0.00 M	0.00 A
	-0.04 G	-0.03 G		
255.0	----------		0.00 e	0.00 A
	-0.20 S	-0.07 G		
250.0	----------		0.00 Y	0.00 A
	-0.58 G	-0.17 S		
245.0	----------		0.00 G	0.00 A
	-1.30 S	-0.29 D		
240.0	----------		-0.01 S	0.00 A
	-2.47 S	-0.49 S		
235.0	----------		-0.03 S	0.00 A
	-3.86 S	-0.46 D		
230.0	----------		-0.01 B	0.00 A
	-5.16 T	-0.57 V		
225.0	----------		-0.03 S	0.00 A
	-6.74 T	-0.63 W		
220.0	----------		-0.13 T	0.00 A
	-8.37 S	-0.82 T		
215.0	----------		-0.06 T	0.00 A
	-10.64 T	-0.76 E		
210.0	----------		-0.01 A	0.00 A
	-12.62 S	-0.87 S		
205.0	----------		-0.06 T	0.00 A
	-14.95 S	-0.90 D		
200.0	----------		-0.16 S	0.00 A
	-17.22 S	-1.09 S		
195.0	----------		-0.07 S	0.00 A
	-20.14 S	-1.01 D		
190.0	----------		-0.01 B	0.00 A
	-22.73 S	-1.13 S		
185.0	----------		-0.06 S	0.00 A
	-26.02 S	-1.18 V		
180.0	----------		-0.22 G	0.00 A
	-28.98 S	-1.42 e		
175.0	----------		-0.10 S	0.00 A
	-33.03 S	-1.57 D		
170.0	----------		-0.02 A	0.00 A
	-36.47 S	-1.59 V		
165.0	----------		-0.10 S	0.00 A
	-40.50 S	-1.70 D		
160.0	----------		-0.33 A	0.00 A
	-42.30 S	-0.61 A		
155.0	----------		-0.09 S	0.00 A
	-43.30 S	-0.37 C		

```
    150.0  ---------------------        -0.01 S       0.00 A
             -43.35 S      -0.46 U
    145.0  ---------------------        -0.06 G       0.00 A
             -44.34 S      -0.54 F
    140.0  ---------------------        -0.01 S       0.00 A
             -44.78 S      -0.52 U
    135.0  ---------------------        -0.04 G       0.00 A
             -45.65 S      -0.55 F
    130.0  ---------------------        -0.02 S       0.00 A
             -46.31 S      -0.54 U
    125.0  ---------------------        -0.03 G       0.00 A
             -47.21 S      -0.57 F
    120.0  ---------------------        -0.02 S       0.00 A
             -48.12 S      -0.64 U
    113.3  ---------------------        -0.03 S       0.00 A
             -49.43 S      -0.67 F
    106.7  ---------------------        -0.02 S       0.00 A
             -50.86 S      -0.73 U
    100.0  ---------------------        -0.02 S       0.00 A
             -52.71 S      -1.10 F
     93.3  ---------------------        -0.02 S       0.00 A
             -54.28 S      -0.99 X
     86.7  ---------------------        -0.02 S       0.00 A
             -56.21 S      -1.17 F
     80.0  ---------------------        -0.01 S       0.00 A
             -57.93 S      -1.08 X
     73.3  ---------------------        -0.02 S       0.00 A
             -59.76 S      -1.21 F
     66.7  ---------------------        -0.01 S       0.00 A
             -61.57 S      -1.15 X
     60.0  ---------------------        -0.02 S       0.00 A
             -63.88 S      -1.39 F
     50.0  ---------------------        -0.02 S       0.00 A
             -66.67 S      -1.33 X
     40.0  ---------------------        -0.02 S       0.00 A
             -69.52 S      -1.45 F
     30.0  ---------------------        -0.02 S       0.00 A
             -72.41 S      -1.41 X
     20.0  ---------------------         0.00 A       0.00 A
             -75.33 S      -1.52 F
     10.0  ---------------------        -0.01 S       0.00 A
             -78.22 S      -1.51 X
      0.0  ---------------------         0.00 A       0.00 A

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

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

     6.74 S       5.53 e      79.59 S     -56.68 A       6.74 S

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

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

   10.3    -8.3    10.3    28.3      1276.0      1043.1      1276.0     4.7
     S       G       S       j           S           b           S       h

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