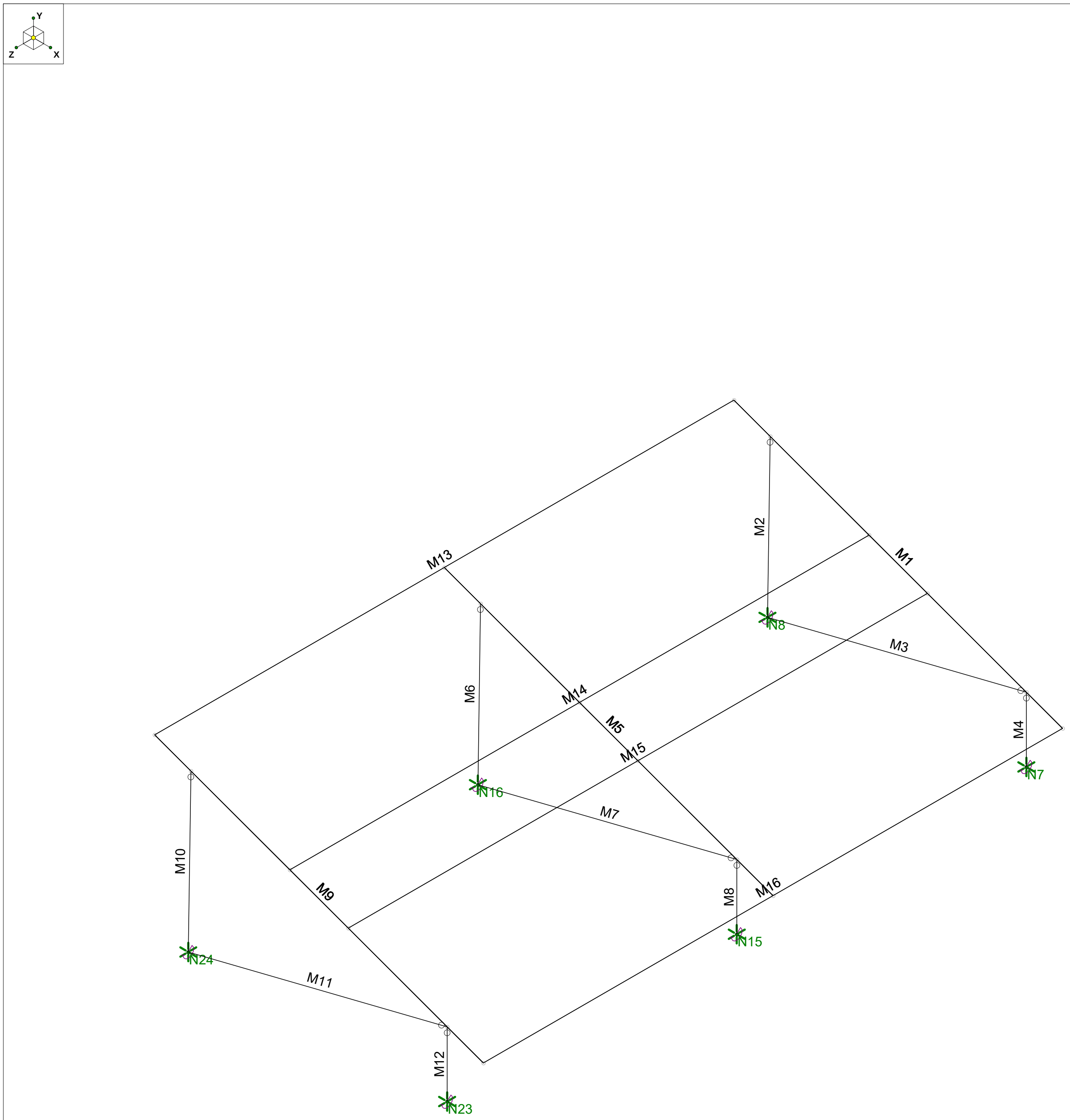


Schletter, Inc.		20° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-05	

1. INTRODUCTION

1.1 Project Description

The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. PVMax ground mount system.

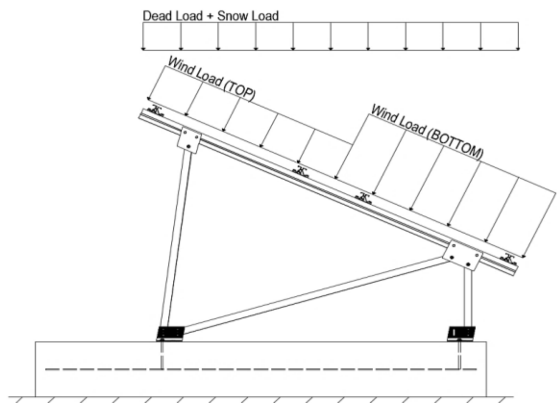
1.2 Construction

Photovoltaic modules are attached to aluminum purlins using clamp fasteners. Purlins are clamped to inclined aluminum girders, which are then connected to aluminum struts. Each support structure is equally spaced.

PV modules are required to meet the following specifications:

	Maximum			Minimum	
Height =	2000	mm	Height =	1900	mm
Width =	1050	mm	Width =	970	mm
Dead Load =	3.00	psf	Dead Load =	1.75	psf

Modules Per Row = 2
Module Tilt = 20°
Maximum Height Above Grade = 3 ft



Typical loading conditions of the module dead loads, snow loads, and wind loads are shown on the left.

1.3 Technical Codes

- ASCE 7-05 - Chapter 6, Wind Loads
- ASCE 7-05 - Chapter 7, Snow Loads
- ASCE 7-05 - Chapter 2, Combination of Loads
- International Building Code, IBC, 2003, 2006, 2009
- Aluminum Design Manual, Eighth Edition, 2005

2. LOAD ACTIONS

2.1 Permanent Loads

g_{MAX} = 3.00 psf
g_{MIN} = 1.75 psf

Self-weight of the PV modules.

2.2 Snow Loads

Ground Snow Load, P_g = 30.00 psf
Sloped Roof Snow Load, P_s = 20.62 psf *(ASCE 7-05, Eq. 7-2)*
I_s = 1.00
C_s = 0.91
C_e = 0.90
C_t = 1.20

2.3 Wind Loads

Design Wind Speed, V = 90 mph — Exposure Category = C
Height < 15 ft — Importance Category = II

Peak Velocity Pressure, q_z = 12.72 psf *Including the gust factor, G=0.85. (ASCE 7-05, Eq. 6-15)*

Pressure Coefficients

$Cf+_{TOP}$	=	1.050	*(Pressure)*
$Cf+_{BOTTOM}$	=	1.650	
$Cf-_{TOP, OUTER PURLIN}$	=	-2.400	*(Suction)*
$Cf-_{TOP, INNER PURLIN}$	=	-1.840	
$Cf-_{BOTTOM}$	=	-1.000	

Provided pressure coefficients are the result of wind tunnel testing done by Ruscheweyh Consult. Coefficients are located in test report # 1127/0611-1e. Negative forces are applied away from the surface.

2.4 Seismic Loads

S_S =	2.50	R =	1.25
S_{DS} =	1.67	C_S =	0.8
S_1 =	1.00	ρ =	1.3
S_{D1} =	1.00	Ω =	1.25
T_a =	0.06	C_d =	1.25

ASCE 7, Section 12.8.1.3: A maximum S_s of 1.5 may be used to calculate the base shear, C_s, of structures under five stories and with a period, T, of 0.5 or less. Therefore, a S_{ds} of 1.0 was used to calculate C_s.

2.5 Combination of Loads

ASCE 7 requires that all structures be checked by specified combinations of loads. Applicable load combinations are provided below.

Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

1.2D + 1.6S + 0.8W
1.2D + 1.6W + 0.5S
0.9D + 1.6W [M]
1.54D + 1.3E + 0.2S [R]
0.56D + 1.3E [R]
1.54D + 1.25E + 0.2S [O]
0.56D + 1.25E [O]

(ASCE 7, Eq 2.3.2-1 through 2.3.2-7) & (ASCE 7, Section 12.4.3.2)

Allowable Stress Design, ASD

Member deflection checks and foundation designs are done according to the following ASD load combinations:

1.0D + 1.0S
1.0D + 1.0W
1.0D + 0.75L + 0.75W + 0.75S
0.6D + 1.0W [M]
1.238D + 0.875E [O]
1.1785D + 0.65625E + 0.75S [O]
0.362D + 0.875E [O]

(ASCE 7, Eq 2.4.1-1 through 2.4.1-8) & (ASCE 7, Section 12.4.3.2)

[M] *Uses the minimum allowable module dead load.*
[R] *Include redundancy factor of 1.3.*
[O] *Includes overstrength factor of 1.25. Used to check seismic drift.*

3. STRUCTURAL ANALYSIS

3.1 RISA Results

Appendix B.1 contains outputs from the structural analysis software package, RISA. These outputs are used to accurately determine resultant member and reaction forces from the loads seen throughout Section 2.

3.2 RISA Components

A member and node list has been provided below to correlate the RISA components with the design calculations in Section 4. Items of significance have been listed.

Purlins	Location	**Diagonal Struts**	Location	**Front Reactions**	Location
M13	Top	M3	Outer	N7	Outer
M14	Mid-Top	M7	Inner	N15	Inner
M15	Mid-Bottom	M11	Outer	N23	Outer
M16	Bottom				

Girders	Location	**Rear Struts**	Location	**Rear Reactions**	Location
M1	Outer	M2	Outer	N8	Outer
M5	Inner	M6	Inner	N16	Inner
M9	Outer	M10	Outer	N24	Outer

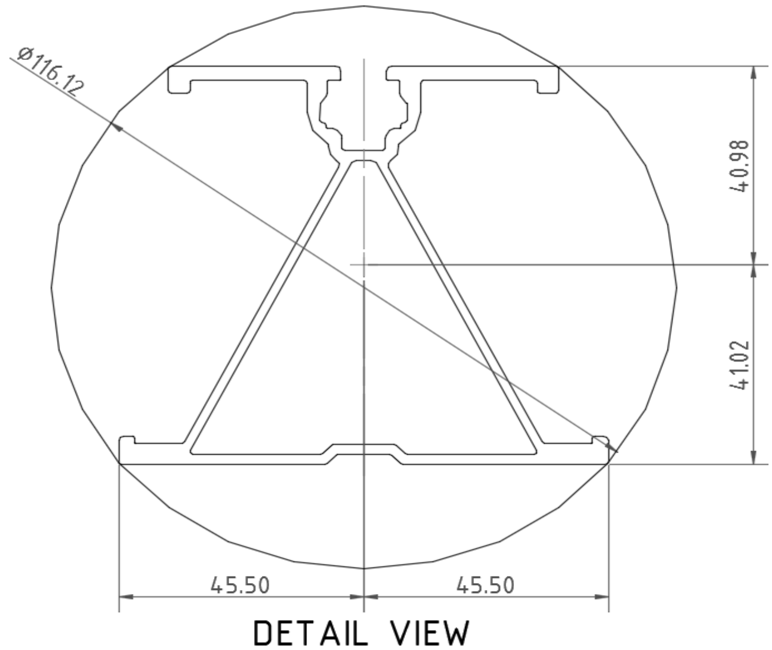
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

4. MEMBER DESIGN CALCULATIONS

4.1 Purlin Design

Aluminum purlins are used to transfer loads to the support structure. Purlins are designed as continous beams with cantilevers. These are considered beams with internal hinges that can be joined with splices at 25% of the support respective span. See Appendix A.1 for detailed member calculations. Section units are in (mm).

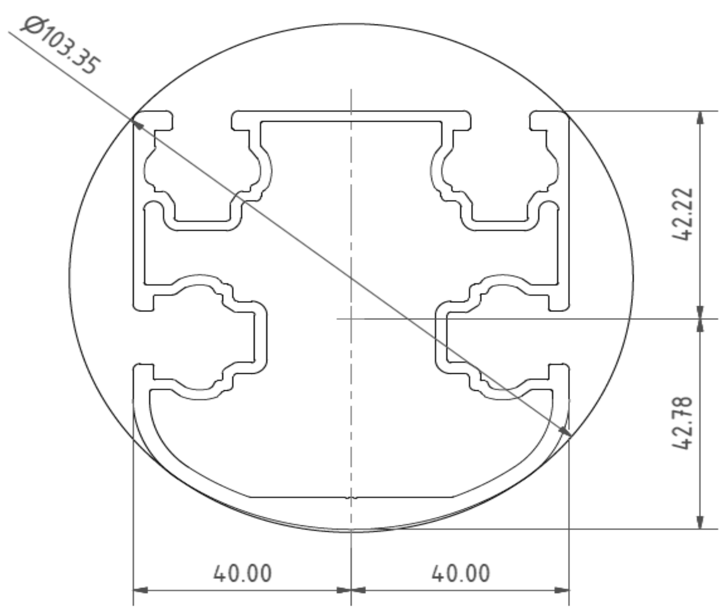
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	108	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	1.730	k-ft
M_z =	0.292	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	88%	



4.2 Girder Design

Loads from purlins are transferred using an inclined girder, which is connected to a set of aluminum struts. Loads on the girder result from the support reactions of the purlins. See Appendix A.2 for detailed member calculations. Section units are in (mm).

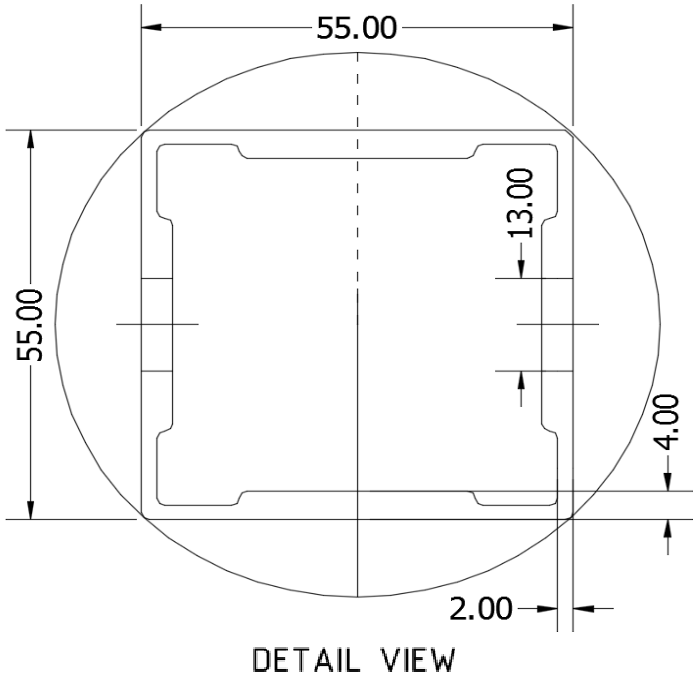
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	104.56	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.00	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.330	k-ft
M_z =	0.000	k-ft
P_n =	-0.379	k
$M_{y\ allowable}$ =	3.422	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	98%	



4.3 Front Strut Design

The front aluminum strut connects a portion of the girder to the foundation. Vertical girder forces are then transferred down through the strut into the foundation. The strut is attached with single M12 bolts at each end. See Appendix A.3 for detailed member calculations. Section units are in (mm).

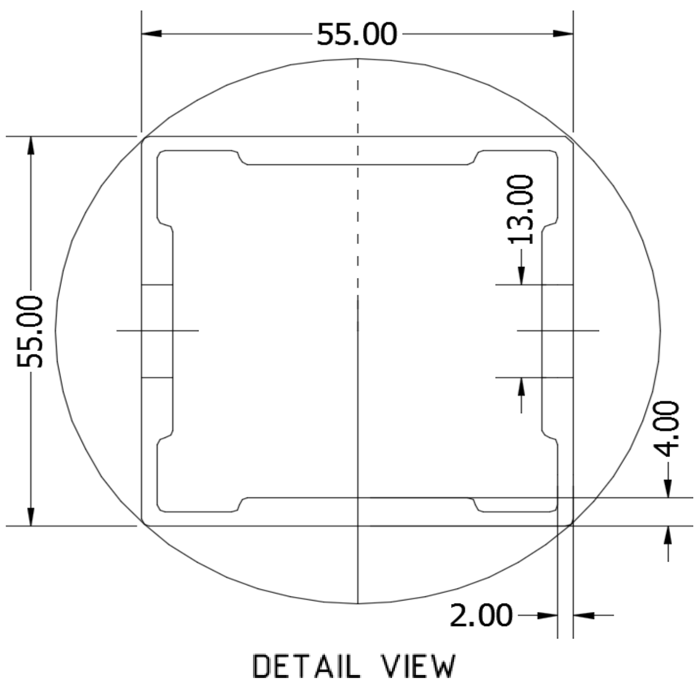
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.536	k-ft
P_n =	0.662	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	40%	



4.4 Diagonal Strut Design

A diagonal aluminum strut braces the support structure. It connects at a front portion of the girder and transfers horizontal forces to the rear foundation connection. The strut is attached with single M12 bolts at each end. See Appendix A.4 for detailed member calculations. Section units are in (mm).

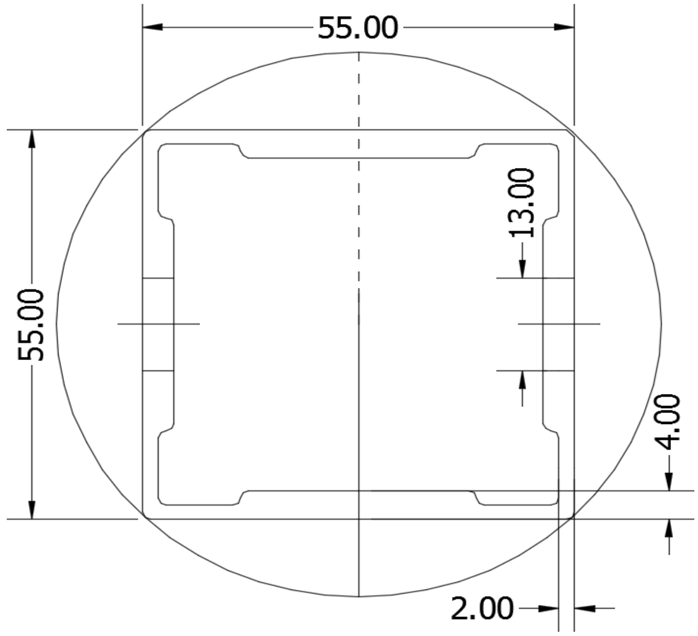
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	98.03	in
$\Phi F_{ty\ AXIAL}$ =	6.11	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.012	k-ft
M_z =	0.000	k-ft
P_n =	1.457	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	6.000	k
Utilization =	25%	



4.5 Rear Strut Design

An aluminum strut connects the rear portion of the girder to the rear foundation connection. Both vertical and horizontal forces are transferred from the girder. The strut is attached with single M12 bolts at each end. See Appendix A.5 for detailed member calculations. Section units are in (mm).

Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	61.10	in
$\Phi F_{ty\ AXIAL}$ =	13.63	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	-0.011	k-ft
M_z =	-0.317	k-ft
P_n =	0.690	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	13.386	k
Utilization =	28%	



DETAIL VIEW

5. FOUNDATION DESIGN CALCULATIONS

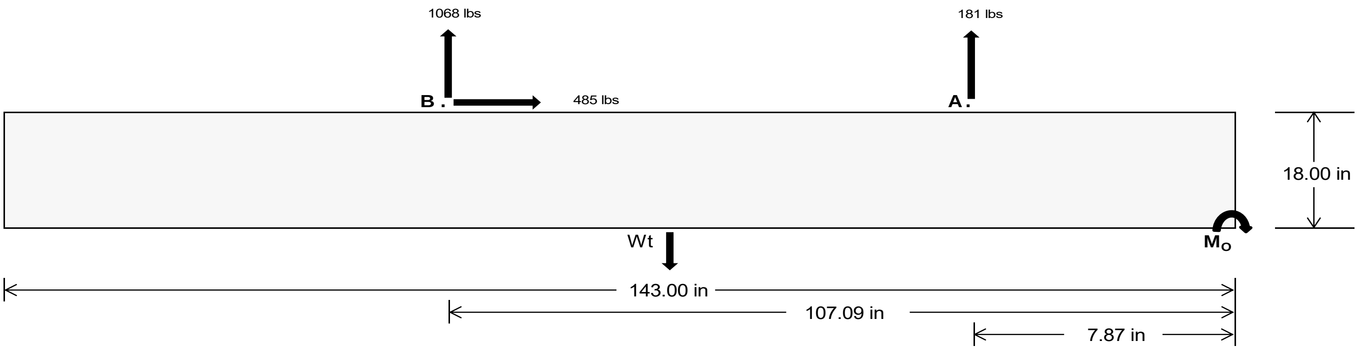
5.1 Helical Pile Foundations

The following LRFD loads include a safety factor of 1.3, and are to be used in conjunction with a Schletter, Inc. Geotechnical Investigation Report. The forces below should fall within the guidelines provided in the Geotechnical Investigation Report. If a Geotechnical Investigation Report is not present, please proceed to Section 5.2 for a concrete foundation design.

Maximum	Front	Rear	
Tensile Load =	764.43	4455.60	k
Compressive Load =	4230.95	4754.95	k
Lateral Load =	353.67	2016.29	k
Moment (Weak Axis) =	0.72	0.41	k

5.2 Design of Ballast Foundations

Ballast foundations are used to secure the racking structure in place. The foundations are checked for potential overturning and sliding. Bearing pressures applied by the racking and ballast foundations are checked against the allowable bearing pressures provided by the IBC tables 1804.2 (2003, 2006) & 1806.2 (2009).



Concrete Properties	
Weight of Concrete =	145 pcf
Compressive Strength =	2500 psi
Yield Strength =	60000 psi

Footing Reinforcement

Use fiber reinforcing with (2) #5 rebar.

Overturning Check	
M_O =	124503.7 in-lbs
Resisting Force Required =	1741.31 lbs
S.F. =	1.67
Weight Required =	2902.19 lbs
Minimum Width =	35 in in
Weight Provided =	7559.64 lbs

A minimum 143in long x 35in wide x 18in tall ballast foundation is required to resist overturning.

Sliding	
Force =	484.52 lbs
Friction =	0.4
Weight Required =	1211.30 lbs
Resisting Weight =	7559.64 lbs
Additional Weight Required =	0 lbs

Use a 143in long x 35in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

Cohesion	
Sliding Force =	484.52 lbs
Cohesion =	130 psf
Area =	34.76 ft^2
Resisting =	3779.82 lbs
Additional Weight Required =	0 lbs

Use a 143in long x 35in wide x 18in tall ballast foundation. Cohesion is OK.

Shear Key	
Additional Force =	0 lbs
Lateral Bearing Pressure =	200 psf/ft
Required Depth =	0.00 ft
f'_c =	2500 psi
Length =	8 in

Shear key is not required.

Bearing Pressure

	Ballast Width			
	35 in	36 in	37 in	38 in
P_{ftg} = (145 pcf)(11.92 ft)(1.5 ft)(2.92 ft) =	7560 lbs	7776 lbs	7992 lbs	8208 lbs

ASD LC	1.0D + 1.0S				1.0D + 1.0W				1.0D + 0.75L + 0.75W + 0.75S				0.6D + 1.0W			
Width	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in	35 in	36 in	37 in	38 in
F_A	1582 lbs	1582 lbs	1582 lbs	1582 lbs	1294 lbs	1294 lbs	1294 lbs	1294 lbs	2028 lbs	2028 lbs	2028 lbs	2028 lbs	-361 lbs	-361 lbs	-361 lbs	-361 lbs
F_B	1703 lbs	1703 lbs	1703 lbs	1703 lbs	1577 lbs	1577 lbs	1577 lbs	1577 lbs	2322 lbs	2322 lbs	2322 lbs	2322 lbs	-2136 lbs	-2136 lbs	-2136 lbs	-2136 lbs
F_V	170 lbs	170 lbs	170 lbs	170 lbs	872 lbs	872 lbs	872 lbs	872 lbs	769 lbs	769 lbs	769 lbs	769 lbs	-969 lbs	-969 lbs	-969 lbs	-969 lbs
P_{total}	10845 lbs	11061 lbs	11277 lbs	11493 lbs	10431 lbs	10647 lbs	10863 lbs	11079 lbs	11910 lbs	12126 lbs	12342 lbs	12558 lbs	2039 lbs	2168 lbs	2298 lbs	2427 lbs
M	3593 lbs-ft	3593 lbs-ft	3593 lbs-ft	3593 lbs-ft	3495 lbs-ft	3495 lbs-ft	3495 lbs-ft	3495 lbs-ft	5022 lbs-ft	5022 lbs-ft	5022 lbs-ft	5022 lbs-ft	2964 lbs-ft	2964 lbs-ft	2964 lbs-ft	2964 lbs-ft
e	0.33 ft	0.32 ft	0.32 ft	0.31 ft	0.34 ft	0.33 ft	0.32 ft	0.32 ft	0.42 ft	0.41 ft	0.41 ft	0.40 ft	1.45 ft	1.37 ft	1.29 ft	1.22 ft
L/6	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft	1.99 ft
f_{min}	260.0 psf	258.8 psf	257.7 psf	256.6 psf	249.5 psf	248.6 psf	247.7 psf	246.9 psf	269.9 psf	268.4 psf	267.1 psf	265.8 psf	15.7 psf	18.9 psf	21.9 psf	24.8 psf
f_{max}	364.1 psf	360.0 psf	356.2 psf	352.5 psf	350.7 psf	347.0 psf	343.5 psf	340.2 psf	415.4 psf	409.9 psf	404.7 psf	399.8 psf	101.6 psf	102.4 psf	103.2 psf	103.9 psf

Maximum Bearing Pressure = 415 psf
Allowable Bearing Pressure = 1500 psf

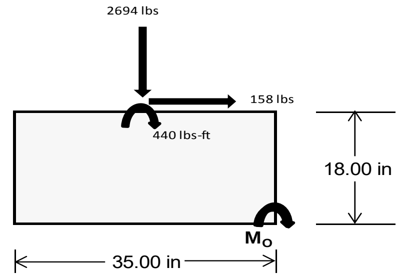
Use a 143in long x 35in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 3251.2 ft-lbs
Resisting Force Required = 2229.40 lbs
S.F. = 1.67
Weight Required = 3715.67 lbs
Minimum Width = 35 in in
Weight Provided = 7559.64 lbs

A minimum 143in long x 35in wide x 18in tall ballast foundation is required to resist overturning.



Bearing Pressure

ASD LC	1.238D + 0.875E			1.1785D + 0.65625E + 0.75S			0.362D + 0.875E		
Width	35 in			35 in			35 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	290 lbs	663 lbs	224 lbs	956 lbs	2694 lbs	904 lbs	108 lbs	194 lbs	42 lbs
F_V	222 lbs	217 lbs	226 lbs	164 lbs	158 lbs	177 lbs	223 lbs	219 lbs	224 lbs
P_{total}	9649 lbs	10022 lbs	9583 lbs	9865 lbs	11603 lbs	9813 lbs	2845 lbs	2930 lbs	2779 lbs
M	905 lbs-ft	891 lbs-ft	914 lbs-ft	680 lbs-ft	678 lbs-ft	721 lbs-ft	901 lbs-ft	888 lbs-ft	905 lbs-ft
e	0.09 ft	0.09 ft	0.10 ft	0.07 ft	0.06 ft	0.07 ft	0.32 ft	0.30 ft	0.33 ft
L/6	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft	0.49 ft
f_{min}	224.1 psf	235.6 psf	221.6 psf	243.6 psf	293.7 psf	239.7 psf	28.5 psf	31.8 psf	26.4 psf
f_{max}	331.2 psf	341.1 psf	329.8 psf	324.1 psf	373.9 psf	325.0 psf	135.2 psf	136.9 psf	133.5 psf

Maximum Bearing Pressure = 374 psf
Allowable Bearing Pressure = 1500 psf

Use a 143in long x 35in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 143in long x 24in wide x 18in tall ballast foundation and fiber reinforcing with (2) #5 rebar.

5.3 Foundation Anchors

Threaded rods are anchored to the the ballast foundations using the Simpson AT-XP epoxy solution. LRFD load results are compared to the allowable strengths of the epoxy solution. Please see the supplementary calculations provided by the Simpson Anchor Designer software.

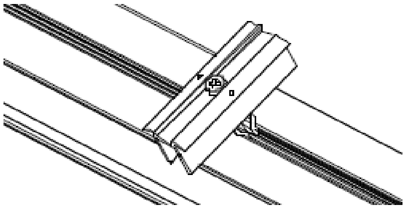
6. DESIGN OF JOINTS AND CONNECTIONS

6.1 Anchorage of Modules to Purlins and Connection of Purlins to Girders

Modules are secured to the purlins with Schletter, Inc. Rapid2+ mounting clamps. Purlins are secured to the girders with the use of 80mm mounting clamps. The reliability of calculations is uncertain due to limited standards, therefore the strength of the clamp fasteners has been evaluated by load testing.

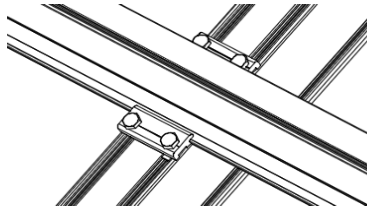
Fastening of Modules to Purlins

Maximum Uplifting Force =	0.534 k
Allowable Uplift =	1.214 k
Utilization =	44%



Fastening of Purlins to Girders

Maximum Uplifting Force =	1.693 k
Allowable Uplift =	4.357 k
Utilization =	39%



6.2 Strut Connections

The aluminum struts connect the aluminum girder ends to custom brackets with mounting holes. Single M12 bolts are used to attach each end of the strut to the girder and post. ASTM A193/A193M-86 equivalent stainless steel bolts are used.

Front Strut

Maximum Axial Load =	3.255 k
M12 Bolt Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	44%

Rear Strut

Maximum Axial Load =	3.430 k
M12 Bolt Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	46%

Diagonal Strut

Maximum Axial Load =	1.547 k
M12 Bolt Shear Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	21%

Bolt and bearing capacities are accounting for double shear. (ASCE 8-02, Eq. 5.3.4-1)

Struts under compression are shown to demonstrate the load transfer from the girder. Single M12 bolts are located at each end of the strut and are subjected to double shear.

7. SEISMIC DESIGN

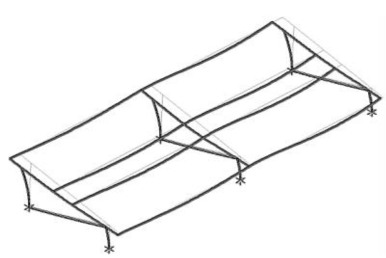
7.1 Seismic Drift

The racking structure has been analyzed under seismic loading. The allowable story drift of the structure must fall within the limits provided by (ASCE 7, Table 12.12-1).

Mean Height, h_{sx} =	51.89 in	
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$	
	1.038 in	
Max Drift, Δ_{MAX} =	0.699 in	

$0.699 \leq 1.038$, OK.

The racking structure's reaction to seismic loads is shown to the right. The deflections have been magnified to provide a clear portrayal of potential story drift.



APPENDIX A

A.1 Design of Aluminum Purlins - Aluminum Design Manual, 2005 Edition

Purlin = **S1.5**

Strong Axis:

3.4.14

L_b = 108 in

J = 0.432

298.779

$$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$$

S1 = 0.51461

$$S2 = \left(\frac{C_c}{1.6}\right)^2$$

S2 = 1701.56

φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]

φF_L= 27.7 ksi

3.4.16

b/t = 32.195

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$$

S1 = 12.2

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 25.1 ksi

3.4.16.1 Not Used

Rb/t =

$$S1 = \left(\frac{Bt - 1.17\frac{\theta_y}{\theta_b}Fcy}{1.6Dt}\right)^2$$

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 37.0588

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$$

S1 = 36.9

m = 0.65

C_0 = 40.985

Cc = 41.015

$$S2 = \frac{k_1 Bbr}{mDbr}$$

S2 = 77.2

φF_L= φb[Bbr-mDbr*h/t]

φF_L= 43.2 ksi

$\varphi F_L St$= 25.1 ksi

Ix = 897074 mm^4

2.155 in^4

y = 41.015 mm

Sx = 1.335 in³

$M_{max}St$ = 2.788 k-ft

Weak Axis:

3.4.14

L_b = 108

J = 0.432

190.005

$$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$$

S1 = 0.51461

$$S2 = \left(\frac{C_c}{1.6}\right)^2$$

S2 = 1701.56

φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]

φF_L= 28.9

3.4.16

b/t = 37.0588

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$$

S1 = 12.2

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 23.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 32.195

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$$

S1 = 36.9

m = 0.65

C_0 = 45.5

Cc = 45.5

$$S2 = \frac{k_1 Bbr}{mDbr}$$

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

$\varphi F_L Wk$= 23.1 ksi

Iy = 446476 mm^4

1.073 in^4

x = 45.5 mm

Sy = 0.599 in³

$M_{max}Wk$ = 1.152 k-ft

Compression

3.4.9

b/t = 32.195
S1 = 12.21 (See 3.4.16 above for formula)
S2 = 32.70 (See 3.4.16 above for formula)
φF_L= φc[Bp-1.6Dp*b/t]
φF_L= 25.1 ksi

b/t = 37.0588
S1 = 12.21
S2 = 32.70
φF_L= (φck2*√(BpE))/(1.6b/t)
φF_L= 21.9 ksi

3.4.10

Rb/t = 0.0

$$S1 = \left(\frac{Bt - \frac{\theta_y}{\theta_b} Fcy}{Dt}\right)^2$$

S1 = 6.87
S2 = 131.3
φF_L= φyFcy
φF_L= 33.25 ksi

φF_L= 21.94 ksi
A = 1215.13 mm^2
1.88 in^2
P_{max} = 41.32 kips

A.2 Design of Aluminum Girders - Aluminum Design Manual, 2005 Edition

Girder = **BF0**

Strong Axis:
3.4.14

L_b = 104.56 in
J = 1.08
179.85

$$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc}\right)^2$$

S1 = 0.51461

$$S2 = \left(\frac{C_c}{1.6}\right)^2$$

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 29.0 ksi

3.4.16

b/t = 16.2

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp}$$

S1 = 12.2

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

S2 = 46.7
φF_L= φb[Bp-1.6Dp*b/t]
φF_L= 31.6 ksi

Weak Axis:
3.4.14

L_b = 104.56
J = 1.08
190.335

$$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc}\right)^2$$

S1 = 0.51461

$$S2 = \left(\frac{C_c}{1.6}\right)^2$$

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 28.9

3.4.16

b/t = 7.4

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp}$$

S1 = 12.2

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

S2 = 46.7
φF_L= φyFcy
φF_L= 33.3 ksi

3.4.16.1 Used

Rb/t = 18.1

$$S1 = \left(\frac{Bt - 1.17\frac{\theta_y}{\theta_b}Fcy}{1.6Dt}\right)^2$$

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= φb[Bt-Dt*√(Rb/t)]

φF_L= 31.1 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 7.4

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$$

S1 = 35.2

m = 0.68

C_0 = 41.067

Cc = 43.717

$$S2 = \frac{k_1 Bbr}{mDbr}$$

S2 = 73.8

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 29.0 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in^3

M_{max}St = 3.323 k-ft

3.4.18

h/t = 16.2

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$$

S1 = 36.9

m = 0.65

C_0 = 40

Cc = 40

$$S2 = \frac{k_1 Bbr}{mDbr}$$

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 33.3 ksi

Iy = 923544 mm^4

2.219 in^4

x = 40 mm

Sy = 1.409 in^3

M_{max}Wk = 3.904 k-ft

Compression

3.4.9

b/t = 16.2

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 31.6 ksi

b/t = 7.4

S1 = 12.21

S2 = 32.70

φF_L= φyFcy

φF_L= 33.3 ksi

3.4.10

Rb/t = 18.1

$$S1 = \left(\frac{Bt - \frac{\theta_y}{\theta_b}Fcy}{Dt}\right)^2$$

S1 = 6.87

S2 = 131.3

φF_L= φc[Bt-Dt*√(Rb/t)]

φF_L= 31.09 ksi

φF_L= 31.09 ksi

A = 1215.13 mm^2

1.88 in^2

P_{max} = 58.55 kips

A.3 Design of Aluminum Struts (Front) - Aluminum Design Manual, 2005 Edition

Strut = **55x55**

Strong Axis:		Weak Axis:	
3.4.14		**3.4.14**	
L_b =	24.8 in	L_b =	24.8
J =	0.942	J =	0.942
	38.7028		38.7028
$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$		$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$	
S1 =	0.51461	S1 =	0.51461
$S2 = \left(\frac{C_c}{1.6}\right)^2$		$S2 = \left(\frac{C_c}{1.6}\right)^2$	
S2 =	1701.56	S2 =	1701.56
φF_L=	φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]	φF_L=	φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L=	31.4 ksi	φF_L=	31.4
3.4.16		**3.4.16**	
b/t =	24.5	b/t =	24.5
$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$		$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$	
S1 =	12.2	S1 =	12.2
$S2 = \frac{k_1 Bp}{1.6Dp}$		$S2 = \frac{k_1 Bp}{1.6Dp}$	
S2 =	46.7	S2 =	46.7
φF_L=	φb[Bp-1.6Dp*b/t]	φF_L=	φb[Bp-1.6Dp*b/t]
φF_L=	28.2 ksi	φF_L=	28.2 ksi
3.4.16.1	Not Used	**3.4.16.1**	
Rb/t =	0.0	N/A for Weak Direction	
$S1 = \left(\frac{Bt - 1.17\frac{\theta_y}{\theta_b}Fcy}{1.6Dt}\right)^2$			
S1 =	1.1		
$S2 = C_t$			
S2 =	141.0		
φF_L=	1.17φyFcy		
φF_L=	38.9 ksi		
3.4.18		**3.4.18**	
h/t =	24.5	h/t =	24.5
$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$		$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$	
S1 =	36.9	S1 =	36.9
m =	0.65	m =	0.65
C_0 =	27.5	C_0 =	27.5
Cc =	27.5	Cc =	27.5
$S2 = \frac{k_1 Bbr}{mDbr}$		$S2 = \frac{k_1 Bbr}{mDbr}$	
S2 =	77.3	S2 =	77.3
φF_L=	1.3φyFcy	φF_L=	1.3φyFcy
φF_L=	43.2 ksi	φF_L=	43.2 ksi
φF_LSt=	28.2 ksi	φF_LWk=	28.2 ksi
Ix =	279836 mm^4	Iy =	279836 mm^4
	0.672 in^4		0.672 in^4
y =	27.5 mm	x =	27.5 mm
Sx =	0.621 in³	Sy =	0.621 in³
M_{max}St =	1.460 k-ft	M_{max}Wk =	1.460 k-ft

Compression

3.4.7

λ = 0.57371

r = 0.81 in

$$S1^* = \frac{Bc - Fcy}{1.6Dc^*}$$

$S1^*$ = 0.33515

$$S2^* = \frac{Cc}{\pi}\sqrt{Fcy/E}$$

$S2^*$ = 1.23671

φcc = 0.87952

φF_L= φcc(Bc-Dc*λ)

φF_L= 28.0279 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

$$S1 = \left(\frac{Bt - \frac{\theta_y}{\theta_b}Fcy}{Dt}\right)^2$$

S1 = 6.87

S2 = 131.3

φF_L= φyFcy

φF_L= 33.25 ksi

φF_L= 28.03 ksi

A = 663.99 mm^2

1.03 in^2

P_{max} = 28.85 kips

A.4 Design of Aluminum Struts (Diagonal) - Aluminum Design Manual, 2005 Edition

Strut = **55x55**

Strong Axis:

3.4.14

L_b = 98.03 in

J = 0.942

152.985

$$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$$

S1 = 0.51461

$$S2 = \left(\frac{C_c}{1.6}\right)^2$$

S2 = 1701.56

φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]

φF_L= 29.4 ksi

Weak Axis:

3.4.14

L_b = 98.03

J = 0.942

152.985

$$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$$

S1 = 0.51461

$$S2 = \left(\frac{C_c}{1.6}\right)^2$$

S2 = 1701.56

φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]

φF_L= 29.4

3.4.16

b/t = 24.5

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$$

S1 = 12.2

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

$$S1 = \left(\frac{Bt - 1.17\frac{\theta_y}{\theta_b}Fcy}{1.6Dt}\right)^2$$

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.18

h/t = 24.5

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$$

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

$$S2 = \frac{k_1 Bbr}{mDbr}$$

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in³

M_{max}St = 1.460 k-ft

3.4.16

b/t = 24.5

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$$

S1 = 12.2

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

S2 = 46.7

φF_L= φb[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$$

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

$$S2 = \frac{k_1 Bbr}{mDbr}$$

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in³

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 2.26776

r = 0.81 in

$$S1^* = \frac{Bc - Fcy}{1.6Dc^*}$$

$S1^*$ = 0.33515

$$S2^* = \frac{Cc}{\pi}\sqrt{Fcy/E}$$

$S2^*$ = 1.23671

φcc = 0.89749

φF_L= (φccFcy)/(λ²)

φF_L= 6.10803 ksi

3.4.9

b/t = 24.5
S1 = 12.21 (See 3.4.16 above for formula)
S2 = 32.70 (See 3.4.16 above for formula)
φF_L= φc[Bp-1.6Dp*b/t]
φF_L= 28.2 ksi

b/t = 24.5
S1 = 12.21
S2 = 32.70
φF_L= φc[Bp-1.6Dp*b/t]
φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

$$S1 = \left(\frac{Bt - \frac{\theta_y}{\theta_b}Fcy}{Dt}\right)^2$$

S1 = 6.87
S2 = 131.3
φF_L= φyFcy
φF_L= 33.25 ksi

φF_L= 6.11 ksi
A = 663.99 mm^2
1.03 in^2
P_{max} = 6.29 kips

A.5 Design of Aluminum Struts (Rear) - Aluminum Design Manual, 2005 Edition

Strut = <u>**55x55**</u>

<u>Strong Axis:</u>

3.4.14

L_b = 61.10 in
J = 0.942
95.3524

$$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$$

S1 = 0.51461

$$S2 = \left(\frac{C_c}{1.6}\right)^2$$

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 30.2 ksi

3.4.16

b/t = 24.5

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$$

S1 = 12.2

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

S2 = 46.7
φF_L= φb[Bp-1.6Dp*b/t]
φF_L= 28.2 ksi

<u>Weak Axis:</u>

3.4.14

L_b = 61.1
J = 0.942
95.3524

$$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$$

S1 = 0.51461

$$S2 = \left(\frac{C_c}{1.6}\right)^2$$

S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 30.2

3.4.16

b/t = 24.5

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$$

S1 = 12.2

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

S2 = 46.7
φF_L= φb[Bp-1.6Dp*b/t]
φF_L= 28.2 ksi

3.4.16.1 Not Used

Rb/t = 0.0

$$S1 = \left(\frac{Bt - 1.17\frac{\theta_y}{\theta_b}Fcy}{1.6Dt}\right)^2$$

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= 1.17φyFcy

φF_L= 38.9 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 24.5

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$$

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

$$S2 = \frac{k_1 Bbr}{mDbr}$$

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LSt= 28.2 ksi

Ix = 279836 mm^4

0.672 in^4

y = 27.5 mm

Sx = 0.621 in^3

M_{max}St = 1.460 k-ft

3.4.18

h/t = 24.5

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$$

S1 = 36.9

m = 0.65

C_0 = 27.5

Cc = 27.5

$$S2 = \frac{k_1 Bbr}{mDbr}$$

S2 = 77.3

φF_L= 1.3φyFcy

φF_L= 43.2 ksi

φF_LWk= 28.2 ksi

Iy = 279836 mm^4

0.672 in^4

x = 27.5 mm

Sy = 0.621 in^3

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 1.41345

r = 0.81 in

$$S1^* = \frac{Bc - Fcy}{1.6Dc^*}$$

$S1^*$ = 0.33515

$$S2^* = \frac{Cc}{\pi}\sqrt{Fcy/E}$$

$S2^*$ = 1.23671

φcc = 0.77788

φF_L= (φccFcy)/(λ²)

φF_L= 13.6277 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L= φc[Bp-1.6Dp*b/t]

φF_L= 28.2 ksi

3.4.10

Rb/t = 0.0

$$S1 = \left(\frac{Bt - \frac{\theta_y}{\theta_b} Fcy}{Dt}\right)^2$$

S1 = 6.87

S2 = 131.3

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 13.63 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 14.03 kips

APPENDIX B

B.1

The following pages will contain the results from RISA. Please refer back to Section 2 for load information and Section 4-5 for member and foundation design.

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Dead Load, Max	DL		-1				4		
2	Dead Load, Min	DL		-1				4		
3	Snow Load	SL						4		
4	Wind Load - Pressure	WL						4		
5	Wind Load - Suction	WL						4		
6	Seismic - Lateral	EL			.8			8		

Member Distributed Loads (BLC 1 : Dead Load, Max)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-9.843	-9.843	0	0
2	M14	Y	-9.843	-9.843	0	0
3	M15	Y	-9.843	-9.843	0	0
4	M16	Y	-9.843	-9.843	0	0

Member Distributed Loads (BLC 2 : Dead Load, Min)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-5.454	-5.454	0	0
2	M14	Y	-5.454	-5.454	0	0
3	M15	Y	-5.454	-5.454	0	0
4	M16	Y	-5.454	-5.454	0	0

Member Distributed Loads (BLC 3 : Snow Load)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-63.565	-63.565	0	0
2	M14	Y	-63.565	-63.565	0	0
3	M15	Y	-63.565	-63.565	0	0
4	M16	Y	-63.565	-63.565	0	0

Member Distributed Loads (BLC 4 : Wind Load - Pressure)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	y	-43.811	-43.811	0	0
2	M14	y	-43.811	-43.811	0	0
3	M15	y	-68.846	-68.846	0	0
4	M16	y	-68.846	-68.846	0	0

Member Distributed Loads (BLC 5 : Wind Load - Suction)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	y	100.14	100.14	0	0
2	M14	y	76.774	76.774	0	0
3	M15	y	41.725	41.725	0	0
4	M16	y	41.725	41.725	0	0

Member Distributed Loads (BLC 6 : Seismic - Lateral)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M13	Z	7.874	7.874	0	0
2	M14	Z	7.874	7.874	0	0
3	M15	Z	7.874	7.874	0	0
4	M16	Z	7.874	7.874	0	0
5	M13	Z	0	0	0	0
6	M14	Z	0	0	0	0
7	M15	Z	0	0	0	0
8	M16	Z	0	0	0	0

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	LRFD 1.2D + 1.6S + 0.8W	Yes	Y		1	1.2	3	1.6	4	.8														
2	LRFD 1.2D + 1.6W + 0.5S	Yes	Y		1	1.2	3	.5	4	1.6														
3	LRFD 0.9D + 1.6W	Yes	Y		2	.9					5	1.6												
4	LATERAL - LRFD 1.54D + 1.3E ...	Yes	Y		1	1.54	3	.2			6	1.3												
5	LATERAL - LRFD 0.56D + 1.3E	Yes	Y		1	.56					6	1.3												
6	LATERAL - LRFD 1.54D + 1.25...	Yes	Y		1	1.54	3	.2			6	1.25												
7	LATERAL - LRFD 0.56D + 1.25E	Yes	Y		1	.56					6	1.25												
8																								
9	ASD 1.0D + 1.0S	Yes	Y		1	1	3	1																
10	ASD 1.0D + 1.0W	Yes	Y		1	1			4	1														
11	ASD 1.0D + 0.75L + 0.75W + 0....	Yes	Y		1	1	3	.75	4	.75														
12	ASD 0.6D + 1.0W	Yes	Y		2	.6					5	1												
13	LATERAL - ASD 1.238D + 0.875E	Yes	Y		1	1.2...					6	.875												
14	LATERAL - ASD 1.1785D + 0.65...	Yes	Y		1	1.1...	3	.75			6	.656												
15	LATERAL - ASD 0.362D + 0.875E	Yes	Y		1	.362					6	.875												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N8	max	381.388	2	1124.756	1	.941	1	.005	1	0	1	0	1
2		min	-506.605	3	-1066.538	3	-66.827	5	-.312	4	0	1	0	1
3	N7	max	.033	9	1175.376	1	-.591	12	-.001	12	0	1	0	1
4		min	-.118	2	-163.236	3	-272.055	4	-.555	4	0	1	0	1
5	N15	max	0	15	3254.578	1	0	12	0	12	0	1	0	1
6		min	-1.398	2	-588.023	3	-258.245	4	-.536	4	0	1	0	1
7	N16	max	1458.243	2	3657.657	1	0	2	0	2	0	1	0	1
8		min	-1550.991	3	-3427.388	3	-66.632	5	-.315	4	0	1	0	1
9	N23	max	.041	14	1175.376	1	12.277	1	.025	1	0	1	0	1
10		min	-.118	2	-163.236	3	-263.959	4	-.542	4	0	1	0	1
11	N24	max	381.388	2	1124.756	1	-.058	12	0	12	0	1	0	1
12		min	-506.605	3	-1066.538	3	-67.499	5	-.314	4	0	1	0	1
13	Totals:	max	2219.383	2	11512.498	1	0	12						
14		min	-2564.632	3	-6474.958	3	-988.792	4						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	M13	1	max	80.62	4	475.065	1	-6.858	12	0	15	.214	1	0	4
2			min	3.904	12	-521.796	3	-168.674	1	-.014	1	.011	12	0	3
3		2	max	76.73	1	331.651	1	-5.43	12	0	15	.106	4	.445	3
4			min	3.904	12	-367.456	3	-129.232	1	-.014	1	.005	12	-.403	1
5		3	max	76.73	1	188.236	1	-4.002	12	0	15	.06	5	.735	3
6			min	3.904	12	-213.117	3	-89.79	1	-.014	1	-.044	1	-.663	1
7		4	max	76.73	1	44.821	1	-2.575	12	0	15	.033	5	.871	3
8			min	3.904	12	-58.778	3	-50.348	1	-.014	1	-.114	1	-.78	1
9		5	max	76.73	1	95.562	3	-.595	10	0	15	.008	5	.852	3
10			min	3.904	12	-98.593	1	-26.734	4	-.014	1	-.145	1	-.753	1
11		6	max	76.73	1	249.901	3	28.536	1	0	15	-.005	12	.68	3
12			min	3.26	15	-242.008	1	-21.628	5	-.014	1	-.136	1	-.583	1
13		7	max	76.73	1	404.24	3	67.978	1	0	15	-.004	12	.353	3
14			min	-6.759	5	-385.423	1	-19.455	5	-.014	1	-.088	1	-.269	1
15		8	max	76.73	1	558.58	3	107.42	1	0	15	.002	2	.188	1
16			min	-18.559	5	-528.838	1	-17.282	5	-.014	1	-.055	4	-.129	3
17		9	max	76.73	1	712.919	3	146.862	1	0	15	.127	1	.789	1
18			min	-30.36	5	-672.252	1	-15.108	5	-.014	1	-.069	5	-.765	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
19		10	max	76.73	1	867.258	3	186.304	1	.014	1	.294	1	1.533	1
20			min	3.904	12	-815.667	1	-110.782	14	-.002	3	.007	12	-1.555	3
21		11	max	76.73	1	672.252	1	-4.565	12	.014	1	.127	1	.789	1
22			min	3.904	12	-712.919	3	-146.862	1	0	15	.002	12	-.765	3
23		12	max	76.73	1	528.838	1	-3.137	12	.014	1	.054	4	.188	1
24			min	3.904	12	-558.58	3	-107.42	1	0	15	-.003	3	-.129	3
25		13	max	76.73	1	385.423	1	-1.709	12	.014	1	.025	5	.353	3
26			min	3.904	12	-404.24	3	-67.978	1	0	15	-.088	1	-.269	1
27		14	max	76.73	1	242.008	1	-.281	12	.014	1	0	15	.68	3
28			min	2.193	15	-249.901	3	-31.128	4	0	15	-.136	1	-.583	1
29		15	max	76.73	1	98.593	1	10.906	1	.014	1	-.005	12	.852	3
30			min	-8.448	5	-95.562	3	-22.553	5	0	15	-.145	1	-.753	1
31		16	max	76.73	1	58.778	3	50.348	1	.014	1	-.003	12	.871	3
32			min	-20.249	5	-44.821	1	-20.38	5	0	15	-.114	1	-.78	1
33		17	max	76.73	1	213.117	3	89.79	1	.014	1	0	3	.735	3
34			min	-32.049	5	-188.236	1	-18.207	5	0	15	-.076	4	-.663	1
35		18	max	76.73	1	367.456	3	129.232	1	.014	1	.065	1	.445	3
36			min	-43.85	5	-331.651	1	-16.033	5	0	15	-.082	5	-.403	1
37		19	max	76.73	1	521.796	3	168.674	1	.014	1	.214	1	0	1
38			min	-55.65	5	-475.065	1	-13.86	5	0	15	-.097	5	0	5
39	M14	1	max	56.561	4	527.209	1	-7.1	12	.009	3	.254	1	0	1
40			min	2.044	12	-417.061	3	-175.224	1	-.015	1	.013	12	0	3
41		2	max	44.76	4	383.794	1	-5.672	12	.009	3	.159	4	.359	3
42			min	2.044	12	-300.108	3	-135.782	1	-.015	1	.006	12	-.455	1
43		3	max	44.503	1	240.379	1	-4.244	12	.009	3	.092	5	.6	3
44			min	2.044	12	-183.154	3	-96.34	1	-.015	1	-.018	1	-.768	1
45		4	max	44.503	1	96.965	1	-2.816	12	.009	3	.051	5	.725	3
46			min	2.044	12	-66.2	3	-56.898	1	-.015	1	-.095	1	-.936	1
47		5	max	44.503	1	50.754	3	-1.222	10	.009	3	.013	5	.733	3
48			min	.067	15	-46.45	1	-42.166	4	-.015	1	-.132	1	-.962	1
49		6	max	44.503	1	167.707	3	21.986	1	.009	3	-.005	12	.623	3
50			min	-11.692	5	-189.865	1	-35.329	5	-.015	1	-.13	1	-.843	1
51		7	max	44.503	1	284.661	3	61.428	1	.009	3	-.004	12	.397	3
52			min	-23.493	5	-333.279	1	-33.155	5	-.015	1	-.088	1	-.582	1
53		8	max	44.503	1	401.615	3	100.87	1	.009	3	0	10	.054	3
54			min	-35.294	5	-476.694	1	-30.982	5	-.015	1	-.094	4	-.177	1
55		9	max	44.503	1	518.569	3	140.312	1	.009	3	.114	1	.372	1
56			min	-47.094	5	-620.109	1	-28.809	5	-.015	1	-.12	5	-.406	3
57		10	max	72.643	4	635.522	3	179.754	1	.015	1	.274	1	1.063	1
58			min	2.044	12	-763.523	1	-114.472	14	-.009	3	.006	12	-.983	3
59		11	max	60.842	4	620.109	1	-4.323	12	.015	1	.159	4	.372	1
60			min	2.044	12	-518.569	3	-140.312	1	-.009	3	.001	12	-.406	3
61		12	max	49.042	4	476.694	1	-2.895	12	.015	1	.09	4	.054	3
62			min	2.044	12	-401.615	3	-100.87	1	-.009	3	-.007	1	-.177	1
63		13	max	44.503	1	333.279	1	-1.467	12	.015	1	.048	5	.397	3
64			min	2.044	12	-284.661	3	-61.428	1	-.009	3	-.088	1	-.582	1
65		14	max	44.503	1	189.865	1	.014	3	.015	1	.01	5	.623	3
66			min	2.044	12	-167.707	3	-43.128	4	-.009	3	-.13	1	-.843	1
67		15	max	44.503	1	46.45	1	17.456	1	.015	1	-.004	12	.733	3
68			min	2.044	12	-50.754	3	-35.532	5	-.009	3	-.132	1	-.962	1
69		16	max	44.503	1	66.2	3	56.898	1	.015	1	-.002	12	.725	3
70			min	-7.46	5	-96.965	1	-33.359	5	-.009	3	-.095	1	-.936	1
71		17	max	44.503	1	183.154	3	96.34	1	.015	1	.002	3	.6	3
72			min	-19.261	5	-240.379	1	-31.185	5	-.009	3	-.1	4	-.768	1
73		18	max	44.503	1	300.108	3	135.782	1	.015	1	.098	1	.359	3
74			min	-31.061	5	-383.794	1	-29.012	5	-.009	3	-.124	5	-.455	1
75		19	max	44.503	1	417.061	3	175.224	1	.015	1	.254	1	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
76			min	-42.862	5	-527.209	1	-26.839	5	-.009	3	-.152	5	0	3
77	M15	1	max	88.81	5	594.767	1	-7.036	12	.015	1	.303	4	0	2
78			min	-47.377	1	-228.28	3	-175.178	1	-.007	3	.012	12	0	3
79		2	max	77.01	5	431.324	1	-5.608	12	.015	1	.211	4	.198	3
80			min	-47.377	1	-167.405	3	-135.736	1	-.007	3	.006	12	-.513	1
81		3	max	65.209	5	267.882	1	-4.18	12	.015	1	.129	5	.335	3
82			min	-47.377	1	-106.53	3	-96.294	1	-.007	3	-.018	1	-.863	1
83		4	max	53.409	5	104.439	1	-2.752	12	.015	1	.074	5	.411	3
84			min	-47.377	1	-45.654	3	-66.903	4	-.007	3	-.095	1	-1.049	1
85		5	max	41.608	5	15.221	3	-1.249	10	.015	1	.021	5	.426	3
86			min	-47.377	1	-59.004	1	-56.578	4	-.007	3	-.132	1	-1.072	1
87		6	max	29.808	5	76.096	3	22.032	1	.015	1	-.005	12	.38	3
88			min	-47.377	1	-222.446	1	-49.724	5	-.007	3	-.13	1	-.931	1
89		7	max	18.007	5	136.972	3	61.474	1	.015	1	-.004	12	.274	3
90			min	-47.377	1	-385.889	1	-47.551	5	-.007	3	-.098	4	-.627	1
91		8	max	6.207	5	197.847	3	100.916	1	.015	1	0	10	.107	3
92			min	-47.377	1	-549.332	1	-45.378	5	-.007	3	-.129	4	-.159	1
93		9	max	-2.456	12	258.722	3	140.358	1	.015	1	.114	1	.472	1
94			min	-47.377	1	-712.774	1	-43.204	5	-.007	3	-.169	5	-.122	3
95		10	max	-2.456	12	319.598	3	179.8	1	.007	3	.302	4	1.267	1
96			min	-47.377	1	-876.217	1	-121.809	14	-.015	1	.007	12	-.411	3
97		11	max	.084	15	712.774	1	-4.387	12	.007	3	.208	4	.472	1
98			min	-47.377	1	-258.722	3	-140.358	1	-.015	1	.002	12	-.122	3
99		12	max	-2.456	12	549.332	1	-2.959	12	.007	3	.125	4	.107	3
100			min	-47.377	1	-197.847	3	-100.916	1	-.015	1	-.007	1	-.159	1
101		13	max	-2.456	12	385.889	1	-1.532	12	.007	3	.069	5	.274	3
102			min	-47.377	1	-136.972	3	-67.896	4	-.015	1	-.088	1	-.627	1
103		14	max	-2.456	12	222.446	1	-.089	3	.007	3	.015	5	.38	3
104			min	-47.377	1	-76.096	3	-57.571	4	-.015	1	-.13	1	-.931	1
105		15	max	-2.456	12	59.004	1	17.41	1	.007	3	-.004	12	.426	3
106			min	-57.954	4	-15.221	3	-49.929	5	-.015	1	-.132	1	-1.072	1
107		16	max	-2.456	12	45.654	3	56.852	1	.007	3	-.002	12	.411	3
108			min	-69.755	4	-104.439	1	-47.756	5	-.015	1	-.106	4	-1.049	1
109		17	max	-2.456	12	106.53	3	96.294	1	.007	3	.002	3	.335	3
110			min	-81.555	4	-267.882	1	-45.582	5	-.015	1	-.137	4	-.863	1
111		18	max	-2.456	12	167.405	3	135.736	1	.007	3	.098	1	.198	3
112			min	-93.356	4	-431.324	1	-43.409	5	-.015	1	-.176	5	-.513	1
113		19	max	-2.456	12	228.28	3	175.178	1	.007	3	.253	1	0	2
114			min	-105.156	4	-594.767	1	-41.236	5	-.015	1	-.218	5	0	5
115	M16	1	max	84.586	5	543.251	1	-6.662	12	.012	1	.217	1	0	1
116			min	-85.192	1	-199.477	3	-169.125	1	-.009	3	.01	12	0	3
117		2	max	72.785	5	379.808	1	-5.234	12	.012	1	.143	4	.169	3
118			min	-85.192	1	-138.602	3	-129.683	1	-.009	3	.004	12	-.462	1
119		3	max	60.985	5	216.365	1	-3.806	12	.012	1	.087	5	.277	3
120			min	-85.192	1	-77.726	3	-90.241	1	-.009	3	-.043	1	-.76	1
121		4	max	49.184	5	52.923	1	-2.378	12	.012	1	.05	5	.324	3
122			min	-85.192	1	-16.851	3	-50.799	1	-.009	3	-.113	1	-.894	1
123		5	max	37.384	5	44.024	3	-.743	10	.012	1	.015	5	.311	3
124			min	-85.192	1	-110.52	1	-37.059	4	-.009	3	-.144	1	-.865	1
125		6	max	25.583	5	104.9	3	28.085	1	.012	1	-.005	12	.236	3
126			min	-85.192	1	-273.963	1	-31.812	5	-.009	3	-.136	1	-.673	1
127		7	max	13.783	5	165.775	3	67.527	1	.012	1	-.004	12	.101	3
128			min	-85.192	1	-437.405	1	-29.638	5	-.009	3	-.088	1	-.318	1
129		8	max	1.982	5	226.65	3	106.969	1	.012	1	.001	2	.202	1
130			min	-85.192	1	-600.848	1	-27.465	5	-.009	3	-.079	4	-.095	3
131		9	max	-4.025	12	287.526	3	146.411	1	.012	1	.126	1	.884	1
132			min	-85.192	1	-764.291	1	-25.292	5	-.009	3	-.103	5	-.352	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
133		10	max	-4.025	12	348.401	3	185.853	1	.009	3	.292	1	1.73	1
134			min	-85.192	1	-927.733	1	-115.801	14	-.012	1	.008	12	-.67	3
135		11	max	.552	5	764.291	1	-4.761	12	.009	3	.145	4	.884	1
136			min	-85.192	1	-287.526	3	-146.411	1	-.012	1	.003	12	-.352	3
137		12	max	-4.025	12	600.848	1	-3.333	12	.009	3	.078	4	.202	1
138			min	-85.192	1	-226.65	3	-106.969	1	-.012	1	-.002	3	-.095	3
139		13	max	-4.025	12	437.405	1	-1.906	12	.009	3	.039	5	.101	3
140			min	-85.192	1	-165.775	3	-67.527	1	-.012	1	-.088	1	-.318	1
141		14	max	-4.025	12	273.963	1	-.478	12	.009	3	.003	5	.236	3
142			min	-85.192	1	-104.9	3	-41.281	4	-.012	1	-.136	1	-.673	1
143		15	max	-4.025	12	110.52	1	11.357	1	.009	3	-.005	12	.311	3
144			min	-85.192	1	-44.024	3	-32.714	5	-.012	1	-.144	1	-.865	1
145		16	max	-4.025	12	16.851	3	50.799	1	.009	3	-.003	12	.324	3
146			min	-85.192	1	-52.923	1	-30.54	5	-.012	1	-.113	1	-.894	1
147		17	max	-4.025	12	77.726	3	90.241	1	.009	3	0	12	.277	3
148			min	-88.966	4	-216.365	1	-28.367	5	-.012	1	-.102	4	-.76	1
149		18	max	-4.025	12	138.602	3	129.683	1	.009	3	.067	1	.169	3
150			min	-100.766	4	-379.808	1	-26.194	5	-.012	1	-.119	5	-.462	1
151		19	max	-4.025	12	199.477	3	169.125	1	.009	3	.217	1	0	1
152			min	-112.567	4	-543.251	1	-24.02	5	-.012	1	-.145	5	0	5
153	M2	1	max	1093.647	1	2.211	4	.906	1	0	3	0	3	0	1
154			min	-954.617	3	.543	15	-58.845	4	0	1	0	1	0	1
155		2	max	1094.063	1	2.202	4	.906	1	0	3	0	1	0	15
156			min	-954.305	3	.541	15	-59.205	4	0	1	-.017	4	0	4
157		3	max	1094.479	1	2.194	4	.906	1	0	3	0	1	0	15
158			min	-953.993	3	.539	15	-59.566	4	0	1	-.033	4	-.001	4
159		4	max	1094.895	1	2.185	4	.906	1	0	3	0	1	0	15
160			min	-953.681	3	.537	15	-59.926	4	0	1	-.05	4	-.002	4
161		5	max	1095.311	1	2.176	4	.906	1	0	3	.001	1	0	15
162			min	-953.369	3	.535	15	-60.287	4	0	1	-.067	4	-.002	4
163		6	max	1095.727	1	2.168	4	.906	1	0	3	.001	1	0	15
164			min	-953.057	3	.533	15	-60.647	4	0	1	-.084	4	-.003	4
165		7	max	1096.142	1	2.159	4	.906	1	0	3	.002	1	0	15
166			min	-952.745	3	.531	15	-61.008	4	0	1	-.101	4	-.004	4
167		8	max	1096.558	1	2.15	4	.906	1	0	3	.002	1	-.001	15
168			min	-952.434	3	.529	15	-61.368	4	0	1	-.118	4	-.004	4
169		9	max	1096.974	1	2.141	4	.906	1	0	3	.002	1	-.001	15
170			min	-952.122	3	.527	15	-61.729	4	0	1	-.135	4	-.005	4
171		10	max	1097.39	1	2.133	4	.906	1	0	3	.002	1	-.001	15
172			min	-951.81	3	.525	15	-62.089	4	0	1	-.153	4	-.005	4
173		11	max	1097.806	1	2.124	4	.906	1	0	3	.003	1	-.001	15
174			min	-951.498	3	.523	15	-62.45	4	0	1	-.17	4	-.006	4
175		12	max	1098.222	1	2.115	4	.906	1	0	3	.003	1	-.002	15
176			min	-951.186	3	.521	15	-62.81	4	0	1	-.188	4	-.007	4
177		13	max	1098.638	1	2.107	4	.906	1	0	3	.003	1	-.002	15
178			min	-950.874	3	.518	15	-63.171	4	0	1	-.205	4	-.007	4
179		14	max	1099.054	1	2.098	4	.906	1	0	3	.003	1	-.002	15
180			min	-950.562	3	.516	15	-63.531	4	0	1	-.223	4	-.008	4
181		15	max	1099.469	1	2.089	4	.906	1	0	3	.004	1	-.002	15
182			min	-950.25	3	.514	15	-63.892	4	0	1	-.241	4	-.008	4
183		16	max	1099.885	1	2.08	4	.906	1	0	3	.004	1	-.002	15
184			min	-949.938	3	.512	15	-64.252	4	0	1	-.259	4	-.009	4
185		17	max	1100.301	1	2.072	4	.906	1	0	3	.004	1	-.002	15
186			min	-949.626	3	.51	15	-64.613	4	0	1	-.277	4	-.01	4
187		18	max	1100.717	1	2.063	4	.906	1	0	3	.004	1	-.003	15
188			min	-949.314	3	.508	15	-64.973	4	0	1	-.295	4	-.01	4
189		19	max	1101.133	1	2.054	4	.906	1	0	3	.005	1	-.003	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
190			min	-949.003	3	.506	15	-65.334	4	0	1	-.313	4	-.011	4
191	M3	1	max	378.169	2	9.133	4	.21	1	0	12	0	1	.011	4
192			min	-505.71	3	2.161	15	-3.415	5	0	4	-.005	4	.003	15
193		2	max	377.998	2	8.259	4	.21	1	0	12	0	1	.007	4
194			min	-505.837	3	1.955	15	-2.806	5	0	4	-.007	4	.002	12
195		3	max	377.828	2	7.384	4	.21	1	0	12	0	1	.003	2
196			min	-505.965	3	1.75	15	-2.197	5	0	4	-.008	4	0	12
197		4	max	377.658	2	6.51	4	.21	1	0	12	0	1	0	2
198			min	-506.093	3	1.544	15	-1.589	5	0	4	-.009	4	-.002	3
199		5	max	377.487	2	5.635	4	.21	1	0	12	0	1	0	15
200			min	-506.221	3	1.338	15	-.98	5	0	4	-.009	5	-.003	6
201		6	max	377.317	2	4.761	4	.21	1	0	12	0	1	-.001	15
202			min	-506.348	3	1.133	15	-.371	5	0	4	-.01	5	-.006	6
203		7	max	377.147	2	3.886	4	.299	4	0	12	0	1	-.002	15
204			min	-506.476	3	.927	15	.01	12	0	4	-.01	5	-.008	6
205		8	max	376.976	2	3.012	4	.907	4	0	12	0	1	-.002	15
206			min	-506.604	3	.722	15	.01	12	0	4	-.009	5	-.009	6
207		9	max	376.806	2	2.137	4	1.516	4	0	12	0	1	-.002	15
208			min	-506.732	3	.516	15	.01	12	0	4	-.009	5	-.011	6
209		10	max	376.636	2	1.263	4	2.125	4	0	12	0	1	-.003	15
210			min	-506.86	3	.311	15	.01	12	0	4	-.008	5	-.011	6
211		11	max	376.465	2	.397	2	2.733	4	0	12	.001	1	-.003	15
212			min	-506.987	3	.035	12	.01	12	0	4	-.007	5	-.012	6
213		12	max	376.295	2	-.1	15	3.342	4	0	12	.001	1	-.003	15
214			min	-507.115	3	-.487	6	.01	12	0	4	-.006	5	-.012	6
215		13	max	376.125	2	-.306	15	3.951	4	0	12	.001	1	-.003	15
216			min	-507.243	3	-1.362	6	.01	12	0	4	-.004	5	-.011	6
217		14	max	375.954	2	-.512	15	4.56	4	0	12	.001	1	-.002	15
218			min	-507.371	3	-2.236	6	.01	12	0	4	-.002	5	-.01	6
219		15	max	375.784	2	-.717	15	5.168	4	0	12	.001	1	-.002	15
220			min	-507.498	3	-3.111	6	.01	12	0	4	0	12	-.009	6
221		16	max	375.614	2	-.923	15	5.777	4	0	12	.003	4	-.002	15
222			min	-507.626	3	-3.985	6	.01	12	0	4	0	12	-.008	6
223		17	max	375.443	2	-1.128	15	6.386	4	0	12	.006	4	-.001	15
224			min	-507.754	3	-4.859	6	.01	12	0	4	0	12	-.005	6
225		18	max	375.273	2	-1.334	15	6.994	4	0	12	.009	4	0	15
226			min	-507.882	3	-5.734	6	.01	12	0	4	0	12	-.003	6
227		19	max	375.103	2	-1.539	15	7.603	4	0	12	.013	4	0	1
228			min	-508.009	3	-6.608	6	.01	12	0	4	0	12	0	1
229	M4	1	max	1172.31	1	0	1	-.589	12	0	1	.008	4	0	1
230			min	-165.535	3	0	1	-270.895	4	0	1	0	12	0	1
231		2	max	1172.48	1	0	1	-.589	12	0	1	0	12	0	1
232			min	-165.408	3	0	1	-271.043	4	0	1	-.023	4	0	1
233		3	max	1172.65	1	0	1	-.589	12	0	1	0	12	0	1
234			min	-165.28	3	0	1	-271.191	4	0	1	-.055	4	0	1
235		4	max	1172.821	1	0	1	-.589	12	0	1	0	12	0	1
236			min	-165.152	3	0	1	-271.338	4	0	1	-.086	4	0	1
237		5	max	1172.991	1	0	1	-.589	12	0	1	0	12	0	1
238			min	-165.024	3	0	1	-271.486	4	0	1	-.117	4	0	1
239		6	max	1173.161	1	0	1	-.589	12	0	1	0	12	0	1
240			min	-164.897	3	0	1	-271.634	4	0	1	-.148	4	0	1
241		7	max	1173.332	1	0	1	-.589	12	0	1	0	12	0	1
242			min	-164.769	3	0	1	-271.781	4	0	1	-.179	4	0	1
243		8	max	1173.502	1	0	1	-.589	12	0	1	0	12	0	1
244			min	-164.641	3	0	1	-271.929	4	0	1	-.211	4	0	1
245		9	max	1173.672	1	0	1	-.589	12	0	1	0	12	0	1
246			min	-164.513	3	0	1	-272.077	4	0	1	-.242	4	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
247		10	max	1173.843	1	0	1	-.589	12	0	1	0	12	0	1
248			min	-164.386	3	0	1	-272.224	4	0	1	-.273	4	0	1
249		11	max	1174.013	1	0	1	-.589	12	0	1	0	12	0	1
250			min	-164.258	3	0	1	-272.372	4	0	1	-.304	4	0	1
251		12	max	1174.184	1	0	1	-.589	12	0	1	0	12	0	1
252			min	-164.13	3	0	1	-272.519	4	0	1	-.336	4	0	1
253		13	max	1174.354	1	0	1	-.589	12	0	1	0	12	0	1
254			min	-164.002	3	0	1	-272.667	4	0	1	-.367	4	0	1
255		14	max	1174.524	1	0	1	-.589	12	0	1	0	12	0	1
256			min	-163.875	3	0	1	-272.815	4	0	1	-.398	4	0	1
257		15	max	1174.695	1	0	1	-.589	12	0	1	0	12	0	1
258			min	-163.747	3	0	1	-272.962	4	0	1	-.43	4	0	1
259		16	max	1174.865	1	0	1	-.589	12	0	1	0	12	0	1
260			min	-163.619	3	0	1	-273.11	4	0	1	-.461	4	0	1
261		17	max	1175.035	1	0	1	-.589	12	0	1	-.001	12	0	1
262			min	-163.491	3	0	1	-273.258	4	0	1	-.492	4	0	1
263		18	max	1175.206	1	0	1	-.589	12	0	1	-.001	12	0	1
264			min	-163.364	3	0	1	-273.405	4	0	1	-.524	4	0	1
265		19	max	1175.376	1	0	1	-.589	12	0	1	-.001	12	0	1
266			min	-163.236	3	0	1	-273.553	4	0	1	-.555	4	0	1
267	M6	1	max	3422.387	1	2.415	2	0	1	0	1	0	4	0	1
268			min	-3063.415	3	.299	12	-59.48	4	0	4	0	1	0	1
269		2	max	3422.803	1	2.409	2	0	1	0	1	0	1	0	12
270			min	-3063.103	3	.295	12	-59.841	4	0	4	-.017	4	0	2
271		3	max	3423.219	1	2.402	2	0	1	0	1	0	1	0	12
272			min	-3062.791	3	.292	12	-60.201	4	0	4	-.034	4	-.001	2
273		4	max	3423.635	1	2.395	2	0	1	0	1	0	1	0	12
274			min	-3062.479	3	.288	12	-60.562	4	0	4	-.05	4	-.002	2
275		5	max	3424.051	1	2.388	2	0	1	0	1	0	1	0	12
276			min	-3062.168	3	.285	12	-60.922	4	0	4	-.068	4	-.003	2
277		6	max	3424.467	1	2.381	2	0	1	0	1	0	1	0	12
278			min	-3061.856	3	.282	12	-61.283	4	0	4	-.085	4	-.003	2
279		7	max	3424.883	1	2.375	2	0	1	0	1	0	1	0	12
280			min	-3061.544	3	.278	12	-61.643	4	0	4	-.102	4	-.004	2
281		8	max	3425.299	1	2.368	2	0	1	0	1	0	1	0	12
282			min	-3061.232	3	.275	12	-62.004	4	0	4	-.119	4	-.005	2
283		9	max	3425.715	1	2.361	2	0	1	0	1	0	1	0	12
284			min	-3060.92	3	.271	12	-62.364	4	0	4	-.137	4	-.005	2
285		10	max	3426.13	1	2.354	2	0	1	0	1	0	1	0	12
286			min	-3060.608	3	.268	12	-62.725	4	0	4	-.154	4	-.006	2
287		11	max	3426.546	1	2.348	2	0	1	0	1	0	1	0	12
288			min	-3060.296	3	.265	12	-63.085	4	0	4	-.172	4	-.007	2
289		12	max	3426.962	1	2.341	2	0	1	0	1	0	1	0	12
290			min	-3059.984	3	.261	12	-63.446	4	0	4	-.19	4	-.007	2
291		13	max	3427.378	1	2.334	2	0	1	0	1	0	1	0	12
292			min	-3059.672	3	.258	12	-63.806	4	0	4	-.207	4	-.008	2
293		14	max	3427.794	1	2.327	2	0	1	0	1	0	1	-.001	12
294			min	-3059.36	3	.254	12	-64.167	4	0	4	-.225	4	-.009	2
295		15	max	3428.21	1	2.32	2	0	1	0	1	0	1	-.001	12
296			min	-3059.048	3	.251	12	-64.527	4	0	4	-.243	4	-.009	2
297		16	max	3428.626	1	2.314	2	0	1	0	1	0	1	-.001	12
298			min	-3058.737	3	.248	12	-64.888	4	0	4	-.262	4	-.01	2
299		17	max	3429.042	1	2.307	2	0	1	0	1	0	1	-.001	12
300			min	-3058.425	3	.244	12	-65.248	4	0	4	-.28	4	-.011	2
301		18	max	3429.457	1	2.3	2	0	1	0	1	0	1	-.001	12
302			min	-3058.113	3	.241	12	-65.609	4	0	4	-.298	4	-.011	2
303		19	max	3429.873	1	2.293	2	0	1	0	1	0	1	-.001	12

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
304			min	-3057.801	3	.237	12	-65.969	4	0	4	-.317	4	-.012	2
305	M7	1	max	1457.018	2	9.141	6	0	1	0	1	0	1	.012	2
306			min	-1544.96	3	2.145	15	-3.631	5	0	4	-.005	4	.001	12
307		2	max	1456.848	2	8.267	6	0	1	0	1	0	1	.008	2
308			min	-1545.088	3	1.939	15	-3.023	5	0	4	-.007	4	0	3
309		3	max	1456.678	2	7.392	6	0	1	0	1	0	1	.005	2
310			min	-1545.215	3	1.734	15	-2.414	5	0	4	-.008	4	-.002	3
311		4	max	1456.507	2	6.518	6	0	1	0	1	0	1	.003	2
312			min	-1545.343	3	1.528	15	-1.805	5	0	4	-.009	4	-.004	3
313		5	max	1456.337	2	5.643	6	0	1	0	1	0	1	0	2
314			min	-1545.471	3	1.323	15	-1.197	5	0	4	-.01	4	-.005	3
315		6	max	1456.167	2	4.769	6	0	1	0	1	0	1	-.001	15
316			min	-1545.599	3	1.117	15	-.588	5	0	4	-.01	4	-.007	3
317		7	max	1455.996	2	3.895	6	.031	4	0	1	0	1	-.002	15
318			min	-1545.726	3	.912	15	0	1	0	4	-.01	4	-.008	4
319		8	max	1455.826	2	3.02	6	.639	4	0	1	0	1	-.002	15
320			min	-1545.854	3	.706	15	0	1	0	4	-.01	4	-.009	4
321		9	max	1455.656	2	2.146	6	1.248	4	0	1	0	1	-.002	15
322			min	-1545.982	3	.499	12	0	1	0	4	-.01	4	-.011	4
323		10	max	1455.485	2	1.394	2	1.857	4	0	1	0	1	-.003	15
324			min	-1546.11	3	.159	12	0	1	0	4	-.009	4	-.011	4
325		11	max	1455.315	2	.713	2	2.466	4	0	1	0	1	-.003	15
326			min	-1546.238	3	-.305	3	0	1	0	4	-.008	4	-.012	4
327		12	max	1455.145	2	.031	2	3.074	4	0	1	0	1	-.003	15
328			min	-1546.365	3	-.816	3	0	1	0	4	-.007	4	-.012	4
329		13	max	1454.974	2	-.322	15	3.683	4	0	1	0	1	-.003	15
330			min	-1546.493	3	-1.352	4	0	1	0	4	-.005	4	-.011	4
331		14	max	1454.804	2	-.527	15	4.292	4	0	1	0	1	-.002	15
332			min	-1546.621	3	-2.227	4	0	1	0	4	-.003	4	-.01	4
333		15	max	1454.634	2	-.733	15	4.9	4	0	1	0	1	-.002	15
334			min	-1546.749	3	-3.101	4	0	1	0	4	-.001	4	-.009	4
335		16	max	1454.463	2	-.938	15	5.509	4	0	1	.001	5	-.002	15
336			min	-1546.876	3	-3.975	4	0	1	0	4	0	1	-.008	4
337		17	max	1454.293	2	-1.144	15	6.118	4	0	1	.004	5	-.001	15
338			min	-1547.004	3	-4.85	4	0	1	0	4	0	1	-.005	4
339		18	max	1454.123	2	-1.35	15	6.726	4	0	1	.007	5	0	15
340			min	-1547.132	3	-5.724	4	0	1	0	4	0	1	-.003	4
341		19	max	1453.952	2	-1.555	15	7.335	4	0	1	.011	5	0	1
342			min	-1547.26	3	-6.599	4	0	1	0	4	0	1	0	1
343	M8	1	max	3251.511	1	0	1	0	1	0	1	.006	5	0	1
344			min	-590.323	3	0	1	-260.932	4	0	1	0	1	0	1
345		2	max	3251.682	1	0	1	0	1	0	1	0	1	0	1
346			min	-590.195	3	0	1	-261.08	4	0	1	-.024	4	0	1
347		3	max	3251.852	1	0	1	0	1	0	1	0	1	0	1
348			min	-590.067	3	0	1	-261.228	4	0	1	-.054	4	0	1
349		4	max	3252.022	1	0	1	0	1	0	1	0	1	0	1
350			min	-589.94	3	0	1	-261.375	4	0	1	-.084	4	0	1
351		5	max	3252.193	1	0	1	0	1	0	1	0	1	0	1
352			min	-589.812	3	0	1	-261.523	4	0	1	-.114	4	0	1
353		6	max	3252.363	1	0	1	0	1	0	1	0	1	0	1
354			min	-589.684	3	0	1	-261.671	4	0	1	-.144	4	0	1
355		7	max	3252.533	1	0	1	0	1	0	1	0	1	0	1
356			min	-589.556	3	0	1	-261.818	4	0	1	-.174	4	0	1
357		8	max	3252.704	1	0	1	0	1	0	1	0	1	0	1
358			min	-589.429	3	0	1	-261.966	4	0	1	-.204	4	0	1
359		9	max	3252.874	1	0	1	0	1	0	1	0	1	0	1
360			min	-589.301	3	0	1	-262.114	4	0	1	-.234	4	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
361		10	max	3253.045	1	0	1	0	1	0	1	0	1	0	1
362			min	-589.173	3	0	1	-262.261	4	0	1	-.264	4	0	1
363		11	max	3253.215	1	0	1	0	1	0	1	0	1	0	1
364			min	-589.045	3	0	1	-262.409	4	0	1	-.294	4	0	1
365		12	max	3253.385	1	0	1	0	1	0	1	0	1	0	1
366			min	-588.918	3	0	1	-262.556	4	0	1	-.324	4	0	1
367		13	max	3253.556	1	0	1	0	1	0	1	0	1	0	1
368			min	-588.79	3	0	1	-262.704	4	0	1	-.355	4	0	1
369		14	max	3253.726	1	0	1	0	1	0	1	0	1	0	1
370			min	-588.662	3	0	1	-262.852	4	0	1	-.385	4	0	1
371		15	max	3253.896	1	0	1	0	1	0	1	0	1	0	1
372			min	-588.534	3	0	1	-262.999	4	0	1	-.415	4	0	1
373		16	max	3254.067	1	0	1	0	1	0	1	0	1	0	1
374			min	-588.407	3	0	1	-263.147	4	0	1	-.445	4	0	1
375		17	max	3254.237	1	0	1	0	1	0	1	0	1	0	1
376			min	-588.279	3	0	1	-263.295	4	0	1	-.475	4	0	1
377		18	max	3254.407	1	0	1	0	1	0	1	0	1	0	1
378			min	-588.151	3	0	1	-263.442	4	0	1	-.506	4	0	1
379		19	max	3254.578	1	0	1	0	1	0	1	0	1	0	1
380			min	-588.023	3	0	1	-263.59	4	0	1	-.536	4	0	1
381	M10	1	max	1093.647	1	2.103	6	-.044	12	0	1	0	4	0	1
382			min	-954.617	3	.471	15	-59.323	4	0	5	0	3	0	1
383		2	max	1094.063	1	2.095	6	-.044	12	0	1	0	10	0	15
384			min	-954.305	3	.469	15	-59.683	4	0	5	-.017	4	0	6
385		3	max	1094.479	1	2.086	6	-.044	12	0	1	0	12	0	15
386			min	-953.993	3	.467	15	-60.044	4	0	5	-.033	4	-.001	6
387		4	max	1094.895	1	2.077	6	-.044	12	0	1	0	12	0	15
388			min	-953.681	3	.465	15	-60.404	4	0	5	-.05	4	-.002	6
389		5	max	1095.311	1	2.068	6	-.044	12	0	1	0	12	0	15
390			min	-953.369	3	.463	15	-60.764	4	0	5	-.067	4	-.002	6
391		6	max	1095.727	1	2.06	6	-.044	12	0	1	0	12	0	15
392			min	-953.057	3	.461	15	-61.125	4	0	5	-.084	4	-.003	6
393		7	max	1096.142	1	2.051	6	-.044	12	0	1	0	12	0	15
394			min	-952.745	3	.459	15	-61.485	4	0	5	-.102	4	-.003	6
395		8	max	1096.558	1	2.042	6	-.044	12	0	1	0	12	0	15
396			min	-952.434	3	.457	15	-61.846	4	0	5	-.119	4	-.004	6
397		9	max	1096.974	1	2.034	6	-.044	12	0	1	0	12	-.001	15
398			min	-952.122	3	.455	15	-62.206	4	0	5	-.136	4	-.005	6
399		10	max	1097.39	1	2.025	6	-.044	12	0	1	0	12	-.001	15
400			min	-951.81	3	.452	15	-62.567	4	0	5	-.154	4	-.005	6
401		11	max	1097.806	1	2.016	6	-.044	12	0	1	0	12	-.001	15
402			min	-951.498	3	.45	15	-62.927	4	0	5	-.171	4	-.006	6
403		12	max	1098.222	1	2.007	6	-.044	12	0	1	0	12	-.001	15
404			min	-951.186	3	.448	15	-63.288	4	0	5	-.189	4	-.006	6
405		13	max	1098.638	1	1.999	6	-.044	12	0	1	0	12	-.002	15
406			min	-950.874	3	.446	15	-63.648	4	0	5	-.207	4	-.007	6
407		14	max	1099.054	1	1.99	6	-.044	12	0	1	0	12	-.002	15
408			min	-950.562	3	.444	15	-64.009	4	0	5	-.225	4	-.007	6
409		15	max	1099.469	1	1.981	6	-.044	12	0	1	0	12	-.002	15
410			min	-950.25	3	.442	15	-64.369	4	0	5	-.243	4	-.008	6
411		16	max	1099.885	1	1.973	6	-.044	12	0	1	0	12	-.002	15
412			min	-949.938	3	.44	15	-64.73	4	0	5	-.261	4	-.009	6
413		17	max	1100.301	1	1.964	6	-.044	12	0	1	0	12	-.002	15
414			min	-949.626	3	.438	15	-65.09	4	0	5	-.279	4	-.009	6
415		18	max	1100.717	1	1.955	6	-.044	12	0	1	0	12	-.002	15
416			min	-949.314	3	.436	15	-65.451	4	0	5	-.297	4	-.01	6
417		19	max	1101.133	1	1.946	6	-.044	12	0	1	0	12	-.002	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
418			min	-949.003	3	.434	15	-65.811	4	0	5	-.316	4	-.01	6
419	M11	1	max	378.169	2	9.069	6	-.01	12	0	1	0	12	.01	6
420			min	-505.71	3	2.118	15	-3.464	4	0	4	-.005	4	.002	15
421		2	max	377.998	2	8.195	6	-.01	12	0	1	0	12	.006	6
422			min	-505.837	3	1.912	15	-2.855	4	0	4	-.007	4	.001	15
423		3	max	377.828	2	7.32	6	-.01	12	0	1	0	12	.003	2
424			min	-505.965	3	1.707	15	-2.246	4	0	4	-.008	4	0	12
425		4	max	377.658	2	6.446	6	-.01	12	0	1	0	12	0	2
426			min	-506.093	3	1.501	15	-1.638	4	0	4	-.009	4	-.002	3
427		5	max	377.487	2	5.571	6	-.01	12	0	1	0	12	0	15
428			min	-506.221	3	1.296	15	-1.029	4	0	4	-.01	4	-.004	4
429		6	max	377.317	2	4.697	6	-.01	12	0	1	0	12	-.002	15
430			min	-506.348	3	1.09	15	-.42	4	0	4	-.01	4	-.006	4
431		7	max	377.147	2	3.822	6	.215	5	0	1	0	12	-.002	15
432			min	-506.476	3	.885	15	-.21	1	0	4	-.01	4	-.008	4
433		8	max	376.976	2	2.948	6	.824	5	0	1	0	12	-.002	15
434			min	-506.604	3	.679	15	-.21	1	0	4	-.01	4	-.01	4
435		9	max	376.806	2	2.074	6	1.432	5	0	1	0	12	-.003	15
436			min	-506.732	3	.473	15	-.21	1	0	4	-.009	4	-.011	4
437		10	max	376.636	2	1.199	6	2.041	5	0	1	0	12	-.003	15
438			min	-506.86	3	.268	15	-.21	1	0	4	-.008	4	-.012	4
439		11	max	376.465	2	.397	2	2.65	5	0	1	0	12	-.003	15
440			min	-506.987	3	.035	12	-.21	1	0	4	-.007	4	-.012	4
441		12	max	376.295	2	-.143	15	3.259	5	0	1	0	12	-.003	15
442			min	-507.115	3	-.551	4	-.21	1	0	4	-.006	4	-.012	4
443		13	max	376.125	2	-.349	15	3.867	5	0	1	0	12	-.003	15
444			min	-507.243	3	-1.425	4	-.21	1	0	4	-.004	4	-.012	4
445		14	max	375.954	2	-.554	15	4.476	5	0	1	0	12	-.003	15
446			min	-507.371	3	-2.3	4	-.21	1	0	4	-.002	4	-.011	4
447		15	max	375.784	2	-.76	15	5.085	5	0	1	0	5	-.002	15
448			min	-507.498	3	-3.174	4	-.21	1	0	4	-.001	1	-.009	4
449		16	max	375.614	2	-.965	15	5.693	5	0	1	.003	5	-.002	15
450			min	-507.626	3	-4.049	4	-.21	1	0	4	-.002	1	-.008	4
451		17	max	375.443	2	-1.171	15	6.302	5	0	1	.006	5	-.001	15
452			min	-507.754	3	-4.923	4	-.21	1	0	4	-.002	1	-.005	4
453		18	max	375.273	2	-1.376	15	6.911	5	0	1	.009	5	0	15
454			min	-507.882	3	-5.798	4	-.21	1	0	4	-.002	1	-.003	4
455		19	max	375.103	2	-1.582	15	7.52	5	0	1	.012	5	0	1
456			min	-508.009	3	-6.672	4	-.21	1	0	4	-.002	1	0	1
457	M12	1	max	1172.31	1	0	1	12.718	1	0	1	.007	5	0	1
458			min	-165.535	3	0	1	-264.151	4	0	1	-.001	1	0	1
459		2	max	1172.48	1	0	1	12.718	1	0	1	0	1	0	1
460			min	-165.408	3	0	1	-264.299	4	0	1	-.023	4	0	1
461		3	max	1172.65	1	0	1	12.718	1	0	1	.002	1	0	1
462			min	-165.28	3	0	1	-264.447	4	0	1	-.054	4	0	1
463		4	max	1172.821	1	0	1	12.718	1	0	1	.003	1	0	1
464			min	-165.152	3	0	1	-264.594	4	0	1	-.084	4	0	1
465		5	max	1172.991	1	0	1	12.718	1	0	1	.005	1	0	1
466			min	-165.024	3	0	1	-264.742	4	0	1	-.114	4	0	1
467		6	max	1173.161	1	0	1	12.718	1	0	1	.006	1	0	1
468			min	-164.897	3	0	1	-264.89	4	0	1	-.145	4	0	1
469		7	max	1173.332	1	0	1	12.718	1	0	1	.008	1	0	1
470			min	-164.769	3	0	1	-265.037	4	0	1	-.175	4	0	1
471		8	max	1173.502	1	0	1	12.718	1	0	1	.009	1	0	1
472			min	-164.641	3	0	1	-265.185	4	0	1	-.206	4	0	1
473		9	max	1173.672	1	0	1	12.718	1	0	1	.011	1	0	1
474			min	-164.513	3	0	1	-265.332	4	0	1	-.236	4	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
475		10	max	1173.843	1	0	1	12.718	1	0	1	.012	1	0	1
476			min	-164.386	3	0	1	-265.48	4	0	1	-.267	4	0	1
477		11	max	1174.013	1	0	1	12.718	1	0	1	.014	1	0	1
478			min	-164.258	3	0	1	-265.628	4	0	1	-.297	4	0	1
479		12	max	1174.184	1	0	1	12.718	1	0	1	.015	1	0	1
480			min	-164.13	3	0	1	-265.775	4	0	1	-.328	4	0	1
481		13	max	1174.354	1	0	1	12.718	1	0	1	.016	1	0	1
482			min	-164.002	3	0	1	-265.923	4	0	1	-.358	4	0	1
483		14	max	1174.524	1	0	1	12.718	1	0	1	.018	1	0	1
484			min	-163.875	3	0	1	-266.071	4	0	1	-.389	4	0	1
485		15	max	1174.695	1	0	1	12.718	1	0	1	.019	1	0	1
486			min	-163.747	3	0	1	-266.218	4	0	1	-.419	4	0	1
487		16	max	1174.865	1	0	1	12.718	1	0	1	.021	1	0	1
488			min	-163.619	3	0	1	-266.366	4	0	1	-.45	4	0	1
489		17	max	1175.035	1	0	1	12.718	1	0	1	.022	1	0	1
490			min	-163.491	3	0	1	-266.514	4	0	1	-.48	4	0	1
491		18	max	1175.206	1	0	1	12.718	1	0	1	.024	1	0	1
492			min	-163.364	3	0	1	-266.661	4	0	1	-.511	4	0	1
493		19	max	1175.376	1	0	1	12.718	1	0	1	.025	1	0	1
494			min	-163.236	3	0	1	-266.809	4	0	1	-.542	4	0	1
495	M1	1	max	168.679	1	521.766	3	55.613	5	0	1	.214	1	0	15
496			min	-13.86	5	-472.92	1	-76.609	1	0	5	-.097	5	-.014	1
497		2	max	169.255	1	520.579	3	57.073	5	0	1	.167	1	.28	1
498			min	-13.591	5	-474.503	1	-76.609	1	0	5	-.062	5	-.325	3
499		3	max	323.828	3	553.217	1	1.297	5	0	3	.119	1	.563	1
500			min	-220.522	2	-384.672	3	-75.958	1	0	1	-.027	5	-.638	3
501		4	max	324.26	3	551.634	1	2.757	5	0	3	.072	1	.221	1
502			min	-219.946	2	-385.859	3	-75.958	1	0	1	-.026	5	-.399	3
503		5	max	324.693	3	550.051	1	4.217	5	0	3	.025	1	-.005	15
504			min	-219.37	2	-387.046	3	-75.958	1	0	1	-.024	5	-.159	3
505		6	max	325.125	3	548.468	1	5.678	5	0	3	-.001	12	.082	3
506			min	-218.794	2	-388.234	3	-75.958	1	0	1	-.025	4	-.462	1
507		7	max	325.557	3	546.884	1	7.138	5	0	3	-.003	12	.323	3
508			min	-218.217	2	-389.421	3	-75.958	1	0	1	-.069	1	-.802	1
509		8	max	325.989	3	545.301	1	8.598	5	0	3	-.006	12	.565	3
510			min	-217.641	2	-390.609	3	-75.958	1	0	1	-.116	1	-1.141	1
511		9	max	337.144	3	34.617	2	52.783	5	0	9	.073	1	.661	3
512			min	-148.775	2	.475	15	-120.508	1	0	3	-.142	5	-1.299	1
513		10	max	337.576	3	33.034	2	54.243	5	0	9	0	10	.644	3
514			min	-148.198	2	-.006	5	-120.508	1	0	3	-.109	4	-1.31	1
515		11	max	338.008	3	31.451	2	55.703	5	0	9	-.004	12	.628	3
516			min	-147.622	2	-1.977	4	-120.508	1	0	3	-.09	4	-1.321	1
517		12	max	349.061	3	254.48	3	151.361	5	0	1	.114	1	.549	3
518			min	-94.788	5	-582.854	1	-73.172	1	0	3	-.234	5	-1.167	1
519		13	max	349.494	3	253.293	3	152.821	5	0	1	.069	1	.391	3
520			min	-94.519	5	-584.437	1	-73.172	1	0	3	-.14	5	-.805	1
521		14	max	349.926	3	252.105	3	154.281	5	0	1	.023	1	.234	3
522			min	-94.25	5	-586.02	1	-73.172	1	0	3	-.044	5	-.442	1
523		15	max	350.358	3	250.918	3	155.741	5	0	1	.052	5	.078	3
524			min	-93.982	5	-587.604	1	-73.172	1	0	3	-.022	1	-.077	1
525		16	max	350.79	3	249.73	3	157.202	5	0	1	.149	5	.288	1
526			min	-93.713	5	-589.187	1	-73.172	1	0	3	-.068	1	-.077	3
527		17	max	351.222	3	248.543	3	158.662	5	0	1	.247	5	.654	1
528			min	-93.444	5	-590.77	1	-73.172	1	0	3	-.113	1	-.232	3
529		18	max	23.751	5	546.868	1	-4.025	12	0	5	.203	5	.327	1
530			min	-169.697	1	-198.353	3	-114.076	4	0	1	-.164	1	-.114	3
531		19	max	24.02	5	545.285	1	-4.025	12	0	5	.145	5	.009	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
532			min	-169.121	1	-199.54	3	-112.616	4	0	1	-.217	1	-.012	1
533	M5	1	max	372.598	1	1734.464	3	92.765	5	0	1	0	1	.029	1
534			min	11.986	12	-1621.186	1	0	1	0	4	-.204	4	0	15
535		2	max	373.174	1	1733.277	3	94.226	5	0	1	0	1	1.035	1
536			min	12.274	12	-1622.769	1	0	1	0	4	-.146	4	-1.073	3
537		3	max	1018.393	3	1575.269	1	42.373	4	0	4	0	1	2.008	1
538			min	-750.351	2	-1180.56	3	0	1	0	1	-.089	4	-2.116	3
539		4	max	1018.825	3	1573.686	1	43.833	4	0	4	0	1	1.031	1
540			min	-749.775	2	-1181.747	3	0	1	0	1	-.062	4	-1.383	3
541		5	max	1019.257	3	1572.103	1	45.294	4	0	4	0	1	.055	1
542			min	-749.198	2	-1182.935	3	0	1	0	1	-.034	4	-.649	3
543		6	max	1019.689	3	1570.52	1	46.754	4	0	4	0	1	.085	3
544			min	-748.622	2	-1184.122	3	0	1	0	1	-.006	5	-.921	1
545		7	max	1020.121	3	1568.937	1	48.214	4	0	4	.024	4	.82	3
546			min	-748.046	2	-1185.309	3	0	1	0	1	0	1	-1.895	1
547		8	max	1020.554	3	1567.353	1	49.674	4	0	4	.054	4	1.556	3
548			min	-747.47	2	-1186.497	3	0	1	0	1	0	1	-2.868	1
549		9	max	1038.093	3	115.369	2	173.735	4	0	1	0	1	1.797	3
550			min	-603.981	2	.48	15	0	1	0	1	-.203	4	-3.252	1
551		10	max	1038.526	3	113.786	2	175.195	4	0	1	0	1	1.735	3
552			min	-603.405	2	.002	15	0	1	0	1	-.095	5	-3.291	1
553		11	max	1038.958	3	112.203	2	176.655	4	0	1	.014	4	1.675	3
554			min	-602.829	2	-1.727	6	0	1	0	1	0	1	-3.33	1
555		12	max	1056.701	3	754.578	3	206.298	4	0	1	0	1	1.466	3
556			min	-459.385	2	-1692.177	1	0	1	0	4	-.33	4	-2.961	1
557		13	max	1057.133	3	753.39	3	207.758	4	0	1	0	1	.998	3
558			min	-458.809	2	-1693.76	1	0	1	0	4	-.201	4	-1.91	1
559		14	max	1057.565	3	752.203	3	209.218	4	0	1	0	1	.53	3
560			min	-458.233	2	-1695.343	1	0	1	0	4	-.072	4	-.859	1
561		15	max	1057.998	3	751.016	3	210.678	4	0	1	.058	4	.244	2
562			min	-457.656	2	-1696.927	1	0	1	0	4	0	1	0	15
563		16	max	1058.43	3	749.828	3	212.139	4	0	1	.19	4	1.248	1
564			min	-457.08	2	-1698.51	1	0	1	0	4	0	1	-.402	3
565		17	max	1058.862	3	748.641	3	213.599	4	0	1	.322	4	2.302	1
566			min	-456.504	2	-1700.093	1	0	1	0	4	0	1	-.867	3
567		18	max	-12.666	12	1866.419	1	0	1	0	4	.314	4	1.183	1
568			min	-372.289	1	-695.909	3	-35.51	5	0	1	0	1	-.451	3
569		19	max	-12.378	12	1864.836	1	0	1	0	4	.293	4	.025	1
570			min	-371.713	1	-697.096	3	-34.05	5	0	1	0	1	-.019	3
571	M9	1	max	168.679	1	521.766	3	80.8	4	0	3	-.011	12	0	15
572			min	6.858	12	-472.92	1	3.904	12	0	4	-.214	1	-.014	1
573		2	max	169.255	1	520.579	3	82.26	4	0	3	-.009	12	.28	1
574			min	7.146	12	-474.503	1	3.904	12	0	4	-.167	1	-.325	3
575		3	max	323.828	3	553.217	1	75.958	1	0	1	-.006	12	.563	1
576			min	-220.522	2	-384.672	3	3.857	12	0	3	-.119	1	-.638	3
577		4	max	324.26	3	551.634	1	75.958	1	0	1	-.004	12	.221	1
578			min	-219.946	2	-385.859	3	3.857	12	0	3	-.072	1	-.399	3
579		5	max	324.693	3	550.051	1	75.958	1	0	1	-.001	12	-.005	15
580			min	-219.37	2	-387.046	3	3.857	12	0	3	-.032	4	-.159	3
581		6	max	325.125	3	548.468	1	75.958	1	0	1	.022	1	.082	3
582			min	-218.794	2	-388.234	3	3.857	12	0	3	-.018	5	-.462	1
583		7	max	325.557	3	546.884	1	75.958	1	0	1	.069	1	.323	3
584			min	-218.217	2	-389.421	3	3.857	12	0	3	-.009	5	-.802	1
585		8	max	325.989	3	545.301	1	75.958	1	0	1	.116	1	.565	3
586			min	-217.641	2	-390.609	3	3.857	12	0	3	0	15	-1.141	1
587		9	max	337.144	3	34.617	2	120.508	1	0	3	-.004	12	.661	3
588			min	-148.775	2	.488	15	5.898	12	0	9	-.167	4	-1.299	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
589		10	max	337.576	3	33.034	2	120.508	1	0	3	.001	1	.644	3
590			min	-148.198	2	.011	15	5.898	12	0	9	-.109	4	-1.31	1
591		11	max	338.008	3	31.451	2	120.508	1	0	3	.076	1	.628	3
592			min	-147.622	2	-1.869	6	5.898	12	0	9	-.066	5	-1.321	1
593		12	max	349.061	3	254.48	3	177.323	4	0	3	-.005	12	.549	3
594			min	-86.73	10	-582.854	1	3.445	12	0	1	-.274	4	-1.167	1
595		13	max	349.494	3	253.293	3	178.783	4	0	3	-.003	12	.391	3
596			min	-86.25	10	-584.437	1	3.445	12	0	1	-.163	4	-.805	1
597		14	max	349.926	3	252.105	3	180.243	4	0	3	-.001	12	.234	3
598			min	-85.77	10	-586.02	1	3.445	12	0	1	-.052	4	-.442	1
599		15	max	350.358	3	250.918	3	181.703	4	0	3	.06	4	.078	3
600			min	-85.29	10	-587.604	1	3.445	12	0	1	0	12	-.077	1
601		16	max	350.79	3	249.73	3	183.163	4	0	3	.174	4	.288	1
602			min	-84.81	10	-589.187	1	3.445	12	0	1	.003	12	-.077	3
603		17	max	351.222	3	248.543	3	184.623	4	0	3	.288	4	.654	1
604			min	-84.329	10	-590.77	1	3.445	12	0	1	.005	12	-.232	3
605		18	max	-6.95	12	546.868	1	85.307	1	0	1	.259	4	.327	1
606			min	-169.697	1	-198.353	3	-86.222	5	0	3	.008	12	-.114	3
607		19	max	-6.662	12	545.285	1	85.307	1	0	1	.217	1	.009	3
608			min	-169.121	1	-199.54	3	-84.762	5	0	3	.01	12	-.012	1

Envelope Member Section Deflections

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
1	M13	1	max	0	1	.192	1	.006	3	1.282e-2	1	NC	1	NC	1
2			min	-.727	4	-.032	3	-.003	2	-1.963e-3	3	NC	1	NC	1
3		2	max	0	1	.151	3	.031	1	1.408e-2	1	NC	5	NC	2
4			min	-.727	4	.003	15	-.017	5	-1.812e-3	3	1186.354	3	7128.016	1
5		3	max	0	1	.298	3	.073	1	1.535e-2	1	NC	5	NC	3
6			min	-.727	4	-.053	1	-.021	5	-1.661e-3	3	654.786	3	3018.19	1
7		4	max	0	1	.389	3	.107	1	1.661e-2	1	NC	5	NC	3
8			min	-.727	4	-.108	1	-.016	5	-1.511e-3	3	513.809	3	2031.451	1
9		5	max	0	1	.411	3	.124	1	1.788e-2	1	NC	5	NC	3
10			min	-.727	4	-.102	1	-.006	5	-1.36e-3	3	487.788	3	1750.177	1
11		6	max	0	1	.367	3	.119	1	1.914e-2	1	NC	5	NC	3
12			min	-.727	4	-.037	1	.004	15	-1.209e-3	3	541.878	3	1831.328	1
13		7	max	0	1	.27	3	.092	1	2.041e-2	1	NC	5	NC	3
14			min	-.727	4	.003	15	.002	10	-1.058e-3	3	716.433	3	2365.133	1
15		8	max	0	1	.203	1	.052	1	2.167e-2	1	NC	1	NC	2
16			min	-.727	4	.006	15	-.002	10	-9.066e-4	3	1217.526	3	4214.684	1
17		9	max	0	1	.317	1	.02	3	2.293e-2	1	NC	5	NC	1
18			min	-.727	4	.009	15	-.007	10	-7.557e-4	3	1717.945	1	NC	1
19		10	max	0	1	.368	1	.02	3	2.42e-2	1	NC	3	NC	1
20			min	-.727	4	-.018	3	-.013	2	-6.047e-4	3	1222.666	1	NC	1
21		11	max	0	12	.317	1	.02	3	2.293e-2	1	NC	5	NC	1
22			min	-.727	4	.009	15	-.013	5	-7.557e-4	3	1717.945	1	NC	1
23		12	max	0	12	.203	1	.052	1	2.167e-2	1	NC	1	NC	2
24			min	-.727	4	.006	15	-.013	5	-9.066e-4	3	1217.526	3	4214.684	1
25		13	max	0	12	.27	3	.092	1	2.041e-2	1	NC	5	NC	3
26			min	-.727	4	.002	15	-.005	5	-1.058e-3	3	716.433	3	2365.133	1
27		14	max	0	12	.367	3	.119	1	1.914e-2	1	NC	5	NC	3
28			min	-.727	4	-.037	1	.005	15	-1.209e-3	3	541.878	3	1831.328	1
29		15	max	0	12	.411	3	.124	1	1.788e-2	1	NC	5	NC	3
30			min	-.727	4	-.102	1	.007	10	-1.36e-3	3	487.788	3	1750.177	1
31		16	max	0	12	.389	3	.107	1	1.661e-2	1	NC	5	NC	3
32			min	-.727	4	-.108	1	.006	10	-1.511e-3	3	513.809	3	2031.451	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
33		17	max	0	12	.298	3	.073	1	1.535e-2	1	NC	5	NC	3
34			min	-.727	4	-.053	1	.004	10	-1.661e-3	3	654.786	3	3018.19	1
35		18	max	0	12	.151	3	.031	1	1.408e-2	1	NC	5	NC	2
36			min	-.727	4	.002	15	0	10	-1.812e-3	3	1186.354	3	7128.016	1
37		19	max	0	12	.192	1	.006	3	1.282e-2	1	NC	1	NC	1
38			min	-.727	4	-.032	3	-.003	2	-1.963e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.27	3	.006	3	7.702e-3	1	NC	1	NC	1
40			min	-.551	4	-.59	1	-.003	2	-4.169e-3	3	NC	1	NC	1
41		2	max	0	1	.477	3	.021	1	8.992e-3	1	NC	5	NC	1
42			min	-.551	4	-.894	1	-.025	5	-4.955e-3	3	708.588	1	9095.888	5
43		3	max	0	1	.657	3	.056	1	1.028e-2	1	NC	15	NC	2
44			min	-.551	4	-1.164	1	-.031	5	-5.742e-3	3	376.001	1	3935.397	1
45		4	max	0	1	.79	3	.089	1	1.157e-2	1	NC	15	NC	3
46			min	-.551	4	-1.374	1	-.022	5	-6.528e-3	3	275.462	1	2452.745	1
47		5	max	0	1	.866	3	.108	1	1.286e-2	1	8959.341	15	NC	3
48			min	-.551	4	-1.51	1	-.005	5	-7.315e-3	3	234.665	1	2024.736	1
49		6	max	0	1	.885	3	.106	1	1.415e-2	1	8431.965	15	NC	3
50			min	-.551	4	-1.571	1	.005	10	-8.101e-3	3	220.087	1	2060.937	1
51		7	max	0	1	.855	3	.084	1	1.544e-2	1	8513.678	15	NC	3
52			min	-.551	4	-1.566	1	.002	10	-8.888e-3	3	221.215	1	2608.569	1
53		8	max	0	1	.794	3	.049	1	1.673e-2	1	9024.689	15	NC	2
54			min	-.551	4	-1.516	1	-.002	10	-9.674e-3	3	233.211	1	4430.574	4
55		9	max	0	1	.73	3	.032	4	1.802e-2	1	9740.108	15	NC	1
56			min	-.551	4	-1.452	1	-.006	10	-1.046e-2	3	250.32	1	6550.764	4
57		10	max	0	1	.698	3	.017	3	1.931e-2	1	NC	15	NC	1
58			min	-.551	4	-1.42	1	-.012	2	-1.125e-2	3	260.233	1	NC	1
59		11	max	0	12	.73	3	.018	3	1.802e-2	1	9740.077	15	NC	1
60			min	-.551	4	-1.452	1	-.025	5	-1.046e-2	3	250.32	1	9075.895	5
61		12	max	0	12	.794	3	.049	1	1.673e-2	1	9024.595	15	NC	2
62			min	-.551	4	-1.516	1	-.03	5	-9.674e-3	3	233.211	1	4564.394	1
63		13	max	0	12	.855	3	.084	1	1.544e-2	1	8513.515	15	NC	3
64			min	-.551	4	-1.566	1	-.02	5	-8.888e-3	3	221.215	1	2608.569	1
65		14	max	0	12	.885	3	.106	1	1.415e-2	1	8431.728	15	NC	3
66			min	-.551	4	-1.571	1	-.002	5	-8.101e-3	3	220.087	1	2060.937	1
67		15	max	0	12	.866	3	.108	1	1.286e-2	1	8959.005	15	NC	3
68			min	-.551	4	-1.51	1	.006	10	-7.315e-3	3	234.665	1	2024.736	1
69		16	max	0	12	.79	3	.089	1	1.157e-2	1	NC	15	NC	3
70			min	-.551	4	-1.374	1	.005	10	-6.528e-3	3	275.462	1	2452.745	1
71		17	max	0	12	.657	3	.056	1	1.028e-2	1	NC	15	NC	2
72			min	-.551	4	-1.164	1	.003	10	-5.742e-3	3	376.001	1	3935.397	1
73		18	max	0	12	.477	3	.033	4	8.992e-3	1	NC	5	NC	1
74			min	-.551	4	-.894	1	0	10	-4.955e-3	3	708.588	1	6321.922	4
75		19	max	0	12	.27	3	.006	3	7.702e-3	1	NC	1	NC	1
76			min	-.551	4	-.59	1	-.003	2	-4.169e-3	3	NC	1	NC	1
77	M15	1	max	0	12	.277	3	.005	3	3.479e-3	3	NC	1	NC	1
78			min	-.448	4	-.589	1	-.003	2	-7.841e-3	1	NC	1	NC	1
79		2	max	0	12	.421	3	.021	1	4.131e-3	3	NC	5	NC	1
80			min	-.448	4	-.917	1	-.037	5	-9.163e-3	1	658.602	1	6083.432	5
81		3	max	0	12	.549	3	.057	1	4.783e-3	3	NC	15	NC	2
82			min	-.448	4	-1.205	1	-.046	5	-1.049e-2	1	350.476	1	3913.774	1
83		4	max	0	12	.652	3	.09	1	5.435e-3	3	NC	15	NC	3
84			min	-.448	4	-1.426	1	-.034	5	-1.181e-2	1	257.982	1	2441.923	1
85		5	max	0	12	.722	3	.108	1	6.087e-3	3	8973.129	15	NC	3
86			min	-.448	4	-1.565	1	-.011	5	-1.313e-2	1	221.293	1	2016.343	1
87		6	max	0	12	.758	3	.107	1	6.739e-3	3	8446.649	15	NC	3
88			min	-.448	4	-1.62	1	.006	10	-1.445e-2	1	209.516	1	2051.704	1
89		7	max	0	12	.765	3	.085	1	7.391e-3	3	8530.76	15	NC	3

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
90			min	-.448	4	-1.602	1	.003	10	-1.577e-2	1	213.222	1	2593.519	1
91		8	max	0	12	.751	3	.06	4	8.043e-3	3	9045.701	15	NC	2
92			min	-.449	4	-1.535	1	-.001	10	-1.71e-2	1	228.217	1	3573.206	4
93		9	max	0	12	.728	3	.042	4	8.695e-3	3	9765.94	15	NC	1
94			min	-.449	4	-1.457	1	-.005	10	-1.842e-2	1	248.742	1	5056.653	4
95		10	max	0	1	.716	3	.016	3	9.347e-3	3	NC	15	NC	1
96			min	-.449	4	-1.418	1	-.011	2	-1.974e-2	1	260.615	1	NC	1
97		11	max	0	1	.728	3	.017	3	8.695e-3	3	9765.916	15	NC	1
98			min	-.449	4	-1.457	1	-.035	5	-1.842e-2	1	248.742	1	6417.854	5
99		12	max	0	1	.751	3	.049	1	8.043e-3	3	9045.633	15	NC	2
100			min	-.448	4	-1.535	1	-.041	5	-1.71e-2	1	228.217	1	4518.77	1
101		13	max	0	1	.765	3	.085	1	7.391e-3	3	8530.645	15	NC	3
102			min	-.448	4	-1.602	1	-.028	5	-1.577e-2	1	213.222	1	2593.519	1
103		14	max	0	1	.758	3	.107	1	6.739e-3	3	8446.485	15	NC	3
104			min	-.448	4	-1.62	1	-.003	5	-1.445e-2	1	209.516	1	2051.704	1
105		15	max	0	1	.722	3	.108	1	6.087e-3	3	8972.9	15	NC	3
106			min	-.448	4	-1.565	1	.007	10	-1.313e-2	1	221.293	1	2016.343	1
107		16	max	0	1	.652	3	.09	1	5.435e-3	3	NC	15	NC	3
108			min	-.448	4	-1.426	1	.005	10	-1.181e-2	1	257.982	1	2441.923	1
109		17	max	0	1	.549	3	.066	4	4.783e-3	3	NC	15	NC	2
110			min	-.448	4	-1.205	1	.003	10	-1.049e-2	1	350.476	1	3241.9	4
111		18	max	0	1	.421	3	.045	4	4.131e-3	3	NC	5	NC	1
112			min	-.448	4	-.917	1	0	10	-9.163e-3	1	658.602	1	4705.75	4
113		19	max	0	1	.277	3	.005	3	3.479e-3	3	NC	1	NC	1
114			min	-.448	4	-.589	1	-.003	2	-7.841e-3	1	NC	1	NC	1
115	M16	1	max	0	12	.186	1	.005	3	6.405e-3	3	NC	1	NC	1
116			min	-.143	4	-.096	3	-.002	2	-1.206e-2	1	NC	1	NC	1
117		2	max	0	12	.023	1	.031	1	7.232e-3	3	NC	5	NC	2
118			min	-.143	4	-.044	3	-.026	5	-1.314e-2	1	1325.549	1	7208.657	1
119		3	max	0	12	0	15	.072	1	8.058e-3	3	NC	5	NC	3
120			min	-.143	4	-.127	2	-.033	5	-1.423e-2	1	743.906	1	3033.809	1
121		4	max	0	12	.011	3	.107	1	8.885e-3	3	NC	5	NC	3
122			min	-.144	4	-.195	2	-.026	5	-1.531e-2	1	602.393	1	2034.52	1
123		5	max	0	12	.004	12	.125	1	9.712e-3	3	NC	5	NC	3
124			min	-.144	4	-.197	2	-.011	5	-1.64e-2	1	605.216	1	1747.157	1
125		6	max	0	12	0	13	.12	1	1.054e-2	3	NC	5	NC	3
126			min	-.144	4	-.136	2	.004	15	-1.749e-2	1	747.727	2	1820.82	1
127		7	max	0	12	.03	9	.094	1	1.137e-2	3	NC	3	NC	3
128			min	-.144	4	-.081	3	.004	10	-1.857e-2	1	1213.79	2	2335.225	1
129		8	max	0	12	.165	1	.054	1	1.219e-2	3	NC	1	NC	2
130			min	-.144	4	-.14	3	0	10	-1.966e-2	1	4924.064	3	4086.44	1
131		9	max	0	12	.294	1	.027	4	1.302e-2	3	NC	5	NC	1
132			min	-.144	4	-.191	3	-.005	10	-2.074e-2	1	1993.327	1	7895.664	4
133		10	max	0	1	.351	1	.014	3	1.385e-2	3	NC	5	NC	1
134			min	-.144	4	-.213	3	-.01	2	-2.183e-2	1	1303.03	1	NC	1
135		11	max	0	1	.294	1	.015	1	1.302e-2	3	NC	5	NC	1
136			min	-.144	4	-.191	3	-.02	5	-2.074e-2	1	1993.327	1	NC	1
137		12	max	0	1	.165	1	.054	1	1.219e-2	3	NC	1	NC	2
138			min	-.143	4	-.14	3	-.021	5	-1.966e-2	1	4924.064	3	4086.44	1
139		13	max	0	1	.03	9	.094	1	1.137e-2	3	NC	3	NC	3
140			min	-.143	4	-.081	3	-.01	5	-1.857e-2	1	1213.79	2	2335.225	1
141		14	max	0	1	0	13	.12	1	1.054e-2	3	NC	5	NC	3
142			min	-.143	4	-.136	2	.005	15	-1.749e-2	1	747.727	2	1820.82	1
143		15	max	0	1	.004	12	.125	1	9.712e-3	3	NC	5	NC	3
144			min	-.143	4	-.197	2	.008	10	-1.64e-2	1	605.216	1	1747.157	1
145		16	max	0	1	.011	3	.107	1	8.885e-3	3	NC	5	NC	3
146			min	-.143	4	-.195	2	.007	10	-1.531e-2	1	602.393	1	2034.52	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
147		17	max	0	1	0	15	.072	1	8.058e-3	3	NC	5	NC	3
148			min	-.143	4	-.127	2	.004	10	-1.423e-2	1	743.906	1	3033.809	1
149		18	max	0	1	.023	1	.037	4	7.232e-3	3	NC	5	NC	2
150			min	-.143	4	-.044	3	0	10	-1.314e-2	1	1325.549	1	5760.585	4
151		19	max	0	1	.186	1	.005	3	6.405e-3	3	NC	1	NC	1
152			min	-.143	4	-.096	3	-.002	2	-1.206e-2	1	NC	1	NC	1
153	M2	1	max	.006	1	.005	2	.01	1	2.538e-3	5	NC	1	NC	2
154			min	-.006	3	-.009	3	-.683	4	-2.247e-4	1	NC	1	88.728	4
155		2	max	.006	1	.004	2	.009	1	2.546e-3	5	NC	1	NC	2
156			min	-.005	3	-.009	3	-.626	4	-2.104e-4	1	NC	1	96.695	4
157		3	max	.006	1	.003	2	.008	1	2.553e-3	5	NC	1	NC	2
158			min	-.005	3	-.008	3	-.57	4	-1.962e-4	1	NC	1	106.173	4
159		4	max	.005	1	.003	2	.008	1	2.56e-3	5	NC	1	NC	2
160			min	-.005	3	-.008	3	-.515	4	-1.819e-4	1	NC	1	117.558	4
161		5	max	.005	1	.002	2	.007	1	2.567e-3	5	NC	1	NC	2
162			min	-.004	3	-.008	3	-.461	4	-1.677e-4	1	NC	1	131.391	4
163		6	max	.005	1	.001	2	.006	1	2.575e-3	5	NC	1	NC	1
164			min	-.004	3	-.008	3	-.408	4	-1.535e-4	1	NC	1	148.426	4
165		7	max	.004	1	0	2	.005	1	2.584e-3	4	NC	1	NC	1
166			min	-.004	3	-.007	3	-.357	4	-1.392e-4	1	NC	1	169.731	4
167		8	max	.004	1	0	2	.004	1	2.595e-3	4	NC	1	NC	1
168			min	-.003	3	-.007	3	-.308	4	-1.25e-4	1	NC	1	196.874	4
169		9	max	.004	1	0	15	.004	1	2.606e-3	4	NC	1	NC	1
170			min	-.003	3	-.007	3	-.261	4	-1.108e-4	1	NC	1	232.222	4
171		10	max	.003	1	0	15	.003	1	2.617e-3	4	NC	1	NC	1
172			min	-.003	3	-.006	3	-.217	4	-9.655e-5	1	NC	1	279.496	4
173		11	max	.003	1	0	15	.003	1	2.628e-3	4	NC	1	NC	1
174			min	-.002	3	-.006	3	-.176	4	-8.231e-5	1	NC	1	344.818	4
175		12	max	.002	1	0	15	.002	1	2.639e-3	4	NC	1	NC	1
176			min	-.002	3	-.005	3	-.138	4	-6.808e-5	1	NC	1	438.855	4
177		13	max	.002	1	0	15	.001	1	2.65e-3	4	NC	1	NC	1
178			min	-.002	3	-.005	3	-.104	4	-5.384e-5	1	NC	1	581.592	4
179		14	max	.002	1	0	15	.001	1	2.661e-3	4	NC	1	NC	1
180			min	-.002	3	-.004	3	-.074	4	-3.961e-5	1	NC	1	814.188	4
181		15	max	.001	1	0	15	0	1	2.672e-3	4	NC	1	NC	1
182			min	-.001	3	-.004	3	-.049	4	-2.538e-5	1	NC	1	1233.136	4
183		16	max	.001	1	0	15	0	1	2.683e-3	4	NC	1	NC	1
184			min	0	3	-.003	3	-.029	4	-1.114e-5	1	NC	1	2111.894	4
185		17	max	0	1	0	15	0	1	2.694e-3	4	NC	1	NC	1
186			min	0	3	-.002	6	-.013	4	-3.195e-7	3	NC	1	4506.999	4
187		18	max	0	1	0	15	0	1	2.705e-3	4	NC	1	NC	1
188			min	0	3	-.001	6	-.004	4	5.459e-7	12	NC	1	NC	1
189		19	max	0	1	0	1	0	1	2.716e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	1.285e-6	12	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-4.117e-7	12	NC	1	NC	1
192			min	0	1	0	1	0	1	-5.239e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.015	4	1.806e-4	4	NC	1	NC	1
194			min	0	2	-.002	6	0	12	8.954e-7	12	NC	1	NC	1
195		3	max	0	3	-.001	15	.03	4	8.851e-4	4	NC	1	NC	1
196			min	0	2	-.005	6	0	12	2.203e-6	12	NC	1	NC	1
197		4	max	0	3	-.002	15	.044	4	1.59e-3	4	NC	1	NC	1
198			min	0	2	-.008	6	0	12	3.51e-6	12	NC	1	NC	1
199		5	max	.001	3	-.002	15	.057	4	2.294e-3	4	NC	1	NC	1
200			min	0	2	-.011	6	0	12	4.817e-6	12	9469.175	6	8933.566	5
201		6	max	.001	3	-.003	15	.071	4	2.999e-3	4	NC	1	NC	1
202			min	-.001	2	-.014	6	0	12	6.124e-6	12	7584.45	6	7816.494	5
203		7	max	.002	3	-.004	15	.083	4	3.703e-3	4	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
204			min	-.001	2	-.016	6	0	12	7.431e-6	12	6454.681	6	7218.288	5
205		8	max	.002	3	-.004	15	.095	4	4.408e-3	4	NC	5	NC	1
206			min	-.001	2	-.018	6	0	12	8.738e-6	12	5757.275	6	6957.64	5
207		9	max	.002	3	-.004	15	.107	4	5.112e-3	4	NC	5	NC	1
208			min	-.002	2	-.019	6	0	12	1.005e-5	12	5340.857	6	6961.465	5
209		10	max	.002	3	-.004	15	.118	4	5.817e-3	4	NC	5	NC	1
210			min	-.002	2	-.02	6	0	12	1.135e-5	12	5131.57	6	7214.749	5
211		11	max	.003	3	-.004	15	.128	4	6.521e-3	4	NC	5	NC	1
212			min	-.002	2	-.02	6	0	12	1.266e-5	12	5098.089	6	7748.077	5
213		12	max	.003	3	-.004	15	.139	4	7.225e-3	4	NC	5	NC	1
214			min	-.002	2	-.02	6	0	12	1.397e-5	12	5239.533	6	8646.525	5
215		13	max	.003	3	-.004	15	.148	4	7.93e-3	4	NC	5	NC	1
216			min	-.002	2	-.018	6	0	12	1.527e-5	12	5586.601	6	NC	1
217		14	max	.004	3	-.004	15	.158	4	8.634e-3	4	NC	5	NC	1
218			min	-.003	2	-.017	6	0	12	1.658e-5	12	6217.903	6	NC	1
219		15	max	.004	3	-.003	15	.168	4	9.339e-3	4	NC	3	NC	1
220			min	-.003	2	-.014	6	0	12	1.789e-5	12	7309.298	6	NC	1
221		16	max	.004	3	-.002	15	.177	4	1.004e-2	4	NC	1	NC	1
222			min	-.003	2	-.011	6	0	12	1.92e-5	12	9287.94	6	NC	1
223		17	max	.004	3	-.002	15	.187	4	1.075e-2	4	NC	1	NC	1
224			min	-.003	2	-.008	1	0	12	2.05e-5	12	NC	1	NC	1
225		18	max	.005	3	0	15	.197	4	1.145e-2	4	NC	1	NC	1
226			min	-.004	2	-.006	1	0	12	2.181e-5	12	NC	1	NC	1
227		19	max	.005	3	0	5	.208	4	1.216e-2	4	NC	1	NC	1
228			min	-.004	2	-.003	1	0	12	2.312e-5	12	NC	1	NC	1
229	M4	1	max	.003	1	.003	2	0	12	7.751e-5	1	NC	1	NC	3
230			min	0	3	-.005	3	-.208	4	-1.06e-3	4	NC	1	119.197	4
231		2	max	.003	1	.003	2	0	12	7.751e-5	1	NC	1	NC	3
232			min	0	3	-.005	3	-.191	4	-1.06e-3	4	NC	1	129.797	4
233		3	max	.002	1	.003	2	0	12	7.751e-5	1	NC	1	NC	3
234			min	0	3	-.004	3	-.174	4	-1.06e-3	4	NC	1	142.402	4
235		4	max	.002	1	.003	2	0	12	7.751e-5	1	NC	1	NC	3
236			min	0	3	-.004	3	-.157	4	-1.06e-3	4	NC	1	157.534	4
237		5	max	.002	1	.003	2	0	12	7.751e-5	1	NC	1	NC	2
238			min	0	3	-.004	3	-.141	4	-1.06e-3	4	NC	1	175.904	4
239		6	max	.002	1	.002	2	0	12	7.751e-5	1	NC	1	NC	2
240			min	0	3	-.004	3	-.125	4	-1.06e-3	4	NC	1	198.496	4
241		7	max	.002	1	.002	2	0	12	7.751e-5	1	NC	1	NC	2
242			min	0	3	-.003	3	-.109	4	-1.06e-3	4	NC	1	226.708	4
243		8	max	.002	1	.002	2	0	12	7.751e-5	1	NC	1	NC	2
244			min	0	3	-.003	3	-.094	4	-1.06e-3	4	NC	1	262.579	4
245		9	max	.002	1	.002	2	0	12	7.751e-5	1	NC	1	NC	2
246			min	0	3	-.003	3	-.08	4	-1.06e-3	4	NC	1	309.179	4
247		10	max	.001	1	.002	2	0	12	7.751e-5	1	NC	1	NC	2
248			min	0	3	-.003	3	-.067	4	-1.06e-3	4	NC	1	371.309	4
249		11	max	.001	1	.001	2	0	12	7.751e-5	1	NC	1	NC	1
250			min	0	3	-.002	3	-.054	4	-1.06e-3	4	NC	1	456.82	4
251		12	max	.001	1	.001	2	0	12	7.751e-5	1	NC	1	NC	1
252			min	0	3	-.002	3	-.043	4	-1.06e-3	4	NC	1	579.3	4
253		13	max	0	1	.001	2	0	12	7.751e-5	1	NC	1	NC	1
254			min	0	3	-.002	3	-.032	4	-1.06e-3	4	NC	1	763.973	4
255		14	max	0	1	0	2	0	12	7.751e-5	1	NC	1	NC	1
256			min	0	3	-.001	3	-.023	4	-1.06e-3	4	NC	1	1062.166	4
257		15	max	0	1	0	2	0	12	7.751e-5	1	NC	1	NC	1
258			min	0	3	-.001	3	-.016	4	-1.06e-3	4	NC	1	1592.228	4
259		16	max	0	1	0	2	0	12	7.751e-5	1	NC	1	NC	1
260			min	0	3	0	3	-.009	4	-1.06e-3	4	NC	1	2681.428	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
261		17	max	0	1	0	2	0	12	7.751e-5	1	NC	1	NC	1
262			min	0	3	0	3	-.004	4	-1.06e-3	4	NC	1	5543.77	4
263		18	max	0	1	0	2	0	12	7.751e-5	1	NC	1	NC	1
264			min	0	3	0	3	-.001	4	-1.06e-3	4	NC	1	NC	1
265		19	max	0	1	0	1	0	1	7.751e-5	1	NC	1	NC	1
266			min	0	1	0	1	0	1	-1.06e-3	4	NC	1	NC	1
267	M6	1	max	.02	1	.02	2	0	1	2.654e-3	4	NC	3	NC	1
268			min	-.018	3	-.027	3	-.69	4	0	1	3040.197	2	87.821	4
269		2	max	.019	1	.018	2	0	1	2.658e-3	4	NC	3	NC	1
270			min	-.017	3	-.026	3	-.633	4	0	1	3347.602	2	95.708	4
271		3	max	.018	1	.016	2	0	1	2.662e-3	4	NC	3	NC	1
272			min	-.016	3	-.024	3	-.576	4	0	1	3721.061	2	105.089	4
273		4	max	.017	1	.014	2	0	1	2.665e-3	4	NC	3	NC	1
274			min	-.015	3	-.023	3	-.52	4	0	1	4180.472	2	116.359	4
275		5	max	.016	1	.013	2	0	1	2.669e-3	4	NC	3	NC	1
276			min	-.014	3	-.021	3	-.466	4	0	1	4754.096	2	130.052	4
277		6	max	.014	1	.011	2	0	1	2.673e-3	4	NC	3	NC	1
278			min	-.013	3	-.02	3	-.412	4	0	1	5483.201	2	146.913	4
279		7	max	.013	1	.009	2	0	1	2.677e-3	4	NC	1	NC	1
280			min	-.012	3	-.019	3	-.36	4	0	1	6430.043	2	168.003	4
281		8	max	.012	1	.008	2	0	1	2.68e-3	4	NC	1	NC	1
282			min	-.011	3	-.017	3	-.311	4	0	1	7692.298	2	194.871	4
283		9	max	.011	1	.006	2	0	1	2.684e-3	4	NC	1	NC	1
284			min	-.01	3	-.016	3	-.263	4	0	1	9430.74	2	229.863	4
285		10	max	.01	1	.005	2	0	1	2.688e-3	4	NC	1	NC	1
286			min	-.009	3	-.014	3	-.219	4	0	1	NC	1	276.66	4
287		11	max	.009	1	.004	2	0	1	2.692e-3	4	NC	1	NC	1
288			min	-.008	3	-.013	3	-.177	4	0	1	NC	1	341.323	4
289		12	max	.008	1	.003	2	0	1	2.695e-3	4	NC	1	NC	1
290			min	-.007	3	-.011	3	-.139	4	0	1	NC	1	434.413	4
291		13	max	.007	1	.002	2	0	1	2.699e-3	4	NC	1	NC	1
292			min	-.006	3	-.01	3	-.105	4	0	1	NC	1	575.714	4
293		14	max	.006	1	.001	2	0	1	2.703e-3	4	NC	1	NC	1
294			min	-.005	3	-.008	3	-.075	4	0	1	NC	1	805.976	4
295		15	max	.004	1	0	2	0	1	2.707e-3	4	NC	1	NC	1
296			min	-.004	3	-.007	3	-.05	4	0	1	NC	1	1220.731	4
297		16	max	.003	1	0	2	0	1	2.71e-3	4	NC	1	NC	1
298			min	-.003	3	-.005	3	-.029	4	0	1	NC	1	2090.727	4
299		17	max	.002	1	0	2	0	1	2.714e-3	4	NC	1	NC	1
300			min	-.002	3	-.003	3	-.014	4	0	1	NC	1	4462.112	4
301		18	max	.001	1	0	2	0	1	2.718e-3	4	NC	1	NC	1
302			min	0	3	-.002	3	-.004	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	2.721e-3	4	NC	1	NC	1
304			min	0	1	0	1	0	1	0	1	NC	1	NC	1
305	M7	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
306			min	0	1	0	1	0	1	-5.238e-4	4	NC	1	NC	1
307		2	max	0	3	0	15	.015	4	1.607e-4	4	NC	1	NC	1
308			min	0	2	-.003	3	0	1	0	1	NC	1	NC	1
309		3	max	.002	3	-.001	15	.03	4	8.452e-4	4	NC	1	NC	1
310			min	-.002	2	-.006	3	0	1	0	1	NC	1	NC	1
311		4	max	.003	3	-.002	15	.044	4	1.53e-3	4	NC	1	NC	1
312			min	-.002	2	-.009	3	0	1	0	1	NC	1	9881.833	4
313		5	max	.003	3	-.003	15	.058	4	2.214e-3	4	NC	1	NC	1
314			min	-.003	2	-.011	3	0	1	0	1	9537.557	4	7969.381	4
315		6	max	.004	3	-.003	15	.071	4	2.899e-3	4	NC	1	NC	1
316			min	-.004	2	-.014	4	0	1	0	1	7633.744	4	6932.505	4
317		7	max	.005	3	-.004	15	.083	4	3.583e-3	4	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
318			min	-.005	2	-.016	4	0	1	0	1	6492.93	4	6358.687	4
319		8	max	.006	3	-.004	15	.095	4	4.268e-3	4	NC	2	NC	1
320			min	-.006	2	-.018	4	0	1	0	1	5788.72	4	6080.532	4
321		9	max	.007	3	-.005	15	.106	4	4.952e-3	4	NC	5	NC	1
322			min	-.006	2	-.02	4	0	1	0	1	5367.992	4	6027.033	4
323		10	max	.008	3	-.005	15	.117	4	5.637e-3	4	NC	5	NC	1
324			min	-.007	2	-.021	4	0	1	0	1	5156.019	4	6176.853	4
325		11	max	.008	3	-.005	15	.127	4	6.321e-3	4	NC	5	NC	1
326			min	-.008	2	-.021	4	0	1	0	1	5121.034	4	6544.606	4
327		12	max	.009	3	-.005	15	.137	4	7.006e-3	4	NC	5	NC	1
328			min	-.009	2	-.02	4	0	1	0	1	5261.958	4	7183.89	4
329		13	max	.01	3	-.004	15	.147	4	7.69e-3	4	NC	5	NC	1
330			min	-.01	2	-.019	4	0	1	0	1	5609.482	4	8207.683	4
331		14	max	.011	3	-.004	15	.156	4	8.375e-3	4	NC	2	NC	1
332			min	-.01	2	-.017	4	0	1	0	1	6242.421	4	9842.225	4
333		15	max	.012	3	-.003	15	.165	4	9.059e-3	4	NC	1	NC	1
334			min	-.011	2	-.015	4	0	1	0	1	7337.215	4	NC	1
335		16	max	.013	3	-.003	15	.173	4	9.744e-3	4	NC	1	NC	1
336			min	-.012	2	-.012	4	0	1	0	1	9322.513	4	NC	1
337		17	max	.014	3	-.002	15	.182	4	1.043e-2	4	NC	1	NC	1
338			min	-.013	2	-.01	1	0	1	0	1	NC	1	NC	1
339		18	max	.014	3	-.001	15	.191	4	1.111e-2	4	NC	1	NC	1
340			min	-.014	2	-.008	1	0	1	0	1	NC	1	NC	1
341		19	max	.015	3	0	15	.201	4	1.18e-2	4	NC	1	NC	1
342			min	-.014	2	-.006	1	0	1	0	1	NC	1	NC	1
343	M8	1	max	.008	1	.013	2	0	1	0	1	NC	1	NC	1
344			min	-.001	3	-.015	3	-.201	4	-1.178e-3	4	NC	1	123.351	4
345		2	max	.007	1	.012	2	0	1	0	1	NC	1	NC	1
346			min	-.001	3	-.014	3	-.185	4	-1.178e-3	4	NC	1	134.332	4
347		3	max	.007	1	.012	2	0	1	0	1	NC	1	NC	1
348			min	-.001	3	-.014	3	-.168	4	-1.178e-3	4	NC	1	147.388	4
349		4	max	.006	1	.011	2	0	1	0	1	NC	1	NC	1
350			min	-.001	3	-.013	3	-.152	4	-1.178e-3	4	NC	1	163.063	4
351		5	max	.006	1	.01	2	0	1	0	1	NC	1	NC	1
352			min	-.001	3	-.012	3	-.136	4	-1.178e-3	4	NC	1	182.09	4
353		6	max	.006	1	.01	2	0	1	0	1	NC	1	NC	1
354			min	-.001	3	-.011	3	-.121	4	-1.178e-3	4	NC	1	205.49	4
355		7	max	.005	1	.009	2	0	1	0	1	NC	1	NC	1
356			min	0	3	-.01	3	-.106	4	-1.178e-3	4	NC	1	234.711	4
357		8	max	.005	1	.008	2	0	1	0	1	NC	1	NC	1
358			min	0	3	-.009	3	-.091	4	-1.178e-3	4	NC	1	271.865	4
359		9	max	.004	1	.007	2	0	1	0	1	NC	1	NC	1
360			min	0	3	-.009	3	-.077	4	-1.178e-3	4	NC	1	320.132	4
361		10	max	.004	1	.007	2	0	1	0	1	NC	1	NC	1
362			min	0	3	-.008	3	-.065	4	-1.178e-3	4	NC	1	384.483	4
363		11	max	.003	1	.006	2	0	1	0	1	NC	1	NC	1
364			min	0	3	-.007	3	-.052	4	-1.178e-3	4	NC	1	473.054	4
365		12	max	.003	1	.005	2	0	1	0	1	NC	1	NC	1
366			min	0	3	-.006	3	-.041	4	-1.178e-3	4	NC	1	599.918	4
367		13	max	.003	1	.004	2	0	1	0	1	NC	1	NC	1
368			min	0	3	-.005	3	-.031	4	-1.178e-3	4	NC	1	791.204	4
369		14	max	.002	1	.004	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.004	3	-.023	4	-1.178e-3	4	NC	1	1100.081	4
371		15	max	.002	1	.003	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.003	3	-.015	4	-1.178e-3	4	NC	1	1649.147	4
373		16	max	.001	1	.002	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.003	3	-.009	4	-1.178e-3	4	NC	1	2777.434	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
375		17	max	0	1	.001	2	0	1	0	1	NC	1	NC	1
376			min	0	3	-.002	3	-.004	4	-1.178e-3	4	NC	1	5742.618	4
377		18	max	0	1	0	2	0	1	0	1	NC	1	NC	1
378			min	0	3	0	3	-.001	4	-1.178e-3	4	NC	1	NC	1
379		19	max	0	1	0	1	0	1	0	1	NC	1	NC	1
380			min	0	1	0	1	0	1	-1.178e-3	4	NC	1	NC	1
381	M10	1	max	.006	1	.005	2	0	12	2.636e-3	4	NC	1	NC	2
382			min	-.006	3	-.009	3	-.688	4	1.202e-5	12	NC	1	88.049	4
383		2	max	.006	1	.004	2	0	12	2.639e-3	4	NC	1	NC	2
384			min	-.005	3	-.009	3	-.631	4	1.129e-5	12	NC	1	95.955	4
385		3	max	.006	1	.003	2	0	12	2.643e-3	4	NC	1	NC	2
386			min	-.005	3	-.008	3	-.575	4	1.055e-5	12	NC	1	105.361	4
387		4	max	.005	1	.003	2	0	12	2.646e-3	4	NC	1	NC	2
388			min	-.005	3	-.008	3	-.519	4	9.806e-6	12	NC	1	116.66	4
389		5	max	.005	1	.002	2	0	12	2.65e-3	4	NC	1	NC	2
390			min	-.004	3	-.008	3	-.464	4	9.067e-6	12	NC	1	130.388	4
391		6	max	.005	1	.001	2	0	12	2.653e-3	4	NC	1	NC	1
392			min	-.004	3	-.008	3	-.411	4	8.327e-6	12	NC	1	147.293	4
393		7	max	.004	1	0	2	0	12	2.657e-3	4	NC	1	NC	1
394			min	-.004	3	-.007	3	-.36	4	7.588e-6	12	NC	1	168.437	4
395		8	max	.004	1	0	2	0	12	2.66e-3	4	NC	1	NC	1
396			min	-.003	3	-.007	3	-.31	4	6.849e-6	12	NC	1	195.375	4
397		9	max	.004	1	0	2	0	12	2.664e-3	4	NC	1	NC	1
398			min	-.003	3	-.007	3	-.263	4	6.109e-6	12	NC	1	230.457	4
399		10	max	.003	1	-.001	2	0	12	2.667e-3	4	NC	1	NC	1
400			min	-.003	3	-.006	3	-.218	4	5.37e-6	12	NC	1	277.375	4
401		11	max	.003	1	-.002	15	0	12	2.671e-3	4	NC	1	NC	1
402			min	-.002	3	-.006	3	-.177	4	4.63e-6	12	NC	1	342.206	4
403		12	max	.002	1	-.001	15	0	12	2.674e-3	4	NC	1	NC	1
404			min	-.002	3	-.005	3	-.139	4	3.891e-6	12	NC	1	435.538	4
405		13	max	.002	1	-.001	15	0	12	2.678e-3	4	NC	1	NC	1
406			min	-.002	3	-.005	4	-.105	4	3.151e-6	12	NC	1	577.207	4
407		14	max	.002	1	-.001	15	0	12	2.682e-3	4	NC	1	NC	1
408			min	-.002	3	-.005	4	-.075	4	2.412e-6	12	NC	1	808.071	4
409		15	max	.001	1	-.001	15	0	12	2.685e-3	4	NC	1	NC	1
410			min	-.001	3	-.004	4	-.049	4	1.672e-6	12	NC	1	1223.916	4
411		16	max	.001	1	0	15	0	12	2.689e-3	4	NC	1	NC	1
412			min	0	3	-.003	4	-.029	4	8.285e-7	10	NC	1	2096.217	4
413		17	max	0	1	0	15	0	12	2.692e-3	4	NC	1	NC	1
414			min	0	3	-.002	4	-.014	4	-3.092e-6	1	NC	1	4473.982	4
415		18	max	0	1	0	15	0	12	2.696e-3	4	NC	1	NC	1
416			min	0	3	-.001	4	-.004	4	-1.733e-5	1	NC	1	NC	1
417		19	max	0	1	0	1	0	1	2.699e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-3.156e-5	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	9.62e-6	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-5.187e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.015	4	1.706e-4	4	NC	1	NC	1
422			min	0	2	-.003	4	0	1	-1.903e-5	1	NC	1	NC	1
423		3	max	0	3	-.001	15	.029	4	8.598e-4	4	NC	1	NC	1
424			min	0	2	-.006	4	0	1	-4.768e-5	1	NC	1	NC	1
425		4	max	0	3	-.002	15	.044	4	1.549e-3	4	NC	1	NC	1
426			min	0	2	-.009	4	0	1	-7.633e-5	1	NC	1	NC	1
427		5	max	.001	3	-.003	15	.057	4	2.238e-3	4	NC	1	NC	1
428			min	0	2	-.012	4	0	1	-1.05e-4	1	9036.891	4	8570.361	4
429		6	max	.001	3	-.004	15	.07	4	2.928e-3	4	NC	1	NC	1
430			min	-.001	2	-.014	4	-.001	1	-1.336e-4	1	7271.191	4	7486.056	4
431		7	max	.002	3	-.004	15	.083	4	3.617e-3	4	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
432			min	-.001	2	-.017	4	-.001	1	-1.623e-4	1	6210.585	4	6899.013	4
433		8	max	.002	3	-.005	15	.094	4	4.306e-3	4	NC	5	NC	1
434			min	-.001	2	-.019	4	-.002	1	-1.909e-4	1	5555.921	4	6633.487	4
435		9	max	.002	3	-.005	15	.106	4	4.995e-3	4	NC	5	NC	1
436			min	-.002	2	-.02	4	-.002	1	-2.196e-4	1	5166.611	4	6617.332	4
437		10	max	.002	3	-.005	15	.117	4	5.685e-3	4	NC	5	NC	1
438			min	-.002	2	-.021	4	-.002	1	-2.482e-4	1	4974.2	4	6833.202	4
439		11	max	.003	3	-.005	15	.127	4	6.374e-3	4	NC	5	NC	1
440			min	-.002	2	-.021	4	-.003	1	-2.769e-4	1	4950.115	4	7305.594	4
441		12	max	.003	3	-.005	15	.137	4	7.063e-3	4	NC	5	NC	1
442			min	-.002	2	-.021	4	-.003	1	-3.055e-4	1	5094.676	4	8107.389	4
443		13	max	.003	3	-.005	15	.146	4	7.753e-3	4	NC	5	NC	1
444			min	-.002	2	-.02	4	-.004	1	-3.342e-4	1	5438.596	4	9388.906	4
445		14	max	.004	3	-.004	15	.156	4	8.442e-3	4	NC	5	NC	1
446			min	-.003	2	-.018	4	-.005	1	-3.628e-4	1	6059.123	4	NC	1
447		15	max	.004	3	-.004	15	.165	4	9.131e-3	4	NC	3	NC	1
448			min	-.003	2	-.015	4	-.005	1	-3.915e-4	1	7128.341	4	NC	1
449		16	max	.004	3	-.003	15	.174	4	9.82e-3	4	NC	1	NC	1
450			min	-.003	2	-.012	4	-.006	1	-4.201e-4	1	9063.678	4	NC	1
451		17	max	.004	3	-.002	15	.183	4	1.051e-2	4	NC	1	NC	1
452			min	-.003	2	-.009	4	-.007	1	-4.488e-4	1	NC	1	NC	1
453		18	max	.005	3	-.001	15	.193	4	1.12e-2	4	NC	1	NC	1
454			min	-.004	2	-.006	1	-.008	1	-4.774e-4	1	NC	1	NC	1
455		19	max	.005	3	0	10	.203	4	1.189e-2	4	NC	1	NC	1
456			min	-.004	2	-.003	1	-.009	1	-5.061e-4	1	NC	1	NC	1
457	M12	1	max	.003	1	.003	2	.009	1	-3.883e-6	12	NC	1	NC	3
458			min	0	3	-.005	3	-.203	4	-1.101e-3	4	NC	1	122.099	4
459		2	max	.003	1	.003	2	.009	1	-3.883e-6	12	NC	1	NC	3
460			min	0	3	-.005	3	-.187	4	-1.101e-3	4	NC	1	132.961	4
461		3	max	.002	1	.003	2	.008	1	-3.883e-6	12	NC	1	NC	3
462			min	0	3	-.004	3	-.17	4	-1.101e-3	4	NC	1	145.877	4
463		4	max	.002	1	.003	2	.007	1	-3.883e-6	12	NC	1	NC	3
464			min	0	3	-.004	3	-.154	4	-1.101e-3	4	NC	1	161.382	4
465		5	max	.002	1	.003	2	.006	1	-3.883e-6	12	NC	1	NC	2
466			min	0	3	-.004	3	-.138	4	-1.101e-3	4	NC	1	180.205	4
467		6	max	.002	1	.002	2	.006	1	-3.883e-6	12	NC	1	NC	2
468			min	0	3	-.004	3	-.122	4	-1.101e-3	4	NC	1	203.353	4
469		7	max	.002	1	.002	2	.005	1	-3.883e-6	12	NC	1	NC	2
470			min	0	3	-.003	3	-.107	4	-1.101e-3	4	NC	1	232.261	4
471		8	max	.002	1	.002	2	.004	1	-3.883e-6	12	NC	1	NC	2
472			min	0	3	-.003	3	-.092	4	-1.101e-3	4	NC	1	269.016	4
473		9	max	.002	1	.002	2	.004	1	-3.883e-6	12	NC	1	NC	2
474			min	0	3	-.003	3	-.078	4	-1.101e-3	4	NC	1	316.765	4
475		10	max	.001	1	.002	2	.003	1	-3.883e-6	12	NC	1	NC	2
476			min	0	3	-.003	3	-.065	4	-1.101e-3	4	NC	1	380.426	4
477		11	max	.001	1	.001	2	.002	1	-3.883e-6	12	NC	1	NC	1
478			min	0	3	-.002	3	-.053	4	-1.101e-3	4	NC	1	468.045	4
479		12	max	.001	1	.001	2	.002	1	-3.883e-6	12	NC	1	NC	1
480			min	0	3	-.002	3	-.042	4	-1.101e-3	4	NC	1	593.545	4
481		13	max	0	1	.001	2	.001	1	-3.883e-6	12	NC	1	NC	1
482			min	0	3	-.002	3	-.032	4	-1.101e-3	4	NC	1	782.772	4
483		14	max	0	1	0	2	.001	1	-3.883e-6	12	NC	1	NC	1
484			min	0	3	-.001	3	-.023	4	-1.101e-3	4	NC	1	1088.32	4
485		15	max	0	1	0	2	0	1	-3.883e-6	12	NC	1	NC	1
486			min	0	3	-.001	3	-.015	4	-1.101e-3	4	NC	1	1631.46	4
487		16	max	0	1	0	2	0	1	-3.883e-6	12	NC	1	NC	1
488			min	0	3	0	3	-.009	4	-1.101e-3	4	NC	1	2747.547	4

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
489		17	max	0	1	0	2	0	1	-3.883e-6	12	NC	1	NC	1
490			min	0	3	0	3	-.004	4	-1.101e-3	4	NC	1	5680.587	4
491		18	max	0	1	0	2	0	1	-3.883e-6	12	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-1.101e-3	4	NC	1	NC	1
493		19	max	0	1	0	1	0	1	-3.883e-6	12	NC	1	NC	1
494			min	0	1	0	1	0	1	-1.101e-3	4	NC	1	NC	1
495	M1	1	max	.006	3	.192	1	.727	4	1.2e-2	1	NC	1	NC	1
496			min	-.003	2	-.032	3	0	12	-1.574e-2	3	NC	1	NC	1
497		2	max	.006	3	.095	1	.705	4	9.579e-3	4	NC	5	NC	1
498			min	-.003	2	-.016	3	-.007	1	-7.813e-3	3	1399.145	1	NC	1
499		3	max	.006	3	.009	3	.682	4	1.658e-2	4	NC	5	NC	1
500			min	-.003	2	-.008	1	-.01	1	-2.202e-4	1	672.371	1	6065.146	5
501		4	max	.006	3	.049	3	.659	4	1.444e-2	4	NC	15	NC	1
502			min	-.003	2	-.126	1	-.009	1	-3.35e-3	3	423.207	1	4280.455	5
503		5	max	.006	3	.101	3	.636	4	1.23e-2	4	9584.522	15	NC	1
504			min	-.003	2	-.25	1	-.006	1	-6.617e-3	3	304.504	1	3370.707	5
505		6	max	.006	3	.157	3	.612	4	1.433e-2	1	7578.187	15	NC	1
506			min	-.003	2	-.37	1	-.003	1	-9.885e-3	3	239.225	1	2820.695	5
507		7	max	.006	3	.211	3	.587	4	1.918e-2	1	6393.297	15	NC	1
508			min	-.003	2	-.478	1	0	3	-1.315e-2	3	200.763	1	2446.132	4
509		8	max	.006	3	.256	3	.562	4	2.403e-2	1	5692.032	15	NC	1
510			min	-.003	2	-.564	1	0	12	-1.642e-2	3	178.046	1	2173.82	4
511		9	max	.006	3	.285	3	.534	4	2.634e-2	1	5325.153	15	NC	1
512			min	-.003	2	-.618	1	0	1	-1.67e-2	3	166.213	1	2001.58	4
513		10	max	.006	3	.296	3	.504	4	2.697e-2	1	5213.045	15	NC	1
514			min	-.003	2	-.635	1	0	12	-1.498e-2	3	162.659	1	1950.755	4
515		11	max	.005	3	.289	3	.47	4	2.76e-2	1	5324.968	15	NC	1
516			min	-.003	2	-.617	1	0	12	-1.326e-2	3	166.413	1	1994.404	4
517		12	max	.005	3	.265	3	.433	4	2.594e-2	1	5691.591	15	NC	1
518			min	-.003	2	-.562	1	-.001	1	-1.132e-2	3	178.657	1	2141.226	4
519		13	max	.005	3	.226	3	.39	4	2.088e-2	1	6392.428	15	NC	1
520			min	-.002	2	-.475	1	0	1	-9.056e-3	3	202.246	1	2550.001	4
521		14	max	.005	3	.175	3	.344	4	1.581e-2	1	7576.583	15	NC	1
522			min	-.002	2	-.366	1	0	12	-6.793e-3	3	242.378	1	3458.069	4
523		15	max	.005	3	.119	3	.297	4	1.075e-2	1	9581.57	15	NC	1
524			min	-.002	2	-.244	1	0	12	-4.529e-3	3	310.937	1	5635.695	4
525		16	max	.005	3	.06	3	.251	4	1.001e-2	4	NC	15	NC	1
526			min	-.002	2	-.12	1	0	12	-2.266e-3	3	436.592	1	NC	1
527		17	max	.005	3	.003	3	.209	4	1.114e-2	4	NC	5	NC	1
528			min	-.002	2	-.005	2	0	12	-2.43e-6	3	702.139	1	NC	1
529		18	max	.005	3	.095	1	.173	4	7.294e-3	1	NC	5	NC	1
530			min	-.002	2	-.048	3	0	12	-2.218e-3	3	1474.173	1	NC	1
531		19	max	.005	3	.186	1	.143	4	1.417e-2	1	NC	1	NC	1
532			min	-.002	2	-.096	3	0	1	-4.513e-3	3	NC	1	NC	1
533	M5	1	max	.02	3	.368	1	.727	4	0	1	NC	1	NC	1
534			min	-.013	2	-.018	3	0	1	-7.597e-6	4	NC	1	NC	1
535		2	max	.02	3	.185	1	.71	4	8.486e-3	4	NC	5	NC	1
536			min	-.014	2	-.01	3	0	1	0	1	734.047	1	8489.725	4
537		3	max	.02	3	.027	3	.689	4	1.678e-2	4	NC	15	NC	1
538			min	-.014	2	-.028	1	0	1	0	1	340.297	1	4921.468	4
539		4	max	.019	3	.118	3	.666	4	1.367e-2	4	7176.125	15	NC	1
540			min	-.013	2	-.29	1	0	1	0	1	204.57	1	3728.13	4
541		5	max	.019	3	.247	3	.64	4	1.056e-2	4	4996.902	15	NC	1
542			min	-.013	2	-.581	1	0	1	0	1	141.832	1	3128.952	4
543		6	max	.018	3	.394	3	.613	4	7.456e-3	4	3832.701	15	NC	1
544			min	-.013	2	-.873	1	0	1	0	1	108.411	1	2751.61	4
545		7	max	.018	3	.538	3	.587	4	4.35e-3	4	3162.852	15	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
546			min	-.012	2	-1.14	1	0	1	0	1	89.223	1	2462.831	4
547		8	max	.018	3	.66	3	.561	4	1.243e-3	4	2774.578	15	NC	1
548			min	-.012	2	-1.354	1	0	1	0	1	78.118	1	2202.81	4
549		9	max	.017	3	.739	3	.535	4	1.721e-7	14	2575.678	15	NC	1
550			min	-.012	2	-1.49	1	0	1	-3.934e-6	5	72.44	1	1997.457	4
551		10	max	.017	3	.769	3	.503	4	2.855e-7	14	2515.725	15	NC	1
552			min	-.012	2	-1.535	1	0	1	-3.729e-6	5	70.75	1	1968.3	4
553		11	max	.016	3	.75	3	.469	4	3.988e-7	14	2575.769	15	NC	1
554			min	-.011	2	-1.489	1	0	1	-3.525e-6	5	72.54	1	2022.424	4
555		12	max	.016	3	.684	3	.434	4	7.938e-4	4	2774.795	15	NC	1
556			min	-.011	2	-1.351	1	0	1	0	1	78.451	1	2102.021	4
557		13	max	.016	3	.579	3	.392	4	2.777e-3	4	3163.295	15	NC	1
558			min	-.011	2	-1.131	1	0	1	0	1	90.098	1	2485.557	4
559		14	max	.015	3	.445	3	.344	4	4.761e-3	4	3833.566	15	NC	1
560			min	-.011	2	-.858	1	0	1	0	1	110.406	1	3516.958	4
561		15	max	.015	3	.297	3	.293	4	6.745e-3	4	4998.611	15	NC	1
562			min	-.011	2	-.562	1	0	1	0	1	146.221	1	6625.102	5
563		16	max	.014	3	.147	3	.245	4	8.728e-3	4	7179.713	15	NC	1
564			min	-.01	2	-.27	1	0	1	0	1	214.572	1	NC	1
565		17	max	.014	3	.009	3	.202	4	1.071e-2	4	NC	15	NC	1
566			min	-.01	2	-.014	1	0	1	0	1	365.066	1	NC	1
567		18	max	.014	3	.185	1	.168	4	5.419e-3	4	NC	5	NC	1
568			min	-.01	2	-.108	3	0	1	0	1	801.654	1	NC	1
569		19	max	.014	3	.351	1	.144	4	0	1	NC	1	NC	1
570			min	-.01	2	-.213	3	0	1	-3.659e-6	4	NC	1	NC	1
571	M9	1	max	.006	3	.192	1	.727	4	1.574e-2	3	NC	1	NC	1
572			min	-.003	2	-.032	3	0	1	-1.2e-2	1	NC	1	NC	1
573		2	max	.006	3	.095	1	.709	4	8.009e-3	5	NC	5	NC	1
574			min	-.003	2	-.016	3	0	12	-5.794e-3	1	1399.145	1	9186.789	4
575		3	max	.006	3	.009	3	.687	4	1.671e-2	4	NC	5	NC	1
576			min	-.003	2	-.008	1	0	12	-7.478e-6	10	672.371	1	5220.028	4
577		4	max	.006	3	.049	3	.664	4	1.311e-2	5	NC	15	NC	1
578			min	-.003	2	-.126	1	0	12	-4.629e-3	1	423.207	1	3867.147	4
579		5	max	.006	3	.101	3	.639	4	9.887e-3	5	9549.065	15	NC	1
580			min	-.003	2	-.25	1	0	12	-9.478e-3	1	304.504	1	3179.344	4
581		6	max	.006	3	.157	3	.613	4	9.885e-3	3	7551.258	15	NC	1
582			min	-.003	2	-.37	1	0	12	-1.433e-2	1	239.225	1	2751.8	4
583		7	max	.006	3	.211	3	.587	4	1.315e-2	3	6371.263	15	NC	1
584			min	-.003	2	-.478	1	0	1	-1.918e-2	1	200.763	1	2442.706	4
585		8	max	.006	3	.256	3	.561	4	1.642e-2	3	5672.827	15	NC	1
586			min	-.003	2	-.564	1	0	1	-2.403e-2	1	178.046	1	2188.763	4
587		9	max	.006	3	.285	3	.535	4	1.67e-2	3	5307.39	15	NC	1
588			min	-.003	2	-.618	1	0	12	-2.634e-2	1	166.213	1	1995.858	4
589		10	max	.006	3	.296	3	.504	4	1.498e-2	3	5195.698	15	NC	1
590			min	-.003	2	-.635	1	0	1	-2.697e-2	1	162.659	1	1951.644	4
591		11	max	.005	3	.289	3	.47	4	1.326e-2	3	5307.19	15	NC	1
592			min	-.003	2	-.617	1	0	1	-2.76e-2	1	166.413	1	2001.444	4
593		12	max	.005	3	.265	3	.433	4	1.132e-2	3	5672.454	15	NC	1
594			min	-.003	2	-.562	1	0	12	-2.594e-2	1	178.657	1	2126.559	4
595		13	max	.005	3	.226	3	.39	4	9.056e-3	3	6370.706	15	NC	1
596			min	-.002	2	-.475	1	0	12	-2.088e-2	1	202.246	1	2549	4
597		14	max	.005	3	.175	3	.343	4	6.793e-3	3	7550.45	15	NC	1
598			min	-.002	2	-.366	1	-.002	1	-1.581e-2	1	242.378	1	3537.51	5
599		15	max	.005	3	.119	3	.294	4	6.381e-3	5	9547.858	15	NC	1
600			min	-.002	2	-.244	1	-.006	1	-1.075e-2	1	310.937	1	6111.485	5
601		16	max	.005	3	.06	3	.246	4	8.569e-3	5	NC	15	NC	1
602			min	-.002	2	-.12	1	-.009	1	-5.687e-3	1	436.592	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
603		17	max	.005	3	.003	3	.204	4	1.083e-2	4	NC	5	NC	1
604			min	-.002	2	-.005	2	-.009	1	-6.241e-4	1	702.139	1	NC	1
605		18	max	.005	3	.095	1	.17	4	5.196e-3	5	NC	5	NC	1
606			min	-.002	2	-.048	3	-.007	1	-7.294e-3	1	1474.173	1	NC	1
607		19	max	.005	3	.186	1	.143	4	4.513e-3	3	NC	1	NC	1
608			min	-.002	2	-.096	3	0	12	-1.417e-2	1	NC	1	NC	1

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-05
Units: Imperial units

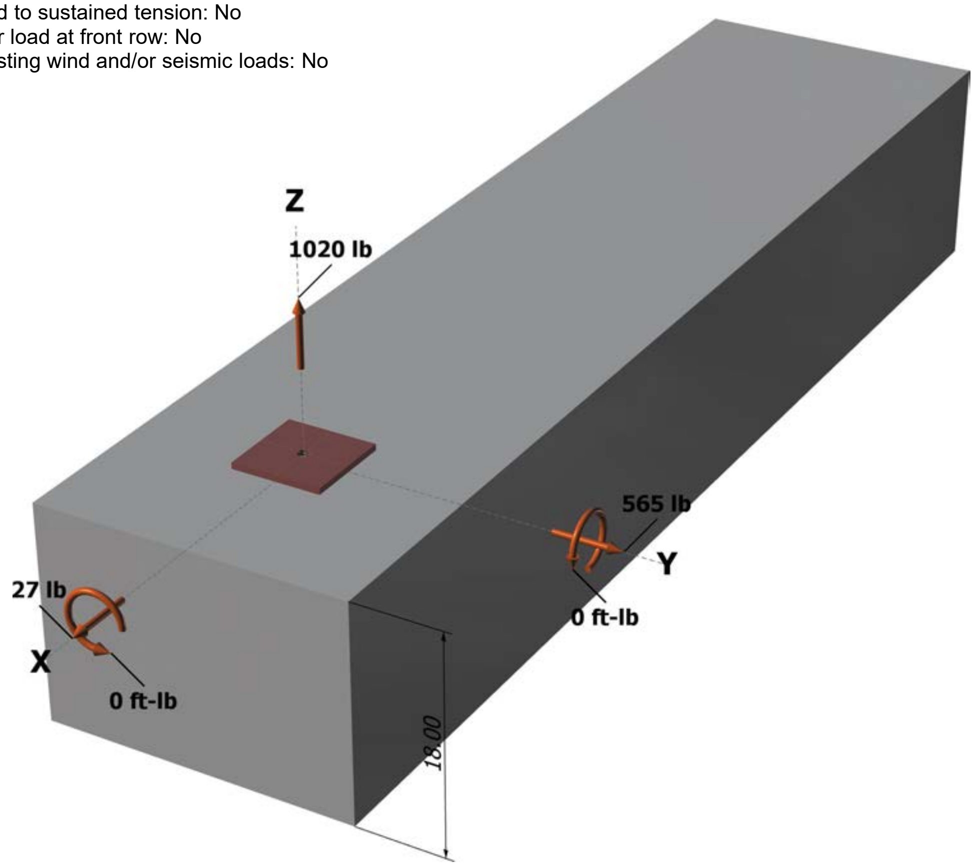
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Load and Geometry
Load factor source: ACI 318 Section 9.2
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: No
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout in tension: No
Do not evaluate concrete breakout in shear: No
Hole condition: Dry concrete
Inspection: Periodic
Temperature range, Short/Long: 110/75°F
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 4.00 x 4.00 x 0.28

<Figure 1>



<Figure 2>

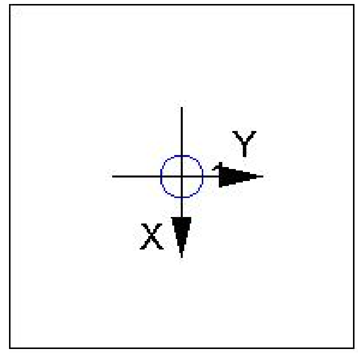
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	1020.0	27.0	565.0	565.6
Sum	1020.0	27.0	565.0	565.6

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 1020
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension(Sec. D.5.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
8095	0.75	6071

5. Concrete Breakout Strength of Anchor in Tension (Sec. D.5.2)

$N_b = k_c \lambda \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. D-7)

k_c	λ	f'_c (psi)	h_{ef} (in)	N_b (lb)
17.0	1.00	2500	5.247	10215

$\phi N_{cb} = \phi\,(A_{Nc} / A_{Nco})\,\Psi_{ed,N}\,\Psi_{c,N}\,\Psi_{cp,N} N_b$ (Sec. D.4.1 & Eq. D-4)

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cb} (lb)
220.36	247.75	0.967	1.00	1.000	10215	0.65	5710

6. Adhesive Strength of Anchor in Tension (AC308 Sec. 3.3)

$\tau_{k,cr} = \tau_{k,cr} f_{short\text{-}term} K_{sat}$

$\tau_{k,cr}$ (psi)	$f_{short\text{-}term}$	K_{sat}	$\tau_{k,cr}$ (psi)
1035	1.00	1.00	1035

$N_{a0} = \tau_{k,cr} \pi d_a h_{ef}$ (Eq. D-16f)

$\tau_{k,cr}$ (psi)	d_a (in)	h_{ef} (in)	N_{a0} (lb)
1035	0.50	6.000	9755

$\phi N_a = \phi\,(A_{Na} / A_{Na0})\,\Psi_{ed,Na}\,\Psi_{p,Na} N_{a0}$ (Sec. D.4.1 & Eq. D-16a)

A_{Na} (in^2)	A_{Na0} (in^2)	$\Psi_{ed,Na}$	$\Psi_{p,Na}$	N_{a0} (lb)	ϕ	ϕN_a (lb)
109.66	109.66	1.000	1.000	9755	0.55	5365

8. Steel Strength of Anchor in Shear (Sec. D.6.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
4855	1.0	0.65	3156

9. Concrete Breakout Strength of Anchor in Shear (Sec. D.6.2)

Shear perpendicular to edge in y-direction:

$V_{by} = 7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda\sqrt{f'_c}c_{a1}^{1.5}$ (Eq. D-24)

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
4.00	0.50	1.00	2500	7.00	6947

$\phi V_{cby} = \phi\ (A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (Sec. D.4.1 & Eq. D-21)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cby} (lb)
192.89	220.50	0.925	1.000	1.000	6947	0.70	3934

Shear perpendicular to edge in x-direction:

$V_{bx} = 7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda\sqrt{f'_c}c_{a1}^{1.5}$ (Eq. D-24)

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
4.00	0.50	1.00	2500	7.87	8282

$\phi V_{cbx} = \phi\ (A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. D.4.1 & Eq. D-21)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbx} (lb)
165.27	278.72	0.878	1.000	1.000	8282	0.70	3018

Shear parallel to edge in x-direction:

$V_{by} = 7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda\sqrt{f'_c}c_{a1}^{1.5}$ (Eq. D-24)

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
4.00	0.50	1.00	2500	7.00	6947

$\phi V_{cbx} = \phi\ (2)(A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (Sec. D.4.1, D.6.2.1(c) & Eq. D-21)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbx} (lb)
192.89	220.50	1.000	1.000	1.000	6947	0.70	8508

Shear parallel to edge in y-direction:

$V_{bx} = 7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda\sqrt{f'_c}c_{a1}^{1.5}$ (Eq. D-24)

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
4.00	0.50	1.00	2500	7.87	8282

$\phi V_{cby} = \phi\ (2)(A_{Vc} / A_{Vco})\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. D.4.1, D.6.2.1(c) & Eq. D-21)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cby} (lb)
165.27	278.72	1.000	1.000	1.000	8282	0.70	6875

10. Concrete Pryout Strength of Anchor in Shear (Sec. D.6.3)

$\phi V_{cp} = \phi\ \min|k_{cp}N_a\ ;\ k_{cp}N_{cb}| = \phi\ \min|k_{cp}(A_{Na} / A_{Na0})\Psi_{ed,Na}\Psi_{p,Na}N_{a0}\ ;\ k_{cp}(A_{Nc} / A_{Nco})\Psi_{ed,N}\Psi_{c,N}\Psi_{cp,N}N_b|$ (Eq. D-30a)

k_{cp}	A_{Na} (in^2)	A_{Na0} (in^2)	$\Psi_{ed,Na}$	$\Psi_{p,Na}$	N_{a0} (lb)	N_a (lb)
2.0	109.66	109.66	1.000	1.000	9755	9755

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ	ϕV_{cp} (lb)
220.36	247.75	0.967	1.000	1.000	10215	8785	0.70	12298

11. Results

Interaction of Tensile and Shear Forces (Sec. D.7)

Tension	Factored Load, N_{ua} (lb)	Design Strength, øN_n (lb)	Ratio	Status
Steel	1020	6071	0.17	Pass
Concrete breakout	1020	5710	0.18	Pass
Adhesive	**1020**	**5365**	**0.19**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, øV_n (lb)	Ratio	Status
Steel	**566**	**3156**	**0.18**	**Pass (Governs)**
T Concrete breakout y+	565	3934	0.14	Pass
T Concrete breakout x+	27	3018	0.01	Pass
|| Concrete breakout y+	27	8508	0.00	Pass
|| Concrete breakout x+	565	6875	0.08	Pass
Concrete breakout, combined	-	-	0.14	Pass
Pryout	566	12298	0.05	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. D.7.1	0.19	0.00	19.0 %	1.0	Pass

AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS) with hef = 6.000 inch meets the selected design criteria.

12. Warnings

- This temperature range is currently outside the scope of ACI 318-11 and ACI 355.4, and is provided for historical purposes.

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.

Anchor Designer™
Software
Version 2.4.6025.0

Company:	Schletter, Inc.	Date:	8/1/2016
Engineer:	HCV	Page:	1/5
Project:	Standard PVMax - Worst Case, 21-31 Inch Width		
Address:			
Phone:			
E-mail:			

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-05
Units: Imperial units

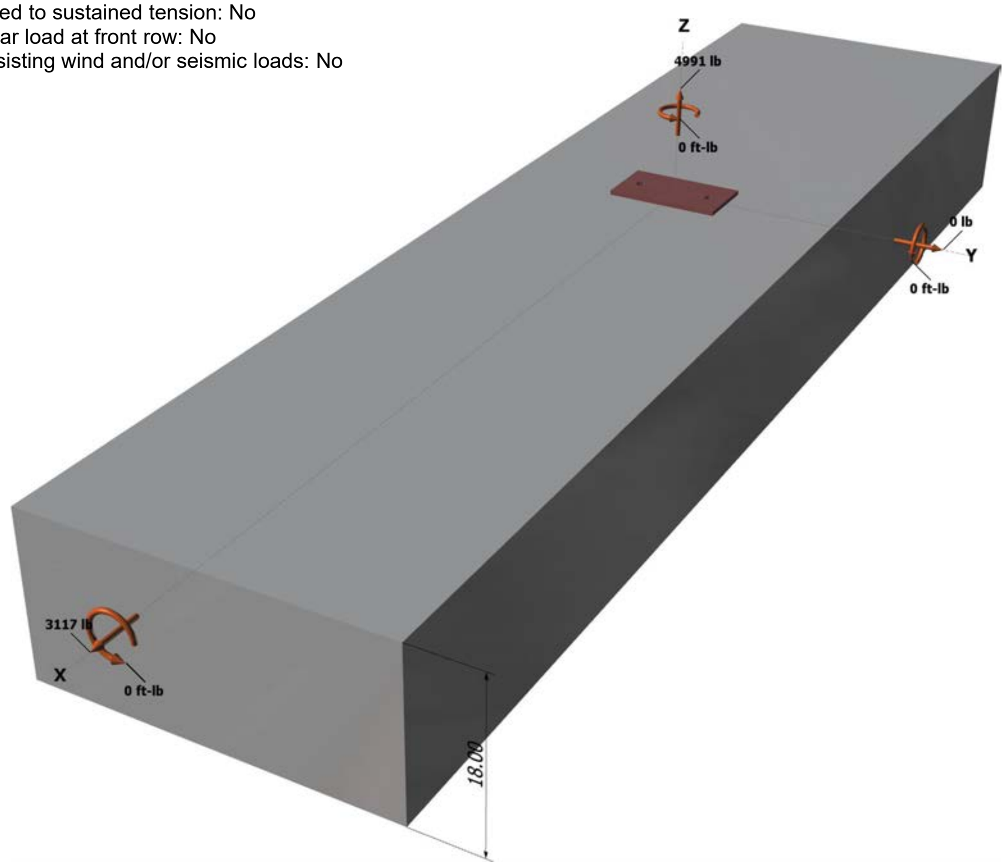
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Load and Geometry
Load factor source: ACI 318 Section 9.2
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: No
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

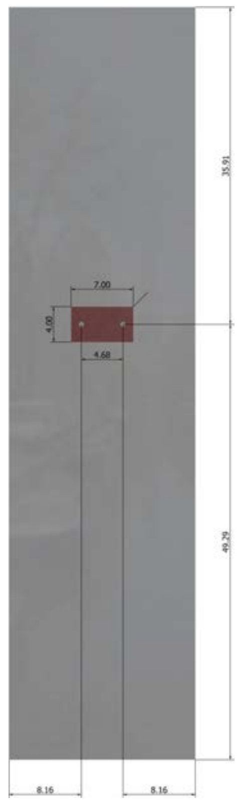
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout in tension: No
Do not evaluate concrete breakout in shear: No
Hole condition: Dry concrete
Inspection: Periodic
Temperature range, Short/Long: 110/75°F
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 4.00 x 7.00 x 0.28

<Figure 1>



<Figure 2>



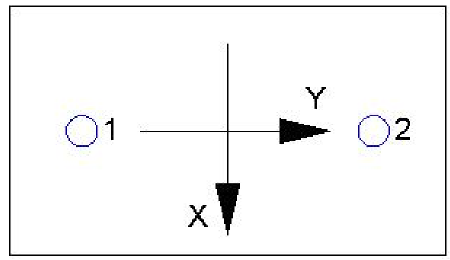
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	2495.5	1558.5	0.0	1558.5
2	2495.5	1558.5	0.0	1558.5
Sum	4991.0	3117.0	0.0	3117.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 4991
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension(Sec. D.5.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
8095	0.75	6071

5. Concrete Breakout Strength of Anchor in Tension (Sec. D.5.2)

$N_b = k_c \lambda \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. D-7)

k_c	λ	f'_c (psi)	h_{ef} (in)	N_b (lb)
17.0	1.00	2500	6.000	12492

$\phi N_{cbg} = \phi\,(A_{Nc} / A_{Nco})\,\Psi_{ec,N}\,\Psi_{ed,N}\,\Psi_{c,N}\,\Psi_{cp,N} N_b$ (Sec. D.4.1 & Eq. D-5)

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
378.00	324.00	1.000	0.972	1.00	1.000	12492	0.65	9208

6. Adhesive Strength of Anchor in Tension (AC308 Sec. 3.3)

$\tau_{k,cr} = \tau_{k,cr} f_{short\text{-}term} K_{sat}$

$\tau_{k,cr}$ (psi)	$f_{short\text{-}term}$	K_{sat}	$\tau_{k,cr}$ (psi)
1035	1.00	1.00	1035

$N_{a0} = \tau_{k,cr} \pi d_a h_{ef}$ (Eq. D-16f)

$\tau_{k,cr}$ (psi)	d_a (in)	h_{ef} (in)	N_{a0} (lb)
1035	0.50	6.000	9755

$\phi N_{ag} = \phi\,(A_{Na} / A_{Na0})\,\Psi_{ed,Na}\,\Psi_{g,Na}\,\Psi_{ec,Na}\,\Psi_{p,Na} N_{a0}$ (Sec. D.4.1 & Eq. D-16b)

A_{Na} (in^2)	A_{Na0} (in^2)	$\Psi_{ed,Na}$	$\Psi_{g,Na}$	$\Psi_{ec,Na}$	$\Psi_{p,Na}$	N_{a0}(lb)	ϕ	ϕN_{ag} (lb)
158.66	109.66	1.000	1.043	1.000	1.000	9755	0.55	8093

8. Steel Strength of Anchor in Shear (Sec. D.6.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
4855	1.0	0.65	3156

9. Concrete Breakout Strength of Anchor in Shear (Sec. D.6.2)

Shear perpendicular to edge in x-direction:

$V_{bx} = 7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda\sqrt{f'_c}c_{a1}^{1.5}$ (Eq. D-24)

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
4.00	0.50	1.00	2500	12.00	15593

$\phi V_{cbgx} = \phi\ (A_{Vc} / A_{Vco})\ \Psi_{ec,V}\ \Psi_{ed,V}\ \Psi_{c,V}\ \Psi_{h,V} V_{bx}$ (Sec. D.4.1 & Eq. D-22)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgx} (lb)
378.00	648.00	1.000	0.836	1.000	1.000	15593	0.70	5323

Shear parallel to edge in x-direction:

$V_{by} = 7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda\sqrt{f'_c}c_{a1}^{1.5}$ (Eq. D-24)

l_e (in)	d_a (in)	λ	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
4.00	0.50	1.00	2500	8.16	8744

$\phi V_{cbx} = \phi\ (2)(A_{Vc} / A_{Vco})\ \Psi_{ed,V}\ \Psi_{c,V}\ \Psi_{h,V} V_{by}$ (Sec. D.4.1, D.6.2.1(c) & Eq. D-21)

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbx} (lb)
299.64	299.64	1.000	1.000	1.000	8744	0.70	12241

10. Concrete Pryout Strength of Anchor in Shear (Sec. D.6.3)

$\phi V_{cpg} = \phi \min|k_{cp}N_{ag}\ ;\ k_{cp}N_{cbg}| = \phi \min|k_{cp}(A_{Na} / A_{Na0})\ \Psi_{ed,Na}\ \Psi_{g,Na}\ \Psi_{ec,Na}\ \Psi_{p,Na}N_{a0}\ ;\ k_{cp}(A_{Nc} / A_{Nco})\ \Psi_{ec,N}\ \Psi_{ed,N}\ \Psi_{c,N}\ \Psi_{cp,N}N_b|$ (Eq. D-30b)

k_{cp}	A_{Na} (in^2)	A_{Na0} (in^2)	$\Psi_{ed,Na}$	$\Psi_{g,Na}$	$\Psi_{ec,Na}$	$\Psi_{p,Na}$	N_{a0} (lb)	N_a (lb)
2.0	158.66	109.66	1.000	1.043	1.000	1.000	9755	14715

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ
378.00	324.00	1.000	0.972	1.000	1.000	12492	14166	0.70

ϕV_{cpg} (lb)
19833

11. Results

Interaction of Tensile and Shear Forces (Sec. D.7)

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	2496	6071	0.41	Pass
Concrete breakout	4991	9208	0.54	Pass
Adhesive	**4991**	**8093**	**0.62**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status
Steel	1559	3156	0.49	Pass
T Concrete breakout x+	**3117**	**5323**	**0.59**	**Pass (Governs)**

|| Concrete breakout y-	**1559**	**12241**	**0.13**	**Pass (Governs)**
Pryout	3117	19833	0.16	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. D.7.3	0.62	0.59	120.2 %	1.2	Pass

AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS) with hef = 6.000 inch meets the selected design criteria.

12. Warnings

- This temperature range is currently outside the scope of ACI 318-11 and ACI 355.4, and is provided for historical purposes.

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer’s product literature for hole cleaning and installation instructions.