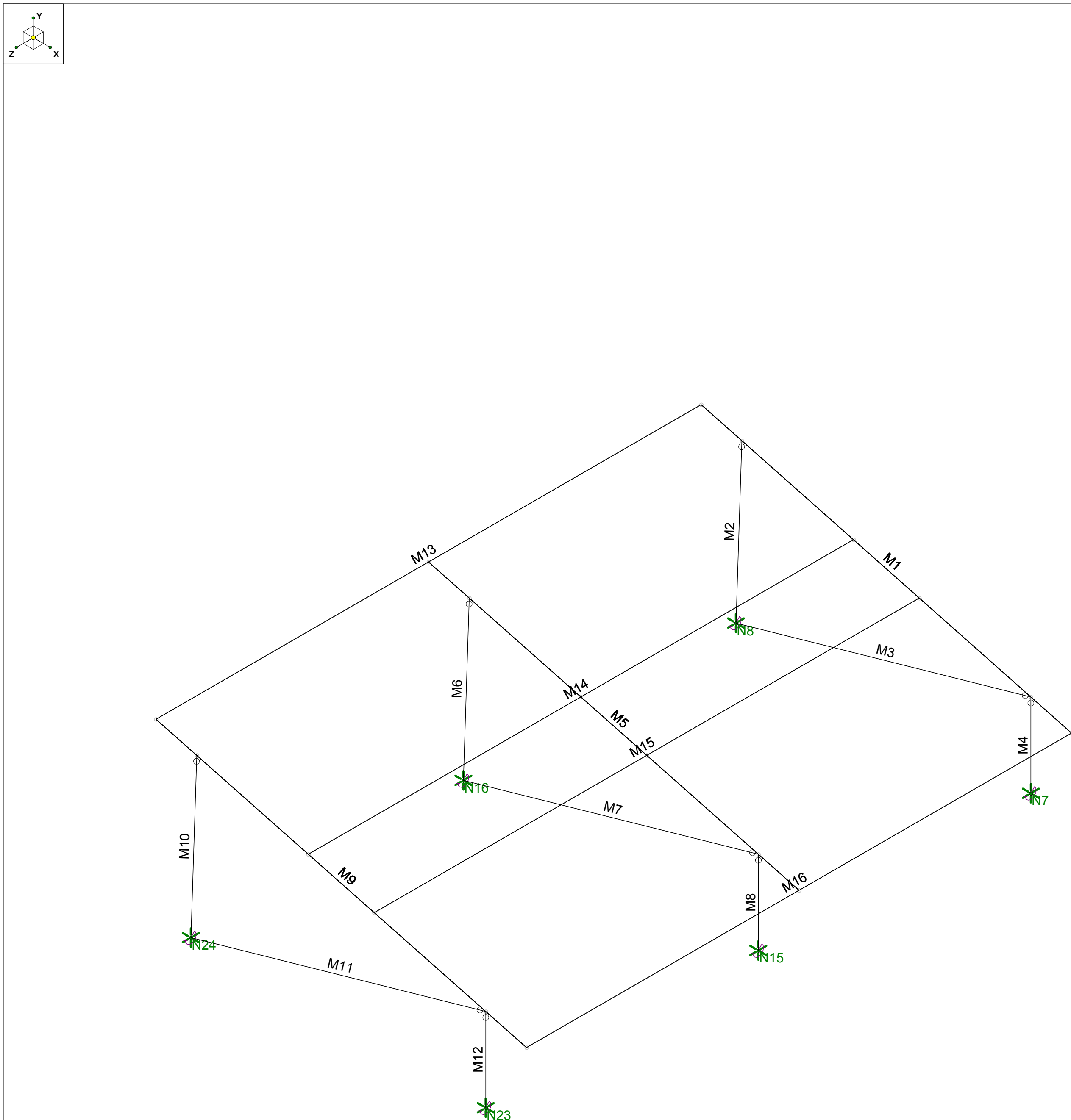


Schletter, Inc.		15° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-10	

1. INTRODUCTION

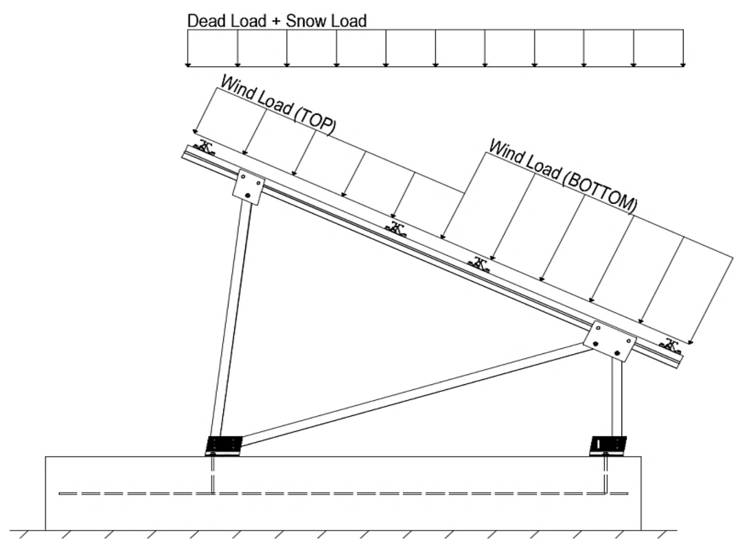
1.1 Project Description
The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. PVMax ground mount system.

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 =	1700	mm	Height =	1550	mm
Width =	1050	mm	Width =	970	mm
Dead Load =	3.00	psf	Dead Load =	1.75	psf

Modules Per Row =	2
Module Tilt =	15°
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 7-10 - Chapter 26-31, Wind Loads
- ASCE 7-10 - Chapter 7, Snow Loads
- ASCE 7-10 - Chapter 2, Combination of Loads
- International Building Code, IBC, 2012, 2015
- 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 =	22.68	psf	*(ASCE 7-10, Eq. 7.4-1)*
I_s =	1.00		
C_s =	1.00		
C_e =	0.90		
C_t =	1.20		

2.3 Wind Loads

Design Wind Speed, V =	130	mph	Exposure Category = C
Height <	15	ft	Importance Category = II

Peak Velocity Pressure, q_z = 26.53 psf *Including the gust factor, G=0.85. (ASCE 7-10, Eq. 27.3-1)*

Pressure Coefficients

$Cf+_{TOP}$	=	1.000	*(Pressure)*
$Cf+_{BOTTOM}$	=	1.600	
$Cf-_{TOP,\ OUTER\ PURLIN}$	=	-2.300	
$Cf-_{TOP,\ INNER\ PURLIN}$	=	-1.780	*(Suction)*
$Cf-_{BOTTOM}$	=	-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 =	0.05	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 + 0.5W
1.2D + 1.0W + 0.5S
0.9D + 1.0W ^{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 + 0.6W
1.0D + 0.75L + 0.45W + 0.75S
0.6D + 0.6W ^{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

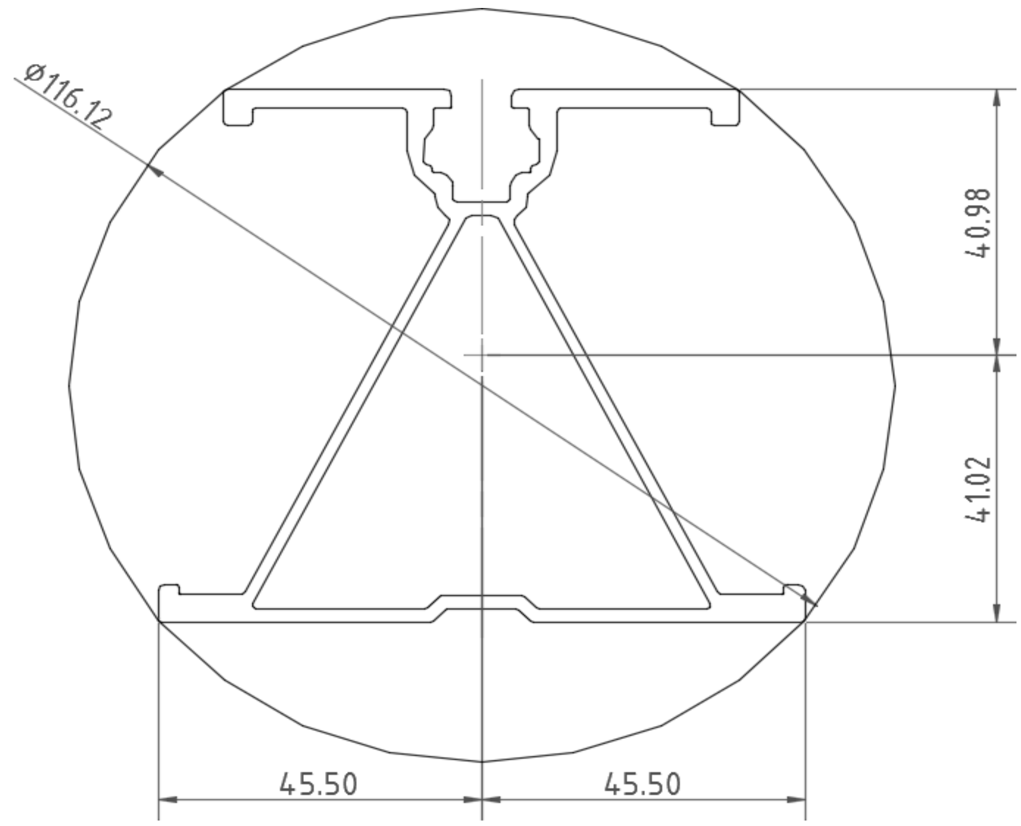
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

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 =	120	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 =	2.119	k-ft
M_z =	0.255	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	98%	

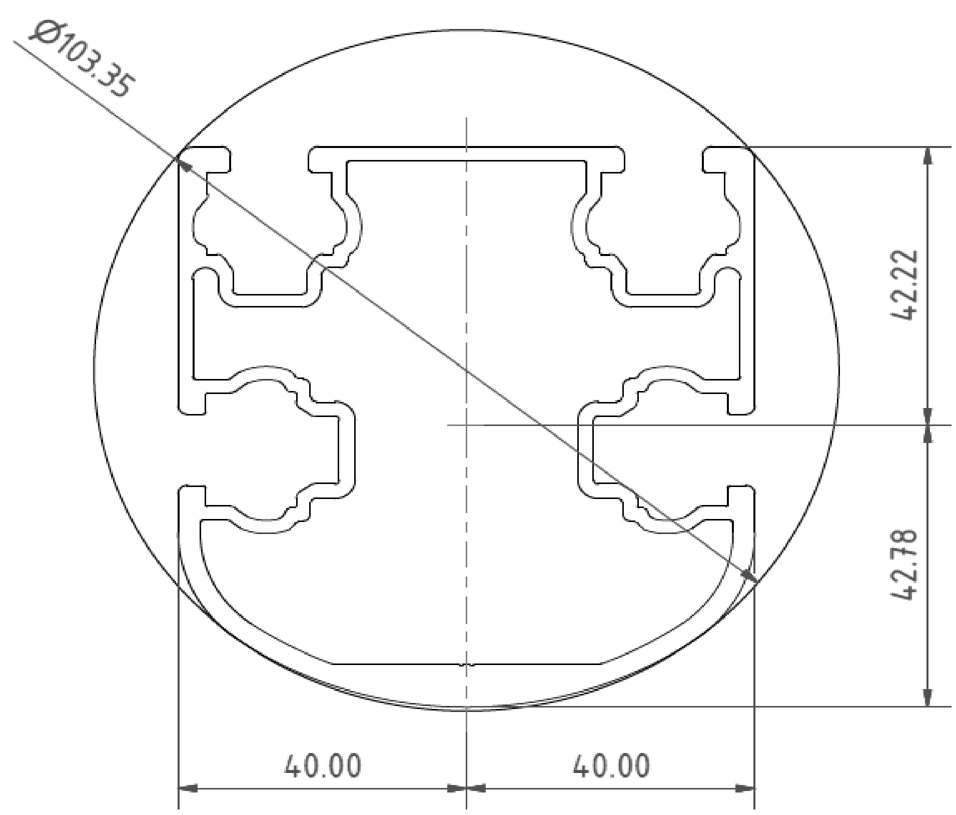


DETAIL VIEW

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).

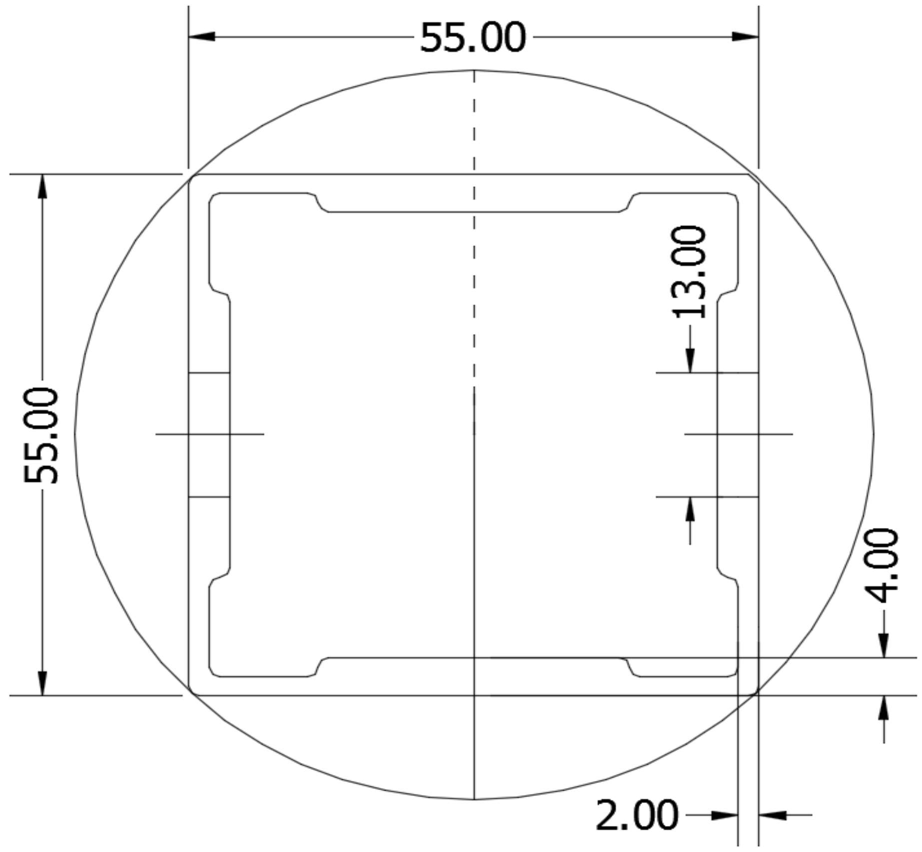
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	88.90	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.35	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.325	k-ft
M_z =	0.000	k-ft
P_n =	-0.244	k
$M_{y\ allowable}$ =	3.464	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	96%	



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 =	-0.470	k-ft
P_n =	0.687	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	36%	

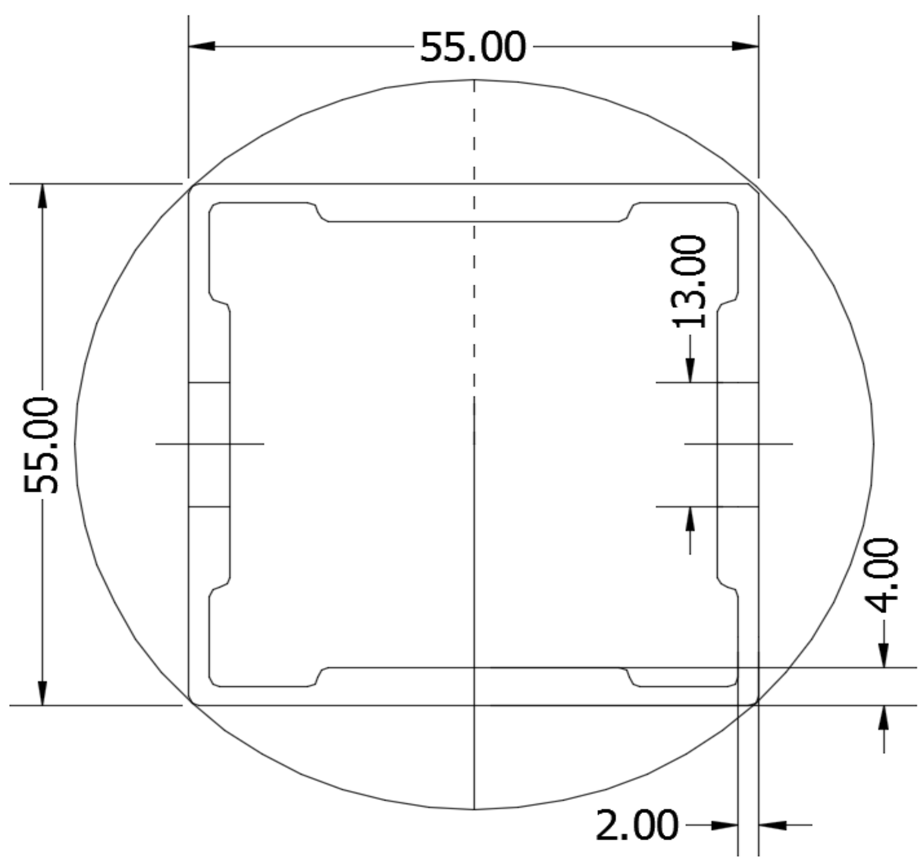


DETAIL VIEW

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 =	86.60	in
$\Phi F_{ty\ AXIAL}$ =	7.50	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 =	0.000	k-ft
P_n =	1.258	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	7.371	k
Utilization =	18%	

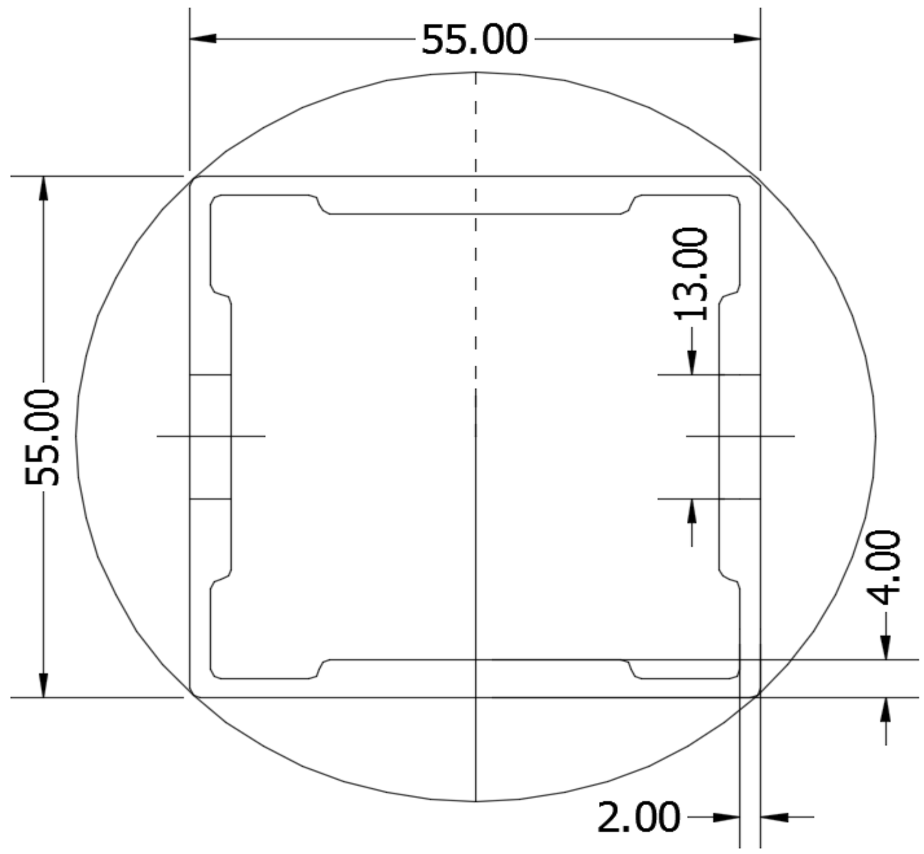


DETAIL VIEW

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 =	48.30	in
$\Phi F_{ty\ AXIAL}$ =	18.93	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 =	-0.009	k-ft
M_z =	-0.325	k-ft
P_n =	0.696	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	18.592	k
Utilization =	27%	



DETAIL VIEW

5. FOUNDATION DESIGN CALCULATIONS

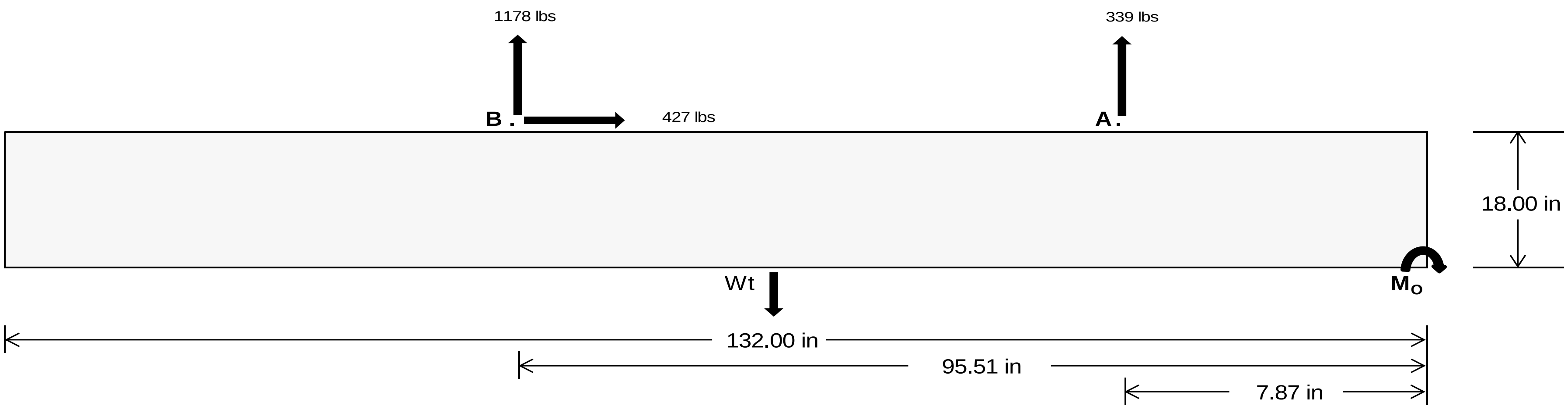
5.1 Helical Pile Foundations

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 =	1490.19	5123.76	k
Compressive Load =	4917.43	5101.97	k
Lateral Load =	307.53	1853.55	k
Moment (Weak Axis) =	0.63	0.42	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 table 1806.2 (2012, 2015).



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 = 122829.0 in-lbs
Resisting Force Required = 1861.05 lbs
S.F. = 1.67
Weight Required = 3101.74 lbs
Minimum Width = 28 in in
Weight Provided = 5582.50 lbs

A minimum 132in long x 28in wide x 18in tall ballast foundation is required to resist overturning.

Sliding

Force = 427.45 lbs
Friction = 0.4
Weight Required = 1068.63 lbs
Resisting Weight = 5582.50 lbs
Additional Weight Required = 0 lbs

Use a 132in long x 28in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

Cohesion

Sliding Force = 427.45 lbs
Cohesion = 130 psf
Area = 25.67 ft^2
Resisting = 2791.25 lbs
Additional Weight Required = 0 lbs

Use a 132in long x 28in 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			
	28 in	29 in	30 in	31 in
P_{ftg} = (145 pcf)(11 ft)(1.5 ft)(2.33 ft) =	5583 lbs	5782 lbs	5981 lbs	6181 lbs

ASD LC	1.0D + 1.0S				1.0D + 0.6W				1.0D + 0.75L + 0.45W + 0.75S				0.6D + 0.6W			
Width	28 in	29 in	30 in	31 in	28 in	29 in	30 in	31 in	28 in	29 in	30 in	31 in	28 in	29 in	30 in	31 in
F_A	1724 lbs	1724 lbs	1724 lbs	1724 lbs	1611 lbs	1611 lbs	1611 lbs	1611 lbs	2373 lbs	2373 lbs	2373 lbs	2373 lbs	-678 lbs	-678 lbs	-678 lbs	-678 lbs
F_B	1786 lbs	1786 lbs	1786 lbs	1786 lbs	1670 lbs	1670 lbs	1670 lbs	1670 lbs	2460 lbs	2460 lbs	2460 lbs	2460 lbs	-2355 lbs	-2355 lbs	-2355 lbs	-2355 lbs
F_V	152 lbs	152 lbs	152 lbs	152 lbs	759 lbs	759 lbs	759 lbs	759 lbs	673 lbs	673 lbs	673 lbs	673 lbs	-855 lbs	-855 lbs	-855 lbs	-855 lbs
P_{total}	9092 lbs	9292 lbs	9491 lbs	9690 lbs	8864 lbs	9063 lbs	9262 lbs	9462 lbs	10415 lbs	10614 lbs	10814 lbs	11013 lbs	316 lbs	436 lbs	556 lbs	675 lbs
M	4187 lbs-ft	4187 lbs-ft	4187 lbs-ft	4187 lbs-ft	4832 lbs-ft	4832 lbs-ft	4832 lbs-ft	4832 lbs-ft	6453 lbs-ft	6453 lbs-ft	6453 lbs-ft	6453 lbs-ft	1225 lbs-ft	1225 lbs-ft	1225 lbs-ft	1225 lbs-ft
e	0.46 ft	0.45 ft	0.44 ft	0.43 ft	0.55 ft	0.53 ft	0.52 ft	0.51 ft	0.62 ft	0.61 ft	0.60 ft	0.59 ft	3.87 ft	2.81 ft	2.20 ft	1.81 ft
L/6	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft	1.83 ft
f_{min}	265.3 psf	263.6 psf	262.1 psf	260.6 psf	242.7 psf	241.8 psf	241.0 psf	240.2 psf	268.7 psf	266.9 psf	265.2 psf	263.7 psf	0.0 psf	0.0 psf	0.0 psf	0.2 psf
f_{max}	443.2 psf	435.4 psf	428.2 psf	421.4 psf	448.0 psf	440.1 psf	432.6 psf	425.7 psf	542.9 psf	531.7 psf	521.2 psf	511.4 psf	55.5 psf	44.7 psf	45.0 psf	47.3 psf

Maximum Bearing Pressure = 543 psf
Allowable Bearing Pressure = 1500 psf

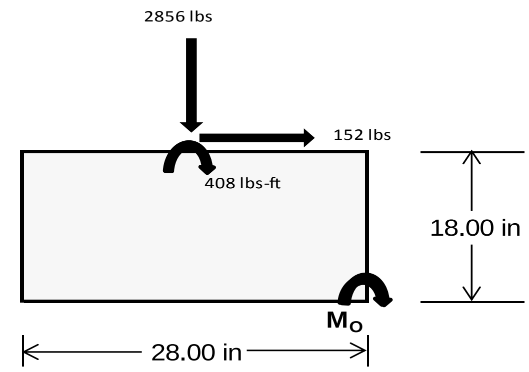
Use a 132in long x 28in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 2695.9 ft-lbs
Resisting Force Required = 2310.78 lbs
S.F. = 1.67
Weight Required = 3851.30 lbs
Minimum Width = 28 in in
Weight Provided = 5582.50 lbs

A minimum 132in long x 28in 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	28 in			28 in			28 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	252 lbs	645 lbs	223 lbs	949 lbs	2856 lbs	927 lbs	84 lbs	189 lbs	55 lbs
F_V	212 lbs	208 lbs	213 lbs	158 lbs	152 lbs	165 lbs	212 lbs	209 lbs	212 lbs
P_{total}	7163 lbs	7556 lbs	7134 lbs	7528 lbs	9435 lbs	7506 lbs	2105 lbs	2210 lbs	2076 lbs
M	846 lbs-ft	840 lbs-ft	851 lbs-ft	642 lbs-ft	636 lbs-ft	665 lbs-ft	843 lbs-ft	837 lbs-ft	845 lbs-ft
e	0.12 ft	0.11 ft	0.12 ft	0.09 ft	0.07 ft	0.09 ft	0.40 ft	0.38 ft	0.41 ft
L/6	0.39 ft	0.39 ft	0.39 ft	0.39 ft	0.39 ft	0.39 ft	0.39 ft	0.39 ft	0.39 ft
f_{min}	194.3 psf	210.3 psf	192.7 psf	229.0 psf	303.9 psf	225.9 psf	0.0 psf	2.2 psf	0.0 psf
f_{max}	363.9 psf	378.5 psf	363.2 psf	357.6 psf	431.3 psf	359.0 psf	166.5 psf	169.9 psf	165.7 psf

Maximum Bearing Pressure = 431 psf
Allowable Bearing Pressure = 1500 psf

Use a 132in long x 28in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 132in long x 28in wide x 18in tall ballast foundation and fiber reinforcing with (2) #5 rebar.

5.3 Foundation Anchors

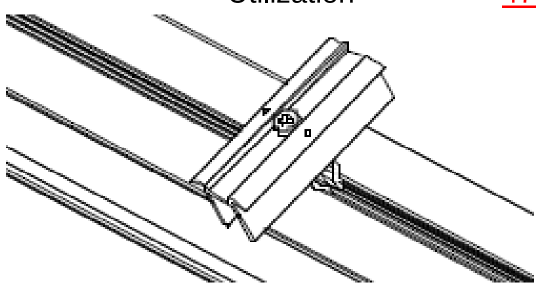
Threaded rods are anchored to the the ballast foundations using the Simpson AT-XP epoxy solution. LRFD load results are compared to the allowable strengths of the epoxy solution. Please see the supplementary calculations provided by the Simpson Anchor Designer software.

6. DESIGN OF JOINTS AND CONNECTIONS

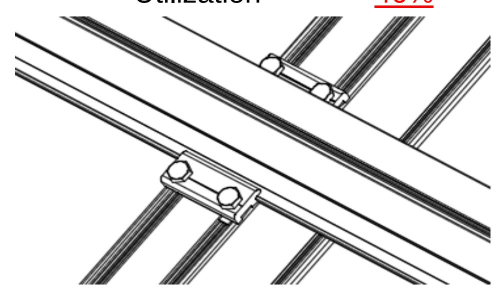
6.1 Anchorage of Modules to Purlins and Connection of Purlins to Girders

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 =	0.571	k
Allowable Uplift =	1.214	k
Utilization =	47%	



Fastening of Purlins to Girders		
Maximum Uplifting Force =	2.021	k
Allowable Uplift =	4.357	k
Utilization =	46%	



6.2 Strut Connections

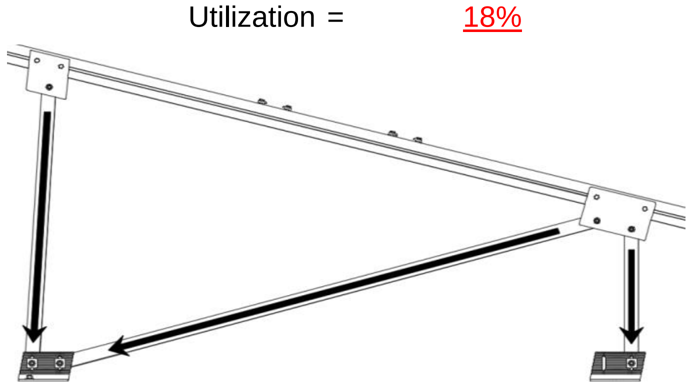
The aluminum struts connect the aluminum girder ends to custom brackets with mounting holes. Single M12 bolts are used to attach each end of the strut to the girder and post. ASTM A193/A193M-86 equivalent stainless steel bolts are used.

Front Strut		
Maximum Axial Load =	3.783	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	51%	

Rear Strut		
Maximum Axial Load =	3.718	k
M12 Bolt Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	50%	

Diagonal Strut		
Maximum Axial Load =	1.347	k
M12 Bolt Shear Capacity =	12.808	k
Strut Bearing Capacity =	7.421	k
Utilization =	18%	

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

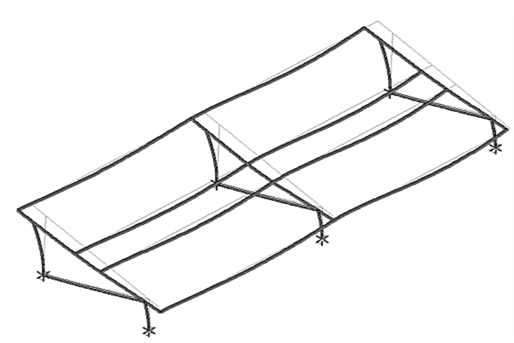
7.1 Seismic Drift

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} =	36.30	in
Allowable Story Drift for All Other Structures, Δ = {	$0.020h_{sx}$	
	0.726	in
Max Drift, Δ_{MAX} =	0.452	in

$0.452 \le 0.726$, 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

$L_b =$ 120 in

$J =$ 0.432

331.976

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

S1 = 0.51461

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

S2 = 1701.56

$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)/2}))}]$

$\varphi F_L =$ 27.4 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

$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$

$\varphi F_L =$ 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

$\varphi F_L = 1.17\varphi yFcy$

$\varphi F_L =$ 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

$\varphi F_L = \varphi b[Bbr-mDbr*h/t]$

$\varphi F_L =$ 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 in^3

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

Weak Axis:

3.4.14

$L_b =$ 120

$J =$ 0.432

211.117

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

S1 = 0.51461

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

S2 = 1701.56

$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)/2}))}]$

$\varphi F_L =$ 28.6

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

$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$

$\varphi F_L =$ 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

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 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 in^3

$M_{max}Wk =$ 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 = 88.9 in
J = 1.08
152.913

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

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

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 = 88.9
J = 1.08
161.829

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

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= 29.2

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 (strong direction)

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 = 29.4 ksi

Ix = 984962 mm^4

2.366 in^4

y = 43.717 mm

Sx = 1.375 in^3

M_{max}St = 3.363 k-ft

3.4.18 (weak direction)

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:

3.4.14

L_b = 24.8 in

J = 0.942

38.7028

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

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= 31.4 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

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 in^3

M_{max}St = 1.460 k-ft

Weak Axis:

3.4.14

L_b = 24.8

J = 0.942

38.7028

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

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= 31.4

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

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 in^3

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

Strong Axis:

3.4.14

L_b = 86.60 in

J = 0.942

135.148

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

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= 29.6 ksi

Weak Axis:

3.4.14

L_b = 86.6

J = 0.942

135.148

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

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= 29.6

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

$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$

$\varphi F_L =$ 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

$\varphi F_L = 1.17\varphi yFcy$

$\varphi F_L =$ 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

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L St =$ 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

3.4.16

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

$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$

$\varphi F_L =$ 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

$\varphi F_L = 1.3\varphi yFcy$

$\varphi F_L =$ 43.2 ksi

$\varphi F_L Wk =$ 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

$\lambda =$ 2.00335

r = 0.81 in

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

$S1^* =$ 0.33515

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

$S2^* =$ 1.23671

$\varphi cc =$ 0.86047

$\varphi F_L = (\varphi ccFcy)/(\lambda^2)$

$\varphi F_L =$ 7.50396 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= 7.50 ksi
A = 663.99 mm^2
1.03 in^2
P_{max} = 7.72 kips

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

Strut = **55x55**

Strong Axis:
3.4.14

L_b = 48.30 in
J = 0.942
75.3767

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

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= 30.6 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

Weak Axis:
3.4.14

L_b = 48.3
J = 0.942
75.3767

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

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= 30.6

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 in³

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 in³

M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 1.11734

r = 0.81 in

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

$S1^*$ = 0.33515

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

$S2^*$ = 1.23671

φcc = 0.76536

φF_L= φcc(Bc-Dc*λ)

φF_L= 18.9268 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

$\varphi F_L = \varphi y Fcy$

$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 18.93 ksi

A = 663.99 mm^2

1.03 in^2

$P_{max} =$ 19.48 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	-8.366	-8.366	0	0
2	M14	Y	-8.366	-8.366	0	0
3	M15	Y	-8.366	-8.366	0	0
4	M16	Y	-8.366	-8.366	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	-4.45	-4.45	0	0
2	M14	Y	-4.45	-4.45	0	0
3	M15	Y	-4.45	-4.45	0	0
4	M16	Y	-4.45	-4.45	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	-61.093	-61.093	0	0
2	M14	Y	-61.093	-61.093	0	0
3	M15	Y	-61.093	-61.093	0	0
4	M16	Y	-61.093	-61.093	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	-73.997	-73.997	0	0
2	M14	y	-73.997	-73.997	0	0
3	M15	y	-118.396	-118.396	0	0
4	M16	y	-118.396	-118.396	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	170.194	170.194	0	0
2	M14	y	131.716	131.716	0	0
3	M15	y	73.997	73.997	0	0
4	M16	y	73.997	73.997	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	6.693	6.693	0	0
2	M14	Z	6.693	6.693	0	0
3	M15	Z	6.693	6.693	0	0
4	M16	Z	6.693	6.693	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 + 0.5W	Yes	Y		1	1.2	3	1.6	4	.5														
2	LRFD 1.2D + 1.0W + 0.5S	Yes	Y		1	1.2	3	.5	4	1														
3	LRFD 0.9D + 1.0W	Yes	Y		2	.9					5	1												
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 + 0.6W	Yes	Y		1	1			4	.6														
11	ASD 1.0D + 0.75L + 0.45W + 0....	Yes	Y		1	1	3	.75	4	.45														
12	ASD 0.6D + 0.6W	Yes	Y		2	.6					5	.6												
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	335.906	2	1173.021	1	1.056	1	.005	1	0	1	0	1
2		min	-451.218	3	-1201.498	3	-82.799	5	-.319	4	0	1	0	1
3	N7	max	.033	9	1284.528	1	-.318	12	0	12	0	1	0	1
4		min	-.091	2	-334.283	3	-236.565	4	-.481	4	0	1	0	1
5	N15	max	.023	9	3782.638	1	0	9	0	9	0	1	0	1
6		min	-1.225	2	-1146.303	3	-228.183	5	-.47	4	0	1	0	1
7	N16	max	1321.393	2	3924.589	1	0	3	0	3	0	1	0	1
8		min	-1425.808	3	-3941.356	3	-82.557	5	-.322	4	0	1	0	1
9	N23	max	.033	9	1284.528	1	7.671	1	.016	1	0	1	0	1
10		min	-.091	2	-334.283	3	-231.934	4	-.473	4	0	1	0	1
11	N24	max	335.906	2	1173.021	1	-.05	12	0	12	0	1	0	1
12		min	-451.218	3	-1201.498	3	-83.268	4	-.321	4	0	1	0	1
13	Totals:	max	1991.799	2	12622.325	1	0	9						
14		min	-2328.874	3	-8159.223	3	-940.882	5						

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	84.096	1	529.796	1	-4.839	12	0	3	.2	1	0	1
2			min	3.527	12	-618.592	3	-136.268	1	-.014	1	.008	12	0	3
3		2	max	84.096	1	371.065	1	-3.811	12	0	3	.071	4	.585	3
4			min	3.527	12	-435.239	3	-104.752	1	-.014	1	.004	12	-.5	1
5		3	max	84.096	1	212.334	1	-2.784	12	0	3	.037	5	.967	3
6			min	3.527	12	-251.885	3	-73.235	1	-.014	1	-.033	1	-.825	1
7		4	max	84.096	1	53.603	1	-1.756	12	0	3	.019	5	1.145	3
8			min	3.527	12	-68.532	3	-41.718	1	-.014	1	-.097	1	-.972	1
9		5	max	84.096	1	114.821	3	-.67	10	0	3	.003	5	1.119	3
10			min	3.527	12	-105.128	1	-16.001	4	-.014	1	-.126	1	-.944	1
11		6	max	84.096	1	298.174	3	21.315	1	0	3	-.004	12	.89	3
12			min	3.527	12	-263.859	1	-12.018	5	-.014	1	-.119	1	-.739	1
13		7	max	84.096	1	481.527	3	52.832	1	0	3	-.003	12	.457	3
14			min	-4.057	5	-422.59	1	-10.429	5	-.014	1	-.078	1	-.357	1
15		8	max	84.096	1	664.881	3	84.348	1	0	3	0	10	.2	1
16			min	-15.463	5	-581.321	1	-8.839	5	-.014	1	-.035	4	-.18	3
17		9	max	84.096	1	848.234	3	115.865	1	0	3	.109	1	.934	1
18			min	-26.869	5	-740.052	1	-7.25	5	-.014	1	-.043	5	-1.021	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	84.096	1	898.783	1	-4.408	12	.014	1	.255	1	1.845	1
20			min	3.527	12	-1031.587	3	-147.381	1	0	3	.006	12	-2.065	3
21		11	max	84.096	1	740.052	1	-3.38	12	.014	1	.109	1	.934	1
22			min	3.527	12	-848.234	3	-115.865	1	0	3	.002	12	-1.021	3
23		12	max	84.096	1	581.321	1	-2.353	12	.014	1	.034	4	.2	1
24			min	3.527	12	-664.881	3	-84.348	1	0	3	-.002	3	-.18	3
25		13	max	84.096	1	422.59	1	-1.326	12	.014	1	.015	5	.457	3
26			min	3.527	12	-481.527	3	-52.832	1	0	3	-.078	1	-.357	1
27		14	max	84.096	1	263.859	1	-.298	12	.014	1	0	15	.89	3
28			min	.689	15	-298.174	3	-21.315	1	0	3	-.119	1	-.739	1
29		15	max	84.096	1	105.128	1	10.202	1	.014	1	-.004	12	1.119	3
30			min	-10.269	5	-114.821	3	-12.556	5	0	3	-.126	1	-.944	1
31		16	max	84.096	1	68.532	3	41.718	1	.014	1	-.003	12	1.145	3
32			min	-21.675	5	-53.603	1	-10.966	5	0	3	-.097	1	-.972	1
33		17	max	84.096	1	251.885	3	73.235	1	.014	1	0	3	.967	3
34			min	-33.08	5	-212.334	1	-9.377	5	0	3	-.048	4	-.825	1
35		18	max	84.096	1	435.239	3	104.752	1	.014	1	.066	1	.585	3
36			min	-44.486	5	-371.065	1	-7.787	5	0	3	-.05	5	-.5	1
37		19	max	84.096	1	618.592	3	136.268	1	.014	1	.2	1	0	1
38			min	-55.892	5	-529.796	1	-6.198	5	0	3	-.058	5	0	3
39	M14	1	max	61.332	4	560.874	1	-4.971	12	.008	3	.228	1	0	1
40			min	1.513	12	-488.541	3	-140.484	1	-.012	1	.009	12	0	3
41		2	max	49.926	4	402.143	1	-3.944	12	.008	3	.102	4	.465	3
42			min	1.513	12	-347.942	3	-108.968	1	-.012	1	.004	12	-.535	1
43		3	max	39.21	1	243.412	1	-2.917	12	.008	3	.055	5	.773	3
44			min	1.513	12	-207.342	3	-77.451	1	-.012	1	-.014	1	-.894	1
45		4	max	39.21	1	84.681	1	-1.889	12	.008	3	.029	5	.925	3
46			min	1.513	12	-66.742	3	-45.934	1	-.012	1	-.083	1	-1.076	1
47		5	max	39.21	1	73.858	3	-.862	12	.008	3	.006	5	.922	3
48			min	1.513	12	-74.05	1	-23.862	4	-.012	1	-.116	1	-1.082	1
49		6	max	39.21	1	214.458	3	17.099	1	.008	3	-.004	12	.761	3
50			min	-3.709	5	-232.781	1	-18.868	5	-.012	1	-.115	1	-.911	1
51		7	max	39.21	1	355.058	3	48.615	1	.008	3	-.003	12	.445	3
52			min	-15.115	5	-391.513	1	-17.278	5	-.012	1	-.078	1	-.565	1
53		8	max	39.21	1	495.658	3	80.132	1	.008	3	0	10	0	15
54			min	-26.52	5	-550.244	1	-15.689	5	-.012	1	-.057	4	-.049	2
55		9	max	39.21	1	636.257	3	111.649	1	.008	3	.1	1	.658	1
56			min	-37.926	5	-708.975	1	-14.099	5	-.012	1	-.071	5	-.657	3
57		10	max	60.876	4	867.706	1	-4.275	12	.012	1	.241	1	1.534	1
58			min	1.513	12	-776.857	3	-143.165	1	-.011	2	.006	12	-1.442	3
59		11	max	49.471	4	708.975	1	-3.248	12	.012	1	.103	4	.658	1
60			min	1.513	12	-636.257	3	-111.649	1	-.008	3	.002	12	-.657	3
61		12	max	39.21	1	550.244	1	-2.22	12	.012	1	.054	5	0	15
62			min	1.513	12	-495.658	3	-80.132	1	-.008	3	-.007	1	-.049	2
63		13	max	39.21	1	391.513	1	-1.193	12	.012	1	.028	5	.445	3
64			min	1.513	12	-355.058	3	-48.615	1	-.008	3	-.078	1	-.565	1
65		14	max	39.21	1	232.781	1	-.166	12	.012	1	.004	5	.761	3
66			min	1.513	12	-214.458	3	-24.419	4	-.008	3	-.115	1	-.911	1
67		15	max	39.21	1	74.05	1	14.418	1	.012	1	-.004	12	.922	3
68			min	-3.906	5	-73.858	3	-18.98	5	-.008	3	-.116	1	-1.082	1
69		16	max	39.21	1	66.742	3	45.934	1	.012	1	-.002	12	.925	3
70			min	-15.312	5	-84.681	1	-17.391	5	-.008	3	-.083	1	-1.076	1
71		17	max	39.21	1	207.342	3	77.451	1	.012	1	.001	3	.773	3
72			min	-26.718	5	-243.412	1	-15.801	5	-.008	3	-.06	4	-.894	1
73		18	max	39.21	1	347.942	3	108.968	1	.012	1	.089	1	.465	3
74			min	-38.124	5	-402.143	1	-14.212	5	-.008	3	-.073	5	-.535	1
75		19	max	39.21	1	488.541	3	140.484	1	.012	1	.228	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	-49.53	5	-560.874	1	-12.622	5	-.008	3	-.088	5	0	3
77	M15	1	max	78.594	5	644.121	1	-4.941	12	.012	1	.228	1	0	2
78			min	-41.144	1	-272.322	3	-140.468	1	-.007	3	.009	12	0	3
79		2	max	67.188	5	460.724	1	-3.914	12	.012	1	.137	4	.26	3
80			min	-41.144	1	-195.855	3	-108.952	1	-.007	3	.004	12	-.614	1
81		3	max	55.782	5	277.327	1	-2.886	12	.012	1	.08	5	.435	3
82			min	-41.144	1	-119.387	3	-77.435	1	-.007	3	-.014	1	-1.024	1
83		4	max	44.376	5	93.93	1	-1.859	12	.012	1	.045	5	.525	3
84			min	-41.144	1	-42.92	3	-45.918	1	-.007	3	-.083	1	-1.23	1
85		5	max	32.971	5	33.548	3	-.832	12	.012	1	.011	5	.531	3
86			min	-41.144	1	-89.468	1	-32.786	4	-.007	3	-.116	1	-1.233	1
87		6	max	21.565	5	110.016	3	17.115	1	.012	1	-.004	12	.451	3
88			min	-41.144	1	-272.865	1	-27.789	5	-.007	3	-.115	1	-1.031	1
89		7	max	10.159	5	186.483	3	48.632	1	.012	1	-.003	12	.286	3
90			min	-41.144	1	-456.262	1	-26.2	5	-.007	3	-.078	1	-.626	1
91		8	max	-.797	15	262.951	3	80.148	1	.012	1	0	10	.036	3
92			min	-41.144	1	-639.659	1	-24.61	5	-.007	3	-.081	4	-.017	1
93		9	max	-1.771	12	339.419	3	111.665	1	.012	1	.1	1	.795	1
94			min	-41.144	1	-823.056	1	-23.021	5	-.007	3	-.105	5	-.298	3
95		10	max	-1.771	12	1006.453	1	-4.305	12	.007	3	.241	1	1.812	1
96			min	-41.144	1	-415.886	3	-143.181	1	-.012	1	.006	12	-.718	3
97		11	max	8.315	5	823.056	1	-3.278	12	.007	3	.137	4	.795	1
98			min	-41.144	1	-339.419	3	-111.665	1	-.012	1	.002	12	-.298	3
99		12	max	-1.771	12	639.659	1	-2.25	12	.007	3	.078	5	.036	3
100			min	-41.144	1	-262.951	3	-80.148	1	-.012	1	-.007	1	-.017	1
101		13	max	-1.771	12	456.262	1	-1.223	12	.007	3	.042	5	.286	3
102			min	-41.144	1	-186.483	3	-48.632	1	-.012	1	-.078	1	-.626	1
103		14	max	-1.771	12	272.865	1	-.196	12	.007	3	.009	5	.451	3
104			min	-41.144	1	-110.016	3	-33.357	4	-.012	1	-.115	1	-1.031	1
105		15	max	-1.771	12	89.468	1	14.402	1	.007	3	-.004	12	.531	3
106			min	-46.092	4	-33.548	3	-27.903	5	-.012	1	-.116	1	-1.233	1
107		16	max	-1.771	12	42.92	3	45.918	1	.007	3	-.002	12	.525	3
108			min	-57.498	4	-93.93	1	-26.314	5	-.012	1	-.083	1	-1.23	1
109		17	max	-1.771	12	119.387	3	77.435	1	.007	3	0	3	.435	3
110			min	-68.904	4	-277.327	1	-24.724	5	-.012	1	-.086	4	-1.024	1
111		18	max	-1.771	12	195.855	3	108.952	1	.007	3	.089	1	.26	3
112			min	-80.309	4	-460.724	1	-23.135	5	-.012	1	-.108	5	-.614	1
113		19	max	-1.771	12	272.322	3	140.468	1	.007	3	.228	1	0	2
114			min	-91.715	4	-644.121	1	-21.545	5	-.012	1	-.133	5	0	5
115	M16	1	max	78.392	5	613.434	1	-4.739	12	.013	1	.201	1	0	1
116			min	-88.778	1	-254.138	3	-136.452	1	-.009	3	.008	12	0	3
117		2	max	66.986	5	430.037	1	-3.711	12	.013	1	.101	4	.24	3
118			min	-88.778	1	-177.67	3	-104.936	1	-.009	3	.003	12	-.58	1
119		3	max	55.58	5	246.64	1	-2.684	12	.013	1	.059	5	.395	3
120			min	-88.778	1	-101.203	3	-73.419	1	-.009	3	-.032	1	-.956	1
121		4	max	44.175	5	63.243	1	-1.656	12	.013	1	.033	5	.465	3
122			min	-88.778	1	-24.735	3	-41.902	1	-.009	3	-.096	1	-1.128	1
123		5	max	32.769	5	51.732	3	-.629	12	.013	1	.009	5	.45	3
124			min	-88.778	1	-120.154	1	-23.456	4	-.009	3	-.125	1	-1.096	1
125		6	max	21.363	5	128.2	3	21.131	1	.013	1	-.004	12	.35	3
126			min	-88.778	1	-303.552	1	-19.405	5	-.009	3	-.119	1	-.861	1
127		7	max	9.957	5	204.668	3	52.647	1	.013	1	-.003	12	.165	3
128			min	-88.778	1	-486.949	1	-17.816	5	-.009	3	-.078	1	-.422	1
129		8	max	-.912	15	281.135	3	84.164	1	.013	1	0	10	.221	1
130			min	-88.778	1	-670.346	1	-16.226	5	-.009	3	-.055	4	-.105	3
131		9	max	-3.537	12	357.603	3	115.681	1	.013	1	.109	1	1.068	1
132			min	-88.778	1	-853.743	1	-14.637	5	-.009	3	-.071	5	-.46	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	-3.537	12	1037.14	1	-4.508	12	.013	1	.255	1	2.119	1
134			min	-88.778	1	-434.071	3	-147.197	1	-.009	3	.007	12	-.9	3
135		11	max	3.917	5	853.743	1	-3.48	12	.009	3	.109	1	1.068	1
136			min	-88.778	1	-357.603	3	-115.681	1	-.013	1	.002	12	-.46	3
137		12	max	-3.537	12	670.346	1	-2.453	12	.009	3	.053	4	.221	1
138			min	-88.778	1	-281.135	3	-84.164	1	-.013	1	-.002	1	-.105	3
139		13	max	-3.537	12	486.949	1	-1.426	12	.009	3	.027	5	.165	3
140			min	-88.778	1	-204.668	3	-52.647	1	-.013	1	-.078	1	-.422	1
141		14	max	-3.537	12	303.552	1	-.398	12	.009	3	.002	5	.35	3
142			min	-88.778	1	-128.2	3	-26.057	4	-.013	1	-.119	1	-.861	1
143		15	max	-3.537	12	120.154	1	10.386	1	.009	3	-.004	12	.45	3
144			min	-88.778	1	-51.732	3	-19.933	5	-.013	1	-.125	1	-1.096	1
145		16	max	-3.537	12	24.735	3	41.902	1	.009	3	-.003	12	.465	3
146			min	-88.778	1	-63.243	1	-18.343	5	-.013	1	-.096	1	-1.128	1
147		17	max	-3.537	12	101.203	3	73.419	1	.009	3	0	12	.395	3
148			min	-88.778	1	-246.64	1	-16.754	5	-.013	1	-.069	4	-.956	1
149		18	max	-3.537	12	177.67	3	104.936	1	.009	3	.067	1	.24	3
150			min	-94.573	4	-430.037	1	-15.164	5	-.013	1	-.08	5	-.58	1
151		19	max	-3.537	12	254.138	3	136.452	1	.009	3	.201	1	0	1
152			min	-105.979	4	-613.434	1	-13.575	5	-.013	1	-.096	5	0	5
153	M2	1	max	1153.033	1	2.333	4	1.196	1	0	3	0	3	0	1
154			min	-1094.6	3	.572	15	-78.273	4	0	4	0	1	0	1
155		2	max	1153.361	1	2.317	4	1.196	1	0	3	0	1	0	15
156			min	-1094.354	3	.568	15	-78.558	4	0	4	-.017	4	0	4
157		3	max	1153.69	1	2.302	4	1.196	1	0	3	0	1	0	15
158			min	-1094.107	3	.565	15	-78.843	4	0	4	-.035	4	-.001	4
159		4	max	1154.018	1	2.287	4	1.196	1	0	3	0	1	0	15
160			min	-1093.861	3	.561	15	-79.128	4	0	4	-.052	4	-.002	4
161		5	max	1154.346	1	2.272	4	1.196	1	0	3	.001	1	0	15
162			min	-1093.615	3	.557	15	-79.413	4	0	4	-.07	4	-.002	4
163		6	max	1154.675	1	2.256	4	1.196	1	0	3	.001	1	0	15
164			min	-1093.368	3	.554	15	-79.697	4	0	4	-.087	4	-.003	4
165		7	max	1155.003	1	2.241	4	1.196	1	0	3	.002	1	0	15
166			min	-1093.122	3	.55	15	-79.982	4	0	4	-.105	4	-.003	4
167		8	max	1155.332	1	2.226	4	1.196	1	0	3	.002	1	0	15
168			min	-1092.876	3	.547	15	-80.267	4	0	4	-.123	4	-.004	4
169		9	max	1155.66	1	2.21	4	1.196	1	0	3	.002	1	0	15
170			min	-1092.629	3	.543	15	-80.552	4	0	4	-.141	4	-.004	4
171		10	max	1155.989	1	2.195	4	1.196	1	0	3	.002	1	-.001	15
172			min	-1092.383	3	.54	15	-80.837	4	0	4	-.159	4	-.005	4
173		11	max	1156.317	1	2.18	4	1.196	1	0	3	.003	1	-.001	15
174			min	-1092.137	3	.536	15	-81.122	4	0	4	-.177	4	-.005	4
175		12	max	1156.646	1	2.165	4	1.196	1	0	3	.003	1	-.001	15
176			min	-1091.89	3	.532	15	-81.406	4	0	4	-.195	4	-.005	4
177		13	max	1156.974	1	2.149	4	1.196	1	0	3	.003	1	-.001	15
178			min	-1091.644	3	.529	15	-81.691	4	0	4	-.213	4	-.006	4
179		14	max	1157.302	1	2.134	4	1.196	1	0	3	.003	1	-.002	15
180			min	-1091.398	3	.525	15	-81.976	4	0	4	-.231	4	-.006	4
181		15	max	1157.631	1	2.119	4	1.196	1	0	3	.004	1	-.002	15
182			min	-1091.151	3	.522	15	-82.261	4	0	4	-.249	4	-.007	4
183		16	max	1157.959	1	2.104	4	1.196	1	0	3	.004	1	-.002	15
184			min	-1090.905	3	.518	15	-82.546	4	0	4	-.267	4	-.007	4
185		17	max	1158.288	1	2.088	4	1.196	1	0	3	.004	1	-.002	15
186			min	-1090.659	3	.514	15	-82.831	4	0	4	-.286	4	-.008	4
187		18	max	1158.616	1	2.073	4	1.196	1	0	3	.004	1	-.002	15
188			min	-1090.412	3	.511	15	-83.115	4	0	4	-.304	4	-.008	4
189		19	max	1158.945	1	2.058	4	1.196	1	0	3	.005	1	-.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
190			min	-1090.166	3	.507	15	-83.4	4	0	4	-.322	4	-.009	4
191	M3	1	max	312.934	2	8.105	4	.014	1	0	3	0	1	.009	4
192			min	-427.376	3	1.918	15	-1.199	5	0	4	-.012	4	.002	15
193		2	max	312.764	2	7.333	4	.014	1	0	3	0	1	.005	4
194			min	-427.504	3	1.736	15	-.657	5	0	4	-.012	4	.001	12
195		3	max	312.594	2	6.56	4	.014	1	0	3	0	1	.003	2
196			min	-427.631	3	1.554	15	-.115	5	0	4	-.013	4	0	3
197		4	max	312.423	2	5.788	4	.48	4	0	3	0	1	0	2
198			min	-427.759	3	1.373	15	0	12	0	4	-.013	4	-.001	3
199		5	max	312.253	2	5.015	4	1.022	4	0	3	0	1	0	15
200			min	-427.887	3	1.191	15	0	12	0	4	-.012	4	-.003	3
201		6	max	312.082	2	4.243	4	1.565	4	0	3	0	1	0	15
202			min	-428.015	3	1.01	15	0	12	0	4	-.012	4	-.004	6
203		7	max	311.912	2	3.471	4	2.107	4	0	3	0	1	-.001	15
204			min	-428.142	3	.828	15	0	12	0	4	-.011	4	-.006	6
205		8	max	311.742	2	2.698	4	2.649	4	0	3	0	1	-.002	15
206			min	-428.27	3	.647	15	0	12	0	4	-.01	4	-.007	6
207		9	max	311.571	2	1.926	4	3.191	4	0	3	0	1	-.002	15
208			min	-428.398	3	.465	15	0	12	0	4	-.009	4	-.008	6
209		10	max	311.401	2	1.153	4	3.733	4	0	3	0	1	-.002	15
210			min	-428.526	3	.283	15	0	12	0	4	-.007	5	-.009	6
211		11	max	311.231	2	.411	2	4.275	4	0	3	0	1	-.002	15
212			min	-428.653	3	.019	3	0	12	0	4	-.006	5	-.009	6
213		12	max	311.06	2	-.08	15	4.817	4	0	3	0	1	-.002	15
214			min	-428.781	3	-.433	3	0	12	0	4	-.004	5	-.009	6
215		13	max	310.89	2	-.261	15	5.359	4	0	3	0	1	-.002	15
216			min	-428.909	3	-1.165	6	0	12	0	4	-.002	5	-.009	6
217		14	max	310.72	2	-.443	15	5.902	4	0	3	0	4	-.002	15
218			min	-429.037	3	-1.937	6	0	12	0	4	0	12	-.008	6
219		15	max	310.549	2	-.624	15	6.444	4	0	3	.004	4	-.002	15
220			min	-429.164	3	-2.71	6	0	12	0	4	0	12	-.007	6
221		16	max	310.379	2	-.806	15	6.986	4	0	3	.006	4	-.001	15
222			min	-429.292	3	-3.482	6	0	12	0	4	0	12	-.006	6
223		17	max	310.209	2	-.988	15	7.528	4	0	3	.009	4	0	15
224			min	-429.42	3	-4.255	6	0	12	0	4	0	12	-.004	6
225		18	max	310.038	2	-1.169	15	8.07	4	0	3	.013	4	0	15
226			min	-429.548	3	-5.027	6	0	12	0	4	0	12	-.002	6
227		19	max	309.868	2	-1.351	15	8.612	4	0	3	.016	4	0	1
228			min	-429.676	3	-5.8	6	0	12	0	4	0	12	0	1
229	M4	1	max	1281.461	1	0	1	-.316	12	0	1	.009	4	0	1
230			min	-336.583	3	0	1	-235.438	4	0	1	0	10	0	1
231		2	max	1281.632	1	0	1	-.316	12	0	1	0	12	0	1
232			min	-336.455	3	0	1	-235.586	4	0	1	-.018	4	0	1
233		3	max	1281.802	1	0	1	-.316	12	0	1	0	12	0	1
234			min	-336.328	3	0	1	-235.733	4	0	1	-.046	4	0	1
235		4	max	1281.972	1	0	1	-.316	12	0	1	0	12	0	1
236			min	-336.2	3	0	1	-235.881	4	0	1	-.073	4	0	1
237		5	max	1282.143	1	0	1	-.316	12	0	1	0	12	0	1
238			min	-336.072	3	0	1	-236.029	4	0	1	-.1	4	0	1
239		6	max	1282.313	1	0	1	-.316	12	0	1	0	12	0	1
240			min	-335.944	3	0	1	-236.176	4	0	1	-.127	4	0	1
241		7	max	1282.484	1	0	1	-.316	12	0	1	0	12	0	1
242			min	-335.817	3	0	1	-236.324	4	0	1	-.154	4	0	1
243		8	max	1282.654	1	0	1	-.316	12	0	1	0	12	0	1
244			min	-335.689	3	0	1	-236.472	4	0	1	-.181	4	0	1
245		9	max	1282.824	1	0	1	-.316	12	0	1	0	12	0	1
246			min	-335.561	3	0	1	-236.619	4	0	1	-.208	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	1282.995	1	0	1	-.316	12	0	1	0	12	0	1
248			min	-335.433	3	0	1	-236.767	4	0	1	-.235	4	0	1
249		11	max	1283.165	1	0	1	-.316	12	0	1	0	12	0	1
250			min	-335.305	3	0	1	-236.914	4	0	1	-.263	4	0	1
251		12	max	1283.335	1	0	1	-.316	12	0	1	0	12	0	1
252			min	-335.178	3	0	1	-237.062	4	0	1	-.29	4	0	1
253		13	max	1283.506	1	0	1	-.316	12	0	1	0	12	0	1
254			min	-335.05	3	0	1	-237.21	4	0	1	-.317	4	0	1
255		14	max	1283.676	1	0	1	-.316	12	0	1	0	12	0	1
256			min	-334.922	3	0	1	-237.357	4	0	1	-.344	4	0	1
257		15	max	1283.846	1	0	1	-.316	12	0	1	0	12	0	1
258			min	-334.794	3	0	1	-237.505	4	0	1	-.372	4	0	1
259		16	max	1284.017	1	0	1	-.316	12	0	1	0	12	0	1
260			min	-334.667	3	0	1	-237.653	4	0	1	-.399	4	0	1
261		17	max	1284.187	1	0	1	-.316	12	0	1	0	12	0	1
262			min	-334.539	3	0	1	-237.8	4	0	1	-.426	4	0	1
263		18	max	1284.357	1	0	1	-.316	12	0	1	0	12	0	1
264			min	-334.411	3	0	1	-237.948	4	0	1	-.453	4	0	1
265		19	max	1284.528	1	0	1	-.316	12	0	1	0	12	0	1
266			min	-334.283	3	0	1	-238.096	4	0	1	-.481	4	0	1
267	M6	1	max	3712.13	1	2.751	2	0	1	0	1	0	4	0	1
268			min	-3585.995	3	.183	3	-78.97	4	0	4	0	1	0	1
269		2	max	3712.459	1	2.739	2	0	1	0	1	0	1	0	3
270			min	-3585.749	3	.174	3	-79.255	4	0	4	-.018	4	0	2
271		3	max	3712.787	1	2.727	2	0	1	0	1	0	1	0	3
272			min	-3585.502	3	.165	3	-79.54	4	0	4	-.035	4	-.001	2
273		4	max	3713.116	1	2.715	2	0	1	0	1	0	1	0	3
274			min	-3585.256	3	.156	3	-79.825	4	0	4	-.053	4	-.002	2
275		5	max	3713.444	1	2.703	2	0	1	0	1	0	1	0	3
276			min	-3585.01	3	.147	3	-80.109	4	0	4	-.07	4	-.002	2
277		6	max	3713.773	1	2.692	2	0	1	0	1	0	1	0	3
278			min	-3584.763	3	.138	3	-80.394	4	0	4	-.088	4	-.003	2
279		7	max	3714.101	1	2.68	2	0	1	0	1	0	1	0	3
280			min	-3584.517	3	.129	3	-80.679	4	0	4	-.106	4	-.004	2
281		8	max	3714.429	1	2.668	2	0	1	0	1	0	1	0	3
282			min	-3584.271	3	.12	3	-80.964	4	0	4	-.124	4	-.004	2
283		9	max	3714.758	1	2.656	2	0	1	0	1	0	1	0	3
284			min	-3584.024	3	.111	3	-81.249	4	0	4	-.142	4	-.005	2
285		10	max	3715.086	1	2.644	2	0	1	0	1	0	1	0	3
286			min	-3583.778	3	.102	3	-81.534	4	0	4	-.16	4	-.005	2
287		11	max	3715.415	1	2.632	2	0	1	0	1	0	1	0	3
288			min	-3583.532	3	.093	3	-81.818	4	0	4	-.178	4	-.006	2
289		12	max	3715.743	1	2.62	2	0	1	0	1	0	1	0	3
290			min	-3583.285	3	.084	3	-82.103	4	0	4	-.196	4	-.007	2
291		13	max	3716.072	1	2.608	2	0	1	0	1	0	1	0	3
292			min	-3583.039	3	.076	3	-82.388	4	0	4	-.214	4	-.007	2
293		14	max	3716.4	1	2.596	2	0	1	0	1	0	1	0	3
294			min	-3582.793	3	.067	3	-82.673	4	0	4	-.233	4	-.008	2
295		15	max	3716.729	1	2.585	2	0	1	0	1	0	1	0	3
296			min	-3582.546	3	.058	3	-82.958	4	0	4	-.251	4	-.008	2
297		16	max	3717.057	1	2.573	2	0	1	0	1	0	1	0	3
298			min	-3582.3	3	.049	3	-83.243	4	0	4	-.27	4	-.009	2
299		17	max	3717.385	1	2.561	2	0	1	0	1	0	1	0	3
300			min	-3582.054	3	.04	3	-83.527	4	0	4	-.288	4	-.009	2
301		18	max	3717.714	1	2.549	2	0	1	0	1	0	1	0	3
302			min	-3581.807	3	.031	3	-83.812	4	0	4	-.307	4	-.01	2
303		19	max	3718.042	1	2.537	2	0	1	0	1	0	1	0	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
304			min	-3581.561	3	.022	3	-84.097	4	0	4	-.325	4	-.011	2
305	M7	1	max	1257.795	2	8.118	6	0	1	0	1	0	1	.011	2
306			min	-1344.57	3	1.905	15	-1.269	5	0	4	-.012	4	0	3
307		2	max	1257.624	2	7.345	6	0	1	0	1	0	1	.008	2
308			min	-1344.698	3	1.723	15	-.727	5	0	4	-.013	4	-.001	3
309		3	max	1257.454	2	6.573	6	0	1	0	1	0	1	.005	2
310			min	-1344.826	3	1.542	15	-.185	5	0	4	-.013	4	-.003	3
311		4	max	1257.284	2	5.8	6	.402	4	0	1	0	1	.003	2
312			min	-1344.953	3	1.36	15	0	1	0	4	-.013	4	-.004	3
313		5	max	1257.113	2	5.028	6	.944	4	0	1	0	1	.001	2
314			min	-1345.081	3	1.178	15	0	1	0	4	-.012	4	-.005	3
315		6	max	1256.943	2	4.256	6	1.487	4	0	1	0	1	0	2
316			min	-1345.209	3	.997	15	0	1	0	4	-.012	4	-.006	3
317		7	max	1256.772	2	3.483	6	2.029	4	0	1	0	1	-.001	15
318			min	-1345.337	3	.815	15	0	1	0	4	-.011	4	-.007	3
319		8	max	1256.602	2	2.711	6	2.571	4	0	1	0	1	-.002	15
320			min	-1345.464	3	.634	15	0	1	0	4	-.01	4	-.007	4
321		9	max	1256.432	2	1.991	2	3.113	4	0	1	0	1	-.002	15
322			min	-1345.592	3	.378	12	0	1	0	4	-.009	4	-.008	4
323		10	max	1256.261	2	1.389	2	3.655	4	0	1	0	1	-.002	15
324			min	-1345.72	3	.054	3	0	1	0	4	-.008	4	-.009	4
325		11	max	1256.091	2	.787	2	4.197	4	0	1	0	1	-.002	15
326			min	-1345.848	3	-.398	3	0	1	0	4	-.006	4	-.009	4
327		12	max	1255.921	2	.185	2	4.739	4	0	1	0	1	-.002	15
328			min	-1345.975	3	-.849	3	0	1	0	4	-.004	4	-.009	4
329		13	max	1255.75	2	-.274	15	5.281	4	0	1	0	1	-.002	15
330			min	-1346.103	3	-1.301	3	0	1	0	4	-.002	5	-.009	4
331		14	max	1255.58	2	-.456	15	5.824	4	0	1	0	4	-.002	15
332			min	-1346.231	3	-1.924	4	0	1	0	4	0	1	-.008	4
333		15	max	1255.41	2	-.637	15	6.366	4	0	1	.003	4	-.002	15
334			min	-1346.359	3	-2.696	4	0	1	0	4	0	1	-.007	4
335		16	max	1255.239	2	-.819	15	6.908	4	0	1	.006	4	-.001	15
336			min	-1346.486	3	-3.469	4	0	1	0	4	0	1	-.006	4
337		17	max	1255.069	2	-1	15	7.45	4	0	1	.009	4	0	15
338			min	-1346.614	3	-4.241	4	0	1	0	4	0	1	-.004	4
339		18	max	1254.899	2	-1.182	15	7.992	4	0	1	.012	4	0	15
340			min	-1346.742	3	-5.013	4	0	1	0	4	0	1	-.002	4
341		19	max	1254.728	2	-1.364	15	8.534	4	0	1	.016	4	0	1
342			min	-1346.87	3	-5.786	4	0	1	0	4	0	1	0	1
343	M8	1	max	3779.572	1	0	1	0	1	0	1	.008	4	0	1
344			min	-1148.603	3	0	1	-230.207	4	0	1	0	1	0	1
345		2	max	3779.742	1	0	1	0	1	0	1	0	1	0	1
346			min	-1148.475	3	0	1	-230.355	4	0	1	-.018	4	0	1
347		3	max	3779.913	1	0	1	0	1	0	1	0	1	0	1
348			min	-1148.347	3	0	1	-230.502	4	0	1	-.045	4	0	1
349		4	max	3780.083	1	0	1	0	1	0	1	0	1	0	1
350			min	-1148.22	3	0	1	-230.65	4	0	1	-.071	4	0	1
351		5	max	3780.253	1	0	1	0	1	0	1	0	1	0	1
352			min	-1148.092	3	0	1	-230.797	4	0	1	-.098	4	0	1
353		6	max	3780.424	1	0	1	0	1	0	1	0	1	0	1
354			min	-1147.964	3	0	1	-230.945	4	0	1	-.124	4	0	1
355		7	max	3780.594	1	0	1	0	1	0	1	0	1	0	1
356			min	-1147.836	3	0	1	-231.093	4	0	1	-.151	4	0	1
357		8	max	3780.764	1	0	1	0	1	0	1	0	1	0	1
358			min	-1147.709	3	0	1	-231.24	4	0	1	-.177	4	0	1
359		9	max	3780.935	1	0	1	0	1	0	1	0	1	0	1
360			min	-1147.581	3	0	1	-231.388	4	0	1	-.204	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	3781.105	1	0	1	0	1	0	1	0	1	0	1
362			min	-1147.453	3	0	1	-231.536	4	0	1	-.23	4	0	1
363		11	max	3781.275	1	0	1	0	1	0	1	0	1	0	1
364			min	-1147.325	3	0	1	-231.683	4	0	1	-.257	4	0	1
365		12	max	3781.446	1	0	1	0	1	0	1	0	1	0	1
366			min	-1147.197	3	0	1	-231.831	4	0	1	-.284	4	0	1
367		13	max	3781.616	1	0	1	0	1	0	1	0	1	0	1
368			min	-1147.07	3	0	1	-231.979	4	0	1	-.31	4	0	1
369		14	max	3781.787	1	0	1	0	1	0	1	0	1	0	1
370			min	-1146.942	3	0	1	-232.126	4	0	1	-.337	4	0	1
371		15	max	3781.957	1	0	1	0	1	0	1	0	1	0	1
372			min	-1146.814	3	0	1	-232.274	4	0	1	-.364	4	0	1
373		16	max	3782.127	1	0	1	0	1	0	1	0	1	0	1
374			min	-1146.686	3	0	1	-232.421	4	0	1	-.39	4	0	1
375		17	max	3782.298	1	0	1	0	1	0	1	0	1	0	1
376			min	-1146.559	3	0	1	-232.569	4	0	1	-.417	4	0	1
377		18	max	3782.468	1	0	1	0	1	0	1	0	1	0	1
378			min	-1146.431	3	0	1	-232.717	4	0	1	-.444	4	0	1
379		19	max	3782.638	1	0	1	0	1	0	1	0	1	0	1
380			min	-1146.303	3	0	1	-232.864	4	0	1	-.47	4	0	1
381	M10	1	max	1153.033	1	2.229	6	-.046	12	0	1	0	1	0	1
382			min	-1094.6	3	.503	15	-78.874	4	0	5	0	3	0	1
383		2	max	1153.361	1	2.214	6	-.046	12	0	1	0	10	0	15
384			min	-1094.354	3	.499	15	-79.159	4	0	5	-.017	4	0	6
385		3	max	1153.69	1	2.199	6	-.046	12	0	1	0	12	0	15
386			min	-1094.107	3	.495	15	-79.444	4	0	5	-.035	4	0	6
387		4	max	1154.018	1	2.184	6	-.046	12	0	1	0	12	0	15
388			min	-1093.861	3	.492	15	-79.728	4	0	5	-.053	4	-.001	6
389		5	max	1154.346	1	2.168	6	-.046	12	0	1	0	12	0	15
390			min	-1093.615	3	.488	15	-80.013	4	0	5	-.07	4	-.002	6
391		6	max	1154.675	1	2.153	6	-.046	12	0	1	0	12	0	15
392			min	-1093.368	3	.485	15	-80.298	4	0	5	-.088	4	-.002	6
393		7	max	1155.003	1	2.138	6	-.046	12	0	1	0	12	0	15
394			min	-1093.122	3	.481	15	-80.583	4	0	5	-.106	4	-.003	6
395		8	max	1155.332	1	2.123	6	-.046	12	0	1	0	12	0	15
396			min	-1092.876	3	.477	15	-80.868	4	0	5	-.124	4	-.003	6
397		9	max	1155.66	1	2.107	6	-.046	12	0	1	0	12	0	15
398			min	-1092.629	3	.474	15	-81.153	4	0	5	-.142	4	-.004	6
399		10	max	1155.989	1	2.092	6	-.046	12	0	1	0	12	0	15
400			min	-1092.383	3	.47	15	-81.437	4	0	5	-.16	4	-.004	6
401		11	max	1156.317	1	2.077	6	-.046	12	0	1	0	12	-.001	15
402			min	-1092.137	3	.467	15	-81.722	4	0	5	-.178	4	-.005	6
403		12	max	1156.646	1	2.062	6	-.046	12	0	1	0	12	-.001	15
404			min	-1091.89	3	.463	15	-82.007	4	0	5	-.196	4	-.005	6
405		13	max	1156.974	1	2.046	6	-.046	12	0	1	0	12	-.001	15
406			min	-1091.644	3	.46	15	-82.292	4	0	5	-.214	4	-.006	6
407		14	max	1157.302	1	2.031	6	-.046	12	0	1	0	12	-.001	15
408			min	-1091.398	3	.456	15	-82.577	4	0	5	-.232	4	-.006	6
409		15	max	1157.631	1	2.016	6	-.046	12	0	1	0	12	-.001	15
410			min	-1091.151	3	.452	15	-82.862	4	0	5	-.251	4	-.007	6
411		16	max	1157.959	1	2.001	6	-.046	12	0	1	0	12	-.002	15
412			min	-1090.905	3	.449	15	-83.146	4	0	5	-.269	4	-.007	6
413		17	max	1158.288	1	1.985	6	-.046	12	0	1	0	12	-.002	15
414			min	-1090.659	3	.445	15	-83.431	4	0	5	-.288	4	-.007	6
415		18	max	1158.616	1	1.97	6	-.046	12	0	1	0	12	-.002	15
416			min	-1090.412	3	.442	15	-83.716	4	0	5	-.306	4	-.008	6
417		19	max	1158.945	1	1.955	6	-.046	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	-1090.166	3	.438	15	-84.001	4	0	5	-.325	4	-.008	6
419	M11	1	max	312.934	2	8.051	6	0	12	0	1	0	12	.008	6
420			min	-427.376	3	1.881	15	-1.2	5	0	4	-.012	4	.002	15
421		2	max	312.764	2	7.279	6	0	12	0	1	0	12	.005	6
422			min	-427.504	3	1.7	15	-.658	5	0	4	-.013	4	.001	15
423		3	max	312.594	2	6.506	6	0	12	0	1	0	12	.003	2
424			min	-427.631	3	1.518	15	-.116	5	0	4	-.013	4	0	3
425		4	max	312.423	2	5.734	6	.474	4	0	1	0	12	0	2
426			min	-427.759	3	1.337	15	-.014	1	0	4	-.013	4	-.001	3
427		5	max	312.253	2	4.961	6	1.016	4	0	1	0	12	0	15
428			min	-427.887	3	1.155	15	-.014	1	0	4	-.012	4	-.003	4
429		6	max	312.082	2	4.189	6	1.558	4	0	1	0	12	-.001	15
430			min	-428.015	3	.973	15	-.014	1	0	4	-.012	4	-.005	4
431		7	max	311.912	2	3.416	6	2.1	4	0	1	0	12	-.002	15
432			min	-428.142	3	.792	15	-.014	1	0	4	-.011	4	-.006	4
433		8	max	311.742	2	2.644	6	2.642	4	0	1	0	12	-.002	15
434			min	-428.27	3	.61	15	-.014	1	0	4	-.01	4	-.007	4
435		9	max	311.571	2	1.872	6	3.184	4	0	1	0	12	-.002	15
436			min	-428.398	3	.429	15	-.014	1	0	4	-.009	4	-.008	4
437		10	max	311.401	2	1.099	6	3.727	4	0	1	0	12	-.002	15
438			min	-428.526	3	.247	15	-.014	1	0	4	-.007	4	-.009	4
439		11	max	311.231	2	.411	2	4.269	4	0	1	0	12	-.002	15
440			min	-428.653	3	.019	3	-.014	1	0	4	-.006	4	-.009	4
441		12	max	311.06	2	-.116	15	4.811	4	0	1	0	12	-.002	15
442			min	-428.781	3	-.447	4	-.014	1	0	4	-.004	4	-.009	4
443		13	max	310.89	2	-.298	15	5.353	4	0	1	0	12	-.002	15
444			min	-428.909	3	-1.219	4	-.014	1	0	4	-.002	4	-.009	4
445		14	max	310.72	2	-.479	15	5.895	4	0	1	0	4	-.002	15
446			min	-429.037	3	-1.992	4	-.014	1	0	4	0	1	-.008	4
447		15	max	310.549	2	-.661	15	6.437	4	0	1	.003	4	-.002	15
448			min	-429.164	3	-2.764	4	-.014	1	0	4	0	1	-.007	4
449		16	max	310.379	2	-.842	15	6.979	4	0	1	.006	4	-.001	15
450			min	-429.292	3	-3.536	4	-.014	1	0	4	0	1	-.006	4
451		17	max	310.209	2	-1.024	15	7.522	4	0	1	.009	4	-.001	15
452			min	-429.42	3	-4.309	4	-.014	1	0	4	0	1	-.004	4
453		18	max	310.038	2	-1.205	15	8.064	4	0	1	.013	4	0	15
454			min	-429.548	3	-5.081	4	-.014	1	0	4	0	1	-.002	4
455		19	max	309.868	2	-1.387	15	8.606	4	0	1	.016	4	0	1
456			min	-429.676	3	-5.854	4	-.014	1	0	4	0	1	0	1
457	M12	1	max	1281.461	1	0	1	7.99	1	0	1	.009	4	0	1
458			min	-336.583	3	0	1	-231.413	4	0	1	0	1	0	1
459		2	max	1281.632	1	0	1	7.99	1	0	1	0	1	0	1
460			min	-336.455	3	0	1	-231.561	4	0	1	-.018	4	0	1
461		3	max	1281.802	1	0	1	7.99	1	0	1	.002	1	0	1
462			min	-336.328	3	0	1	-231.709	4	0	1	-.045	4	0	1
463		4	max	1281.972	1	0	1	7.99	1	0	1	.003	1	0	1
464			min	-336.2	3	0	1	-231.856	4	0	1	-.071	4	0	1
465		5	max	1282.143	1	0	1	7.99	1	0	1	.004	1	0	1
466			min	-336.072	3	0	1	-232.004	4	0	1	-.098	4	0	1
467		6	max	1282.313	1	0	1	7.99	1	0	1	.004	1	0	1
468			min	-335.944	3	0	1	-232.152	4	0	1	-.125	4	0	1
469		7	max	1282.484	1	0	1	7.99	1	0	1	.005	1	0	1
470			min	-335.817	3	0	1	-232.299	4	0	1	-.151	4	0	1
471		8	max	1282.654	1	0	1	7.99	1	0	1	.006	1	0	1
472			min	-335.689	3	0	1	-232.447	4	0	1	-.178	4	0	1
473		9	max	1282.824	1	0	1	7.99	1	0	1	.007	1	0	1
474			min	-335.561	3	0	1	-232.594	4	0	1	-.205	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	1282.995	1	0	1	7.99	1	0	1	.008	1	0	1
476			min	-335.433	3	0	1	-232.742	4	0	1	-.231	4	0	1
477		11	max	1283.165	1	0	1	7.99	1	0	1	.009	1	0	1
478			min	-335.305	3	0	1	-232.89	4	0	1	-.258	4	0	1
479		12	max	1283.335	1	0	1	7.99	1	0	1	.01	1	0	1
480			min	-335.178	3	0	1	-233.037	4	0	1	-.285	4	0	1
481		13	max	1283.506	1	0	1	7.99	1	0	1	.011	1	0	1
482			min	-335.05	3	0	1	-233.185	4	0	1	-.312	4	0	1
483		14	max	1283.676	1	0	1	7.99	1	0	1	.012	1	0	1
484			min	-334.922	3	0	1	-233.333	4	0	1	-.338	4	0	1
485		15	max	1283.846	1	0	1	7.99	1	0	1	.013	1	0	1
486			min	-334.794	3	0	1	-233.48	4	0	1	-.365	4	0	1
487		16	max	1284.017	1	0	1	7.99	1	0	1	.014	1	0	1
488			min	-334.667	3	0	1	-233.628	4	0	1	-.392	4	0	1
489		17	max	1284.187	1	0	1	7.99	1	0	1	.015	1	0	1
490			min	-334.539	3	0	1	-233.776	4	0	1	-.419	4	0	1
491		18	max	1284.357	1	0	1	7.99	1	0	1	.015	1	0	1
492			min	-334.411	3	0	1	-233.923	4	0	1	-.446	4	0	1
493		19	max	1284.528	1	0	1	7.99	1	0	1	.016	1	0	1
494			min	-334.283	3	0	1	-234.071	4	0	1	-.473	4	0	1
495	M1	1	max	136.271	1	618.576	3	55.881	5	0	1	.2	1	0	3
496			min	-6.198	5	-528.564	1	-84.017	1	0	3	-.058	5	-.014	1
497		2	max	136.642	1	617.538	3	57.122	5	0	1	.156	1	.265	1
498			min	-6.025	5	-529.947	1	-84.017	1	0	3	-.028	5	-.325	3
499		3	max	253.564	3	590.266	1	-3.479	12	0	3	.111	1	.531	1
500			min	-158.759	2	-451.539	3	-83.032	1	0	1	.001	15	-.638	3
501		4	max	253.842	3	588.883	1	-3.479	12	0	3	.067	1	.22	1
502			min	-158.389	2	-452.577	3	-83.032	1	0	1	-.008	5	-.4	3
503		5	max	254.12	3	587.499	1	-3.479	12	0	3	.024	1	-.004	15
504			min	-158.018	2	-453.614	3	-83.032	1	0	1	-.016	5	-.161	3
505		6	max	254.398	3	586.116	1	-3.479	12	0	3	0	12	.079	3
506			min	-157.647	2	-454.652	3	-83.032	1	0	1	-.028	4	-.4	1
507		7	max	254.677	3	584.732	1	-3.479	12	0	3	-.003	12	.319	3
508			min	-157.276	2	-455.69	3	-83.032	1	0	1	-.064	1	-.709	1
509		8	max	254.955	3	583.348	1	-3.479	12	0	3	-.004	12	.56	3
510			min	-156.906	2	-456.728	3	-83.032	1	0	1	-.108	1	-1.017	1
511		9	max	262.753	3	42.048	2	38.662	5	0	9	.064	1	.654	3
512			min	-102.563	2	.417	15	-122.265	1	0	3	-.116	5	-1.159	1
513		10	max	263.031	3	40.665	2	39.903	5	0	9	0	10	.637	3
514			min	-102.192	2	0	5	-122.265	1	0	3	-.096	4	-1.17	1
515		11	max	263.309	3	39.281	2	41.145	5	0	9	-.003	12	.621	3
516			min	-101.821	2	-1.734	4	-122.265	1	0	3	-.087	4	-1.181	1
517		12	max	271.058	3	302.921	3	125.203	5	0	1	.107	1	.541	3
518			min	-60.748	10	-627.724	1	-81.154	1	0	3	-.168	5	-1.043	1
519		13	max	271.336	3	301.883	3	126.445	5	0	1	.064	1	.382	3
520			min	-60.439	10	-629.108	1	-81.154	1	0	3	-.102	5	-.711	1
521		14	max	271.614	3	300.846	3	127.686	5	0	1	.021	1	.223	3
522			min	-60.13	10	-630.491	1	-81.154	1	0	3	-.034	5	-.379	1
523		15	max	271.892	3	299.808	3	128.928	5	0	1	.033	5	.064	3
524			min	-59.821	10	-631.875	1	-81.154	1	0	3	-.022	1	-.046	1
525		16	max	272.17	3	298.77	3	130.169	5	0	1	.102	5	.293	2
526			min	-59.512	10	-633.259	1	-81.154	1	0	3	-.065	1	-.094	3
527		17	max	272.448	3	297.733	3	131.411	5	0	1	.171	5	.622	1
528			min	-59.203	10	-634.642	1	-81.154	1	0	3	-.108	1	-.251	3
529		18	max	13.402	5	615.974	1	-3.537	12	0	5	.142	5	.312	1
530			min	-136.821	1	-253.135	3	-107.263	4	0	1	-.154	1	-.125	3
531		19	max	13.575	5	614.591	1	-3.537	12	0	5	.096	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	-136.45	1	-254.173	3	-106.022	4	0	1	-.201	1	-.013	1
533	M5	1	max	294.757	1	2063.117	3	85.059	5	0	1	0	1	.029	1
534			min	8.816	12	-1790.323	1	0	1	0	4	-.129	4	-.001	3
535		2	max	295.128	1	2062.08	3	86.301	5	0	1	0	1	.974	1
536			min	9.001	12	-1791.706	1	0	1	0	4	-.084	4	-1.09	3
537		3	max	814.687	3	1802.526	1	13.758	4	0	4	0	1	1.876	1
538			min	-569.107	2	-1447.112	3	0	1	0	1	-.04	4	-2.135	3
539		4	max	814.965	3	1801.142	1	15	4	0	4	0	1	.925	1
540			min	-568.736	2	-1448.15	3	0	1	0	1	-.032	4	-1.372	3
541		5	max	815.243	3	1799.759	1	16.241	4	0	4	0	1	.014	9
542			min	-568.365	2	-1449.187	3	0	1	0	1	-.024	4	-.607	3
543		6	max	815.521	3	1798.375	1	17.483	4	0	4	0	1	.158	3
544			min	-567.994	2	-1450.225	3	0	1	0	1	-.015	5	-.974	1
545		7	max	815.799	3	1796.991	1	18.724	4	0	4	0	1	.923	3
546			min	-567.624	2	-1451.263	3	0	1	0	1	-.007	5	-1.922	1
547		8	max	816.077	3	1795.608	1	19.966	4	0	4	.005	4	1.689	3
548			min	-567.253	2	-1452.301	3	0	1	0	1	0	1	-2.87	1
549		9	max	829.054	3	140.034	2	123.558	4	0	1	0	1	1.944	3
550			min	-455.395	2	.418	15	0	1	0	1	-.152	4	-3.248	1
551		10	max	829.332	3	138.65	2	124.8	4	0	1	0	1	1.885	3
552			min	-455.025	2	0	15	0	1	0	1	-.087	5	-3.287	1
553		11	max	829.61	3	137.267	2	126.041	4	0	1	0	1	1.826	3
554			min	-454.654	2	-1.597	6	0	1	0	1	-.022	5	-3.325	1
555		12	max	842.685	3	955.784	3	170.372	4	0	1	0	1	1.603	3
556			min	-342.823	2	-1943.685	1	0	1	0	4	-.233	4	-2.963	1
557		13	max	842.963	3	954.747	3	171.614	4	0	1	0	1	1.099	3
558			min	-342.452	2	-1945.069	1	0	1	0	4	-.143	4	-1.937	1
559		14	max	843.242	3	953.709	3	172.855	4	0	1	0	1	.595	3
560			min	-342.082	2	-1946.452	1	0	1	0	4	-.052	4	-.91	1
561		15	max	843.52	3	952.671	3	174.096	4	0	1	.039	4	.182	2
562			min	-341.711	2	-1947.836	1	0	1	0	4	0	1	-.004	13
563		16	max	843.798	3	951.633	3	175.338	4	0	1	.132	4	1.146	1
564			min	-341.34	2	-1949.22	1	0	1	0	4	0	1	-.41	3
565		17	max	844.076	3	950.596	3	176.579	4	0	1	.225	4	2.174	1
566			min	-340.97	2	-1950.603	1	0	1	0	4	0	1	-.912	3
567		18	max	-9.201	12	2082.359	1	0	1	0	4	.221	4	1.124	1
568			min	-294.77	1	-867.308	3	-40.865	5	0	1	0	1	-.476	3
569		19	max	-9.015	12	2080.975	1	0	1	0	4	.201	4	.025	1
570			min	-294.399	1	-868.345	3	-39.624	5	0	1	0	1	-.019	3
571	M9	1	max	136.271	1	618.576	3	84.017	1	0	3	-.008	12	0	3
572			min	4.838	12	-528.564	1	3.527	12	0	1	-.2	1	-.014	1
573		2	max	136.642	1	617.538	3	84.017	1	0	3	-.007	12	.265	1
574			min	5.024	12	-529.947	1	3.527	12	0	1	-.156	1	-.325	3
575		3	max	253.564	3	590.266	1	83.032	1	0	1	-.005	12	.531	1
576			min	-158.759	2	-451.539	3	-9.852	5	0	3	-.111	1	-.638	3
577		4	max	253.842	3	588.883	1	83.032	1	0	1	-.003	12	.22	1
578			min	-158.389	2	-452.577	3	-8.611	5	0	3	-.067	1	-.4	3
579		5	max	254.12	3	587.499	1	83.032	1	0	1	-.001	12	-.004	15
580			min	-158.018	2	-453.614	3	-7.37	5	0	3	-.024	4	-.161	3
581		6	max	254.398	3	586.116	1	83.032	1	0	1	.02	1	.079	3
582			min	-157.647	2	-454.652	3	-6.128	5	0	3	-.022	5	-.4	1
583		7	max	254.677	3	584.732	1	83.032	1	0	1	.064	1	.319	3
584			min	-157.276	2	-455.69	3	-4.887	5	0	3	-.025	5	-.709	1
585		8	max	254.955	3	583.348	1	83.032	1	0	1	.108	1	.56	3
586			min	-156.906	2	-456.728	3	-3.645	5	0	3	-.027	5	-1.017	1
587		9	max	262.753	3	42.048	2	122.265	1	0	3	-.003	12	.654	3
588			min	-102.563	2	.422	15	4.99	12	0	9	-.137	4	-1.159	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	263.031	3	40.665	2	122.265	1	0	3	0	1	.637	3
590			min	-102.192	2	.005	15	4.99	12	0	9	-.096	4	-1.17	1
591		11	max	263.309	3	39.281	2	122.265	1	0	3	.065	1	.621	3
592			min	-101.821	2	-1.695	6	4.99	12	0	9	-.068	5	-1.181	1
593		12	max	271.058	3	302.921	3	151.394	4	0	3	-.004	12	.541	3
594			min	-60.748	10	-627.724	1	3.22	12	0	1	-.202	4	-1.043	1
595		13	max	271.336	3	301.883	3	152.635	4	0	3	-.003	12	.382	3
596			min	-60.439	10	-629.108	1	3.22	12	0	1	-.122	4	-.711	1
597		14	max	271.614	3	300.846	3	153.877	4	0	3	0	12	.223	3
598			min	-60.13	10	-630.491	1	3.22	12	0	1	-.041	4	-.379	1
599		15	max	271.892	3	299.808	3	155.118	4	0	3	.041	4	.064	3
600			min	-59.821	10	-631.875	1	3.22	12	0	1	0	12	-.046	1
601		16	max	272.17	3	298.77	3	156.36	4	0	3	.123	4	.293	2
602			min	-59.512	10	-633.259	1	3.22	12	0	1	.003	12	-.094	3
603		17	max	272.448	3	297.733	3	157.601	4	0	3	.206	4	.622	1
604			min	-59.203	10	-634.642	1	3.22	12	0	1	.004	12	-.251	3
605		18	max	-4.924	12	615.974	1	88.854	1	0	1	.191	4	.312	1
606			min	-136.821	1	-253.135	3	-79.714	5	0	3	.006	12	-.125	3
607		19	max	-4.739	12	614.591	1	88.854	1	0	1	.201	1	.009	3
608			min	-136.45	1	-254.173	3	-78.472	5	0	3	.008	12	-.013	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	.118	1	.005	3	9.392e-3	1	NC	1	NC	1
2			min	-.47	4	-.021	3	-.002	2	-1.565e-3	3	NC	1	NC	1
3		2	max	0	1	.27	3	.032	1	1.079e-2	1	NC	5	NC	2
4			min	-.47	4	-.109	1	-.013	5	-1.637e-3	3	824.323	3	7876.522	1
5		3	max	0	1	.506	3	.076	1	1.219e-2	1	NC	5	NC	3
6			min	-.47	4	-.288	1	-.015	5	-1.708e-3	3	455.751	3	3221.635	1
7		4	max	0	1	.648	3	.114	1	1.359e-2	1	NC	5	NC	3
8			min	-.47	4	-.388	1	-.011	5	-1.78e-3	3	358.762	3	2131.188	1
9		5	max	0	1	.68	3	.134	1	1.499e-2	1	NC	5	NC	3
10			min	-.47	4	-.394	1	-.002	5	-1.851e-3	3	342.464	3	1814.751	1
11		6	max	0	1	.604	3	.129	1	1.64e-2	1	NC	5	NC	3
12			min	-.47	4	-.309	1	.005	15	-1.923e-3	3	384.23	3	1879.006	1
13		7	max	0	1	.442	3	.102	1	1.78e-2	1	NC	5	NC	3
14			min	-.47	4	-.153	1	.005	10	-1.995e-3	3	518.45	3	2393.742	1
15		8	max	0	1	.237	3	.06	1	1.92e-2	1	NC	4	NC	2
16			min	-.47	4	.001	15	0	10	-2.066e-3	3	929.823	3	4140.698	1
17		9	max	0	1	.204	1	.018	14	2.06e-2	1	NC	4	NC	1
18			min	-.47	4	.005	15	-.004	10	-2.138e-3	3	2666.743	2	NC	1
19		10	max	0	1	.279	1	.014	3	2.2e-2	1	NC	3	NC	1
20			min	-.47	4	-.032	3	-.009	2	-2.21e-3	3	1487.59	1	NC	1
21		11	max	0	12	.204	1	.017	1	2.06e-2	1	NC	4	NC	1
22			min	-.47	4	.005	15	-.01	5	-2.138e-3	3	2666.743	2	NC	1
23		12	max	0	12	.237	3	.06	1	1.92e-2	1	NC	4	NC	2
24			min	-.47	4	0	15	-.01	5	-2.066e-3	3	929.823	3	4140.698	1
25		13	max	0	12	.442	3	.102	1	1.78e-2	1	NC	5	NC	3
26			min	-.47	4	-.153	1	-.004	5	-1.995e-3	3	518.45	3	2393.742	1
27		14	max	0	12	.604	3	.129	1	1.64e-2	1	NC	5	NC	3
28			min	-.47	4	-.309	1	.004	15	-1.923e-3	3	384.23	3	1879.006	1
29		15	max	0	12	.68	3	.134	1	1.499e-2	1	NC	5	NC	3
30			min	-.47	4	-.394	1	.009	10	-1.851e-3	3	342.464	3	1814.751	1
31		16	max	0	12	.648	3	.114	1	1.359e-2	1	NC	5	NC	3
32			min	-.47	4	-.388	1	.008	10	-1.78e-3	3	358.762	3	2131.188	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	.506	3	.076	1	1.219e-2	1	NC	5	NC	3
34			min	-.47	4	-.288	1	.005	10	-1.708e-3	3	455.751	3	3221.635	1
35		18	max	0	12	.27	3	.032	1	1.079e-2	1	NC	5	NC	2
36			min	-.47	4	-.109	1	.001	10	-1.637e-3	3	824.323	3	7876.522	1
37		19	max	0	12	.118	1	.005	3	9.392e-3	1	NC	1	NC	1
38			min	-.47	4	-.021	3	-.002	2	-1.565e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.193	3	.004	3	5.856e-3	1	NC	1	NC	1
40			min	-.376	4	-.38	1	-.002	2	-3.485e-3	3	NC	1	NC	1
41		2	max	0	1	.479	3	.022	1	7.03e-3	1	NC	5	NC	1
42			min	-.376	4	-.743	1	-.019	5	-4.243e-3	3	660.371	1	NC	1
43		3	max	0	1	.72	3	.061	1	8.205e-3	1	NC	15	NC	2
44			min	-.376	4	-1.056	1	-.022	5	-5.e-3	3	355.087	1	4022.126	1
45		4	max	0	1	.887	3	.098	1	9.379e-3	1	NC	15	NC	3
46			min	-.376	4	-1.282	1	-.015	5	-5.757e-3	3	266.005	1	2490.975	1
47		5	max	0	1	.964	3	.119	1	1.055e-2	1	9947.13	15	NC	3
48			min	-.376	4	-1.404	1	-.002	5	-6.514e-3	3	234.233	1	2046.065	1
49		6	max	0	1	.953	3	.118	1	1.173e-2	1	9822.69	15	NC	3
50			min	-.376	4	-1.422	1	.007	10	-7.271e-3	3	230.225	1	2070.372	1
51		7	max	0	1	.868	3	.094	1	1.29e-2	1	NC	15	NC	3
52			min	-.376	4	-1.352	1	.004	10	-8.029e-3	3	246.8	1	2594.321	1
53		8	max	0	1	.741	3	.056	1	1.408e-2	1	NC	15	NC	2
54			min	-.376	4	-1.228	1	0	10	-8.786e-3	3	282.828	1	4423.921	1
55		9	max	0	1	.618	3	.026	4	1.525e-2	1	NC	15	NC	1
56			min	-.376	4	-1.102	1	-.003	10	-9.543e-3	3	332.37	1	9349.503	4
57		10	max	0	1	.56	3	.013	3	1.643e-2	1	NC	5	NC	1
58			min	-.376	4	-1.041	1	-.008	2	-1.03e-2	3	362.797	1	NC	1
59		11	max	0	12	.618	3	.017	1	1.525e-2	1	NC	15	NC	1
60			min	-.376	4	-1.102	1	-.019	5	-9.543e-3	3	332.37	1	NC	1
61		12	max	0	12	.741	3	.056	1	1.408e-2	1	NC	15	NC	2
62			min	-.376	4	-1.228	1	-.021	5	-8.786e-3	3	282.828	1	4423.921	1
63		13	max	0	12	.868	3	.094	1	1.29e-2	1	NC	15	NC	3
64			min	-.376	4	-1.352	1	-.013	5	-8.029e-3	3	246.8	1	2594.321	1
65		14	max	0	12	.953	3	.118	1	1.173e-2	1	9822.342	15	NC	3
66			min	-.376	4	-1.422	1	0	15	-7.271e-3	3	230.225	1	2070.372	1
67		15	max	0	12	.964	3	.119	1	1.055e-2	1	9946.683	15	NC	3
68			min	-.376	4	-1.404	1	.008	10	-6.514e-3	3	234.233	1	2046.065	1
69		16	max	0	12	.887	3	.098	1	9.379e-3	1	NC	15	NC	3
70			min	-.376	4	-1.282	1	.006	10	-5.757e-3	3	266.005	1	2490.975	1
71		17	max	0	12	.72	3	.061	1	8.205e-3	1	NC	15	NC	2
72			min	-.376	4	-1.056	1	.004	10	-5.e-3	3	355.087	1	4022.126	1
73		18	max	0	12	.479	3	.026	4	7.03e-3	1	NC	5	NC	1
74			min	-.376	4	-.743	1	0	10	-4.243e-3	3	660.371	1	9056.816	4
75		19	max	0	12	.193	3	.004	3	5.856e-3	1	NC	1	NC	1
76			min	-.376	4	-.38	1	-.002	2	-3.485e-3	3	NC	1	NC	1
77	M15	1	max	0	12	.198	3	.004	3	2.951e-3	3	NC	1	NC	1
78			min	-.318	4	-.379	1	-.001	2	-5.963e-3	1	NC	1	NC	1
79		2	max	0	12	.382	3	.023	1	3.594e-3	3	NC	5	NC	1
80			min	-.318	4	-.782	1	-.028	5	-7.163e-3	1	595.935	1	8194.004	5
81		3	max	0	12	.542	3	.061	1	4.237e-3	3	NC	15	NC	2
82			min	-.318	4	-1.126	1	-.035	5	-8.364e-3	1	321.29	1	4010.675	1
83		4	max	0	12	.659	3	.098	1	4.88e-3	3	NC	15	NC	3
84			min	-.318	4	-1.372	1	-.025	5	-9.564e-3	1	241.787	1	2485.246	1
85		5	max	0	12	.726	3	.119	1	5.523e-3	3	9956.075	15	NC	3
86			min	-.318	4	-1.499	1	-.007	5	-1.076e-2	1	214.404	1	2041.605	1
87		6	max	0	12	.742	3	.118	1	6.166e-3	3	9833.187	15	NC	3
88			min	-.318	4	-1.506	1	.007	10	-1.197e-2	1	212.942	1	2065.449	1
89		7	max	0	12	.714	3	.094	1	6.809e-3	3	NC	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	-.318	4	-1.415	1	.005	10	-1.317e-2	1	231.798	1	2586.332	1
91		8	max	0	12	.659	3	.056	1	7.452e-3	3	NC	15	NC	2
92			min	-.318	4	-1.263	1	0	10	-1.437e-2	1	271.487	1	4400.546	1
93		9	max	0	12	.601	3	.034	4	8.095e-3	3	NC	15	NC	1
94			min	-.318	4	-1.112	1	-.003	10	-1.557e-2	1	327.592	1	7021.017	4
95		10	max	0	1	.573	3	.012	3	8.738e-3	3	NC	5	NC	1
96			min	-.318	4	-1.04	1	-.007	2	-1.677e-2	1	363.2	1	NC	1
97		11	max	0	1	.601	3	.017	1	8.095e-3	3	NC	15	NC	1
98			min	-.318	4	-1.112	1	-.027	5	-1.557e-2	1	327.592	1	8824.569	5
99		12	max	0	1	.659	3	.056	1	7.452e-3	3	NC	15	NC	2
100			min	-.318	4	-1.263	1	-.032	5	-1.437e-2	1	271.487	1	4400.546	1
101		13	max	0	1	.714	3	.094	1	6.809e-3	3	NC	15	NC	3
102			min	-.318	4	-1.415	1	-.021	5	-1.317e-2	1	231.798	1	2586.332	1
103		14	max	0	1	.742	3	.118	1	6.166e-3	3	9832.93	15	NC	3
104			min	-.318	4	-1.506	1	-.002	5	-1.197e-2	1	212.942	1	2065.449	1
105		15	max	0	1	.726	3	.119	1	5.523e-3	3	9955.746	15	NC	3
106			min	-.318	4	-1.499	1	.008	10	-1.076e-2	1	214.404	1	2041.605	1
107		16	max	0	1	.659	3	.098	1	4.88e-3	3	NC	15	NC	3
108			min	-.318	4	-1.372	1	.007	10	-9.564e-3	1	241.787	1	2485.246	1
109		17	max	0	1	.542	3	.061	1	4.237e-3	3	NC	15	NC	2
110			min	-.318	4	-1.126	1	.004	10	-8.364e-3	1	321.29	1	4010.675	1
111		18	max	0	1	.382	3	.036	4	3.594e-3	3	NC	5	NC	1
112			min	-.318	4	-.782	1	0	10	-7.163e-3	1	595.935	1	6624.916	4
113		19	max	0	1	.198	3	.004	3	2.951e-3	3	NC	1	NC	1
114			min	-.318	4	-.379	1	-.001	2	-5.963e-3	1	NC	1	NC	1
115	M16	1	max	0	12	.113	1	.003	3	5.155e-3	3	NC	1	NC	1
116			min	-.141	4	-.065	3	-.001	2	-8.731e-3	1	NC	1	NC	1
117		2	max	0	12	.039	3	.032	1	6.061e-3	3	NC	5	NC	2
118			min	-.141	4	-.167	2	-.021	5	-9.973e-3	1	895.827	1	7919.939	1
119		3	max	0	12	.121	3	.076	1	6.967e-3	3	NC	5	NC	3
120			min	-.141	4	-.376	2	-.027	5	-1.121e-2	1	499.283	1	3228.722	1
121		4	max	0	12	.165	3	.114	1	7.872e-3	3	NC	5	NC	3
122			min	-.141	4	-.496	2	-.02	5	-1.246e-2	1	398.995	1	2131.751	1
123		5	max	0	12	.163	3	.134	1	8.778e-3	3	NC	5	NC	3
124			min	-.141	4	-.511	2	-.007	5	-1.37e-2	1	391.192	1	1812.093	1
125		6	max	0	12	.119	3	.13	1	9.684e-3	3	NC	5	NC	3
126			min	-.141	4	-.423	2	.005	15	-1.494e-2	1	461.732	1	1872.153	1
127		7	max	0	12	.041	3	.102	1	1.059e-2	3	NC	5	NC	3
128			min	-.141	4	-.255	2	.006	10	-1.618e-2	1	684.15	2	2375.957	1
129		8	max	0	12	.01	9	.06	1	1.15e-2	3	NC	3	NC	2
130			min	-.141	4	-.053	3	.002	10	-1.742e-2	1	1666.092	2	4070.291	1
131		9	max	0	12	.179	1	.024	4	1.24e-2	3	NC	4	NC	1
132			min	-.141	4	-.135	3	-.002	10	-1.866e-2	1	3441.982	3	9909.174	4
133		10	max	0	1	.265	1	.01	3	1.331e-2	3	NC	5	NC	1
134			min	-.141	4	-.172	3	-.007	2	-1.991e-2	1	1581.861	1	NC	1
135		11	max	0	1	.179	1	.018	1	1.24e-2	3	NC	4	NC	1
136			min	-.141	4	-.135	3	-.017	5	-1.866e-2	1	3441.982	3	NC	1
137		12	max	0	1	.01	9	.06	1	1.15e-2	3	NC	3	NC	2
138			min	-.141	4	-.053	3	-.018	5	-1.742e-2	1	1666.092	2	4070.291	1
139		13	max	0	1	.041	3	.102	1	1.059e-2	3	NC	5	NC	3
140			min	-.141	4	-.255	2	-.009	5	-1.618e-2	1	684.15	2	2375.957	1
141		14	max	0	1	.119	3	.13	1	9.684e-3	3	NC	5	NC	3
142			min	-.141	4	-.423	2	.004	15	-1.494e-2	1	461.732	1	1872.153	1
143		15	max	0	1	.163	3	.134	1	8.778e-3	3	NC	5	NC	3
144			min	-.141	4	-.511	2	.008	12	-1.37e-2	1	391.192	1	1812.093	1
145		16	max	0	1	.165	3	.114	1	7.872e-3	3	NC	5	NC	3
146			min	-.141	4	-.496	2	.007	12	-1.246e-2	1	398.995	1	2131.751	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	.121	3	.076	1	6.967e-3	3	NC	5	NC	3
148			min	-.141	4	-.376	2	.005	10	-1.121e-2	1	499.283	1	3228.722	1
149		18	max	0	1	.039	3	.032	1	6.061e-3	3	NC	5	NC	2
150			min	-.141	4	-.167	2	.001	10	-9.973e-3	1	895.827	1	7552.195	4
151		19	max	0	1	.113	1	.003	3	5.155e-3	3	NC	1	NC	1
152			min	-.141	4	-.065	3	-.001	2	-8.731e-3	1	NC	1	NC	1
153	M2	1	max	.005	1	.003	2	.006	1	1.198e-3	5	NC	1	NC	2
154			min	-.005	3	-.006	3	-.445	4	-1.656e-4	1	NC	1	107.427	4
155		2	max	.005	1	.002	2	.006	1	1.281e-3	5	NC	1	NC	2
156			min	-.005	3	-.006	3	-.409	4	-1.534e-4	1	NC	1	117.054	4
157		3	max	.005	1	.002	2	.005	1	1.364e-3	5	NC	1	NC	2
158			min	-.004	3	-.005	3	-.372	4	-1.413e-4	1	NC	1	128.503	4
159		4	max	.004	1	.002	2	.005	1	1.448e-3	5	NC	1	NC	2
160			min	-.004	3	-.005	3	-.336	4	-1.291e-4	1	NC	1	142.248	4
161		5	max	.004	1	.001	2	.004	1	1.531e-3	5	NC	1	NC	1
162			min	-.004	3	-.005	3	-.301	4	-1.17e-4	1	NC	1	158.94	4
163		6	max	.004	1	0	2	.004	1	1.615e-3	5	NC	1	NC	1
164			min	-.004	3	-.005	3	-.267	4	-1.048e-4	1	NC	1	179.478	4
165		7	max	.004	1	0	2	.003	1	1.698e-3	5	NC	1	NC	1
166			min	-.003	3	-.005	3	-.233	4	-9.267e-5	1	NC	1	205.143	4
167		8	max	.003	1	0	2	.003	1	1.782e-3	4	NC	1	NC	1
168			min	-.003	3	-.004	3	-.201	4	-8.051e-5	1	NC	1	237.804	4
169		9	max	.003	1	0	15	.002	1	1.87e-3	4	NC	1	NC	1
170			min	-.003	3	-.004	3	-.171	4	-6.836e-5	1	NC	1	280.284	4
171		10	max	.003	1	0	15	.002	1	1.958e-3	4	NC	1	NC	1
172			min	-.003	3	-.004	3	-.142	4	-5.621e-5	1	NC	1	337	4
173		11	max	.002	1	0	15	.002	1	2.046e-3	4	NC	1	NC	1
174			min	-.002	3	-.004	3	-.115	4	-4.406e-5	1	NC	1	415.207	4
175		12	max	.002	1	0	15	.001	1	2.133e-3	4	NC	1	NC	1
176			min	-.002	3	-.003	3	-.091	4	-3.191e-5	1	NC	1	527.491	4
177		13	max	.002	1	0	15	0	1	2.221e-3	4	NC	1	NC	1
178			min	-.002	3	-.003	3	-.069	4	-1.976e-5	1	NC	1	697.326	4
179		14	max	.001	1	0	15	0	1	2.309e-3	4	NC	1	NC	1
180			min	-.001	3	-.002	3	-.049	4	-7.606e-6	1	NC	1	972.741	4
181		15	max	.001	1	0	15	0	1	2.397e-3	4	NC	1	NC	1
182			min	-.001	3	-.002	3	-.033	4	-1.29e-7	3	NC	1	1465.342	4
183		16	max	0	1	0	15	0	1	2.485e-3	4	NC	1	NC	1
184			min	0	3	-.002	3	-.019	4	4.508e-7	12	NC	1	2487.264	4
185		17	max	0	1	0	15	0	1	2.573e-3	4	NC	1	NC	1
186			min	0	3	-.001	3	-.009	4	9.649e-7	12	NC	1	5217.964	4
187		18	max	0	1	0	15	0	1	2.661e-3	4	NC	1	NC	1
188			min	0	3	0	6	-.003	4	1.479e-6	12	NC	1	NC	1
189		19	max	0	1	0	1	0	1	2.748e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	1.993e-6	12	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-6.258e-7	12	NC	1	NC	1
192			min	0	1	0	1	0	1	-6.13e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.013	4	4.115e-6	1	NC	1	NC	1
194			min	0	2	-.001	6	0	12	-2.142e-6	5	NC	1	NC	1
195		3	max	0	3	0	15	.026	4	6.131e-4	4	NC	1	NC	1
196			min	0	2	-.003	6	0	12	9.641e-7	12	NC	1	NC	1
197		4	max	0	3	-.001	15	.038	4	1.226e-3	4	NC	1	NC	1
198			min	0	2	-.005	6	0	12	1.759e-6	12	NC	1	NC	1
199		5	max	0	3	-.001	15	.05	4	1.839e-3	4	NC	1	NC	1
200			min	0	2	-.007	6	0	12	2.554e-6	12	NC	1	9167.559	4
201		6	max	.001	3	-.002	15	.061	4	2.452e-3	4	NC	1	NC	1
202			min	0	2	-.008	6	0	12	3.349e-6	12	NC	1	8272.128	4
203		7	max	.001	3	-.002	15	.072	4	3.065e-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
204			min	0	2	-.01	6	0	12	4.144e-6	12	9461.486	6	7881.256	4
205		8	max	.001	3	-.002	15	.082	4	3.678e-3	4	NC	1	NC	1
206			min	-.001	2	-.011	6	0	12	4.939e-6	12	8421.457	6	7838.739	5
207		9	max	.002	3	-.003	15	.091	4	4.291e-3	4	NC	1	NC	1
208			min	-.001	2	-.012	6	0	12	5.734e-6	12	7798.864	6	8105.789	5
209		10	max	.002	3	-.003	15	.1	4	4.904e-3	4	NC	2	NC	1
210			min	-.001	2	-.012	6	0	12	6.529e-6	12	7482.542	6	8706.735	5
211		11	max	.002	3	-.003	15	.109	4	5.517e-3	4	NC	2	NC	1
212			min	-.002	2	-.013	6	0	12	7.324e-6	12	7424.855	6	9733.02	5
213		12	max	.002	3	-.003	15	.118	4	6.131e-3	4	NC	2	NC	1
214			min	-.002	2	-.012	6	0	12	8.119e-6	12	7623.242	6	NC	1
215		13	max	.003	3	-.002	15	.126	4	6.744e-3	4	NC	1	NC	1
216			min	-.002	2	-.012	6	0	12	8.914e-6	12	8121.443	6	NC	1
217		14	max	.003	3	-.002	15	.135	4	7.357e-3	4	NC	1	NC	1
218			min	-.002	2	-.01	6	0	12	9.708e-6	12	9032.967	6	NC	1
219		15	max	.003	3	-.002	15	.143	4	7.97e-3	4	NC	1	NC	1
220			min	-.002	2	-.009	1	0	12	1.05e-5	12	NC	1	NC	1
221		16	max	.003	3	-.001	15	.152	4	8.583e-3	4	NC	1	NC	1
222			min	-.002	2	-.008	1	0	12	1.13e-5	12	NC	1	NC	1
223		17	max	.003	3	0	15	.161	4	9.196e-3	4	NC	1	NC	1
224			min	-.002	2	-.006	1	0	12	1.209e-5	12	NC	1	NC	1
225		18	max	.004	3	0	15	.17	4	9.809e-3	4	NC	1	NC	1
226			min	-.003	2	-.005	1	0	12	1.289e-5	12	NC	1	NC	1
227		19	max	.004	3	0	5	.18	4	1.042e-2	4	NC	1	NC	1
228			min	-.003	2	-.003	1	0	12	1.368e-5	12	NC	1	NC	1
229	M4	1	max	.003	1	.002	2	0	12	-3.297e-7	12	NC	1	NC	2
230			min	0	3	-.004	3	-.18	4	-8.906e-4	4	NC	1	137.899	4
231		2	max	.003	1	.002	2	0	12	-3.297e-7	12	NC	1	NC	2
232			min	0	3	-.003	3	-.165	4	-8.906e-4	4	NC	1	150.136	4
233		3	max	.003	1	.002	2	0	12	-3.297e-7	12	NC	1	NC	2
234			min	0	3	-.003	3	-.151	4	-8.906e-4	4	NC	1	164.689	4
235		4	max	.003	1	.002	2	0	12	-3.297e-7	12	NC	1	NC	2
236			min	0	3	-.003	3	-.136	4	-8.906e-4	4	NC	1	182.161	4
237		5	max	.002	1	.002	2	0	12	-3.297e-7	12	NC	1	NC	2
238			min	0	3	-.003	3	-.122	4	-8.906e-4	4	NC	1	203.371	4
239		6	max	.002	1	.002	2	0	12	-3.297e-7	12	NC	1	NC	2
240			min	0	3	-.003	3	-.108	4	-8.906e-4	4	NC	1	229.458	4
241		7	max	.002	1	.001	2	0	12	-3.297e-7	12	NC	1	NC	2
242			min	0	3	-.002	3	-.095	4	-8.906e-4	4	NC	1	262.034	4
243		8	max	.002	1	.001	2	0	12	-3.297e-7	12	NC	1	NC	2
244			min	0	3	-.002	3	-.082	4	-8.906e-4	4	NC	1	303.454	4
245		9	max	.002	1	.001	2	0	12	-3.297e-7	12	NC	1	NC	1
246			min	0	3	-.002	3	-.069	4	-8.906e-4	4	NC	1	357.263	4
247		10	max	.002	1	.001	2	0	12	-3.297e-7	12	NC	1	NC	1
248			min	0	3	-.002	3	-.058	4	-8.906e-4	4	NC	1	429	4
249		11	max	.001	1	0	2	0	12	-3.297e-7	12	NC	1	NC	1
250			min	0	3	-.002	3	-.047	4	-8.906e-4	4	NC	1	527.734	4
251		12	max	.001	1	0	2	0	12	-3.297e-7	12	NC	1	NC	1
252			min	0	3	-.001	3	-.037	4	-8.906e-4	4	NC	1	669.148	4
253		13	max	.001	1	0	2	0	12	-3.297e-7	12	NC	1	NC	1
254			min	0	3	-.001	3	-.028	4	-8.906e-4	4	NC	1	882.36	4
255		14	max	0	1	0	2	0	12	-3.297e-7	12	NC	1	NC	1
256			min	0	3	-.001	3	-.02	4	-8.906e-4	4	NC	1	1226.618	4
257		15	max	0	1	0	2	0	12	-3.297e-7	12	NC	1	NC	1
258			min	0	3	0	3	-.013	4	-8.906e-4	4	NC	1	1838.531	4
259		16	max	0	1	0	2	0	12	-3.297e-7	12	NC	1	NC	1
260			min	0	3	0	3	-.008	4	-8.906e-4	4	NC	1	3095.838	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	-3.297e-7	12	NC	1	NC	1
262			min	0	3	0	3	-.004	4	-8.906e-4	4	NC	1	6399.646	4
263		18	max	0	1	0	2	0	12	-3.297e-7	12	NC	1	NC	1
264			min	0	3	0	3	-.001	4	-8.906e-4	4	NC	1	NC	1
265		19	max	0	1	0	1	0	1	-3.297e-7	12	NC	1	NC	1
266			min	0	1	0	1	0	1	-8.906e-4	4	NC	1	NC	1
267	M6	1	max	.017	1	.012	2	0	1	1.25e-3	4	NC	3	NC	1
268			min	-.017	3	-.018	3	-.449	4	0	1	3836.626	2	106.521	4
269		2	max	.016	1	.011	2	0	1	1.332e-3	4	NC	3	NC	1
270			min	-.016	3	-.017	3	-.412	4	0	1	4206.277	2	116.068	4
271		3	max	.015	1	.01	2	0	1	1.414e-3	4	NC	3	NC	1
272			min	-.015	3	-.016	3	-.376	4	0	1	4651.307	2	127.421	4
273		4	max	.014	1	.009	2	0	1	1.496e-3	4	NC	1	NC	1
274			min	-.014	3	-.015	3	-.339	4	0	1	5193.064	2	141.052	4
275		5	max	.013	1	.008	2	0	1	1.578e-3	4	NC	1	NC	1
276			min	-.013	3	-.014	3	-.304	4	0	1	5861.27	2	157.604	4
277		6	max	.012	1	.007	2	0	1	1.661e-3	4	NC	1	NC	1
278			min	-.012	3	-.013	3	-.269	4	0	1	6698.312	2	177.972	4
279		7	max	.011	1	.006	2	0	1	1.743e-3	4	NC	1	NC	1
280			min	-.011	3	-.012	3	-.235	4	0	1	7766.348	2	203.425	4
281		8	max	.01	1	.005	2	0	1	1.825e-3	4	NC	1	NC	1
282			min	-.01	3	-.011	3	-.203	4	0	1	9159.588	2	235.817	4
283		9	max	.01	1	.004	2	0	1	1.907e-3	4	NC	1	NC	1
284			min	-.009	3	-.01	3	-.172	4	0	1	NC	1	277.946	4
285		10	max	.009	1	.004	2	0	1	1.989e-3	4	NC	1	NC	1
286			min	-.008	3	-.009	3	-.143	4	0	1	NC	1	334.198	4
287		11	max	.008	1	.003	2	0	1	2.072e-3	4	NC	1	NC	1
288			min	-.007	3	-.008	3	-.116	4	0	1	NC	1	411.765	4
289		12	max	.007	1	.002	2	0	1	2.154e-3	4	NC	1	NC	1
290			min	-.006	3	-.007	3	-.091	4	0	1	NC	1	523.138	4
291		13	max	.006	1	.001	2	0	1	2.236e-3	4	NC	1	NC	1
292			min	-.006	3	-.006	3	-.069	4	0	1	NC	1	691.603	4
293		14	max	.005	1	0	2	0	1	2.318e-3	4	NC	1	NC	1
294			min	-.005	3	-.005	3	-.05	4	0	1	NC	1	964.818	4
295		15	max	.004	1	0	2	0	1	2.4e-3	4	NC	1	NC	1
296			min	-.004	3	-.004	3	-.033	4	0	1	NC	1	1453.538	4
297		16	max	.003	1	0	2	0	1	2.483e-3	4	NC	1	NC	1
298			min	-.003	3	-.003	3	-.019	4	0	1	NC	1	2467.579	4
299		17	max	.002	1	0	2	0	1	2.565e-3	4	NC	1	NC	1
300			min	-.002	3	-.002	3	-.009	4	0	1	NC	1	5178.011	4
301		18	max	0	1	0	2	0	1	2.647e-3	4	NC	1	NC	1
302			min	0	3	-.001	3	-.003	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	2.729e-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	-6.065e-4	4	NC	1	NC	1
307		2	max	0	3	0	15	.013	4	0	1	NC	1	NC	1
308			min	0	2	-.002	3	0	1	-6.727e-6	5	NC	1	NC	1
309		3	max	.001	3	0	15	.026	4	5.953e-4	4	NC	1	NC	1
310			min	-.001	2	-.004	3	0	1	0	1	NC	1	NC	1
311		4	max	.002	3	-.001	15	.038	4	1.196e-3	4	NC	1	NC	1
312			min	-.002	2	-.006	3	0	1	0	1	NC	1	NC	1
313		5	max	.003	3	-.002	15	.049	4	1.797e-3	4	NC	1	NC	1
314			min	-.002	2	-.007	3	0	1	0	1	NC	1	8779.179	4
315		6	max	.003	3	-.002	15	.06	4	2.398e-3	4	NC	1	NC	1
316			min	-.003	2	-.009	3	0	1	0	1	NC	1	7894.734	4
317		7	max	.004	3	-.002	15	.071	4	2.999e-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	-.004	2	-.01	4	0	1	0	1	9203.033	3	7491.682	4
319		8	max	.005	3	-.003	15	.081	4	3.6e-3	4	NC	1	NC	1
320			min	-.004	2	-.011	4	0	1	0	1	8483.723	3	7422.843	4
321		9	max	.005	3	-.003	15	.09	4	4.201e-3	4	NC	1	NC	1
322			min	-.005	2	-.012	4	0	1	0	1	7864.505	4	7641.533	4
323		10	max	.006	3	-.003	15	.099	4	4.802e-3	4	NC	1	NC	1
324			min	-.006	2	-.013	4	0	1	0	1	7541.505	4	8162.443	4
325		11	max	.007	3	-.003	15	.108	4	5.403e-3	4	NC	1	NC	1
326			min	-.006	2	-.013	4	0	1	0	1	7480.047	4	9059.926	4
327		12	max	.007	3	-.003	15	.116	4	6.004e-3	4	NC	1	NC	1
328			min	-.007	2	-.013	4	0	1	0	1	7677.068	4	NC	1
329		13	max	.008	3	-.003	15	.124	4	6.605e-3	4	NC	1	NC	1
330			min	-.007	2	-.012	4	0	1	0	1	8176.265	4	NC	1
331		14	max	.009	3	-.003	15	.133	4	7.205e-3	4	NC	1	NC	1
332			min	-.008	2	-.012	1	0	1	0	1	9091.627	4	NC	1
333		15	max	.009	3	-.002	15	.141	4	7.806e-3	4	NC	1	NC	1
334			min	-.009	2	-.011	1	0	1	0	1	NC	1	NC	1
335		16	max	.01	3	-.002	15	.149	4	8.407e-3	4	NC	1	NC	1
336			min	-.009	2	-.01	1	0	1	0	1	NC	1	NC	1
337		17	max	.01	3	-.001	15	.158	4	9.008e-3	4	NC	1	NC	1
338			min	-.01	2	-.01	1	0	1	0	1	NC	1	NC	1
339		18	max	.011	3	0	15	.166	4	9.609e-3	4	NC	1	NC	1
340			min	-.01	2	-.009	1	0	1	0	1	NC	1	NC	1
341		19	max	.012	3	0	15	.176	4	1.021e-2	4	NC	1	NC	1
342			min	-.011	2	-.008	1	0	1	0	1	NC	1	NC	1
343	M8	1	max	.009	1	.009	2	0	1	0	1	NC	1	NC	1
344			min	-.003	3	-.011	3	-.176	4	-9.127e-4	4	NC	1	140.94	4
345		2	max	.009	1	.009	2	0	1	0	1	NC	1	NC	1
346			min	-.003	3	-.011	3	-.162	4	-9.127e-4	4	NC	1	153.45	4
347		3	max	.008	1	.008	2	0	1	0	1	NC	1	NC	1
348			min	-.002	3	-.01	3	-.147	4	-9.127e-4	4	NC	1	168.326	4
349		4	max	.008	1	.008	2	0	1	0	1	NC	1	NC	1
350			min	-.002	3	-.01	3	-.133	4	-9.127e-4	4	NC	1	186.186	4
351		5	max	.007	1	.007	2	0	1	0	1	NC	1	NC	1
352			min	-.002	3	-.009	3	-.119	4	-9.127e-4	4	NC	1	207.868	4
353		6	max	.007	1	.007	2	0	1	0	1	NC	1	NC	1
354			min	-.002	3	-.008	3	-.106	4	-9.127e-4	4	NC	1	234.534	4
355		7	max	.006	1	.006	2	0	1	0	1	NC	1	NC	1
356			min	-.002	3	-.008	3	-.093	4	-9.127e-4	4	NC	1	267.833	4
357		8	max	.006	1	.006	2	0	1	0	1	NC	1	NC	1
358			min	-.002	3	-.007	3	-.08	4	-9.127e-4	4	NC	1	310.173	4
359		9	max	.005	1	.005	2	0	1	0	1	NC	1	NC	1
360			min	-.002	3	-.006	3	-.068	4	-9.127e-4	4	NC	1	365.176	4
361		10	max	.005	1	.005	2	0	1	0	1	NC	1	NC	1
362			min	-.001	3	-.006	3	-.057	4	-9.127e-4	4	NC	1	438.507	4
363		11	max	.004	1	.004	2	0	1	0	1	NC	1	NC	1
364			min	-.001	3	-.005	3	-.046	4	-9.127e-4	4	NC	1	539.433	4
365		12	max	.004	1	.004	2	0	1	0	1	NC	1	NC	1
366			min	-.001	3	-.004	3	-.036	4	-9.127e-4	4	NC	1	683.987	4
367		13	max	.003	1	.003	2	0	1	0	1	NC	1	NC	1
368			min	0	3	-.004	3	-.027	4	-9.127e-4	4	NC	1	901.934	4
369		14	max	.003	1	.003	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.003	3	-.02	4	-9.127e-4	4	NC	1	1253.84	4
371		15	max	.002	1	.002	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.003	3	-.013	4	-9.127e-4	4	NC	1	1879.347	4
373		16	max	.002	1	.002	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.002	3	-.008	4	-9.127e-4	4	NC	1	3164.592	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	.001	1	.001	2	0	1	0	1	NC	1	NC	1
376			min	0	3	-.001	3	-.004	4	-9.127e-4	4	NC	1	6541.835	4
377		18	max	0	1	0	2	0	1	0	1	NC	1	NC	1
378			min	0	3	0	3	-.001	4	-9.127e-4	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	-9.127e-4	4	NC	1	NC	1
381	M10	1	max	.005	1	.003	2	0	12	1.25e-3	4	NC	1	NC	2
382			min	-.005	3	-.006	3	-.449	4	7.261e-6	12	NC	1	106.651	4
383		2	max	.005	1	.002	2	0	12	1.332e-3	4	NC	1	NC	2
384			min	-.005	3	-.006	3	-.412	4	6.747e-6	12	NC	1	116.21	4
385		3	max	.005	1	.002	2	0	12	1.414e-3	4	NC	1	NC	2
386			min	-.004	3	-.005	3	-.375	4	6.233e-6	12	NC	1	127.576	4
387		4	max	.004	1	.002	2	0	12	1.495e-3	4	NC	1	NC	2
388			min	-.004	3	-.005	3	-.339	4	5.719e-6	12	NC	1	141.224	4
389		5	max	.004	1	.001	2	0	12	1.577e-3	4	NC	1	NC	1
390			min	-.004	3	-.005	3	-.303	4	5.205e-6	12	NC	1	157.797	4
391		6	max	.004	1	0	2	0	12	1.659e-3	4	NC	1	NC	1
392			min	-.004	3	-.005	3	-.269	4	4.691e-6	12	NC	1	178.19	4
393		7	max	.004	1	0	2	0	12	1.741e-3	4	NC	1	NC	1
394			min	-.003	3	-.005	3	-.235	4	4.176e-6	12	NC	1	203.673	4
395		8	max	.003	1	0	2	0	12	1.822e-3	4	NC	1	NC	1
396			min	-.003	3	-.004	3	-.203	4	3.662e-6	12	NC	1	236.105	4
397		9	max	.003	1	0	2	0	12	1.904e-3	4	NC	1	NC	1
398			min	-.003	3	-.004	3	-.172	4	3.148e-6	12	NC	1	278.286	4
399		10	max	.003	1	0	2	0	12	1.986e-3	4	NC	1	NC	1
400			min	-.003	3	-.004	3	-.143	4	2.634e-6	12	NC	1	334.607	4
401		11	max	.002	1	0	10	0	12	2.068e-3	4	NC	1	NC	1
402			min	-.002	3	-.004	3	-.116	4	2.12e-6	12	NC	1	412.27	4
403		12	max	.002	1	0	15	0	12	2.149e-3	4	NC	1	NC	1
404			min	-.002	3	-.003	3	-.091	4	1.606e-6	12	NC	1	523.781	4
405		13	max	.002	1	0	15	0	12	2.231e-3	4	NC	1	NC	1
406			min	-.002	3	-.003	3	-.069	4	1.092e-6	12	NC	1	692.455	4
407		14	max	.001	1	0	15	0	12	2.313e-3	4	NC	1	NC	1
408			min	-.001	3	-.002	3	-.05	4	5.225e-7	10	NC	1	966.011	4
409		15	max	.001	1	0	15	0	12	2.395e-3	4	NC	1	NC	1
410			min	-.001	3	-.002	4	-.033	4	-4.545e-6	1	NC	1	1455.347	4
411		16	max	0	1	0	15	0	12	2.476e-3	4	NC	1	NC	1
412			min	0	3	-.002	4	-.019	4	-1.67e-5	1	NC	1	2470.68	4
413		17	max	0	1	0	15	0	12	2.558e-3	4	NC	1	NC	1
414			min	0	3	-.001	4	-.009	4	-2.885e-5	1	NC	1	5184.645	4
415		18	max	0	1	0	15	0	12	2.64e-3	4	NC	1	NC	1
416			min	0	3	0	4	-.003	4	-4.1e-5	1	NC	1	NC	1
417		19	max	0	1	0	1	0	1	2.722e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-5.315e-5	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	1.649e-5	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-6.047e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.013	4	-1.691e-7	12	NC	1	NC	1
422			min	0	2	-.002	4	0	1	-4.115e-6	1	NC	1	NC	1
423		3	max	0	3	0	15	.026	4	6.007e-4	4	NC	1	NC	1
424			min	0	2	-.003	4	0	1	-2.472e-5	1	NC	1	NC	1
425		4	max	0	3	-.001	15	.038	4	1.203e-3	4	NC	1	NC	1
426			min	0	2	-.005	4	0	1	-4.532e-5	1	NC	1	NC	1
427		5	max	0	3	-.002	15	.049	4	1.806e-3	4	NC	1	NC	1
428			min	0	2	-.007	4	-.001	1	-6.592e-5	1	NC	1	9040.486	4
429		6	max	.001	3	-.002	15	.06	4	2.409e-3	4	NC	1	NC	1
430			min	0	2	-.009	4	-.001	1	-8.653e-5	1	NC	1	8151.138	4
431		7	max	.001	3	-.003	15	.071	4	3.011e-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
432			min	0	2	-.01	4	-.002	1	-1.071e-4	1	9108.184	4	7758.718	4
433		8	max	.001	3	-.003	15	.081	4	3.614e-3	4	NC	1	NC	1
434			min	-.001	2	-.012	4	-.002	1	-1.277e-4	1	8131.233	4	7715.273	4
435		9	max	.002	3	-.003	15	.09	4	4.217e-3	4	NC	1	NC	1
436			min	-.001	2	-.013	4	-.002	1	-1.483e-4	1	7548.573	4	7977.151	4
437		10	max	.002	3	-.003	15	.099	4	4.819e-3	4	NC	2	NC	1
438			min	-.001	2	-.013	4	-.003	1	-1.689e-4	1	7257.136	4	8566.438	4
439		11	max	.002	3	-.003	15	.108	4	5.422e-3	4	NC	2	NC	1
440			min	-.002	2	-.013	4	-.003	1	-1.895e-4	1	7213.412	4	9572.199	4
441		12	max	.002	3	-.003	15	.116	4	6.025e-3	4	NC	2	NC	1
442			min	-.002	2	-.013	4	-.003	1	-2.101e-4	1	7416.666	4	NC	1
443		13	max	.003	3	-.003	15	.124	4	6.627e-3	4	NC	1	NC	1
444			min	-.002	2	-.012	4	-.004	1	-2.308e-4	1	7910.728	4	NC	1
445		14	max	.003	3	-.003	15	.133	4	7.23e-3	4	NC	1	NC	1
446			min	-.002	2	-.011	4	-.004	1	-2.514e-4	1	8807.225	4	NC	1
447		15	max	.003	3	-.002	15	.141	4	7.833e-3	4	NC	1	NC	1
448			min	-.002	2	-.01	4	-.004	1	-2.72e-4	1	NC	1	NC	1
449		16	max	.003	3	-.002	15	.149	4	8.435e-3	4	NC	1	NC	1
450			min	-.002	2	-.008	4	-.005	1	-2.926e-4	1	NC	1	NC	1
451		17	max	.003	3	-.001	15	.158	4	9.038e-3	4	NC	1	NC	1
452			min	-.002	2	-.006	1	-.005	1	-3.132e-4	1	NC	1	NC	1
453		18	max	.004	3	0	15	.167	4	9.641e-3	4	NC	1	NC	1
454			min	-.003	2	-.005	1	-.006	1	-3.338e-4	1	NC	1	NC	1
455		19	max	.004	3	0	12	.177	4	1.024e-2	4	NC	1	NC	1
456			min	-.003	2	-.003	1	-.006	1	-3.544e-4	1	NC	1	NC	1
457	M12	1	max	.003	1	.002	2	.006	1	1.214e-5	1	NC	1	NC	2
458			min	0	3	-.004	3	-.177	4	-8.843e-4	4	NC	1	140.321	4
459		2	max	.003	1	.002	2	.006	1	1.214e-5	1	NC	1	NC	2
460			min	0	3	-.003	3	-.162	4	-8.843e-4	4	NC	1	152.773	4
461		3	max	.003	1	.002	2	.005	1	1.214e-5	1	NC	1	NC	2
462			min	0	3	-.003	3	-.148	4	-8.843e-4	4	NC	1	167.58	4
463		4	max	.003	1	.002	2	.005	1	1.214e-5	1	NC	1	NC	2
464			min	0	3	-.003	3	-.134	4	-8.843e-4	4	NC	1	185.357	4
465		5	max	.002	1	.002	2	.004	1	1.214e-5	1	NC	1	NC	2
466			min	0	3	-.003	3	-.12	4	-8.843e-4	4	NC	1	206.939	4
467		6	max	.002	1	.002	2	.004	1	1.214e-5	1	NC	1	NC	2
468			min	0	3	-.003	3	-.106	4	-8.843e-4	4	NC	1	233.481	4
469		7	max	.002	1	.001	2	.003	1	1.214e-5	1	NC	1	NC	2
470			min	0	3	-.002	3	-.093	4	-8.843e-4	4	NC	1	266.627	4
471		8	max	.002	1	.001	2	.003	1	1.214e-5	1	NC	1	NC	2
472			min	0	3	-.002	3	-.08	4	-8.843e-4	4	NC	1	308.771	4
473		9	max	.002	1	.001	2	.002	1	1.214e-5	1	NC	1	NC	1
474			min	0	3	-.002	3	-.068	4	-8.843e-4	4	NC	1	363.52	4
475		10	max	.002	1	.001	2	.002	1	1.214e-5	1	NC	1	NC	1
476			min	0	3	-.002	3	-.057	4	-8.843e-4	4	NC	1	436.511	4
477		11	max	.001	1	0	2	.002	1	1.214e-5	1	NC	1	NC	1
478			min	0	3	-.002	3	-.046	4	-8.843e-4	4	NC	1	536.97	4
479		12	max	.001	1	0	2	.001	1	1.214e-5	1	NC	1	NC	1
480			min	0	3	-.001	3	-.036	4	-8.843e-4	4	NC	1	680.854	4
481		13	max	.001	1	0	2	0	1	1.214e-5	1	NC	1	NC	1
482			min	0	3	-.001	3	-.028	4	-8.843e-4	4	NC	1	897.791	4
483		14	max	0	1	0	2	0	1	1.214e-5	1	NC	1	NC	1
484			min	0	3	-.001	3	-.02	4	-8.843e-4	4	NC	1	1248.063	4
485		15	max	0	1	0	2	0	1	1.214e-5	1	NC	1	NC	1
486			min	0	3	0	3	-.013	4	-8.843e-4	4	NC	1	1870.663	4
487		16	max	0	1	0	2	0	1	1.214e-5	1	NC	1	NC	1
488			min	0	3	0	3	-.008	4	-8.843e-4	4	NC	1	3149.924	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	1.214e-5	1	NC	1	NC	1
490			min	0	3	0	3	-.004	4	-8.843e-4	4	NC	1	6511.405	4
491		18	max	0	1	0	2	0	1	1.214e-5	1	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-8.843e-4	4	NC	1	NC	1
493		19	max	0	1	0	1	0	1	1.214e-5	1	NC	1	NC	1
494			min	0	1	0	1	0	1	-8.843e-4	4	NC	1	NC	1
495	M1	1	max	.005	3	.118	1	.47	4	1.772e-2	1	NC	1	NC	1
496			min	-.002	2	-.021	3	0	12	-2.266e-2	3	NC	1	NC	1
497		2	max	.005	3	.058	1	.458	4	8.641e-3	1	NC	5	NC	1
498			min	-.002	2	-.01	3	-.004	1	-1.121e-2	3	1915.165	1	NC	1
499		3	max	.005	3	.007	3	.445	4	1.365e-2	4	NC	5	NC	1
500			min	-.002	2	-.007	1	-.006	1	-1.143e-4	1	916.616	1	8837.157	5
501		4	max	.004	3	.036	3	.433	4	1.207e-2	4	NC	5	NC	1
502			min	-.002	2	-.082	1	-.006	1	-4.176e-3	3	572.991	1	5994.783	5
503		5	max	.004	3	.072	3	.421	4	1.048e-2	4	NC	15	NC	1
504			min	-.002	2	-.161	1	-.004	1	-8.243e-3	3	410.148	1	4565.496	5
505		6	max	.004	3	.113	3	.409	4	1.551e-2	1	NC	15	NC	1
506			min	-.002	2	-.238	1	-.002	1	-1.231e-2	3	320.997	1	3728.587	5
507		7	max	.004	3	.151	3	.396	4	2.071e-2	1	9699.005	15	NC	1
508			min	-.002	2	-.308	1	0	12	-1.638e-2	3	268.643	1	3191.558	4
509		8	max	.004	3	.183	3	.382	4	2.592e-2	1	8617.861	15	NC	1
510			min	-.002	2	-.363	1	0	12	-2.044e-2	3	237.793	1	2831.423	4
511		9	max	.004	3	.204	3	.367	4	2.857e-2	1	8054.174	15	NC	1
512			min	-.002	2	-.398	1	0	1	-2.059e-2	3	221.776	1	2629.165	4
513		10	max	.004	3	.212	3	.35	4	2.953e-2	1	7882.513	15	NC	1
514			min	-.002	2	-.41	1	0	12	-1.813e-2	3	216.984	1	2574.747	4
515		11	max	.004	3	.207	3	.33	4	3.048e-2	1	8054.014	15	NC	1
516			min	-.001	2	-.398	1	0	12	-1.567e-2	3	222.07	1	2643.449	4
517		12	max	.004	3	.189	3	.309	4	2.88e-2	1	8617.493	15	NC	1
518			min	-.001	2	-.362	1	0	1	-1.315e-2	3	238.705	1	2852.969	5
519		13	max	.004	3	.161	3	.284	4	2.313e-2	1	9698.299	15	NC	1
520			min	-.001	2	-.306	1	0	1	-1.052e-2	3	270.89	1	3365.743	4
521		14	max	.004	3	.125	3	.258	4	1.747e-2	1	NC	15	NC	1
522			min	-.001	2	-.235	1	0	12	-7.903e-3	3	325.827	1	4402.362	4
523		15	max	.004	3	.084	3	.231	4	1.181e-2	1	NC	15	NC	1
524			min	-.001	2	-.157	1	0	12	-5.282e-3	3	420.119	1	6601.331	4
525		16	max	.003	3	.042	3	.205	4	9.064e-3	4	NC	5	NC	1
526			min	-.001	2	-.078	1	0	12	-2.66e-3	3	594.044	1	NC	1
527		17	max	.003	3	.003	3	.18	4	9.968e-3	4	NC	5	NC	1
528			min	-.001	2	-.004	1	0	12	-3.907e-5	3	964.355	1	NC	1
529		18	max	.003	3	.058	1	.159	4	1.051e-2	1	NC	5	NC	1
530			min	-.001	2	-.033	3	0	12	-4.031e-3	3	2036.616	1	NC	1
531		19	max	.003	3	.113	1	.141	4	2.091e-2	1	NC	1	NC	1
532			min	-.001	2	-.065	3	0	1	-8.178e-3	3	NC	1	NC	1
533	M5	1	max	.014	3	.279	1	.47	4	0	1	NC	1	NC	1
534			min	-.009	2	-.032	3	0	1	-2.235e-6	4	NC	1	NC	1
535		2	max	.014	3	.138	1	.46	4	6.989e-3	4	NC	5	NC	1
536			min	-.009	2	-.016	3	0	1	0	1	812.213	1	NC	1
537		3	max	.014	3	.022	3	.449	4	1.376e-2	4	NC	15	NC	1
538			min	-.009	2	-.022	1	0	1	0	1	379.678	1	7398.69	4
539		4	max	.014	3	.099	3	.437	4	1.121e-2	4	9361.541	15	NC	1
540			min	-.009	2	-.218	1	0	1	0	1	230.384	1	5354.249	4
541		5	max	.014	3	.204	3	.423	4	8.664e-3	4	6551.261	15	NC	1
542			min	-.009	2	-.431	1	0	1	0	1	161.039	1	4304.02	4
543		6	max	.013	3	.321	3	.41	4	6.114e-3	4	5043.914	15	NC	1
544			min	-.008	2	-.645	1	0	1	0	1	123.848	1	3657.117	4
545		7	max	.013	3	.435	3	.396	4	3.565e-3	4	4173.402	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	-.008	2	-.839	1	0	1	0	1	102.369	1	3207.853	4
547		8	max	.013	3	.531	3	.382	4	1.016e-3	4	3667.235	15	NC	1
548			min	-.008	2	-.994	1	0	1	0	1	89.882	1	2865.099	4
549		9	max	.013	3	.592	3	.367	4	0	1	3407.654	15	NC	1
550			min	-.008	2	-1.092	1	0	1	-1.283e-6	5	83.482	1	2629.653	4
551		10	max	.012	3	.615	3	.35	4	0	1	3329.438	15	NC	1
552			min	-.008	2	-1.125	1	0	1	-1.214e-6	5	81.578	1	2593.273	4
553		11	max	.012	3	.599	3	.33	4	0	1	3407.712	15	NC	1
554			min	-.008	2	-1.092	1	0	1	-1.145e-6	5	83.6	1	2669.594	4
555		12	max	.012	3	.547	3	.31	4	7.178e-4	4	3667.371	15	NC	1
556			min	-.007	2	-.992	1	0	1	0	1	90.271	1	2815.106	4
557		13	max	.012	3	.463	3	.285	4	2.519e-3	4	4173.682	15	NC	1
558			min	-.007	2	-.833	1	0	1	0	1	103.38	1	3314.318	4
559		14	max	.011	3	.357	3	.258	4	4.32e-3	4	5044.467	15	NC	1
560			min	-.007	2	-.635	1	0	1	0	1	126.121	1	4518.845	4
561		15	max	.011	3	.239	3	.229	4	6.121e-3	4	6552.36	15	NC	1
562			min	-.007	2	-.419	1	0	1	0	1	165.969	1	7622.971	5
563		16	max	.011	3	.12	3	.201	4	7.922e-3	4	9363.847	15	NC	1
564			min	-.007	2	-.205	1	0	1	0	1	241.426	1	NC	1
565		17	max	.01	3	.008	3	.177	4	9.723e-3	4	NC	15	NC	1
566			min	-.007	2	-.014	1	0	1	0	1	406.532	1	NC	1
567		18	max	.01	3	.137	1	.156	4	4.938e-3	4	NC	5	NC	1
568			min	-.007	2	-.087	3	0	1	0	1	884.164	1	NC	1
569		19	max	.01	3	.265	1	.141	4	0	1	NC	1	NC	1
570			min	-.007	2	-.172	3	0	1	-9.198e-7	4	NC	1	NC	1
571	M9	1	max	.005	3	.118	1	.47	4	2.266e-2	3	NC	1	NC	1
572			min	-.002	2	-.021	3	0	1	-1.772e-2	1	NC	1	NC	1
573		2	max	.005	3	.058	1	.46	4	1.121e-2	3	NC	5	NC	1
574			min	-.002	2	-.01	3	0	12	-8.641e-3	1	1915.165	1	NC	1
575		3	max	.005	3	.007	3	.448	4	1.372e-2	4	NC	5	NC	1
576			min	-.002	2	-.007	1	0	12	-2.721e-5	10	916.616	1	7535.365	4
577		4	max	.004	3	.036	3	.436	4	1.077e-2	5	NC	5	NC	1
578			min	-.002	2	-.082	1	0	12	-5.093e-3	1	572.991	1	5403.604	4
579		5	max	.004	3	.072	3	.423	4	8.243e-3	3	NC	15	NC	1
580			min	-.002	2	-.161	1	0	12	-1.03e-2	1	410.148	1	4309.8	4
581		6	max	.004	3	.113	3	.41	4	1.231e-2	3	NC	15	NC	1
582			min	-.002	2	-.238	1	0	12	-1.551e-2	1	320.997	1	3642.25	4
583		7	max	.004	3	.151	3	.396	4	1.638e-2	3	9686.864	15	NC	1
584			min	-.002	2	-.308	1	0	1	-2.071e-2	1	268.643	1	3187.779	4
585		8	max	.004	3	.183	3	.382	4	2.044e-2	3	8607.308	15	NC	1
586			min	-.002	2	-.363	1	0	1	-2.592e-2	1	237.793	1	2849.515	5
587		9	max	.004	3	.204	3	.367	4	2.059e-2	3	8044.43	15	NC	1
588			min	-.002	2	-.398	1	0	12	-2.857e-2	1	221.776	1	2623.328	4
589		10	max	.004	3	.212	3	.35	4	1.813e-2	3	7873.004	15	NC	1
590			min	-.002	2	-.41	1	0	1	-2.953e-2	1	216.984	1	2575.593	4
591		11	max	.004	3	.207	3	.33	4	1.567e-2	3	8044.273	15	NC	1
592			min	-.001	2	-.398	1	0	1	-3.048e-2	1	222.07	1	2650.697	4
593		12	max	.004	3	.189	3	.309	4	1.315e-2	3	8607.008	15	NC	1
594			min	-.001	2	-.362	1	0	12	-2.88e-2	1	238.705	1	2834.915	4
595		13	max	.004	3	.161	3	.284	4	1.052e-2	3	9686.389	15	NC	1
596			min	-.001	2	-.306	1	0	12	-2.313e-2	1	270.89	1	3366.145	4
597		14	max	.004	3	.125	3	.257	4	7.903e-3	3	NC	15	NC	1
598			min	-.001	2	-.235	1	-.002	1	-1.747e-2	1	325.827	1	4502.467	5
599		15	max	.004	3	.084	3	.229	4	5.714e-3	5	NC	15	NC	1
600			min	-.001	2	-.157	1	-.004	1	-1.181e-2	1	420.119	1	7113.28	5
601		16	max	.003	3	.042	3	.202	4	7.698e-3	5	NC	5	NC	1
602			min	-.001	2	-.078	1	-.006	1	-6.142e-3	1	594.044	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	.003	3	.003	3	.177	4	9.75e-3	4	NC	5	NC	1
604			min	-.001	2	-.004	1	-.006	1	-4.784e-4	1	964.355	1	NC	1
605		18	max	.003	3	.058	1	.157	4	4.589e-3	5	NC	5	NC	1
606			min	-.001	2	-.033	3	-.004	1	-1.051e-2	1	2036.616	1	NC	1
607		19	max	.003	3	.113	1	.141	4	8.178e-3	3	NC	1	NC	1
608			min	-.001	2	-.065	3	0	12	-2.091e-2	1	NC	1	NC	1

Company:	Schletter, Inc.	Date:	11/17/2015
Engineer:	HCV	Page:	1/5
Project:	Standard PVMax - Worst Case, 14-42 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

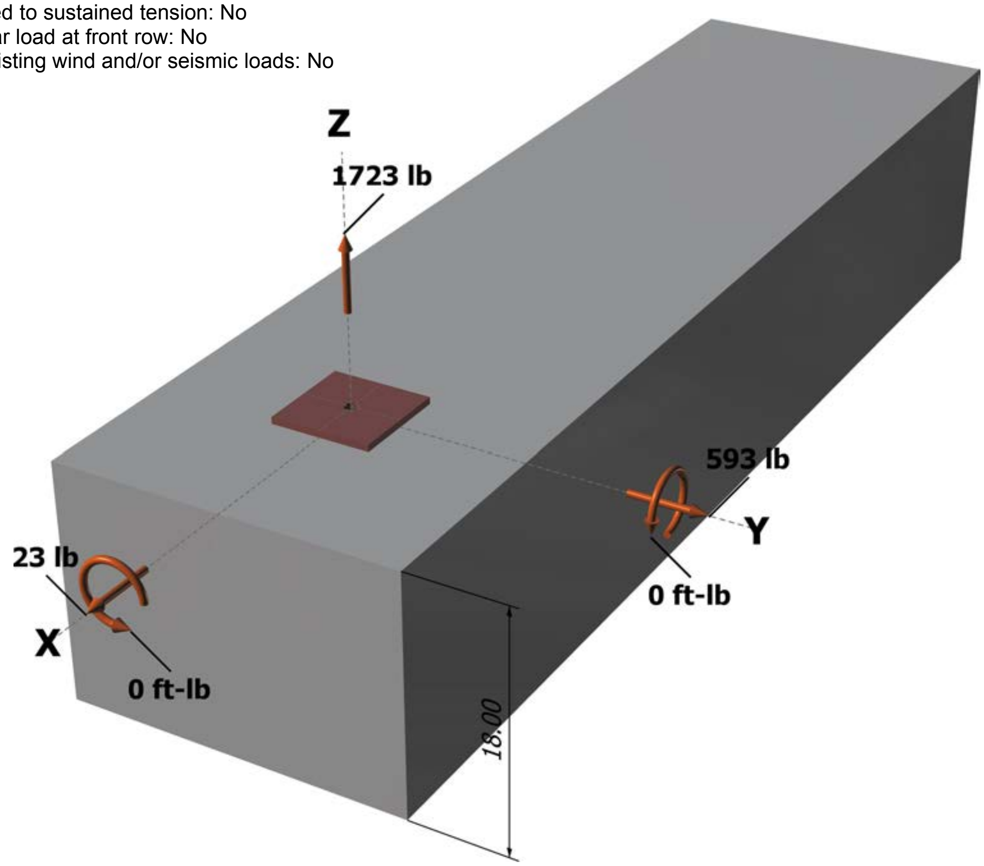
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch): 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 4.00 x 0.28

<Figure 1>



<Figure 2>

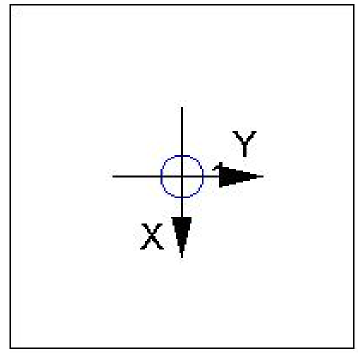
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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	1723.0	23.0	593.0	593.4
Sum	1723.0	23.0	593.0	593.4

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 1723
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, ϕN_n (lb)	Ratio	Status
Steel	1723	6071	0.28	Pass
Concrete breakout	1723	5710	0.30	Pass
Adhesive	**1723**	**5365**	**0.32**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status
Steel	**593**	**3156**	**0.19**	**Pass (Governs)**
T Concrete breakout y+	593	3934	0.15	Pass
T Concrete breakout x+	23	3018	0.01	Pass
|| Concrete breakout y+	23	8508	0.00	Pass
|| Concrete breakout x+	593	6875	0.09	Pass
Concrete breakout, combined	-	-	0.15	Pass
Pryout	593	12298	0.05	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status
Sec. D.7.1	0.32	0.00	32.1 %	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.

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

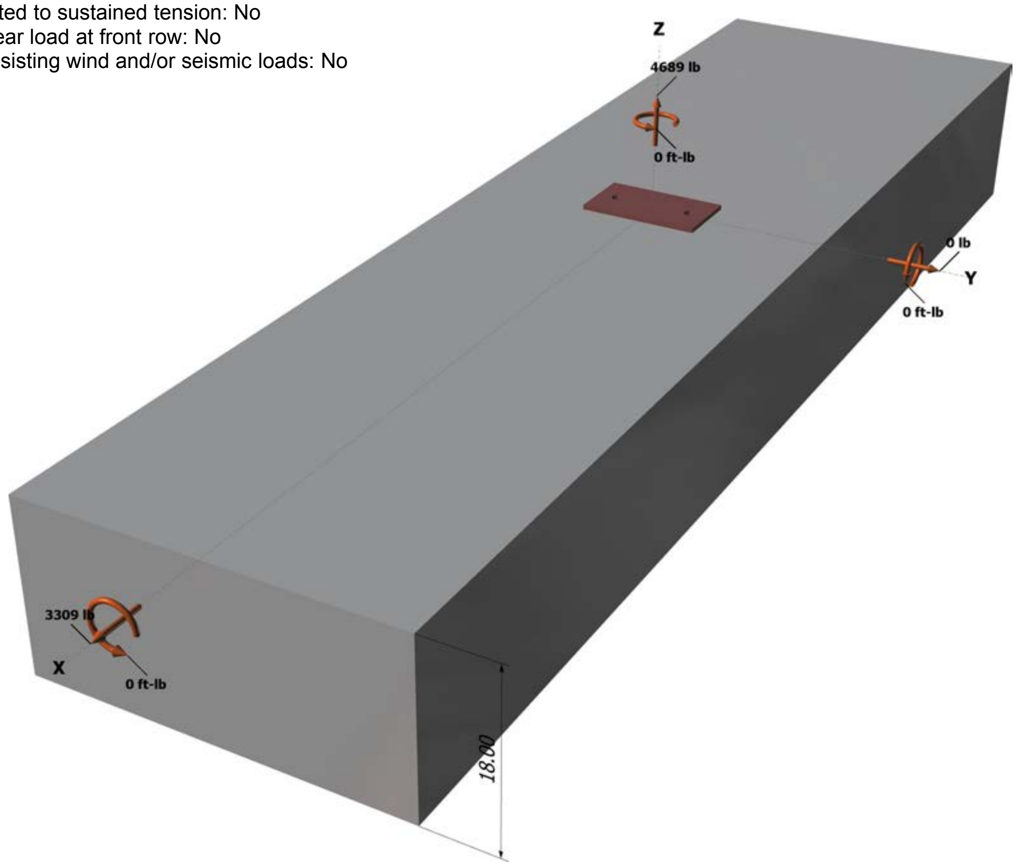
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

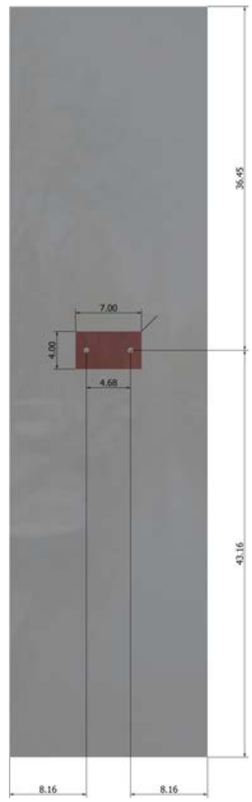
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout 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>



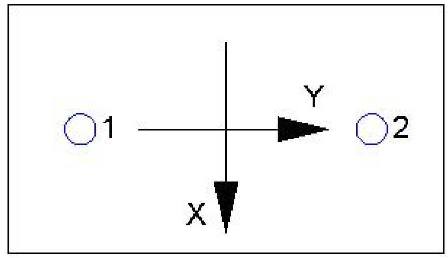
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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	2344.5	1654.5	0.0	1654.5
2	2344.5	1654.5	0.0	1654.5
Sum	4689.0	3309.0	0.0	3309.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 4689
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} (in²)	A_{Vco} (in²)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	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} (in²)	A_{Vco} (in²)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	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} (in²)	A_{Na0} (in²)	$\Psi_{ed,Na}$	$\Psi_{g,Na}$	$\Psi_{ec,Na}$	$\Psi_{p,Na}$	N_{a0} (lb)	N_a (lb)
2.0	158.66	109.66	1.000	1.043	1.000	1.000	9755	14715

A_{Nc} (in²)	A_{Nco} (in²)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	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	2345	6071	0.39	Pass
Concrete breakout	4689	9208	0.51	Pass
Adhesive	**4689**	**8093**	**0.58**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status
Steel	1655	3156	0.52	Pass
T Concrete breakout x+	**3309**	**5323**	**0.62**	**Pass (Governs)**
|| Concrete breakout y-	**1655**	**12241**	**0.14**	**Pass (Governs)**
Pryout	3309	19833	0.17	Pass

Interaction check	$N_{ua}/\phi N_n$	$V_{ua}/\phi V_n$	Combined Ratio	Permissible	Status

Sec. D.7.3	0.58	0.62	120.1 %	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.