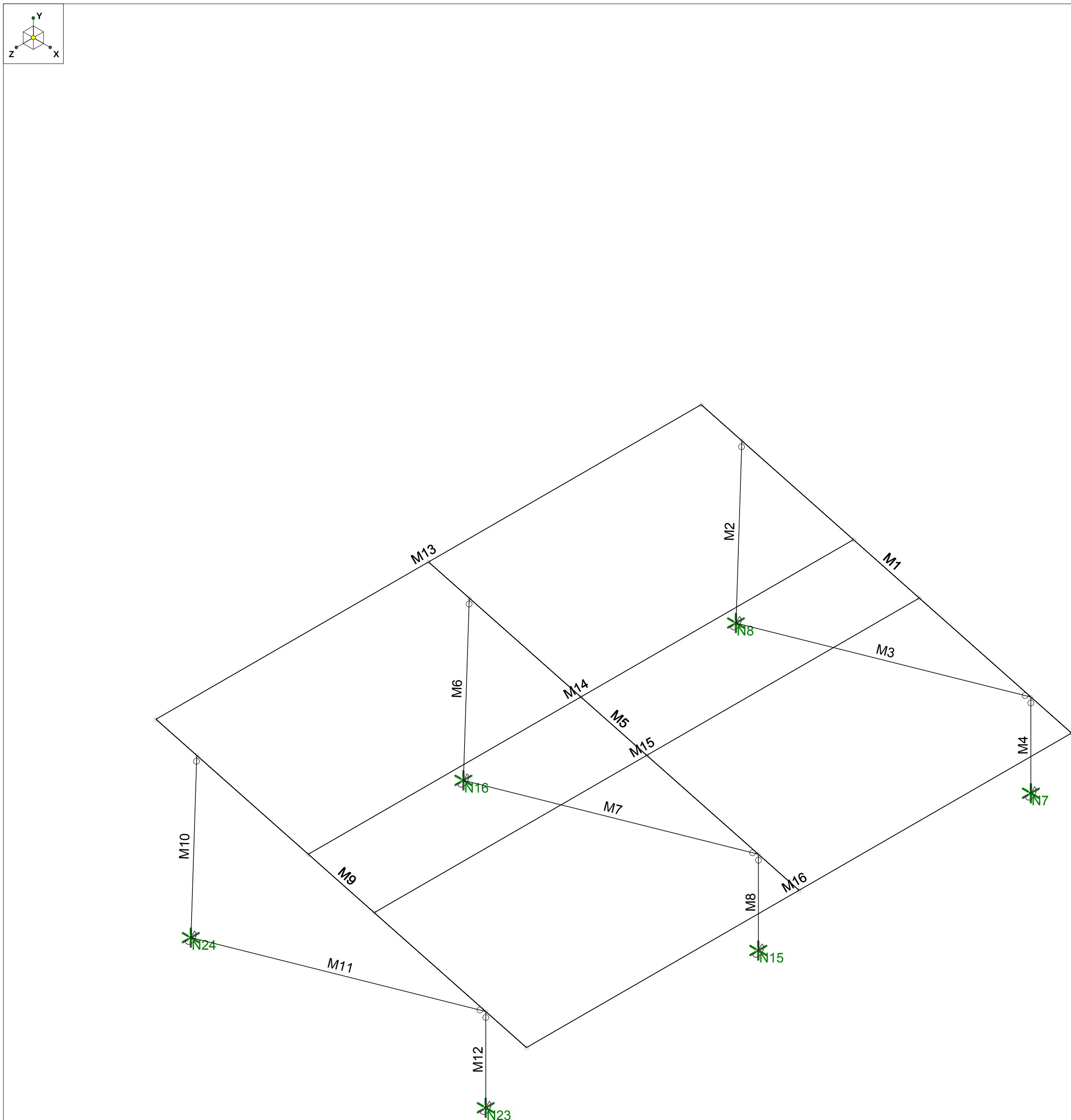


Schletter, Inc.		15° Tilt w/ Seismic Design
HCV	Standard PVMax Racking System	
	Representative Calculations - ASCE 7-05	

1. INTRODUCTION

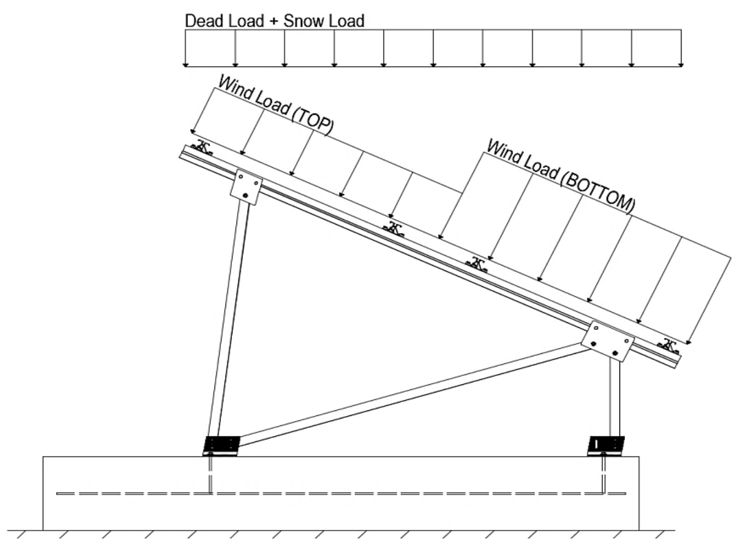
1.1 Project Description
The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. PVMax ground mount system.

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

PV modules are required to meet the following specifications:

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

2. LOAD ACTIONS

2.1 Permanent Loads
g_{MAX} = 3.00 psf
g_{MIN} = 1.75 psf

Self-weight of the PV modules.

2.2 Snow Loads

Ground Snow Load, P_g =	30.00	psf	
Sloped Roof Snow Load, P_s =	22.68	psf	*(ASCE 7-05, Eq. 7-2)*
I_s =	1.00		
C_s =	1.00		
C_e =	0.90		
C_t =	1.20		

2.3 Wind Loads
Design Wind Speed, V = 110 mph — Exposure Category = C
Height < 15 ft — Importance Category = II

Peak Velocity Pressure, q_z = 19.00 psf *Including the gust factor, G=0.85. (ASCE 7-05, Eq. 6-15)*

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.

<u>Strength Design, LRFD</u>

Component stresses are checked using the following LRFD load combinations:

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

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

<u>Allowable Stress Design, ASD</u>

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

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

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

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

3. STRUCTURAL ANALYSIS

3.1 RISA Results

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

3.2 RISA Components

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

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

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

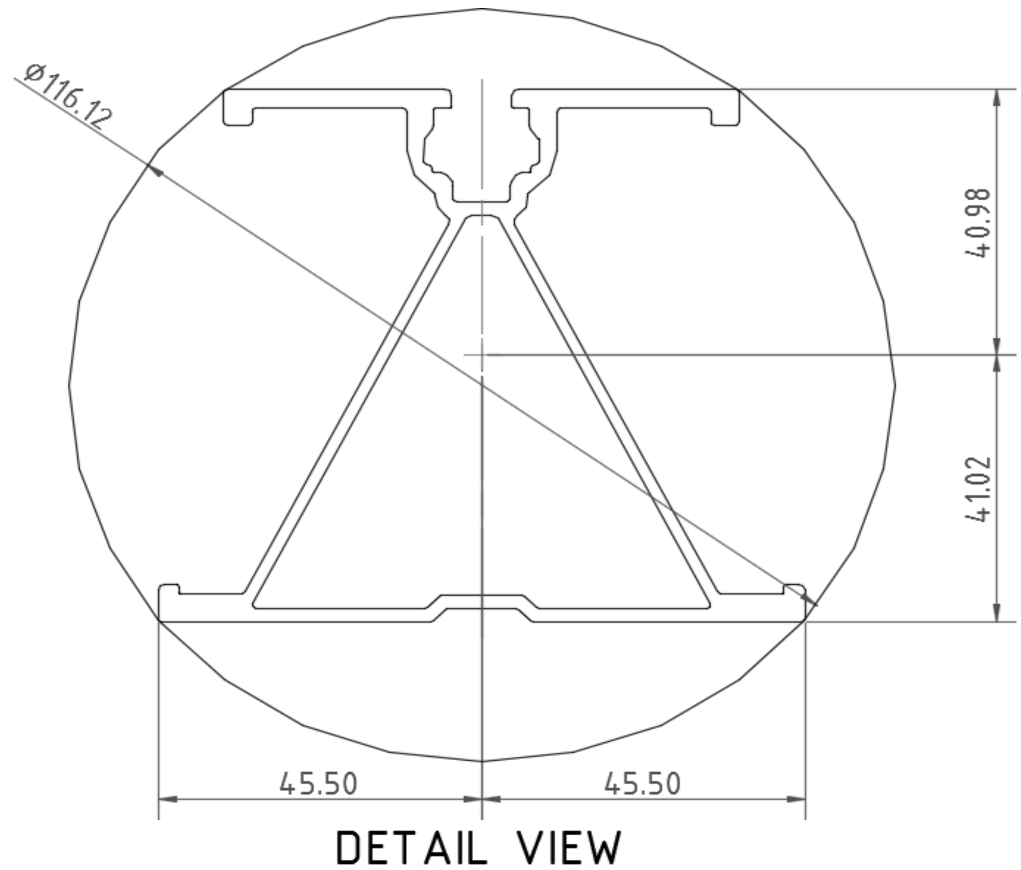
Front Struts	Location
M4	Outer
M8	Inner
M12	Outer

4. MEMBER DESIGN CALCULATIONS

4.1 Purlin Design

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

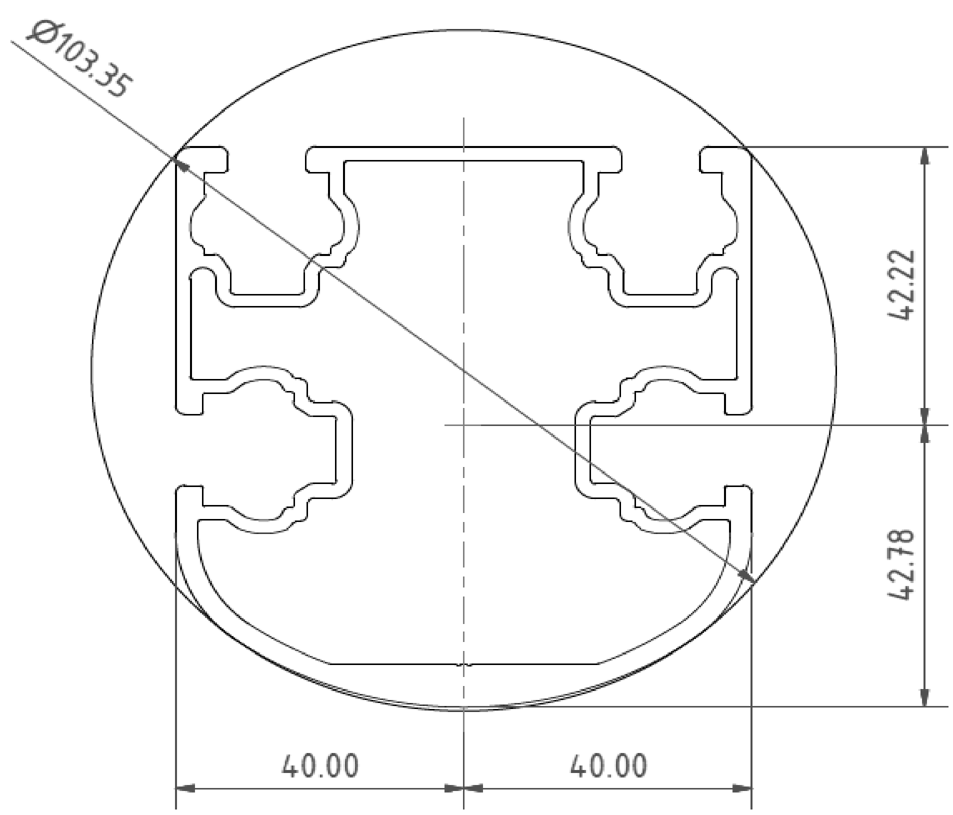
Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	117	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	2.121	k-ft
M_z =	0.243	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	97%	



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).

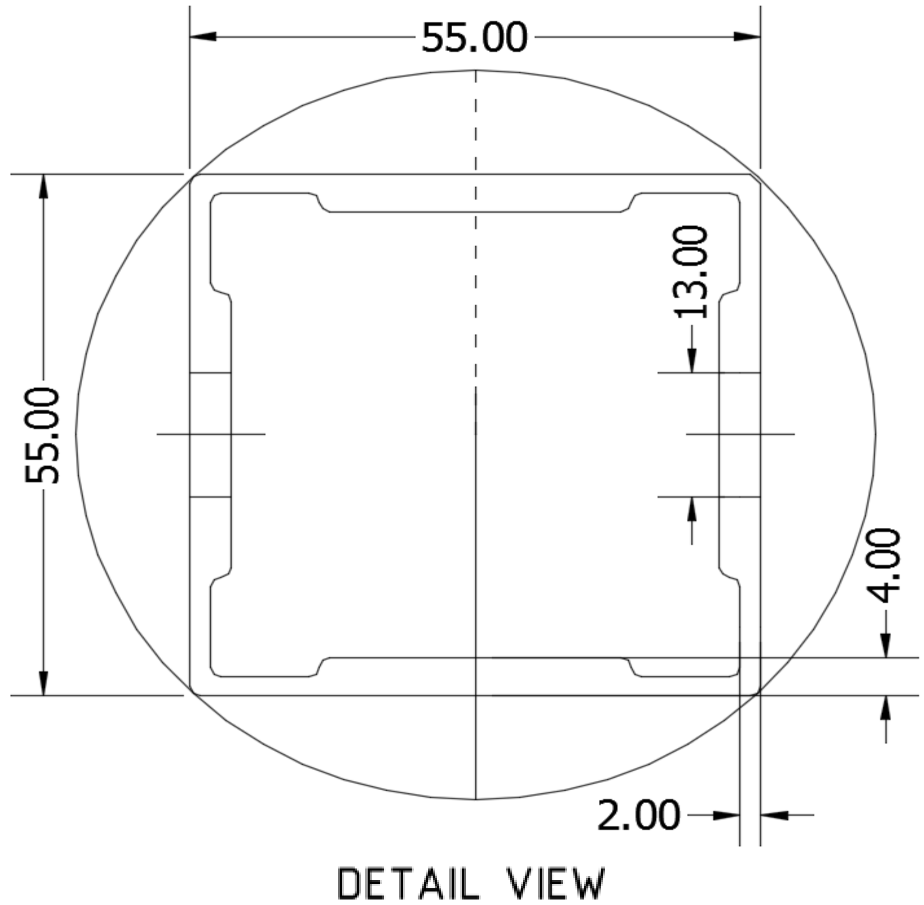
Girder Type =	**BF0**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	88.90	in
$\Phi F_{ty\ AXIAL}$ =	31.09	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	29.35	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	33.25	ksi
S_y =	1.42	in^3
S_x =	1.41	in^3
E =	10100	ksi
I_y =	2.39	in^4
I_x =	2.22	in^4
A =	1.88	in^2
g =	2.26	lbs/ft
M_y =	-3.379	k-ft
M_z =	0.000	k-ft
P_n =	-0.268	k
$M_{y\ allowable}$ =	3.464	k-ft
$M_{z\ allowable}$ =	3.907	k-ft
$P_{n\ allowable}$ =	58.535	k
Utilization =	98%	



4.3 Front Strut Design

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

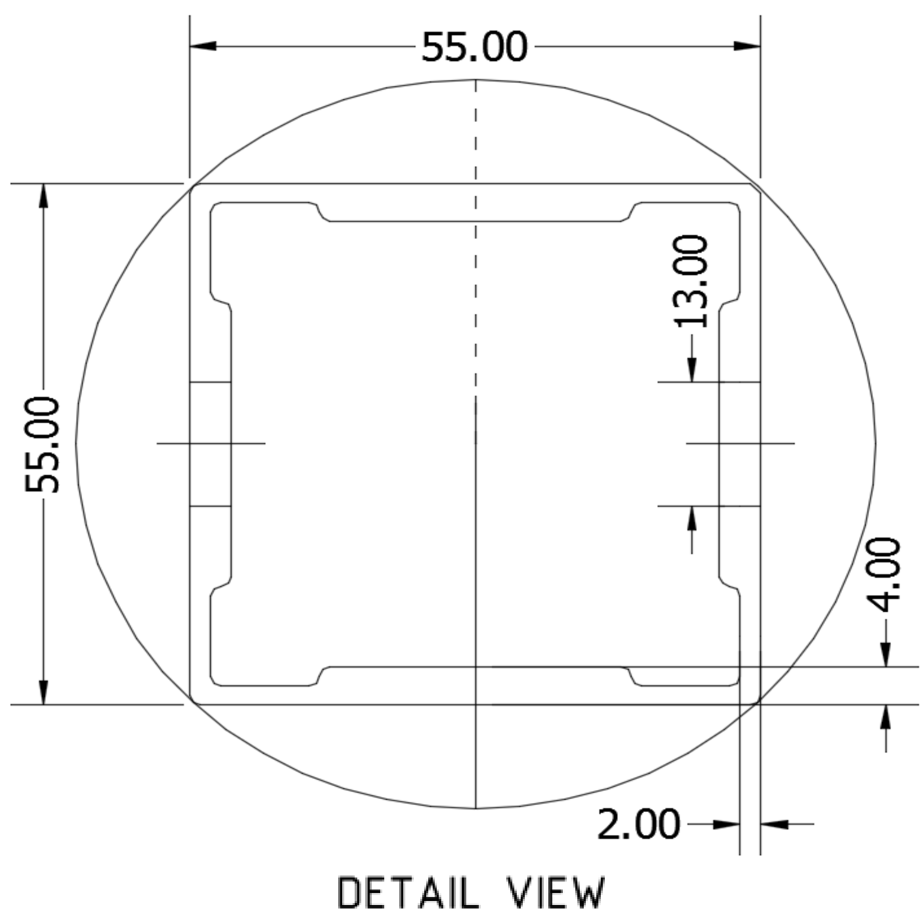
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	24.80	in
$\Phi F_{ty\ AXIAL}$ =	28.03	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.000	k-ft
M_z =	-0.460	k-ft
P_n =	0.671	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	27.532	k
Utilization =	35%	



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).

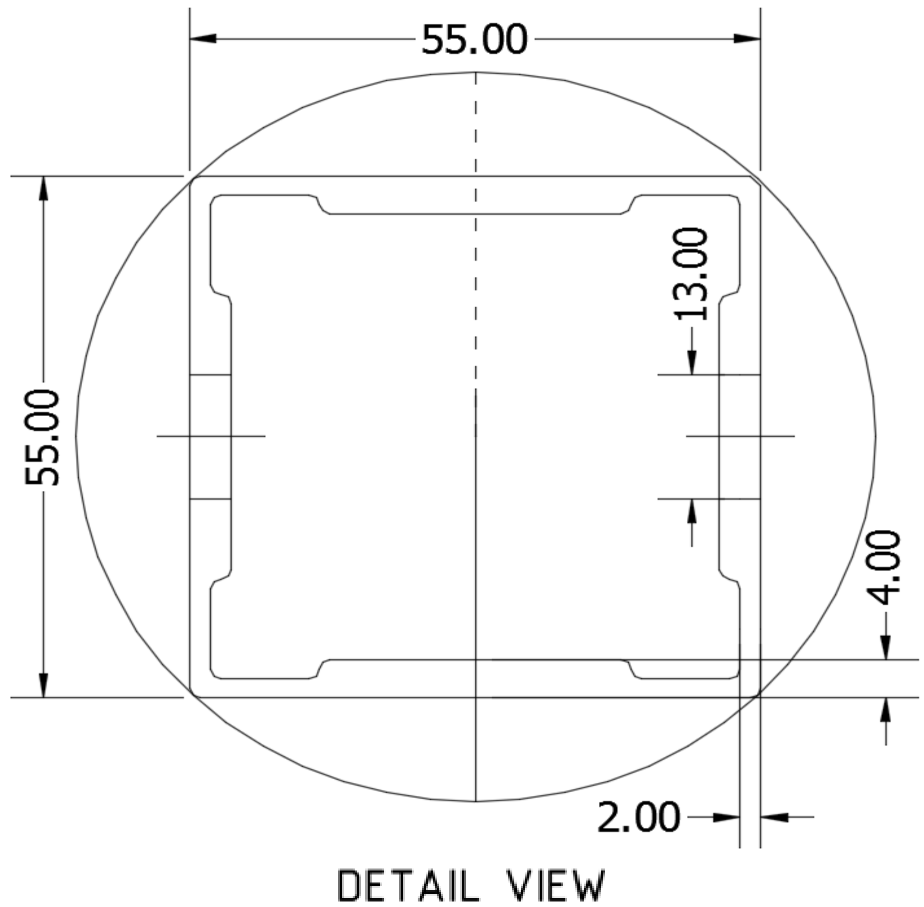
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	86.60	in
$\Phi F_{ty\ AXIAL}$ =	7.50	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.011	k-ft
M_z =	0.000	k-ft
P_n =	1.395	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	7.371	k
Utilization =	20%	



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 =	-0.316	k-ft
P_n =	0.679	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	18.592	k
Utilization =	27%	



5. FOUNDATION DESIGN CALCULATIONS

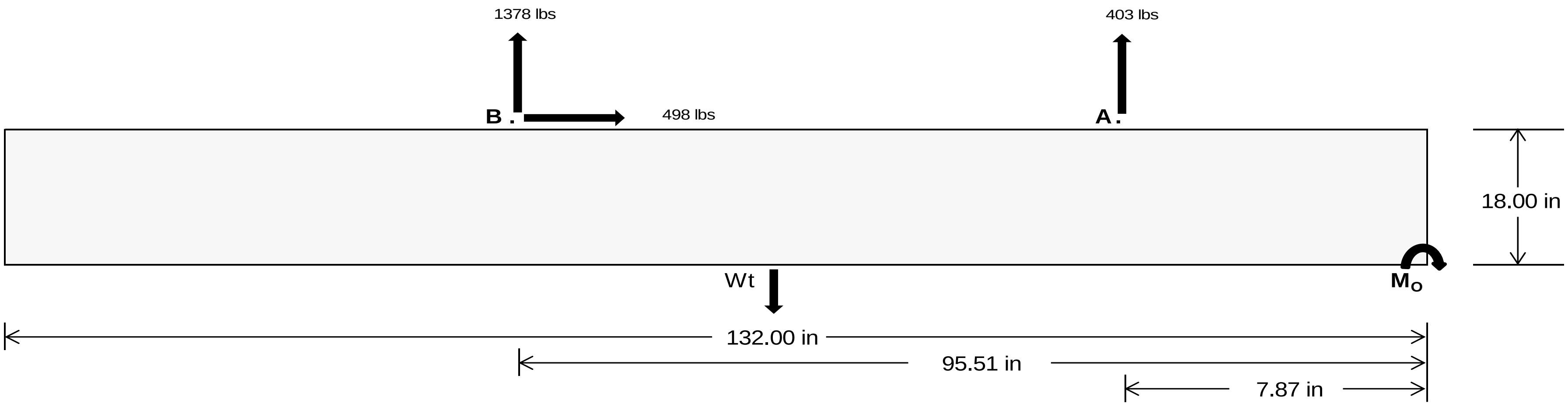
5.1 Helical Pile Foundations

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 =	1689.67	5746.25	k
Compressive Load =	5000.99	5186.92	k
Lateral Load =	301.30	2070.47	k
Moment (Weak Axis) =	0.61	0.41	k

5.2 Design of Ballast Foundations

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



<u>Concrete Properties</u>

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

<u>Footing Reinforcement</u>

Use fiber reinforcing with (2) #5 rebar.

<u>Overturning Check</u>

M_O =	143785.6 in-lbs
Resisting Force Required =	2178.57 lbs
S.F. =	1.67
Weight Required =	3630.95 lbs
Minimum Width =	<u>32 in</u> in
Weight Provided =	6380.00 lbs

A minimum 132in long x 32in wide x 18in tall ballast foundation is required to resist overturning.

<u>Sliding</u>

Force =	497.59 lbs
Friction =	0.4
Weight Required =	1243.98 lbs
Resisting Weight =	6380.00 lbs
Additional Weight Required =	0 lbs

Use a 132in long x 32in wide x 18in tall ballast foundation to resist sliding. Friction is OK.

<u>Cohesion</u>

Sliding Force =	497.59 lbs
Cohesion =	130 psf
Area =	29.33 ft^2
Resisting =	3190.00 lbs
Additional Weight Required =	0 lbs

Use a 132in long x 32in wide x 18in tall ballast foundation. Cohesion is OK.

<u>Shear Key</u>

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.

<u>Bearing Pressure</u>

	Ballast Width			
	32 in	33 in	34 in	35 in
P_{ftg} = (145 pcf)(11 ft)(1.5 ft)(2.67 ft) =	6380 lbs	6579 lbs	6779 lbs	6978 lbs

ASD LC	1.0D + 1.0S				1.0D + 1.0W				1.0D + 0.75L + 0.75W + 0.75S				0.6D + 1.0W			
Width	32 in	33 in	34 in	35 in	32 in	33 in	34 in	35 in	32 in	33 in	34 in	35 in	32 in	33 in	34 in	35 in
F_A	1681 lbs	1681 lbs	1681 lbs	1681 lbs	1825 lbs	1825 lbs	1825 lbs	1825 lbs	2504 lbs	2504 lbs	2504 lbs	2504 lbs	-806 lbs	-806 lbs	-806 lbs	-806 lbs
F_B	1740 lbs	1740 lbs	1740 lbs	1740 lbs	1892 lbs	1892 lbs	1892 lbs	1892 lbs	2595 lbs	2595 lbs	2595 lbs	2595 lbs	-2757 lbs	-2757 lbs	-2757 lbs	-2757 lbs
F_V	148 lbs	148 lbs	148 lbs	148 lbs	878 lbs	878 lbs	878 lbs	878 lbs	759 lbs	759 lbs	759 lbs	759 lbs	-995 lbs	-995 lbs	-995 lbs	-995 lbs
P_{total}	9801 lbs	10000 lbs	10199 lbs	10399 lbs	10098 lbs	10297 lbs	10496 lbs	10696 lbs	11479 lbs	11679 lbs	11878 lbs	12077 lbs	265 lbs	384 lbs	504 lbs	624 lbs
M	4082 lbs-ft	4082 lbs-ft	4082 lbs-ft	4082 lbs-ft	5504 lbs-ft	5504 lbs-ft	5504 lbs-ft	5504 lbs-ft	6885 lbs-ft	6885 lbs-ft	6885 lbs-ft	6885 lbs-ft	1381 lbs-ft	1381 lbs-ft	1381 lbs-ft	1381 lbs-ft
e	0.42 ft	0.41 ft	0.40 ft	0.39 ft	0.55 ft	0.53 ft	0.52 ft	0.51 ft	0.60 ft	0.59 ft	0.58 ft	0.57 ft	5.22 ft	3.59 ft	2.74 ft	2.21 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}	258.2 psf	257.0 psf	255.8 psf	254.7 psf	241.9 psf	241.2 psf	240.5 psf	239.8 psf	263.3 psf	261.9 psf	260.6 psf	259.4 psf	0.0 psf	0.0 psf	0.0 psf	0.0 psf
f_{max}	410.0 psf	404.2 psf	398.7 psf	393.5 psf	446.6 psf	439.6 psf	433.1 psf	426.9 psf	519.4 psf	510.2 psf	501.6 psf	493.5 psf	232.9 psf	48.9 psf	43.0 psf	43.4 psf

Maximum Bearing Pressure = 519 psf
Allowable Bearing Pressure = 1500 psf

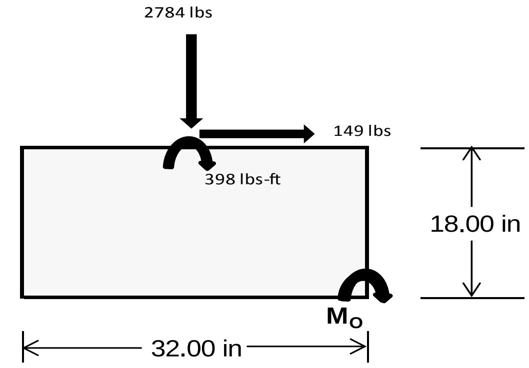
Use a 132in long x 32in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Seismic Design

Overturning Check

M_O = 3090.5 ft-lbs
Resisting Force Required = 2317.88 lbs
S.F. = 1.67
Weight Required = 3863.13 lbs
Minimum Width = 32 in in
Weight Provided = 6380.00 lbs

A minimum 132in long x 32in 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	32 in			32 in			32 in		
Support	Outer	Inner	Outer	Outer	Inner	Outer	Outer	Inner	Outer
F_Y	247 lbs	630 lbs	218 lbs	928 lbs	2784 lbs	905 lbs	82 lbs	184 lbs	54 lbs
F_V	207 lbs	204 lbs	209 lbs	154 lbs	149 lbs	161 lbs	207 lbs	205 lbs	208 lbs
P_{total}	8146 lbs	8528 lbs	8117 lbs	8447 lbs	10303 lbs	8424 lbs	2392 lbs	2494 lbs	2363 lbs
M	827 lbs-ft	821 lbs-ft	832 lbs-ft	627 lbs-ft	621 lbs-ft	648 lbs-ft	824 lbs-ft	818 lbs-ft	825 lbs-ft
e	0.10 ft	0.10 ft	0.10 ft	0.07 ft	0.06 ft	0.08 ft	0.34 ft	0.33 ft	0.35 ft
L/6	0.44 ft	0.44 ft	0.44 ft	0.44 ft	0.44 ft	0.44 ft	0.44 ft	0.44 ft	0.44 ft
f_{min}	214.3 psf	227.8 psf	212.9 psf	239.9 psf	303.6 psf	237.5 psf	18.4 psf	22.3 psf	17.3 psf
f_{max}	341.1 psf	353.7 psf	340.5 psf	336.0 psf	398.9 psf	336.9 psf	144.7 psf	147.8 psf	143.9 psf

Maximum Bearing Pressure = 399 psf
Allowable Bearing Pressure = 1500 psf

Use a 132in long x 32in wide x 18in tall ballast foundation for an acceptable bearing pressure.

Foundation Requirements: 132in long x 32in wide x 18in tall ballast foundation and fiber reinforcing with (2) #5 rebar.

5.3 Foundation Anchors

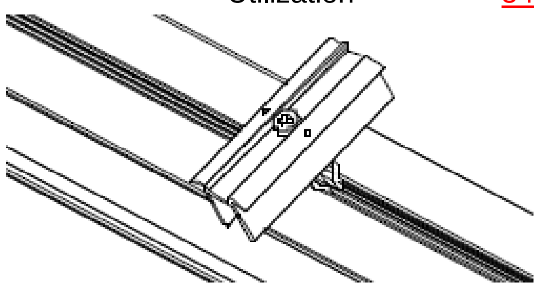
Threaded rods are anchored to the the ballast foundations using the Simpson AT-XP epoxy solution. LRFD load results are compared to the allowable strengths of the epoxy solution. Please see the supplementary calculations provided by the Simpson Anchor Designer software.

6. DESIGN OF JOINTS AND CONNECTIONS

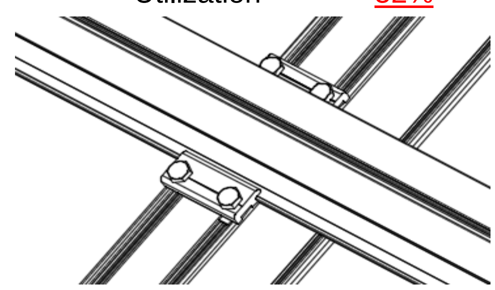
6.1 Anchorage of Modules to Purlins and Connection of Purlins to Girders

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 =	0.657 k
Allowable Uplift =	1.214 k
Utilization =	54%



Fastening of Purlins to Girders	
Maximum Uplifting Force =	2.273 k
Allowable Uplift =	4.357 k
Utilization =	52%



6.2 Strut Connections

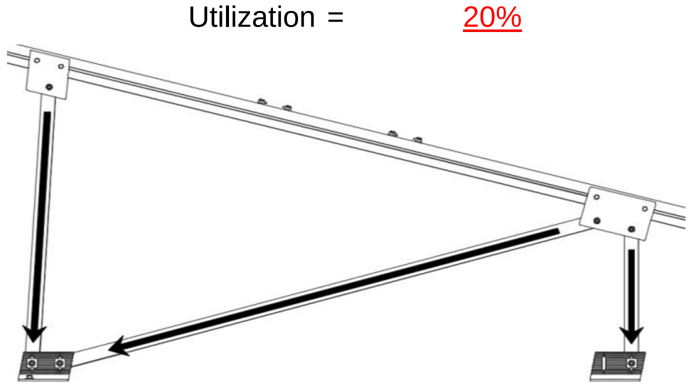
The aluminum struts connect the aluminum girder ends to custom brackets with mounting holes. Single M12 bolts are used to attach each end of the strut to the girder and post. ASTM A193/A193M-86 equivalent stainless steel bolts are used.

Front Strut	
Maximum Axial Load =	3.847 k
M12 Bolt Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	52%

Rear Strut	
Maximum Axial Load =	4.022 k
M12 Bolt Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	54%

Diagonal Strut	
Maximum Axial Load =	1.503 k
M12 Bolt Shear Capacity =	12.808 k
Strut Bearing Capacity =	7.421 k
Utilization =	20%

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

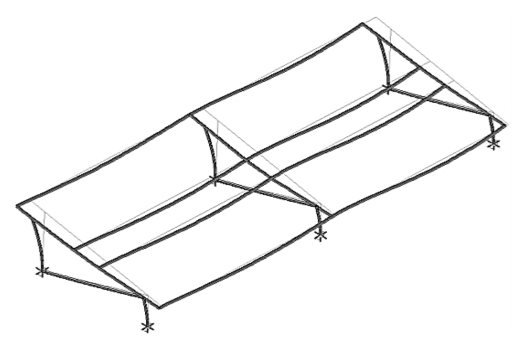
7.1 Seismic Drift

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} =	0.438 in

$0.438 \le 0.726$, 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:		Weak Axis:	
3.4.14		**3.4.14**	
L_b =	117 in	L_b =	117
J =	0.432	J =	0.432
	323.677		205.839
$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$		$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$	
S1 =	0.51461	S1 =	0.51461
$S2 = \left(\frac{C_c}{1.6}\right)^2$		$S2 = \left(\frac{C_c}{1.6}\right)^2$	
S2 =	1701.56	S2 =	1701.56
φF_L=	φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]	φF_L=	φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L=	27.5 ksi	φF_L=	28.7
3.4.16		**3.4.16**	
b/t =	32.195	b/t =	37.0588
$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$		$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$	
S1 =	12.2	S1 =	12.2
$S2 = \frac{k_1 Bp}{1.6Dp}$		$S2 = \frac{k_1 Bp}{1.6Dp}$	
S2 =	46.7	S2 =	46.7
φF_L=	φb[Bp-1.6Dp*b/t]	φF_L=	φb[Bp-1.6Dp*b/t]
φF_L=	25.1 ksi	φF_L=	23.1 ksi
3.4.16.1	Not Used	**3.4.16.1**	
Rb/t =		N/A for Weak Direction	
$S1 = \left(\frac{Bt - 1.17\frac{\theta_y}{\theta_b}Fcy}{1.6Dt}\right)^2$			
S1 =	1.1		
$S2 = C_t$			
S2 =	141.0		
φF_L=	1.17φyFcy		
φF_L=	38.9 ksi		
3.4.18		**3.4.18**	
h/t =	37.0588	h/t =	32.195
$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$		$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$	
S1 =	36.9	S1 =	36.9
m =	0.65	m =	0.65
C_0 =	40.985	C_0 =	45.5
Cc =	41.015	Cc =	45.5
$S2 = \frac{k_1 Bbr}{mDbr}$		$S2 = \frac{k_1 Bbr}{mDbr}$	
S2 =	77.2	S2 =	77.3
φF_L=	φb[Bbr-mDbr*h/t]	φF_L=	1.3φyFcy
φF_L=	43.2 ksi	φF_L=	43.2 ksi
φF_LSt=	25.1 ksi	φF_LWk=	23.1 ksi
Ix =	897074 mm^4	Iy =	446476 mm^4
	2.155 in^4		1.073 in^4
y =	41.015 mm	x =	45.5 mm
Sx =	1.335 in^3	Sy =	0.599 in^3
M_{max}St =	2.788 k-ft	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)
$\varphi F_L = \varphi c[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 25.1 ksi

b/t = 37.0588
S1 = 12.21
S2 = 32.70
$\varphi F_L = (\varphi ck2*\sqrt{(BpE)})/(1.6b/t)$
$\varphi F_L =$ 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
$\varphi F_L = \varphi yFcy$
$\varphi F_L =$ 33.25 ksi

$\varphi F_L =$ 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
$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)}/2))}]$
$\varphi F_L =$ 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
$\varphi F_L = \varphi b[Bp-1.6Dp*b/t]$
$\varphi F_L =$ 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
$\varphi F_L = \varphi b[Bc-1.6Dc*\sqrt{((LbSc)/(Cb*\sqrt{(IyJ)}/2))}]$
$\varphi F_L =$ 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
$\varphi F_L = \varphi yFcy$
$\varphi F_L =$ 33.3 ksi

3.4.16.1	Used	3.4.16.1	
Rb/t =	18.1	N/A for Weak Direction	

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L= φb[Bt-Dt*√(Rb/t)]

φF_L= 31.1 ksi

3.4.18 (left column)

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 (right column)

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

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

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 = 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

φcc = 0.86047

φF_L= (φccFcy)/(λ²)

φF_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	**3.4.16.1**	
Rb/t =	0.0	N/A for Weak Direction	

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

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L = 1.17φyFcy

φF_L = 38.9 ksi

3.4.18		**3.4.18**	
h/t =	24.5	h/t =	24.5
$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$		$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$	
S1 =	36.9	S1 =	36.9
m =	0.65	m =	0.65
C_0 =	27.5	C_0 =	27.5
Cc =	27.5	Cc =	27.5
$S2 = \frac{k_1 Bbr}{mDbr}$		$S2 = \frac{k_1 Bbr}{mDbr}$	
S2 =	77.3	S2 =	77.3
φF_L =	1.3φyFcy	φF_L =	1.3φyFcy
φF_L =	43.2 ksi	φF_L =	43.2 ksi
φF_LSt=	28.2 ksi	φF_LWk=	28.2 ksi
Ix =	279836 mm^4	Iy =	279836 mm^4
	0.672 in^4		0.672 in^4
y =	27.5 mm	x =	27.5 mm
Sx =	0.621 in^3	Sy =	0.621 in^3
M_{max}St =	1.460 k-ft	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

$\varphi F_L = \varphi yFcy$

$\varphi F_L =$ 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	-52.98	-52.98	0	0
2	M14	y	-52.98	-52.98	0	0
3	M15	y	-84.769	-84.769	0	0
4	M16	y	-84.769	-84.769	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	121.855	121.855	0	0
2	M14	y	94.305	94.305	0	0
3	M15	y	52.98	52.98	0	0
4	M16	y	52.98	52.98	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 + 0.8W	Yes	Y		1	1.2	3	1.6	4	.8														
2	LRFD 1.2D + 1.6W + 0.5S	Yes	Y		1	1.2	3	.5	4	1.6														
3	LRFD 0.9D + 1.6W	Yes	Y		2	.9					5	1.6												
4	LATERAL - LRFD 1.54D + 1.3E ...	Yes	Y		1	1.54	3	.2			6	1.3												
5	LATERAL - LRFD 0.56D + 1.3E	Yes	Y		1	.56					6	1.3												
6	LATERAL - LRFD 1.54D + 1.25...	Yes	Y		1	1.54	3	.2			6	1.25												
7	LATERAL - LRFD 0.56D + 1.25E	Yes	Y		1	.56					6	1.25												
8																								
9	ASD 1.0D + 1.0S	Yes	Y		1	1	3	1																
10	ASD 1.0D + 1.0W	Yes	Y		1	1			4	1														
11	ASD 1.0D + 0.75L + 0.75W + 0....	Yes	Y		1	1	3	.75	4	.75														
12	ASD 0.6D + 1.0W	Yes	Y		2	.6					5	1												
13	LATERAL - ASD 1.238D + 0.875E	Yes	Y		1	1.2...					6	.875												
14	LATERAL - ASD 1.1785D + 0.65...	Yes	Y		1	1.1...	3	.75			6	.656												
15	LATERAL - ASD 0.362D + 0.875E	Yes	Y		1	.362					6	.875												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N8	max	382.572	2	1197.377	1	1.002	1	.004	1	0	1	0	1
2		min	-503.85	3	-1350.993	3	-80.509	5	-.309	4	0	1	0	1
3	N7	max	.031	9	1303.051	1	-.317	12	0	12	0	1	0	1
4		min	-.114	2	-382.114	3	-231.77	4	-.47	4	0	1	0	1
5	N15	max	.023	9	3846.917	1	0	2	0	2	0	1	0	1
6		min	-1.469	2	-1299.747	3	-223.675	5	-.46	4	0	1	0	1
7	N16	max	1461.242	2	3989.942	1	0	2	0	2	0	1	0	1
8		min	-1592.671	3	-4420.195	3	-80.302	5	-.312	4	0	1	0	1
9	N23	max	.031	9	1303.051	1	7.272	1	.016	1	0	1	0	1
10		min	-.114	2	-382.114	3	-227.348	4	-.463	4	0	1	0	1
11	N24	max	382.572	2	1197.377	1	-.051	12	0	12	0	1	0	1
12		min	-503.85	3	-1350.993	3	-80.955	4	-.312	4	0	1	0	1
13	Totals:	max	2224.689	2	12837.716	1	0	2						
14		min	-2601.169	3	-9186.156	3	-920.352	4						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	M13	1	max	79.576	1	535.596	1	-4.821	12	0	3	.189	1	0	1
2			min	3.55	12	-693.659	3	-132.7	1	-.015	1	.008	12	0	3
3		2	max	79.576	1	374.999	1	-3.819	12	0	3	.069	4	.64	3
4			min	3.55	12	-488.052	3	-101.972	1	-.015	1	.004	12	-.493	1
5		3	max	79.576	1	214.402	1	-2.817	12	0	3	.036	5	1.057	3
6			min	3.55	12	-282.444	3	-71.243	1	-.015	1	-.032	1	-.812	1
7		4	max	79.576	1	53.805	1	-1.815	12	0	3	.019	5	1.252	3
8			min	3.55	12	-76.836	3	-40.514	1	-.015	1	-.092	1	-.958	1
9		5	max	79.576	1	128.772	3	-.569	10	0	3	.004	5	1.224	3
10			min	3.55	12	-106.792	1	-15.96	4	-.015	1	-.12	1	-.929	1
11		6	max	79.576	1	334.38	3	20.943	1	0	3	-.004	12	.973	3
12			min	3.55	12	-267.389	1	-12.099	5	-.015	1	-.114	1	-.726	1
13		7	max	79.576	1	539.988	3	51.672	1	0	3	-.003	12	.499	3
14			min	-4.101	5	-427.986	1	-10.55	5	-.015	1	-.074	1	-.35	1
15		8	max	79.576	1	745.596	3	82.401	1	0	3	0	10	.201	1
16			min	-15.221	5	-588.583	1	-9	5	-.015	1	-.034	4	-.197	3
17		9	max	79.576	1	951.203	3	113.129	1	0	3	.104	1	.926	1
18			min	-26.342	5	-749.18	1	-7.45	5	-.015	1	-.042	5	-1.116	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	79.576	1	909.777	1	-4.195	12	.005	14	.243	1	1.824	1
20			min	3.55	12	-1156.811	3	-143.858	1	-.015	1	.005	12	-2.258	3
21		11	max	79.576	1	749.18	1	-3.193	12	.015	1	.104	1	.926	1
22			min	3.55	12	-951.203	3	-113.129	1	0	3	.001	12	-1.116	3
23		12	max	79.576	1	588.583	1	-2.191	12	.015	1	.033	4	.201	1
24			min	3.55	12	-745.596	3	-82.401	1	0	3	-.002	3	-.197	3
25		13	max	79.576	1	427.986	1	-1.19	12	.015	1	.015	5	.499	3
26			min	3.55	12	-539.988	3	-51.672	1	0	3	-.074	1	-.35	1
27		14	max	79.576	1	267.389	1	-.188	12	.015	1	0	15	.973	3
28			min	.614	15	-334.38	3	-20.943	1	0	3	-.114	1	-.726	1
29		15	max	79.576	1	106.792	1	9.786	1	.015	1	-.004	12	1.224	3
30			min	-10.102	5	-128.772	3	-12.635	5	0	3	-.12	1	-.929	1
31		16	max	79.576	1	76.836	3	40.514	1	.015	1	-.002	12	1.252	3
32			min	-21.223	5	-53.805	1	-11.085	5	0	3	-.092	1	-.958	1
33		17	max	79.576	1	282.444	3	71.243	1	.015	1	0	3	1.057	3
34			min	-32.343	5	-214.402	1	-9.535	5	0	3	-.047	4	-.812	1
35		18	max	79.576	1	488.052	3	101.972	1	.015	1	.062	1	.64	3
36			min	-43.464	5	-374.999	1	-7.985	5	0	3	-.049	5	-.493	1
37		19	max	79.576	1	693.659	3	132.7	1	.015	1	.189	1	0	1
38			min	-54.585	5	-535.596	1	-6.436	5	0	3	-.057	5	0	3
39	M14	1	max	59.314	4	569.395	1	-4.952	12	.009	3	.216	1	0	1
40			min	1.518	12	-549.682	3	-136.893	1	-.012	1	.009	12	0	3
41		2	max	48.194	4	408.798	1	-3.951	12	.009	3	.099	4	.51	3
42			min	1.518	12	-391.828	3	-106.165	1	-.012	1	.005	12	-.53	1
43		3	max	37.68	1	248.201	1	-2.949	12	.009	3	.054	5	.849	3
44			min	1.518	12	-233.973	3	-75.436	1	-.012	1	-.014	1	-.886	1
45		4	max	37.68	1	87.604	1	-1.947	12	.009	3	.029	5	1.017	3
46			min	1.518	12	-76.118	3	-44.707	1	-.012	1	-.079	1	-1.068	1
47		5	max	37.68	1	81.736	3	-.942	10	.009	3	.006	5	1.014	3
48			min	1.518	12	-72.993	1	-23.952	4	-.012	1	-.111	1	-1.076	1
49		6	max	37.68	1	239.591	3	16.75	1	.009	3	-.004	12	.84	3
50			min	-3.985	5	-233.591	1	-19.085	5	-.012	1	-.109	1	-.909	1
51		7	max	37.68	1	397.445	3	47.479	1	.009	3	-.003	12	.495	3
52			min	-15.106	5	-394.188	1	-17.535	5	-.012	1	-.074	1	-.569	1
53		8	max	37.68	1	555.3	3	78.208	1	.009	3	0	10	0	15
54			min	-26.226	5	-554.785	1	-15.986	5	-.012	1	-.056	4	-.064	2
55		9	max	37.68	1	713.154	3	108.936	1	.009	3	.095	1	.633	1
56			min	-37.347	5	-715.382	1	-14.436	5	-.012	1	-.07	5	-.708	3
57		10	max	59.579	4	875.979	1	-4.063	12	.009	3	.23	1	1.495	1
58			min	1.518	12	-871.009	3	-139.665	1	-.012	1	.005	12	-1.566	3
59		11	max	48.459	4	715.382	1	-3.061	12	.012	1	.1	4	.633	1
60			min	1.518	12	-713.154	3	-108.936	1	-.009	3	.001	12	-.708	3
61		12	max	37.68	1	554.785	1	-2.059	12	.012	1	.053	5	0	15
62			min	1.518	12	-555.3	3	-78.208	1	-.009	3	-.006	1	-.064	2
63		13	max	37.68	1	394.188	1	-1.058	12	.012	1	.028	5	.495	3
64			min	1.518	12	-397.445	3	-47.479	1	-.009	3	-.074	1	-.569	1
65		14	max	37.68	1	233.591	1	-.037	3	.012	1	.005	5	.84	3
66			min	1.518	12	-239.591	3	-24.508	4	-.009	3	-.109	1	-.909	1
67		15	max	37.68	1	72.993	1	13.978	1	.012	1	-.003	12	1.014	3
68			min	-3.492	5	-81.736	3	-19.198	5	-.009	3	-.111	1	-1.076	1
69		16	max	37.68	1	76.118	3	44.707	1	.012	1	-.002	12	1.017	3
70			min	-14.613	5	-87.604	1	-17.648	5	-.009	3	-.079	1	-1.068	1
71		17	max	37.68	1	233.973	3	75.436	1	.012	1	.001	3	.849	3
72			min	-25.733	5	-248.201	1	-16.098	5	-.009	3	-.059	4	-.886	1
73		18	max	37.68	1	391.828	3	106.165	1	.012	1	.085	1	.51	3
74			min	-36.854	5	-408.798	1	-14.548	5	-.009	3	-.072	5	-.53	1
75		19	max	37.68	1	549.682	3	136.893	1	.012	1	.216	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	-47.974	5	-569.395	1	-12.999	5	-.009	3	-.087	5	0	3
77	M15	1	max	76.906	5	671.185	2	-4.915	12	.013	1	.216	1	0	2
78			min	-39.48	1	-308.204	3	-136.881	1	-.008	3	.009	12	0	3
79		2	max	65.786	5	479.893	2	-3.913	12	.013	1	.135	4	.287	3
80			min	-39.48	1	-221.98	3	-106.152	1	-.008	3	.004	12	-.623	2
81		3	max	54.665	5	288.602	2	-2.912	12	.013	1	.079	5	.481	3
82			min	-39.48	1	-135.755	3	-75.423	1	-.008	3	-.014	1	-1.04	2
83		4	max	43.544	5	97.94	1	-1.91	12	.013	1	.045	5	.581	3
84			min	-39.48	1	-49.531	3	-44.695	1	-.008	3	-.079	1	-1.249	2
85		5	max	32.424	5	36.694	3	-.908	12	.013	1	.012	5	.588	3
86			min	-39.48	1	-93.982	2	-33.069	4	-.008	3	-.111	1	-1.251	2
87		6	max	21.303	5	122.918	3	16.763	1	.013	1	-.004	12	.502	3
88			min	-39.48	1	-285.273	2	-28.2	5	-.008	3	-.109	1	-1.045	2
89		7	max	10.182	5	209.143	3	47.492	1	.013	1	-.003	12	.322	3
90			min	-39.48	1	-476.565	2	-26.65	5	-.008	3	-.074	1	-.637	1
91		8	max	-.59	15	295.367	3	78.22	1	.013	1	0	10	.049	3
92			min	-39.48	1	-667.856	2	-25.1	5	-.008	3	-.08	4	-.029	1
93		9	max	-1.815	12	381.592	3	108.949	1	.013	1	.095	1	.815	2
94			min	-39.48	1	-859.148	2	-23.55	5	-.008	3	-.104	5	-.318	3
95		10	max	-1.815	12	1050.44	2	-4.1	12	.013	1	.23	1	1.849	2
96			min	-39.48	1	-467.816	3	-139.678	1	-.008	11	.005	12	-.778	3
97		11	max	7.885	5	859.148	2	-3.098	12	.008	3	.134	4	.815	2
98			min	-39.48	1	-381.592	3	-108.949	1	-.013	1	.001	12	-.318	3
99		12	max	-1.815	12	667.856	2	-2.097	12	.008	3	.077	5	.049	3
100			min	-39.48	1	-295.367	3	-78.22	1	-.013	1	-.006	1	-.029	1
101		13	max	-1.815	12	476.565	2	-1.095	12	.008	3	.042	5	.322	3
102			min	-39.48	1	-209.143	3	-47.492	1	-.013	1	-.074	1	-.637	1
103		14	max	-1.815	12	285.273	2	-.093	12	.008	3	.009	5	.502	3
104			min	-39.48	1	-122.918	3	-33.638	4	-.013	1	-.109	1	-1.045	2
105		15	max	-1.815	12	93.982	2	13.966	1	.008	3	-.003	12	.588	3
106			min	-45.038	4	-36.694	3	-28.313	5	-.013	1	-.111	1	-1.251	2
107		16	max	-1.815	12	49.531	3	44.695	1	.008	3	-.002	12	.581	3
108			min	-56.159	4	-97.94	1	-26.763	5	-.013	1	-.079	1	-1.249	2
109		17	max	-1.815	12	135.755	3	75.423	1	.008	3	.001	3	.481	3
110			min	-67.279	4	-288.602	2	-25.214	5	-.013	1	-.085	4	-1.04	2
111		18	max	-1.815	12	221.98	3	106.152	1	.008	3	.084	1	.287	3
112			min	-78.4	4	-479.893	2	-23.664	5	-.013	1	-.107	5	-.623	2
113		19	max	-1.815	12	308.204	3	136.881	1	.008	3	.216	1	0	2
114			min	-89.521	4	-671.185	2	-22.114	5	-.013	1	-.132	5	0	5
115	M16	1	max	76.671	5	640.568	2	-4.695	12	.013	1	.19	1	0	2
116			min	-84.046	1	-286.275	3	-132.894	1	-.011	3	.008	12	0	3
117		2	max	65.55	5	449.277	2	-3.693	12	.013	1	.099	4	.263	3
118			min	-84.046	1	-200.051	3	-102.166	1	-.011	3	.003	12	-.59	2
119		3	max	54.429	5	257.985	2	-2.691	12	.013	1	.058	5	.433	3
120			min	-84.046	1	-113.826	3	-71.437	1	-.011	3	-.031	1	-.973	2
121		4	max	43.309	5	66.694	2	-1.69	12	.013	1	.033	5	.51	3
122			min	-84.046	1	-27.602	3	-40.708	1	-.011	3	-.092	1	-1.149	2
123		5	max	32.188	5	58.623	3	-.652	10	.013	1	.009	5	.493	3
124			min	-84.046	1	-124.598	2	-23.56	4	-.011	3	-.119	1	-1.118	2
125		6	max	21.067	5	144.847	3	20.749	1	.013	1	-.004	12	.383	3
126			min	-84.046	1	-315.89	2	-19.63	5	-.011	3	-.114	1	-.879	2
127		7	max	9.947	5	231.072	3	51.478	1	.013	1	-.003	12	.179	3
128			min	-84.046	1	-507.181	2	-18.081	5	-.011	3	-.074	1	-.433	2
129		8	max	-.731	15	317.296	3	82.207	1	.013	1	0	10	.223	1
130			min	-84.046	1	-698.473	2	-16.531	5	-.011	3	-.054	4	-.118	3
131		9	max	-3.519	12	403.521	3	112.935	1	.013	1	.104	1	1.08	2
132			min	-84.046	1	-889.765	2	-14.981	5	-.011	3	-.07	5	-.508	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	-3.519	12	1081.056	2	-4.321	12	.013	1	.243	1	2.147	2
134			min	-84.046	1	-489.746	3	-143.664	1	-.011	3	.006	12	-.992	3
135		11	max	3.825	5	889.765	2	-3.319	12	.011	3	.104	1	1.08	2
136			min	-84.046	1	-403.521	3	-112.935	1	-.013	1	.002	12	-.508	3
137		12	max	-3.519	12	698.473	2	-2.317	12	.011	3	.053	4	.223	1
138			min	-84.046	1	-317.296	3	-82.207	1	-.013	1	-.002	1	-.118	3
139		13	max	-3.519	12	507.181	2	-1.315	12	.011	3	.026	5	.179	3
140			min	-84.046	1	-231.072	3	-51.478	1	-.013	1	-.074	1	-.433	2
141		14	max	-3.519	12	315.89	2	-.314	12	.011	3	.002	5	.383	3
142			min	-84.046	1	-144.847	3	-26.15	4	-.013	1	-.114	1	-.879	2
143		15	max	-3.519	12	124.598	2	9.98	1	.011	3	-.004	12	.493	3
144			min	-84.046	1	-58.623	3	-20.156	5	-.013	1	-.119	1	-1.118	2
145		16	max	-3.519	12	27.602	3	40.708	1	.011	3	-.002	12	.51	3
146			min	-84.046	1	-66.694	2	-18.606	5	-.013	1	-.092	1	-1.149	2
147		17	max	-3.519	12	113.826	3	71.437	1	.011	3	0	3	.433	3
148			min	-84.046	1	-257.985	2	-17.056	5	-.013	1	-.068	4	-.973	2
149		18	max	-3.519	12	200.051	3	102.166	1	.011	3	.063	1	.263	3
150			min	-91.697	4	-449.277	2	-15.507	5	-.013	1	-.079	5	-.59	2
151		19	max	-3.519	12	286.275	3	132.894	1	.011	3	.19	1	0	2
152			min	-102.817	4	-640.568	2	-13.957	5	-.013	1	-.095	5	0	5
153	M2	1	max	1170.124	1	2.333	4	1.133	1	0	3	0	3	0	1
154			min	-1230.683	3	.572	15	-75.902	4	0	4	0	1	0	1
155		2	max	1170.452	1	2.318	4	1.133	1	0	3	0	1	0	15
156			min	-1230.436	3	.569	15	-76.186	4	0	4	-.017	4	0	4
157		3	max	1170.78	1	2.303	4	1.133	1	0	3	0	1	0	15
158			min	-1230.19	3	.565	15	-76.471	4	0	4	-.034	4	-.001	4
159		4	max	1171.109	1	2.288	4	1.133	1	0	3	0	1	0	15
160			min	-1229.944	3	.561	15	-76.756	4	0	4	-.051	4	-.002	4
161		5	max	1171.437	1	2.272	4	1.133	1	0	3	0	1	0	15
162			min	-1229.697	3	.558	15	-77.041	4	0	4	-.068	4	-.002	4
163		6	max	1171.766	1	2.257	4	1.133	1	0	3	.001	1	0	15
164			min	-1229.451	3	.554	15	-77.326	4	0	4	-.085	4	-.003	4
165		7	max	1172.094	1	2.242	4	1.133	1	0	3	.001	1	0	15
166			min	-1229.205	3	.551	15	-77.611	4	0	4	-.102	4	-.003	4
167		8	max	1172.423	1	2.227	4	1.133	1	0	3	.002	1	0	15
168			min	-1228.958	3	.547	15	-77.895	4	0	4	-.119	4	-.004	4
169		9	max	1172.751	1	2.211	4	1.133	1	0	3	.002	1	0	15
170			min	-1228.712	3	.544	15	-78.18	4	0	4	-.137	4	-.004	4
171		10	max	1173.079	1	2.196	4	1.133	1	0	3	.002	1	-.001	15
172			min	-1228.466	3	.54	15	-78.465	4	0	4	-.154	4	-.005	4
173		11	max	1173.408	1	2.181	4	1.133	1	0	3	.002	1	-.001	15
174			min	-1228.219	3	.536	15	-78.75	4	0	4	-.171	4	-.005	4
175		12	max	1173.736	1	2.166	4	1.133	1	0	3	.003	1	-.001	15
176			min	-1227.973	3	.533	15	-79.035	4	0	4	-.189	4	-.005	4
177		13	max	1174.065	1	2.15	4	1.133	1	0	3	.003	1	-.001	15
178			min	-1227.727	3	.529	15	-79.319	4	0	4	-.206	4	-.006	4
179		14	max	1174.393	1	2.135	4	1.133	1	0	3	.003	1	-.002	15
180			min	-1227.48	3	.526	15	-79.604	4	0	4	-.224	4	-.006	4
181		15	max	1174.722	1	2.12	4	1.133	1	0	3	.003	1	-.002	15
182			min	-1227.234	3	.522	15	-79.889	4	0	4	-.242	4	-.007	4
183		16	max	1175.05	1	2.105	4	1.133	1	0	3	.004	1	-.002	15
184			min	-1226.988	3	.518	15	-80.174	4	0	4	-.259	4	-.007	4
185		17	max	1175.379	1	2.089	4	1.133	1	0	3	.004	1	-.002	15
186			min	-1226.741	3	.515	15	-80.459	4	0	4	-.277	4	-.008	4
187		18	max	1175.707	1	2.074	4	1.133	1	0	3	.004	1	-.002	15
188			min	-1226.495	3	.511	15	-80.744	4	0	4	-.295	4	-.008	4
189		19	max	1176.035	1	2.059	4	1.133	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	-1226.249	3	.508	15	-81.028	4	0	4	-.313	4	-.009	4
191	M3	1	max	358.935	2	8.106	4	.015	1	0	3	0	1	.009	4
192			min	-476.885	3	1.918	15	-1.186	5	0	4	-.012	4	.002	15
193		2	max	358.764	2	7.333	4	.015	1	0	3	0	1	.006	4
194			min	-477.013	3	1.736	15	-.644	5	0	4	-.012	4	.001	12
195		3	max	358.594	2	6.561	4	.015	14	0	3	0	1	.003	2
196			min	-477.14	3	1.555	15	-.101	5	0	4	-.012	4	0	3
197		4	max	358.424	2	5.788	4	.494	4	0	3	0	1	0	2
198			min	-477.268	3	1.373	15	0	12	0	4	-.012	4	-.001	3
199		5	max	358.253	2	5.016	4	1.036	4	0	3	0	1	0	15
200			min	-477.396	3	1.192	15	0	12	0	4	-.012	4	-.003	3
201		6	max	358.083	2	4.244	4	1.578	4	0	3	0	1	0	15
202			min	-477.524	3	1.01	15	0	12	0	4	-.011	4	-.004	6
203		7	max	357.913	2	3.471	4	2.12	4	0	3	0	1	-.001	15
204			min	-477.651	3	.828	15	0	12	0	4	-.011	4	-.006	6
205		8	max	357.742	2	2.699	4	2.662	4	0	3	0	1	-.002	15
206			min	-477.779	3	.647	15	0	12	0	4	-.01	4	-.007	6
207		9	max	357.572	2	1.926	4	3.204	4	0	3	0	1	-.002	15
208			min	-477.907	3	.465	15	0	12	0	4	-.008	5	-.008	6
209		10	max	357.402	2	1.154	4	3.746	4	0	3	0	1	-.002	15
210			min	-478.035	3	.284	15	0	12	0	4	-.007	5	-.009	6
211		11	max	357.231	2	.429	2	4.288	4	0	3	0	1	-.002	15
212			min	-478.162	3	-.004	3	0	12	0	4	-.005	5	-.009	6
213		12	max	357.061	2	-.079	15	4.831	4	0	3	0	1	-.002	15
214			min	-478.29	3	-.455	3	0	12	0	4	-.003	5	-.009	6
215		13	max	356.891	2	-.261	15	5.373	4	0	3	0	1	-.002	15
216			min	-478.418	3	-1.165	6	0	12	0	4	-.001	5	-.009	6
217		14	max	356.72	2	-.443	15	5.915	4	0	3	.001	4	-.002	15
218			min	-478.546	3	-1.937	6	0	12	0	4	0	12	-.008	6
219		15	max	356.55	2	-.624	15	6.457	4	0	3	.004	4	-.002	15
220			min	-478.674	3	-2.709	6	0	12	0	4	0	12	-.007	6
221		16	max	356.38	2	-.806	15	6.999	4	0	3	.007	4	-.001	15
222			min	-478.801	3	-3.482	6	0	12	0	4	0	12	-.006	6
223		17	max	356.209	2	-.987	15	7.541	4	0	3	.01	4	0	15
224			min	-478.929	3	-4.254	6	0	12	0	4	0	12	-.004	6
225		18	max	356.039	2	-1.169	15	8.083	4	0	3	.013	4	0	15
226			min	-479.057	3	-5.027	6	0	12	0	4	0	12	-.002	6
227		19	max	355.869	2	-1.35	15	8.625	4	0	3	.017	4	0	1
228			min	-479.185	3	-5.799	6	0	12	0	4	0	12	0	1
229	M4	1	max	1299.985	1	0	1	-.314	12	0	1	.009	4	0	1
230			min	-384.414	3	0	1	-230.567	4	0	1	0	10	0	1
231		2	max	1300.155	1	0	1	-.314	12	0	1	0	12	0	1
232			min	-384.286	3	0	1	-230.714	4	0	1	-.018	4	0	1
233		3	max	1300.326	1	0	1	-.314	12	0	1	0	12	0	1
234			min	-384.158	3	0	1	-230.862	4	0	1	-.044	4	0	1
235		4	max	1300.496	1	0	1	-.314	12	0	1	0	12	0	1
236			min	-384.03	3	0	1	-231.01	4	0	1	-.071	4	0	1
237		5	max	1300.666	1	0	1	-.314	12	0	1	0	12	0	1
238			min	-383.903	3	0	1	-231.157	4	0	1	-.097	4	0	1
239		6	max	1300.837	1	0	1	-.314	12	0	1	0	12	0	1
240			min	-383.775	3	0	1	-231.305	4	0	1	-.124	4	0	1
241		7	max	1301.007	1	0	1	-.314	12	0	1	0	12	0	1
242			min	-383.647	3	0	1	-231.453	4	0	1	-.15	4	0	1
243		8	max	1301.177	1	0	1	-.314	12	0	1	0	12	0	1
244			min	-383.519	3	0	1	-231.6	4	0	1	-.177	4	0	1
245		9	max	1301.348	1	0	1	-.314	12	0	1	0	12	0	1
246			min	-383.392	3	0	1	-231.748	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
247		10	max	1301.518	1	0	1	-.314	12	0	1	0	12	0	1
248			min	-383.264	3	0	1	-231.896	4	0	1	-.23	4	0	1
249		11	max	1301.688	1	0	1	-.314	12	0	1	0	12	0	1
250			min	-383.136	3	0	1	-232.043	4	0	1	-.257	4	0	1
251		12	max	1301.859	1	0	1	-.314	12	0	1	0	12	0	1
252			min	-383.008	3	0	1	-232.191	4	0	1	-.283	4	0	1
253		13	max	1302.029	1	0	1	-.314	12	0	1	0	12	0	1
254			min	-382.88	3	0	1	-232.338	4	0	1	-.31	4	0	1
255		14	max	1302.199	1	0	1	-.314	12	0	1	0	12	0	1
256			min	-382.753	3	0	1	-232.486	4	0	1	-.337	4	0	1
257		15	max	1302.37	1	0	1	-.314	12	0	1	0	12	0	1
258			min	-382.625	3	0	1	-232.634	4	0	1	-.363	4	0	1
259		16	max	1302.54	1	0	1	-.314	12	0	1	0	12	0	1
260			min	-382.497	3	0	1	-232.781	4	0	1	-.39	4	0	1
261		17	max	1302.71	1	0	1	-.314	12	0	1	0	12	0	1
262			min	-382.369	3	0	1	-232.929	4	0	1	-.417	4	0	1
263		18	max	1302.881	1	0	1	-.314	12	0	1	0	12	0	1
264			min	-382.242	3	0	1	-233.077	4	0	1	-.444	4	0	1
265		19	max	1303.051	1	0	1	-.314	12	0	1	0	12	0	1
266			min	-382.114	3	0	1	-233.224	4	0	1	-.47	4	0	1
267	M6	1	max	3759.883	1	2.848	2	0	1	0	1	0	4	0	1
268			min	-4022.444	3	.047	3	-76.571	4	0	4	0	1	0	1
269		2	max	3760.212	1	2.837	2	0	1	0	1	0	1	0	3
270			min	-4022.198	3	.038	3	-76.856	4	0	4	-.017	4	0	2
271		3	max	3760.54	1	2.825	2	0	1	0	1	0	1	0	3
272			min	-4021.951	3	.029	3	-77.141	4	0	4	-.034	4	-.001	2
273		4	max	3760.869	1	2.813	2	0	1	0	1	0	1	0	3
274			min	-4021.705	3	.02	3	-77.426	4	0	4	-.051	4	-.002	2
275		5	max	3761.197	1	2.801	2	0	1	0	1	0	1	0	3
276			min	-4021.459	3	.011	3	-77.71	4	0	4	-.068	4	-.003	2
277		6	max	3761.525	1	2.789	2	0	1	0	1	0	1	0	3
278			min	-4021.212	3	.002	3	-77.995	4	0	4	-.086	4	-.003	2
279		7	max	3761.854	1	2.777	2	0	1	0	1	0	1	0	3
280			min	-4020.966	3	-.007	3	-78.28	4	0	4	-.103	4	-.004	2
281		8	max	3762.182	1	2.765	2	0	1	0	1	0	1	0	3
282			min	-4020.72	3	-.016	3	-78.565	4	0	4	-.12	4	-.004	2
283		9	max	3762.511	1	2.753	2	0	1	0	1	0	1	0	3
284			min	-4020.473	3	-.025	3	-78.85	4	0	4	-.138	4	-.005	2
285		10	max	3762.839	1	2.741	2	0	1	0	1	0	1	0	3
286			min	-4020.227	3	-.034	3	-79.135	4	0	4	-.155	4	-.006	2
287		11	max	3763.168	1	2.73	2	0	1	0	1	0	1	0	3
288			min	-4019.981	3	-.042	3	-79.419	4	0	4	-.173	4	-.006	2
289		12	max	3763.496	1	2.718	2	0	1	0	1	0	1	0	3
290			min	-4019.734	3	-.051	3	-79.704	4	0	4	-.19	4	-.007	2
291		13	max	3763.824	1	2.706	2	0	1	0	1	0	1	0	3
292			min	-4019.488	3	-.06	3	-79.989	4	0	4	-.208	4	-.007	2
293		14	max	3764.153	1	2.694	2	0	1	0	1	0	1	0	3
294			min	-4019.242	3	-.069	3	-80.274	4	0	4	-.226	4	-.008	2
295		15	max	3764.481	1	2.682	2	0	1	0	1	0	1	0	3
296			min	-4018.995	3	-.078	3	-80.559	4	0	4	-.244	4	-.009	2
297		16	max	3764.81	1	2.67	2	0	1	0	1	0	1	0	3
298			min	-4018.749	3	-.087	3	-80.844	4	0	4	-.262	4	-.009	2
299		17	max	3765.138	1	2.658	2	0	1	0	1	0	1	0	3
300			min	-4018.503	3	-.096	3	-81.128	4	0	4	-.279	4	-.01	2
301		18	max	3765.467	1	2.646	2	0	1	0	1	0	1	0	3
302			min	-4018.256	3	-.105	3	-81.413	4	0	4	-.297	4	-.01	2
303		19	max	3765.795	1	2.634	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	-4018.01	3	-.114	3	-81.698	4	0	4	-.316	4	-.011	2
305	M7	1	max	1395.412	2	8.117	6	0	1	0	1	0	1	.011	2
306			min	-1501.095	3	1.905	15	-1.256	5	0	4	-.012	4	0	3
307		2	max	1395.242	2	7.344	6	0	1	0	1	0	1	.008	2
308			min	-1501.223	3	1.723	15	-.714	5	0	4	-.012	4	-.002	3
309		3	max	1395.071	2	6.572	6	0	1	0	1	0	1	.006	2
310			min	-1501.351	3	1.541	15	-.172	5	0	4	-.012	4	-.003	3
311		4	max	1394.901	2	5.799	6	.415	4	0	1	0	1	.003	2
312			min	-1501.479	3	1.36	15	0	1	0	4	-.012	4	-.004	3
313		5	max	1394.731	2	5.027	6	.957	4	0	1	0	1	.001	2
314			min	-1501.606	3	1.178	15	0	1	0	4	-.012	4	-.005	3
315		6	max	1394.56	2	4.255	6	1.5	4	0	1	0	1	0	2
316			min	-1501.734	3	.997	15	0	1	0	4	-.012	4	-.006	3
317		7	max	1394.39	2	3.482	6	2.042	4	0	1	0	1	-.001	15
318			min	-1501.862	3	.815	15	0	1	0	4	-.011	4	-.007	3
319		8	max	1394.22	2	2.71	6	2.584	4	0	1	0	1	-.002	15
320			min	-1501.99	3	.618	12	0	1	0	4	-.01	4	-.007	3
321		9	max	1394.049	2	2.042	2	3.126	4	0	1	0	1	-.002	15
322			min	-1502.118	3	.318	12	0	1	0	4	-.009	4	-.008	4
323		10	max	1393.879	2	1.44	2	3.668	4	0	1	0	1	-.002	15
324			min	-1502.245	3	-.018	3	0	1	0	4	-.007	4	-.009	4
325		11	max	1393.709	2	.838	2	4.21	4	0	1	0	1	-.002	15
326			min	-1502.373	3	-.469	3	0	1	0	4	-.006	4	-.009	4
327		12	max	1393.538	2	.237	2	4.752	4	0	1	0	1	-.002	15
328			min	-1502.501	3	-.92	3	0	1	0	4	-.004	4	-.009	4
329		13	max	1393.368	2	-.274	15	5.294	4	0	1	0	1	-.002	15
330			min	-1502.629	3	-1.372	3	0	1	0	4	-.002	5	-.009	4
331		14	max	1393.198	2	-.456	15	5.837	4	0	1	0	4	-.002	15
332			min	-1502.756	3	-1.925	4	0	1	0	4	0	1	-.008	4
333		15	max	1393.027	2	-.637	15	6.379	4	0	1	.003	4	-.002	15
334			min	-1502.884	3	-2.697	4	0	1	0	4	0	1	-.007	4
335		16	max	1392.857	2	-.819	15	6.921	4	0	1	.006	4	-.001	15
336			min	-1503.012	3	-3.47	4	0	1	0	4	0	1	-.006	4
337		17	max	1392.687	2	-1.001	15	7.463	4	0	1	.009	4	0	15
338			min	-1503.14	3	-4.242	4	0	1	0	4	0	1	-.004	4
339		18	max	1392.516	2	-1.182	15	8.005	4	0	1	.012	4	0	15
340			min	-1503.267	3	-5.014	4	0	1	0	4	0	1	-.002	4
341		19	max	1392.346	2	-1.364	15	8.547	4	0	1	.016	4	0	1
342			min	-1503.395	3	-5.787	4	0	1	0	4	0	1	0	1
343	M8	1	max	3843.851	1	0	1	0	1	0	1	.008	4	0	1
344			min	-1302.047	3	0	1	-225.488	4	0	1	0	1	0	1
345		2	max	3844.021	1	0	1	0	1	0	1	0	1	0	1
346			min	-1301.919	3	0	1	-225.636	4	0	1	-.017	4	0	1
347		3	max	3844.192	1	0	1	0	1	0	1	0	1	0	1
348			min	-1301.791	3	0	1	-225.783	4	0	1	-.043	4	0	1
349		4	max	3844.362	1	0	1	0	1	0	1	0	1	0	1
350			min	-1301.663	3	0	1	-225.931	4	0	1	-.069	4	0	1
351		5	max	3844.532	1	0	1	0	1	0	1	0	1	0	1
352			min	-1301.536	3	0	1	-226.078	4	0	1	-.095	4	0	1
353		6	max	3844.703	1	0	1	0	1	0	1	0	1	0	1
354			min	-1301.408	3	0	1	-226.226	4	0	1	-.121	4	0	1
355		7	max	3844.873	1	0	1	0	1	0	1	0	1	0	1
356			min	-1301.28	3	0	1	-226.374	4	0	1	-.147	4	0	1
357		8	max	3845.043	1	0	1	0	1	0	1	0	1	0	1
358			min	-1301.152	3	0	1	-226.521	4	0	1	-.173	4	0	1
359		9	max	3845.214	1	0	1	0	1	0	1	0	1	0	1
360			min	-1301.025	3	0	1	-226.669	4	0	1	-.199	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	3845.384	1	0	1	0	1	0	1	0	1	0	1
362			min	-1300.897	3	0	1	-226.817	4	0	1	-.225	4	0	1
363		11	max	3845.554	1	0	1	0	1	0	1	0	1	0	1
364			min	-1300.769	3	0	1	-226.964	4	0	1	-.251	4	0	1
365		12	max	3845.725	1	0	1	0	1	0	1	0	1	0	1
366			min	-1300.641	3	0	1	-227.112	4	0	1	-.277	4	0	1
367		13	max	3845.895	1	0	1	0	1	0	1	0	1	0	1
368			min	-1300.514	3	0	1	-227.26	4	0	1	-.303	4	0	1
369		14	max	3846.065	1	0	1	0	1	0	1	0	1	0	1
370			min	-1300.386	3	0	1	-227.407	4	0	1	-.33	4	0	1
371		15	max	3846.236	1	0	1	0	1	0	1	0	1	0	1
372			min	-1300.258	3	0	1	-227.555	4	0	1	-.356	4	0	1
373		16	max	3846.406	1	0	1	0	1	0	1	0	1	0	1
374			min	-1300.13	3	0	1	-227.702	4	0	1	-.382	4	0	1
375		17	max	3846.576	1	0	1	0	1	0	1	0	1	0	1
376			min	-1300.003	3	0	1	-227.85	4	0	1	-.408	4	0	1
377		18	max	3846.747	1	0	1	0	1	0	1	0	1	0	1
378			min	-1299.875	3	0	1	-227.998	4	0	1	-.434	4	0	1
379		19	max	3846.917	1	0	1	0	1	0	1	0	1	0	1
380			min	-1299.747	3	0	1	-228.145	4	0	1	-.46	4	0	1
381	M10	1	max	1170.124	1	2.229	6	-.046	12	0	1	0	1	0	1
382			min	-1230.683	3	.502	15	-76.471	4	0	5	0	3	0	1
383		2	max	1170.452	1	2.214	6	-.046	12	0	1	0	10	0	15
384			min	-1230.436	3	.499	15	-76.756	4	0	5	-.017	4	0	6
385		3	max	1170.78	1	2.199	6	-.046	12	0	1	0	12	0	15
386			min	-1230.19	3	.495	15	-77.041	4	0	5	-.034	4	0	6
387		4	max	1171.109	1	2.184	6	-.046	12	0	1	0	12	0	15
388			min	-1229.944	3	.492	15	-77.326	4	0	5	-.051	4	-.001	6
389		5	max	1171.437	1	2.168	6	-.046	12	0	1	0	12	0	15
390			min	-1229.697	3	.488	15	-77.61	4	0	5	-.068	4	-.002	6
391		6	max	1171.766	1	2.153	6	-.046	12	0	1	0	12	0	15
392			min	-1229.451	3	.484	15	-77.895	4	0	5	-.085	4	-.002	6
393		7	max	1172.094	1	2.138	6	-.046	12	0	1	0	12	0	15
394			min	-1229.205	3	.481	15	-78.18	4	0	5	-.103	4	-.003	6
395		8	max	1172.423	1	2.123	6	-.046	12	0	1	0	12	0	15
396			min	-1228.958	3	.477	15	-78.465	4	0	5	-.12	4	-.003	6
397		9	max	1172.751	1	2.107	6	-.046	12	0	1	0	12	0	15
398			min	-1228.712	3	.474	15	-78.75	4	0	5	-.138	4	-.004	6
399		10	max	1173.079	1	2.092	6	-.046	12	0	1	0	12	0	15
400			min	-1228.466	3	.47	15	-79.035	4	0	5	-.155	4	-.004	6
401		11	max	1173.408	1	2.077	6	-.046	12	0	1	0	12	-.001	15
402			min	-1228.219	3	.466	15	-79.319	4	0	5	-.173	4	-.005	6
403		12	max	1173.736	1	2.062	6	-.046	12	0	1	0	12	-.001	15
404			min	-1227.973	3	.463	15	-79.604	4	0	5	-.19	4	-.005	6
405		13	max	1174.065	1	2.046	6	-.046	12	0	1	0	12	-.001	15
406			min	-1227.727	3	.459	15	-79.889	4	0	5	-.208	4	-.006	6
407		14	max	1174.393	1	2.031	6	-.046	12	0	1	0	12	-.001	15
408			min	-1227.48	3	.456	15	-80.174	4	0	5	-.226	4	-.006	6
409		15	max	1174.722	1	2.016	6	-.046	12	0	1	0	12	-.001	15
410			min	-1227.234	3	.452	15	-80.459	4	0	5	-.243	4	-.007	6
411		16	max	1175.05	1	2	6	-.046	12	0	1	0	12	-.002	15
412			min	-1226.988	3	.448	15	-80.744	4	0	5	-.261	4	-.007	6
413		17	max	1175.379	1	1.985	6	-.046	12	0	1	0	12	-.002	15
414			min	-1226.741	3	.445	15	-81.028	4	0	5	-.279	4	-.007	6
415		18	max	1175.707	1	1.97	6	-.046	12	0	1	0	12	-.002	15
416			min	-1226.495	3	.441	15	-81.313	4	0	5	-.297	4	-.008	6
417		19	max	1176.035	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	-1226.249	3	.438	15	-81.598	4	0	5	-.315	4	-.008	6
419	M11	1	max	358.935	2	8.051	6	0	12	0	1	0	12	.008	6
420			min	-476.885	3	1.881	15	-1.187	5	0	4	-.012	4	.002	15
421		2	max	358.764	2	7.279	6	0	12	0	1	0	12	.005	2
422			min	-477.013	3	1.699	15	-.645	5	0	4	-.012	4	.001	15
423		3	max	358.594	2	6.506	6	0	12	0	1	0	12	.003	2
424			min	-477.14	3	1.518	15	-.103	5	0	4	-.012	4	0	3
425		4	max	358.424	2	5.734	6	.486	4	0	1	0	12	0	2
426			min	-477.268	3	1.336	15	-.015	1	0	4	-.012	4	-.001	3
427		5	max	358.253	2	4.961	6	1.029	4	0	1	0	12	0	15
428			min	-477.396	3	1.155	15	-.015	1	0	4	-.012	4	-.003	3
429		6	max	358.083	2	4.189	6	1.571	4	0	1	0	12	-.001	15
430			min	-477.524	3	.973	15	-.015	1	0	4	-.011	4	-.005	4
431		7	max	357.913	2	3.416	6	2.113	4	0	1	0	12	-.002	15
432			min	-477.651	3	.792	15	-.015	1	0	4	-.011	4	-.006	4
433		8	max	357.742	2	2.644	6	2.655	4	0	1	0	12	-.002	15
434			min	-477.779	3	.61	15	-.015	1	0	4	-.01	4	-.007	4
435		9	max	357.572	2	1.872	6	3.197	4	0	1	0	12	-.002	15
436			min	-477.907	3	.429	15	-.015	1	0	4	-.008	4	-.008	4
437		10	max	357.402	2	1.099	6	3.739	4	0	1	0	12	-.002	15
438			min	-478.035	3	.247	15	-.015	1	0	4	-.007	4	-.009	4
439		11	max	357.231	2	.429	2	4.281	4	0	1	0	12	-.002	15
440			min	-478.162	3	-.004	3	-.015	1	0	4	-.005	4	-.009	4
441		12	max	357.061	2	-.116	15	4.823	4	0	1	0	12	-.002	15
442			min	-478.29	3	-.455	3	-.015	1	0	4	-.003	4	-.009	4
443		13	max	356.891	2	-.298	15	5.366	4	0	1	0	12	-.002	15
444			min	-478.418	3	-1.219	4	-.015	1	0	4	-.001	4	-.009	4
445		14	max	356.72	2	-.479	15	5.908	4	0	1	.001	4	-.002	15
446			min	-478.546	3	-1.992	4	-.015	1	0	4	0	1	-.008	4
447		15	max	356.55	2	-.661	15	6.45	4	0	1	.004	4	-.002	15
448			min	-478.674	3	-2.764	4	-.015	1	0	4	0	1	-.007	4
449		16	max	356.38	2	-.842	15	6.992	4	0	1	.007	4	-.001	15
450			min	-478.801	3	-3.536	4	-.015	1	0	4	0	1	-.006	4
451		17	max	356.209	2	-1.024	15	7.534	4	0	1	.01	4	-.001	15
452			min	-478.929	3	-4.309	4	-.015	1	0	4	0	1	-.004	4
453		18	max	356.039	2	-1.206	15	8.076	4	0	1	.013	4	0	15
454			min	-479.057	3	-5.081	4	-.015	1	0	4	0	1	-.002	4
455		19	max	355.869	2	-1.387	15	8.618	4	0	1	.017	4	0	1
456			min	-479.185	3	-5.854	4	-.015	1	0	4	0	1	0	1
457	M12	1	max	1299.985	1	0	1	7.579	1	0	1	.009	4	0	1
458			min	-384.414	3	0	1	-226.745	4	0	1	0	1	0	1
459		2	max	1300.155	1	0	1	7.579	1	0	1	0	1	0	1
460			min	-384.286	3	0	1	-226.893	4	0	1	-.017	4	0	1
461		3	max	1300.326	1	0	1	7.579	1	0	1	.002	1	0	1
462			min	-384.158	3	0	1	-227.041	4	0	1	-.043	4	0	1
463		4	max	1300.496	1	0	1	7.579	1	0	1	.002	1	0	1
464			min	-384.03	3	0	1	-227.188	4	0	1	-.069	4	0	1
465		5	max	1300.666	1	0	1	7.579	1	0	1	.003	1	0	1
466			min	-383.903	3	0	1	-227.336	4	0	1	-.096	4	0	1
467		6	max	1300.837	1	0	1	7.579	1	0	1	.004	1	0	1
468			min	-383.775	3	0	1	-227.483	4	0	1	-.122	4	0	1
469		7	max	1301.007	1	0	1	7.579	1	0	1	.005	1	0	1
470			min	-383.647	3	0	1	-227.631	4	0	1	-.148	4	0	1
471		8	max	1301.177	1	0	1	7.579	1	0	1	.006	1	0	1
472			min	-383.519	3	0	1	-227.779	4	0	1	-.174	4	0	1
473		9	max	1301.348	1	0	1	7.579	1	0	1	.007	1	0	1
474			min	-383.392	3	0	1	-227.926	4	0	1	-.2	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	1301.518	1	0	1	7.579	1	0	1	.008	1	0	1
476			min	-383.264	3	0	1	-228.074	4	0	1	-.226	4	0	1
477		11	max	1301.688	1	0	1	7.579	1	0	1	.009	1	0	1
478			min	-383.136	3	0	1	-228.222	4	0	1	-.252	4	0	1
479		12	max	1301.859	1	0	1	7.579	1	0	1	.009	1	0	1
480			min	-383.008	3	0	1	-228.369	4	0	1	-.279	4	0	1
481		13	max	1302.029	1	0	1	7.579	1	0	1	.01	1	0	1
482			min	-382.88	3	0	1	-228.517	4	0	1	-.305	4	0	1
483		14	max	1302.199	1	0	1	7.579	1	0	1	.011	1	0	1
484			min	-382.753	3	0	1	-228.664	4	0	1	-.331	4	0	1
485		15	max	1302.37	1	0	1	7.579	1	0	1	.012	1	0	1
486			min	-382.625	3	0	1	-228.812	4	0	1	-.357	4	0	1
487		16	max	1302.54	1	0	1	7.579	1	0	1	.013	1	0	1
488			min	-382.497	3	0	1	-228.96	4	0	1	-.384	4	0	1
489		17	max	1302.71	1	0	1	7.579	1	0	1	.014	1	0	1
490			min	-382.369	3	0	1	-229.107	4	0	1	-.41	4	0	1
491		18	max	1302.881	1	0	1	7.579	1	0	1	.015	1	0	1
492			min	-382.242	3	0	1	-229.255	4	0	1	-.436	4	0	1
493		19	max	1303.051	1	0	1	7.579	1	0	1	.016	1	0	1
494			min	-382.114	3	0	1	-229.403	4	0	1	-.463	4	0	1
495	M1	1	max	132.703	1	693.641	3	54.574	5	0	1	.189	1	0	3
496			min	-6.435	5	-534.357	1	-79.503	1	0	3	-.057	5	-.015	1
497		2	max	133.074	1	692.603	3	55.815	5	0	1	.147	1	.268	1
498			min	-6.262	5	-535.741	1	-79.503	1	0	3	-.028	5	-.365	3
499		3	max	283.888	3	601.016	1	-3.5	12	0	3	.105	1	.537	1
500			min	-174.97	2	-509.501	3	-78.569	1	0	1	0	15	-.716	3
501		4	max	284.166	3	599.632	1	-3.5	12	0	3	.064	1	.22	1
502			min	-174.599	2	-510.539	3	-78.569	1	0	1	-.008	5	-.447	3
503		5	max	284.444	3	598.249	1	-3.5	12	0	3	.022	1	-.004	15
504			min	-174.229	2	-511.576	3	-78.569	1	0	1	-.016	5	-.177	3
505		6	max	284.722	3	596.865	1	-3.5	12	0	3	0	12	.093	3
506			min	-173.858	2	-512.614	3	-78.569	1	0	1	-.027	4	-.411	1
507		7	max	285.001	3	595.481	1	-3.5	12	0	3	-.003	12	.364	3
508			min	-173.487	2	-513.652	3	-78.569	1	0	1	-.061	1	-.726	1
509		8	max	285.279	3	594.098	1	-3.5	12	0	3	-.005	12	.635	3
510			min	-173.116	2	-514.689	3	-78.569	1	0	1	-.102	1	-1.04	1
511		9	max	293.032	3	46.754	2	38.079	5	0	9	.061	1	.741	3
512			min	-120.236	2	.417	15	-116.272	1	0	3	-.113	5	-1.185	1
513		10	max	293.31	3	45.371	2	39.32	5	0	9	0	10	.723	3
514			min	-119.866	2	0	5	-116.272	1	0	3	-.094	4	-1.198	1
515		11	max	293.588	3	43.987	2	40.562	5	0	9	-.003	12	.705	3
516			min	-119.495	2	-1.736	4	-116.272	1	0	3	-.084	4	-1.21	1
517		12	max	301.283	3	342.769	3	122.77	5	0	2	.101	1	.614	3
518			min	-75.274	10	-643.523	1	-76.819	1	0	3	-.165	5	-1.069	1
519		13	max	301.561	3	341.731	3	124.011	5	0	2	.06	1	.434	3
520			min	-74.965	10	-644.907	1	-76.819	1	0	3	-.1	5	-.729	1
521		14	max	301.839	3	340.693	3	125.253	5	0	2	.02	1	.254	3
522			min	-74.656	10	-646.291	1	-76.819	1	0	3	-.034	5	-.388	1
523		15	max	302.117	3	339.656	3	126.494	5	0	2	.032	5	.074	3
524			min	-74.347	10	-647.674	1	-76.819	1	0	3	-.021	1	-.047	1
525		16	max	302.395	3	338.618	3	127.735	5	0	2	.099	5	.317	2
526			min	-74.038	10	-649.058	1	-76.819	1	0	3	-.061	1	-.105	3
527		17	max	302.673	3	337.58	3	128.977	5	0	2	.167	5	.652	2
528			min	-73.729	10	-650.441	1	-76.819	1	0	3	-.102	1	-.283	3
529		18	max	13.784	5	642.354	2	-3.519	12	0	5	.14	5	.328	2
530			min	-133.263	1	-285.277	3	-104.097	4	0	2	-.146	1	-.14	3
531		19	max	13.957	5	640.97	2	-3.519	12	0	5	.095	5	.011	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	-132.892	1	-286.315	3	-102.856	4	0	2	-.19	1	-.013	1
533	M5	1	max	287.71	1	2313.561	3	82.986	5	0	1	0	1	.03	1
534			min	8.39	12	-1812.38	1	0	1	0	4	-.126	4	-.002	3
535		2	max	288.08	1	2312.523	3	84.228	5	0	1	0	1	.986	1
536			min	8.575	12	-1813.764	1	0	1	0	4	-.082	4	-1.222	3
537		3	max	911.245	3	1826.305	1	13.809	4	0	4	0	1	1.9	1
538			min	-618.087	2	-1625.481	3	0	1	0	1	-.039	4	-2.395	3
539		4	max	911.523	3	1824.921	1	15.05	4	0	4	0	1	.937	1
540			min	-617.716	2	-1626.519	3	0	1	0	1	-.031	4	-1.537	3
541		5	max	911.801	3	1823.538	1	16.292	4	0	4	0	1	.016	9
542			min	-617.346	2	-1627.557	3	0	1	0	1	-.023	4	-.678	3
543		6	max	912.079	3	1822.154	1	17.533	4	0	4	0	1	.181	3
544			min	-616.975	2	-1628.594	3	0	1	0	1	-.014	5	-.988	1
545		7	max	912.357	3	1820.771	1	18.775	4	0	4	0	1	1.04	3
546			min	-616.604	2	-1629.632	3	0	1	0	1	-.006	5	-1.949	1
547		8	max	912.635	3	1819.387	1	20.016	4	0	4	.006	4	1.901	3
548			min	-616.233	2	-1630.67	3	0	1	0	1	0	1	-2.909	1
549		9	max	925.007	3	156.183	2	121.753	4	0	1	0	1	2.186	3
550			min	-506.935	2	.418	15	0	1	0	1	-.149	4	-3.294	1
551		10	max	925.285	3	154.8	2	122.995	4	0	1	0	1	2.12	3
552			min	-506.564	2	0	15	0	1	0	1	-.085	5	-3.337	1
553		11	max	925.563	3	153.416	2	124.236	4	0	1	0	1	2.054	3
554			min	-506.194	2	-1.608	6	0	1	0	1	-.02	5	-3.379	1
555		12	max	938.054	3	1076.415	3	166.996	4	0	1	0	1	1.804	3
556			min	-396.934	2	-1983.724	1	0	1	0	4	-.229	4	-3.012	1
557		13	max	938.332	3	1075.378	3	168.237	4	0	1	0	1	1.236	3
558			min	-396.563	2	-1985.107	1	0	1	0	4	-.141	4	-1.965	1
559		14	max	938.61	3	1074.34	3	169.479	4	0	1	0	1	.669	3
560			min	-396.192	2	-1986.491	1	0	1	0	4	-.052	4	-.917	1
561		15	max	938.888	3	1073.302	3	170.72	4	0	1	.038	4	.207	2
562			min	-395.822	2	-1987.875	1	0	1	0	4	0	1	-.004	13
563		16	max	939.166	3	1072.264	3	171.962	4	0	1	.128	4	1.232	2
564			min	-395.451	2	-1989.258	1	0	1	0	4	0	1	-.464	3
565		17	max	939.444	3	1071.227	3	173.203	4	0	1	.22	4	2.258	2
566			min	-395.08	2	-1990.642	1	0	1	0	4	0	1	-1.029	3
567		18	max	-8.826	12	2165.743	2	0	1	0	4	.218	4	1.164	2
568			min	-287.703	1	-978.674	3	-39.641	5	0	1	0	1	-.538	3
569		19	max	-8.641	12	2164.359	2	0	1	0	4	.198	4	.026	1
570			min	-287.333	1	-979.712	3	-38.4	5	0	1	0	1	-.021	3
571	M9	1	max	132.703	1	693.641	3	79.503	1	0	3	-.008	12	0	3
572			min	4.82	12	-534.357	1	3.549	12	0	1	-.189	1	-.015	1
573		2	max	133.074	1	692.603	3	80.48	4	0	3	-.007	12	.268	1
574			min	5.006	12	-535.741	1	3.549	12	0	1	-.147	1	-.365	3
575		3	max	283.888	3	601.016	1	78.569	1	0	1	-.005	12	.537	1
576			min	-174.97	2	-509.501	3	-9.324	5	0	3	-.105	1	-.716	3
577		4	max	284.166	3	599.632	1	78.569	1	0	1	-.003	12	.22	1
578			min	-174.599	2	-510.539	3	-8.082	5	0	3	-.064	1	-.447	3
579		5	max	284.444	3	598.249	1	78.569	1	0	1	-.001	12	-.004	15
580			min	-174.229	2	-511.576	3	-6.841	5	0	3	-.023	4	-.177	3
581		6	max	284.722	3	596.865	1	78.569	1	0	1	.019	1	.093	3
582			min	-173.858	2	-512.614	3	-5.599	5	0	3	-.021	5	-.411	1
583		7	max	285.001	3	595.481	1	78.569	1	0	1	.061	1	.364	3
584			min	-173.487	2	-513.652	3	-4.358	5	0	3	-.024	5	-.726	1
585		8	max	285.279	3	594.098	1	78.569	1	0	1	.102	1	.635	3
586			min	-173.116	2	-514.689	3	-3.116	5	0	3	-.026	5	-1.04	1
587		9	max	293.032	3	46.754	2	116.272	1	0	3	-.003	12	.741	3
588			min	-120.236	2	.422	15	5.017	12	0	9	-.133	4	-1.185	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	293.31	3	45.371	2	116.272	1	0	3	0	1	.723	3
590			min	-119.866	2	.005	15	5.017	12	0	9	-.093	4	-1.198	1
591		11	max	293.588	3	43.987	2	116.272	1	0	3	.062	1	.705	3
592			min	-119.495	2	-1.697	6	5.017	12	0	9	-.066	5	-1.21	1
593		12	max	301.283	3	342.769	3	147.594	4	0	3	-.004	12	.614	3
594			min	-75.274	10	-643.523	1	3.204	12	0	2	-.197	4	-1.069	1
595		13	max	301.561	3	341.731	3	148.836	4	0	3	-.003	12	.434	3
596			min	-74.965	10	-644.907	1	3.204	12	0	2	-.119	4	-.729	1
597		14	max	301.839	3	340.693	3	150.077	4	0	3	0	12	.254	3
598			min	-74.656	10	-646.291	1	3.204	12	0	2	-.04	4	-.388	1
599		15	max	302.117	3	339.656	3	151.319	4	0	3	.039	4	.074	3
600			min	-74.347	10	-647.674	1	3.204	12	0	2	0	12	-.047	1
601		16	max	302.395	3	338.618	3	152.56	4	0	3	.119	4	.317	2
602			min	-74.038	10	-649.058	1	3.204	12	0	2	.003	12	-.105	3
603		17	max	302.673	3	337.58	3	153.802	4	0	3	.2	4	.652	2
604			min	-73.729	10	-650.441	1	3.204	12	0	2	.004	12	-.283	3
605		18	max	-4.88	12	642.354	2	84.116	1	0	2	.186	4	.328	2
606			min	-133.263	1	-285.277	3	-77.99	5	0	3	.006	12	-.14	3
607		19	max	-4.695	12	640.97	2	84.116	1	0	2	.19	1	.011	3
608			min	-132.892	1	-286.315	3	-76.748	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	.122	1	.005	3	9.678e-3	1	NC	1	NC	1
2			min	-.456	4	-.025	3	-.002	2	-1.866e-3	3	NC	1	NC	1
3		2	max	0	1	.278	3	.029	1	1.108e-2	1	NC	5	NC	2
4			min	-.456	4	-.089	1	-.012	5	-1.944e-3	3	773.511	3	8439.325	1
5		3	max	0	1	.523	3	.069	1	1.249e-2	1	NC	5	NC	3
6			min	-.456	4	-.256	1	-.014	5	-2.021e-3	3	427.67	3	3463.596	1
7		4	max	0	1	.67	3	.103	1	1.39e-2	1	NC	5	NC	3
8			min	-.456	4	-.348	1	-.01	5	-2.099e-3	3	336.675	3	2295.468	1
9		5	max	0	1	.703	3	.121	1	1.53e-2	1	NC	5	NC	3
10			min	-.456	4	-.352	1	-.002	5	-2.177e-3	3	321.411	3	1957.508	1
11		6	max	0	1	.624	3	.117	1	1.671e-2	1	NC	5	NC	3
12			min	-.456	4	-.271	1	.004	15	-2.254e-3	3	360.672	3	2030.182	1
13		7	max	0	1	.456	3	.092	1	1.812e-2	1	NC	5	NC	3
14			min	-.456	4	-.124	1	.003	10	-2.332e-3	3	486.843	3	2593.271	1
15		8	max	0	1	.243	3	.053	1	1.952e-2	1	NC	4	NC	2
16			min	-.456	4	.001	15	-.001	10	-2.409e-3	3	874.038	3	4515.723	1
17		9	max	0	1	.217	2	.016	3	2.093e-2	1	NC	4	NC	1
18			min	-.456	4	.005	15	-.005	10	-2.487e-3	3	2359.309	2	NC	1
19		10	max	0	1	.284	1	.016	3	2.234e-2	1	NC	3	NC	1
20			min	-.456	4	-.037	3	-.01	2	-2.564e-3	3	1444.191	1	NC	1
21		11	max	0	12	.217	2	.016	3	2.093e-2	1	NC	4	NC	1
22			min	-.456	4	.005	15	-.01	5	-2.487e-3	3	2359.309	2	NC	1
23		12	max	0	12	.243	3	.053	1	1.952e-2	1	NC	4	NC	2
24			min	-.456	4	.001	15	-.01	5	-2.409e-3	3	874.038	3	4515.723	1
25		13	max	0	12	.456	3	.092	1	1.812e-2	1	NC	5	NC	3
26			min	-.456	4	-.124	1	-.003	5	-2.332e-3	3	486.843	3	2593.271	1
27		14	max	0	12	.624	3	.117	1	1.671e-2	1	NC	5	NC	3
28			min	-.456	4	-.271	1	.004	15	-2.254e-3	3	360.672	3	2030.182	1
29		15	max	0	12	.703	3	.121	1	1.53e-2	1	NC	5	NC	3
30			min	-.456	4	-.352	1	.007	10	-2.177e-3	3	321.411	3	1957.508	1
31		16	max	0	12	.67	3	.103	1	1.39e-2	1	NC	5	NC	3
32			min	-.456	4	-.348	1	.006	10	-2.099e-3	3	336.675	3	2295.468	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	.523	3	.069	1	1.249e-2	1	NC	5	NC	3
34			min	-.456	4	-.256	1	.004	10	-2.021e-3	3	427.67	3	3463.596	1
35		18	max	0	12	.278	3	.029	1	1.108e-2	1	NC	5	NC	2
36			min	-.456	4	-.089	1	0	10	-1.944e-3	3	773.511	3	8439.325	1
37		19	max	0	12	.122	1	.005	3	9.678e-3	1	NC	1	NC	1
38			min	-.456	4	-.025	3	-.002	2	-1.866e-3	3	NC	1	NC	1
39	M14	1	max	0	1	.22	3	.005	3	5.991e-3	1	NC	1	NC	1
40			min	-.366	4	-.389	1	-.002	2	-3.95e-3	3	NC	1	NC	1
41		2	max	0	1	.522	3	.02	1	7.177e-3	1	NC	5	NC	1
42			min	-.366	4	-.738	1	-.017	5	-4.798e-3	3	671.183	1	NC	1
43		3	max	0	1	.777	3	.055	1	8.364e-3	1	NC	5	NC	2
44			min	-.366	4	-1.038	1	-.021	5	-5.646e-3	3	360.399	1	4339.711	1
45		4	max	0	1	.956	3	.088	1	9.551e-3	1	NC	15	NC	3
46			min	-.366	4	-1.258	1	-.014	5	-6.493e-3	3	269.342	1	2690.102	1
47		5	max	0	1	1.04	3	.107	1	1.074e-2	1	NC	15	NC	3
48			min	-.366	4	-1.379	1	-.002	5	-7.341e-3	3	236.313	1	2211.589	1
49		6	max	0	1	1.032	3	.106	1	1.192e-2	1	NC	15	NC	3
50			min	-.366	4	-1.402	1	.005	10	-8.188e-3	3	231.038	1	2240.644	1
51		7	max	0	1	.947	3	.085	1	1.311e-2	1	NC	15	NC	3
52			min	-.366	4	-1.341	1	.003	10	-9.036e-3	3	245.778	1	2814.174	1
53		8	max	0	1	.817	3	.05	1	1.43e-2	1	NC	15	NC	2
54			min	-.366	4	-1.229	1	0	10	-9.884e-3	3	278.685	1	4828.185	1
55		9	max	0	1	.69	3	.024	4	1.548e-2	1	NC	15	NC	1
56			min	-.366	4	-1.112	1	-.004	10	-1.073e-2	3	323.46	1	9778.119	4
57		10	max	0	1	.631	3	.014	3	1.667e-2	1	NC	5	NC	1
58			min	-.366	4	-1.056	1	-.009	2	-1.158e-2	3	350.58	1	NC	1
59		11	max	0	12	.69	3	.015	3	1.548e-2	1	NC	15	NC	1
60			min	-.366	4	-1.112	1	-.017	5	-1.073e-2	3	323.46	1	NC	1
61		12	max	0	12	.817	3	.05	1	1.43e-2	1	NC	15	NC	2
62			min	-.366	4	-1.229	1	-.02	5	-9.884e-3	3	278.685	1	4828.185	1
63		13	max	0	12	.947	3	.085	1	1.311e-2	1	NC	15	NC	3
64			min	-.366	4	-1.341	1	-.013	5	-9.036e-3	3	245.778	1	2814.174	1
65		14	max	0	12	1.032	3	.106	1	1.192e-2	1	NC	15	NC	3
66			min	-.366	4	-1.402	1	0	15	-8.188e-3	3	231.038	1	2240.644	1
67		15	max	0	12	1.04	3	.107	1	1.074e-2	1	NC	15	NC	3
68			min	-.366	4	-1.379	1	.006	10	-7.341e-3	3	236.313	1	2211.589	1
69		16	max	0	12	.956	3	.088	1	9.551e-3	1	NC	15	NC	3
70			min	-.366	4	-1.258	1	.005	10	-6.493e-3	3	269.342	1	2690.102	1
71		17	max	0	12	.777	3	.055	1	8.364e-3	1	NC	5	NC	2
72			min	-.366	4	-1.038	1	.003	10	-5.646e-3	3	360.399	1	4339.711	1
73		18	max	0	12	.522	3	.025	4	7.177e-3	1	NC	5	NC	1
74			min	-.366	4	-.738	1	0	10	-4.798e-3	3	671.183	1	9489.459	4
75		19	max	0	12	.22	3	.005	3	5.991e-3	1	NC	1	NC	1
76			min	-.366	4	-.389	1	-.002	2	-3.95e-3	3	NC	1	NC	1
77	M15	1	max	0	12	.225	3	.004	3	3.352e-3	3	NC	1	NC	1
78			min	-.309	4	-.389	1	-.002	2	-6.106e-3	1	NC	1	NC	1
79		2	max	0	12	.422	3	.02	1	4.073e-3	3	NC	5	NC	1
80			min	-.309	4	-.778	1	-.027	5	-7.319e-3	1	601.02	1	8484.34	5
81		3	max	0	12	.593	3	.056	1	4.793e-3	3	NC	5	NC	2
82			min	-.309	4	-1.112	1	-.033	5	-8.533e-3	1	323.687	1	4326.828	1
83		4	max	0	12	.721	3	.089	1	5.514e-3	3	NC	15	NC	3
84			min	-.309	4	-1.351	1	-.024	5	-9.747e-3	1	243.144	1	2683.53	1
85		5	max	0	12	.794	3	.107	1	6.235e-3	3	NC	15	NC	3
86			min	-.31	4	-1.477	1	-.006	5	-1.096e-2	1	214.999	1	2206.366	1
87		6	max	0	12	.814	3	.106	1	6.955e-3	3	NC	15	NC	3
88			min	-.31	4	-1.489	1	.006	10	-1.217e-2	1	212.632	1	2234.752	1
89		7	max	0	12	.788	3	.085	1	7.676e-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	-.31	4	-1.406	1	.003	10	-1.339e-2	1	230.015	1	2804.387	1
91		8	max	0	12	.732	3	.05	1	8.396e-3	3	NC	15	NC	2
92			min	-.31	4	-1.265	1	0	10	-1.46e-2	1	266.986	1	4798.714	1
93		9	max	0	12	.673	3	.032	4	9.117e-3	3	NC	15	NC	1
94			min	-.31	4	-1.123	1	-.004	10	-1.582e-2	1	318.614	1	7317.374	4
95		10	max	0	1	.644	3	.013	3	9.837e-3	3	NC	5	NC	1
96			min	-.31	4	-1.055	1	-.008	2	-1.703e-2	1	350.929	1	NC	1
97		11	max	0	1	.673	3	.015	1	9.117e-3	3	NC	15	NC	1
98			min	-.31	4	-1.123	1	-.025	5	-1.582e-2	1	318.614	1	9156.188	5
99		12	max	0	1	.732	3	.05	1	8.396e-3	3	NC	15	NC	2
100			min	-.31	4	-1.265	1	-.03	5	-1.46e-2	1	266.986	1	4798.714	1
101		13	max	0	1	.788	3	.085	1	7.676e-3	3	NC	15	NC	3
102			min	-.309	4	-1.406	1	-.02	5	-1.339e-2	1	230.015	1	2804.387	1
103		14	max	0	1	.814	3	.106	1	6.955e-3	3	NC	15	NC	3
104			min	-.309	4	-1.489	1	-.002	5	-1.217e-2	1	212.632	1	2234.752	1
105		15	max	0	1	.794	3	.107	1	6.235e-3	3	NC	15	NC	3
106			min	-.309	4	-1.477	1	.006	10	-1.096e-2	1	214.999	1	2206.366	1
107		16	max	0	1	.721	3	.089	1	5.514e-3	3	NC	15	NC	3
108			min	-.309	4	-1.351	1	.005	10	-9.747e-3	1	243.144	1	2683.53	1
109		17	max	0	1	.593	3	.056	1	4.793e-3	3	NC	5	NC	2
110			min	-.309	4	-1.112	1	.003	10	-8.533e-3	1	323.687	1	4326.828	1
111		18	max	0	1	.422	3	.034	4	4.073e-3	3	NC	5	NC	1
112			min	-.309	4	-.778	1	0	10	-7.319e-3	1	601.02	1	6906.628	4
113		19	max	0	1	.225	3	.004	3	3.352e-3	3	NC	1	NC	1
114			min	-.309	4	-.389	1	-.002	2	-6.106e-3	1	NC	1	NC	1
115	M16	1	max	0	12	.116	1	.004	3	5.883e-3	3	NC	1	NC	1
116			min	-.138	4	-.075	3	-.002	2	-8.935e-3	1	NC	1	NC	1
117		2	max	0	12	.033	3	.029	1	6.89e-3	3	NC	5	NC	2
118			min	-.138	4	-.159	2	-.02	5	-1.016e-2	1	893.337	2	8483.2	1
119		3	max	0	12	.118	3	.069	1	7.897e-3	3	NC	5	NC	3
120			min	-.138	4	-.367	2	-.025	5	-1.139e-2	1	497.334	2	3469.892	1
121		4	max	0	12	.162	3	.103	1	8.905e-3	3	NC	5	NC	3
122			min	-.138	4	-.487	2	-.019	5	-1.262e-2	1	396.589	2	2294.948	1
123		5	max	0	12	.16	3	.121	1	9.912e-3	3	NC	5	NC	3
124			min	-.138	4	-.501	2	-.007	5	-1.385e-2	1	387.336	2	1953.351	1
125		6	max	0	12	.113	3	.117	1	1.092e-2	3	NC	5	NC	3
126			min	-.138	4	-.413	2	.004	15	-1.508e-2	1	453.739	2	2020.857	1
127		7	max	0	12	.03	3	.092	1	1.193e-2	3	NC	5	NC	3
128			min	-.138	4	-.244	2	.004	10	-1.631e-2	1	674.313	2	2570.023	1
129		8	max	0	12	.017	9	.054	1	1.293e-2	3	NC	3	NC	2
130			min	-.138	4	-.068	3	0	10	-1.754e-2	1	1676.695	2	4424.512	1
131		9	max	0	12	.184	1	.022	4	1.394e-2	3	NC	4	NC	1
132			min	-.138	4	-.155	3	-.003	10	-1.877e-2	1	2926.398	3	NC	1
133		10	max	0	1	.267	1	.012	3	1.495e-2	3	NC	5	NC	1
134			min	-.138	4	-.193	3	-.008	2	-2.e-2	1	1553.824	1	NC	1
135		11	max	0	1	.184	1	.016	1	1.394e-2	3	NC	4	NC	1
136			min	-.138	4	-.155	3	-.016	5	-1.877e-2	1	2926.398	3	NC	1
137		12	max	0	1	.017	9	.054	1	1.293e-2	3	NC	3	NC	2
138			min	-.138	4	-.068	3	-.017	5	-1.754e-2	1	1676.695	2	4424.512	1
139		13	max	0	1	.03	3	.092	1	1.193e-2	3	NC	5	NC	3
140			min	-.138	4	-.244	2	-.008	5	-1.631e-2	1	674.313	2	2570.023	1
141		14	max	0	1	.113	3	.117	1	1.092e-2	3	NC	5	NC	3
142			min	-.138	4	-.413	2	.004	15	-1.508e-2	1	453.739	2	2020.857	1
143		15	max	0	1	.16	3	.121	1	9.912e-3	3	NC	5	NC	3
144			min	-.138	4	-.501	2	.008	10	-1.385e-2	1	387.336	2	1953.351	1
145		16	max	0	1	.162	3	.103	1	8.905e-3	3	NC	5	NC	3
146			min	-.138	4	-.487	2	.007	10	-1.262e-2	1	396.589	2	2294.948	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	.118	3	.069	1	7.897e-3	3	NC	5	NC	3
148			min	-.138	4	-.367	2	.004	10	-1.139e-2	1	497.334	2	3469.892	1
149		18	max	0	1	.033	3	.029	4	6.89e-3	3	NC	5	NC	2
150			min	-.138	4	-.159	2	0	10	-1.016e-2	1	893.337	2	7902.067	4
151		19	max	0	1	.116	1	.004	3	5.883e-3	3	NC	1	NC	1
152			min	-.138	4	-.075	3	-.002	2	-8.935e-3	1	NC	1	NC	1
153	M2	1	max	.005	1	.003	2	.006	1	1.181e-3	5	NC	1	NC	2
154			min	-.006	3	-.007	3	-.432	4	-1.559e-4	1	NC	1	110.698	4
155		2	max	.005	1	.003	2	.006	1	1.262e-3	5	NC	1	NC	2
156			min	-.005	3	-.006	3	-.397	4	-1.445e-4	1	NC	1	120.618	4
157		3	max	.005	1	.002	2	.005	1	1.342e-3	5	NC	1	NC	2
158			min	-.005	3	-.006	3	-.361	4	-1.33e-4	1	NC	1	132.413	4
159		4	max	.005	1	.002	2	.005	1	1.422e-3	5	NC	1	NC	1
160			min	-.005	3	-.006	3	-.326	4	-1.216e-4	1	NC	1	146.576	4
161		5	max	.004	1	.001	2	.004	1	1.503e-3	5	NC	1	NC	1
162			min	-.004	3	-.006	3	-.292	4	-1.102e-4	1	NC	1	163.773	4
163		6	max	.004	1	.001	2	.004	1	1.583e-3	5	NC	1	NC	1
164			min	-.004	3	-.005	3	-.259	4	-9.872e-5	1	NC	1	184.934	4
165		7	max	.004	1	0	2	.003	1	1.663e-3	5	NC	1	NC	1
166			min	-.004	3	-.005	3	-.226	4	-8.728e-5	1	NC	1	211.376	4
167		8	max	.003	1	0	2	.003	1	1.744e-3	4	NC	1	NC	1
168			min	-.003	3	-.005	3	-.195	4	-7.584e-5	1	NC	1	245.027	4
169		9	max	.003	1	0	2	.002	1	1.828e-3	4	NC	1	NC	1
170			min	-.003	3	-.004	3	-.166	4	-6.441e-5	1	NC	1	288.792	4
171		10	max	.003	1	0	15	.002	1	1.913e-3	4	NC	1	NC	1
172			min	-.003	3	-.004	3	-.138	4	-5.297e-5	1	NC	1	347.225	4
173		11	max	.002	1	0	15	.002	1	1.997e-3	4	NC	1	NC	1
174			min	-.003	3	-.004	3	-.112	4	-4.153e-5	1	NC	1	427.797	4
175		12	max	.002	1	0	15	.001	1	2.081e-3	4	NC	1	NC	1
176			min	-.002	3	-.003	3	-.088	4	-3.009e-5	1	NC	1	543.477	4
177		13	max	.002	1	0	15	0	1	2.166e-3	4	NC	1	NC	1
178			min	-.002	3	-.003	3	-.067	4	-1.865e-5	1	NC	1	718.444	4
179		14	max	.002	1	0	15	0	1	2.25e-3	4	NC	1	NC	1
180			min	-.002	3	-.003	3	-.048	4	-7.211e-6	1	NC	1	1002.177	4
181		15	max	.001	1	0	15	0	1	2.335e-3	4	NC	1	NC	1
182			min	-.001	3	-.002	3	-.032	4	-2.03e-7	3	NC	1	1509.648	4
183		16	max	0	1	0	15	0	1	2.419e-3	4	NC	1	NC	1
184			min	0	3	-.002	3	-.019	4	3.965e-7	12	NC	1	2562.389	4
185		17	max	0	1	0	15	0	1	2.503e-3	4	NC	1	NC	1
186			min	0	3	-.001	3	-.009	4	9.12e-7	12	NC	1	5375.331	4
187		18	max	0	1	0	15	0	1	2.588e-3	4	NC	1	NC	1
188			min	0	3	0	3	-.003	4	1.427e-6	12	NC	1	NC	1
189		19	max	0	1	0	1	0	1	2.672e-3	4	NC	1	NC	1
190			min	0	1	0	1	0	1	1.943e-6	12	NC	1	NC	1
191	M3	1	max	0	1	0	1	0	1	-6.127e-7	12	NC	1	NC	1
192			min	0	1	0	1	0	1	-5.962e-4	4	NC	1	NC	1
193		2	max	0	3	0	15	.013	4	3.988e-6	1	NC	1	NC	1
194			min	0	2	-.001	6	0	12	0	15	NC	1	NC	1
195		3	max	0	3	0	15	.025	4	6.01e-4	4	NC	1	NC	1
196			min	0	2	-.003	6	0	12	9.607e-7	12	NC	1	NC	1
197		4	max	0	3	-.001	15	.037	4	1.2e-3	4	NC	1	NC	1
198			min	0	2	-.005	6	0	12	1.747e-6	12	NC	1	NC	1
199		5	max	0	3	-.001	15	.049	4	1.798e-3	4	NC	1	NC	1
200			min	0	2	-.007	6	0	12	2.534e-6	12	NC	1	9657.556	4
201		6	max	.001	3	-.002	15	.059	4	2.397e-3	4	NC	1	NC	1
202			min	0	2	-.008	6	0	12	3.321e-6	12	NC	1	8738.26	5
203		7	max	.001	3	-.002	15	.07	4	2.995e-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	-.001	2	-.01	6	0	12	4.107e-6	12	9464.738	6	8344.438	5
205		8	max	.002	3	-.002	15	.079	4	3.594e-3	4	NC	1	NC	1
206			min	-.001	2	-.011	6	0	12	4.894e-6	12	8424.121	6	8331.433	5
207		9	max	.002	3	-.003	15	.089	4	4.193e-3	4	NC	1	NC	1
208			min	-.001	2	-.012	6	0	12	5.681e-6	12	7801.155	6	8658.614	5
209		10	max	.002	3	-.003	15	.098	4	4.791e-3	4	NC	2	NC	1
210			min	-.002	2	-.012	6	0	12	6.467e-6	12	7484.601	6	9359.842	5
211		11	max	.002	3	-.003	15	.106	4	5.39e-3	4	NC	2	NC	1
212			min	-.002	2	-.012	6	0	12	7.254e-6	12	7426.784	6	NC	1
213		12	max	.003	3	-.003	15	.115	4	5.988e-3	4	NC	1	NC	1
214			min	-.002	2	-.012	6	0	12	8.041e-6	12	7625.123	6	NC	1
215		13	max	.003	3	-.002	15	.123	4	6.587e-3	4	NC	1	NC	1
216			min	-.002	2	-.011	6	0	12	8.827e-6	12	8123.36	6	NC	1
217		14	max	.003	3	-.002	15	.131	4	7.185e-3	4	NC	1	NC	1
218			min	-.002	2	-.01	6	0	12	9.614e-6	12	9035.019	6	NC	1
219		15	max	.003	3	-.002	15	.14	4	7.784e-3	4	NC	1	NC	1
220			min	-.002	2	-.009	1	0	12	1.04e-5	12	NC	1	NC	1
221		16	max	.003	3	-.001	15	.148	4	8.383e-3	4	NC	1	NC	1
222			min	-.003	2	-.008	1	0	12	1.119e-5	12	NC	1	NC	1
223		17	max	.004	3	0	15	.157	4	8.981e-3	4	NC	1	NC	1
224			min	-.003	2	-.006	1	0	12	1.197e-5	12	NC	1	NC	1
225		18	max	.004	3	0	15	.166	4	9.58e-3	4	NC	1	NC	1
226			min	-.003	2	-.005	1	0	12	1.276e-5	12	NC	1	NC	1
227		19	max	.004	3	0	5	.176	4	1.018e-2	4	NC	1	NC	1
228			min	-.003	2	-.003	1	0	12	1.355e-5	12	NC	1	NC	1
229	M4	1	max	.003	1	.002	2	0	12	-2.611e-7	12	NC	1	NC	2
230			min	0	3	-.004	3	-.176	4	-8.331e-4	4	NC	1	140.986	4
231		2	max	.003	1	.002	2	0	12	-2.611e-7	12	NC	1	NC	2
232			min	0	3	-.004	3	-.162	4	-8.331e-4	4	NC	1	153.492	4
233		3	max	.003	1	.002	2	0	12	-2.611e-7	12	NC	1	NC	2
234			min	0	3	-.004	3	-.147	4	-8.331e-4	4	NC	1	168.364	4
235		4	max	.003	1	.002	2	0	12	-2.611e-7	12	NC	1	NC	2
236			min	0	3	-.003	3	-.133	4	-8.331e-4	4	NC	1	186.219	4
237		5	max	.002	1	.002	2	0	12	-2.611e-7	12	NC	1	NC	2
238			min	0	3	-.003	3	-.119	4	-8.331e-4	4	NC	1	207.896	4
239		6	max	.002	1	.002	2	0	12	-2.611e-7	12	NC	1	NC	2
240			min	0	3	-.003	3	-.106	4	-8.331e-4	4	NC	1	234.555	4
241		7	max	.002	1	.002	2	0	12	-2.611e-7	12	NC	1	NC	2
242			min	0	3	-.003	3	-.093	4	-8.331e-4	4	NC	1	267.847	4
243		8	max	.002	1	.002	2	0	12	-2.611e-7	12	NC	1	NC	2
244			min	0	3	-.003	3	-.08	4	-8.331e-4	4	NC	1	310.177	4
245		9	max	.002	1	.001	2	0	12	-2.611e-7	12	NC	1	NC	1
246			min	0	3	-.002	3	-.068	4	-8.331e-4	4	NC	1	365.167	4
247		10	max	.002	1	.001	2	0	12	-2.611e-7	12	NC	1	NC	1
248			min	0	3	-.002	3	-.057	4	-8.331e-4	4	NC	1	438.48	4
249		11	max	.001	1	.001	2	0	12	-2.611e-7	12	NC	1	NC	1
250			min	0	3	-.002	3	-.046	4	-8.331e-4	4	NC	1	539.381	4
251		12	max	.001	1	0	2	0	12	-2.611e-7	12	NC	1	NC	1
252			min	0	3	-.002	3	-.036	4	-8.331e-4	4	NC	1	683.898	4
253		13	max	.001	1	0	2	0	12	-2.611e-7	12	NC	1	NC	1
254			min	0	3	-.001	3	-.028	4	-8.331e-4	4	NC	1	901.787	4
255		14	max	0	1	0	2	0	12	-2.611e-7	12	NC	1	NC	1
256			min	0	3	-.001	3	-.02	4	-8.331e-4	4	NC	1	1253.595	4
257		15	max	0	1	0	2	0	12	-2.611e-7	12	NC	1	NC	1
258			min	0	3	0	3	-.013	4	-8.331e-4	4	NC	1	1878.918	4
259		16	max	0	1	0	2	0	12	-2.611e-7	12	NC	1	NC	1
260			min	0	3	0	3	-.008	4	-8.331e-4	4	NC	1	3163.759	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	-2.611e-7	12	NC	1	NC	1
262			min	0	3	0	3	-.004	4	-8.331e-4	4	NC	1	6539.852	4
263		18	max	0	1	0	2	0	12	-2.611e-7	12	NC	1	NC	1
264			min	0	3	0	3	-.001	4	-8.331e-4	4	NC	1	NC	1
265		19	max	0	1	0	1	0	1	-2.611e-7	12	NC	1	NC	1
266			min	0	1	0	1	0	1	-8.331e-4	4	NC	1	NC	1
267	M6	1	max	.017	1	.014	2	0	1	1.232e-3	4	NC	3	NC	1
268			min	-.019	3	-.021	3	-.436	4	0	1	3449.392	2	109.773	4
269		2	max	.016	1	.013	2	0	1	1.311e-3	4	NC	3	NC	1
270			min	-.017	3	-.019	3	-.4	4	0	1	3772.583	2	119.611	4
271		3	max	.015	1	.012	2	0	1	1.39e-3	4	NC	3	NC	1
272			min	-.016	3	-.018	3	-.364	4	0	1	4159.743	2	131.309	4
273		4	max	.014	1	.01	2	0	1	1.469e-3	4	NC	3	NC	1
274			min	-.015	3	-.017	3	-.329	4	0	1	4628.394	2	145.355	4
275		5	max	.013	1	.009	2	0	1	1.548e-3	4	NC	1	NC	1
276			min	-.014	3	-.016	3	-.295	4	0	1	5202.683	2	162.411	4
277		6	max	.013	1	.008	2	0	1	1.627e-3	4	NC	1	NC	1
278			min	-.013	3	-.015	3	-.261	4	0	1	5916.637	2	183.397	4
279		7	max	.012	1	.007	2	0	1	1.706e-3	4	NC	1	NC	1
280			min	-.012	3	-.014	3	-.228	4	0	1	6819.466	2	209.623	4
281		8	max	.011	1	.006	2	0	1	1.785e-3	4	NC	1	NC	1
282			min	-.011	3	-.013	3	-.197	4	0	1	7984.518	2	242.999	4
283		9	max	.01	1	.005	2	0	1	1.864e-3	4	NC	1	NC	1
284			min	-.01	3	-.011	3	-.167	4	0	1	9525.108	2	286.407	4
285		10	max	.009	1	.004	2	0	1	1.943e-3	4	NC	1	NC	1
286			min	-.009	3	-.01	3	-.139	4	0	1	NC	1	344.365	4
287		11	max	.008	1	.003	2	0	1	2.022e-3	4	NC	1	NC	1
288			min	-.008	3	-.009	3	-.113	4	0	1	NC	1	424.286	4
289		12	max	.007	1	.003	2	0	1	2.101e-3	4	NC	1	NC	1
290			min	-.007	3	-.008	3	-.089	4	0	1	NC	1	539.035	4
291		13	max	.006	1	.002	2	0	1	2.18e-3	4	NC	1	NC	1
292			min	-.006	3	-.007	3	-.067	4	0	1	NC	1	712.604	4
293		14	max	.005	1	.001	2	0	1	2.259e-3	4	NC	1	NC	1
294			min	-.005	3	-.006	3	-.048	4	0	1	NC	1	994.093	4
295		15	max	.004	1	0	2	0	1	2.338e-3	4	NC	1	NC	1
296			min	-.004	3	-.005	3	-.032	4	0	1	NC	1	1497.603	4
297		16	max	.003	1	0	2	0	1	2.417e-3	4	NC	1	NC	1
298			min	-.003	3	-.003	3	-.019	4	0	1	NC	1	2542.299	4
299		17	max	.002	1	0	2	0	1	2.496e-3	4	NC	1	NC	1
300			min	-.002	3	-.002	3	-.009	4	0	1	NC	1	5334.55	4
301		18	max	0	1	0	2	0	1	2.575e-3	4	NC	1	NC	1
302			min	-.001	3	-.001	3	-.003	4	0	1	NC	1	NC	1
303		19	max	0	1	0	1	0	1	2.654e-3	4	NC	1	NC	1
304			min	0	1	0	1	0	1	0	1	NC	1	NC	1
305	M7	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
306			min	0	1	0	1	0	1	-5.901e-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	-4.382e-6	5	NC	1	NC	1
309		3	max	.001	3	0	15	.025	4	5.836e-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	.037	4	1.171e-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	.048	4	1.757e-3	4	NC	1	NC	1
314			min	-.003	2	-.008	3	0	1	0	1	NC	1	9231.684	4
315		6	max	.004	3	-.002	15	.059	4	2.344e-3	4	NC	1	NC	1
316			min	-.003	2	-.009	3	0	1	0	1	9880.386	3	8322.485	4
317		7	max	.004	3	-.002	15	.069	4	2.931e-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	-.011	3	0	1	0	1	8767.433	3	7921.604	4
319		8	max	.005	3	-.003	15	.079	4	3.518e-3	4	NC	1	NC	1
320			min	-.005	2	-.011	3	0	1	0	1	8100.192	3	7877.943	4
321		9	max	.006	3	-.003	15	.088	4	4.105e-3	4	NC	1	NC	1
322			min	-.005	2	-.012	4	0	1	0	1	7742.137	3	8147.208	4
323		10	max	.007	3	-.003	15	.096	4	4.692e-3	4	NC	1	NC	1
324			min	-.006	2	-.013	4	0	1	0	1	7537.195	4	8752.626	4
325		11	max	.007	3	-.003	15	.105	4	5.279e-3	4	NC	1	NC	1
326			min	-.007	2	-.013	4	0	1	0	1	7476.015	4	9786.585	4
327		12	max	.008	3	-.003	15	.113	4	5.865e-3	4	NC	1	NC	1
328			min	-.007	2	-.013	4	0	1	0	1	7673.136	4	NC	1
329		13	max	.009	3	-.003	15	.121	4	6.452e-3	4	NC	1	NC	1
330			min	-.008	2	-.012	4	0	1	0	1	8172.262	4	NC	1
331		14	max	.01	3	-.003	15	.129	4	7.039e-3	4	NC	1	NC	1
332			min	-.009	2	-.012	1	0	1	0	1	9087.345	4	NC	1
333		15	max	.01	3	-.002	15	.137	4	7.626e-3	4	NC	1	NC	1
334			min	-.01	2	-.011	1	0	1	0	1	NC	1	NC	1
335		16	max	.011	3	-.002	15	.145	4	8.213e-3	4	NC	1	NC	1
336			min	-.01	2	-.01	1	0	1	0	1	NC	1	NC	1
337		17	max	.012	3	-.001	15	.154	4	8.8e-3	4	NC	1	NC	1
338			min	-.011	2	-.01	1	0	1	0	1	NC	1	NC	1
339		18	max	.012	3	0	15	.163	4	9.387e-3	4	NC	1	NC	1
340			min	-.012	2	-.009	1	0	1	0	1	NC	1	NC	1
341		19	max	.013	3	0	15	.172	4	9.974e-3	4	NC	1	NC	1
342			min	-.012	2	-.008	1	0	1	0	1	NC	1	NC	1
343	M8	1	max	.009	1	.01	2	0	1	0	1	NC	1	NC	1
344			min	-.003	3	-.013	3	-.172	4	-8.556e-4	4	NC	1	144.068	4
345		2	max	.009	1	.01	2	0	1	0	1	NC	1	NC	1
346			min	-.003	3	-.012	3	-.158	4	-8.556e-4	4	NC	1	156.849	4
347		3	max	.008	1	.009	2	0	1	0	1	NC	1	NC	1
348			min	-.003	3	-.011	3	-.144	4	-8.556e-4	4	NC	1	172.049	4
349		4	max	.008	1	.009	2	0	1	0	1	NC	1	NC	1
350			min	-.003	3	-.011	3	-.13	4	-8.556e-4	4	NC	1	190.297	4
351		5	max	.007	1	.008	2	0	1	0	1	NC	1	NC	1
352			min	-.002	3	-.01	3	-.117	4	-8.556e-4	4	NC	1	212.451	4
353		6	max	.007	1	.007	2	0	1	0	1	NC	1	NC	1
354			min	-.002	3	-.009	3	-.103	4	-8.556e-4	4	NC	1	239.697	4
355		7	max	.006	1	.007	2	0	1	0	1	NC	1	NC	1
356			min	-.002	3	-.009	3	-.091	4	-8.556e-4	4	NC	1	273.721	4
357		8	max	.006	1	.006	2	0	1	0	1	NC	1	NC	1
358			min	-.002	3	-.008	3	-.078	4	-8.556e-4	4	NC	1	316.983	4
359		9	max	.005	1	.006	2	0	1	0	1	NC	1	NC	1
360			min	-.002	3	-.007	3	-.066	4	-8.556e-4	4	NC	1	373.183	4
361		10	max	.005	1	.005	2	0	1	0	1	NC	1	NC	1
362			min	-.002	3	-.006	3	-.055	4	-8.556e-4	4	NC	1	448.109	4
363		11	max	.004	1	.005	2	0	1	0	1	NC	1	NC	1
364			min	-.001	3	-.006	3	-.045	4	-8.556e-4	4	NC	1	551.231	4
365		12	max	.004	1	.004	2	0	1	0	1	NC	1	NC	1
366			min	-.001	3	-.005	3	-.035	4	-8.556e-4	4	NC	1	698.929	4
367		13	max	.003	1	.003	2	0	1	0	1	NC	1	NC	1
368			min	-.001	3	-.004	3	-.027	4	-8.556e-4	4	NC	1	921.614	4
369		14	max	.003	1	.003	2	0	1	0	1	NC	1	NC	1
370			min	0	3	-.004	3	-.019	4	-8.556e-4	4	NC	1	1281.166	4
371		15	max	.002	1	.002	2	0	1	0	1	NC	1	NC	1
372			min	0	3	-.003	3	-.013	4	-8.556e-4	4	NC	1	1920.256	4
373		16	max	.002	1	.002	2	0	1	0	1	NC	1	NC	1
374			min	0	3	-.002	3	-.008	4	-8.556e-4	4	NC	1	3233.392	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	-8.556e-4	4	NC	1	6683.856	4
377		18	max	0	1	0	2	0	1	0	1	NC	1	NC	1
378			min	0	3	0	3	-.001	4	-8.556e-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	-8.556e-4	4	NC	1	NC	1
381	M10	1	max	.005	1	.003	2	0	12	1.231e-3	4	NC	1	NC	2
382			min	-.006	3	-.007	3	-.435	4	7.335e-6	12	NC	1	109.916	4
383		2	max	.005	1	.003	2	0	12	1.31e-3	4	NC	1	NC	2
384			min	-.005	3	-.006	3	-.4	4	6.82e-6	12	NC	1	119.767	4
385		3	max	.005	1	.002	2	0	12	1.389e-3	4	NC	1	NC	2
386			min	-.005	3	-.006	3	-.364	4	6.304e-6	12	NC	1	131.48	4
387		4	max	.005	1	.002	2	0	12	1.467e-3	4	NC	1	NC	1
388			min	-.005	3	-.006	3	-.329	4	5.789e-6	12	NC	1	145.544	4
389		5	max	.004	1	.001	2	0	12	1.546e-3	4	NC	1	NC	1
390			min	-.004	3	-.006	3	-.294	4	5.273e-6	12	NC	1	162.622	4
391		6	max	.004	1	.001	2	0	12	1.625e-3	4	NC	1	NC	1
392			min	-.004	3	-.005	3	-.261	4	4.758e-6	12	NC	1	183.637	4
393		7	max	.004	1	0	2	0	12	1.703e-3	4	NC	1	NC	1
394			min	-.004	3	-.005	3	-.228	4	4.243e-6	12	NC	1	209.896	4
395		8	max	.003	1	0	2	0	12	1.782e-3	4	NC	1	NC	1
396			min	-.003	3	-.005	3	-.197	4	3.727e-6	12	NC	1	243.316	4
397		9	max	.003	1	0	2	0	12	1.861e-3	4	NC	1	NC	1
398			min	-.003	3	-.004	3	-.167	4	3.212e-6	12	NC	1	286.781	4
399		10	max	.003	1	0	2	0	12	1.939e-3	4	NC	1	NC	1
400			min	-.003	3	-.004	3	-.139	4	2.696e-6	12	NC	1	344.815	4
401		11	max	.002	1	0	2	0	12	2.018e-3	4	NC	1	NC	1
402			min	-.003	3	-.004	3	-.113	4	2.181e-6	12	NC	1	424.84	4
403		12	max	.002	1	0	10	0	12	2.096e-3	4	NC	1	NC	1
404			min	-.002	3	-.003	3	-.089	4	1.665e-6	12	NC	1	539.74	4
405		13	max	.002	1	0	15	0	12	2.175e-3	4	NC	1	NC	1
406			min	-.002	3	-.003	3	-.067	4	1.15e-6	12	NC	1	713.539	4
407		14	max	.002	1	0	15	0	12	2.254e-3	4	NC	1	NC	1
408			min	-.002	3	-.003	3	-.048	4	4.508e-7	10	NC	1	995.401	4
409		15	max	.001	1	0	15	0	12	2.332e-3	4	NC	1	NC	1
410			min	-.001	3	-.002	3	-.032	4	-4.228e-6	1	NC	1	1499.583	4
411		16	max	0	1	0	15	0	12	2.411e-3	4	NC	1	NC	1
412			min	0	3	-.002	4	-.019	4	-1.567e-5	1	NC	1	2545.688	4
413		17	max	0	1	0	15	0	12	2.49e-3	4	NC	1	NC	1
414			min	0	3	-.001	4	-.009	4	-2.711e-5	1	NC	1	5341.774	4
415		18	max	0	1	0	15	0	12	2.568e-3	4	NC	1	NC	1
416			min	0	3	0	4	-.003	4	-3.854e-5	1	NC	1	NC	1
417		19	max	0	1	0	1	0	1	2.647e-3	4	NC	1	NC	1
418			min	0	1	0	1	0	1	-4.998e-5	1	NC	1	NC	1
419	M11	1	max	0	1	0	1	0	1	1.552e-5	1	NC	1	NC	1
420			min	0	1	0	1	0	1	-5.884e-4	4	NC	1	NC	1
421		2	max	0	3	0	15	.013	4	3.901e-7	4	NC	1	NC	1
422			min	0	2	-.002	4	0	1	-3.988e-6	1	NC	1	NC	1
423		3	max	0	3	0	15	.025	4	5.892e-4	4	NC	1	NC	1
424			min	0	2	-.003	4	0	1	-2.349e-5	1	NC	1	NC	1
425		4	max	0	3	-.001	15	.037	4	1.178e-3	4	NC	1	NC	1
426			min	0	2	-.005	4	0	1	-4.3e-5	1	NC	1	NC	1
427		5	max	0	3	-.002	15	.048	4	1.767e-3	4	NC	1	NC	1
428			min	0	2	-.007	4	-.001	1	-6.251e-5	1	NC	1	9519.987	4
429		6	max	.001	3	-.002	15	.059	4	2.355e-3	4	NC	1	NC	1
430			min	0	2	-.009	4	-.001	1	-8.202e-5	1	NC	1	8606.827	4
431		7	max	.001	3	-.003	15	.069	4	2.944e-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	-.001	2	-.01	4	-.002	1	-1.015e-4	1	9107.966	4	8219.589	4
433		8	max	.002	3	-.003	15	.078	4	3.533e-3	4	NC	1	NC	1
434			min	-.001	2	-.012	4	-.002	1	-1.21e-4	1	8131.054	4	8206.774	4
435		9	max	.002	3	-.003	15	.088	4	4.122e-3	4	NC	1	NC	1
436			min	-.001	2	-.013	4	-.002	1	-1.405e-4	1	7548.418	4	8528.215	4
437		10	max	.002	3	-.003	15	.096	4	4.71e-3	4	NC	2	NC	1
438			min	-.002	2	-.013	4	-.003	1	-1.6e-4	1	7256.996	4	9216.805	4
439		11	max	.002	3	-.003	15	.105	4	5.299e-3	4	NC	2	NC	1
440			min	-.002	2	-.013	4	-.003	1	-1.796e-4	1	7213.281	4	NC	1
441		12	max	.003	3	-.003	15	.113	4	5.888e-3	4	NC	1	NC	1
442			min	-.002	2	-.013	4	-.003	1	-1.991e-4	1	7416.537	4	NC	1
443		13	max	.003	3	-.003	15	.121	4	6.477e-3	4	NC	1	NC	1
444			min	-.002	2	-.012	4	-.004	1	-2.186e-4	1	7910.597	4	NC	1
445		14	max	.003	3	-.003	15	.129	4	7.066e-3	4	NC	1	NC	1
446			min	-.002	2	-.011	4	-.004	1	-2.381e-4	1	8807.085	4	NC	1
447		15	max	.003	3	-.002	15	.137	4	7.654e-3	4	NC	1	NC	1
448			min	-.002	2	-.01	4	-.004	1	-2.576e-4	1	NC	1	NC	1
449		16	max	.003	3	-.002	15	.146	4	8.243e-3	4	NC	1	NC	1
450			min	-.003	2	-.008	4	-.005	1	-2.771e-4	1	NC	1	NC	1
451		17	max	.004	3	-.001	15	.154	4	8.832e-3	4	NC	1	NC	1
452			min	-.003	2	-.006	1	-.005	1	-2.966e-4	1	NC	1	NC	1
453		18	max	.004	3	0	15	.163	4	9.421e-3	4	NC	1	NC	1
454			min	-.003	2	-.005	1	-.005	1	-3.161e-4	1	NC	1	NC	1
455		19	max	.004	3	0	12	.173	4	1.001e-2	4	NC	1	NC	1
456			min	-.003	2	-.003	1	-.006	1	-3.356e-4	1	NC	1	NC	1
457	M12	1	max	.003	1	.002	2	.006	1	1.067e-5	1	NC	1	NC	2
458			min	0	3	-.004	3	-.173	4	-8.276e-4	4	NC	1	143.388	4
459		2	max	.003	1	.002	2	.005	1	1.067e-5	1	NC	1	NC	2
460			min	0	3	-.004	3	-.159	4	-8.276e-4	4	NC	1	156.105	4
461		3	max	.003	1	.002	2	.005	1	1.067e-5	1	NC	1	NC	2
462			min	0	3	-.004	3	-.145	4	-8.276e-4	4	NC	1	171.229	4
463		4	max	.003	1	.002	2	.004	1	1.067e-5	1	NC	1	NC	2
464			min	0	3	-.003	3	-.131	4	-8.276e-4	4	NC	1	189.387	4
465		5	max	.002	1	.002	2	.004	1	1.067e-5	1	NC	1	NC	2
466			min	0	3	-.003	3	-.117	4	-8.276e-4	4	NC	1	211.431	4
467		6	max	.002	1	.002	2	.004	1	1.067e-5	1	NC	1	NC	2
468			min	0	3	-.003	3	-.104	4	-8.276e-4	4	NC	1	238.542	4
469		7	max	.002	1	.002	2	.003	1	1.067e-5	1	NC	1	NC	2
470			min	0	3	-.003	3	-.091	4	-8.276e-4	4	NC	1	272.398	4
471		8	max	.002	1	.002	2	.003	1	1.067e-5	1	NC	1	NC	2
472			min	0	3	-.003	3	-.079	4	-8.276e-4	4	NC	1	315.445	4
473		9	max	.002	1	.001	2	.002	1	1.067e-5	1	NC	1	NC	1
474			min	0	3	-.002	3	-.067	4	-8.276e-4	4	NC	1	371.367	4
475		10	max	.002	1	.001	2	.002	1	1.067e-5	1	NC	1	NC	1
476			min	0	3	-.002	3	-.056	4	-8.276e-4	4	NC	1	445.922	4
477		11	max	.001	1	.001	2	.002	1	1.067e-5	1	NC	1	NC	1
478			min	0	3	-.002	3	-.045	4	-8.276e-4	4	NC	1	548.532	4
479		12	max	.001	1	0	2	.001	1	1.067e-5	1	NC	1	NC	1
480			min	0	3	-.002	3	-.036	4	-8.276e-4	4	NC	1	695.497	4
481		13	max	.001	1	0	2	0	1	1.067e-5	1	NC	1	NC	1
482			min	0	3	-.001	3	-.027	4	-8.276e-4	4	NC	1	917.076	4
483		14	max	0	1	0	2	0	1	1.067e-5	1	NC	1	NC	1
484			min	0	3	-.001	3	-.019	4	-8.276e-4	4	NC	1	1274.84	4
485		15	max	0	1	0	2	0	1	1.067e-5	1	NC	1	NC	1
486			min	0	3	0	3	-.013	4	-8.276e-4	4	NC	1	1910.749	4
487		16	max	0	1	0	2	0	1	1.067e-5	1	NC	1	NC	1
488			min	0	3	0	3	-.008	4	-8.276e-4	4	NC	1	3217.337	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	1.067e-5	1	NC	1	NC	1
490			min	0	3	0	3	-.004	4	-8.276e-4	4	NC	1	6650.557	4
491		18	max	0	1	0	2	0	1	1.067e-5	1	NC	1	NC	1
492			min	0	3	0	3	-.001	4	-8.276e-4	4	NC	1	NC	1
493		19	max	0	1	0	1	0	1	1.067e-5	1	NC	1	NC	1
494			min	0	1	0	1	0	1	-8.276e-4	4	NC	1	NC	1
495	M1	1	max	.005	3	.122	1	.456	4	1.691e-2	1	NC	1	NC	1
496			min	-.002	2	-.025	3	0	12	-2.415e-2	3	NC	1	NC	1
497		2	max	.005	3	.06	1	.444	4	8.247e-3	1	NC	5	NC	1
498			min	-.002	2	-.012	3	-.004	1	-1.194e-2	3	1860.034	1	NC	1
499		3	max	.005	3	.008	3	.432	4	1.325e-2	4	NC	5	NC	1
500			min	-.002	2	-.007	2	-.006	1	-1.164e-4	3	890.959	1	9060.993	5
501		4	max	.005	3	.041	3	.42	4	1.169e-2	4	NC	5	NC	1
502			min	-.002	2	-.084	1	-.006	1	-4.526e-3	3	557.59	1	6152.177	5
503		5	max	.005	3	.083	3	.409	4	1.013e-2	1	NC	15	NC	1
504			min	-.002	2	-.165	1	-.004	1	-8.936e-3	3	399.504	1	4688.501	5
505		6	max	.005	3	.128	3	.397	4	1.525e-2	1	NC	15	NC	1
506			min	-.002	2	-.244	1	-.002	1	-1.335e-2	3	312.893	1	3830.498	5
507		7	max	.005	3	.172	3	.385	4	2.037e-2	1	9843.686	15	NC	1
508			min	-.002	2	-.315	1	0	12	-1.776e-2	3	261.999	1	3278.978	4
509		8	max	.005	3	.208	3	.372	4	2.549e-2	1	8748.632	15	NC	1
510			min	-.002	2	-.372	1	0	12	-2.217e-2	3	231.995	1	2908.35	4
511		9	max	.005	3	.232	3	.357	4	2.814e-2	1	8177.523	15	NC	1
512			min	-.002	2	-.408	1	0	1	-2.236e-2	3	216.412	1	2698.609	4
513		10	max	.004	3	.241	3	.34	4	2.916e-2	1	8003.558	15	NC	1
514			min	-.002	2	-.419	1	0	12	-1.975e-2	3	211.756	1	2641.128	4
515		11	max	.004	3	.235	3	.321	4	3.017e-2	1	8177.354	15	NC	1
516			min	-.002	2	-.407	1	0	12	-1.714e-2	3	216.728	1	2709.573	4
517		12	max	.004	3	.215	3	.301	4	2.854e-2	1	8748.243	15	NC	1
518			min	-.002	2	-.371	1	0	1	-1.442e-2	3	232.97	1	2921.258	5
519		13	max	.004	3	.183	3	.277	4	2.293e-2	1	9842.94	15	NC	1
520			min	-.002	2	-.313	1	0	1	-1.155e-2	3	264.393	1	3443.677	4
521		14	max	.004	3	.142	3	.252	4	1.731e-2	1	NC	15	NC	1
522			min	-.002	2	-.241	1	0	12	-8.671e-3	3	318.03	1	4504.287	4
523		15	max	.004	3	.096	3	.226	4	1.169e-2	1	NC	15	NC	1
524			min	-.002	2	-.161	1	0	12	-5.796e-3	3	410.095	1	6760.624	4
525		16	max	.004	3	.048	3	.2	4	8.838e-3	4	NC	5	NC	1
526			min	-.002	2	-.08	1	0	12	-2.92e-3	3	579.921	1	NC	1
527		17	max	.004	3	.003	3	.176	4	9.754e-3	4	NC	5	NC	1
528			min	-.002	2	-.005	2	0	12	-4.51e-5	3	941.529	1	NC	1
529		18	max	.004	3	.059	1	.156	4	1.042e-2	2	NC	5	NC	1
530			min	-.002	2	-.037	3	0	12	-4.277e-3	3	1988.584	1	NC	1
531		19	max	.004	3	.116	1	.138	4	2.096e-2	2	NC	1	NC	1
532			min	-.002	2	-.075	3	0	1	-8.675e-3	3	NC	1	NC	1
533	M5	1	max	.016	3	.284	1	.456	4	0	1	NC	1	NC	1
534			min	-.01	2	-.037	3	0	1	-2.311e-6	4	NC	1	NC	1
535		2	max	.016	3	.14	1	.447	4	6.783e-3	4	NC	5	NC	1
536			min	-.01	2	-.019	3	0	1	0	1	800.625	1	NC	1
537		3	max	.016	3	.024	3	.436	4	1.336e-2	4	NC	5	NC	1
538			min	-.01	2	-.023	1	0	1	0	1	374.301	1	7596.106	4
539		4	max	.016	3	.112	3	.424	4	1.088e-2	4	9627.536	15	NC	1
540			min	-.01	2	-.221	1	0	1	0	1	227.156	1	5499.987	4
541		5	max	.015	3	.23	3	.411	4	8.409e-3	4	6735.736	15	NC	1
542			min	-.01	2	-.438	1	0	1	0	1	158.802	1	4422.854	4
543		6	max	.015	3	.362	3	.398	4	5.935e-3	4	5185.056	15	NC	1
544			min	-.01	2	-.654	1	0	1	0	1	122.139	1	3758.684	4
545		7	max	.015	3	.49	3	.385	4	3.46e-3	4	4289.699	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	-.009	2	-.851	1	0	1	0	1	100.964	1	3296.495	4
547		8	max	.014	3	.597	3	.371	4	9.861e-4	4	3769.165	15	NC	1
548			min	-.009	2	-1.009	1	0	1	0	1	88.652	1	2942.825	4
549		9	max	.014	3	.667	3	.357	4	0	1	3502.247	15	NC	1
550			min	-.009	2	-1.108	1	0	1	-1.331e-6	5	82.342	1	2699.068	4
551		10	max	.014	3	.692	3	.34	4	0	1	3421.824	15	NC	1
552			min	-.009	2	-1.141	1	0	1	-1.259e-6	5	80.466	1	2660.335	4
553		11	max	.013	3	.674	3	.321	4	0	1	3502.309	15	NC	1
554			min	-.009	2	-1.108	1	0	1	-1.187e-6	5	82.469	1	2736.622	4
555		12	max	.013	3	.616	3	.301	4	7.025e-4	4	3769.313	15	NC	1
556			min	-.008	2	-1.006	1	0	1	0	1	89.072	1	2882.16	4
557		13	max	.013	3	.521	3	.278	4	2.465e-3	4	4290.002	15	NC	1
558			min	-.008	2	-.845	1	0	1	0	1	102.056	1	3389.94	4
559		14	max	.013	3	.402	3	.251	4	4.228e-3	4	5185.65	15	NC	1
560			min	-.008	2	-.643	1	0	1	0	1	124.598	1	4618.774	4
561		15	max	.012	3	.269	3	.224	4	5.991e-3	4	6736.912	15	NC	1
562			min	-.008	2	-.424	1	0	1	0	1	164.14	1	7789.254	5
563		16	max	.012	3	.134	3	.197	4	7.754e-3	4	9629.999	15	NC	1
564			min	-.008	2	-.207	1	0	1	0	1	239.125	1	NC	1
565		17	max	.012	3	.009	3	.173	4	9.517e-3	4	NC	5	NC	1
566			min	-.008	2	-.014	2	0	1	0	1	403.462	1	NC	1
567		18	max	.012	3	.138	1	.153	4	4.833e-3	4	NC	5	NC	1
568			min	-.008	2	-.098	3	0	1	0	1	878.869	1	NC	1
569		19	max	.012	3	.267	1	.138	4	0	1	NC	1	NC	1
570			min	-.008	2	-.193	3	0	1	-9.506e-7	4	NC	1	NC	1
571	M9	1	max	.005	3	.122	1	.456	4	2.415e-2	3	NC	1	NC	1
572			min	-.002	2	-.025	3	0	1	-1.691e-2	1	NC	1	NC	1
573		2	max	.005	3	.06	1	.446	4	1.194e-2	3	NC	5	NC	1
574			min	-.002	2	-.012	3	0	12	-8.247e-3	1	1860.034	1	NC	1
575		3	max	.005	3	.008	3	.435	4	1.332e-2	4	NC	5	NC	1
576			min	-.002	2	-.007	2	0	12	-3.332e-5	10	890.959	1	7760.005	4
577		4	max	.005	3	.041	3	.423	4	1.046e-2	5	NC	5	NC	1
578			min	-.002	2	-.084	1	0	12	-5.016e-3	1	557.59	1	5561.401	4
579		5	max	.005	3	.083	3	.411	4	8.936e-3	3	NC	15	NC	1
580			min	-.002	2	-.165	1	0	12	-1.013e-2	1	399.504	1	4433.132	4
581		6	max	.005	3	.128	3	.398	4	1.335e-2	3	NC	15	NC	1
582			min	-.002	2	-.244	1	0	12	-1.525e-2	1	312.893	1	3744.433	4
583		7	max	.005	3	.172	3	.385	4	1.776e-2	3	9831.184	15	NC	1
584			min	-.002	2	-.315	1	0	1	-2.037e-2	1	261.999	1	3275.488	4
585		8	max	.005	3	.208	3	.371	4	2.217e-2	3	8737.758	15	NC	1
586			min	-.002	2	-.372	1	0	1	-2.549e-2	1	231.995	1	2926.505	5
587		9	max	.005	3	.232	3	.357	4	2.236e-2	3	8167.478	15	NC	1
588			min	-.002	2	-.408	1	0	12	-2.814e-2	1	216.412	1	2692.712	4
589		10	max	.004	3	.241	3	.34	4	1.975e-2	3	7993.754	15	NC	1
590			min	-.002	2	-.419	1	0	1	-2.916e-2	1	211.756	1	2641.962	4
591		11	max	.004	3	.235	3	.321	4	1.714e-2	3	8167.308	15	NC	1
592			min	-.002	2	-.407	1	0	1	-3.017e-2	1	216.728	1	2716.84	4
593		12	max	.004	3	.215	3	.301	4	1.442e-2	3	8737.433	15	NC	1
594			min	-.002	2	-.371	1	0	12	-2.854e-2	1	232.97	1	2903.076	4
595		13	max	.004	3	.183	3	.277	4	1.155e-2	3	9830.664	15	NC	1
596			min	-.002	2	-.313	1	0	12	-2.293e-2	1	264.393	1	3443.77	4
597		14	max	.004	3	.142	3	.251	4	8.671e-3	3	NC	15	NC	1
598			min	-.002	2	-.241	1	-.001	1	-1.731e-2	1	318.03	1	4603.567	5
599		15	max	.004	3	.096	3	.224	4	5.796e-3	3	NC	15	NC	1
600			min	-.002	2	-.161	1	-.004	1	-1.169e-2	1	410.095	1	7268.025	5
601		16	max	.004	3	.048	3	.197	4	7.545e-3	5	NC	5	NC	1
602			min	-.002	2	-.08	1	-.005	1	-6.076e-3	1	579.921	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	.004	3	.003	3	.173	4	9.547e-3	4	NC	5	NC	1
604			min	-.002	2	-.005	2	-.006	1	-4.593e-4	1	941.529	1	NC	1
605		18	max	.004	3	.059	1	.154	4	4.514e-3	5	NC	5	NC	1
606			min	-.002	2	-.037	3	-.004	1	-1.042e-2	2	1988.584	1	NC	1
607		19	max	.004	3	.116	1	.138	4	8.675e-3	3	NC	1	NC	1
608			min	-.002	2	-.075	3	0	12	-2.096e-2	2	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

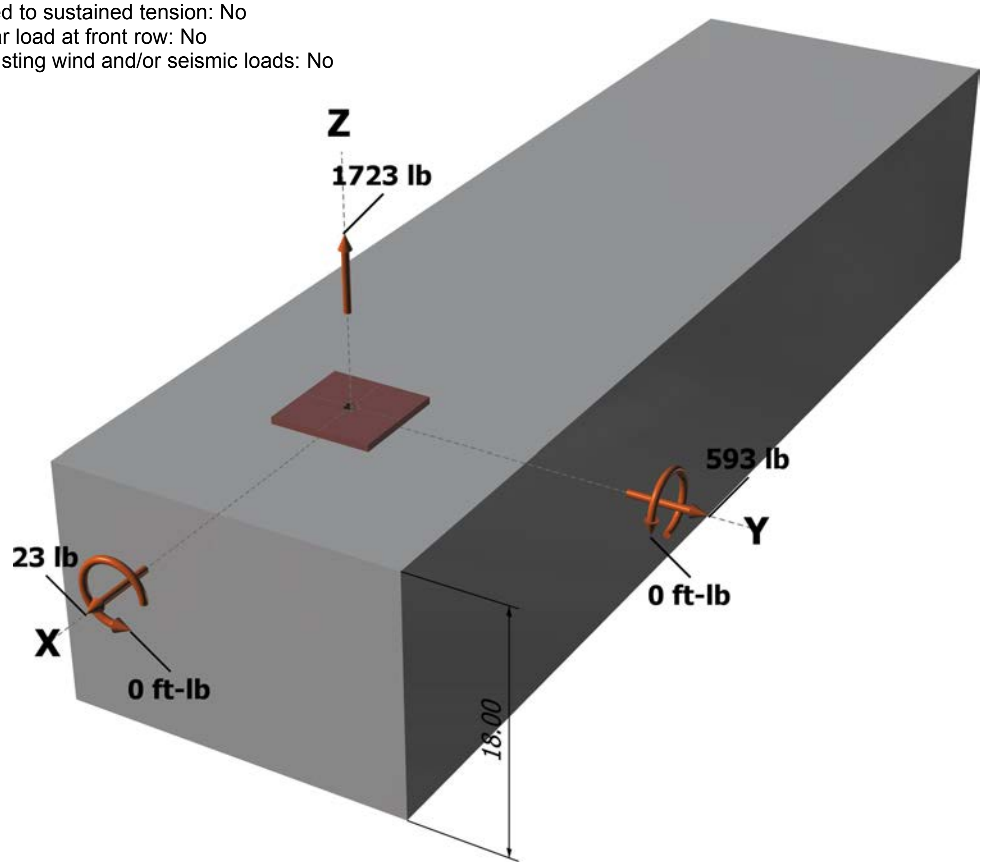
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

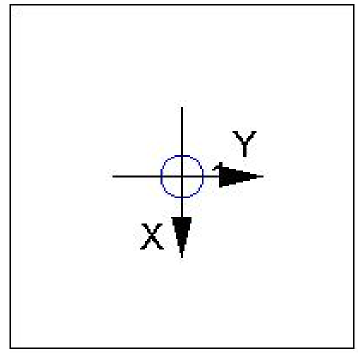
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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

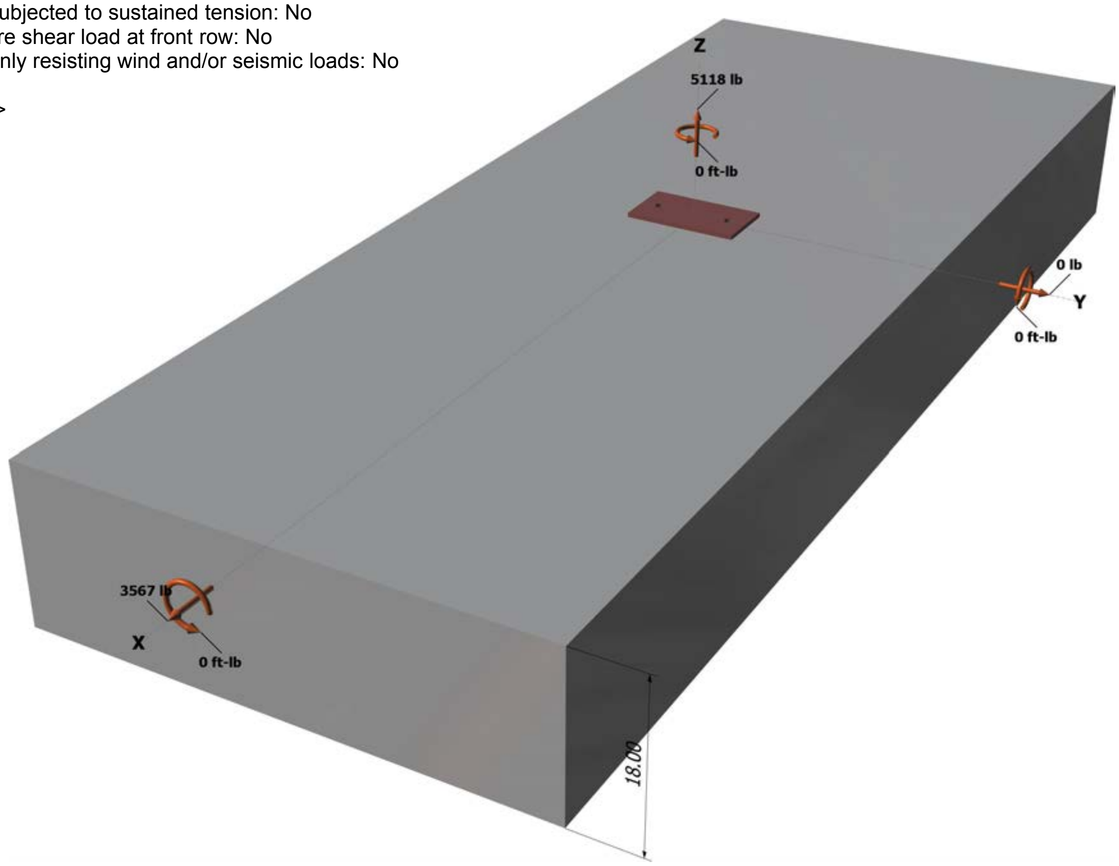
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 0.500
Effective Embedment depth, h_{ef} (inch): 6.000
Code report: IAPMO UES ER-263
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 8.50
c_{ac} (inch): 9.67
C_{min} (inch): 1.75
S_{min} (inch):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

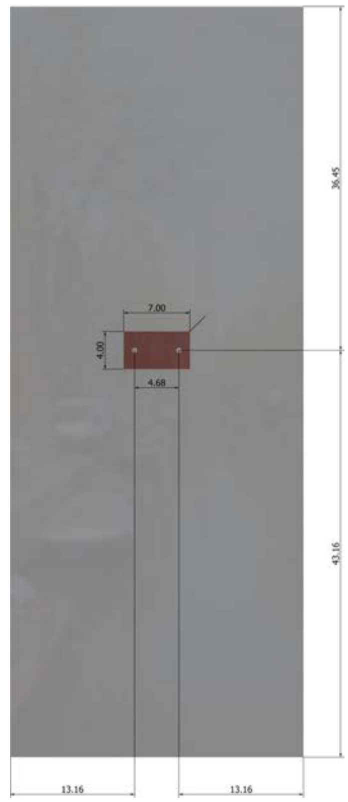
Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 18.00
State: Cracked
Compressive strength, f'c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Do not evaluate concrete breakout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



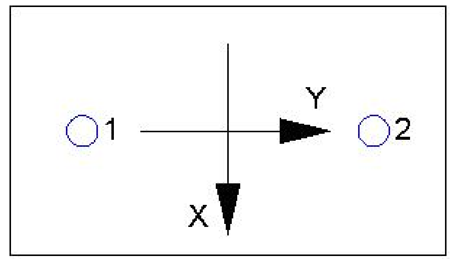
Recommended Anchor
Anchor Name: AT-XP® - AT-XP w/ 1/2"Ø A193 Gr. B8/B8M (304/316SS)
Code Report: IAPMO UES ER-263

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	2559.0	1783.5	0.0	1783.5
2	2559.0	1783.5	0.0	1783.5
Sum	5118.0	3567.0	0.0	3567.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 5118
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)
408.24	324.00	1.000	1.000	1.00	1.000	12492	0.65	10231

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

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

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

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

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

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

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

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

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

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

Shear perpendicular to edge in x-direction:

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

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

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

A_{Vc} (in^2)	A_{Vco} (in^2)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgx} (lb)
558.00	648.00	1.000	0.919	1.000	1.000	15593	0.70	8641

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	13.16	17908

$\phi V_{cbx} = \phi\,(2)(A_{Vc} / A_{Vco})\,\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (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)
710.64	779.34	1.000	1.000	1.000	17908	0.70	22862

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

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

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

A_{Nc} (in^2)	A_{Nco} (in^2)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ
408.24	324.00	1.000	1.000	1.000	1.000	12492	15740	0.70

ϕV_{cpg} (lb)
20601

11. Results

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

Tension	Factored Load, N_{ua} (lb)	Design Strength, $øN_n$ (lb)	Ratio	Status
Steel	2559	6071	0.42	Pass
Concrete breakout	5118	10231	0.50	Pass
Adhesive	**5118**	**8093**	**0.63**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, $øV_n$ (lb)	Ratio	Status
Steel	**1784**	**3156**	**0.57**	**Pass (Governs)**
T Concrete breakout x+	3567	8641	0.41	Pass
|| Concrete breakout y-	1784	22862	0.08	Pass
Pryout	3567	20601	0.17	Pass

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

Sec. D.7.3	0.63	0.57	119.8 %	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.