CONSIGN, LLC

CONSULTING ENGINEERS

CERTIFICATION OF AUTH. # 31618

14021 SW 143rd Court - Bay 1, Miami, Florida 33186 - Phone -Fax # (305) 253-9442

Cover Sheet
Structural Calculations

PROJECT:

ALUMINUM AWNING 20'-0" x 24'-0"

Work at:

7405 SW 126TH STREET, MIAMI, FL 33156

CUSTOMER: **MIAMI AWNING**

DESIGNER: **Adolfo Espino P.E.**

STATE OF FLORIDA REG. # 98949

CODES AND SPECIFICATIONS:

F.B.C 2023 8TH EDITION

A.S.C.E. 7-22

ALUMINUM DESIGN MANUAL 2020

A.I.S.C 16TH EDITION

ACI 318-19

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED

Digitally signed by Adolfo Espino
Date: 2025.07.08 '18:13:49 -04'00

ADOLFO ESPINO LICENSE No 98949 STATE OF FLORIDA PROFESSIONAL ENGINEER

ON THE DATE ADJACENT TO THE SEAL.
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14021 SW 143rd COURT - BAY 1, MIAMI, FL 33186

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ALUMINUM AWNING 20'-0" x 24'-0" - CALCULATIONS

DESIGN CRITERIA & APPLICABLE CODES

- ***F.B.C 2023 8TH EDITION***
- ***A.S.C.E 7-22***
- ***ALUMINUM DESIGN MANUAL 2020***
- ***A.I.S.C 16TH EDITION***
- ***ACI 318-19***

1.- WIND LOAD CALCULATIONS - Z < 60 ft

WIND CODE :	ASCE 7-22							
WINDSPEED, V =	105	MPH	- FBC 2023 - 3105.4.2.1					
MEAN ROOF HEIGHT:	Z =	12.0	ft	<	60	ft		
EXPOSURE CATEGORY :		**"C"**	- FBC 2023 - 3105.4.2.2					
EFFECTIVE AREA, EA =	5.00	ft	X	12.00	ft	=	60.0	ft2
Kzt =	1	- Section 26.8-2 ASCE 7-22						
Kd =	0.85	- Table 26.6-1 ASCE 7-22						
Kz =	0.85	- Table 26.10-1 ASCE 7-22						
qh =	$0.00256 * Kz * Kzt\ Kd * V^2$	- Section 30.3-1						
	20.39	psf						
And:								
Average Slope, θ =	14.78°	7° < θ < 20°						
GCp =	-1.20 0.40	- Fig. 30.3-2B - Using EA =	60	SQF	**- AS ROOF (ZONE 1)**			
Gcpi =	+/- 0.55	- Table 26.13-1 - Partially Enclosed Buldings						
P design =	qh * (GCp - Gcpi)							
	-35.69	psf	- Critical Away Pressure					
	19.37	psf	- Critical Toward Pressure					

1.1.- CHECKING LOADS COMBINATIONS. - ASCE 7-22

Live Load - L =	5.0	psf	**- DESIGN LOADS PER ASCE 7-22**	
Dead Load - D =	8.0	psf	**- DESIGN LOADS PER ASCE 7-22**	
W_{Up} =	-35.69	psf		
W_{Down} =	19.37	psf		
1.-	D		4.-	D+0.6W
2.-	D+L		5.-	D+0.75L+0.6W
3.-	D+0.75L		6.-	0.6D+0.6W

1.2.- LOADS ON BORDER FLAT BEAM

Live Load - L =	5.0	psf	*	3.00	ft
	15.00	lb/ft			
Dead Load - D =	8.0	psf	*	3.00	ft
	24.0	lb/ft			
Wind Load - W_{Up} =	-35.69	psf	*	3.00	ft
	-107.06	lb/ft			
Wind Load - W_{Down} =	19.37	psf	*	3.00	ft
	58.12	lb/ft			

1.3.- LOADS ON MIDDLE FLAT BEAM

Live Load - L =	5.0	psf	*	6.00	ft
	30.00	lb/ft			
Dead Load - D =	8.0	psf	*	6.00	ft
	48.0	lb/ft			
Wind Load - W_{Up} =	-35.69	psf	*	6.00	ft
	-214.11	lb/ft			
Wind Load - W_{Down} =	19.37	psf	*	6.00	ft
	116.23	lb/ft			

2.- CHECKING CRITICAL CONNECTION PLATE TO EXISTING CONCRETE WALL - DETAIL A/A107

Shear, V = (F1+F3) = 199 lbs Critical Shear On Plate

SEE SAP2000 REPORT ATTACHED

Try using : (2) 1/2"ϕ LDT Anchor Per Plate(Min. Emb. 3-1/2") Into Existing Concrete Wall.

Spacing Between Bolts =	4.0	<	8.0	in	68%	**- For Shear**
Edge distance		>	5.0	in	100%	**- For Shear**

SHEAR CHECK

Ru =	2035	x	2 Anchor	x	68%	
	2768	lbs	>	V = 199	lbs	**OK**

THEN USE : (2) 1/2"ϕ LDT Anchor Per Plate(Min. Emb. 3-1/2") Into Existing Concrete Wall.

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3.- CHECKING CRITICAL CONNECTION PLATE TO EXISTING CONCRETE WALL - DETAIL B/A107

Shear, V = (F1+F3) = 927 lbs Critical Shear On Plate

SEE SAP2000 REPORT ATTACHED

Try using : (1) 1/2"ϕ LDT Anchor @ 30"Max (Min. Emb. 3-1/2") Into Existing Concrete Wall.

Spacing Between Bolts =		>	8.0	in	100%	**- For Shear**
Edge distance		>	5.0	in	100%	**- For Shear**

SHEAR CHECK

Ru =	2035	x	1 Anchor	x	100%		
	2035	lbs	>	V = 927	lbs	**OK**	

THEN USE : (1) 1/2"ϕ LDT Anchor @ 30"Max (Min. Emb. 3-1/2") Into Existing Concrete Wall.

4.- CHECKING CRITICAL CONNECTION SLEEVE TO COLUMN - DETAIL A/A106

Shear, V = 796 lbs Critical Tension On Plate

SEE SAP2000 REPORT ATTACHED

Try using : (2) 1/2"ϕ S.S Tap Bolts per Connection

CHECKING SHEAR - ONE SIDES IN SHEAR

Yield Strength, fy =	30000	psi					
Allowable Strength, fv = 0.4fy =	12000	psi					
Section area, A =	0.16	in^2	- Critical Threaded Zone				
Ru = A x fv =	1909	x	2 Bolts				
	3817	lbs	>	V = 796	lbs	**O.K.**	

THEN USE : (2) 1/2"ϕ S.S Tap Bolts per Connection

5.- CHECKING CRITICAL CONNECTION PLATE TO EXISTING CONCRETE SLAB - DETAIL B/A106

Tension, T = 796 lbs Critical Tension On Plate
Shear, V = 24 lbs Critical Shear On Plate

SEE SAP2000 REPORT ATTACHED

Try using : (4) 1/2"ϕ LDT Anchor Per Plate (Min. Emb. 3-1/2") Into Existing Concrete Slab.

Spacing Between Bolts =	8.0	=	8.0	in	100%	**- For Tension**
Spacing Between Bolts =	8.0	=	8.0	in	100%	**- For Shear**
Edge distance		>	3.0	in	100%	**- For Tension**
Edge distance =		>	5.0	in	100%	**- For Shear**

TENSION CHECK

Ru =	2209	x	2 Anchor	x	100%	
	4418	lbs	>	T = 796	lbs	**OK**

SHEAR CHECK

Ru =	2035	x	2 Anchor	x	100%	
	4070	lbs	>	V = 24	lbs	**OK**

CHECKING COMBINED STRESSES (TENSION + SHEAR)

$$\frac{796}{4418} + \frac{24}{4070} = 0.19 < 1.0 \quad \textbf{OK}$$

THEN USE : (4) 1/2"ϕ LDT Anchor Per Plate (Min. Emb. 3-1/2") Into Existing Concrete Slab.

SAP2000 ATTACHMENT:

3D VIEWS OF THE MODEL
ELEVATION VIEWS OF THE MODEL - DESIGN SECTIONS
3D VIEWS OF THE MODEL - LOADS APPLIED
3D VIEW OF THE MODEL - DEFORMED SHAPE BY CRITICAL LOAD
P-M RATIO COLORS AND VALUES - DESIGN OF ELEMENTS
3D VIEW - JOINTS SUPPORT REACTIONS BY CRITICAL COMBINATION

STRUCTURAL ANALYSIS REPORT
THOMAS MACKLE CAR PORT- ALUMINUM AWNING

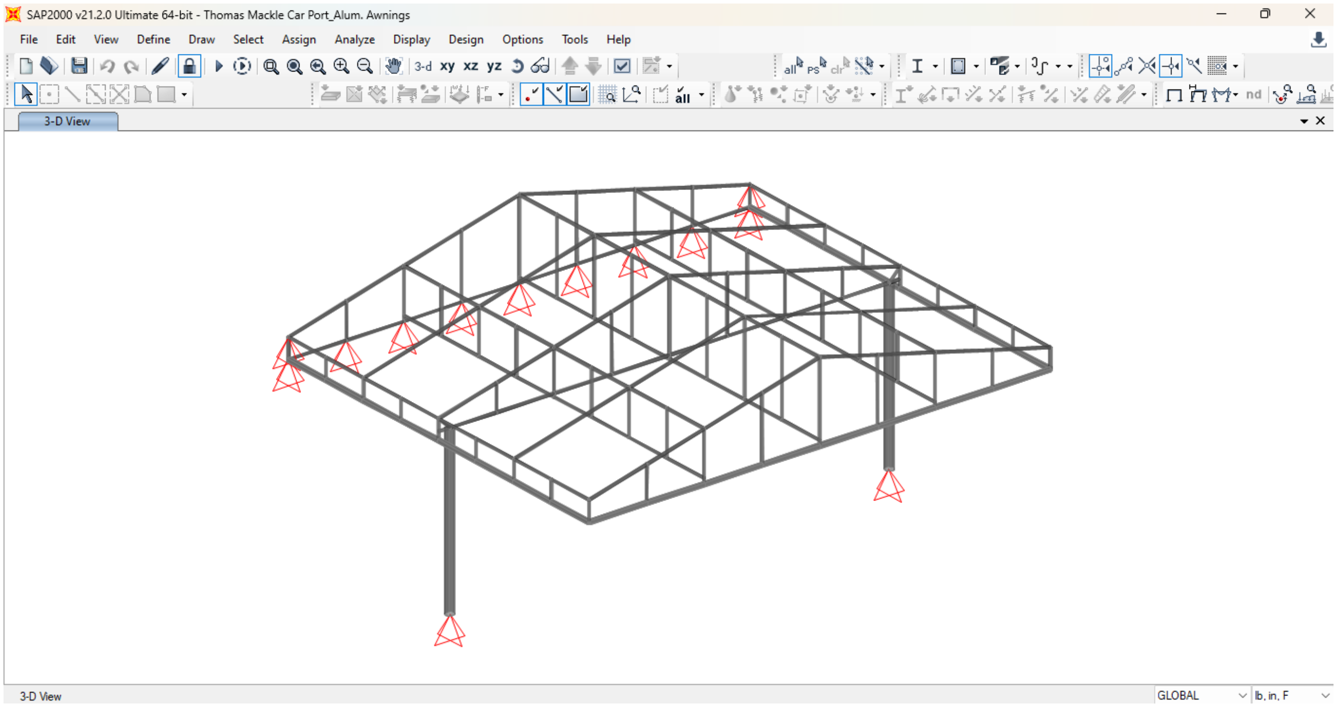
SAP2000 Analysis Report

Prepared by
VAV_RCP

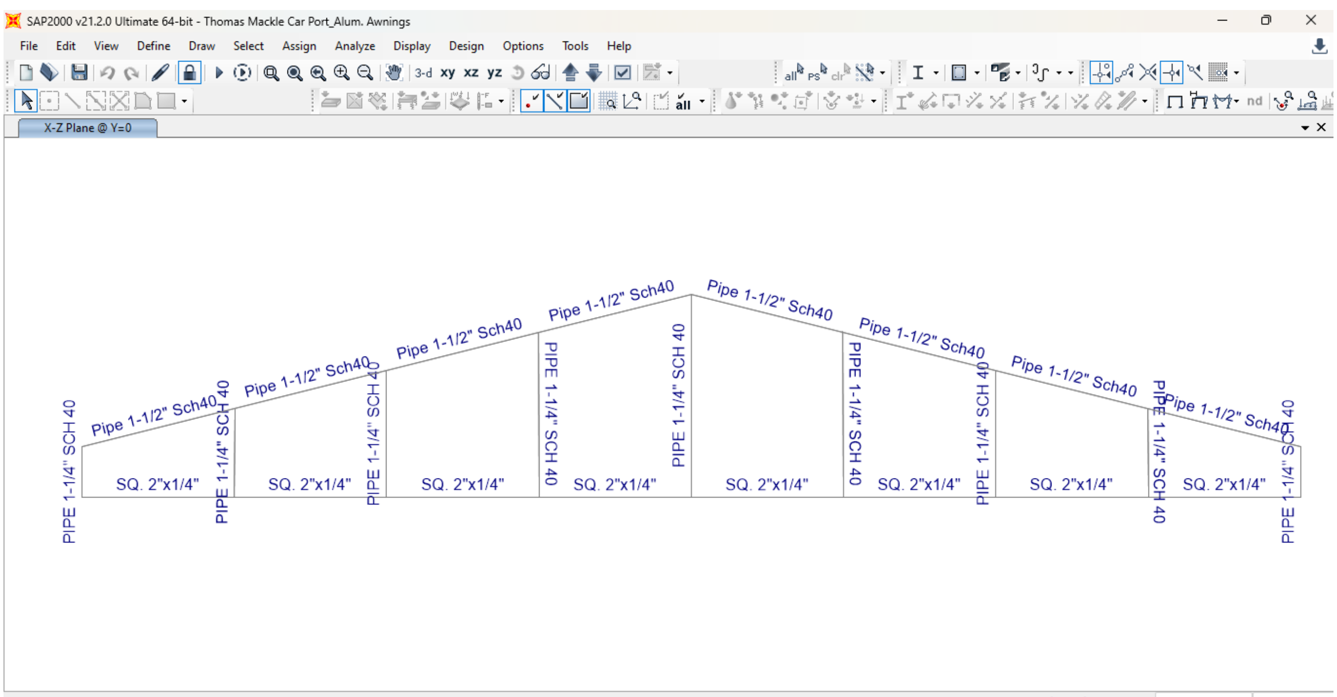
Model Name: Thomas Mackle Car Port_Alum. Awnings.SDB

July 08th, 2025

STRUCTURAL ANALYSIS REPORT
THOMAS MACKLE CAR PORT- ALUMINUM AWNING

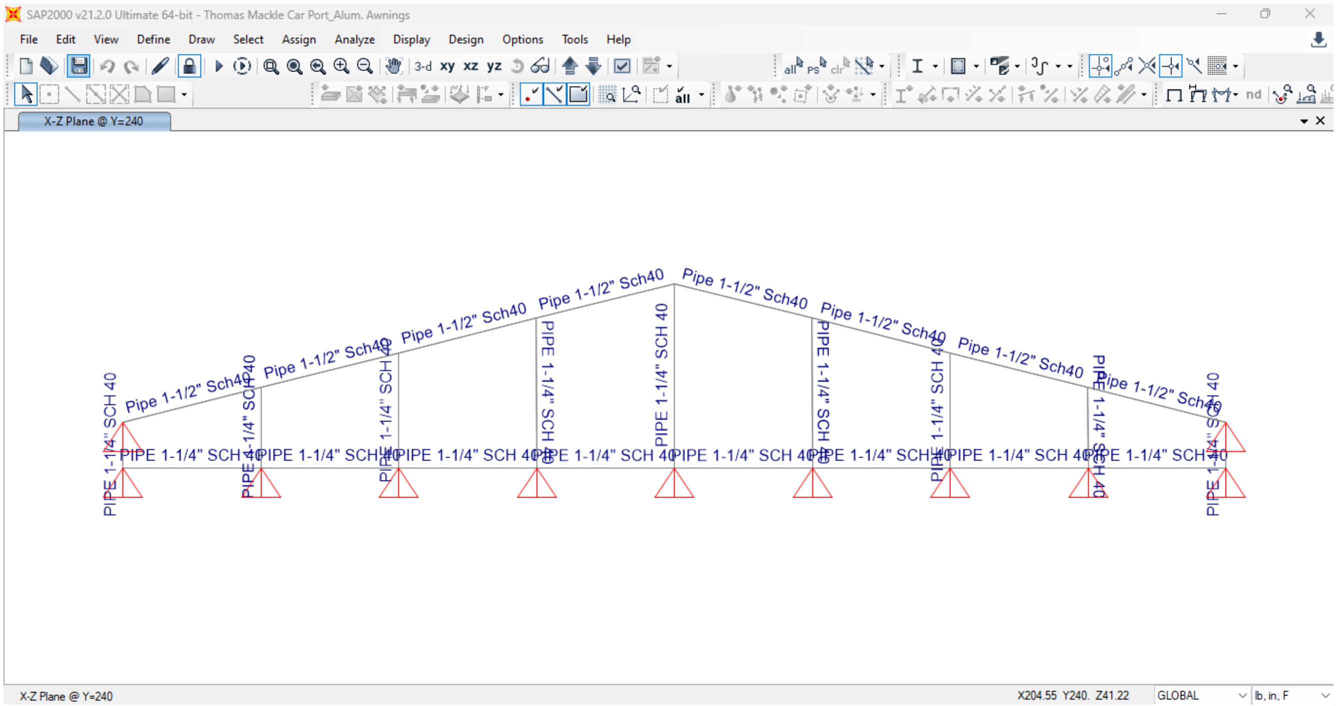


3D VIEW OF THE MODEL

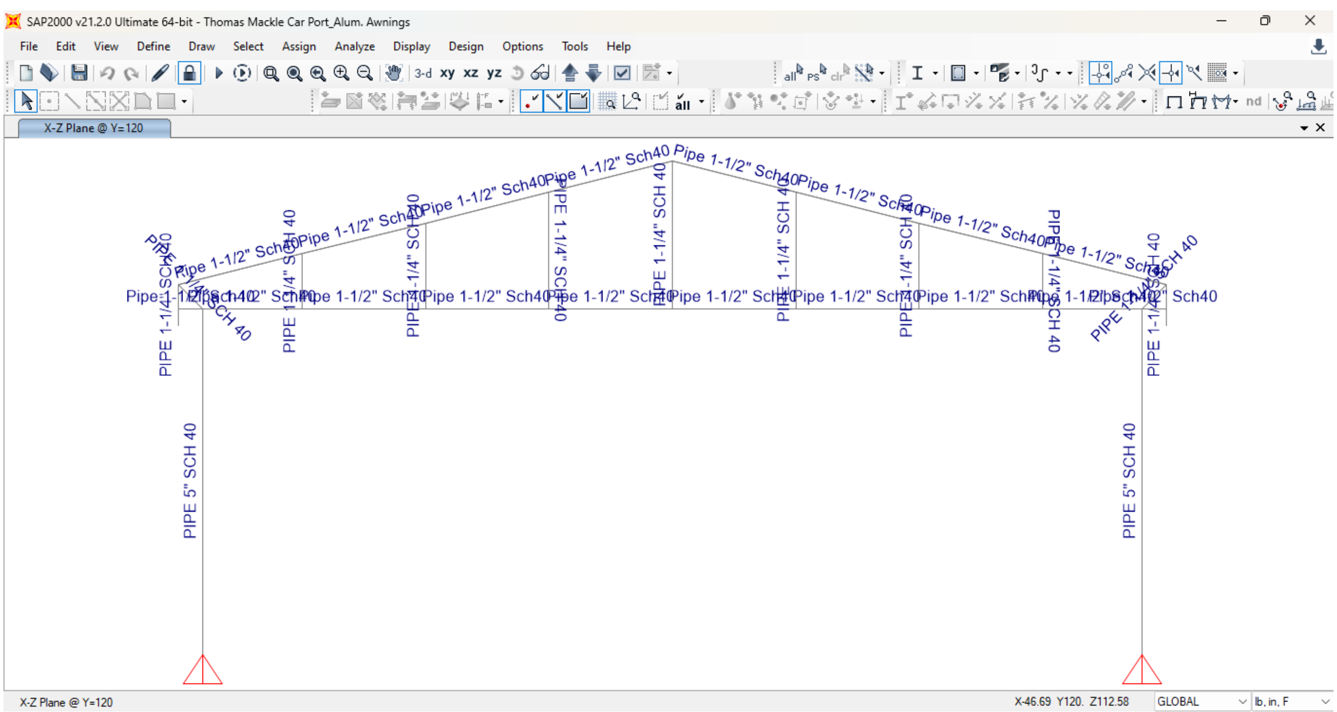


ELEVATION VIEW OF FRONTAL MAIN TRUSS_DESIGN SECTIONS

STRUCTURAL ANALYSIS REPORT
THOMAS MACKLE CAR PORT- ALUMINUM AWNING

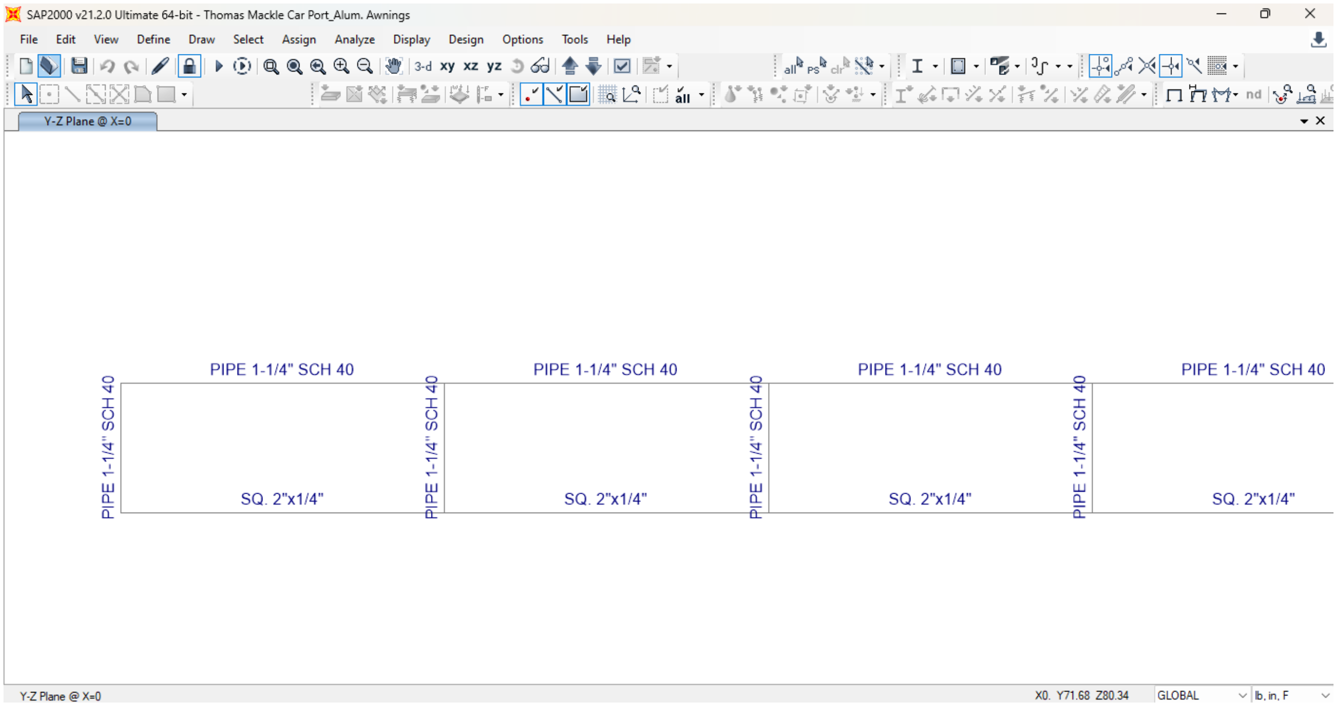


ELEVATION VIEW OF REAR MAIN TRUSS_DESIGN SECTIONS

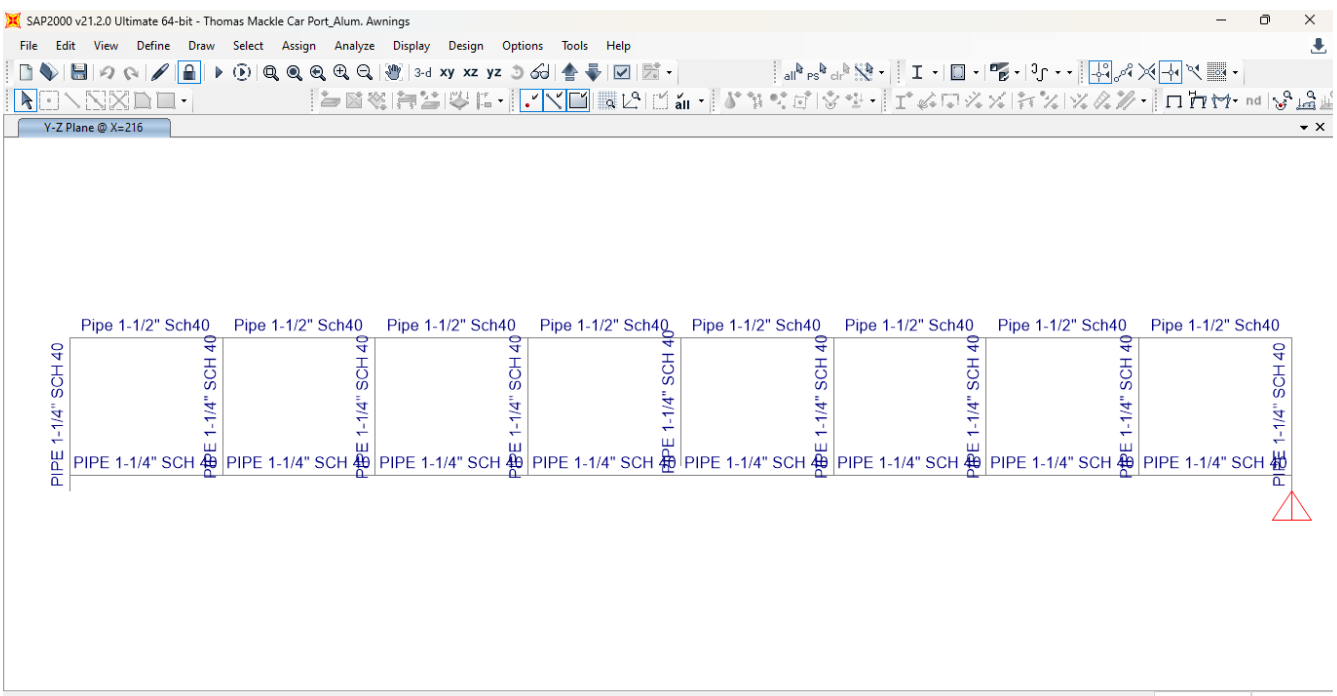


ELEVATION VIEW OF MIDDLE MAIN TRUSS AND COLUMNS_DESIGN SECTIONS

STRUCTURAL ANALYSIS REPORT
THOMAS MACKLE CAR PORT- ALUMINUM AWNING

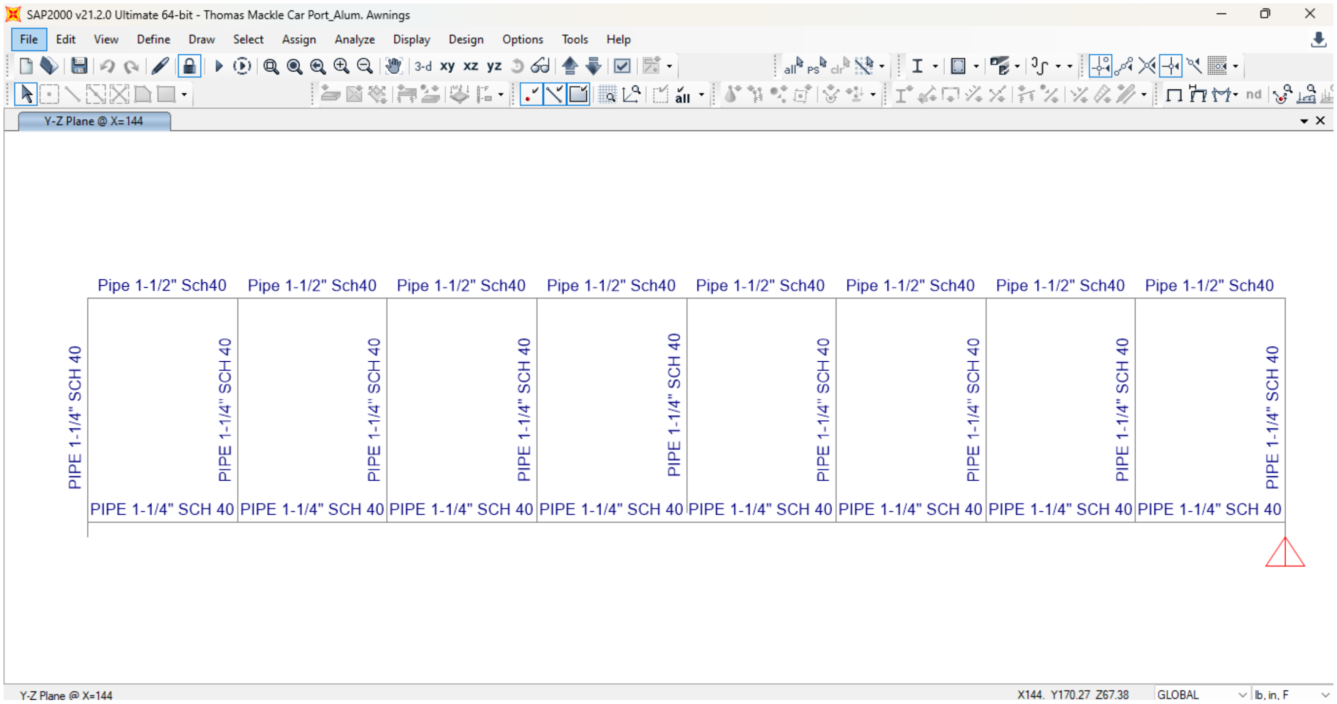


ELEVATION VIEW OF SIDE FLAT BEAM H=12"_DESIGN SECTIONS

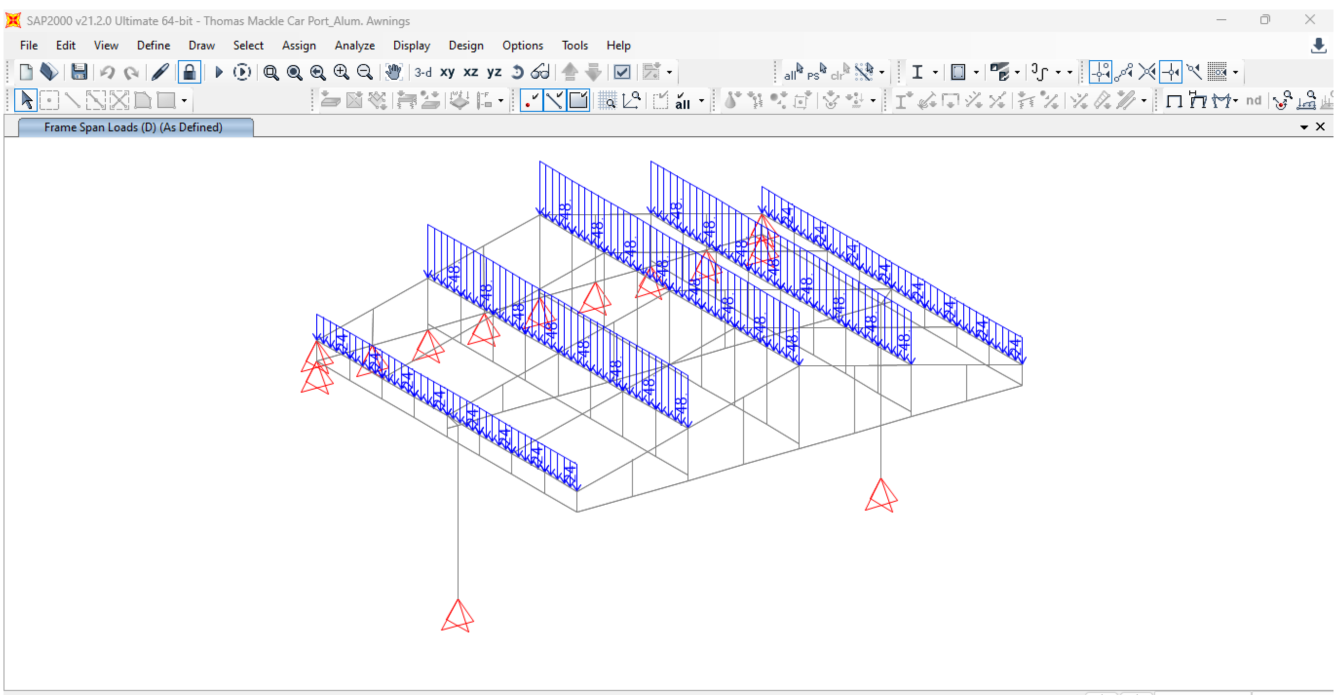


ELEVATION VIEW OF MIDDLE FLAT BEAM H=27"_DESIGN SECTIONS

STRUCTURAL ANALYSIS REPORT
THOMAS MACKLE CAR PORT- ALUMINUM AWNING

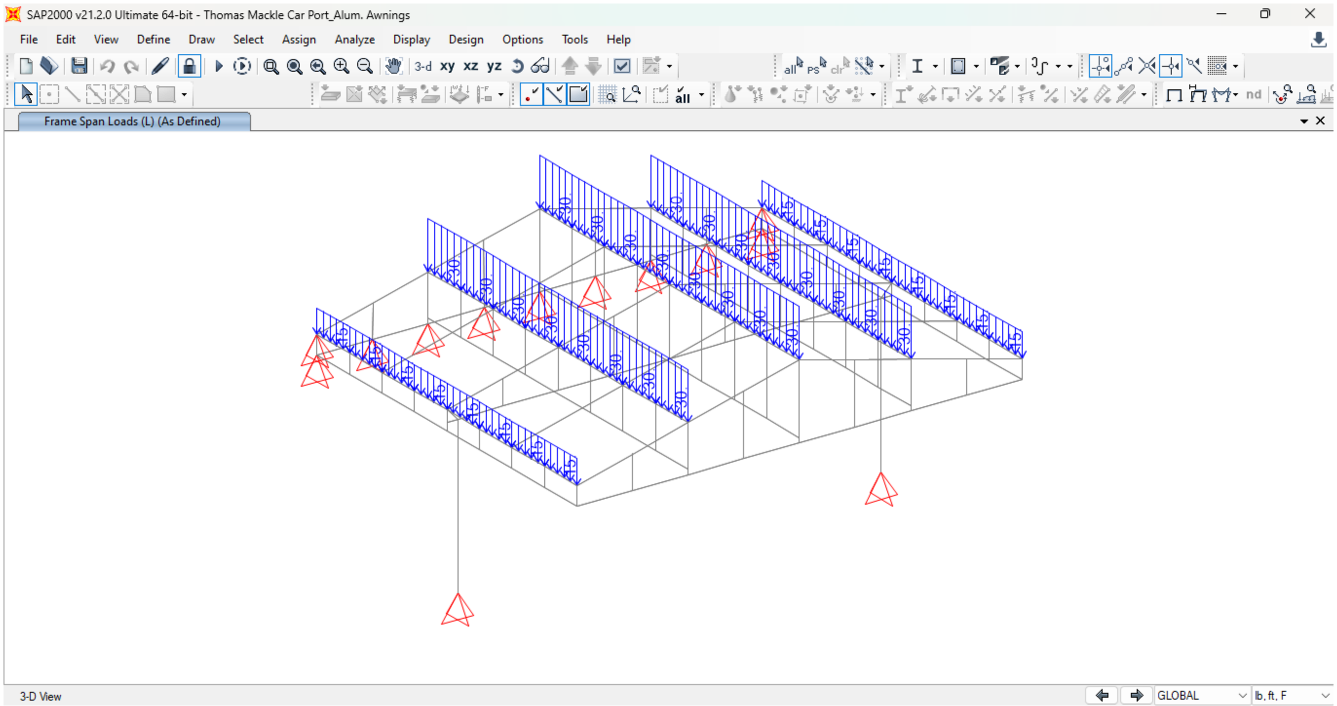


ELEVATION VIEW OF PRINCIPAL FLAT BEAM H=45"_DESIGN SECTIONS

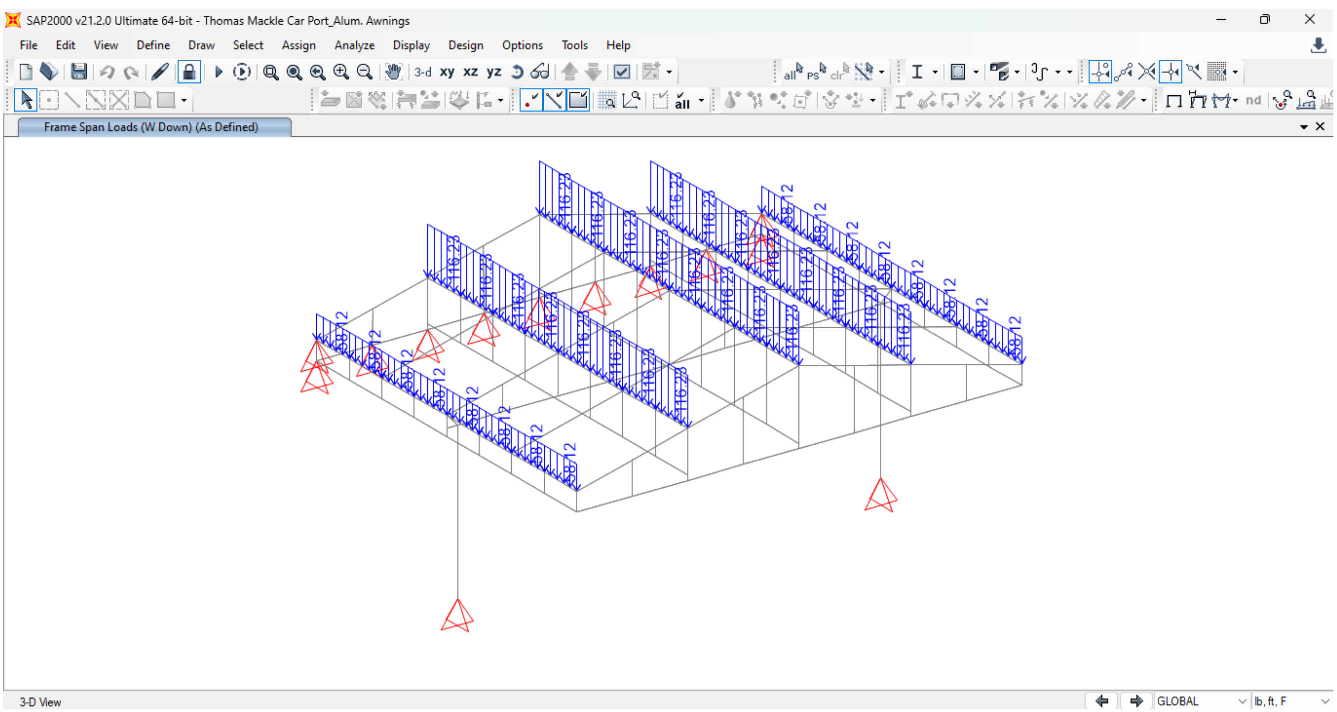


3D VIEW - DEAD LOADS APPLIED (Lb/ft)

STRUCTURAL ANALYSIS REPORT
THOMAS MACKLE CAR PORT- ALUMINUM AWNING

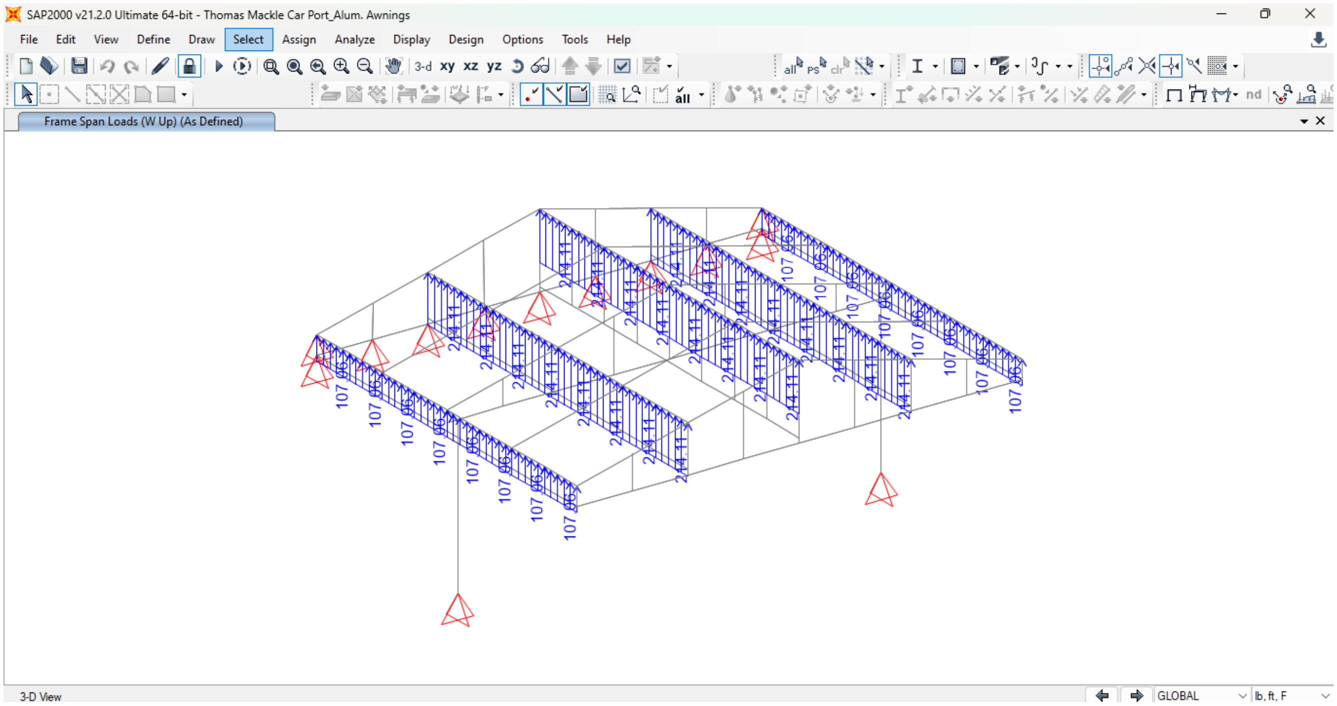


3D VIEW - LIVE LOADS APPLIED (Lb/ft)

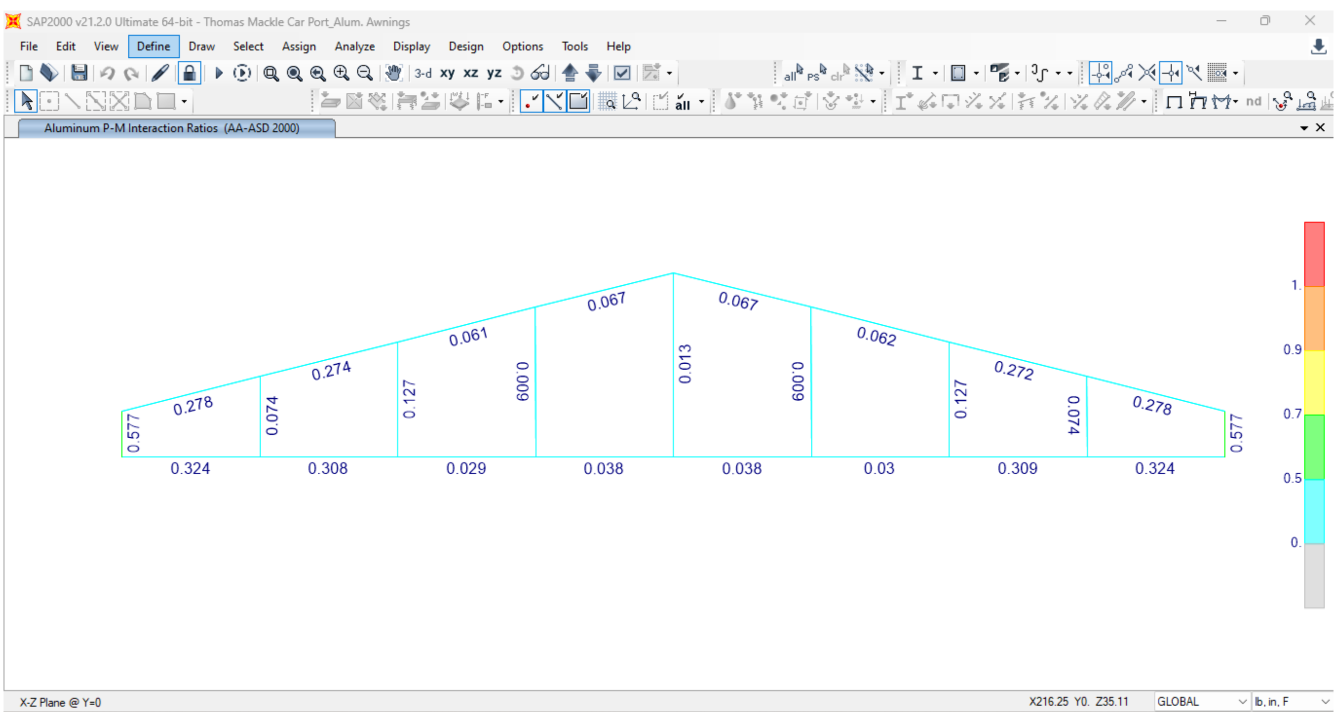


3D VIEW – TOWARD WIND LOADS APPLIED (Lb/ft)

STRUCTURAL ANALYSIS REPORT
THOMAS MACKLE CAR PORT- ALUMINUM AWNING

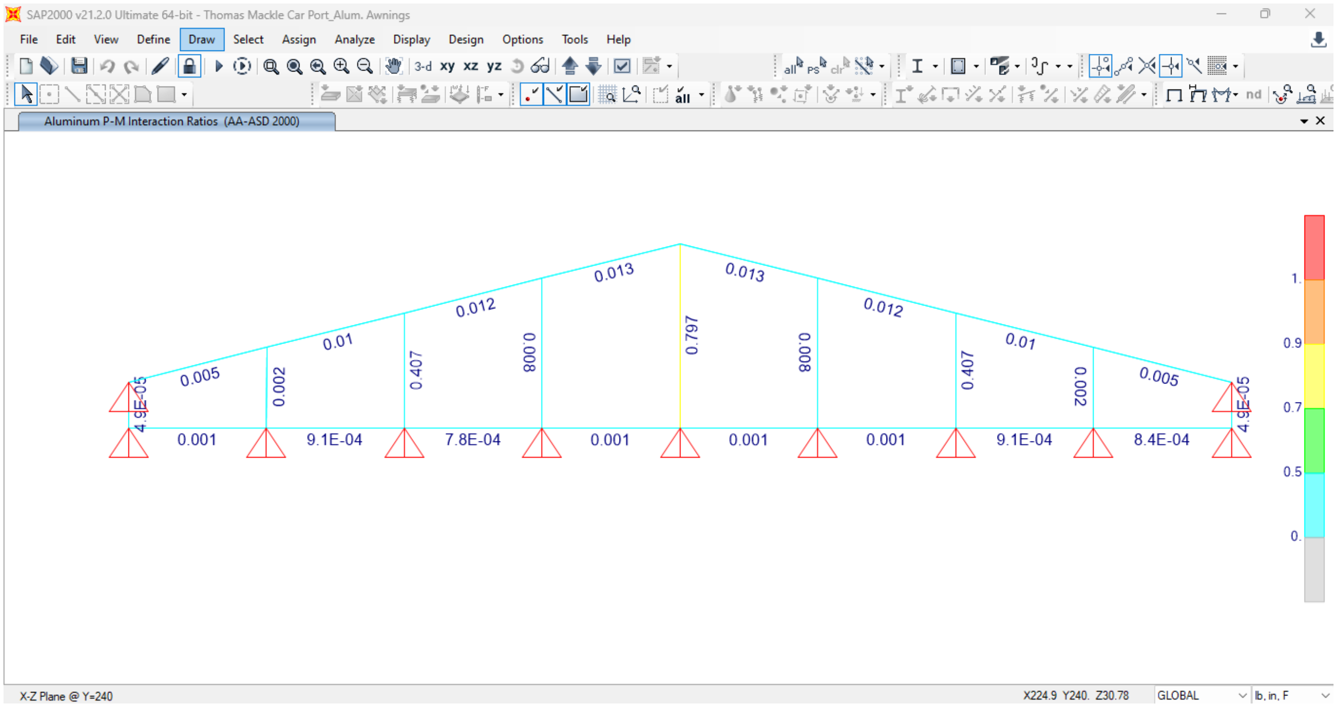


3D VIEW – AWAY WIND LOADS APPLIED (Lb/ft)

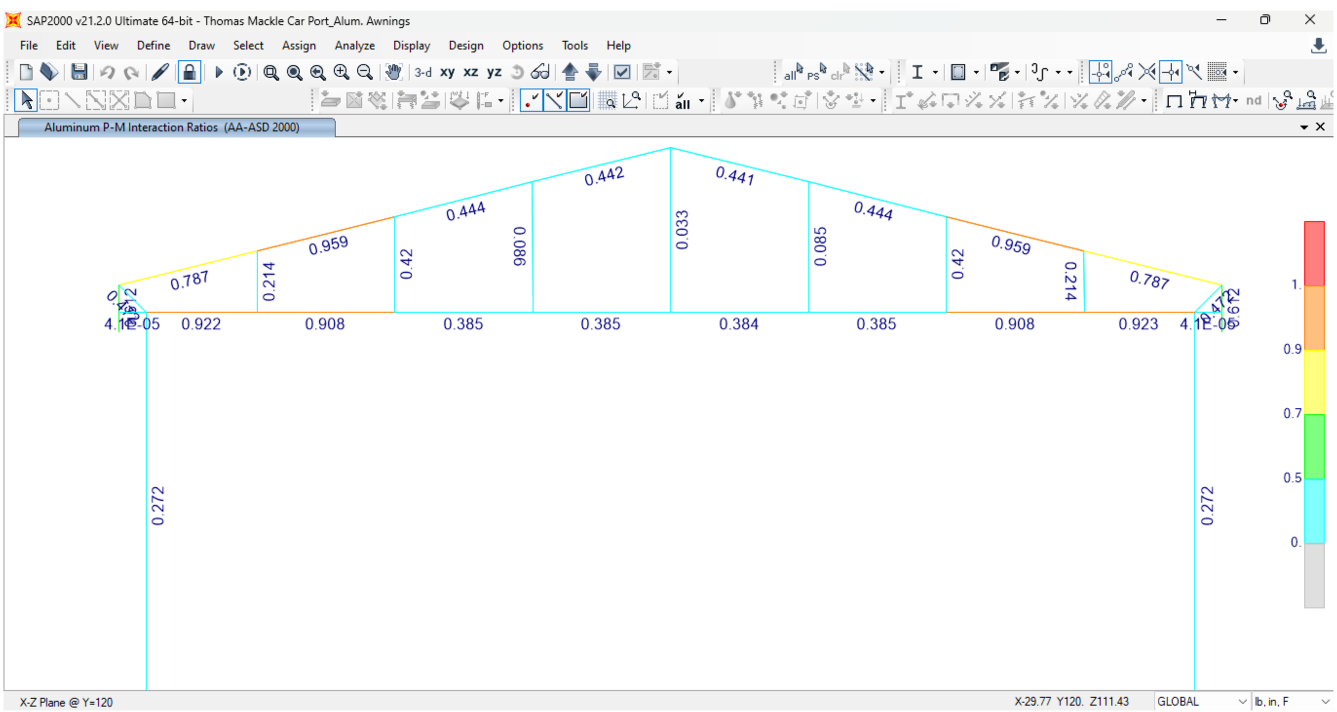


P-M RATIO COLORS AND VALUES – ELEVATION VIEW OF FRONTAL MAIN TRUSS (ALL MEMBERS PASS)

STRUCTURAL ANALYSIS REPORT
THOMAS MACKLE CAR PORT- ALUMINUM AWNING

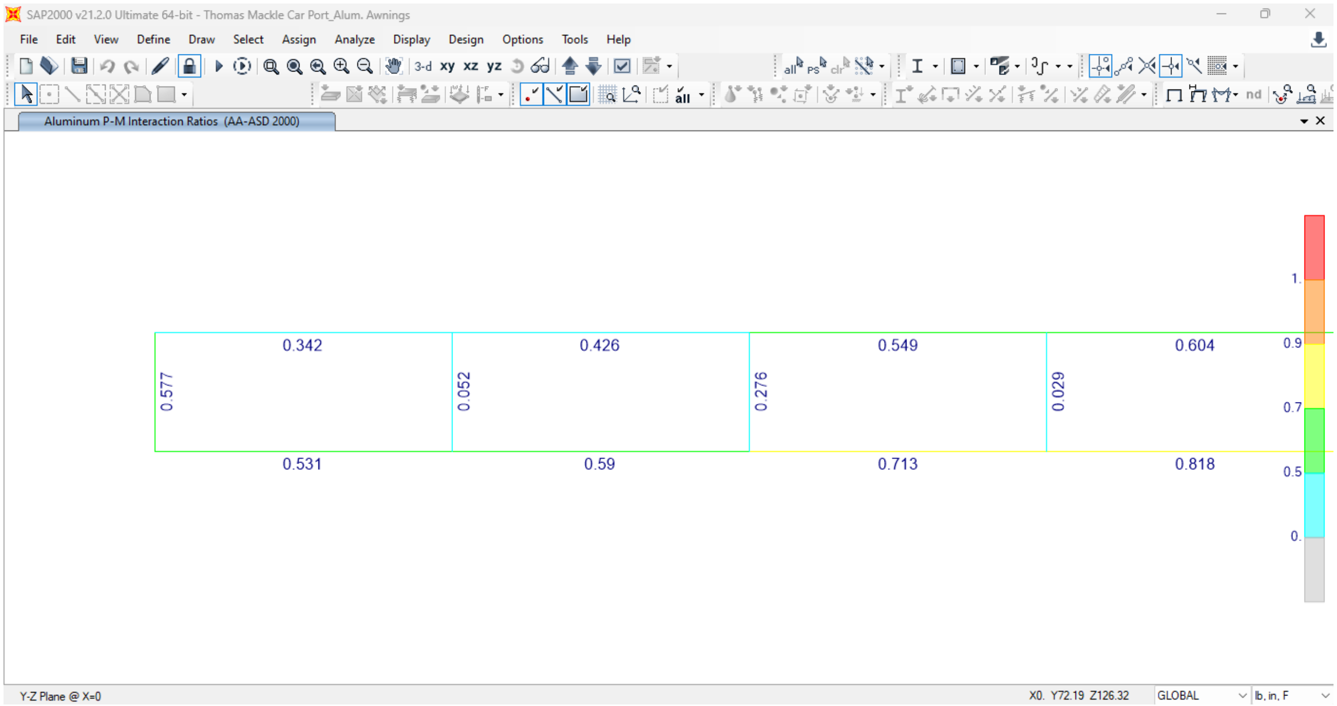


P-M RATIO COLORS AND VALUES – ELEVATION VIEW OF REAR MAIN TRUSS (ALL MEMBERS PASS)

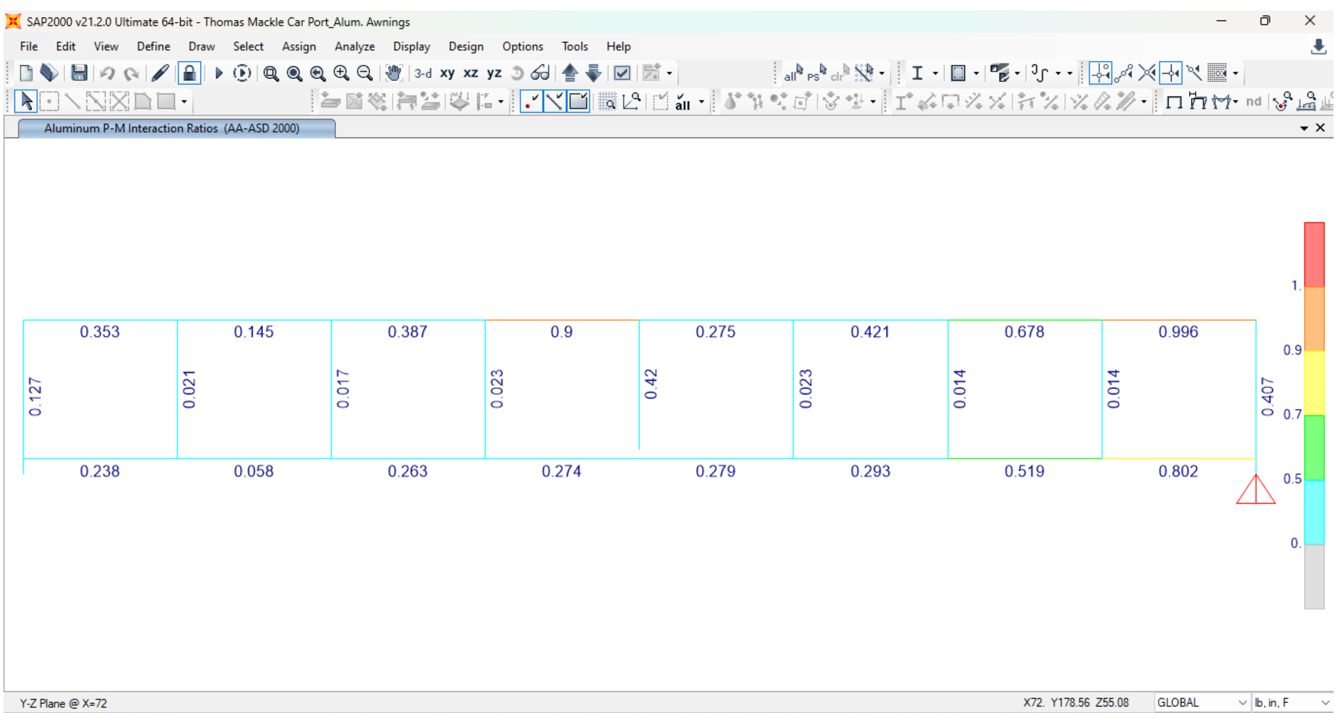


P-M RATIO COLORS AND VALUES – ELEVATION VIEW OF MIDDLE MAIN TRUSS AND COLUMNS (ALL MEMBERS PASS)

STRUCTURAL ANALYSIS REPORT
THOMAS MACKLE CAR PORT- ALUMINUM AWNING

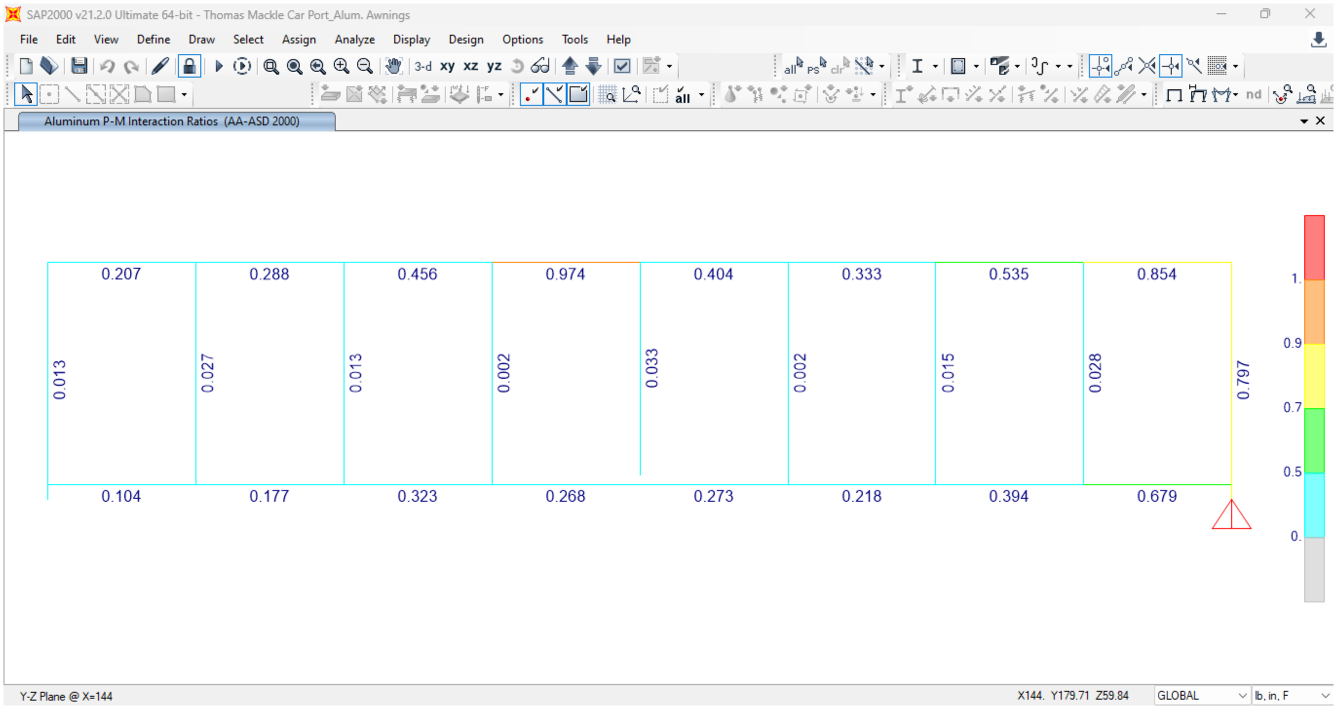


P-M RATIO COLORS AND VALUES – ELEVATION VIEW OF SIDE FLAT BEAM H=12" (ALL MEMBERS PASS)

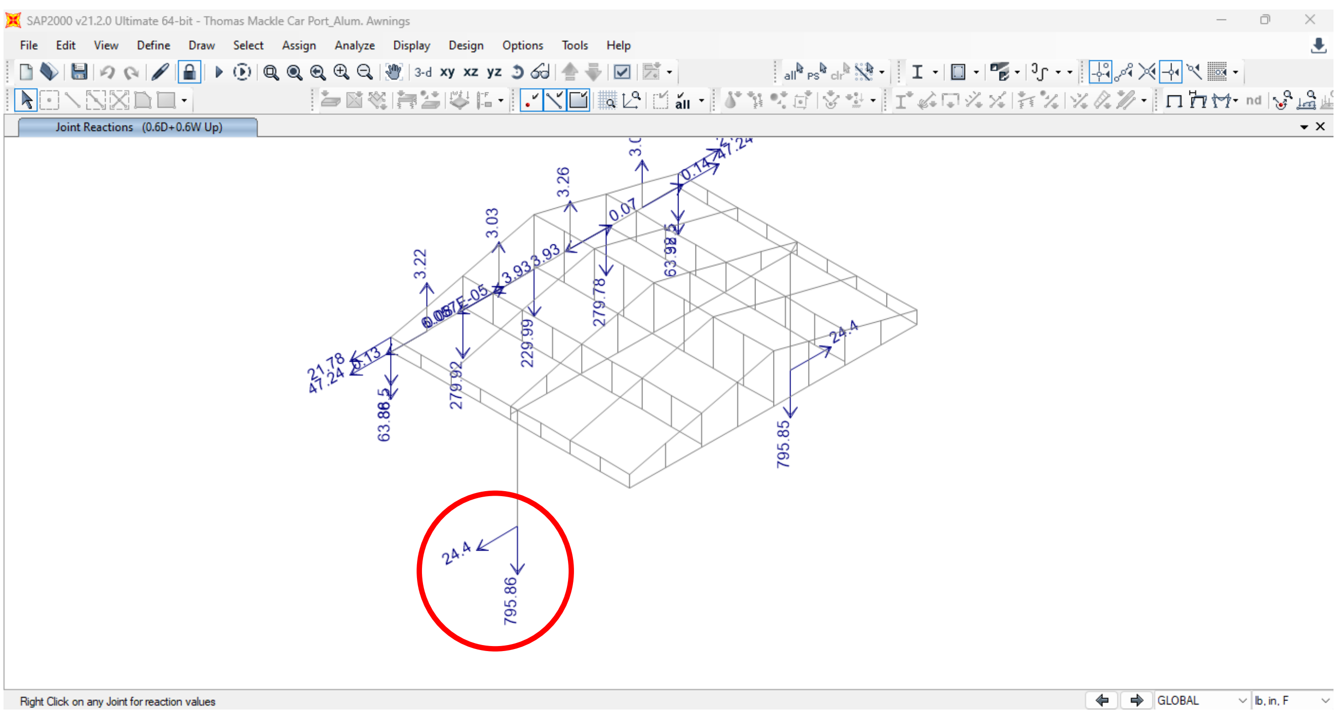


P-M RATIO COLORS AND VALUES – ELEVATION VIEW OF MIDDLE FLAT BEAM H=27" (ALL MEMBERS PASS)

STRUCTURAL ANALYSIS REPORT
THOMAS MACKLE CAR PORT- ALUMINUM AWNING

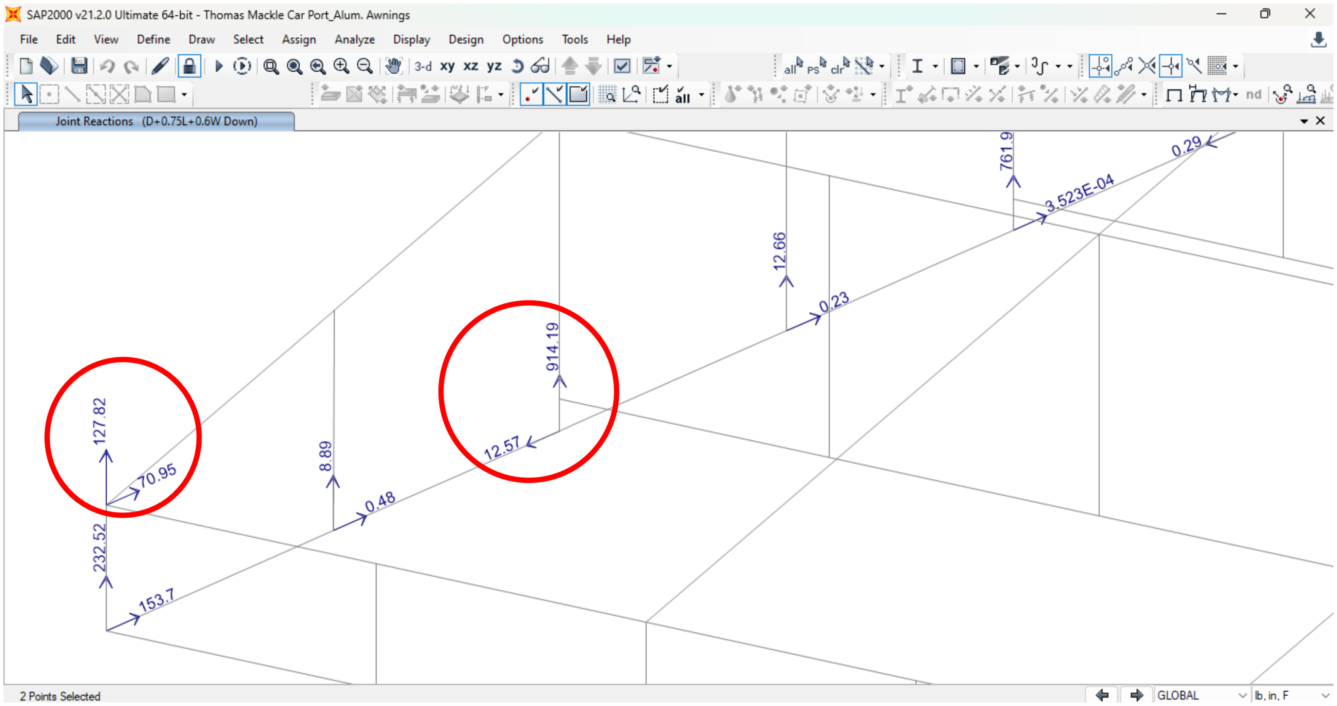


P-M RATIO COLORS AND VALUES – ELEVATION VIEW OF PRINCIPAL FLAT BEAM H=45" (ALL MEMBERS PASS)

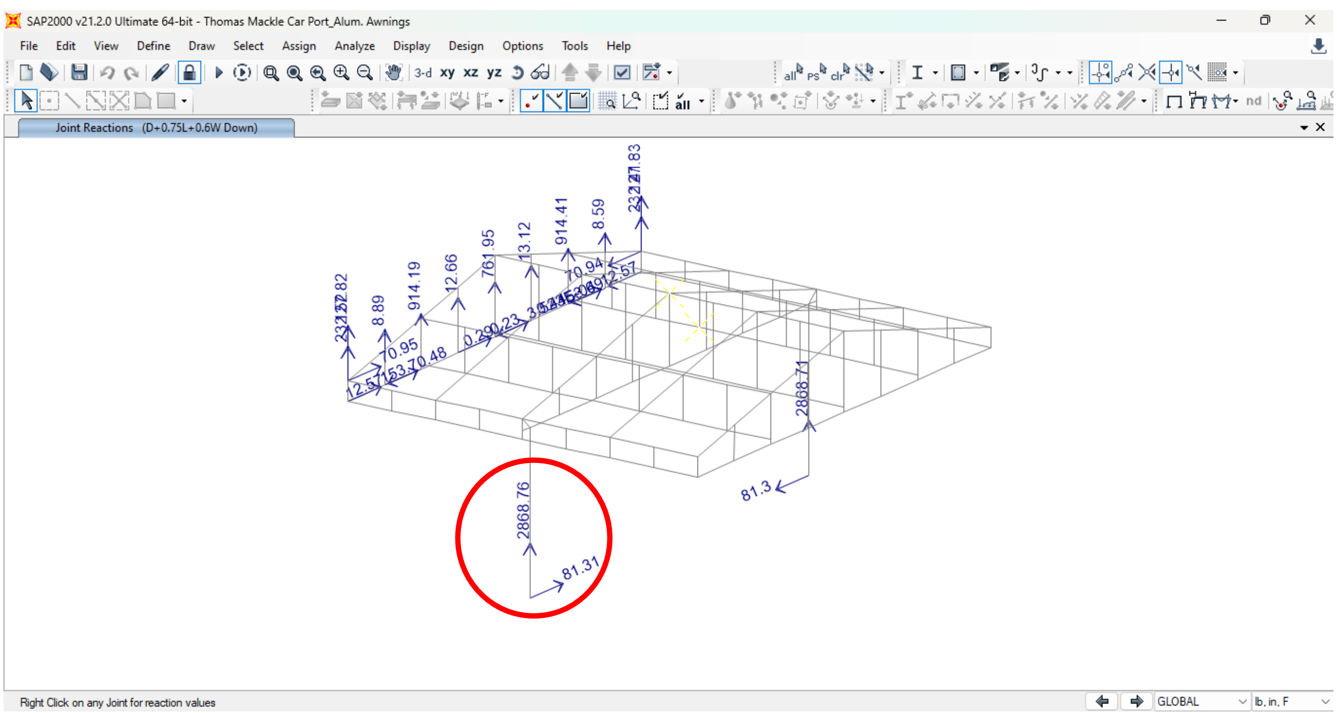


ELEV. VIEW - CRITICAL SUPPORT REACTIONS BY CRITICAL COMB. (0.6D+0.6W Up)

STRUCTURAL ANALYSIS REPORT
THOMAS MACKLE CAR PORT- ALUMINUM AWNING

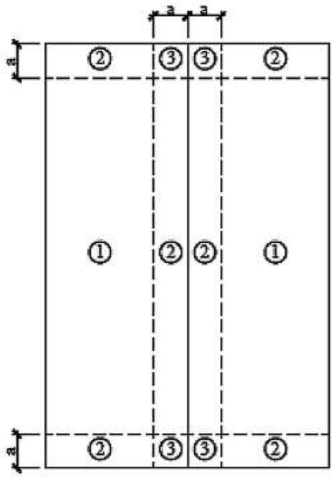


ELEV. VIEW - CRITICAL SUPPORT REACTIONS BY CRITICAL COMB. (D+0.75L+0.6W Down)

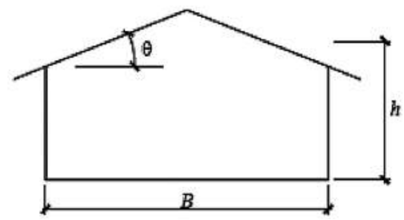


ELEV. VIEW - CRITICAL SUPPORT REACTIONS BY CRITICAL COMB. (D+0.75L+0.6W Down)

Diagrams



PLAN VIEW



ELEVATION VIEW

Notation

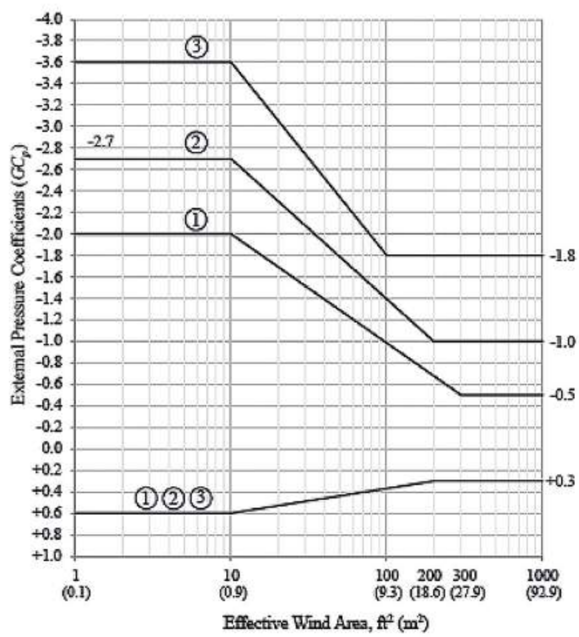
a = 10% of least horizontal dimension or $0.4h$, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m). If an overhang exists, the edge distance shall be measured from the outside edge of the overhang. The horizontal dimensions used to compute the edge distance shall not include any overhang dimensions.

B = Horizontal dimension of building measured normal to wind direction, ft (m).

h = Mean roof height, in ft (m), except that eave height shall be used for $\theta \leq 10°$.

θ = Angle of plane of roof from horizontal, degrees.

External Pressure Coefficients (GC_p)



Notes

1. Vertical scale denotes (GCp) to be used with q_h.
2. Horizontal scale denotes effective wind area A, ft^2 (m^2).
3. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.
4. Each component shall be designed for maximum positive and negative pressures.
5. Values of (GCp) for roof overhangs to be determined in accordance with Section 30.7 Roof Overhangs.

Figure 30.3-2B. Components and cladding [$h \leq 60$ ft ($h \leq 18.3$ m)]: external pressure coefficients, (GC_p), for enclosed, partially enclosed, and partially open buildings—gable roofs, $7° < \theta \leq 20°$.

$$q_z = 0.00256 K_z K_{zt} K_e V^2 (\text{lb/ft}^2);\ V, \text{mi/h} \quad (26.10\text{-}1)$$

$$q_z = 0.613 K_z K_{zt} K_e V^2 (\text{N/m}^2);\ V, \text{m/s} \quad (26.10\text{-}1.\text{SI})$$

where

K_z = Velocity pressure exposure coefficient, see Section 26.10.1;
K_{zt} = Topographic factor, see Section 26.8.2;
K_e = Ground elevation factor, see Section 26.9;
V = Basic wind speed, see Section 26.5; and
q_z = Velocity pressure at height z.

The velocity pressure at mean roof height is computed as $q_h = q_z$ evaluated from Equation (26.10-1) using K_z at mean roof height h.

The basic wind speed, V, used in determination of design wind loads on rooftop structures, rooftop equipment, and other building appurtenances shall consider the Risk Category equal to the greater of the following:

1. Risk category for the building on which the equipment or appurtenance is located, or
2. Risk category for any building or other structure to which the equipment or appurtenance provides a necessary service.

26.11 GUST EFFECTS

26.11.1 Gust-Effect Factor The gust-effect factor for a rigid building or other structure is permitted to be taken as 0.85.

26.11.2 Frequency Determination To determine whether a building or other structure is rigid or flexible as defined in Section 26.2, the fundamental natural frequency, n_1, shall be established using the structural properties and deformational characteristics of the resisting elements in a properly substantiated analysis. Low-rise buildings, as defined in Section 26.2, are permitted to be considered rigid.

26.11.2.1 Limitations for Approximate Natural Frequency As an alternative to performing an analysis to determine n_1, the approximate building natural frequency, n_a, shall be permitted to be calculated in accordance with Section 26.11.3 for structural steel, concrete, or masonry buildings meeting the following requirements:

1. The building height is less than or equal to 300 ft (91 m).
2. The building height is less than four times its effective length, L_{eff}.

The effective length, L_{eff}, in the direction under consideration shall be determined from the following equation:

$$L_{\text{eff}} = \frac{\sum_{i=1}^{n} h_i L_i}{\sum_{i=1}^{n} h_i} \quad (26.11\text{-}1)$$

The summations are over the height of the building, where h_i is the height above grade of level i, and L_i is the building length at level i parallel to the wind direction.

26.11.3 Approximate Natural Frequency The approximate lower bound natural frequency (n_a), in Hz, of concrete or structural steel buildings meeting the conditions of

Table 26.10-1. Velocity Pressure Exposure Coefficients, K_h and K_z.

Height above Ground Level, z or h		Exposure		
ft	m	B	C	D
0–15	0–4.6	0.57 (0.70)*	0.85	1.03
20	6.1	0.62 (0.70)*	0.90	1.08
25	7.6	0.66 (0.70)*	0.94	1.12
30	9.1	0.70	0.98	1.16
40	12.2	0.74	1.04	1.22
50	15.2	0.79	1.09	1.27
60	18.3	0.83	1.13	1.31
70	21.3	0.86	1.17	1.34
80	24.4	0.90	1.21	1.38
90	27.4	0.92	1.24	1.40
100	30.5	0.95	1.26	1.43
120	36.6	1.00	1.31	1.48
140	42.7	1.04	1.34	1.52
160	48.8	1.08	1.39	1.55
180	54.9	1.11	1.41	1.58
200	61.0	1.14	1.44	1.61
250	76.2	1.21	1.51	1.68
300	91.4	1.27	1.57	1.73
350	106.7	1.33	1.62	1.78
400	121.9	1.38	1.66	1.82
450	137.2	1.42	1.70	1.86
500	152.4	1.46	1.74	1.89

*Use 0.70 in Chapter 28, Exposure B, when $z < 30$ ft (9.1 m).

Notes:

1. Velocity pressure exposure coefficient K_z may be determined from the following formula:

For $z < 15$ ft	$K_z = 2.41\,(15/z_g)^{2/\alpha}$
For $z < 4.6$ m	$K_z = 2.41\,(4.6/z_g)^{2/\alpha}$
For 15 ft (4.6 m) $\le z \le z_g$	$K_z = 2.41\,(z/z_g)^{2/\alpha}$
For $z_g < z \le 3{,}280$ ft (1,000 m)	$K_z = 2.41$

2. α and z_g are tabulated in Table 26.11-1.
3. Linear interpolation for intermediate values of height z is acceptable.
4. Exposure categories are defined in Section 26.7.

Section 26.11.2.1 is permitted to be determined from one of the following equations.

For structural steel moment-resisting frame buildings,

$$n_a = 22.2/h^{0.8} \quad (26.11\text{-}2)$$

$$n_a = 8.58/h^{0.8} \quad (26.11\text{-}2.\text{SI})$$

For concrete moment-resisting frame buildings,

$$n_a = 43.5/h^{0.9} \quad (26.11\text{-}3)$$

$$n_a = 14.93/h^{0.9} \quad (26.11\text{-}3.\text{SI})$$

Table 26.13-1. Main Wind Force Resisting System and Components and Cladding (All Heights): Internal Pressure Coefficient, (GC_{pi}), for Enclosed, Partially Enclosed, Partially Open, and Open Buildings (Walls and Roof).

Enclosure Classification	Criteria for Enclosure Classification	Internal Pressure	Internal Pressure Coefficient (GC_{pi})
Enclosed buildings	A_o is less than the smaller of $0.01A_g$ or 4 ft^2 (0.37 m^2), and $A_{oi}/A_{gi} \le 0.2$	Moderate	+0.18 −0.18
Partially enclosed buildings	$A_o > 1.1A_{oi}$, and $A_o >$ the lesser of $0.01A_g$ or 4 ft^2 (0.37 m^2), and $A_{oi}/A_{gi} \le 0.2$	High	+0.55 −0.55
Partially open buildings	A building that does not comply with Enclosed, Partially Enclosed, or Open classifications	Moderate	+0.18 −0.18
Open buildings	Each wall is at least 80% open	Negligible	0.00

Notes:

1. Plus and minus signs signify pressures acting toward and away from the internal surfaces, respectively.
2. Values of (GC_{pi}) shall be used with q_z or q_h as specified.
3. Two cases shall be considered to determine the critical load requirements for the appropriate condition:
   (a) A positive value of (GC_{pi}) applied to all internal surfaces, or
   (b) A negative value of (GC_{pi}) applied to all internal surfaces.

unpartitioned large volume, the internal pressure coefficient, (GC_{pi}), shall be multiplied by the reduction factor, R_i:

$$R_i = 1.0 \quad \text{or} \quad R_i = 0.5\left(1 + \frac{1}{\sqrt{1 + \frac{V_i}{22{,}800A_{og}}}}\right) < 1.0 \qquad (26.13\text{-}1)$$

where A_{og} is the total area of openings in the building envelope [walls and roof (ft^2)], and V_i is the unpartitioned internal volume (ft^3).

26.14 CONSENSUS STANDARDS AND OTHER REFERENCED DOCUMENTS

This section lists the consensus standards and other documents that shall be considered part of this standard to the extent referenced in this chapter.

ANSI A58.1, *Minimum Design Loads for Buildings and Other Structures*, American National Standards Institute, 1982.

Cited in: Section C26.5.2.

ANSI/DASMA 115, *Standard Method for Testing Sectional Doors, Rolling Doors, and Flexible Doors: Determination of Structural Performance under Missile Impact and Cyclic Wind Pressure*, Door and Access Systems Manufacturers Association International, 2017.

Cited in: Sections 26.12.3.2, C26.12.

ASTM E330, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference*, ASTM International, 2014.

Cited in: Section C26.5.1.

ASTM E1886, *Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials*, ASTM, 2019.

Cited in: Sections 26.12.3.2, C26.12

ASTM E1996, *Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes*, ASTM International, 2020.

Cited in: Sections 26.12.3.2, C26.12

CAN/CSA A123.21, *Standard Test Method for the Dynamic Wind Uplift Resistance of Membrane-Roofing Systems*, CSA Group, 2014.

Cited in: Section C26.5.1

PERFORMANCE TABLE

LDT Anchors
Allowable Tension and Shear Values (Lbs/kN) in Concrete Carbon and Stainless Steel*

ANCHOR DIA. In. (mm)	EMBEDMENT DEPTH In. (mm)	f'c = 2000 PSI (13.8 MPa) TENSION Lbs. (kN)	f'c = 2000 PSI (13.8 MPa) SHEAR Lbs. (kN)	f'c = 3000 PSI (20.7 MPa) TENSION Lbs. (kN)	f'c = 3000 PSI (20.7 MPa) SHEAR Lbs. (kN)	f'c = 4000 PSI (27.6 MPa) TENSION Lbs. (kN)	f'c = 4000 PSI (27.6 MPa) SHEAR Lbs. (kN)
3/8 (9.5)	1-1/2 (38.1)	334 (1.5)	527 (2.3)	413 (1.8)	691 (3.1)	492 (2.1)	854 (3.8)
	2 (50.8)	373 (1.7)	759 (3.4)	506 (2.2)	807 (3.6)	638 (2.8)	855 (3.8)
	2-1/2 (63.5)	933 (4.2)	828 (3.7)	937 (4.2)	841 (3.7)	940 (4.2)	856 (3.8)
	3-1/2 (88.9)	1,349 (6.0)	828 (3.7)	1,656 (7.4)	842 (3.7)	1,963 (8.7)	857 (3.8)
1/2 (12.7)	2 (50.8)	895 (4.0)	1,411 (6.3)	977 (4.3)	1,628 (7.2)	1,059 (4.7)	1,845 (8.2)
	3-1/2 (88.9)	1,813 (8.0)	1,609 (7.2)	2,011 (8.9)	1,822 (8.1)	2,209 (9.8)	2,035 (9.0)
	4-1/2 (114.3)	2,544 (11.3)	1,846 (8.2)	2,583 (11.5)	1,992 (8.9)	2,622 (11.7)	2,138 (9.5)
5/8 (15.9)	2-3/4 (69.9)	1,319 (5.9)	2,164 (9.7)	1,640 (7.3)	2,766 (12.3)	1,961 (8.7)	3,369 (15.0)
	3-1/2 (88.9)	1,993 (8.9)	2,556 (11.4)	2,462 (10.9)	3,036 (13.5)	2,931 (13.0)	3,515 (15.6)
	4-1/2 (114.3)	2,892 (12.9)	3,079 (13.7)	3,358 (14.9)	3,395 (15.1)	4,223 (18.8)	3,710 (16.5)
3/4 (19.1)	3-1/4 (82.6)	1,719 (7.6)	1,785 (7.9)	2,439 (10.8)	2,682 (11.9)	3,159 (14.0)	3,579 (15.9)
	4-1/2 (114.3)	2,576 (11.5)	3,280 (14.6)	3,606 (16.0)	4,217 (18.7)	4,635 (20.6)	5,153 (22.9)
	5-1/2 (139.7)	3,262 (14.5)	4,477 (19.9)	4,539 (20.2)	5,445 (24.2)	5,817 (25.9)	6,413 (28.5)

* Allowable values are based upon a 4 to 1 safety factor. (Ultimate/4)

PERFORMANCE TABLE

LDT Anchors
Recommended Edge & Spacing Requirements for Tension Loads Carbon and Stainless Steel*

ANCHOR DIA. In. (mm)	EMBEDMENT DEPTH In. (mm)	EDGE DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	LOAD FACTOR APPLIED AT MIN. EDGE DISTANCE 1-3/4 Inches (44mm)	SPACING DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	LOAD FACTOR APPLIED AT MIN. SPACING DISTANCE 3 Inches (76mm)
3/8 (9.5)	1-1/2 (38.1)	2 (50.8)	70%	6 (152.4)	44%
	2 (50.8)	2 (50.8)	70%	6 (152.4)	44%
	2-1/2 (63.5)	3 (76.2)	70%	6 (152.4)	44%
	3-1/2 (88.9)	4 (101.6)	70%	6 (152.4)	44%
1/2 (12.7)	2 (50.8)	2-1/4 (57.2)	65%	8 (203.2)	27%
	3-1/2 (88.9)	3 (76.2)	65%	8 (203.2)	27%
	4-1/2 (114.3)	4 (101.6)	65%	8 (203.2)	27%

* Edge and spacing distance shall be divided by .75 when anchors are placed in structural lightweight concrete. Linear interpolation may be used for intermediate spacing and edge distances.

For 5/8" and 3/4" LDT Anchors, the critical edge distance for these anchors is 10 times the anchor diameter. The edge distance of these anchors may be reduced to 1-3/4" provided a 0.65 load factor is used for tension loads, a 0.15 load factor is used for shear loads applied perpendicular to the edge, or a 0.60 load factor is used for shear loads applied parallel to the edge. Linear interpolation may be used for intermediate edge distances.

PERFORMANCE TABLE

LDT Anchors
Recommended Edge & Spacing Requirements for Shear Loads Carbon and Stainless Steel*

ANCHOR DIA. In. (mm)	EMBEDMENT DEPTH In. (mm)	EDGE DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	LOAD FACTOR APPLIED AT MIN. EDGE DISTANCE 1-3/4 Inches (44mm)	SPACING DISTANCE REQUIRED TO OBTAIN MAX. WORKING LOAD In. (mm)	LOAD FACTOR APPLIED AT MIN. SPACING DISTANCE 3 Inches (76mm)
3/8 (9.5)	1-1/2 (38.1)	3 (76.2)	25%	6 (152.4)	57%
	2 (50.8)	4 (101.6)	25%	6 (152.4)	57%
	2-1/2 (63.5)	5 (127.0)	25%	6 (152.4)	57%
	3-1/2 (88.9)	5 (127.0)	25%	6 (152.4)	57%
1/2 (12.7)	2 (50.8)	5 (127.0)	25%	8 (203.2)	60%
	3-1/2 (88.9)	5 (127.0)	25%	8 (203.2)	60%
	4-1/2 (114.3)	5-1/2 (139.7)	25%	8 (203.2)	60%

* Edge and spacing distances shall be divided by .75 when anchors are placed in structural lightweight concrete. Linear interpolation may be used for intermediate spacing and edge distances.