STRUCTURAL CALCULATIONS

Project name:

12700 Rolling Road

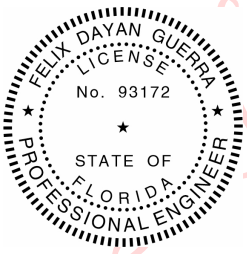
Job No.:

25-1944

Project address:

12700 Rolling Rd Dr, Miami, FL 33156, USA

These calculations are strictly valid for the address above. Use in other projects is unauthorized and may constitute fraud.



Digitally signed by Felix D Guerra
DN: c=US, o=D and SG Engineering Group INC, dnQualifier=A01410D00 00019B951B44DB002D6 574, cn=Felix D Guerra
Date: 2026.07.23 09:16:50 -04'00'

DESIGN CRITERIA:

Calculations based on:

1. Florida Building Code 8th Edition 2023
2. Minimum Design Loads for Buildings and Other Structures ASCE 7-22
3. Building Code Requirements for Structural Concrete ACI 318-19
4. American Institute of Steel Construction AISC 360-16
5. Aluminum Design Manual 2020
6. American Wood Council NDS 2024

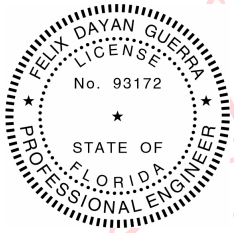
CALCULATION INDEX:

I.	Wind Load Analysis	3-5
II.	Canopy Design	6-43

Total Pages = 43

CALCULATION STATEMENT:

To the best of my knowledge, ability, belief and professional judgment, I hereby attest that the manual calculations and computer-generated calculations are in compliance with the existing governing codes.



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DN: c=US, o=D and SG Engineering Group INC, dnQualifier=A01410D00 00019B951B44DB002D6 574, cn=Felix D Guerra
Date: 2026.07.23 09:17:05 -04'00'

WIND LOAD ANALYSIS

MecaWind v2545

Developed by Meca Enterprises Inc., https://www.mecaenterprises.com
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Calculations Prepared by:
Date: Jan 07, 2026
File Location: N:\EEG ACTIVE\Work in Progress\2025\25 1944 12700 Rolling Road\Calc\Temp\Wind Analysis\Wind V00.wnd

General:
Reference Abbreviations: T: Table, F: Figure, E: Equation, §: Section, ¶: Paragraph

Wind Load Standard	= ASCE 7-16	Basic Wind Speed	= 175.0 mph
Exposure Classification	= C	Risk Category	= II
Structure Type	= Canopy	Basis for Wind Pressures	= LRFD
MWFRS Analysis Method	= None	C&C Analysis Method	= Ch 30 Pt 6
Dynamic Type of Structure	= Rigid	Advanced Options	= True
Base Reactions Output Type	= None	Altitude above Sea Level	= 0.000 ft
Base Elevation Of Structure	= 0.0000 ft	MWFRS Pressure Elevations	= Mean Ht
Topographic Effects	= None	Override Directionality Factor	= True
Manual - Directionality Factor	= 0.8500	Override Gust Factor	= False
Override Minimum Pressure	= False		

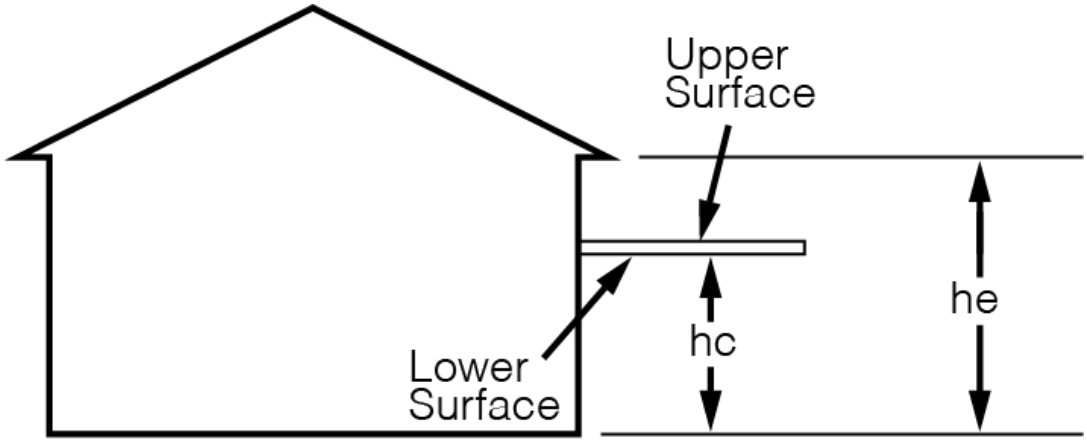
Building Inputs

h	= Mean Building Roof Height	= 55.0000 ft
he	= Mean Eave Height	= 55.0000 ft
hc	= Mean canopy height	= 10.0000 ft

Exposure Constants T:26.11-1:

α = 3-s Gust-speed exponent	= 9.500	Z_g = Nominal Ht of Boundary Layer	= 900.000 ft
$\hat{a}$ = Reciprocal of α	= 0.105	b = 3 sec gust speed factor	= 1.000
α_m = Mean hourly Wind-Speed Exponent	= 0.154	b_m = Mean hourly Windspeed Exponent	= 0.650
c = Turbulence Intensity Factor	= 0.200	ε = Integral Length Scale Exponent	= 0.2000

Components and Cladding (C&C) Wind Loads per Ch 30 Pt 6 Canopy



Zone = “Upr & Lwr Surf” Considers Simultaneous contribution from both upper and lower surfaces.

h = Mean structure height	= 55.000 ft	$K_h = 2.01 \cdot (h_{grade}/Z_g)^{2/\alpha}$ T:26.10-1	= 0.902
K_{zt} = No Topographic Feature	= 1.000	K_d = Directionality (Manual)	= 0.85
LF = STRENGTH Load Factor	= 1.00	K_e = Ground Elev Factor T:26.9-1	= 1.000
$q_h = .00256 \cdot K_h \cdot K_{zt} \cdot K_d \cdot K_e \cdot V^2 * LF$ E:26.10-1	= 74.37 psf		

Components and Cladding (C&C) Wind Loads per Ch 30 Pt 6 Canopy

h = Mean structure height	= 55.000 ft	$K_h = 2.01 \cdot (h_{grade}/Z_g)^{2/\alpha}$ T:26.10-1	= 0.902
K_{zt} = No Topographic Feature	= 1.000	K_d = Directionality (Manual)	= 0.85
LF = STRENGTH Load Factor	= 1.00	K_e = Ground Elev Factor T:26.9-1	= 1.000
$q_h = .00256 \cdot K_h \cdot K_{zt} \cdot K_d \cdot K_e \cdot V^2 * LF$ E:26.10-1	= 74.37 psf		

C&C Wind Canopy Detailed per Ch 30 Pt 6
All wind pressures include a Load Factor (LF) of 1.0

Description	Zone	Width ft	Span ft	Area ft^2	1/3 Rule	Reference	a ft	GC_{pi}	GC_{pd}	GC_{pu}	P_{max} psf	P_{min} psf
	Upr & Lwr Surf	1.0000	1.0000	1.00	No	F:30.11-1A/B	5	±0.18	0.90	-0.60	66.93	-44.62

GC_{pd} = Down (+) External Coefficient
P_{max} = $q_h \cdot GC_{pdE:30.11-1}$
+Press = Pressure Acting Toward Surface
§30.2.2 = C&C Min Pressure = 16.00 psf
Width = Width of Component
Area = Span • Width
a = $Max[Min(.1 \cdot B,.4 \cdot h),.04 \cdot B,3]_{F:30.11-1A/B}$
Reference = Applicable Reference from Standard

GC_{pu} = Uplift (-) External Coefficient
P_{min} = $q_h \cdot GC_{puE:30.11-1}$
-Press = Pressure Acting Away from Surface
Zone = Applicable Zone per Figure
Span = Span of Component
1/3 Rule = Width limited to Span/3
GC_{pi} = Internal Coef T:26.13-1

C&C Wind Canopy Summary per Ch 30 Pt 6
All wind pressures include a Load Factor (LF) of 1.0

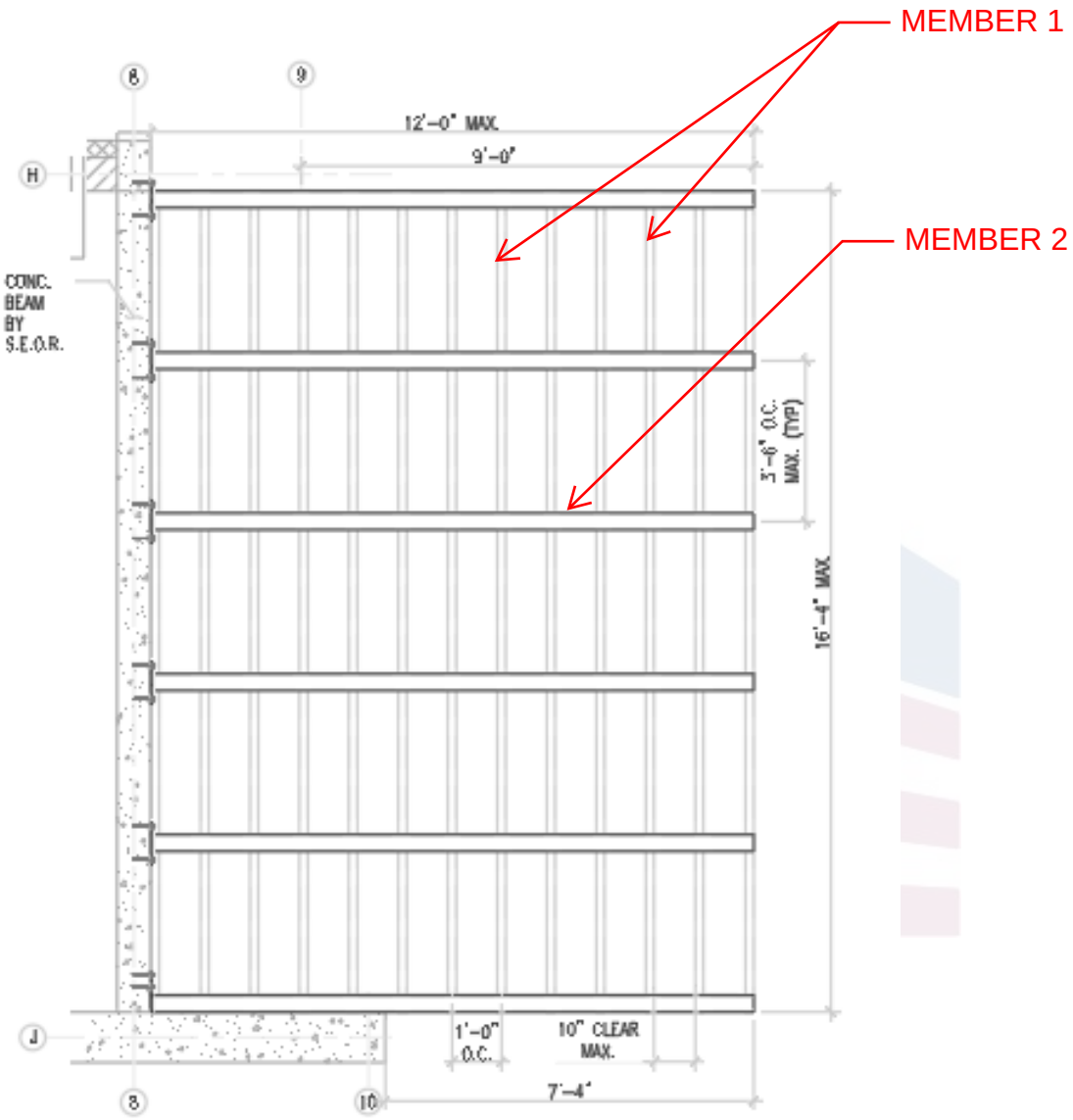
Zone	Reference	P_{max} A ≤ 10 ft^2 psf	P_{min} A ≤ 10 ft^2 psf	P_{max} A = 20 ft^2 psf	P_{min} A = 20 ft^2 psf	P_{max} A = 50 ft^2 psf	P_{min} A = 50 ft^2 psf	P_{max} A > 100 ft^2 psf	P_{min} A > 100 ft^2 psf
Lower Surface	F:30.11-1A/B	59.49	-59.49	55.02	-56.14	49.10	-51.70	44.62	-48.34
Upper Surface	F:30.11-1A/B	59.49	-85.52	55.02	-76.57	49.10	-64.73	44.62	-55.77
Upr & Lwr Surf	F:30.11-1A/B	56.98	-44.162	61.33	-42.38	53.93	-39.42	48.34	-37.18

P_{max} = Maximum Pressure
Area = Span • Width
Span = Span of Component
§30.2.2 = C&C Min Pressure = 16.00 psf

P_{min} = Minimum Pressure
Width = Width of Component
Reference = Applicable Reference from Standard
Interpolate = Interpolate for Areas between columns

WIND UP & DOWN

CANOPY DESIGN



B
X-9.0

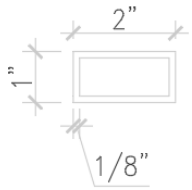
ENTRANCE CANOPY
LOWER PLAN VIEW

SCALE: 3/8"=1'-0"
(1:32)

SKETCH

SECTIONS PROPERTIES

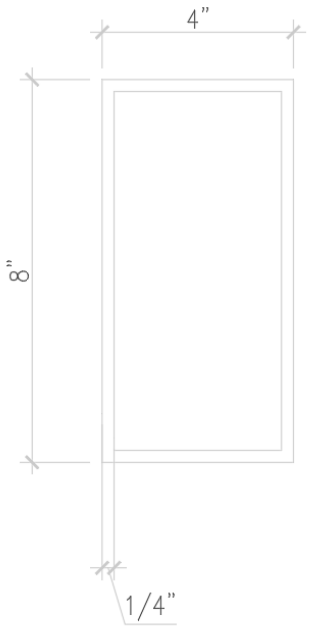
MEMBER 1: RT2X1X1/8 ALLOY 6061-T6



Area = 0.6875 in^2
Ixx = 0.1051 in^4
Iyy = 0.3317 in^4
Jz = 0.4368 in^4
Pxy = -0.0000 in^4
rxx = 0.3911 in
ryy = 0.6946 in
Sxx max = 0.2103 in^3
Sxx min = 0.2103 in^3
Syy max = 0.3317 in^3
Syy min = 0.3317 in^3

MAIN BEAM

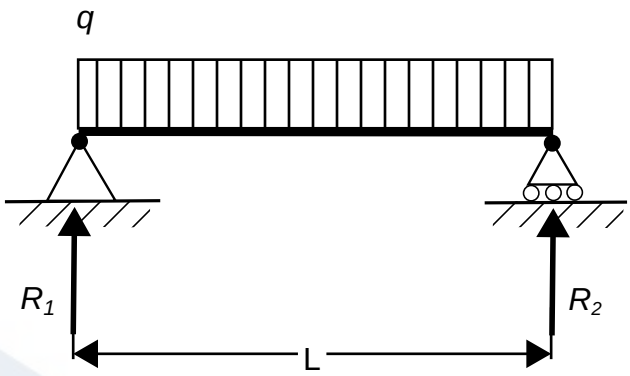
MEMBER 2: RT4X8X1/4 ALLOY 6061-T6



Area = 5.7500 in^2
Ixx = 47.6198 in^4
Iyy = 15.8698 in^4
Jz = 63.4896 in^4
Pxy = 0.0000 in^4
rxx = 2.8778 in
ryy = 1.6613 in
Sxx max = 11.9077 in^3
Sxx min = 11.9022 in^3
Syy max = 7.9349 in^3
Syy min = 7.9349 in^3

MEMBER 1 DESIGN

Loads:
DL = 30 psf
LL = 20 psf
Wind UP = -86.0 psf
Wind DW = 66.0 psf
Wind Lateral = 74.0 psf



F.B.D.

Loads Processing:

Analysis 1 : Gravity Loads

DL + 0.45Wind Dw + 0.75LL → Worst Case (By ENERCAL)

L = 3.25ft
Trib. Strip= 1'-0"=12in

*For Member 1 Analysis see Enercalc report printout.

Mmax.= 0.099 k-ft * 12000 = 1188 #-in

fb grav.loads = M/Sx ≤Fb= 9000 psi (Alloy 6061-T6, Welded)
fb grav.loads = 1188#-in/0.21in^3
fb grav.loads = 5658.0psi < 9000 psi (OK)

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: 25-1944 V00.ec6

LIC# : KW-06018068, Build:20.25.07.09 Eastern Engineering Group (c) ENERCALC, LLC 1982-2026

DESCRIPTION: Member #1 Analysis Gravity (Uplift)

Code References

Calculations per IBC 2021
Load Combinations Used : ASCE 7-22 / IBC 2024

General Beam Properties

Elastic Modulus 10,100.0 ksi

Span #1 Span Length = 3.250 ft Area = 0.680 in^2 Moment of Inertia = 0.1050 in^4

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Loads on all spans...
Uniform Load on ALL spans : W = 0.0860 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Maximum Bending =	0.068 k-ft	Maximum Shear =	0.08385 k
Load Combination	+0.60W	Load Combination	+0.60W
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	1.625 ft	Location of maximum on span	0.000 ft

Maximum Deflection	Deflection	Ratio	Span	Load Combo
Max Downward Transient Deflection	0.205 in	190	Span #1	W Only
Max Upward Transient Deflection	-0.205 in	190	Span #1	-W
Max Downward Total Deflection	0.123 in	316	Span #1	+0.60W
Max Upward Total Deflection	-0.123 in	316	Span #1	-0.60W

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Overall MAXimum Envelope													
Dsgn. L = 3.25 ft	1			0.07		0.07					0.08		
Dsgn. L = 3.25 ft	1										-0.00		
+0.60W													
Dsgn. L = 3.25 ft	1			0.07		0.07					0.08		
-0.60W													
Dsgn. L = 3.25 ft	1				-0.07	0.07					0.08		
+0.450W													
Dsgn. L = 3.25 ft	1			0.05		0.05					0.06		
-0.450W													
Dsgn. L = 3.25 ft	1				-0.05	0.05					0.06		

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	-W	-0.2052	1.641

Vertical Reactions

Support notation : Far left is #' Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	-0.140	-0.140
Overall MINimum	-0.140	-0.140
+0.60W	0.084	0.084
-0.60W	-0.084	-0.084
+0.450W	0.063	0.063
-0.450W	-0.063	-0.063
W Only	0.140	0.140

General Beam Analysis

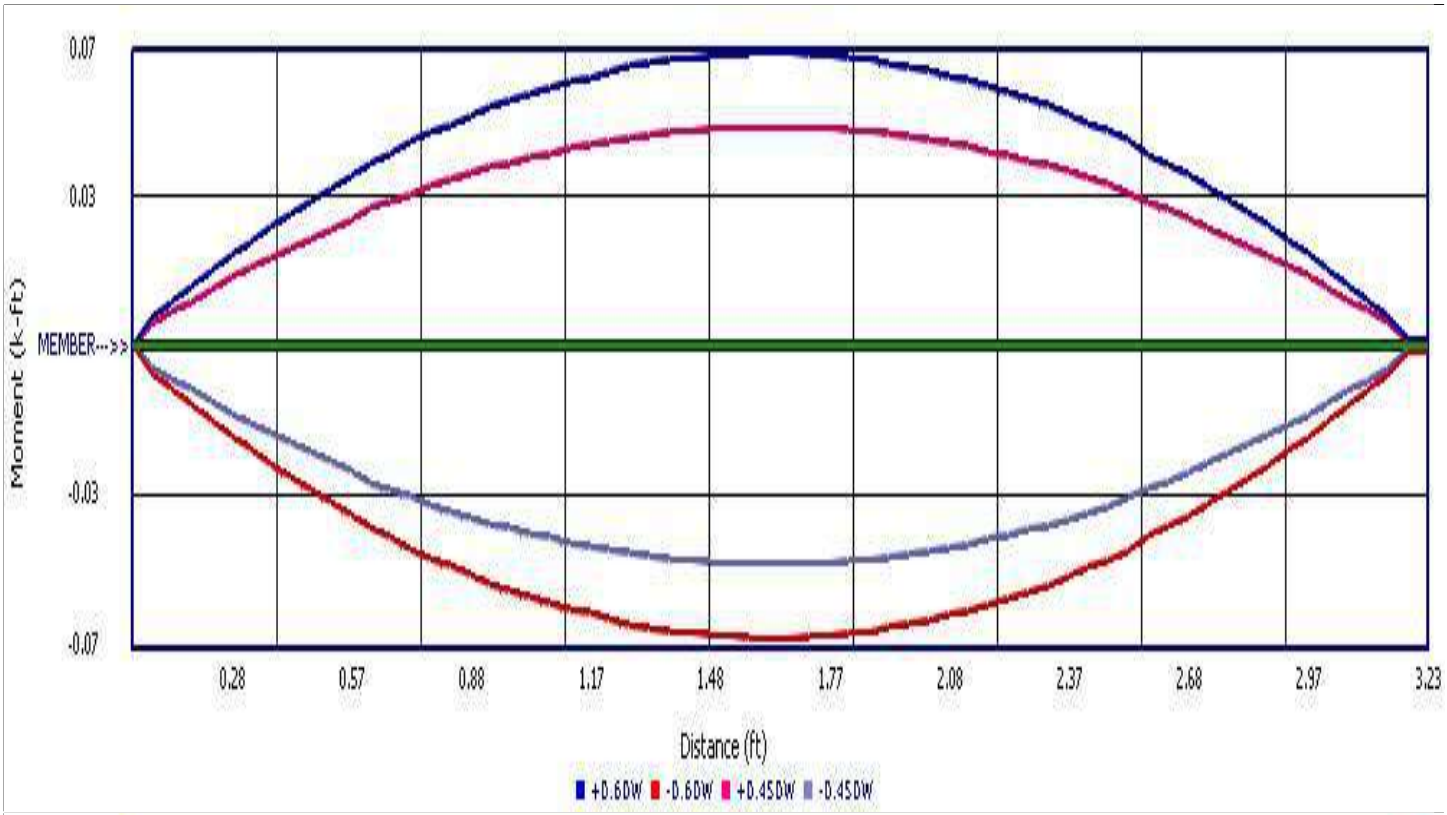
LIC# : KW-06018068, Build:20.25.07.09 Eastern Engineering Group (c) ENERCALC, LLC 1982-2026

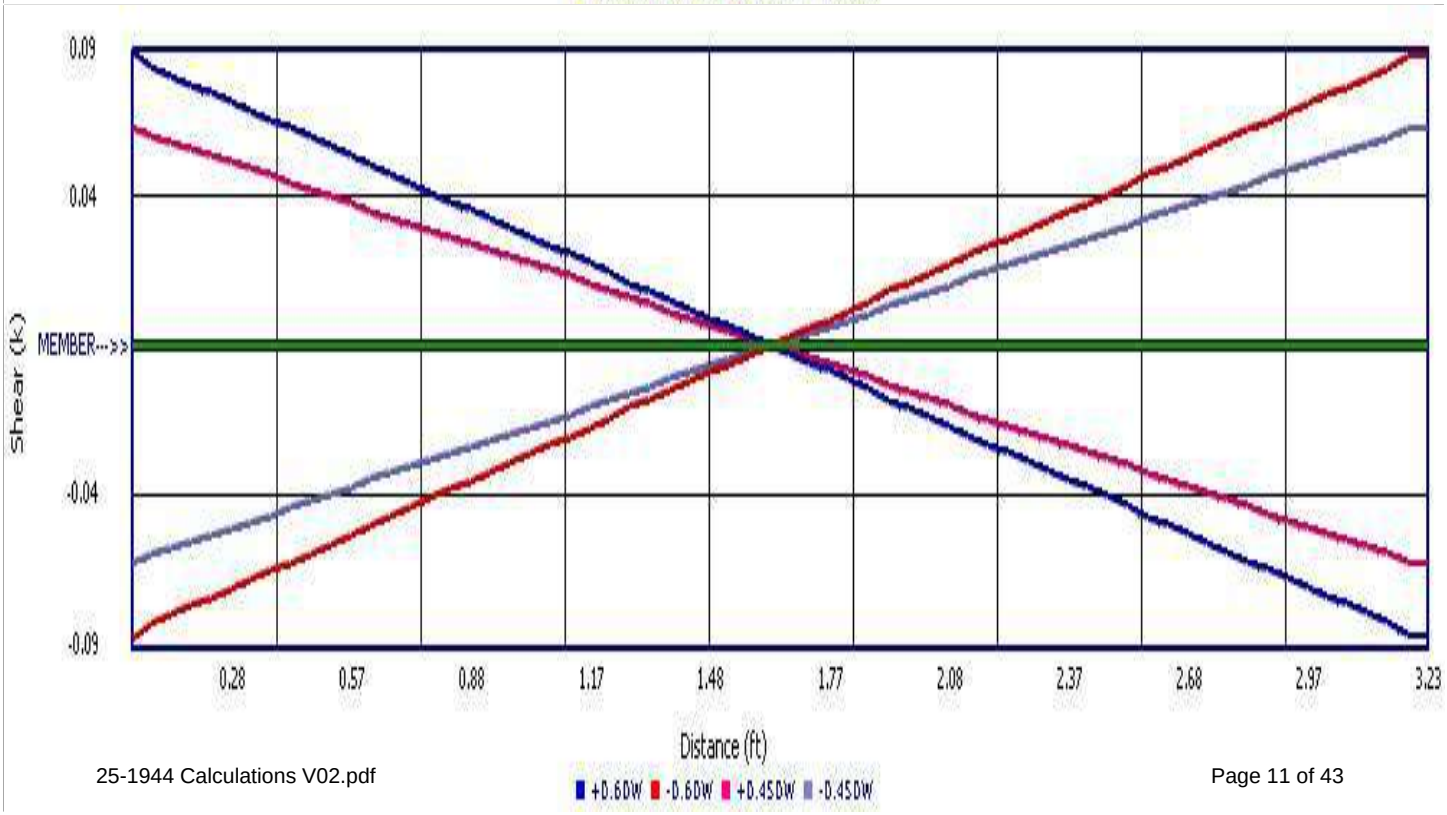
DESCRIPTION: Member #1 Analysis Gravity (Uplift)

Vertical Reactions

Support notation : Far left is #' Values in KIPS

Load Combination	Support 1	Support 2
-W	-0.140	-0.140

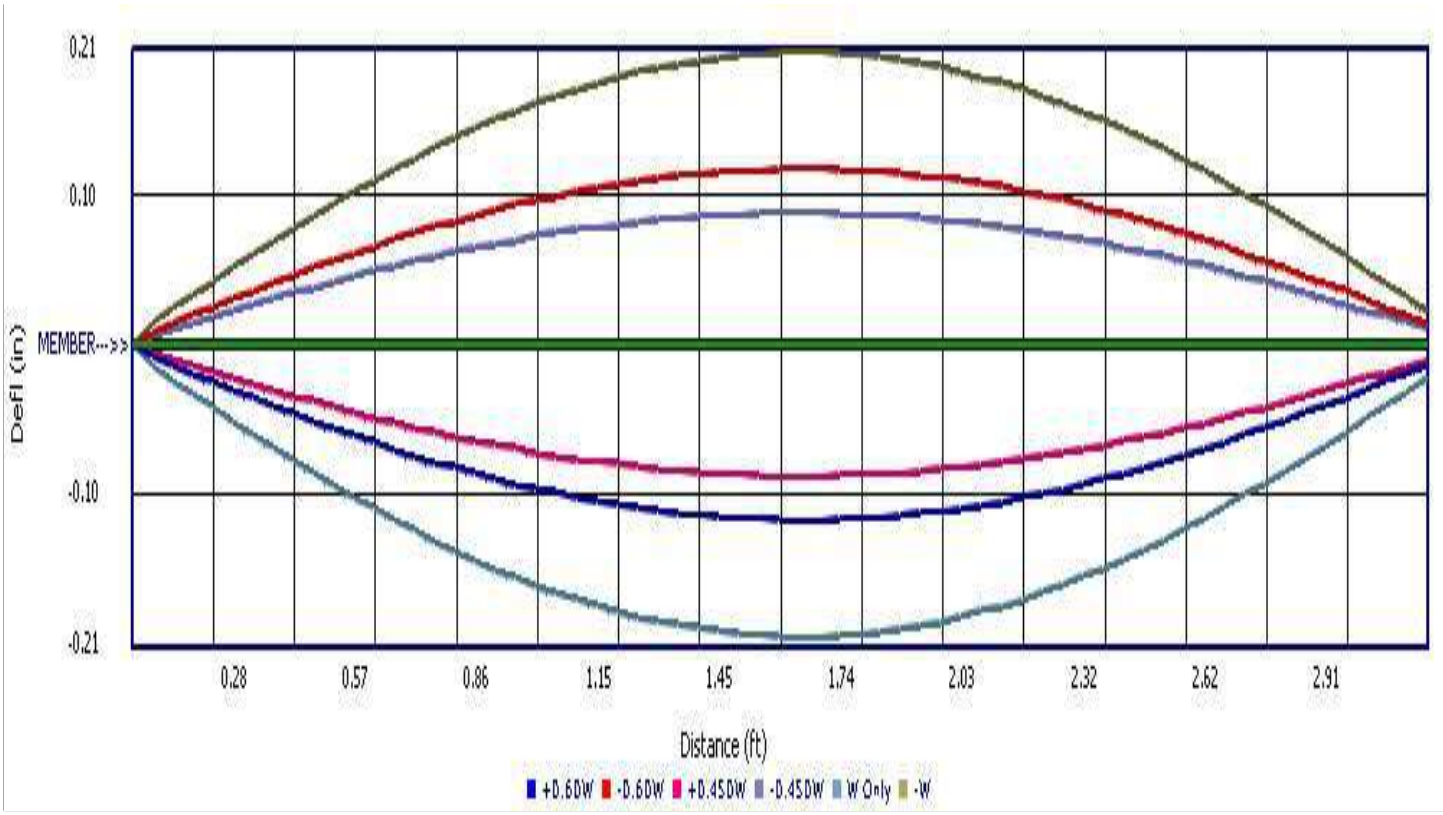




General Beam Analysis

LIC# : KW-06018068, Build:20.25.07.09 Eastern Engineering Group (c) ENERCALC, LLC 1982-2026

DESCRIPTION: Member #1 Analysis Gravity (Uplift)



Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: 25-1944 V00.ec6

DESCRIPTION: Member #1 Analysis Gravity (Down)

Code References

Calculations per IBC 2021
Load Combinations Used : ASCE 7-22 / IBC 2024

General Beam Properties

Elastic Modulus 10,100.0 ksi

Span #1 Span Length = 3.250 ft Area = 0.6870 in^2 Moment of Inertia = 0.1050 in^4

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Loads on all spans...
Uniform Load on ALL spans : D = 0.030, L = 0.020, W = 0.0660 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Maximum Bending =	0.099 k-ft	Maximum Shear =	0.1214 k
Load Combination	+D+0.750L+0.450W	Load Combination	+D+0.750L+0.450W
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	1.625 ft	Location of maximum on span	0.000 ft

Maximum Deflection	Deflection	Ratio	Span	Load Combo
Max Downward Transient Deflection	0.157 in	247	Span #1	W Only
Max Upward Transient Deflection	-0.157 in	247	Span #1	-W
Max Downward Total Deflection	0.178 in	218	Span #1	+D+0.750L+0.450W
Max Upward Total Deflection	-0.052 in	756	Span #1	+0.60D-0.60W

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	Vnx	Vnx/Omega
Overall MAXimum Envelope													
Dsgn. L = 3.25 ft	1			0.10		0.10					0.12		
D Only													
Dsgn. L = 3.25 ft	1			0.04		0.04					0.05		
+D+L													
Dsgn. L = 3.25 ft	1			0.07		0.07					0.08		
+D+0.750L													
Dsgn. L = 3.25 ft	1			0.06		0.06					0.07		
+D+0.60W													
Dsgn. L = 3.25 ft	1			0.09		0.09					0.11		
+D-0.60W													
Dsgn. L = 3.25 ft	1				-0.01	0.01					0.02		
+D+0.750L+0.450W													
Dsgn. L = 3.25 ft	1			0.10		0.10					0.12		
+D+0.750L-0.450W													
Dsgn. L = 3.25 ft	1			0.02		0.02					0.02		
+0.60D+0.60W													
Dsgn. L = 3.25 ft	1			0.08		0.08					0.09		
+0.60D-0.60W													
Dsgn. L = 3.25 ft	1				-0.03	0.03					0.04		
+0.60D													
Dsgn. L = 3.25 ft	1			0.02		0.02					0.03		

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+	1	0.1782	1.641		0.0000	0.000

General Beam Analysis

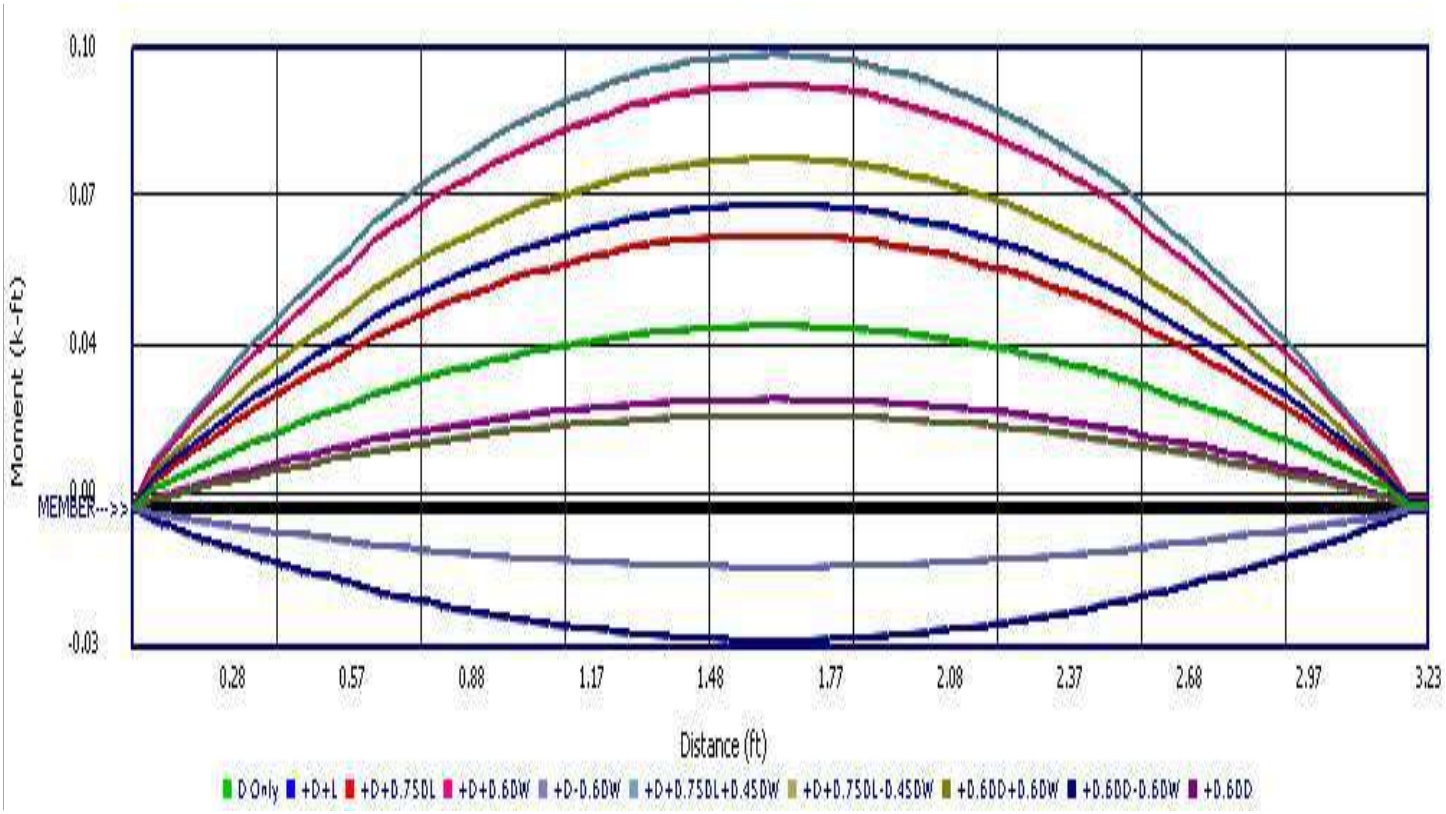
LIC# : KW-06018068, Build:20.25.07.09 Eastern Engineering Group (c) ENERCALC, LLC 1982-2026

DESCRIPTION: Member #1 Analysis Gravity (Down)

Vertical Reactions

Support notation : Far left is #' Values in KIPS

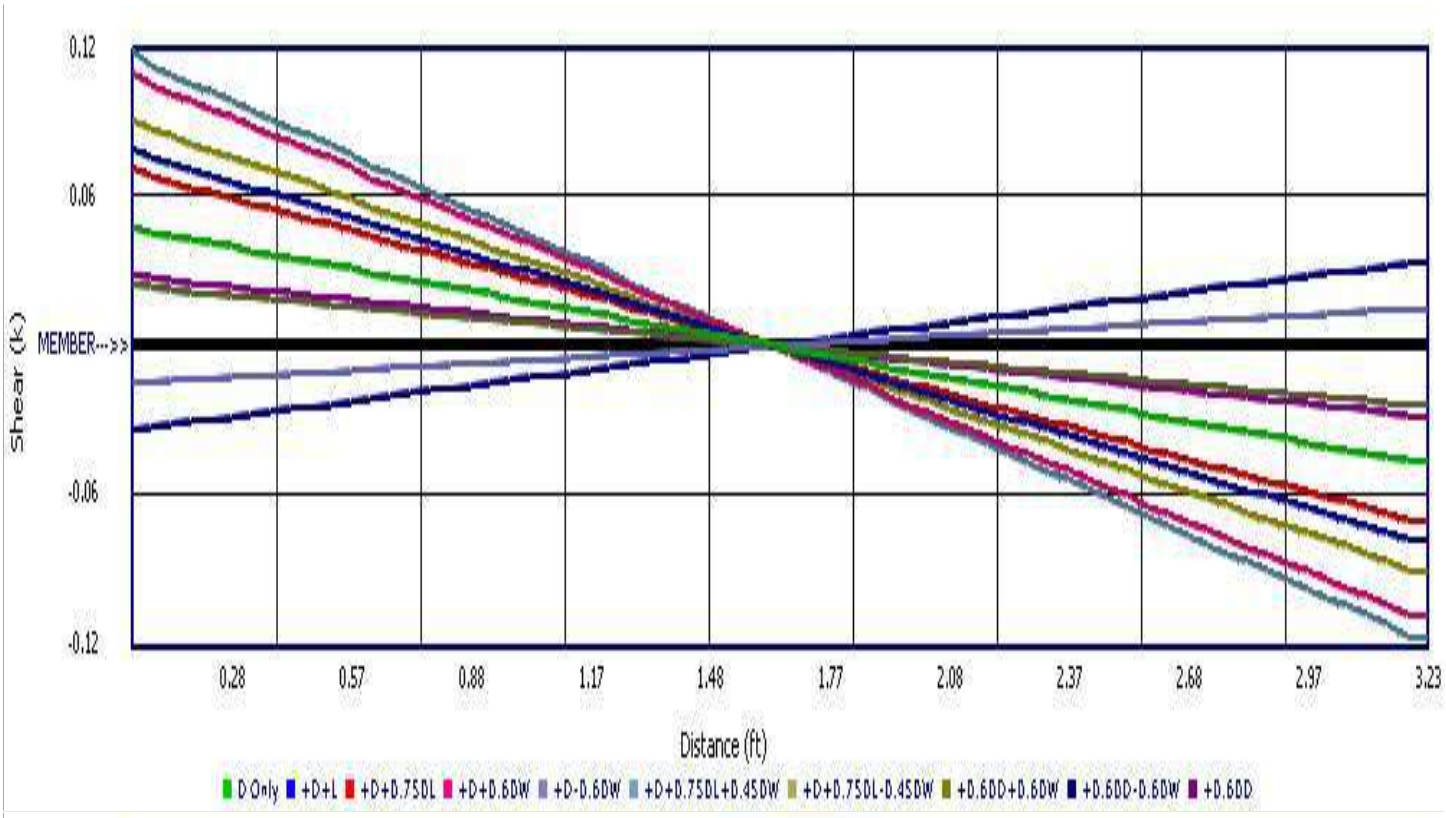
Load Combination	Support 1	Support 2
Overall MAXimum	0.121	0.121
Overall MINimum	-0.107	-0.107
D Only	0.049	0.049
+D+L	0.081	0.081
+D+0.750L	0.073	0.073
+D+0.60W	0.113	0.113
+D-0.60W	-0.016	-0.016
+D+0.750L+0.450W	0.121	0.121
+D+0.750L-0.450W	0.025	0.025
+0.60D+0.60W	0.094	0.094
+0.60D-0.60W	-0.035	-0.035
+0.60D	0.029	0.029
L Only	0.033	0.033
W Only	0.107	0.107
-W	-0.107	-0.107

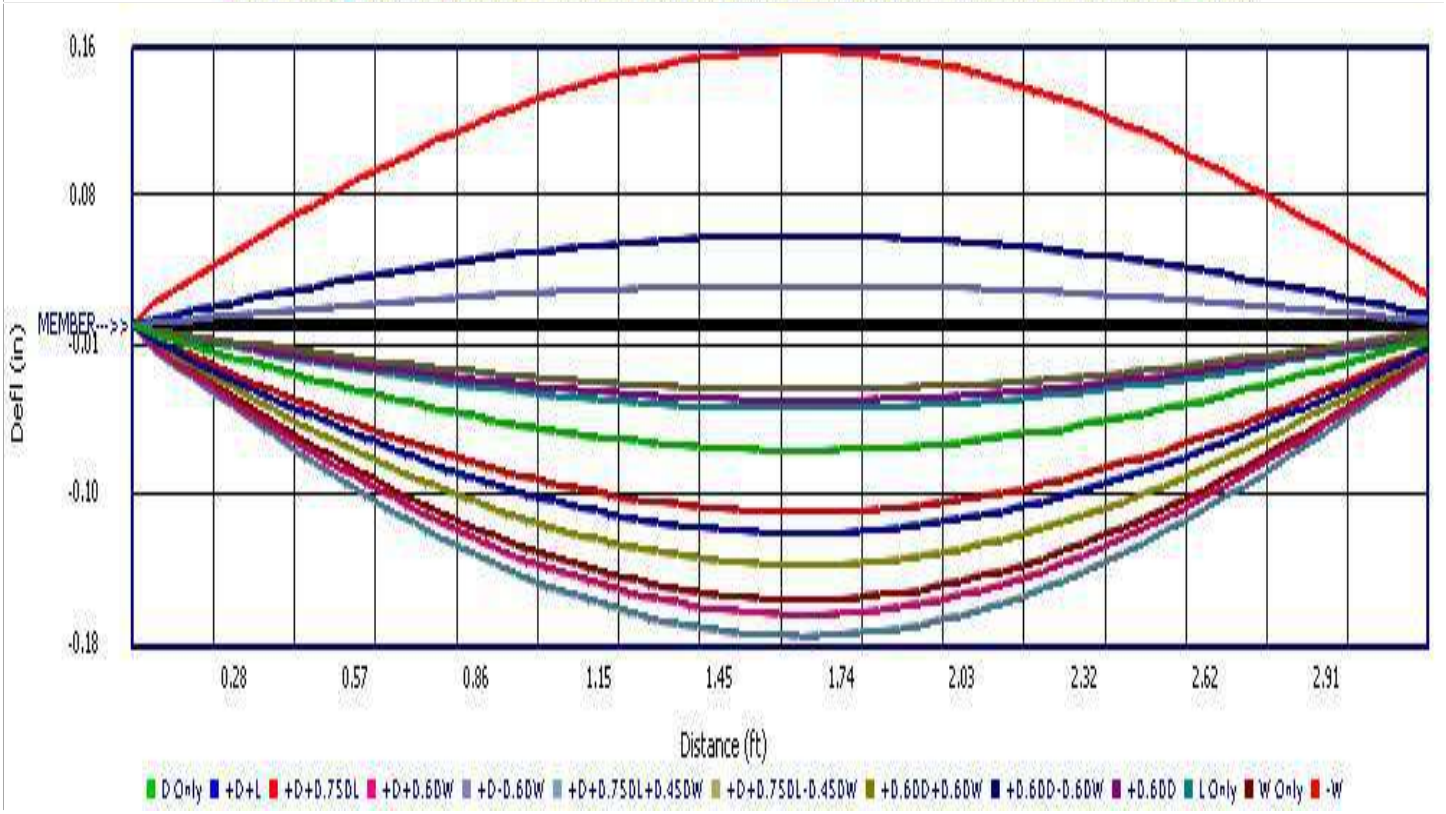


General Beam Analysis

LIC# : KW-06018068, Build:20.25.07.09 Eastern Engineering Group (c) ENERCALC, LLC 1982-2026

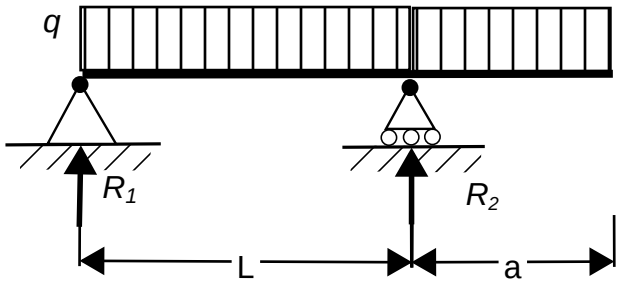
DESCRIPTION: Member #1 Analysis Gravity (Down)





MEMBER 2 DESIGN

Loads:
DL = 30 psf
LL = 20 psf
Wind UP = -86.0 psf
Wind DW = 66.0 psf
Wind Lateral = 74 psf



F.B.D.

Loads Processing:

Analysis 1 : Gravity Loads

DL + 0.45Wind Dw + 0.75LL → Worst Case

L = 4.67'
a = 7.33'
Trib. Strip= 3.5ft Conservative

*For Member 2 Analysis see Enercalc report printout.

Mmax.= 7.024 k-ft * 12000 = 84 288 #-in

fb grav.loads = M/Sx ≤Fb= 9000 psi (Alloy 6061-T6, Welded)
fb grav.loads = 84 288#-in/11.90in^3
fb grav.loads = 7084.0psi < 9000 psi (OK)

Analysis 2 : Wind Lateral
Trib. Strip= 12"/12=1 ft

Mmax.=1.193 k-ft * 12000 = 14 316 #-in
fb Wlat. = M/Sy ≤Fb= 9000 psi
fb Wlat. = 14 316 #-in/7.93 in^3
fb Wlat. = 1806.0 psi < 9000 psi (OK)

Combined:

$$\frac{fb\ grav.loads}{Fb} + \frac{fb\ Wlat.}{Fb} \leq 1.0$$

0.98 < < 1.0 (OK)

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: 25-1944 V00.ec6

LIC# : KW-06018068, Build:20.25.07.09 Eastern Engineering Group (c) ENERCALC, LLC 1982-2025

DESCRIPTION: Member Analysis Gravity (Uplift)

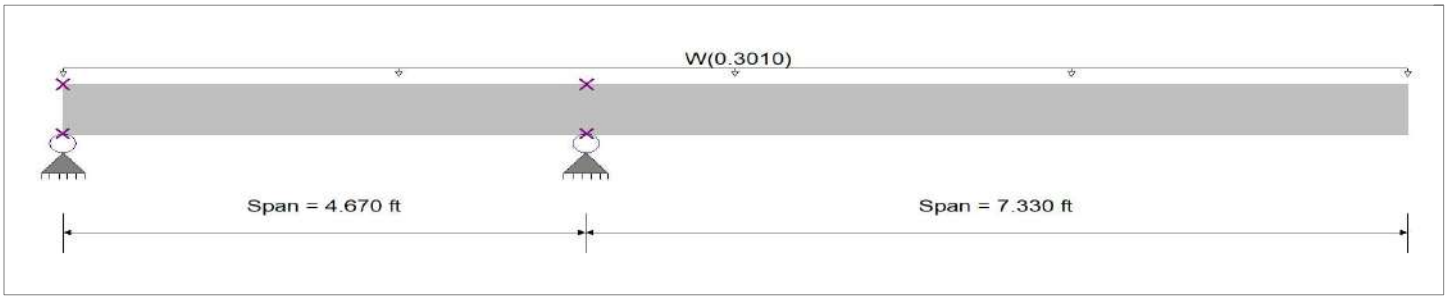
Code References

Calculations per IBC 2021
Load Combinations Used : ASCE 7-22 / IBC 2024

General Beam Properties

Elastic Modulus 10,100.0 ksi

Span #1	Span Length =	4.670 ft	Area =	5.750 in^2	Moment of Inertia =	47.60	in^4
Span #2	Span Length =	7.330 ft	Area =	5.750 in^2	Moment of Inertia =	47.60	in^4



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Loads on all spans...
Uniform Load on ALL spans : W = 0.0860 k/ft, Tributary Width = 3.50 ft

DESIGN SUMMARY

Maximum Bending =	4.852 k-ft	Maximum Shear =	1.461 k
Load Combination	+0.60W	Load Combination	+0.60W
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	4.670 ft	Location of maximum on span	4.670 ft

Maximum Deflection	Deflection	Ratio	Span	Load Combo
Max Downward Transient Deflection	0.686 in	256	Span #2	W Only
Max Upward Transient Deflection	-0.686 in	256	Span #2	-W
Max Downward Total Deflection	0.412 in	426	Span #2	+0.60W
Max Upward Total Deflection	-0.412 in	426	Span #2	-0.60W

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	VnxVnx/Omega
Overall MAXimum Envelope												
Dsgn. L = 4.67 ft	1				-4.85	4.85					1.46	
Dsgn. L = 7.33 ft	2				-4.85	4.85					1.32	
Dsgn. L = 4.67 ft	1										-0.00	
Dsgn. L = 7.33 ft	2										-0.00	
+0.60W												
Dsgn. L = 4.67 ft	1				-4.85	4.85					1.46	
Dsgn. L = 7.33 ft	2				-4.85	4.85					1.32	
-0.60W												
Dsgn. L = 4.67 ft	1			4.85		4.85					1.46	
Dsgn. L = 7.33 ft	2			4.85		4.85					1.32	
+0.450W												
Dsgn. L = 4.67 ft	1				-3.64	3.64					1.10	
Dsgn. L = 7.33 ft	2				-3.64	3.64					0.99	
-0.450W												
Dsgn. L = 4.67 ft	1			3.64		3.64					1.10	
Dsgn. L = 7.33 ft	2			3.64		3.64					0.99	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
-W	1	0.0345	2.802		0.0000	0.000
	2	0.0000	2.802	-W	-0.6864	7.330

General Beam Analysis

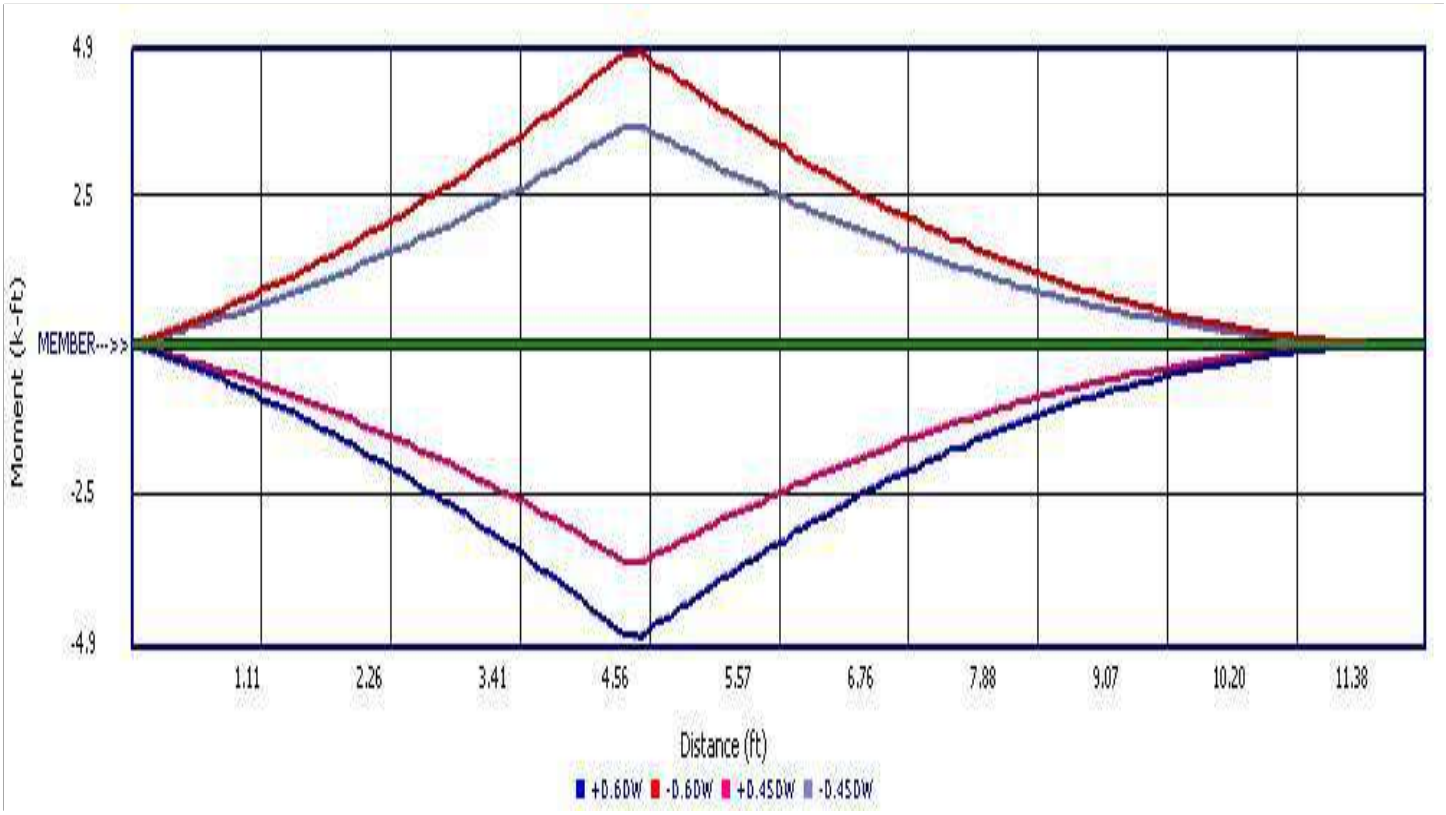
LIC# : KW-06018068, Build:20.25.07.09 Eastern Engineering Group (c) ENERCALC, LLC 1982-2025

DESCRIPTION: Member Analysis Gravity (Uplift)

Vertical Reactions

Support notation : Far left is #' Values in KIPS

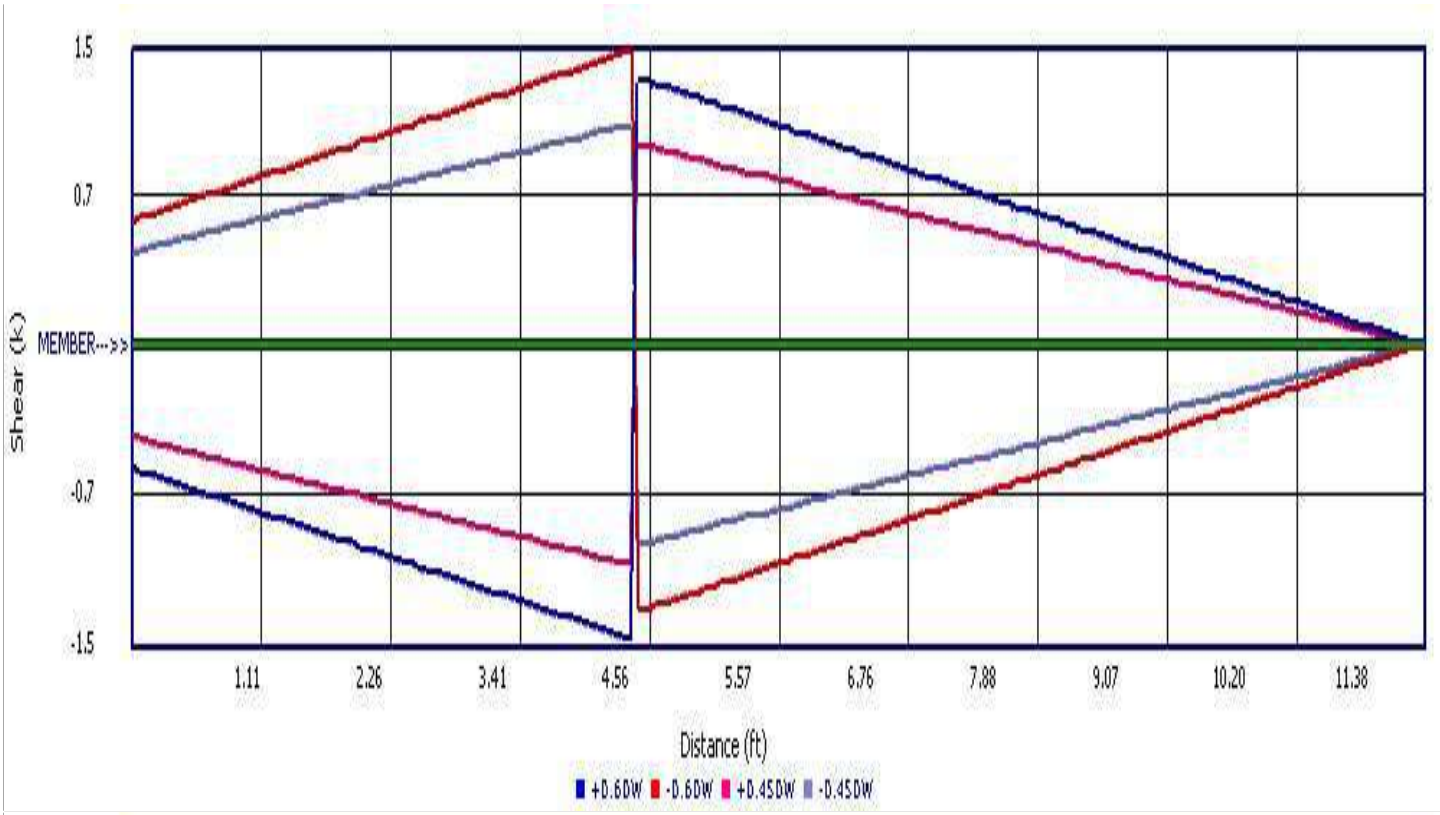
Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	1.029	-4.641	
Overall MINimum	-1.029	-4.641	
+0.60W	-0.617	2.784	
-0.60W	0.617	-2.784	
+0.450W	-0.463	2.088	
-0.450W	0.463	-2.088	
W Only	-1.029	4.641	
-W	1.029	-4.641	

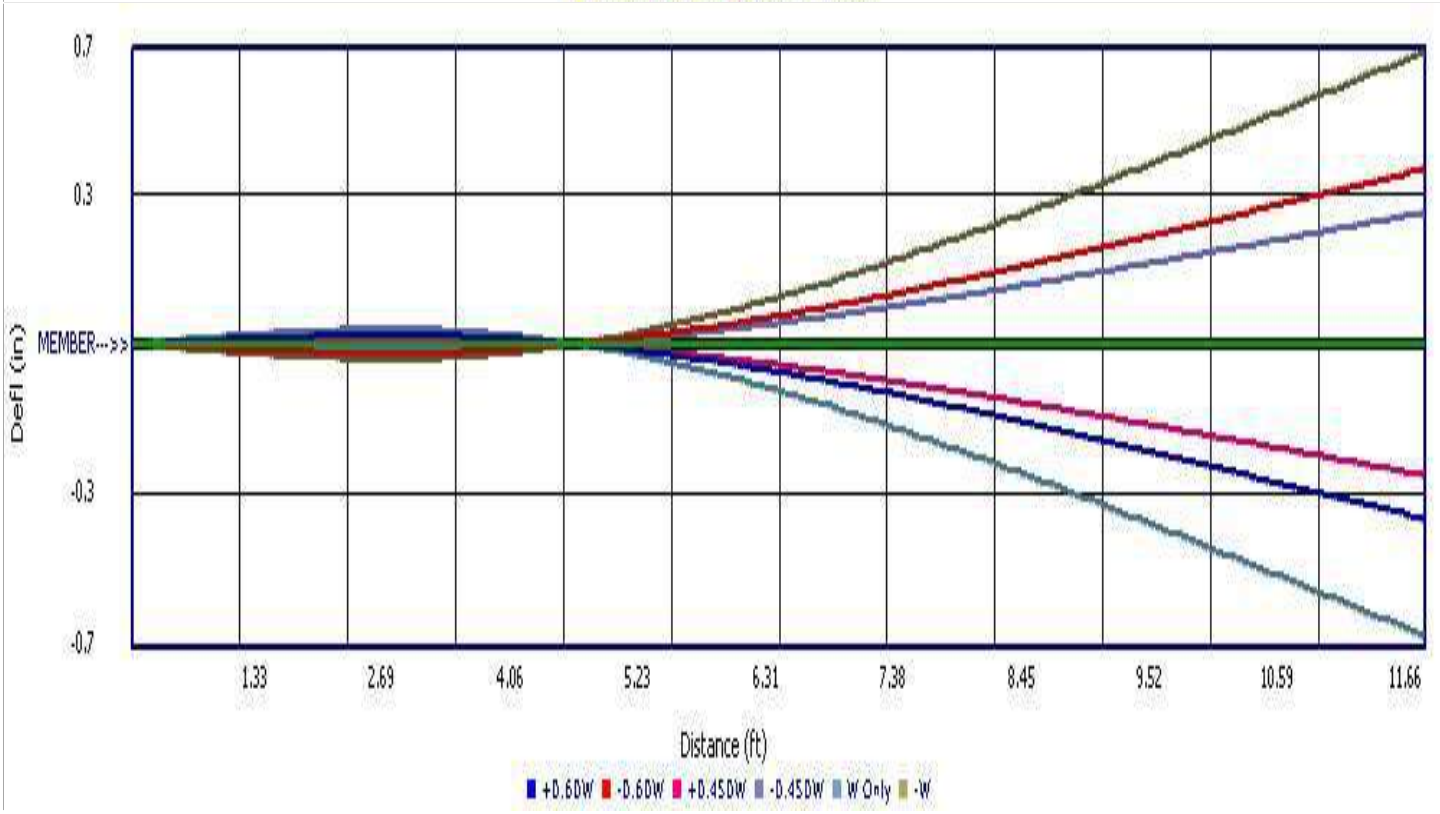


General Beam Analysis

LIC# : KW-06018068, Build:20.25.07.09 Eastern Engineering Group (c) ENERCALC, LLC 1982-2025

DESCRIPTION: Member Analysis Gravity (Uplift)





Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: 25-1944 V00.ec6

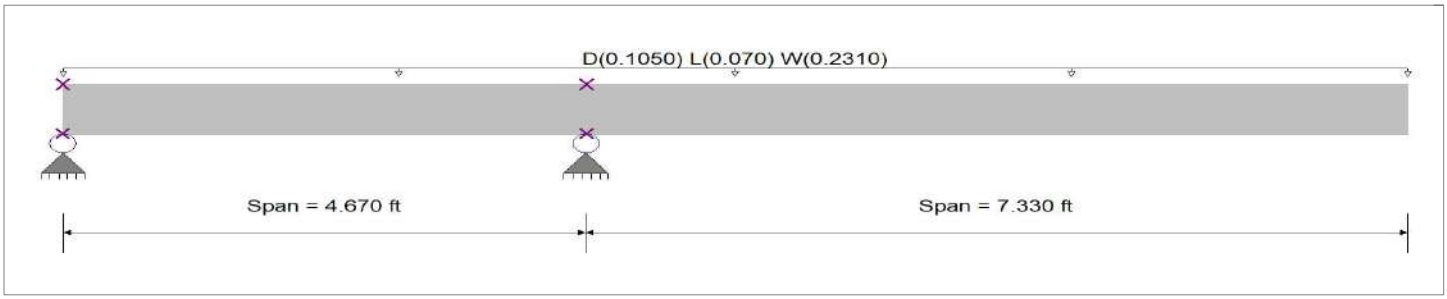
DESCRIPTION: Member Analysis Gravity (Down)

Code References

Calculations per IBC 2021
Load Combinations Used : ASCE 7-22 / IBC 2024

General Beam Properties

Elastic Modulus	10,100.0 ksi							
Span #1	Span Length =	4.670 ft	Area =	5.750 in^2	Moment of Inertia =	47.60	in^4	
Span #2	Span Length =	7.330 ft	Area =	5.750 in^2	Moment of Inertia =	47.60	in^4	



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Loads on all spans...
Uniform Load on ALL spans : D = 0.030, L = 0.020, W = 0.0660 k/ft, Tributary Width = 3.50 ft

DESIGN SUMMARY

Maximum Bending =	7.024 k-ft	Maximum Shear =	2.114 k
Load Combination	+D+0.750L+0.450W	Load Combination	+D+0.750L+0.450W
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	4.670 ft	Location of maximum on span	4.670 ft

Maximum Deflection	Deflection	Ratio	Span	Load Combo
Max Downward Transient Deflection	0.527 in	332	Span #2	W Only
Max Upward Transient Deflection	-0.527 in	332	Span #2	-W
Max Downward Total Deflection	0.596 in	294	Span #2	+D+0.750L+0.450W
Max Upward Total Deflection	-0.172 in	1020	Span #2	+0.60D-0.60W

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	VnxVnx/Omega
Overall MAXimum Envelope												
Dsgn. L = 4.67 ft	1				-7.02	7.02					2.11	
Dsgn. L = 7.33 ft	2				-7.02	7.02					1.92	
D Only												
Dsgn. L = 4.67 ft	1				-2.82	2.82					0.85	
Dsgn. L = 7.33 ft	2				-2.82	2.82					0.77	
+D+L												
Dsgn. L = 4.67 ft	1				-4.70	4.70					1.42	
Dsgn. L = 7.33 ft	2				-4.70	4.70					1.28	
+D+0.750L												
Dsgn. L = 4.67 ft	1				-4.23	4.23					1.27	
Dsgn. L = 7.33 ft	2				-4.23	4.23					1.15	
+D+0.60W												
Dsgn. L = 4.67 ft	1				-6.54	6.54					1.97	
Dsgn. L = 7.33 ft	2				-6.54	6.54					1.79	
+D-0.60W												
Dsgn. L = 4.67 ft	1			0.90		0.90					0.27	
Dsgn. L = 7.33 ft	2			0.90		0.90					0.25	
+D+0.750L+0.450W												
Dsgn. L = 4.67 ft	1				-7.02	7.02					2.11	
Dsgn. L = 7.33 ft	2				-7.02	7.02					1.92	
+D+0.750L-0.450W												
Dsgn. L = 4.67 ft	1				-1.44	1.44					0.43	
Dsgn. L = 7.33 ft	2				-1.44	1.44					0.39	
+0.60D+0.60W												
Dsgn. L = 4.67 ft	1				-5.42	5.42					1.63	
Dsgn. L = 7.33 ft	2				-5.42	5.42					1.48	

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: 25-1944 V00.ec6

LIC# : KW-06018068, Build:20.25.07.09 Eastern Engineering Group (c) ENERCALC, LLC 1982-2025

DESCRIPTION: Member Analysis Gravity (Down)

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	VnxVnx/Omega
+0.60D-0.60W												
Dsgn. L = 4.67 ft	1			2.03		2.03					0.61	
Dsgn. L = 7.33 ft	2			2.03		2.03					0.55	
+0.60D												
Dsgn. L = 4.67 ft	1				-1.69	1.69					0.51	
Dsgn. L = 7.33 ft	2				-1.69	1.69					0.46	

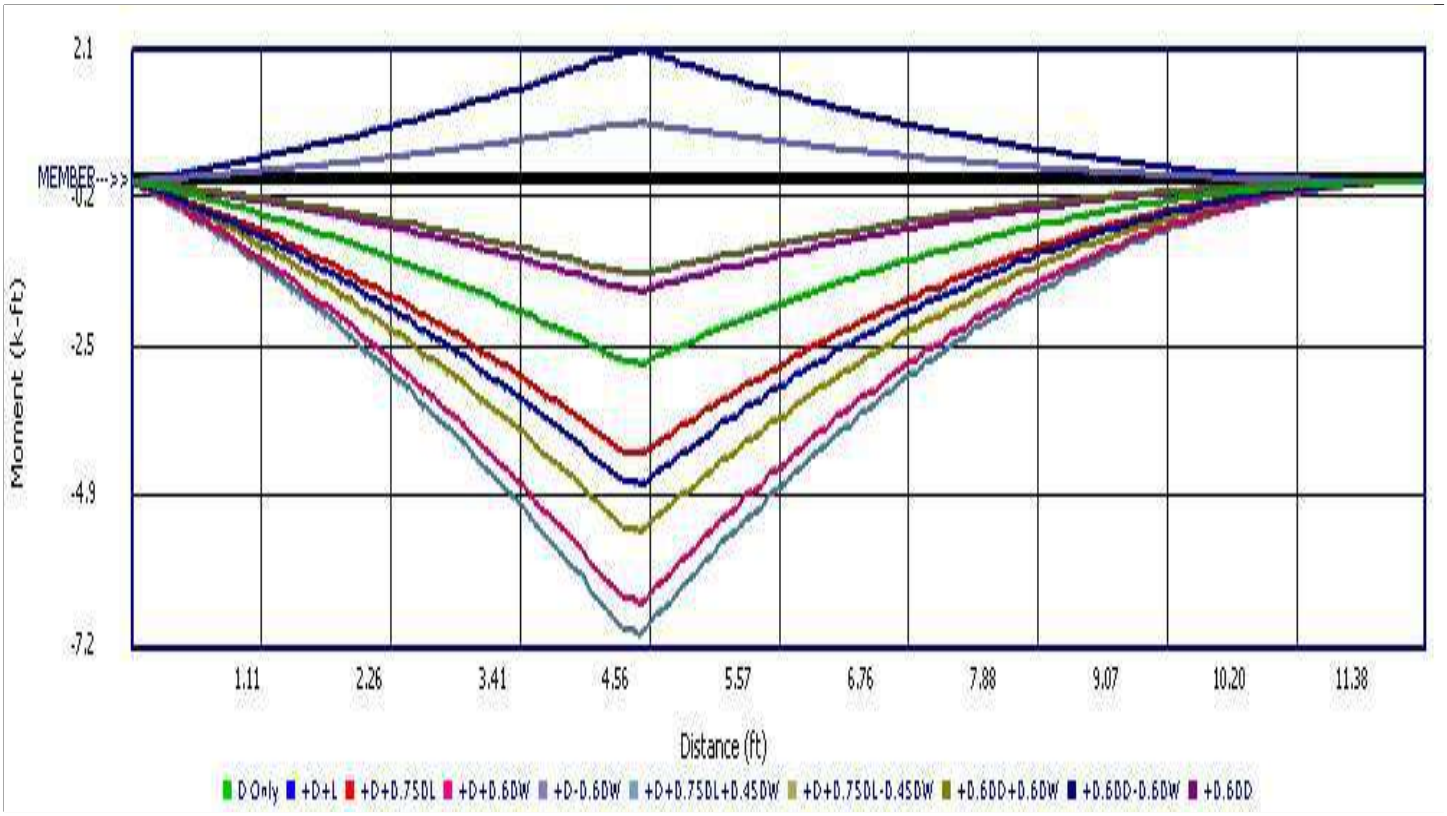
Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000	+D+0.750L+	-0.0300	2.802
+D+0.750L+	2	0.5962	7.330		0.0000	2.802

Vertical Reactions

Support notation : Far left is #' Values in KIPS

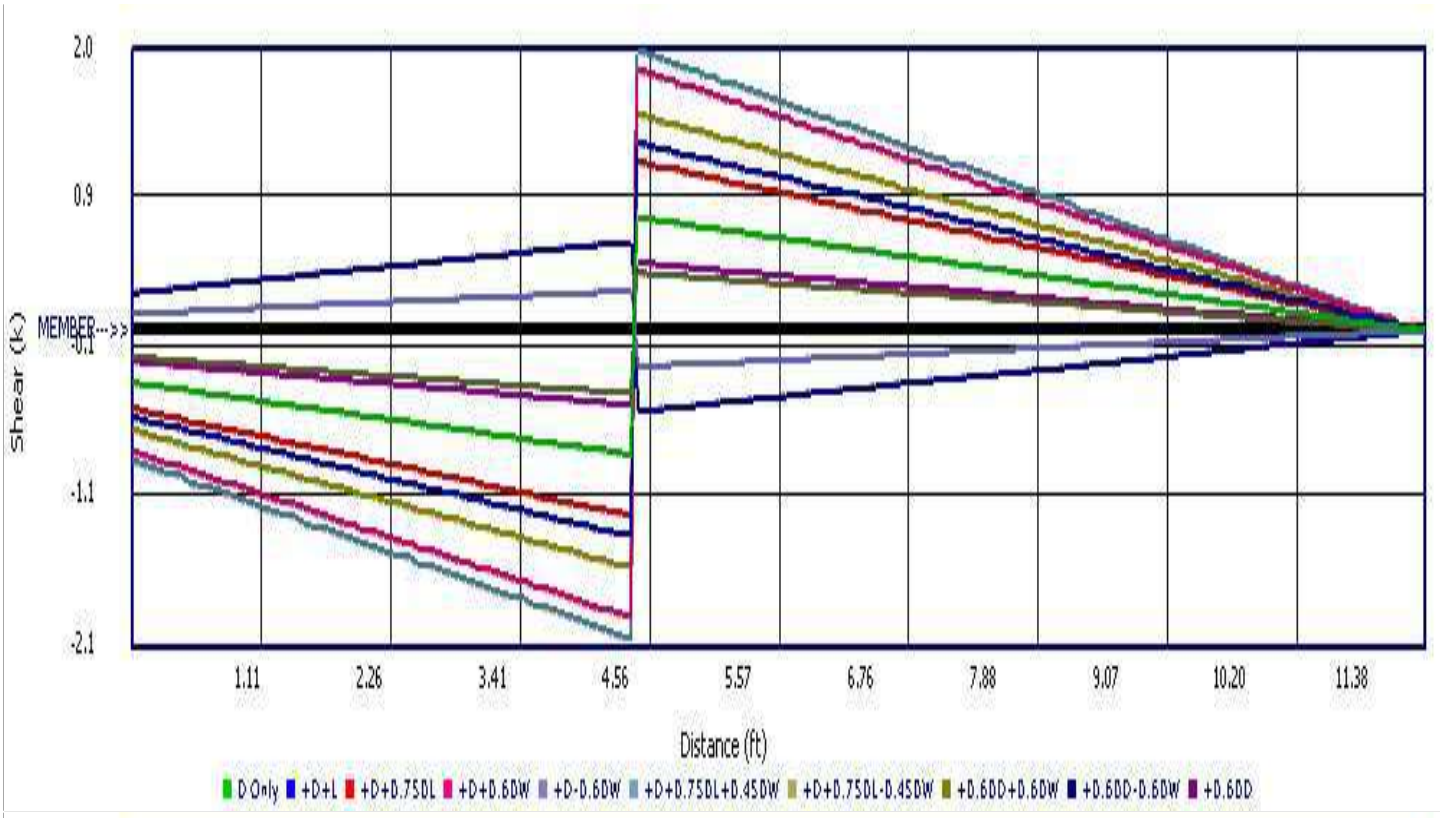
Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	-0.894	4.031	
Overall MINimum	-0.789	-3.561	
D Only	-0.359	1.619	
+D+L	-0.598	2.698	
+D+0.750L	-0.538	2.428	
+D+0.60W	-0.833	3.756	
+D-0.60W	0.115	-0.518	
+D+0.750L+0.450W	-0.894	4.031	
+D+0.750L-0.450W	-0.183	0.826	
+0.60D+0.60W	-0.689	3.108	
+0.60D-0.60W	0.258	-1.166	
+0.60D	-0.215	0.971	
L Only	-0.239	1.079	
W Only	-0.789	3.561	
-W	0.789	-3.561	

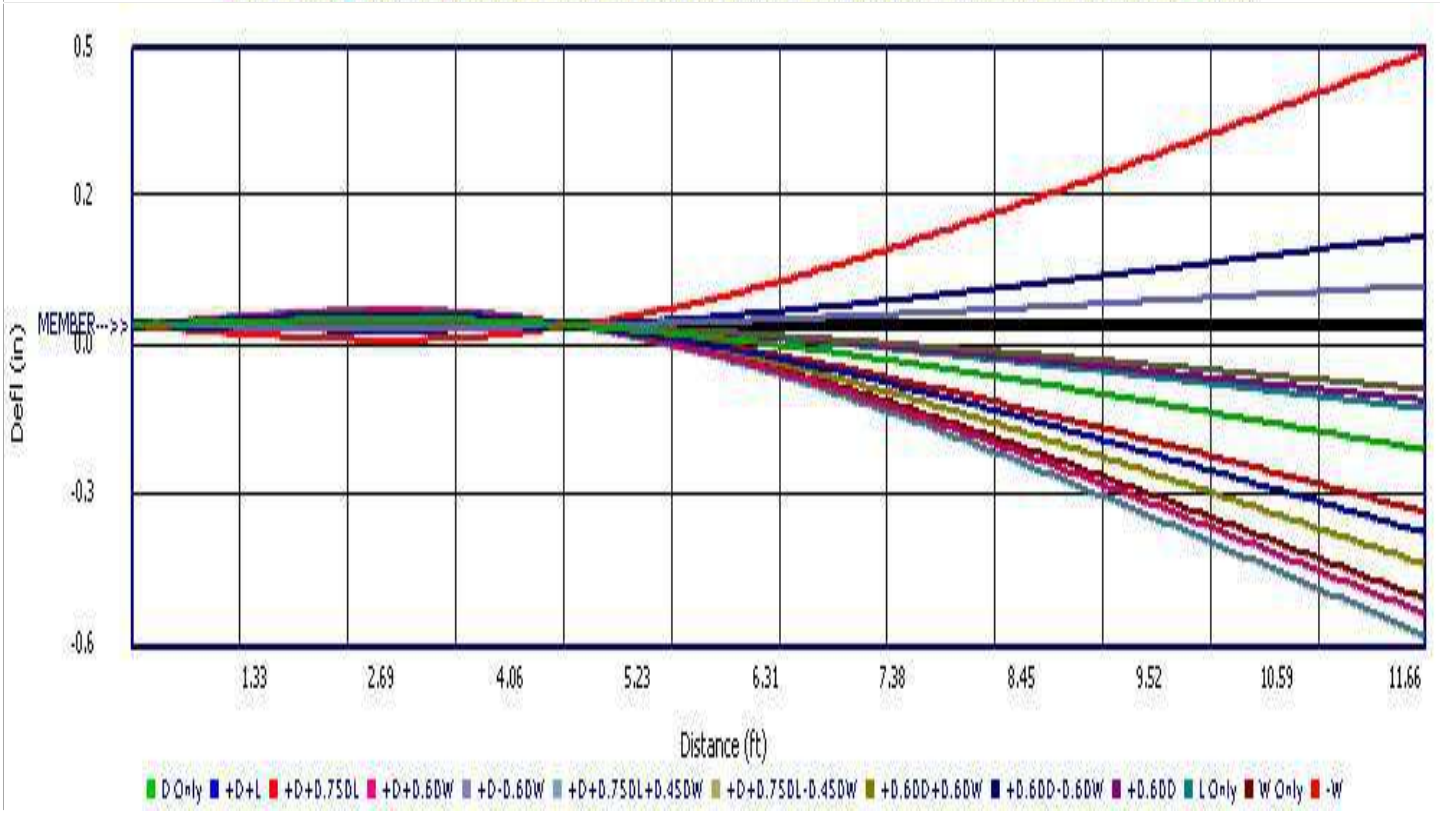


General Beam Analysis

LIC# : KW-06018068, Build:20.25.07.09 Eastern Engineering Group (c) ENERCALC, LLC 1982-2025

DESCRIPTION: Member Analysis Gravity (Down)





Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: 25-1944 V00.ec6

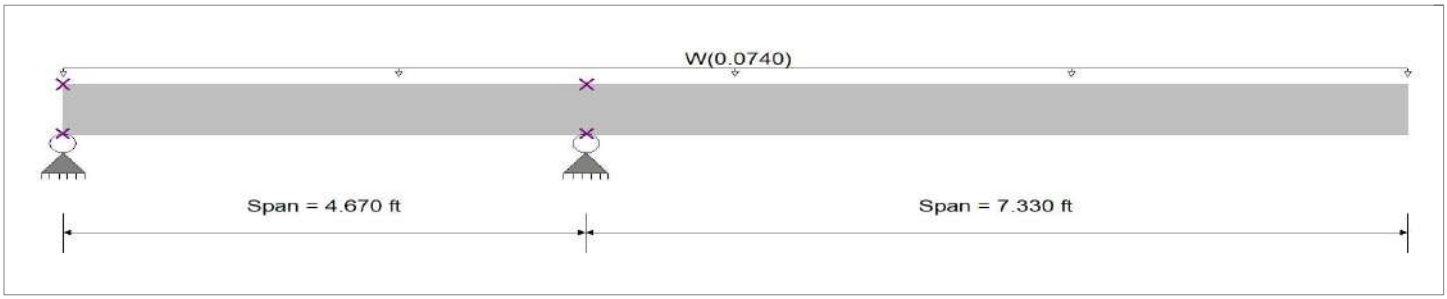
DESCRIPTION: Member Analysis Gravity (Lateral)

Code References

Calculations per IBC 2021
Load Combinations Used : ASCE 7-22 / IBC 2024

General Beam Properties

Elastic Modulus	10,100.0 ksi						
Span #1	Span Length =	4.670 ft	Area =	5.750 in^2	Moment of Inertia =	15.870	in^4
Span #2	Span Length =	7.330 ft	Area =	5.750 in^2	Moment of Inertia =	15.870	in^4



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Loads on all spans...
Uniform Load on ALL spans : W = 0.0740 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Maximum Bending =	1.193 k-ft	Maximum Shear =	0.3591 k
Load Combination	+0.60W	Load Combination	+0.60W
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	4.670 ft	Location of maximum on span	4.670 ft

Maximum Deflection	Deflection	Ratio	Span	Load Combo
Max Downward Transient Deflection	0.506 in	346	Span #2	W Only
Max Upward Transient Deflection	-0.506 in	346	Span #2	-W
Max Downward Total Deflection	0.304 in	578	Span #2	+0.60W
Max Upward Total Deflection	-0.304 in	578	Span #2	-0.60W

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values (k-ft) Mmax +	Mmax -	Ma - Max	Mnx	Mnx/Omega	Cb	Rm	Shear Values (k) Va Max	VnxVnx/Omega
Overall MAXimum Envelope												
Dsgn. L = 4.67 ft	1				-1.19	1.19					0.36	
Dsgn. L = 7.33 ft	2				-1.19	1.19					0.33	
Dsgn. L = 4.67 ft	1										-0.00	
Dsgn. L = 7.33 ft	2										-0.00	
+0.60W												
Dsgn. L = 4.67 ft	1				-1.19	1.19					0.36	
Dsgn. L = 7.33 ft	2				-1.19	1.19					0.33	
-0.60W												
Dsgn. L = 4.67 ft	1			1.19		1.19					0.36	
Dsgn. L = 7.33 ft	2			1.19		1.19					0.33	
+0.450W												
Dsgn. L = 4.67 ft	1				-0.89	0.89					0.27	
Dsgn. L = 7.33 ft	2				-0.89	0.89					0.24	
-0.450W												
Dsgn. L = 4.67 ft	1			0.89		0.89					0.27	
Dsgn. L = 7.33 ft	2			0.89		0.89					0.24	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
-W	1	0.0255	2.802		0.0000	0.000
	2	0.0000	2.802	-W	-0.5061	7.330

General Beam Analysis

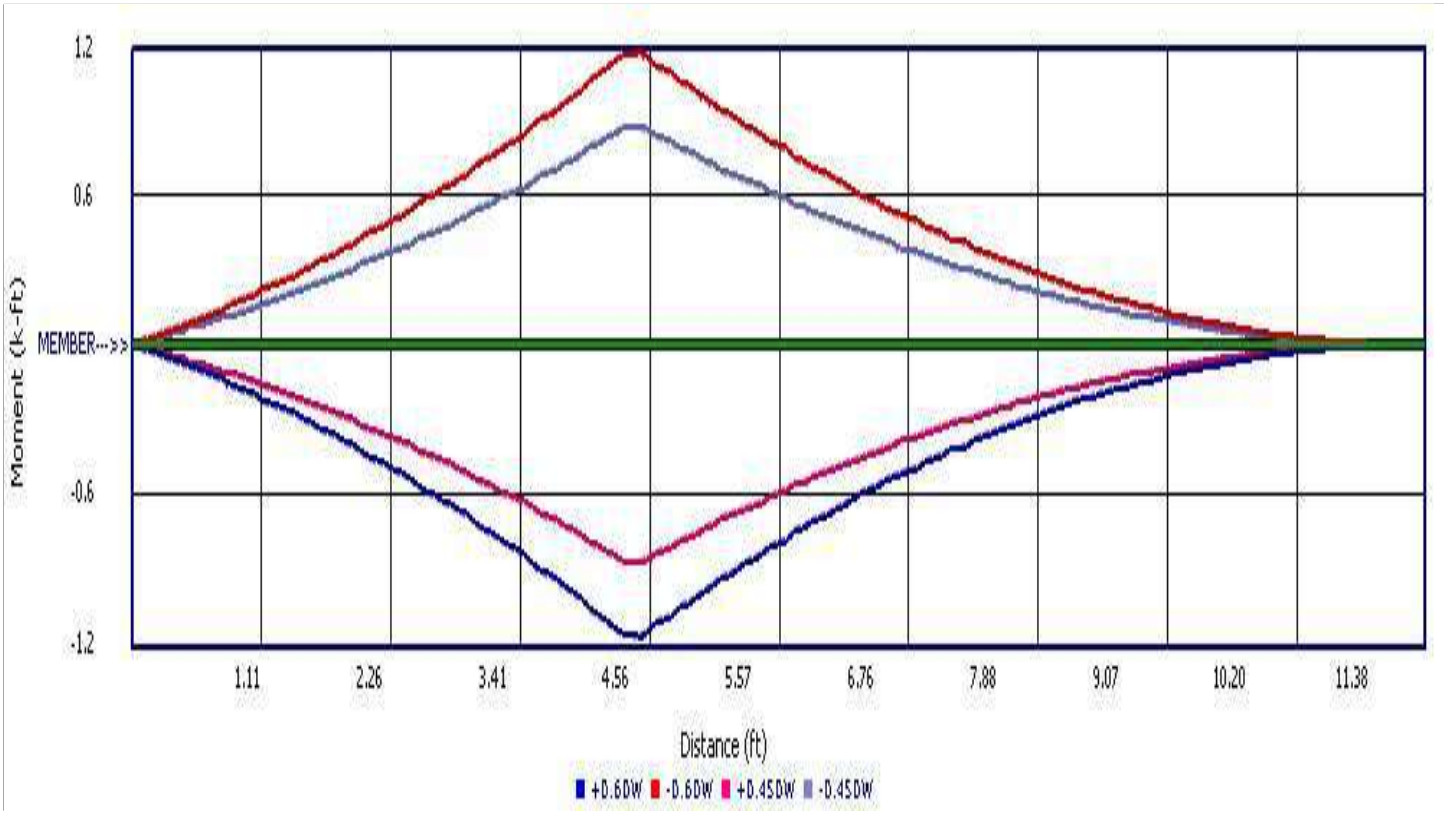
LIC# : KW-06018068, Build:20.25.07.09 Eastern Engineering Group (c) ENERCALC, LLC 1982-2026

DESCRIPTION: Member Analysis Gravity (Lateral)

Vertical Reactions

Support notation : Far left is #' Values in KIPS

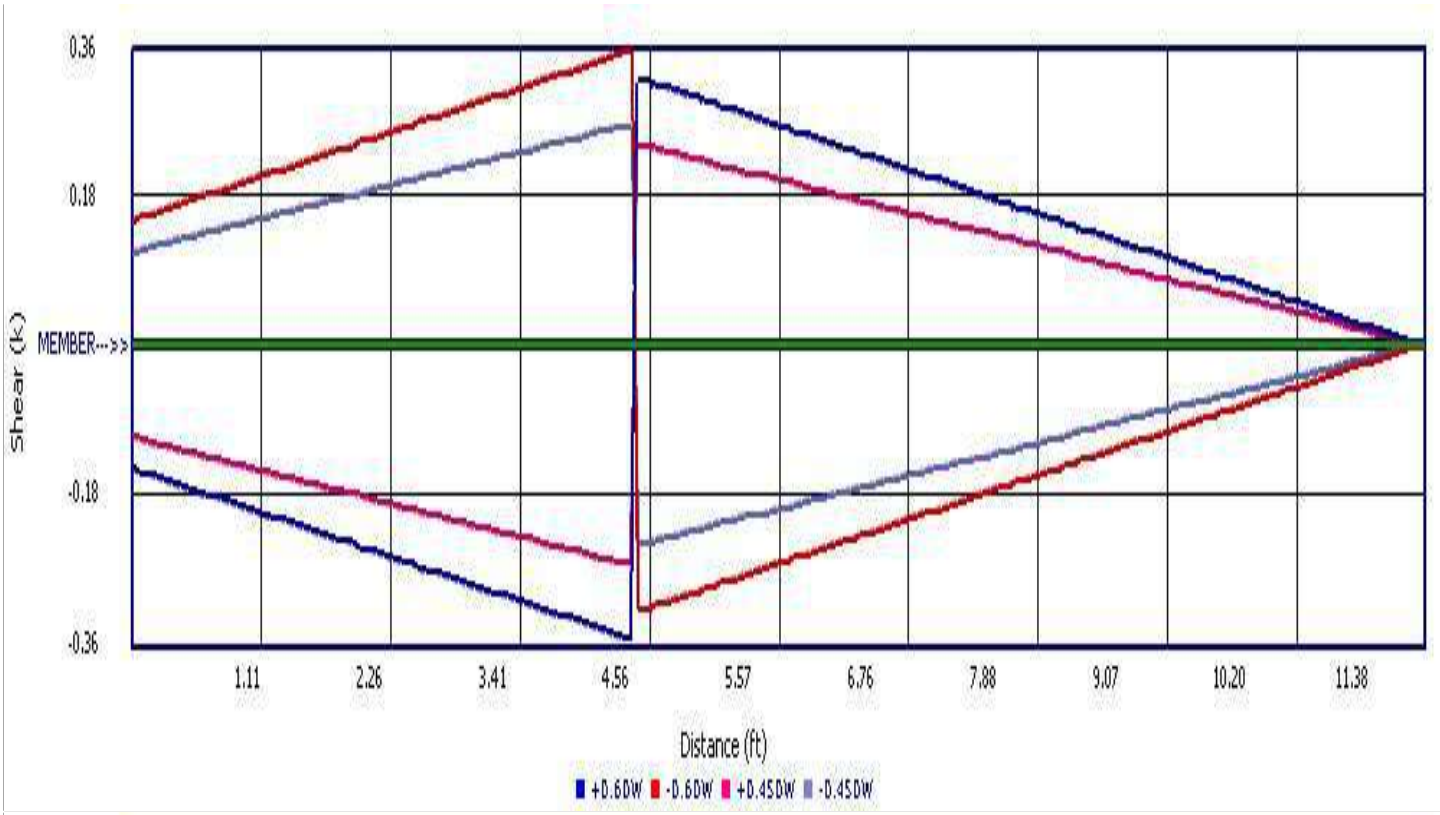
Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	0.253	-1.141	
Overall MINimum	-0.253	-1.141	
+0.60W	-0.152	0.685	
-0.60W	0.152	-0.685	
+0.450W	-0.114	0.513	
-0.450W	0.114	-0.513	
W Only	-0.253	1.141	
-W	0.253	-1.141	

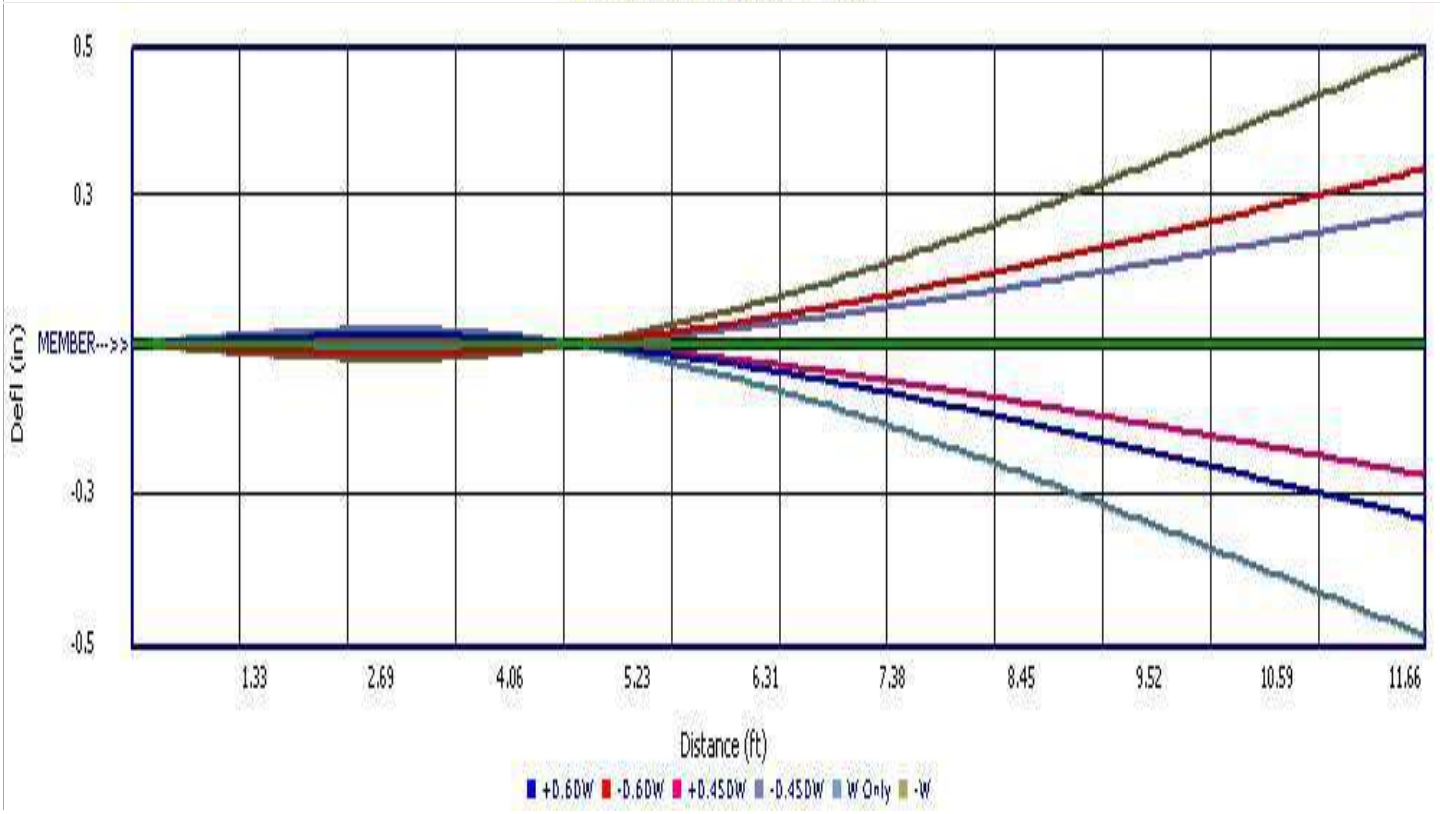


General Beam Analysis

LIC# : KW-06018068, Build:20.25.07.09 Eastern Engineering Group (c) ENERCALC, LLC 1982-2026

DESCRIPTION: Member Analysis Gravity (Lateral)





CONNECTIONS DESIGN

CONNECTION 1 DESIGN

LOAD:

Rx=1 141# REFER TO MEMBER 2 Comb 3 ENERCALC REPORT
Ry=4641 # REFER TO MEMBER 2 Comb 2 ENERCALC REPORT

Mz=Rx* 9"(0.75')= 856.0 #-ft

LOAD PROCESSING:

.Combination: 0.75 Rx+0.75Ry+0.75Mz

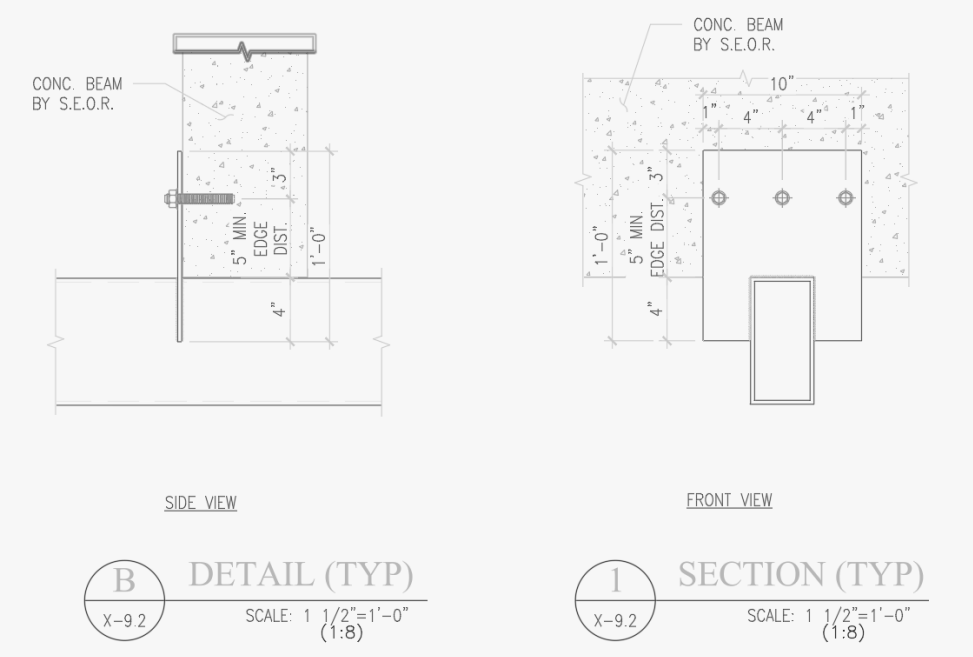
LRFD

Rx=4641# * 1.67 * (0.75) =5 813#
Ry=1 141# * 1.67 * (0.75) =1 430#
Mz=856 #-ft *1.67 * (0.75) = 1 072#-ft

*FOR ANALYSIS CONNECTION SEE NEXT PRINTED PAGE

USING: ø5/8"X2.5" C6+ Threaded Rod A36 by Red Head

SKETCH



CALCULATION SHEET FOR RED HEAD ANCHORS

Company :	Phone number :
Carried out by :	Mail address :
Company :	Project name :
Contact name :	Location :
Phone number :	Fastening point :
Mail address :	
Comment :	

Recommended anchors

C6+ Threaded Rod A36 Carbon Steel 5/8 x 2-1/2

Min. Effective embedment: 2.5 in

ESR 4046 issued 2018/09/01 / 2020/09/01

Base material

Concrete Strength	4000 psi
Concrete condition:	Uncracked
Thickness of concrete :	7.9 in
Tension load conditions:	Condition A Tension
Shear load conditions:	Condition A Shear
Edge reinforcement :	None or < no. 4 bar

Longitudinal reinforcement should be provided along the edge of the member

Conditions

Installation conditions :	Dry concrete
Hole drilling method:	Hammer drilling
Short term temperature :	130 °F
Long term temperature :	110 °F

Anchor plate

Thickness of part to be fixed :	0.4 in
Recommended plate thickness :	The base plate thickness has not been checked
Clearance diameter :	0.8 in
Profile :	
Profile position :	Ex = 0 in ; Ey = 0 in
Stand-off :	None

Design method : ACI 318-14 Design for static, quasi-static loading

Design Actions :

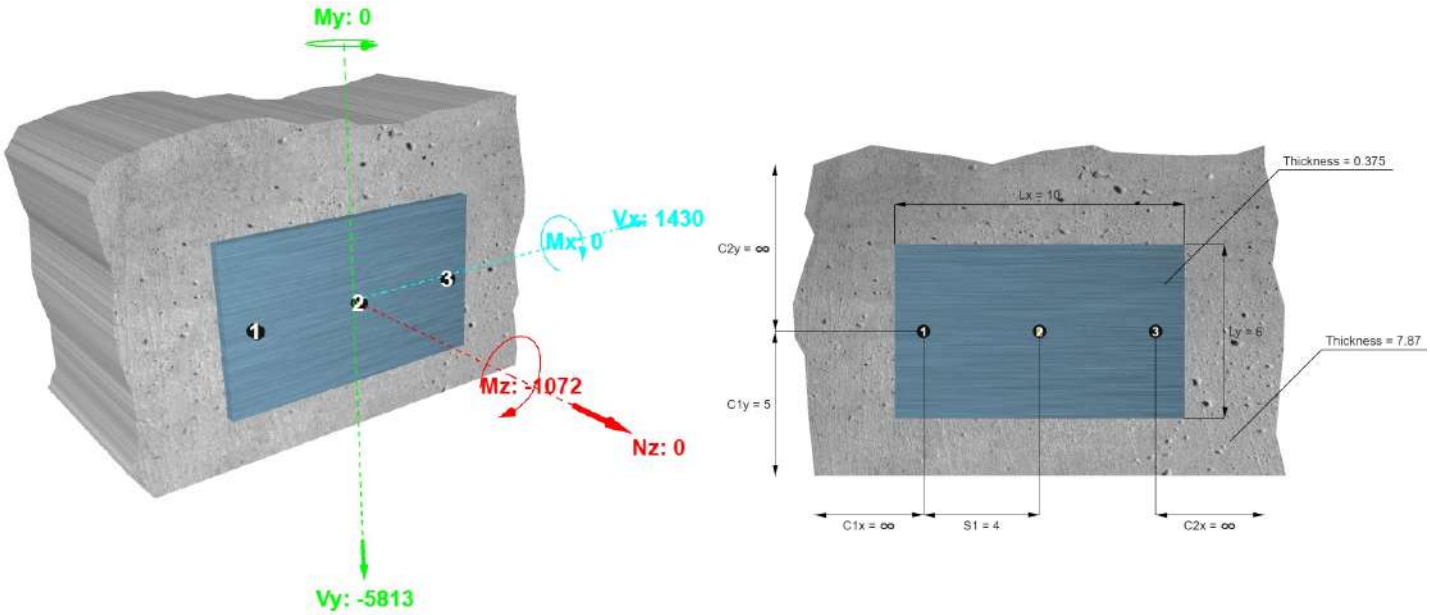
Action [lbf] / [lbf ft]	Action type	Nuz	Vux	Vuy	Muz	Mux	Muy
Combination 1	Static	0	1430	-5813	-1072	0	0

Specifications :

Static

Sustained Load : False

Geometry :



Calculation Hypothesis :

- The anchoring plate is assumed to be sufficient to resist deformation imposed by the load actions.

- REDHEAD can only be held responsible if the calculation examples exactly reflect the application and if the installation is carried out according to the instruction given in the REDHEAD specifications. The calculation is correct for REDHEAD anchors only. The
contractor or specifier should make sure that the base material is able to support the loads especially in the case of a group of anchors. REDHEAD cannot be held responsible if this software package is modified without its written approval.

Resulting anchors forces

Loads on anchors

Anchor	Tensile	Shear[x]	Shear[y]
1	0 lbf	477 lbf	-330 lbf
2	0 lbf	477 lbf	-1938 lbf
3	0 lbf	477 lbf	-3546 lbf

N^g [lbf]	N^h [lbf]	e_{Nx}[in]	e_{NY}[in]
0	0	0	0

V^h [lbf]	V^h [lbf]
6153	3578

Utilization

Tension load	Tension force N_{ua} [lbf]	Capacity ΦN_n [lbf]	$\beta_N = N_{ua} / \Phi N_n$ [%]
Bond strength	/	/	/
Sustained Tension Load Bond Strength	/	/	/
Concrete breakout strength	/	/	/
Steel strength	/	/	/

Shear load	Shear force V_{ua} [lbf]	Capacity ΦV_n [lbf]	$\beta_V = V_{ua} / \Phi V_n$ [%]
Concrete Breakout Strength	5986	6459	92.68
Pryout strength	3578	6903	51.83
Steel strength	3578	5115	69.94

Combined tension and shear loads

β_V = [0.93] ≤ 1

CALCULATION DETAILS

Tension load - Bond Strength

Failure mode is not applicable

Tension load - Concrete breakout Strength

Failure mode is not applicable

Tension load - Steel Strength

Failure mode is not applicable

Shear load - Concrete Breakout Strength

$\Phi V_{cbg} \geq V_{ua}$ [ACI 318−14 Table.17.3.1.1]

$V_{cbg} = V_b \cdot \frac{A_{Vc}}{A_{Vc0}} \cdot \Psi_{ed,V} \cdot \Psi_{h,V} \cdot \Psi_{ec,V} \cdot \Psi_{c,V} \cdot \Psi_{parallel,V}$ [ACI 318−14 – Eq. (17.5.2.1b)]

$V_b = \min\left[\left(7 \cdot \left(\frac{l_e}{d_a}\right)^{0.2} \cdot \sqrt{d_a}\right) \cdot \lambda_a \cdot \sqrt{f'_c} \cdot {c_{a1}}^{1.5} ; 9 \cdot \lambda_a \cdot \sqrt{f'_c} \cdot {c_{a1}}^{1.5}\right]$ [ACI 318−14 – Eq. (17.5.2.2b)]

A_{Vc} [ACI 318−14 Section 17.5.2.1 – Fig. R17.5.2.1(b)]

$A_{Vc0} = 4.5 \cdot {c_{a1}}^2$ [ACI 318−14 – Eq. (17.5.2.1c)]

$\Psi_{ed,V} = 0.7 + 0.3 \cdot \frac{c_{a2}}{1.5 \cdot c_{a1}} \leq 1$ [ACI 318−14 – Eq. (17.5.2.6b)]

$\Psi_{h,V} = \sqrt{\frac{1.5 \cdot c_{a1}}{h_a}} \geq 1$ [ACI 318−14 – Eq. (17.5.2.8)]

$\Psi_{ec,V} = \frac{1}{1 + 2 \cdot (e_V / 3 \cdot c_{a1})} \leq 1$ [ACI 318−14 – Eq. (.17.5.2.5)]

ΦV_{cbg}	= 6459 lbf	V_b	= 5163 lbf	c_{a1}	= 5 in
V_{cbg}	= 8612 lbf	A_{Vc}/A_{Vc0}	= 1.53	c_{a2}	= ∞
$\Phi_{concrete}$	= 0.75	A_{Vc}	= 172 in²	f'_c	= 4000 psi
		A_{Vc0}	= 112 in²	λ_a	= 1
		$\Psi_{ec,V}$	= 0.78	l_e	= 2.5 in
		$\Psi_{ed,V}$	= 1.00	d_a	= 0.625 in
		$\Psi_{h,V}$	= 1.00	$e_{c,V}$	= 2.1 in
		$\Psi_{c,V}$	= 1.40		
		$\Psi_{parallel,V}$	= 1.00		

Shear load - Pryout Strength based on Concrete Strength

$\Phi V_{cpg} \geq V_{ua}$	[ACI 318−14 Table.17.3.1.1]
$V_{cpg} = k_{cp} \cdot \left(N_b \cdot \frac{A_{Nc}}{A_{Nc0}} \cdot \Psi_{ec,N} \cdot \Psi_{ed,N} \cdot \Psi_{c,N} \cdot \Psi_{cp,N} \right)$	[ACI 318−14 – Eq. (17.5.3.1b)]
$N_b = k_c \cdot \lambda_a \cdot \sqrt{f'_c} \cdot h_{ef}^{1.5}$	[ACI 318−14 – Eq. (17.4.2.2a)]
A_{Nc}	[ACI 318−14 Section 17.4.2.1 – Fig. R17.4.2.1(b)]
$A_{Nc0} = 9 \cdot h_{ef}^2$	[ACI 318−14 – Eq. (17.4.2.1c)]
$\Psi_{ed,N} = 0.7 + 0.3 \cdot \frac{c_{a,min}}{1.5 \cdot h_{ef}} \leq 1$	[ACI 318−14 – Eq. (17.4.2.5b)]
$\Psi_{cp,N} = \max\left(\frac{c_{a,min}}{c_{ac}}; \frac{1.5 \cdot h_{ef}}{c_{ac}} \right) \leq 1$	[ACI 318−14 – Eq. (17.4.2.7b)]
$\Psi_{ec,N} = \frac{1}{1 + (2 \cdot e_N / 3 \cdot h_{ef})} \leq 1$	[ACI 318−14 – Eq. (17.4.2.4)]

ΦV_{cpg}	= 0 lbf	K_{cp}	= 2	k_c	= 24
V_{cpg}	= 9204 lbf	N_{br}	= 6002 lbf	f'_c	= 4000 psi
$\Phi_{concrete}$	= 0.75	A_{Nc}/A_{Nc0}	= 2.08	λ_a	= 1
		A_{Nc}	= 117 in²	$\Psi_{c,N}$	= 1.00
		A_{Nc0}	= 56 in²	h_{ef}	= 2.5 in
		$\Psi_{ec,Nx}$	= 1.00	c_{ac}	= 3.6 in
		$\Psi_{ec,Ny}$	= 1.00	$c_{a,min}$	= 5 in
		$\Psi_{ed,N}$	= 1.00	e_{Nx}	= 0 in
		$\Psi_{cp,N}$	= 1.00	e_{Ny}	= 0 in

Shear load - Steel Strength

$\Phi V_{sa} \geq V_{ua}$	[ACI 318−14 Table.17.3.1.1]
V_{sa}	[ESR approval]

ΦV_{sa}	= 5115 lbf
V_{sa}	= 7870 lbf
Φ_{steel}	= 0.65

INSTALLATION DATA

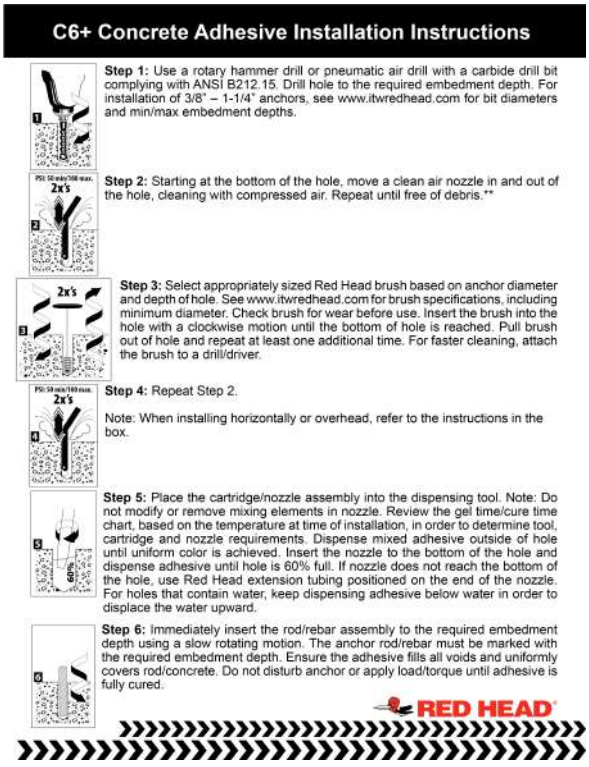
C6+ Threaded Rod A36 Carbon Steel 5/8 x 2-1/2

Min. Effective embedment: 2.5 in

ESR 4046 issued 2018/09/01 / 2020/09/01

Min. Effective embedment:	2.5 in
Minimum thickness of base material :	3.7 in
Hole diameter in the base material :	0.7 in
Min. hole depth in base material	2.5 in
Design installation torque	60.00 ft-lb
Max. base plate thickness	0.4 in
Profile family (section type) :	
Clearance diameter :	0.8 in

INSTALLATION Method



CONNECTION 2 DESIGN

LOAD:

Rx=253# REFER TO MEMBER 2 Comb 3 ENERCALC REPORT
Ry=894 # REFER TO MEMBER 2 Comb 2 ENERCALC REPORT

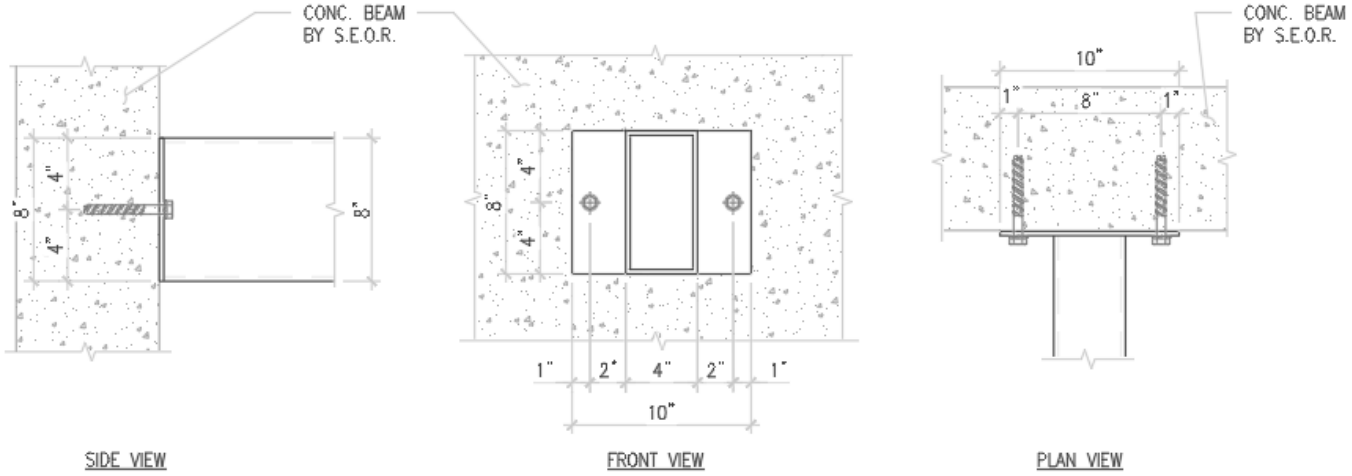
LOAD PROCESSING:

LRFD

Rx=253# * 1.67 =423#
Ry=894# * 1.67 =1 493#

*FOR ANALYSIS CONNECTION SEE NEXT PRINTED PAGE

USING: ø5/8"X2.5" C6+ Threaded Rod A36 by Red Head



A
X-9.2
DETAIL (TYP)
SCALE: 1 1/2"=1'-0"
(1:8)

CALCULATION SHEET FOR RED HEAD ANCHORS

Company :	Phone number :
Carried out by :	Mail address :
Company :	Project name :
Contact name :	Location :
Phone number :	Fastening point :
Mail address :	
Comment :	

Recommended anchors

C6+ Threaded Rod A36 Carbon Steel 5/8 x 2-1/2

Min. Effective embedment: 2.5 in

ESR 4046 issued 2018/09/01 / 2020/09/01

Base material

Concrete Strength	4000 psi
Concrete condition:	Uncracked
Thickness of concrete :	7.9 in
Tension load conditions:	Condition A Tension
Shear load conditions:	Condition A Shear
Edge reinforcement :	None or < no. 4 bar

Longitudinal reinforcement should be provided along the edge of the member

Conditions

Installation conditions :	Dry concrete
Hole drilling method:	Hammer drilling
Short term temperature :	130 °F
Long term temperature :	110 °F

Anchor plate

Thickness of part to be fixed :	0.2 in
Recommended plate thickness :	The base plate thickness has not been checked
Clearance diameter :	0.8 in
Profile :	HSS 8X4X1/4
Profile position :	Ex = 0 in ; Ey = 0 in
Stand-off :	None

Design method : ACI 318-14 Design for static, quasi-static loading

Design Actions :

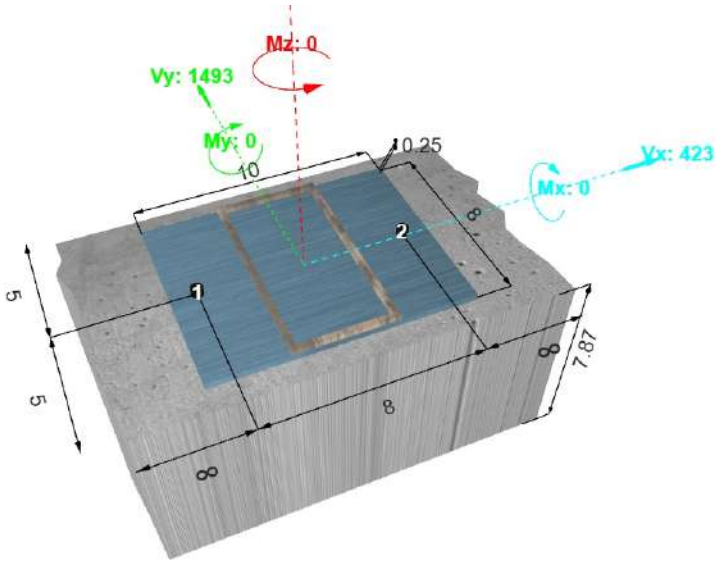
Action [lbf] / [lbf ft]	Action type	Nuz	Vux	Vuy	Muz	Mux	Muy
Combination 1	Static	0	423	1493	0	0	0

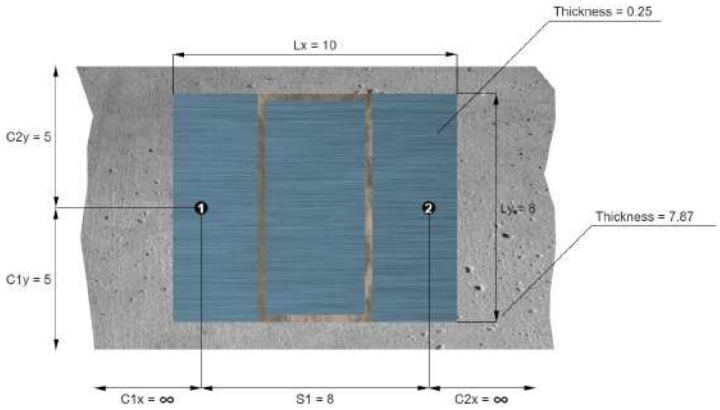
Specifications :

Static

Sustained Load : False

Geometry :





Calculation Hypothesis :

- The anchoring plate is assumed to be sufficient to resist deformation imposed by the load actions.

- REDHEAD can only be held responsible if the calculation examples exactly reflect the application and if the installation is carried out according to the instruction given in the REDHEAD specifications. The calculation is correct for REDHEAD anchors only. The
contractor or specifier should make sure that the base material is able to support the loads especially in the case of a group of anchors. REDHEAD cannot be held responsible if this software package is modified without its written approval.

Resulting anchors forces

Loads on anchors

Anchor	Tensile	Shear[x]	Shear[y]
1	0 lbf	212 lbf	747 lbf
2	0 lbf	212 lbf	747 lbf

N^g [lbf]	N^h [lbf]	e_{Nx}[in]	e_{NY}[in]
0	0	0	0

V^h [lbf]	V^h [lbf]
1552	776

Utilization

Tension load	Tension force N_{ua} [lbf]	Capacity ΦN_n [lbf]	$\beta_N = N_{ua} / \Phi N_n$ [%]
Bond strength	/	/	/
Sustained Tension Load Bond Strength	/	/	/
Concrete breakout strength	/	/	/
Steel strength	/	/	/

Shear load	Shear force V_{ua} [lbf]	Capacity ΦV_n [lbf]	$\beta_V = V_{ua} / \Phi V_n$ [%]
Concrete Breakout Strength	1552	8313	18.67
Pryout strength	1552	11722	13.24
Steel strength	776	5115	15.17

Combined tension and shear loads

$\beta_V = [0.19] \leq 1$

CALCULATION DETAILS

Tension load - Bond Strength

Failure mode is not applicable

Tension load - Concrete breakout Strength

Failure mode is not applicable

Tension load - Steel Strength

Failure mode is not applicable

Shear load - Concrete Breakout Strength

$\Phi V_{cbg} \geq V_{ua}$ [ACI 318−14 Table.17.3.1.1]

$V_{cbg} = V_b \cdot \frac{A_{Vc}}{A_{Vc0}} \cdot \Psi_{ed,V} \cdot \Psi_{h,V} \cdot \Psi_{ec,V} \cdot \Psi_{c,V} \cdot \Psi_{parallel,V}$ [ACI 318−14 – Eq. (17.5.2.1b)]

$V_b = \min\left[\left(7 \cdot \left(\frac{l_e}{d_a}\right)^{0.2} \cdot \sqrt{d_a}\right) \cdot \lambda_a \cdot \sqrt{f_c} \cdot {c_{a1}}^{1.5} ; 9 \cdot \lambda_a \cdot \sqrt{f_c} \cdot {c_{a1}}^{1.5}\right]$ [ACI 318−14 – Eq. (17.5.2.2a) & Eq. (17.5.2.2b)]

A_{Vc} [ACI 318−14 Section 17.5.2.1 – Fig. R17.5.2.1(b)]

$A_{Vc0} = 4.5 \cdot {c_{a1}}^2$ [ACI 318−14 – Eq. (17.5.2.1c)]

$\Psi_{ed,V} = 0.7 + 0.3 \cdot \frac{c_{a2}}{1.5 \cdot c_{a1}} \leq 1$ [ACI 318−14 – Eq. (17.5.2.6b)]

$\Psi_{h,V} = \sqrt{\frac{1.5 \cdot c_{a1}}{h_a}} \geq 1$ [ACI 318−14 – Eq. (17.5.2.8)]

$\Psi_{ec,V} = \frac{1}{1 + 2 \cdot (e_V / 3 \cdot c_{a1})} \leq 1$ [ACI 318−14 – Eq. (.17.5.2.5)]

ΦV_{cbg}	= 8313 lbf	V_b	= 5163 lbf	c_{a1}	= 5 in
V_{cbg}	= 11083 lbf	A_{Vc}/A_{Vc0}	= 1.53	c_{a2}	= ∞
$\Phi_{concrete}$	= 0.75	A_{Vc}	= 172 in²	f'_c	= 4000 psi
		A_{Vc0}	= 112 in²	λ_a	= 1
		$\Psi_{ec,V}$	= 1.00	l_e	= 2.5 in
		$\Psi_{ed,V}$	= 1.00	d_a	= 0.625 in
		$\Psi_{h,V}$	= 1.00	$e_{c,V}$	= 0 in
		$\Psi_{c,V}$	= 1.40		
		$\Psi_{parallel,V}$	= 1.00		

Shear load - Pryout Strength based on Concrete Strength

$\Phi V_{cbg} \geq V_{ua}$ [ACI 318−14 Table.17.3.1.1]

$V_{cbg} = k_{cp} \cdot \left(N_{ba} \cdot \frac{A_{Nc}}{A_{Nc0}} \cdot \Psi_{ec,Na} \cdot \Psi_{ed,Na} \cdot \Psi_{cp,N} \right)$ [ACI 318−14 – Eq. (17.5.3.1b)]

$N_b = \lambda_a \cdot \tau_{k,c} \cdot \Pi \cdot d_a \cdot h_{ef}$ [ACI 318−14 – Eq. (17.4.2.2a)]

A_{Na} [ACI 318−14 Section 17.4.2.1 – Fig. R17.4.2.1(b)]

$A_{Na0} = 9 \cdot h_{ef}^2$ [ACI 318−14 – Eq. (17.4.2.1c)]

$\Psi_{ed,Na} = 0.7 + 0.3 \cdot \frac{c_{a,min}}{1.5 \cdot h_{ef}} \leq 1$ [ACI 318−14 – Eq. (17.4.2.5b)]

$\Psi_{cp,Na} = \max\left(\frac{c_{a,min}}{c_{ac}}; \frac{1.5 \cdot h_{ef}}{c_{ac}} \right) \leq 1$ [ACI 318−14 – Eq. (17.4.2.7b)]

$\Psi_{ec,Na} = \frac{1}{1 + (2 \cdot e_N / 3 \cdot h_{ef})} \leq 1$ [ACI 318−14 – Eq. (17.4.2.4)]

ΦV_{cpg}	= 11722 lbf	N_{ba}	= 11364 lbf	f'_c	= 4000 psi
V_{cpg}	= 15629 lbf	$\tau_{k,c}$	= 2315 psi	λ_a	= 1
$\Phi_{concrete}$	= 0.75	τ_{uncr}	= 2315 psi	c_{Na}	= 9.1 in
		A_{Na}/A_{Na0}	= 0.79	d_a	= 0.625 in
		A_{Na}	= 261 in²	h_{ef}	= 2.5 in
		A_{Na0}	= 329 in²	c_{ac}	= 3.6 in
		$\Psi_{ecx,Na}$	= 1.00	e_{Nx}	= 0 in
		$\Psi_{ecy,Na}$	= 1.00	e_{Ny}	= 0 in
		$\Psi_{ed,Na}$	= 0.87		
		$\Psi_{cp,Na}$	= 1.00		

Shear load - Steel Strength

$\Phi V_{sa} \geq V_{ua}$ [ACI 318−14 Table.17.3.1.1]

V_{sa} [ESR approval]

ΦV_{sa}	= 5115 lbf
V_{sa}	= 7870 lbf
Φ_{steel}	= 0.65

INSTALLATION DATA

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ESR 4046 issued 2018/09/01 / 2020/09/01

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Hole diameter in the base material :	0.7 in
Min. hole depth in base material	2.5 in
Design installation torque	60.00 ft-lb
Max. base plate thickness	0.2 in
Profile family (section type) :	HSS 8X4X1/4
Clearance diameter :	0.8 in

INSTALLATION Method

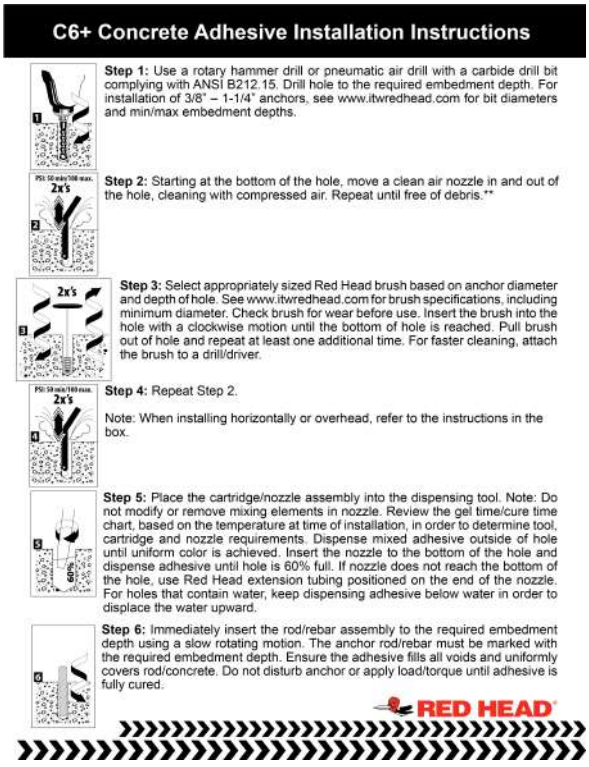

Plate Design : 3/16"

DL = 30 psf

LL = 20 psf

$W_{yp} = -86$ psf

$W_{pw} = 66$ psf

Loads Processing

.DL + 0.45 WPW + 0,75 LL → Worst Case

= 75 Psf

L = 3,25 ft long trib = 12"

$M_{max} = \frac{q \cdot L^2}{8} = 1189$ #-in

$M_{allow} = F_b \times S_x = 19000 \text{ psi} * \frac{12" \times 3/16^2}{6} = 1335$ #-in OK]