Wind Load Report - Garage Rebuild

1. Site & Building Data

Roof Type:	Gable
Wind Speed (ult):	140 mph
Exposure Category:	C
Enclosure Class:	Enclosed
Building Width (W):	25 ft.
Building Length (L):	74 ft.
Eave Height (h_e):	9 ft.
Foundation Height (h_f):	0 ft.
Roof Pitch:	4 /12
Eave Overhang (OH_e):	1 ft.
Gable Overhang (OH_g):	1 ft.

2. Parameters & Coefficients

Topographic Factor (K_{zt}):	1.0
Directionality Factor (K_d):	.85
Roof Angle (θ):	18.43 deg.
Mean Roof Height (h):	11.08 ft.
Ridge Height (h_r):	13.17 ft.
Pos. Internal Pressure (+GCpi):	+0.18
Neg. Internal Pressure (-GCpi):	-0.18
Velocity Pressure Exp. Coeff. (K_h):	0.85 @ z=h
Velocity Pressure (q_h):	36.20 psf
End Zone Width (a):	3.00 ft.
Zone 2/2E Dist.:	12.50 ft.

3. Design Assumptions and Notes

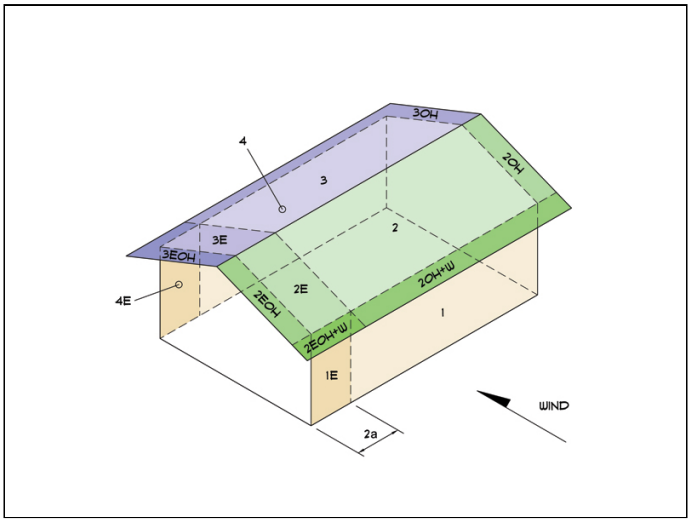
Code Standard:	ASCE 7-10
Geometry:	Regular-Shaped Bldg.
Height Class:	Low-Rise Building
Notes:	

4. Design Loads

Top Chord Dead Load:	7 psf
Bottom Chord Dead Load:	10 psf
Truss/Rafter Spacing:	24 in. o/c

4. Design Wind Pressures: MWFRS Envelope Procedure

Load Case A: Transverse Direction			
Surface	GCpf	Design Pressure (psf)	
		(w/ +GCpi)	(w/ -GCpi)
1	0.52	12.18	25.21
2	-0.69	-31.50	-18.46
3	-0.47	-23.48	-10.45
4	-0.42	-21.56	-8.52
1E	0.78	21.73	34.76
2E	-1.07	-45.26	-32.22
3E	-0.67	-30.89	-17.86
4E	-0.62	-28.89	-15.86
2OH	-0.69	-24.98	
2EOH	-1.07	-38.74	
3OH	-0.47	-16.96	
3EOH	-0.67	-24.38	
2OH+W	-0.69/-0.7	-50.32	
2EOH+W	-1.07/-0.7	-64.08	



a) (+) and (-) signs signify wind pressures acting toward & away from surfaces.
b) External Pressure Coefficients linearly interpolated from Fig. 28.4-1 ASCE 7-10.
c) Design building for all wind directions, 4 load patterns per load case.
d) Total horizontal shear shall not be less than that by neglecting roof wind forces.
e) Min. wind load for enclosed or partially enclosed bldg.: 16 psf wall, 8 psf roof.
f) Design pressures are for strength design, multiply by 0.6 for ASD.

Subject	Customer	Location	Job No.
Wind Loads	Sean LeBarron	4709 Beachmont	2024D398

Engr.		Rev.
Engineer	Company Name 123 Street City, State 12345 ph. (888) 777-5555 www.website.com	-
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Load Case B: Longitudinal Direction			
Surface	GCpf	Design Pressure (psf)	
		(w/ +GCpi)	(w/ -GCpi)
1	-0.45	-22.81	-9.78
2	-0.69	-31.50	-18.46
3	-0.37	-19.91	-6.88
4	-0.45	-22.81	-9.78
5	0.40	7.97	21.00
6	-0.29	-17.02	-3.98
1E	-0.48	-23.90	-10.86
2E	-1.07	-45.26	-32.22
3E	-0.53	-25.71	-12.67
4E	-0.48	-23.90	-10.86
5E	0.61	15.57	28.60
6E	-0.43	-22.08	-9.05
2OH	-0.69	-24.98	
2EOH	-1.07	-38.74	
3OH	-0.37	-13.40	
3EOH	-0.53	-19.19	
2EOH+W	-1.07/-0.7	-64.08	
3EOH+W	-0.53/-0.7	-44.53	

a) (+) and (-) signs signify wind pressures acting toward & away from surfaces.
b) External Pressure Coefficients linearly interpolated from Fig. 28.4-1 ASCE 7-10.
c) Design building for all wind directions, 4 load patterns per load case.
d) Total horizontal shear shall not be less than that by neglecting roof wind forces.
e) Min. wind load for enclosed or partially enclosed bldg.: 16 psf wall, 8 psf roof.
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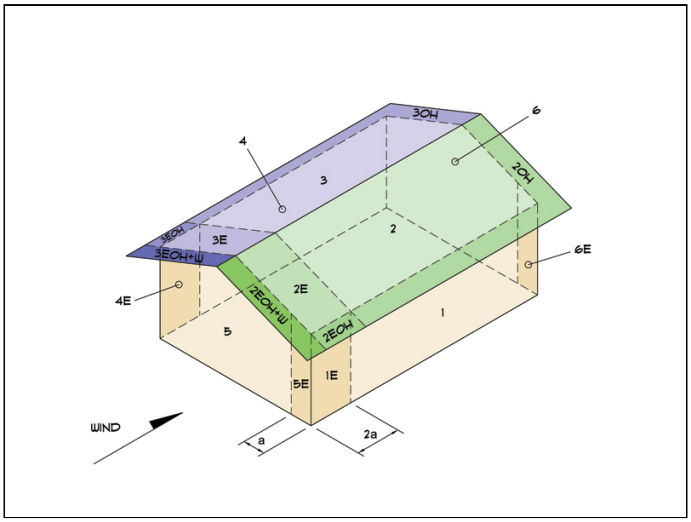
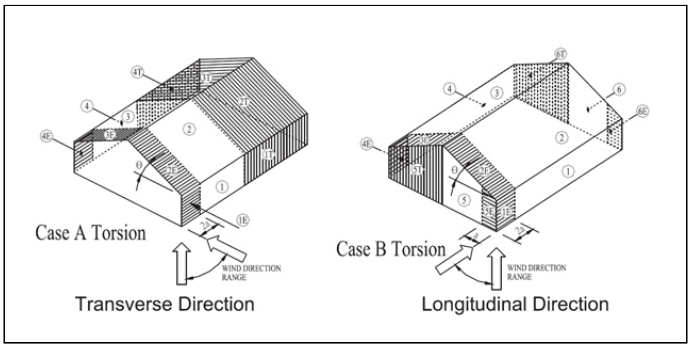


Torsional Load Cases				
Surface	Load Case	GCpf	Design Pressure (psf)	
			(w/ +GCpi)	(w/ -GCpi)
1T	A	-	3.05	6.30
2T	A	-	-7.87	-4.62
3T	A	-	-5.87	-2.61
4T	A	-	-5.39	-2.13
5T	B	-	1.99	5.25
6T	B	-	-4.25	-1.00

a) (+) and (-) signs signify wind pressures acting toward & away from surfaces.
b) Pressures designated with a "T" are 25% of full design wind pressures.
c) Torsional loading shall apply to all 8 load patterns using the figures shown.
d) Design pressures are for strength design, multiply by 0.6 for ASD.
e) Torsional Design Exceptions: One story bldg. with h ≤ 30 ft,
Two stories or less framed with light frame construction,
Two stories or less with flexible diaphragms.



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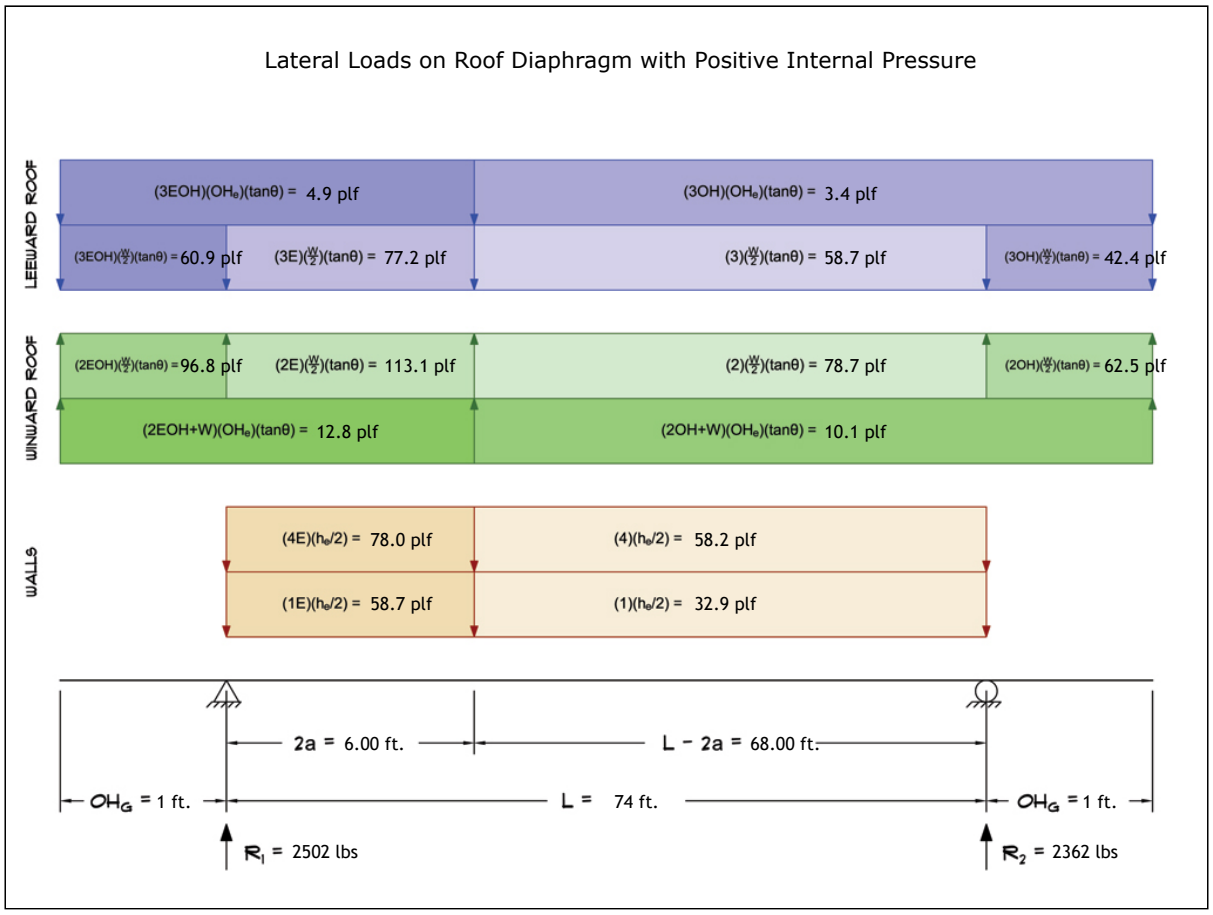
5. Wind Load Calculations

1.) Lateral Loads - Transverse Direction:



a) (-) signs signify wind lateral forces acting opposite to the direction of the arrows shown.
b) Strength design values multiplied by 0.6 to obtain ASD values.

Wind Base Shear (ASD)						
Load Case A: Transverse Direction						
Load Case	Walls (lbs)	Roof (lbs)	Roof Overhangs (lbs)	Total Lateral Load (lbs)	R_1 (lbs)	R_2 (lbs)
Positive Internal Pressure	7014	-1579	-572	4864	2502	2362
Negative Internal Pressure	7014	-1579	-572	4864	2502	2362
Roof Pressure = 0	7014	0	0	7014	3633	3381
Min. Pressures (8 psf, 16 psf)	3197	1480	162	4838	2419	2419

a) Bottom half of wall neglected in tributary area calculations.
b) Strength design values multiplied by 0.6 to obtain ASD values.

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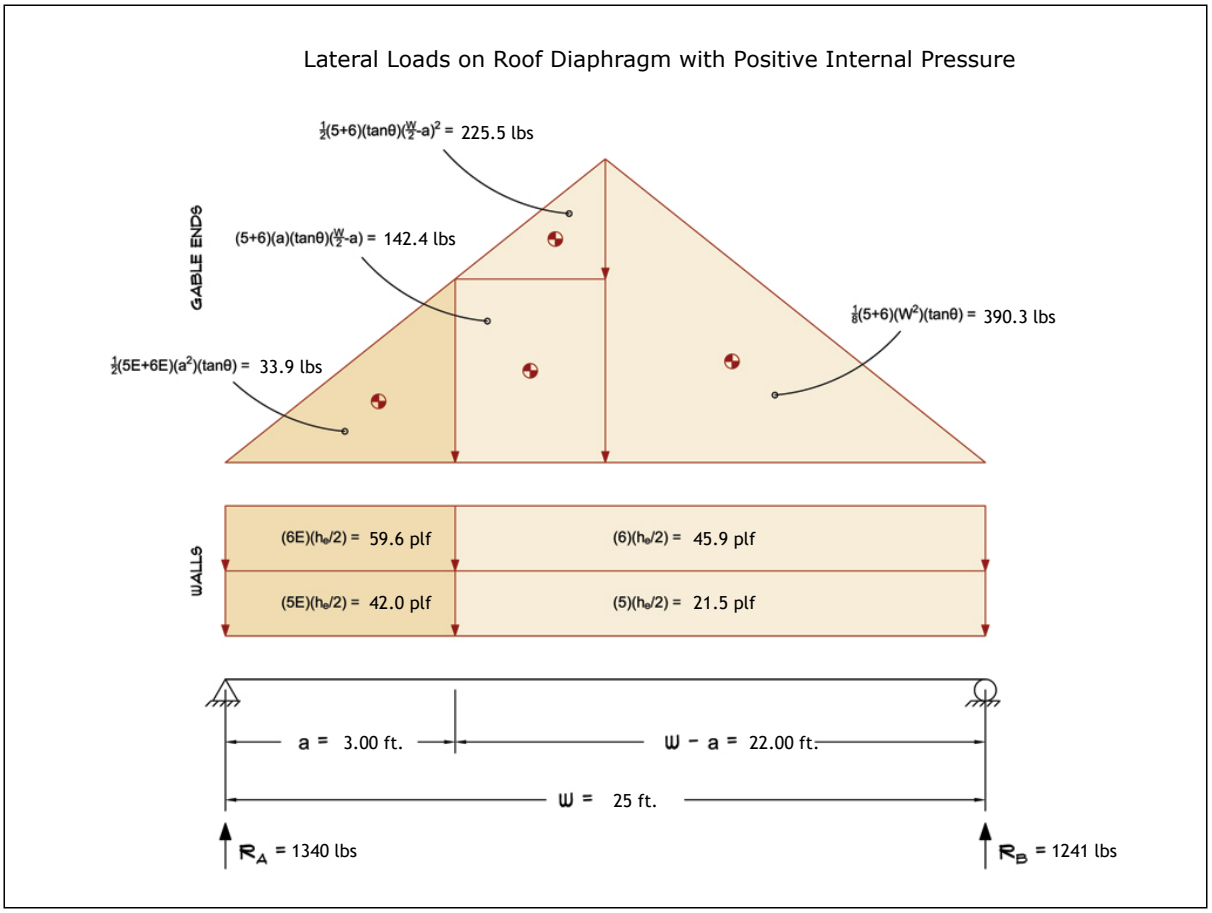
2.) Lateral Loads - Longitudinal Direction:



a) (-) signs signify wind lateral forces acting opposite to the direction of the arrows shown.
b) Strength design values multiplied by 0.6 to obtain ASD values.
c) Where the length of building (L) exceeds 4X the mean roof height (h), wind drag forces should additionally be considered.

Wind Base Shear (ASD)						
Load Case B: Longitudinal Direction						
Load Case	Walls (lbs)	Gable Ends (lbs)	Roof (lbs)	Total Lateral Load (lbs)	R_A (lbs)	R_B (lbs)
Positive Internal Pressure	1789	792	0	2581	1340	1241
Negative Internal Pressure	1789	792	0	2581	1340	1241
Roof Pressure = 0	1789	792	0	2581	1340	1241
Min. Pressures (8 psf, 16 psf)	1080	500	0	1580	790	790

a) Bottom half of wall neglected in tributary area calculations.
b) Strength design values multiplied by 0.6 to obtain ASD values.

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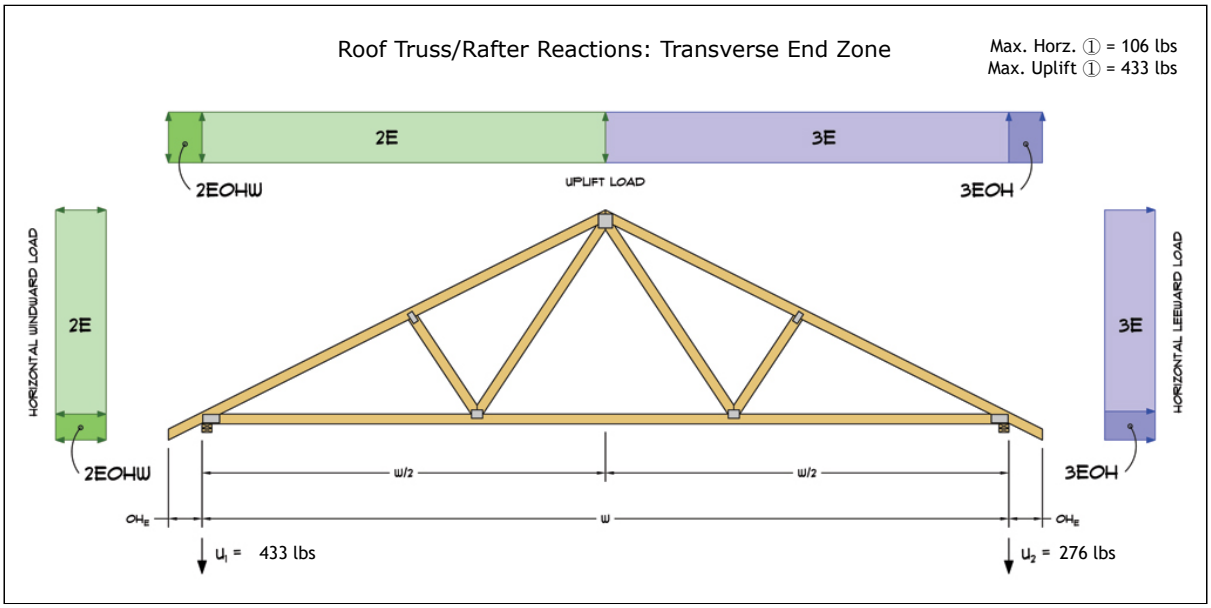
3.) Roof Truss Reactions:



a) Strength design values multiplied by 0.6 to obtain ASD values.
b) Windward loads may be positive or negative depending on pitch of roof.

Roof Truss/Rafter Reactions (ASD)					
w/ Positive Internal Pressure					
Load Case	Horizontal Load (lbs)	Gross Uplift (lbs)	Net Uplift (lbs)	U_1 (lbs)	U_2 (lbs)
Transverse Int. Zone	53	905	366	234	132
Transverse End Zone	88	1248	709	433	276
Longitudinal Int. Zone	63	817	278	190	88
Longitudinal End Zone	106	1134	595	383	212

a) Gross Uplift calculations do not include any counteracting roof dead loads.
b) Net Uplift calculations include counteracting roof dead loads multiplied by 0.6 per load case (7) ASCE 7-10.
c) Strength design values multiplied by 0.6 to obtain ASD values for wind loads.
d) Loads based on truss spacing calculated at 24" o/c.
e) Negative values for horizontal load indicate load acting in windward direction (tranverse load cases).
f) Negative values for uplift indicate net downward force (zero uplift).

*Disclaimer: The calculations produced herein are for initial design and estimating purposes only. The calculations and drawings presented do not constitute a fully engineered design. All of the potential load cases required to fully design an actual structure may not be provided by this calculator. For the design of an actual structure, a registered and licensed professional should be consulted as per IRC 2012 Sec. R802.10.2 and designed according to the minimum requirements of ASCE 7-10. The wind load calculations provided by this online tool are for educational and illustrative purposes only. Medeek Design assumes no liability or loss for any designs presented and does not guarantee fitness for use.

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