MWFRS Wind Load Calculations

ASCE 7-10 Chapter 28 Wind Loads on Buildings; Envelope Procedure
Simple Diaphragm

Project: Textron Stone Road Addition

Table 28.5-1 Enclosed Simple Diaphragm Low-Rise Buildings

1. Risk Category Table 1.5-1 — Cat 3
2. Basic Wind Speed, by wesite at council.org — 143 mph
3. Wind load parameters
   - a. Surface Roughness, Section 26.7.2: — Roughness D
   - b. Exposure Category, Section 26.7.3: — Exposure D
   - c. Topographic Factor, Section 26.8.2: — K_{zt} = 1
4. Wind Pressures Fig 28.6-1 — Load Case 1 for roof slope 56º

Interpolating Wind Speeds												
Basic Wind Speed	Roof Angle	Load Case	Horizontal Pressures, P_{s30} (psf)				Vertical Pressures, P_{s30} (psf)				Overhangs	
			A	B	C	D	E	F	G	H	Eoh	Goh
140 mph	45º	1	35.0	23.9	27.8	19.1	2.7	-21.2	0.9	-18.2	-12.3	-14.0
150 mph	45º	1	40.1	27.4	31.9	22.0	3.1	-24.4	1.0	-20.9	-14.1	-16.1
143 mph	45º	1	36.5	25.0	29.0	20.0	2.8	-22.2	0.9	-19.0	-12.8	-14.6

5. Building mean height (h) = <30 ft — Fig 28.6-1 λ for Exposure D = 1.66
6. Adjusted wind pressure P_s = Equation 28.6-1 — $P_s = \lambda K_{zt} P_{s30} = 1.21 * 1 * P_{s30}$

Adjusted Wind Pressure Ps												
Basic Wind Speed	Roof Angle	Load Case	Horizontal Pressures, Ps (psf)				Vertical Pressures, Ps (psf)				Overhangs	
			A	B	C	D	E	F	G	H	Eoh	Goh
143 mph	45º	1	60.6	41.4	48.2	33.2	4.7	-36.8	1.5	-31.6	-21.3	-24.3

7. D1.1 One and Two Story Building with h ≤ 30 ft are exempt from torsional load cases.

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