WIND LOADING ANALYSIS - Wall Components and Cladding

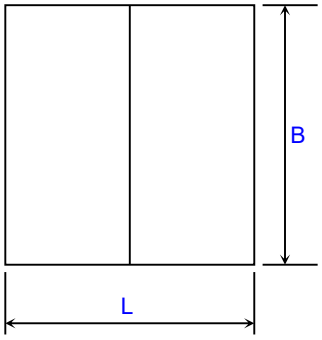
Per ASCE 7-05 Code for Buildings of Any Height

Using Method 2: Analytical Procedure (Section 6.5)

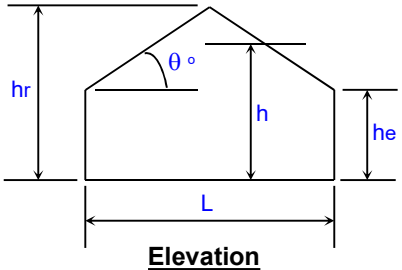
Job Name:		Subject:			
Job Number:		Originator:		Checker:	

Input Data:

Wind Speed, V =	90	mph (Wind Map, Figure 6-1)
Bldg. Classification =	II	(Table 1-1 Occupancy Category)
Exposure Category =	C	(Sect. 6.5.6)
Ridge Height, hr =	53.33	ft. (hr >= he)
Eave Height, he =	20.00	ft. (he <= hr)
Building Width =	200.00	ft. (Normal to Building Ridge)
Building Length =	250.00	ft. (Parallel to Building Ridge)
Roof Type =	Gable	(Gable or Monoslope)
Topo. Factor, Kzt =	1.00	(Sect. 6.5.7 & Figure 6-4)
Direct. Factor, Kd =	0.85	(Table 6-4)
Enclosed? (Y/N)	Y	(Sect. 6.2 & Figure 6-5)
Hurricane Region?	N	
Component Name =	Girt	(Girt, Siding, Wall, or Fastener)
Effective Area, Ae =	208	ft.^2 (Area Tributary to C&C)



Plan



Elevation

Resulting Parameters and Coefficients:

Roof Angle, θ =	18.43	deg.
Mean Roof Ht., h =	36.67	ft. (h = (hr+he)/2, for roof angle >10 deg.)

Wall External Pressure Coefficients, GCp:

GCp Zone 4 Pos. =	0.77	(Fig. 6-11A)
GCp Zone 5 Pos. =	0.77	(Fig. 6-11A)
GCp Zone 4 Neg. =	-0.87	(Fig. 6-11A)
GCp Zone 5 Neg. =	-0.93	(Fig. 6-11A)

Positive & Negative Internal Pressure Coefficients, GCpi (Figure 6-5):

+GCpi Coef. =	0.18	(positive internal pressure)
-GCpi Coef. =	-0.18	(negative internal pressure)

If z <= 15 then: Kz = 2.01*(15/zg)^(2/α) , If z > 15 then: Kz = 2.01*(z/zg)^(2/α) (Table 6-3, Case 1a)

α =	9.50	(Table 6-2)
zg =	900	(Table 6-2)
Kh =	1.02	(Kh = Kz evaluated at z = h)
I =	1.00	(Table 6-1) (Importance factor)

Velocity Pressure: qz = 0.00256*Kz*Kzt*Kd*V^2*I (Sect. 6.5.10, Eq. 6-15)

qh = 18.06 psf qh = 0.00256*Kh*Kzt*Kd*V^2*I (qz evaluated at z = h)

Design Net External Wind Pressures (Sect. 6.5.12.4):

For h <= 60 ft.: p = qh*((GCp) - (+/-GCpi)) (psf)

For h > 60 ft.: p = q*(GCp) - qi*(+/-GCpi) (psf)

where: q = qz for windward walls, q = qh for leeward walls and side walls

qi = qh for all walls (conservatively assumed per Sect. 6.5.12.4.2)

Wind Load Tabulation for Wall Components & Cladding

Component	z (ft.)	Kh	qh (psf)	p = Net Design Pressures (psf)			
				Zone 4 (+)	Zone 4 (-)	Zone 5 (+)	Zone 5 (-)
Girt	0	1.02	18.06	17.11	-18.91	17.11	-20.13
	15.00	1.02	18.06	17.11	-18.91	17.11	-20.13
	20.00	1.02	18.06	17.11	-18.91	17.11	-20.13
	25.00	1.02	18.06	17.11	-18.91	17.11	-20.13
	30.00	1.02	18.06	17.11	-18.91	17.11	-20.13
	35.00	1.02	18.06	17.11	-18.91	17.11	-20.13
	40.00	1.02	18.06	17.11	-18.91	17.11	-20.13
	45.00	1.02	18.06	17.11	-18.91	17.11	-20.13
	50.00	1.02	18.06	17.11	-18.91	17.11	-20.13
For z = hr:	53.33	1.02	18.06	17.11	-18.91	17.11	-20.13
For z = he:	20.00	1.02	18.06	17.11	-18.91	17.11	-20.13
For z = h:	36.67	1.02	18.06	17.11	-18.91	17.11	-20.13

Notes: 1. (+) and (-) signs signify wind pressures acting toward & away from respective surfaces.

2. Width of Zone 5 (end zones), 'a' = 14.67 ft.

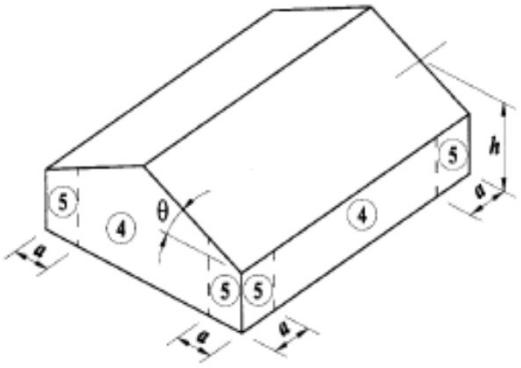
3. Per Code Section 6.1.4.2, the minimum wind load for C&C shall not be less than 10 psf.

4. References : a. ASCE 7-05, "Minimum Design Loads for Buildings and Other Structures".

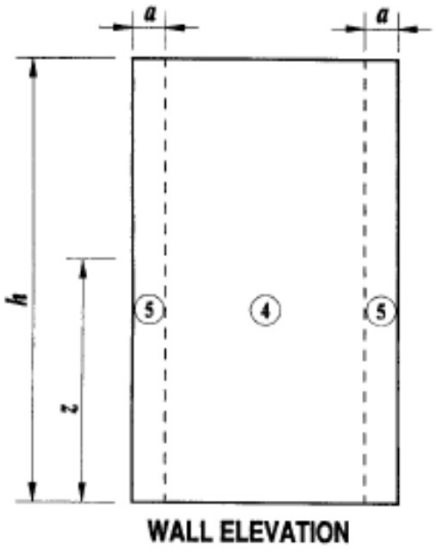
b. "Guide to the Use of the Wind Load Provisions of ASCE 7-05"

by: Kishor C. Mehta and William L. Coulbourne (2010).

Wall Components and Cladding:



Wall Zones for Buildings with h <= 60 ft.



Wall Zones for Buildings with h > 60 ft.

Version 1.4

User Input for Height, z (ft.):

N	Use Input Values?