MecaWind v2344

Calculations Prepared by:
Date: Jun 24, 2020

File Location : M:\Website\Website Content\C&C Calculation\Example_CandC_Ch30Pt1.wnd

Basic Wind Parameters

Wind Load Standard	= ASCE 7-16	Exposure Category	= C
Wind Design Speed	= 150.0 mph	Risk Category	= III
Structure Type	= Building	Building Type	= Enclosed

General Wind Settings

Incl_LF	= Include ASD Load Factor of 0.6 in Pressures	= False
DynType	= Dynamic Type of Structure	= Rigid
NF	= Natural Frequency of Structure (Mode 1)	= 1.000 Hz
Zg	= Altitude (Ground Elevation) above Sea Level	= 0.000 ft
Bdist	= Base Elevation of Structure	= 0.000 ft
SDB	= Simple Diaphragm Building	= False
Reacs	= Show the Base Reactions in the output	= False
MWFRSType	= MWFRS Method Selected	= No Analysis

Topographic Factor per Fig 26.8-1

Topo	= Topographic Feature	= None
Kzt	= Topographic Factor	= 1.000

Building Inputs

Roof : Building Roof Type	= MonoSlope	W : Width Perp to Ridge	= 100.000 ft
L : Length Along Ridge	= 200.000 ft	EHt : Eave Height	= 40.000 ft
RE : Roof Entry Method	= Slope	Slope: Slope of Roof	= 1.0 :12
Theta: Roof Slope	= 4.76 Deg	Par : Is there a Parapet	= False

Exposure Constants per Table 26.11-1:

Alpha: Const from Table 26.11-1	= 9.500	Zg: Const from Table 26.11-1	= 900.000 ft
At: Const from Table 26.11-1	= 0.105	Bt: Const from Table 26.11-1	= 1.000
Am: Const from Table 26.11-1	= 0.154	Bm: Const from Table 26.11-1	= 0.650
C: Const from Table 26.11-1	= 0.200	Eps: Const from Table 26.11-1	= 0.200

Overhang Inputs:

Std	= Overhangs on all sides are the same	= True
OHType	= Type of Roof Wall Intersections	= None

Components and Cladding (C&C) Calculations per Ch 30 Part 1:

h/W	= Ratio of mean roof height to building width	= 0.400
h/L	= Ratio of mean roof height to building length	= 0.200
h	= Mean Roof Height above grade	= 40.000 ft
Kh	= 15 ft [4.572 m]< Z <Zg -->(2.01*(Z/zg)^(2/Alpha) {Table 26.10-1}	= 1.044
Kzt	= Topographic Factor is 1 since no Topographic feature specified	= 1.000
Kd	= Wind Directionality Factor per Table 26.6-1	= 0.85
GCPi	= Ref Table 26.13-1 for Enclosed Building	= +/-0.18
LF	= Load Factor based upon STRENGTH Design	= 1.00
qh	= (0.00256 * Kh * Kzt * Kd * Ke * V^2) * LF	= 51.09 psf
LHD	= Least Horizontal Dimension: Min(B, L)	= 100.000 ft
a1	= Min(0.1 * LHD, 0.4 * h	= 10.000 ft
a	= Max(a1, 0.04 * LHD, 3 ft [0.9 m])	= 10.000 ft
h/B	= Ratio of mean roof height to least hor dim: h / B	= 0.400

Wind Pressures for C&C Ch 30 Pt 1
All wind pressures include a load factor of 1.0

Description	Zone	Width ft	Span ft	Area sq ft	1/3 Rule	Ref Fig	GCp Max	GCp Min	p Max psf	p Min psf
Zone 1	1	1.000	1.000	1.00	No	30.3-5A	0.300	-1.100	24.52	-65.40
Zone 2	2	1.000	1.000	1.00	No	30.3-5A	0.300	-1.300	24.52	-75.62
Zone 2'	2'	1.000	1.000	1.00	No	30.3-5A	0.300	-1.600	24.52	-90.95
Zone 3	3	1.000	1.000	1.00	No	30.3-5A	0.300	-1.800	24.52	-101.17
Zone 3'	3'	1.000	1.000	1.00	No	30.3-5A	0.300	-2.600	24.52	-142.04
Zone 4	4	1.000	1.000	1.00	No	30.3-1	0.900	-0.990	55.18	-59.78
Zone 5	5	1.000	1.000	1.00	No	30.3-1	0.900	-1.260	55.18	-73.57

Area = Span Length x Effective Width
1/3 Rule = Effective width need not be less than 1/3 of the span length
GCp = External Pressure Coefficients taken from Figures 30.3-1 through 30.3-7
p = Wind Pressure: qh*(GCp - GCpi) [Eqn 30.3-1]*
* Per Para 30.2.2 the Minimum Pressure for C&C is 16.00 psf [0.766 kPa] {Includes LF}
Since Roof Slope <= 10 Deg, the GCp value is reduced by 10%

Components and Cladding (C&C) Zone Summary per Ch 30 Pt 1:

h/W	= Ratio of mean roof height to building width	= 0.400
h/L	= Ratio of mean roof height to building length	= 0.200
h	= Mean Roof Height above grade	= 40.000 ft
Kh	= 15 ft [4.572 m]< Z <Zg -->(2.01*(Z/zg)^(2/Alpha) {Table 26.10-1}	= 1.044
Kzt	= Topographic Factor is 1 since no Topographic feature specified	= 1.000
Kd	= Wind Directionality Factor per Table 26.6-1	= 0.85
GCPi	= Ref Table 26.13-1 for Enclosed Building	= +/-0.18
LF	= Load Factor based upon STRENGTH Design	= 1.00

qh	= (0.00256 * Kh * Kzt * Kd * Ke * V^2) * LF	= 51.09 psf
LHD	= Least Horizontal Dimension: Min(B, L)	= 100.000 ft
a1	= Min(0.1 * LHD, 0.4 * h	= 10.000 ft
a	= Max(a1, 0.04 * LHD, 3 ft [0.9 m])	= 10.000 ft
h/B	= Ratio of mean roof height to least hor dim: h / B	= 0.400

Wind Pressure Summary for C&C Zones based Upon Areas Ch 30 Pt 1 (Table 1 of 2)
All wind pressures include a load factor of 1.0

Zone	Figure	A <= 10.00 sq ft psf	A = 20.00 sq ft psf	A = 50.00 sq ft psf
1	30.3-5A	24.52 -65.40	22.99 -65.40	20.95 -65.40
2	30.3-5A	24.52 -75.62	22.99 -74.08	20.95 -72.05
2'	30.3-5A	24.52 -90.95	22.99 -89.41	20.95 -87.38
3	30.3-5A	24.52 -101.17	22.99 -91.94	20.95 -79.74
3'	30.3-5A	24.52 -142.04	22.99 -126.66	20.95 -106.33
4	30.3-1	55.18 -59.78	52.74 -57.34	49.51 -54.10
5	30.3-1	55.18 -73.57	52.74 -68.69	49.51 -62.22

Wind Pressure Summary for C&C Zones based Upon Areas Ch 30 Pt 1 (Table 2 of 2)
All wind pressures include a load factor of 1.0

Zone	Figure	A = 100.00 sq ft psf	A = 200.00 sq ft psf	A > 500.00 sq ft psf
1	30.3-5A	19.42 -65.40	19.42 -65.40	19.42 -65.40
2	30.3-5A	19.42 -70.51	19.42 -70.51	19.42 -70.51
2'	30.3-5A	19.42 -85.84	19.42 -85.84	19.42 -85.84
3	30.3-5A	19.42 -70.51	19.42 -70.51	19.42 -70.51
3'	30.3-5A	19.42 -90.95	19.42 -90.95	19.42 -90.95
4	30.3-1	47.06 -51.66	44.62 -49.22	41.39 -45.98
5	30.3-1	47.06 -57.34	44.62 -52.45	41.39 -45.98

* A is effective wind area for C&C: Span Length * Effective Width
* Effective width need not be less than 1/3 of the span length
* Maximum and minimum values of pressure shown.
* + Pressures acting toward surface, - Pressures acting away from surface
* Per Para 30.2.2 the Minimum Pressure for C&C is 16.00 psf [0.766 kPa] {Includes LF}
* Interpolation can be used for values of A that are between those values shown.