

MecaWind v2364

Software Developer: Meca Enterprises Inc., www.meca.biz, Copyright © 2020

Calculations Prepared by:

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File Location : C:\Users\Chris\Desktop\Temp\sign.wnd

Basic Wind Parameters

Wind Load Standard	= ASCE 7-16	Exposure Category	= C
Wind Design Speed	= 120.0 mph	Risk Category	= II
Structure Type	= Other	Other Structure Type	= Solid Sign

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
Reacs	= Show the Base Reactions in the output	= False
MWFRSType	= MWFRS Method Selected	= Ch 27 Pt 1

Topographic Factor per Fig 26.8-1

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

Solid Sign Inputs

h	: Height to Top of Sign = 20.000 ft	B	: Horizontal Width of Sign= 20.000 ft
Lr	: Dimension of return corner= 0.000 ft	s	: Vertical Height of Sign= 10.000 ft
e	: Solidity Ratio = 1.000	t	: Thickness of Sign = 0.000 ft
Att	: Attached to Wall = False	Dbl	: Double Faced & all sides enclosed= False
IsCol	: Is the Sign Supported on Columns= True	Nc	: Quantity of Columns Supporting Sign= 1
Dc	: Width of Column = 24.0000 in	Oc	: Offset of Columns from Centerline= 0.000 ft
Sc	: Column Spacing = 0.000 ft	Shape	: Shape of Column = Round Moderately Smooth

Exposure Constants per Table 26.11-1:

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

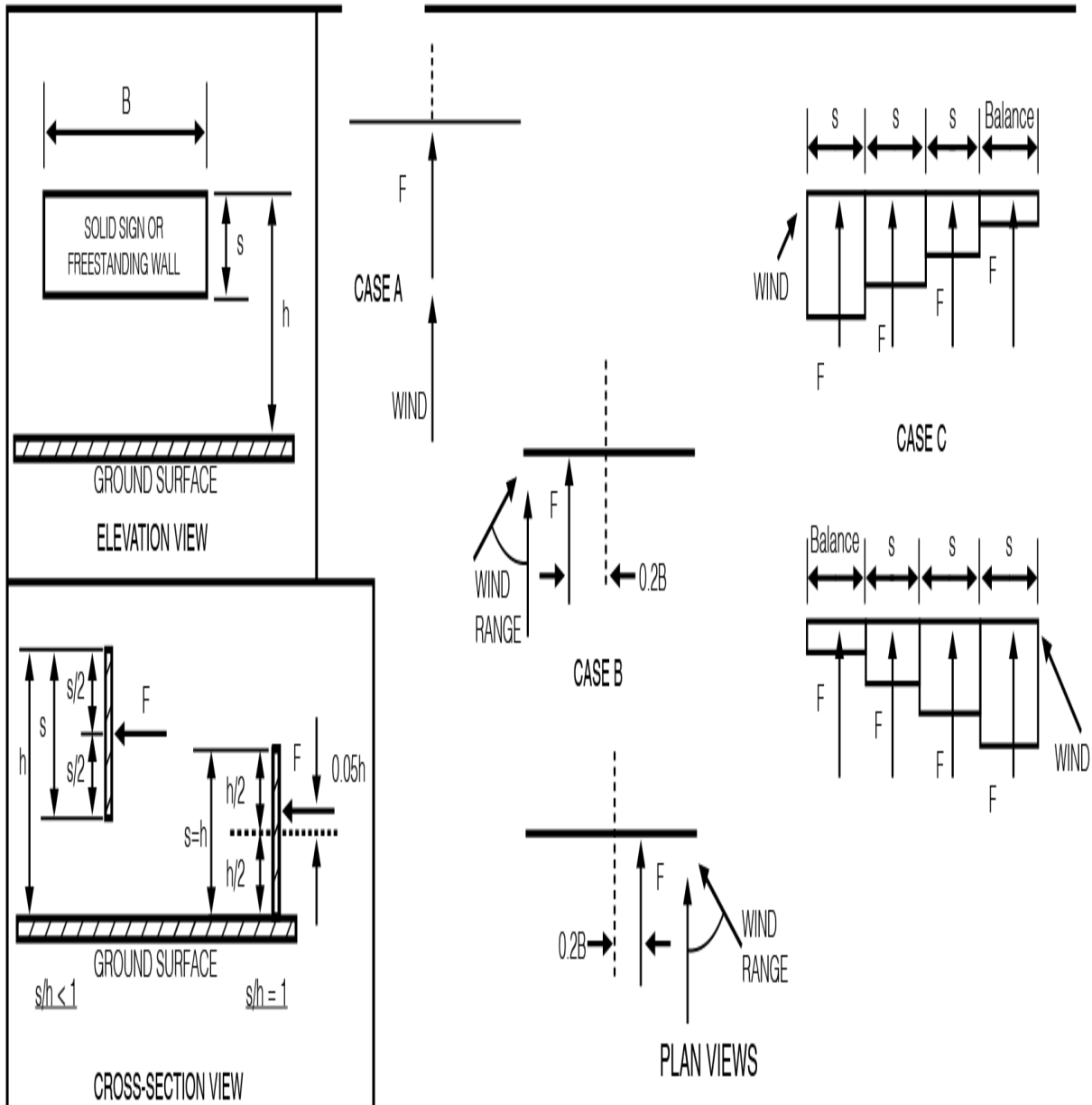
Gust Factor Calculation:

Gust Factor Category I Rigid Structures - Simplified Method	
G1	= For Rigid Structures (Nat. Freq.>1 Hz) use 0.85 = 0.85
Gust Factor Category II Rigid Structures - Complete Analysis	
Zm	= 0.6 * Ht = 15.000 ft
Izm	= Cc * (33 / Zm) ^ 0.167 = 0.228
Lzm	= L * (Zm / 33) ^ Epsilon = 427.057
Q	= (1 / (1 + 0.63 * ((B + Ht) / Lzm)^0.63))^0.5 = 0.936
G2	= 0.925 * ((1+1.7*1zm*3.4*Q)/(1+1.7*3.4*1zm)) = 0.891
Gust Factor Used in Analysis	
G	= Lessor Of G1 Or G2 = 0.850

Main Wind Force Resisting System (MWFRS) Calculations for Solid Sign per Ch 29:

LF	= Load Factor based upon STRENGTH Design	= 1.00
hs	= Overall height of structure	= 20.000 ft
h	= Mean Roof Height above grade	= 20.000 ft
Kh	= 15 ft [4.572 m] < Z < Zg --> (2.01*(Z/zg)^(2/Alpha) {Table 26.10-1})	= 0.902
Kzt	= Topographic Factor is 1 since no Topographic feature specified	= 1.000
Kd	= Wind Directionality Factor per Table 26.6-1	= 0.85
qh	= (0.00256 * Kh * Kzt * Kd * Ke * V^2) * LF	= 28.26 psf

MWFRS Pressures on Solid Sign per Fig 29.3-1:



R	= Reduction factor to account for openings: $(1 - (1 - e)^{1.5})$	= 1.000
Rc	= Reduction factor for Case C not applicable since $s/h \leq 0.8$	= 1.000
As	= Gross Area of Sign: $B * s$	= 200.00 sq ft
B/s	= Aspect Ratio: B / s	= 2.000
s/h	= Clearance Ratio: s / h	= 0.500
Cf	= Net Force Coefficient for Case A and B per Fig 29.3-1	= 1.700
e	= Not Double Faced, Case B eccentricity is 0.2	= 0.2

Case A: Resultant force acts normal to face through geometric center
 $F =$ Design Wind force: $qh * G * Cf * As * R = 8167 \text{ lb}$

Case B: Resultant force acts normal to face at a distance from the geometric center toward the windward edge equal to e times the average width
 $Dx =$ Force Offset from Center toward windward edge: $e * B = 4.000 \text{ ft}$
 $F =$ Design Wind force: $qh * G * Cf * As * R = 8167 \text{ lb}$

Case C: Since $B/s \geq 2$ then Case C must also be considered
 Forces act normal to the face and through the geometric center of each region