Company	**JOB TITLE**	Example 3.4 - 160' Tall Office Building
Address		
City, State	**JOB NO.**	**SHEET NO.**
Phone	**CALCULATED BY**	**DATE**
	CHECKED BY	**DATE**

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STRUCTURAL CALCULATIONS

FOR

Example 3.4 - 160' Tall Office Building

Guide to Wind Load Procedures ASCE 7-22

Company	**JOB TITLE** Example 3.4 - 160' Tall Office Building
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Code Search

Code: ASCE 7 - 22

Occupancy:

Occupancy Group =   B   Business

Risk Category & Importance Factors:

Risk Category =   II

Wind Factor =	1.00
Snow Factor	1.00
Seismic Importance factor =	1.00

Type of Construction:

Fire Rating:

Roof =	0.0 hr
Floor =	0.0 hr

Building Geometry:

Roof angle (θ)	0.00 / 12	0.0 deg
Building length	200.0 ft	
Least width	100.0 ft	
Mean Roof Ht (h)	157.0 ft	
Parapet ht above grd	160.0 ft	
Minimum parapet ht	3.0 ft	
hb for Elevated bldg	0.0 ft	

Live Loads:

Roof   0 to 200 sf: 20 psf
            200 to 600 sf: 24 - 0.02Area, but not less than 12 psf
           over 600 sf: 12 psf

Roofs used for roof gardens	100 psf

Floor:

Typical Floor	50 psf
Partitions	15 psf
Corridors above first floor	80 psf
Lobbies & first floor corridors	100 psf
Stairs and exit ways	100 psf

Wind Loads :   ASCE 7- 22

Ultimate Wind Speed	140 mph
Nominal Wind Speed	108.4 mph
Risk Category	II
Exposure Category	B
Enclosure Classif.	Enclosed Building
Internal pressure	+/-0.18
Bldg Directionality (Kd)	0.85
Kh MWFRS<=60	1.072
Kh all other	1.072
Type of roof	Monoslope

Topographic Factor   (Kzt)

Topography		Flat
Hill Height	(H)	80.0 ft
Half Hill Length (Lh)		100.0 ft
Actual H/Lh	=	0.80
Use H/Lh	=	0.50
Modified Lh	=	160.0 ft
From top of crest: x =		50.0 ft
Bldg up/down wind?		downwind

H/Lh= 0.50	K_1 = 0.000
x/Lh = 0.31	K_2 = 0.792
z/Lh = 0.98	K_3 = 1.000

At Mean Roof Ht:

$$Kzt = (1+K_1 K_2 K_3)^2 = 1.00$$
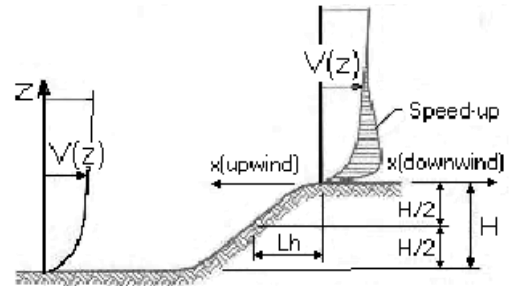
ESCARPMENT
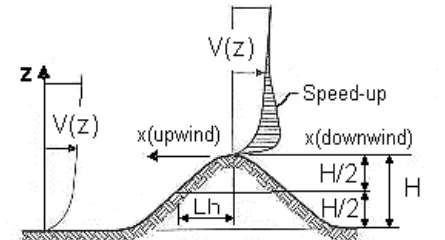
2D RIDGE or 3D AXISYMMETRICAL HILL

Gust Effect Factor

h =	157.0 ft
B =	100.0 ft
/z (0.6h) =	94.2 ft

Flexible structure if natural frequency < 1 Hz   (T > 1 second).
If building h/B>4 then may be flexible and should be investigated.
h/B = 1.57

G =   0.83   Using rigid structure formula

Rigid Structure		**Flexible or Dynamically Sensitive Structure**					
$\bar{e}$ =	0.33	Natural Frequency (η_1) =	0.7 Hz				
ℓ =	320 ft	Damping ratio (β) =	0.01				
z_{min} =	30 ft	/b =	0.470				
c =	0.30	/α =	0.222				
g_Q, g_v =	3.4	Vz =	121.8				
L_z =	453.9 ft	N_1 =	2.61				
Q =	0.83	R_n =	0.076				
I_z =	0.25	R_h =	0.212	η =	4.149	h =	157.0 ft
G =	**0.83**	R_B =	0.307	η =	2.643		
		R_L =	0.055	η =	17.695		
		g_R =	4.104				
		R =	0.525				
		Gf =	0.951				

Ground Elevation Factor (Ke)

Grd level above sea level =	0 ft	Ke =	1.0000
Constant =	0.00256		
0.00256Ke =	0.00256		

Enclosure Classification

Test for Enclosed Building: Ao < 0.01Ag or 4 sf, whichever is smaller

Test for Open Building: All walls are at least 80% open.
Ao ≥ 0.8Ag

Test for Partially Enclosed Building: Predominately open on one side only

	Input			Test	
Ao	500.0	sf	Ao ≥ 1.1Aoi	NO	
Ag	600.0	sf	Ao > 4sf or 0.01Ag	YES	
Aoi	1000.0	sf	Aoi / Agi ≤ 0.20	YES	Building is NOT
Agi	10000.0	sf			Partially Enclosed

Conditions to qualify as Partially Enclosed Building. Must satisfy all of the following:
Ao ≥ 1.1Aoi
Ao >   smaller of 4sf or 0.01 Ag
Aoi / Agi ≤ 0.20
Where:
Ao = the total area of openings in a wall that receives positive external pressure.
Ag = the gross area of that wall in which Ao is identified.
Aoi = the sum of the areas of openings in the building envelope (walls and roof) not including Ao.
Agi = the sum of the gross surface areas of the building envelope (walls and roof) not including Ag.

Test for Partially Open Building: A building that does not qualify as open, enclosed or partially enclosed.
(This type building will have same wind pressures as an enclosed building.)

Reduction Factor for large volume partially enclosed buildings (Ri) :
If the partially enclosed building contains a single room that is unpartitioned , the internal
pressure coefficient may be multiplied by the reduction factor Ri.

Total area of all wall & roof openings (Aog):		-	SF
Unpartitioned internal volume (Vi) :		-	CF
	Ri =	1.00	

Wind Loads - MWFRS all h (Except for Open Buildings)

Base pressure (qh) =	53.8 psf	Kh =	1.072	GCpi = +/-0.18
(Kd qh) =	**45.7 psf**	Bldg dim parallel to ridge =	200.0 ft	G = 0.83
Roof Angle (θ) =	0.0 deg	Bldg dim normal to ridge =	100.0 ft	qi = qh
Roof tributary area:		h =	157.0 ft	
Wind normal to ridge =(h/2)*L:	15700 sf	ridge ht =	157.0 ft	
Wind parallel to ridge =(h/2)*L:	7850 sf			

Ultimate Wind Surface Pressures (psf)

Surface	Wind Normal to Ridge $L/B = 0.50$ $h/L = 1.57$				Wind Parallel to Ridge $L/B = 2.00$ $h/L = 0.79$				
	Cp	q_hGC_p	w/+q_iGC_{pi}	w/-q_hGCpi	Dist.*	Cp	q_hGC_p	w/ +q_iGC_{pi}	w/ -q_hGC_{pi}
Windward Wall (WW)	0.80	30.5	see table below			0.80	30.5	see table below	
Leeward Wall (LW)	-0.50	-19.0	-27.3	-10.8		-0.30	-11.4	-19.7	-3.2
Side Wall (SW)	-0.70	-26.7	-34.9	-18.4		-0.70	-26.7	-34.9	-18.4
Leeward Roof (LR)		**				Included in windward roof			
Neg Windward Roof: 0 to h/2*	-1.04	-39.6	-47.8	-31.4	0 to h/2*	-0.98	-37.3	-45.6	-29.1
> h/2*	-0.70	-26.7	-34.9	-18.4	h/2 to h*	-0.79	-29.9	-38.2	-21.7
					h to 2h*	-0.61	-23.4	-31.6	-15.2
Pos/min windward roof press.	-0.18	-6.9	-15.1	1.4	Min press.	-0.18	-6.9	-15.1	1.4

*Horizontal distance from windward edge
**Roof angle < 10 degrees. Therefore, leeward roof is included in windward roof pressure zones.

For monoslope roofs, entire roof surface is either windward or leeward surface.

Windward roof overhangs :   30.5 psf (upward : add to qhGCp windward roof pressure)

Parapet

z	Kz	Kzt	Kdqp (psf)
160.0 ft	1.077	1.00	45.9

Windward parapet:	68.9 psf	(GCpn = +1.5)
Leeward parapet:	-45.9 psf	(GCpn = -1.0)

Windward Wall Pressures at "z" (psf)

z	Kz	Kzt	q_zGC_p	Windward Wall w/+q_iGC_{pi}	w/-q_hGC_{pi}	Combined WW + LW Wind Normal to Ridge	Wind Parallel to Ridge
0 to 15'	0.57	1.00	16.3	8.1	24.5	35.3	27.7
20.0 ft	0.62	1.00	17.6	9.4	25.8	36.6	29.0
25.0 ft	0.66	1.00	18.7	10.4	26.9	37.7	30.1
30.0 ft	0.69	1.00	19.6	11.4	27.8	38.6	31.0
40.0 ft	0.74	1.00	21.2	12.9	29.4	40.2	32.6
50.0 ft	0.79	1.00	22.5	14.2	30.7	41.5	33.9
60.0 ft	0.83	1.00	23.6	15.4	31.8	42.6	35.0
70.0 ft	0.86	1.00	24.6	16.3	32.8	43.6	36.0
80.0 ft	0.90	1.00	25.5	17.2	33.7	44.5	36.9
90.0 ft	0.92	1.00	26.3	18.0	34.5	45.3	37.7
100.0 ft	0.95	1.00	27.0	18.8	35.2	46.1	38.5
120.0 ft	1.00	1.00	28.4	20.1	36.6	47.4	39.8
140.0 ft	1.04	1.00	29.6	21.3	37.8	48.6	41.0
h= 157.0 ft	1.07	1.00	30.5	22.3	38.7	49.5	41.9
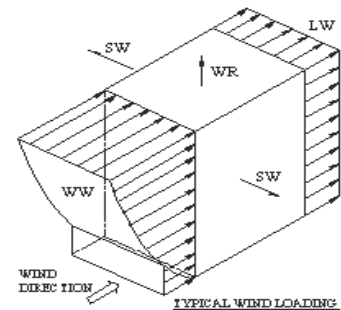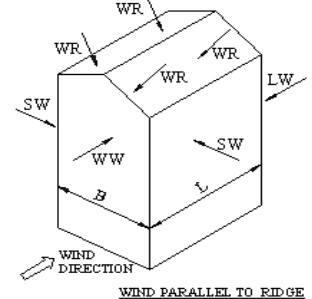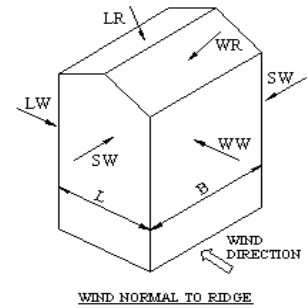
Company
Address
City, State
Phone

JOB TITLE Example 3.4 - 160' Tall Office Building

JOB NO.	SHEET NO.
CALCULATED BY	DATE
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NOTE: ASCE 7 requires the application of full and partial loading of the wind pressures per the 4 cases below.

CASE 1

P_{WX} P_{LX} P_{WY} P_{LY}

CASE 3

$0.75P_{WY}$ $0.75P_{WX}$ $0.75P_{LX}$ $0.75P_{LY}$

CASE 2

$M_T = 0.75(P_{WX}+P_{LX})B_X e_X$
$e_X = \pm 0.15 B_X$

$M_T = 0.75(P_{WY}+P_{LY})B_Y e_Y$
$e_Y = \pm 0.15 B_Y$

B_Y $0.75P_{WY}$ $0.75P_{WX}$ $0.75P_{LX}$ $0.75P_{LY}$

CASE 4

$M_T = 0.563(P_{WX}+P_{LX})B_X e_X + 0.563(P_{WY}+P_{LY})B_Y e_Y$
$e_X = \pm 0.15 B_X$ $e_Y = \pm 0.15 B_Y$

B_Y $0.563P_{WY}$ B_X $0.563P_{WX}$ $0.563P_{LX}$ $0.563P_{LY}$
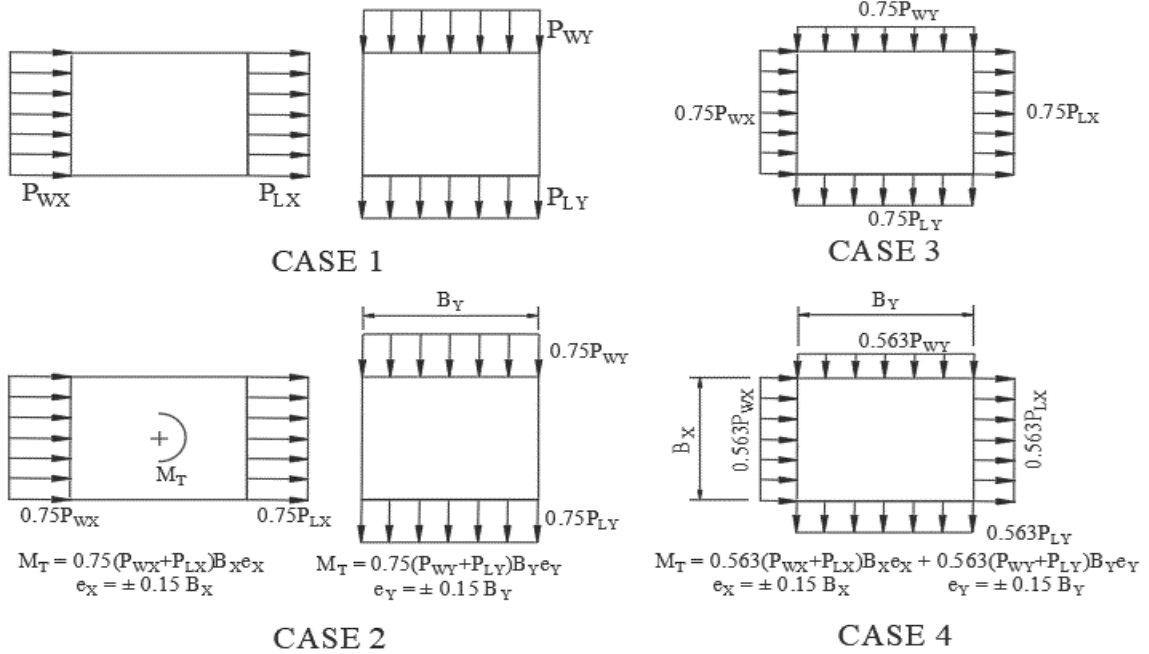
Wind Forces at Floors

Total Floors above grade =	11	Building dimension (parallel with ridge) = 200.0 ft e = 30.00 ft
T/Fdn (dist below grade) =	2.0 ft	Building dimension (normal to ridge) = 100.0 ft e = 15.00 ft
		L is the building dimension parallel to the wind direction

Level	Elevation Above Grade (ft)	Height of Centroid to Fdn (ft)	L	B	Area (sf)	Applied Force (k)	Story Shear (k)	Overturning Moment ('k)	Area	Applied Force (k)	Story Shear (k)	Overturning Moment ('k)	
Equip,etc	158.00	160.00	wind on equip, screenwalls, etc =			2				0			
Parapet	160.00	160.50	100.0	200.0	600.0	68.9			300.0	34.5			
T/Ridge	157.00	159.00	100.0	200.0	0.0	0.0			0.0	0.0			
Roof	157.00	159.00	100.0	200.0	1,400.0	69.3	140.2	105.4	700.0	29.3	63.8	51.7	Roof
11	143.00	145.00	100.0	200.0	2,800.0	136.6	276.8	2,068.6	1,400.0	57.6	121.4	944.7	11
10	129.00	131.00	100.0	200.0	2,800.0	134.3	411.1	5,943.9	1,400.0	56.5	177.9	2,644.3	10
9	115.00	117.00	100.0	200.0	2,800.0	131.9	543.0	11,699.6	1,400.0	55.3	233.2	5,134.8	9
8	101.00	103.00	100.0	200.0	2,800.0	129.2	672.2	19,301.5	1,400.0	53.9	287.1	8,399.1	8
7	87.00	89.00	100.0	200.0	2,800.0	126.2	798.4	28,712.2	1,400.0	52.5	339.5	12,418.4	7
6	73.00	75.00	100.0	200.0	2,800.0	122.9	921.3	39,890.3	1,400.0	50.8	390.3	17,172.1	6
5	59.00	61.00	100.0	200.0	2,800.0	119.1	1,040.4	52,789.0	1,400.0	48.9	439.2	22,636.8	5
4	45.00	47.00	100.0	200.0	2,800.0	114.5	1,154.9	67,354.7	1,400.0	46.6	485.8	28,785.6	4
3	31.00	33.00	100.0	200.0	2,800.0	108.7	1,263.6	83,523.2	1,400.0	43.7	529.5	35,586.5	3
2	17.00	19.00	100.0	200.0	3,100.0	111.3	1,374.9	101,213.6	1,550.0	43.8	573.3	42,998.9	2
1	0.00	2.00	100.0	200.0	1,700.0	60.1	1,435.0	124,586.3	850.0	23.6	596.9	52,744.9	1
GRD		2.00						124,586.3				52,744.9	GRD
FDN		0.00						127,456.2				53,938.6	FDN

Column group headers: Wind Normal to Ridge | Wind Parallel to Ridge

Ultimate Wind Pressures

Wind Loads - Components & Cladding : h > 60'

Base pressure (qh) =	53.8 psf	Kh =	1.072	~~100.0 ft~~ ~~30.0 ft~~
(Kd qh) =	**45.7 psf**	h =	157.0 ft	~~100.0 ft~~
Minimum parapet ht =	3.0 ft	a =	10.0 ft	~~100.0 ft~~
Roof Angle (θ) =	0.0 deg	GCpi =	+/-0.18	
Type of roof = Monoslope		Kd qi = Kd qh =	45.7 psf	

Roof

	GCp				Surface Pressure (psf)				User input	
Area	10 sf	50 sf	100 sf	500 sf	10 sf	50 sf	100 sf	500 sf	80 sf	200 sf
Negative Zone 1	-1.40	-1.19	-1.11	-0.90	-72.2	-62.8	-58.8	-49.4	-60.1	-54.7
Negative Zone 2	-2.30	-2.01	-1.89	-1.60	-113.3	-100.2	-94.5	-81.4	-96.3	-88.8
Negative Zone 3	-2.30	-2.01	-1.89	-1.60	-113.3	-100.2	-94.5	-81.4	-96.3	-88.8
Positive All Zones	-	-	-	-	16.0	16.0	16.0	16.0	16.0	16.0
Overhang Zone 1	-2.30	-2.04	-1.91	-1.60	-105.1	-93.1	-87.1	-73.1	-89.0	-81.1
Overhang Zone 2	-3.20	-2.86	-2.69	-2.30	-146.2	-130.5	-122.8	-105.1	-125.3	-115.2
Overhang Zone 3 @zone 4	-3.20	-2.86	-2.69	-2.30	-146.2	-130.5	-122.8	-105.1	-125.3	-115.2
Overhang Zone 3 @zone 5	-4.10	-3.58	-3.29	-2.60	-187.4	-163.8	-150.3	-118.8	-154.6	-136.7

Negative zone 3 = zone 2, since parapet >= 3ft.
Overhang pressures in the table above assume an internal pressure coefficient (Gcpi) of 0.0
Overhang soffit pressure equals adj wall pressure (which includes internal pressure of 8.2 psf)

Parapet

Kd qp = 45.9 psf

	Surface Pressure (psf)						User input
Solid Parapet Pressure	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf	50 sf
CASE A : Edge zones:	147.0	141.3	129.8	121.2	112.5	101.1	129.8
Corner zones:	147.0	141.3	129.8	121.2	112.5	101.1	129.8
CASE B : Edge zones:	-82.7	-82.7	-76.1	-71.2	-66.2	-59.7	-76.1
Corner zones:	-124.0	-124.0	-109.6	-98.8	-87.9	-73.5	-109.6

Walls

	GCp				Surface Pressure at h				User input	
Area	20 sf	100 sf	200 sf	500 sf	20 sf	100 sf	200 sf	500 sf	100 sf	200 sf
Negative Zone 4	-0.90	-0.80	-0.76	-0.70	-49.4	-44.8	-42.8	-40.2	-44.8	-42.8
Negative Zone 5	-1.80	-1.40	-1.23	-1.00	-90.5	-72.2	-64.3	-53.9	-72.2	-64.3
Positive Zone 4 & 5	0.90	0.75	0.69	0.60	49.4	42.5	39.6	35.6	42.5	39.6

NOTE: Negative zones 4 & 5 pressures apply to all heights. Positive pressures vary with height, see below.

Wall surface pressure at 'z'				Positive zone 4 & 5 (psf)				User input	
z	Kz	Kzt	qz (psf)	20	100	200	500	100 sf	200 sf
0 to 15'	0.57	1.00	24.4	30.2	26.6	25.0	22.9	26.6	25.0
20.0 ft	0.62	1.00	26.4	32.0	28.0	26.3	24.1	28.0	26.3
25.0 ft	0.66	1.00	28.0	33.4	29.2	27.4	25.0	29.2	27.4
30.0 ft	0.69	1.00	29.4	34.7	30.3	28.4	25.9	30.3	28.4
40.0 ft	0.74	1.00	31.7	36.8	32.0	30.0	27.3	32.0	30.0
50.0 ft	0.79	1.00	33.7	38.5	33.5	31.3	28.4	33.5	31.3
60.0 ft	0.83	1.00	35.4	40.1	34.7	32.5	29.4	34.7	32.5
70.0 ft	0.86	1.00	36.8	41.4	35.9	33.5	30.3	35.9	33.5
80.0 ft	0.90	1.00	38.2	42.6	36.9	34.4	31.1	36.9	34.4
90.0 ft	0.92	1.00	39.4	43.7	37.8	35.2	31.9	37.8	35.2
100.0 ft	0.95	1.00	40.5	44.7	38.6	36.0	32.5	38.6	36.0
120.0 ft	1.00	1.00	42.5	46.5	40.1	37.4	33.8	40.1	37.4
140.0 ft	1.04	1.00	44.3	48.1	41.5	38.6	34.8	41.5	38.6
h = 157.0 ft	1.07	1.00	45.7	49.4	42.5	39.6	35.6	42.5	39.6

Location of C&C Wind Pressure Zones - ASCE 7-22
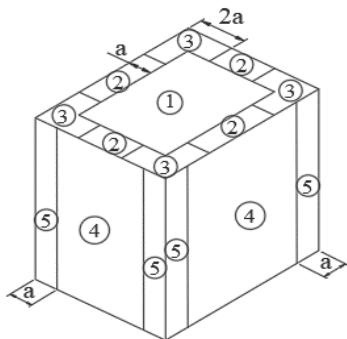
Roofs w/ θ ≤ 10°
and all walls
h > 60'
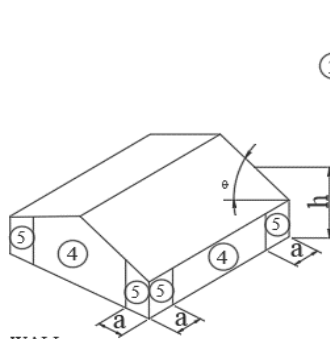
Walls h ≤ 60'
& alt design h<90'
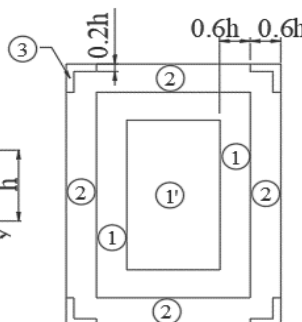
Multispan Gable & Sawtooth ≤ 10°
& Gable θ ≤ 7 degrees &
Monoslope ≤ 3 degrees
h ≤ 60' & alt design h<90'
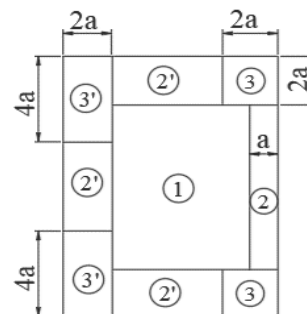
Monoslope roofs
3° < θ ≤ 10°
h ≤ 60' & alt design h<90'
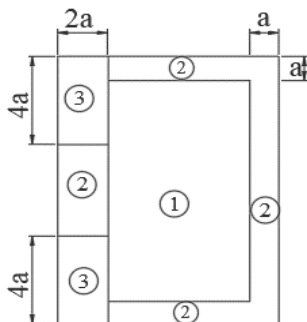
Monoslope roofs
10° < θ ≤ 30°
h ≤ 60' & alt design h<90'

Gable 7° < θ ≤ 27°

Gable 27° < θ ≤ 45°
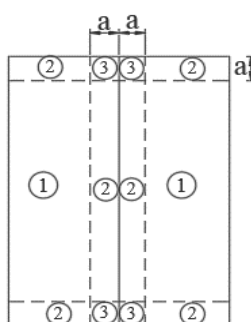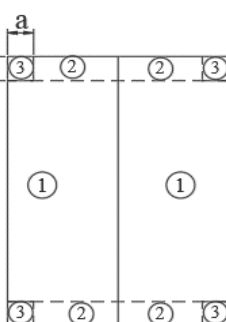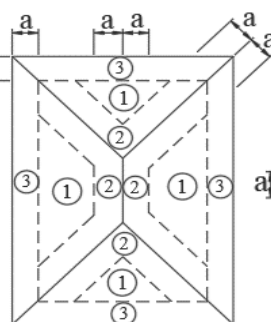
Hip 7° < θ ≤ 45°
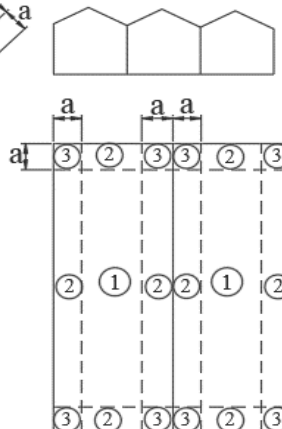
Multispan gable 10° < θ ≤ 45°
h ≤ 60' & alt design h<90'
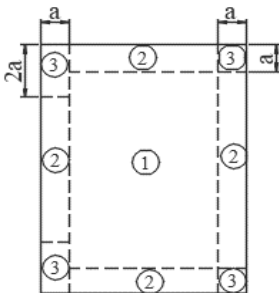
Sawtooth 10° < θ ≤ 45°
h ≤ 60' & alt design h<90'
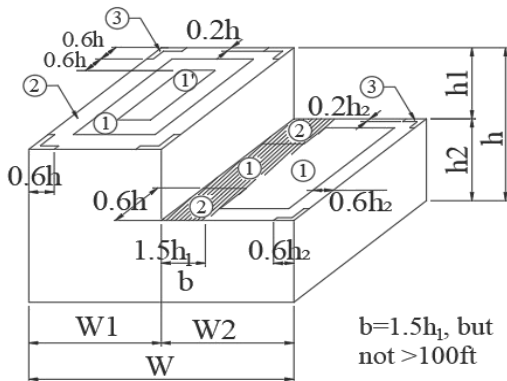
Stepped roofs θ ≤ 3°
h ≤ 60' & alt design h<90'

b=1.5h₁, but
not >100ft
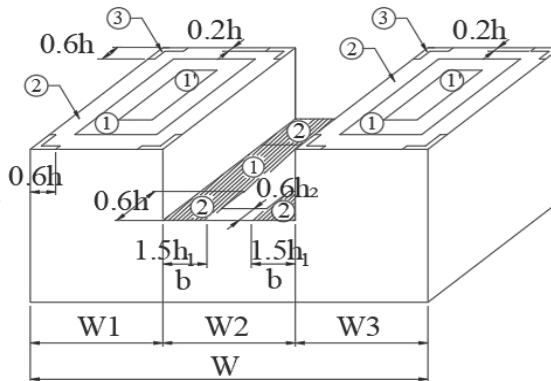
Note: The hatched area indicates where roof positive pressures
are equal to the adjacent wall positive pressure.

Company
Address
City, State
Phone

JOB TITLE Example 3.4 - 160' Tall Office Building

JOB NO.	**SHEET NO.**
CALCULATED BY	**DATE**
CHECKED BY	**DATE**

Roof Design Loads

Items	Description	Multiple	psf (max)	psf (min)
Roofing	3 ply felt & gravel		5.5	5.0
Decking	Metal Roof deck, 1.5, 22 ga.		1.7	1.2
Framing	Steel roof joists & girders		3.0	2.0
Insulation	Rigid insulation, per 1"	x 2.0	3.0	1.4
Ceiling	Suspended acoustical tile		1.8	1.0
Sprinklers	Sprinklers		2.0	0.0
Mech & Elec	Mech. & Elec.		2.0	0.0
			0.0	0.0

		psf (max)		psf (min)	
	Actual Dead Load	○	19.0	○	10.6
	Use this DL instead	◉	20.0	◉	9.0
	Live Load		20.0		0.0
	Snow Load		12.1		0.0
	Ultimate Wind (zone 2 - 100 sf)		16.0		-94.5
ASD Loading	D + Lr		40.0		-
	D + 0.75(0.6W + Lr)		42.2		-
	0.6*D + 0.6*W		-		-51.3
LRFD Loading	1.2D + 1.6 Lr + 0.5W		64.0		-
	1.2D + 1.0W + 0.5Lr		50.0		-
	0.9D + 1.0W		-		-86.4

Roof Live Load Reduction   Roof angle   0.00 / 12   0.0 deg

0 to 200 sf:	20.0 psf
200 to 600 sf:	24 - 0.02Area, but not less than 12 psf
over 600 sf:	12.0 psf

	300 sf	18.0 psf
	400 sf	16.0 psf
	500 sf	14.0 psf
User Input:	450 sf	15.0 psf

Floor Design Loads

Items	Description	Multiple	psf (max)	psf (min)
Flooring	Carpet & pad		1.0	1.0
Topping	Concrete regular per 1"	x 4.3	53.8	51.6
Decking	Metal Floor deck - 2", 20ga		2.0	1.5
Framing	Steel floor bms/joists & girders		8.0	5.0
Topping	Deflection Concrete	x 0.8	10.0	1.6
Ceiling	Suspended acoustical tile		1.8	1.0
Sprinklers	Sprinklers		2.0	0.0
Mech & Elec	Mech. & Elec.		2.0	0.0
Misc.	Misc.		0.5	0.0
		Actual Dead Load	○ 81.1	◉ 61.7
		Use this DL instead	◉ 85.0	○ 65.0
		Partitions	15.0	0.0
		Live Load	50.0	0.0
		Total Live Load	65.0	0.0
		Total Load	150.0	61.7

FLOOR LIVE LOAD REDUCTION (not including partitions)

NOTE: Not allowed for assembly occupancy or LL>100psf or passenger car garages,
except may reduce members supporting 2 or more floors & non-assembly 20%.

$$L=L_o(0.25+15/\sqrt{K_{LL}A_T})$$

Unreduced design live load: L_o = 50 psf

Floor member & 1 floor cols K_{LL} = 2
Tributary Area A_T = 300 sf
Reduced live load: L = 43.1 psf

Columns (2 or more floors) K_{LL} = 4
Tributary Area A_T = 500 sf
Reduced live load: L = 29.3 psf

IBC alternate procedure
Smallest of:
R= .08%(SF - 150)
R= 23.1(1+D/L) = 62.4%
R= 40% beams; 60% columns

R = 12.0%
Reduced live load: L = 44.0 psf

R = 28.0%
Reduced live load: L = 36.0 psf

Company
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JOB TITLE Example 3.4 - 160' Tall Office Building

JOB NO.   **SHEET NO.**
CALCULATED BY   **DATE**
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Wall Design Load #1

Items	Description	Multiple	psf (max)	psf (min)
Sheathing	7/16" plywood/OSB		1.6	1.4
Sheathing	5/8" gypsum		2.8	2.5
Framing	6" metal studs @16"		2.5	0.9
veneer	4" Clay Brick		40.0	38.0
Wall Covering	1" Wood Paneling	x 0.38	0.9	0.9
Insulation	R-11 Fiberglass insul.		0.4	0.4
Mech & Elec	Mech. & Elec.		1.0	0.0
Misc.	Misc.		0.5	0.0
	Actual Dead Load		○ 49.7	○ 44.0
	Use this DL instead		◉ 50.0	◉ 40.0

Wall Design Load #2

Items	Description	Multiple	psf (max)	psf (min)
Sheathing	7/16" plywood/OSB		1.6	1.4
Sheathing	5/8" gypsum		2.8	2.5
Framing	CMU wall		47.0	45.0
veneer	7/8" Stucco		10.0	10.0
			0.0	0.0
Insulation	R-11 Fiberglass insul.		0.4	0.4
Mech & Elec	Mech. & Elec.		1.0	0.0
Misc.	Misc.		0.5	0.0
	Actual Dead Load		○ 63.3	○ 59.3
	Use this DL instead		◉ 65.0	◉ 55.0

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JOB TITLE Example 3.4 - 160' Tall Office Building

JOB NO.   **SHEET NO.**
CALCULATED BY   **DATE**
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www.struware.com

CODE SUMMARY

Code: ASCE 7 - 22

Live Loads:

Roof	0 to 200 sf:	20 psf
	200 to 600 sf:	24 - 0.02Area, but not less than 12 psf
	over 600 sf:	12 psf
Roofs used for roof gardens		100 psf
Typical Floor		50 psf
Partitions		15 psf
Corridors above first floor		80 psf
Lobbies & first floor corridors		100 psf
Stairs and exit ways		100 psf

Dead Loads:

Floor	85.0 psf
Roof	20.0 psf

Roof Snow Loads:

Design Uniform Roof Snow load	=	12.1 psf
Flat Roof Snow Load	P_f =	4.1 psf
Risk Category	=	II
Balanced Snow Load	P_s =	4.1 psf
Ground Snow Load	P_g =	5.0 psf
Importance Factor	I =	1.00
Snow Exposure Factor	C_e =	0.97
Thermal Factor	C_t =	1.20
Sloped-roof Factor	C_s =	1.00
Drift Surcharge load	P_d =	
Width of Snow Drift	w =	
Winter wind Parameter	W_2 =	0.55

Earthquake Design Data:

Risk Category	=	II
Importance Factor	I =	1.00
Mapped spectral response accelerat	S_s =	0.60 g
	S_1 =	0.10 g
Site Class	=	C
Spectral Response Coef.	S_{ds} =	0.007
	S_{d1} =	0.007
Seismic Design Category	=	A
Basic Structural System	= Structural steel systems not specifically detailed for seismic resistance
Seismic Resisting System	= Structural steel systems not specifically detailed for seismic resistance
Design Base Shear	V =	0.010W
Seismic Response Coef.	C_s =	0.010
Response Modification Factor	R =	3
Analysis Procedure	= Equivalent Lateral-Force Analysis

Rain Design Data:

Rain intensity	i =	7.23 in/hr
Rain Load	R =	34.8 psf

Wind Design Data:

Ultimate Design Wind Speed	140 mph
Nominal Design Wind Speed	108.44 mph
Risk Category	II
Mean Roof Ht (h)	157.0 ft
Exposure Category	B
Enclosure Classif.	Enclosed Building
Internal pressure Coef.	+/-0.18
Directionality (Kd)	0.85

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JOB TITLE Example 3.4 - 160' Tall Office Building

JOB NO.

SHEET NO.

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Component and Cladding Ultimate Wind Pressures

Roof	Surface Pressure (psf)							
Area	10 sf	50 sf	100 sf	500 sf				
Negative Zone 1	-72.2	-62.8	-58.8	-49.4				
Negative Zone 2	-113.3	-100.2	-94.5	-81.4				
Negative Zone 3	-113.3	-100.2	-94.5	-81.4				
Positive All Zones	16.0	16.0	16.0	16.0				
Overhang Zone 1	-105.1	-93.1	-87.1	-73.1				
Overhang Zone 2	-146.2	-130.5	-122.8	-105.1				
Overhang Zone 3 @zone 4	-146.2	-130.5	-122.8	-105.1				
Overhang Zone 3 @zone 5	-187.4	-163.8	-150.3	-118.8				

Overhang soffit pressure equals adj wall pressure (which includes internal pressure of 8.2 psf)

Parapet	Solid Parapet Pressure (psf)					
Area	10 sf	20 sf	50 sf	100 sf	200 sf	500 sf
CASE A : Edge zones:	147.0	141.3	129.8	121.2	112.5	101.1
Corner zones:	147.0	141.3	129.8	121.2	112.5	101.1
CASE B : Edge zones:	-82.7	-82.7	-76.1	-71.2	-66.2	-59.7
Corner zones:	-124.0	-124.0	-109.6	-98.8	-87.9	-73.5

Wall	Surface Pressure (psf)			
Area	20 sf	100 sf	200 sf	500 sf
Negative Zone 4	-49.4	-44.8	-42.8	-40.2
Negative Zone 5	-90.5	-72.2	-64.3	-53.9
Positive Zone 4 & 5				
0 to 15'	30.2	26.6	25.0	22.9
20 ft	32.0	28.0	26.3	24.1
25 ft	33.4	29.2	27.4	25.0
30 ft	34.7	30.3	28.4	25.9
40 ft	36.8	32.0	30.0	27.3
50 ft	38.5	33.5	31.3	28.4
60 ft	40.1	34.7	32.5	29.4
70 ft	41.4	35.9	33.5	30.3
80 ft	42.6	36.9	34.4	31.1
90 ft	43.7	37.8	35.2	31.9
100 ft	44.7	38.6	36.0	32.5
120 ft	46.5	40.1	37.4	33.8
140 ft	48.1	41.5	38.6	34.8
h = 157 ft	49.4	42.5	39.6	35.6