

An architectural rendering of a modern, multi-story building. The building features a prominent skybridge on the right side, supported by a white structure. The ground floor is covered by a series of white columns, creating a walkway. The building has a mix of brick and glass facades. The word "APPENDIX" is overlaid in the center in a large, black, serif font. The background shows a clear blue sky and some trees on the left.

# APPENDIX

**A1. Wind Loads**

height	$K_z$	$q_z$
0-15'	0.57	10.05
20'	0.62	10.93
25'	0.66	11.63
30'	0.7	12.34
40'	0.76	13.40
50'	0.81	14.28
60'	0.85	14.98
70'	0.89	15.69
80'	0.93	16.39
84.67	0.94	16.57

G	0.85
Gcpi	0.18

$C_p$		
	Leeward	Windward
N-S	0.332	0.8
E-W	0.5	0.8

$P=qGC_p - q_i(GC_{pi})$						
height	Windward		Leeward		Total	
	N-S	E-W	N-S	E-W	N-S	E-W
0-15'	6.83	6.83	-4.68	-7.04	11.51	13.87
20'	7.43	7.43	-4.68	-7.04	12.11	14.47
25'	7.91	7.91	-4.68	-7.04	12.59	14.95
30'	8.39	8.39	-4.68	-7.04	13.07	15.43
40'	9.11	9.11	-4.68	-7.04	13.78	16.15
50'	9.71	9.71	-4.68	-7.04	14.38	16.75
60'	10.19	10.19	-4.68	-7.04	14.86	17.23
70'	10.67	10.67	-4.68	-7.04	15.34	17.71
80'	11.15	11.15	-4.68	-7.04	15.82	18.19
84.67	11.27	11.27	-4.68	-7.04	15.94	18.31

			Story Force (kip)		Cumulative Shear (kip)		OM (ft-kip)	
Floor	Height	Trib. Ht	N-S	E-W	N-S	E-W	N-S	E-W
1	0.00	0.00	0.00	0.00	110.30	236.70	5396.45	11508.87
2	16.33	14.84	18.00	39.70	110.30	236.70	293.94	648.30
3	29.67	13.34	18.10	39.20	92.30	197.00	537.03	1163.06
4	43.00	13.33	19.30	41.40	74.20	157.80	829.90	1780.20
5	56.33	13.34	20.30	43.20	54.90	116.40	1143.50	2433.46
6	69.67	14.17	22.50	47.60	34.60	73.20	1567.58	3316.29
Roof	84.67	7.50	12.10	25.60	12.10	25.60	1024.51	2167.55

Wind Loads

Category II  $\Rightarrow I = 1.0$

$V = 90 \text{ mph}$

$K_d = 0.85$

$K_{zt} = 1.0$

Exposure = B

$K_n = \text{Case 2} \rightarrow 0.94$

$K_z$  - varies

$$g_z = 0.00256 K_z K_{zt} K_d V^2 I$$

$$= 0.00256 (1.0) (0.85) (90)^2 (1.0) K_z$$

$$= 17.6256 K_z$$

Bldg:  $h = 84' - 8'' = 84.67 \text{ ft}$   
 $101' - 6'' \times 187' - 2''$   
 $\uparrow$  E-W  $\uparrow$  N-S

flexible if  $f \leq 1.0 \text{ Hz}$   $f = \frac{1}{T}$

$$T_c = C_T h_n^x = 0.02 (84.67)^{0.75} = 0.56 \text{ s}$$

Table 12.8-2  $C_T = 0.02$   $x = 0.75$   $f = \frac{1}{0.56} = 1.8 > 1.0 \therefore \text{Rigid}$

$G = 0.85$

$G C_{pi} = \pm 0.18$  fig. 6-5

$C_p$ : windward = 0.8  
 fig. 6-6 leeward = N-S =  $187' - 2'' / 101' - 6'' = 1.84 \Rightarrow 0.332$   
 E-W =  $101' - 6'' / 187' - 2'' \Rightarrow 0.5$

$P = g G C_p + g_i (G C_{pi})$

for windward  $g = g_z$   
 $g_i = g_h$

for leeward  $g_i = g_h$   
 $g = g_h$

**A2. Seismic Forces**

Story	V	k	$h_x$	Area (sq. ft.)	$W_x$ (k)	$h_x^k W_x$	$C_{vx}$	$F_x$ (k)	OM (ftk)
2	214.41	1.19	16.33	18023.40	2379.09	65132.73	0.04	9.53	12986.2
3	214.41	1.19	29.67	18906.30	2495.63	138636.24	0.09	20.29	602.037
4	214.41	1.19	43.00	19029.30	2511.87	216599.21	0.15	31.70	1363.18
5	214.41	1.19	56.33	19029.30	2511.87	298279.46	0.20	43.66	2459.19
6	214.41	1.19	69.67	19029.30	2511.87	383712.57	0.26	56.16	3912.73
R	214.41	1.19	84.67	19029.30	1883.90	362591.43	0.25	53.07	4493.41

$\sum W_x =$	14294.22
$\sum h_x^k W_x =$	1464951.64

Earthquake LoadsOccupancy Cat. II  $\Rightarrow I = 1.0$ 

Site Class C

 $R = 5$  - ordinary moment, if intermediate  $R = 5$ 

$$S_s = 0.15$$

$$S_1 = 0.06$$

$$F_v = 1.7$$

$$F_a = 1.2$$

$$S_{MS} = F_a S_s = 1.2(0.15) = 0.18$$

$$S_{M_1} = F_v S_1 = 1.7(0.06) = 0.102$$

$$S_{D_2} = \frac{2}{3} S_{MS} = \frac{2}{3}(0.18) = 0.12$$

$$S_{D_1} = \frac{2}{3} S_{M_1} = \frac{2}{3}(0.102) = 0.068$$

Design Category

$$S_{D_2} = A$$

$$S_{D_1} = A$$

$$C_s = \frac{S_{D_2}}{\frac{R}{I}} = \frac{0.12}{3} = 0.04 \quad ; \quad \frac{0.12}{5} = 0.024$$

$$T_a = 0.016$$

$$C_s \leq \frac{S_{D_1}}{T_a \left(\frac{R}{I}\right)} = \frac{0.067}{0.87(3)} = 0.026 \leftarrow \text{controls} \quad ; \quad \frac{0.067}{0.87(5)} = 0.015$$

$$T_a = 0.016(84.67)^{0.9} = 0.87$$

$$K = 1 \text{ for } T_a < 1.5 \\ = 2 \text{ for } T_a > 2.5$$

$$K = 1.185 \text{ for } T_a = 0.87$$