

CODE LEVEL SEISMIC FORCES AND SHEARS AT FLOOR LEVELS
ASCE 7-10 CHAPTER 12 - SEISMIC REQUIREMENTS FOR BUILDING STRUCTURES
SAMPLE PROJECT, ANYTOWN - NEW DESIGN

1. Seismic Parameter Data

$h_n = 98.0$ feet (Building Height)

	N-S Direction	W-E Direction
LFRS	RC SMRF	RC SMRF
C_t	0.016	0.016
x	0.90	0.90

System	C_t	x
Steel MRF	0.028	0.80
Concrete MRF	0.016	0.90
EBF	0.030	0.75
All other systems	0.020	0.75

$T_a = C_t h_n^x$ (12.8-7)

T_a	0.99	0.99
R	8.00	8.00

Seconds (Approximate Fundamental Period)
 Response Modification Factor (Table 12.2-1)

K =	1.25	1.25
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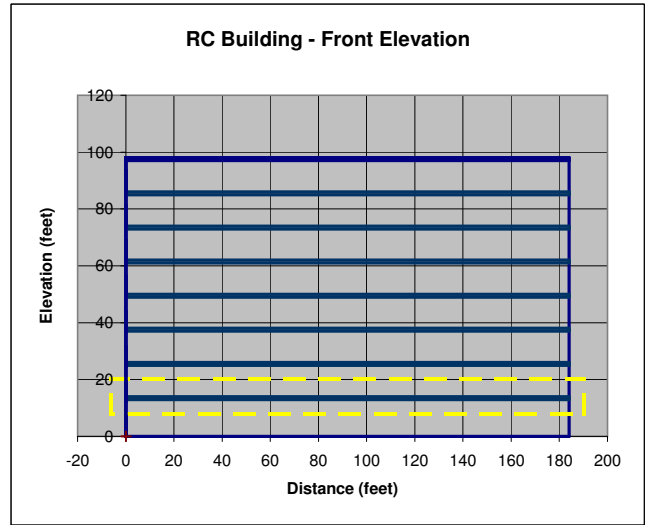
(Exponent factor for Floor Levels - Sect 12.8.3)

$C_s =$	0.079	0.079
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g's (Seismic Coefficient - Sect 12.8.1)

$\rho =$	1.000	1.000
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Redundancy Factor (Section 12.3.4)



2. Vertical Distribution of Seismic Forces (Section 12.8.3)

Note: $F_x = \rho C_s W_x H_x^k$ for $\rho =$ Redundancy Factor each side
 $C_s =$ Seismic Coefficient each side
 $W_x H_x^k =$ Product each floor level, each side

Floor Level	Story Weight, W_x (kips)	Floor Elevation, H_x (feet)	N-S and E-W Directions						$W_x H_x^k$	Lateral Force, F_x (kips)	Story Shear, V_x (kips)	$F_x * h_x$ (kip-ft)	Over - turning Moment about Roof, M_{OTR} (kip-ft)	Over - turning Moment, M_{ot} (kip-ft)
			$W_x H_x^k$	Lateral Force, F_x (kips)	Story Shear, V_x (kips)	$F_x * h_x$ (kip-ft)	Over - turning Moment about Roof, M_{OTR} (kip-ft)	Over - turning Moment, M_{ot} (kip-ft)						
R	1,999	98.00	604,298	309	309	30,257	3,705	30,257						
8	2,092	86.00	537,415	275	583	23,613	10,705	53,870						
7	2,092	74.00	445,666	228	811	16,850	20,437	70,720						
6	2,092	62.00	357,513	183	994	11,325	32,361	82,044						
5	2,092	50.00	273,476	140	1,133	6,986	45,962	89,031						
4	2,092	38.00	194,291	99	1,233	3,772	60,754	92,803						
3	2,092	26.00	121,102	62	1,295	1,609	76,288	94,411						
2	2,107	14.00	56,424	29	1,323	404	94,815	94,815						

$\sum_{i=1}^n w_i h_i^k = 2,590,186$

$\sum_{i=1}^n w_i h_i^k = 0$

Weight = 16,659 kips

V = 1,323 kips

V = 0 kips

$M_{ot} = 94,815$ kip-ft

$M_{ot} = 0$ kip-ft