

RDA DEMANDS TO RC SMRF ELEMENTS - LEVEL 2
ASCE 7-10 SECTION 12.8 - EQUIVALENT LATERAL FORCE PROCEDURE - RIGID DIAPHRAGM ANALYSIS
SAMPLE PROJECT, ANYTOWN - NEW DESIGN

Floor Level : 2

1. General Design Parameters

$H_A = 12.00$ feet (Height of Floor Level Above)
 $H_B = 14.00$ feet (Height of Floor Level Below)

Story Shear - N-S Direction (Y) for Loading Direction = + (+/-)
 LFRS System: RC SMRF $V_S = 1,323$ kips (Story Shear)
 $C_S = 0.079$ g's (Seismic Coefficient)

Story Shear - W-E Direction (X) for Loading Direction = + (+/-)
 LFRS System: RC SMRF $V_S = 1,323$ kips (Story Shear)
 $C_S = 0.079$ g's (Seismic Coefficient)

Moment Frame Beams - N-S Direction (Y) **Moment Frame Beams - W-E Direction (X)**
 $b = 20.00$ inches $b = 20.00$ inches
 $d = 24.00$ inches $d = 24.00$ inches

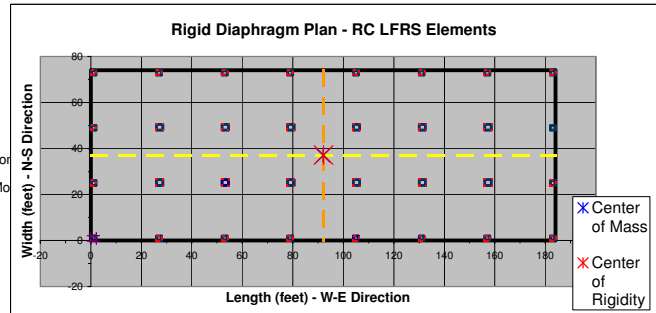
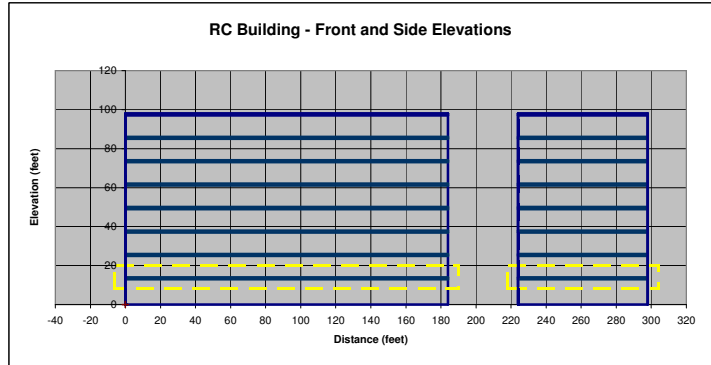
RC Diaphragm Dimensions						
Section	Length (feet)	Width (feet)	Thickness (inches)	x (feet)	y (feet)	Weight (kips)
1	184.00	74.00	12.00	-	-	1,906
2						
3						

for $\rho = 140$ pcf (Unit Weight)

Accidental Eccentricity (ASCE (Section 12.8.4.2):

$e_{MIN} = 5.00$ % (accidental eccentricity)
 $= > e_{AX} A_{XY} = 3.70$ feet for $A_{XY} = 1.00$ (N-S Amplification of Accidental Torsional Mo
 $e_{AY} A_{XX} = 9.20$ feet $A_{XX} = 1.00$ (W-E Amplification of Accidental Torsional Mo

Material Data: $f'_c = 4.00$ Ksi (Compressive Strength - Concrete)
 $E_m =$ Ksi (Modulus of Rupture - Masonry)
 $= > E_c = 3,605$ ksi



2. RDA Load Distribution to RC Elements - Summary of Results

LFRS Direction	RC Element ID	RC Element Dimensions and Data									SMRF Column Demands				SMRF Beam Demands					
		RC LFRS		Dimensions				Coordinates			Stiffness		P_{MAX} (Kips)	V_c (kips)	M_{TOP} (Kip-in)	M_{BOT} (Kip-in)	V_{BL} (kips)	M_{BL} (Kip-ft)	V_{BR} (kips)	M_{BR} (Kip-ft)
		Shear Wall	SMRF Column	H_{below} (feet)	H_{above} (feet)	L (feet)	t (inches)	x (feet)	y (feet)	K (kip/in)	Relative Stiffness									
N-S	1	x		14.00	12.00	2.00	24.0	0.00	0.00	75	1.00	165	30.7	184	215					
	2	x		14.00	12.00	2.00	24.0	26.00	0.00	75	1.00	165	30.1	180	210			26.3	289	
	3	x		14.00	12.00	2.00	24.0	52.00	0.00	75	1.00	165	29.4	176	206			25.2	277	
	4	x		14.00	12.00	2.00	24.0	78.00	0.00	75	1.00	165	28.7	172	201			24.6	270	
	5	x		14.00	12.00	2.00	24.0	104.00	0.00	75	1.00	165	28.1	168	197			24.0	264	
	6	x		14.00	12.00	2.00	24.0	130.00	0.00	75	1.00	165	27.4	165	192			23.5	258	
	7	x		14.00	12.00	2.00	24.0	156.00	0.00	75	1.00	165	26.8	161	187			22.9	252	
	8	x		14.00	12.00	2.00	24.0	182.00	0.00	75	1.00	165	26.1	157	183			22.3	246	
	9	x		14.00	12.00	2.00	24.0	0.00	24.00	131	1.75		53.2	319	372	19.9	219	19.9	219	
	10	x		14.00	12.00	2.50	30.0	26.00	24.00	154	2.05		61.4	368	430	27.0	290	27.0	290	
	11	x		14.00	12.00	2.50	30.0	52.00	24.00	154	2.05		60.0	360	420	26.4	284	26.4	284	
	12	x		14.00	12.00	2.50	30.0	78.00	24.00	154	2.05		58.7	352	411	25.8	277	25.8	277	
	13	x		14.00	12.00	2.50	30.0	104.00	24.00	154	2.05		57.3	344	401	25.2	271	25.2	271	
	14	x		14.00	12.00	2.50	30.0	130.00	24.00	154	2.05		56.0	336	392	24.6	264	24.6	264	
	15	x		14.00	12.00	2.50	30.0	156.00	24.00	154	2.05		54.6	328	383	24.0	258	24.0	258	
	16	x		14.00	12.00	2.00	24.0	182.00	24.00	131	1.75		45.2	271	316	16.9	186	16.9	186	
	17	x		14.00	12.00	2.00	24.0	0.00	48.00	131	1.75		53.2	319	372	19.9	219	19.9	219	
	18	x		14.00	12.00	2.50	30.0	26.00	48.00	154	2.05		61.4	368	430	27.0	290	27.0	290	
	19	x		14.00	12.00	2.50	30.0	52.00	48.00	154	2.05		60.0	360	420	26.4	284	26.4	284	
	20	x		14.00	12.00	2.50	30.0	78.00	48.00	154	2.05		58.7	352	411	25.8	277	25.8	277	
	21	x		14.00	12.00	2.50	30.0	104.00	48.00	154	2.05		57.3	344	401	25.2	271	25.2	271	
	22	x		14.00	12.00	2.50	30.0	130.00	48.00	154	2.05		56.0	336	392	24.6	264	24.6	264	
	23	x		14.00	12.00	2.50	30.0	156.00	48.00	154	2.05		54.6	328	383	24.0	258	24.0	258	
	24	x		14.00	12.00	2.00	24.0	182.00	48.00	131	1.75		45.2	271	316	16.9	186	16.9	186	
	25	x		14.00	12.00	2.00	24.0	0.00	72.00	75	1.00		-164	30.7	184	215	26.3	289		
	26	x		14.00	12.00	2.00	24.0	26.00	72.00	75	1.00		-164	30.1	180	210	25.7	283		
	27	x		14.00	12.00	2.00	24.0	52.00	72.00	75	1.00		-164	29.4	176	206	25.2	277		
	28	x		14.00	12.00	2.00	24.0	78.00	72.00	75	1.00		-164	28.7	172	201	24.6	270		
	29	x		14.00	12.00	2.00	24.0	104.00	72.00	75	1.00		-164	28.1	168	197	24.0	264		
	30	x		14.00	12.00	2.00	24.0	130.00	72.00	75	1.00		-164	27.4	165	192	23.5	258		
	31	x		14.00	12.00	2.00	24.0	156.00	72.00	75	1.00		-164	26.8	161	187	22.9	252		
	32	x		14.00	12.00	2.00	24.0	182.00	72.00	75	1.00		-164	26.1	157	183	22.3	246		

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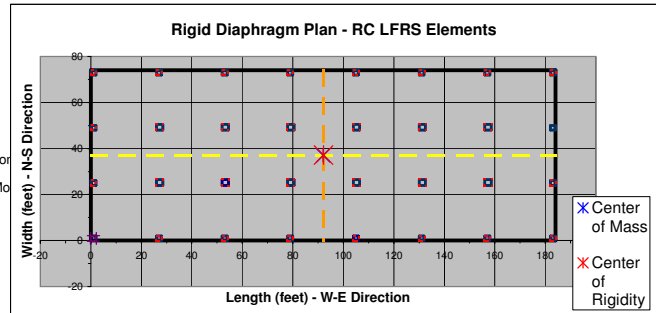
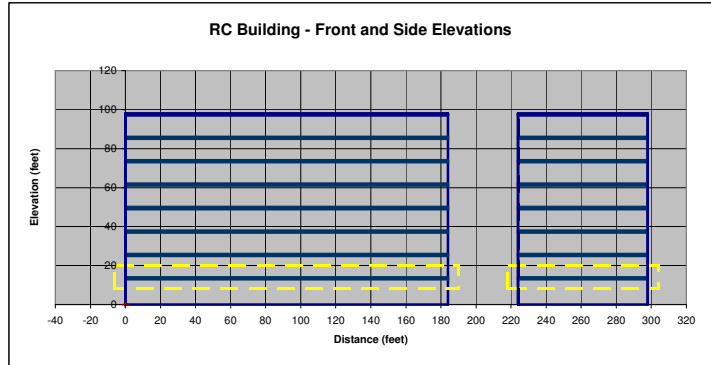
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		Shear Wall	SMRF Column	H_{below} (feet)	H_{above} (feet)	L (feet)	t (inches)	x (feet)	y (feet)	K (kip/in)	Relative Stiffness								
W-E	1	x		14.00	12.00	2.00	24.0	0.00	0.00	75	1.00	130	23.1	138	162	19.7	237		
	2	x		14.00	12.00	2.00	24.0	26.00	0.00	131	1.75		39.9	239	279	14.9	179	14.9	179
	3	x		14.00	12.00	2.00	24.0	52.00	0.00	131	1.75		39.9	239	279	14.9	179	14.9	179
	4	x		14.00	12.00	2.00	24.0	78.00	0.00	131	1.75		39.9	239	279	14.9	179	14.9	179
	5	x		14.00	12.00	2.00	24.0	104.00	0.00	131	1.75		39.9	239	279	14.9	179	14.9	179
	6	x		14.00	12.00	2.00	24.0	130.00	0.00	131	1.75		39.9	239	279	14.9	179	14.9	179
	7	x		14.00	12.00	2.00	24.0	156.00	0.00	131	1.75		39.9	239	279	14.9	179	14.9	179
	8	x		14.00	12.00	2.00	24.0	182.00	0.00	75	1.00	-130	23.1	138	162	19.7	237		
	9	x		14.00	12.00	2.00	24.0	0.00	24.00	75	1.00	130	24.6	147	172			21.0	252
	10	x		14.00	12.00	2.50	30.0	26.00	24.00	154	2.05		50.2	301	351	22.0	259	22.0	259
	11	x		14.00	12.00	2.50	30.0	52.00	24.00	154	2.05		50.2	301	351	22.0	259	22.0	259
	12	x		14.00	12.00	2.50	30.0	78.00	24.00	154	2.05		50.2	301	351	22.0	259	22.0	259
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	14	x		14.00	12.00	2.50	30.0	130.00	24.00	154	2.05		50.2	301	351	22.0	259	22.0	259
	15	x		14.00	12.00	2.50	30.0	156.00	24.00	154	2.05		50.2	301	351	22.0	259	22.0	259
	16	x		14.00	12.00	2.00	24.0	182.00	24.00	75	1.00	-130	24.6	147	172	21.0	252		
	17	x		14.00	12.00	2.00	24.0	0.00	48.00	75	1.00	130	26.0	156	182			22.3	267
	18	x		14.00	12.00	2.50	30.0	26.00	48.00	154	2.05		53.2	319	372	23.4	275	23.4	275
	19	x		14.00	12.00	2.50	30.0	52.00	48.00	154	2.05		53.2	319	372	23.4	275	23.4	275
	20	x		14.00	12.00	2.50	30.0	78.00	48.00	154	2.05		53.2	319	372	23.4	275	23.4	275
	21	x		14.00	12.00	2.50	30.0	104.00	48.00	154	2.05		53.2	319	372	23.4	275	23.4	275
	22	x		14.00	12.00	2.50	30.0	130.00	48.00	154	2.05		53.2	319	372	23.4	275	23.4	275
	23	x		14.00	12.00	2.50	30.0	156.00	48.00	154	2.05		53.2	319	372	23.4	275	23.4	275
	24	x		14.00	12.00	2.00	24.0	182.00	48.00	75	1.00	-130	26.0	156	182	22.3	267		
	25	x		14.00	12.00	2.00	24.0	0.00	72.00	75	1.00	130	27.5	165	193			23.5	283
	26	x		14.00	12.00	2.00	24.0	26.00	72.00	131	1.75		47.6	286	333	17.8	214	17.8	214
	27	x		14.00	12.00	2.00	24.0	52.00	72.00	131	1.75		47.6	286	333	17.8	214	17.8	214
	28	x		14.00	12.00	2.00	24.0	78.00	72.00	131	1.75		47.6	286	333	17.8	214	17.8	214
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