Reinforced Concrete Moment Frame Archetype Overview

- Perimeter Frame Layout (LFRS around entire perimeter of building, gravity system elsewhere)

- 20ft bay spacing, 6 bays x 6 bays, 120' x 120' in plan (only three bays of the structural frame are modeled)

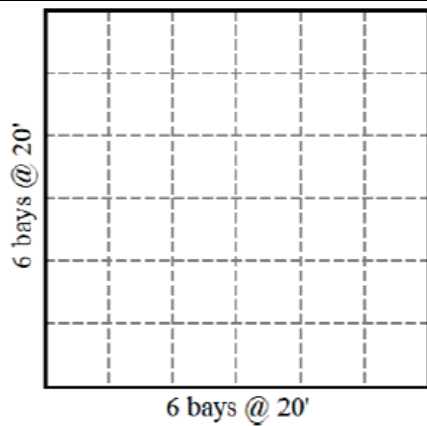- 15ft first story height, 13ft elsewhere

- 8" flat gravity slab

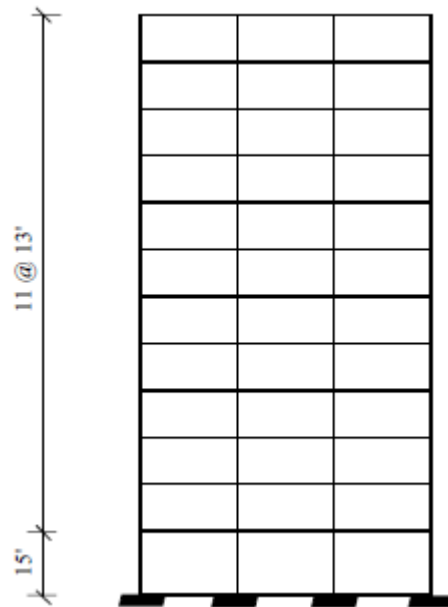

Figure 1. Plan view of the Perimeter Frame Building

Figure 2. Elevation view of the 3 bays of the perimeter frame building

12-Story Special RCMF Design Summary: Baseline

	Columns		Beams	
	depth x width [tie spacing]		depth x width [hoop spacing]	
	$(\rho_{total}, \rho_{sh})$		$(\rho_{top}, \rho_{bot}, \rho_{sh})$	
Level	Exterior	Interior	Exterior	Interior
12	30x24 [3.5] (0.0109, 0.0070)	30x24 [3.5] (0.0109, 0.0093)	30x24 [6] (0.0066, 0.0036, 0.0027)	30x24 [6] (0.0066, 0.0036, 0.0027)
11	30x24 [3.5] (0.0109, 0.0070)	30x24 [3.5] (0.0109, 0.0093)	30x24 [5.5] (0.0066, 0.0036, 0.0030)	30x24 [5.5] (0.0066, 0.0036, 0.0030)
10	30x24 [3.5] (0.0109, 0.0070)	30x24 [3.5] (0.0131, 0.0093)	30x24 [4] (0.0066, 0.0036, 0.0030)	30x24 [4] (0.0066, 0.0036, 0.0030)
9	30x24 [3.5] (0.0109, 0.0070)	30x24 [3.5] (0.0131, 0.0093)	30x24 [4.5] (0.0075, 0.0045, 0.0036)	30x24 [4.5] (0.0075, 0.0045, 0.0036)
8	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0127, 0.0093)	36x24 [4.5] (0.0061, 0.0045, 0.0036)	36x24 [4.5] (0.0061, 0.0045, 0.0036)
7	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0127, 0.0093)	36x24 [4.5] (0.0061, 0.0052, 0.0036)	36x24 [4.5] (0.0061, 0.0052, 0.0036)
6	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0127, 0.0093)	36x24 [4] (0.0069, 0.0052, 0.0041)	36x24 [4] (0.0069, 0.0052, 0.0041)
5	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0127, 0.0093)	36x24 [4] (0.0069, 0.0052, 0.0041)	36x24 [4] (0.0069, 0.0052, 0.0041)
4	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0127, 0.0093)	36x24 [3.5] (0.0076, 0.0060, 0.0047)	36x24 [3.5] (0.0076, 0.0060, 0.0047)
3	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0127, 0.0093)	36x24 [3.5] (0.0076, 0.0060, 0.0047)	36x24 [3.5] (0.0076, 0.0060, 0.0047)
2	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0127, 0.0093)	36x24 [4] (0.0069, 0.0052, 0.0041)	36x24 [4] (0.0069, 0.0052, 0.0041)
1	36x24 [3.5] (0.0182, 0.0093)	36x24 [3.5] (0.0127, 0.0093)	36x24 [4.5] (0.0061, 0.0045, 0.0036)	36x24 [4.5] (0.0061, 0.0045, 0.0036)

12-Story Special RCMF Design Summary: Ie = 1.25

Level	Columns depth x width [tie spacing] (ρ_{total}, ρ_{sh}) Exterior	Interior	Beams depth x width [hoop spacing] (ρ_{top}, ρ_{bot}, ρ_{sh}) Exterior	Interior
12	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0109, 0.0093)	36x24 [5] (0.0061, 0.0037, 0.0033)	36x24 [5] (0.0061, 0.0037, 0.0033)
11	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0109, 0.0093)	36x24 [5] (0.0061, 0.0037, 0.0033)	36x24 [5] (0.0061, 0.0037, 0.0033)
10	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0109, 0.0093)	36x24 [3.5] (0.0061, 0.0037, 0.0033)	36x24 [3.5] (0.0061, 0.0037, 0.0033)
9	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	36x24 [4.5] (0.0061, 0.0045, 0.0036)	36x24 [4.5] (0.0061, 0.0045, 0.0036)
8	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	42x24 [4] (0.0064, 0.0044, 0.0041)	42x24 [4] (0.0064, 0.0044, 0.0041)
7	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	42x24 [4] (0.0064, 0.0044, 0.0041)	42x24 [4] (0.0064, 0.0044, 0.0041)
6	36x24 [3.5] (0.0127, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	42x24 [3.5] (0.0064, 0.0051, 0.0047)	42x24 [3.5] (0.0064, 0.0051, 0.0047)
5	36x24 [3.5] (0.0127, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	42x24 [3.5] (0.0064, 0.0051, 0.0047)	42x24 [3.5] (0.0064, 0.0051, 0.0047)
4	36x24 [3.5] (0.0127, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	42x24 [3.5] (0.0064, 0.0051, 0.0047)	42x24 [3.5] (0.0064, 0.0051, 0.0047)
3	36x24 [3.5] (0.0145, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	42x24 [3.5] (0.0064, 0.0051, 0.0047)	42x24 [3.5] (0.0064, 0.0051, 0.0047)
2	36x24 [3.5] (0.0145, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	42x24 [3.5] (0.0064, 0.0051, 0.0047)	42x24 [3.5] (0.0064, 0.0051, 0.0047)
1	36x24 [3.5] (0.0218, 0.0093)	36x24 [3.5] (0.0164, 0.0093)	42x24 [4] (0.0064, 0.0044, 0.0041)	42x24 [4] (0.0064, 0.0044, 0.0041)

12-Story Special RCMF Design Summary: Ie = 1.5

Level	Columns depth x width [tie spacing] (ρ_{total}, ρ_{sh})		Beams depth x width [hoop spacing] (ρ_{top}, ρ_{bot}, ρ_{sh})	
	Exterior	**Interior**	**Exterior**	**Interior**
12	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0109, 0.0093)	36x24 [5] (0.0061, 0.0037, 0.0033)	36x24 [5] (0.0061, 0.0037, 0.0033)
11	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0109, 0.0093)	36x24 [5] (0.0061, 0.0037, 0.0033)	36x24 [5] (0.0061, 0.0037, 0.0033)
10	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0145, 0.0093)	36x24 [3] (0.0061, 0.0037, 0.0033)	36x24 [3] (0.0061, 0.0037, 0.0033)
9	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0145, 0.0093)	36x24 [4.5] (0.0061, 0.0052, 0.0036)	36x24 [4.5] (0.0061, 0.0052, 0.0036)
8	36x24 [3.5] (0.0127, 0.0070)	36x24 [3.5] (0.0200, 0.0093)	42x24 [3.5] (0.0064, 0.0051, 0.0047)	42x24 [3.5] (0.0064, 0.0051, 0.0047)
7	36x24 [3.5] (0.0127, 0.0070)	36x24 [3.5] (0.0200, 0.0093)	42x24 [3.5] (0.0064, 0.0051, 0.0047)	42x24 [3.5] (0.0064, 0.0051, 0.0047)
6	36x30 [2.5] (0.0116, 0.0079)	36x30 [2.5] (0.0160, 0.0105)	42x30 [3.5] (0.0057, 0.0046, 0.0037)	42x30 [3.5] (0.0057, 0.0046, 0.0037)
5	36x30 [2.5] (0.0116, 0.0079)	36x30 [2.5] (0.0160, 0.0105)	42x30 [3.5] (0.0057, 0.0046, 0.0037)	42x30 [3.5] (0.0057, 0.0046, 0.0037)
4	36x30 [2.5] (0.0116, 0.0079)	36x30 [2.5] (0.0160, 0.0105)	42x30 [3] (0.0057, 0.0051, 0.0044)	42x30 [3] (0.0057, 0.0051, 0.0044)
3	36x30 [2.5] (0.0131, 0.0079)	36x30 [2.5] (0.0160, 0.0105)	42x30 [3] (0.0057, 0.0051, 0.0044)	42x30 [3] (0.0057, 0.0051, 0.0044)
2	36x30 [2.5] (0.0131, 0.0079)	36x30 [2.5] (0.0160, 0.0105)	42x30 [3] (0.0057, 0.0051, 0.0044)	42x30 [3] (0.0057, 0.0051, 0.0044)
1	36x30 [2.5] (0.0204, 0.0105)	36x30 [2.5] (0.0160, 0.0105)	42x30 [3.5] (0.0057, 0.0046, 0.0037)	42x30 [3.5] (0.0057, 0.0046, 0.0037)

12-Story Special RCMF Design Summary: 1.5% Drift Limit

Level	Columns depth x width [tie spacing] (ρ_{total}, ρ_{sh})		Beams depth x width [hoop spacing] (ρ_{top}, ρ_{bot}, ρ_{sh})	
	Exterior	Interior	Exterior	Interior
12	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0109, 0.0093)	30x24 [5.5] (0.0065, 0.0036, 0.0030)	30x24 [5.5] (0.0065, 0.0036, 0.0030)
11	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0109, 0.0093)	30x24 [5] (0.0065, 0.0036, 0.0033)	30x24 [5] (0.0065, 0.0036, 0.0033)
10	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0109, 0.0093)	30x24 [4] (0.0065, 0.0036, 0.0033)	30x24 [4] (0.0065, 0.0036, 0.0033)
9	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0109, 0.0093)	30x24 [5] (0.0065, 0.0045, 0.0033)	30x24 [5] (0.0065, 0.0045, 0.0033)
8	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0109, 0.0093)	36x24 [4.5] (0.0061, 0.0045, 0.0036)	36x24 [4.5] (0.0061, 0.0045, 0.0036)
7	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	36x24 [4.5] (0.0061, 0.0045, 0.0036)	36x24 [4.5] (0.0061, 0.0045, 0.0036)
6	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	42x24 [4] (0.0064, 0.0044, 0.0041)	42x24 [4] (0.0064, 0.0044, 0.0041)
5	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	42x24 [4] (0.0064, 0.0044, 0.0041)	42x24 [4] (0.0064, 0.0044, 0.0041)
4	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	42x24 [4] (0.0064, 0.0044, 0.0041)	42x24 [4] (0.0064, 0.0044, 0.0041)
3	36x24 [3.5] (0.0127, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	42x24 [4] (0.0064, 0.0044, 0.0041)	42x24 [4] (0.0064, 0.0044, 0.0041)
2	36x24 [3.5] (0.0127, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	42x24 [4] (0.0064, 0.0044, 0.0041)	42x24 [4] (0.0064, 0.0044, 0.0041)
1	36x24 [3.5] (0.0164, 0.0093)	36x24 [3.5] (0.0164, 0.0093)	42x24 [4] (0.0064, 0.0038, 0.0041)	42x24 [4] (0.0064, 0.0038, 0.0041)

12-Story Special RCMF Design Summary: 1% Drift Limit

	Columns depth x width [tie spacing] (ρ_{total}, ρ_{sh})		Beams depth x width [hoop spacing] (ρ_{top}, ρ_{bot}, ρ_{sh})	
Level	**Exterior**	**Interior**	**Exterior**	**Interior**
12	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0109, 0.0093)	36x24 [5] (0.0061, 0.0037, 0.0033)	36x24 [5] (0.0061, 0.0037, 0.0033)
11	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0109, 0.0093)	36x24 [5] (0.0061, 0.0037, 0.0033)	36x24 [5] (0.0061, 0.0037, 0.0033)
10	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0145, 0.0093)	36x24 [3.5] (0.0061, 0.0037, 0.0033)	36x24 [3.5] (0.0061, 0.0037, 0.0033)
9	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0145, 0.0093)	36x24 [5] (0.0061, 0.0037, 0.0033)	36x24 [5] (0.0061, 0.0037, 0.0033)
8	42x30 [2.5] (0.0112, 0.0079)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3.5] (0.0056, 0.0035, 0.0037)	42x30 [3.5] (0.0056, 0.0035, 0.0037)
7	42x30 [2.5] (0.0112, 0.0079)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3.5] (0.0056, 0.0035, 0.0037)	42x30 [3.5] (0.0056, 0.0035, 0.0037)
6	42x30 [2.5] (0.0112, 0.0079)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3.5] (0.0056, 0.0035, 0.0037)	42x30 [3.5] (0.0056, 0.0035, 0.0037)
5	42x30 [2.5] (0.0112, 0.0079)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3.5] (0.0056, 0.0035, 0.0037)	42x30 [3.5] (0.0056, 0.0035, 0.0037)
4	42x30 [2.5] (0.0112, 0.0079)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3.5] (0.0056, 0.0035, 0.0037)	42x30 [3.5] (0.0056, 0.0035, 0.0037)
3	42x30 [2.5] (0.0112, 0.0079)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3.5] (0.0056, 0.0035, 0.0037)	42x30 [3.5] (0.0056, 0.0035, 0.0037)
2	42x30 [2.5] (0.0112, 0.0079)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3.5] (0.0056, 0.0035, 0.0037)	42x30 [3.5] (0.0056, 0.0035, 0.0037)
1	42x30 [2.5] (0.0112, 0.0105)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3.5] (0.0056, 0.0035, 0.0037)	42x30 [3.5] (0.0056, 0.0035, 0.0037)

12-Story Special RCMF Design Summary: Risk Category IV

Level	Columns depth x width [tie spacing] (ρ_{total}, ρ_{sh}) Exterior	Interior	Beams depth x width [hoop spacing] (ρ_{top}, ρ_{bot}, ρ_{sh}) Exterior	Interior
12	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0109, 0.0093)	36x24 [5] (0.0061, 0.0037, 0.0033)	36x24 [5] (0.0061, 0.0037, 0.0033)
11	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0109, 0.0093)	36x24 [5] (0.0061, 0.0037, 0.0033)	36x24 [5] (0.0061, 0.0037, 0.0033)
10	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	36x24 [3.5] (0.0061, 0.0037, 0.0033)	36x24 [3.5] (0.0061, 0.0037, 0.0033)
9	36x24 [3.5] (0.0109, 0.0070)	36x24 [3.5] (0.0164, 0.0093)	36x24 [4.5] (0.0061, 0.0052, 0.0036)	36x24 [4.5] (0.0061, 0.0052, 0.0036)
8	42x30 [2.5] (0.0112, 0.0079)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3.5] (0.0056, 0.0041, 0.0037)	42x30 [3.5] (0.0056, 0.0041, 0.0037)
7	42x30 [2.5] (0.0112, 0.0079)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3.5] (0.0056, 0.0046, 0.0037)	42x30 [3.5] (0.0056, 0.0046, 0.0037)
6	42x30 [2.5] (0.0112, 0.0079)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3.5] (0.0056, 0.0046, 0.0037)	42x30 [3.5] (0.0056, 0.0046, 0.0037)
5	42x30 [2.5] (0.0112, 0.0079)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3.5] (0.0056, 0.0046, 0.0037)	42x30 [3.5] (0.0056, 0.0046, 0.0037)
4	42x30 [2.5] (0.0112, 0.0079)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3] (0.0056, 0.0051, 0.0044)	42x30 [3] (0.0056, 0.0051, 0.0044)
3	42x30 [2.5] (0.0112, 0.0079)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3] (0.0062, 0.0051, 0.0044)	42x30 [3] (0.0062, 0.0051, 0.0044)
2	42x30 [2.5] (0.0112, 0.0079)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3.5] (0.0056, 0.0046, 0.0037)	42x30 [3.5] (0.0056, 0.0046, 0.0037)
1	42x30 [2.5] (0.0187, 0.0105)	42x30 [2.5] (0.0112, 0.0105)	42x30 [3.5] (0.0056, 0.0041, 0.0037)	42x30 [3.5] (0.0056, 0.0041, 0.0037)