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Seismic Analysis of RC -Framed Building with and Without Provision of Bands at Different Level

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ABSTRACT

Improperly designed cause undesirable effects below unstable loading in each bolstered concrete(RC) frames and masonry load wall structures. Doors and windows (openings) are inescapable parts in brick masonry in-filled RC structures and masonry load wall structures owing to its practical and ventilation necessities. The presence of openings in brick masonry walls reduces the lateral stiffness and strength of the enclose each RC and cargo bearing structures, that changes the particular behavior of structure. If these openings are settled within the restricted zones like areas inside middle 2 thirds of a wall, then the wall has to be strong by providing necessary horizontal (bands) structural components like header or header bands around them. Lack of such structural components could cause the structure to endure severe injury throughout the earthquake event. In this paper, two case studies, (a) seismic analysis of RC framed building without provision of bands (b) seismic analysis of RC framed building with provision of bands at different level

1. Introduction

1.1 Aim

To do the seismic analysis of RC-framed building with and without provision of bands at different level

1.2 Objective

- •To study the effect of earthquake on RC frame structure
- •To study the conceptive seismic resistive technique
- •To study various seismic analysis methods
- •To modal and analysis the RC frame building with and without bands
- •To do the comparative study of the various structure

2. Case consideration

Case 1

Seismic analysis of RC frame Structure without Bands

In Case number one we have done a analysis of a RC frame structure without bands with seismic resistive criteria given from IS CODE 1893.All the dimension given above in plan detail.

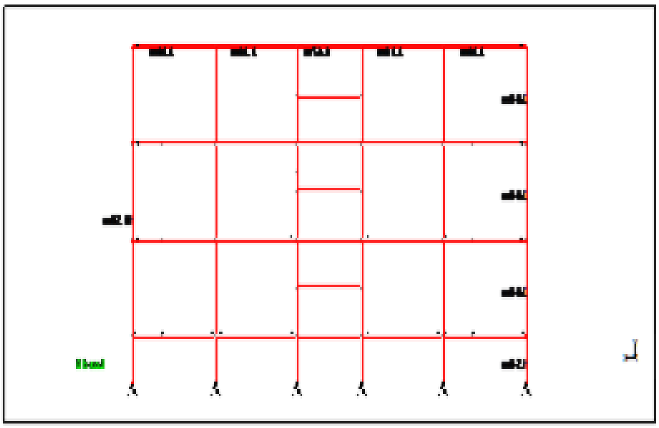

Figure 1. RC Frame Structure Without Band.

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Case 2

Seismic analysis of RC frame Structure with Band at lintel level

In Case number Two we have done a analysis of a RC frame structure with Lintel bands with seismic resistive criteria given from IS CODE 1893.All the dimension given above in plan detailOnly a band is provide of dimension 0.23mX0.23m at height 2.1m from floor level.

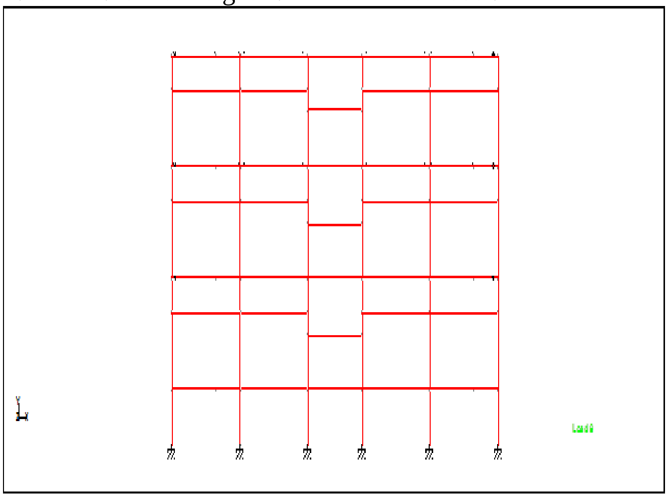


Figure 2.RC Frame Structure With Lintel level Bands.

Case 3

Seismic analysis of RC frame Structure with Band at sill level

In Case number three we have done a analysis of a RC frame structure with sill bands with seismic resistive criteria given from IS CODE 1893.All the dimension given above in plan detail Only a band is provide of dimension 0.23mX0. 23m at height 1m from floor level.

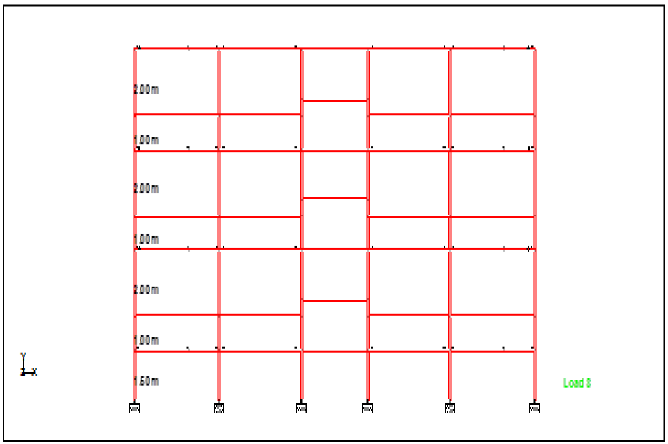


Figure 3. RC Frame Structure with Sill level Bands.

Case 4

Seismic analysis of RC frame Structure with Band at footing level

In Case number four we have done a analysis of a RC frame structure with footing bands with seismic resistive criteria given from IS CODE 1893.All the dimension given above in plan detail Only a band is provide of dimension 0.23mX0.23m at footing as a tie band

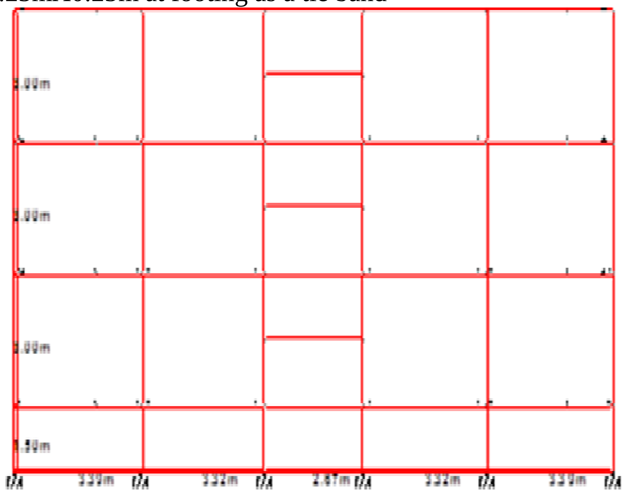


Figure 4. RC Frame Structure with Footing level Bands.

3. Observations and Remark

Table 3.1. Nodal Displacement.

		For The Edge Nodal Location			
		X Max	Y Max	Z Max	Resultant
Case 1	129	14.983	-1.11	29.262	29.272
		1.5DL+1.5EQ+X	1.5DL+1.5EQ-X	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	91	12.32	-1.037	23.414	23.424
		0	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	53	7.781	-0.783	13.637	13.646
		1.5DL+1.5EQ+X	1.5DL+1.5EQ-X	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	1	1.643	-0.307	1.81	1.82
		1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	35	0	0	0	0
		For ALL	For All	For All	For All
Case 2	129	20.036	1.77	24.575	24.62
		1.5DL+1.5EQ+X	1.5DL+1.5EQ-X	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	53	10.37	1.211	12.09	12.117
		1.5DL+1.5EQ+X	1.5DL+1.5EQ-X	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	91	16.455	1.657	19.769	19.807
		1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	1	2.187	0.47	2.451	2.467
		1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	35	0	0	0	0
		For ALL	For All	For All	For All
Case 3	129	18.426	-1.677	23.16	23.205
		1.5DL+1.5EQ+X	1.5DL+1.5EQ-X	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	91	15.347	-1.592	18.721	18.759
		1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	53	9.573	-1.179	11.328	11.356
		1.5DL+1.5EQ+X	1.5DL+1.5EQ-X	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	1	2.011	-0.471	2.229	2.248
		1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	35	0	0	0	0
		For ALL	For All	For All	For All
Case 4	129	18.924	-1.138	23.115	23.145
		1.5DL+1.5EQ+X	1.5DL+1.5EQ-X	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	91	15.543	-1.082	18.474	18.497
		1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	53	9.592	-0.797	11.062	11.077
		1.5DL+1.5EQ+X	1.5DL+1.5EQ-X	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	1	1.691	-0.319	2.018	2.027
		1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	35	0	0	0	0
		For ALL	For All	For All	For All

		For The Staircase Nodal Location			
		X Max	Y Max	Z Max	Resultant
Case 1	137	-18.515	-2.337	29.974	30.065
		1.5DL+1.5EQ-X	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	99	-15.294	-2.167	24.109	24.206
		1.5DL+1.5EQ-X	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	61	-9.704	-1.591	14.242	14.33
		1.5DL+1.5EQ-X	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z	1.5DL+1.5EQ-X
	9	-2.085	-0.591	1.966	2.053
		1.5DL+1.5EQ-X	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	43	0	0	0	0
		For All	For All	For All	For All
Case 2	137	23.662	3.345	26.121	26.325
		1.5DL+1.5EQ+X	1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	99	19.525	3.02	21.017	21.231
		1.5DL+1.5EQ-X	1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	61	12.327	2.236	12.739	12.927
		1.5DL+1.5EQ-X	1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	9	2.601	0.812	2.568	2.696
		1.5DL+1.5EQ-X	1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ-X
	43	0	0	0	0
		For All	For All	For All	For All
Case 3	137	21.97	-3.211	24.747	24.943
		1.5DL+1.5EQ+X	1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	99	-18.436	-2.991	20.096	20.306
		1.5DL+1.5EQ-X	1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	61	-11.532	-2.192	12.076	12.266
		1.5DL+1.5EQ-X	1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	9	-2.444	-0.812	2.417	2.549
		1.5DL+1.5EQ-X	1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ-X
	43	0	0	0	0
		For All	For All	For All	For All
Case 4	137	23.302	-2.511	24.986	25.098
		1.5DL+1.5EQ+X	1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	99	-19.184	-2.333	19.898	20.018
		1.5DL+1.5EQ-X	1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	61	-11.812	-1.704	11.731	11.84
		1.5DL+1.5EQ-X	1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+Z
	9	-2.063	-0.621	2.05	2.131
		1.5DL+1.5EQ-X	1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ-X
	43	0	0	0	0
		For All	For All	For All	For All

Table 3.2. Maximum Shear Forces.

For Edge Maximum Shear Force					
	Nodal Location	Load Case		Distance	Z DIRECTION
CASE 1	91	204 1.5DL+1.5EQ-Z	Max +ve	0	13.545
	129		Max -ve	N/A	N/A
CASE 2	91	204 1.5DL+1.5EQ-Z	Max +ve	0	6.35
	129		Max -ve	N/A	N/A
CASE 3	91	204 1.5DL+1.5EQ-Z	Max +ve	N/A	N/A
	129		Max -ve	0	-18.4
CASE 4	91	204 1.5DL+1.5EQ-Z	Max +ve	0	13.767
	129		Max -ve	N/A	N/A
CASE 1	53	204 1.5DL+1.5EQ-Z	Max +ve	0	24.227
	91		Max -ve	N/A	N/A
CASE 2	53	204 1.5DL+1.5EQ-Z	Max +ve	0	6.892
	91		Max -ve	N/A	N/A
CASE 3	53	204 1.5DL+1.5EQ-Z	Max +ve	N/A	N/A
	91		Max -ve	0	-210.846

CASE 4	53	204 1.5DL+1.5EQ-Z	Max +ve	0	24.616
	91		Max -ve	N/A	N/A
CASE 1	1	204 1.5DL+1.5EQ-Z	Max +ve	0	27.648
	53		Max -ve	N/A	N/A
CASE 2	1	204 1.5DL+1.5EQ-Z	Max +ve	0	7.159
	53		Max -ve	N/A	N/A
CASE 3	1	204 1.5DL+1.5EQ-Z	Max +ve	N/A	N/A
	53		Max -ve	0	-196.984
CASE 4	1	204 1.5DL+1.5EQ-Z	Max +ve	0	28.156
	53		Max -ve	N/A	N/A
CASE 1	1	202 1.5DL+1.5EQ-X	Max +ve	0	13.891
	35		Max -ve	N/A	N/A
CASE 2	1	202 1.5DL+1.5EQ-X	Max +ve	0	24.814
	35		Max -ve	N/A	N/A
CASE 3	1	202 1.5DL+1.5EQ-X	Max +ve	0	27.578
	35		Max -ve	N/A	N/A
CASE 4	1	202 1.5DL+1.5EQ-X	Max +ve	0	14.081
	35		Max -ve	N/A	N/A
For Staircase Maximum Shear Force					
CASE 1	99	204 1.5DL+1.5EQ-Z	Max +ve	0	11.889
	137		Max -ve	N/A	N/A
CASE 2	99	204 1.5DL+1.5EQ-Z	Max +ve	N/A	N/A
	137		Max -ve	0	-12.751
CASE 3	99	201 1.5DL+1.5EQ+X	Max +ve	N/A	N/A
	137		Max -ve	0	-15.966
CASE 4	99	204 1.5DL+1.5EQ-Z	Max +ve	0	11.966
	137		Max -ve	N/A	N/A
CASE 1	61	204 1.5DL+1.5EQ-Z	Max +ve	0	18.349
	99		Max -ve	N/A	N/A
CASE 2	61	204 1.5DL+1.5EQ-Z	Max +ve	N/A	N/A
	99		Max -ve	0	-16.556
CASE 3	61	201 1.5DL+1.5EQ+X	Max +ve	N/A	N/A
	99		Max -ve	0	-30.917
CASE 4	61	204 1.5DL+1.5EQ-Z	Max +ve	0	19.684
	99		Max -ve	N/A	N/A
CASE 1	9	203 1.5DL+1.5EQ+Z	Max +ve	N/A	N/A
	61		Max -ve	0	-24.212
CASE 2	9	203 1.5DL+1.5EQ+Z	Max +ve	N/A	N/A
	61		Max -ve	0	-15.623
CASE 3	9	201 1.5DL+1.5EQ+X	Max +ve	N/A	N/A
	61		Max -ve	0	-36.908
CASE 4	9	204 1.5DL+1.5EQ-Z	Max +ve	0	21.13
	61		Max -ve	N/A	N/A
CASE 1	9	201 1.5DL+1.5EQ+X	Max +ve	N/A	N/A
	43		Max -ve	0	-29.969
CASE 2	9	201 1.5DL+1.5EQ+X	Max +ve	N/A	N/A
	43		Max -ve	0	-43.703
CASE 3	9	201 1.5DL+1.5EQ+X	Max +ve	N/A	N/A

	43		Max -ve	0	-41.341
CASE 4	9	201 1.5DL+1.5EQ+X	Max +ve	N/A	N/A
	43		Max -ve	0	-30.433

Table 3.3. Reaction value.

	Node	Fx	Fy	Fz	MX	My	MZ
Case 1	35	13.891	364.331	41.322	43.445	0.491	-17.666
		202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	203 1.5DL+1.5EQ+Z	202 1.5DL+1.5EQ-X
Case 2	35	24.814	546.185	49.398	58.212	-0.017	-26.966
		202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	203 1.5DL+1.5EQ+Z	202 1.5DL+1.5EQ-X
Case 3	35	27.578	647.027	50.929	47.433	1.595	-29.623
		202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	203 1.5DL+1.5EQ+Z	202 1.5DL+1.5EQ-X
Case 4	35	14.081	372.797	41.824	41.943	0.501	-16.02
		202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	203 1.5DL+1.5EQ+Z	202 1.5DL+1.5EQ-X
Case 1	36	43.157	501.831	32.665	30.823	0.341	-45.063
		202 1.5DL+1.5EQ-X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X
Case 2	36	52.342	635.043	30.813	29.036	0.196	-58.89
		202 1.5DL+1.5EQ-X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X
Case 3	36	59.513	305.061	52.037	31.857	0.673	-65.244
		202 1.5DL+1.5EQ-X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X
Case 4	36	43.721	514.501	33.162	29.074	0.348	-45.787
		202 1.5DL+1.5EQ-X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X
Case 1	37	-19.279	430.3	48.814	51.38	0.377	20.603
		201 1.5DL+1.5EQ+X	201 1.5DL+1.5EQ+X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	201 1.5DL+1.5EQ+X
Case 2	37	-29.664	697.636	50.564	61.56	-0.328	29.327
		201 1.5DL+1.5EQ+X	201 1.5DL+1.5EQ+X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	201 1.5DL+1.5EQ+X
Case 3	37	-31.808	248.472	55.583	50.825	-3.168	30.047
		201 1.5DL+1.5EQ+X	201 1.5DL+1.5EQ+X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	201 1.5DL+1.5EQ+X
Case 4	37	-19.479	442.458	49.131	47.885	0.402	20.142
		201 1.5DL+1.5EQ+X	201 1.5DL+1.5EQ+X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	201 1.5DL+1.5EQ+X
Case 1	47	24.346	648.041	37.106	41.995	0.39	-26.341
		202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	203 1.5DL+1.5EQ+Z	202 1.5DL+1.5EQ-X
Case 2	47	31.208	873.704	48.98	58.047	-0.025	-31.455
		202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	203 1.5DL+1.5EQ+Z	202 1.5DL+1.5EQ-X
Case 3	47	12.109	594.041	45.797	47.273	-0.405	-16.148
		202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	203 1.5DL+1.5EQ+Z	202 1.5DL+1.5EQ-X
Case 4	47	24.62	660.8	37.873	41.316	0.398	-24.768

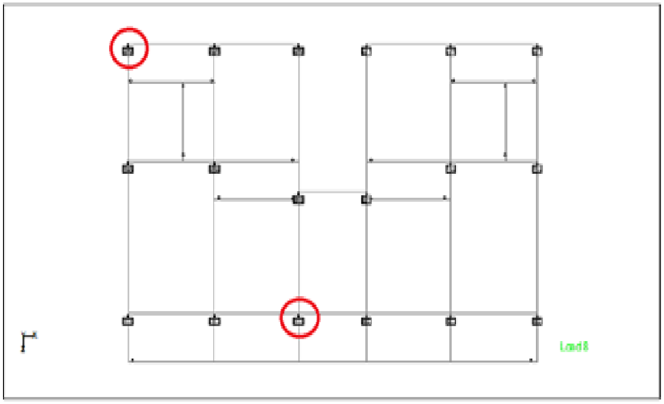
		202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	203 1.5DL+1.5EQ+Z	202 1.5DL+1.5EQ-X
Case 1	48	31.793	839.466	45.827	56.233	0.992	-29.938
		202 1.5DL+1.5EQ-X	200 1.5DL+1.5LL	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X
Case 2	48	32.92	870.15	45.041	53.742	1.214	-32.434
		202 1.5DL+1.5EQ-X	200 1.5DL+1.5LL	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X
Case 3	48	44.705	2017.881	11.311	23.459	4.988	-31.841
		202 1.5DL+1.5EQ-X	200 1.5DL+1.5LL	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X
Case 4	48	32.216	855.516	46.721	56.278	1.012	-29.299
		202 1.5DL+1.5EQ-X	200 1.5DL+1.5LL	204 1.5DL+1.5EQ-Z	204 1.5DL+1.5EQ-Z	202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X
Case 1	51	-29.588	898.318	-34.031	-47.804	-0.823	-31.759
		201 1.5DL+1.5EQ+X	202 1.5DL+1.5EQ-X	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	201 1.5DL+1.5EQ+X	202 1.5DL+1.5EQ-X
Case 2	51	-34.959	1164.021	-58.045	-67.462	-0.934	-37.108
		201 1.5DL+1.5EQ+X	202 1.5DL+1.5EQ-X	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	201 1.5DL+1.5EQ+X	202 1.5DL+1.5EQ-X
Case 3	51	-44.003	2055.632	-73.927	-93.384	1.932	-47.265
		201 1.5DL+1.5EQ+X	202 1.5DL+1.5EQ-X	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	201 1.5DL+1.5EQ+X	202 1.5DL+1.5EQ-X
Case 4	51	-30.066	915.151	-34.498	-45.844	-0.822	-31.377
		201 1.5DL+1.5EQ+X	202 1.5DL+1.5EQ-X	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	201 1.5DL+1.5EQ+X	202 1.5DL+1.5EQ-X
Case 1	41	23.536	579.076	-44.035	-47.666	0.542	-25.663
		202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	202 1.5DL+1.5EQ-X
Case 2	41	34.686	861.385	-49.072	-61.607	-0.135	-34.724
		202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	202 1.5DL+1.5EQ-X
Case 3	41	26.071	567.882	-28.58	-53.782	3.197	-25.963
		202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	202 1.5DL+1.5EQ-X
Case 4	41	23.822	588.445	-44.372	-44.312	0.553	-24.128
		202 1.5DL+1.5EQ-X	202 1.5DL+1.5EQ-X	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	202 1.5DL+1.5EQ-X
Case 1	42	-48.944	775.4	-32.536	-32.255	0.3	54.977
		201 1.5DL+1.5EQ+X	200 1.5DL+1.5LL	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	201 1.5DL+1.5EQ+X	201 1.5DL+1.5EQ+X
Case 2	42	-54.168	980.899	-30.507	-30.158	0.265	66.229
		201 1.5DL+1.5EQ+X	200 1.5DL+1.5LL	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	201 1.5DL+1.5EQ+X	201 1.5DL+1.5EQ+X
Case 3	42	-36.726	987.67	-37.124	-47.121	0.114	45.876
		201 1.5DL+1.5EQ+X	200 1.5DL+1.5LL	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	201 1.5DL+1.5EQ+X	201 1.5DL+1.5EQ+X
Case 4	42	-49.788	786.666	-32.882	-28.714	0.306	55.848
		201 1.5DL+1.5EQ+X	200 1.5DL+1.5LL	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	201 1.5DL+1.5EQ+X	201 1.5DL+1.5EQ+X

Case 1	43	-29.969	724.462	-46.19	-52.56	-0.316	28.616
		201 1.5DL+1.5EQ+X	200 1.5DL+1.5LL	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	201 1.5DL+1.5EQ+X
Case 2	43	-43.703	948.308	-46.759	-62.362	0.211	38.839
		201 1.5DL+1.5EQ+X	200 1.5DL+1.5LL	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	201 1.5DL+1.5EQ+X
Case 3	43	-32.283	355.036	-65.107	-90.629	-1.36	28.558
		201 1.5DL+1.5EQ+X	200 1.5DL+1.5LL	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	201 1.5DL+1.5EQ+X
Case 4	43	-30.433	733.704	-46.654	-50.734	-0.33	28.448
		201 1.5DL+1.5EQ+X	200 1.5DL+1.5LL	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	203 1.5DL+1.5EQ+Z	201 1.5DL+1.5EQ+X

Table 3.4. Beam End Forces .

For The Edge Beam End Force							
	Node	FX	FY	FZ	MX	MY	MZ
CASE 1	91	48.17	16.773	9.058	0.377	12.797	24.84
	129	39.114	16.773	9.058	0.377	14.37	25.51
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z
CASE 2	91	41.038	27.068	13.75	-0.192	0.602	-0.304
	129	-38.321	-27.068	-13.75	0.192	-12.977	24.665
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z
CASE 3	91	98.365	42.778	18.166	0.911	-13.002	28.418
	129	-95.346	-42.778	-18.166	-0.911	-5.164	14.36
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z
CASE 4	91	41.911	16.648	8.874	0.383	6.421	-10.701
	129	-39.194	-16.648	-8.874	-0.383	-14.407	25.684
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z
CASE 1	53	162.944	29.865	14.89	0.68	21.79	41.72
	91	153.33	29.865	14.89	0.68	22.89	47.87
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z
CASE 2	53	211.901	52.34	24.759	0.632	-0.055	-2.295
	91	-209.184	-52.34	-24.759	-0.632	-22.228	49.402
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z
CASE 3	53	273.79	51.235	26.646	0.982	-22.137	43.128
	91	-270.771	-51.235	-26.646	-0.982	-4.51	8.107
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z
CASE 4	53	157.054	30.063	14.971	0.696	9.675	-21.292
	91	-154.338	-30.063	-14.971	-0.696	-23.15	48.349
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z
CASE 1	1	288.96	34.04	16.89	0.61	23.37	47.08
	53	279.9	35.05	16.89	0.61	27.31	55.09
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z
CASE 2	1	398.319	55.287	29.847	0.711	0.077	-5.565
	53	-395.602	-55.287	-29.847	-0.711	-26.939	55.324
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z
CASE 3	1	463.777	58.17	28.058	0.861	-21.446	47.028
	53	-460.758	-58.17	-28.058	-0.861	-6.612	11.142
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z
CASE 4	1	283.641	34.44	17.117	0.624	12.312	-24.759
	53	-280.924	-34.44	-17.117	-0.624	-27.718	55.755
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z
CASE 1	1	368.77	41.01	17.87	0.4	6.96	15.56
	35	373.3	41.01	17.87	0.4	19.84	45.95
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z
CASE 2	1	545.78	49.39	24.81	0.25	10.25	15.88
	35	550.31	49.39	24.81	0.25	26.96	58.21
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z
CASE 3	1	546.323	-51.798	25.072	0.319	-11.617	-20.54
	35	-550.852	51.798	-25.072	-0.319	-25.991	-57.158
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z
CASE 4	1	370.077	-41.456	18.149	0.414	-7.044	-15.514
	35	-374.605	41.456	-18.149	-0.414	-20.179	-46.67
		1.5DL+1.5EQ-Z	1.5DL+1.5EQ-Z	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-X	1.5DL+1.5EQ-Z

For The Staircase Beam End Forces							
	Node	FX	FY	FZ	MX	MY	MZ
CASE 1	99	108.43	14.3	12.39	0.22	18.56	17.03
	137	99.38	14.3	12.39	0.22	18.63	25.87
		1.5DL+1.5LL	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-X	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z
CASE 2	99	101.756	-13.073	-21.875	-0.507	5.842	-24.245
	137	-99.039	13.073	21.875	0.507	17.901	27.414
		1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z
CASE 3	99	180.765	-27.201	-38.919	0.415	24.688	14.551
	137	-177.747	27.201	38.919	-0.415	14.232	-12.941
		1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z
CASE 4	99	102.1	-7.866	-12.296	-7.709	0.004	-14.078
	137	-99.383	7.866	12.296	18.776	0.031	-13.307
		1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z
CASE 1	61	371.391	22.74	22.1	0.317	32.81	31.95
	99	362.39	22.74	22.1	0.317	33.49	36.28
		1.5DL+1.5LL	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-X	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z
CASE 2	61	439.313	-35.434	-48.18	-0.043	7.435	-26.594
	99	-436.597	35.434	48.18	0.043	35.927	36.929
		1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z
CASE 3	61	518.979	-36.569	-50.843	0.136	38.09	31.24
	99	-515.961	36.569	50.843	-0.136	12.753	-15.754
		1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z
CASE 4	61	365.052	-21.231	-22.322	0.033	-13.874	-16.135
	99	-362.335	21.231	22.322	-0.033	33.964	36.813
		1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z
CASE 1	9	635.18	23.04	26.13	0.45	37.65	46.57
	61	626.13	23.04	26.13	0.45	40.74	42.6
		1.5DL+1.5LL	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-X	1.5DL+1.5EQ+X	1.5DL+1.5EQ+Z
CASE 2	9	777.839	-35.735	-55.655	0.053	6.486	-28.34
	61	-775.122	35.735	55.655	-0.053	43.604	44.767
		1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z
CASE 3	9	856.416	-59.477	-55.999	0.193	40.649	19.372
	61	-853.397	59.477	55.999	-0.193	15.35	-11.583
		1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z
CASE 4	9	628.85	-30.138	-26.518	0.034	-17.53	-22.464
	61	-626.133	30.138	26.518	-0.034	41.396	43.572
		1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z
CASE 1	9	722.04	40.29	34.44	0.16	21.24	17.83
	43	729.57	40.29	34.44	0.16	30.42	36.27
		1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-X	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z
CASE 2	9	943.78	46.759	-43.703	-0.192	26.716	12.936
	43	-948.308	-46.759	43.703	0.192	38.839	-49.281
		1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z
CASE 3	9	943.913	50.293	-41.341	-0.099	25.366	9.455
	43	-948.441	-50.293	41.341	0.099	36.645	-46.069
		1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z
CASE 4	9	722.049	40.758	-34.984	-0.064	21.548	17.907
	43	-726.577	-40.758	34.984	0.064	30.928	-37.035
		1.5DL+1.5LL	1.5DL+1.5EQ+Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z	1.5DL+1.5EQ+X	1.5DL+1.5EQ-Z



Node Location

The Modelling and analysis is carried out considering the RCC structure as described in Chapter no.5On the Basis of Modelling and port processing various analysis of output are compared as shown in table 3.1 to 3.4For comparison the corner exterior edge is consider similarly the node along the interior edge near staircase is consider

From table no. 3.1 it can be seen that maximum displacement at the top and gradually reduces at the bottom i.e. for case number one node number 129 it is maximum at the top i.e. 29.272mm and 1.82 for first floor.

When the comparison mode for various cases. In case no. one where is no band provide the displacement is maximum while in case no. two where lintel band are provided the displacement at the top is 24.62 similarly in the case no. third the displacement value is reduce when the band are provide in sill level i.e. 23.305. While for case no. four when the footing are interconnected with bands the displacement further reduce.

From table no. 3.2 the comparison is made for shear force where it can be seen that for the case no. one where no bands provided as well as case no. four when strap footing providing the result are almost same. When the lintel bands are provided there is considerable reduction in shear force i.e. case no two similarly form table no. 3.3.It can be observed that the reaction value increases for case two and case number third whereas the forces in horizontal Z direction is more as compared to X direction out of all four cases the reaction values increases with the increase in load in a particular cases.

Form table number 3.4 the beam end forces at the top is minimum and increases with decrease in storey level out of all four cases the beam end forces is maximum for the case number three where sill level band are provided

On the basis of this remarks the conclusion is drawn in next chapter

4. Conclusion

Out of all vulnerable action one such action- earthquake and structure response to it is studied over here in this dissertation work, the RCC structure with and without bands provision are studied. In all they are four cases consisting of case 1 (Seismic analysis of RC frame Structure without Bands),case 2 (Seismic analysis of RC frame Structure with Band at lintel level),case 3 (Seismic analysis of RC frame Structure with Band at sill level),case 4 (Seismic analysis of RC frame Structure with Band at footing level) are model using Staad Pro v8i and comparative study done for the values of nodal displacement, drift value, shear forces ,reactions value, beam end forces for the same structure with the change in bands provision. The size of the band and material is kept same and location is shifted from the lintel to sill and sill to substructure foundation. From the chapter observation drawn in chapter number five it can be seen that the structure without provision of bands shows higher displacement values ,shear forces, beam end forces on inner and outer nodal location as specified in chapter number five when the comparison is made the value of displacement is maximum for the combination of (1.5 DL + 1.5 EQ) in X direction the result of case number 4 where the footing are connected by a bands are much more better as compared to the provision of bands at lintel level.

Similarly, the provision of bands at sill level shows reduce displacement values as comparative lintel bands for the increasing the structure overall stability does the study shows that not only provision of bands but their location plays important role.

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