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Analysis Of Multistoried Irregular Building With And Without Floating Column Using Etabs

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ABSTRACT

In construction scenario of present days, floating column is growing as a new feature for the reinforced concrete framed buildings in urban regions of India. Generally, in earthquake prone areas such type of practices is undesirable. Use of floating column tends to increase the moments in columns, storey shear and storey drifts, etc. which ultimately decreases the strength of structures. The present study emphasizes to evaluate the presence and absence of floating column in high rise Irregular building for the different cases of RC frames were studied and analysed by dynamic analysis. In present study eight models are used 'Model 1 (G+14 Irregular building without floating column)', 'Model 2 (G+14 Irregular building with floating column at all four corners in ground floor only)', 'Model 3 (G+14 Irregular building with floating column at all four corners in second floor only)', 'Model 4 (G+14 Irregular building with floating column at all four corners in third floor only)', 'Model 5 (G+14 Irregular building with floating column at all four corners in fifth floor only)'. 'Model 6 (G+14 Irregular building with floating column at all four corners in seventh floor only)', 'Model 7 (G+14 Irregular building with floating column at all four corners in ninth floor only)', 'Model 8 (G+14 Irregular building with floating column at all four corners in eleventh floor only)' Seismic analyses of all eight models have been carried out using Response Spectrum Method (RSM) at zone (IV). Further comparisons of results on the basis of parameters such as Storey Drifts, Storey Displacements, etc. for all eight models are executed. This analysis is executed using ETABS 2016 software as per the codal provisions of IS: 1893-2002. In this way floating column structures play a vital role for the occupancy and free circulation feature. Present study claims that the use of floating column in seismically active areas may cause a hazardous damage to the RC frame structures.

Keywords: Multistorey building, floating column, ETABS

I. INTRODUCTION

Building construction is becoming more complicated today as a result of requirements and usability. Due to the varied uses of the same structure, various architectural plans have been put out for the various floors, and it is becoming more challenging to fit such frames since the location of the columns would provide issues. As balconies and terraces are not included in the Floor Space Index, we occasionally need extra space in residential buildings for these purposes as well as for porticos on the ground floor for lavish views and in parking lots where we need some extra column-free space to facilitate easy vehicle movement. Additionally, there are times when we need to build areas with no columns in the lower levels and spaces with a grid design (for residences) in the higher stories. For all of the scenarios mentioned above, we will often offer a frame configuration of the cantilever variety, also known as a frame with floating column. However, logical studies and knowledge of how buildings perform during earthquakes show that such buildings would cause misalignments in the building space, forming elements that would not only reduce the building's capacity to withstand earthquakes but also eventually lead to its failure.

II. LITERATURE REVIEW

1. **KeerthiGowda B. S and Syed Tajoddeen studies "Seismic Analysis Of Multistorey Building With Floating Columns"** Proceedings of the first annual conference on innovations and developments in civil engineering, ACIDIC-2014

Major earthquakes showed the hazardous effects and vulnerability of inadequate constructions. New multistory structures in urban areas often use floating columns as an architectural feature. The vertical component known as

the floating column is supported at its base by a beam. In order to avoid poor performance, any variation or discontinuity in the path of load transfer for the seismic inertia forces produced at a building's floor levels must be brought down along the height to the ground. As a result, structures built in seismically active areas should avoid using floating columns and other design features.
The eleven-story symmetric RC structure in ETABS 9.7.1 is modelled as having floating columns, floating columns without bracing, floating columns with bracing, and floating columns after providing bracing.
The primary goal of the current study was to evaluate the seismic performance of RC buildings with floating columns as well as the seismic performance of RC buildings with floating columns after lateral bracings were installed. In order to achieve this, three models—without floating columns, with floating columns, and with floating columns plus bracings—are examined using response spectrum analysis (RSA). The multi-story buildings having floating columns performed badly during seismic excitation, according to the parametric investigation of storey drift, storey shear, time period, and displacement. Lateral bracings were thus provided to enhance the multi-story RC building's seismic performance. The bracings significantly increased the multi-story building's seismic performance as many indices, including storey drift, storey shear, time period, and displacement, all improved by 10% to 30%.

2. Isha Rohilla, S.M. Gupta, Babita Saini studies **"Seismic Response Of Multi-Storey Irregular Building With Floating Column"** International Journal Of Research In Engineering And Technology Volume: 04 Issue: 03 | Mar-2015
This study discusses the essential position of a floating column in vertically irregular structures for zones II and V that are G+5 and G+7 RC buildings. The impact of the size of the beams and columns supporting the weight of the floating column has also been evaluated. The results produced by ETABS software have been evaluated using building responses such storey drift, storey displacement, and storey shear.Two irregular RC building models with G+5 & G+7 storeys have been used for the evaluation For each model two zones were considered for analysis viz. zone II and zone V.The analysis was conducted under medium soil conditions. Additionally, two cases of irregularities have been obtained for each model. Each model has two bays with a 5 m apart spacing and one bay with a 6 m apart spacing in the X direction. However, in the Y-direction, each bay is spaced 5m apart. The analysis has employed the importance factor as 1 and the response reduction factor as 5, respectively. Earthquake has only been taken into account in the X direction.

Following conclusions have been made on the basis of analysis and results:

i. Due to their poor performance, floating columns should not be used in high-rise buildings in zone 5.
ii. The presence of a floating column causes an increase in storey displacement and storey drift.
iii. As the weight on a floating column increases, storey displacement also rises.
iv. Storey shear reduces when a floating column is present.

3. Murtaza A. Rangwala , Sitesh Kumar Singh . "Seismic Analysis of Multi-Storey Frame with and Without Floating Columns" International Journal of Innovative Research in Science, Engineering and Technology, Vol. 7 , Issue 5, May 2018.

Due to the growth in population, there is an increasing problem with space in metropolitan areas nowadays. A column-free area is necessary for this, as well as for aesthetic and other practical reasons. The majority of high-rise buildings include open ground story space for parking, lobbies, receptions, and other aesthetic requirements thanks to modern construction processes, which place a priority on structural and architectural necessities. This novel idea results in the disruption of floating columns, which renders the lateral resistance of the structure impossible.

It's possible that floating columns in multi-story buildings in metropolitan areas weren't made to withstand seismic shocks. The four models below are created and examined in this study:
Model 1 (G+9 Bare RC frame without provision of floating column)
Model 2 (G+9 infill RC frame without provision of floating column)
Model 3 (G+9 Bare RC frame with floating column)
Model 4 (G+9 infill RC frame with floating column)
The analysis' findings are simple to acquire. The linear analysis of the structure is conducted using the Equivalent Static Method (ESM). The findings of the current work are covered in this chapter. The importance of floating and non-floating construction parameters is discussed in this chapter with reference to standard engineering procedures.

Each storey in the G+9 Storey Building used in this study has a height of 3.5 m. Both the bare frame model and the bare frame model with floating column have undergone static analysis.

4. Vandana Sharma, Sourabh Dashore "Static and Dynamic Analysis of Multistorey Buildings Having Floating Columns" Volume: 05 Issue: 12 | Dec 2018 International Research Journal of Engineering and Technology (IRJET)

In addition to how the forces of an earthquake are transmitted to the ground, a building's overall design, size, and geometry have a significant impact on how it responds to earthquakes. A building's performance suffers if there is any departure from this load transfer path, which must carry the earthquake forces generated at various floor levels along the height to the bottom in the least amount of time. At the level of discontinuity, buildings with vertical setbacks (such as hotel buildings that are a few storeys wider than the rest) generate a sharp increase in earthquake forces. Buildings with exceptionally tall storeys or those with fewer columns or walls in a single story are more likely to sustain damage or collapse from that point forward. During the 2001 Bhuj earthquake in Gujarat, many structures with an open ground floor designed for parking fell or sustained significant damage. The load transfer path is interrupted in structures with columns that hang or float on beams at an intermediate story rather than continuing all the way to the foundation.

The goal of the current effort is to compare, using static and dynamic analysis, how multi-story buildings with floating columns with and without shear walls respond to seismic pressures. Three cases of multistory buildings are taken into consideration for this purpose. Shear walls have been added to decrease lateral displacement and storey drift.

The response parameters chosen to examine the behavior are storey drift and lateral displacement. All of the examples are thought to be in zones III, IV, and V, and they are all static and dynamically evaluated. The shear wall and without it in each of the three scenarios are both examined.

III. OBJECTIVE

The main objectives of my work are:

1. Analysis of a 15 story irregular building on plain ground.
2. To investigate the performance of all the building models with respect to Base shear, Story Drift, Story Displacement with and without Floating Column.
3. To study the effect of varying the location of floating column on irregular multistoried building.

IV. METHODOLOGY

A G+14 storied model of Irregular building is analyzed having 8 bays in X direction and 10 bays in Y direction for a total of 8 cases with and without floating column at corners within the floor level and in different stories. Using Indian Standard Code IS 1893 (part 1): 2002 various parameters are analyzed for various condition under seismic zone IV by Response Spectrum Method. Using Etabs 2016.

Model 1: Modelling and analysis of G+14 Irregular building without floating column.

Model 2: Modelling and analysis of G+14 Irregular building with floating column at all four corners in ground floor only.

Model 3: Modelling and analysis of G+14 Irregular building with floating column at all four corners in 2nd floor only.

Model 4: Modelling and analysis of G+14 Irregular building with floating column at all four corners in 3rd floor only.

Model 5: Modelling and analysis of G+14 Irregular building with floating column at all four corners in 5th floor only.

Model 6: Modelling and analysis of G+14 Irregular building with floating column at all four corners in 7th floor only.

Model 7: Modelling and analysis of G+14 Irregular building with floating column at all four corners in 9th floor only.

Model 8: Modelling and analysis of G+14 Irregular building with floating column at all four corners in 11th floor only.

Table 1: Specifications of Irregular building

Plan size	40mX50m
Purpose	Commercial
Number of bays in X direction	8 Nos
Number of bays in Y direction	10 Nos
Spacing of bays in each direction	5m
Number of stories	15
Story height and Plinth height	3.2m and 1.5m
Total height of the building	49.5m
End condition	fixed
Material properties	M30 grade concrete and Fe 500 HYSD bars
Unit weight of RCC	25KN/m^2
Unit weight of brick masonry	19.2 KN/m^2
Wall thickness	230mm
Column sizes	Internal : 600x600mm External : 500x500mm
Beam size	230X300mm
Soil type	Hard soil
Live load	4KN/m^2 on floor and 2KN/m^2 on roof
Infill load	12KN/m^2
Floor finish	1KN/m^2
Earthquake parameters	Earthquake zone Z= IV=0.24 Importance factor I = 1.2 Response reduction factor, R = 5 (SMRF)
Study parameters	Base shear, story displacement, story drift
Method of analysis	Response spectrum analysis

V. ANALYSIS RESULTS AND DISCUSSION

The analysis results of all the models are discussed below with respect to the studyparameters as follows.

BASE SHEAR

Base shear is total lateral force transmitted to the foundation during an earthquake. It determines the building's response to seismic forces and influences structural design. Factors affecting base shear include ground motion and building properties. It's crucial for designing the load-resisting system. Engineers use analysis methods to calculate base shear. Distribution along the building's height is necessary for stability. It helps determine the size and strength of structural elements. Base shear ensures the building can withstand seismic forces, ensuring occupant safety.

The design base shear is given by Vb= Z/2 x I/R x Sa/g x W
Where, Importance factor "I" =1.2
Response Reduction Factor "R"=5 as the structure would be designed as SMRF.
Sa/g = the normalized response spectrum value for the structure which is the function of the fundamental time period of vibration of the structure and the type of the founding soil.
W = Seismic weight of the building which will be calculated in accordance with the relevant clause IS 1893 (Part 1):2002.

Table 2 : Table Showing Base Shear Values in all Models

MODEL NUMBER	CASE TYPE	BASE SHEAR(KN)
MODEL 1	RSMX CASE RSMY CASE	871.7541 879.7789
MODEL 2	RSMX CASE RSMY CASE	854.3358 862.3935
MODEL 3	RSMX CASE RSMY CASE	863.9199 872.0224
MODEL 4	RSMX CASE RSMY CASE	865.4531 873.5448
MODEL 5	RSMX CASE RSMY CASE	867.9839 876.0551
MODEL 6	RSMX CASE RSMY CASE	869.0458 877.1040
MODEL 7	RSMX CASE RSMY CASE	871.1715 879.2120
MODEL 8	RSMX CASE RSMY CASE	872.6746 880.6960

From the above base shear comparison it is clear that the lowest value is observed in 2ndmodel and the highest value is seen in the 8th model.

As the floor height increases with floating column base shear also increases.

The base shear for a Irregular building without floating column is greater than building with floating column.

TABLE 3: PERCENTAGE INCREASE IN BASE SHEAR

MODEL NUMBER	BASE SHEAR	PERCENTAGE INCREASE (%)
MODEL 1	871.7541 879.7789	-
MODEL 2	854.3358 862.3935	-1.9981 -1.9761
MODEL 3	863.9199 872.0224	-0.8987 -0.8816
MODEL 4	865.4531 873.5448	-0.7228 -0.7086
MODEL 5	867.9839 876.0551	-0.4325 -0.4233
MODEL 6	869.0458 877.1040	-0.3107 -0.304
MODEL 7	871.1715 879.212	-0.0668
MODEL 8	872.6746 880.6960	-0.0644 0.10559

From the above tables it is clear that comparing building without floating column to building with floating column base shear decreases.

Model 1 having the greater base shear in both the cases i.e, RSMX and RSMY

Model 2 Irregular building with floating has less base shear compared to the building without floating column.

Decreases in the percentage of base shear when compared the models.

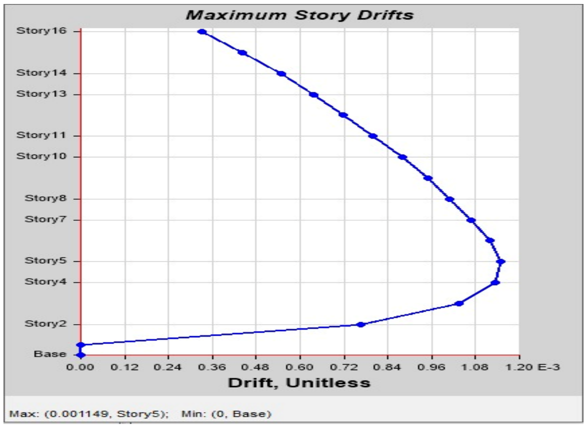
STORY DRIFT

Story drift is a crucial parameter in the seismic analysis and design of buildings. refers to the relative horizontal displacement or movement between adjacent floors of a building during an earthquake. It is an essential consideration in evaluating the structural performance and ensuring the safety of the building.

During an earthquake, the ground motion imparts lateral forces on the building, causing it to oscillate and undergo deformation. The story drift is a measure of the extent to which each floor moves horizontally in response to these seismic forces. It helps engineers understand the building's behavior under seismic loads and assess its structural integrity

TABLE 4: STORY DRIFT FOR MODEL 1

STORY	ELEVATION (m)	RSMX (X-dir)	RSMY (Y-dir)
Story15	49.5	0.000333	0.000327
Story14	46.3	0.000442	0.000436
Story13	43.1	0.000549	0.000542
Story12	39.9	0.000639	0.000632
Story11	36.7	0.000719	0.000713
Story10	33.5	0.0008	0.000793
Story9	30.3	0.000879	0.000872
Story8	27.1	0.00095	0.000943
Story7	23.9	0.00101	0.001003
Story6	20.7	0.001066	0.00106
Story5	17.5	0.001118	0.001112
Story4	14.3	**0.001149**	**0.001143**
Story3	11.1	0.001033	0.001127
Story2	7.9	0.001034	0.001029
Story1	4.7	0.000766	0.000758
plinth	1.5	0	0



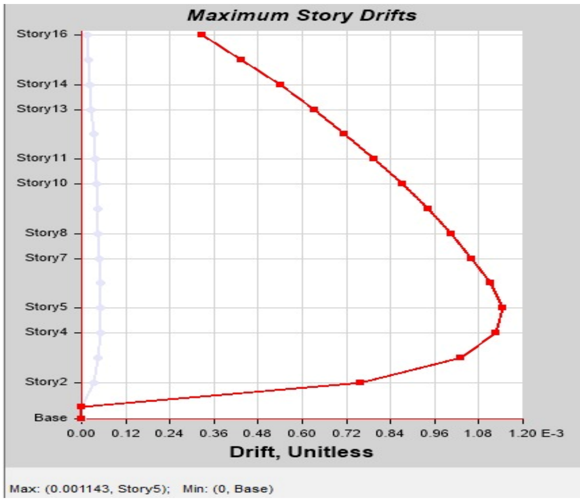
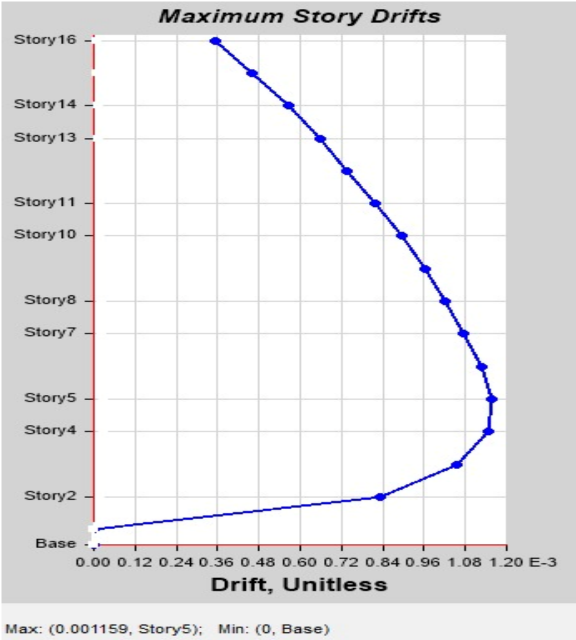


TABLE 5: STORY DRIFT FOR MODEL 2

STORY	ELEVATION (m)	RSMX (X-dir)	RSMY (Y-dir)
Story15	49.5	0.000352	0.000346
Story14	46.3	0.000461	0.000455
Story13	43.1	0.000567	0.000561
Story12	39.9	0.000657	0.000651
Story11	36.7	0.000737	0.000731
Story10	33.5	0.000816	0.00081
Story9	30.3	0.000893	0.000887
Story8	27.1	0.000962	0.000956
Story7	23.9	0.00102	0.001015
Story6	20.7	0.001075	0.00107
Story5	17.5	0.001127	0.001122
Story4	**14.3**	**0.001159**	**0.001154**
Story3	11.1	0.001145	0.001141
Story2	7.9	0.001053	0.001049
Story1	4.7	0.00083	0.000811
plinth level	1.5	0	0
Base	0	0	0



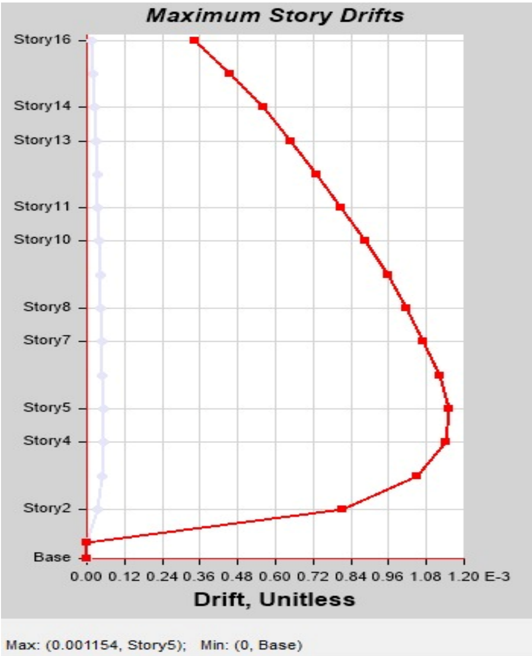


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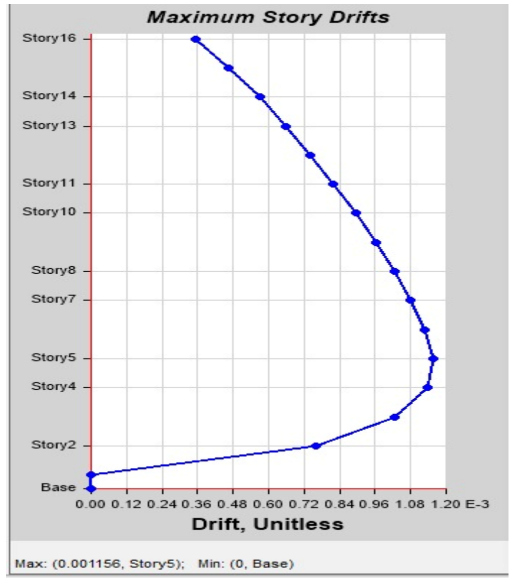
TABLE 6: STORY DRIFT FOR MODEL 3

STORY	ELEVATION (m)	RSMX (X-dir)	RSMY (Y-dir)
Story15	49.5	0.000354	0.000348
Story14	46.3	0.000463	0.000458
Story13	43.1	0.00057	0.000564
Story12	39.9	0.00066	0.000654
Story11	36.7	0.00074	0.000734
Story10	33.5	0.00082	0.000814
Story9	30.3	0.000897	0.000891
Story8	27.1	0.000965	0.000959
Story7	23.9	0.001024	0.001018
Story6	20.7	0.001078	0.001072
Story5	17.5	0.001128	0.001122
Story4	14.3	**0.001156**	**0.001151**
Story3	11.1	0.001139	0.001134
Story2	7.9	0.001025	0.00102
Story1	4.7	0.000759	0.000752
plinth level	1.5	0	0
Base	0	0	0



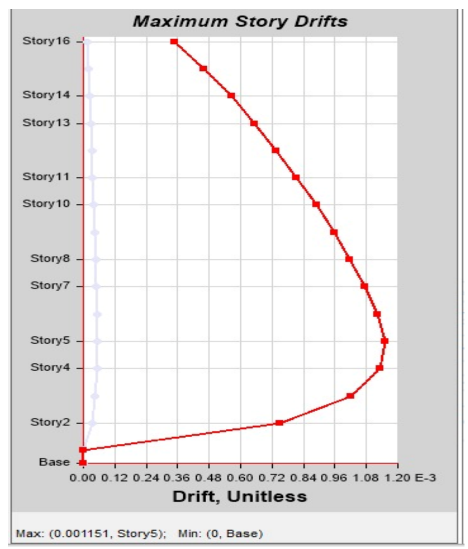
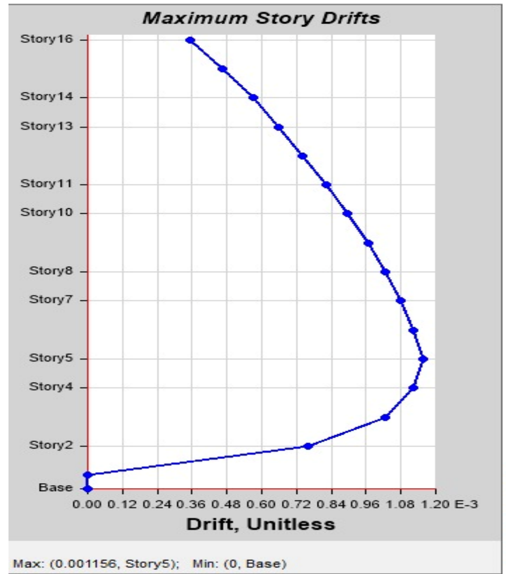


TABLE 7: STORY DRIFT FOR MODEL 4

STORY	ELEVATION (m)	RSMX (X-dir)	RSMY (Y-dir)
Story15	49.5	0.000354	0.000348
Story14	46.3	0.000463	0.000458
Story13	43.1	0.00057	0.000565
Story12	39.9	0.00066	0.000655
Story11	36.7	0.000741	0.000735
Story10	33.5	0.00082	0.000814
Story9	30.3	0.000897	0.000891
Story8	27.1	0.000966	0.000959
Story7	23.9	0.001024	0.001018
Story6	20.7	0.001077	0.001071
Story5	17.5	0.001124	0.001119
Story4	14.3	**0.001156**	**0.001151**
Story3	11.1	0.001124	0.001119
Story2	7.9	0.001025	0.00102
Story1	4.7	0.000758	0.000751
plinth level	1.5	0	0
Base	0	0	0



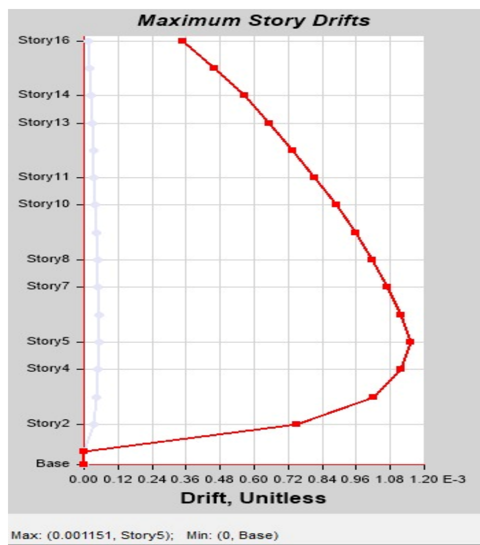
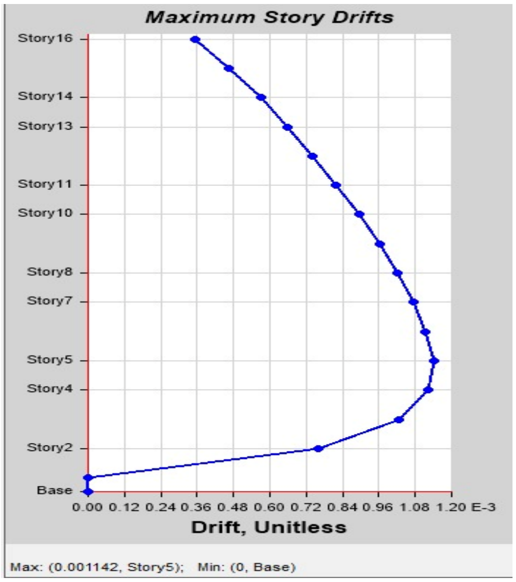


TABLE 8: STORY DRIFT FOR MODEL 5

STORY	ELEVATION (m)	RSMX (X-dir)	RSMY (Y-dir)
Story15	49.5	0.000354	0.000348
Story14	46.3	0.000463	0.000457
Story13	43.1	0.00057	0.000564
Story12	39.9	0.00066	0.000654
Story11	36.7	0.00074	0.000734
Story10	33.5	0.00082	0.000813
Story9	30.3	0.000897	0.00089
Story8	27.1	0.000964	0.000958
Story7	23.9	0.001019	0.001013
Story6	20.7	0.001075	0.001069
Story5	17.5	0.001114	0.001108
Story4	14.3	**0.001142**	**0.001136**
Story3	11.1	0.001124	0.001119
Story2	7.9	0.001026	0.001021
Story1	4.7	0.00076	0.000752
plinth level	1.5	0	0
Base	0	0	0



MODEL NUMBERS	MAXIMUM STORY DRIFT RSMX	MAXIMUM STORY DRIFT RSMY	FLOOR LEVEL

1	0.001149	0.001143	4
2	**0.001159**	**0.001154**	**4**
3	0.001156	0.001151	4
4	0.001156	0.001151	4
5	0.001142	0.001136	4
6	0.001143	0.001137	4
7	0.001146	0.00114	4
8	0.001148	0.001142	4

From the above table it is clear that the irregular building without floating column has less story drift comparing with the irregular building having floating column.

In the model 1 story drift value is LESS in both the cases RSMX and RSMY.

As the height of the building increases having the floating column the story drift values goes on decreasing in both the cases i.e,RSMX and RSMY.

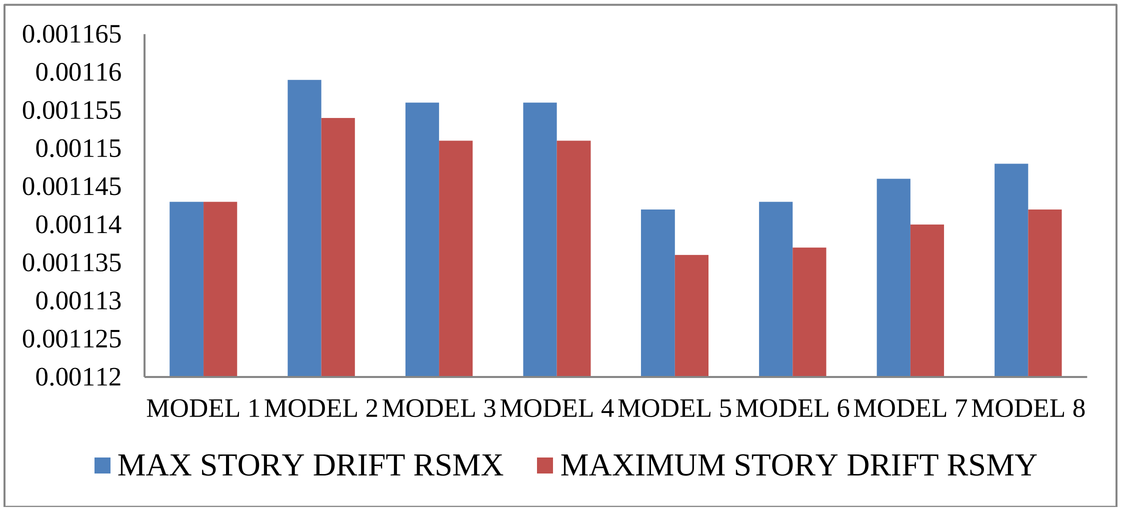
Maximum story drift value is seen in the fourth floor only in both the cases i.e, RSMX and RSMY.

Maximum drift value is seen in Model 2 only in both the cases.

Minimum drift value is seen in Model 5 only in both the cases.

A building's maximum allowed drift is 0.004H as per IS 875 part 3, where H= height of one story Maximum allowed drift =0.004×3.2=0.0128m

The story drift is within the allowable limit for all the models



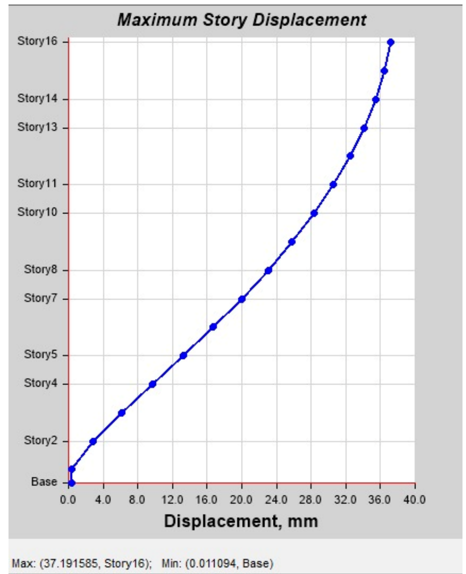
GRAPH:1 SHOWING MAXIMUM STORY DRIFT VALUES IN ALL THE MODELS

STORY DISPLACEMENT

Story displacement is the deflection of a single story relative to the base or ground level of the structure. Story displacement occurs when the seismic waves cause different levels or storys of a building to move relative to each other. This can lead to differential displacements, where some storys move more than others. The magnitude of story displacement depends on various factors, including the intensity and duration of the earthquake, the characteristics of the soil, and the structural properties of the building.

TABLE 9: STORY DISPLACEMENT FOR MODEL 1

STORY	ELEVATION (m)	RSMX (X-dir)	RSMY (Y-dir)
Story15	49.5	37.192	36.882
Story14	46.3	36.451	36.162
Story13	43.1	35.447	35.178
Story12	39.9	34.134	33.885
Story11	36.7	32.505	32.277
Story10	33.5	30.564	30.357
Story9	30.3	28.322	28.137
Story8	27.1	25.796	25.632
Story7	23.9	23.007	22.864
Story6	20.7	19.969	19.847
Story5	17.5	16.701	16.599
Story4	14.3	13.238	13.156
Story3	11.1	9.662	9.599
Story2	7.9	6.114	6.067
Story1	4.7	2.834	2.805
plinth level	1.5	0.402	0.389
Base	0	0.402	0.389



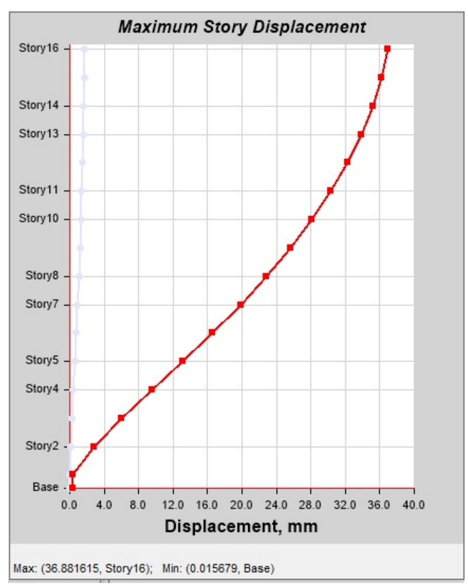
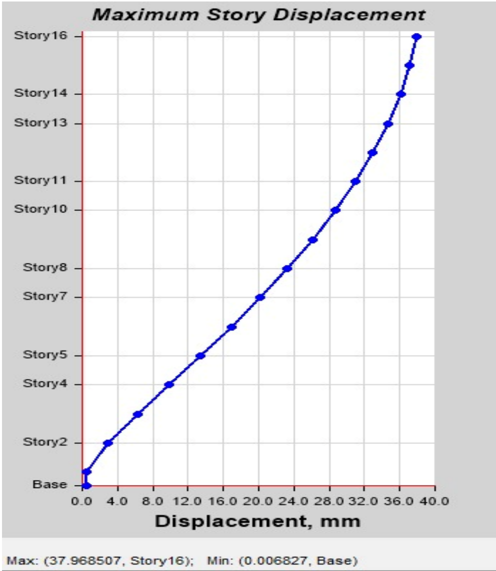


TABLE 10: STORY DISPLACEMENT FOR MODEL 2			
STORY	**ELEVATION (m)**	**RSMX (X-dir)**	**RSMY (Y-dir)**
Story15	49.5	37.969	37.708
Story14	46.3	37.143	36.902
Story13	43.1	36.059	35.836
Story12	39.9	34.672	34.467
Story11	36.7	32.976	32.789
Story10	33.5	30.975	30.807
Story9	30.3	28.681	28.531
Story8	27.1	26.11	25.978
Story7	23.9	23.282	23.168
Story6	20.7	20.211	20.115
Story5	17.5	16.913	16.833
Story4	14.3	13.422	13.358
Story3	11.1	9.816	9.766
Story2	7.9	6.229	6.191
Story1	4.7	2.898	2.867
plinth level	1.5	0.407	0.396
Base	0	0.407	0.396



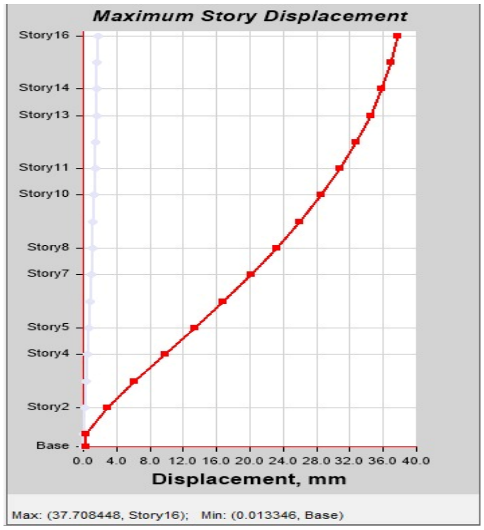


TABLE 11: STORY DISPLACEMENT FOR MODEL 3			
STORY	**ELEVATION (m)**	**RSMX (X-dir)**	**RSMY (Y-dir)**
Story15	49.5	37.818	35.547
Story14	46.3	36.991	36.738
Story13	43.1	35.902	35.668
Story12	39.9	34.51	34.294
Story11	36.7	32.807	32.61
Story10	33.5	30.8	30.62
Story9	30.3	28.497	28.337
Story8	27.1	25.918	25.776
Story7	23.9	23.082	22.958
Story6	20.7	20.004	19.898
Story5	17.5	16.701	16.612
Story4	14.3	13.21	13.138
Story3	11.1	9.619	9.562
Story2	7.9	6.054	6.011
Story1	4.7	2.806	2.778
plinth level	1.5	0.398	0.385
Base	0	0.398	0.385

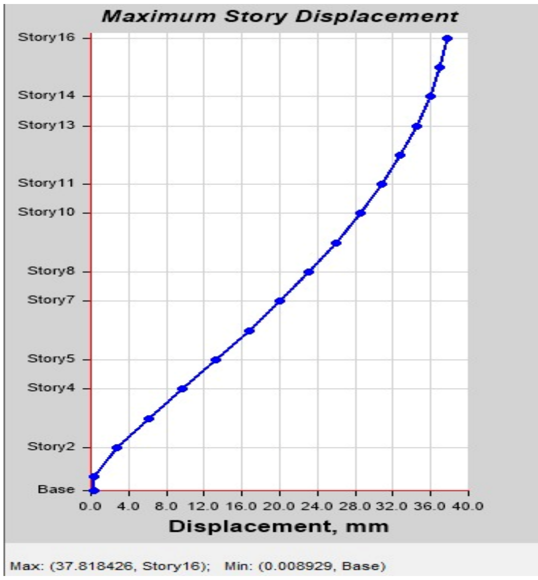
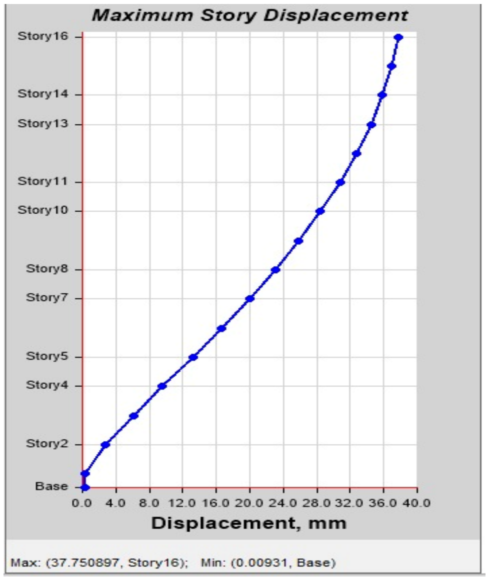


TABLE 12: STORY DISPLACEMENT FOR MODEL 4			
STORY	ELEVATION (m)	RSMX (X-dir)	RSMY (Y-dir)
Story15	49.5	37.751	37.473
Story14	46.3	36.925	36.666
Story13	43.1	35.838	35.597
Story12	39.9	34.447	34.224
Story11	36.7	32.744	32.541
Story10	33.5	30.737	30.552
Story9	30.3	28.434	28.268
Story8	27.1	25.855	25.708
Story7	23.9	23.019	22.89
Story6	20.7	19.943	19.833
Story5	17.5	16.645	16.553
Story4	14.3	13.169	13.094
Story3	11.1	9.577	9.518
Story2	7.9	6.056	6.012
Story1	4.7	2.807	2.779
plinth level	1.5	0.399	0.385
Base	0	0.399	0.385



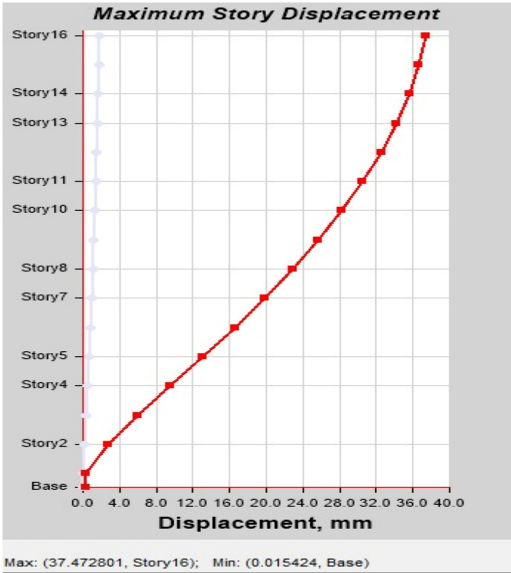
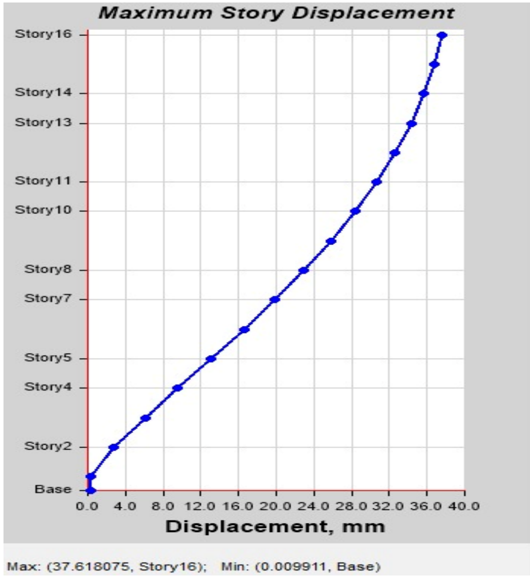
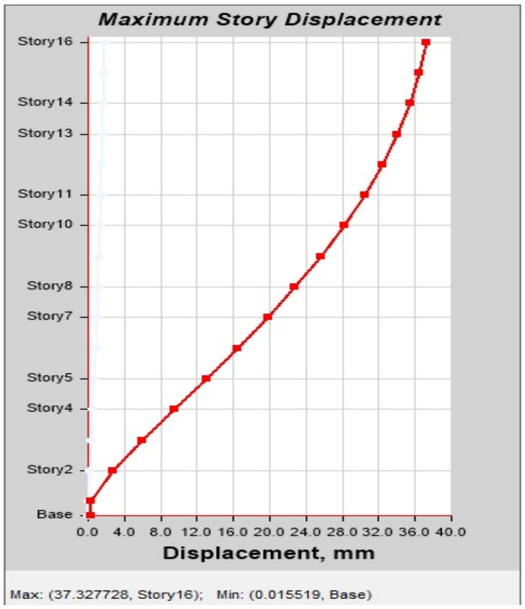


TABLE 13: STORY DISPLACEMENT FOR MODEL 5

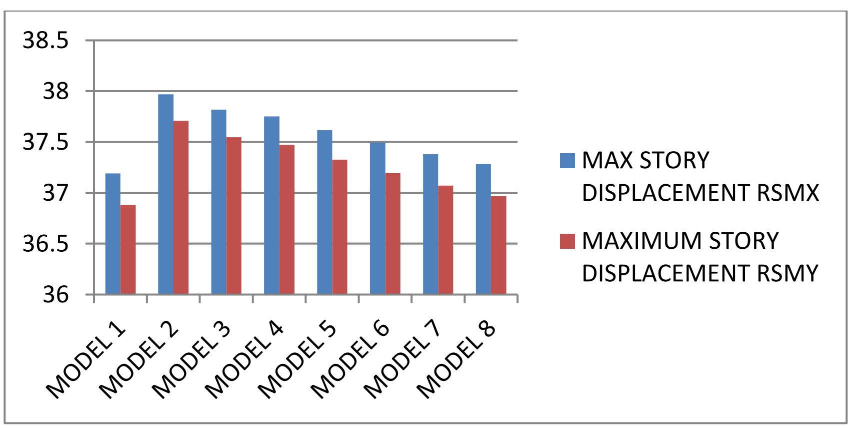
STORY	ELEVATION (m)	RSMX (X-dir)	RSMY (Y-dir)
Story15	49.5	37.618	37.328
Story14	46.3	36.799	36.528
Story13	43.1	35.719	35.467
Story12	39.9	34.333	34.099
Story11	36.7	32.635	32.421
Story10	33.5	30.631	30.436
Story9	30.3	28.332	28.157
Story8	27.1	25.757	25.602
Story7	23.9	22.93	22.794
Story6	20.7	19.874	19.759
Story5	17.5	16.583	16.486
Story4	14.3	13.135	13.056
Story3	11.1	9.585	9.524
Story2	7.9	6.066	6.021
Story1	4.7	2.813	2.785
plinth level	1.5	0.399	0.386
Base	0	0.399	0.386





MODEL NUMBERS	MAXIMUM STORY DISPLACEMENT RSMX (MM)	MAXIMUM STORY DISPLACEMENT RSMY (MM)	FLOOR LEVEL
1	37.191585	36.881615	15
2	**37.968507**	**37.708448**	**15**
3	37.818426	37.546911	15
4	37.750897	37.472801	15
5	37.618075	37.327728	15
6	37.49378	37.193233	15
7	37.379906	37.071671	15
8	37.282297	36.969056	15

- From the above table it is clear that the irregular building without floating column has less story displacement comparing with the irregular building having floating column.
- In the model 1 story displacement value is LESS in both the cases RSMX and RSMY.
- As the height of the building increases having the floating column the story displacement values goes on decreasing in both the cases i.e., RSMX and RSMY.
- Story displacement values in building having floating columns goes on decreasing from Model 2.
- Maximum story displacement value is seen in the top floor only in both the cases i.e, RSMX and RSMY.
- Maximum displacement value is seen in Model 2 only in both the cases.
- A building's maximum allowed displacement in a multistory structure is hs/500 (IS 456 cl.20.5), Where hs= building height
- The maximum allowed displacement for the models utilized in the study = 49.5/500 =0.099m or 99mm.
- The story displacement is within the allowable limit for all the models.



GRAPH:2 SHOWING MAXIMUM STORY DISPLACEMENT VALUES IN ALL THE MODELS

VI. CONCLUSION

After the analysis outputs were obtained. The outputs or results are organized in excel sheet such as values of base shear, values of drifts and values of displacements for the comparison. And the following points are concluded from the comparative study between the Irregular building without floating column and Irregular building with floating column.

1. A comparison of irregular buildings with and without floating columns that have a higher base shear value in model 1 than in model 2.
2. As the height of the building rises, the base shear value gradually rises for all the other models.
3. The presence of a floating column causes increased story displacement and story drift.
4. As the weight on a floating column increases, story displacement also increases.
5. Model 2 has higher story drift, more story displacement, and a lower base shear value.

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