COMPARISION OF BEHAVIOUR OF STRUCTURE WITH FLOATING COLUMN IN 5TH AND 10TH FLOOR IN SEISMIC ZONE 2 AND 3

Prof. sharmila H C[1], Prof. Priyadarshini H P[2], Prof. Gunasheela P[3]

[1] *Assistant Professor, Department of Civil Engineering, RRIT, Karnataka, India*
[2] *Assistant Professor, Department of Civil Engineering, RRIT, Karnataka, India*
[3] *Assistant Professor, Department of Civil Engineering, RRIT, Karnataka, India*

ABSTRACT

A floating column is supposed to be a vertical member starting from foundation level and transferring the load to the ground. In India many of the buildings are constructed with floating columns. Providing floating columns may satisfy some of the functional requirements but structural behaviour changes abruptly due to provisions of floating columns. In this study comparison in the behaviour of structures with floating column in 5th and 10th floor in seismic zone 2 and 3 using ETABS is performed. Models are created in ETABS software. 3 models are G+10 buildings whereas, one is regular structure and others are structures with floating columns provided in different stories. In this thesis parameters such as storey displacement, storey shear and storey drift are computed using ETABS and the values extracted are compared with each other.

Keyword : -*Seismic forces, Floating column, Storey displacement, Storey drift, Storey shear, Etabs*

1. INTRODUCTION

Modern multi-storey buildings are constructed with Irregularities such as mass irregularity, plan irregularity and vertical irregularity. And it is observed that most of RC structures with irregularities are undesirable for seismic activity. In this study we have taken stiffness irregularity ie., floating column irregularity. Stiffness irregularity is nothing but, a storey in which lateral stiffness is less than 60-70 percent of that of above or less than 70-80 percent of the average lateral stiffness of the three storeys above. In this study 3 models i.e, regular structure, structure with floating column in 5th floor, structure with 10th floor are considered and analysed for zone 2 and 3 using ETAB's. Results such as storey displacement, storey shear, storey drift for zone 2 and zone 3 are extracted from ETABS and compared the respective results with different models.

1.1 Floating columns

The floating column is a vertical member which rests on beam and transfers loads from beam to the column below it. Now a days multi-storey buildings constructed for the purpose of residential, commercial, industrial etc., with an open ground storey has become a common feature. For a hotel or commercial building, where the lower floors contain banquet halls, conference rooms, and large uninterrupted space is required for the movement of people or vehicles.

2. OBJECTIVES

- To study the storey displacement of the structure with floating column in 5^{th} and 10^{th} floors for seismic zones 2 and 3.
- To study the storey drift of the structure with floating column in 5^{th} and 10^{th} floors for seismic zones 2 and 3.
- To study the storey shear of the structure with floating column in 5^{th} and 10^{th} floors for seismic zones 2 and 3.

3. STRUCTURAL DATA AND MODEL

Table -1: Structural Data

Particulars	Model-01	Model-02	Model-03
Number of storey	G+10	G+10	G+10
Size of column(mm)	300*450	300*450	300*450
Size of beam(mm)	230*450	230*450	230*450
Zone	2 and 3	2 and 3	2 and 3
Soil type	2	2	2
Height of building	33.5	33.5	33.5
Position of floating column	-	5^{th} floor	10^{th} floor
Type of structure	Moment resisting frame	Moment resisting frame	Moment resisting frame

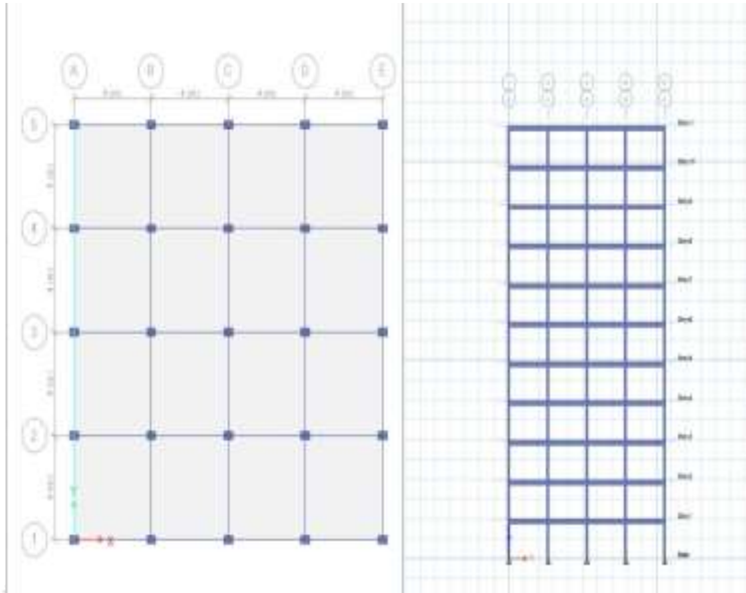

Fig -1: Regular structure

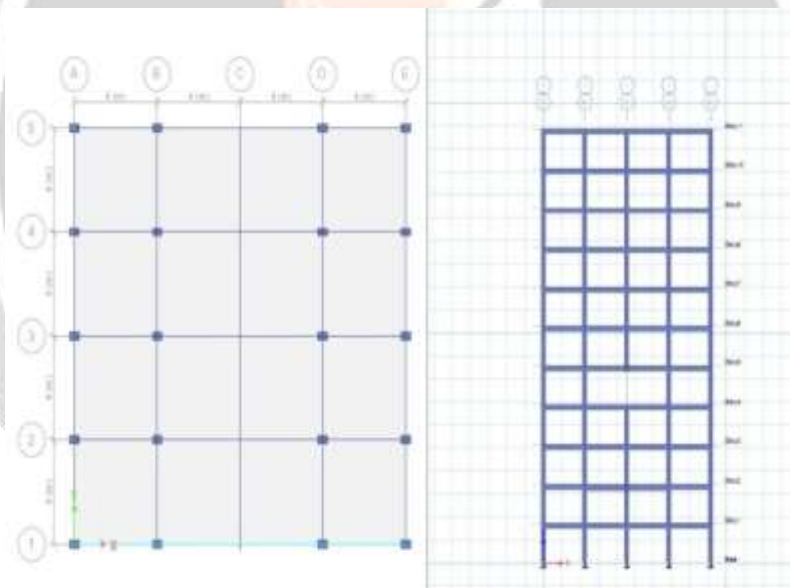

Fig -2: Structure with floating column in 5th floor

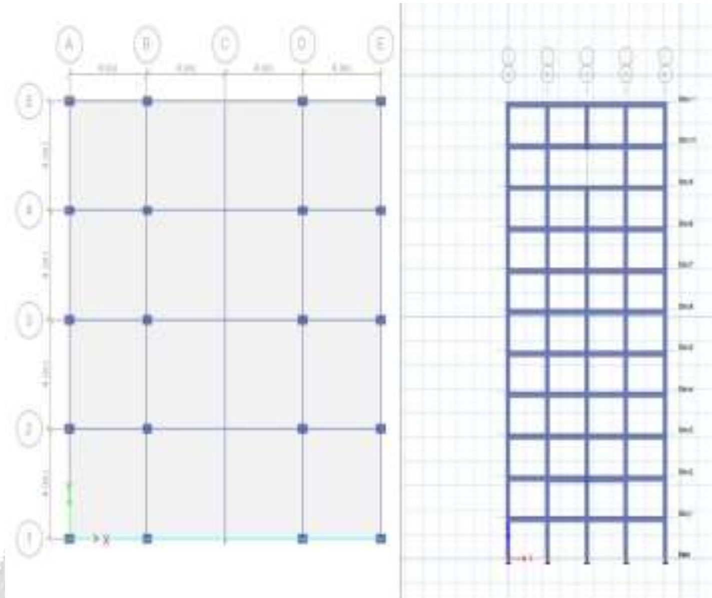

Fig 3: Structure with floating column in 10th floor

4. RESULT AND DISCUSSION

4.1. Storey displacement

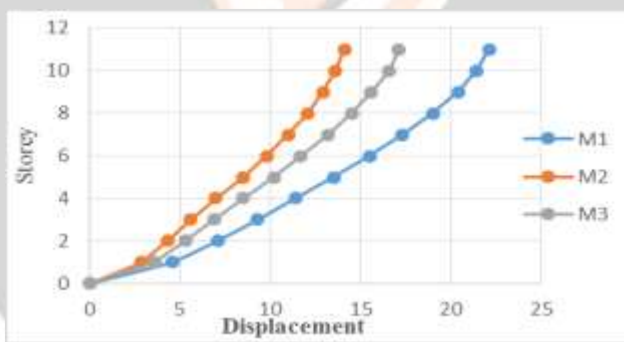

Chart -1: Storey vs storey displacement in X direction in zone 2

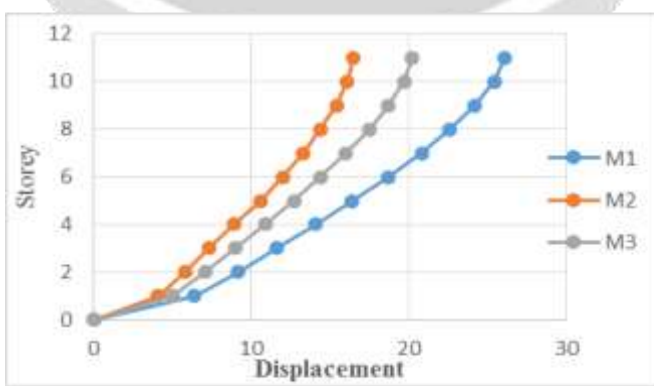

Chart -2: Storey vs storey displacement in Y direction in zone 2

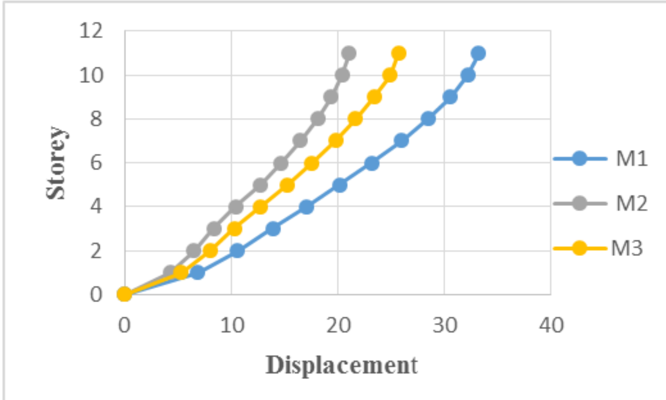

Chart -3: Storey vs storey displacement in X direction in zone 3

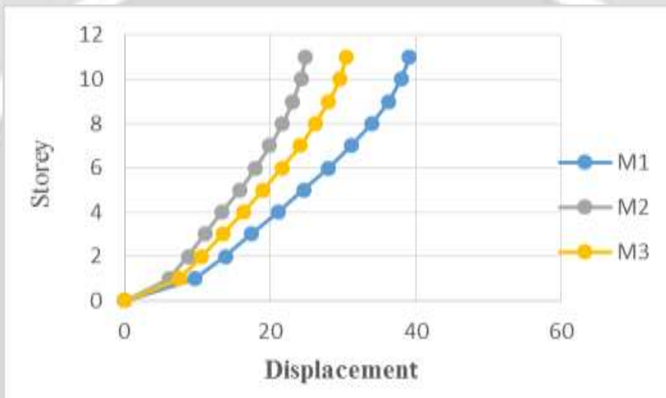

Chart -4: Storey vs storey displacement in Y direction in zone 3

4.2.storey drift

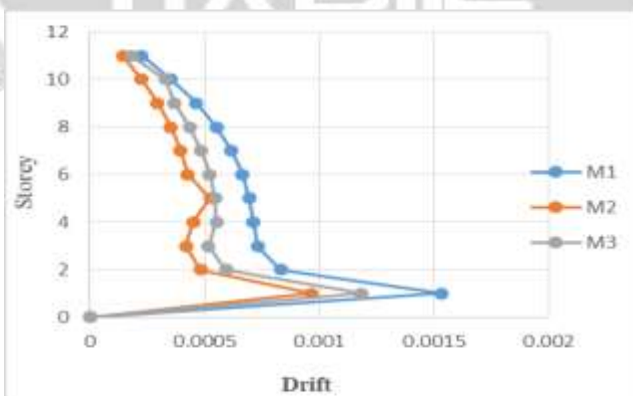

Chart -5: Storey vs storey drift in X direction in zone 2

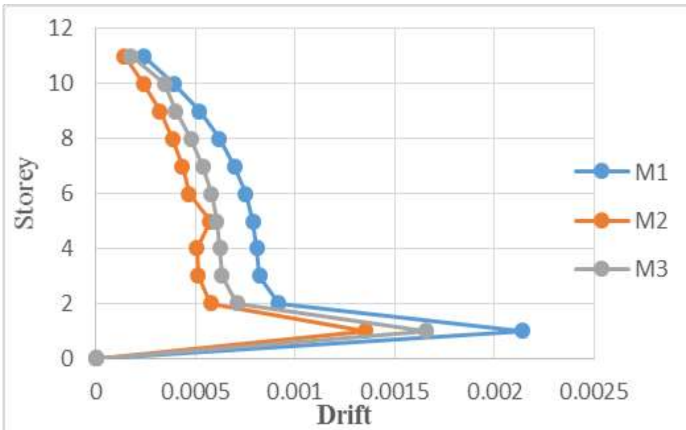

Chart -6: Storey vs storey drift in Y direction in zone 2

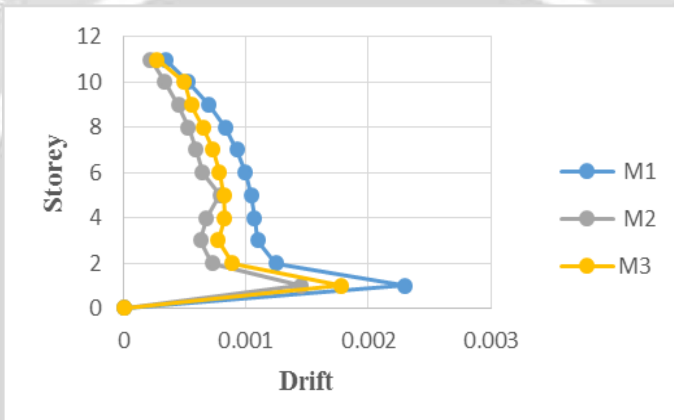

Chart -7: Storey vs storey drift in X direction in zone 3

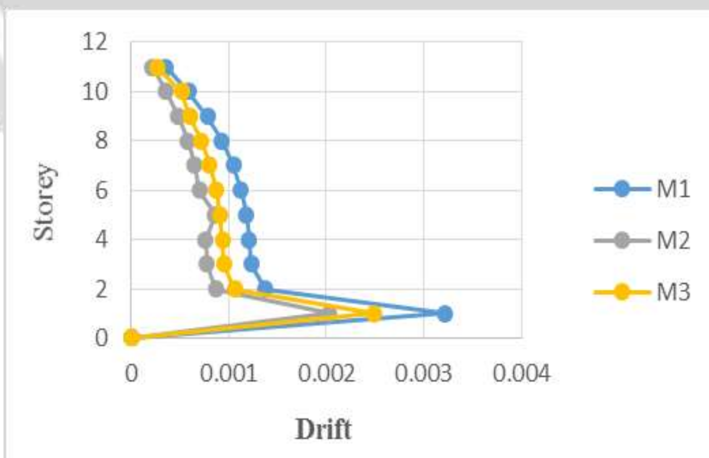

Chart -8: Storey vs storey drift in Y direction in zone 3

4.3.storey shear

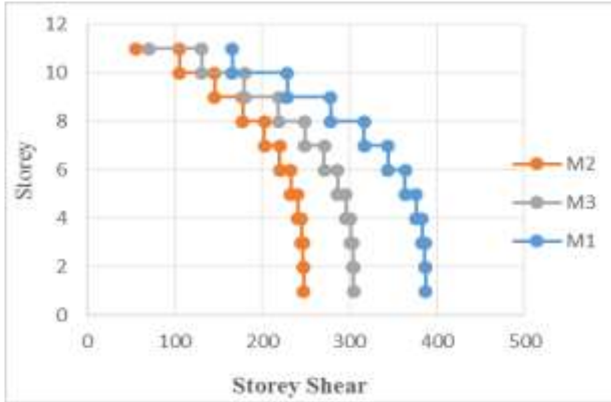

Chart -9: Storey vs storey shear in X direction in zone 2

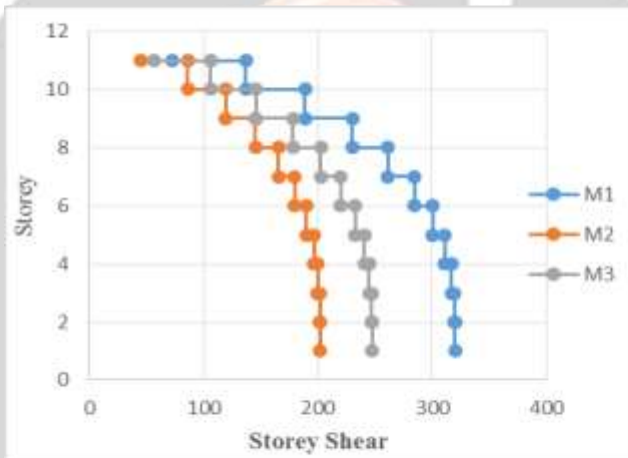

Chart -10: Storey vs storey shear in Y direction in zone 2

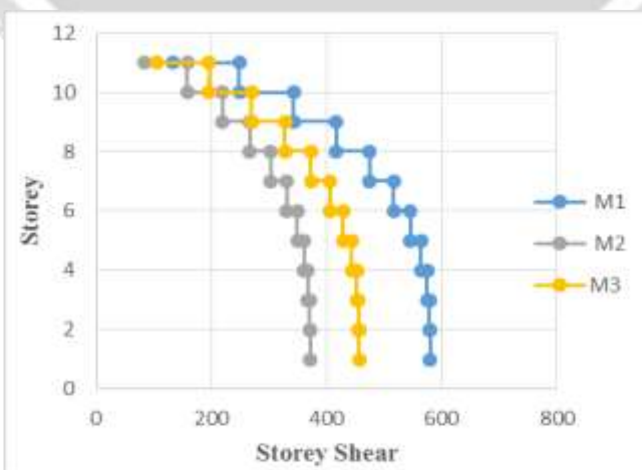

Chart -11: Storey vs storey shear in X direction in zone 3

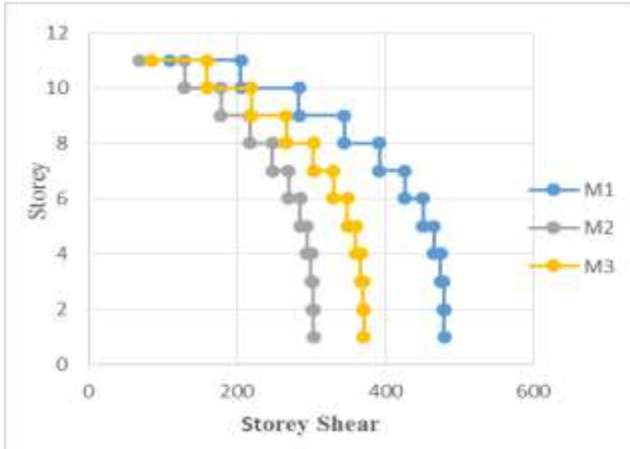

Chart -12: Storey vs storey shear in Y direction in zone 3

5. CONCLUSIONS

Following are the conclusions drawn from the study.

- The storey displacement in all the models is less in zone 2 comparing with models in zone 3 and model with floating column @5th floor in both zone shows less displacement compared to all other models.
- The storey drift in all the models is less in zone 2 comparing with models in zone 3 and model with floating column @5th floor in both zone shows less drift compared to all other models.
- The storey shear in all the models is less in zone 2 comparing with models in zone 3 and model with floating column @5th floor in both zone shows less shear compared to all other models.
- As the zone increases models shows more results and model with floating column @5th floor in both zone shows less results compared to other models.

From the above study we can conclude that as the zone increases the response of the structure like displacement, drift and shear also increases. Building with floating columns can be provided in lower zones.

6. REFERENCES

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