



A Literature Review on R.C.C. Frame Structure with Change in Location of Floating Column

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ABSTRACT:

In Construction multi-storied building with floating column plays a serious role in urban areas of India. These floating columns are mainly used for justifying the space availability within the construction and to urge good architectural view of the building. A residential high -rise building consisting of G+3 has been chosen for polishing off project work. The work was disbursed considering different cases of removal of columns in several positions and in various floors of the building. The building models are designed by using the software staad pro v8i and models of buildings are analyzing and refined followed by IS 456-2000 guidelines

Keywords: Floating columns, G+3, RCC frames, Building design

Introduction:

The floating column is a vertical member which rest on a beam and doesn't have a foundation. Reinforced concrete building can adequately resist both horizontal and vertical load. Whenever there is requirement for a multistorey building to resist higher value of seismic forces, lateral load resisting system such as shear wall should be introduced in a building. In R.C.C framed structure, the no of column is present in ground floor. For parking purpose this column is an obstacle. To reduce this obstacle, the floating column concept is used. Column is float at ground level. It provides good architectural view for that building and also increase the open space for parking purpose, assembly hall etc. In RCC framed structure, the load is transferred from a slab to the beam then to the columns, further to the lower columns, and finally to the foundation which transfers the load to the soil, the walls are constructed after the frame is prepared, most tall buildings use RCC technology. A column is a vertical member which transfers the loads from beam to foundation whereas a floating column is a vertical member which transfers the load from beam to another beam. The load transfer in any building is usually from slab to beams to columns and then foundation. But a floating column, instead of transferring the load to foundation transfers the load on to the beam. The beam on which the floating column rests transfers the load to the columns below. The load is transferred in the form of a point load.

In recent times, multi-storey buildings in urban cities are required to have column free space due to shortage of space, population and also for aesthetic and functional requirements. For these buildings are provided with floating columns at one or more storey. These floating columns are highly disadvantageous in a building built in seismically active areas. The earthquake forces that are developed at different floor levels in a building need to be carried down along the height to the ground by the shortest path. The behavior of a building during earthquakes depends critically on its overall shape, size and geometry, in addition to how the earthquake forces are carried to the ground. Many buildings with an open ground storey intended for parking collapsed.

Literature Review

Shweta A. Waghe, et. al. [1] Comparative Study of R.C.C and Steel Concrete Composite Structures (Case Study) They publish paper in Int. Journal of Engineering Research and Applications ISSN: 2248-9622, Vol. 4, Issue 4(Version 1), April 2014, pp.369-376. They are proposed four various multistoried commercial buildings i.e. G+12, G+16, G+20, G+24 are analyzed by using STAAD-Pro software. Where design and cost estimation is carried out using MS-Excel programming and from obtained result comparison can be made between R.C.C and composite structure.

Sharma R.K. (2016) [2]- Analyzing an RCC framed structure using SAP 2000 having Floating column as a member. Floating column make load pattern distribution unbalance generate torsional effect causing building to twist and turn. It obtains more stiffness in each level of the structure.

Rupali Goud (2017) [3]- The result has much higher displacement values with floating member. Time history analysis give more lateral displacement than other methods of the dynamic analysis. Building experience more storey drift at each floor levels.

Ms Waykule (2017) [4]- Software approach is applied for comparative study of the Floating column and brought that base shear in first floor decreases with use of floating column in place of without floating column.

Snehal Ashok Bhoyar (2017) [5]- Different locations of Floating column in the structures changes the behavior of the especially its performance.

Sukumar Behera (2012) [6] has proposed that in seismically area the features are highly undesirable. He has analyzed the structure by using ETAB software with and without floating column. The alternate measures are also including by including stiffness balance of first storey and storey above. Pratyush Malaviya1 publish paper on International Journal of Scientific and Engineering Research, Volume 5, Issue 5, May 2014, on Comparative study of effect of floating column on the cost analysis of a structure designed on Etabs. They have compared the cost of normal column structure and floating column structure.

Mr. Mahesha M, et. Al [7] publish paper in Research Journal of Engineering and Technology International on Comparative study on 3D RC frame structure with and without floating columns for stiffness irregularities subjected to seismic loading. They study the significance of expressly perceiving the vicinity of the floating columns and significance of explicitly recognizing the presence of with and without floating column in the investigation of building furthermore alongside floating column with a few complexities were considered for G+16 story building at different alternative location.

Objectives of this Paper

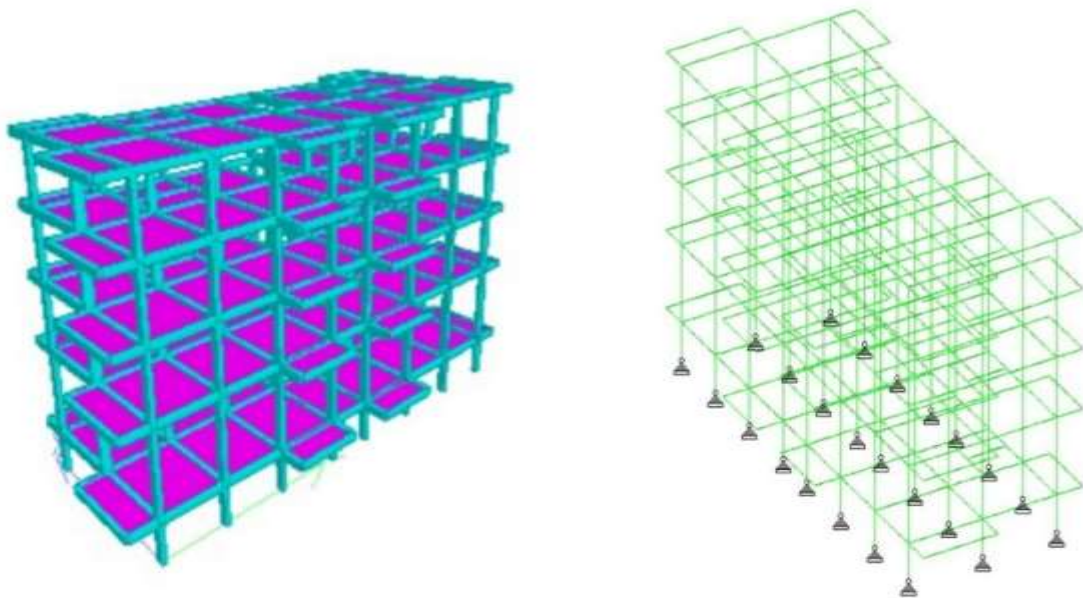
1. The objective of present work is to study comparison of normal column structure with floating column structure.
2. The objective of this work is to check the behaviour of multistorey buildings with floating columns.
3. To study of normal and seismic analysis of Rcc Building.
4. To study impact of earthquake structure on Rcc Building.

Methodology:

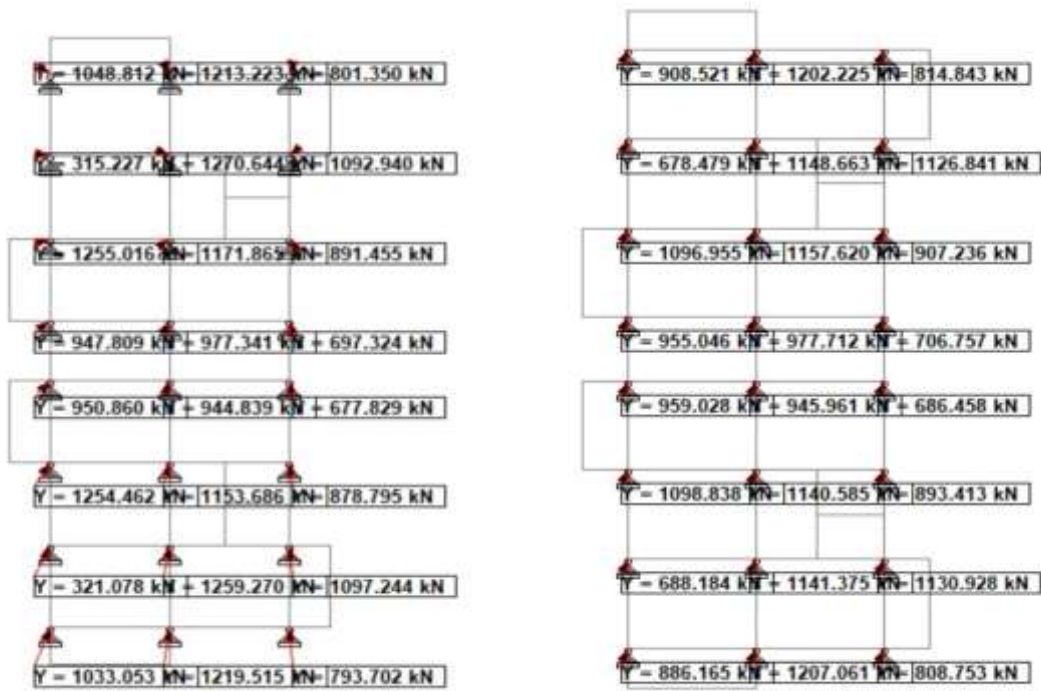
a) MODELING OF BUILDING

Analysis and style are finished by using architectural software like Staad pro V8i. The planning of reinforced cement concrete elements is distributed by as long as the minimum ambit of columns, beams and slabs. The look is carried as per the rule i.e., IS 456-2000. The building is taken into account as residential building having G+6. Height of every storey is kept same as other prevalent data. Building for residential (G+4) with floating column were selected for the research. The construction is taken into account to be positioned in Zone III as per IS 1893-2002. The building is designed using the structural software Stadd pro V8i.

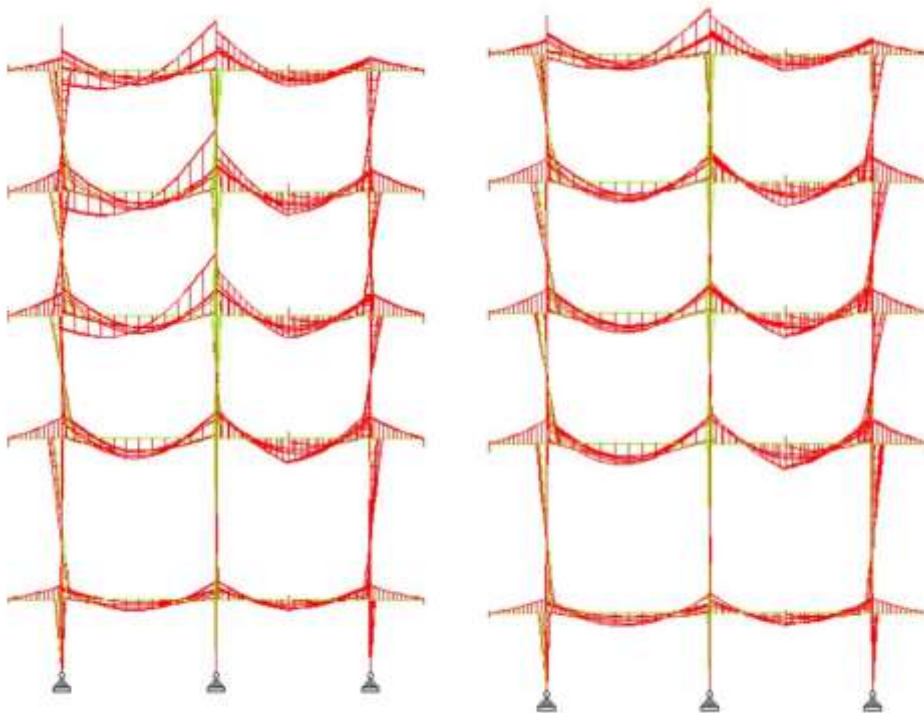
3D view and Load Displacement of Building are as follows:



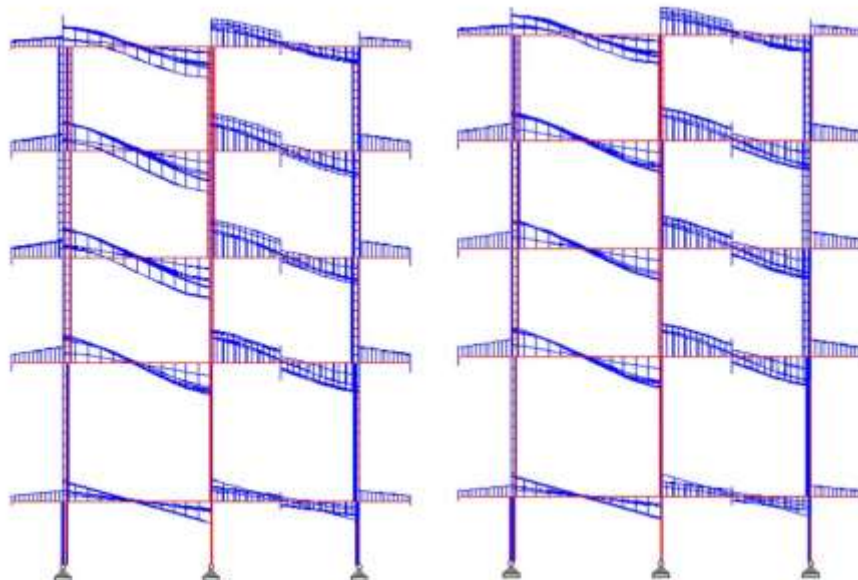
b) REACTIONS:



c) The BMD of beams for the G+3 storied frame structure is as shown below:



d) The SFD for the required multi storied structure is as shown below:



CONCLUSION

Based on the test result, the subsequent conclusions were made:

- The use of floating columns in modern building are increasing vastly.
- The floating columns is advantageous in providing good floor space index but risky & vulnerability of the building increases.
- Floating column building has more displacement as compared to without floating column building.
- Hard soil type is more feasible to construct buildings with floating column.
- Soft and loamy soil is not at all safe for the floating column buildings.
- In the framed structure with no floating columns the nodal displacements is minimum with uniform distribution of stresses at all beams and columns. As a result, it is most economical.

References

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