The Effect of Floating Column in RCC Building: A Review

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Abstract— In the recent time in India the floating column is the great concept of civil engineering and architecture engineering life. Floating column is a vertical member which is put on the beam and this beam does not transfer the load directly to the foundations. In this paper we prepare the model of G+3 building plan in the STAAD Pro V8i software and analysis the effect of floating column in the RCC building. Floating column acts as a point load on the beam and this beam transfers the load to the other columns below it. It is widely used in the construction of the underground parking which helps to smooth parking in the multi storey building. The figure show the floating column which rest on the beam and this beam transfer the load the other column below it as shown in figure. In this paper analysis of the floating column in the RCC building after including all the dead load ,live load earthquake load and load combination and then find out the number and types of reinforcement required and quantity of concrete required for the particular building plans and finally check the building is safe or not.

Keywords: Floating, STAAD Pro V8i

I. INTRODUCTION

In the recent time the floating column is widely used in the purpose of enhance the aesthetic appearance. It is a very lot of demerits in the construction of highly seismic zone. It is undesirable in the multy storey building. It is use in first storey for the purpose of underground parking, reception lobbies etc. Floating column transfer the load of super structure to sub structure. Some time it is costly because large diameter of reinforcement required and high grade of concrete is required for the design of floating column. For the purpose of reducing the cost of construction we prepare the economical design of floating column in the STAAD Pro software. For the design of the floating column first of all we generate the model on the software then provide property, support, loading, analysis then concrete design in last result verification.

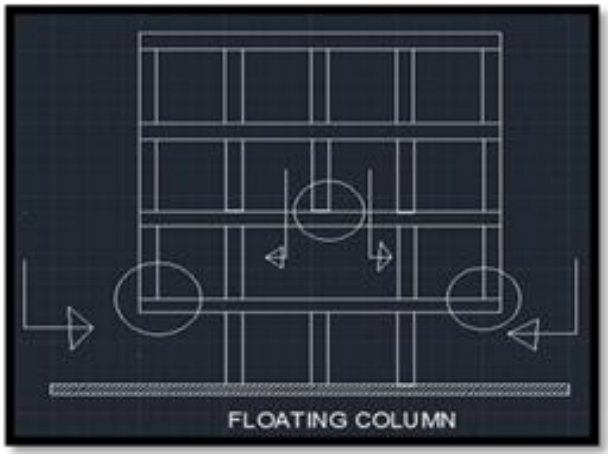

Fig. 1:

A. Floating Column

The floating column is nothing but it is a vertical member which put on the beam and this beam does not transfer the load directly to the foundation. It works as a point load for the beam and this beam transfer the load to the other column below it.

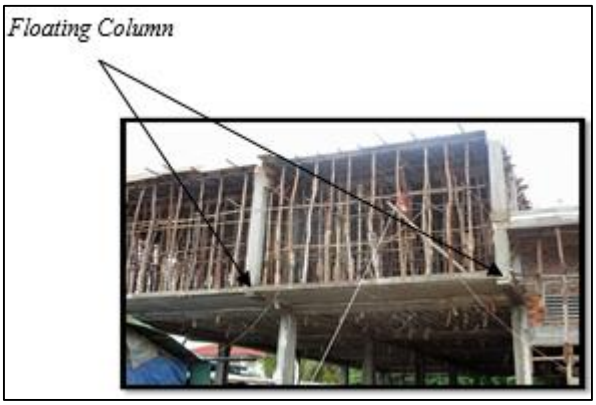

Fig. 2: Floating Column

The floating column is design for the purpose of enhance the aesthetic appearance of the building, and work as a large column free space.

B. Methodology

The methodology of the floating column is that the beam is design in such a way that to resist the load of the floating column. The high grade of concrete is to be used for the construction of the floating column. Before the construction of the floating column it is essential to check the designed beam and column is safe or not through software such as SAP 2000, STAAD Pro.

C. Designing of Floating Column

Floating columns buildings are adopted either for architectural aspect or when we required large free space for ground floor. We prepare the Building plan as given below:

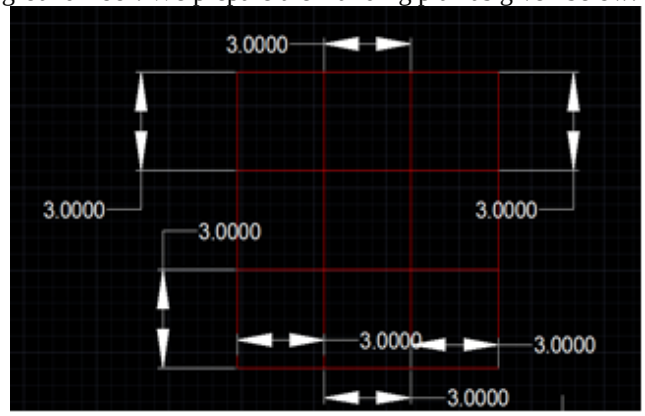

Fig. 3: The plan of building on Auto CAD

It is designed a particular place such as Gorakhpur and medium grain soil. First of all we generate the model on the STAAD Pro V8i software.

Specification:

1) Number of floor=G+3
2) Height of each floor=3m.
3) Beam size for economical cross section= 0.17m×0.16m. (After Analyze by software)
4) Column size for economical cross section= 0.22m × 0.29m. (After Analyze by software)
5) Support=Fixed support.
6) Thickness of main wall=9”
7) Thickness of partition wall=4”
8) Thickness of parapet wall=9”
9) Floor thickness=0.150m
10) Load combination=1.5(DL+LL)

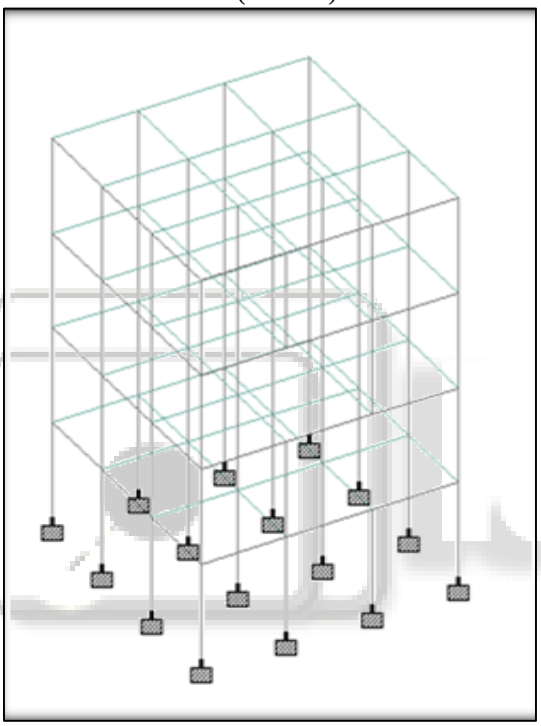

Fig. 4: Generate model on STAAD Pro V8i software

For the designing of these type of structure we use the IS 456 2000 code.

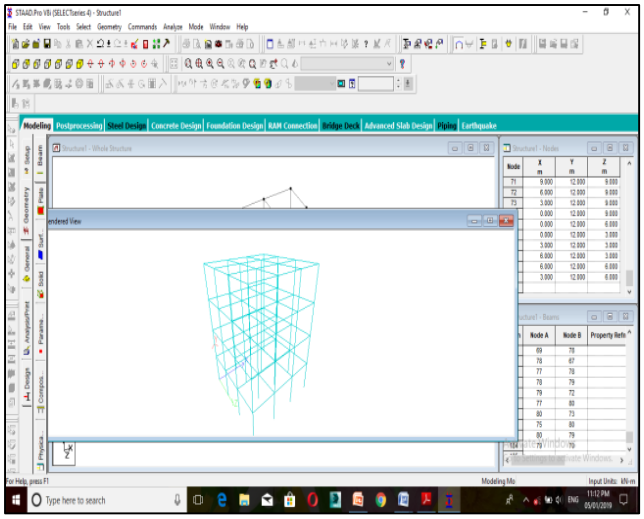

Fig. 5: Model before properties

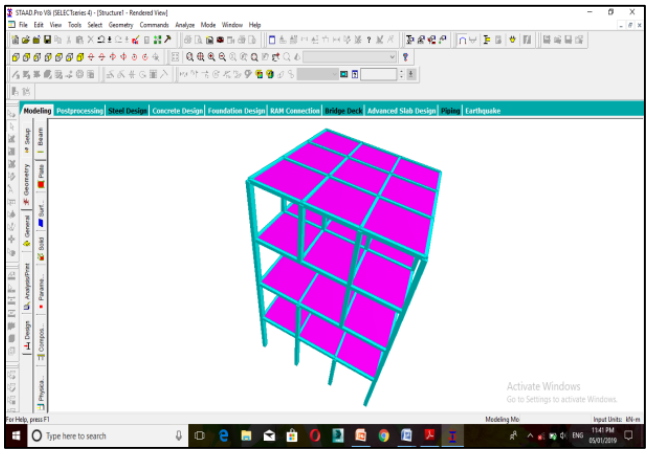

Fig. 6: Model after Properties

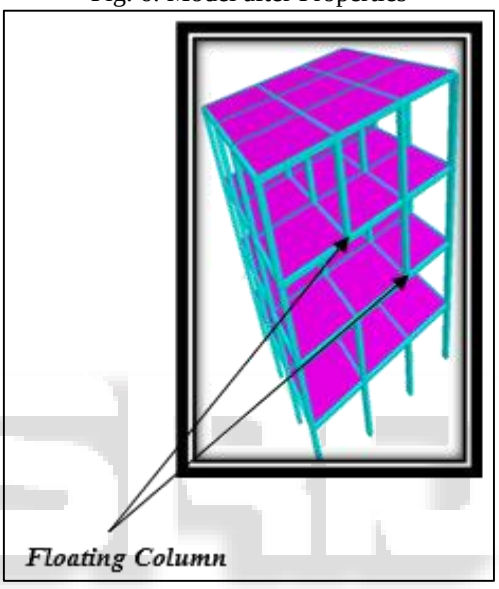

Fig. 7: Floating Column

The plate stress of this particular building is given below. The plate stress is due to the addition of the slab thickness. In the given figure show the different colour with different value of the stress in N/mm^2.

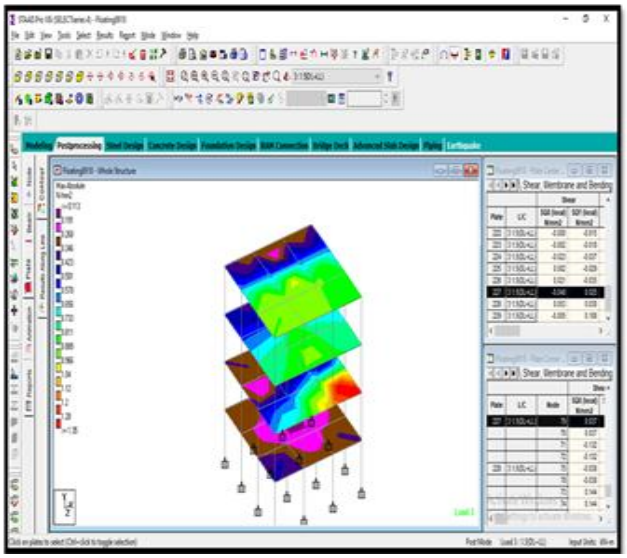

Fig. 8:

The bending moment diagram and shear force diagram are given below for the particular frame.

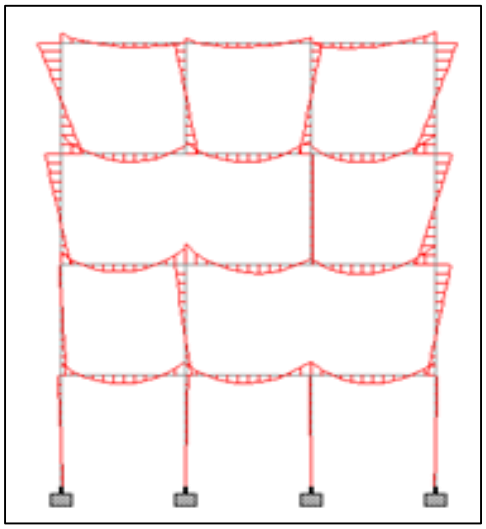

Fig. 9: Bending Moment of frame

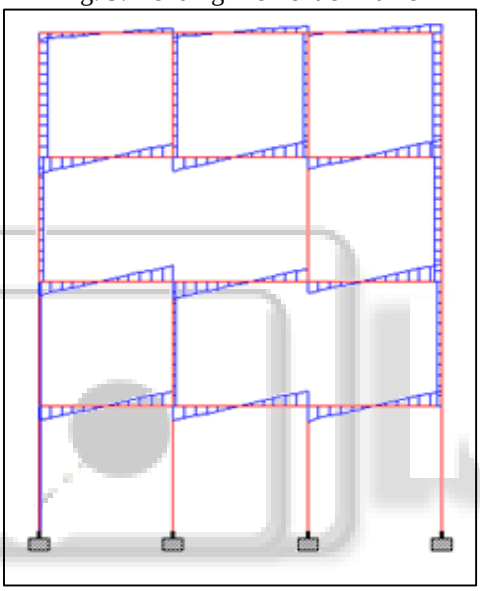

Fig. 10: Shear Force diagram of frame

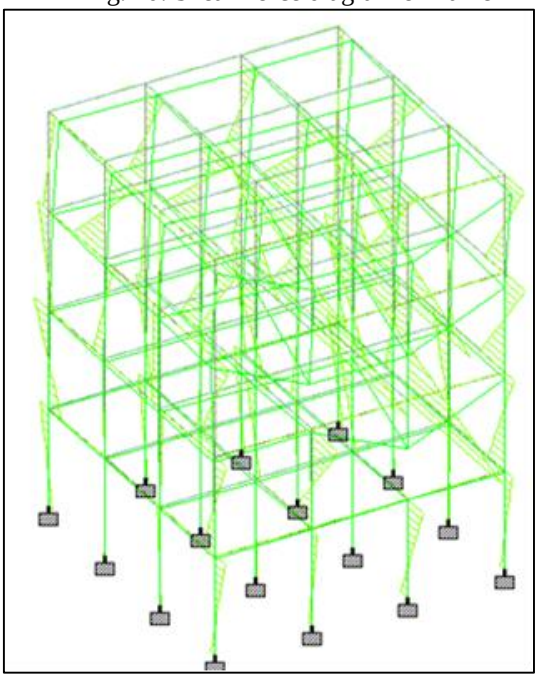

Fig. 11: Shear Force of whole structure

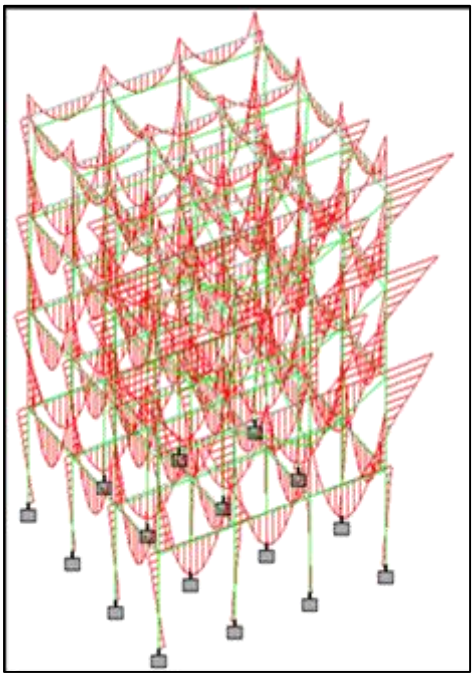

Fig. 12: Bending Moment of Whole structure

The detailed study of this floating column is given below and this report is given by the STAAD Pro V8i software. This report gives the result of the quantity of the concrete and number of bars and diameter of the reinforcement.

D. Advantage

1) Large column free space.
2) Provide space for parking.
3) Concept includes disrupting flow of transfer of EQ force.

E. Disadvantage

1) Increased storey displacement in buildings.
2) It is not use in the heavy earth quake zone areas.
3) There is no continuity with the above and below floors making it vulnerable.

II. Conclusion

The floating column is used for the purpose of enhance the aesthetic appearance for the building. It is also used in the underground parking. After the design of floating column on the STAAD Pro V8i software we come to conclusion that it is be undesirable in the heavy earthquake zone area and it is also not suitable for the multy storey building.

Acknowledgement

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