

# A Review on Investigation of Effect of Floating Column and Infill Wall on the Seismic Performance of RC Structure

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**Abstract** -In the present scenario of the construction there is huge range developments. Floating columns are columns which is rest directly on beam with holding continuity. Discontinuity of the framed element column and presence of infill masonry wall change the performance of building. Infill wall presence in the structure which is plays important role in building. Infill masonry wall have more beneficial effect on seismic behaviour of structure.

Buildings that having some columns or walls in a particular storey or with some tall storey tends to collapse which is initiated in that storey. Floating columns are common to accommodate parking floors at ground floor or open halls at different floors in structure. The analysis of work is completed mostly for G+ various floors. ETABS2020 software is use for the analysis and design work. The work in terms of shear at base, Displacement, story drift is basically carried out in design and analysis work. The work is carried out for checking of the safe building design. Response spectrum method is going to be used to check the seismic performance of building. This paper is meant to review the concept of the structure is with and without floating column and with and without infill walls

**Key Words:** with and without Floating Column, Infill Wall, ETABS, Response spectrum

## 1.INTRODUCTION

The construction is going to be huge development. Construction work is developed vertically with requirement of more space and for good view. More space is good along with strength if important in structure.

In case the floating situation various load come from above structure is act as vertical point load on beam then column is floating column and to increase the stability of frame of structure walls are used and wall which is mostly use to separate the rooms from one other is infill wall. In case of floating column with infill gives good strength having less quantity of steel requirement. But in case of floating without infill steel in beam increases but in case of infill with floating required more steel. The behaviour of building or any

structure is depending on its Shape, size and geometry. Buildings which are not present with some framed element column or wall have some columns or walls in a any storey or with unusually tall storey tends to damage or collapse in that relative story.

### 1.1 Infill Wall

Infill masonry wall is nothing but closed barrier element of open space between framed structures which is use for to close the perimeter of building. It's separate the rooms from each other such as one other and also to provide more lateral stability and strength.

### 1.2 Floating Column

The structural element column is vertical member to transfer vertical load from above structure. Floating column is vertical structural member but it break the continuity of load transfer way that's why reduce the performance of building. This column transfer load directly on the beam as vertical point load which going to be increase beam depth and steel quantity in structure.

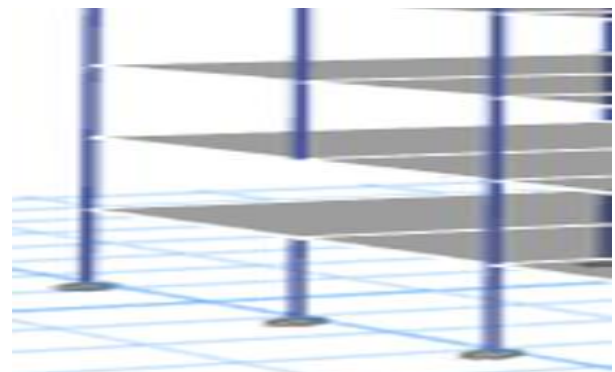


Fig.1: Floating Column

### 1.3 OBJECTIVES AND SCOPE

1. To analysis and design model for floating column.
2. To analysis and design model for infill wall.
3. To study floating column structure with infill wall performance.
4. To find result on the basis of base shear, drift, displacements.

### 2. LITRATURE REVIEW

#### **Trupanshu Patel, Jasmin Gadhiya, Aditya Bhatt [1]**

In the present work author is to study the behaviour of G+3 buildings having floating columns. In the recent studies based on structural element floating columns building, which have most on contracted on the higher zones and very some amount of works is available for lower seismic zones Also to be obtain the various effects of mass variations and infill walls on behaviour of normal and floating column building, some portion of typical floor has been provided with higher mass compare to the various other portions and different building models analysed with and without provisions of infill walls. Analytical study is done on SAP 2000

#### **Hakan Dilmac, Hakan Ultras, Hamide Tekeli 1band**

**Fuat Demir [2]** This paper investigates the effects of infill walls on seismic performance of the existing structure of residential building by considering requirements of the Turkish Earthquake Code (TEC). Seismic performance levels of residential RC buildings with and without masonry walls in high-hazard zones were find according to the nonlinear procedure given in the code. Pushover curves were obtained by considering the effect of masonry infill walls on seismic performance of RC buildings. The analysis results are going shows that the infill masonry walls beneficially effected to the rigidity, roof displacements and seismic performance of the building.

**Sharma R. K, Dr. Shelke N. L. [3]** In the project studies the analysis of G+5, G+7, G+12 storey building with floating column and without floating is carried out. The analysis is done by using Staad Pro software by using Response spectrum analysis. The work deals with the results the in displacement of structure, base shear, Seismic weight calculation of building from manual calculation and Staad pro V8i. For building with floating column and buildings are without floating column structure, finding the various difference

between the response parameters of earthquake and describe what happens when variation may be high or low.

**Dev Raj Paudel, Santosh Kumar Adhikari [4]** models of (G+5) and (G+9) reinforced concrete framed building assumed to be located in Seismic zone have been considered. Masonry infill walls the stiffness is included in the models by convert them into equivalent diagonal strut for to FEMA-356. Linear Dynamic analysis has been performed as per IS: 1893:2002. Non-Linear static Pushover analysis is to be used to study the work effect of infills on dynamic characteristics, yield patterns and seismic performance of the structure.

#### **Mohasin khan N. Bargir and Ajim G. Mujawar [5]**

The paper deals with validation of the software has been done in relation to the literature and further matters have been decided and studied based on the validation result. Finite element-based software like Staad-Pro has been used, Equivalent static method and response spectrum method have been used for analysis. The results have been obtained in various types' terms of base shear, displacement, storey drift. Based on results it was concluded that triangular plate in floating column building reduces displacement and base shear of building.

**M. S. Razzaghi • M. Javidnia [6]** This study aims to shows that neglect the various effects of infill walls during the nonlinear dynamic analysis of the RC frames may lead to the dramatic misunderstanding the seismic performance of the structure. To this end seismic response of 18 models of the same structure and different arrangements of the infill wallsto four different ground motions.

**Umesh P. Patil, Shivanand S Hallur [7]** In the paper the study of the G+5 storey RCC structure is going to be considered for earthquake analysis. For comparison of three models are used, one with conventional building, after that with shear walls and third with masonry infill walls. All the methods Equivalent static method, response spectrum and time history method were used for analysis ETABS- 2013 Software used and structure was assumed to be situated in earthquake Zone III on a medium soil (type II). The parameters evaluated were shear, Storey drift and Displacement.

**JEBIN JAMES [8]** The study work in present case The effect of masonry infill panel on the response of RC

frames subjected to seismic action is widely recognized and has been subject of numerous experimental search work, the several times to model it analytically have been reported. In analytically analysis infill walls are modeled as equivalent strut approach there have various types of formula derived by research scholars and scientist for width of strut and modeling. Infill behaves like compression strut between column and beam and compression forces are transferred from one node to another.

**Priya Prasannan [9]** In the present study, the effect of varying the location of floating columns floor wise and within the floor of high storied RCC building on various structural response quantities of the building using response spectrum analysis is studied in the software ETABS 2015. The main aim here is to study the seismic response of building with floating columns and to find out the most suitable configuration for providing floating columns. Various parameters such as total base shear force, storey displacement, storey drift, story acceleration of a buildings are studied with respect to different configurations of floating columns.

### 3. CONCLUSIONS

Structure is going to be act as load carrying mechanism like wind and earthquake. Structure with floating column is gives huge amount displacement as compare to the structure without floating column structure. Floating column structure also give huge drift as compare to conventional structure. Structure with infill masonry wall having less displacement as well as less drift than without infill wall structure because it provide more stability as act as resistant for lateral load.

In both condition of floating and infill building which act as good than only floating but without infill masonry structure.

While designing the structure with floating column requires more quantity of steel as compare to normal structure. Floating column building gives having more base shear than infill wall structure. Finally conclude that building without floating column and with infill wall shows less displacement and drift making if more suitable force seismic zones IV & V.

### REFERENCES

[1] Trupanshu Patel, Jasmin Gadhiya, Aditya Bhatt "Effect of floating column on RCC building with and without infill wall subjected seismic force" International

Journal of Engineering Trends and Technology (IJETT) – Volume 47 Number 4 May 2017

[2] Hakan Dilmac, Hakan Ulutas, Hamide Tekeli and Fuat Demir, "The investigation of seismic performance of existing RC buildings with and without infill walls" International Journal of Advanced Research in Science, Engineering and Technology, Vol. 22, No. 5 (2018) 000-000

[3] Devraj paudel, Santosh Kumar Adhikari "Effect of masonry infills on seismic performance of RC frame buildings" International Journal of Advanced Research in Science, Engineering and Technology, ISSN 2319-8753.

[4] Mohasin khan N. Bargir and Ajim G. Mujawar, "Earthquake Analysis of High-Rise Building with Floating Column" International research journal of engineering and technology, vol.7

[5] M. S. Razzaghi • M. Javidnia, "Evaluation of the effect of infill walls on seismic performance of RC dual frames" International Journal of Advanced Research in Science, Engineering and Technology Int J Adv Struct Eng (2015) 7:49-54

[6] Jebin james "Seismic Analysis of Frame with masonry infill walls using ETABS" International Journal of Advanced Research in Science, Engineering and Technology Volume: 03 Issue: 10 | OCT-2016 e-ISSN: 2395 -0056 p-ISSN: 2395-007

[7] Umesh P. Patil<sup>1</sup>, Shivanand S Hallur "Seismic Analysis of G+5 Framed Structures with and Without Floating Columns Using ETABS-2013 Software" International Journal of Advanced Research in Science, Engineering and Technology, Volume: 02 Issue: 04 | July-2015 e-ISSN: 2395 -0056 p-ISSN: 2395-0072

[8] Jebin james "Seismic Analysis of Frame with masonry infill walls using ETABS" International Journal of Advanced Research in Science, Engineering and Technology Volume: 03 Issue: 10 | OCT-2016 e-ISSN: 2395 -0056 p-ISSN: 2395-007

## BIOGRAPHIES



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