Seismic Response Evaluation of RC Frame Building with Floating Column

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ABSTRACT
The purpose of this study, the seismic response of the building is to design and build a structure that is minimizing the damage to the structure and components of the structure by the earthquake. The aim of the paper toward reconsideration of the study of the structural behavior dynamic configuration simple and complex configuration multiple floors with floating column conducted by different authors in the past. The analysis is to build and there are different numbers of floors of the Revolutionary Command Council, with simple and complex floor plan with floating columns. In buildings current scenario models with a floating column is a typical feature of the modern multi-storey building in urban India. These features are not very desirable in a building built in the paper seismically active areas. This aims to study the impact of the floating column under earthquake excitation for different soil conditions and where there is no text or zoom determining factor in I.S. Symbol, and thus determine these factors for the design of safe, economical to build and there are floating column. The linear dynamic analysis of the 2 D framework of a multi-storey with and without floating column to achieve the above objective no response (effect) factors secure and economical design of the structure under a different excitement earthquake.

Keywords--- Floating Column, Linear Analysis, Response Spectrum Analysis, Magnification Factor, STAAD Pro.

I. INTRODUCTION
Multi-storey at present constructed for the purpose of residential, commercial, industrial, etc., with the open ground floors have become a common feature. For the purpose of parking and everything, usually for free, without any constructions are kept on the ground floor, with the exception of the columns that carry the weight of the building to the ground. Total base shear earthquakes experienced from a building during an earthquake depends on the natural period, and the distribution of earthquakes depends on the distribution of mass and stiffness along the rise. Building behavior during earthquakes depends heavily on all of its shape, size and geometry, as well as how to implement the earthquake on the ground forces. Forces need the quake on a different floor levels in the building to be dropped on the length of the height to the ground through the shortest route. Any deviation or interruption in this way the transfer of load results in poor performance of the building. Buildings with vertical setbacks (such as buildings hotel with a few of the larger story of the rest) caused a sudden jump in the earthquake forces at the level of disruption. Buildings that have fewer columns or walls in a specific floor or floors tall with unusually tend to damage or collapse, which began in that story. Many buildings with ground floor open dedicated parking collapsed or were badly damaged in Gujarat during the earthquake Bhuj 2001. buildings with columns that hang or perched on the beams in a medium-storey not go all the way to the institution, have interruptions in the load transfer path. Most of the buildings in Ahmedabad and Gandhi or cover the largest possible area on a plot of land within the regulations available. Since balconies are not counted in the floor space index (FSI), building balconies existence hangs in the upper floors outside the footprint at the ground storey , overhangs up to 1.2m to 1.5 m in plan are usually provided on each side of the building. In the upper storey, the perimeter columns of the ground storey are discontinued, and floating columns are provided along the overhanging perimeter of the building. This floating rest at of the taper overhanging beams without considering the increased vulnerability of the lateral load resisting system due to vertical discontinuity. This type of construction does not create any problem under vertical loading condition. But during an earthquake a clear load path is not available for transferring the lateral forces to the foundation. Lateral forces accumulated in upper floors during the earthquake
have to be transmitted by the projected cantilever beams. Overturning forces thus developed overwhelm the columns of the ground floor. Under this situation the columns begin to deform & buckle, resulting in a total collapse. This is because of a fundamental lack of strength of the ground floor columns, beams projected and supple joints cantilever beam column. Contact ductile abroad and joints beam columns indispensable for the transfer of these forces. Figure shows the damage to the apartment building because of floating concrete columns. This is the second and most amazing reasons for failure in buildings. In the August 15 Apartment buildings in the garden Nilima Ahmedabad is a typical example of failure that is being discontinued, and the walls walls excavation work in the upper floors in the lower floors began.

II. FLOATING COLUMN

It supposed to be a member of the vertical starting from the ground level and the transfer of a load on the ground column. Column floating term is also a component of the vertical ends (due to the architectural design of the situation / location) in the lower level (the level of termination) based on the packets, which is a horizontal member. Packets turn the load to the other columns underneath. These columns where the pregnancy was considered as a load point. Theoretically such structures can be analyzed and designed. In fact, it is not created real columns without ending level. The columns which are supported on a beam instead of rigid foundation are called as floating columns. The earthquake force generated at different floor level of the building need to be carried out to the foundation by the shortest possible way which may not be the case when floating columns are provided. Providing floating columns may satisfy some of the functional requirements but structural behavior changes abruptly due provisions of floating columns. The flexural and shear demand of the beams which supports floating columns are much higher than surrounding beams, this leads to stiffness irregularities at a particular joint. Columns are main lateral load resisting elements in moment resisting frame and supple joints cantilever beam column. Contact

III. OBJECTIVES OF THE STUDY

1) The main objective of the study to study the effect of a floating column under earthquake excitation.
2) As there is no provision or the magnification factor specified in I.S. Code, hence the determination of such factors for safe and economical design of a building having floating column.

IV. WORK METHODOLOGY

- Models selected building with and without floating column.
- Linear dynamic analysis of the selected building models.
- A comparative study of the results obtained from the analysis.
- Results and Discussion.

V. LINEAR ANALYSIS

Seismic analysis is a subset of a structural analysis of the structure of the building to respond to the earthquake account, a relevant part of the structural design, where earthquakes are prevalent. Seismic analysis structure involves the evaluation of earthquake forces on the behavior of the overall structure. Analysis may be static or dynamic in accordance with the provisions of law approach.

And so on a large scale, we can say that the analysis of linear structures to calculate the forces earthquake usually based on one of the following three methods.

1. An equivalent lateral force procedure in which dynamic effects are approximated by horizontal static forces applied to the structure. This method is quasi-dynamic in nature and is termed as the Seismic Coefficient Method in the IS code.

2. The Response Spectrum Approach or mode superposition in which the effects on the structure are related to the response of simple, single degree of freedom oscillators of varying natural periods of earthquake shaking.

3. Elastic Time History Method who entered history as an earthquake are designed to guide the athlete structure using the computer model analysis. One of the above-mentioned three methods of analysis, any response spectrum method, is considered in the analysis of the buildings studied here. He described the details of these methods in the next section. Described in 2002 (Part 1) as follows: seismic analysis method on the basis of the 1893 Indian Standard.

VI. RESULTS AND DISCUSSION

<table>
<thead>
<tr>
<th>Models</th>
<th>Magnification Factor</th>
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<tbody>
<tr>
<td>Model Ac-g</td>
<td>0.87-1.50</td>
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<tr>
<td>Model Ac-1</td>
<td>0.77-1.69</td>
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</tbody>
</table>
VII. CONCLUSION

The results of different models indicate that the presence of the floating column changing moments in the beams and columns analysis. Variation in the moments of beams and columns depends on where in the building the floating column. While in the building, which is a floating column design, based on the site column, you must multiply the moments of beams and columns by the zoom factor. It can be concluded from this behavior building As noted above, in the case drop side columns. Storey site goes a decisive shift to higher as the peak height of the building. It can also be concluded that the story is the most important site in the high 50% of the structure. 7 meters in the 14-meter high building (G+3), 10.5 m by 21 m high building (G+5) in 14M in the 28 m high building (G+7), can be concluded from such behaviour of building as observed above that in case of discontinuity of side columns; location of critical storey goes on shifting upward as the height of the building increases. It can further be concluded that the location of most critical storey is at 50% height of the structure; at 7 m in 14 m high building (G+3), at 10.5 m in 21 m high building (G+5) and at 14m in 28 m high building (G+7).

VIII. SCOPE FOR FUTURE WORK

(i) The proposed results need to be validated by further case studies. Building models considered in this study are two way frame models and of height up to eight floors.

(ii) In present study, only linear analysis has been done. Multiplication Factor can also be checked for nonlinear analysis.

(iii) Another field of wide research could be the design of building which is having floating.

REFERENCES


