A Review on Seismic Analysis of with and without Floating Column Building

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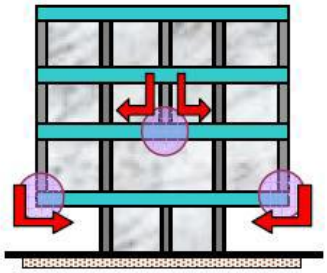
Abstract- Modern multi-storey buildings are constructed with irregularities such as soft storey, vertical or plan irregularity, floating column and heavy loads. These type of structures have become a very common construction practice in urban India. It is observed that most of the RC structures with such irregularities constructed are highly undesirable in seismically active areas from the results of past earthquake studies. These effects occurred due to various reasons, such as non-uniform distribution of mass, stiffness and strength. This study explains the seismic analysis of a multi-storey building with floating column constructed in seismically active areas observing its reactions to the external lateral forces exerted on the building in various seismic zones using the software staad pro. Thus highlighting the alternative measures involving in improvising the non-uniform distribution in the irregular building such as multi-storied building with floating column, and recommended the safer design of such building in seismically active areas considering the results observed from storey drifts, story displacements, when compared to Response Spectrum method shows best results.

Keywords – Floating column, staad-pro, RCC frame, column shear, Displacement, Base shear, Storey drift.

INTRODUCTION



Hanging or Floating Columns

India is a developing country, Most of the urban multi-storey building constructed in India today has open base storey as an unescapable feature. It is largely being approved to accommodate reception lobbies or parking in the opening storey. However, the base shear practiced by a structure in an earthquake is totally reliant on building's natural period and the distribution of seismic force depends on the stiffness dispersal and structured mass along the building height.

The behaviour of a structure in an earthquake basically depends critically on its total size, profile and the geometry, in accumulation to by what means the seismic (quake) forces are transferred to the foundation. The earthquake forces produced at various floor heights in a building required to be carried down lengthwise the height to the foundation by the shortest possible path; and any eccentricity or deviation or disjointedness in this transference route results in deprived presentation of the structural building.

A column is an upright companion member which begins from ground degree & transferring the diverse loads to basis. Similarly, floating (putting) column is likewise an upright aspect which (because of website online scenario / architectural look) at its bottom level (quit) rests on a girder which is as we recognise a horizontal phase. The girder or beam in the end transmit the vertical loads to different upright additives such as columns under it.

LITERATURE REVIEW

Several researchers studied the effect of using the bracings in multy-storey reinforced cement concrete structures. A brief review of previous studies on effect of using the bracings as retrofitting structure on seismic behaviour of reinforced cement concrete structures is presented in this section and past efforts most closely related to the needs of the present work.

Sekhar TR, Prasad PV (2014), studied "The behaviour of seismic analysis of multi- storied building with and without floating column" in consideration with static loads, free vibration and forced tremor conditions. The consequences of the observe were provided in graphs for both the buildings with and without floating column by means of touching on their time history of base shear and floor displacements. He done the equivalent static-analysis the usage of the staad pro v8i and the evaluation of those organized models has been obtained.

He counseled that with the growth in base ground column the intense motion is decreasing and base shear fluctuates with the distinct sizes of the columns..

Sreekanth Gandla Nanabala, Pradeep Kumar Ramancharla, Arunakanthi E[2],(2014), This paper refers as "**SEISMIC ANALYSIS OF A NORMAL BUILDING AND FLOATING COLUMN BUILDING**" in which The evaluation of a g+five storey ordinary constructing and g+five storey floating column constructing for external lateral forces the use of sap2000, is completed. This paper observe the variations of each homes which include time history values by means of applying the intensities which include ground motions of the past earthquakes. Such that the look at highlights whether or not the structure with floating columns are secure or risky in seismically energetic areas and additionally examine the structure is within your means or uneconomical. This paper studies the g+five storey building with all columns that could be a regular building and the opposite building without part columns inside the ground floor that is a floating column building's behaviour when excited to the lateral loads. After the contrast of the buildings it's far discovered that the g+five with out edge columns isn't always secure in seismic area because the lateral displacement in a floating column building is better than a regular constructing, so the floating column building is unsafe in seismic areas. When the lateral stiffness of each the buildings are compared then it's far discovered that the constructing with floating columns will suffer excessive gentle storey effect where on the opposite side the everyday building is loose from gentle storey impact completely. In the analysis done between the buildings the quantity of metallic and urban are forty% and forty two% extra in floating column building than the normal constructing. As a result it is concluded that the floating column constructing is risky and uneconomical and now not most advantageous for production whilst as compared with the regular column building.

Srikanth.M.K, Yogeendra.R.Holebagilu [3](2014), This paper refers to "**SEISMIC RESPONSE OF COMPLEX BUILDINGS WITH FLOATING COLUMN FOR ZONE II AND ZONE V**" in which The evaluation of the constructing with floating column and additionally different complexities are taken into consideration for ten storey constructing at opportunity place and also for low to better zones. This examine imparting opportunity measures concerning stiffness stability of the storey wherein floating column supplied and the storey above whilst different irregularities are also introduced inside the tales. Ultimately analysis outcomes such as storey drifts, storey displacements, storey shears of the excessive upward push building are in comparison inside the study the usage of the software etabs.

Prerna Nautiyal, Saleem Akhtara And Geeta Batham[4],(2014) titled as "**SEISMIC RESPONSE EVALUATION OF RC FRAME BUILDING WITH FLOATING COLUMN CONSIDERING DIFFERENT SOIL CONDITIONS**". This paper investigated the impact of the floating column underneath earthquake excitation for exclusive soil situations and a linear dynamic evaluation is accomplished for the 2nd body of the multi-storey building with and without floating column to obtain the reaction of the body for more secure and low-cost layout of the shape underneath such excitations.

T.Seshadri Sekhar, Md.Jaweed Jilani Khan[24],(2014), entitled as "EVALUATION OF SEISMIC RESPONSE OF SYMMETRIC AND ASYMMETRIC MULTISTOREYED BUILDINGS". In this study 3d analytical version of four and 9 storied buildings have been generated for symmetric and uneven modelling and are analysed the usage of the software etabs, wherein the four unique sorts of lateral load patterns are discussed for the distribution of masses on the structure for a pushover load cases. These load patterns are uniform acceleration, force proportional to the special mode shape, arbitrary static load pattern and combination of the cited patterns. As a consequence to examine the impact of various height of columns in floor storey due to sloping floor, the plan format is saved similar for both homes on plane and sloping ground and the analytical version of the constructing includes all crucial additives that

have an effect on the mass, strength, stiffness and deformability of the shape. As a result to look at the impact of infill throughout earthquake, seismic evaluation using both linear dynamics (reaction spectrum technique) as well as nonlinear static system (pushover) has been performed. As a result it is concluded that fundamental natural length decreases while the effect of infill is taken into consideration, and the storey drifts are found to be within the unique limits in the code is-1893(2002) part-1 in each linear dynamic evaluation and non-linear static analysis, and additionally that the base shear and displacements are less in asymmetric constructing when compared with symmetric constructing in the first hinge. It is also concluded that, the masonry infill walls in the shape impacts the average behaviour while subjected to the lateral loading and the joint displacements and storey drifts are significantly decreased while the infill wall contribution in the constructing is considered into account. Goal: ito iunderstand ithe ibehaviour iof ithe floating coloum constructing the floating coloum is a vertical member which relaxation on a beam but does no longer transfer the burden at once to the inspiration. ... The beam is referred to as as switch beam. That is widely use in excessive tale constructing foe each commercial and recidential purpose. This allows to modify the plan of the top floors to our convenience.

Kabade PP, Prof.Dr.Shinde D.N[22],(2014), entitled as "EFFECT OF COLUMN DISCONTINUITY ON BASE SHEAR AND DISPLACEMENT OF STRUCTURE". This take a look at considers a g+3 vertically irregular constructing framed building subjected to earthquake loading and analysed for 3-d model with discontinuous column at top ground analysed the usage of the sap2000 software. This analysis in particular aims at base shear carrying ability of a structure and performance degree of the structure beneath slight area of india, and from the received outcomes it is concluded that a constructing with irregularity that obtained due to the discontinuity of the columns provides the instability in the shape and also that increases storey displacements. Accordingly, it is additionally concluded that the base shear of both regular and irregular frame taken into consideration in both orthogonal directions suggests extra than the calculated base shear, from the effects obtained on the evaluation of the abnormal frame it is very clear that the displacements are multiplied and base shear are decreased due to the seismic loading in the shape with irregularity due to columns discontinuity in the structure. For the abnormal building which are much less than 40m height built in region ii and sector iii, the dynamic analysis is endorsed even though it is no longer a obligatory to carry out. Comparing the drifts, it is located that the drift in x-direction for a 30 ordinary body is much less than the irregular body and on the y-direction the abnormal body is much less than the regular frame float and in a not unusual statement there is a sudden boom in flow whilst each orthogonal directions at the discontinues level. It is additionally recommended that the irregularity in column is a susceptible circumstance in a shape creating the gentle storey impact which also results on the overall performance of the constructing beneath seismic loading..

METHODOLOGY

1. Studing literature evaluates related to seismic evaluation of constructing with and without floating column.

2. Making one-of-a-kind model of constructing using staad pro software.

3. Designing for the one of a kind model cases and giving the evaluation primarily based on parameter which include time period ,story drift ,story displacement and so on..

4. Suggesting the exceptional suitable version case from all the structure

CONCLUSION

Following conclusions are drawn from the present study;

1. time periods of the building without floating column is less and is maximum while floating column is close to the basement. It has a tendency to lower while placing column is put within the upward flooring.

2. Displacements of diverse floors in longitudinal direction i. E. X-directions is determined and it's been visible that once floating column is provided storey displacement is barely better than the normally built constructing without considering any discontinuity.

3. From the response spectrum analysis, base response of the constructing rises whilst we move floating column to the upper floors being lowest for the first floor and most whilst there is no such floating column.

4. drift of a specific storey will increase due to the existence of floating column inside the structure.

5. It's been visible that possibilities of failure of building with floating column are lots higher as compared to the homes without floating column.

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