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Comparative Analysis Of Conventional RCC Building With And Without Floating Column Using E-Tabs-2017

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Abstract: This work includes the analysis and design of the floating column and non floating column structures by using software ETABS-2015 and compares the result with STAAD-Pro v8i Software. In today's jet age, we have a host of construction techniques at our disposal. Steel structures, R.C.C. structures, Core and hull type of structure (combination of steel & R.C.C construction). At times this choice available leads to confusion. The best way is to select the type of construction, depending on the circumstances and type of structure.Load transfer path has a great importance in case of structural stability in very major earthquake. The load distribution on the floating columns and the various effects due to it is also been studied in the paper. The importance and effects due to line of action of force is also studied. In this paper we are dealing with the comparative study of seismic analysis of multi-storied building with and without floating columns

I. INTRODUCTION

The ground storey is kept free without any constructions, except the columns which transfer the building weight to the ground. For a hotel or commercial building, where the lower floors contain banquet halls, conference rooms, lobbies, show rooms or parking areas, large interrupted space required for the movement of people or vehicles.

The earthquake forces developed a t different floor levels in a building need to be brought down along the height to the ground by the shortest path; any deviation or discontinuity in this load transfer path results in poor performance of the building. Buildings with vertical setbacks (like the hotel buildings with a few storey wider than the rest) cause a sudden jump in earthquake forces at the level of discontinuity. Buildings that have fewer columns or walls in a particular storey or with unusually tall storey tend to damage or collapse which is initiated in that storey. Many buildings with an open ground story intended for parking collapsed or were severely damaged in Gujarat during the 2001 Bhuj earthquake.

II. LITERATURE SURVEY

Sr.no	Paper	Author	Description
1	Comparative Study of Floating and Non-Floating Columns with and Without Seismic Behaviour- A Review	Nakul A. Patil *1, Prof. Riyaz Sameer Shah*2.	Analysis was carried out by using Extended Three Dimensional Analysis of Building Systems (ETABS) version 9.7.4 software and following results were obtained.
2	Multiple-Story Building With And Without A Floating Column: A Comparative Study	Ms. Rawale Pradnya Balaji, Prof. K. S. Upase2	These inertia forces, called seismic loads, are usually dealt with by assuming forces external to the building.

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III. METHODOLOGY

The design of RCC structural elements is carried out by considering the minimum dimensions of column, beam and slab. The dimensions of RCC structure elements are designed using MS EXCEL (spreadsheet) by considering the various loads such as Live load, Dead load and Wind load. A floating column refers to a column that does not extend from the foundation to the topmost floor but is supported by the floors below. A total 3 number of problems will be taken for with and without floating columns and for with and without seismic behaviour. The problems will include, comparative study of seismic analysis of building without floating columns, seismic and non seismic analysis of a building with floating columns

IV. RESULT

BENDING MOMENT

The BMD of beams for the G+5 storied frame structure is as shown in Fig .below. It is observed that the bending moment is greater at the mid-span of each beam and reduces linearly as it proceeds towards the support of the beam span.

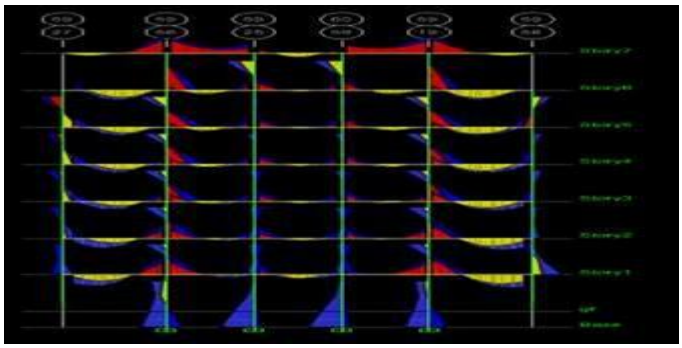

Fig. Bending Moment

SHEAR FORCE

The SFD for the desired multi-storied structure is as shown in Fig. below. It is observed that the shear force is greater towards the end portions of the beams than is towards the joint pertaining to a beam and column. Shear force may also occur in a beam to beam junction.

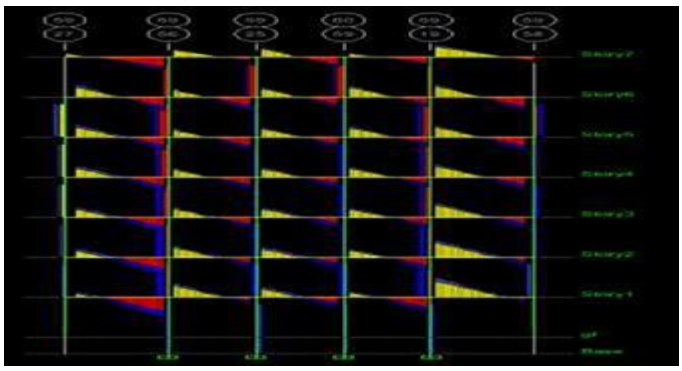

Fig. Shear Force

FOOTING REACTIONS

The below Fig. Below. Shows the vertical load along the column of the structure to the base of the footing. These footing loads are used to determine the type of footings corresponding to the soil condition and seismology. These column loads are grouped and used to design a combined footing.

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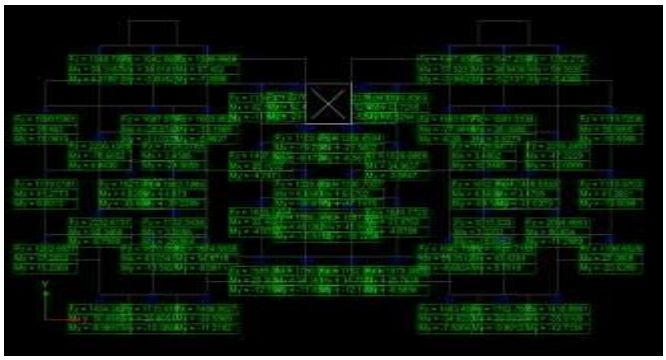

Fig. Reactions and Moment for Footing

ESTIMATION OF THE PROJECT

Plinth Area Rate

Total cost of the project(INR)	Area of the building In Sq.ft.	Plinth area rate per Sq.ft
7,15,50,000	5608	1823

CONCLUSION

Building provided with the floating column shows more storey drift & storey displacement as compared to building without floating columns. The optimum position to provide floating column is at 1st floor alternatively so that moment, shear & steel requirement of the whole building can be minimized.It was observed that, provision of floating columns at different locations affects the performance of building during earthquake also different parameters such as storey drift, storey shear, displacement increases.There is a correlation between the height of the building and the amount of storey displacement. Every single model displacement value goes up for the floating column structures, but most noticeably for the corner floating column building. The mass of the storey may either raise or reduce the amount of storey displacement

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2. Comparative Study of Floating and Non-Floating Columns with and Without Seismic Behaviour- A Review, Nakul A. Patil *1, Prof. Riyaz Sameer Shah*2, Final Year Student (M.E. Structure), Department of Civil Engineering Prof. Ram Meghe Institute of Tech & Research Badnera, Amravati-444701, Maharashtra, India*1,Asst.Professor Department of Civil Engineering Prof. Ram Meghe Institute of Tech & Research Badnera, Amravati-444701, Maharashtra, India*2.
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