International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue XI, Nov 2018- Available at www.ijraset.com

A Review Paper on Seismic Responses Analysis of Multistoried RC Building

Nitin Tiwari[1], Rashmi Sakalle[2], Vicky Kumar[3], Sheetal Dangi[4], Neha Verma[5]
[1,2]Assistant Professor, [3, 4, 5,] UG Student, Department of Civil Engineering, Truba Institute of Engineering and Information Technology, Bhopal M.P, India

Abstract: The principle objective of this project is to analyse and a multistorey building using STAAD Pro. The Design Involves load calculations manually and analysing the whole structure by using STAAD Pro. The design methods used in STAAD-Pro analysis are Limit State of Design conforming of Indian Standard Code. We started with the analysis of frames and manually checked the accuracy of the software with our results. We analyses and designed a G+4, G+9, G+14, & G+19 storey building initially for all possible load combinations [Dead, live and seismic loads]. We modelled the structure of different story like G+4, G+9, G+14 and G+19 and applied all zones (II, III, IV, & V) with different soil condition. By using STAAD. Pro that is very interactive software and user interface which gives the result according to seismic code (IS1893). Then according to the specified criteria assigned it analyses the structure and analysis the structure in different seismic Zone. We continued with our work with some more multistorey 2-D and 3-D frames under various load Combinations. Td to analyse the structure which can easily determine the parameter such as storey drift, displacement, Lateral forces, bending moment, Shear force, & axial forcehe IS1893 codes of practice to be followed were also specified for analyse purpose with other important details. The STAAD. Pro use.

Keywords: EQ Analysis, Multi-Storey building, RC Structure, Seismic zone V/s Soil condition comparison

I. INTRODUCTION

During an earthquake, failure start in structure at points of weakness. Generally weakness is due to geometry and mass isolation of structure. The structures having this isolation are termed as Irregular structures. This irregularity in structure contain a large portion of urban infrastructure.

Due to vertical irregularity structures fail during earthquakes**.** Many concrete structures have been collapsed or severely damaged during these earthquakes.

This will leads to the need for evaluating the seismic adequacy of existing buildings. India has recently divided into four upgraded seismic zones and which cover the more than 60% of the land. Under such circumstances, seismic behaviour of existing buildings under revised codes has become important. The seismic rehabilitation of old concrete structures in high seismicity areas is a matter of evolving concern.

The designing of the earthquake building has to go through regular motion at its base, which cause to inertia forces in the building that will consecutively cause stresses. In the designing of earthquake resistant building, the normal building should be able to resist minor, moderate, sever shaking.

In the circumstances of the building, symmetrical shape configuration building transfer the earthquake force in the direct path to the base, while in irregular shape configuration of building the load transferring path is indirect which leads to generation of stresses at the corners. During the warm shaking of earth the cantilever portion experience whiplash effect. Structure tends to swing in the direction in which are more flexible and have larger oscillating time period. Normal periods of earthquake are controlled by mass and stiffness specification of the building.

The elementary mode of oscillation is the rendering natural modes of oscillation that also are the pure translational mode Shapes and not from corner to corner or torsional oscillation. According to Indian seismic code 5% damping for all natural modes of oscillation for reinforced concrete building and 2% for steel structure issued. Building with large projections are not structurally accepted because they offer stresses are corners. Stresses on column on lower storey cause structural damage of building during earthquake shaking. In ground storey building stiffness is lower as compared to upper storey, so it is more suitable to use structural wall element in RCC building endure the strong earthquake shaking. Architects and structural engineers deal with earthquake design building with greater precision. In our study we have taken four different type of RC frame of different height, these such buildings are G+4, G+9, G+14 & G+19 and we study the seismic analysis in different zone (zone II, III, IV, V) with different soil condition.

II. OBJECTIVE OF PROJECT

1) Progressive changes of RC frame structure under different seismic zone and different soil condition.
2) Analysed a multistorey building under different type of earthquake zone(i.e., II, III, IV and V)
3) To compare the seismic response of multistorey buildings without shear wall in terms of Storey drift, Storey displacement, Shear force and Bending moment

III. LITERATURE REVIEW

1) *Prof. S.S. Patil (2015)* [1] He observed seismic analysis of high rise building using program in STAAD Pro. While considering different conditions of the lateral stiffness system. Their analysis is carried out by response spectrum method. This analysis gives the effect of higher modes of vibration and actual distribution of force within elastic range in good way. These results including base shear, storey drift and storey deflection.
2) *Mohit Sharma et. al. (2014)*[2] They study a G+30 storied regular building and the static and dynamic analysis has done on computer with the help of STAAD-Pro software using the parameters for the design as per the IS-1893- 2002/2005 -Part-1 for the zones- 2 and 3.
3) *Mayuri D. Bhagwat et, al (2014)*[3] They work on dynamic analysis of G+12 multistorey practiced RCC building considering for Koyna and Bhuj earthquake is carried out response spectrum analysis and seismic responses of such building are comparatively studied and modelled with the help of ETABS software. In this they evaluate two time histories (i.e. Koyna and Bhuj) have been used to develop different acceptable criteria and their results are base shear, storey displacement, storey drifts.
4) *Himanshu Bansal et. al. (2013)*[4] They study on storey shear force was found to be maximum for the first storey and it decreased to a minimum in the top storey in all cases. He also found the mass irregular building frames experience larger base shear than drifts.
5) *Ketan Bajaj et. al. (2013)*[5] They studied different type of building subjected to different earthquake loading and behaves differently with diversification in the types of soil condition. It has been sown that with change in soil properties from hard to medium and from hard to soft the lateral deflection decreased by 53.33% and 60.25% respectively for flexible base. In flexible foundation with change in zone from III to IV and III to V with same hard soil the deflection has increased by 4.07% and 24.72% for symmetrical building respectively.
6) *Md. Arman Chowdhury et. al. (2012)*[6] They observed that regular and irregular and irregular building with and without isolator are analyse. Installation of isolator in buildings with increases in the time period of the structure and due to this it reduces the possibility of resonance of the structure. By providing isolator in building the cost is increases, but in the reinforcement requirement and material cost is reduces.

IV. PROBLEM STATEMENT

Many of the studies have shown seismic analysis of the RCC structures with different irregularities such as mass irregularity, and vertical geometry regularity. Whenever a structure having different irregularity, it is necessary to analyze the building in various earthquake zones and soil condition. The various researches have worked on various zones but they have not published data. It is advised to compare the seismic zone and soil condition compression using various software bring out some standard results.

REFERENCES

[1] Prof. S.S. Patil (2015) [1] "seismic analysis of high rise building using program in STAAD Pro. While considering different conditions of the lateral stiffness system"
[2] Mohit Sharma et. al. (2014)[2 Comparative Study of Performance of RCC Multistorey Building For Koyna and Bhuj Earthquakes IS: 1893-2002 (part-1), Bureau of Indian Standards, New Delhi.
[3] Mayuri D. Bhagwat et, al (2014)[3] "Dynamic analysis of G+12 multistorey practiced RCC building considering for Koyna and Bhuj earthquake is carried out response spectrum analysis and seismic responses"
[4] Himanshu Bansal et. al. (2013)[4] "study on storey shear force was found to be maximum for the first storey and it decreased to a minimum in the top storey".
[5] Ketan Bajaj et. al. (2013)[5] "studied different type of building subjected to different earthquake loading and behaves differently with diversification in the types of soil condition".
[6] Md. Arman Chowdhury, (2012) [6]"Comparative study of the Dynamic Analysis of Multi-storey Irregular building with or without Base Isolator".
[7] IS: 875-1987 (part-1) for Dead Loads, code of practice of Design loads (other than earthquake) for buildings and structures.
[8] IS: 875-1987 (part-2) for Live Loads or Imposed Loads, code of practice of Design loads (other than earthquake) for buildings and structures.