A Review on Regular And Irregular Multi Storey Building

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Abstract- *The study of seismic analysis and design of G+5 multistory building of regular and irregular configuration is carried out sing STAAD pro. Assuming that material properties are linear static and dynamic analysis is performed. The analysis is carried out by considering seismic zones ii and for medium soil. The result is tabulated and graphs are plotted for displacement, base shear, and time period. The comparative study of regular and irregular building using is code 1893-2016.*

Keywords- stad pro, base shear, displacement etc

I. INTRODUCTION

Earthquake means the sudden vibration of earth which is caused by naturally or manually. We know that different type of vertical irregularities buildings are used in modern infrastructure. During an earthquake, the building tends to collapse. This is mainly due to discontinuity in geometry, mass and stiffness. This discontinuity is termed as Irregular structures. So vertical irregularities are one of the major reasons of failures of structures during earthquakes. In planning stage of vertical irregularity due to some architectural and functional reasons. During an earthquake, failure of structure starts at points of weakness. This weakness arises due to discontinuity in mass, stiffness and geometry of structure.

1.1 Objective:

1. This paper deals with the comparison between equivalent static technique & response spectrum technique. The earthquake effect lead to the damage the property and many people loss of life. So we have to know the structural performance under seismic load before construction.
2. To compare the base shear and node displacement, time period, frequencies of different types irregular building.

II. LITERATURE REVIEW

Paper [1] shows Reinforced Concrete (RC) building frames are most common types of constructions in urban India. These are subjected to several types of forces during their lifetime, such as static forces due to dead and live loads and dynamic forces due to earthquake. This paper presents a review of the previous work done on multistoried buildings vis-à-vis earthquake analysis. It focuses on static and dynamic analysis of buildings[12].

In paper [2] the behaviour of G+11 multi story building of regular and irregular configuration under earth quake is complex and it varies of wind loads are assumed to act simultaneously with earth quake loads. In this paper a residential of G+11 multi story building is studied for earth quake and wind load using ETABS and STAAS PRO V8i .Assuming that material property is linear static and dynamic analysis are performed. These analysis are carried out by considering different seismic zones and for each zone the behaviour is assessed by taking three different types of soils namely Hard , Medium and Soft .Different response like story drift, displacements base shear are plotted for different zones and different types of soils[13].

Paper [3] deals with the comparison between equivalent static technique &response spectrum technique. The earthquake effect lead to the damage the property and many people loss of life. So we have to know the structural performance under seismic load before construction. [7] Method of analysis Adopt the equivalent static and response spectrum techniques to analyze the model for the present study and observe the lateral displacement of the structure in a regular and irregular structure in various zones[11].

Paper [4] shows, It's a very big challenge that building or structure must withstand lateral forces such as earthquake and wind load. In the present work, the comparative analysis of various structures is performed using SAP 2000. [8] The main aim of the project is comparative study of the stiffness of the structure by considering the three models that is Regular Structure, Plan irregular structure and

Vertical irregular structure. All these three models are analyzed with static and dynamic earthquake loading for the Zones II, III, IV & V. The results are tabulated and graphs are plotted for displacement, drift, base shear and time period. Based on the results and discussion the structural behavior and stiffness is concluded for regular and irregular structures, among these structures regular structure shown maximum displacement and drift for all the zones in both static and dynamic analysis[9].

In this paper [5] The national building code of India (NBC) 2015 was released by bureau of Indian standards during December 2016/january2017. The various sections of this NBC have undergone changes as per latest technologies and user requirements. It is necessary to identify the performance of the structures to withstand against disaster for both new and existing one. The paper discusses the performance evaluation of RC (Reinforced Concrete) Buildings with plan irregularity. Structural irregularities are important factors which decrease the seismic performance of the structures [6]. This study as a whole makes an effort to evaluate the effect of plan irregularity on RC buildings using IS 1893:2002 and IS 1893:2016 in terms of dynamic characteristics[10].

III. METHODOLOGY

As per existing code IS 1893 (Part 1): 2002

Base isolation and energy absorbing devices may be used for earthquake resistant design. Only standard devices having detailed experimental data on the performance should be used. The designer must demonstrate by detailed analyses that these devices provide sufficient protection to the buildings and equipment as envisaged in this standard.[14] Performance of locally assembled isolation and energy absorbing devices should be evaluated experimentally before they are used in practice. Design of buildings and equipment using such device should be reviewed by the competent authority.

To study the effect of earthquake on a high-rise RC framed structure by considering plan irregularities in earthquake Seismic zones as per IS code 1893 (Part I):2016.

Following steps of methods of analysis are adopted in this study:

Step-1: Selection of the structures with plan regular and irregular.
Step-2: Selection of seismic zone
Step-3: Formation of load combinations.
Step-4: Modeling of building frames using STAAD-Pro software.
Step-5: Response Spectrum Analysis of all the models.
Step-6: Comparative study of results (seismic parameters) in terms of Storey lateral displacement and Base shear.

IV. CONCLUSION

1. This paper presents a review of the comparison of static and dynamic analysis multistoried building. Design parameters such as Displacement, Base shear, Storey drift, Torsion were the focus of the study.
2. When compared to irregular configuration the story drift value is more in the regular configuration. Story drift is increased as height of building increased.
3. The irregular shape building undergoes more deformation and hence regular shape building must be preferred.
4. When compared the both the regular and irregular configuration and the base shear value is more in the regular configuration. Because of the structure have more symmetrical dimensions.
5. . The fundamental time period for regular structure was found to be least and maximum for vertical irregular structure.
6. According to the time period graph the regular building gas the minimum least point in the form of seconds so it conclude that the regular building is more strength against the lateral loads to the structure.
7. When the eccentricity between center of mass and center of rigidity is less than 20% of its dimensions, the displacement is less in both X and Y directions than the ones have more eccentricity.[15] This proved the torsion irregularity which mentioned in the code. In other words if the eccentricity between center of mass and center of resistance of the building is less than 20% of its dimension, we can ignore the torsional irregularity. Since torsion is the most critical factor leading to major damage or complete collapse of buildings therefore, it is very essential that irregular buildings should be carefully analysis for torsion and the designer should avoid these types of structures as much as possible.

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