Review Paper on Seismic Analysis of RC Building

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Abstract- *Mention the abstract for the article. An abstract is a brief summary of a research article, thesis, review, conference proceeding or any in-depth analysis of a particular subject or discipline, and is often used to help the reader quickly ascertain the paper's purpose. When used, an abstract always appears at the beginning of a manuscript, acting as the point-of-entry for any given scientific paper or patent application.*

Keywords- Non-Linear Analysi, Push-0ver analysis, Etabs, Buildings with Varying height, Performance Comparision.

I. INTRODUCTION

This article guides a stepwise walkthrough by Experts for writing a successful journal or a research paper starting from inception of ideas till their publications. Research papers are highly recognized in scholar fraternity and form a core part of PhD curriculum. Research scholars publish their research work in leading journals to complete their grades. In addition, the published research work also provides a big weight-age to get admissions in reputed varsity. Now, here we enlist the proven steps to publish the research paper in a journal.

I.I PUSHOVER ANALYSIS

It is a non-linear structural analysis technique in which an incremental lateral load is applied to the structure under consideration. The sequential progress of crack formation, plastification, inter-storey drift and yielding can be aptly monitored through this method. It is an iterative process and continues till the design fulfills some pre-defined criterion such as target roof displacement. Roof displacement is often taken as the failure criteria because of the ease associated with its estimation. This has become a widely used tool for the purpose of seismic analysis and design of new as well as existing buildings.

II. REVIEW OF LITERATURE

Devesh p. soni and Bharat b. mistry (2006)[1] have observed that increase in drift demand in the tower portion of set-back structures and on the increase in seismic demand for buildings with discontinuous distributions in mass, stiffness, and strength. The largest seismic demand is found for the combined-stiffness-and-strengthirregularity.

The seismic response of vertically irregular building frames, which has been the subject of numerous research papers, started getting attention in the late 1970s. A large number of papers have focused on plan irregularity resulting in torsion in structural systems. Vertical irregularities are characterized by vertical discontinuities in the distribution of mass, stiffness and strength.

Shahrooz and Moehle (1990)[2] observed based on their analytical study that damage is concentrated in the tower portion of a setback structure due to high rotational ductilities. They also performed experimental studies and concluded that fundamental mode dominates the response in the direction parallel to the set-back.

In this work Dynamic analysis of G+12 multistoried RCC building considering Koyna and Bhuj earthquake is carried out by Mayuri D. Bhagwat (2014)[3] by using time history analysis and response spectrum analysis. Seismic responses of such building are comparatively studied and modeled with the help of ETABS software. Two time histories (i.e. Koyna and Bhuj) have been used to develop different acceptable criteria (base shear, storey displacement, storey drifts).

In the study by Himanshu Bansal (2012)[4] the 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. It was found that mass irregular building frames experience larger base shear than similar regular building frames. The stiffness irregular building experienced lesser base shear and has larger inter storey drifts.

In the study analyses by B. M. Saiful Islam (2011)[5] results show that isolation system considerably reduce earthquake induced load on building. Furthermore, method of analysis has been found to have considerable effect on the response of low to medium rise buildings. Time history analysis shows significant less base shear than that from response spectrum analysis. Also, less isolator displacement is obtained from time history analysis than that from response spectrum analysis.

Seismic analysis of high rise building by S.S. Patil (2013)[6] by using program in STAAD Pro. with considering different conditions of the lateral stiffness system. Analysis is carried out by response spectrum method. This analysis gives the effect of higher modes of vibration and actual distribution of force in elastic range in good way. These results include base shear, storey drift and storey deflection are presented.

The need of such an exercise has been well illustrated by Ghosh and Munshi (1998)[7] in which it has been stated that the aim of the design codes is cardinally to minimize the life hazards and maintain a reasonable level of continued functionality of the essential components of building, thereby codal design provisions allow some extent of damage such as cracking of concrete and yielding of steel at certain locations at certain predisposed locations. In this work a 12-storey RC has been analysed for inelastic seismic performance under several earthquake ground motions

Athanassiadou (2008)[8] analysed two ten-storeyed plane stepped frames and one ten-storeyed regular frame which were designed as per Euro code 8 (2004) for the high and medium ductility classes. In this work the Inter-storey drift ratios of the frames and plastic hinge formation in columns were monitored. In this work, the results of pushover analysis were presented using "uniform" load pattern as well as "modal" load pattern.

Kadid and Boumrkik (2008), have advocated the Pushover Analysis as a viable tool to assess the actual seismic vulnerability of a code designed building. An incremental static analysis was carried out to develop a capacity curve for the building. Based on the capacity curve found from analysis, an estimate of the displacement which the design earthquake would probably produce on the building was determined. The extent of damage experienced by the structure considering the plastic yielding effects as well at the designated target displacement is taken into account for the analysis results.

III. OBJECTIVES OF THE STUDY

This work attempts to evaluate effect of change of seismic zones on the design, detailing and performance of the building. The work includes comparison of base shear, percentage steel in columns and beams, and detailing of selected members. Moreover, it includes a performance comparison of the designed buildings on the basis of over-strength factors obtained from pushover analysis of the buildings.

IV. SCOPE OF WORK

- All the modelling and analysis has been done for only RC structures.
- The beams and columns have been modelled as frame elements.
- Soil-structure interaction is not being taken into consideration.
- Foundation is modelled as a fixed support at the level of footing and the building design & material estimation exclude foundation.
- Infill walls have not been considere

V. METHODOLOGY

I. Comparison of design and detailing requirement of an RC building for all the four earthquake zones(II,III,IV, and V),i.e, as in India. This will be done for 3 buildings with varying heights of five, seven and nine storey respectively. For every building, It will consist of the following steps-

- Modelling of the building with all the requisite parameters .
- Designing the building for all the four earthquake zones(as in India)
- Comparing of design and detailing for different earthquake zones.

II. A comparison of performance of designed buildings for various seismic zones and detailing provisions using computer based "PUSH-OVER" analysis

VI. CONCLUSIONS

1. There is significant increase in base shear as we move from zone II to zone V, indicating the increase in severity of earthquakes occurring in these regions.
2. Moreover, from the Base Shear curves, it is evident that magnitude of Base Shear increases with the increase in height of a building.
3. As far as steel requirement in columns is concerned, it almost increased to 43%(for exterior as well as interior columns) on average when we move from zone II to Zone V.
4. The variation of percentage of longitudinal steel at support sections in external beams is approximately 0.54% to 1.23% and in internal beams is 0.78% to 1.4%.
5. In the external and internal beams, the percentage of bottom middle reinforcement underwent comparatively lesser increment to about 15-20% for different earthquake zones.

6. There has been a steady rise in overall steel requirements in the building to about 35%,as we move from zone III to zone V.
7. From the analysis of over-strength factor, we find that it tends to decrease with increase in height of the building.

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