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A review on Seismic Assessment of an RC Building using Pushover Analysis

Navneet Kashinath Ganekar
B.E.Civil Engg, Vishwatamak Om Gurudev College of Engg,
navneet.ganekar@gmail.com

Bhagyashree Vishnu Ghogale
B.E. Civil Engg, Vishwatamak Om Gurudev College Of Engg,
bhagyashreeghogale47@gmail.com

Shraddha Uday Jadhav
B.E. Civil Engg, Vishwatamak Om Gurudev College Of Engg,
shraddha2408@gmail.com

Prof. Vaibhavi Mhatre
Project Guide, Department of Civil Engg,
Vishwatamak Om Gurudev College Of Engg,

***Abstract*—**in this review paper it is shown that the building design considering only gravity loads was inadequate in performance as compared to building designed considering lateral loads with the help of pushover analysis. Also with the help of pushover analysis the relationship between lateral shear force and lateral deformation of RC framed building is obtained.

Keywords-*Non linear analysis; linear analysis; pushover analysis; ground motion; capacity-spectrum*

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I. INTRODUCTION

We can not foresee precisely the real auxiliary reaction to solid seismic tremor because of the substantial uncertainities and haphazardness of basic properties and ground movement parameters. For that Non-straight examination strategy is embraced in light of the fact that it gives best results and also more exactness. The auxiliary examination in seismic tremor designing is a mind boggling assignment in light of the fact that: 1.The issue is changing and non-straight 2.The basic framework is unpredictable 3.Input information is arbitrary and unverifiable.

Non-linear analysis is adopted when there are large deflections observed in the structure, for complicated contact set up and the loads are applied rapidly on the structure i.e. seismic loads. Pushover analysis is non-linear static analysis method. The pushover analysis of a structure is a static non-linear analysis under a permanent vertical loads and gradually increasing lateral loads i.e. seismic loads. Pushover analysis provides data on the strength and ductility of a structure which cannot be obtained by linear analysis. The design weakness which remains hidden in linear analysis gets exposed in non-linear analysis.

II. LITERATURE REVIEW

Riza Hakim et. Al(2014) in their examination paper "Seismic appraisal of a RC building utilizing Pushover investigation" clarifies that a large portion of the current structures don't meet the present outline norms because of configuration deficiency. It is trusted that traditional versatile outline examination strategy can't catch numerous critical perspectives that influence the seismic execution of the building. The capacity of a working to experience inelastic misshapenings decides the basic conduct of working amid seismic ground movement. Consequently the assessment of a building ought to be founded on the inelastic misshapenings connected requested by a seismic tremor which can be gotten by sucker examination strategy. It is normally utilized strategy which gives satisfactory results. The weakling examination is a progression of incremental static investigation did to build up the limit bend for the building. The limit bend or compel dislodging bend relies on upon the quality and distortion limits of the structure and it portrays how the structure carries on past as far as possible. The creators got the outcomes by utilizing limit range strategy.

A. Pushover analysis

In this type of analysis a computer model of a structure is subjected to increasing pattern of lateral loads which would be experienced by the structures when subjected to ground shaking. The intensity of the load is increased i.e. structure is pushed and it records the sequence of cracks, yielding, load at which the failure of structural components occurs. Consequently, at each event the structure experiences loss in stiffness. By using pushover analysis, a characteristics non-linear force-displacement relationship can be determined. The force-displacement curve provides important information about how structure will behave after exceeding its elastic limit.

B. Capacity spectrum

The capacity spectrum method is a graphical procedure which compares the capacity of a structure with the demands of earthquake ground motion on the structure. The building performance level can be determined by target displacement using the capacity spectrum method. The capacity spectrum method allows graphical comparisons between the structure capacity and the seismic demand. The graphical presentation makes possible a visual evaluation of the performance of the structure during the earthquake ground motion. The pushover curve represents the lateral resisting capacity and the response spectrum curve represents the seismic demand.

C. Suggestions

In this paper we have studied the non-linear analysis, pushover analysis and capacity spectrum method. As we cannot predict the seismic loads, so it's difficult to understand the behavior of structure that is non-linear behavior. In such case the pushover analysis better understand the behavior of structure.

As the other methods are manual and complex also time consuming whereas the pushover analysis is time saving and simple method to understand .It also gives the accurate result in seismic load cases help of .we can perform this analysis with help of SAP STAD PRO, ETAB .which gives the quick as well as accurate results.

With the help of pushover analysis by using the software mentioned above we can make the structure more resistant to the seismic loads & the actual consumption of materials is also can be known. We are performing Non-linear Analysis of an earthquake Resistant building using software SAP2016 so we will get the results of actual behavior of structure & the structure can withstand the maximum earthquake load.

Due to this analysis we can reduce the damage level of structure as we cannot predict actual seismic load conditions.

III. CONCLUSION

Following are the conclusions obtained by reviewing this paper:

- The results show that the design considering only gravity load is found inadequate. Therefore, a structural engineer should consider a seismic load in designing procedures of building.
- Pushover analysis can identify weak elements by predicting failure mechanism.
- By pushover analysis we can identify critical regions in which deformation is expected to be high.
- It also estimate the force demands like axial forces on columns, shear forces on beams and moments on beam to column connections.
- Pushover analysis is an approximation method based on static loading. It may not accurately represent dynamic phenomena.

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