

Review Paper on Convincement based Seismic Design of Open Ground Storey Framed Buildings

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Abstract - From past earthquakes it's evidenced that a lot of structure are altogether or partly broken because of earthquake. So, it's necessary to work out unstable responses of such buildings. There are totally different techniques of unstable analysis of structure. Time history analysis is one among the vital techniques for structural unstable analysis usually the evaluated structural response is non-linear in nature. For such kind of analysis, a representative earthquake time history is needed. During this project work unstable analysis of RCC buildings with mass irregularity at totally different floor level are dispensed. Here for analysis totally different time histories are used. This paper highlights the impact of mass irregularity on totally different floor in RCC buildings with time history and analysis is completed by mistreatment ETABS software package.

Key Words: Infill walls, Diagonal strut, Open Ground Storey, Pushover Analysis, High Rise Building.

1. INTRODUCTION

The concept of open ground building (OGS) has taken its place in the Indian urban environment due to the fact that it provides the parking facility in the ground storey of the building. The cost of construction of this type of building is much less than that of a building with basement parking. Surveys of buildings failed in the past earthquakes show that this types of buildings are found to be one of the most vulnerable. The majority of buildings that failed during the Bhuj earthquake (2001) and Gujraat earthquake were of the open ground storey type. The collapse mechanism of such type of building is predominantly due to the formation of soft-storey behavior in the ground storey of this type of building. The sudden reduction in lateral stiffness and mass in the ground storey results in higher stresses in the columns of ground storey under seismic loading. In conventional design practice, the contribution of stiffness of infill walls present in upper storey of OGS framed buildings are ignored in the structural modeling (commonly called bare frame analysis). Design based on such analysis, results in underestimation of the bending moments and shear forces in the columns of ground storey, and hence it may be one of the reasons responsible for the failures observed. After the Bhuj earthquake took place, the IS 1893 code was revised in 2002, incorporating new design recommendations to address OGS framed buildings. According to this clause 7.10.3(a) of the same code states: "The columns and beams of the soft-storey

are to be designed for the multiplication factor of 2.5 times the storey shears and moments calculated under seismic loads of bare frame". The prescribed multiplication factor (MF) of 2.5, applicable for all OGS framed buildings, is proved to be fairly higher and suggests that all existing OGS framed buildings (those designed to earlier codes) are highly vulnerable under seismic loading. This MF value however does not account for number of storeys, number of bays, type and number of infill walls present, etc and hence it is independent of all of the above factors. Present study deals with various aspects related to the performance of OGS buildings. The values of magnification factor recommended in literatures vary from 1.0 to 4.8 (Kaushik, 2009). The main objective of present study is the study of comparative performance of OGS buildings designed according to various MFs using nonlinear analysis. As the more realistic performance of the OGS building requires the modeling the stiffness and strength of the infill walls, the stiffness and strength of the infill walls also considered. The variations in the type of the infill walls using in Indian constructions are significant. Depending on the modulus of elasticity and the strength, it can be classified as strong or weak. The two extreme cases of infill walls, strong and weak are considered in the study. The behavior of buildings depends on the type of foundations and soils also. Depending on the foundations resting on soft or hard soils, the displacement boundary conditions at the bottom of foundations can be considered as hinged or fixed. As the modeling of soils is not in the scope of the study, two boundary conditions, fixed and hinged, that represent two extreme conditions are considered.

2. LITERATURE REVIEW

Seismic analysis could be a major tool in earthquake engineering that is employed to grasp the response of buildings because of unstable excitations in an exceedingly easier manner. Within the past the buildings were designed only for gravity hundreds and unstable analysis could be a recent development. It's a vicinity of structural analysis and a vicinity of structural style wherever earthquake is prevailing.

Mayuri D. Bhagwat et.al [1] during this work dynamic analysis of G+12 multistorey practiced RCC building considering for Koyna and Bhuj earthquake is dispensed by time history analysis and response spectroscopy and unstable responses of such building are relatively studied and shapely with the assistance of ETABS software package.

2 time histories (i.e. Koyna and Bhuj) are accustomed develop totally different acceptable criteria (base shear, level displacement, level drifts).

Himanshu Bansal et al [2] during this study the level shear force was found to be most for the primary level and it belittled to a minimum within the high level altogether cases. It absolutely was found that mass irregular building frames expertise larger base shear than similar regular building frames. The stiffness irregular building veteran lesser base shear and has larger bury level drifts.

Mohit Sharma et al [3] during this study a G+30 storied regular building. The static and dynamic analysis has done on pc with the assistance of STAAD-Pro software package mistreatment the parameters for the look as per the IS-1893- a pair of 002-Part-1 for the zones- 2 and three.

A. B. M. Saiful Islam et al [4] during this study analyses results show that isolation system significantly scale back earthquake elicited load on building. Moreover, methodology of research has been found to own extensive impact on the response of low to medium rise buildings. Time history analysis shows important less base shear than that from response spectroscopy. Also, less isolator displacement is obtained from time history analysis than that from response spectroscopy.

A S Patil et al [5] This study shows similar variations pattern in unstable responses like base shear and level displacements with intensities V to X. From the study it's counseled that analysis of multistory RCC building mistreatment Time History methodology becomes necessary to make sure safety against earthquake force.

Md. Arman Chowdhury et al [6] during this study regular and irregular and irregular building with and while not isolator are analyse. Installation of isolator in buildings that will increase the period of time of the structure and because of this it reduces the likelihood of resonance of the structure. By providing isolator in building the value will increase, however reinforcement demand and material value is reduced

P. P. Chandurkar et al [7] during this study shear walls, is taken into account as major earthquake resisting member. Structural wall provides smart} bracing system and provide good potential for lateral load resistance. Thus it's vital to work out the unstable response of the wall or shear wall. During this study main focus is to work out the placement for the shear enclose multi level building.

Prof. S.S. Patil et al [8] This study provides unstable analysis of high rise building mistreatment program in STAAD professional. With considering totally different conditions of the lateral stiffness system. Analysis is dispensed by response spectrum methodology. This analysis provides the impact of upper modes of vibration and actual distribution of

force in elastic target great way. These results embody base shear, level drift and level deflection are given.

3. METHODOLOGY

If the structure not properly designed and created with needed quality they will cause giant destruction of structures because of earthquakes. Time history Analysis is an helpful technique for unstable analysis of structure once the structure shows nonlinear response. This methodology is step by step analysis of the unstable responses of a structure to a such that loading which will amendment with time.

1) Extensive literature survey by referring books, technical papers dispensed to grasp basic thought of topic.

2) Selection of kind of structures.

3) Modeling of the chosen structures

4) Analytical work is to be dispensed.

5) Interpretation of result and conclusion. In the gift work it's projected to hold out unstable analysis of multistored RCC buildings mistreatment time history analysis methodology considering mass irregularity at totally different floor levels with the assistance of ETABS software package.

4. CONCLUSION

Many of the studies have shown unstable analysis of the RCC structures with totally different irregularities like mass irregularity, stiffness and vertical pure mathematics irregularity. Whenever a structure having totally different irregularity, it's necessary to analyse the building in varied earthquake zones. From several past studies it's clear that impact of earthquake on structure may be minimize by providing shear wall, base isolation etc.

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