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Review Article

Review Paper on Dynamic Analysis of Building

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Abstract

The important objective of earthquake engineers is to design and build a structure in such a way that damage to the structure and its structural component during the earthquake is minimize. The paper aims towards the dynamic analysis of RCC and Steel building with unsymmetrical configuration. For the analysis purpose models of G +9 stories of RCC and Steel with unsymmetrical floor plan is consider. The analysis is by carried by using F.E based software E TABS. Various parameter such as lateral force, base shear , story drift , story shear can be determined .For dynamic analysis time history method or response spectra method is used .Dynamic analysis should be performed for symmetrical as well as unsymmetrical building. Dynamic analysis can be in the form of full nonlinear dynamic time history analysis .If the RCC and Steel building are unsymmetrical , Torsional effect will be produce in both the building and thus are compared with each other to determine the efficient building under the effect of torsion.

Keywords: *Dynamic effect, Seismic Design, Finite Element Analysis, Torsion.*

1. Introduction

Various civil structures is primarily based on prescriptive method of building codes. And loads which acts on this structure are low and resulting in elastic structural behaviour. A structure can be subjected to the force beyond the elastic limit. The structural safety against major earthquake relate to the structural design of building for seismic loading. The loading behaviour is different from wind and gravity loading which required detail analysis to reach the acceptable elastic range. In dynamic analysis the mathematical model of building by determining of strength, stiffness, mass and inelastic member properties are assigned. Dynamic analysis should be performed for symmetrical as well as unsymmetrical building. Due to unsymmetrical section of building the major parameter to be considered is Torque. The structural engineers perform for both regular as well as irregular buildings. in dynamic analysis the mathematical model of building are develop and determination of strength , inelastic The main objective is to create awareness regarding dynamic effect on the building in simple manner with the help of E-TABS, It also Shows better response of building under dynamic loading and Minimize the hazard to life for all structures.

2. Literature Review

Baldev D. Prajapati has study that the analysis & design procedure adopted for the calculation of symmetric high rise multi-storey building (G+30) under effect of EQ and Wind forces. The R.C.C., Steel, & Composite building with shear wall is considered to resist lateral forces resisting system.

Wakchaure M.R *et.al* has investigated that study the effect of masonry walls on high rise building. Linear dynamic analysis is done on high rise building with different arrangement is carried out. Analysis is done on G+9 R.C.C. framed building. Earthquake time history is applieds to the models. equivalent strut method is used to calculate the width of strut. Various cases of analysis are taken. Analysis is carried out by software ETABS. Base shear, storey displacement, story drift is calculated and all models are compared.

Ashwini Bidari *et.al* has done the analysis and design of high-rise steel building frame with braced and without braced under effect of earthquake and wind .And the soft ware used for all analysis s Sap2000. Dynamic analysis is carried out by using Equivalent Static method and Response spectrum method for earthquake zone V as per Indian code. The Natural period, Design Base shear, lateral Displacements are compared for the different silo supporting models .The braced system gives the economical results as compared to un braced system in terms of frequency and displacement

Kasliwal Sagar K. *et.al* has investigated tha the present work two multi storey building both are sixteen storeys have been modeled using software package ETABS and SAP2000 for earthquake zone V in India. The paper also deals with the Dynamic linear

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Response spectra method and static non-linear pushover method .The analysis is carried on multi-storey shear wall building with variation in number and position of shear wall. The author have concluded that the shear walls are one of the most effective building elements which resist the lateral forces during earthquake. The shear wall in proper position can minimized effect and damages due to earthquake and winds.

P. Mendis Bhagwat *et.al* has investigated that the paper provides an outline of advanced levels of wind design in the context of the Australian Wind Code and also explain the exceptional benefits it offers over simplified approaches. Wind tunnel testing,which has the potential benefits of further refinement in deriving design wind loading and its effects on tallbuildings is also emphasized.he the conclusion are made on various key factors with the design of tall buildings to the effects of wind loading. The general design requirements for structural strength and serviceability are assume particular importance in the case of tall building design as significant dynamic response can result from both buffeting and cross-wind loading excitation mechanisms.

Mayuri D. Bhagwat *et.al* studied dynamic analysis of G+12 multistoried practiced RCC building considering for Koyna and Bhuj earthquake is carried out. The time history analysis and response spectrum analysis and seismic responses of such building are comparatively studied. The modeled with the help of ETABS software is made. 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 of Mohit Sharma *et.al* he take (G+30) storied regular building for analysis. The buildings have the plan area of 25m x 45m , storey height 3.6m each, depth of foundation is 2.4 m. & total height of chosen building including depth of foundation is 114 m. The static and dynamic analysis is carried out on computer with the help of STAAD-Pro software using the parameters for the design as per the IS-1893-2002-Part-1 for the zones- 2 and 3.

3. Methodology of Work

1) Extensive literature survey by referring books, technical papers carried out to understand basic concept of topic.

2) Identification of need of research.
3) Data collection.

4) Analytical work is to be carried out.

5) Interpretation of results & conclusion.

Dynamic analysis for simple structures can be carried out manually and for high rise buildings the dynamic effect on building can be analysis by software, if the building are unsymmetrical in nature the torsoion will develop and it will the important parameter for the analysis , Torsional failures are seen to occur where the symmetry is not planned in the location of the lateral structural elements as for example providing the lift cores at one end of the building or at one corner of the building or unsymmetrically planned buildings in L shape at the street corners. Large torsional shears are caused in the building columns causing there torsional shear failures.

Conclusions

From the above review I have concluded that lot of research have carried on the dynamic effect on the building with symmetrical configuration. for the analysis purpose basic parameter taken are lateral force ,base shear, storey drift , storey shear and results are interpreted on the bases of this parameter. Lack of research have observed on the building with unsymmetrical configuration thus in the further work i will compared the building with unsymmetrical configuration. Due to the unsymmetrical the important factor to be considered is torsion.

References

Baldev D. Prajapati1 & D. R. Pancha (2013) study of seismic and wind effect on multi storey r.c.c., steel and composite building International Journal of Advances in Engineering & Technology, Sept. 2013

Wakchaure M.R et al. (2012): Earthquake Analysis of High Rise Building with and Without In filled Walls , International Journal of Engineering and Innovative Technology (IJEIT) Volume 2, Issue 2, August 2012

Ashwini Bidari(2014) Analysis of Seismic and Wind Effect on Steel Silo Supporting Structures International Journal of Research in Advent Technology, Vol.2, No.9, September 2014E-ISSN: 2321-9637

Kasliwal Sagar K, Prof. M.R.Wakchaure , Anantwad Shirish (2010) Effects of numbers and positions of shear walls on seismic behaviour of multistorey structure ISSN: 2278-7844

P. Mendis, T. Ngo, N. Haritos, A. Hira,B. Samali ,J. Cheung Wind Loading on Tall Buildings EJSE Special Issue: Loading on Structures (2007)

Mayuri D. Bhagwat, Dr.P.S.Patil, Comparative Study of Performance of Rcc Multistory Building For Koyna and Bhuj Earthquakes ,International Journal of Advanced Technology in Engineering and Science www.ijates.com Volume No.02, Issue No. 07, July 2014 ISSN (online): 2348 – 7550.

Mohit Sharma, Dr. Savita Maru, Dynamic Analysis of Multistoried Regular Building IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-ISSN: 2278-1684,p-ISSN: 2320-334X, Volume 11, Issue 1 Ver. II (Jan. 2014), PP 37-42 www.iosrjournals.org