Proceedings of International Conference on
Novel Innovations and Sustainable Development in Civil Engineering (NISDCE'22)
31st March and 1st April 2022

Seismic Performance of Deep Column Structure

Ashwin K[1], M.Shanmugasundaram[2]

[1] M-Tech Student, Department of Civil Engineering, Vellore Institute of Technology, Chennai, Tamil Nadu.
[2] Assistant Professor, Department of Civil Engineering, Vellore Institute of Technology, Chennai, Tamil Nadu
k.ashwin360@gmail.com

ABSTRACT

Stiffness has been playing the major important role in RCC framed structures especially in columns. Most of the Structures collapsed due to its stiffness irregularity and stiffness distribution is not uniform throughout the structure. In this project G+8 structure is considered taken for analysis using ETABS and seismic performance is observed under various static and dynamic loadings with irregularities on the horizontal planes with a build-up area of 1284sqm approximately. The objective of this project is to study about the performance based design for deep column by varying stiffness of the structure using pushover analysis. In this study Type A structure is designed with deep column and also rectangular , T, L shaped columns. Type B structure is designed with deep column and replacing other column shapes with only rectangular shaped. Type C structure is designed by replacing the deep columns with normal RC column. In this analysis structure is classified into three types, TYPE A possessing 25mm displacement, TYPE B possessing 50mm displacement, TYPE C possessing 95mm displacement obtained for the maximum load combination by redesigning the stiffness. Response spectra is initially carried out to find the displacement and interstory drift. In order to understand the performance based design non linear performance is carried out in each types and comparing hinge patterns to find how the building behaves in each types. Further timehistory analysis is also performed and comparative analysis of different performances at economical impact is carried out in which aspect the structure performs well during an seismic event.

Keywords: Performance based design, Deep column, Redesigning Stiffness, Response Spectra, Pushover Analysis, Time history Analysis