

Seismic Retrofitting of RC Buildings with Soft Storey and Floating Columns

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Abstract : Open ground storey with floating columns is a typical feature in the modern multistory constructions in urban India. Such features are very much undesirable in buildings built in seismically active areas. The present study proposes a feasible solution to mitigate the effects caused due to non-uniformity of stiffness and discontinuity in load path and to simultaneously hold the functional use of the open storey particularly under the floating column, through a combination of various lateral strengthening systems. An investigation is performed on an example building with nine different analytical models to bring out the importance of recognising the presence of open ground storey and floating columns. Two separate analyses on various models of the building namely, the equivalent static analysis and the response spectrum analysis as per IS: 1893-2002 were performed. Various measures such as incorporation of Chevron bracings and shear walls, strengthening the columns in the open ground storey, and their different combinations were examined. The analysis shows that, in comparison to two short ones separated by interconnecting beams, the structural walls are most effective when placed at the periphery of the buildings and used as one long structural wall. Further, it can be shown that the force transfer from floating columns becomes less horizontal when the Chevron Bracings are placed just below them, thereby reducing the shear forces in the beams on which the floating column rests.

Keywords : equivalent static analysis, floating column, open ground storey, response spectrum analysis, shear wall, stiffness irregularity

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020