Seismic Performance of Multistorey Reinforced Concrete Buildings by Pushover Analysis

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ABSTRACT

The buildings are constructed mostly based on the usual standard codes considering the gravity loads consisting of the self-weight of the structure and the live load. These structures are experiencing low magnitude loads in their design life that leads only to the elastic range response, however, strong loads such as a sudden earthquake will lead the structure beyond its elastic limit. The performance of Reinforced Concrete structures will be nonlinear under seismic loads so the nonlinear behavior of reinforced buildings will be defined by the formation of plastic hinges and loss of considerable stiffness. In this case we need a method to evaluate the performance level of the structure in the plastic range, hence we used pushover analysis to evaluate the response of the structure to the lateral loadsFor the explanation above the best example can be the devastating earthquake of Nepal (25th April 2015) which has affected many buildings constructed based on traditional design ductile behavior for structure; this will avoid the collapse of the building and will surely ensure life safety. In present study pushover analysis is carried out on G+4, G+11 and G+21 Building situated in New Delhi (Zone IV) according to IS 1893:2002 classification of seismic zones in India. Pushover analysis was performed in SAP2000 after it was designed for gravity loads in STAAD Pro based on IS-456-2000. The pushover curve, capacity spectrum, demand spectrum and Performance point of the building was found from the results of SAP2000 and hence it was concluded that the building response is highly dependent on the materials used in the design. Mostly the failure was noticed in the columns of ground story of the buildings. After using increased amount of reinforcement in the ground story the buildings have reached life safety performance level.