

Simplifying Seismic Vulnerability Analysis for Existing Reinforced Concrete Buildings

Authors : Maryam Solgi, Behzad Shahmohammadi, Morteza Raissi Dehkordi

Abstract : One of the main steps for seismic retrofitting of buildings is to determine the vulnerability of structures. While current procedures for evaluating existing buildings are complicated, and there is no limitation between short, middle-high, and tall buildings. This research utilizes a simplified method for assessing structures, which is adequate for existing reinforced concrete buildings. To approach this aim, Simple Lateral Mechanisms Analysis (SLaMA) procedure proposed by NZSEE (New Zealand Society for Earthquake Engineering) has been carried out. In this study, three RC moment-resisting frame buildings are determined. First, these buildings have been evaluated by inelastic static procedure (Pushover) based on acceptance criteria. Then, Park-Ang Damage Index is determined for the whole members of each building by Inelastic Time History Analysis. Next, the Simple Lateral Mechanisms Analysis procedure, a hand method, is carried out to define the capacity of structures. Ultimately, existing procedures are compared with Peak Ground Acceleration caused to fail (PGA_{fail}). The results of this comparison emphasize that the Pushover procedure and SLaMA method define a greater value of PGA_{fail} than the Park-Ang Damage model.

Keywords : peak ground acceleration caused to fail, reinforced concrete moment-frame buildings, seismic vulnerability analysis, simple lateral mechanisms analysis

Conference Title : ICSSDCE 2023 : International Conference on Structural Seismic Design and Civil Engineering

Conference Location : Vancouver, Canada

Conference Dates : May 22-23, 2023