

Fragility Assessment for Vertically Irregular Buildings with Soft Storey

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Abstract : Seismic behavior of irregular structures through the past decades indicate that the stated buildings do not have appropriate performance. Among these subjects, the current paper has investigated the behavior of special steel moment frame with different configuration of soft storey vertically. The analyzing procedure has been evaluated with respect to incremental dynamic analysis (IDA), and numeric process was carried out by OpenSees finite element analysis package. To this end, nine 2D steel frames, with different numbers of stories and irregularity positions, which were subjected to seven pairs of ground motion records orthogonally with respect to Ibarra-Krawinkler deterioration model, have been investigated. This paper aims at evaluating the response of two-dimensional buildings incorporating soft storey which subjected to bi-directional seismic excitation. The IDAs were implemented for different stages of PGA with various ground motion records, in order to determine maximum inter-storey drift ratio. According to statistical elements and fracture range (standard deviation), the vulnerability or exceedance from above-mentioned cases has been examined. For this reason, fragility curves for different placement of soft storey in the first, middle and the last floor for 4, 8, and 16 storey buildings have been generated and compared properly.

Keywords : special steel moment frame, soft storey, incremental dynamic analysis, fragility curve

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