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Evaluating Probable Bending of Frames for Near-Field and Far-Field Records

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Abstract : Most reinforced concrete structures are designed only under heavy loads have large transverse reinforcement spacing values, and therefore suffer severe failure after intense ground movements. The main goal of this paper is to compare the shear- and axial failure of concrete bending frames available in Tehran using incremental dynamic analysis under near- and far-field records. For this purpose, IDA analyses of 5, 10, and 15-story concrete structures were done under seven far-fault records and five near-faults records. The results show that in two-dimensional models of short-rise, mid-rise and high-rise reinforced concrete frames located on Type-3 soil, increasing the distance of the transverse reinforcement can increase the maximum inter-story drift ratio values up to 37%. According to the existing results on 5, 10, and 15-story reinforced concrete models located on Type-3 soil, records with characteristics such as fling-step and directivity create maximum drift values between floors more than far-fault earthquakes. The results indicated that in the case of seismic excitation modes under earthquake encompassing directivity or fling-step, the probability values of failure and failure possibility increasing rate values are much smaller than the corresponding values of far-fault earthquakes. However, in near-fault frame records, the probability of exceedance occurs at lower seismic intensities compared to far-fault records.

Keywords : IDA, failure curve, directivity, maximum floor drift, fling step, evaluating probable bending of frames, near-field and far-field earthquake records
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