

عنوان مقاله:

THE EFFECTS OF NEAR-FIELD AND FAR-FIELD MULTIPLE EARTHQUAKES ON SINGLE STORY RC FRAMES

محل انتشار:

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خلاصه مقاله:

Most of the structures situated in seismic regions experience several earthquakes during their lifetime. The majority of research studies in earthquake engineering field consider the effects of a separate earthquake on an intact structure i.e. without any initial seismic capacity deterioration. This consideration might have been justified based on the low probability of occurring two ground motions of significant effects in the lifetime of the structure, or based on the assumption that there would be sufficient time to assess and repair the structure after the first event. However, based on recent experiences, the issue of a structure to be subjected to consecutive earthquakes is real and therefore requires adequate attention. These earthquakes may be considered as from the same seismic source commonly known as foreshocks, main shocks and aftershocks, or from nearby sources affecting similar regions. It is now well known that the seismic ground motions recorded within the near-fault region of an earthquake are qualitatively quite different from the far fault seismic ground motions. Therefore, this paper aims to investigate the effects of multiple near-field and far-field earthquakes on a SDOF system using IDA. In order to evaluate frame's behaviour under these seismic situations, the systems are considered to have a spectrum of various dynamic properties and hysteresis stiffness and strength degrading characteristics. It is concluded that multiple near field seismic excitations may result different lateral transient and permanent deformations as compared with far field ground motions. It is also shown that the extent of these differences depends on the structural dynamic characteristics which are sensitive to ground motion frequency contents. This suggests that multiple near field and far field earthquakes would require different seismic considerations within the design procedure. Recommendations are provided on the threshold of seismic excitations as a seismic hazard level to be considered.

کلمات کلیدی:

Fragility Curves, Multiple Earthquakes, Incremental Dynamic Analysis

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