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Study on Earthquake Characteristics and Method of Assembling Repeated Earthquakes on the 2D Seismic Design RC Frames

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Abstract
Current paper presents two-dimensional reinforced concrete frames subjected to real repeated earthquakes. The frames are designed with seismic loading according to European codes. In this study, 14 sets of real repeated earthquakes with two different earthquake characteristics, namely source to site and near-field earthquakes with forward directivity are employed to study the frames response. Nonlinear static and nonlinear dynamic analyses are considered in order to measure engineering demand parameters (EDPs). The outcome of this study discovered that the method of assembling repeated earthquakes apparently influenced the outcomes of EDPs. The dissimilar characteristics of earthquakes, mainly source to site repeated earthquakes induced higher outcome for repeated earthquakes. On the other hand, near-field earthquakes with forward directivity indicate scattered pattern behavior where single and repeated earthquake events provide the same outcomes. Thus, earthquake characteristics and assembling repeated earthquakes influence the structure responses and should be carefully addressed in the analysis for accurate understanding of structures behaviors. © 2024, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author Keywords
Earthquake characteristics; Engineering demand parameters; Repeated earthquakes

Index Keywords
Forward scattering, Reinforced concrete, Seismic design; 'current, 2d seismic, Earthquake characteristic, Engineering demand parameters, Forward directivity, Near-field earthquakes, R.C. frames, RC frames, Repeated earthquake, Two-dimensional; Earthquakes

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