**INVESTIGATION ON THE EFFECTIVENESS OF DAMPERS FOR RETROFITTING THROUGH SEISMIC RESPONSE ANALYSES UNDER REAL AND SIMULATED MOTIONS**

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**ABSTRACT**

Earthquakes are among the most destructive natural hazards to the built environment resulting in economic losses as well as fatalities. Recently, many studies are focused on reducing the potential loss induced by ground shaking to the built environment. A recent and reliable tool to mitigate the potential risk is the implementation of dampers. The effect of dampers varies depending on the building seismic hazard, dynamic properties, and damper parameters. In this study, the effect of dampers is investigated for the case of a mid-rise building under a selected set of earthquake ground motions. The selected building is a 7-story 3-bay reinforced concrete frame structure where the dampers are installed for retrofitting purposes. The set of ground motion records includes both real and simulated records of the 1999 Duzce (Turkey) earthquake with Mw=7.1. The simulated ground motion records are generated with stochastic finite-fault technique with dynamic corner frequency approach. The structure’s numerical model is built in OpenSees finite-element analysis software and its response to earthquakes is simulated through nonlinear time history analysis. The analysis results are investigated in terms of the maximum drift ratio of the frames to observe the effectiveness of dampers. The responses under simulated records are also compared against the real responses in order to comment on the future use of simulated motions in damped buildings.

*Keywords: Dampers, reinforced concrete frame structure, real records, stochastic Finite-Fault ground motion simulation technique, the 1999 Duzce (Turkey) earthquake (Mw=7.1)*

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