

A study on fragility analyses of masonry buildings in Erzincan (Turkey) utilizing simulated and real ground motion records

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Loss estimations in seismically active regions require fragility analyses to be performed which necessitate the use of ground motion records. These records could be ‘real’, i.e. recorded acceleration time series or ‘simulated’ records consistent with the regional seismicity and produced using alternative simulation techniques. This study mainly concentrates on developing fragility curves for masonry buildings located in Erzincan (eastern Turkey) using ‘simulated’ ground motion records and evaluates the suitability of these fragilities by comparing with the curves developed utilizing ‘real’ records. To generate a set of scenario earthquakes by using regional seismicity parameters of Erzincan, stochastic finite-fault methodology has been employed as the simulation technique. The ‘real’ records, on the other hand, are selected from the large ground motion database of PEER and chosen to be compatible with the seismological characteristics of the region of interest. The records are imposed on a set of masonry buildings (with 1-, 2-, 3-stories and 3 different quality classes) representing the building stock in Erzincan. This study also investigates the effects of ground motion variability and two alternative fragility curve development approaches which are considered as key aspects in the generation of fragility curves.