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Selection of Intensity Measure in Probabilistic Seismic Risk Assessment of a Turkish Railway Bridge

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Abstract : Fragility curve is an effective common used tool to determine the earthquake performance of structural and nonstructural components. Also, it is used to determine the nonlinear behavior of bridges. There are many historical bridges in the Turkish railway network; the earthquake performances of these bridges are needed to be investigated. To derive fragility curve Intensity measures (IMs) and Engineering demand parameters (EDP) are needed to be determined. And the relation between IMs and EDP are needed to be derived. In this study, a typical simply supported steel girder riveted railway bridge is studied. Fragility curves of this bridge are derived by two parameters lognormal distribution. Time history analyses are done for selected 60 real earthquake data to determine the relation between IMs and EDP. Moreover, efficiency, practicality, and sufficiency of three different IMs are discussed. PGA, Sa(0.2s) and Sa(1s), the most common used IMs parameters for fragility curve in the literature, are taken into consideration in terms of efficiency, practicality and sufficiency.

Keywords : railway bridges, earthquake performance, fragility analyses, selection of intensity measures
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