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A Fragility Analysis of Retrofitted RC Bridge Damaged Under Severe Earthquake

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Abstract

Historic and old RC bridges are more vulnerable in an event of an earthquake either due to lack of ductility or lack of the practice of incorporating seismic guidelines in earlier design codes. Thus, these structures require structural strengthening. To assess the effectiveness of a chosen retrofitting technique, a study is carried out using RC jacketing on columns of bridge using the seismic fragility analysis under earthquake events. The study is implemented separately on isolated columns and columns of a box-girder bridge. Performance levels are compared in terms of fragility for minor damage state to the collapse damage state. Varying performance under slight and extensive damage states is observed. RC jacketing is observed to be effectively contributing to enhancing the performance under collapsed damage state based on assessed fragility curve using non-linear time history analysis. This study is useful to decide the efficacy of a particular method to rehabilitate seismically damaged bridges.

Keywords: Bridge pier, Seismic hazard, Jacketing, Rehabilitation, Fragility