



Effectiveness of Friction Pendulum System in Controlling Structural and Non-structural Responses of Short-period Reinforced-concrete Buildings at Near-fault Sites

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Abstract

The present study investigates the structural and non-structural responses of a four-story reinforced-concrete building with and without friction pendulum isolation system. The non-linear time history analyses are conducted using the design level and maximum considered earthquake ground motions with velocity pulses. Two different subsets of earthquake ground motions: one with pulse periods in the vicinity of the structural periods and the other with pulse periods sufficiently away from the structural periods, are considered. The structural and non-structural engineering demand parameters, i.e., maximum inter-story drift ratio, peak floor acceleration, and floor response spectra, are estimated and compared for the fixed base and base-isolated buildings. The effectiveness of the isolation system is demonstrated with respect to reduction in both the structural and non-structural responses. It is shown that base isolation may not necessarily be equally helpful in reducing the non-structural response of all components and secondary systems.

Keywords: RC frame buildings, Friction pendulum bearing, Structural response, Non-structural response