

Seizure Effects of FP Bearings on the Seismic Reliability of Base-Isolated Systems

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Abstract : This study deals with the seizure effects of friction pendulum (FP) bearings on the seismic reliability of a 3D base-isolated nonlinear structural system, designed according to Italian seismic code (NTC08). The isolated system consists in a 3D reinforced concrete superstructure, a r.c. substructure and the FP devices, described by employing a velocity dependent model. The seismic input uncertainty is considered as a random variable relevant to the problem, by employing a set of natural seismic records selected in compliance with L'Aquila (Italy) seismic hazard as provided from NTC08. Several non-linear dynamic analyses considering the three components of each ground motion have been performed with the aim to evaluate the seismic reliability of the superstructure, substructure, and isolation level, also taking into account the seizure event of the isolation devices. Finally, a design solution aimed at increasing the seismic robustness of the base-isolated systems with FPS is analyzed.

Keywords : FP devices, seismic reliability, seismic robustness, seizure

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