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ABSTRACTS

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Vibration control of asymmetric structures using MR dampers

Manuel Braz Cesar, Rui Barros

Abstract: This paper is devoted to study the effectiveness of semi-active control systems with MR dampers to reduce lateral-torsional responses of irregular structures, in particular plan asymmetric building structures. Basic concepts and the analytical formulation of asymmetric structural systems are initially provided. Then, several numerical simulations comprising a two-story, one bay building structure excited by an earthquake ground motion will be used to demonstrate the effectiveness of a non-collocated passive and semi-active control systems in mitigating seismic-induced vibrations. The passive configurations are accomplished using the MR damper as passive energy dissipation devices while the semi-active configurations make use of the controllable nature of this type of actuators. The numerical results achieved with uncontrolled and passive configurations are compared with those of several semi-active controllers to evaluate the performance of each control scheme in reducing the coupled lateral-torsional response of the plan asymmetric structure due to seismic loading.

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