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Numerical modeling and seismic assessment of smart isolation system for high-speed railway RC bridge subjected to near-field ground motions

Lingkun Chen, Yangzhou University

ABSTRACT

The paper presents a numerical analysis process of a smart isolation system, which is installed in the high-speed railway bridge. At first, an equivalent linear model of lead rubber bearings (LRB) is established in this paper, the calculation method of dynamic parameters of the LRB is presented based on the model. Second, the spatial analysis model of a vehicle-bridge system under high-speed vehicles is set up, the dynamic responses of the non-isolated and isolated bridge under the earthquake load combination of the horizontal and vertical directions are calculated, and seismic isolation effect of LRBs is analyzed. The numerical calculation results indicate that the LRB have excellent performance in seismic isolation and energy dissipation.

KEYWORDS: equivalent linear model, high-speed railway, lead rubber bearings, isolated bridge