

Evaluation of Seismic Running Safety of Railway Rolling Stock and Restorability of Continuous PC Girder Bridges with Seismic Isolation Bearings

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The purpose of this paper is to clarify the running safety of railway rolling stock on continuous girder bridges with seismic isolation bearings in the traverse direction during earthquakes. Dynamic interaction analyses between vehicles and structures indicate that seismic isolation can significantly decrease derailment limit acceleration depending on the vibration frequencies of the piers and tracks. When the yield seismic intensity of the isolators is set to approximately 0.4 and the resulting dominant track frequency is reduced to 0.5 Hz or lower, derailment can be prevented even under L2-class earthquakes. Moreover, the proposed isolation system effectively suppresses track displacement and reduces pier displacement by as much as 50%.