

The Safety Assessment of Railway Vehicle Running on a Curved Track

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ABSTRACT

Due to the rail vehicles providing the convenience, timeliness, and economy, these reasons have positively motivated the development of rail transportation in Taiwan. The research of rail transportation is divided into two major aspects, which are the safety and the comfort of rail vehicle. Predicting and identifying the danger of derailment are the key researching for the safety of rail vehicle. Therefore, the objective of this study is the formulation of the equations of motion for the rail vehicle considering one single train car, two bogie mounts and four wheelsets. In order to conclude whether the rail vehicle is safe, the study uses the derailment coefficient of rail vehicle as a criterion, which gets from the vertical force and lateral force of the wheel/rail contact forces. The contact relation between the wheelsets and routes is derived from the Kalker ' s linear contact theory, and the Newton ' s second equation of motion. To confirm the accuracy for derivation of the equation of motion, the proposal of this study is comparing to the experimental results and numerical results using the OMNISIM software code. In addition, the proposed results obtain the potential for evaluating the derailment safety of rail vehicle on curving performance of a track and guiding the future development of safety technologies for the train design and rail routing design.

Keywords : Rail Vehicle, Curved Track, Derailment, Bogie, Suspension System

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