Advances in Automobile Engineering

Extended Abstract

Development of a dynamic rolling stock model to predict the impact strength of derailment containment provisions

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Abstract

As the operating speed of train increases, there is a growing interest in reducing damage caused by derailment and collision accidents. Since the collision with the surrounding structure after a derailment accident causes a great damage, the derailment containment provision (DCP) should be installed to reduce the damage due to the secondary collision accident. However, the criteria to design the DCP such as locations and design loads are not clear because of difficulties in predicting derailment and collision behaviors. In this paper, we derived a dynamics bogie model which can predict derailment and collision behaviors in the design phase of the DCP. The derived bogie model was simplified for various frames and suspensions to reduce the simulation time. Also, the actual derailment tests were conducted on a real test track to verify the reliability of the bogie model in terms of impact accelerations and derailment behaviors under a trial derailment containment provision. The simulation results of the developed model showed reasonable agreements to the test results. Using the developed modeling technique, we developed a dynamic power car model of the Korean high speed train to predict and design the tolerable impact strength of DCP. We could obtain a reasonable impact strength of DCP.

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