Derailment Detection of Freight Wagon Using Mechanical Contact Sensors

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In long freight trains, if a freight wagon derails away from the locomotive, there may be a delay in detecting the derailment. In such cases, there is a concern that the wagons may continue to run while derailed, causing severe damage to track components, and therefore there is a need for early detection of wagon derailment. Therefore, the authors investigated a derailment detection method using mechanical contact sensors as one of several methods, since the contact sensors is too useful to detect wagon derailment. In this study, based on the results of past accident investigations and simulation results, two locations on the bogie of a wagon were selected as suitable locations for the installation of contact sensors. In addition, in order to evaluate the derailment detection performance of the proposed method, derailment tests on actual tracks were carried on freight wagons using bogies with contact sensors. The test results showed that the proposed method using contact sensors could detect a derailment immediately after it occurred.