Pressure Tightness Model for Freight Containers Passing in Tunnel

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In mixed traffic, high-speed and conventional trains share the same tracks. This exacerbates the problem of aerodynamic loads due to pressure variations in the tunnel on conventional trains when they pass high-speed trains in a tunnel. In particular, freight cars, such as containers and wagons, may be damaged by these loads, as their structural strength is lower than that of passenger trains. To predict the aerodynamic loads, it is necessary to estimate not only the external pressure (i.e., the pressure in the tunnel) but also the internal pressure. This study involved conducting an experiment using a train model launcher to measure the pressure inside and outside a model freight container. The pressure tightness model proposed in previous studies was validated quantitatively using experimental results. It was also confirmed that the pressure tightness model which takes into account the influence of the elastic deformation of vehicle bodies is suitable for predicting the internal pressure in vehicles with low rigidity, such as freight cars.