

**Development of Rails for Hand Straps  
Improving Carbodies' Rigidity and Ride Comfort**

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The authors have been investigating how non-structural members of the carbody influence on the rigidity and the vibration characteristics of a railway vehicle. Rails for hand straps (RHSs) are utilized to improve the car-bodies' rigidity and ride comfort in this study. Firstly, the prototype of the proposed RHS is designed for a test vehicle, and attached to the carbody. Excitation tests of the test car have been performed on the rolling stock test plant. The RHSs designed based on the prototype are then adopted for a newly designed commercial commuter vehicle. The results of the vibration measurement in running conditions have shown that the proposed RHSs have favorable effects on the natural frequencies and accelerations of the carbody.