

**Experimental Verification of Handrail Effect on Injury Reduction
for Passengers Seated in Long Seats in the Event of Collision**

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In order to enhance the safety of passengers seated in long seats, it is important to identify the risk to passengers in the event of a collision. In a prior study, case studies using numerical analysis showed that the installation of handrails reduced the secondary impact velocity of the passenger's head. The purpose of this study is to investigate the effect of handrails in reducing the severity of injury to passengers by some physical tests. The experiment results showed that passengers seated third from bench-end partitions in long seats are at higher risk, and that the severity of head and thorax injury decreased significantly because of handrails.