

Torque Loss Prediction Test Method of Bolted Joints in Heavy Commercial Vehicles

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Abstract : Loosening as a result of torque loss in bolted joints is one of the most encountered problems resulting in loss of connection between parts. The main reason for this is the dynamic loads to which the joints are subjected while the vehicle is moving. In particular, vibration-induced loads can loosen the joints in any size and geometry. The aim of this study is to study an improved method due to road-induced vibration in heavy commercial vehicles for estimating the vibration performance of bolted joints of the components connected to the chassis, before conducting prototype level vehicle structural strength tests on a proving ground. The frequency and displacements caused by the road conditions-induced vibration loads have been determined for the parts connected to the chassis, and various experimental design scenarios have been formed by matching specific components and vibration behaviors. In the studies, the performance of the torque, washer, test displacement, and test frequency parameters were observed by maintaining the connection characteristics on the vehicle, and the sensitivity ratios for these variables were calculated. As a result of these experimental design findings, tests performed on a developed device based on Junker's vibration device and proving ground conditions versus test correlation levels were found.

Keywords : bolted joints, junker's test, loosening failure, torque loss

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