

Numerical study to optimize exhaust hanger location based on finite element modelling and model updating

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Abstract:

This article provides numerically study of optimizing exhaust hanger location through reliable finite element (FE) model treated with finite element modelling and model updating. The goal of this study to improve the dynamic characteristic of the test structure by optimizes its hanger locations. Preliminarily, the reliable FE model prepared via FE modelling and model updating approach with joint strategy (existed element connector model; RBE2, CBAR, CBEAM and CBUSH in FEA package) verified by measured counterpart. Modal analysis of the FE model executed using CAD software, SolidWork and FEA package, MSC. Nastran/Patran. Hence, the reliable FE model of exhaust is undergo with a method called average driving degree of freedom displacement (ADDOFD) to determine and optimize the exhaust hanger locations. Once relevant locations of the hangers identified, the vibration level experienced by the structure would reduced. The proposed approach is feasible to identify the optimum position of exhaust's hanger to provide healthier NVH performance in advance before manufacturing process. This method is reasonable to be extent to the other types of structure instead of field-testing which consumed extra time and expenditure.

Keywords: Nastran/Patran; average driving degree of freedom displacement (ADDOFD); Finite Element (FE); Element Modelling

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