Aero Acoustic Noise Analysis of a Locomotive Cooling System Ducts and Structure Optimization

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Abstract

Aero acoustic noise of a locomotive cab cooling system ducts was analyzed by method of Computational Fluid Dynamics (CFD) and Computational Aero acoustic (CAA) approach. Flow characteristic of the ducts was analyzed by CFD software, then near-field and far-field aero acoustic noise was forecasted with BNS model and FW-H model respectively. Duct structure was optimized according to the analysis of flow field and sound field. Results indicated that noise characteristic of sensitive frequency band at the position of human ear with the optimized duct has a significant improvement.

Keyword: Flow field analysis, Aero acoustic analysis, BNS model, FW-H model

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