

Interior Noise Reduction of Construction Equipment Vehicle

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Abstract : One can witness the constant development and redevelopment of cities throughout the world. Construction equipment vehicles (CEVs) are commonly used on the construction site. However, noise pollution from construction sites due to the use of CEV has become a major problem for many cities. The construction equipment employed, which includes excavators and bulldozers, is one of the main causes of these elevated noise levels. The construction workers possibly will face a potential risk to their auditory health and well-being due to the noise levels they are exposed to. Different countries have imposed exterior and operator noise limits for construction equipment vehicles, enabling them to control noise pollution from CEVs. In this study, the operator ear level noise of the identified vehicle is higher than the benchmark vehicle by 8 dB(A). It was a tough time for the NVH engineer to beat the interior noise level of the benchmark vehicle. Initially, the noise source identification technique was used to identify the dominant sources for increasing the interior noise of the test vehicle. It was observed that the transfer of structure-borne and air-borne noise to the cabin was the major issue with the vehicle. It was foremost required to address the issue without compromising the overall performance of the vehicle. Surprisingly, the steering pump and radiator fan were identified as the major dominant sources than typical conventional sources like powertrain, intake, and exhaust. Individual sources of noise were analyzed in detail, and optimizations were made to minimize the noise at the source. As a result, the significant noise reduction achieved inside the vehicle and the overall in-cab noise level for the vehicle became a new benchmark in the market.

Keywords : interior noise, noise reduction, CEV, noise source identification

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