Product Sound Quality of Vehicle Noise – A permanent Challenge for NVH Measurement Technologies

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Abstract:

Sound quality is a very important product feature which besides functional quality, significantly influences the perceived product quality. Over recent years, the broad variety of new models, which resulted in an increased competition, has lead to ris ing customer demands with regard to NVH aspects.

Today, cars are often much quieter than several years ago and a lot of low-level sounds are not masked anymore. These noises often pose serious problems. As one annoying source is minimized, a previously undetected or unnoticed noise is often unearthed. The human hearing concentrates on specific noise patterns and detects disturbing noise events almost regardless of their absolute values. The reduction of sound pressure levels only neither automatically leads to a positive result nor to the product's target sound. In fact, the sound of a vehicle must be deliberately designed, which means that certain noise aspects have to be emphasized while others have to be reduced. In this respect, apart from the indispensable troubleshooting, the acoustic engineer's scope of work is extended to NVH design-engineering.

Moreover, the mentioned demands cannot be met by simple measures only, since the acoustic demands vary strongly from vehicle to vehicle. This exerts pressure on the manufacturers to innovate new products with high quality and reliability. Thus, innovative, ambitious measurement technologies were developed to meet these new, challenging tasks and to maintain a competitive advantage . Simulation techniques, capable of predicting vehicle's behavior in early design phases, transfer path analyses, projecting and assessing contributions of individual noise paths, driving simulators, which provide authentic vehicle scenarios, are only a few tools for optimizing products' sound quality. The objective is to detect and implement the best sound, tailored to suit the auditory expectations of the target group, instead of excising all sound and vibration. All in all, the vehicle's acoustical feedback is essential with respect to orientation, controllability, driving pleasure, and the general drivers' contentment.

The presentation will highlight state-of-the-art NVH measurement technologies, solutions of NVH challenges and will consider future prospects and developments in the e field.