

Vehicle NVH Development Overview

Customer perception of vehicle quality is closely related to the NVH behavior of the vehicle. FEV continues to work with its customers from all over the world to ensure that the vehicle NVH characteristics are well tuned to meet or exceed the demands placed by today's consumer.

Proper powertrain integration in a vehicle is crucial to designing a satisfactory driving experience. As a well-established powertrain developer, FEV continues to expand and use new and efficient methodologies in the process of **powertrain integration**. These methodologies can set realistic targets, achieve targets early in the development cycle, and therefore reduce cost of development.



FEV conducts extensive **NVH benchmarking** on vehicles in order to continually assess the state of the art. NVH relevant design features are analyzed and various metrics stored in a proprietary database. Such a database helps identify areas of weakness in a given vehicle and provides guidance for **NVH target setting**.

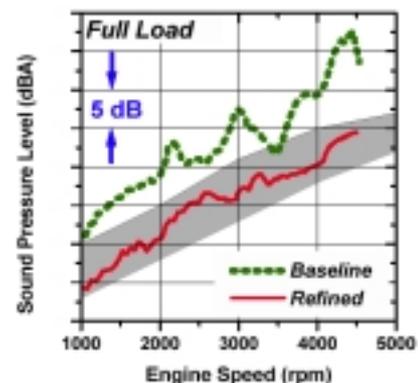
FEV has developed a methodology to perform vehicle **interior noise simulation**. Through a combination of measured powertrain level NVH data and airborne and structureborne transfer functions, FEV's technique allows for prediction of interior vehicle sound and sound quality under various engine speeds and loads.

FEV has significant expertise in the area of **induction and exhaust system** analysis. FEV's **air-to-air simulation** methodology simultaneously optimizes engine performance and NVH. This is done by striking a judicious balance between various engine orders as well as the airborne noise share between induction and exhaust systems, bearing in mind the influence of such changes on the engine's power output.

- Powertrain Integration
- **Vehicle NVH Benchmarking**
- NVH Target Setting
- **Interior Noise Simulation**
- **Air-to-Air System Refinement**
- **Exhaust System Development**
- **Powertrain Mounts Optimization**
- **Driveline Optimization**
- Root Cause Analysis
- NVH Troubleshooting

FEV uses advanced CAE and experimental methodologies to minimize the structureborne noise in the vehicle interior. This is accomplished by optimizing the **powertrain mounts**, exhaust mounts and hanger locations, as well as the **vehicle driveline**.

Finally, FEV offers assistance to its customers in the area of **NVH troubleshooting**. To resolve tough vehicle NVH problems, FEV conducts **root cause analyses** and develops suitable solutions in a timely and cost-effective manner.



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