



ASCEND-TECH.COM
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NVH

Noise, Vibration, Harshness

TESTING



NVH TESTING

NVH, it stands for Noise, Vibration, and Harshness, is the study of the noise and modification vibration characteristics of vehicles, and is basically a measure of how much unpleasant aural and tactile feedback the vehicles delivers as you drive.

Put simply, the Noise is what you can hear, the vibration is what you can feel and the harshness is how much of an effect thumps, bumps, noise and vibration have on the cabin and its occupants.

These terms describe audible (noise) or tangible (vibration) vibrations in vehicles. Harshness is the rough transmission of vibrations, felt as a sudden tremor, in the speed range of the motor from 20 to 100 Hertz. Minimising these vibrations such that the end consumer in the vehicle no longer perceives them as disturbing is a major aim during the development of the drivetrain.

NVH testing enables early recognition of NVH phenomena, which can then be avoided early during the development stage of the powertrain. This later makes driving in the production vehicle more comfortable and serves to avoid complaints and a loss of image.



NOISE ————— **Noise** is unwanted sound or unwanted disturbance in an electronic signal. Acoustic noise is energy transmitted to the air that causes an audible disturbance. Tools such as acoustic intensity mapping and combustion/mechanical noise separation can be used to identify the best method of noise reduction.

VIBRATION ————— **Vibration** is an oscillation that causes noise and disturbance. Vibration is generally of concern due to the physical effects which can cause disturbance to people, disruption in electrical systems, and failure or breakdown in mechanical systems. Shakers and controllers are techniques used to test vibration issues.

HARSHNESS ————— **Harshness** is generally used to describe the severity and discomfort associated with both vibration and noise. It is a qualitative system based on desired characteristics rather than on quantifiable measurements.

Noise, vibration and harshness are caused by the car's mechanical and electrical systems, as well as the car's interaction with road surfaces and its passage through the air.

The main sources of NVH in a car are its engine, drivetrain and tyres, as well as the sound of airflow along its body.



Images Sources: Illustrations

Tyres are a huge source of noise, due to vibrations created by their rotation, which then travel along suspension mounts and into the cabin

The responsibility of NVH engineers of modern day do not end at ensuring a quiet cabin. They fix hundreds of sensors on the chassis and the body of the vehicle. Through this engineers understand how Vibration and Noise from the engine and the road enter the cabin and find necessary solutions.

They fix microphones inside the vehicle to assess the level of Noise and Vibration at different situations and design NVH pads to eliminate them.



Images Sources: Siemens

For automakers to meet and exceed customers' expectations, suppliers must provide excellent manufacturing quality. Customer dissatisfaction because of high NVH levels in vehicles are costly. Rework, scrap, product failures and recalls can all severely damage a business by creating inefficiencies, delays, direct costs, and low shareholder confidence.



To enhance vehicle performance, comfort, and brand recognition, **AscendTech Group** offer a wide range of solutions for capturing and analyzing NVH data in the field of Noise, Vibration, and Harshness (NVH), all compliant with international standards and supported by calibration services.

[Learn more](#) →

NVH TYPES

Interior NVH

Deals with noise and vibration experienced by occupants of the cabin.

Exterior NVH

Is largely concerned with the noise radiated by the vehicle, and includes Pass-By Noise Testing.

Improving NVH can be achieved by reducing the source strength, by interrupting the noise or vibration path, or by absorption of the noise or vibration energy. Techniques used to help identify NVH include part substitution, modal analysis, rig squeak and rattle tests (complete vehicle or component/system tests), lead cladding, acoustic intensity, transfer path analysis, and partial coherence.

HARDWARE AND SOFTWARE FOR NVH TESTING



Simcenter SCADAS XS

Simcenter SCADAS XS helps you perform fast and reliable sound and vibration, NVH testing measurements and comes with a tablet for instant, in-the-field troubleshooting.



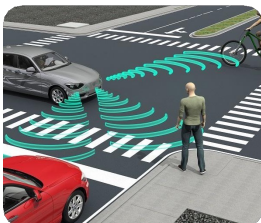
Simcenter ANOVIS

Simcenter Anovis combines all necessary sensors, accurate sound and vibration signal recording hardware, smart signal analysis, and flexible test bench control software to precisely perform pass or fail checks and deliver a formal proof that the part meets its specifications or that the machine operates safely.



Sound Source Localization Systems

Sound source localization (SSL) systems help you visualize sound directly at the source, for all types of sound fields and a wide range of applications, including onsite troubleshooting and source localization in aero-acoustic wind tunnels.



Active Sound Design

Solution for the recent legal requirement of AVAS in electrified vehicles to achieve minimal noise levels. The same system can emit exterior sounds to alert other road users.

Would you like to learn
more about the possibilities
and discover a wide range
solutions of NVH testing at
AscendTech Group?

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