



Vehicle Noise and Vibration Development

Applus IDIADA is an independent partner for the automotive industry with extensive capacity for the management and resolution of NVH development projects.

State-of-the-art tools for testing and simulation, a highly experienced team, integration within a whole-vehicle performance department (vehicle dynamics, braking system, fluid dynamics, stiffness and fatigue) and a management network for global development projects, provide us with unique characteristics for successfully carrying out global NVH projects.

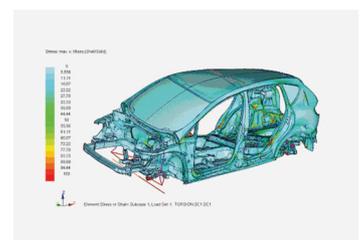
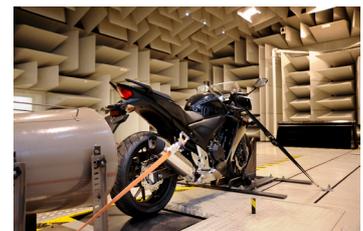
CONCEPT AND TARGET DEFINITION

- Benchmark measurement programmes
- Establishment of full vehicle and systems project targets:
 - Aerodynamic noise
 - Booming noise
 - Medium and high-frequency engine noise
 - Rolling noise and impact harshness
- Analysis of design concepts



DEVELOPMENT AND TESTING

- Body-in-white development
- Trimmed body optimisation
 - Panel and crossbeam sizing
 - Subframe design
- Component development
 - Cockpit and steering column concept
 - Seat comfort
 - Gear shifting mechanism
 - Mirror design
 - Electrical and hydraulic components
- Engine mounting and bracket development
 - Supplier assessment
 - Mount optimisation for structure-borne noise, ride shaking and engine control
 - Bracket design
 - Fatigue and durability program
- Chassis development
 - Modal management
 - Static/dynamic stiffness
 - Mount design
 - Tyre evaluation
- Acoustic isolation performance
 - Panel isolation characterisation and acoustic material validation
 - Assembly process analysis



VALIDATION

- NVH Validation
- Trouble shooting and tuning
- Components validation (modal analysis, squeak & rattle, fatigue test)
- Final tuning for exterior noise regulation



NVH FACILITIES

HEMI-ANECHOIC CHAMBER

- **Acoustic chamber** with chassis dyno for full NVH vehicle characterisation

Dimensions	14,7 m x 11 m x 5,1 m
Cut-off frequency (ISO 26101)	50 Hz
Background noise (systems off)	22 dB(A)
Reversible vehicle ventilation	
Temperature control: 24 ± 1 °C	

- **Chassis dyno** (2 independent motors)

Max speed	250 km/h
Roller diameter	72" (1828 mm)
Nominal power (temporarily up to)	320 kW (480 kW)
Tractive force (temporarily up to)	14.000 N (21.000 N)
Noise level	48 dBA at 100 km/h
Dyno available for front- and rear-wheel drive	
Inspection pit available	
Impact strip to perform impact noise tests	
Maximum drive axle weight	2500 kg
Doors height	3,57 m

TEST TRACKS

- **High-speed track** (smooth asphalt)
- **Rough asphalt track**
- **Deterministic inputs comfort track**
- **Comfort track** (badly maintained road, belgian block road, etc.)
- **Exterior noise tracks** according to ISO 10844:2014

HEMI-ANECHOIC CHAMBER

- Data acquisition systems, SIEMENS, B&K, Müller-BBM, HEAD Acoustics (including binaural microphones). 112 ch available at the same time
- Exterior noise dedicated measurement equipment B&K Pulse
- Multi-purpose microphones, accelerometers, force, displacement and stress sensors
- Acoustic sources, shakers and impact hammers

MODAL ROOM

- Modal workshop for complete vehicle and component modal analysis

Dimensions	8 m x 6 m x 5 m
Bridge crane and inspection pit available	



VEHICLE PREPARATION AREA

Workshop	1.115 m ²
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CONTACT INFORMATION

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