Product portfolio

Engine Bay · Interior Floor · Underbody
Sustainable Champions · New Mobility
Measurement Systems · Simulation Tools
Autoneum provides a full range of simulation tools based on our long-standing expertise in vehicle acoustics and thermal management. These tools predict and optimize NVH in the concept phase to provide our customers with cost-effective solutions and reduced lead times. Thanks to our broad range of measurement systems, the data for this process can be evaluated thoroughly.

For further information, please contact:
Autoneum Products and Systems Simulation
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Optimizing the vehicle body structure and acoustic trim

Autoneum has developed a complete tool portfolio for state-of-the-art computer-aided engineering (CAE) for vibroacoustics, focusing on body vibration and acoustic trim performance. Our tools predict and optimize NVH in the concept phase to provide our customers with cost effective solutions and reduced lead times.

GOLD

GOLD is a unique simulation tool for the simultaneous improvement of a damping package and vehicle body panel shape. It exploits the Finite Elements (FE) analysis performed with NASTRAN (Superelement Technique for full body optimization) and uses an Autoneum modeling-technique to simulate the application of damping material on vehicle body panels. GOLD automatically updates the FE model with possible shape modifications as set by the user: beadings, ribs and soapfilms.

**BENEFITS**

- Handles high number of design variables
- Customized shape modification

11 design variables for the position and the thickness of damping patches.

27 design variables for the shape modifications on the panels: 20 beadings, 7 soap films.

Full vehicle simulation: 7 uncorrelated loading conditions

Example

Reduction of damping package weight by 20% in floor area.
Same or better performance as original (same panel vibration).
TREASURI2

TREASURI2 allows the Finite Elements (FE) simulation of acoustic trim components containing porous materials. TREASURI2 can set-up, solve and post-process vehicle FE models that include trim parts with porous materials. It is applied to predict noise levels in the passenger compartment (full vehicle acoustics) mainly for structure-borne noise in the low- and mid-frequency range. TREASURI2 can also be used to evaluate in situ insertion loss of full components like floor components.

SILVER

SILVER is a simulation tool which predicts the shape and ideal location of dampers based on a single vibration Finite Elements (FE) simulation performed with NASTRAN. SILVER rationalizes and simplifies the design process of a damping package by optimizing the overall weight and the distribution of pads among the different areas of the vehicle, making it possible to efficiently evaluate a particular damping solution (e.g. reference damping configuration versus a proposed modification). It is applied directly on the same FE models used by the OEMs for NVH optimization.

Example

Refinement of baseline damping package with 15% weight reduction
Enhancing the acoustic performance of vehicle parts

High-performance software programs are used for the analysis, optimization and validation of the isolation and insulation properties of components for the vehicle interior floor, including carpet systems, inner dashes and floor insulators. The aim is to achieve the perfect balance between acoustic performance and product weight.

VisualSISAB

VisualSISAB calculates the absorption and insulation of sound package components with complex geometries and a wide range of different materials. It exploits the transfer matrix technique to represent the wave propagation through layers of porous materials, hard layers, foils or spacers. VisualSISAB enables material compositions and thicknesses of press-molded components already to be reviewed with respect to NVH requirements and adjusted if necessary during the CAD stage by means of computer-controlled simulations. This is a prerequisite for the development and manufacture of effective, lightweight and cost-efficient noise protection components.

**Benefits**

- Used for components in the vehicle interior, engine bay and body-in-white
- Fast design modifications and analysis on parts
- Performance result comparison with target curves
- Fast multilayer 3D constructions from CAD data

Example

Area split to simulate transmission loss of dashes
REVAMP

REVAMP can predict the impact of trim parts inside the passenger compartment. It is based on the existing Statistical Energy Analysis (SEA) theory. REVAMP is based on over 20 years’ experience in SEA modeling and is specifically designed to carry out typical sound package development and optimization tasks in the mid- and high-frequency range.

**BENEFITS**

- Supports the building and analysis of SEA models of vehicles
- Allows determination of dominating acoustic transfer paths
- Cascades vehicle noise level targets down to acoustic component TL and ABS targets
- Compatible with other commercial SEA tools

**Workflow to link parts performance to vehicle targets**

**Example**

Workflow to link parts performance to vehicle targets
Thermal management solutions for vehicles

Autoneum’s range of automotive thermal management solutions includes state-of-the-art thermal testing and calculation processes to develop components for the insulation, shielding and storage of heat.

At global research and development centers, Autoneum’s thermal management experts carry out material testing on components and in vehicles and use unique simulation software to develop innovative thermal protection packages that are tailored to customer needs.

For example, Autoneum offers Theta-FiberCell, a key technology for innovative engine bay parts like engine encapsulations, engine top covers or hoodliners. Autoneum provides full engineering services for the predevelopment and development stage for thermal safety, heat storage as well as acoustic validation at vehicle level.

For further information, please contact:
Autoneum | Thermal Management
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Example

Engine encapsulation pre-development workflow
Autoneum offers a variety of thermal management solutions for its customers

**Part simulation for thermal and acoustic performance**

- **VisualTherm**: predicting the thermal insulation performance of engine bay parts
- **VisualSISAB**: predicting the acoustic absorption and insulation performance

**Autoneum’s global vehicle testing facilities**

To perform OEM’s thermal safety cycles and 24 hours cooldown measurements for engine encapsulation efficiency assessment.

**Engine cooldown methodology**

Based on a smart and accelerated combination of Star-CCM+ and TAITherm to virtually evaluate the cooldown duration and efficiency of engine

**Material measurement equipment**

To enable the creation of temperature- and density-dependent thermal property databases.