HYBRID MODULAR ENGINEERING

powered by **VIBES.technology**

Hybrid Modular Engineering, introduced by VIBES.technology, is a product development strategy that combines test & simulation at the component level to develop, update, and optimize complex products. VIBES develops user-friendly solutions, provides engineer training and works as a consultant for customers around the world.

At VIBES, solutions are built to address specific engineering challenges in sound and vibration. Each solution is designed to support engineers in obtaining reliable, high-quality data early in development. By aligning with real engineering processes, our solutions help teams work more efficiently and solve the right problems with confidence.

HYBRID MODULAR ENGINEERING

This approach breaks complex assemblies into manageable substructures that can be tested and simulated separately. This allows engineers to create accurate system-level models early in development, even before physical prototypes are available.

TRANSFER PATH ANALYSIS (TPA)

Transfer Path Analysis (TPA) methods are various techniques to identify and evaluate the contribution of vibration sources in an assembly. Vibrations and noise levels can be predicted to further understand areas of improvement of the product.

SOURCE DESCRIPTIONS

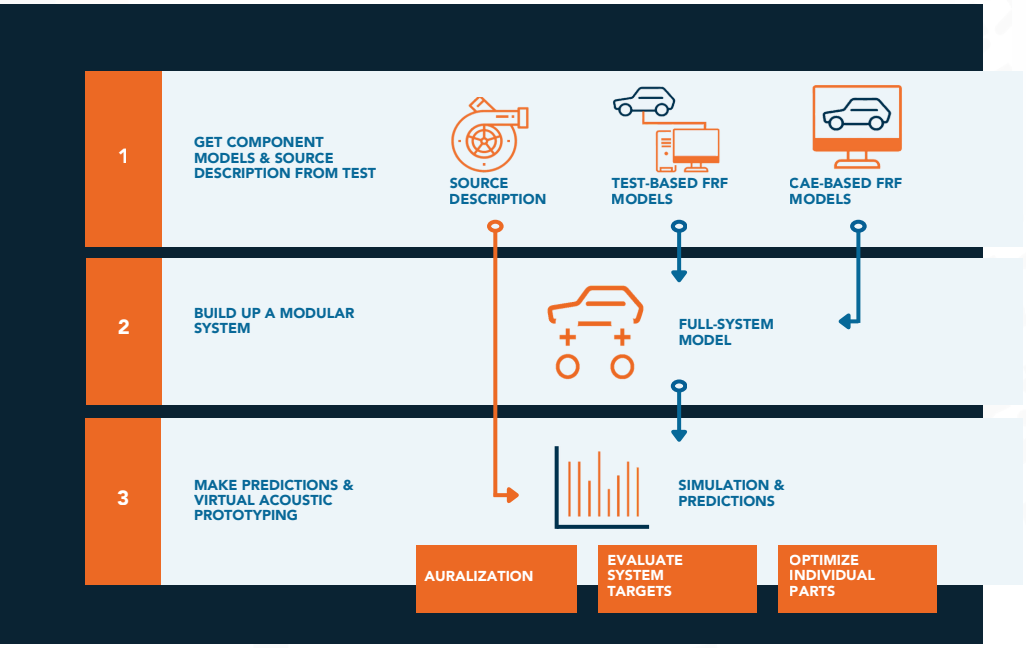
Standardized source descriptions, such as blocked forces, make it possible to characterize active vibration sources independently of the receiving structure. These models can be reused across platforms and integrated into simulations or benchmarking activities.

TEST-BASED MODELLING

When simulation models are not available or not sufficient, test-based modelling allows engineers to build dynamic models of passive components using physical measurement data. These models can be integrated into broader assemblies for NVH analysis.

MODAL ANALYSIS

Modal analysis identifies the natural frequencies, mode shapes, and damping of components or systems. This data supports validation and refinement of structural and acoustic behaviour, particularly in early development stages where accurate models are critical.



INSIDE THE SOLUTIONS

DIRAC

DIRAC enables engineers to prepare, perform and analyse dynamic measurements yielding high quality experimental component models. DIRAC ensures traceability of results and indicates the quality of the measurement. Overall, DIRAC helps to reduce the number of prototype variants needed – thus saving valuable time and resources.

SOURCE

SOURCE is a software tool for Blocked Force Source Characterization (SC) and component Transfer Path Analysis (TPA). It combines all SC and TPA methods in one clear workflow with quality checks. Results are then integrated into CAE simulations, helping engineers address NVH issues early in product development with traceable, reliable data.

COUPLE

COUPLE is a standalone application for assembling, predicting, and improving NVH designs through Dynamic Substructuring. It combines test models from DIRAC and SOURCE with simulation models in a full modular workflow. COUPLE helps avoid late-phase troubleshooting and reduces design cycles, making reliable full-system models available much earlier.

VIBES ENGINEERING SERVICES

Our experts on demand offer customized solutions for every vibration issue. A team of technical consultants helps you optimize complex engineering processes and shows the power of VIBES' methodology on any challenge.

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