

ENGINE

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POWERTRAIN

technology international

TESTING FOCUS

The latest in powertrain analysis and validation, including innovative industry breakthroughs that are reshaping the development process

FINE PRINT

All you need to know about next-generation technologies, processes and challenges as additive manufacturing hits the mainstream

FAST-FORWARD

Stefan Fischer, powertrain engineering head at Bentley, discusses an ICE-less future

TAKE PART

A look behind the scenes at the GM site researching the future of drive component production

BIG SIX

The Acura Type S performance brand returns with a turbo V6 to challenge the German OEMs

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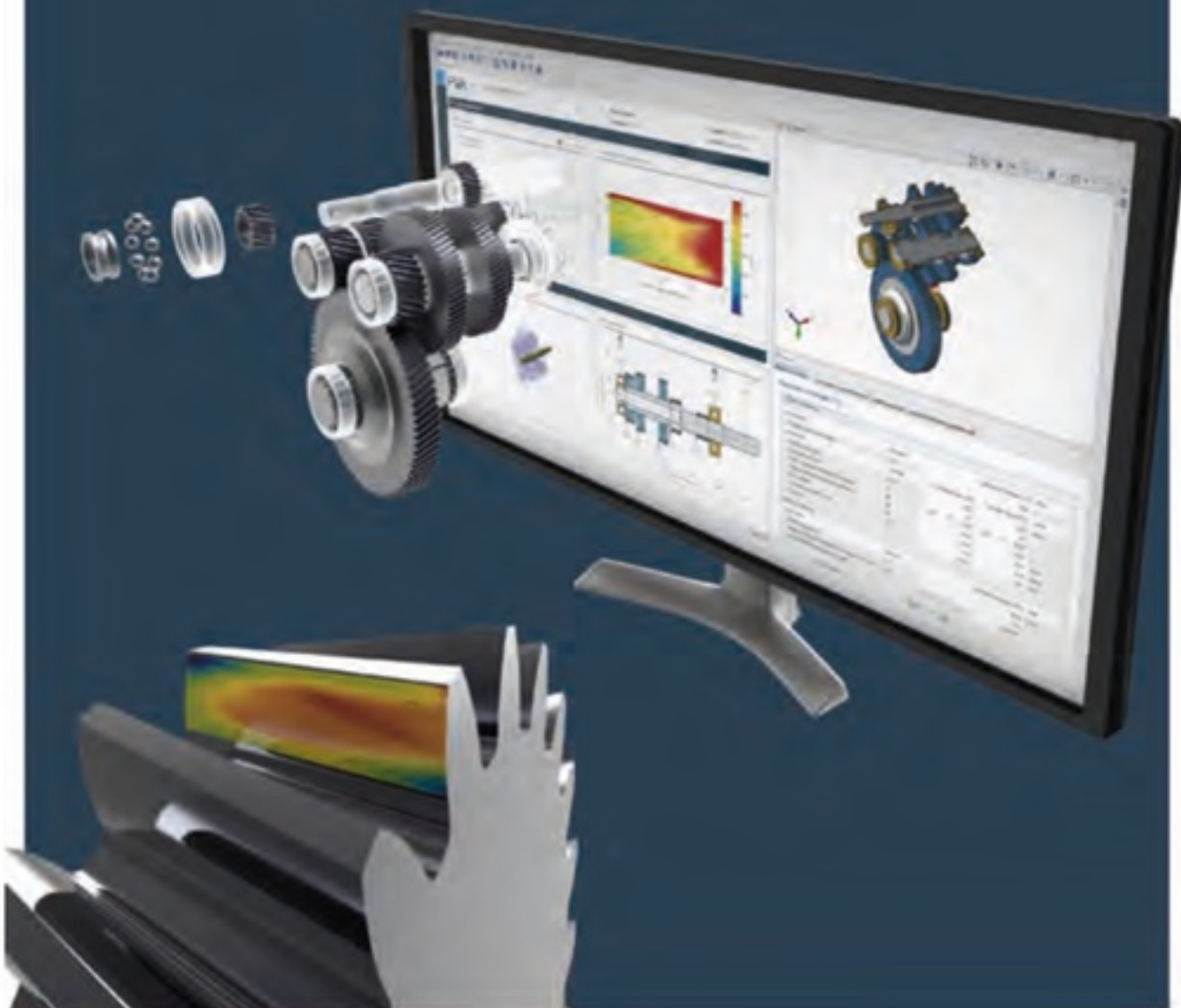
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Gearbox system analysis

Simulation software combines proven and reliable gear design calculation methods with user-friendly modeling and impressive reporting features

As the automotive industry evolves, there is a greater need for powerful, manufacturer-neutral software that enables modeling, design and optimization of transmission systems. The FVA-Workbench – which focuses on gear noise, component load capacity and efficiency – does this. Furthermore, its innovative system analysis features help designers to guarantee that all relevant influences are considered.

All the features in the FVA-Workbench have been developed, tested and validated by the Forschungsvereinigung Antriebstechnik (FVA) Research Association for Drive Technology. For over 50 years, the 25 expert working groups in this leading drive technology network have researched every detail in gearbox development, damage analysis and damage simulation. The FVA-Workbench design software suite provides user-friendly access to the results of this research, making it an efficient and reliable simulation tool for gearbox development.

The FVA-Workbench delivers cutting-edge, research-based simulations for everything from the motor flange to the driven machine. The multitude of standardized calculation methods makes it one of the most comprehensive toolboxes for gearbox calculation as per recognized standards. As well as verification according to common standards such as ISO 6336, DIN 3990 and AGMA 2101-D04, calculations can be performed according to current classification society rules and previous versions of these calculation methods. The FVA-Workbench can also be used to easily simulate plastic gears. In addition to standards such as VDI 2736, local pressures and stresses can be calculated while taking into consideration hyper-elastic material behavior.

DATA DRIVEN

Local approaches are a particular strength of the FVA-Workbench. System behavior can be used to calculate the load and pressure distribution for each point on the flank. Proper calculation of the gear stiffness is essential. Methods from the FVA research project on pinion modification (FVA 30 RIKOR) are applied for this purpose. Local load and pressure distribution can be used to draw conclusions on noise excitation. To do this, the transmission error, force excitation and the associated Fourier spectra are calculated.



1. The FVA-Workbench software suite provides engineers with access to extensive research into gearbox development, gear damage analysis and damage simulation

The FVA-Workbench is also a leading tool for the simulation of bevel gears. Rules from marine classification societies are available in addition to standard methods such as ISO 10300, DIN 3991 and AGMA 2003-C10. Furthermore, local simulation methods can be used for the calculation of bevel gears, hypoids and beveloids. This calculation is based on manufacturing simulations that determine the exact gearing geometry. This is then used to solve the contact and calculate flank pressure, local damage, tooth root stress and other key parameters.

These reliable results can be visualized via drag-and-drop with the reporting system. Clear and simple preparation makes it easy to understand the complex interrelationships in the gearbox, and to identify optimal measures to meet customer requirements. The large number of predefined graphics make it possible to create the ideal report for every application. For example, interactive graphics for management or sales presentations, or process tables for project workflows, can be created in just a few clicks.

Founded in 2010, FVA works with research institutions and drive technology companies toward practical application of knowledge gained from FVA research. FVA is a joint venture between the Research Association for Drive Technology and VDMA Services within VDMA (Verband Deutscher Maschinen und Anlagenbau, the Mechanical Engineering Industry Association). ©

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