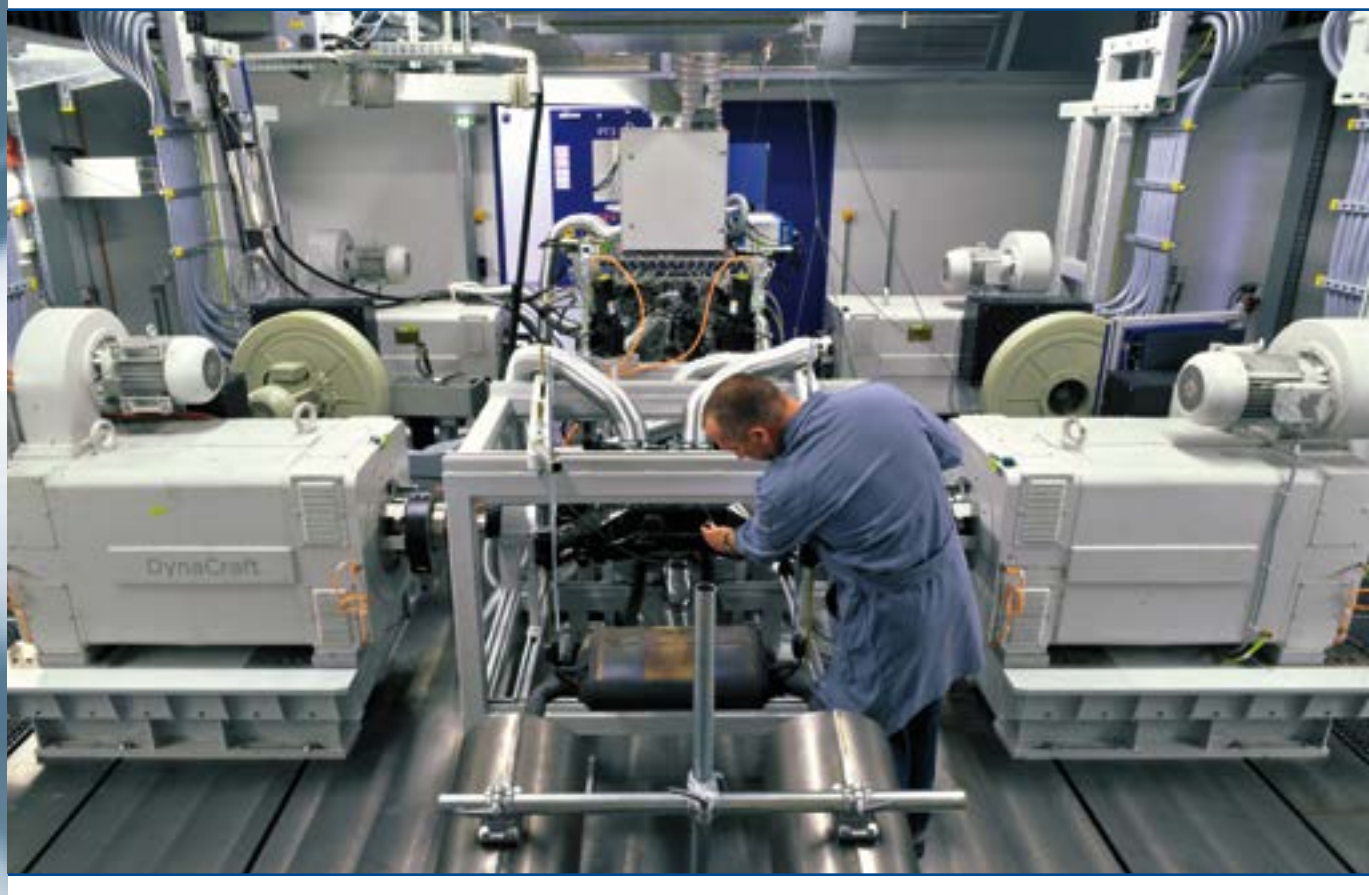
SPECTRUM

Transmission Development and Calibration

Special Edition, August 2009



FEV Transmission: The Upshift in Driveline Technology

Summary

As a result of the strong market demand for powertrain development, FEV has significantly expanded its capacity for transmission development over the last decade. FEV long ago recognized the importance of a total drivetrain approach rather than specializing on a specific unit. FEV is able to handle complete transmission development programs through its four transmission divisions (Design, Testing, Hydraulics and Calibration).

In addition to our normal development projects, FEV further focuses its support on transmission development by benchmarking new transmissions, using FEV's well-known scatterbands and troubleshooting during the development process and after SOP. ▶

Special Edition

Preface

Dear Readers,

Transmission development has seen a revolution in technology over the last decade. The market has witnessed a large diversification in technology with CVT, AMT, DCT and hybrid transmissions.

Major advancements have also been made in conventional transmissions. The role of the transmission within automated powertrains is becoming increasingly important, with the modern automatic transmission being the most important element in the vehicle's drivability.

Competition between the various powertrain and transmission concepts is at an all-time high. In addition, the electrification of the powertrain offers new alternatives. Against this background the transmission plays a significant role in CO_2 emission reduction.

FEV has intensively expanded its transmission development group over the last decade. We develop and optimize complete powertrain units. The complete process from concept through development and ultimately to implementation is our continual focus.

We are looking forward to supporting you in your development work!

Dr. Ing. Markus Schwaderlapp
Executive Vice President FEV Motorentechnik GmbH

▶ Transmission development at FEV provides the following:

- Complete solutions from the concept phase up to SOP
- Development support during all phases of development
- Benchmarking of new transmissions and powertrains
- System solutions including hybrids
- Vehicle integration and calibration
- Comprehensive testing including calibration demands
- Troubleshooting during development and after SOP

The different groups of transmission development specialists are fully integrated within the requirement-driven FEV organization, to achieve the greatest synergy. For example, the transmission calibration group is integrated into the vehicle application center and cooperates with all other parties that work directly on vehicles, such as engine calibration or vehicle NVH. Using this approach, FEV is capable of controlling the growing complexity and dependencies between powertrain components such as the transmission, combustion engine, chassis and – in case of a hybrid transmission – the electric motors.

Within the last decade, FEV has conducted over 100 powertrain benchmarking programs. The entire range of available technologies and their potential has been assessed for each of these projects. All key data from these analyses are processed, analyzed and stored in a database. With this data, FEV not only has an independent, objective opinion, but also benefits from an objective ranking using its comprehensive scatterbands. Integrating the transmission into the particular vehicle's powertrain has also been a part of some development programs, and has proven particularly useful in providing a detailed understanding of subsystem CO_2 contributions and interactions, or hybrid technologies.

Detailed knowledge of modern transmissions is an important attribute in understanding the critical parameters for future solutions; accordingly, experience gained in benchmarking is directly used in development projects and vice versa.

janssen_p@fev.com