ZF – Worldwide On Track

- **Increased cost effectiveness for rail vehicles**
- **Power transmission for diesel railcars: Efficient system from EcoLife Rail, gear set reversing transmission, retarder including control unit**
- **Rail damping systems for all rolling stock applications**
- **Custom-made services for driveline technology and vibration damping**

At the Railtex 2009 in London, ZF Friedrichshafen AG is exhibiting parts of its product range for rail vehicles. With its system components for rail vehicles, this supplier is responding to longer-term sectoral trends: Modular systems simplify the integration of powertrain and suspension components in rail vehicles while at the same time increasing their cost-effectiveness. ZF systems also enhance the safety and comfort of rail passengers - which in turn increases the appeal of this environmentally friendly form of transport.

Limited investment budgets, the drive for profitability by cutting fuel consumption and life-cycle costs – all without diminishing levels of passenger comfort and safety: Rail operators are facing broadly similar challenges to other players in the transport sector. The supplier corporation, ZF Friedrichshafen AG, helps its customers to achieve these objectives with the products it manufactures: ZF rail vehicle systems are based on the modular design principle which makes them more versatile and easier to integrate. They increase the cost-effectiveness of rail vehicles in a wide range of ways – either on the basis of their long service life, their reduced weight, fuel savings during operation and minimization of wear and maintenance costs. At the same time, ZF rail vehicle products increase the comfort and safety of rail passengers.

Complete System for Diesel Railcars
ZF offers to take end-to-end responsibility for rail vehicle powertrains. The 6-speed automatic transmission EcoLife Rail's

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88038 Friedrichshafen
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system package with retarder, gear set reversing transmission and Rail Drive Control System (RDCS) delivers comfortable and economical operation. Diesel railcars with engine torque ratings up to 2500 Nm travel the tracks quickly, quietly, and energy-efficiently. The six gear ratios in the EcoLife Rail enable railcars to set off smoothly and comfortably with fuel-efficient ratio steps. The integrated retarder protects the braking system without in any way limiting safety. This helps to cut maintenance costs. The Rail Drive Control System (RCDS) is responsible for controlling the entire ZF system. It coordinates the powertrain and is the central interface between train control unit and the ZF system. This enables diesel railcar manufacturers to dispense with the elaborate process of integrating and electronically matching different components. Furthermore, the ZF system is easy to install in the vehicle. The ZF system module also delivers great flexibility because the components can be assembled in a modular fashion to suit the required performance rating.

Properly Damped on the Track

ZF also develops and produces rail vehicle dampers for virtually all applications - from trams to high-speed trains. The production range includes yaw dampers, carriage body dampers, as well as horizontal and vertical dampers which can be used as primary dampers (between wheel and bogie) or as secondary dampers (between bogie and cab body). A newly developed yaw damper - which can be engaged and disengaged electrically - combines what might appear to be mutually exclusive objectives. With a hard characteristics curve it delivers optimum bogie operation at high speeds. When cornering more slowly, it can disable the damping force to minimize the wear associated with wheel-rail transmission forces. In this way, the system helps to reduce maintenance costs.

Specialist Technology for Individual Requirements

ZF also supplies custom-made products for rail vehicles. For example, employees in the Special Driveline Technology business unit at the ZF site in Friedrichshafen manufacture specialist transmissions for electrically powered railcars, featuring superlatively compact dimensions, low noise levels, and long

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service lives. Innovative chassis modules and components made of rubber-metal technology for mounting and vibration damping in chassis units and powertrains are produced to order by ZF Lemförder for rail vehicle manufacturers. These flexible connecting elements assure reliable power transmission for a tremendously diverse range of applications for leading manufacturers of locomotives, trams, and wagons.

Captions:

1.) Efficient package: The 6-speed EcoLife Rail automatic transmission with gear set reversing transmission, retarder, and control unit propels diesel railcars down the track economically and quietly.

2.) New development: With electrically switchable yaw dampers, ZF Sachs underscores its leadership position as a developer and supplier of rail vehicle dampers.

Photos: ZF

Press contact:
Thomas Wenzel, Manager Technical Press, Tel. +49 7541-77 2543,
Fax: +49 7541-77 902543, E-mail: thomas.wenzel@zf.com

ZF is a leading worldwide automotive supplier for Driveline and Chassis Technology with approximately 64,000 employees at 119 locations in 25 countries. In 2008, the ZF Group achieved sales of approximately EUR 12.6 billion. In order to continue to be successful with innovative products, ZF annually invests about five percent of its sales in Research & Development.

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Corporate Communications
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