



Comfort on Rails

- **Innovation: Electrically controlled yaw dampers**
- **ZF damper technology allows for comfortable and fast train journeys**
- **Overhaul-friendly damper program**

ZF holds an internationally leading position in the development of chassis technology for commercial vehicles. Also when it comes to equipping rail vehicles, the Group has been firmly established for many years now. ZF develops and produces yaw dampers, freight car suspensions, horizontal and vertical dampers for almost every rail vehicle application, from streetcars up to high-speed trains. A newly developed, electrically controlled yaw damper even combines different damper requirements - for high and low speeds.

ZF Sachs AG, the ZF division for Powertrain and Suspension Components, presents itself at the UITP 2009 with a complete range of damper components. The application spectrum ranges from streetcars to high-speed trains.

Yaw dampers - standard and electrically controlled

Yaw dampers are a special feature with rail vehicles. Especially at high speeds, they must ensure the stiffness of the bogie. ZF Sachs offers yaw dampers in the respectively optimal design; thanks to their modular structure, they only require little installation space. ZF Sachs has further advanced yaw damper technology with a new development: Electrically controlled yaw dampers have no fixed characteristic curve, they cover an entire map. Thus, the hard damper characteristics - which are necessary at high traveling speeds - can be deactivated for cornering at slower speeds. This preserves both the wheelsets and the tracks, since the transfer of the high wheel-track forces is reduced.

Twin-tube dampers - robust and easy to maintain

In addition, ZF Sachs also produces twin-tube dampers which are available both as vertical and as horizontal dampers. Thanks to



their robust design, twin-tube dampers from ZF Sachs attain a long service life and they are characterized by easy maintenance. Their modular structure facilitates installation in the bogie, the integrated lift stop guarantees safe contact with the tracks.

Modern chassis technology for rail-bound vehicles by ZF Sachs is onboard of the e.g. Velaro high-speed train by the train manufacturer Siemens. With a top speed of up to 350 km/h, the model designed for the Spanish market is currently also the fastest volume produced train of the world. Moreover, the FLIRT platform (Swiss abbreviation for 'fast, light, innovative, regional multiple unit) by the Swiss Stadler Rail Group is equipped with vibration dampers by ZF Sachs. The flexible train unit is used by public transport authorities all across Europe.

Captions:

- 1.) Innovation by ZF Sachs: Electrically controlled yaw dampers. At high traveling speeds, they ensure torsional stiffness of the bogie and, during cornering, they lead to less wear on wheelsets and tracks.
- 2.) Robust and easy to maintain: Twin-tube dampers from ZF Sachs for rail vehicles.

Photos: ZF

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ZF is one of the world's leading automotive industry suppliers specializing in driveline and chassis technologies. With a workforce of 63,000 employees, the company operates 125 plants in 26 countries. To sustain its success with innovative products, ZF invests at least 5 percent of its annual revenues (about €700 million from an annual total of €12.5 billion in 2008) in research and development.

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