

Press Release

Schaeffler at InnoTrans, Hall 21, Booth 430

On track to the future: Innovative development projects for the rail sector

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- Innovative TwinTandem project points the way to resource-friendly and efficient high-speed transport
- Expected lifetime of TwinTandem bearing up to three million kilometers
- Successful proof of concept: Schaeffler Data Matrix Code (DMC) allows use of fixed measuring systems for optimized bearing maintenance

The future of mobility must be more sustainable, more efficient, and more reliable. Schaeffler is therefore investing in numerous research projects for the design optimization and new development of components and digital systems. For the renowned supplier to the automotive and industrial segments, the priority is an optimized circular economy and the resource-efficient operation of rail vehicles in high-speed, freight, and urban traffic. As a key development partner in the field of rolling bearing solutions, Schaeffler is focused not just on developing new components but on digital solutions as well.

Revolutionary axlebox bearing: TwinTandem with balls instead of rollers

With the TwinTandem R&E investment project, Schaeffler's experts are developing a new kind of axlebox bearing concept and heralding a leap forward in rail transport innovation. The innovative design of this bottom bracket bearing will open up performance capabilities that will have a significant positive impact on operation and maintenance. The key innovation of the TwinTandem is the use of ball bearings with substantially lower friction. As a result, low temperatures are maintained even at high speeds, which in turn leads to a lasting extension of the lifetime of the grease used and consequently, of the entire axlebox bearing.

"The TwinTandem is currently one of our most promising development projects," explains Dr. Michael Holzapfel, Senior Vice President Business Unit Rail - Industrial Europe at Schaeffler. "Through the use of ball bearings we are facilitating a considerable improvement in rail transport in respect of mileage and maintenance intervals. According to our calculations, validations, and tests, we are looking at an expected service life of up to three million kilometers – a genuine innovation, especially for high-speed rail transport."

Comprehensive studies with the Schaeffler calculation tool Bearinx also substantiate and qualify a weight reduction of the TwinTandem of up to 20 percent compared with a conventional tapered roller bearing. In addition, a geometry-related reduction in friction of 55 percent was measured. Compared with bottom bracket bearings with rollers, a CO2 reduction of more than 1.1 tons per million kilometers and bearing is expected. Moreover, when used in inboard bearing axleboxes, the TwinTandem allows the weight of the bogie to be reduced by up to 30 percent, resulting in lower rail wear.

For the research paper preceding the development project TwinTandem, Schaeffler won the Best Paper Award at the World Congress of Railway Research in Birmingham in June 2022.

Taking revolution a step further: Development potential of TwinTandem

Schaeffler's experts are already working on possible measures to make the TwinTandem even better in respect of efficiency and sustainability. A crucial factor in this context is the material used. To minimize friction and maximize the service life of lubricants, the use of high-quality ceramic for manufacturing the rolling bearings could be a suitable option. With a view to climate protection and Schaeffler's sustainability goals, the use of green steel will potentially play an important role. Bearing identification with the Data Matrix Code is intended to bridge the gap to digitalization for sustainable rail transport.

The DMC enables the use of fixed measuring data for diagnosing bearing condition

In conjunction with the internationally recognized, vendor-neutral standardized interface GS1 EPCIS, the DMC enables data to be exchanged between component manufacturer, OEM, and rail operator. Among other things, the DMC allows vehicle-specific data collected by fixed sensors to be assigned digitally to the bearings installed in the train and used for diagnosing their condition. Schaeffler has successfully trialed this specific process in a pilot project with rolling stock manufacturer Stadler Rail AG and a Swiss rail operator. Schaeffler will demonstrate the results at InnoTrans 2022 on the basis of the "Proof of Concept". The database for the mutual provision of the production, operating, and maintenance data of the components will be provided by the European EPC Competence Center, the European market leader for solutions and services relating to the Electronic Product Code (EPC). A major advantage of combining this process with trackside data collection is that it allows informative condition monitoring even without retrofitting a separate sensor system in the vehicle.

Schaeffler Group – We pioneer motion The Schaeffler Group has been driving forward groundbreaking inventions and developments in the field of motion technology for over 75 years. With innovative technologies, products, and services for electric mobility, CO₂-efficient drives, chassis solutions, Industry 4.0, digitalization, and renewable energies, the company is a reliable partner for making motion more efficient, intelligent, and sustainable – over the entire life cycle. The Motion Technology Company manufactures high-precision components and systems for drive train and chassis applications as well as rolling and plain bearing solutions for a large number of industrial applications. The Schaeffler Group generated sales of EUR 16.3 billion in 2023. With around 83,400 employees, Schaeffler is one of the world's largest family-owned companies and one of Germany's most innovative companies.

The TwinTandem is one of Schaeffler's most promising development projects. Friction is reduced by using ball bearings, so that even at high speeds low temperatures are maintained. As a result, the service life of the entire axlebox bearing is increased. Photo: Schaeffler

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The DMC is the basis for the development of a digital supply chain. Thanks to standardized data, information can be exchanged between component manufacturer, OEM, and rail operator. Photo: Schaeffler

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