Improving RAMS for the railway industry
To meet the challenges of maintaining safety and reliability at any speed, the railway industry has been moving toward a systematic approach to RAMS (Reliability, Availability, Maintainability and Safety) for decades.

Detailed in the European Union’s EN 50126, RAMS standards describe specific processes for managing the life cycle of railway components and systems. With rail industry services from SKF, managing railway assets according to RAMS standards has never been easier, or more cost-effective.

Boost RAMS with SKF Life Cycle Management

Rail industry services from SKF reflect decades of expertise earned since the dawn of the rail industry, when SKF first helped to develop, design and test wheelset bearings across Europe. Today, our railway services are backed by a global network of production, service and remanufacturing centers geared to meet the requirements of manufacturers and operators.

Supported by a highly trained network of sales, application and service engineers, rail industry services from SKF also support SKF Life Cycle Management – our proven approach to improving equipment reliability, optimizing operational and energy efficiency and reducing total cost of ownership across the entire asset life cycle.

From design and manufacturing to maintenance and repair, rail industry services from SKF can help improve RAMS and control costs during the typical 30-year life cycle of railway assets.

Capabilities

• Testing resources
• Engineering consultancy
• Bearing and axlebox remanufacturing
• Drive system bearings overhaul
• Bearing mounting and dismounting
• Bearing maintenance extension
• Bearing investigation and analysis
• Training

Benefits

• Increased safety
• Improved performance
• Increased reliability
• Reduced life cycle costs
• Extended maintenance intervals
• Reduced energy use
• Optimized service life
• Reduced environmental impact
When it’s time to maintain railway wheel set bearings, operators have two choices: scrap the used bearings and replace them with new ones, or re-use the existing bearings using refurbishment or remanufacturing services from SKF.

Maintaining the bearings in this way offers a far more cost-effective and sustainable option, as the process can be a key factor in achieving life cycle cost optimization. Compared to bearing replacement, bearing remanufacturing and refurbishment delivers:

- Significant cost reductions
- Longer service life
- Shorter lead times leading to reduced downtime
- Reduced raw material and energy use
- Lower CO₂ emissions

SKF professional refurbishment services for axlebox bearings are performed in accordance with original equipment manufacturers (OEM) specifications, and the specifications of railway operators based on operating conditions.

SKF Beyond Zero
Bearing and axlebox remanufacturing services are part of the SKF Beyond Zero portfolio, a range of products and solutions with quantified environmental benefits. In a study comparing all-new SKF compact tapered roller bearing units (CTBU) with remanufactured units, SKF found that the remanufactured CTBUs cut both CO₂ and SO₂ emissions by more than 60%.

Old bearing prior to remanufacturing.

“New” bearing after remanufacturing.
Bogie condition monitoring

A new maintenance route

By ensuring that vehicles are only taken out of service for maintenance when it’s actually necessary, bogie condition monitoring services from SKF are helping the industry transition from costly time-based maintenance to more cost-effective condition-based maintenance.

With solutions geared toward railway manufacturers and operators alike, bogie condition monitoring services from SKF use advanced detection technologies and efficient and proven data processing algorithms to detect incipient damage.

In the short-term, this early warning gives operators the opportunity to proactively schedule and execute repairs based on condition rather than service interval before significant mechanical failures can develop. Over the long-term, the operational insights captured by SKF condition monitoring can help manufacturers understand how the bearing performs in their particular application condition. This information can help support OEMs in the development of more advanced vehicle designs for the next generation of rolling stock.

Ultimately, such capabilities support SKF Life Cycle Management – our proven approach to improving equipment reliability, optimizing operational and energy efficiency and reducing total cost of ownership across the entire asset life cycle.

Support at every stage

Offering everything from components to full systems, SKF is a proven technology supplier with full condition monitoring solutions for the rotating subsystems of the bogie, as well as customized projects. Condition monitoring services from SKF include consultation on system configuration, for example sensor location, troubleshooting, training, installation and calibration supported by SKF’s railway condition monitoring competence centre.

SKF cloud-based data access supports advanced reporting and analysis, helping customers understand failure modes and refine future axlebox and drive system solutions for current applications.

Monitoring capabilities

- Wheelset bearing condition
- Wheel flats and roundness
- Bogie stability/hunting
- Drive system condition
- Track monitoring
- Unbalance and resonance condition

Benefits

- Reduced unplanned downtime and service interruptions
- Reduced maintenance costs
- Improved maintenance planning
- Extended overhaul intervals
- Root cause analysis capabilities
- Optimized spare parts logistics
Testing resources

To ensure the long-term reliability and performance of high-speed rolling stock, rigorous testing is essential. SKF is helping the industry conduct it at dedicated railway research centres.

Here, SKF engineers perform endurance trials on complete axleboxes, including surrounding parts such as bogie frame interfaces, plus bearing units, seals and cages.

The Railway Test Centre houses R3 endurance test rigs on which SKF conducts testing in accordance with the European standard EN 12 082. Two axleboxes are mounted on the rigs and subjected to repeated loading cycles that reflect application service conditions, including speeds of up to 500 km/h. The THISBE axlebox test rig also simulates operating conditions that have been recorded in service.

Engineering consultancy

Backed by decades of experience in railway bearing design and application engineering, plus expertise in bearings and bearing units, seals, and lubrication systems, SKF takes a systems approach to application engineering. Our dedicated drive system and axlebox competence centres focus on a manufacturer’s unique specifications to develop optimized solutions that deliver maximum performance and value.

Using proprietary 3D modeling software, SKF engineers enable designers to optimize equipment design while still in the prototype stage, and explore the merits of various design options with a virtual test rig.

Bearing relubrication

Specialists at SKF Railway Service Centres can clean and regrease sealed bearings, including using non-standard greases to satisfy particular operating conditions. This service can also be conducted on site.

Bearing investigation and analysis

SKF provides bearing investigation and analysis services at its dedicated Railway Service Centres. This service can help clarify service issues, offer root cause failure analysis and be used to check axle bearing condition to achieve vehicle maintenance interval extensions and optimum bearing performance.
Bearing mounting and dismounting

To help ensure easy, correct, damage-free mounting and dismounting of railway bearing units, SKF offers specially designed tools. SKF’s unique hydraulic tool is ideal for disassembling railway axlebox spherical bearings. To remove inner rings of axlebox cylindrical bearings and to disassemble labyrinth rings, SKF offers special induction heaters, which are suitable for serial dismounting operations in railway workshops.

SKF also offers tools and equipment to optimize railway bearing lubrication. Based on customer requirements, SKF can package all the measurement tools needed to check journals and axleboxes during maintenance periods.

Bearing exchange

SKF offers an on-site bearing exchange service for customers operating railway vehicles on bearing units. Benefits of exchanging bearings on-site at a maintenance depot location include:

- Vehicle quickly returned to service
- Inventory reduced by holding a reduced stock of spare wheel sets
- Exchanging bearings on-site offers a cost effective solution for wheelset bearing management

With the SKF TBU exchange service, wheelset bearings can be exchanged in just hours.

Training

SKF offers many training modules dedicated to the railway industry, either on-site at a customer’s facility, or at an SKF location worldwide. Ranging from theoretical classroom modules to hands-on workshops, SKF training courses are designed to give attendees a deeper understanding of general bearing principles and how they relate to railway operating challenges. “Bearing defects and examination techniques” is a typical SKF training course topic.
Support that spans the globe

SKF railway service operations are strategically located world-wide, providing excellent local customer service and support wherever it is required.