NSK

BUILT FOR SPEED.
ENGINEERED FOR SAFETY.

Bearing Solutions for High-Speed Rail - Trusted at 300km/h and beyond.

Axlebox | Gearbox | Traction Motor

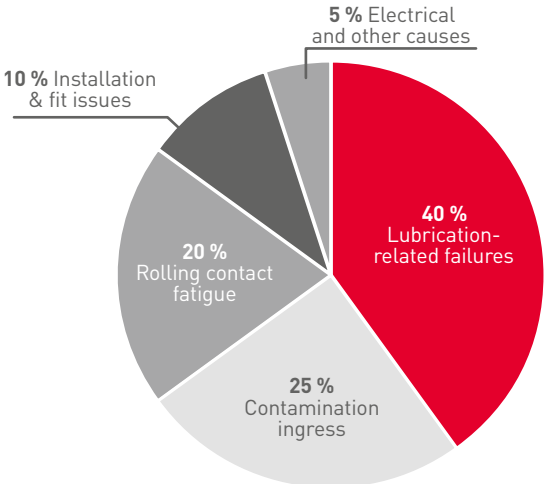
SPEED ALONE IS NOT ENOUGH

When you're travelling at speeds of 300km/h, reliable components are an absolute must. The bearings used in railway drivetrains will directly influence the stability, efficiency and safety of the train, and they will have to withstand extreme speeds, shock loads, heat and vibrations, all whilst delivering long service life and conforming to a predictable maintenance schedule.

KEY ENGINEERING CHALLENGES

- **Handling extreme speeds and vibrations whilst under thermal stress**
- **Meeting severe size and design constraints**
- **Ensuring long service life despite limited maintenance**
- **Meeting challenging Lifecycle Cost (LCC) and Total Cost of Ownership (TCO) targets**

FAILURE DRIVERS



Trust is built on transparency between customer and supplier.

ENGINEERED FOR TRUST

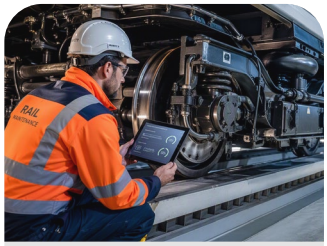
NSK supports OEMs and railway drivetrain specialists via an end-to-end engineering approach which translates a deep understanding of an application's requirements into robust bearing performance. We make sure that we optimise our design, materials, surface treatments, lubrication concepts and seals, and align all of them with the real-world conditions the bearing will be operating in.

OUR RAILWAY SOLUTION KEY FEATURES

High-strength cages provide stability despite shocks and vibrations

Seizure resistance under high speed and demanding lubrication conditions

Heat management through precision internal geometry and material selection



Solutions that help extend service intervals and reduce unplanned downtime

UNDERSTAND

Work with the customer to understand the unique demands of their application

PROPOSE

Analyse the challenges and present a tailored solution

REVIEW

Reviewing the solution with the customer to ensure it is the perfect fit

INSTALL

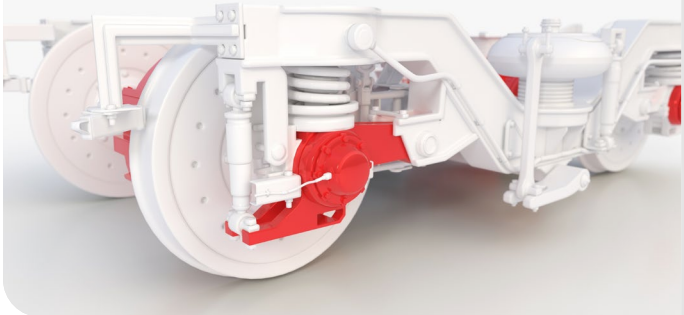
Demonstrate the correct method of installation, to ensure best possible performance

SUCEED

Finished product will then lead to improved efficiency, reliability and profitability for our customer

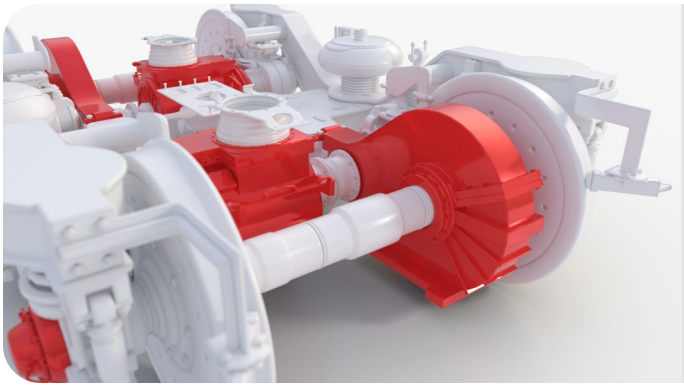
RAILWAY DRIVETRAIN APPLICATIONS

NSK supplies parts and solutions for critical systems within rail vehicles. These include:



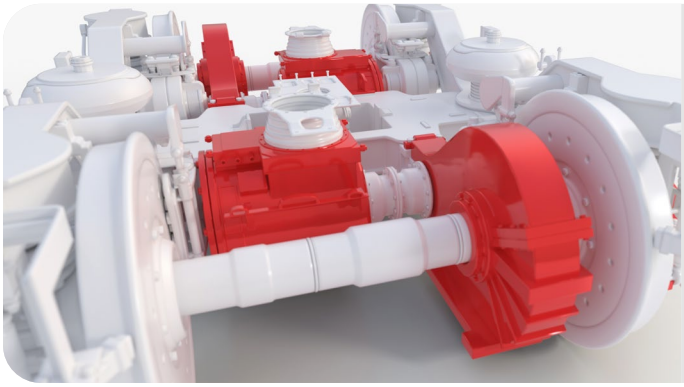
Axlebox Bearings

Resistant shock loads and contamination, easy to inspect and available with long life grease.



Gearbox Bearings

Offering high rotational speeds and able to handle combined loads whilst offering seizure resistance even in limited spaces



Traction Motors

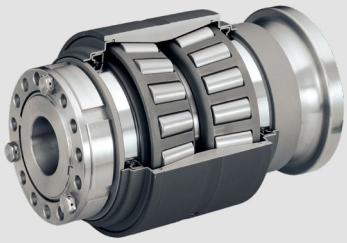
High RPM and highly reliable traction motor bearings with an insulated design which enables them to handle electrical currents.

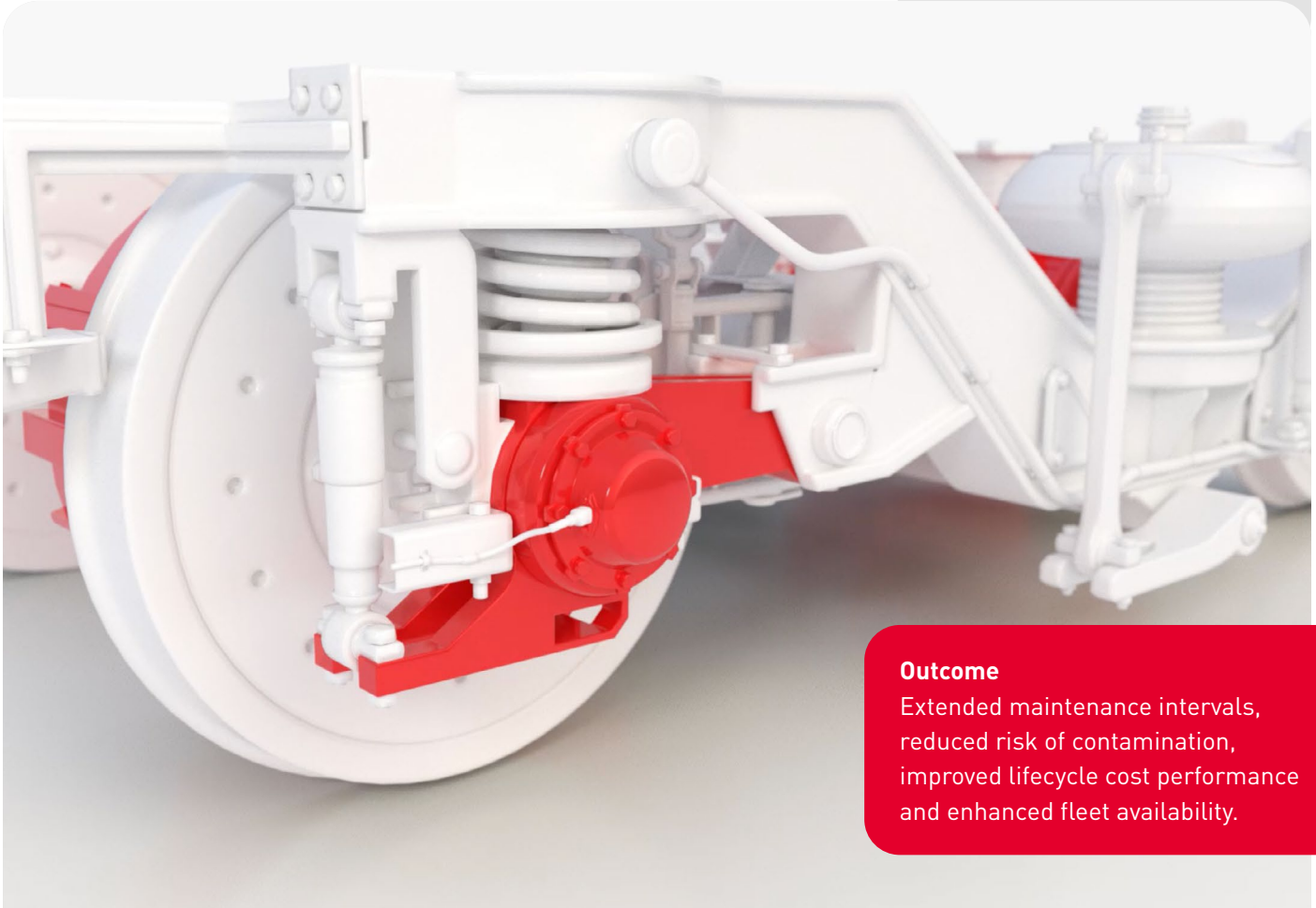
AXLEBOX BEARINGS – SEALED FOR LONG LIFE

Axlebox bearings are found in harsh environments where they're asked to tolerate vibrations, shocks, contamination and more. In order to combat this, NSK's Sealed-Clean Rotating End Cap Tapered Roller Bearings integrate advanced sealing mechanisms and service-friendly handling.

KEY SOLUTIONS

- Removable rotating end cap for convenient inspection and disassembly
- Advanced sealing options including labyrinth concepts
- Corrosion-resistant surface treatments
- Compact, lightweight construction supporting downsizing strategies
- Long-life grease retention to support extended service cycles





Outcome
Extended maintenance intervals, reduced risk of contamination, improved lifecycle cost performance and enhanced fleet availability.

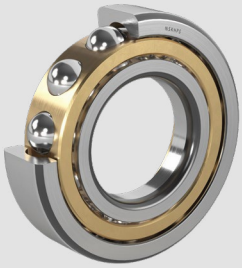
GEARBOX BEARINGS

In high-speed rail applications, every bearing fulfills a specific purpose. From radial guidance to axial load support to offering thermal stability in compact spaces.

TYPICAL BEARING CONFIGURATION

Tapered Roller Bearings for pinion shafts – Offering seizure resistance and high-strength cage concepts for high-speed reliability.

Cylindrical Roller Bearings for compact radial guidance – Ensuring thermal stability and long-life performance in compact spaces.



Four-Point Contact Ball Bearings for compact gearbox layouts – Guaranteeing high axial load capacity in a space-saving design.

Proven in real-world high-speed rail applications including europeans high-speed trains and Shinkansen bullet trains.

TRACTION MOTOR BEARINGS – INSULATED, DURABLE, READY

Traction motors in rail transport are a challenging environment combining high speeds, heavy loads and the risk of electric erosion. That's why NSK has developed insulated bearing technologies designed to prevent electro-pitting and premature failure.

KEY FEATURES

Insulated Cylindrical Roller Bearings and Deep Groove Ball Bearings with ceramic or PPS coatings

High insulation performance helps prevent harmful bearing currents from passing through the bearing, reducing the risk of surface damage, electropitting and premature failure.

High-strength cage designs to absorb vibration and loads whilst maintaining stability

Outcome
Higher reliability under electrical stress, combined with reduced downtime and consistent long-term performance.

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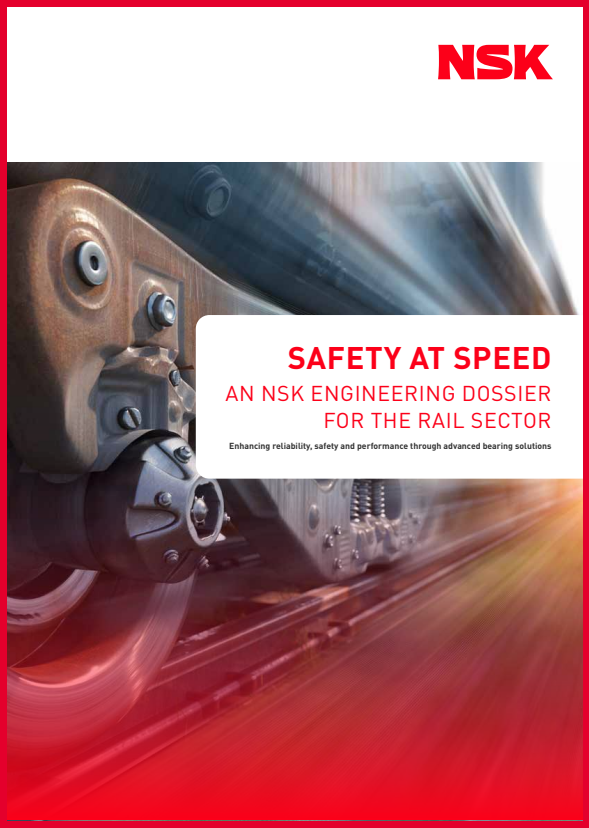
GET THE FULL TECHNICAL INSIGHT



Download the Engineering Dossier:
Bearing Solutions for High-Speed Railway Applications
Materials | Design | Lubrication | Failure Prevention | TCO Optimisation

TALK TO AN NSK EXPERT.

Request an engineering consultation for your axlebox, gearbox or traction motor application.

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REACH OUT TO NSK TODAY AND LET'S START WORK.

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