



SKF Remanufacturing Services

Bearing damage evaluation guide



Damage evaluation guide for bearing remanufacturing

- 1 Value and benefits
- 2 Introduction
- 3 Candidates for remanufacturing
- 4 ISO – Classification for bearing failure modes
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Legends: RSC – SKF Remanufacturing Service Centre



Remanufacturing possible



Remanufacturing possible depending on application



Remanufacturing impossible





1 Value and benefits

- Extends operating life cycle
 - Remanufacturing further extends service life
- Reduces life cycle cost
 - Extended life cycle postpones investment in replacement assets
- Increases availability
 - Quick remanufacturing turnaround
- Improves overall application reliability
 - Detailed bearing analysis is valuable input to RCFA (Root Cause Failure Analysis) and further application improvement
- Reduces environmental impact through recycling
 - Remanufacturing saves up to 90% energy compared to manufacturing of a new bearing
- Opportunity to maintain condition of replacement stock
 - Revitalization keeps cost down and gives instant spare part availability

2 Introduction

This guide will assist you in the initial diagnosis of the bearing condition. It will help to determine if the bearing can be a candidate for remanufacturing.

- 1 Focuses the investigation on the rings. Most of the other bearing components can be repaired or replaced.
- 2 According to your initial diagnostic result:
 - Remanufacturing possible → Send the bearing to a RSC
 - Remanufacturing not possible → Propose alternative solutions (new bearing, redesign, SKF maintenance program, etc.)



If any doubt, ask SKF's remanufacturing specialists.



SKF specialists can make the final judgment

A Send the case data to a RSC, including:

- Detailed, close-up pictures of component damages
- General pictures of bearing arrangement
- Technical inputs such as:
 - Application description
 - Lubricant characteristics (oil/grease)
 - Lubrication method
 - Bearing service time, loads and speed



Alternatively

B Send the remanufacturing candidate directly to a RSC.

Please note!

After dismantling, never disassemble, clean or wash the bearing before sending it for investigation and remanufacturing. All evidence from the usage is vital to make a correct investigation and analysis.

3 Candidates for remanufacturing

Typical bearing types suitable for remanufacturing of all brands are shown below.

Large size bearings



Other

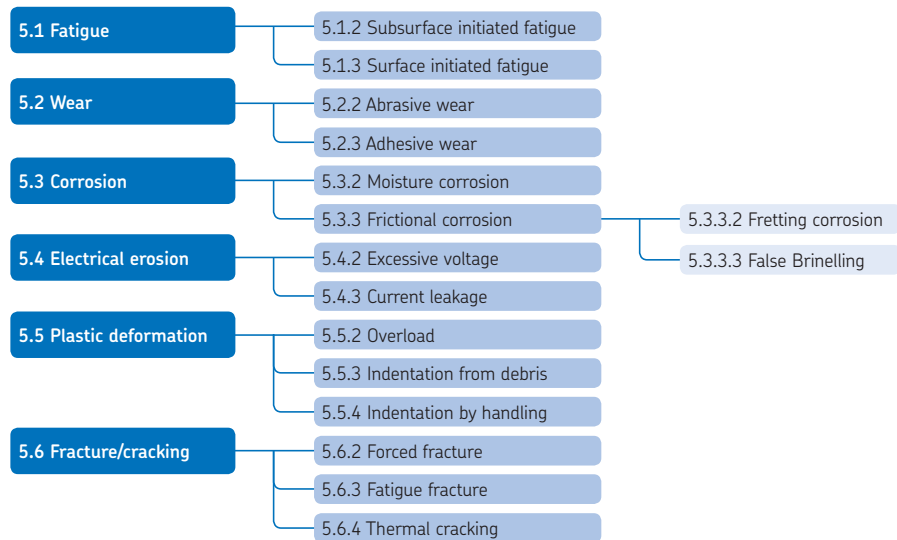


Note!

Remanufacturing can also include related equipment such as housings, bearing units and cassettes, etc.



4 ISO – Classification for bearing failure modes, ISO 15243:2004



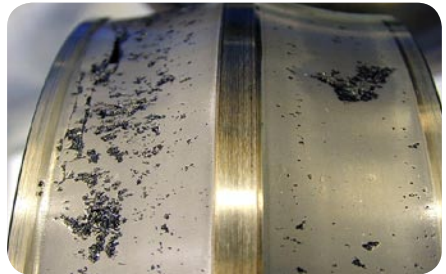
5 Failure mode descriptions

Failure mode 5.1: Fatigue

5.1.2 Subsurface initiated fatigue



5.1.3 Surface initiated fatigue



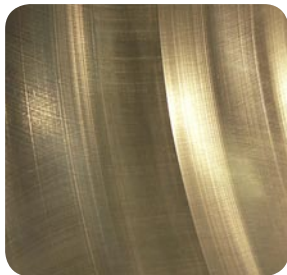
- Remanufacturing possible
- Remanufacturing possible depending on application
- Remanufacturing impossible





Failure mode 5.2: Wear

5.2.2 Abrasive wear



- *Remanufacturing possible*
- *Remanufacturing possible depending on application*
- *Remanufacturing impossible*

Failure mode 5.2: Wear

5.2.3 Adhesive wear



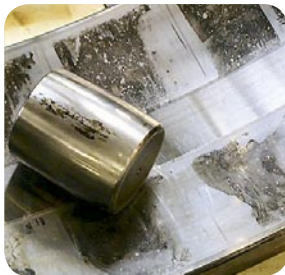
- *Remanufacturing possible*
- *Remanufacturing possible depending on application*
- *Remanufacturing impossible*





Failure mode 5.3: Corrosion

5.3.2 Moisture corrosion

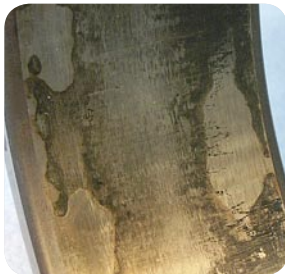
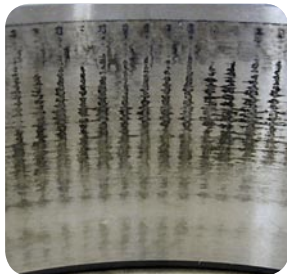


- *Remanufacturing possible*
- *Remanufacturing possible depending on application*
- *Remanufacturing impossible*

Failure mode 5.3: Corrosion

5.3.3 Frictional corrosion

5.3.3.2 Fretting corrosion



- *Remanufacturing possible*
- *Remanufacturing possible depending on application*
- *Remanufacturing impossible*





Failure mode 5.3: Corrosion

5.3.3 Frictional corrosion

5.3.3.3 False Brinelling



- *Remanufacturing possible*
- *Remanufacturing possible depending on application*
- *Remanufacturing impossible*

Failure mode 5.4: Electric erosion

5.4.2 Excessive voltage



5.4.3 Current leakage



- *Remanufacturing possible*
- *Remanufacturing possible depending on application*
- *Remanufacturing impossible*





Failure mode 5.5: Plastic deformation

5.5.2 Overload



- *Remanufacturing possible*
- *Remanufacturing possible depending on application*
- *Remanufacturing impossible*

Failure mode 5.5: Plastic deformation

5.5.3 Indentation from debris



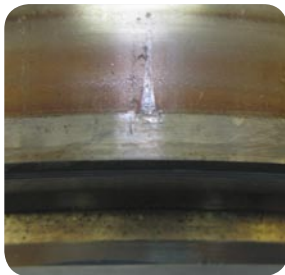
- Remanufacturing possible
- Remanufacturing possible depending on application
- Remanufacturing impossible





Failure mode 5.5: Plastic deformation

5.5.4 Indentation by handling



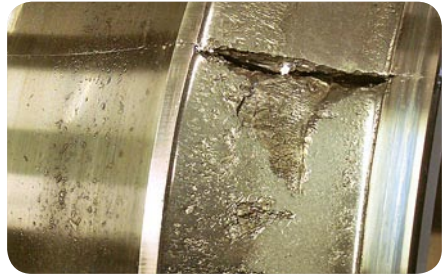
- *Remanufacturing possible*
- *Remanufacturing possible depending on application*
- *Remanufacturing impossible*

Failure mode 5.6: Fracture

5.6.2 Forced fracture



5.6.3 Fatigue fracture



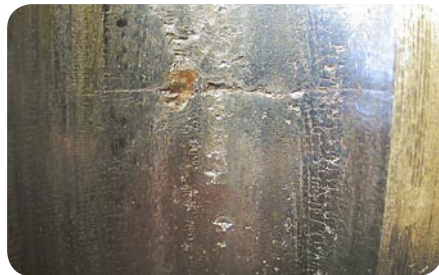
- *Remanufacturing possible*
- *Remanufacturing possible depending on application*
- *Remanufacturing impossible*





Failure mode 5.6: Fracture

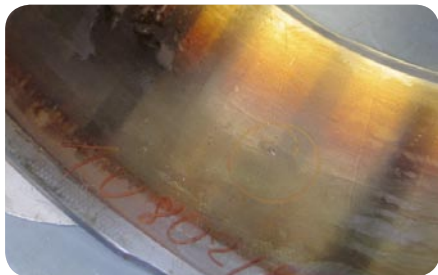
5.6.4 Thermal cracking



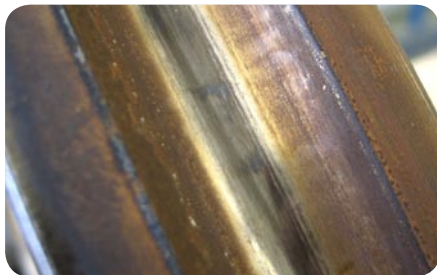
- *Remanufacturing possible*
- *Remanufacturing possible depending on application*
- *Remanufacturing impossible*

Other: Discolouration

Overheating



Chemical



- Remanufacturing possible
- Remanufacturing possible depending on application
- Remanufacturing impossible

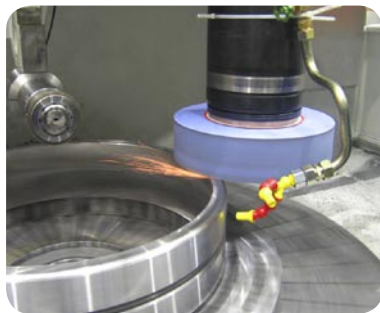




6 SKF Remanufacturing Services

SKF has developed a range of core capabilities, resources, and infrastructure that ensures our bearing remanufacturing services are truly world-class.

- Quality resulting from consistent processes
- Global database for knowledge sharing
- Reconditioning adapted processes
- Computerized case handling
- Bearing analysis reports
- Measuring protocols
- Traceability



A responsive and reliable global network of service centres.

Austria
China
Russia
USA

Brazil
India
South Africa



SKF's network of dedicated state-of-the-art remanufacturing service centres handles a large volume of bearings and related equipment annually. All service centres are organized into highly trained teams with special competencies. Operating as a global network, they regularly share knowledge, spare part procurement and capability development.

The network continue to expand with new service centres.



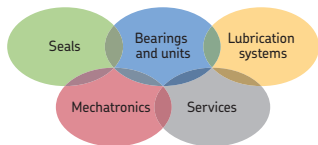


A living process for asset optimization

- Asset Efficiency Optimization
- Engineering audit and consultancy
- Condition-based maintenance
- Condition monitoring, equipment and analysis
- Alignment and balancing
- Bearing assembly and disassembly
- Technical training



SKF Asset Management Services focuses on Strategy, Identification, Control, Execution, and Optimization. Improvement can begin anywhere along the continuum and proceed indefinitely.



The Power of Knowledge Engineering

Drawing on five areas of competence and application-specific expertise amassed over more than 100 years, SKF brings innovative solutions to OEMs and production facilities in every major industry worldwide. These five competence areas include bearings and units, seals, lubrication systems, mechatronics (combining mechanics and electronics into intelligent systems), and a wide range of services, from 3-D computer modelling to advanced condition monitoring and reliability and asset management systems. A global presence provides SKF customers uniform quality standards and worldwide product availability.

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