FM502 Bearing Damage During Fitting / Removal (Heating / Hammering) → Early Failure

Chapter 5: Maintenance & Repair — Fault model & typical case

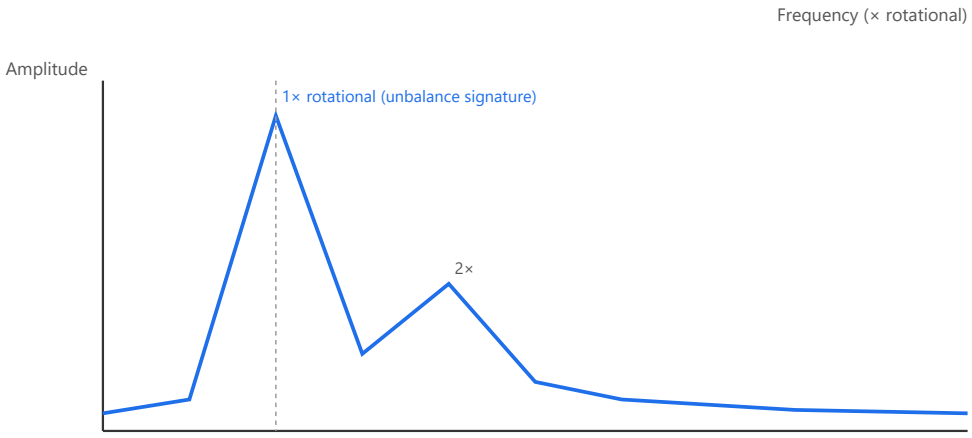
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CHAPTER
Maintenance & Repair

RELATED Q&A
4-31, 4-35, 4-36

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Fault model + typical case. Mechanism, causes, symptoms, diagnosis, corrective actions and prevention are all anchored to the relevant entries of the Fan Engineering Q&A (see front matter for question references).



FM502 Bearing Damage During Fitting / Removal → Early Failure: hammering the ring or uneven heating leaves raceway indentations that spall early, giving a 1× peak with harmonics within days. Heat evenly and never strike the ring.

Failure Mechanism

Wrong rolling bearing fitting or removal methods (4-31 radial and axial clearance, 4-35/4-36 fitting methods), such as direct hammering or uneven heating, produce raceway indentations and early spalling.

Common Causes

- Hammering the outer ring
- Overheating during heating

Failure Symptoms

- Abnormal noise or spalling on a new bearing within a short time

Diagnosis & Evaluation

- Dismantle and inspect the damage morphology of the bearing

Corrective Actions

- Standardise the fitting/removal method and replace the bearing

Preventive Measures

- Train workers in the bearing fitting process

Typical Failure Case (Summary)

- The drive-end bearing of a fan (SKF 22313E spherical roller bearing with cylindrical bore) was obstructed by the bearing housing after heating because the shaft shoulder was too short. Maintenance staff hammered the bearing inner ring with a copper bar to seat it, deforming the cage and producing micro-cracks, so the bearing ran at high temperature. The shaft boss was then machined so that the bearing could be heated into place, avoiding hammering.
- A pulveriser at a captive power plant used 23226CC/W33 bearings, which burned out and stopped the machine in less than 5 h. Third-party technical analysis confirmed improper installation: severe misalignment loading and shock load (the raceway defect frequency appears in the spectrum), plus the bearing was not demagnetised after induction heating and attracted iron particles, causing high temperature.
- The bearing of a large fan seized after one week of operation with a sharp temperature rise. Dismantling showed that the adapter sleeve had been tightened too hard, driving the internal clearance to zero and making the preload excessive, so the rolling elements rubbed dry, the grease carbonised and the bearing steel annealed.

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