Overheating

Diagnosing and Preventing Bearing Damage

Overheating damage can appear in several ways: babbitt discoloration, cracking, wiping, or surface deformation. These symptoms can result from a wide range of problems, many of which are related to lubricant issues such as flow rate, viscosity, an interruption in the oil film, or boundary lubrication. In the photo at right, oil additives were plated out, which contributed to overheating.

In addition to lubrication concerns, the following conditions may also cause overheating:

- Improper bearing selection
- High-pressure lift system failure
- Poor collar, runner, or journal surface finish
- Insufficient bearing clearance
- Excessive load
- Over-speed
- Harsh operating environment

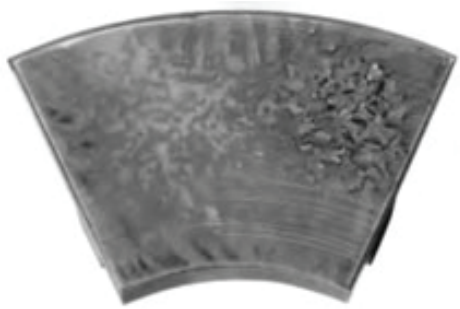
When there is evidence of overheating, we recommend contacting a Kingsbury technician to help assess whether the quantity and quality of oil flowing to the bearing is sufficient.

To perform a thorough analysis, we will need:

- A drawing or detailed description of the bearing assembly
- The axial and/or radial loads
- Oil viscosity
- Oil flow rate
- Supply temperature and pressure

Thermal Ratcheting

Repeated cycles of heating may result in thermal ratcheting, a type of surface deformation that occurs in anisotropic materials. These materials have different thermal expansion rates along each crystal axis. If thermal ratcheting has occurred, as shown in the image here, examine the shoes for the presence and depth of cracks. Remove the cracks and restore the original shoe surface. If this cannot be done, the shoes must be replaced.



Journal shoes typically need to be replaced. However, if the correction leaves the bearing within design tolerance, the bearing may be reused. The condition of the rotating journal, collar, or runner surfaces must also be evaluated and restored to their original condition through lapping, hand stoning, or replacement.

Preventing Bearing Overheating

Overheating can often be prevented during the design stage if potentially damaging conditions are identified in advance. **Consider the following guidelines to reduce the risk of failure:**

- Incorporate a directed lubrication bearing such as Kingsbury's Leading Edge Groove (LEG) technology
- Increase lubricant flow rates
- Increase bearing area to better distribute the load
  - For thrust bearings: increase diameter
  - For journal bearings: increase the width-to-diameter ratio
- Install thermocouples or RTDs in the bearings (not just in the oil) to monitor babbitt temperature in critical zones
- Use a reliable high-pressure lift system to ensure smooth startup

Start the Conversation Early

To ensure optimal bearing performance, we encourage you to speak with a Kingsbury sales engineer during the design phase of your equipment. Early collaboration can help prevent costly damage and extend the life of your bearing system.

Contact Kingsbury Repair & Service to talk with an engineer:
repair@kingsbury.com

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