NSK FOOD & BEVERAGE UPDATE

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3 REASONS FOR PREMATURE BEARING FAILURE AND HOW TO AVOID THEM

Every failed bearing tells a story - one that can help identify machinery problems, maintenance issues, bearing selection errors and other important issues.

In **food and beverage applications**, bearings face harsh conditions - frequent washdowns, harsh chemicals, contamination, and fluctuating extreme temperatures. To withstand these challenges, and keep your facility productive, bearings must perform to the highest standards while satisfying the industry standards for hygiene. If bearings fail, entire facilities can shut down and paralyze production. It is vital to understand the causes of bearing failure and act quickly to find solutions to prevent future machinery problems. Taking the time to investigate bearing failure can actually **increase uptime** and decrease both maintenance time and cost.

CREEP

Photo 1-1

Part: Inner ring of a spherical roller bearing
Symptom: Creep accompanied by scoring of bore surface
Cause: Insufficient interference

Photo 1-2

Part: Outer ring of a spherical roller bearing
Symptom: Creep over entire circumference of outside surface
Cause: Loose fit between outer ring and housing

Creep is where slipping occurs at the fitting surfaces and thereby creates a clearance at the fitting surface.

What to look for: A shiny bearing surface, occasionally with scoring or wear.

Cause:

- Insufficient interference or loose fit
- Insufficient sleeve tightening

Solution:

- Check the interference, and prevent rotation
- Correct the sleeve tightening
- Study the shaft and housing precision
- Preload in the axial direction
- Tighten the raceway ring side face
- Apply adhesive to the fitting surface
- Apply a film of lubricant to the fitting surface

FLAKING

Photo 2-1

Part: Inner ring of an angular contact ball bearing
Symptom: Flaking around half of the circumference of the

Photo 2-2

Part: Inner ring of an angular contact ball bearing

Symptom: Flaking diagonally along raceway
Cause: Poor alignment

FEATURED PRODUCT

RHP Self-Lube®

- Wide selection of units and
- Easily mounted onto shafting
- Increased shock load protection
- High capacity design

Why Choose Self-Lube®?

- Easy to install and remove
- Protectors cover shaft ends from contaminants and safety hazards
- Quiet operation
- Lower cost

Click **here** to find out more!

SUCCESS STORY

- A confectionery manufacturer was experiencing water ingress on a conveyor, causing crystallization of sugar on the equipment. This operating condition was creating costly machine breakdowns, resulting in lost production and increased maintenance intervals. **More**

NEWS

raceway surface
Cause: Poor lubrication due to entry of cutting coolant into bearing

between shaft and housing during mounting


Photo 2-3

Part: Inner ring of deep groove ball bearing
Symptom: Flaking of raceway at ball pitch
Cause: Dents due to shock load during mounting


Photo 2-4

Part: Inner ring of an angular contact ball bearing
Symptom: Flaking of raceway at ball pitch
Cause: Dents due to shock load while stationary


Photo 2-5

Part: Outer ring of Photo 2-4
Symptom: Flaking of raceway surface at ball pitch
Cause: Dents due to shock load while stationary


Photo 2-6

Part: Balls of Photo 2-4
Symptom: Flaking of ball surface
Cause: Dents due to shock load while stationary


Photo 2-7

Part: Inner ring of a spherical roller bearing
Symptom: Flaking of only one raceway over its entire circumference
Cause: Excessive axial load


Photo 2-8

Part: Outer ring of Photo 2-7 **Symptom**: Flaking of only one raceway over its entire circumference
Cause: Excessive axial load


Photo 2-9

Part: Inner ring of a spherical roller bearing
Symptom: Flaking of only one row of raceway
Cause: Poor lubrication


Photo 2-10

Part: Rollers of a cylindrical roller bearing
Symptom: Premature flaking occurs axially on the rolling surfaces
Cause: Scratches caused during improper mounting

Flaking occurs when small pieces of bearing material are split off from the smooth surface of the raceway or rolling elements due to rolling fatigue, thereby creating regions having rough and coarse texture.

What to look for: Rough, coarse texture on the bearing surface.

Cause:

- Excessive load
- Poor mounting (misalignment)
- Moment load
- Entry of foreign debris, water penetration
- Poor lubrication, improper lubricant
- Unsuitable bearing clearance
- Improper precision for shaft or housing, unevenness in housing rigidity, large shaft bending
- Progression from rust, corrosion pits, smearing, dents (brinelling)

Solution:

- Reconfirm the bearing application and check the load conditions
- Improve the mounting method
- Improve the sealing mechanism, prevent rusting during non-running
- Use a lubricant with a proper viscosity, improve the lubrication method
- Check the precision of shaft and housing
- Check the bearing internal clearance

SEIZURE


Photo 3-1

Part: Inner ring of a spherical roller bearing
Symptom: Raceway is discolored and melted. Worn particles from the


Photo 3-2

Part: Convex rollers of Photo 3-1
Symptom: Discoloration and melting of roller rolling surface, adhesion

cage were rolled and attached to the raceway.
Cause: Insufficient lubrication

of worn particles from cage
Cause: Insufficient lubrication

Photo 3-3

Part: Inner ring of an angular contact ball bearing
Symptom: Raceway Discoloration, melting at ball pitch intervals
Cause: Excessive preload

Photo 3-4

Part: Outer ring in Photo 3-3
Symptom: Raceway Discoloration, melting at ball pitch intervals
Cause: Excessive preload

Photo 3-5

Part: Balls and cage of Photo 3-3
Symptom: Cage is damaged by melting, balls discolored and melted
Cause: Excessive preload

Seizure is the result of sudden overheating that occurs during rotation.

What to look for: Discolored bearing. Next, raceway rings, rolling elements and cage will soften, melt and deform as damage accumulates.

Cause:

- Poor lubrication
- Excessive load (excessive preload)
- Excessive rotational speed
- Excessively small internal clearance
- Entry of water and debris
- Poor precision of shaft and housing, excessive shaft bending

Solution:

- Improve the lubrication method
- Analyze suitability of bearing type selected
- Study the preload, bearing clearance and fitting
- Improve the sealing mechanism
- Check the precision of the shaft and housing
- Improve the mounting method

Bearing failure in the food and beverage industry can be a result of many factors that are specific to the unique working conditions found in industry-specific applications. By investigating the cause of bearing failure, you may be able to prolong bearing life, improve productivity and reduce maintenance costs by identifying and resolving issues around bearing selection, mounting, lubrication and application.

For more information on maximizing bearing life to increase uptime, visit **www.nskmaxuptime.com**.