# **Bearing Damage Analysis**

To learn more about each damage mode, reference the bearing damage analysis brochure, or contact your local Timken sales or service representative.



Hard particle contamination

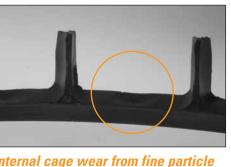


Fine particle contamination



### Foreign Material









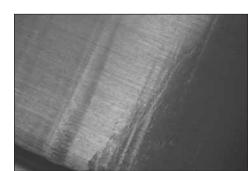












Roller impact damage

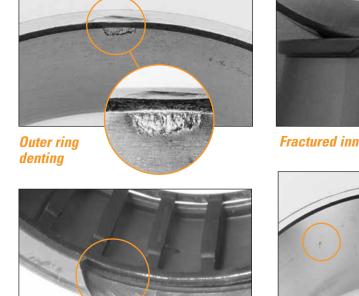


Shock loading

True brinell on needle bearing drawn cup race

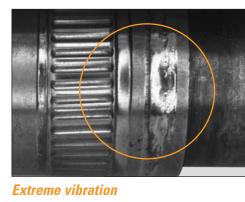
Typical causes include rough handling, and shock loads exceeding the material's limits.

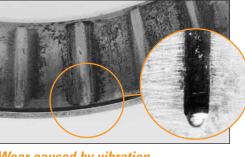
Brinell and Impact Damage



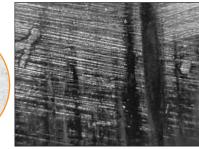


Broken rib on outer race













True metal deformation

• Never spin a bearing with compressed air. The rollers may be forcefully expelled creating a risk of serious bodily harm. • Proper maintenance and handling practices are critical. Failure to follow installation instructions and to maintain proper lubrication can result in equipment failure, creating a risk of serious bodily harm.





















Typical causes include improper tool design, tool positioning, poor roller alignment, and excessive force.

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**Needle Bearing Installation Damage** 

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Typical causes include wrong size and poor form, shaft or housing stress riser, and inaccurate machining.



**Roller lock-up** 

Bearing stamping lip fracture

Loose outer ring fit in a wheel hub





## **Excessive Preload, Overload and Rollout**

Rollout in bearing outer ring Outer ring subcase fracture Typical causes include excessive load, and/or misalignment, and improper mounting procedure.



Roller fracture



