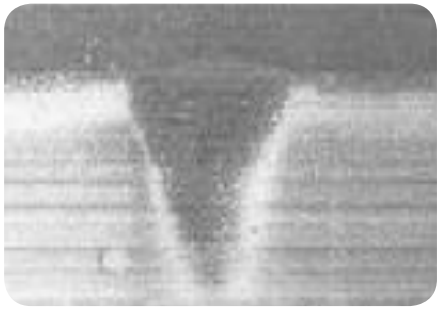
Work execution:

# Teaming up for optimized asset management

## Reliability bulletin WE 1010

### Bearing damage analysis: Identifying installation, in-service, or removal damage

Prevention of future bearing damage depends on accurate identification of the true failure mechanism. The severe damage shown in the first figure was actually caused when the bearing was removed from the shaft. While efforts should be made to avoid destroying evidence, an experienced technician will look beyond this obvious damage for the evidence of in-service or mounting problems that may have limited life.



The arrowhead pattern shown in the second photograph is clearly due to improper bearing installation - true brinelling. The typical arrowhead shaped dents are plastic deformation, also called a "true brinell" marks. There's an easy way to separate this type of damage from operational damage:

A true brinell mark will generally show the original machining grooves before, through, and after the damage location. Observed under low power (3x-5x) magnification, the manufacturer's grinding and honing marks are easily seen.

We now have a common language to use in identifying distress, such as brinelling, found in bearings with ISO 15243:2004. Both of these cases fall into the ISO standard category of Damage Classification 5.3: Plastic Deformation, Indentation by Handling but obviously the mechanisms that created the damage are very different.

A FALSE brinell mark, (actually a wear process) will not show machining marks in the dented area. Instead, polishing of the dented area, often accompanied by corrosion products (typically reddish or brownish) from the wear process is evident. This falls into ISO Classification 3.3.2: False brinelling. Look for external vibration sources that might have produced these wear marks. This photograph shows false brinelling on the inner ring of a cylindrical roller bearing.

Understanding the origin of the damage leads to the changes necessary to prevent recurrence.

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