Wheel Bearing Reconditioning

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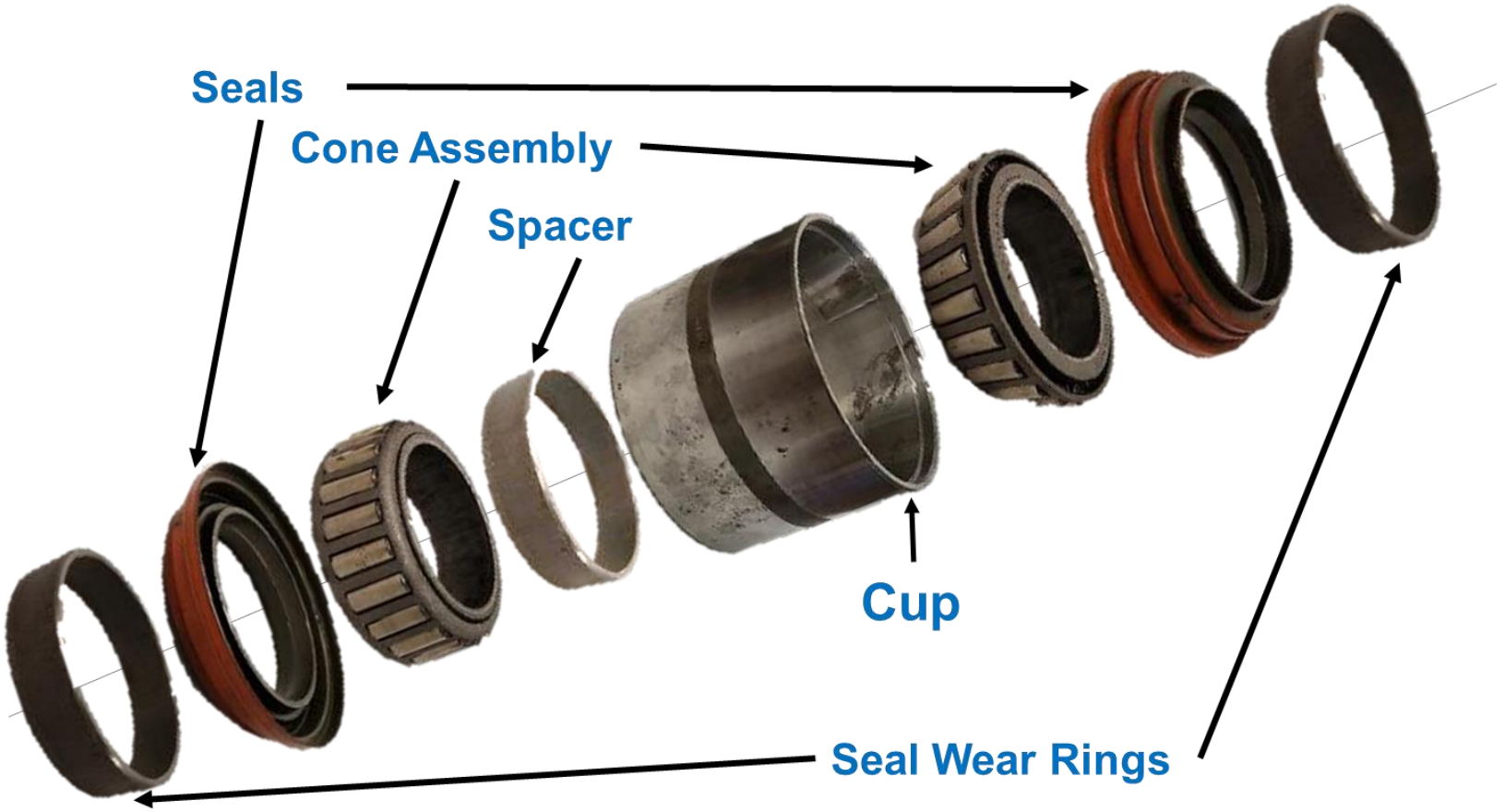
Presentation Overview

- Project Objectives
- Review of the Reconditioning Process
- Current state of bearing Service Life and Performance Testing
- Non-Destructive Evaluation (NDE) Scanning Technology
- Concluding Remarks

Project Objectives

- Evaluate the bearing reconditioning process in improving performance and lengthening service life
- Approaches:
  - Investigate performance and service life expectancy of bearings after reconditioning
  - Determine how successful the reconditioning process is at completely removing defects in bearings

Roller Bearing Components

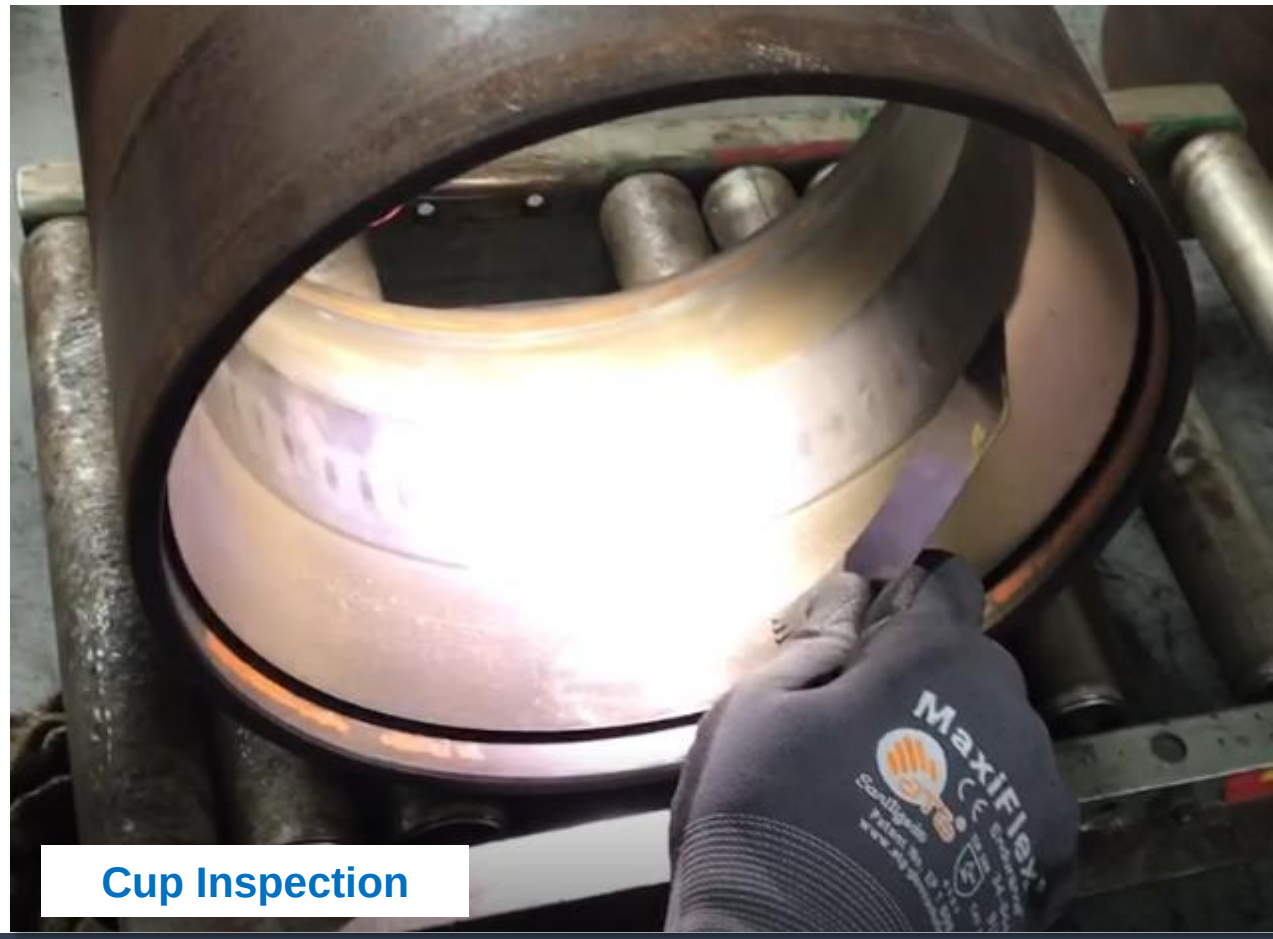


Inspection

- Visual inspection
- “Feeler” gauge

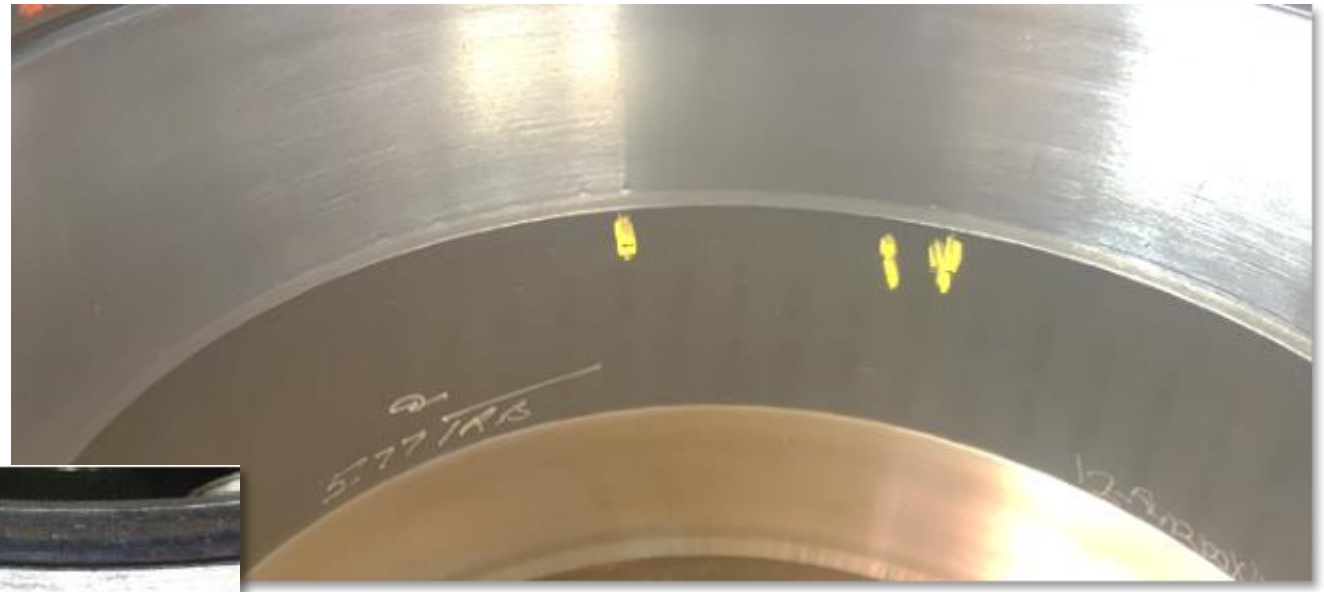
Cup Raceway Defect

Feeler Gauge



Cup Inspection

Reconditioning



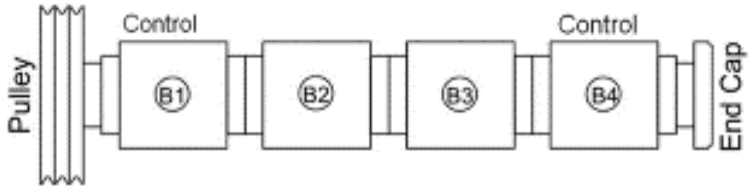
Reconditioning Repairs

Before Reconditioning

After Reconditioning

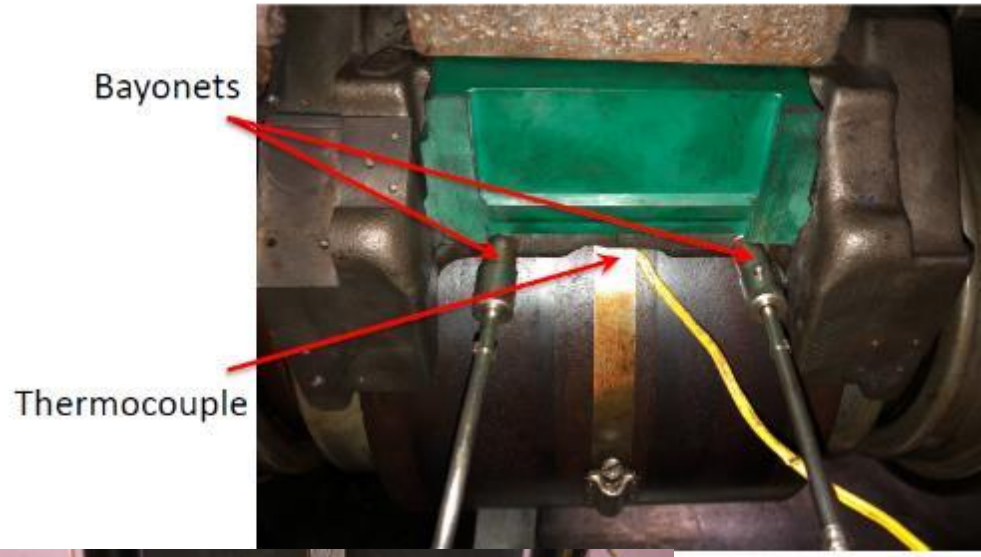
Service Life and Performance Testing

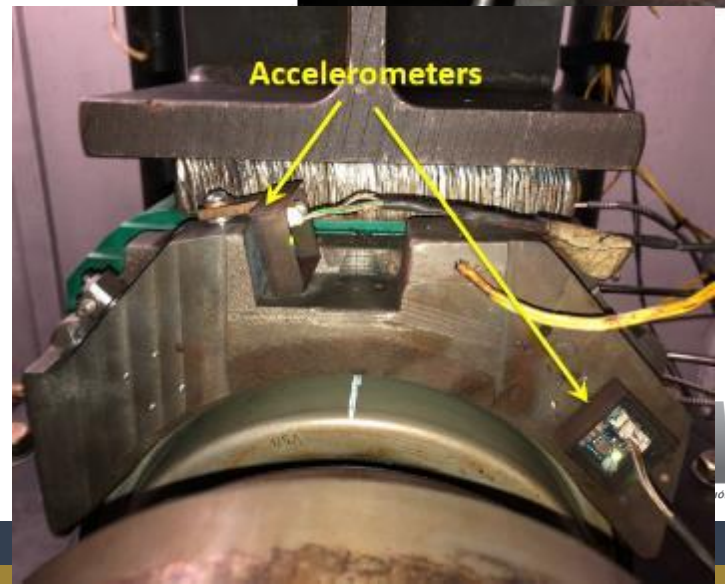
- Two tests – performance and service life
  - Reconditioning repairs of spalls on cup raceways
- Performance test
  - Operating temperature and vibration
  - Paired measurements before and after repair
- Service life test
  - Observe miles until defect occurs in repaired spall
  - Samples from two populations
- Rig testing completed at University of Texas



Performance Testing Review

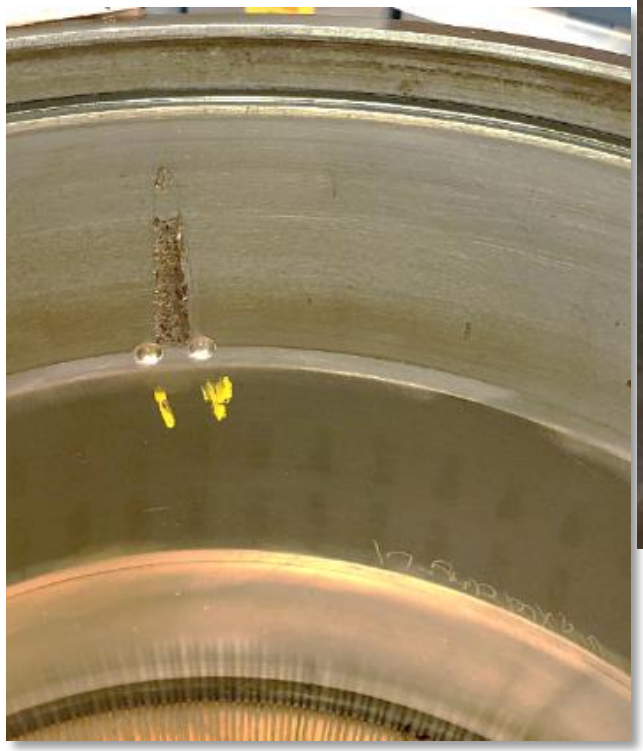
- Reconditioning did not impact negatively the bearing performance
- Performance of 12 bearings tested before and after reconditioning
  - Paired test to assess change in performance after repairs
- Five bearings had slightly lower operating temperatures
- Ten bearings had a decrease in vibration levels
- Three bearings had slightly higher operating temperatures, but still within normal bounds





Performance Testing Review

- Defects occurred in two repaired cups:
  - Defect occurred at 8,700 miles for one spall repair
  - Defect occurred at 93,000 miles for another spall repair
  - Prompted changes to service life test
  - Prompted search for NDE technology to detect issues

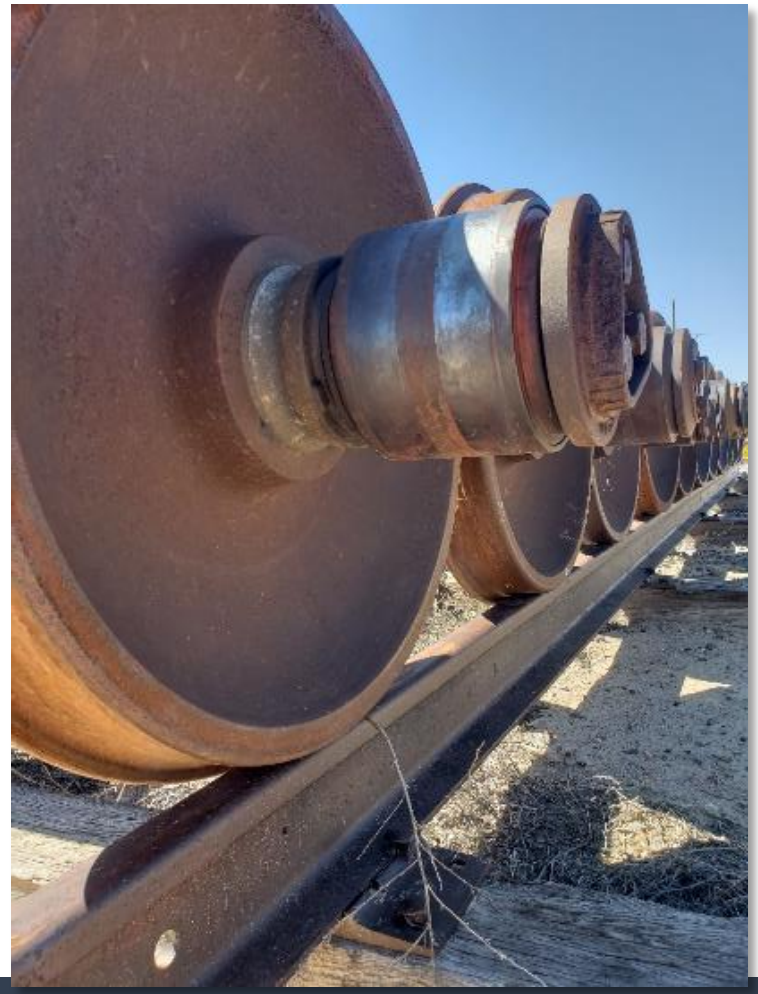


After run of 93,000 miles

After Reconditioning

After run of 8,700 miles

Service Life and Performance Testing



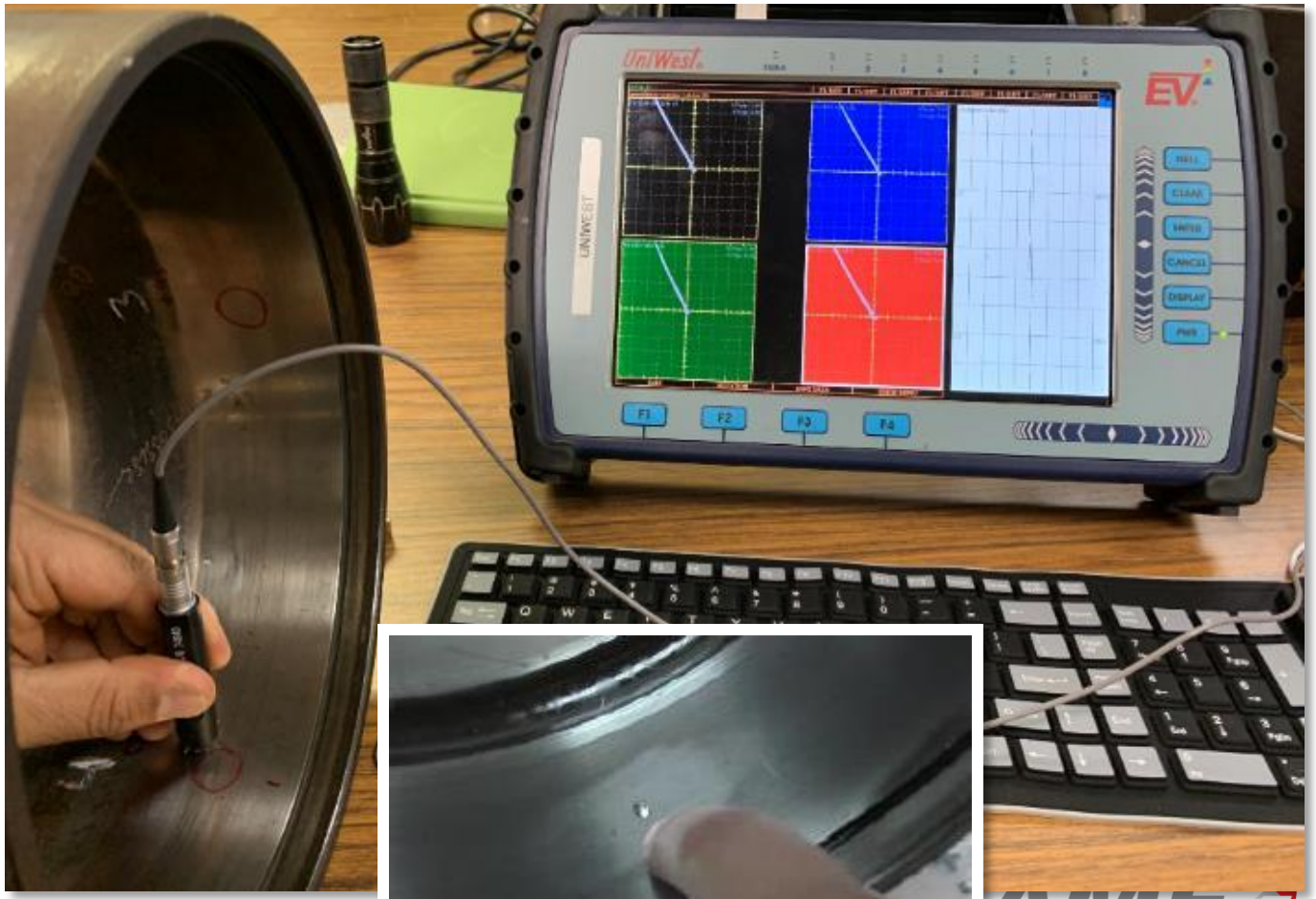
- Sixteen bearings were service-life tested after reconditioning
  - Eight bearings from the population of completely repaired bearings
    - The repair did not fail during the test
  - Eight bearings from the population of partially repaired bearings
    - To be tested this year

Non- Destructive Evaluation (NDE) Technology

- Current inspection now: best practice is visual
- Improved inspection could be possible from NDE methods
- Flexible Eddy Current Array (ECA)

Non- Destructive Evaluation

- Bearing cups used in service-life testing have been scanned with flexible ECA
- Additional bearings are being scanned to complete verification of the device and determine its applicability to the reconditioning process



Concluding Remarks

- Reconditioning process
  - Visual inspection is current method
  - Possible new inspection technology using Eddy Current Array
- Performance testing
  - Reconditioning did not negatively impact the performance of the bearings
  - However, defects may reoccur quickly
- Service life testing
  - To understand how long repairs last
  - Understand the mechanism that causes defects to reoccur

Gracias. ¿Hay alguna pregunta?

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