1200 S Maple Street
Bristow, OK 74010

BEARING RETURN TO SERVICE
BEARING INSPECTION & OVERHAUL
BY PAS MRO

FAA Repair Station 5POR020C
EASA Certificate No EASA 145.6544

ISO9001/AS9110 Registered

BEARING RETURN TO SERVICE BY PAS MRO

COMPANY & CAPABILITY

FAA REPAIR STATION No. 5POR020C
EASA CERTIFICATION No. EASA.145.6544

COMPANY OVERVIEW

- FORMED AND BEGAN OPERATIONS IN 2003
- MRO FOCUSED
- ISO9001/AS9110 CERTIFICATION IN 2005
- FAA REPAIR STATION & EASA CERTIFIED IN 2012
- 18 EMPLOYEES
- CURRENT OPERATIONS IN BRISTOW, OK (25 miles SW of Tulsa)
- Over 18,000 SQ. FT OF OPERATION

FAA REPAIR STATION No. 5POR020C
EASA CERTIFICATION No. EASA.145.6544

BEARING LEVEL II REPAIR PROCESS

- REPAIR & REPAIR DEVELOPMENT PROCESS SPECIFICATIONS
  - FAA DER & FAA ACO APPROVED
- ISO9001/AS9110 REGISTERED (SINCE 2007)
- **OEM APPROVAL – MD HELICOPTERS**
- OPS SPEC RATING:
  - AIRCRAFT ENGINE (Bearings)
  - AIRCRAFT AIRFRAME (Bearings)
  - AIRCRAFT ACCESSORY (Electrical/Mechanical)
- CASE READY

FAA & EASA CERTIFICATIONS


Air Agency Certificate


U.S. APPROVAL CERTIFICATE
EASA.145.6544


Certificate of Registration
nqa

ISO9001 / AS9110 Certificate

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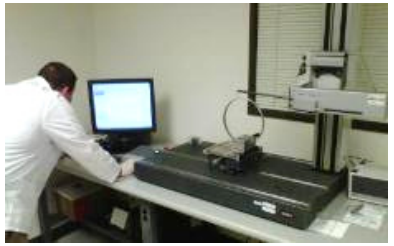
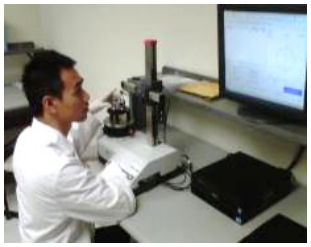
BEARING LEVEL II REPAIR PROCESS

- Receiving
- Disassembly
- Vibromilling
- Cleaning (Cellular)
- Pre-Hone Visual Inspection
- Hone/Restoration
- Post Hone Dimensional Inspection
- Fit Up (Rolling Element Sizing)
- Assembly
- Final Dimensional Inspection
- Dynamic Analysis
- Final Inspect
- Preserve
- Package
- Ship







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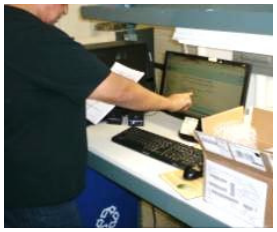
BEARING LEVEL II REPAIR PROCESS

RECEIVING

- Initial Paperwork Check (Packing Slip/PO/RO)
- Check for Suspected/Possible Hidden Damage
- Check For ADs and/or SBs
- Perform Cursory Visual Inspection
  - Obvious Damage
  - Missing Components
  - Suspected Unapproved Parts
- Check Bearing for Correct Information
  - P/N
  - S/N (if no S/N – we assign one for traceability)
  - Any Previous Repairs
- Inspection Data Availability
  - CMM; Drawing; Overhaul Manual; Major Repair Document
  - FAA Approved Data
- Create Shop Router, Enter into Log Book
- P/N; S/N; Job No; Customer; ESN; TSN



DISASSEMBLY

- De-Magnetize Bearings
- Disassemble to Facilitate Repair
  - Separable Bearings
  - Non-Separable Bearings
- Separable Bearings
  - Inner and/or Outer Race Removable
  - Rolling Element Removal and Discard
- Non-Separable Bearings
  - Form-Fit
  - Riveted Cage
  - Tanged or Staked Cage
- Riveted Cage
  - Drill to remove Rivet Head
  - Remove Remainder of Rivet
  - No Damage to Cage
- Identification Preservation
  - Engrave as Required
  - P/N; S/N; Other - As Required for Legibility
  - Re-Work Number (i.e. RW1 for initial Overhaul)

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BEARING LEVEL II REPAIR PROCESS

VIBROMILL

- Vibratory Tumble Parts to Facilitate Pre-Repair Inspection
- Ceramic Media
  - Removes Staining; Coking; Varnish; Discoloration
  - Aids in Visual Inspection of Bearing Components to Identify Defects that Require Removal
- Mild Aqueous Solution
  - Works in Conjunction with Ceramic Media
- Clean to Remove Solution
  - Hot Water Rinse
  - Dip in Aquasorb
  - High Pressure Solvent Spray
- Dry
  - Filtered & Dried Compressed Air
  - (Class 100 Filter)
- Protect
  - Bearing Components Placed in New Sealed Poly Bags and Back into Protective Container

VISUAL INSPECTION

- Raceways; Cage (Separator) Visually Inspected Under High Lighted Magnification
- Visual Inspection to Determine Size and Location of Defects
- Annotated for Honing Operation
- Determination if Bearing is Repairable or Non-Repairable based on Severity of Defects

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BEARING LEVEL II REPAIR PROCESS

RACEWAY HONING

- Polish Raceways to Remove Light Defects and/or Surface Anomalies That Prevent Serviceability
- Low-Speed Bearing Hones and Precision Honing Lathes
- Micro Polish Media
  - Easier Control of Polishing
  - Less Invasive than Honing Stones
  - Superior for Removing Defects; Roughness

- Hone – Clean – Inspect – Repeat
  - Hone for Short Duration
  - Clean to remove Compound
  - Inspect Defects
  - Repeat until Defects are Removed
  - Prevention from Over-Polishing

- Clean in Solvent
  - High Pressure Spray To Remove Debris
- Dry

CAGE / SEPARATOR

- Cage Inspection
  - Pocket Wear or Fatigue
  - Plating Wear
  - Pocket Damage
  - Corrosion

- Refurbishment
  - NDI
  - New Silver Plate (certified plater: Hixson)
- Replacement
  - Reverse Engineer
  - Outsource to Cage OEM

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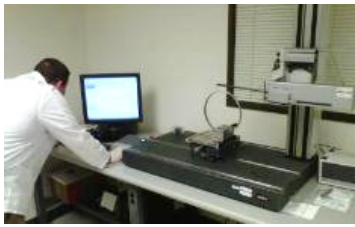
BEARING LEVEL II REPAIR PROCESS

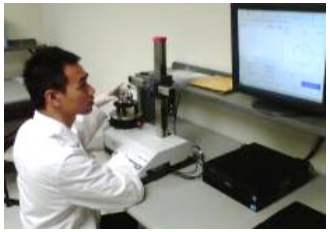
RACEWAY MOUNTING SURFACE

- Hone Mounting Surface
  - Removal of Defects Only – Minimal Removal
- Dimensionally Inspect
- Nickel Brush Plate
  - Build up of Mounting Surface
  - Increments of .00005”
  - Max .0013”
  - Dimensionally Inspect

POST HONE INSPECTION

- Perform Dimensional Measurements Following Honing to Ensure The Geometrical Design of the Raceways has Not Been Changed
- Check Against OEM Manual; Drawing; FAA or DER Approved Repair Data; Pre-Hone Dimensional Measurements
  - Raceway Geometry & Roughness
  - Bore & OD
  - Roundness; Concentricity; Flatness
- Measured in Micro-Inches
  - Mahr Federal XCR-90
  - Mahr Federal CLM817 & Sunnen Bore Gages
  - Mahr Federal MMQ100
- Hardness Test (Rockwell)
- Data Recorded and Stored





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BEARING LEVEL II REPAIR PROCESS

FIT-UP DIMENSIONAL

- Select Trial Rolling Element Size
  - Ball/Roller
- Install & Assemble Bearing
- Dimensionally Measure
  - As Required:
    - Contact Angle
    - Radial Play
    - Axial Play
    - Flushness Under Load

- Repeat
  - Until Dimensions Meet Specified Tolerances
- Select Required New Rolling Elements

ASSEMBLY

- Install Required Size New Rolling Element
  - Ball/Roller
- Complete Bearing Assembly
  - Cage (Retainer) Retention
  - Riveted Cage
  - Inner & Outer Raceways

- Check for Freedom of Rotation
- Dimensionally Measure
  - As Required:
    - Contact Angle
    - Radial Play
    - Axial Play
    - Flushness Under Load
    - Under Roller Diameter

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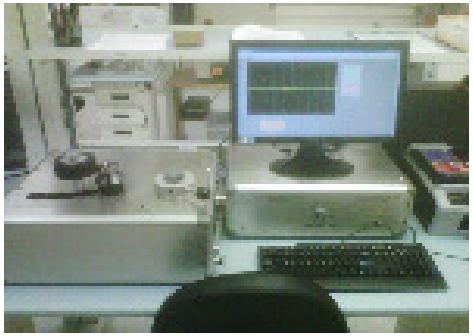
BEARING LEVEL II REPAIR PROCESS

DYNAMIC ANALYSIS



- Bearing Inspection
  - (Timken) BA-96-2 Model
- As Applicable*
- Set Up Noise Analyzer
  - Speed
  - Limits (Peak-to-Peak; RMS)
  - P/N; S/N; Customer; PO/RO
- Check Calibration (master bearing)

- Lubricate Bearing
- Mount & Test

- Verify Results
- Capture & Record Results

FINAL INSPECTION

- Final 'White Glove' Visual Inspection of Bearing

- Check Paperwork
  - Router Completeness/Accuracy
  - Inspections Completed/Accuracy
  - Data Recorded Completed/Accuracy
  - Test Reports Completion/Accuracy
- PO Requirements Met
- Regulatory Requirements Met
- Dual Release 8130-3 or C of C Completed & Signed

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BEARING LEVEL II REPAIR PROCESS

PRESERVATION

- Final Clean & Dry Bearings
  - Spray Solvent
  - Rinse
  - Aquasorb Dip
  - Fingerprint Remover Dip
- Non-Greased Bearings:
  - Dip in Filtered MIL-PRF-6085 Preservative Oil
  - Drain

- Greased Bearings:
  - Apply required Amount of Specified Grease
  - Install Seals or Shields (if required)
  - Apply Light Coat of MIL-PRF-6085 Oil Around Bearing Outside Surfaces

PACKAGING

- Place Substrate on Vacuum Packager
- Place Preserved Bearing on Substrate
- Heat & Vacuum Seal Bearing with Required Film
- Trim and Check for Seal / Film Adhesion
- Place Required Labels on Package

PAS MRO BRISTOW, OK FACILITY

Main Entrance (covered)

18,000 Total Sq. Ft. – ALL CLIMATE CONTROLLED