VAN HORN AVIATION, L.L.C.
Tempe, Arizona

Customer Support Specification CSS-500
206 Series Tail Rotor Bearing Installation

August 28, 2012

Revision E
Revision Date: December 2, 2021

PREPARED BY: Austin Schneider

CHECKED BY: Dean Rosenlof

REVISIONS

REV	DATE	DESCRIPTION	APPROVED
A	08/14/13	Revised speeds in Section 2.2.5 Revised processes in Sections 2.2.7 through 2.2.12 Removed Figure 5 showing 90° swaging	JVH
B	09/15/14	Complete rewrite	JVH
C	11/30/17	Replaced WC-6TG-8 with WC-6TG-10 Complete rewrite to accommodate WC-6TG-10 bearing installation procedure	DR
D	03/19/19	Revised Figures 1, 2 and 9 and revised the removal, installation and inspection procedures to account for WC-6TG-10 bearings installed from either side of the blade.	DR
E	10/26/21	Revised document title. Added bearing removal fixture to Equipment and Materials section. Added bearing P/N 2062290-3 to all bearing callouts and Figure 9. Added note about less breakaway torque for P/N 2062290-3 bearings. Provided allowance for any bearing combination in all 2062200-101/-301/-501 tail rotor blade assemblies.	DR

TABLE OF CONTENTS

1 EQUIPMENT AND MATERIALS

1.1 WC-6TG-10 or 2062290-3 Bearing
1.2 Dixie Aerospace RST 2153 Bearing Tri-Roller Swaging Tool and Locating Fixture. Alternatively, Shafer 77896 RST2153 Bearing Tri-Roller Swaging Tool with Shafer 77896-RST2153 Locating Fixture or Shafer 77896- RST1010 First Swage Fixture may be used.
1.3 Bearing Removal Fixture, Van Horn Aviation P/N 206R2200-10
1.4 Table-mounted arbor press
1.5 Hydraulic press to remove bearings
1.6 Manual milling machine or drill press if no milling machine is available
1.7 Feeler gage, 0.005 inch
1.8 Loctite 609 Retaining Compound
1.9 MEK, MPK, acetone, denatured alcohol or equivalent solvent
1.10 Machining oil

2 PROCEDURE

The WC-6TG-10 and 2062290-3 bearings have a preformed lip on one side of the bearing race. Only one side of the WC-6TG-10 and 2062290-3 bearing requires swaging. The WC-6TG-10 and 2062290-3 bearings may be installed from either side of the blade. Any combination of WC-6TG-10 and 2062290-3 bearings may be installed into the 2062200-101/-301/-501 tail rotor blades.

The 2062290-3 spherical bearings are sourced from Kamatics Corporation and incorporate a propriety self-lubricating liner material instead of the more common PTFE liner material. Due to the low friction characteristics of the KAron® liner, there will be less breakaway torque with the Kamatics bearings. The bearings may rotate more freely under light finger pressure, and there may be a slight amount of axial play in the bearings. The minimal breakaway torque and slight axial play in the new 2062290-3 bearings are normal and expected characteristics.

2.1 Removal

NOTE

Bearings must be replaced if damaged, or if bearing axial movement is beyond ICA allowable range. Bearings must also be removed before any full-blade cure.

2.1.1 Disassemble the tail rotor blade assembly from tail rotor hub per Bell Helicopter Component Repair and Overhaul Manuals.
2.1.2 On the side of the blade where the preformed lip of the bearings are located (could be either side of blade), mask around the bearing and the surrounding blade surface with masking tape. The masking tape will protect the paint when the bearings are pushed out.
2.1.3 Place the blade with masked surface down on the bearing removal fixture (ref. Figure 3). Secure the blade to the fixture with the bearing removal plate (ref. Figure 4) using (2x) ¼”-28 UNF screws. Ensure the blade will not slip, and view from the underside of the fixture to verify no interference when the bearing is

pushed out. Reference Figure 2 for setup.

2.1.4 Use a hydraulic press to push out the bearing from the side of the blade that has the swaged lip. Reference Figure 1.

a. Center a deep-well socket (11/16 inch or 18mm diameter) onto the bearing race. Slowly apply load until the socket is seated on the bearing.

b. Continue applying load to break the adhesive bond, and until the bearing is pushed free of the root fitting.

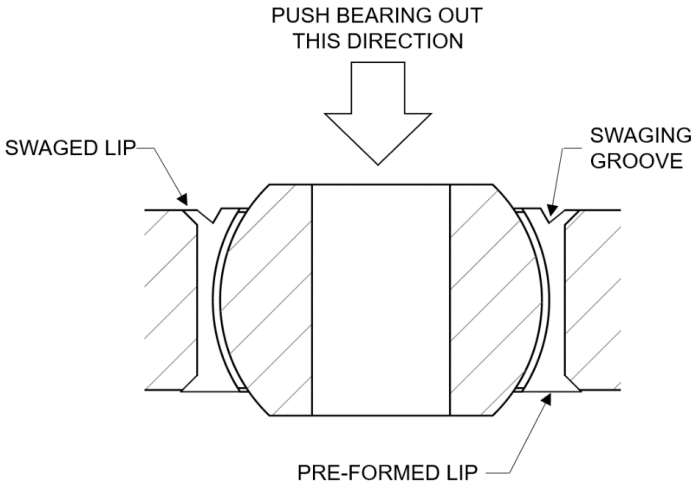


Figure 1. Blade Oriented with Preformed Lip Facing Down for Bearing Removal

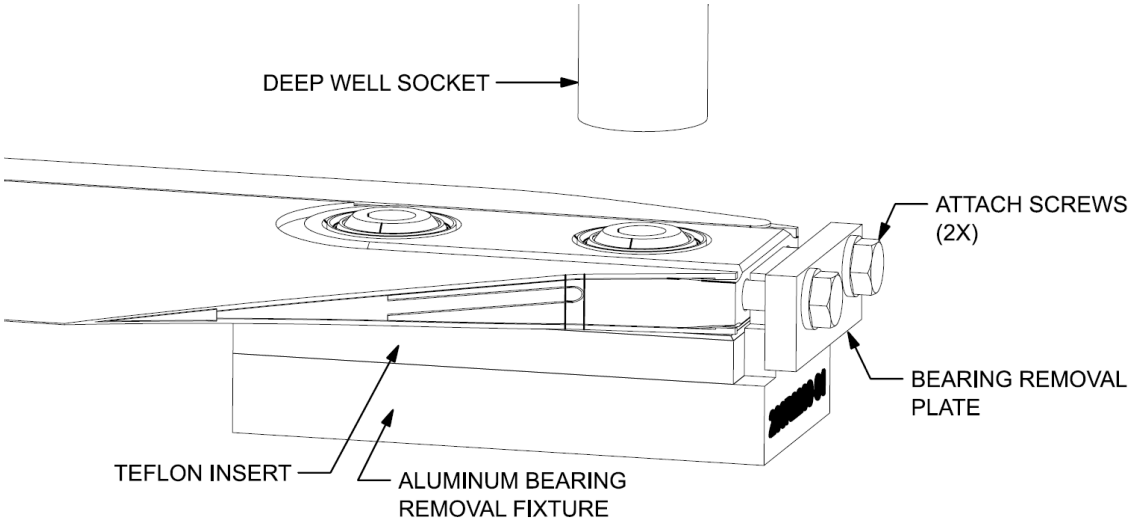
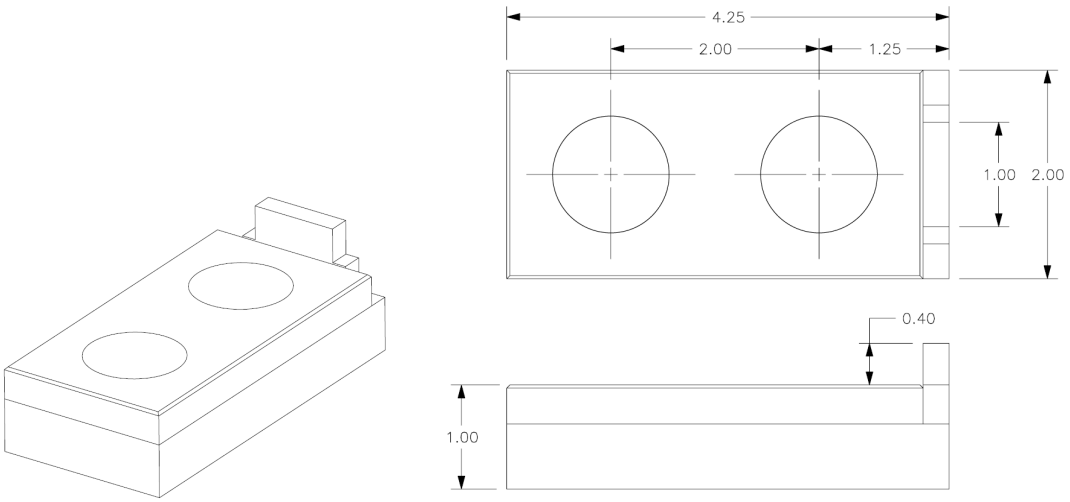


Figure 2. Blade Configured for Bearing Removal with Swaged Lip Facing Up

2.1.5 Use a rotary tool and a 1-inch (25.4 mm) diameter buffing wheel (280–320 grit) to clean the root fitting bearing hole. Move the buffing wheel continuously in line with the hole until the hole surface is clean. Do not abrade the paint finish.

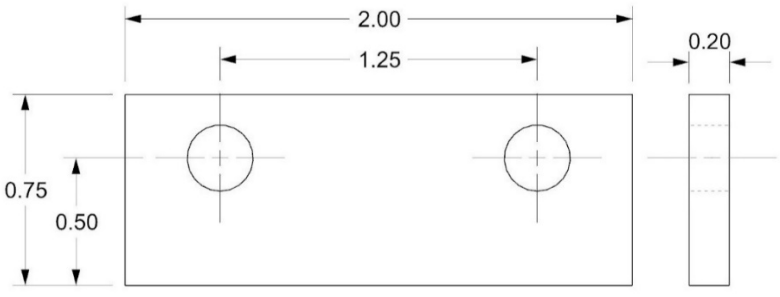
2.1.6 Wipe the surface of the bearing hole clean with MEK, MPK, acetone, denatured alcohol or equivalent solvent.

2.1.7 Inspect the root fitting bearing holes for any nicks or scratches. If a scratch or nick is present, notify engineering liaison. Do not proceed with work without engineering approval.



NOTE: All dimensions are in inches.

Figure 3. Bearing Removal Fixture



NOTE: All dimensions are in inches.

Figure 4. Bearing Removal Plate

2.2 Installation

NOTE

The depth of the chamfer on the root fitting bearing hole determines which side of the blade the new bearing will be installed from.

2.2.1 Obtain a new bearing. Clean the faying surfaces of the bearing and root fitting with MEK, MPK, acetone, denatured alcohol or equivalent solvent.

2.2.2 Coat the faying surfaces of the bearing and root fitting with retaining compound. Loctite 609 preferred.

2.2.3 Determine which side of the root fitting bearing hole the deeper chamfer is located on. Position the un-swaged end of the bearing into the deeper chamfer of the root fitting hole. Ensure that the bearing is not canted in the root fitting. The bearing must be properly aligned with the hole to avoid damage during installation.

2.2.4 Place the opposite surface of the blade against a backstop (ref. Figure 6). Reference Figure 5 for arbor press setup.

2.2.5 Attach the bearing pilot (ref. Figure 7) to an arbor press. Press the bearing into the root fitting with one continuous movement.

NOTE

The bearing is installed with a location fit.

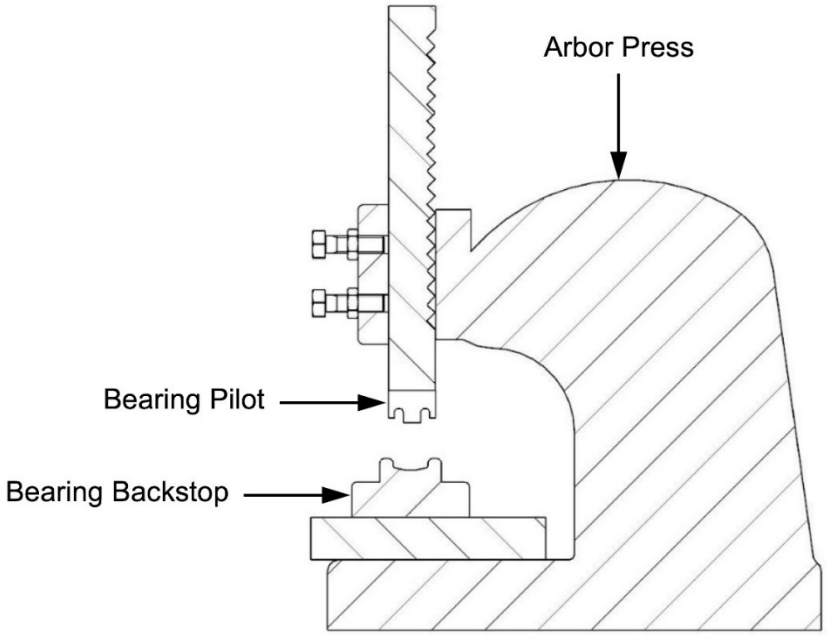


Figure 5. Cross-section View of Arbor Press Configuration for Bearing Installation

2.2.6 **INSPECTION:** Visually inspect the installed bearing. Ensure that the preformed lip of the bearing is installed flush to the root fitting before swaging. Reference operation 3.5 after swaging for final inspection criteria.

2.2.7 Check that the swaging tool is in operational condition and that the rollers are free of defects.

2.2.8 Lubricate the swaging tool rollers with machining oil and install the tool in the spindle chuck. Spindle speed of either machine option should be set at 100 to 225 RPM. 190 RPM is the preferred speed.

NOTE

A manual milling machine is preferred for swaging because of spindle rigidity. A manual drill press may be used if a milling machine is not available.

NOTE

To display swaging loads, secure a load cell to the table of the milling or drilling machine. The load cell should be wide enough to accommodate the locating fixture. Connect the load cell to a display that indicates the load applied to the nearest pound.

2.2.9 Position the flat locating fixture (ref. Figure 8) onto the load cell. Reference Figure 9 for manual milling machine or drill press setup.

2.2.10 Position the blade at the 9 o'clock position (when facing the machine). Keep the blade parallel to the machine bed, with surface containing the unswaged side of the bearing facing up. Align the center of the bearing to the flat locating fixture.

2.2.11 Swage the unformed bearing lip. Gradually apply swaging loads to a maximum of 600 lbs. and dwell at maximum load for 6 seconds.

3 FINAL INSPECTION

3.1 Inspect the circumference of the swaged lip with a 0.005-inch (0.127 mm) feeler gage. An acceptance of the feeler gage up to 40% of the bearing circumference (144°) is allowed.

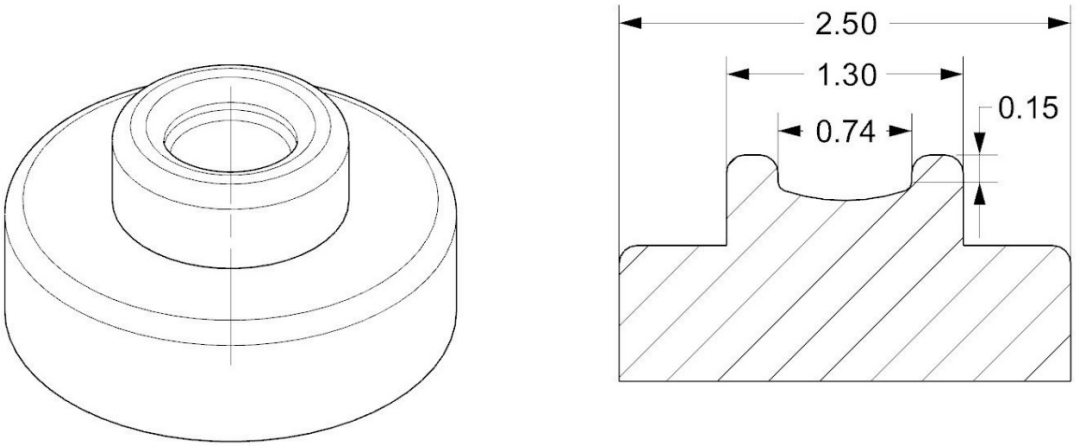
3.2 Check for over swaging. Over swaging makes the bearing feel tight when moved. Insert a 6.0-inch (152 mm) bar or tube in the bearing. Attach a pull scale to end of tube or bar. Force required to move bearing shall not exceed 8.0 in-lbs.

3.3 If swage gap is out of acceptable limits (>40%), re-swage the bearing lip, repositioning the blade at the 3 o'clock, 6 o'clock, or 10 o' clock position, depending on the location of the swage gap. Increase the load by 100 lbs. and maintain dwell times at 6 seconds. Do not exceed 700 lbs. load.

3.4 Repeat steps 3.1-3.3 until the bearing is properly swaged and passes inspection.

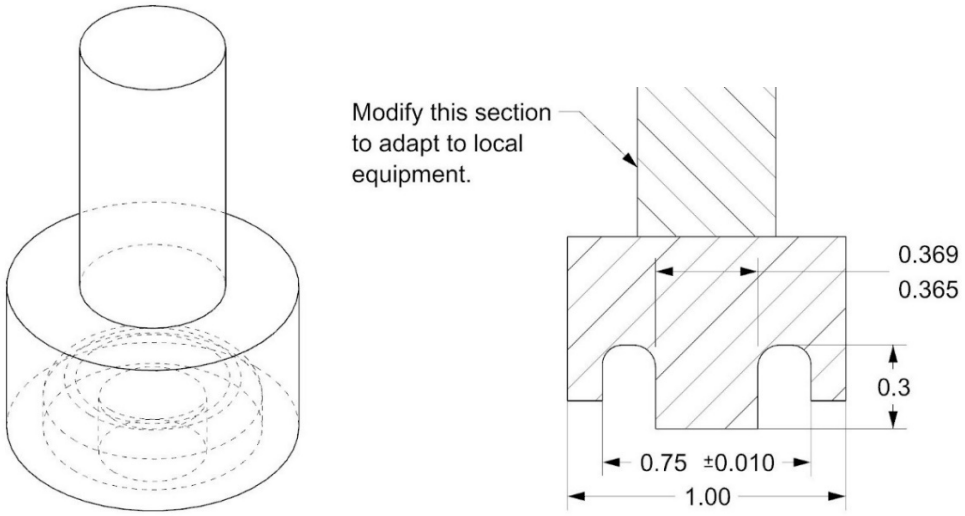
3.5 A slight protrusion of the preformed bearing lip above the root fitting surface is allowed if a .005-inch feeler gage does not fit into more than 40% of the circumference underneath the preformed lip of the bearing.

3.6 To avoid staining the paint finish, remove any oil or retaining compound by wiping surface clean with MEK, MPK, acetone, denatured alcohol, or equivalent solvent.



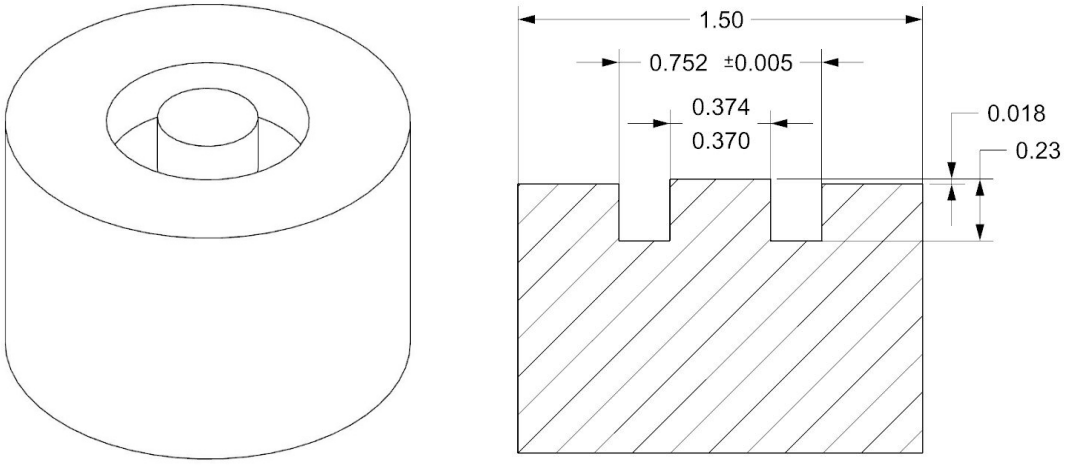
NOTE: All dimensions are in inches.

Figure 6. Bearing Backstop



NOTE: All dimensions are in inches.

Figure 7. Bearing Pilot



NOTE: All dimensions are in inches.

Figure 8. Flat Locating Fixture

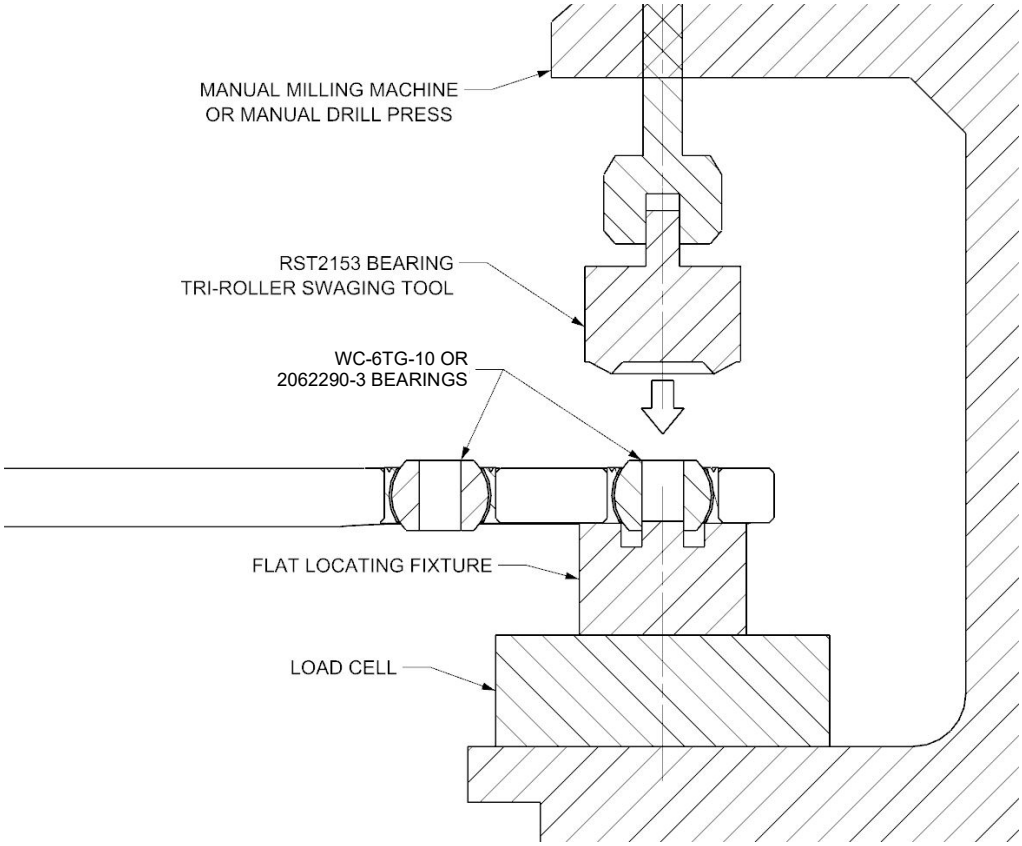


Figure 9. Manual Machine or Drill Press Installation Setup