A Textron Company

ALERT SERVICE BULLETIN

505-22-30

PSL # 982

20 October 2022

Revision A, 9 November 2022

MODEL AFFECTED: **505**

SUBJECT: **FREEWHEEL ASSEMBLY AFT CAP 406-040-509-101, INSPECTION OF.**

HELICOPTERS AFFECTED: **Serial numbers 65037, 65038, 65043, 65044, 65046 through 65048, 65050 through 65067, 65070, 65076 through 65078, 65080, 65081, 65084 through 65087, 65089, 65091, 65094, 65097, 65099 through 65105, 65107 through 65109, 65111 through 65117, 65121, 65124, 65141, 65142, 65158, 65182, and 65280.**

[Serial numbers 65011 through 65036, 65039 through 65042, 65045, 65049, 65068, 65069, 65071 through 65075, 65079, 65082, 65083, 65088, 65090, 65092, 65093, 65095, 65096, 65098, 65106, 65110, 65118 through 65120, 65122, 65123, 65125 through 65140, 65143 through 65157, 65159 through 65181, and 65183 through 65279 are not affected by this bulletin.]

[Serial numbers 65281 and subsequent will have the intent of this bulletin accomplished prior to delivery.]

COMPLIANCE:

PART I: Within 50 flight hours or 30 days, whichever occurs first, after the release date of this bulletin.

PART II: At the next freewheel assembly overhaul, next freewheel assembly 6 year inspection, or at next available access, whichever occurs first, but no later than 12 months after the release date of this bulletin.

DESCRIPTION:

Bell has been made aware of a quality escape in the manufacturing process of the freewheel assembly aft cap 406-040-509-101. Some aft caps may have improperly machined scallops that are designed to allow oil to flow between the aft face of the support assembly bearing and the aft cap seal.
This Alert Service Bulletin (ASB) provides instructions to perform a one-time inspection of suspect parts for this potential defect and replacement of parts if required.
Revision A of this bulletin is to revise the **HELICOPTERS AFFECTED** section of this bulletin, to remove an erroneous serial number and provide clarification to helicopters not affected as they were delivered with known conforming parts.
Applicability of this bulletin to any spare part shall be determined prior to its installation on an affected helicopter.

APPROVAL:

The engineering design aspects of this bulletin are Transport Canada Civil Aviation (TCCA) approved.

CONTACT INFO:

For any questions regarding this bulletin, please contact:

Bell Product Support Engineering
Tel: 1-450-437-2862 / 1-800-363-8023 / productsupport@bellflight.com

MANPOWER:

Approximately 0.10 man-hour is required to complete **PART I** of this bulletin.
Approximately 3.0 man-hours are required to complete **PART II** of this bulletin. No additional man-hours are required to accomplish **PART II** of this bulletin if done in conjunction with the freewheel assembly overhaul or interim inspection.
These estimates are based on hands-on time and may vary with personnel and facilities available.

WARRANTY:

Owner Operators, and or Fleet Operators of Bell Aircraft who comply with the instructions in this Bulletin will be eligible to receive non prorated replacement part as required, listed in the bulletin. The www.mybell.com portal allocates specific warranty entitlement for an aircraft by serial number. The Product Service Letter (PSL) number which will be listed below the bulletin number on the introduction page is going to be a required field when submitting a claim for replacement parts, labor, and/or freight. If you receive an ASB or TB that does not have a PSL number, then there is no warranty entitlement for that bulletin.

Labor entitlement: Yes $ 285.0 USD

To receive parts, labor, under warranty:

- Comply with the instructions contained in this Bulletin no later than the applicable date in the **COMPLIANCE** section.
- If there is a PSL number identified in the bulletin you will be required to enter this PSL number which will validate warranty entitlement for the selected aircraft. Please ensure that you use the **Bulletin tab** on the warranty section on www.mybell.com portal to file your claim.

NOTES:

- A user guide on how to submit a claim can be found here: How to Submit PSL Bulletin Claims.

MATERIAL:

Required Material:
The following material is required for the accomplishment of this bulletin and may be obtained through your Bell Supply Center.

Part Number	Nomenclature	Qty (Note)
AS3208-03	PACKING	1 (1)
AS3209-018	PACKING	1 (1)
AS3209-021	PACKING	1 (1)
AS3209-140	PACKING	1 (1)
MS24665-285	COTTER PIN	1 (1)
209-340-265-103	SEAL	1 (2)
214-040-814-105	WEAR SLEEVE	1 (2)
406-040-509-101	FREEWHEEL AFT CAP	1 (2)
406-040-532-101	BEARING	1 (2)

NOTES:

1. Required for accomplishment of **PART II** of this bulletin.
2. Only required if failing inspection criteria of **PART II** of this bulletin.

Consumable Material:
The following material is required to accomplish this bulletin, but may not require ordering, depending on the operator's consumable material stock levels. This material may be obtained through your Bell Supply Center.

Part Number	Nomenclature	Qty (Note)	Reference *
2400-00017-00	GREASE	5 LB (1)	C-001
2400-00220-00	ASSEMBLY FLUID	2 OZ (1)	C-024
2400-00020-00	LUBRICATING OIL	1 QT (1)	C-030
2010-07915-01	SEALANT	6 OZ (1)	C-308

* C-XXX numbers refer to the consumables list in the BHT-ALL-SPM, Standard Practices Manual

NOTE 1: The quantity indicated is the format the product is delivered in. Actual quantity required to accomplish the instructions in this bulletin may be more or less.

SPECIAL TOOLS:

T103216-101 Spanner Assembly.
T103311-101 Wear Sleeve Press (only required if wear sleeve requires replacement in procedures of **PART II** of this bulletin)
Bearing puller (commercial)

WEIGHT AND BALANCE:

Not affected.

ELECTRICAL LOAD DATA:

Not affected.

REFERENCES:

505-IPC Illustrated Parts Catalog, Chapter 63 and 65.
505-MM Maintenance Manual, Chapter 63 and 65.

PUBLICATIONS AFFECTED:

None affected.

ACCOMPLISHMENT INSTRUCTIONS:

PART I – Identification of freewheel assembly aft cap serial number

1. Prepare the helicopter for maintenance.

2. Gain access to engine bay area.

3. Verify serial number of the aft cap. It will be located under the part number (Figure 1).

   a. If the aft cap serial number **is not** included in the **Table 1**, no further action is required, and go to step 4.

   b. If the aft cap serial number **is** in the list in **Table 1**, perform **PART II** of this bulletin within the **COMPLIANCE** period.

4. Make an entry in the helicopter logbook and historical service records indicating compliance with **PART I** of this Alert Service Bulletin.

PART II – Inspection of freewheel assembly aft cap 406-040-509-101

-NOTE-

When not specified in a Figure legend, refer to the Illustrated Parts Catalog (IPC) for all parts and part numbers referenced in the Figures of this bulletin.

1. Prepare the helicopter for maintenance.
2. Remove the aft engine cowling (443AT) (DMC-505-A-71-10-02-00A-520A-A)
3. Remove the forward driveshaft (DMC-505-A-65-10-01-00A-520A-A).

-NOTE-

The followings steps are specific to the freewheel assembly aft support assembly, and are included as detailed in the complete freewheel assembly removal instructions and associated figures (DMC-505-A-63-10-02-00A-520A-A).

4. Remove the freewheel support assembly (10, Figure 2) and freewheel aft adapter (3) as follows:
   a. Remove and discard the cotter pin (1) from the nut (2).
   b. Install the spanner assembly (T103216-101) on the freewheel aft adapter (3) and attach in place with the hardware supplied (Figure 2, sheet 2 of 2).
   c. Hold the freewheel aft adapter (3) with the spanner assembly (T103216-101) and remove the nut (2) and washers (4 and 32) from the freewheel output shaft assembly (5).
   d. Remove the spanner assembly (T103216-101).
   e. Use a plastic scraper to remove the sealant from the washers (4, 6, and 32) and the freewheel aft adapter (3).

-NOTE-

When removing the freewheel aft adapter (3), the oil will drain from the freewheel aft support assembly to the engine pan.

   f. Remove the pilot washer (6), packing (7), and adapter (3) from the freewheel aft support assembly (5). Discard the packing (7).

g. Disconnect the oil inlet line (18, Figure 3) from the elbow (20) on the freewheel support assembly (29).

h. Close the oil inlet line (18) with a cap.

i. Remove the nuts (8, Figure 2) and the washers (9) that hold the aft freewheel support assembly (10).

j. Remove the freewheel support assembly (10) and the packing (11) from the engine Reduction Gear Box (RGB) (12). Discard the packing (11).

CAUTION

YOU MUST KEEP THE CONE HALVES OF THE CONE SET TOGETHER. THE CONE SET IS A MATCHED SERIALIZED SET. INSTALLATION OF A CONE HALF FROM ANOTHER SET WILL CAUSE AN INCORRECT OPERATION OF THE FREEWHEEL ASSEMBLY.

k. Remove the spacer (13), packing (14), and cone set (15) from the shaft assembly (5). Discard the packing (14).

5. Remove the bearing from the freewheel aft support assembly as follows:

a. Put the freewheel aft support assembly (3, Figure 3) in a vise (4) and safety in place. Make sure you protect the surface finish from damage.

b. Remove the ring (1) from the freewheel aft support assembly (3).

-NOTE-

If a bearing puller is not available, you can remove the seal and press the bearing out (DMC-505-A-63-10-02-03A-921A-A).

c. Heat the freewheel aft support assembly (3). Use a bearing puller and remove the roller bearing (2) from the freewheel aft support assembly.

6. Inspect the freewheel assembly aft cap for a correctly machined scallop (Figure 4).

a. If the aft cap is correctly machined, go to step 11.

b. If the aft cap is **not** correctly machined, go to step 7.

7. Remove the elbow (20, Figure 5), nut (28), and preformed packing (30) on the freewheel support assembly (29). Discard packing (30).

8. Replace aft cap (29) with a serviceable cap that meets the intent of this bulletin.

    a. If there is no seal installed on the replacement aft cap, install (DMC-505-A-63-10-02-03A-921A-A).

9. Inspect support assembly bearing. Replace if unserviceable.

    a. Examine the mating surfaces of the freewheel aft support housing for burrs, nicks, and scratches.

10. Visually inspect freewheel adapter and wear sleeve (6)(Figure 3) for nicks, dents, scratches, or wear. Replace adapter or wear sleeve if any defects or wear beyond allowable limits are exceeded (DMC-505-A-63-10-02-00A-530B-B and DMC-505-A-63-10-02-00A-710B-B).

    a. Wear is permitted if as follows:

        (1) It is smooth with no sharp edges.

        (2) It has a maximum depth of 0.002 inch (0.05 mm).

    b. Remove wear sleeve (6, Figure 3) as follows:

        (1) Put the freewheel aft adapter (5) in a vise (4). Make sure the vise is clamped on the wear sleeve (6).

CAUTION

BE VERY CAREFUL WHEN YOU CUT THE GROOVE IN THE WEAR SLEEVE. IF YOU ARE NOT CAREFUL, THE ROTARY TOOL CAN CAUSE DAMAGE TO THE OUTPUT FREEWHEEL ADAPTER.

        (2) Use a rotary tool to cut a groove in the wear sleeve (6) and stop just before you cut through.

        (3) Use a blunt chisel and plastic mallet and hit the groove in the wear sleeve (6) until it separates.

        (4) Remove and discard the wear sleeve (6) from the freewheel aft adapter (5).

    c. Install wear sleeve (6, Figure 3) as follows:

        (1) Lubricate the wear sleeve (6) inside diameter and adapter mating face with assembly fluid (C-024) or with system oil.

        (2) Install the Wear Sleeve Press (T103311-101) (8) on the wear sleeve (6).

(3) Use a heat gun to increase the temperature of the wear sleeve (6) and the Wear Sleeve Press (T103311-101) (8). Do not exceed 250°F ±10°F (121°C ±5°C).

-NOTE-

Make sure the chamfer inside diameter of the wear sleeve goes against the shoulder on the output freewheel adapter (Figure 3, Detail A).

(4) Install the wear sleeve (6) and the Wear Sleeve Press (T103311-101) (8) on the freewheel aft adapter (5).

(5) Use the arbor press (7) to push the wear sleeve (6) on the freewheel aft adapter (5) until seated.

11. Install aft support (10) bearing (2, Figure 3) as follows:

a. Lubricate the bearing outside diameter and the bore of the roller bearing with system oil.

b. Heat the freewheel aft support assembly (3). Push the roller bearing (2) in the freewheel aft support assembly and install the retaining ring (1).

-NOTE-

The following steps are specific to the freewheel assembly aft support assembly, and are included as detailed in the complete freewheel assembly installation instructions and associated figures (DMC-505-A-63-10-02-00A-720A-A).

12. Install aft support (10, Figure 2) and freewheel aft adapter (3) as follows:

a. Lubricate the two halves of the cone set (15), packing (AS3209-018) (14), and spacer (13) with lubricating oil (C-030).

CAUTION

MAKE SURE THAT THE TWO HALVES OF THE CONE SET ARE CORRECTLY SEATED IN THE GROOVE OF THE TAIL ROTOR DRIVE OUTPUT SHAFT AND THAT THE SPACER IS FULLY SEATED ON TOP OF THE CONE SET. IF THE CONE SET BECOMES UNSEATED, THEN THE ACCESSORY DRIVE GEARS AND OUTPUT SHAFT CAN BE DAMAGED.

b. Install the cone set (15) and the packing (AS3209-018) (14) in the groove of the shaft assembly (5), and then install the spacer (13) on the cone set.

c. Lubricate the new packing (AS3209-140) (11) with lubricating oil (C-030) and install it on the support assembly (10).

d. Apply a light coat of grease (C-001) to the area between the lips of the aft cap seal.

e. Install the freewheel support assembly (10) on the studs. Use hand pressure to set the freewheel support assembly (10) on the Reduction Gear Box (RGB).

f. Install the washers (9) and the nuts (8) on the studs. Torque nuts (13) 50 to 70 inch-pounds (5.65 to 7.91 Nm).

g. Lubricate a new packing (AS3208-03) (30, Figure 5) with lubricating oil (C-030).

h. Install the elbow (20), nut (28), and new packing (AS3208-03) (30) on the freewheel support assembly (10). Torque nut (10) 30 to 45 inch-pounds (3.39 to 5.08 Nm).

i. Connect the inlet oil line (18) to the elbow (20).

CAUTION

USE CAUTION WHEN INSTALLING THE ADAPTER ONTO THE SHAFT ASSEMBLY TO PREVENT DAMAGE TO THE SEAL IN THE SUPPORT ASSEMBLY.

j. Install the adapter (3, Figure 2) on the shaft assembly (5).

k. Lubricate a new packing (AS3209-021) (7) with lubricating oil (C-030).

l. Install the packing (AS3209-021) (7) and the pilot washer (6) on the shaft assembly (5).

m. Apply a small bead of sealant (C-308) to the exposed face of the pilot washer (6) and to the threads of the shaft assembly (5).

-NOTE-

It is permitted to add one thick washer (4) to the thin washer (32) for the cotter pin (1) to be engaged correctly. Refer to the Illustrated Parts Catalog (505-IPC, Chapter 63) for the correct part number of the washer(s).

n. Install the washers (32 and 4 if required) and the nut (2).

o. Install the spanner assembly (T103216-101) on the freewheel aft adapter (3) and tighten the nut (2). Torque nut (2) 225 to 500 inch-pounds (25.4 to 56.5 Nm).

p. Safety the nut (2) with a new cotter pin (1).

q. Remove spanner assembly (T103216-101) from the aft adapter (3).

13. Install the forward tail rotor short shaft assembly (DMC-505-A-65-10-01-00A-720A-A).

14. Service the transmission and freewheel oil system (DMC-505-A-12-10-03-00A-212A-A).

15. Install the aft engine cowling (443AT) (DMC-505-A-71-10-02-00A-720A-A).

16. Do the main rotor drive operation test (DMC-505-A-63-00-00-00A-320A-A).

17. Make an entry in the helicopter logbook and historical service records indicating compliance with **PART II** of this Alert Service Bulletin.

Table 1 – Suspect Freewheel Assembly Aft Cap 406-040-509-101

AFT CAP SERIAL NUMBER DELIVERED/INSTALLED	
RD0002	RD0046
RD0003	RD0047
RD0005	RD0049
RD0006	RD0050
RD0007	RD0051
RD0008	RD0052
RD0009	RD0053
RD0010	RD0054
RD0011	RD0055
RD0013	RD0056
RD0015	RD0057
RD0017	RD0059
RD0019	RD0060
RD0020	RD0062
RD0021	RD0063
RD0022	RD0064
RD0023	RD0065
RD0024	RD0068
RD0026	RD0072
RD0027	RD0073
RD0028	RD0074
RD0029	RD0075
RD0030	RD0076
RD0033	RD0077
RD0034	RD0078
RD0036	RD0079
RD0037	RD0082
RD0038	RD0084
RD0039	RD0085
RD0040	RD0086
RD0042	RD0087
RD0045	RD0088

Figure 1 – Location of Freewheel Assembly Aft Cap Serial Number

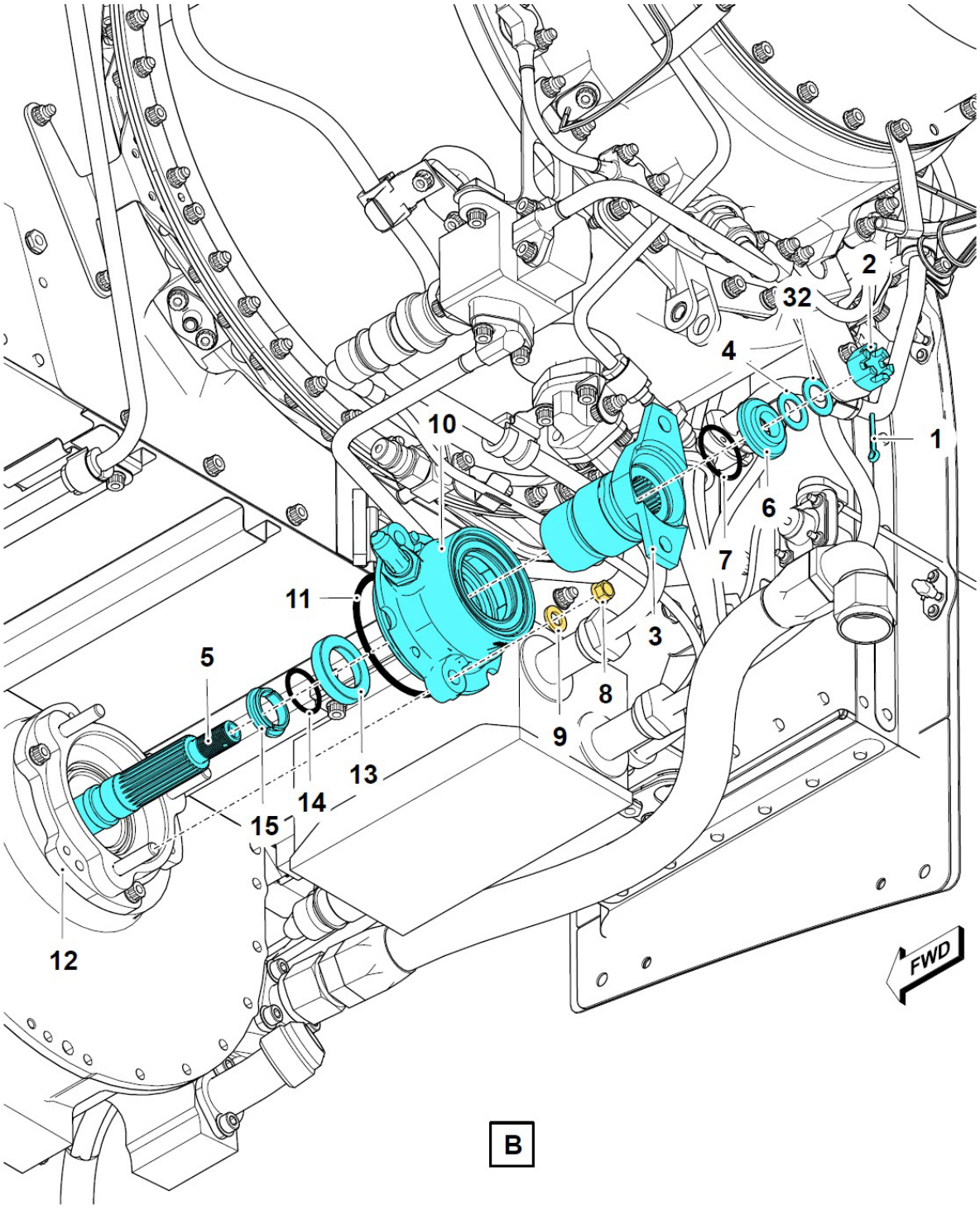

Figure 2 – Freewheel Aft Support Assembly (sheet 1 of 2)

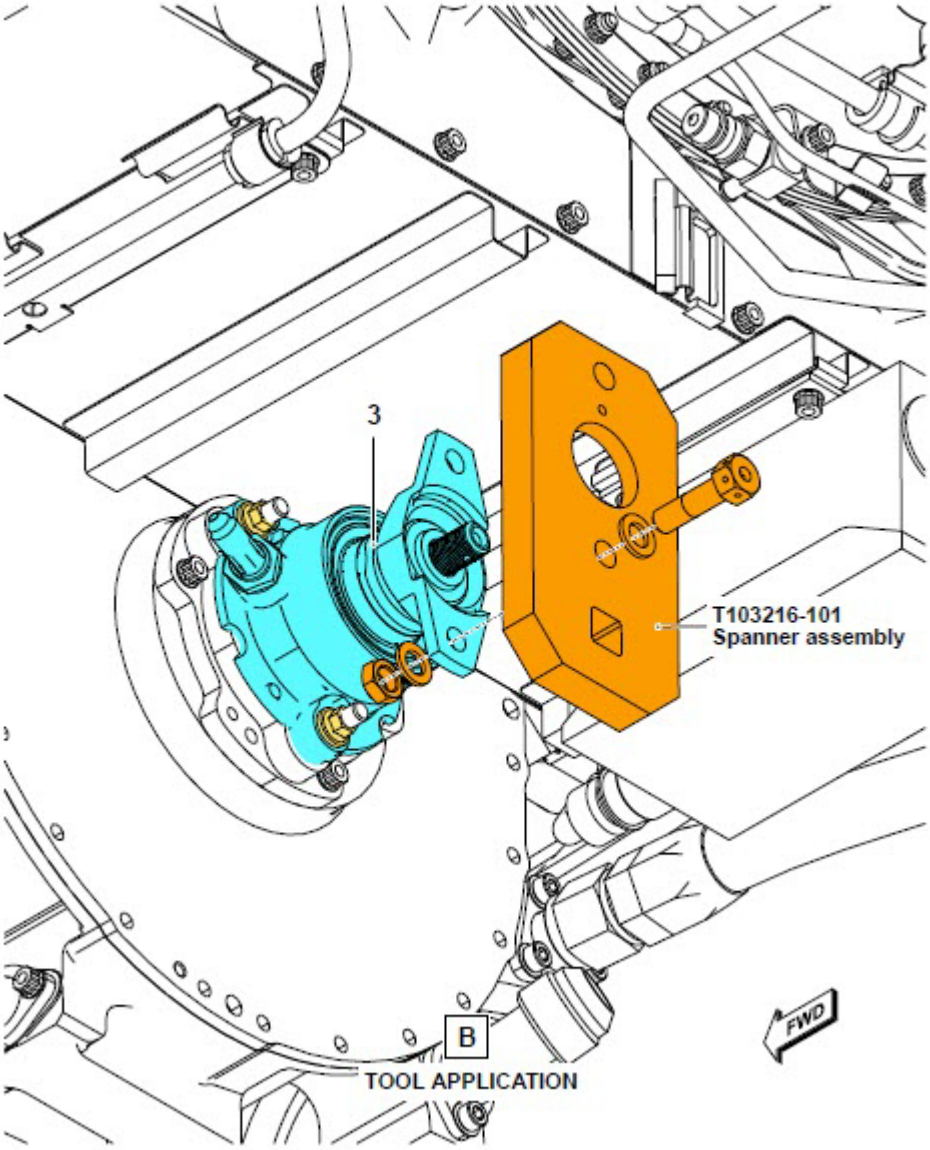

Figure 2 – Freewheel Aft Support Assembly (sheet 2 of 2)

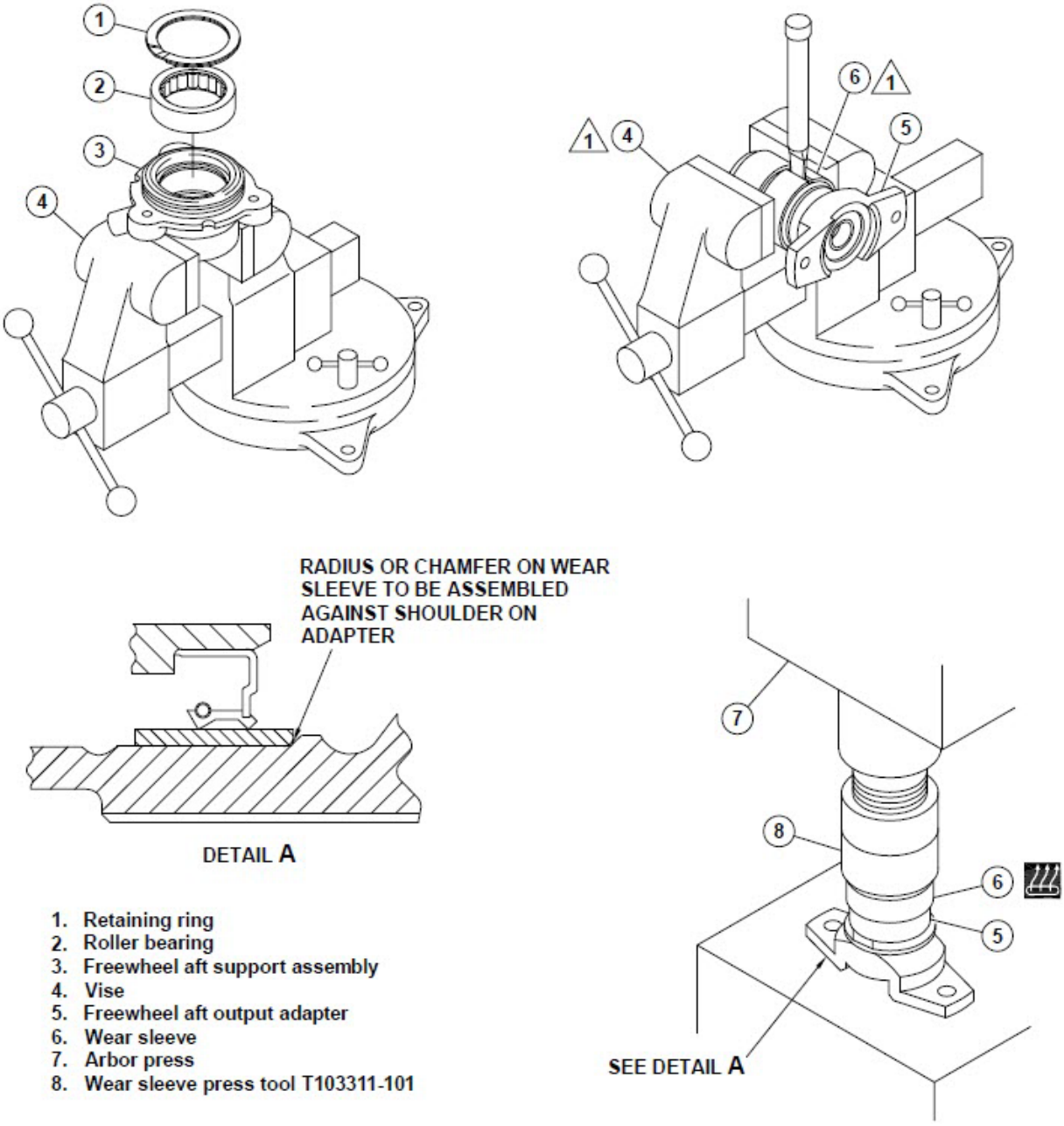

Figure 3 – Bearing and Sleeve Installation/Removal

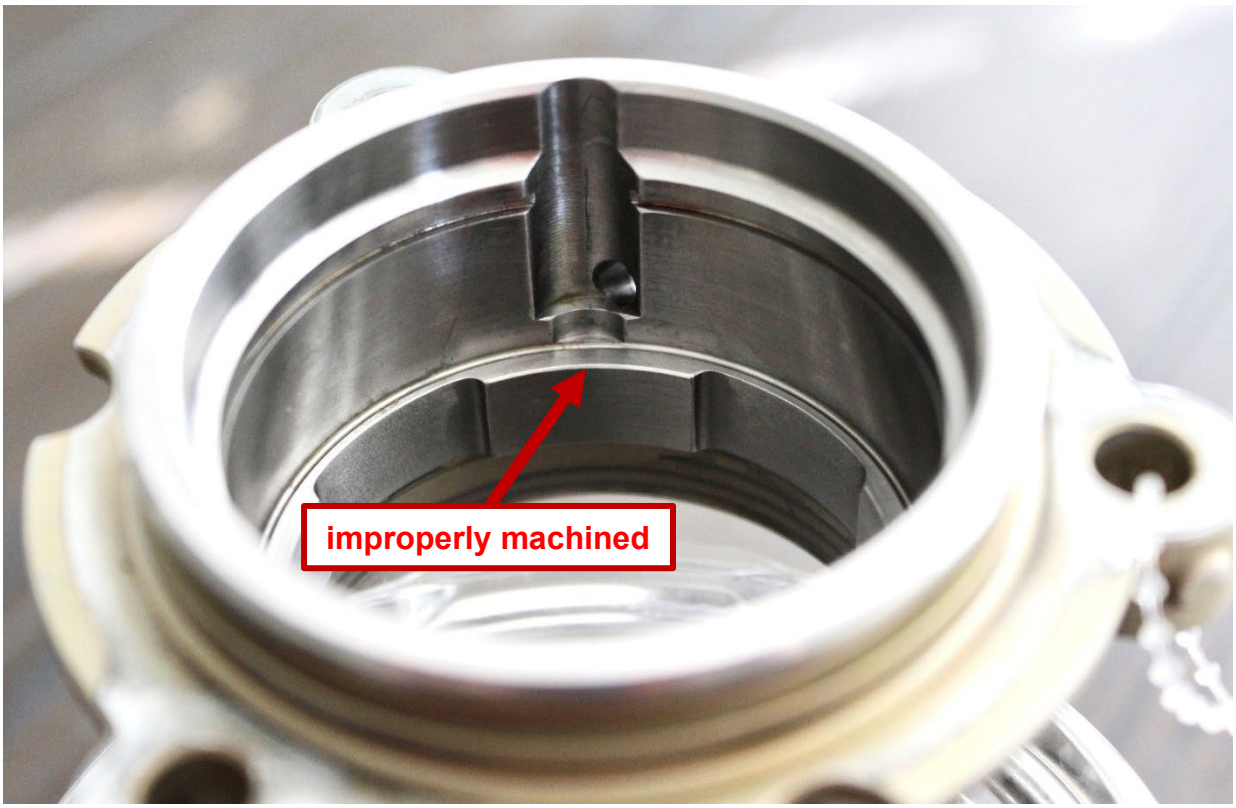

Figure 4 – Improper Machining of Aft Cap Scallop (sheet 1 of 2)

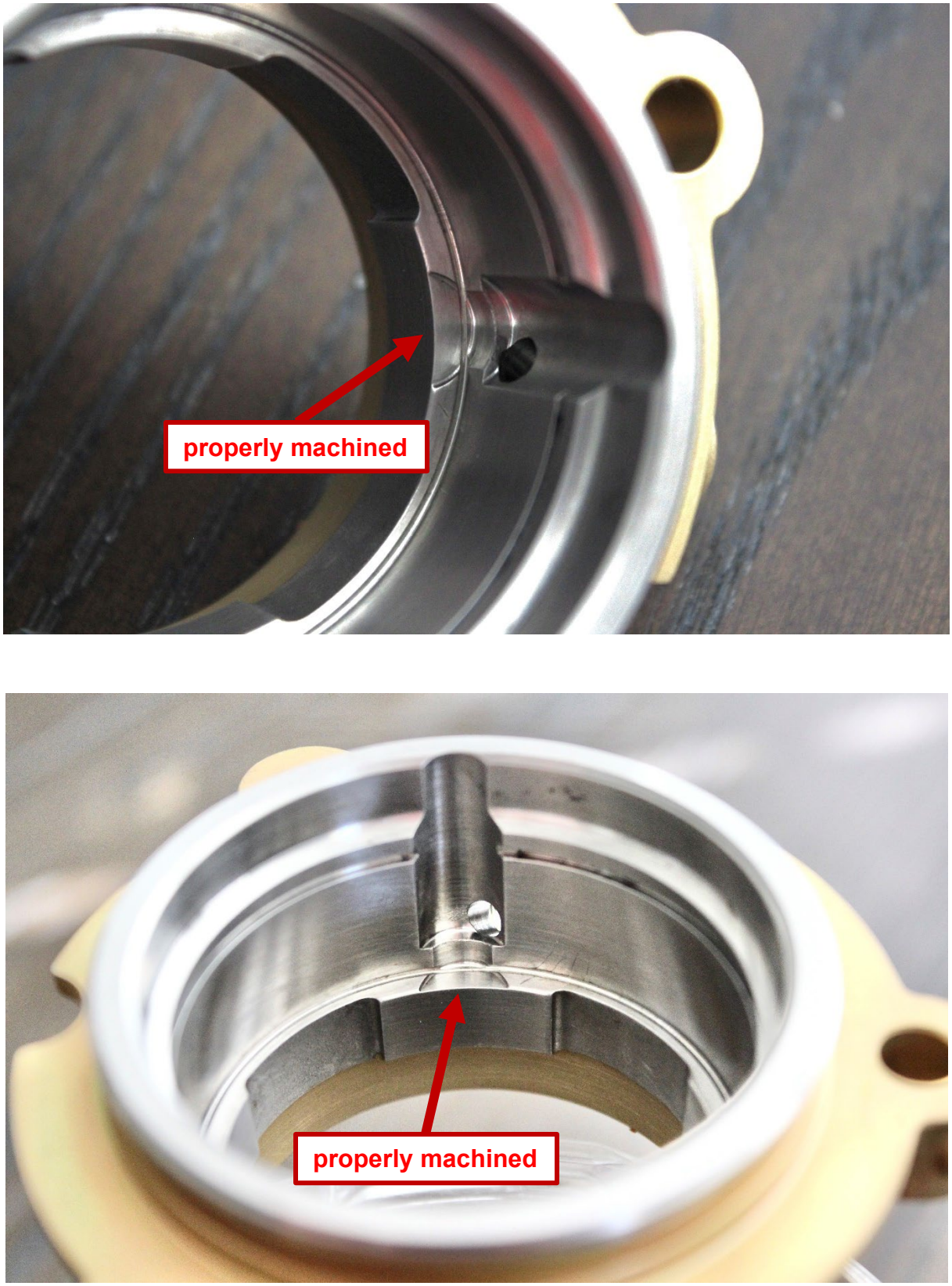

Figure 4 – Proper Machining of Aft Cap Scallop (sheet 2 of 2)

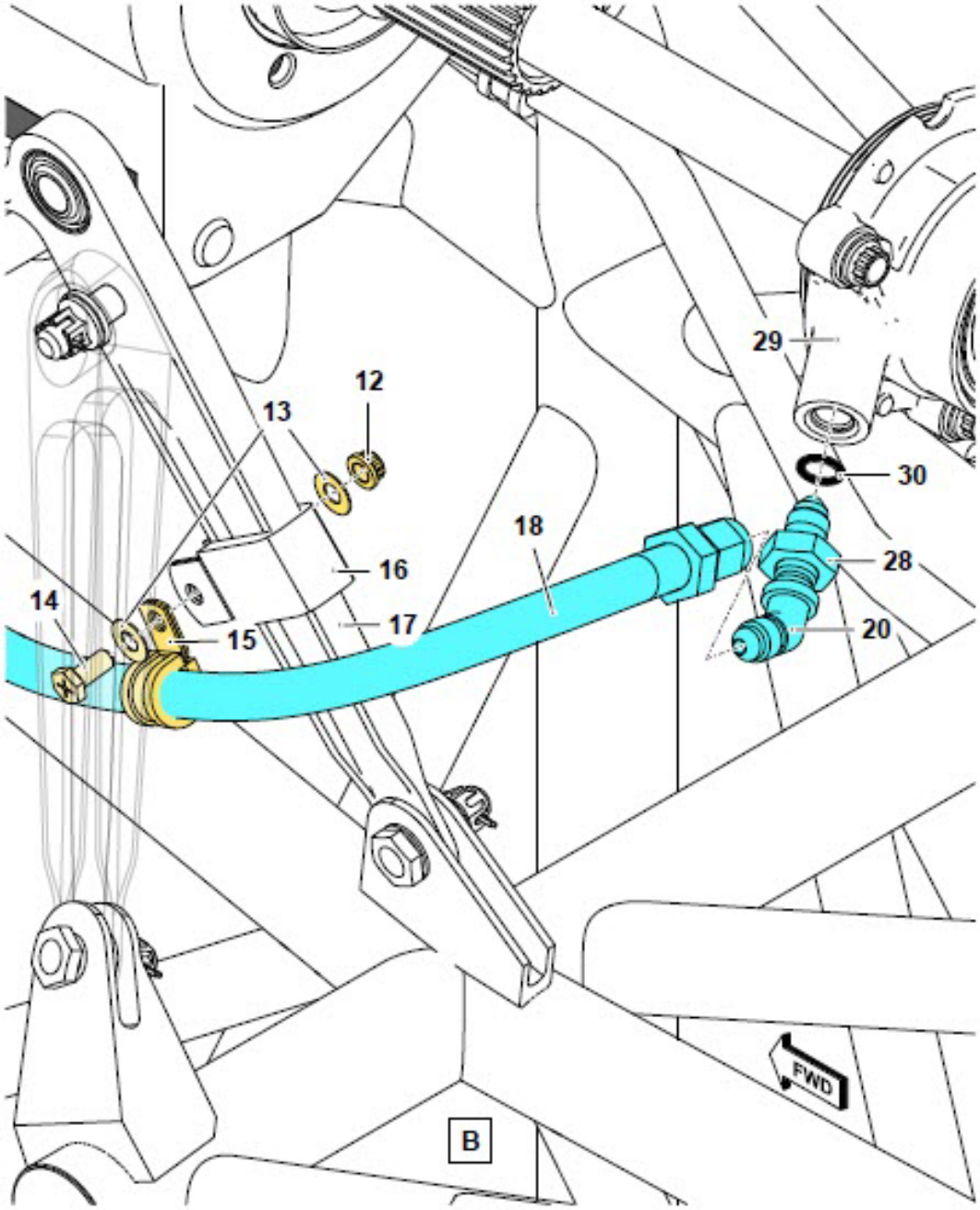

Figure 5 – Freewheel Aft Support Pressure Line