TECHNICAL BULLETIN

Bell Helicopter TEXTRON
A Subsidiary of Textron Inc.

NO 407-99-17

DATE 04-15-99

DATE
REV.

MODELS AFFECTED: 407

SUBJECT: **NEW TAIL ROTOR INSTALLATION 407-012-100-109, INTRODUCTION OF.**

HELICOPTERS AFFECTED: 407, S/N 53000 through 53350.

[Helicopters 53351 and subsequent will have the intent of this bulletin completed before delivery.]

COMPLIANCE: For warranty claims, in the next 300 hours of operation, but not later than 1 October 1999

- NOTE -

Operators of Helicopters 53000 through 53350 that have completed Technical Bulletin 407-98-13 do not need to do PART I of this bulletin.

DESCRIPTION:

Bell helicopter has changed the fixed controls, the tail rotor control system, and the way the tail rotor is installed on the output shaft of the tail rotor gearbox. This change yields more clearance between the tail rotor and the tailboom structure.

PART I gives the instructions to install the pedal stop 407-001-006-101. PART II of this bulletin gives instructions to change the way to install the tail rotor using a new crosshead 407-012-109-101, a new flapping stop 407-012-110-101, a new mast nut 407-012-111-101, and a new pitch horn assembly 407-012-112-101. PART III gives new instructions to rig the tail rotor controls.

APPROVAL:

The engineering design aspects of this bulletin are Transport Canada approved.

MANPOWER:

Approximately 4.0 man-hours are necessary to complete this bulletin. The man-hours are based on hands-on time and can change because of the personnel and available facilities.

7851 60540

WARRANTY:

The parts kit required for accomplishment of this bulletin will be supplied at no cost to the customer. In addition, labor to incorporate this bulletin will be allowed to a maximum of U.S. $220.00.

To receive the parts kit and labor credit:

1. Customers must direct order the parts kit from BHT Ft. Worth. Send your request by facsimile to the special fax number below, referencing the helicopter serial number on which the kit will be installed.

   FAX: 1-817-280-4745

   - NOTE -

   No orders via Coop.

2. The owner/operator must send a completed Malfunction Report (MR) to BHT Warranty Administration within 30 days after completion of this bulletin.

   - NOTE -

   Customers who comply with the instructions in this bulletin after 1 October 1999 are **not** eligible for the special warranty credit provisions listed above.

MATERIAL:

Required Material:

The material that follows is necessary to complete this bulletin and can be procured through your Bell Helicopter Textron Supply Center.

Order **hardware kit CT-407-99-17** that includes the parts that follow:

PART NUMBER	NOMENCLATURE	QUANTITY
407-001-006-101	Stop, Pedal	1 (NOTE 1)
407-012-109-101	Crosshead	1
407-012-110-101	Stop, Flapping	1
407-012-111-101	Nut, Mast	1
407-012-112-101	Pitch Horn Assembly	2 (NOTE 2)
MS20426AD4-9	Rivet, Solid	2 (NOTE 1)

NOTES:

1. Stop 407-001-006-101 and rivets MS20426AD4-9 are used in PART I of this bulletin. If you completed TB 407-98-13, you do not need these.

2. As an alternative, Pitch Horn Assembly 406-012-108-107 can be used.

Consumable Material:

The material that follows is necessary to do this bulletin, however this material is consumable (bench stock) material and does not need ordering depending on the operator consumable stock levels. This material can be obtained through your Bell Helicopter Textron Supply Center.

PART NUMBER	NOMENCLATURE	REF. NO. (NOTE 1)
MIL-G-81322 8OZ	GREASE	C-001
AS100028	LOCKWIRE	C-405
MIL-C-16173,GR2 6OZ	CPC, GRADE 2	C-104
MIL-C-16173,GR1 2OZ	CPC, GRADE 1	C-101
MIL-P-85582TYCL2	PRIMER (PT)	C-026 (NOTE 2)
METHYL ETHYL KETONE	SOLVENT	C-309 (NOTE 3)
ABRASIVE 240 GRIT	ABRASIVE PAPER	S-423 (NOTE 4)

NOTES:

1. The "C" REF. NO. above is a cross-reference found in the Standard Practices Manual.

2. As an alternative use Epoxy Polyamide Primer per MIL-P-23377.

3. Where the use of MEK is not permitted, use RHO SOLV756.

4. For a cross-reference to this REF. NO., consult the SRM, Appendix A4.

SPECIAL TOOLS:

You will need a workaid to help rig the tail rotor controls system. Use the instructions on Figure 5 to make the workaid locally. If you need more information on the workaid, contact Product Support Engineering.

WEIGHT AND BALANCE:

Not affected

ELECTRICAL LOAD DATA:

Not affected.

REFERENCES:

BHT-407-MM-2, Rev. 7, 01 May 1998.

Chapter 18, Vibration Analysis.

BHT-407-MM-7, Rev.6, 14 April 1998.

Chapter 64, Tail Rotor.

BHT-407-MM-8, Rev. 6, 14 April 1998.

Chapter 67, Flight Control System.

PUBLICATIONS AFFECTED:

BHT-407-MM-7.

Chapter 64, Tail Rotor.

BHT-407-MM-8.

Chapter 67, Flight Control System.

BHT-407-IPB

Chapter 64, Tail Rotor.

Chapter 67, Flight Control.

ACCOMPLISHMENT INSTRUCTIONS:

PART I – Modification of the Interconnect Bellcrank Assembly

- NOTE-

Doing PART I of this bulletin accomplishes the same results as TB 407-98-13, dated 12 December 1998. Therefore, if you completed Technical Bulletin 407-98-13, you do not need to do PART I.

1. Remove the interconnect bellcrank (refer to BHT-407-MM, Paragraph 67-102).

2. Install the new stop as follows (refer to Figure 1):

   a. Put the stop (3, Figure 1) on the bellcrank (1). Make sure that the edges (Note 1) on the stop (3) are flush with the related edges on the bellcrank (1).

   b. With the stop in position, make sure that the insert (4) of the stop fits flush into the bellcrank stop radius (Detail A). If the fit is not correct, sand the irregular edges on the stop insert (4) only until you get the correct fit.

   c. Put the stop (3) on the bellcrank (1) per Steps a. and b. above. Clamp the stop (3) to the bellcrank (1). Use the pilot holes in the stop as a guide; drill two No. 40 drill size holes through the bellcrank. Increase the dimension of the two holes to a No. 30 drill size. Drill countersinks for the heads of the rivets on the stop.

   d. Remove the stop (3) and deburr the holes in the stop (3) and the bellcrank (1). Prime all bare material.

- NOTE -

Do not remove the primer.

   e. Clean the faying surfaces of the stop (3) and the bellcrank (1). Make the faying surfaces rough with abrasive cloth (S-423). Use a clean cloth wet with alcohol to clean the stop (3) and bellcrank (1).

   f. Apply adhesive (C-317) to the faying surfaces of the stop (3) and the bellcrank (1). Put the stop (3) per Steps a. and b. above and hold in position. Install the rivets while the adhesive is wet.

   g. Remove the excess adhesive. Allow the adhesive to dry at room temperature for 24 hours.

h. Seal the edges of the stop (3) and the bellcrank (1) with sealant (C-392). Allow sealant to dry at room temperature for 24 hours.

3. Install the interconnect bellcrank (refer to BHT-407-MM, Paragraph 67-104).

4. Put the three temporary revisions that follow – HOVER PERFORMANCE CORRECTION FOR TEMPORARY TAIL ROTOR PEDAL STOP, dated 10 March 1999 – in the Flight Manual:

   a. BHT-407-FM-1.

   b. BHT-407-FMS-3 Particle Separator.

   c. BHT-407-FMS-4 Snow Deflector.

PART II: New Tail Rotor Installation

1. Remove the tail rotor nut (1, Figure 2), the crosshead (3), and the pitch change links (5). Discard the crosshead (3). Keep the tail rotor nut (1), the driver plate (2), the sliding seal (4), the pitch change links (5), and all hardware for subsequent installation. Refer to BHT-407-MM-8, Paragraphs 67-140, 67-144 and 67-148.

2. Remove the tail rotor retainer nut (6), the support (7), hub and blade assembly (8), and the spacer (9). Discard the tail rotor retainer nut (6), the support (7), and the spacer (9). Keep the hub and blade assembly (8) for subsequent installation. Refer to BHT-407-MM-7, Paragraph 64-5.

3. Remove the two pitch horns (11) that are installed on the tail rotor blades and discard them. Refer to BHT-407-MM-7, Paragraph 64-35.

4. Install the new pitch horns (1, Figure 3) on the tail rotor blades. Refer to BHT-407-MM-7, Paragraph 64-39.

5. Identify the tail rotor hub and blade assembly (3) with the correct configuration dash number.

   a. Use a vibrating tool to identify the data plate of the hub and blade assembly. The depth of the vibrotech must not exceed 0.005 inch (0.127 mm).

   Example: 407-012-101-~~109~~-111

6. Install the hub and blade assembly (3) as follows (refer to Figure 3):

   a. Apply a layer of corrosion preventive compound (C-104) to the splines of the support (4) and the gearbox shaft (5).

-NOTE-

Place the stop (4) with the splined end outboard as shown in Figure 3.

b. Install the new stop (4) on the gearbox shaft (5).

c. Apply a layer of corrosion preventive compound (C-104) to the splined trunnion (7) of the hub and blade assembly (3) and the gearbox shaft (5).

d. Install the hub and blade assembly (3) on the gearbox shaft (5).

e. Apply a coat of corrosion preventive compound (C-104) to the threads and mating surface of the retainer nut (6).

f. Install the retainer nut (6) on the gearbox shaft (5).

g. Use the crowfoot and tighten the retainer nut (6) (T).

h. Use lockwire (C-405) and safety the retainer nut (6) to the trunnion (7).

i. Install the crosshead (8) as follows:

1) Put the lip of the sliding seal (9) in the groove of the crosshead (8).

2) Apply a layer of grease (C-001) on the splines of the gearbox shaft (5).

3) Put the crosshead (8) on the gearbox shaft (5).

j. Install the driver plate (10) as follows:

CAUTION

THE RAISED BOSS OF DRIVER PLATE (10) FITS INSIDE THE BORE OF THE CROSSHEAD (8).

1) Put driver plate (10) in position on the crosshead (8).

2) Install the washers (11) and the bolts (12) that hold the driver plate (10) to the crosshead (8).

3) Tighten the bolts (12) (T).

4) Use lockwire (C-405) and safety the bolts (12) together.

5) Install the washer (13) and the nut (14) on the control tube (5).

6) Tighten the nut (14) (T).

7) Use a cotter pin (15) to safety the nut (14).

k. Install the pitch links (16) as follows:

1) Put the pitch link (16) between the pitch horn (1) and the crosshead (8).

2) Install the washer (17) and the bolt (18) that hold the pitch link (16) in the pitch horn (1).

3) Tighten the bolt (18) (T).

4) Safety the bolt (18) with lockwire (C-405).

- NOTE -

Make sure that the bolt head (19) is on the leading side of the crosshead. The bolts must be installed with the head in the direction of rotation of the tail rotor assembly.

5) Install the bolt (19), the washers (20), and the nut (21).

6) Tighten the nut (21) (T).

7) Safety the nut (21) with cotter pin (15).

PART III: New Directional Controls Rigging Procedure

1. Adjust the rigging of the directional controls (refer to Figure 4, Sheet 1) as follows:

- NOTE -

Rig the directional controls with the Hydraulic Boost in the “OFF” position.

1) Do a check of the rigging of the directional controls at four locations. If you need to make adjustments you can use the procedure in the Maintenance Manual, Paragraph 67-94. The rigging procedure is the same except for the changes that follow (refer to Figure 4).

1) Make sure that the directional pedal angle (BHT-407-MM-8, Paragraph 67-94, Step 2 and Figure 67-24, Detail A) is **now 46**° +/- **0.5**° with the stop installed. The value without the stop was 56°. If the dimension is not **46**° +/- **0.5**°, adjust the value.

2) Make sure that the dimension between the floor and the bellcrank (BHT-407-MM-8, Paragraph 67-94, Step 5 and Figure 67-24, Detail B) is **now 2.13 inches** with the stop installed. The value without the stop was 1.79 inches. If the dimension is not **2.13 inches**, adjust the dimension.

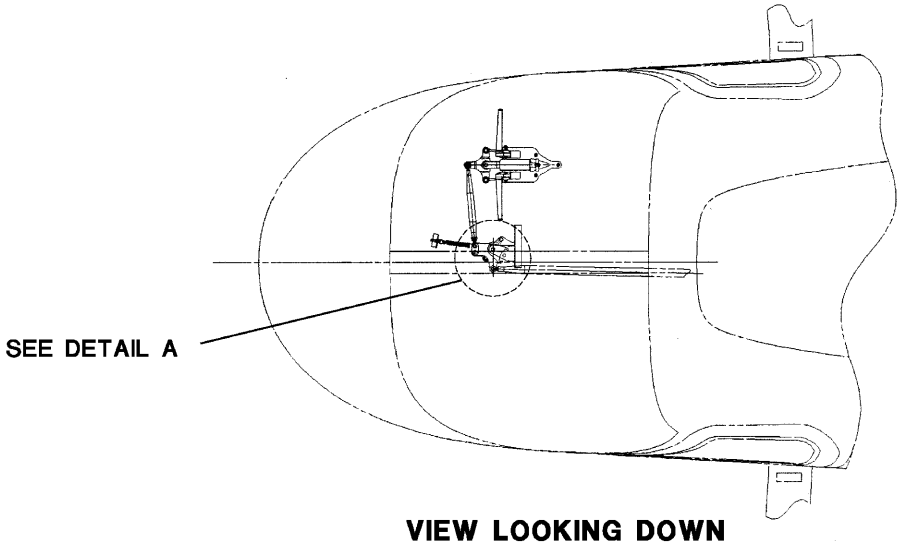
3) Make sure that the dimension between the bellcrank and the aft face of web on the casting (BHT-407-MM-8, Paragraph 67-94, Step 5 and Figure 67-24, Detail C is **now** –**0.35 inch** with the stop installed. The value without the stop was + 0.15 inch. If the dimension is not –**0.35 inch**, adjust the dimension.
4) Install the workaid (Figure 4, Sheet 2) on the tail rotor assembly.

5) Make sure that the mean tail rotor blade angle (BHT-407-MM-8, Paragraph 67-25, view B-B) is **now 18.7° to 19.7**° with the stop installed. The value without the stop was 27.5° to 28.5°. If the mean angle is not **18.7° to 19.7**°, adjust it (refer to BHT-407-MM-8, Paragraph 67-94, Step 18).

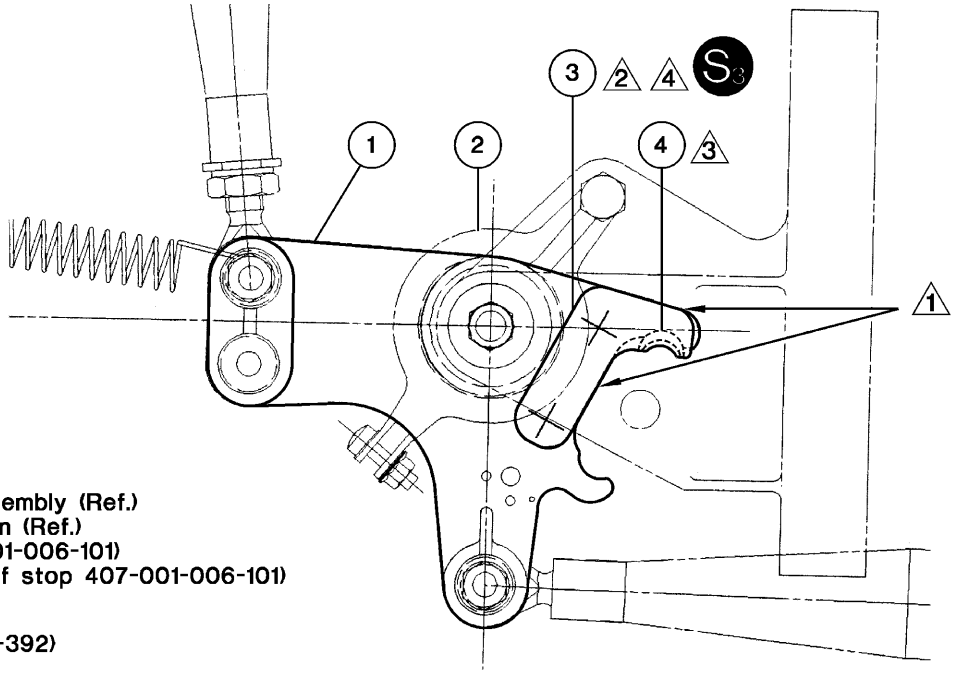
2. Adjust the balance of the tail rotor assembly (Refer to BHT-407-MM, Chapter 18).

3. Make an entry in the helicopter historical record to show that this bulletin is completed.

4. Make an entry in the record of Technical Bulletins in the Maintenance Manual.



VIEW LOOKING DOWN ON HELICOPTER



DETAIL A

LEGEND

1. Bellcrank assembly (Ref.)
2. Clamp, friction (Ref.)
3. Stop (407-001-006-101)
4. Insert (part of stop 407-001-006-101)

S3 SEALANT (C-392)

NOTES

1. Edges of stop (3) must be flush with corresponding edges of the bellcrank.
2. Install stop (3) with adhesive (C-317) and MS20426AD4-9 rivet (2 REQ'D).
3. If fit of stop insert (4) to bellcrank (2) stop radius is not correct, sand the irregular edges on the stop insert (4) only until you get the correct fit.
4. Seal edges of stop (3) and bellcrank (1).

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Figure 1. Modification of the Interconnect Bellcrank Assembly

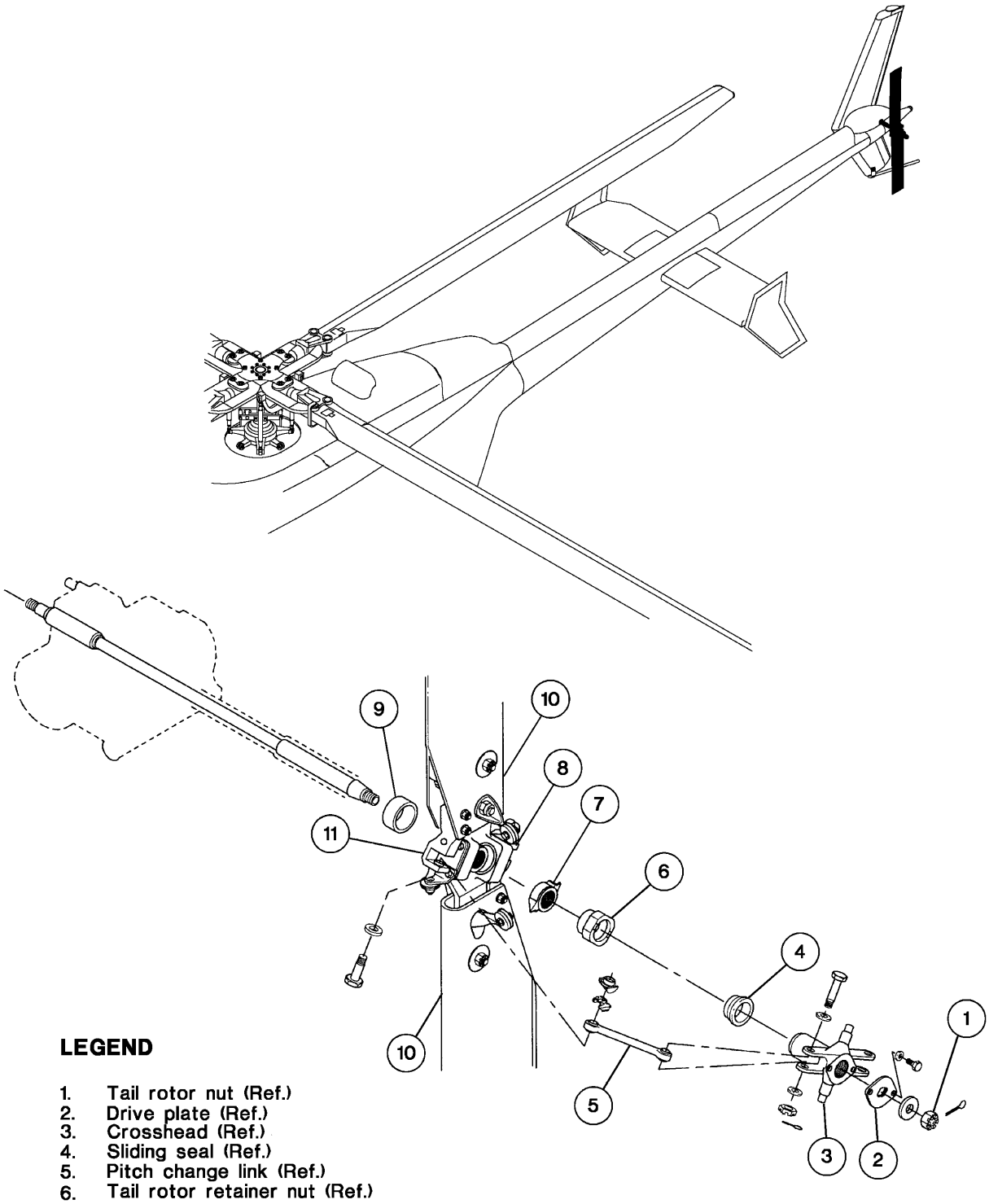
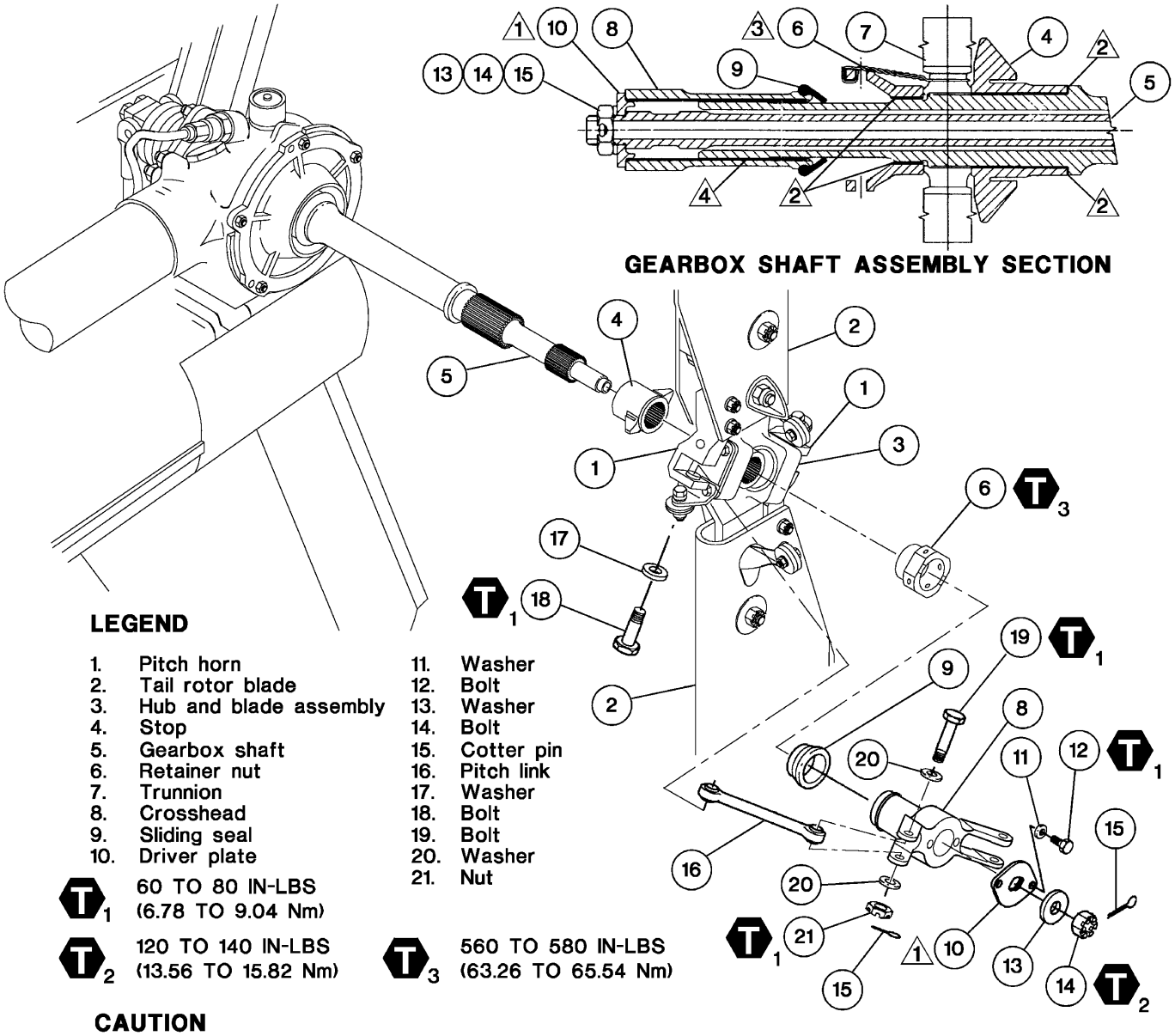


Figure 2. Old Hub and Blade Assembly – Removal/Installation



LEGEND

1. Pitch horn
2. Tail rotor blade
3. Hub and blade assembly
4. Stop
5. Gearbox shaft
6. Retainer nut
7. Trunnion
8. Crosshead
9. Sliding seal
10. Driver plate
11. Washer
12. Bolt
13. Washer
14. Bolt
15. Cotter pin
16. Pitch link
17. Washer
18. Bolt
19. Bolt
20. Washer
21. Nut

T1 60 TO 80 IN-LBS (6.78 TO 9.04 Nm)

T2 120 TO 140 IN-LBS (13.56 TO 15.82 Nm)

T3 560 TO 580 IN-LBS (63.26 TO 65.54 Nm)

CAUTION

△1 THE RAISED BOSS OF DRIVER PLATE (10) FITS INSIDE BORE OF CROSSHEAD (8).

NOTES

△2 Apply corrosion preventive compound (C-104) to noted splines, threads, and faying surfaces at time of assembly.

△3 Safety nut (6) to trunnion (7) with lockwire (C-405).

△4 Apply grease (C-001) to splines of crosshead (8) and gearbox shaft (5).

5. Apply corrosion preventive compound (C-104) on all bolt shanks. After installation and torquing, coat bolt heads, nuts, and washers with corrosion preventive compound (C-101).

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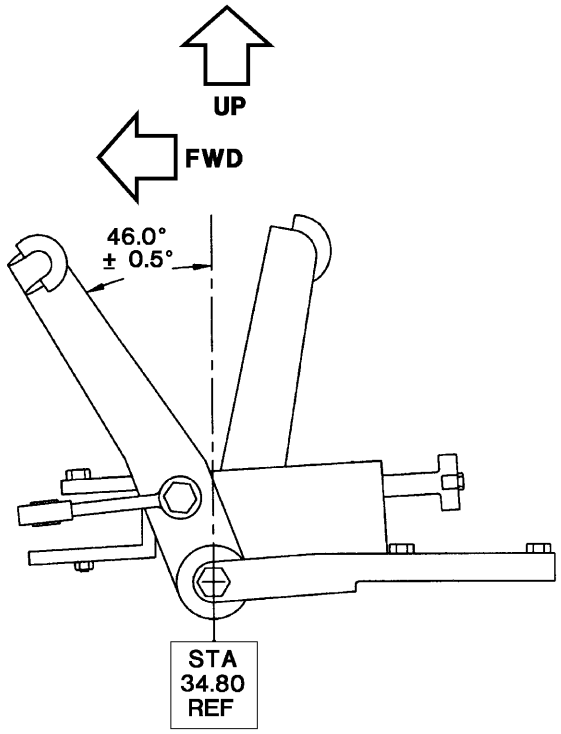
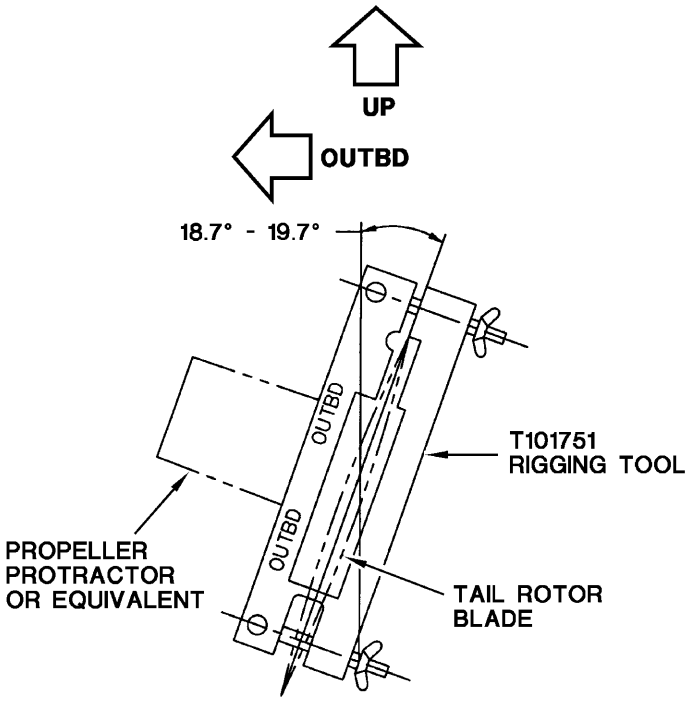
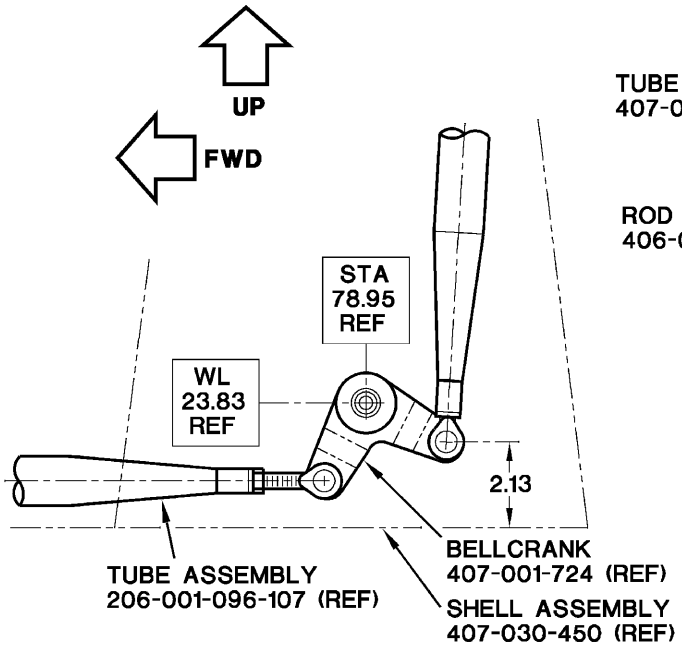
Figure 3. New Hub and Blade Assembly - Removal/Installation



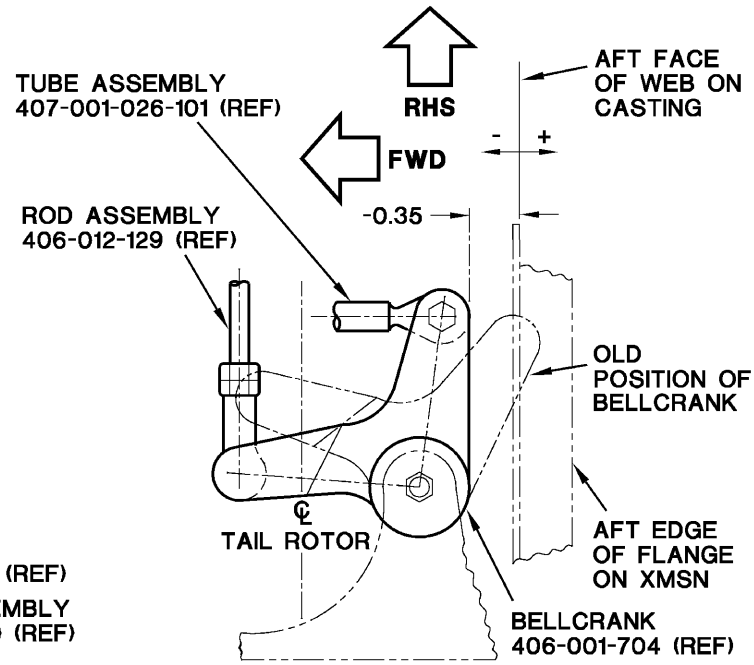
NEW PEDAL ANGLE 46.0° ± 0.5°



VIEW LOOKING FORWARD
NEW T/R BLADE ANGLE 18.7° - 19.7°



BELLCRANK POSITION
LEFT PEDAL FULL FWD



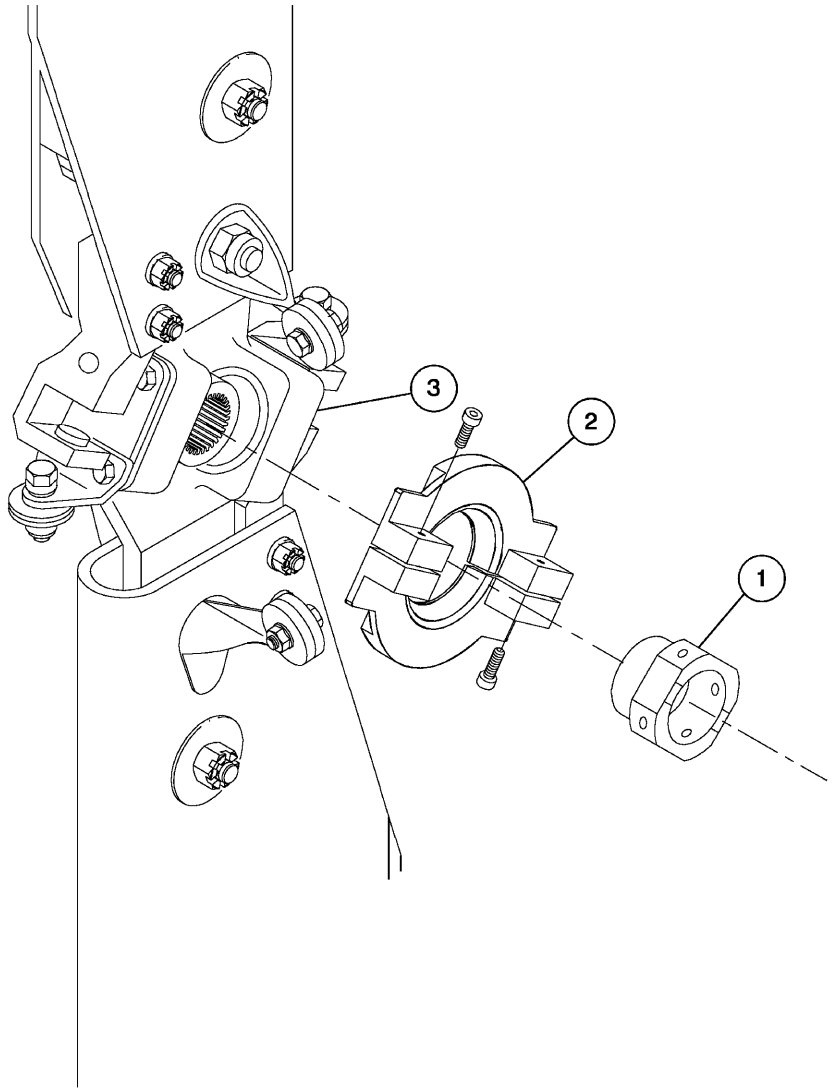
BELLCRANK ORIENTATION

NOTE

All values are given for boost "off" condition.

RTB01103

Figure 4. New Directional Control Rigging Procedure (Sheet 1 of 2)



LEGEND

1. Retainer nut
2. Workaid, tail rotor centering
3. Hub and blade assembly

NOTE

It will be necessary to remove the lockwire that holds the nut (1) to the yoke of the hub and blade assembly (3).
Make sure to install lockwire after you have completed the rigging.

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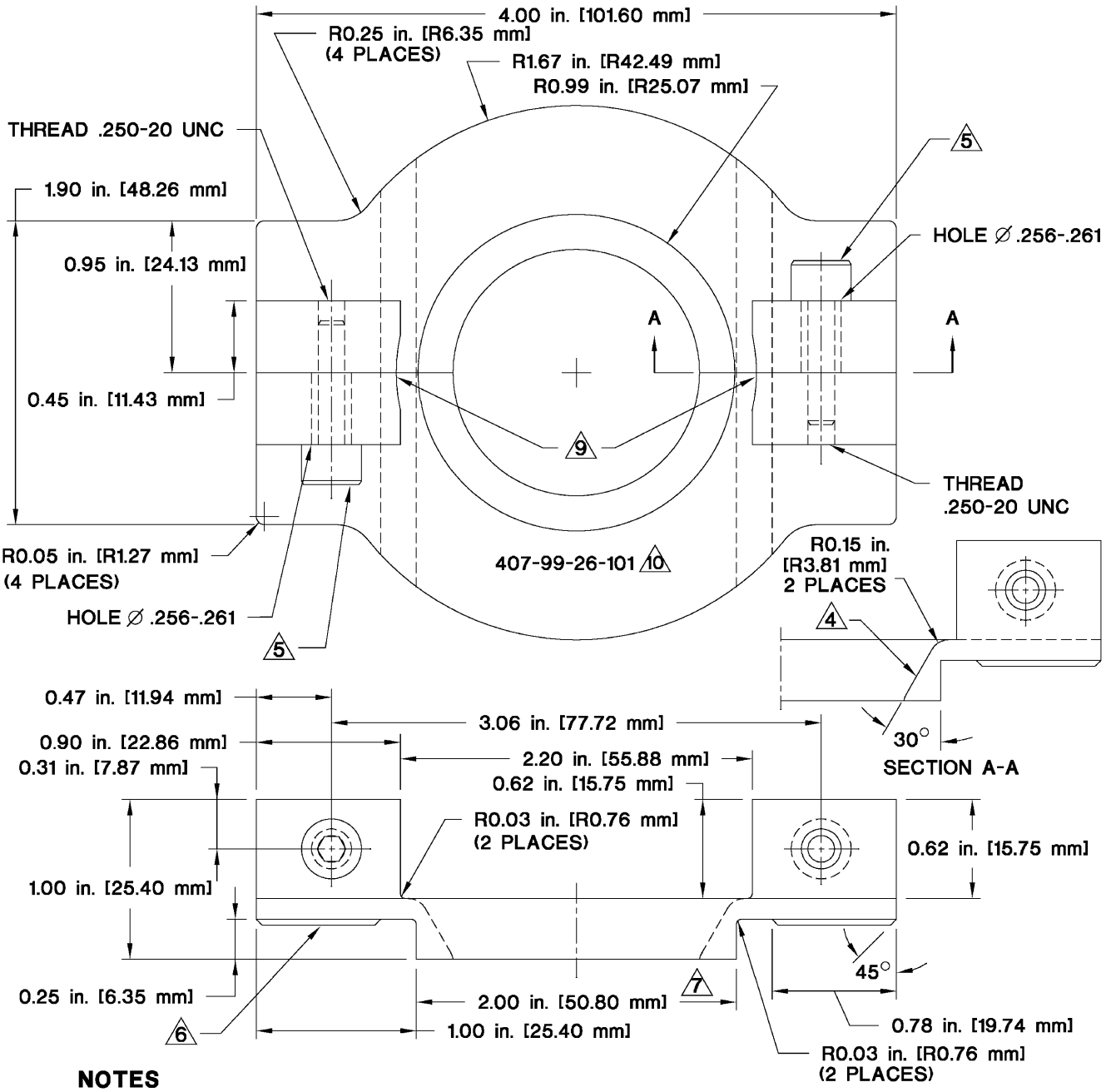
Figure 4. New Directional Control Rigging Procedure (Sheet 2)



NOTES

1. Aluminium (Roll) Stock (or equivalent) 6061-T6, 1.00 inch (25.40 mm) thick.
2. Deburr all sharp edges.
3. Install only as matched set.
4. Cut to fit nut 407-012-111-101.
5. Cap screw NAS1352-4-12, 2 places.
6. Teflon Pad or equivalent, .020 inch thick, 2 places.
7. Width to fit inside yoke on tail rotor hub.
8. Finish: 125 μ inch (3.2 μ meter) RMS.
9. Trim to clear nut 407-012-111-101.
10. Use vibrotech or impression-stamp to identify P/N 407-99-26-101.

RTB01105

Figure 5. Workaid, Tail Rotor Centering