TECHNICAL BULLETIN

Bell Helicopter TEXTRON
A Subsidiary of Textron Inc.

NO 407-99-16

DATE 3-26-99

DATE
REV.

MODELS AFFECTED: 407

SUBJECT: **IMPROVED LOWER CONE SEAT 407-010-107-103, LOWER CONE 407-010-104-109 AND CONE SET 407-010-114-101, INTRODUCTION OF.**

HELICOPTERS AFFECTED: 407, Serial Numbers 53000 through 53066

(Helicopters Serial Number 53067 and subsequent will have the intent of this Technical Bulletin completed before delivery.)

COMPLIANCE: PART I: At the next replacement of the lower cone seat and lower cone.

PART II: At installation of main rotor hub assembly on helicopter.

DESCRIPTION:

PART I of this Technical Bulletin introduces a new lower cone seat, 407-010-107-103, that provides an increase in service life. This new lower cone seat must be used with lower cone, 407-010-104-109.

PART II of this Technical Bulletin includes revised installation instructions of the main rotor hub assembly on the helicopter when lower cone seat, 407-010-107-103, lower cone, 407-010-104-109, and cone set, 407-010-114-101 are used.

APPROVAL :

The engineering design aspects of this Technical Bulletin are Transport Canada approved.

MANPOWER :

No added man-hours are necessary when replacing the old lower cone seat, lower cone and cone set by the new parts.

WARRANTY:

Owners/operators of 407 helicopters that have the lower cone seat, 407-010-107-101, installed on their ship(s) are eligible for a special 100% warranty credit when they purchase the replacement lower cone seat, 407-010-107-103, the lower cone 407-010-104-109 and the attaching hardware.

To receive this credit:

1. The original part(s) must have been used, to within 25 hours of the published life limit for the original part, before they are replaced. Deviations to this requirement must be approved in advance through BHT Warranty Administration (Phone (817) 280-3406, Facsimile (817) 280-8898).

2. The owner/operator must get replacement part(s) from an approved BHTI spares supply source.

3. The work must be done in compliance with the instructions outlined in this Technical Bulletin.

4. The owner/operator must send a completed Malfunction Report (MR) to BHT Warranty Administration within 30 days after the completion of this Technical Bulletin. To complete this Warranty Claim, a copy of the BHTI invoice referencing the replacement parts purchased, must be attached to the Malfunction Report (MR).

MATERIAL:

Required Material:

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

PART I

PART NUMBER	NOMENCLATURE	QUANTITY
407-010-107-103	LOWER CONE SEAT	1

PART II

PART NUMBER	NOMENCLATURE	QUANTITY
407-010-104-109	LOWER CONE	1
407-010-114-101	CONE SET (*)	1
MS21250H04016	BOLTS	8
42FLW-428	NUTS	8
140-007-17S14C4	WASHERS	16

(*) Cones set halves are a matched set and serialized. If the new cone set style, 407-010-114-101, is already installed, replacement may not be needed depending on its condition.

Consumable Material:

PART I

For consumable material required for accomplishment of PART I, refer to BHT-407-CR&O, Chapter 62.

PART II

The material that follows is necessary to complete PART II of this Technical Bulletin. However, this material is consumable and does not require ordering depending on the operator's consumable material stock levels.

This material can be obtained through your Bell Helicopter Textron Supply Center.

PART NUMBER	NOMENCLATURE	REF.NO.
MIL-C-16173,GR1 2OZ	CORROSION PREVENTIVE COMPOUND	C-101
MIL-C-16173,GR2 6OZ	CORROSION PREVENTIVE COMPOUND	C-104
MILS8802CLB2 6OZ	SEALANT (*)	C-308
AS100028	LOCKWIRE	C-405

(*) SEALANT MIL-S-81733, Type II (C-392) may be used as an alternate to MIL-S-8802, Type II, Class B2 (C-308).

SPECIAL TOOLS:

The following tools are used with support, 407-210-002-101:

TORQUE MULTIPLIER	PD2501
DRIVE BAR	PD1471
SOCKET	IM403

OR

TORQUE MULTIPLIER	PD1201
SOCKET	SIM402

WEIGHT AND BALANCE:

Not affected.

ELECTRICAL LOAD DATA:

Not affected.

REFERENCES:

BHT-407-MM-6, Rev.2 - 1 June 1996:

Chapter 62, Main Rotor System.

BHT-407-CR&O, Rev 1, 15 December 1997:

Chapter 62, Main Rotor Hub.

BHT-407-IPB, Rev 3, 16 December 1996:

Chapter 62, Main Rotor.

PUBLICATIONS AFFECTED:

BHT-407-MM-6,Rev. 2, 1 June 1996:

Chapter 62, Main Rotor System.

ACCOMPLISHMENT INSTRUCTIONS:

PART I: Replacement of the Lower Cone Seat.

1. Remove the main rotor blades from the hub. Refer to BHT-407-MM-6, Chapter 62.

2. Remove the main rotor hub assembly from the helicopter. Refer to BHT-407-MM-6, Chapter 62.

3. Remove the lower cone seat, 407-010-107-101, and install the lower cone seat, 407-010-107-103. Refer to BHT-407-CR&O, Chapter 62.

PART II: Installation of Main-Rotor Hub-Assembly.

It is very important that you follow the correct torque sequence. Refer to Figure 2, Detail C.

CAUTION

THE MAIN ROTOR BLADES AND THE HUB COMPONENTS ARE COLOR CODED FOR POSITION. ALL THE COMPONENTS OF ONE COLOR THAT ARE REMOVED MUST BE INSTALLED IN THE SAME COLOR LOCATION.

1. Clean the bolt (3, Figure 1), the washer (4), and the lock (5) with solvent (C-304, BHT-ALL-SPM). Make sure that there is no oil, grease, or corrosion preventive compound on the bolt, washer, and lock.

2. Clean the mast nut lock bolts threaded holes in the hub upper plate (6).

3. Make sure that the lower cone (7, Figure 2) red index mark is correct as follows:

   a) Put the lower cone (7) on a table with the bevelled side down (refer to Detail A).

   b) Align the cone split at the 12 o'clock position. The Red index mark should be at the 11 o'clock position as shown in Detail A.

   c) If there is no index mark, apply red paint at the proper location.

4. Install the lower cone (15, Figure 1) on the mast (13) with bevelled side up.

CAUTION

DO NOT APPLY CORROSION PREVENTIVE COMPOUND (C-104, BHT-ALL-SPM) AND CORROSION PRENVENTIVE COMPOUND (C-101,BHT-ALL-SPM) TO THE METALLIC BEARINGS, ELASTOMERIC BEARINGS, SEALS, TEFLON AND TEFLON COATED PARTS. THE CORROSION PREVENTIVE COMPOUND (C-101 AND C-104) CAUSES DAMAGE TO THE METALLIC BEARINGS, SEALS, TEFLON AND THE TEFLON COATED PARTS.

5. Use a brush to apply a thin layer of corrosion preventive compound (C-104, BHT-ALL-SPM) to the mast (13) and to the inside surface of the cone set (14) as shown in Figure 1. Remove the unwanted corrosion preventive compound with a clean cloth.

- NOTE -

Make sure that the lockwire does not come out of the groove in the center of the cone set and that the twisted end of the lockwire has been pushed into split of cone set.

6. Install the cone set (14, Figure 1) on the mast with the splits at 90 degrees to the master spline. While holding the cone set firmly, install the two wraps of lockwire (C-405, BHT-ALL-SPM) in the cone set groove. Tighten the lockwire to make sure the cone set is attached solidly to the mast. This will prevent the cone set from moving while you install the main rotor hub.

7. Use a brush and apply a thin layer of corrosion preventive compound (C-104, BHT-ALL-SPM) to the outer surface of the center cone set (14) as shown in Figure 1.

8. Install the sling to the upper plate of the main-rotor hub- assembly. Refer to BHT-407-MM-6, Chapter 62, Figure 62-9.

9. Lift the main-rotor hub-assembly (24) and move it above the mast (13).

10. Align the master spline of the main-rotor hub-assembly (24) with the master spline of the mast (13).

- NOTE -

Avoid contact of the main-rotor hub-assembly (24) with the cone set (14) to prevent cone set displacement. If you suspect that this has occured, lift the hub assembly and repeat Steps 6 to 10.

11. Slowly lower the main-rotor hub-assembly (24) to the mast (13). While you lower it, hold the lower cone seat and mast stable so that the hub does not move and contact the cone set, until the hub sits on the cone set.

12. Remove the sling from the hub upper plate. Refer to BHT-407-MM-6, Chapter 62, Figure 62-9.

13. Apply a thin layer of corrosion preventive compound (C-104, BHT-ALL-SPM) on the grip portion of bolts (3, Figure 2) and on the washers (4). Do not let the corrosion peventive compound (C-104, BHT-ALL-SPM) get on the threaded portion of the bolts (3). Remove the excess corrosion preventive compound with clean cloth.

CAUTION

MAKE SURE THAT THERE IS NO CORROSION PREVENTIVE COMPOUND (C-104, BHT-ALL-SPM) ON THE LINER OF THE LOWER CONE (7). THE CORROSION PREVENTIVE COMPOUND (C-104, BHT-ALL-SPM) CAUSES DAMAGE TO THE LINER.

14. Apply a thin layer of the corrosion preventive compound (C-104, BHT-ALL-SPM) to the outside (bevelled) surface of the lower cone (7).

- NOTE -

Make sure the red index mark on the lower cone (7, Figure 2) is aligned with the center line of the red blade (refer to Figure 2, Detail C).

15. Use the bolts (3), washers (4), and nuts (5) to install the lower cone (7, Figure 2). Do not tighten nuts (5) at this time.

16. Apply corrosion preventive compound (C-104, BHT-ALL-SPM) to the entire surface of the upper cone (2, Figure 1) and install it on the main-rotor hub-assembly (24).

17. Put the mast nut (4, Figure 3) on the mast.

- NOTE -

A 3/4 inch (19.05 mm) drive torque wrench (1, Figure 3) with a minimum 1000 ft-LBS (1360 Nm) capacity can be used to install the mast nut (4). This is an alternate to the torque multiplier (2) used with the support, 407-210-002-101, (3). Make sure the correct type 1.25 inch (31.7 mm) socket is used. The socket must be capable of a minimum of 1000 ft-LBS (1360 Nm) torque.

18. Install the torque multiplier (2, Figure 3) and the support, 407-210-002-101, (3) on the upper plate assembly (5).

19. Tighten the mast nut (4) (T) on the mast.

- NOTE -

It is very important that you follow the correct torque sequence when you tighten the nuts (5, Figure 2). Even though there are provisions for safetying the heads of the bolts (3) no lockwire is needed.

20. Tighten the nuts (5, Figure 2) on the lower cone (7) as follows:

    a) Tighten the nuts (5) in sequence to 30 in-LBS (3.4 Nm). Do the sequence again until the nuts do not turn at 30 in-LBS (3.4 Nm) of torque.

    b) Continue to tighten the lower cone nuts (5) in 20 in-LBS (2.3 Nm) increments in numbered sequence as shown in Figure 2, Detail C. Do the sequence again for every torque increment until the nuts stop turning. Follow this procedure until you reach the final torque.

21. Using a feeler gauge, measure the space between the lower cone (7, Figure 2) and the lower cone seat (2) at each bolt's location. The measurements must be within 0.010 inch (0.25 mm) of each other (refer to Figure 2, Detail B).

22. Remove the torque multiplier (2, Figure 3) and the support, 407-210-002-101 (3).

23. Install the lock (5, Figure 1) and attach with the washers (4) and bolts (3).

24. Tighten the bolts (3) (T), and safety with the lockwire (C-405, BHT-ALL-SPM)

- NOTE -

Do not install the FRAHM assembly (2, Figure 4) and the cover (1) at this time. This will make it easy for the pecial inspection torque checks. Refer to BHT-407-MM-1, Chapter 5.

25. Attach the top plate (6, Figure 1) to the dampers (8) with the washers and nuts. Refer to Figure 1, Detail A and Note 1.

26. Attach the pitch links (16, Figure 1) to the pitch horn (17) with the bolts (10), floating bushing (11), washer (12), and the nuts (18).

27. Safety the nuts (18) with the cotter pins (19).

28. Install the main-rotor blades on the hub. Refer to BHT-407-MM-6, Chapter 62.

CAUTION

DO NOT FLY THE HELICOPTER WITHOUT FRAHM DAMPER AND COVER INSTALLED.

29. Install RADS equipment. Do a ground run and on Initial Mode, work the main rotor track and balance vibrations. Refer to BHT-407-MM-2, Chapter 18.

30. When you are satisfied with the main rotor vibration levels in Initial Mode, do the special inspection torque checks (refer to BHT-407-MM-1, Chapter 5, Paragragh 5-20).

31. Install the FRAHM assembly (2, Figure 4) and the cover (1). Refer to BHT-407-MM-6, Chapter 62.

32. Continue to work main rotor vibrations in Flight Mode. Refer to BHT-407-MM-2, Chapter 18. When you are satisfied with the main rotor vibration levels, do the special inspections torque checks. Refer to BHT-407-MM-1, Chapter 5.

- NOTE -

Make sure the passageway in the cone split (Figure 2, Detail B) is open.

33. Apply the sealing compound (C-308, BHT-ALL-SPM) as follows:

    a) Apply a layer of sealing compound (C-308, BHT-ALL-SPM) in the space between the lower cone (7, Figure 2, Detail B) and the lower cone seat (2).

b) Apply a layer of sealing compound (C-308, BHT-ALL-SPM) in the space between the lower cone (7) and the mast (6).

c) Apply a layer of sealing compound (C-308, BHT-ALL-SPM) around the mating lines of the mast nut (1, Figure 1), the upper cone (2) and the upper plate (6). Cover upper cone (2) completely.

34. Apply a layer of corrosion preventive compound (C-101, BHT-ALL-SPM) on the exposed bolt heads, threads and nuts.

35. Make an entry in the helicopter historical record to show that this Technical Bulletin is completed.

36. Make an entry in the record of Technical Bulletin in the Maintenance Manual.

37. Return the helicopter to service.

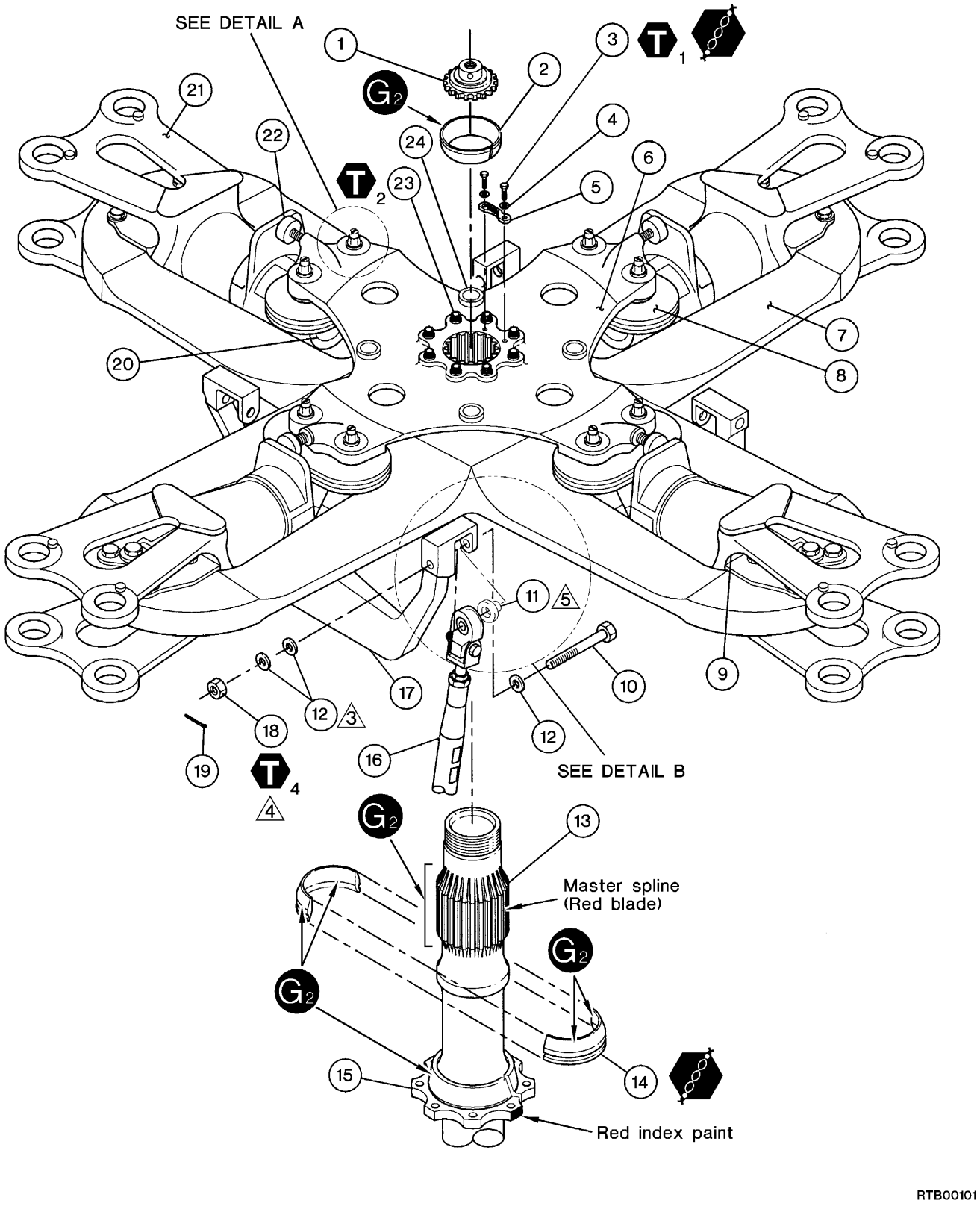
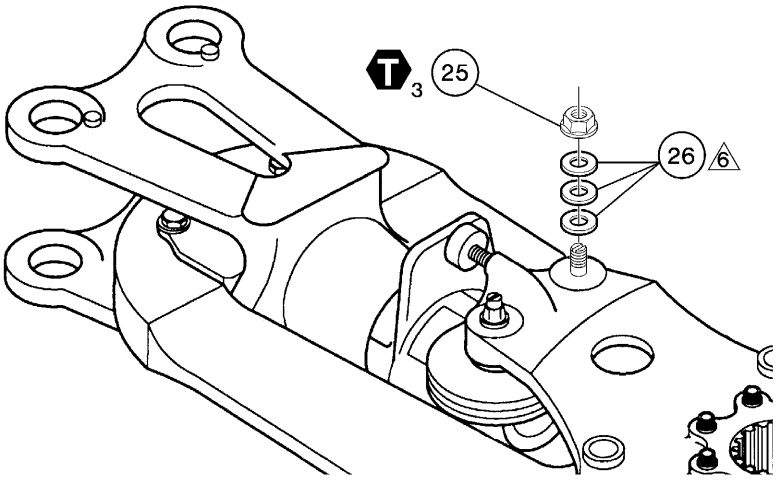
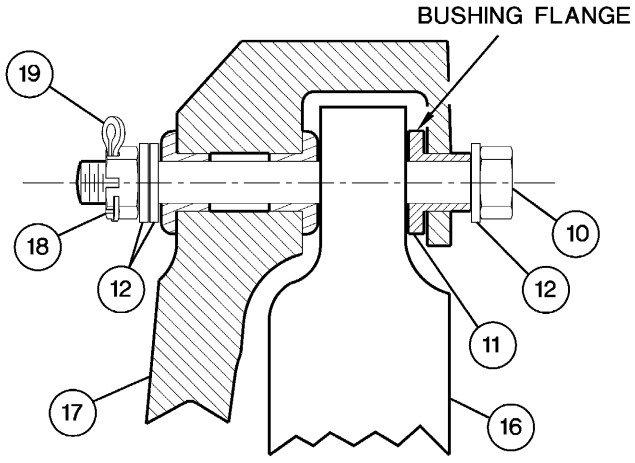


Figure 1. Main Rotor Hub Assembly (Sheet 1)



DETAIL A



DETAIL B

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Figure 1. Main Rotor Hub Assembly (Sheet 2)

LEGEND

1. Mast nut
2. Upper cone
3. Bolt
4. Washer
5. Lock
6. Upper plate
7. Yoke
8. Damper
9. Elastomeric lead-lag bearing
10. Bolt
11. Floating bushing
12. Washer
13. Mast
14. Center cone set
15. Lower cone
16. Pitch link
17. Pitch horn
18. Nut
19. Cotter pin
20. Elastomeric shear bearing
21. Main rotor blade grips
22. Droop stop
23. Bolt
24. Main rotor hub
25. Nut
26. Washer

T_1 60 TO 80 IN-LBS (6.8 TO 9.0 Nm)

T_2 58 TO 62 FT-LBS (78. TO 84.1 Nm)

T_3 75 TO 95 IN-LBS (8.5 TO 10.7 Nm)

T_4 90 TO 110 IN-LBS (10.2 TO 12.4 Nm)

G_2 MIL-C-16173 GRADE 2 (C-104)

LOCKWIRE (C-405)

NOTES

1. The recommended installation torque range and maximum permitted torque are given. Add the tare torque to the given torque value.
2. Before you install the bolt, apply corrosion preventive compound (C-104, BHT-ALL-SPM) to the bolt shank only. Remove all unwanted compound. After you install the bolt and tighten and safety the nut, apply corrosion preventive compound (C-101, BHT-ALL-SPM) to the bolt head and nut. Refer to BHT-407-MM-8, Paragraph 67-9.

△3 When you torque the nut, make sure you can align it for the installation of the cotter pin. To prevent the nut from becomming thread bound on the bolt shank, you can use a quantity of two washers under the nut. The washer under the nut can be a thick (NAS1149F0563P) or a thin (NAS1149F0532P). You must always put the thin washer next to the nut.

△4 You can damage the nut if you torque the nut more than the given values while you align it for the cotter pin. Replace the nut if you think it is damaged.

△5 Make sure that the floating bushing (Item 11, Figure 1) is installed with the flange against the pitch link.

△6 Use the washers, P/N NAS1149F0663P or AN960-616, on the unthreaded portion of the stud. Use the washers, P/N NAS1149F0563P or AN960-516, on the threaded portion of the stud. The washer quantity is as required.

RTB00107

Figure 1. Main Rotor Hub Assembly (Sheet 3)

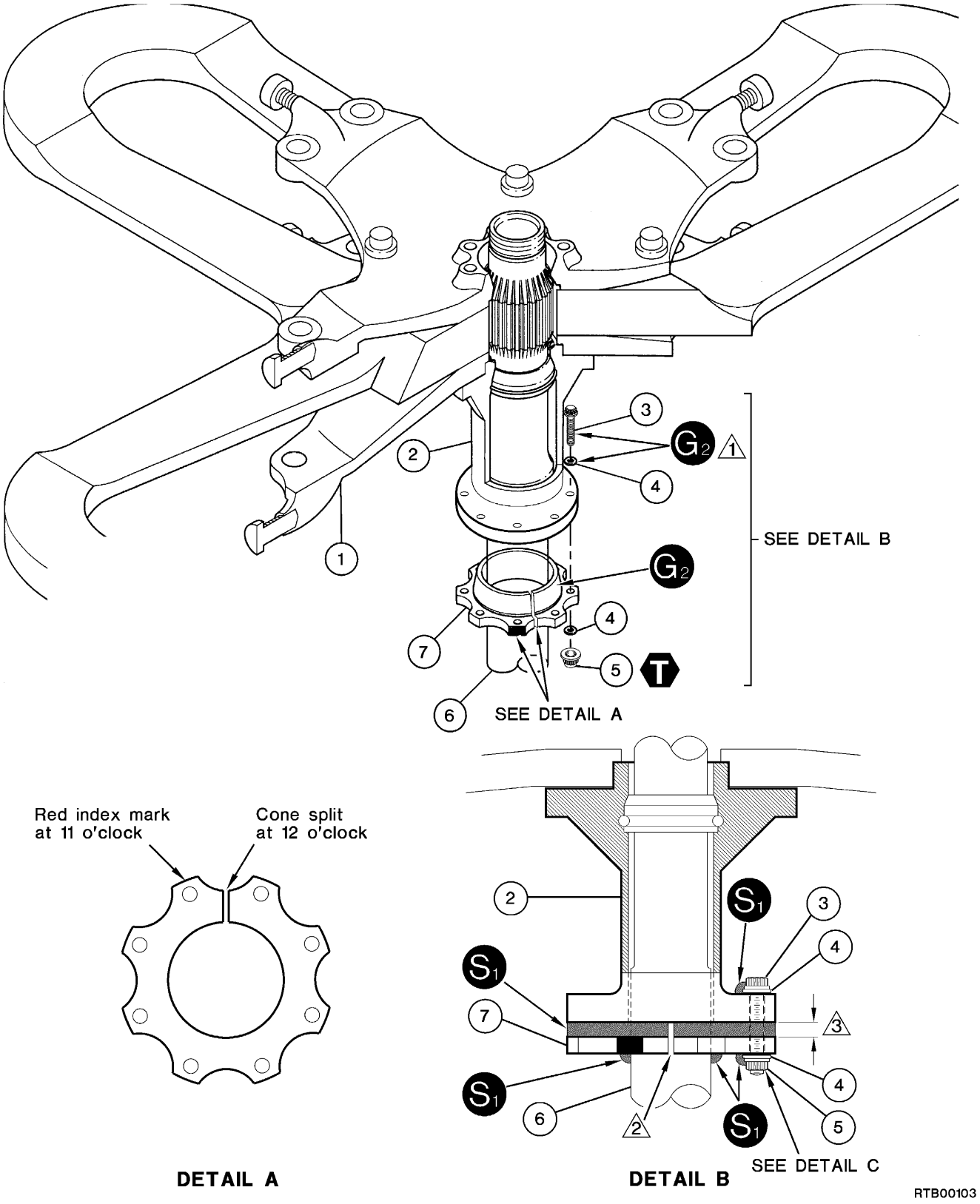
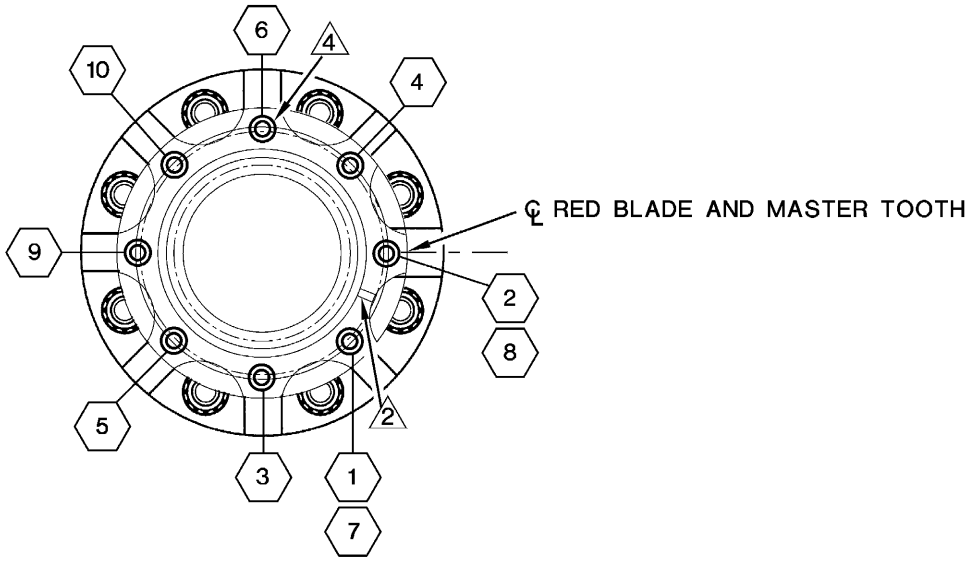


Figure 2. Main Rotor Hub, Center Cone Set, Seat and Lower Cone (Sheet 1)



DETAIL C
TORQUE SEQUENCE

LEGEND

1. Lower plate
2. Lower cone seat
3. Bolt
4. Washer
5. Nut
6. Mast
7. Lower cone

T — 85 TO 105 IN-LBS (9.6 TO 11.9 Nm)

G2 — MIL-C-16173 GRADE 2 (C-104)

S1 — MIL-S-8802 TYPE 2 CL82 (C-308)

NOTES

1. Apply corrosion preventive (C-104) on the bolt shank only and the washer.
2. The cone split must remain open after installation is complete, to allow the moisture to drain.
3. The final measurement must be within 0.010 inch (0.25 mm) of each other.
4. Even though there are provisions for safetying the heads of the bolts (3), no lockwire is needed.

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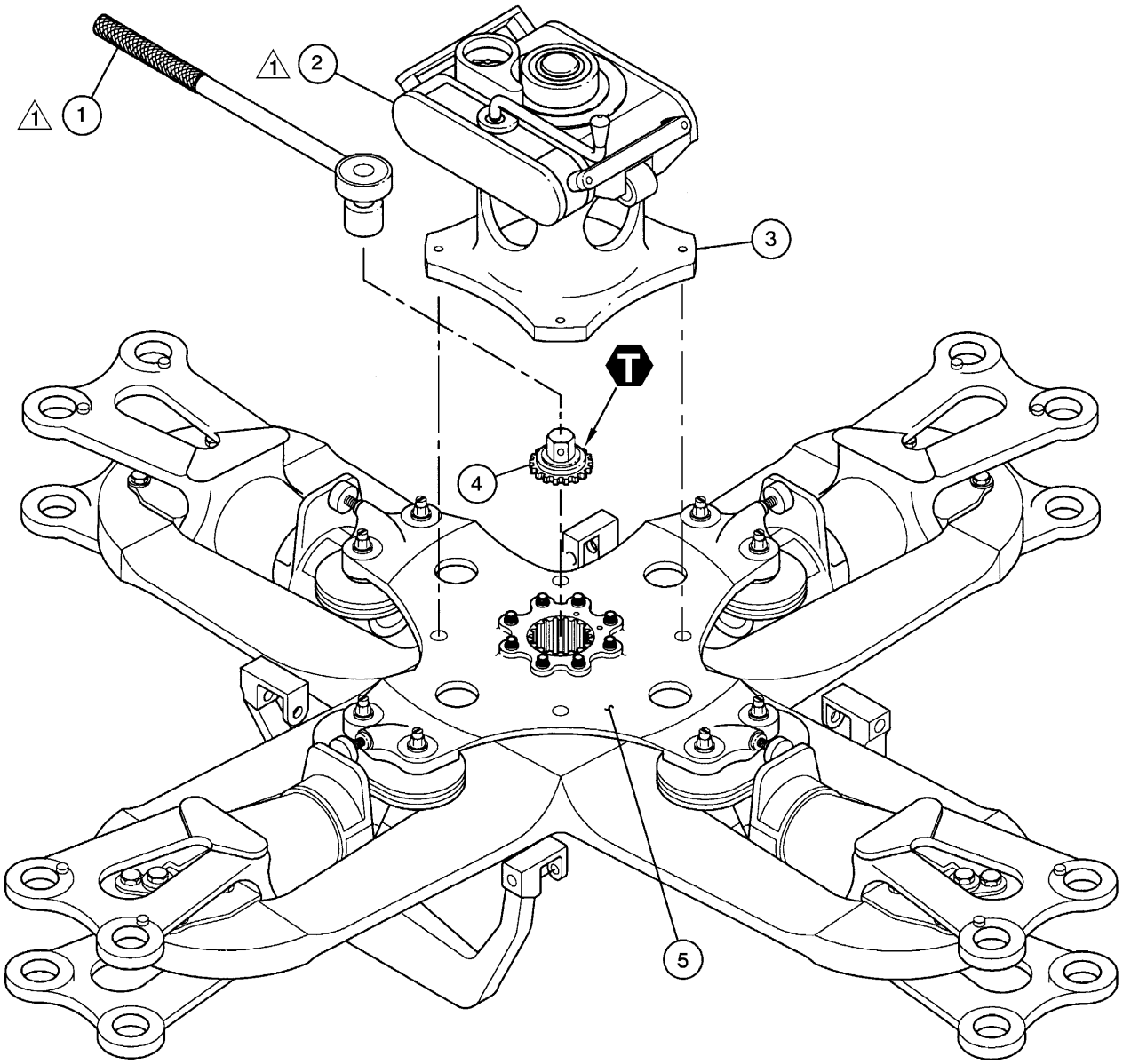
Figure 2. Main Rotor Hub, Center Cone Set, Seat and Lower Cone (Sheet 2)



LEGEND

1. Torque wrench
2. Torque multiplier
3. Support 407-210-002-101
4. Mast nut
5. Upper plate

T 650 TO 700 FT-LBS (881.3 TO 949.1 Nm)

NOTE

1 A 3/4 inch (19.05 mm) drive torque wrench or breaker bar can be used instead of the torque mutiplier. Both must be able to supply 1000 ft-lbs (1360 Nm) of torque.

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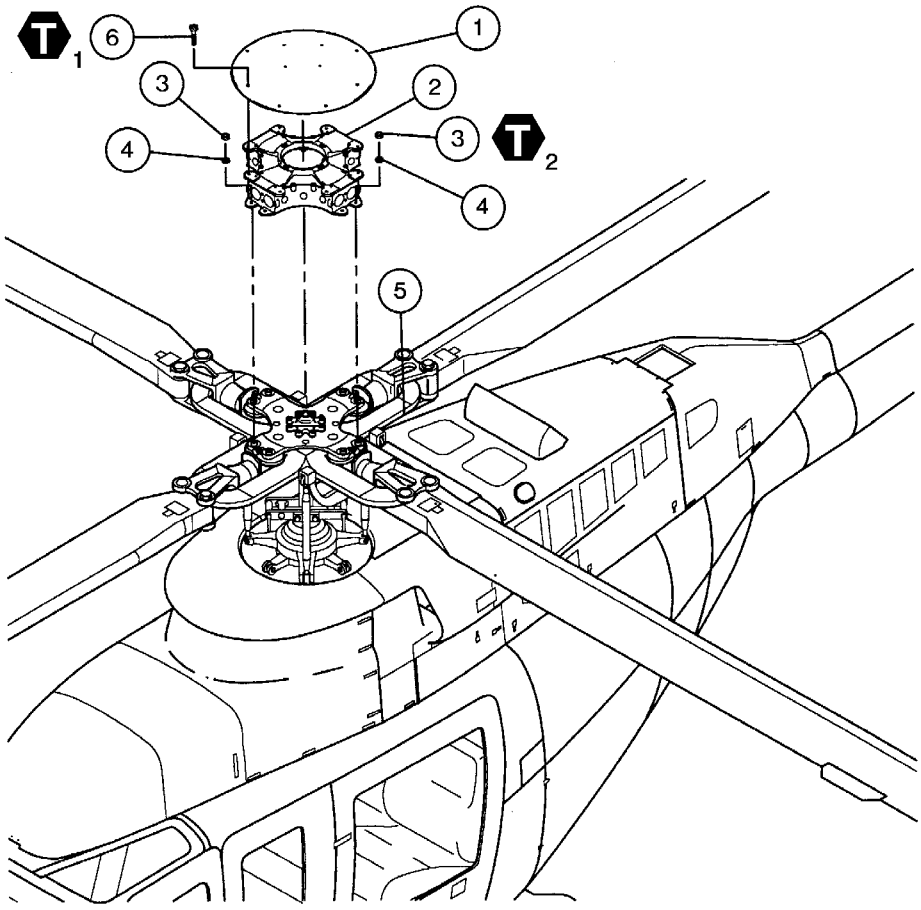
Figure 3. Mast Nut - Installation



LEGEND

1. Cover
2. Frahm assembly
3. Nut
4. Washer
5. Main rotor hub assembly
6. Screw

T1 140 IN-LBS (15.8 Nm)

T2 75 TO 95 IN-LBS (8.5 TO 10.7 Nm)

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Figure 4. FRAHM Assembly - Installation