

ALERT SERVICE BULLETIN

Bell Helicopter **TEXTRON**

A Subsidiary of Textron Inc.

NO. 407-02-56

DATE December 5, 2002

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DATE
REV

MODEL AFFECTED: 407

SUBJECT: TAIL ROTOR BLADES 407-016-001-101 and 406-016-100-119 ONE TIME LEAK CHECK

HELICOPTERS AFFECTED: 407

Tail rotor blade **407-016-001-101**, all serial numbers.

Tail rotor blade **406-016-100-119** serial numbers:

A-1427 through A-2538, A-2540 through A-2603, A-2605 through A-2986, A-2988 through A-2996, A-2998 through A-3005, A-3007 through A-3010, A-3014, A-3015, A-3018, A-3026, A-3029 and A-3035.

[Tail rotor blade **406-016-100-119** serial numbers: A-2539, A-2604, A-2987, A-2997, A-3006, A-3011 through 3013, A-3016, A-3017, A-3019 through A-3025, A-3027, A-3028, A-3030 through A-3034 and A-3036 and subsequent have the intent of this Alert Service Bulletin accomplished prior to delivery.]

COMPLIANCE: PART I: Immediately upon receipt of this bulletin, identify the affected tail rotor blades by serial number affected.

PART II: For new or used uninstalled tail rotor blades that are affected by this bulletin, do PART II c. of this bulletin prior to installation on a helicopter.

For affected tail rotor blades installed on a helicopter do PART II of this bulletin within the next 100 flight-hours or 60 days after receipt of this bulletin which ever comes first, or before next flight if an excessive tail rotor vibration is reported by the pilot.

PART III and PART IV: As directed by PART II c.

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DESCRIPTION:

Bell Helicopter has received reports of a significant increase in tail rotor vibration level recorded during scheduled tail rotor balance checks. It was found that the vibration increase was due to water entering in one of the tail rotor blades.

This situation, if not remedied, can degrade and result in severe vibration that may affect the tail rotor gearbox attachment integrity.

PART I of the ACCOMPLISHMENT INSTRUCTIONS requires the identification of the affected tail rotor blades.

PART II a. of the ACCOMPLISHMENT INSTRUCTIONS requires the inspection of the affected tail rotor hub and blade assembly for serviceability.

PART II b. of the ACCOMPLISHMENT INSTRUCTIONS requires a one time dynamic balance check of the affected tail rotor blades.

PART II c. of the ACCOMPLISHMENT INSTRUCTIONS requires a leak check of all affected tail rotor blades.

PART III of the ACCOMPLISHMENT INSTRUCTIONS provides instruction to repair the blade if found with a leak.

PART IV of the ACCOMPLISHMENT INSTRUCTIONS requires dynamic balance of the tail rotor assembly.

APPROVAL:

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

MANPOWER:

PART I: Approximately 0.5 man-hour per aircraft is necessary to complete PART I of this Alert Service Bulletin.

PART II: Approximately 3 man-hours per aircraft are necessary to complete PART II of this Alert Service Bulletin.

PART III: Approximately 2 man-hours per blade are necessary to complete PART III of this Alert Service Bulletin.

PART IV: Approximately 2 man-hours are necessary to complete PART IV of this Alert Service Bulletin.

Estimated man-hours are based on hands-on time, and may vary with personnel and facilities available.

MATERIAL:

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 Helicopter Textron Supply Center.

<u>Part Number</u>	<u>Nomenclature</u>	<u>Quantity</u>	<u>Reference</u>
MILC87936TYI 5GAL	Detergent (1)	As required	C-318
AMS-S-8802 6OZ	Sealant (2) (3)	As required	C-308
299-947-100T2CL3 50G	Adhesive (4)	As required	C-363
MILC85285,TYI,37038	Paint (lusterless black)	As required	C-245
MILC85285TYI-27925	Paint (semi-gloss white)	As required	C-245

Note:

1. Detergent MIL-C-87936 is an alternate to detergent MIL-C-87937.
2. AMS-S-8802 is the new designation for MIL-S-8802.
3. The AMS-S-8802 sealant is used to repair the blade root end cuff.
4. The 299-947-100T2CL3 adhesive is used to repair the exterior surface of the blade where smooth finish is required.

SPECIAL TOOLS:

1. Waterproof insulated gloves.
2. Water tank having dimensions of 18 inches wide by 36 inches long by 18 inches deep or equivalent.

WEIGHT AND BALANCE:

Not affected.

ELECTRICAL LOAD DATA:

Not affected

REFERENCES:

BHT-407-MM Maintenance Manual
BHT-407-CR&O

PUBLICATIONS AFFECTED:

None affected

ACCOMPLISHMENT INSTRUCTIONS:

PART I: Identification of affected tail rotor blades

1. For tail rotor blades installed on a helicopter that are affected do PART II.
2. For tail rotor blades installed on a helicopter that are not affected make an entry in the tail rotor blade and the helicopter Historical Records to show that this bulletin has been accomplished.
3. For uninstalled tail rotor blades that are affected do PART II c.
4. For uninstalled tail rotor blades that are not affected make an entry in the tail rotor blade Historical Record to show that this bulletin has been accomplished.

PART II a.: Inspection of the tail rotor hub and blade assembly for serviceability

1. Inspect tail rotor hub and blade assembly for any defect or damage that could affect the tail rotor balance.
2. Pay particular attention to the tail rotor yoke pitch change bearings for excessive axial play. If axial play exceeds 0.015 inch, replace bearings. Refer to the BHT-407-CR&O.
3. Inspect elastomeric flapping bearing for condition. Replace defective flapping bearing. Refer to the BHT-407-CR&O.
4. Inspect tail rotor pitch change links bearings for excessive axial play. If bearing axial play exceeds 0.020 inch replace pitch change link. Refer to the BHT-407-MM-8.
5. Record the total amount of spanwise balance weight installed on the blade bolts. Refer to TABLE 1.

TABLE 1 –Total balance weight-

OUTBOARD BLADE BOLT		INBOARD BLADE BOLT		BALANCE WEIGHTS	
P/N	Weight above basic bolt (grams)	P/N	Weight above basic bolt (grams)	P/N	Weight (grams)
NAS6606D30	Basic	NAS6606D36	Basic	NAS1149F0632P	0.7
NAS6606D31	0.4	NAS6606D37	0.9	NAS1149F0663P	1.4
NAS6606D32	1.6	NAS6606D38	1.7	AN970-6	14.9
NAS6606D33	2.5	NAS6606D39	2.7		
NAS6606D34	3.3				
NAS6606D35	4.2				
NAS6606D36	5.1				
NAS6606D37	6.0				
NAS6606D38	6.8				

Note:

To obtain the total amount of spanwise balance weight installed add the weight of all balance weights and the total weight above the basic bolt for the inboard and the outboard bolts.

Example:

Outboard blade bolt: NAS6606D34 (3.3 grams)

Inboard blade bolt: NAS6606D37 (0.9 grams)

Balance weights: Two NAS1149F0663P (2.8 grams) and one AN970-6 (14.9 grams)

The total spanwise balance weight to record is 21.9 grams. This number will be used to determine the action to take in Table 2.

PART II b.: Tail rotor assembly dynamic balance check**-NOTE-**

The tail rotor assembly dynamic balance check must be performed with the RADS-AT.

1. Install the RADS-AT and verify the dynamic balance of the tail rotor assembly. Refer to the BHT-407-MM-2.
2. Record the tail rotor assembly vibration level. Do not balance tail rotor assembly at this time.

PART II c.: Tail rotor blade leak check

1. Prior to removal and disassembly of the tail rotor blade assembly, index the tail rotor hub and blade assembly components to ensure reinstallation at the original location.
2. Remove the tail rotor blade assembly from the helicopter and disassemble. Refer to the BHT-407-MM-7.
3. Thoroughly clean the blade including the surfaces of the root end cuff (Figure 1) with detergent (C-318). Rinse with clear water.
4. Wipe the blade dry and perform a thorough inspection of the blade. Look for any pin hole or bond line separation that could be the potential for water entry. Pay particular attention in the root end cuff and around the leading edge drain hole (Figure 1).
5. Note any suspect areas that may require particular attention.
6. Cool the blades in a refrigerator for a minimum of 1 hour at a temperature of -1°C to 7°C (30°F to 45°F).
7. Fill the water tank with clean clear water. For best results the water should be maintained at 60°C to 80°C (140°F to 175°F).
8. Wearing protective gloves, place the cool blade into the heated water. The blade will float so it will be necessary to manually submerge the blade.

-NOTE-

Be careful not to misinterpret random trapped surface air bubbles as a leak point.

9. Slightly rotate the blade back and forth about the blade pitch change axis to allow any air trapped on the blade surfaces to be expelled.

-NOTE-

It may take several seconds before the air is forced out through any existing leak path.

10. With the blade under water, check for air leaks that will be indicated by a steady stream of fine bubbles originating from a single point.

11. Gently rotate blade back and forth to allow a thorough inspection of all the blade surfaces. Pay particular attention to the root end cuff and around the leading edge drain hole. Refer to the Figure 1.

CAUTION

Do not submerge the blade in water for more than 2 minutes. Maintaining the blade in water for more than 2 minutes could allow water to enter the blade if a leak path is present.

12. The blade should be left in hot water for a minimum of 1 minute and a maximum of 2 minutes.
13. If an air leak is found on a new uninstalled blade do PART III.
14. If an air leak is found on a used uninstalled tail rotor blade send the tail rotor blade to a Bell Helicopter Approved Blade Repair Facility for evaluation and repair.
15. If no air leak is found on a new or used uninstalled tail rotor blade the tail rotor blade is acceptable to release from this inspection procedure. Make an entry in the tail rotor blade Historical Record to show that this Alert Service Bulletin has been completed.
16. If an air leak is found on a tail rotor blade that was installed on a helicopter refer to TABLE 2 to determine the next action.
17. If no air leak is found on a tail rotor blade that was installed on a helicopter the blade is serviceable. Refer to TABLE 2 to determine the next action.

PART III: Blade repair

1. Repair any defect located in the blade root end cuff as follows:
 - a. Thoroughly clean the area around the leak point using aliphatic naphtha solvent (C-305). Do not allow solvent to enter the leak point. Wipe dry with a clean lint-free cloth.
 - b. Apply sufficient AMS-S-8802 sealant (C-308) to the leak point to completely seal the defect. Sealant should extend a minimum of 0.250 inch around the defect in all directions.
 - c. Cure the sealant per manufacturer's instructions.
 - d. Do the leak check again as per PART II c. of this bulletin after the repair to ensure the blade does not leak.
 - e. Prime and paint touch-up the repaired area is optional.

2. Repair any defect located on the exterior surface of the blade or in the leading edge drain hole as follows:
 - a. Sand the area to be repaired by hand with 220 grit sand paper. Do not sand into the fiberglass.
 - b. Thoroughly clean the sanded area using aliphatic naphtha solvent (C-305). Do not allow solvent to enter the leak point. Wipe dry with clean cloth.
 - c. Apply sufficient 299-947-100T2CL3 adhesive (C-363) to the leak point to completely seal the defect.
 - d. Cure the adhesive per manufacturer's instructions.
 - e. Using 220 grit sandpaper, fair the cured adhesive to obtain a smooth finish.
 - f. Do the leak check again as per PART II c. of this bulletin after the repair to ensure the blade does not leak.
 - g. Prime and paint touch-up the repaired area as required.
3. For new uninstalled tail rotor blades make an entry in the tail rotor blade Historical Record to show that this Alert Service Bulletin is completed.
4. For tail rotor blades that were installed on a helicopter do PART IV.

PART IV: Perform dynamic balance of the tail rotor assembly

-NOTE-

Make sure all previously removed indexed parts are reinstalled at the original location.

1. Assemble and the tail rotor hub and blade assembly and install on the helicopter. Refer to the BHT-407-MM-7.
2. Install the RADS-AT and perform the dynamic balance of the tail rotor assembly. Refer to the BHT-407-MM-2.
3. Make an entry in the Helicopter and the Tail Rotor Blade Historical Records to show that this Alert Service Bulletin is completed.
4. If a "future action" is required per TABLE 2 make an entry in the helicopter and the tail rotor blade Historical Records to show that a "future action" is required.

VIBRATION LEVEL AND TOTAL BALANCE WEIGHT	LEAK CHECK RESULT	IMMEDIATE ACTION TO TAKE	FUTURE ACTION TO TAKE
1.0 IPS or less 25 grams or less	No leak	Do PART IV.	None.
	Leak	Do PART III.	Do one time dynamic balance check between 20 and 30 flight-hours after accomplishment of PART IV.
More than 1.0 IPS 25 grams or less	No leak	<ol style="list-style-type: none"> Investigate cause for high vibration. Do a tail gearbox torque check. See Note. Do PART IV. 	Do one time dynamic balance check between 20 and 30 flight-hours after accomplishment of PART IV.
	Leak	<ol style="list-style-type: none"> Do a tail gearbox torque check. See Note. DO PART III. 	<ol style="list-style-type: none"> Do one time dynamic balance check between 20 and 30 flight-hours after accomplishment of PART IV and every 100 hours thereafter. Send the blade to Bell Helicopter within 6 months of operation after repair.
1.0 IPS or less More than 25 grams	No leak	Do PART IV.	Do one time dynamic balance check between 20 and 30 flight-hours after accomplishment of PART IV.
	Leak	Do PART III.	<ol style="list-style-type: none"> Do one time dynamic balance check between 20 and 30 flight-hours after accomplishment of PART IV and every 100 hours thereafter. Send the blade to Bell Helicopter within 6 months of operation after repair.
More than 1.0 IPS More than 25 grams	No leak	<ol style="list-style-type: none"> Investigate cause for high vibration. Do a tail gearbox torque check. See Note. Do PART IV. 	Do one time dynamic balance check between 20 and 30 flight-hours after accomplishment of PART IV.
	Leak	<ol style="list-style-type: none"> Do a tail gearbox torque check. See Note. Do PART III. 	<ol style="list-style-type: none"> Do one time dynamic balance check between 20 and 30 flight-hours after accomplishment of PART IV and every 100 hours thereafter. Send the blade to Bell Helicopter within 6 months of operation after repair.

Note: If a tail rotor gearbox loss of torque is found contact Product Support Engineering.

Table 2 - Action to take -

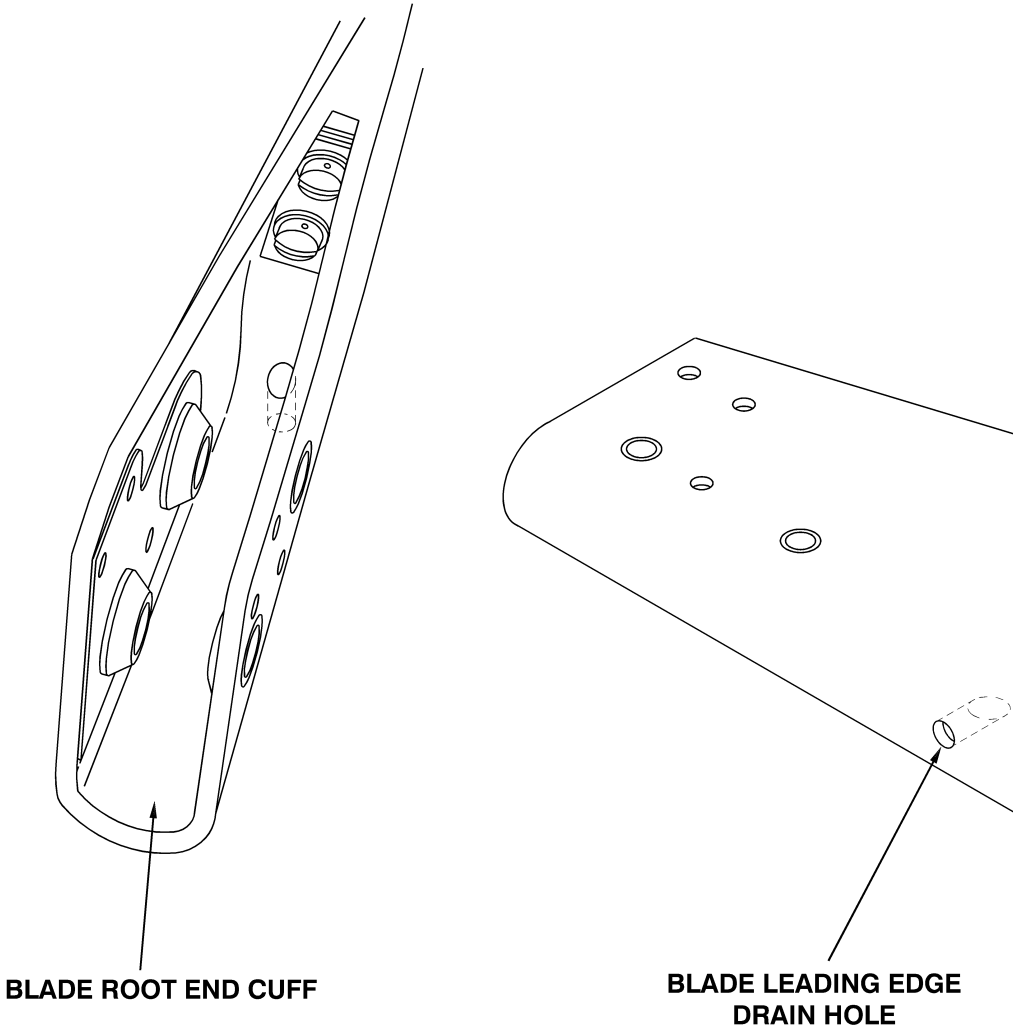
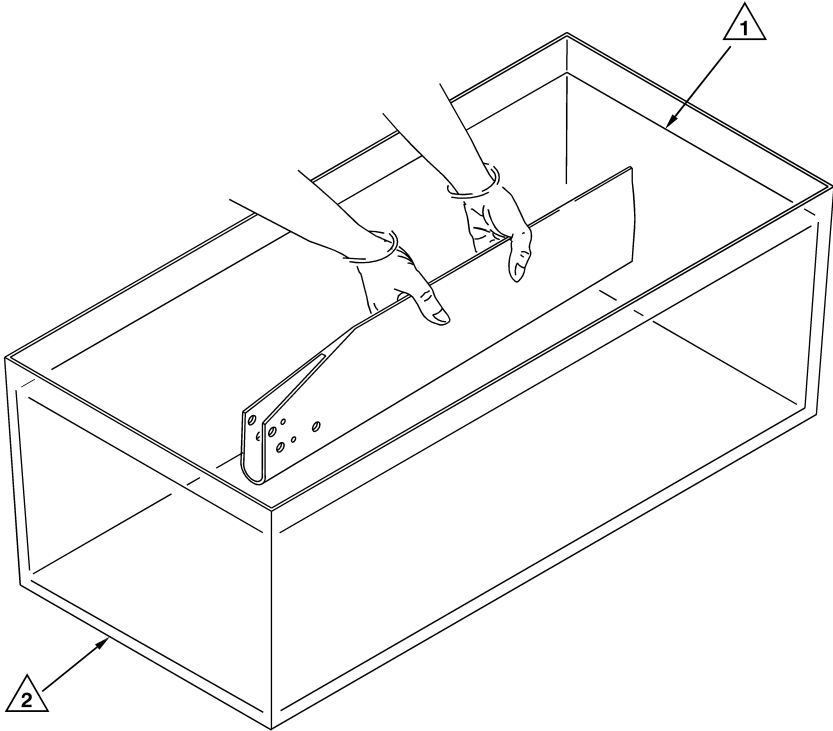


Figure 1. Areas for particular attention during inspection



NOTES

- 1** Water temperature to be maintained between 60°C to 80°C (140°F to 175°F).
- 2** Water tank should be 18 inches wide x 36 inches long by 18 inches deep or equivalent.

Figure 2. Water tightness check