

# ALERT SERVICE BULLETIN



NO. 407-10-92

DATE APR 13, 2010

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**MODEL AFFECTED:** 407

**SUBJECT:** TAIL ROTOR BLADES 406-016-100-109 AND 407-016-001-101, INSPECTION OF

**HELICOPTERS AFFECTED:** 407 Helicopters serial number 53000 through 53900 and 53911 through subsequent.

**COMPLIANCE:**

**PART I.** Within the next 50 flight hours or 30 days after receipt of the bulletin whichever comes first and every 300 hours or Progressive Inspection event # 1 thereafter.

**PART II.** As required.

**PART III.** As required.

## DESCRIPTION:

Bell Helicopter has received some 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 one of the tail rotor blades. Subsequent investigation revealed bond line separation in the blade root end block at the trailing edge as well as delamination between the blade root end closure and either upper or lower blade skin. This situation, if not remedied, can degrade and result in severe vibration that may affect the tail rotor gearbox attachment integrity.

This bulletin introduces tail rotor blade inspection particularly at the root end of the blade. In addition, specific maintenance procedures are provided should cracks or delamination be detected or excessive tail rotor vibrations are reported.

**APPROVAL:**

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

**MANPOWER:**

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

PART II: Approximately 2.0 man-hours per affected tail rotor blade are necessary to complete PART II of this bulletin.

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

**WARRANTY:**

There is no warranty applicable with this bulletin.

**MATERIAL:**

**Required Material:**

None required.

**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>
PD680	Drycleaning solvent	As required	C-304
MIL-C-87936, TYI	Detergent (Note 1)	As required	C-318

Note:

1. Or equivalent aviation approved detergent.

**SPECIAL TOOLS:**

1. Waterproof insulated gloves.
2. Water tank with 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-IPB Illustrated Parts Breakdown  
BHT-407-MM Maintenance Manual

**PUBLICATIONS AFFECTED:**

BHT-407-MM Maintenance Manual

**ACCOMPLISHMENT INSTRUCTIONS:**

**PART I: Tail rotor blade inspection**

**-NOTE-**

This inspection is in addition to the pre-flight check. The visual check of the tail rotor blade can be done by the pilot during the pre-flight check. Pilot staff shall be advised of the area to check.

1. Refer to Figure 1. Use detergent (C-318) and thoroughly clean the tail rotor blade in the area to be inspected.
2. Inspect tail rotor blade(s) for evidence of separation between skin plies and root end block at trailing edge using a 10x magnifying glass.

- If cracks are found, remove tail rotor blade from the aircraft and proceed with PART II of this bulletin.
  - If no crack is found but the tail rotor assembly has history of balance change or balance difficulties for unknown reason, remove tail rotor blade from the aircraft and proceed with PART II of this bulletin.
  - If no crack is found and the tail rotor assembly has no history of balance change or balance difficulties, blade may be returned to service.
3. Make an entry in the tail rotor blade historical record to reflect compliance with PART I of this bulletin.
  4. Refer to the BHT-407-MM, Chapter 5 for dynamic balance requirements of the tail rotor hub and blade requirement.

**PART II: Tail rotor blade leak check**

**-NOTE-**

The following inspection should be performed whenever signs of delamination/separation are visible at the root end area of the blade or if excessive tail rotor vibrations are reported with no apparent causes.

1. Thoroughly clean the blade including the surfaces of the root end cuff with a weak solution of detergent (C-318). Rinse with clear water.
2. Cool the blade in a refrigerator for a minimum of 1 hour at a temperature of  $-1^{\circ}$  C to  $7^{\circ}$  C ( $30^{\circ}$  F to  $45^{\circ}$  F).
3. Fill the water tank with clean clear water. For best results the water should be maintained at  $60^{\circ}$  C to  $80^{\circ}$  C ( $140^{\circ}$  F to  $175^{\circ}$  F).
4. Refer to Figure 3. 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.

5. 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.

6. 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.
7. Gently rotate blade back and forth to allow a thorough inspection of all the blade surfaces. Refer to the Figure 2, pay particular attention to the root end cuff and around the leading edge drain hole.

**CAUTION**

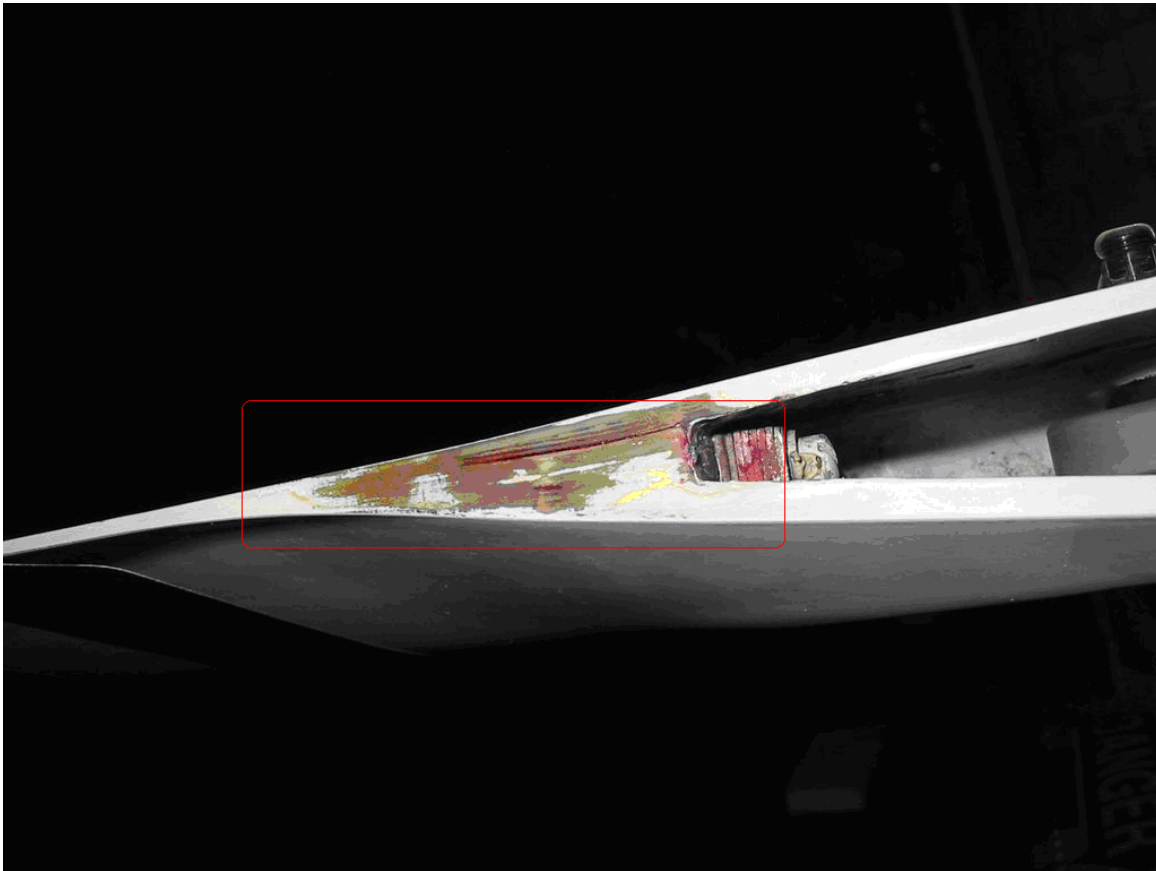
Do not submerge the blade in water for more than 2 minutes. Maintaining the blade in water for more than 2 minutes could allow water to enter the blade if a leak path is present.

8. The blade should be left in the heated water for a minimum of 1 minute and a maximum of 2 minutes.
9. If an air leak is found on a tail rotor blade, contact Bell Helicopter Product Support for further advise.
10. If no air leak is found but the tail rotor assembly has history of balance change or balance difficulties, additional maintenance actions shall be carried out. Refer to BHT-407-MM-2, Chapter 18, Tail Rotor Balancing.
11. If no air leak is found on a tail rotor blade, then the tail rotor blade is acceptable for return to service. Make an entry in the tail rotor blade Historical Record to reflect compliance with PART II of this bulletin.

**PART III: Blade repair**

1. Repair any defect located in the blade root end cuff as follows:
  - a. Thoroughly clean the area around the defect using aliphatic naphtha (C-305). Do not allow solvent to enter the blade. Wipe dry with a clean lint-free cloth.

- b. Apply sufficient AMS-S-8802 sealant (C-308) to the affected area 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. Perform a leak check again per PART II of this bulletin to ensure the blade does not leak.
    - e. Refer to BHT-407-MM. Prime and paint touch-up the repaired area.
  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(C-305). Do not allow solvent to enter the blade. Wipe dry with clean cloth.
    - c. Apply sufficient 299-947-100T2CL3 adhesive (C-363) to the affected area to completely seal the defect.
    - d. Cure the adhesive per manufacturer's instructions.
    - e. Using 220 grit sand paper, fair the cured adhesive to obtain a smooth finish.
    - f. Perform a leak check again as per PART II of this bulletin to ensure the blade does not leak.
    - g. Refer to BHT 407-MM. Prime and paint touch-up the repaired area.
  3. Make an entry in the tail rotor blade historical record to reflect compliance with Part II and Part III of this bulletin.



**Figure 1. Areas for particular attention during inspection**

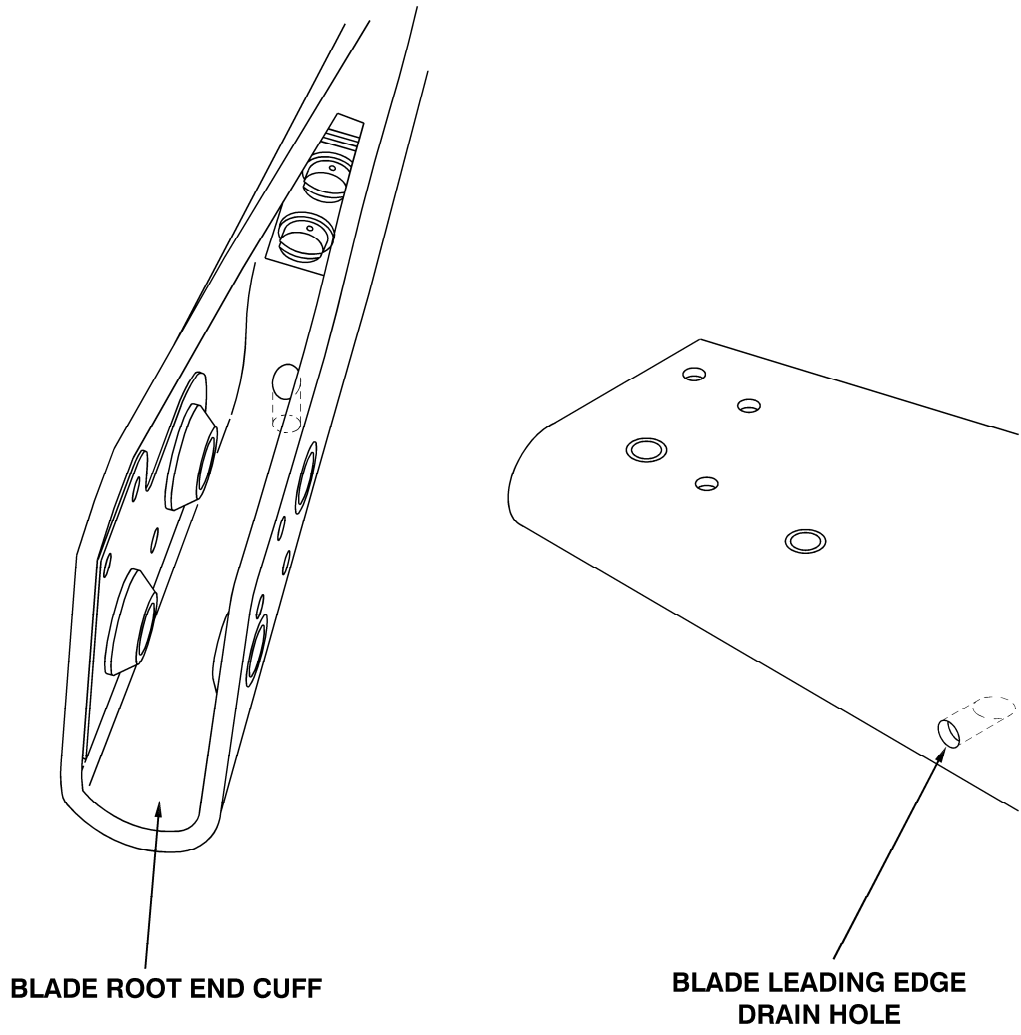
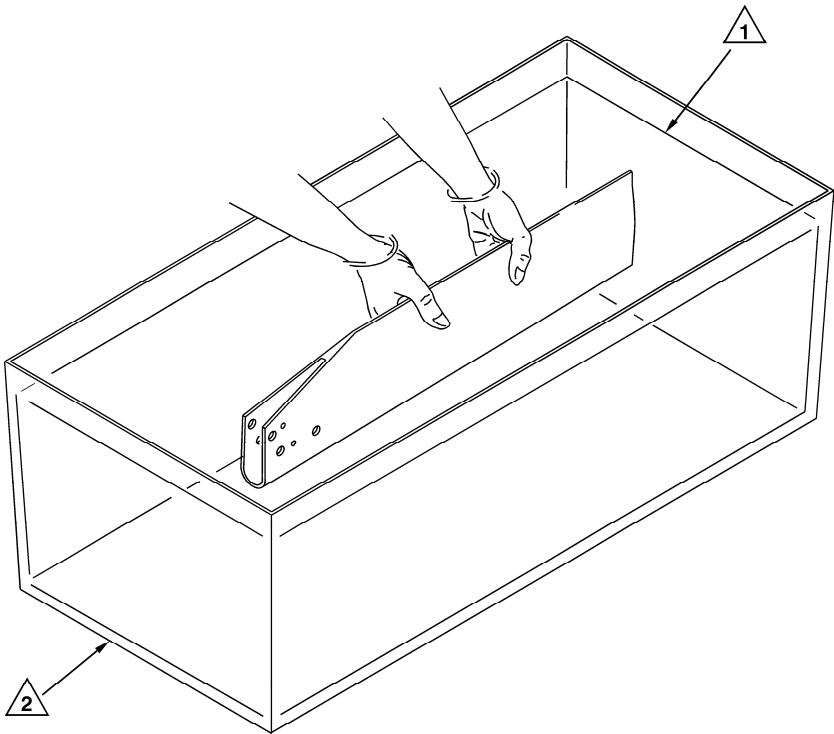


Figure 2 Areas to verify during leak check



**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 3 Water tightness check.**