

TECHNICAL BULLETIN
Bell Helicopter

A Textron Company

No. 407-07-80

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DATE
REV

MODEL AFFECTED: 407

SUBJECT: PITCH HORN 407-010-103-113, REPAIR OF.

HELICOPTERS AFFECTED: Model 407 helicopters serial number 53000 through subsequent.

COMPLIANCE: At Customer's Option

DESCRIPTION:

Bell Helicopter has received reports of corrosion on the 407-010-103-113 main rotor pitch horn surface where the Tungsten Carbide coating is applied. The corrosion may cause the Tungsten Carbide coating to bulge, crack and eventually flake.

Part I of this bulletin provides inspection and repair procedures that can be used to remove corrosion from the affected area.

Part II gives instructions to apply an organic finish on the Tungsten Carbide coating as preventive maintenance, for pitch horns that do not exhibit corrosion.

Part III gives the instructions to send pitch horns that can not be repaired in accordance with Part I to Bell Helicopter Textron, Inc for evaluation and possible repair. It also give the authorization for spares replacement to mix and match -101, -107, -113 and -113FM (post repair) on all main rotor hub assembly dash numbers.

APPROVAL:

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

MANPOWER:

Approximately 4 man-hours / pitch horn are required to complete Part I of this bulletin. Man-hours are based on hands-on time, and may vary with personnel and facilities available.

Approximately 1 man-hour / pitch horn is required to complete Part II of this bulletin. Man-hours are based on hands-on time, and may vary with personnel and facilities available.

WARRANTY:

Owners / Operators of Bell 407 helicopters who comply with the instructions in Part I, Item (3) of this Bulletin who find pitch horns that can not be repaired using the procedures given in step (3) may remove and return the 407-010-103-113 pitch horns through BHT Warranty for evaluation and possible repair at no cost.

In order to receive this special warranty exception, submit a completed MMIR to BHTI Warranty Administration on VISTA for the affected pitch horns only. Be sure to check the block labeled Request Bell Helicopter to Repair the Part under Warranty. Obtain the RMA# authorization form VISTA, ship the pitch horns together with the original historical record cards maintaining a copy for your records, to the address provided on the RMA. Ensure that a copy of the RMA number is visible on the outside of the package.

For customers that do not have access to VISTA, please submit a Bell Helicopter Malfunction Report paper claim. Contact Warranty Administration 817-280-3406 for assistance.

Discrepant parts being returned for this special warranty exception should be shipped Federal Express freight collect. Please use the following links for International and Domestic shipments:

http://www.bellhelicopter.com/en/support/pdf/Bell_Int_Shipping.pdf

http://www.bellhelicopter.com/en/support/pdf/Bell_Dom_Shipping.pdf

Customers who fail to comply with the instructions in this Bulletin after 31st December 2009 Bulletin are not eligible for the special warranty exception listed above. No other labor cost will be covered under this Bulletin.

MATERIALS:

Consumable Material:

The following material is required to accomplish this bulletin, however this material is considered consumable (bench stock) material and may not require ordering depending on the operators consumable material stock levels. This material may be obtained through your Bell Helicopter Textron Supply Center.

<u>Part Number</u>	<u>Nomenclature</u>	<u>Reference</u>
MIL-PRF-23377TI, CLC	Primer	C-204
MILC85285, TYI, 16440	Polyurethane Coating, Light Gull Gray	C-245
ACETONE GALLON	Solvent ASTM D329	C-316
TT-1735 ISOPROPYL	Isopropyl Alcohol 99%	C-385
MIL-C-81706 1 QT	Chemical Film, alodine 1200	C-100

SPECIAL TOOLS:

None required.

WEIGHT AND BALANCE:

Not affected.

ELECTRICAL LOAD DATA:

Not affected.

REFERENCES:

BHT-407-CR&O Component Repair and Overhaul

PUBLICATIONS AFFECTED:

BHT-407-CR&O Component Repair and Overhaul

ACCOMPLISHMENT INSTRUCTIONS:

PART I. Corrosion damage repair procedure.

-NOTE-

Pitch horns that can not be repaired using the procedure given below can be sent to Bell Helicopter Textron, Inc for evaluation and possible repair. Refer to Part III for instructions.

1. Refer to Figure 1 and evaluate if the repair provided herein can be accomplished.
2. If the corrosion damage does not exceed the repair limits given on Figure 1, proceed with step 3. If the corrosion damage exceeds the limit given on Figure 1, proceed with Part III.
3. Remove the 407-010-103-113 pitch horns from the main rotor hub assembly. Refer to BHT-407-CR&O, Chapter 62.

-NOTE-

The cutter will have a definite change in sound as it penetrates the tungsten carbide and begins to cut the aluminum.

- a. Set up the pitch horn in a drill press or mill. Using a diamond coated end mill cutter from 0.375 to 0.5 inch diameter with a corner radius of 0.050 to 0.100 inch, center on the exposed area of corrosion to remove the tungsten carbide. Visible corrosion must be no closer than 0.100 inch from edge of removed material. Turning speed to be 250 RPM, coolant is not required, use 5 to 10 second intervals with equally spaced pauses. The part should not feel hot to the touch; you must be able to hold your bare hand on the part in the general area of drilling. Penetration through the tungsten carbide coating should take approximately 2 to 3 minutes. Stop removing material as soon as the tungsten carbide coating is removed.
- b. Exchange the diamond cutter for a conventional flat-bottomed mill cutter of the same or slightly smaller diameter and 0.050 to 0.100 inch corner radius. Control speed and/or use coolant to insure that part temperature does not rise to a temperature you are unable to handle with your bare hand. Remove aluminum until there is no evidence of corrosion. Polish any uneven areas remaining in the bottom of the hole by hand-sanding with 180 to 220 grit abrasive paper.
- c. Measure the depth from the tungsten carbide surface to the bottom of the cut after removing the corrosion from the aluminum. If the depth exceeds the repair limits given on Figure 1, proceed with Part III.

- d. Using the conventional mill cutter from step 3.b., remove an additional 0.010 inch of material depth past the visible corrosion removal.
- e. Using abrasive paper or cloth containing 180 grit or finer aluminum oxide or silicon carbide abrasives, polish and blend the edges of the tungsten carbide, any mismatch between the surfaces cut by the diamond cutter and the conventional mill cutter, and any visible machine marks from either cutter.
- f. Clean the reworked area with alcohol (C-385) or acetone (C-316) and allow to dry completely.
- g. Glass bead clean surface to remove any loose or smeared aluminum material. Use glass beads of a uniform size, select a size between 0.002 to 0.011 inch in diameter in accordance with MIL-G-9954. Blow clean, dry compressed air onto surface to remove residual beads.
- h. Clean surface again with alcohol (C-385) or acetone (C-316) and allow to dry completely.
- i. Inspect the machined area with a 10X magnifying glass to ensure that all the corrosion has been removed and no new corrosion has been exposed. The surface finish after repair must be 63 RA or smoother as measured by visual comparator or profilometer. Inspect the edge of the tungsten carbide for cracking and general condition. Rework of the surface is allowed in order to meet the above conditions as long as the limits stated in this bulletin are not exceeded.
- j. Repeat steps 3.a. through 3.i. for other areas indicating corrosion. Quantity of repairs is limited as shown in Figure 1. There must be also a minimum of 0.150 inch space between the edges of adjacent repair circles.
- k. Thoroughly clean the reworked area with acetone (C-316) and allow to dry completely.
- l. Apply brush alodine chemical film treatment (C-100) to the reworked areas.
- m. Apply polyamide epoxy primer (C-204) to the reworked areas and allow to dry. Apply an overcoat of primer to the entire tungsten surface. Before the entire surface has time to dry, wipe primer from the surface with a clean dry cloth. This is to provide a seal coat of primer onto the tungsten carbide. Do not remove primer from the reworked areas.
- n. Make an entry in the helicopter records to indicate that Part I of this bulletin has been accomplished.

PART II. Organic finish application to the tungsten carbide coating.

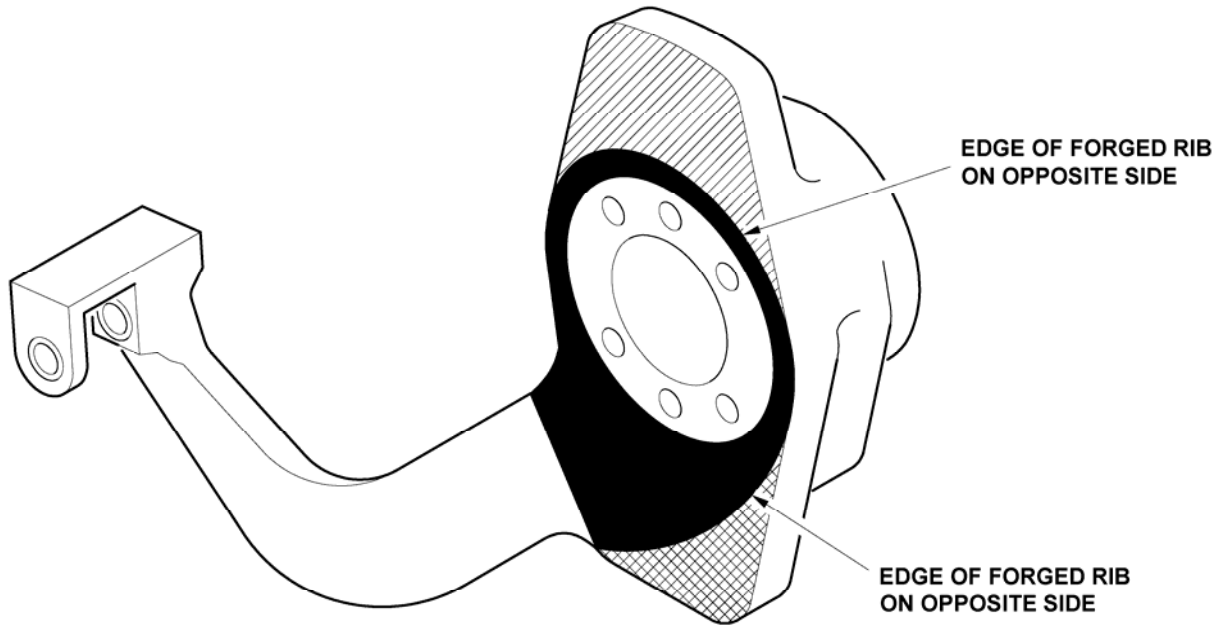
-NOTE-

The application of paint to the tungsten carbide coating is optional and limited to new pitch horns or pitch horns that are not exhibiting any damage to the tungsten carbide coating. Painting of the surface is highly recommended when operating in a corrosive environment.







1. Thoroughly clean the surface with a cloth dampened with acetone (C-316) or equivalent.
2. Apply one coat of primer (C-204).
3. Apply two coats of polyurethane coating (C-245) Light Gull Gray #16440.
4. Make an entry in the helicopter records to indicate that Part II of this bulletin has been accomplished.

PART III. Repair performed by Bell Helicopter Textron, Inc.

1. Pitch horns that can not be repaired using the procedure given in Part I of this bulletin can be sent to Bell Helicopter Textron, Inc for evaluation and possible repair. Refer to the Warranty Statement of this bulletin for further instructions.
2. Disassemble the main rotor hub assembly to the extent required to remove the pitch horn. Refer to the BHT-407-CR&O.
3. Once repaired, the pitch horn will be identified as 407-010-103-113FM.
4. The 407-010-103-113FM pitch horn has the same airworthiness limitation of 5000 hours. Cumulated total time before repair will not be reset. The inspection criteria published in the BHT-407-CR&O for the 407-010-103-107 pitch horn apply to the -113FM.
5. For spare replacement, pitch horns 407-010-103-101, -107, -113 and -113FM can be mixed and matched on all main rotor hub assembly dash numbers.



PITCH HORN (407-010-103-113)

TYPE OF REPAIR	REPAIR LOCATION SYMBOLS			
				
	MAXIMUM REPAIR DEPTH			
CORROSION	0.015 inch (0.381 mm)	0.040 inch (1.016 mm)	NO CORROSION DAMAGE ALLOWED	 
NUMBER OF REPAIRS	FOUR	TEN	NO CORROSION DAMAGE ALLOWED	

NOTES




-  There must be a minimum of 0.150 inch (3.81 mm) space between the edges of adjacent repair circles.
-  Measure the depth from the tungsten carbide surface.
-  Limits are for corrosion removal prior to Part 1, step 3d.

Figure 1. Pitch horn assembly repair limits