



A Textron Company

ALERT SERVICE BULLETIN

407-23-130

27 February 2023

Revision A, 27 March 2023

MODEL AFFECTED: 407

SUBJECT: PILOT CYCLIC STICK ASSEMBLY 206-001-344-105/-109/-115, INSPECTION AND REPAIR OF.

HELICOPTERS AFFECTED: Serial numbers 53000 through 53900, 53911 through 53999, 54000 through 54166, 54300 through 54800, 54805 through 54999, 56300 through 56304, 56311 through 56315.

Serial number 54955, 54998, 56305 through 56310, and 56316 and subsequent are not affected by this bulletin.

COMPLIANCE: **PART I:** Within 100 flight hours or 90 days, whichever occurs first, following the release date of this bulletin.

PART II: Prior to next flight as required by **PART I**.

PART III: Within 300 flight hours or 6 months, whichever occurs first, after accomplishment of **PART II**, and every 300 flight hours or 6 months thereafter until accomplishment of **PART IV**.

PART IV: Within 24 months after accomplishment of **PART II**.

DESCRIPTION:

Bell has recently received a report of a fractured pilot cyclic stick found while performing the Interior and Prestart Check of the 407 Rotorcraft Flight Manual (RFM). The fracture originated at the upper slotted area near the lower base of the cyclic stick.

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Approved for public release.

Consequently, helicopters of a mixed fleet were inspected, and additional cyclic sticks were found cracked on 407 helicopters.

The cracked cyclic sticks may have resulted from excessive force being applied when checking the travel of the cyclic stick to verify the cyclic centering light operation.

As a result, the Interior and Prestart Check of the applicable Flight Manuals was revised to limit the freedom of movement of the cyclic stick to approximately 1 inch (25.4 mm) when the CYCLIC CENTERING light is verified.

PART I of this bulletin mandates a 10X magnifying glass inspection of the lower four inches of the cyclic stick tube assembly (1, Figure 1).

PART II of this bulletin provides a repair for cracked 206-001-342-101 cyclic stick tube assemblies consisting of a stop drill procedure. This repair can only be performed for cracks initiating in the upper slot on the lower part of the stick tube. The maximum repairable crack length is shown in Figure 2 of this bulletin.

PART III of this bulletin introduces a 300 flight hour or 6 month, whichever occurs first, 10X magnifying glass visual inspection of the cyclic stick tubes that have been repaired per **PART II**. This inspection is a recurring inspection until accomplishment of **PART IV**.

PART IV of this bulletin mandates the replacement of the repaired cyclic stick tube 206-001-342-101FM accomplished in **PART II**.

Revision A of this bulletin requires customers to contact Bell Product Support when finding a cracked cyclic stick tube assembly. Figures with drill bushings revised to allow a final ream of .1875-inch (4.763mm).

Applicability of this bulletin to any spare part must be determined prior to its installation on an affected helicopter.

APPROVAL:

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

CONTACT INFO:

For any questions regarding this bulletin, please contact:

Bell Product Support Engineering
Tel: 1-450-437-2862 / 1-800-363-8023 / productsupport@bellflight.com

MANPOWER:

Approximately 4.0 man-hours are required to complete **PART I** of this bulletin.
Approximately 6.0 man-hours are required to complete **PART II** of this bulletin.
Approximately 2.0 man-hours are required to complete **PART III** of this bulletin.
Approximately 2.0 man-hours are required to complete **PART IV** of this bulletin.

This estimate is based on hands-on time and may vary with personnel and facilities available.

WARRANTY:

There is no warranty credit applicable for parts or labor associated with this bulletin.

MATERIAL:

Required Material:

The following material is required for the accomplishment of this bulletin and may be obtained through your Bell Supply Center.

<u>Part Number</u>	<u>Nomenclature</u>	<u>Qty (Note)</u>
206-001-342-101	Cyclic Stick Tube Assy	1 (1)

NOTE 1: Only required if the cyclic stick tube exceeds the mechanical and/or corrosion damage limits of **PART I**.

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 Supply Center.

<u>Part Number</u>	<u>Nomenclature</u>	<u>Qty (Note)</u>	<u>Reference *</u>
2230-00425-00	Primer, Epoxy	1 PT (1)	C-204
2230-06023-00	Polyamide Coating, Polyurethane	5 QT (1)	C-245
2100-00006-00	Cleaning Compound	5 GAL (1)	C-318
2900-05806-00	Aluminum oxide abrasive cloth or paper (400 grit)	A/R	C-406
2230-05688-00	Paint Remover	1 PT (1)	C-436

* C-XXX numbers refer to the consumables list in the BHT-ALL-SPM, Standard Practices Manual

NOTE 1: The quantity indicated is the format the product is delivered in. Actual quantity required to accomplish the instructions in this bulletin may be less.

SPECIAL TOOLS:

Locally manufactured drill guide (Figure 4).
Drill bushings for drill guide - may be procured locally or through McMaster-Carr or Carr-Lane.

WEIGHT AND BALANCE:

Not affected.

ELECTRICAL LOAD DATA:

Not affected.

REFERENCES:

BHT-407-MM Maintenance Manual, Chapter 5 and 67
BHT-ALL-SPM Standard Practices Manual, Chapter 4 and 6
BHT-ELEC-SPM Electrical Standard Practices Manual, Chapter 5
BHT-407-FM-1, 22 SEP 2022 Rev. 22
BHT-407-FM-2, 22 SEP 2022 Rev. 17
BHT-407-FM-3, 22 SEP 2022 Rev. 9

PUBLICATIONS AFFECTED:

BHT-407-IPB Illustrated Parts Breakdown, Chapter 67
BHT-407-MM Maintenance Manual, Chapter 5 and 67

ACCOMPLISHMENT INSTRUCTIONS:

PART I: 206-001-342-101 Cyclic Stick Tube Inspection

-NOTE-

The cyclic stick tubes 206-001-342-101 are currently on manual allocation due to limited quantities available.

1. Prepare the helicopter for maintenance.

-NOTE-

Clean the lower 4.0 inches (101.6 mm) of the removed cyclic stick assembly with cleaning compound (C-318) before inspection (1, Figure 1).

2. Perform the Pilot Cyclic Control Stick 1200 Hour or 24 Month Inspection ([DMC-407-A-67-12-03-00A-281A-A](#)).
 - a. If no crack is found, go to step 4.
 - b. If a crack is found or suspected using the 10X magnifying glass visual inspection, disassemble the cyclic stick assembly by removing the cyclic stick grip assembly.
 - i. Disconnect the wires from connector (BHT-ELEC-SPM, Chapter 5); retain connector for further use (9, Figure 1).
 - ii. Remove screw (5), washers (6) and nut (7).
 - iii. Remove cyclic stick grip (4) and elbow (8) as an assembly from cyclic control stick (1).

-NOTE-

Applying heat to the stick tube (1, Figure 1) after removal of screw (5) may be required if the cyclic stick grip and elbow assembly (8) is difficult to remove. Pay particular attention to direct heat away for the cyclic stick grip (4). Do not exceed 200°F (93°C).

CAUTION

When the cyclic stick grip assembly is being removed, ensure that the wire removal is assisted from the connector end to avoid excessive stress on the cyclic stick grip connections.

- c. Remove the paint and primer with paint remover (C-436) and thoroughly inspect the lower end of the cyclic stick tube using the fluorescent penetrant inspection (FPI) method (BHT-ALL-SPM, Chapter 6).
 - d. If cracks are found, accomplish **PART II** prior to next flight or replace the cracked cyclic stick tube assembly with a serviceable part meeting the intent of the bulletin.

- i. The following inspection criteria apply to a cracked cyclic tube stick assembly eligible for the accomplishment of **PART II**:
 1. Cracks that extend beyond the edges of the slot are not permitted (Figure 2).
 2. Cracked slot lengths longer than 0.791 inch (20.09 mm) are not permitted.
 - ii. If the crack length in the cyclic stick assembly exceeds the criteria of step 2.d.(i), the cyclic stick tube assembly will be considered unserviceable and must be replaced by a serviceable cyclic stick tube assembly meeting the intent of this bulletin prior to next flight.
3. Customers finding a cracked cyclic stick tube assembly must send an email to Bell Product Support Engineering at productsupport@bellflight.com with the following information.
 - a. Subject Line: Helicopter model, serial number and ASB number.

Example email subject line:

407 (53001) – ASB 407-23-130RA

- b. The email shall include the following information:
 - (1) Total time in-service.
 - (2) Cyclic stick tube part number. Ex: 206-001-342-101.
 - (3) Clear in-focus pictures of the damaged cyclic stick tube assembly.
4. If no cracks are found, thoroughly clean the cyclic stick tube with water and mild detergent (C-318) to completely remove residual penetrant and developer.
 - a. Dry the cyclic stick assembly completely.
 - b. Restore removed primer (C-204) and organic finish with polyurethane coating (C-245) before installation of stick into pivot assembly (BHT-ALL-SPM, Chapter 4).
5. If the cyclic stick assembly was disassembled, reinstall cyclic stick grip and wiring harness as follows:

- a. Route the wires through the tube assembly (1, Figure 1).
 - b. Install the cyclic stick grip (4) and elbow (8) as an assembly.
 - c. Secure the elbow (8) into the cyclic stick tube (1) with screw (5), washers (6) and nut (7).
 - d. Insert wires in connector (9) (BHT-ELEC-SPM Chapter 5).
6. Install the pilot cyclic control stick assembly ([DMC-407-A-67-12-03-00A-720A-A](#)).
 7. Ensure the following revisions of the INTERIOR AND PRESTART CHECK are inserted in the applicable Flight Manual (RFM):
 - a. BHT-407-FM-1, 22 SEP 2022 Rev. 22
 - b. BHT-407-FM-2, 22 SEP 2022 Rev. 17
 - c. BHT-407-FM-3, 22 SEP 2022 Rev. 9
 8. Make an entry in the helicopter logbook and historical service records indicating compliance with **PART I** of this Alert Service Bulletin.

PART II: Pilot cyclic stick assembly stop-drill repair

1. For cyclic stick tubes with cracks in the slotted area not exceeding the limits of Figure 2, carry out the following stop drill procedure:

-NOTE-

The maximum repairable crack length that can be stop drilled cannot be beyond the outside edge of the slot (Figure 2). The pilot hole for the stop drill must be in the full thickness of the tube, centered along the centerline of the slot and no further than 0.010 inch (.25 mm) from the edge of the slot (Figure 3, Sheet 1 of 2).

- a. Use an automatic center punch to mark the edge of the slot (Figure 3, Sheet 1 of 2).

CAUTION

The location and orientation of the stop drill is critical. It is important to properly secure the cyclic stick tube prior to drilling to ensure the drill bit is oriented exactly through the centerline of the tube. Preferably the cyclic stick tube should be held in place in a fixing head and drilled on a milling machine. However, since this is not always achievable, Figure 4 shows an example of a drill guide that can be locally manufactured to ensure a clean and well-oriented stop drill hole. Figure 5 shows the installed workaid with the addition of various drill bushings for precise drilling and reaming.

- b. Locally manufacture a workaid (Figure 4) and procure drill bushings or have the cyclic stick tube stop-drilled in a milling machine.
- c. Install the drill guide on the cyclic stick tube (Figure 5) and line up with the center punch mark using the smallest drill bushing.
- d. Secure the drill guide by tightening the nuts only enough to stop the drill guide from moving. Confirm that the drill bushing hole is exactly in line with the center punch mark. Do not over-tighten nuts and bolts to avoid damaging the cyclic stick tube.
- e. Drill a pilot hole using the smallest drill guide. Use a drill stop to limit the drilling depth to avoid damaging the opposite side of the tube.

-NOTE-

Stop drill holes must be free of all sharp edges and deburred.

- f. Increase the stop drill hole diameter until a final ream of 0.1875 inch (4.76 mm) is achieved. Deburr holes.
- g. Once the stop drill procedure is completed, carry out a fluorescent penetrant inspection (FPI) of the repaired area to ensure the crack is removed and there are no cracks in the stop drill bore. (BHT-ALL-SPM, Chapter 6).
- h. Thoroughly clean the cyclic stick tube with water and mild detergent (C-318) to completely remove residual penetrant and developer.
- i. Dry the cyclic stick assembly completely.
- j. Touch up the repaired area with epoxy polyamide primer (C-204). Refinish the repair as required to match the original finish with polyurethane coating (C-245) (BHT-ALL-SPM, Chapter 4).

2. The repaired cyclic stick tube assembly must be identified as follows:
 - a. Identify the lower part of the cyclic stick tube directly above the pivot assembly by hand marking or stencil marking part number 206-001-342-101FM with white or silver lettering. The size of the alpha-numeric lettering must be approximately 0.25 inch (6.35 mm) -in height.
3. Reinstall cyclic stick grip and wiring harness as follows:
 - i. Route the wires through the tube assembly (1, Figure 1).
 - ii. Install the cyclic stick grip (4) and elbow (8) as an assembly.
 - iii. Secure the elbow (8) into the cyclic stick tube (1) with screw (5), washers (6) and nut (7).
4. Install the pilot cyclic control stick assembly ([DMC-407-A-67-12-03-00A-720A-A](#)).
5. Insert wires in connector (9, Figure 1) using Insert/Extract Tool M81969/14-10 and reinstall connector (9).
6. **PART III** and **PART IV** of this bulletin are mandatory after completing **PART II**.
7. Make an entry in the helicopter logbook and historical service records indicating compliance with **PART II** of this Alert Service Bulletin.

PART III: Recurring inspection of cyclic stick tubes 206-001-342-101FM

1. Prepare the helicopter for maintenance.
2. Remove the pilot cyclic control stick ([DMC-407-A-67-12-03-00A-520A-A](#)).
3. Clean the lower 4.0 inches (101.6 mm) of the removed cyclic stick assembly (1, Figure 1) with cleaning compound (C-318) before inspection.
4. Inspect the lower 4.0 inches (101.6 mm) of the cyclic stick tube using a 10X magnifying glass. Pay particular attention to the stop-drilled repair area.

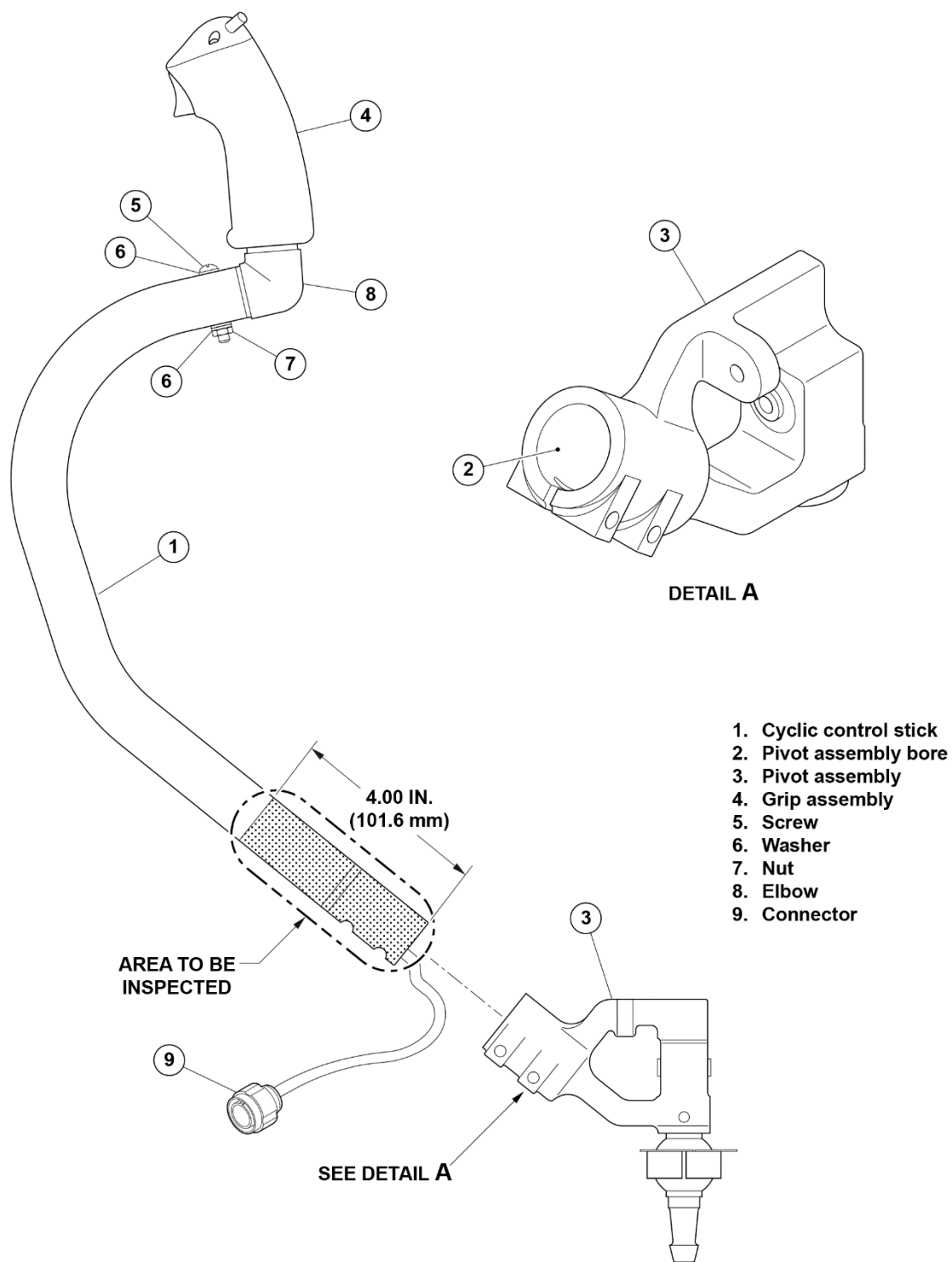
-NOTE-

Cracks in the circled areas of the inner sleeve inboard of the stop-drilled holes as shown in Figure 3 (Sheet 2 of 2) are not cause for rejection.

- a. If any cracks are found, remove the cyclic stick tube assembly from service and replace with a serviceable cyclic stick tube assembly meeting the intent of this bulletin.
 - b. If no cracks are found, install the cyclic control stick assembly ([DMC-407-A-67-12-03-00A-720A-A](#)).
5. Make an entry in the helicopter logbook and historical service records indicating compliance with **PART III** of this Alert Service Bulletin.
6. Repeat **PART III** every 300 flight hours or 6 months, whichever occurs first, until accomplishment of **PART IV**.

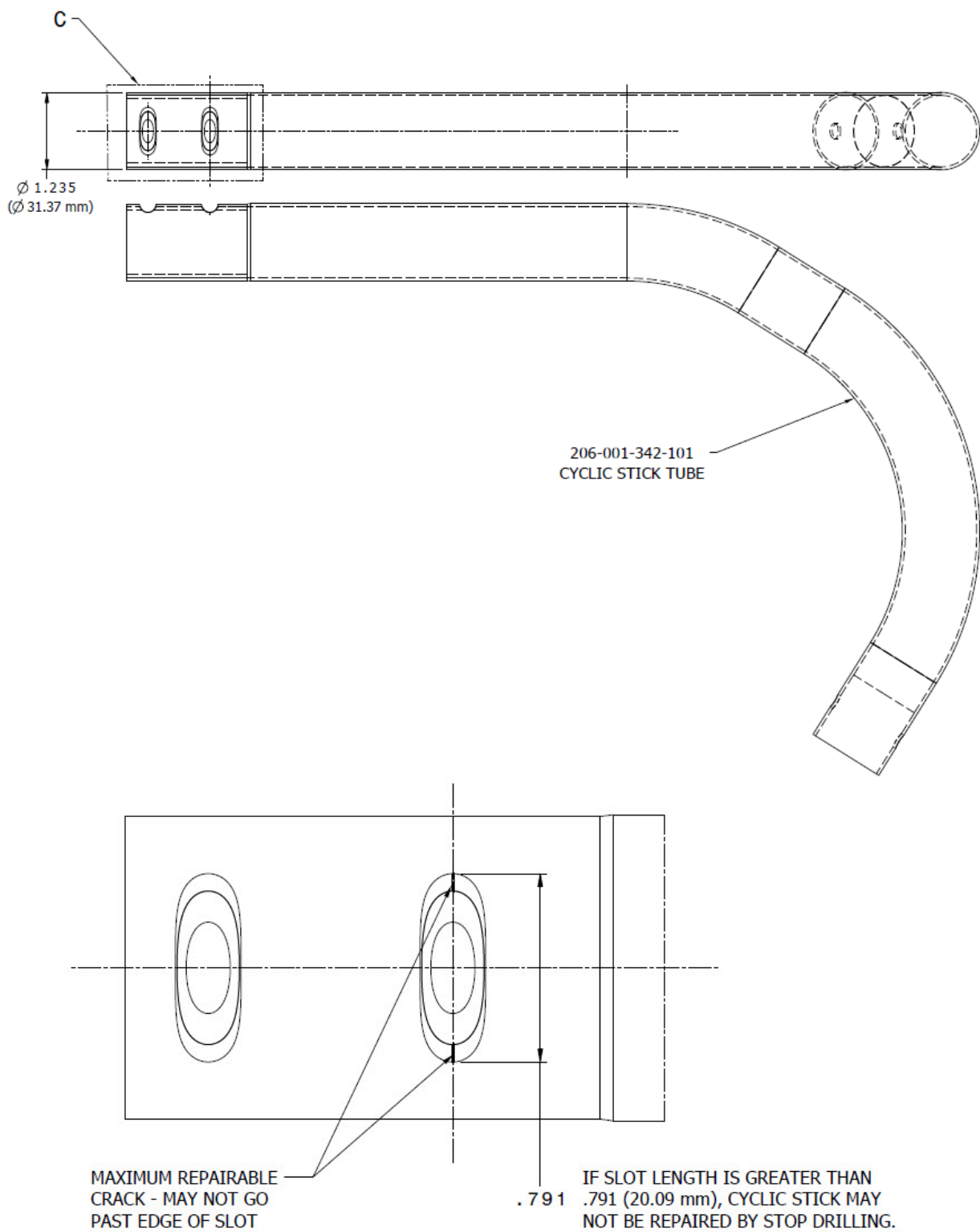
PART IV: Replacement of the cyclic stick tube 206-001-342-101FM

1. Prepare the helicopter for maintenance.
2. Remove the cyclic stick tube assembly 206-001-342-101FM that was repaired per **PART II** of this bulletin.
3. Install a serviceable 206-001-342-101 cyclic stick tube assembly ([DMC-407-A-67-12-03-00A-720A-A](#)).
4. Make an entry in the helicopter logbook and historical service records indicating compliance with **PART IV** of this Alert Service Bulletin.



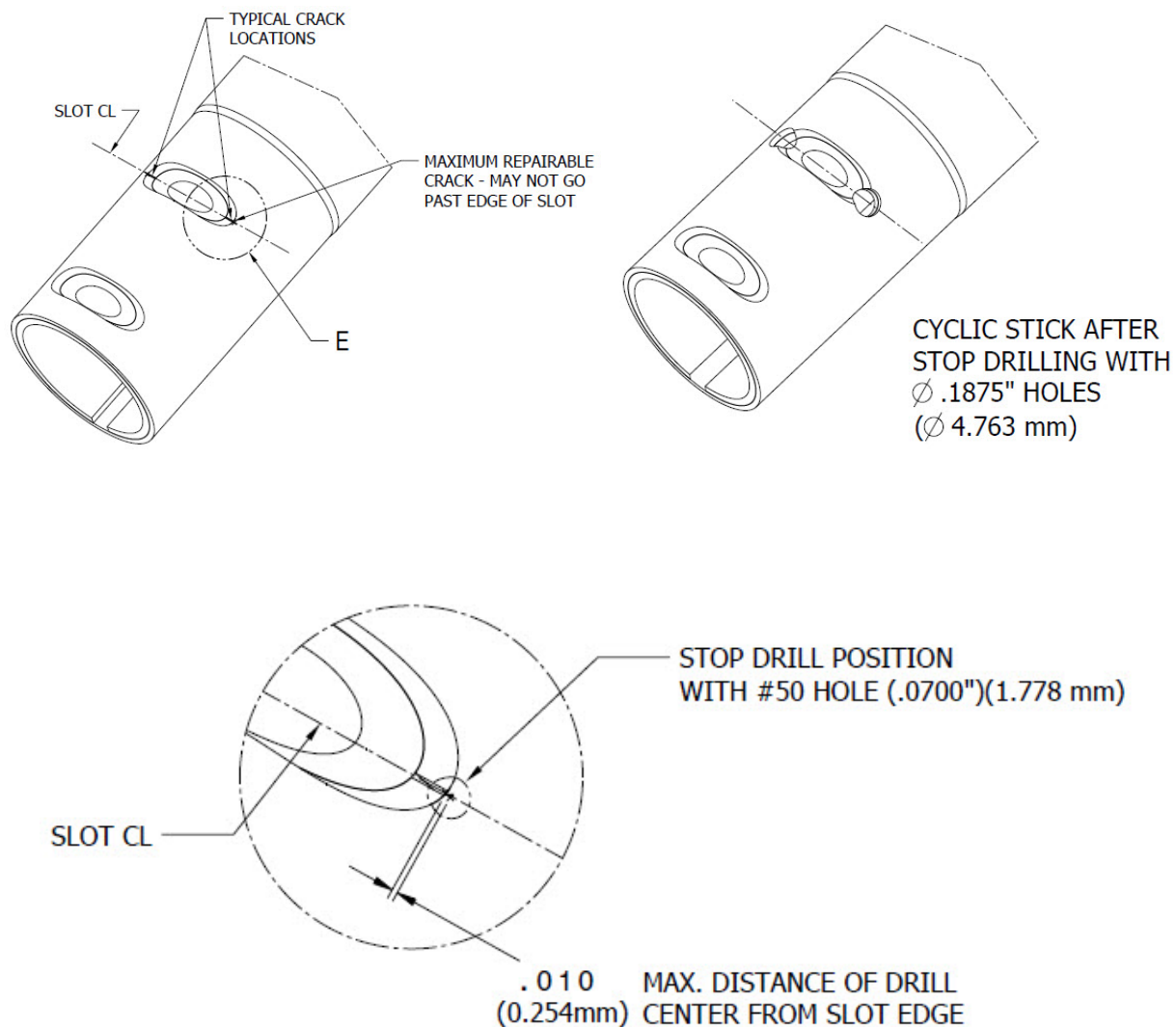
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Figure 1 – Pilot Cyclic Stick Assembly – 10X Magnifying Glass Inspection Area



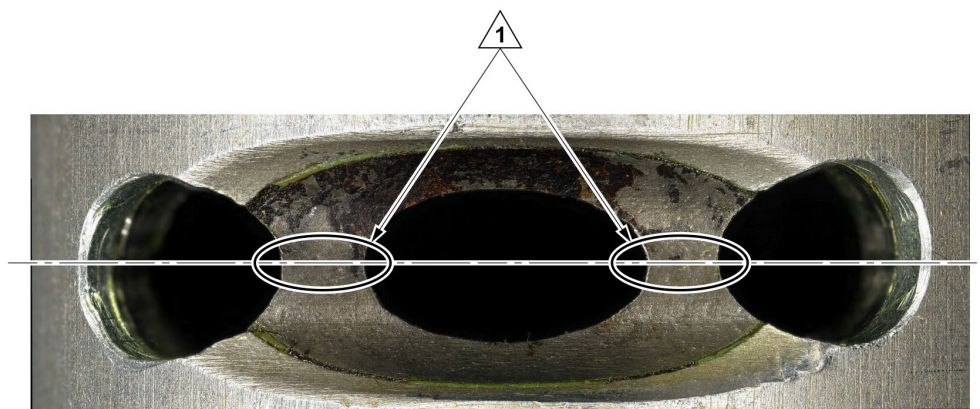
DETAIL C

Figure 2- Typical Crack Location and Maximum Repairable Crack Length



DETAIL E

Figure 3 (Sheet 1 of 2) – Pilot Hole Location for Stop Drill



DETAIL A

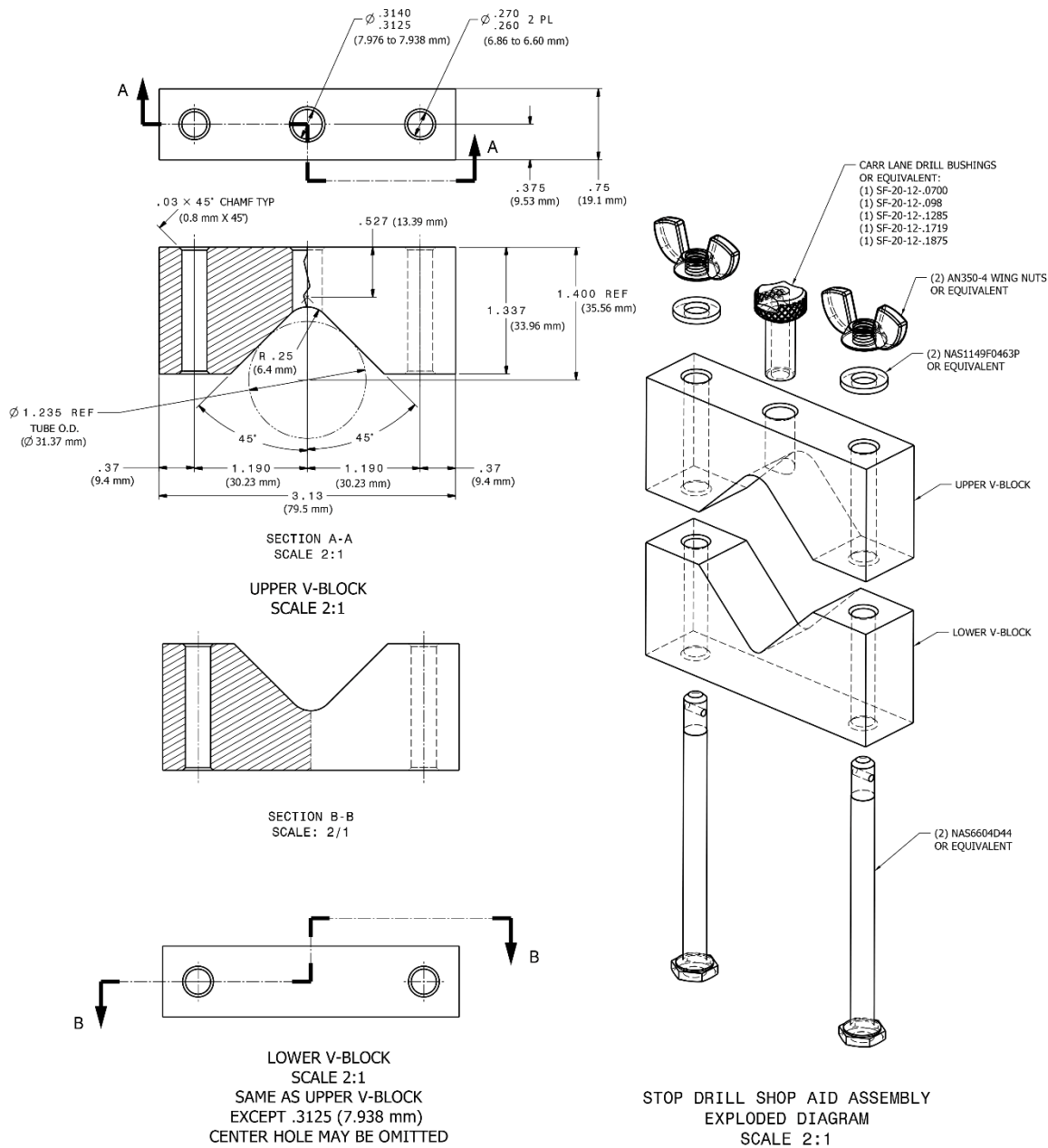
NOTE



Cracks in the circled areas of the inner sleeve inboard of the stop-drilled holes are not cause for rejection.

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Figure 3 (Sheet 2 of 2) – Stop-Drilled Holes and Inner Sleeve



NOTES:

1. ALL DIMENSIONS IN INCHES. MILLIMETERS IN PARENTHESES.
2. V-BLOCK MATERIAL IS OPTIONAL. METALS, PLASTICS, OR 3D PRINTED PLASTICS ARE ACCEPTABLE.
3. BREAK ALL SHARP EDGES WITH .015 (0.38 mm) RADIUS OR .015 (0.38 mm) X 40-50 DEGREE CHAMFER.
4. TOLERANCES ON DECIMALS (INCHES):
 .XXX $\pm .010$ (0.25 mm)
 .XX $\pm .03$ (0.8 mm)
 .X $\pm .1$ (3 mm)
 TOLERANCE ON ANGLES $\pm 1/2^\circ$
5. LOCK SCREW (NOT SHOWN) TO SECURE BUSHING IS OPTIONAL.

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Figure 4 – Drilling Guide V-Blocks (Workaid)

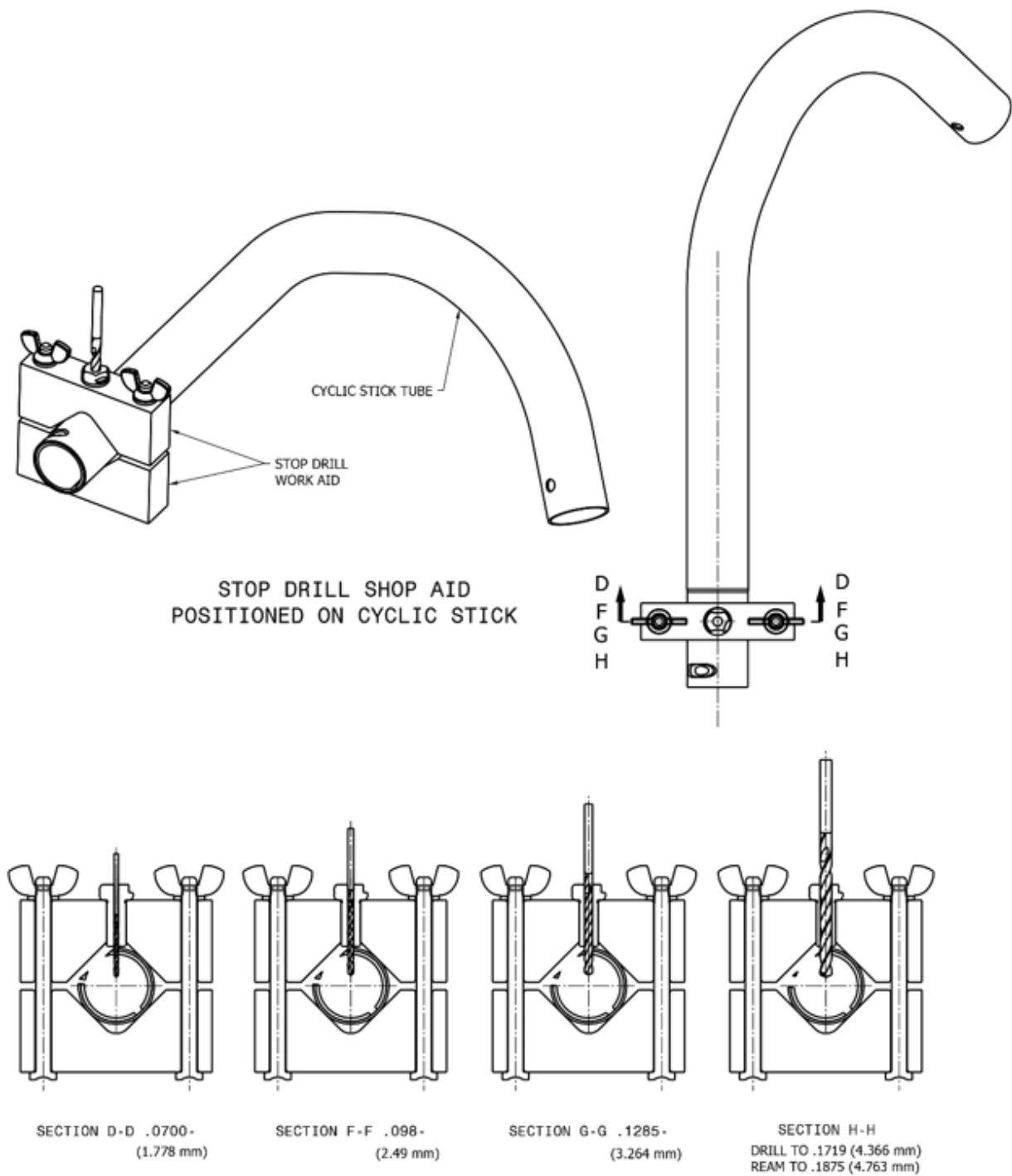


Figure 5 – Cyclic Stick Tube with Workaid Installed