A Textron Company

ALERT SERVICE BULLETIN

407-24-138
PSL # 2293
26 November 2024

MODEL AFFECTED: **407**

SUBJECT: **ROOF BEAM SHIMMING, INSPECTION AND REPAIR OF**

HELICOPTERS AFFECTED: **Serial numbers 54667, 54682, 54684, 54689, 54690, 54694, 54695, 54700, 54704, 54710, 54712, 54714 through 54752, 54805 through 54995, 54998, 54999, 56300 and 56307.**

[Serial number 54996, 54997, 56301 through 56306, 56308 and subsequent had the intent of this bulletin accomplished prior to delivery.]

COMPLIANCE: **PART I**: Within 330 flight hours or 12 months whichever occurs first after the release date of this bulletin.

PART II: Within 660 flight hours or 12 months whichever occurs first after the release date of this bulletin, provided gaps less than 0.012 inch (0.305 mm) are detected during accomplishment of PART I.

Before next flight, if gap in excess of 0.012 inch (0.305 mm) is detected during accomplishment of PART I.

DESCRIPTION:

Bell has been made aware that some operations during the assembly process of the roof beam structure could have been incorrectly performed. The resulting gaps, if not rectified, could affect the airworthiness life of the pylon side beams.

PART I of this Alert Service Bulletin (ASB) provides instructions to inspect the roof beam assembly at specific locations where presence of gap is suspected.

PART II of this ASB provides instructions to inspect roof shell and roof beam components at the locations where gaps were detected during PART I. PART II also provides shimming instructions to rectify the detected gaps between the affected roof beam components.

Applicability of this bulletin to any spare part shall 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 man-hours are required to complete PART I of this bulletin. Approximately 12 man-hours are required to complete PART II of this bulletin.
This estimate is based on hands-on time and may vary with personnel and facilities available.

WARRANTY:

Owners / Operators of Bell Helicopters who comply with the instructions in this bulletin will be eligible to receive replacement parts and labor as applicable, listed in the bulletin. The www.mybell.com portal allocates specific warranty entitlement for an aircraft by serial number. The Product Service Letter (PSL) number which will be listed below the bulletin number on the introduction page. This is going to be a required field when submitting a claim on the Bulletins Tab for replacement parts, labor, and/or freight. If you receive an ASB or TB that does not have a PSL number, then there is no warranty entitlement for that bulletin.

Labor entitlement: Yes

PART I $440.0 USD
PART II $1320.0 USD

NOTE: Please de-select the parts not needed prior to submitting your claim.
To receive parts, labor, under warranty:

- Comply with the instructions contained in this Bulletin no later than the applicable date in the “compliance section”.
- If there is a PSL number identified in the bulletin you will be required to enter this PSL number which will validate warranty entitlement for the selected aircraft. Please ensure that you use the Bulletin tab on the warranty section on www.mybell.com portal to file your claim.

MATERIAL:

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

Part Number	Nomenclature	Qty (Note)
407-010-222-101	Pylon Side Beam Shim (fwd)	2 (1)
407-010-222-103	Pylon Side Beam Shim (aft)	2 (1)
151-025-019-038B	Solid shim (STA113.97/140.65)	A/R (2)
151-025-009-040B	Solid shim (STA 127.31)	A/R (2)
120-098-20B99	Laminated Shim	A/R (3)
100-048-6-5	Pin (STA 127.31)	A/R (4)
100-048-6-6	Pin (STA 127.31)	A/R (4)
100-048-6-8	Pin (STA 145.40)	A/R (5)
30-015-6	Collar	A/R (4, 5)
407-010-201-105	Beam Assy, LH, Pylon	A/R (6)
407-010-203-105	Beam Assy, RH, Pylon	A/R (6)

NOTES:

1. Only required if pylon side beam shims are damaged during transmission removal for aircraft Pre TB 407-12-97.
2. Required if a gap is more than 0.008 inch (0.200 mm) at the affected STA. Solid shim can be locally manufactured using 7075-T6 aluminum alloy.
3. Upper laminated shim must be trimmed to fit the pylon support 407-030-425 footprint at STA 113.97, 127.31 or 140.65.
4. Required if stop support 407-030-428 removal is required for shimming purposes.
5. Required if shimming is necessary inside roof beam at STA 145.40.
6. Only required if a gap exceeding 0.012 inch (0.305 mm) is detected during PART I or PART II.

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.

Part Number	Nomenclature	Qty (Note)	Reference *
2000-01022-00	Adhesive	1 PT (1)	C-317
2230-00451-00	Epoxy Polyamide Primer	2 OZ (1)	C-204
2010-07915-01	Sealant	6 OZ (1)	C-308
2400-00184-00	Petrolatum	13 OZ (1)	C-008

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

NOTE 1: Quantity indicated is the format that the product is delivered in. Actual quantity required to accomplish the instructions in this bulletin may be less than what has been delivered.

SPECIAL TOOLS:

Lifting Tool (T102137-107)

WEIGHT AND BALANCE:

Not affected.

ELECTRICAL LOAD DATA:

Not affected.

REFERENCES:

407-IPB Illustrated Parts Breakdown, Chapter 53
407-MM Maintenance Manual, Chapter 63
TB 407-12-97 Technical Bulletin
GEN-22-154 Information Letter
BHT-ALL-SPM, Chapter 6, Chapter 4
BHT-ALL-SRM, Chapter 3

PUBLICATIONS AFFECTED:

None affected.

ACCOMPLISHMENT INSTRUCTIONS:

PART I: Inspection of roof beam assembly for possible gaps

1. Prepare the helicopter for maintenance.

2. Remove the center headliner from the passenger compartment to expose the roof beam assembly (DMC-407-A-25-20-00-04A-520A-A).

-NOTE-

The roof shell and beam assembly part number and serial number are located at the forward L/H side on the inner skin of the roof shell (Figure 1).

3. Determine if the roof shell and beam assembly serial number is affected by this bulletin using the list in Table 1 (Figure 1).

   a. If the roof shell and beam assembly serial number is part of the list in Table 1, proceed to step 4.

   b. If the roof shell and beam assembly serial number is not part of the list in Table 1, proceed to step 14.

4. Remove transmission fairing assembly (DMC-407-A-53-04-00-01A-520A-A) and air inlet cowling assembly (DMC-407-A-53-04-00-02A-520A-A).

-NOTE-

As an alternative, the transmission assembly with mast, swashplate and pylon beam assemblies can be completely removed to unload the roof shell (DMC-407-A-63-21-00-00A-520A-A).

-NOTE-

Wooden blocks can be installed under the forward skid tubes saddles to position the aircraft with the mast in vertical position.

5. Lift the complete helicopter with the mast nut (DMC-407-A-07-00-00-01A-171A-A). Center and level the helicopter under hoist in order to position the main rotor mast in a vertical position. Release all tension on the Lifting Tool (T102137-107) .

6. Remove sealant around the base of each pylon beam. Loosen all the pylon beam and stop fitting roof attachment bolts until threaded ends are flush with the bottom of the nutplates / anchor nut inside the cabin.

CAUTION

The transmission must be lifted slowly to unload the roof shell without pulling on the pylon beam bolt heads. A 0.015 inch (0.381 mm) gap between the pylon beam and the pylon beam shims/roof shell must not be exceeded.

7. Carefully lift the transmission assembly with mast, swashplate, pylon beam assemblies, main rotor head assembly and mast nut (DMC-407-A-07-00-00-01A-171A-A) until the roof shell is unloaded. Ensure the pylon beam bolt heads/washers are not contacting the pylon beams.

8. Remove sealant at the junction of every pylon / stop support and roof beam outboard flanges (Figure 2).

9. Using a feeler gauge, inspect for gap at the locations specified below. If gaps are found, measure and record them:

    a. At fuselage STA 113.97 and 140.65: Inspect for Gap 1 (fore and aft) between roof beam flange and pylon support (View B and C, Figure 2). Inspect for Gap 3 inside roof beam (both sides) (View D, Figure 2).

    b. At fuselage STA 127.31: Inspect for Gap 2 (fore and aft) between roof beam flange and stop support (View B and C, Figure 2). Inspect for Gap 3 inside roof beam (both sides) (View D, Figure 2).

    c. At fuselage STA 145.40: Inspect for Gap 3 inside roof beam (both sides) (View B and D, Figure 2).

10. Depending on the measured gap(s) values, roof beam shimming will need to be accomplished within different intervals.

    a. If no gap exceeding 0.003 inch (0.076 mm) is detected, PART II of this ASB is not required. Proceed to step 11.

CAUTION

A gap exceeding 0.012 inch (0.305 mm) at the pylon interface (GAP 1) affects the airworthiness life of the Pylon Side Beams. Such gap(s) shall be reported to Product Support Engineering.

b. If any gap exceeding 0.012 inch (0.305 mm) is detected, the affected pylon side beam shall be replaced and PART II of this ASB must be accomplished before next flight.

c. For gap(s) exceeding 0.003 inch (0.076 mm) and not exceeding 0.012 inch (0.305 mm), PART II of this ASB must be accomplished within 660 flight hours or 12 months whichever occurs first after the release date of this bulletin .

11. Lower the transmission assembly with mast, swashplate, pylon beam assembly and main rotor head assembly. Release all tension on Lifting Tool (T102137-107)

12. Torque all the roof attachment pylon beams bolts in accordance with transmission installation procedure (DMC-407-A-63-21-00-00A-720A-A). Seal the edge of each pylon beam base using sealant (C-308).

13. Apply sealant (C-308) at the junction of every pylon/stop support and roof beam outboard flanges where the gaps were checked. (Figure 2).

14. Install air inlet cowling assembly (DMC-407-A-53-04-00-02A-720A-A) and transmission fairing assembly (DMC-407-A-53-04-00-01A-720A-A).

15. Install the center passenger headliner (DMC-407-A-25-20-00-04A -720A-A).

16. Make an entry in the helicopter logbook and historical service records indicating compliance with PART I of this Alert Service Bulletin.

PART II: Shimming of the roof beam components

1. Prepare the helicopter for maintenance.

2. Remove the center headliner from the passenger compartment to expose the roof beam assembly (DMC-407-A-25-20-00-04A-520A-A).

3. Remove transmission fairing assembly (DMC-407-A-53-04-00-01A-520A-A) and air inlet cowling assembly (DMC-407-A-53-04-00-02A-520A-A).

4. Remove the transmission assembly with mast, swashplate and pylon beam assembly attached to the top case (DMC-407-A-63-21-00-00A-520A-A).

5. Using a feeler gauge, inspect for gap at the locations specified below. If gaps are found, measure and record them:

a. At fuselage STA 113.97 and 140.65: Inspect for Gap 1 (fore and aft) between roof beam flange and pylon support (View B and C, Figure 2). Inspect for Gap 3 inside roof beam (both sides) (View D, Figure 2).

b. At fuselage STA 127.31: Inspect for Gap 2 (fore and aft) between roof beam flange and stop support (View B and C, Figure 2). Inspect for Gap 3 inside roof beam (both sides) (View D, Figure 2).

c. At fuselage STA 145.40: Inspect for Gap 3 inside roof beam (both sides) (View B and D, Figure 2).

CAUTION

A gap exceeding 0.012 inch (0.305 mm) at the pylon interface (GAP 1) affects the airworthiness life of the Pylon Side Beams. Such gap(s) shall be reported to Product Support Engineering

6. If any gap exceeding 0.012 inch (0.305 mm) is detected, the affected pylon side beam shall be replaced before next flight.

7. For every gap exceeding 0.003 inch (0.076 mm) at pylon support (GAP 1) or stop support (GAP 2) locations, detailed visual inspection or Non Destructive Inspection (NDI) of the affected area/component is required.

   a. Using a 10X magnifying glass, perform a detailed visual inspection of the affected pylon side beam lower ends. Inspect for any signs of crack around each attachment bolt holes.

   b. Remove the pylon beam shim or stop fitting shims from the roof shell doublers at the affected zone (where a gap was found on the roof beam) as shown in Figure 3. If not damaged, retain original affected shim.

   c. Remove primer on roof shell doublers in the affected zones (where a gap was found on the roof beam) as shown in Figure 3.

   d. Perform a Fluorescent Penetrant Inspection (FPI) on the roof shell doublers at the affected pylon beam or stop fitting shim footprint areas (Figure 3). If no crack is found, refinish with primer (C-204) and reinstall affected shim.

   e. If a crack is detected, the roof shell will need to be repaired. Send a duly completed Structural Repair request (Ref: IL GEN-22-154) to Product Support Engineering.

   f. Remove the affected outboard pylon supports or stop supports and remove all sealant. Retain the hardware.

g. Using a 10X magnifying glass, inspect the affected pylon supports or stop supports within the inboard upper radius. Inspect for any signs of crack (Figure 4).

h. Remove primer on the roof beam outboard flange sections that mate with the affected pylon supports or stop supports.

i. Perform a Fluorescent Penetrant Inspection (FPI) on the roof beam outboard flanges. If no crack is found, refinish with primer (C-204) and proceed to step 8.

j. If a crack is detected, the roof beam assembly will need to be replaced in a Bell Approved fuselage fixture. Report any crack to Product Support Engineering.

8. For every gap measured between 0.025 inch (0.635 mm) and 0.060 inch (1.524 mm) at pylon support (GAP 1) or stop support (GAP 2) locations, shimming with the use of a solid shim is required before the laminated or liquid shim. If there is no gap measured between 0.025 inch (0.635 mm) and 0.060 inch (1.524 mm), proceed to step 9.

   a. Clean the top surface of the pylon support or stop support.

   b. Fabricate solid shim to obtain a remaining gap between 0.025 inch (0.635 mm) and 0.003 inch (0.076 mm).

   c. Shim must be trimmed to fit the affected support footprint.

   d. Apply a light coat of Petrolatum (C-008) on the pylon/stop bolt shanks.

-NOTE-

The clamping pressure must be applied carefully to ensure firm contact but avoid excessive adhesive squeeze-out.

   e. Bond the solid shim to the pylon support or stop support using adhesive (C-317). While adhesive is still wet, apply even clamping pressure using flat stock and pylon or stop bolts.

   f. Allow the adhesive to cure per manufacturer specifications.

   g. Remove pylon support or stop support bolts.

   h. Proceed to step 9.

9. For gaps between 0.009 inch (0.203 mm) and 0.025 inch (0.635 mm) at pylon support (GAP 1) or stop support (GAP 2) locations, shimming with the use of laminated shims is required before the liquid shim. If gap is measured at 0.008 inch (0.203 mm) or less, proceed to step 10.

a. Clean the top surface of the pylon support or stop support solid shim.

b. Fabricate shim to obtain a remaining gap between 0.008 inch (0.203 mm) and 0.003 inch (0.076 mm).

c. Shim must be trimmed to fit the affected support footprint.

d. Apply a light coat of Petrolatum (C-008) on the pylon/stop bolt shanks.

-NOTE-

The clamping pressure must be applied carefully to ensure firm contact but avoid excessive adhesive squeeze-out.

e. Bond the laminated shim to the pylon support or stop support using adhesive (C-317). While adhesive is still wet, apply even clamping pressure using flat stock and pylon or stop bolts.

f. Allow the adhesive to cure per manufacturer specifications.

g. Remove pylon support or stop support bolts.

h. Clean the pylon and stop support nutplate threads to remove potential Petrolatum (C-008) from the shimming process.

i. Proceed to step 10.

10. For gaps of 0.008 inch (0.203 mm) or less at pylon support (GAP 1) or stop support (GAP 2) locations, only liquid shimming is required:

-NOTE-

Liquid shimming must be used to rectify maximum gap(s) of 0.008 inch (0.203 mm).

a. Clean the top surface of the peelable or solid shim bonded to the pylon support or stop support.

b. Apply a light coat of Petrolatum (C-008) on the pylon/stop bolt shanks.

c. Apply a layer of adhesive (C-317) on the affected pylon support or stop support shim.

-NOTE-

Removed Pins 100-048-6-X may be re-used if in good condition. Collars 30-015-6 shall be discarded and replaced with new.

d. Install the pylon support or stop support to the roof beam using the removed hardware (Figure 5). Install the four outboard pylon beam or stop fitting bolts through the roof shell by hand.

e. Torque the hardware removed from the roof beam (Figure 5).

CAUTION

Inboard pylon beam or stop fitting roof attachment bolts shall not be torqued during the liquid shimming procedure. The only intent of installing them by hand is to prevent adhesive squeeze-out to reach the threads of the nutplates.

f. Using suitable washers stack-up to simulate pylon beam thickness, torque the two outboard pylon beam or stop fitting roof attachment bolts to obtain a proper clamp up. Do not torque the two inboard pylon beam or stop fitting roof attachment bolts.

g. Allow the adhesive to cure per manufacturer specifications.

h. Seal the edge of the pylon support or stop support with sealant (C-308).

11. For gap(s) between 0.003 inch (0.076 mm) and 0.008 inch (0.203 mm) inside the roof beam (GAP 3), only liquid shimming by injection is required:

-NOTE-

For any gaps over 0.008 inch (0.203 mm) inside roof beam, please contact Product Support Engineering for further instructions.

a. Remove and retain bolt (1, Figure 5) or pin (applicable only at STA 145.40) at the location where a gap is detected. Confirm the gap with the affected bolt or pin removed does not exceed 0.008 inch (0.203 mm).

b. Remove loose material / adhesive between parts using shop air.

c. To plug the hole and prevent adhesive from flowing out through the hole, temporarily locate bolt / pin in position with petrolatum (C-008).

d. Inject adhesive (C-317) within the affected gap(s) and remove excessive squeeze out.

e. Allow the adhesive to cure per manufacturer specifications and remove bolt / pin.

-NOTE-

Removed Pins 100-048-6-X may be re-used if in good condition. Collars 30-015-6 shall be discarded and replaced with new.

f. Clean bolt (1) or pin. Install and torque as shown in Figure 5.

12. Clean pylon or stop support bolt threads.

13. Install the transmission assembly with the mast, swashplate and pylon beam assembly (DMC-407-A-63-21-00-00A-720A-A).

14. Install air inlet cowling assembly (DMC-407-A-53-04-00-02A-720A-A) and transmission fairing assembly (DMC-407-A-53-04-00-01A-720A-A).

15. Install the center passenger headliner (DMC-407-A-25-20-00-04A -720A-A).

16. Make an entry in the helicopter logbook and historical service records indicating compliance with PART II of this Alert Service Bulletin.

VIEW A

DETAIL B
ROTATED 180°

25554_001

Figure 1: Roof shell and beam assembly part number and serial number location

Table 1: Roof shell and beam assembly serial number affected

DY400002 through DY400017	DY400226 through DY400229
DY400019 through DY400074	DY400232
DY400076 through DY400114	DY400234 through DY400235
DY400116 through DY400189	DY400238
DY400195 through DY400198	DY400240
DY400203 through DY400221	DY400248
DY400224	

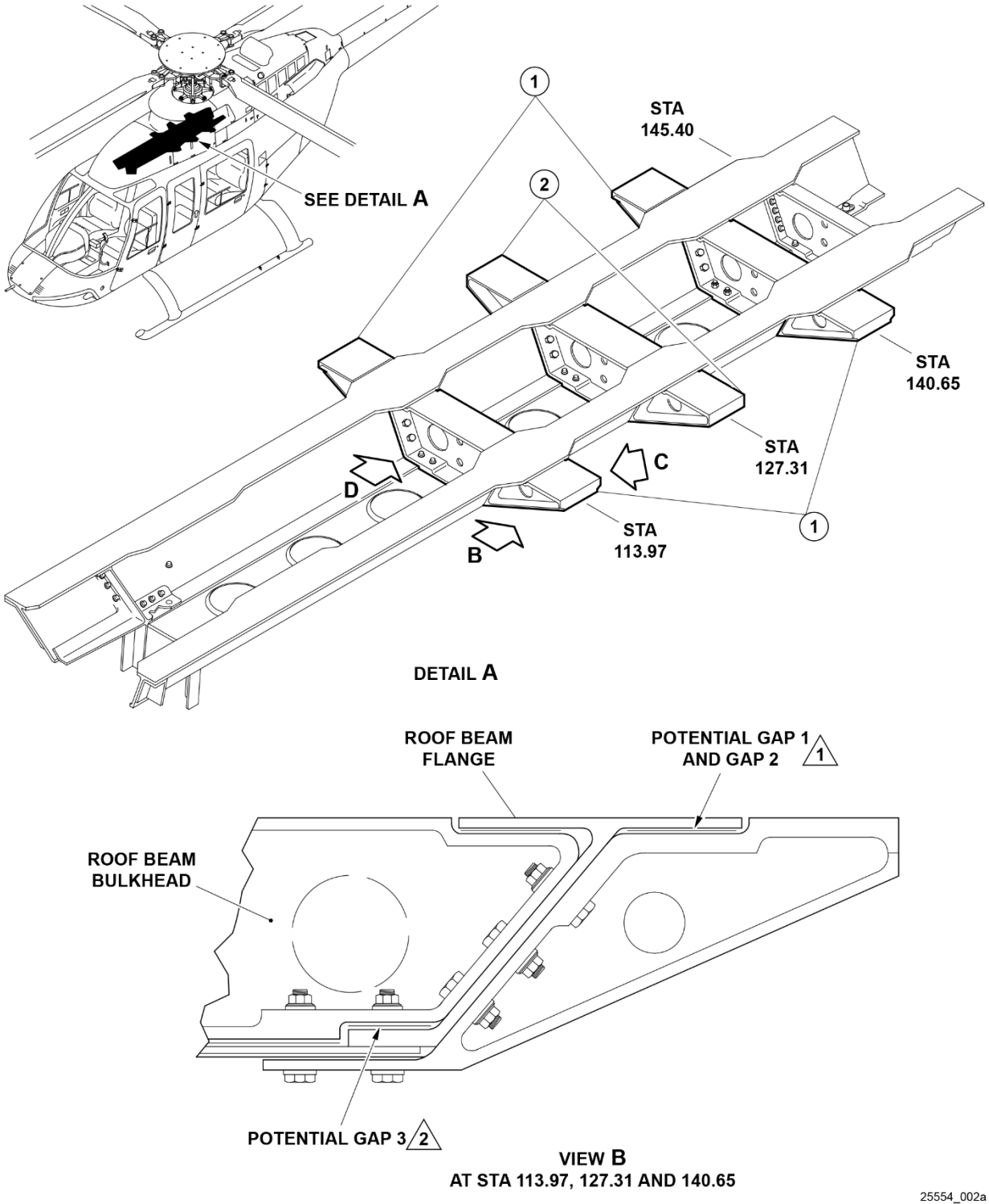
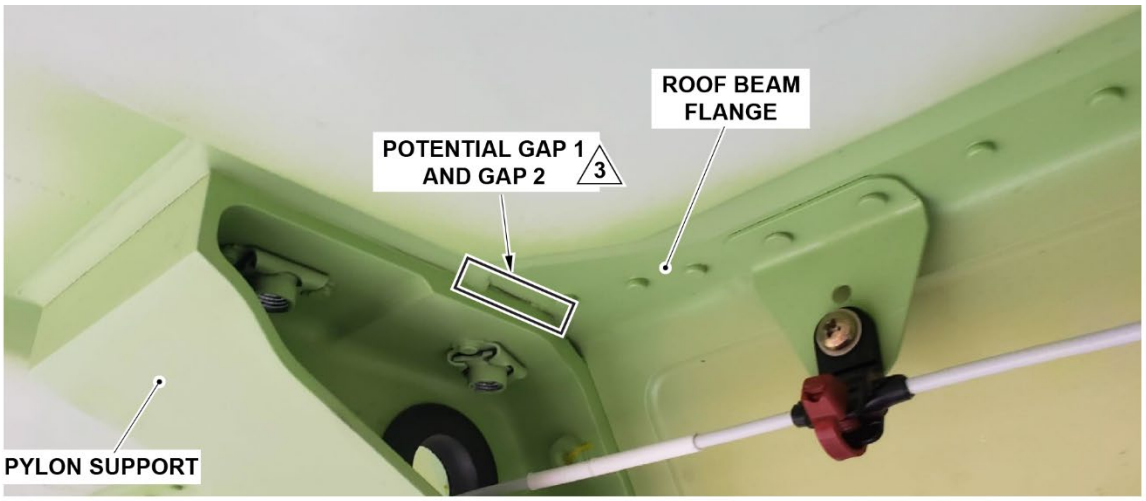


Figure 2: Roof beam potential Gap locations (Sheet 1 of 2)



VIEW C
AT STA 113.97, 127.31 AND 140.65

VIEW D
AT STA 113.97, 127.31, 140.65 AND 145.40
AFT SIDE SHOWN, FWD SIDE OPPOSITE

1. Pylon support (407-030-425-101) QTY 4
2. Stop support (407-030-428-101) QTY 2

NOTES

1. Gap 1 located at STA 113.97 and 140.65, Gap 2 is similar to Gap 1 but at STA 127.31.
2. Qty (4) Gaps must be checked at STA 113.97, 127.31 and 140.65 (Fwd / Aft L/H side and Fwd / Aft R/H side). Qty (2) Gaps must be checked at STA 145.40 (Fwd L/H side and Fwd R/H side).
3. Must be checked at these locations (fore and aft).

25554_002b

Figure 2: Roof beam potential at fuselage STA 113.97, 127.31, 140.65 and 145.40 (Sheet 2 of 2)

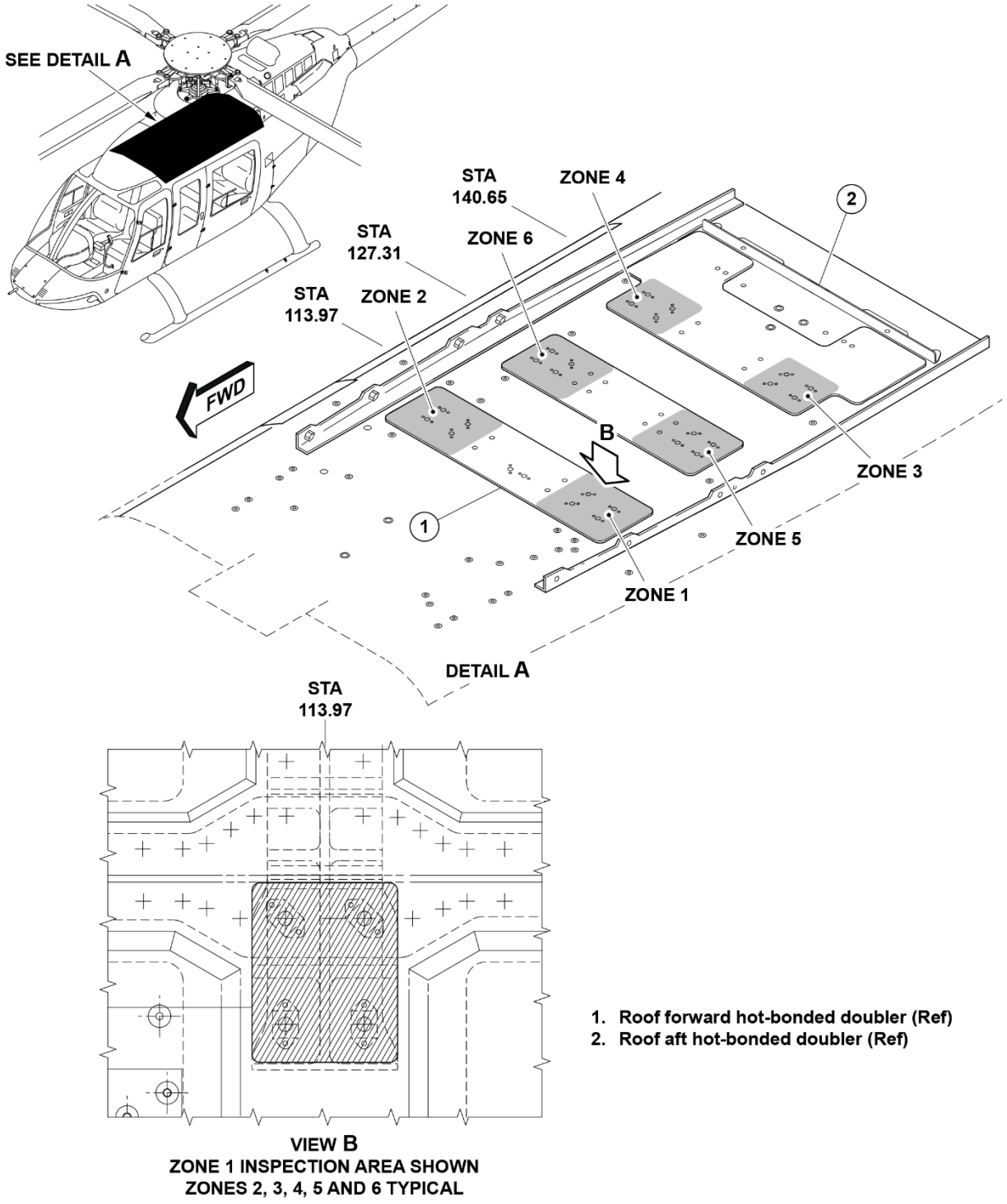
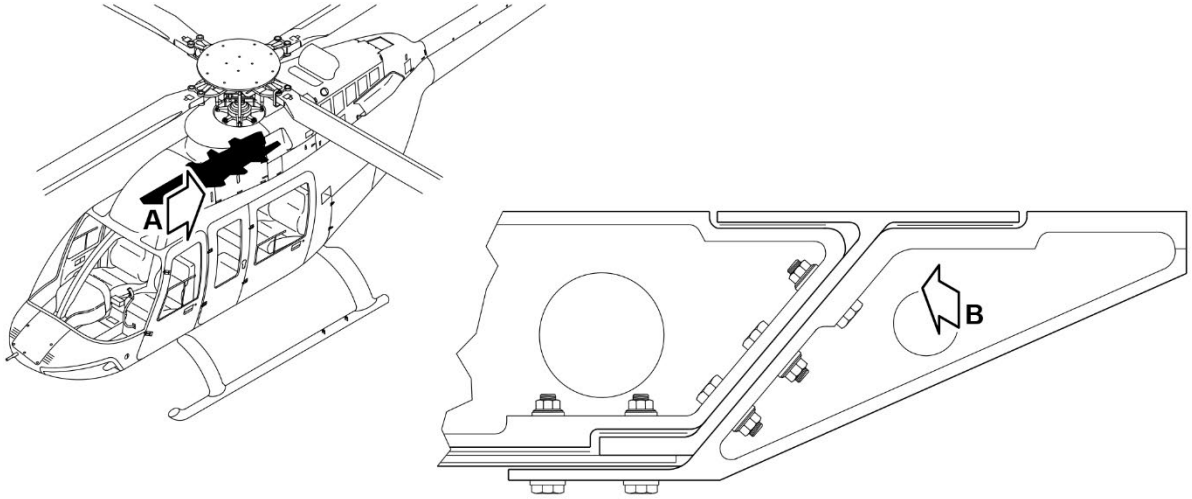


Figure 3: Roof shell doubler FPI inspection areas



VIEW **A**
AT STA 113.97, 127.31 AND 140.65

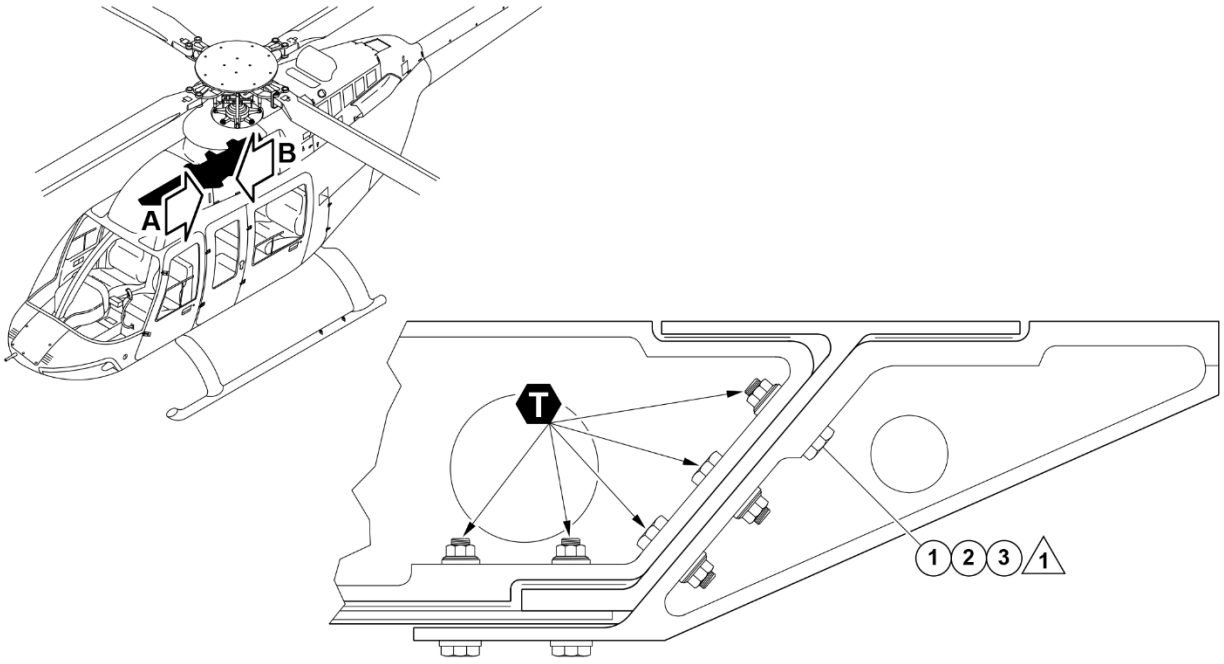
VIEW **B**

NOTE

1 **Pylon support and stop support area to inspect using a 10X magnifying glass.**

25554_004

Figure 4: Pylon support and stop support area to inspect



1. Bolt (NAS6404-(XX))
2. Washer (NAS1149DO432K)
3. Nut (MS21042L4 or NAS9926-4L)
4. Pin (100-048-6-X)
5. Collar (30-015-6)

T 50 TO 70 IN-LBS
(5.6 TO 7.9 Nm)

NOTES

1. Different length of bolts and pins are used depending on their locations.
2. At STA 145.40 use pin (100-048-6-X) instead of bolt (NAS1149DO432K).

25554_005

Figure 5: Installation of pylon and stop supports