WPR23LA004

AIRWORTHINESS

Group Chair's Factual Report – Attachment 1

Bell Alert Service Bulletin No. 206-20-139

A Textron Company

ALERT SERVICE BULLETIN 206-20-139

21 July 2020
Revision A, 21 August 2020

MODEL AFFECTED: **206A/B and TH-67**

SUBJECT: **SEGMENTED TAIL ROTOR DRIVESHAFTS 206-040-330-003/-101, 206-040-931-009/-011/-101/-103, 206-040-365-101/-105/-121/-123 WITH BONDED ADAPTERS, PROOF LOAD TEST OF.**

HELICOPTERS AFFECTED: **Serial numbers 004 through 1251 (equipped with the five (5) segmented bonded driveshafts), 1252 through 4523 and 5101 through 5267.**

COMPLIANCE: **PART I** Within the next 75 flight hours or 3 months after the release date of this bulletin, and every 300 flight hours or 12 months thereafter.

PART II At customer's option.

DESCRIPTION:

Bell has received reports of disbonds of the bonded adapters on the segmented tail rotor driveshaft part numbers 206-040-369-101 and 206-040-931-009. Disbonding of a tail rotor driveshaft adapter can result in a loss of tail rotor drive and control of the helicopter. **PART I** of this Alert Service Bulletin (ASB) introduces an initial, and recurring, proof load testing procedure of installed bonded tail rotor driveshafts to verify the integrity of the bond line. If an affected bonded tail rotor driveshaft assembly fails the proof load test, it is to be replaced with a serviceable segmented bonded driveshaft as per the applicable Maintenance Manual or by a riveted tail rotor driveshaft using the instructions in the Technical Bulletin 206-06-186. **PART II** of this ASB provides a terminating action to **PART I**, with the replacement of all bonded tail rotor driveshaft assemblies with riveted tail rotor driveshafts using the information published in the Technical Bulletin 206-06-186. Applicability of this bulletin to any spare part shall be determined prior to its installation on an affected helicopter.

Revision A allows failed bonded tail rotor driveshafts to be replaced with serviceable bonded driveshafts that meet the intent of this bulletin and makes corrections to some of the metric dimensions in Figure 1 of this bulletin. It is also being used to inform owners and operators that some helicopters outside of the **HELICOPTERS AFFECTED** serial number range may have been modified with segmented bonded shafts through local aviation authority approvals; in this case, the bulletin shall be carried out on those helicopters as well.

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
LIGHT Tel: 450-437-2862 / 1-800-363-8023 / productsupport@bellflight.com

MANPOWER:

Approximately 1.5 man-hour is required to complete **PART I** of this bulletin. Approximately 12.0 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:

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

MATERIAL:

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

Part Number	Nomenclature	Qty (Note)
206-040-383-101	Aft Short Shaft (riveted)	1 (1)
206-040-385-105	Shaft Assembly (riveted)	1 (1)
206-040-385-109	Shaft Assembly (riveted)	4 (1)
9440904	Disk	1 (1)

NOTE 1: Quantity as required. Affected driveshafts may be replaced individually or the complete set may be replaced as per Technical Bulletin 206-06-186. The rotor brake disk is required anytime one or all of the riveted shafts are installed. The purpose of the rotor brake disk is to reduce the effect of the torsional load due to the increased stiffness of the riveted shaft(s).

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 *
2100-09016-02	CPC, MIL-PRF-16173 GR2	1 PT (1)	C-104

* 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:

The bonded shaft tool part number 206-244-001-101 (QTY 2 required) can be procured through your Bell Supply Center or locally manufactured using the information provided on Figure 1.

WEIGHT AND BALANCE:

Not affected if no tail rotor driveshaft is replaced or replaced with a drive shaft of the same part number.
If one or more bonded driveshaft is replaced with a riveted drive shaft, refer to TB 206-06-186.

ELECTRICAL LOAD DATA:

Not affected.

REFERENCES:

BHT-206A/B-SERIES-MM Maintenance Manual, Chapters 53, 65, and 71
BHT-ALL-SPM, Standard Practice Manual, Chapter 2
Technical Bulletin 206-06-186

PUBLICATIONS AFFECTED:

BHT-206A/B-SERIES-MM, Maintenance Manual, Chapter 5 and 65.

ACCOMPLISHMENT INSTRUCTIONS:

PART I – Proof load test procedure

1. Prepare the helicopter for maintenance and gain access to the tail rotor driveshafts. (BHT-206A/B-SERIES-MM, Chapters 53, 65, and 71).

2. Verify the part numbers of the segmented tail rotor driveshafts installed. If all the tail rotor driveshafts are riveted tail rotor driveshafts (206-040-383-101, 206-040-385-105, and 206-040-385-109) go to step 15, otherwise go to step 3. Having all riveted tail rotor driveshafts is considered meeting the intent of **PART II** of this ASB and a terminating action to **PART I**.

3. Carry out a detailed visual inspection of the bond line on the inboard end of the flange of the bonded tail rotor driveshafts using a 10X magnifying glass (Figure 2). If the bond line area shows damage such as cracked or missing adhesive or evidence of corrosion, the affected shaft is deemed un-repairable and must be removed from service and scrapped. Replace affected driveshaft(s) with a riveted tail rotor driveshaft(s) (TB 206-06-186).

-NOTE-

Two people are required to carry out the proof load testing procedure of the bonded tail rotor driveshafts. Proof loading of the shafts is carried out with the shafts installed on the helicopter.

4. Index-mark each bonded tail rotor driveshaft and adapters with a fine tip felt marker (Figure 2) and number the shafts (example: Aft SS, 1, 2, 3, 4 and, 5. Driveshaft #5 being the closest to the tail rotor gearbox).

-NOTE-

If the forward short shaft is removed, install the (206-040-328) sliding adapter and work aid (Bonded Shaft Tool 206-244-001-101) on the forward splines of the oil cooler fan shaft. The bonded shaft tool 206-244-001-101 can be locally manufactured using the information in Figure 1 or can be purchased from a Bell Supply Center.

5. If the forward short shaft is installed, attach the bonded shaft tool on the aft face of the sliding adapter flange (206-040-328), on the forward splines of the oil cooler blower shaft. Removal of the forward short shaft is not required.

6. Install the bonded shaft tool on the (206-040-328) sliding adapter flange of the forward splines of the oil cooler blower shaft using two (2) AN174-12 or NAS6604-12 bolts, current washers AN960-416L, and nuts MS21042L4, NAS9926-4L or MS35650-3252 nut, or equivalent (Figure 3).

7. Remove two (2) AN174 bolts from the (206-040-328) sliding adapter on the input pinion of the tail rotor gearbox.

8. Install the second bonded shaft tool on the aft face of the sliding adapter (206-040-328) of the input pinion of the tail rotor gearbox using two (2) AN174-12 of NAS6604-12 bolts, current washers AN960-416L, and nuts MS21042L4, NAS9926-4L or MS35650-3252 nut, or equivalent (Figure 3).

-NOTE-

This following step may be carried out from either the left or right side of the helicopter, depending on access.

9. One person is required to hold the bonded shaft tool on the splines of the forward end of the oil cooler blower shaft with a ½-inch square drive breaker bar (Figure 4).

WARNING

To avoid personnel injury, use caution when carrying out the proof load testing in case of a sudden bond separation of the tail rotor driveshafts.

CAUTION

Protect the fuselage and tailboom adequately to prevent damage that may be caused by the breaker bar, torque wrench, and bonded shaft tools.

10. One person is required to hold the torque wrench on the bonded shaft tool installed on the sliding adapter (206-040-328) of the tail rotor gearbox input pinion (Figure 4).

-NOTE-

Use a ½-inch square drive dial-type torque wrench capable of measuring up to 150 foot-pounds (237 Newton-meters). Refer to BHT-ALL-SPM, Figures 2-1, 2-2 and 2-3 concentric and non-concentric type attachments. Examples of torque values when using concentric and nonconcentric attachments are shown in Figure 5.

11. For helicopters equipped with the 1.0-inch diameter shafts 206-040-330-003/-101 and 206-040-931-009/-011/-101/-103 carry out the proof load testing of the installed driveshafts by applying the equivalent of 82 foot-pounds (111 Newton-meters). Stand on the left side of the tailboom (tail rotor side), position the torque wrench vertically (12 o'clock) and pull down until the required torque is reached. For helicopters equipped with the 1.25-inch diameter shafts 206-040-369-001/-101 and 206-040-365-101/-105/-121/-123, carry out the proof load testing of the installed tail rotor driveshafts by applying the equivalent of 123 foot-pounds (167 Newton-meters) of torque.

-NOTE-

Unserviceable bonded tail rotor driveshafts may be replaced individually with riveted driveshafts or as a complete set as per Technical Bulletin 206-06-186.

12. In the event of a bond line failure, record the torque value at which it failed as well as the affected the shaft position, part number, serial number and which end failed. Notify Bell Product Support Engineering of the findings. Replace the affected driveshaft with a serviceable bonded tail rotor driveshaft as per the applicable Maintenance Manual or a riveted tail rotor driveshaft (TB 206-06-186) and repeat step 11.

13. Following the proof load testing, carry out a detailed visual inspection of the bond line on the inboard end of the flange of the tail rotor driveshafts using a 10X magnifying glass to ensure there was no movement of the bonded adapter during the proof load testing.

14. After the proof load testing procedure has been successfully carried out, re-install previously removed attaching hardware (BHT-206A/B-SERIES-MM, Chapters 53, 65, and 71). Carry out the torque check of the disc pack coupling hardware per Maintenance Manual Chapter 5 requirements.

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

16. If **PART II** of this ASB has not been accomplished, repeat **PART I** every 300 hours or 12 months, whichever comes first.

PART II – Installation of riveted tail rotor driveshafts

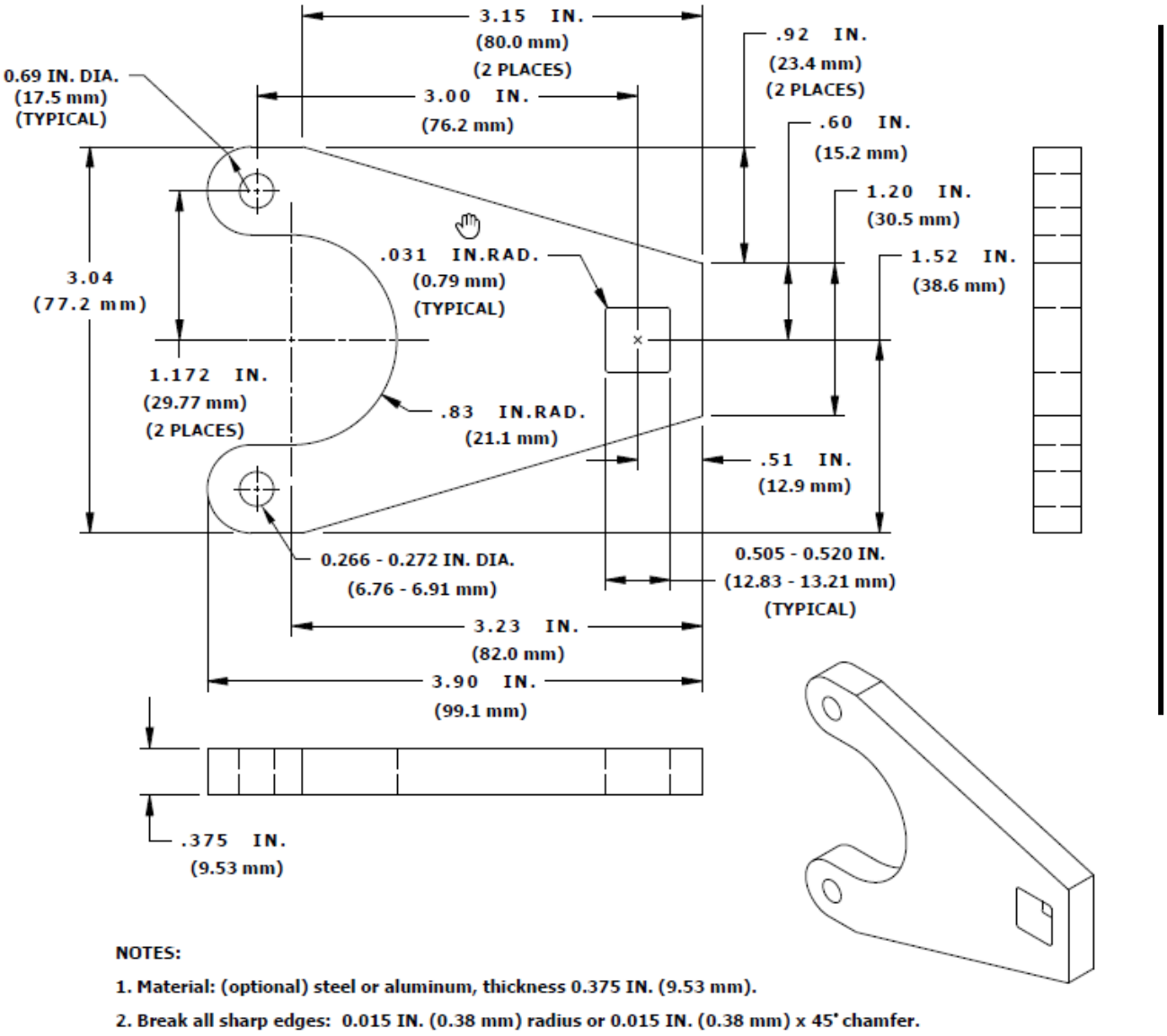
-NOTE-

PART II of this ASB is considered the terminating action to the requirements of **PART I**.

1. Prepare helicopter for maintenance.

2. Remove all bonded tail rotor driveshafts and install riveted tail rotor driveshafts 206-040-383-101, 206-040-385-105, or 206-040-385-109, in all locations applicable (Technical Bulletin 206-06-186).

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



NOTES:

1. Material: (optional) steel or aluminum, thickness 0.375 IN. (9.53 mm).
2. Break all sharp edges: 0.015 IN. (0.38 mm) radius or 0.015 IN. (0.38 mm) x 45° chamfer.

Figure 1 – Bonded Shaft Tool (206-244-001-101)

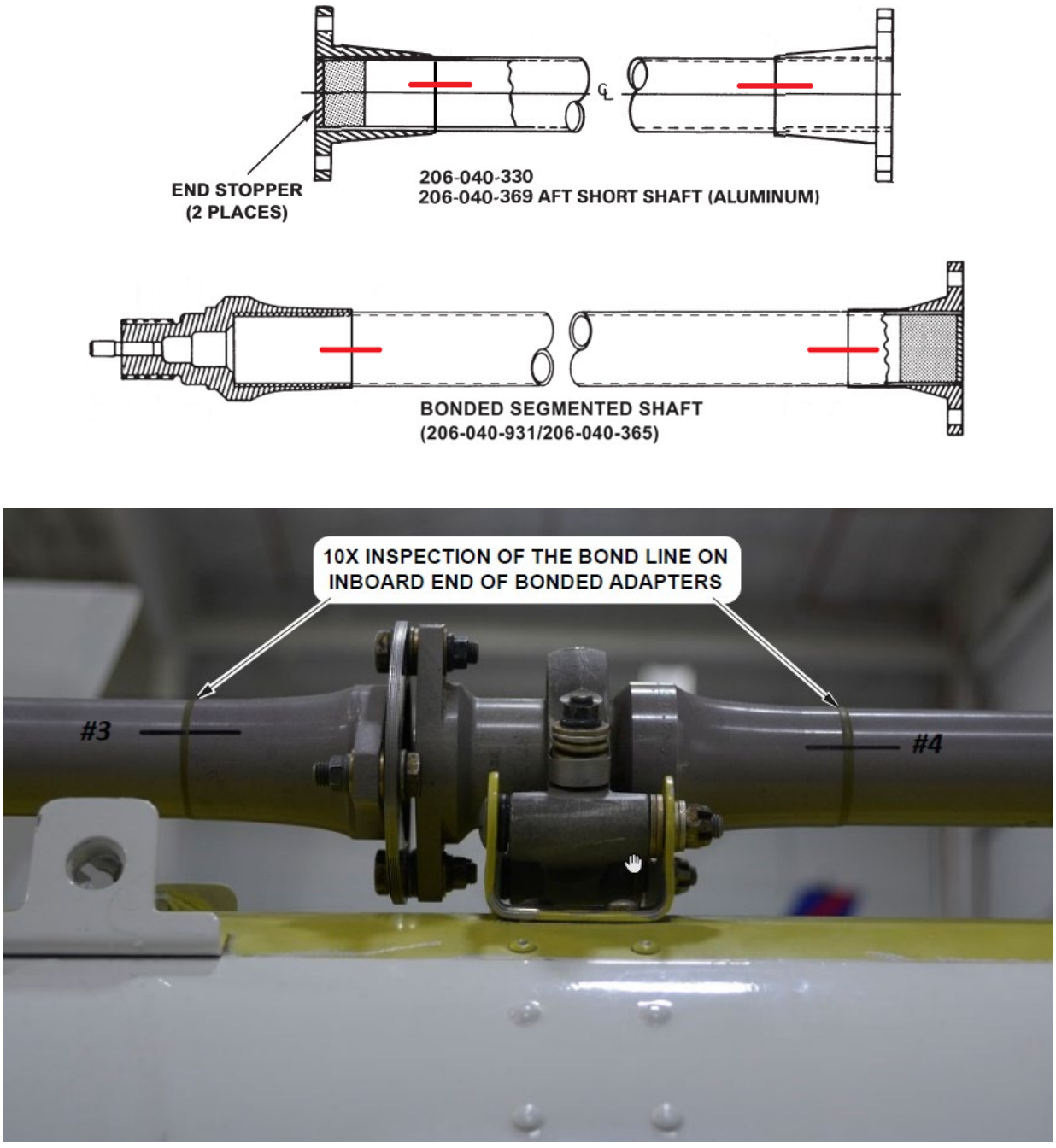


Figure 2 – Example of Tail Rotor Driveshaft Numbering and Index Marking

Figure 3 - Examples of Bonded Shaft Tool Installations

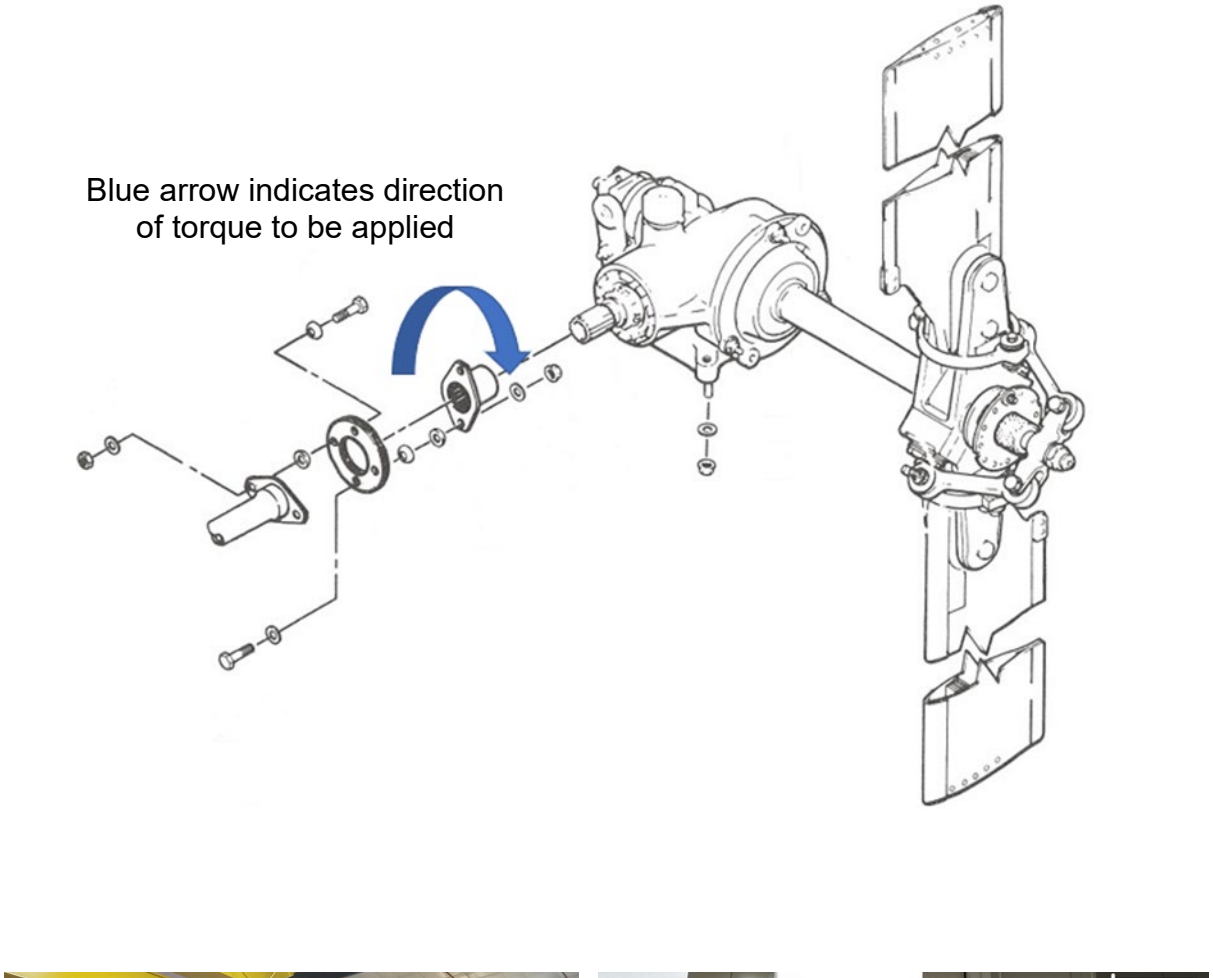
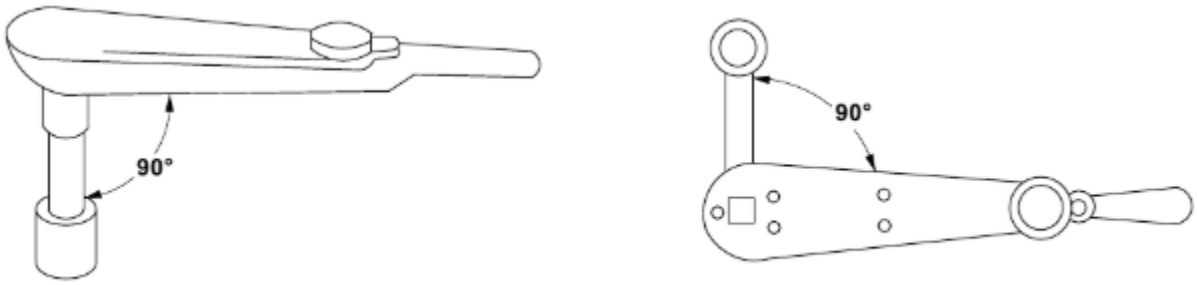


Figure 4 – Proof Load testing



NOTE

Applied and indicated torque values are the same.

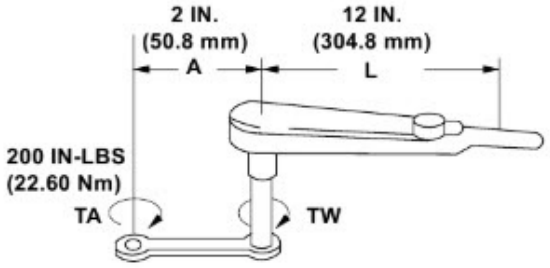
Torque Wrench Concentric Type Attachments
(Ref) BHT-ALL-SPM, Chapter 2

FORMULA TO OBTAIN CORRECT INDICATED TORQUE VALUE WHEN USING NONCONCENTRIC ATTACHMENT

$$TW = \frac{(TA) \times (L)}{(L) \pm (A)}$$

TW = INDICATED TORQUE VALUE ON TORQUE WRENCH
TA = ACTUAL TORQUE VALUE APPLIED TO FASTENER
L = LEVEL LENGTH
A = ATTACHMENT LENGTH

FORMULA



$$TW = \frac{200 \times 12}{12 + 2} = \frac{2400}{14} = 171.4 \text{ IN-LBS } (19.37 \text{ Nm})$$

RESULTS: FASTENER TORQUED 200 IN-LBS (22.60 Nm) WHEN WRENCH INDICATES 171.4 IN-LBS (19.37 Nm)

EXAMPLE 1

Figure 5 – Nonconcentric Type Attachments
(Ref) BHT-ALL-SPM, Chapter 2