# HUGHES SERVICE INFORMATION NOTICE

*Supersedes Service Information Notice No. N-141 dated 24 December 1976

MANDATORY MANDATORY MANDATORY

SUBJECT: FIELD MODIFICATION AND INTERIM INSPECTIONS - BELT DRIVE CLUTCH LINEAR ACTUATOR ASSEMBLY

MODELS AFFECTED: The following helicopters equipped with Clutch Actuator PN 269A4564 or DL1020M82C (24 VDC) or DL1020M48 or DL1020M81C (12 VDC):

269A (TH-55A) Helicopter Serial No. 0315 thru 1109†
269A-1 Helicopter Serial No. 0001 thru 0041†
269B Helicopter Serial No. 0001 and subsequent
269C Helicopter Serial No. 0004 thru 0569†

†Helicopters with 24-volt electrical system and equipped with 269A4564-5 Clutch Actuator Assembly are NOT affected by this Notice.

TIME OF COMPLIANCE:

Part I - Field Modification - Shall be accomplished within next 600 hours of helicopter operation, or within one year after date of this Notice, whichever is sooner.

Part II - Daily Visual Inspection - Shall be accomplished prior to first flight each day until compliance with Part I of this Notice is accomplished.

Part III - 100-Hour Dye Penetrant Inspection - Shall be accomplished at each 100-Hour Periodic Inspection interval until compliance with Part I of this Notice is accomplished.

PREFACE: Field reports indicate that cracking and failure of certain aluminum components of the clutch actuator assembly and attach hardware has occurred in service. Part I of this Service Information Notice lists a procedure for a field modification to replace the aluminum fixed end fitting on the clutch actuator with a stainless steel end fitting having greater strength and resistance to corrosion, cracking and deformation. Instructions are also provided for replacing the existing

(▮) Denotes portion of text added or revised.

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PREFACE (Continued)

aluminum actuator shaft, if installed, with a stainless steel shaft on early 269A (TH-55A), 269A-1 and 269B helicopters; and for replacing the existing aluminum 269A5490 attach fitting, where required, with a steel strap-type 269A5491-5 attach bracket.

Part II of this Notice lists a procedure for an interim daily visual inspection of the actuator aluminum fixed end fitting and shaft for cracks, deformation or other damage. Compliance with Part I removes the requirement for the daily inspection.

Part III of this Notice lists a procedure for an interim 100-Hour dye penetrant inspection of the actuator aluminum fixed end fitting and shaft for cracks and damage. Compliance with Part I removes the requirement for the 100-Hour dye penetrant inspection.

## References

269 Series - Basic HMI, Issued 1 April 1973; Revision No. 4, 15 December 1976

## PARTS LIST

| Nomenclature | Part No. | Qty |
|---|---|---|
| Modification Kit K-179: | | |
| Fixed End Fitting | A2402-2 | 1 |
| O-ring | MS28775-015 | 1 |
| Shim | S7002 | 3 |
| Shim | S7002-002 | 3 |
| Shim | S7002-005 | 3 |
| Screw, Mach Socket Head | S6370CESHS4-12 | 4 |
| O-Ring, Connector | MS28775-017 | 1 |
| Modification Plate | A6605 | 1 |
| *Shaft, Stainless Steel | AA56160 | 1 |
| **Attach Bracket, Steel | 269A5491-5 | 1 |

*Replacement, as applicable, for AA56160 aluminum actuator shaft installed on early 269A (TH-55A), 269A-1 and 269B helicopters. (NOTE: Stainless steel and aluminum shaft have same part number.)

**Replacement, as required, for aluminum actuator attach fitting PN 269A5490 installed on early 269A(TH-55A), 269A-1 and 269B helicopters.

MATERIALS

| | | |
|---|---|---|
| Dye Penetrant Kit | "Spotcheck" | Peabody Testing-Magnaflux<br>6800 East Washington Blvd.<br>Los Angeles, CA |
| | | or |
| | "Tracer-Tech" | Uresco, Inc.<br>12412 Benedict Ave.<br>Downey, CA |
| | | or |
| | Equivalent kit conforming to MIL-I-25135 | |

PART I - FIELD MODIFICATION

NOTE

For helicopters with 24-volt electrical system, existing clutch actuator may be modified per Part I of this Notice, or a new 269A4564-5 Clutch Actuator Assembly may be installed.

a. Remove belt drive clutch control linear actuator from helicopter, per Section 10 of Basic HMI; remove clevis from end of actuator shaft.

b. Disassemble clutch actuator as follows (see Figure 1):

1. Remove sealing tape between covers (2) and (22), then remove nut (1) and slide off cover (2).

2. Remove O-rings (3) and (4).

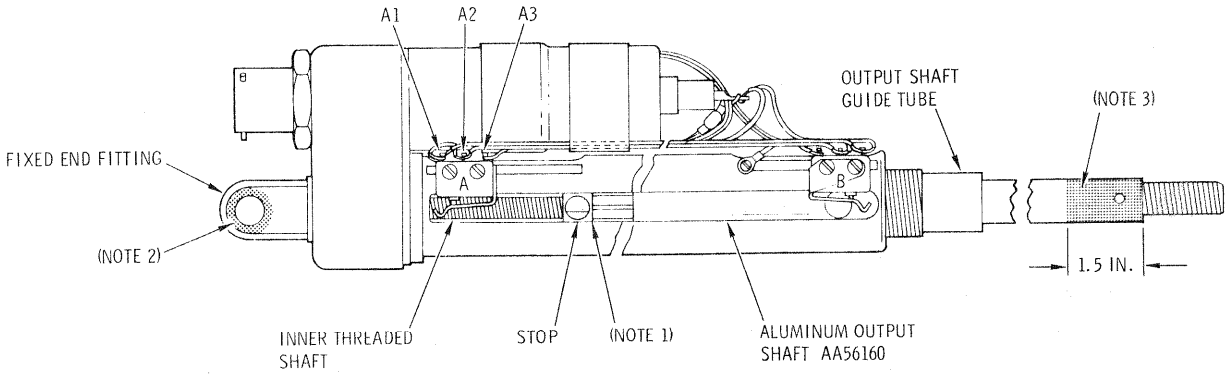
3. Remove fixed end fitting (5) by removing four screws (6).

NOTE

Use caution not to disturb gear train, associated bearings and gear housing (12 through 20). The modification does not require removal of these items.

4. Replace two existing screws (6) in lower holes of housing (20) to secure it during modification. Discard the two remaining screws (6).

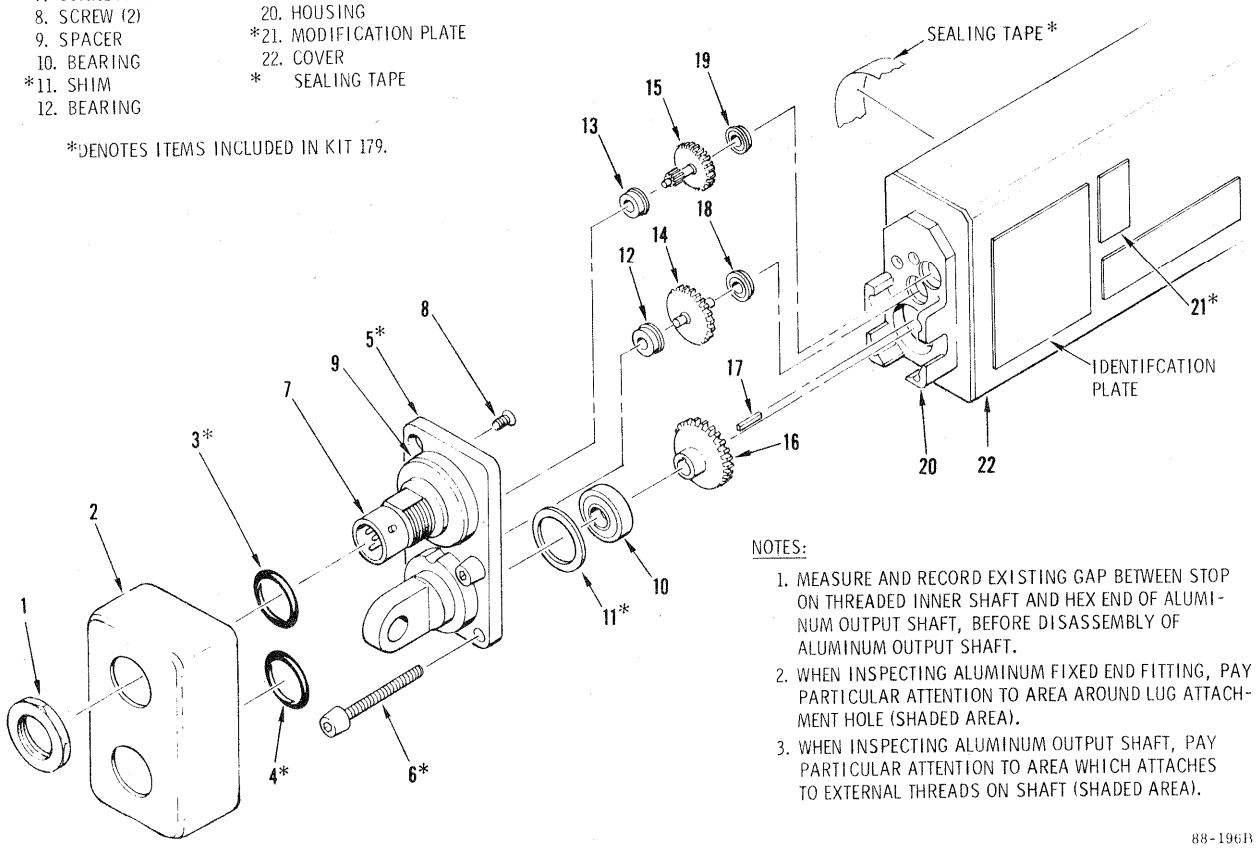
5. Remove bearing (10) and shim (11) from bore in fixed end fitting (5). Measure and record shim thickness. Discard existing shim (11).




INSPECTION AND REPLACEMENT OF ALUMINUM OUTPUT SHAFT AND END FITTING

1. NUT
2. COVER
*3. O-RING
*4. O-RING
*5. FIXED END FITTING
*6. SCREW (4)
7. CONNECTOR
8. SCREW (2)
9. SPACER
10. BEARING
*11. SHIM
12. BEARING
13. BEARING
14. GEAR AND PINION
15. GEAR AND PINION
16. SPUR GEAR
17. KEY
18. BEARING
19. BEARING
20. HOUSING
*21. MODIFICATION PLATE
22. COVER
* SEALING TAPE

*DENOTES ITEMS INCLUDED IN KIT 179.




NOTES:

1. MEASURE AND RECORD EXISTING GAP BETWEEN STOP ON THREADED INNER SHAFT AND HEX END OF ALUMINUM OUTPUT SHAFT, BEFORE DISASSEMBLY OF ALUMINUM OUTPUT SHAFT.
2. WHEN INSPECTING ALUMINUM FIXED END FITTING, PAY PARTICULAR ATTENTION TO AREA AROUND LUG ATTACHMENT HOLE (SHADED AREA).
3. WHEN INSPECTING ALUMINUM OUTPUT SHAFT, PAY PARTICULAR ATTENTION TO AREA WHICH ATTACHES TO EXTERNAL THREADS ON SHAFT (SHADED AREA).

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Figure 1. Inspection and Modification - Belt Drive Clutch Actuator Assembly

6. Remove connector (7) by removing two screws (8); remove spacer(9).

7. Carefully slide sleeving from terminals on connector (7) and unsolder leadwires.

8. Remove and discard existing fixed end fitting (5).

c. Reassemble clutch actuator as follows:

1. Place electrical wires through bore in new fixed end fitting (5).

2. Place existing sleeving over ends of electrical wires.

3. Solder electrical wires to connector as follows:

| Wire Color | Connector Terminal |
|---|---|
| Black | A |
| Red | B |
| White | C |
| Blue | D |

NOTE

Solder all connections per MIL-S-6872 with solder SN60WRMAP3-.063, Fed Spec QQ-S-571.

4. Slide sleeving over soldered connections.

5. Install connector (7) to fixed end fitting (5) with spacer (9), using two screws (8). Torque screws to 2.0 to 2.5 inch-pounds.

NOTE

(For TH-55A, 269A-1 and 269B helicopters only)
Examine actuator output shaft to determine whether shaft is aluminum or stainless steel. If aluminum, replace with stainless steel output shaft. Aluminum shaft has dull gray anodized finish; stainless steel has polished finish. If there is a doubt as to shaft material, check with ohmmeter as follows: Clean shaft with solvent to remove dirt and grease. Using low scale on meter, apply light finger pressure and place probes on shaft. Aluminum shaft will show no meter indication, as long as anodize is not scratched. Stainless steel shaft will deflect needle full scale.

6. As applicable, replace aluminum shaft AA56160 with stainless steel shaft AA56160 as follows:

   (a) Remove nylon nut on output shaft guide tube and cover (22).

   (b) Remove gear (16) with key (17) from end of inner threaded shaft.

   (c) Using feeler gage or equivalent, measure and record existing gap between stop on threaded inner shaft and hex end of aluminum output shaft inside actuator.

   (d) Extract and unscrew threaded inner shaft and remove aluminum output shaft. Discard output shaft.

   (e) Insert and install new stainless steel output shaft on threaded inner shaft so that gap dimension between stop and hex end of new output shaft is identical to that recorded in substep c. 5(c) above.

7. Reinstall gear (16) and key (17). Install new shim (11) of same thickness as recorded in step b. 5. and existing bearing (10) into bore of new fixed end fitting (5).

CAUTION

Shim (11) is used as necessary to eliminate end play. End play after assembly (see step d below) shall not exceed 0.010 inch at the output shaft. Install additional S7002-002 and -005 shims as required.

8. Remove and discard two screws (6) used to hold housing to actuator during modification. Install new fixed end fitting (5) to housing (20) using new screws (6). Torque screws (6) to 5 to 7 inch-pounds.

d. Perform bench test of actuator as follows:

1. Endplay

   (a) Mount actuator in vise or suitable fixture; apply static tension load of 10.0 ±1.0 pound to output shaft, using spring scale or equivalent.

   (b) Set dial indicator at end of output shaft and zero indicator. Release the load.

   (c) Apply a static compression load of 10.0 ±1.0 pound; output shaft endplay must not exceed 0.010 inch. Release the load.

NOTE

If output shaft endplay is greater than 0.010 inch, install additional shim (11) and retest for endplay.

2. Direction of operation

CAUTION

During any operational check, the actuator must be case grounded to allow dynamic braking at the electrical limits.

NOTE

Power must be applied to pins A and B only.

(a) Apply 24.0 VDC for 24 VDC actuator (12.0 VDC for 12 VDC actuator) with the positive (+) potential applied to pin A, and the negative (-) potential applied to pin B. The output shaft must move towards the extended direction.

(b) Apply 24.0 VDC for 24 VDC actuator (12.0 VDC for 12 VDC actuator) with the positive (+) potential applied to pin B, and the negative (-) potential applied to pin A. The output shaft must move towards the retract direction.

(c) Using a volt ohmmeter, check for electrical continuity between pin D and pin A; and between pin C and pin D.

3. Electrical Stroke

(a) Apply 24.0 VDC for 24 VDC actuator (12.0 VDC for 12 VDC actuator). Operate the output shaft into the electrical retract. The dimension between the centerline of the fixed end fitting and the end of the output shaft must be 9.530 to 9.590 inches.

(b) Operate the output shaft into the electrical extend. The dimension between the centerline of the fixed end fitting and the end of the output shaft must be 15.030 to 15.090 inches.

f. Install new O-rings (3) and (4). (Figure 1)

g. Slide on cover (2) and secure loosely with nut (1).

h. Install cover (22) and secure with nylon nut.

i. Install clevis on end of actuator shaft.

j. Identify reworked actuator by impression stamping "K179" and date of modification on modification plate (21). Install modification plate (21) as shown.

k. Reinstall and adjust linear actuator, per Section 10 of Basic HMI. Secure actuator cover with nut; reseal cover seam with 3/4-inch width plastic electrical tape.

NOTE

Early Model 269A (TH-55A), 269A-1 and 269B helicopters may have aluminum 269A5490 fitting installed in center frame section for actuator attachment (see Figure 2). Replacement of 269A5490 aluminum fitting with 269A5491-5 steel strap-type bracket is required if aluminum 269A5490 fitting lugs are bent or damaged.

For early 269A (TH-55A) and 269A-1 helicopters with 24-volt electrical system, replacement of existing aluminum 269A5490 fitting with 269A5491-5 steel strap-type bracket is required, if new 269A4564-5 actuator is installed.

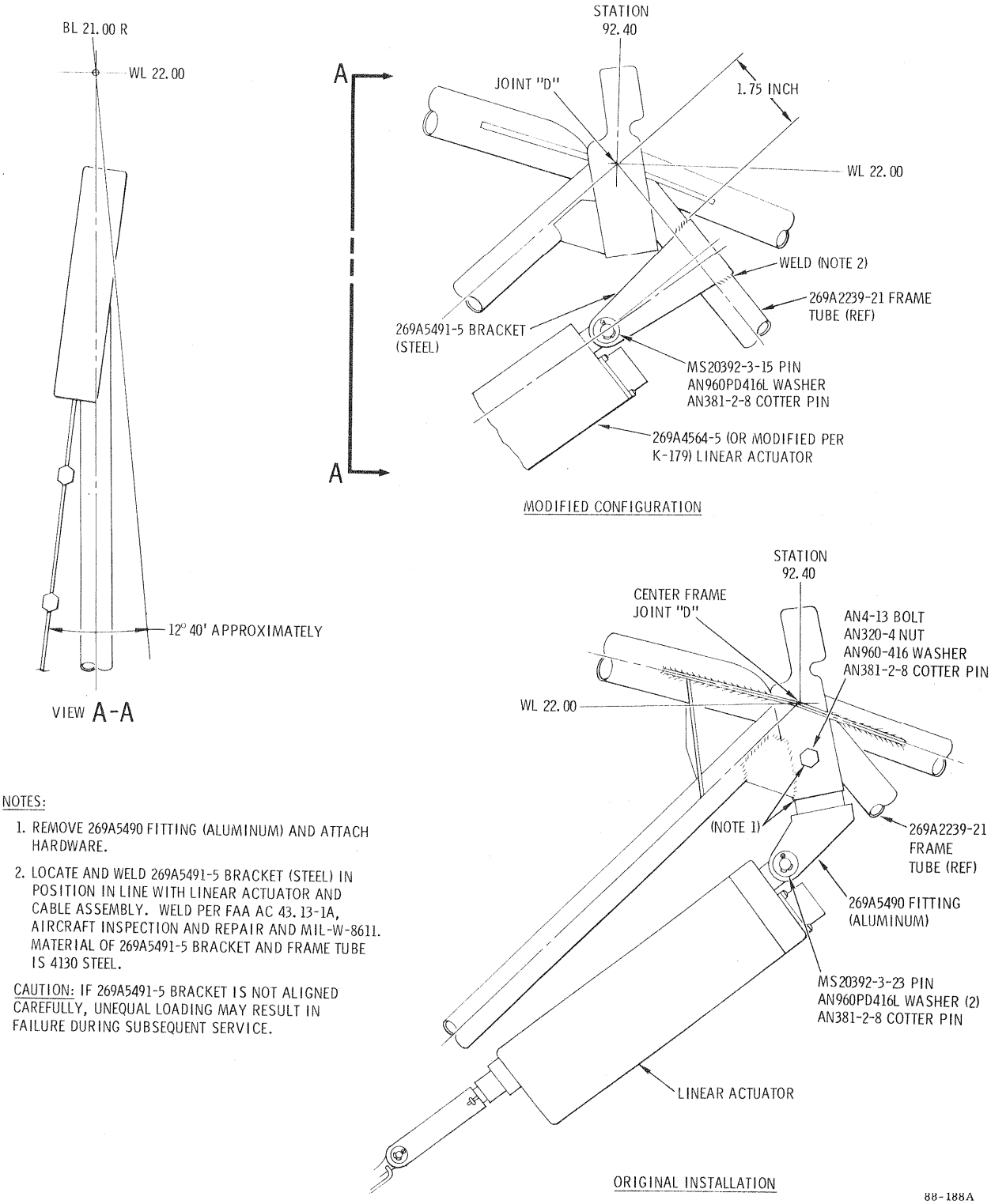
l. As required, remove aluminum 269A5490 attach fitting from helicopter center frame section. Install new 269A5491-5 bracket on frame tube; position and weld strap bracket in line with linear actuator and cable assembly as shown in Figure 2. Touch up and paint reworked surfaces, per Section 2 of Basic HMI.

m. Perform operational check of linear actuator, per Section 10 of Basic HMI.

n. Record installation of stainless steel fixed end fitting (and steel actuator shaft and/or attach bracket, as applicable) per Part I of this Notice in Compliance Record of helicopter Log Book.

WEIGHT AND BALANCE DATA

Weight and balance not affected.




NOTES:

1. REMOVE 269A5490 FITTING (ALUMINUM) AND ATTACH HARDWARE.
2. LOCATE AND WELD 269A5491-5 BRACKET (STEEL) IN POSITION IN LINE WITH LINEAR ACTUATOR AND CABLE ASSEMBLY. WELD PER FAA AC 43.13-1A, AIRCRAFT INSPECTION AND REPAIR AND MIL-W-8611. MATERIAL OF 269A5491-5 BRACKET AND FRAME TUBE IS 4130 STEEL.

CAUTION: IF 269A5491-5 BRACKET IS NOT ALIGNED CAREFULLY, UNEQUAL LOADING MAY RESULT IN FAILURE DURING SUBSEQUENT SERVICE.

Figure 2. Installation of 269A5491-5 Bracket, Clutch Actuator

PART II - DAILY INSPECTION

a. Until compliance with Part I of this Notice is accomplished, visually inspect actuator aluminum fixed end fitting and shaft as follows: (See Figure 1.)

1. Inspect aluminum fixed end fitting for cracks, corrosion, deformation, hole elongation, or bending. Pay particular attention to the area around the lug attachment hole.

2. Inspect the exposed length of the aluminum shaft for cracks, corrosion, deformation or other damage, with shaft fully extended (clutch switch in "Disengage" position). Pay particular attention to area shown in Figure 1.

NOTE

If cracking, corrosion, deformation or other damage is noted, replace with new stainless steel fixed end fitting or new steel shaft, as applicable.

b. Record compliance with Part II of this Notice in Compliance Record of helicopter Log Book.

PART III - 100-HOUR INSPECTION

a. Until compliance with Part I of this Notice is accomplished, perform dye penetrant inspection of actuator aluminum fixed end fitting and aluminum shaft for cracks and structural integrity; pay particular attention to areas specified in Part II, step a above and Figure 1. Perform dye penetrant inspection in accordance with kit manufacturer's instructions.

b. Record compliance with Part III of this Notice in Compliance Record of helicopter Log Book.

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