SUBJECT: INTERIM REVISION - HANDBOOK OF MAINTENANCE INSTRUCTIONS (HMI) RE: MAINTENANCE INSTRUCTIONS FOR LOW TIP SPEED TAIL ROTOR ASSEMBLY

MODELS AFFECTED: Model 269A Helicopter Serial No's. 0011 and subsequent incorporating configuration "C" or "D" equipment items noted in the Helicopter Configuration Table in the Owners Manual.
All 269A-1, 269A-2 and 269B Helicopters.

Reference

269A/A-1 Handbook of Maintenance Instructions
TH55A Handbook of Maintenance Instructions Addendum
269B Handbook of Maintenance Instructions
Owners Manual for 269A, 269A-1, TH55A and 269B

The information given in this Service Information Letter is to be used for maintenance and service of the low tip speed tail rotor system utilizing the 269A6034 tail rotor. This data supplements applicable instructions given in the current HMI, and in Service Information Notice No. N-26, covering procedure for field installation of the low tip speed tail rotor assembly. The data is to be considered a part of the HMI until formal incorporation is accomplished at the next revision cycle.

HANDBOOK OF MAINTENANCE INSTRUCTIONS

(A) Applicable to 269A/A-1 HMI
(B) Applicable to 269B HMI

Pg. 1-3 (A, B), Table 1-1. Support Equipment List

| | | | |
|---|---|---|---|
| ADD: | Rigging Aid - Tail Rotor Control Installation | 269A9204 | HTC-AD |

Pg. 1-28 (A), Table 1-7, Pg. 1-15 (B), Table 1-6. Limited Life and Component Overhaul List.

ADD:

| Nomenclature | Part Number | Part Life (Hours) |
|---|---|---|
| Strap Subassembly, Tension Torsion - Tail Rotor | 1701 | 2800 |
| Stabilizer Ass'y - Horizontal | 2516 | 3070 when zero time unit is installed |
| Shaft Assy - Tail Rotor Drive | 6040 | 3000 |
| Spline Adapter Fitting | 6030 | 20,000 |
| Boom Ass'y - Tail | 2320 | 17,370 |

Pg. 2-20 (A), Pg. 2-21 (B); Key to View B

ADD:

NOTE: Low tip speed tail rotor system requires lubrication at points (2) and (5) only. Filler and vent are combined on tail rotor transmission (5).

Pg. 4-3 (A, B), Table 4-2. Troubleshooting - Tail Rotor Vibration

ADD:

| Condition | Probable Cause | Required Action |
|---|---|---|
| High frequency vibration primarily in foot pedals as a buzzing sensation | Tail rotor blades slightly out of balance | Balance tail rotor assembly. |
| | Excessive wear in pitch control link ass'y. bearing | Replace pitch control link ass'y. |

| Condition | Probable Cause | Required Action |
|---|---|---|
| Excessive play in pitch control link assemblies | Excessive wear in pitch control link ass'y. bearing | Replace pitch control link ass'y. |
| Pedals Binding | Nylon or Teflon liner loose in swashplate ass'y. | Replace swashplate ass'y. |

Pg. 5-13 (A, B)

Add following paragraphs:

## LOW TIP SPEED TAIL ROTOR DRIVE ASSEMBLY

5-1.1 GENERAL. (See Figure 5-12)

5-2.1 The low tip speed tail rotor installation consists of the tail rotor drive shaft assembly, tail rotor gear box mounting adapter, tail rotor transmission assembly, and tail rotor assembly. Maintenance which may be performed consists of removal, inspection. lubrication and installation.

5-3.1 LOW TIP SPEED TAIL ROTOR ASSEMBLY

5-4.1 The tail rotor installation consists of a pitch control assembly, a drive fork assembly, two pitch control link assemblies, and two blade assemblies telescoped over a hub and bolted to an interconnecting tension-torsion strap assembly located outside the hub. Collective pitch is controlled by the pitch control assembly consisting of link assemblies connecting the pitch control arms to a swashplate which slides axially on the tail rotor output shaft. Movement of the swashplate is controlled through a series of bellcranks and rod assemblies connected to the pedal installation. Rotation of the blades is effected through the tail rotor transmission splined output shaft, tail rotor drive fork assembly and hub.

5-5.1 REMOVAL - LOW TIP SPEED TAIL ROTOR ASSEMBLY. Remove low tip speed tail rotor assembly by the following procedure. (Refer to Figure 5-12)

a. Remove cotter pin (50), nut (49), two washers (48), and bolt (47) at pivot point of bellcrank (37) so that bellcrank arm drops away from bearing in lower surface of pitch control assembly (31).

b. Pull beaded end of boot (56) out of groove at inboard end of pitch control assembly (31).

c. Remove blade stop (36) and spacer (35) by pulling from shaft (29); straighten tabs on key washer (32) and remove nut (33).

d. Remove and discard key washer.

CAUTION

Key washer may not be reused.

e. Slide tail rotor assembly off shaft, while holding hand or small pan under shaft to catch split rings (34). If both split rings do not fall out, remove them from shaft groove.

5-6.1 CLEANING - TAIL ROTOR ASSEMBLY. Clean the low tip speed tail rotor assembly as follows:

a. Clean tail rotor assembly with clean, lint-free cloth dampenened with soap and water solution.

b. Wipe dry with clean, lint-free cloth.

5-7.1 INSPECTION - LOW TIP SPEED TAIL ROTOR ASSEMBLY. Inspect the tail rotor assembly as follows: (Refer to Figure 5-12)

CAUTION

No cracks, voids or breaks are permissible in tail rotor blade, hub, pitch control assemblies or fork assembly. Remove and replace defective components.

a. Inspect the tail rotor assembly for evidence of binding by hand-turning a few turns while listening for unusual sounds.

b. Inspect pitch control assembly (31) for scratches, nicks, dents, burrs, cracks, corrosion and similar surface defects.

c. Teeter blade assembly on drive fork assembly (28) to check for evidence of binding.

d. Inspect fork assembly for scratches, nicks, dents, burrs, cracks, corrosion and similar surface defects. Scratches and nicks requiring no more than 0.005 inch removal of material in clean up are permissible.

e. Inspect all nuts and bolts for security.

f. Inspect pitch control link assemblies (B) for scratches, nicks, dents, burrs, cracks, corrosion and similar surface defects.

g. Inspect blade stop (36) for deterioration and security of attachment at drive fork retaining nut (33).

h. Inspect hub (51) for scratches, nicks, dents, burrs, cracks, corrosion, and similar surface defects. Scratches and nicks requiring no more than 0.005 inch removal of material in clean up are permissible.

i. Inspect blade as follows:

(1) Inspect blade spars (52) for cracks, scratches, and nicks. Scratches and nicks between attach bolt (53) and pitch control arm assembly (54) requiring no more than 0.005 inch removal of material in clean up are permissible. Deeper defects in the specified area require blade replacement.

(2) Inspect stainless steel abrasion strips (55) on blade leading edges for cracks, dents, scratches, nicks and separation from blade skin. Scratches and nicks requiring no more than 0.010 inch removal of material are repairable by burnishing or abrasive polishing. Separation of the abrasion strip from the blade leading edge can be tolerated up to 0.5 inch locally unless propagating.

(3) Inspect blade fiberglass skin for cracks, voids, breaks and other surface defects to detect voids. Tap blades surface with a piece of wood or coin and listen for sound differential.

j. Inspect boots (56 and 27) for general deterioration. Inspect for security of beaded ends within machined grooves of pitch control and drive fork assemblies.

k. Inspect drain holes in trailing edge of blade assembly for freedom from obstructions.

5-8.1 REPLACEMENT - LOW TIP SPEED TAIL ROTOR PITCH CONTROL LINK ASSEMBLY. Replace defective pitch control link assembly as follows: (Refer to Figure 5-12, View B)

a. Disconnect end of pitch control link assembly at swashplate by removing cotter pin (57), nut (58), washers (59), and bolt (60).

b. Disconnect end of pitch control link assembly (B) at pitch control arm by removing cotter pin (61), nut (62), washers (63), and bolt (64).

5-9.1 REPLACEMENT - TAIL ROTOR SWASHPLATE ASSEMBLY. Replace tail rotor swashplate assembly as follows: (Refer to Figure 5-12)

a. Remove tail rotor assembly, per paragraph 5-5.1.

b. Disconnect end of pitch control link assembly (View B) at swashplate by removing cotter pins (57) nuts (58), washers (59), and bolts (60).

c. Replace swashplate assembly and reconnect pitch control link assemblies.

d. Reinstall tail rotor assembly per paragraph 5-11.1.

5-10.1 INSTALLATION - LOW TIP SPEED TAIL ROTOR ASSEMBLY. Install the low tip speed tail rotor assembly as follows: (Refer to Figure 5-12)

a. Pull beaded end of boot (27) out of groove at inboard end of drive fork assembly (28).

b. Position tail rotor assembly in line with transmission output shaft (29), rotating tail rotor assembly back and forth slightly, until internally splined hub of swashplate (30) inside pitch control assembly (31) engages spline of shaft.

c. Slide tail rotor assembly onto shaft, while positioning drive fork assembly so that splined hub of drive fork is concentric with splined shaft and drive fork attach bolt is aligned with arms of swashplate. Position tail rotor assembly on shaft so that approximately two threads at end of shaft protrude beyond outboard face of splined hub on drive fork.

d. Slip new key washer (32) over threaded end of shaft; install nut (33), turning nut approximately two full turns on threaded end of shaft.

e. Slide tail rotor assembly outboard against nut.

f. Press boot (27) against swashplate to expose groove in shaft.

g. Insert split rings (34) in groove of shaft with chamfered sides of split rings facing beveled seat in drive fork assembly.

h. While holding split rings in place, slide tail rotor assembly inboard, making certain that chamfered split rings are nested in beveled seat of drive fork. (Approximately 0.050 inch of split rings protrude out from under drive fork.)

i. Torque nut (33) to 160-190 inch-pounds torque; bend tabs on key washers to lock nut and insert blade stop (36) on nut, pressing under cut groove in blade stop around knurled circumference of nut.

NOTE

Minimum clearance of .75 inches must be maintained between tail rotor and tail boom in maximum teetered position. Install 1812-3 or 1812-5 spacers (35) as required between lock nut and blade stop.

j. Pull boot (56) over end of pitch control assembly (31) so that beaded end of boot slips into machined groove in pitch control assembly.

k. Pull boot over hub of drive fork assembly so that beaded end of boot slips into machined groove in drive fork.

l. Install 6042 bellcrank ass'y. (37) and secure aft end of 6044 rod ass'y (38) to bellcrank with bolt (39), washers (40), nut (41), and cotter pin (42).

NOTE

Check that bushing is installed in bellcrank before attaching push rod assembly. Torque bolts to 100-150 inch pounds; add washers as required.

m. Install pin (43) on bellcrank with washer (44), nut (45) and cotter pin (46); raise arm of bellcrank so that pin in bellcrank slips into bearing at lower surface of pitch control assembly.

n. While holding bellcrank up against lower surface of pitch control assembly, rotate bellcrank back and forth as required to align bearing in bellcrank with hole in boss at gearbox mounting flange.

o. Install bolt (47), washers (48), and nut (49); torque nut and install cotter pin (50).

5-11.1 LOW TIP SPEED TAIL ROTOR DRIVE SHAFT & TRANSMISSION - The tail rotor drive shaft transmits power from the main rotor transmission to the tail rotor transmission. The shaft rotates at approximately 2045 rpm. Identical flanged couplings at each end of the shaft provides a connection for the shaft to the main rotor and tail rotor transmissions. The tail rotor transmission assembly is a right-angle speed increasing transmission located at the aft end of the tail rotor boom. The transmission transmits power from

the tail rotor drive shaft to the tail rotor. The transmission uses the splash method of lubrication. A sight gage is located on the aft end of the transmission and a breather-filler assembly is located on top. Oil is drained from the transmission by removing the plug on the bottom of the transmission.

5-12.1 REMOVAL - LOW TIP SPEED TAIL ROTOR DRIVE SHAFT & TRANSMISSION ASSEMBLY. Remove tail rotor drive shaft and transmission assembly as follows:

a. Remove tail rotor assembly, per paragraph 5-5.1.

b. Cut safetywire and loosen nut (15) with spanner wrench to disengage forward end of drive shaft (9) from main rotor transmission drive assembly.

c. Remove four nuts (12), washers (13) and cotter pins (14) from gear box assembly and pull transmission off adapter studs until drive shaft is exposed approximately one foot at aft end of boom.

d. Cut safety wire and loosen nut (11) to disengage drive shaft from transmission input shaft and remove transmission (10).

e. Pull drive shaft from boom.

5-13.1 INSPECTION - LOW TIP SPEED TAIL ROTOR DRIVE SHAFT. Inspect the tail rotor drive shaft as follows:

a. Inspect visible portions of drive shaft for dents, scratches, cracks or corrosion, and security of attachment.

b. Ensure that attaching hardware in coupling at main rotor transmission drive shaft is secure.

c. Check that lockwire on attaching bolts is intact.

5-14.1 SERVICE - The tail rotor drive shaft requires lubrication every 100 hours at fore and aft drive shaft couplings. Refer to Section II, HMI.

5-15.1 INSPECTION - LOW TIP SPEED TAIL ROTOR TRANSMISSION ASSEMBLY. Inspect the tail rotor transmission as follows:

a. Check transmission for leaks, cracks, nicks, pits, corrosion and security of attachment.

b. Check that ears and bolts are secure and that lockwires are intact.

c. Inspect adapter for visible evidence of damage, in particular, cracks, nicks, burrs and corrosion; check mounting hubs for deformity.

d. Inspect tail boom in area of transmission attachment for visible evidence of damage, in particular, cracks, nicks, burrs and corrosion; check mounting hubs for deformity.

5-16.1 SERVICE - LOW TIP SPEED TAIL ROTOR TRANSMISSION. Service the tail rotor transmission as follows:

a. Check oil level as indicated by transmission sight gage plug.

b. If oil level is at or below ADD line, remove lockwire, unscrew oil breather-filler assembly and add oil by pouring oil into transmission until oil is at FULL line.

c. Install breather-filler assembly and lockwire.

5-17.1 INSTALLATION - LOW TIP SPEED TAIL ROTOR DRIVE SHAFT AND TRANSMISSION. Install the tail rotor drive shaft and transmission as follows:

a. Insert drive shaft (9) into boom through damper assembly.

b. Install drive shaft on tail rotor transmission input shaft and secure nut (11) with spanner wrench and safetywire.

c. Fill grease cup in aft end of drive shaft with heavy duty grease, per lubrication chart, Section II, HMI.

d. Position gear box assembly (10) on four studs of gear box adapter (6) and secure with four nuts (12), washers (13), and cotter pins (14).

e. Secure drive shaft to main rotor belt drive transmission assembly and secure nut (15) with spanner wrench and safetywire.

f. Fill grease cup at forward end of drive shaft with heavy duty grease, per lubrication chart, Section II, HMI.

5-18.1 TEARDOWN INSPECTION (1800 HOURS) - LOW TIP SPEED TAIL ROTOR DRIVE ASSEMBLY. A complete disassembly of all subassemblies, inspection of all components, and replacement of bearings, seals and damaged parts shall be performed on the low tip speed tail rotor drive assembly at every 1800-hour interval of operation on the aircraft.

Pg. 6-1, (A, B) Para. 6-2, TOOLS AND EQUIPMENT

ADD:

Rigging Tool 269A9204

Pg. 6-19 (A), Para. 6-30, Pg. 6-16 (B), Para. 6-29, RIGGING-TAIL ROTOR PITCH CONTROL PEDALS

Following step d. ADD:

NOTE

Use special rigging tool, P/N 269A9204 for low tip speed tail rotor installation. Blade angle at NEUTRAL position shall be 6.5 degrees ± 1 degree at 75% radius point on each blade, measured from centerline of hub. Helicopter should be leveled longitudinally and laterally by normal means.

Following step i. ADD:

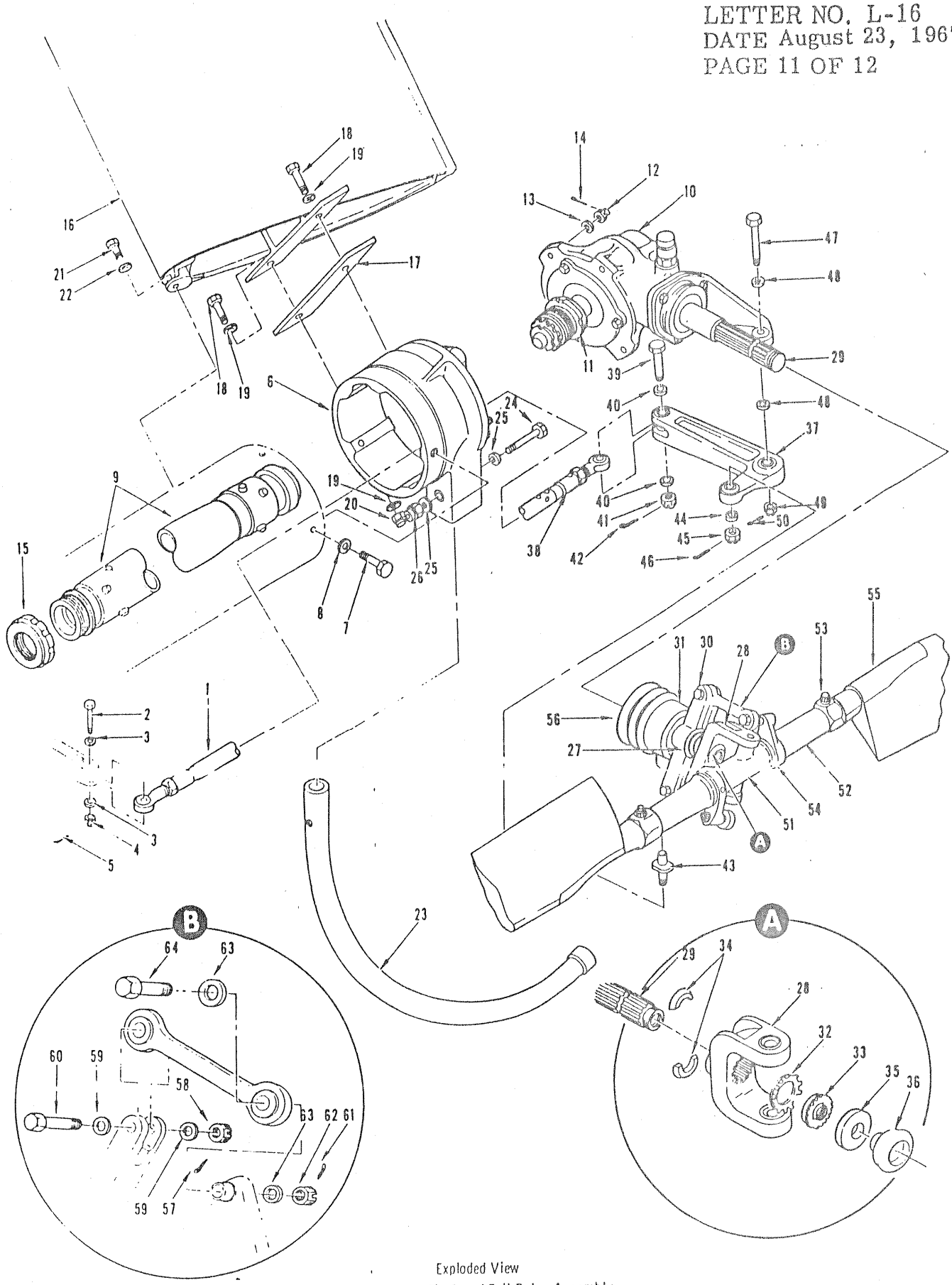
NOTE

Not required when low tip speed tail rotor assembly is installed.

Following step k. ADD:

NOTE

With low tip speed tail rotor installation, measurement of tail rotor (collective) blade movements shall be ± 25 degrees ± 1 degree thrust to right and -12 degrees ±1 degree thrust to left.




Exploded View

Figure 1. Low Tip Speed Tail Rotor Assembly

KEY TO FIGURE 5-12.

1. Rod Assembly - Fwd. End
2. Bolt
3. Washer
4. Nut
5. Cotter Pin
6. Gear Box Adapter
7. Bolt
8. Washer
9. Drive Shaft
10. Tail Rotor Transmission
11. Nut
12. Nut
13. Washer
14. Cotter Pin
15. Nut
16. Stabilizer Assembly
17. Spacer Plate
18. Bolt
19. Washer
20. Nut
21. Bolt
22. Washer
23. Skid Assembly
24. Bolt
25. Washer
26. Nut
27. Boot
28. Drive Fork Assembly
29. Transmission Output Shaft
30. Swashplate
31. Pitch Control Assembly
32. Key Washer
33. Nut
34. Split Ring
35. Spacer
36. Blade Stop
37. Bellcrank Assembly
38. Rod Assembly - Aft End
39. Bolt
40. Washer
41. Nut
42. Cotter Pin
43. Pin
44. Washer
45. Nut
46. Cotter Pin
47. Bolt
48. Washer
49. Nut
50. Cotter Pin
51. Hub
52. Spar
53. Attach Bolt
54. Pitch Control Arm Assembly
55. Abrasion Strip
56. Boot
57. Cotter Pin
58. Nut
59. Washer
60. Bolt
61. Cotter Pin
62. Nut
63. Washer
64. Bolt