SECTION 4

WINGS AND EMPENNAGE

TABLE OF CONTENTS

4-1. WINGS AND EMPENNAGE.

4-2. WINGS. (See figure 4-1.)

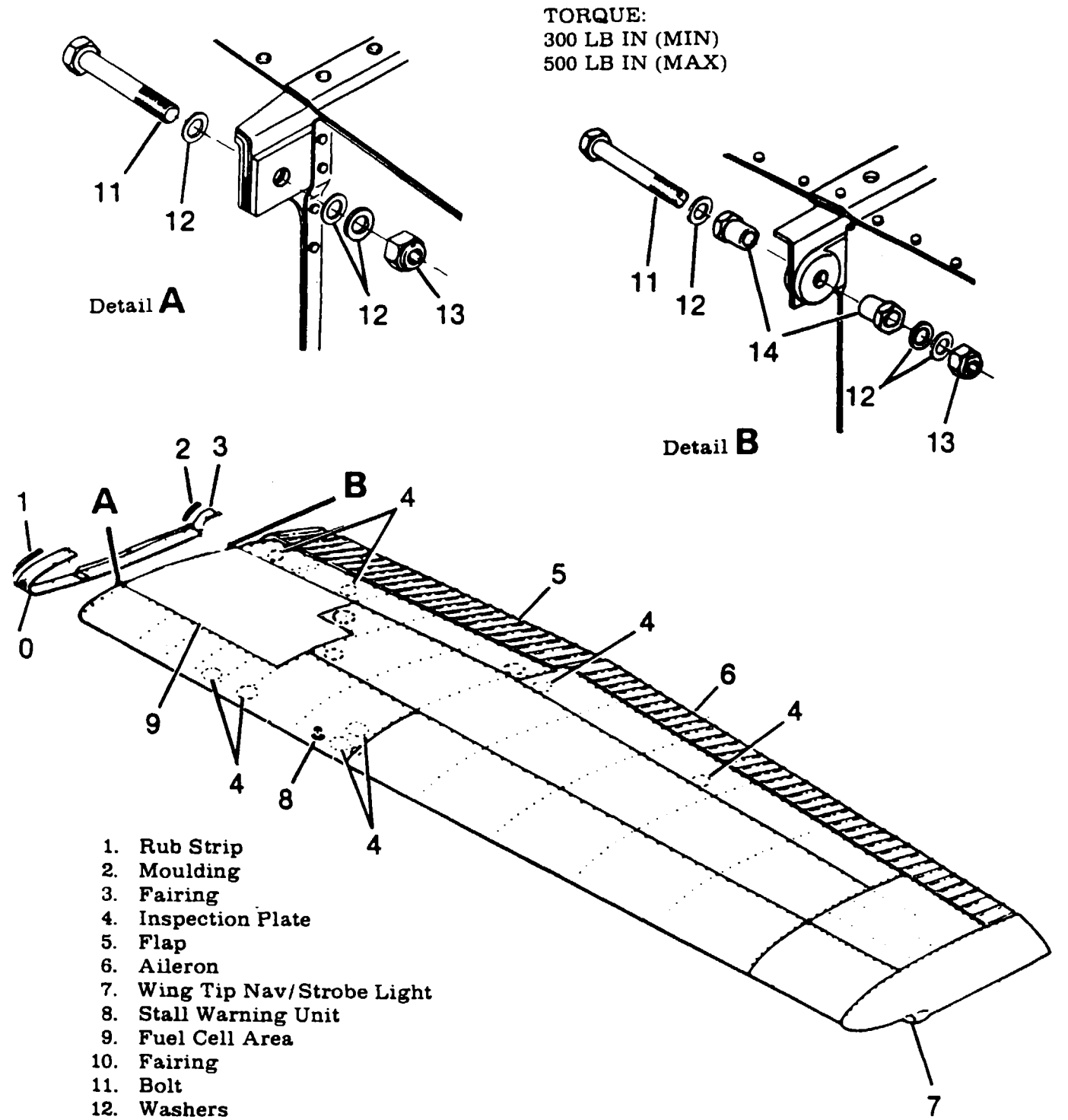
4-3. DESCRIPTION. Each all-metal wing panel is a semicantilever, semimonocoque type, with two main spars and suitable ribs for the attachment of the skin. Skin panels are riveted to ribs, spars and stringers to complete the structure. An all-metal, piano-hinged aileron, flap, and a detachable wing tip are mounted on each wing assembly. Navigation/ strobe lights are mounted at each wing tip.

4-4. REMOVAL. Wing panel removal is most easily accomplished if four men are available to handle the wing. Otherwise, the wing should be supported with a sling or maintenance stand when the fastenings are loosened.

a. Remove wing root fairings and fairing plates.
b. Remove all wing inspection plates.
c. Drain fuel from cell of wing being removed.
d. Disconnect:
   1. Electrical wires at wing root disconnects.
   2. Fuel lines at wing root. (Observe precautions outlined in paragraph 12-3.)
e. Reduce aileron cable tension by loosening turnbuckles and disconnect cables at aileron bellcranks. Disconnect flap cables at turnbuckles above headliner, and pull cables into wing root area.

NOTE

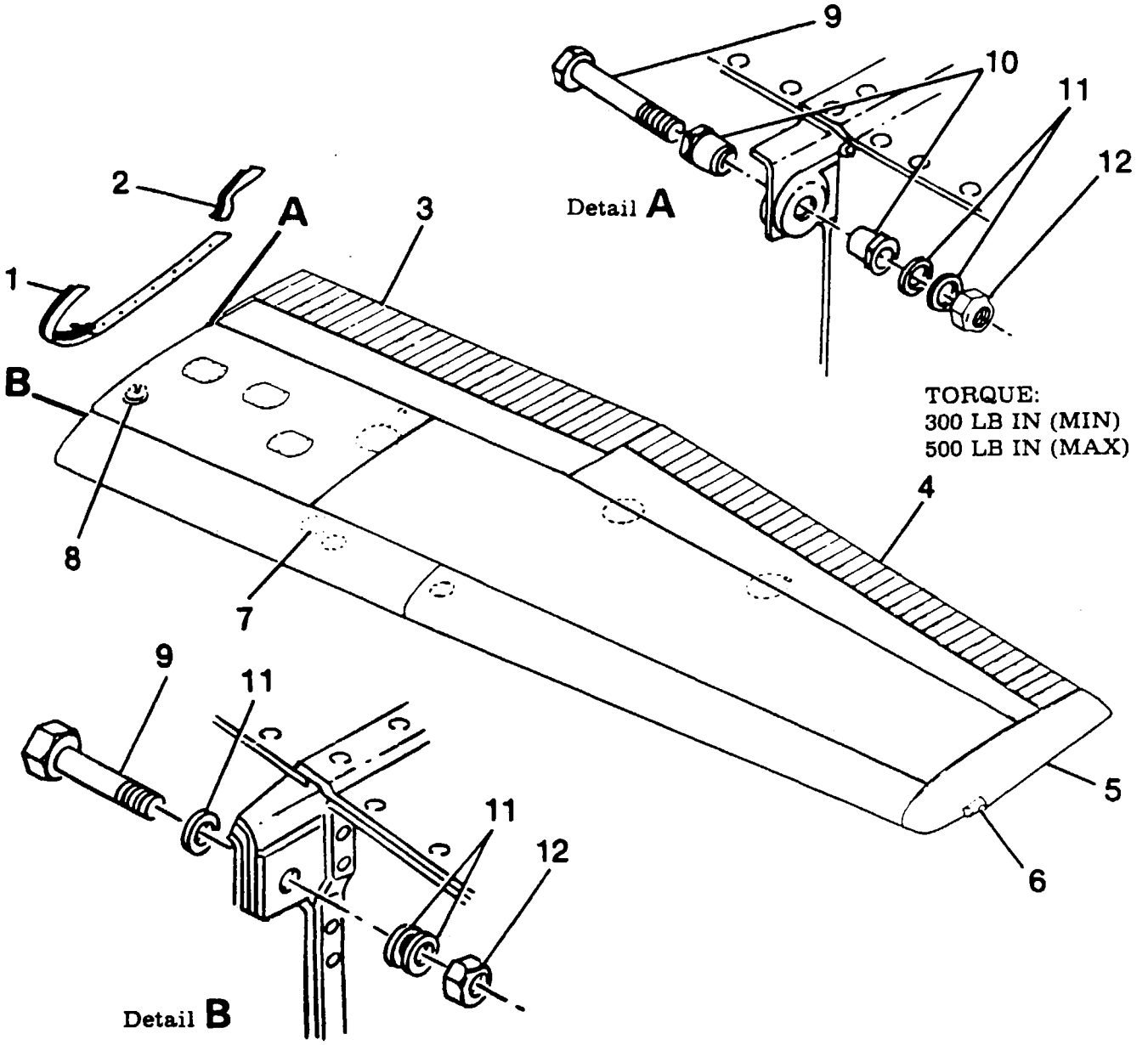
To simplify aileron and flap cable installation, attach an equal length piece of guide wire to each cable before removal. Leave the wire inside wing during maintenance operation. To install, simply attach cables to correct guide wire, and pull cables into wing as the guide wire is removed.



1. Rub Strip
2. Moulding
3. Fairing
4. Inspection Plate
5. Flap
6. Aileron
7. Wing Tip Nav/Strobe Light
8. Stall Warning Unit
9. Fuel Cell Area
10. Fairing
11. Bolt
12. Washers
13. Nut (Self Locking)
14. Bushing

STANDARD WING
THRU R18200583

Figure 4-1. Wing Installation (Sheet 1 of 2)



1. Fairing
2. Lower Rear Fairing
3. Wing Flap
4. Aileron
5. Wing Tip
6. Navigation and Strobe Lights
7. Courtesy Light
8. Fuel Filler Cap
9. Bolt
10. Eccentric Bushings
11. Washers
12. Nut

WET WING
R18200584 & ON

Figure 4-1. Wing Installation (Sheet 2 of 2)

f. Support wing at outboard end and disconnect strut at wing fitting. (Refer to paragraph 4-10.) Tie the strut up with wire to prevent it from swinging down and straining strut-to-fuselage fitting. Loosen lower strut fairing and slide fairing up the strut; the strut may then be lowered without damage.

NOTE

Tape flaps in the streamlined position to prevent damage during removal.

g. Mark position of wing attachment eccentric bushings (Refer to figure 4-1); these bushings are used to rig out "wing heaviness."
h. Remove nuts, washers, bushings and bolts attaching wing spars to fuselage.

NOTE

It may be necessary to rock the wings slightly while removing attaching bolts, or to use a long drift punch to drive them out.

i. Remove wing, and place it on a padded stand.

4-5. REPAIR. A damaged wing panel may be repaired in accordance with instructions outlined in Section 17. Extensive repairs of wing skin or structure are best accomplished using the wing repair jig, which may be obtained from Cessna. The wing jig serves not only as a holding fixture, making work on the wing easier, but also assures the absolute alignment of the repaired wing.

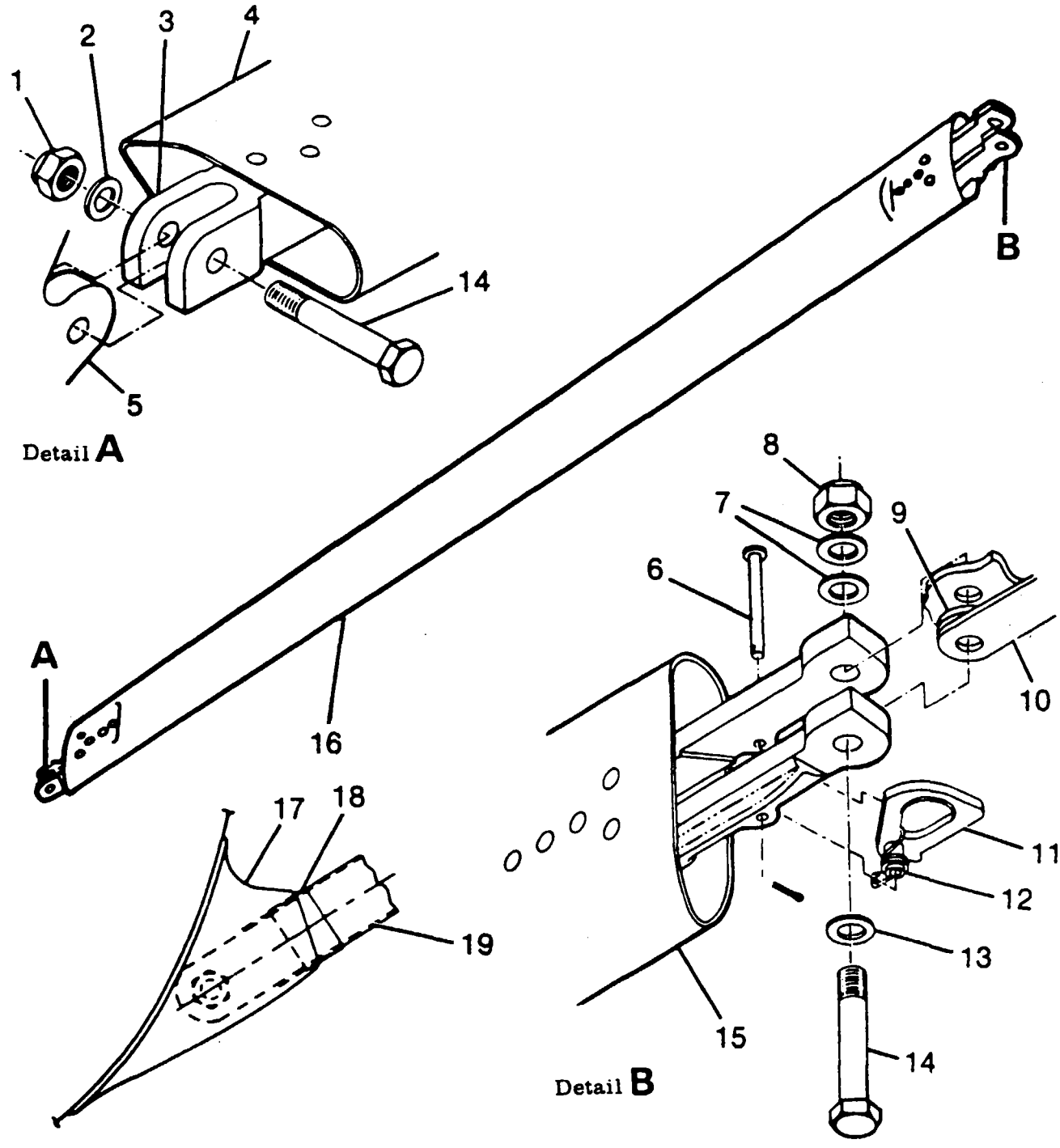
4-6. INSTALLATION.

a. Hold wing in position and install bolts, bushings, washers and nuts attaching wing spars to fuselage fittings. Be sure eccentric bushings are positioned as marked.

NOTE

If aircraft was factory equipped with soundproofing panels in the wing gaps, be sure they are installed before replacing wing root fairings.

b. Install bolts, spacers and nuts to secure upper and lower ends of wing strut to wing and fuselage fittings.
c. Route flap and aileron cables, using guide wires. (Refer to note in paragraph 4-4.)
d. Connect:
   1. Electric wires at wing root disconnects.
   2. Fuel lines at wing root. (Observe precautions outlined in Section 12).
   3. Pitot line (if left wing is being installed.)
   4. Cabin ventilator hose at wing root.
e. Rig aileron system (Section 6).
f. Rig flap system (Section 7).
g. Refill wing fuel cell and check for leaks. (Observe precautions outlined in Section 12).
h. Check operation of wing tip lights and landing and taxi lights.
i. Check operation of fuel quantity indicator.
j. Install wing root fairings.



1. Nut
2. Washer
3. Fuselage Attach Fitting
4. Strut End
5. Fuselage Fitting
6. Pin
7. Washers
8. Nut
9. Spacer
10. Strut Attach Strap (Wing)
11. Mooring Ring
12. Spring
12. Fairing
13. Washer
14. Bolt
15. Strut End
16. Strut
17. Fairing
18. Tape
19. strut End

Figure 4-2. Wing Strut

NOTE

Be sure that the short bushing (14) is installed forward side of wing spars, and the long bushing (14) on the aft side. Apply Electro Moly No. 11 MIL-G-121164 grease to bolt (11) and bushing (14) lightly.

k. Install all wing inspection plates, interior panels and upholstery.

4-7. ADJUSTMENT (Correcting "Wing-Heavy" Condition). (Refer to figure 4-1.) If considerable control wheel pressure is required to keep the wings level in normal flight, a "wing-heavy" condition exists.

a. Remove wing fairing strip on the "wing-heavy" side of the aircraft.
b. Loosen nut (7) and rotate bushings (5) simultaneously until the bushings are positioned with the thick sides of the eccentrics up. This will lower the trailing edge of the wing, and decrease "wing-heaviness" by increasing the angle-of-incidence of the wing.

CAUTION

Be sure to rotate the eccentric bushings simultaneously. Rotating them separately will destroy the alignment between the off-center bolt holes in the bushings, thus exerting a shearing force on the bolt, with possible damage to the hole in the wing spar fitting.

c. Tighten nut and reinstall fairing strip.
d. Test-fly the aircraft. If the "wing-heavy" condition still exists, remove fairing strip on the "lighter" wing, loosen nut, and rotate bushings simultaneously until the bushings are positioned with the thick side of the eccentrics down. This will raise the trailing edge of the wing, thus increasing "wing-heaviness" to balance heaviness in the opposite wing.
e. Tighten nut, install fairing strip, and repeat test flight.

4-8. WING STRUTS. (See figure 4-2.)

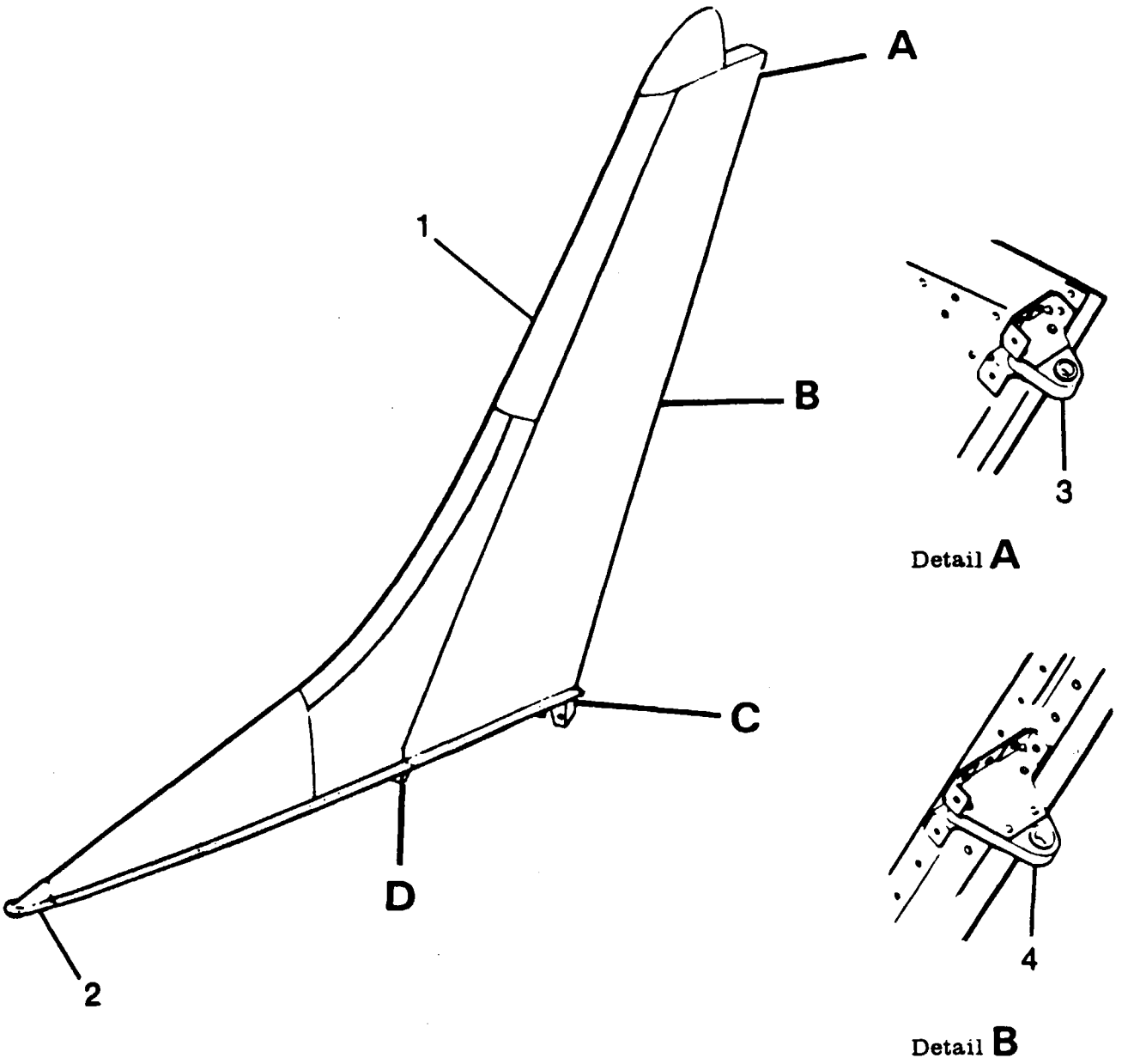
4-9. DESCRIPTION. Each wing has a single lift strut which transmits a part of the wing load to the lower portion of the fuselage. The strut consists of a streamlined tube with fittings riveted on each end for attachment to two the fuselage and wing.

4-10. REMOVAL AND INSTALLATION.

a. Remove screws from strut fairings and slide fairings along strut.
b. Remove fuselage and wing inspection plates at strut junction points.
c. Support wing securely, then remove nut and bolt securing strut to fuselage.
d. Remove nut, bolt and spacer used to attach strut to wing, then remove strut from aircraft.
e. Reverse preceding steps to install strut.

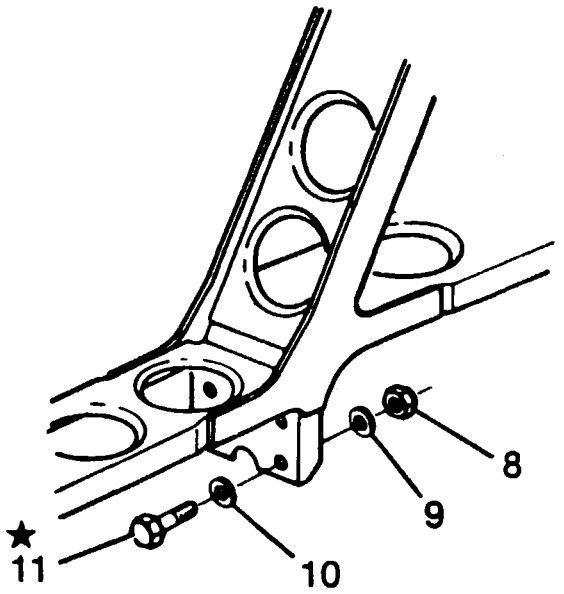
NOTE

Wrap strut with Y-8562 Polyurethane tape (3-M Co.), or equivalent in the areas where strut fairings (17) contact strut (4). Locate tape splice (seam) at trailing edge of strut (4).

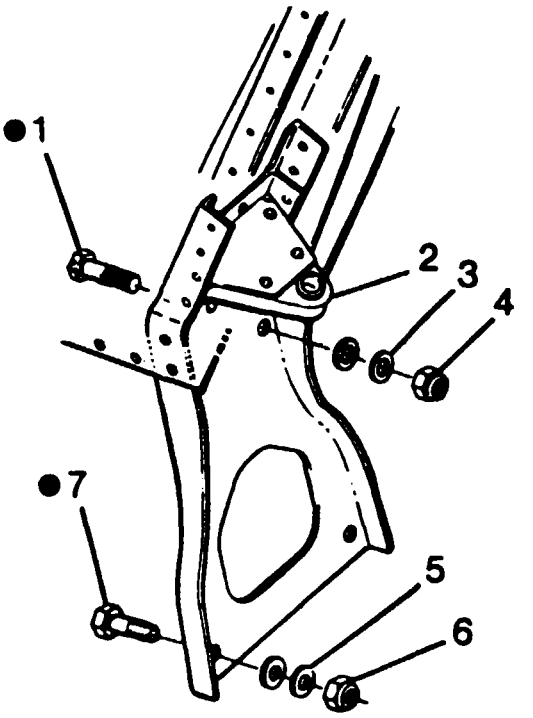


1. Fin Assembly
2. Fairing
3. Upper Rudder Hinge
4. Center Rudder Hinge

Figure 4-3. Vertical Fin (Sheet 1 of 2)



Detail D



Detail C

NOTE
Attach Bolt Torques:
★ 70-100 Inch-Lbs
● 140-225 Inch-Lbs

1. Bolt
2. Lower Rudder Hinge
3. Washer
4. Nut
5. Washer
6. Nut
7. Bolt
8. Nut
9. Washer
10. Washer
11. Bolt

Figure 4-3. Vertical Fin (Sheet 2 of 2)

4-11. REPAIR. Wing strut repair is limited to replacement of tie-downs and attaching parts. Refer to Section 18.

4-12. FIN. (See figure 4-3.)

4-13. DESCRIPTION. The vertical fin is primarily of metal construction, consisting of ribs and spars covered with skin. Fin tips are of ABS construction. The rudder is attached at the fin rear spar with hinge brackets.

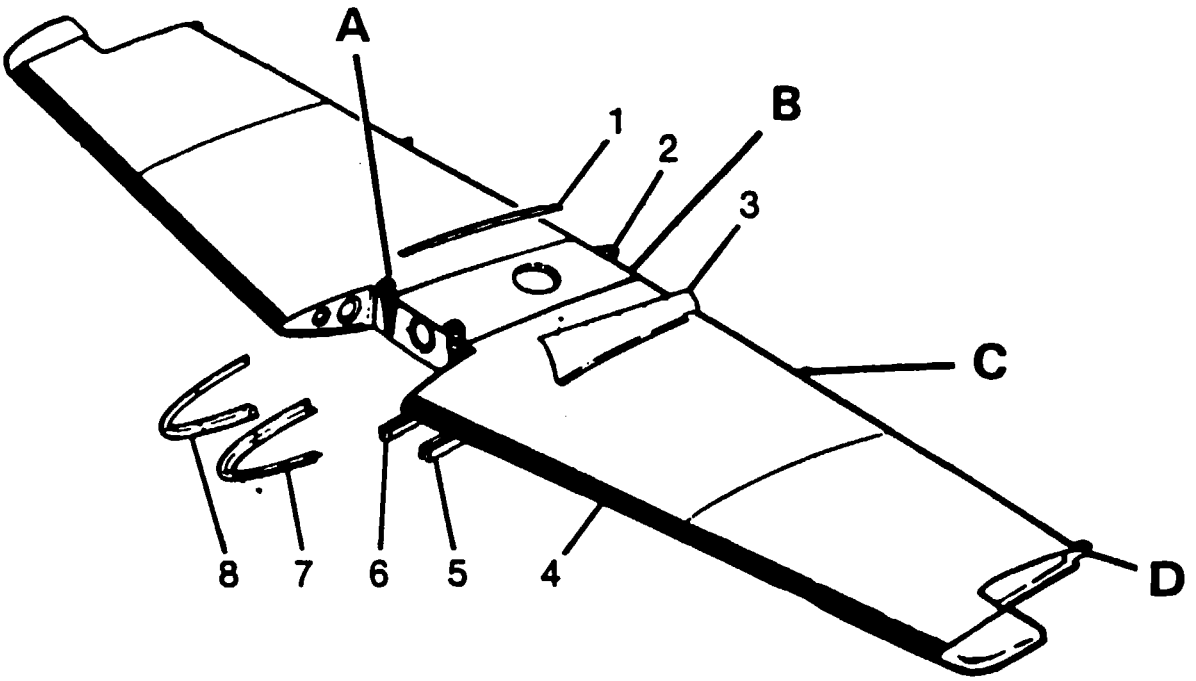
4-14. REMOVAL. The vertical fin may be removed without first removing the rudder. However, for access and ease of handling, the rudder may be removed by following procedures outlined in Section 10.

a. Remove fairings on either side of fin.
b. Disconnect flashing beacon lead, tail navigation light lead, antennas and antenna leads, and rudder cables, if rudder has not been removed.

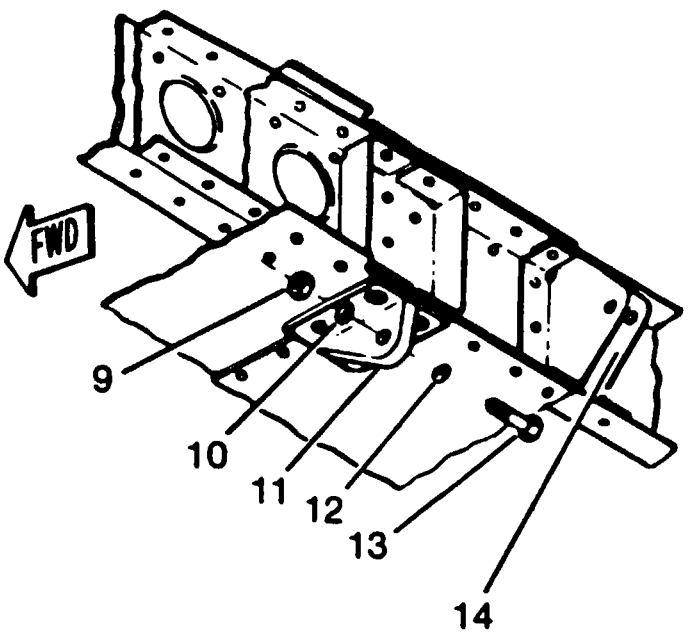
NOTE

The flashing beacon power lead routed into the fuselage should be cut if no splice exists. Upon reassembly, install quick disconnects or suitable splice in this wire.

c. Remove screws attaching dorsal to fuselage.
d. Remove bolts attaching fin rear spar to fuselage fitting.
e. Remove bolts attaching fin front spar to fuselage, and remove fin.

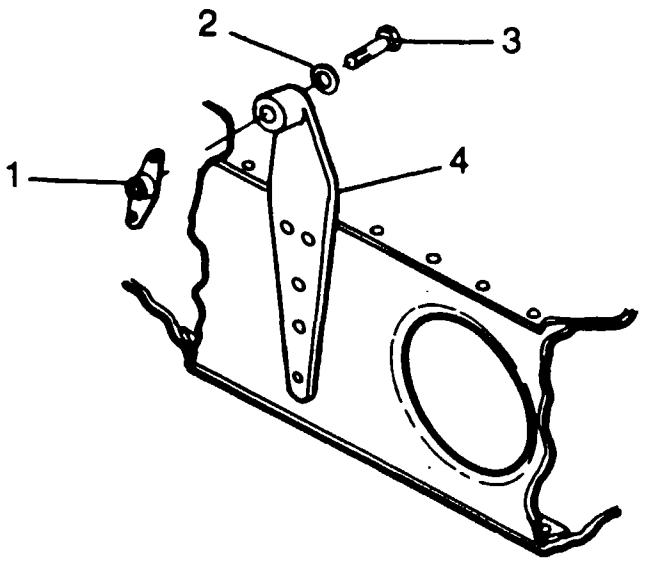


1. Upper Right Fairing
2. Elevator Pylon Bracket
3. Upper Left Fairing
4. Abrasion Boot
5. Lower Left Moulding
6. Lower Right Moulding
7. Forward Left Fairing
8. Forward Right Fairing
9. Nut
10. Washer
11. Bracket
12. Washer
13. Bolt
14. Elevator Pylon Bracket

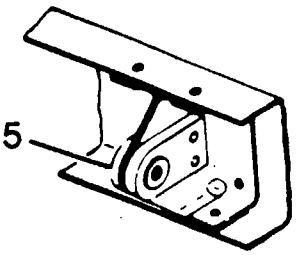


Detail B

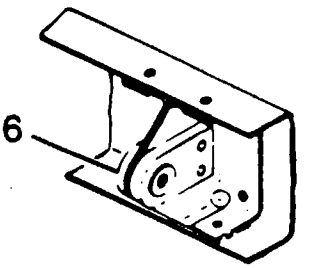
Figure 4-4. Horizontal Stabilizer (Sheet 1 of 2)



Detail A



Detail C



Detail D

1. Nutplate
2. Washer
3. Bolt
4. Bracket
5. Elevator Inboard Hinge
6. Elevator Outboard Hinge

Figure 4-4. Horizontal Stabilizer (Sheet 2 of 2)

4-15. REPAIR. Fin repair should be accomplished in accordance with applicable instructions outlined in Section 17.

4-16. INSTALLATION. Reverse the procedures outlined in paragraph 4-14 to install the vertical fin. Be sure to check and reset rudder and elevator travel. If any stop bolts were removed or settings disturbed, the systems will have to be rigged. Refer to applicable sections in this manual for rigging procedures.

4-17. HORIZONTAL STABILIZER. (See figure 4-4.)

4-18. DESCRIPTION. The horizontal stabilizer is primarily of all-metal construction, consisting of ribs and spars covered with skin. Stabilizer tips are of ABS construction. A formed metal leading edge is riveted to the assembly to complete the structure. The elevator trim tab actuator is contained within the horizontal stabilizer. The underside of the stabilizer contains a covered opening which provides access to the actuator. Hinges are located on the rear spar assembly to support the elevators.

4-19. REMOVAL.

a. Remove elevators and rudder in accordance with procedures outlined in Sections 8 and 10.
b. Remove vertical fin in accordance with procedures outlined in paragraph 4-14.
c. Disconnect elevator trim control cables at cable ends and turnbuckle inside tailcone. Remove stop blocks, then remove pulleys which route the aft cables into horizontal stabilizer. Pull cables out of tailcone.

4-20. REPAIR. Horizontal stabilizer repair should be accomplished in accordance with applicable instructions outlined in Section 17.

4-21. INSTALLATION. Reverse procedures outlined in paragraph 4-19 to install the horizontal stabilizer. Rig elevator, elevator trim and rudder systems as outlined in Sections 8, 9 and 10 consecutively. Check operation of tail navigation light and flashing beacon.

4-22. STABILIZER ABRASION BOOTS.

NOTE

An Accessory Kit (AK182-217) is available from the Cessna Service Parts Center for installation of abrasion boots on aircraft not so equipped.

4-23. DESCRIPTION. The aircraft may be equipped with two extruded rubber abrasion boots, one on the leading edge of each horizontal stabilizer. These boots are installed to protect the stabilizer leading edge from damage caused by rocks thrown back by the propeller.

4-24. REMOVAL. The abrasion boots can be removed by loosening one end of the boot and pulling it off the stabilizer with an even pressure. Excess adhesive or rubber can be removed with Methyl-Ethyl-Ketone.

4-25. INSTALLATION. Install abrasion boots as outlined in the following procedures.

a. Trim boots to desired length.
b. Mask off boot area on leading edge of stabilizer with 1-inch masking tape, allowing 1/4-inch margin.
c. Clean inside of abrasion boot with Methyl-Ethyl-Ketone and a Scotch brite pad to ensure complete removal of paraffin/talc. Then a normal wipedown with MEK on a cloth will leave surface suitable for bonding to the aluminum.

NOTE

Boots may be applied over epoxy primer, but if the surface has been painted, the paint shall be removed from the bond area. This shall be done by wiping the surfaces with a clean, lint-free rag, soaked with solvent, and then wiping the surfaces dry, before the solvent has time to evaporate, with a clean, dry lint-free rag.

e. Stir cement (EC-1300 Minnesota Mining and Manufacturing Co.) thoroughly.
f. Apply one even brush coat to the metal and the inner surface of the boot. Allow cement to air-dry for a minimum of 30 minutes, and then apply a second coat to each surface. Allow at least 30 minutes (preferably one-hour) for drying.
g. After the cement has thoroughly dried, reactivate the surface of the cement on the stabilizer and boot, using a clean, lint-free coth, heavily moistened with toluol. Avoid excess rubbing which would remove the cement from the surfaces.
h. Position boot against leading edge, exercising care not to trap air between boot and stabilizer.

NOTE

Should boot be attached "off-course", pull it up immediately with a quick motion, and reposition properly.

i. Press or roll entire surface of boot to assure positive contact between the two surfaces.
j. Apply a coat of GACO N700A sealer, or equivalent, conforming to MIL-C-21067, along the trailing edges of the boots to the surface of the skin to form a neat, straight fillet.
k. Remove masking tape and clean stabilizer of excess material.
l. Mask to the edge of boot for painting stabilizer.