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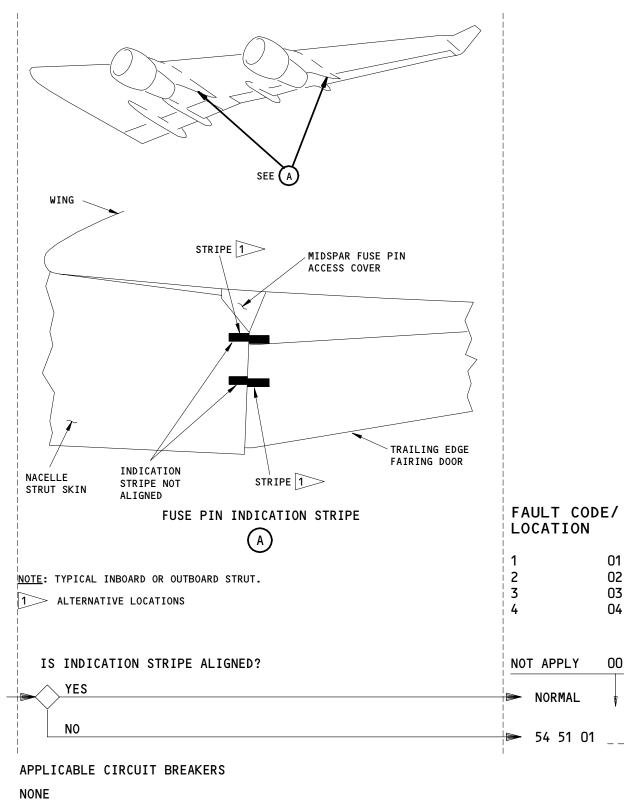


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NACELLES/PYLONS - FAULT CODES (GROUND FAULTS)

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FAULT CODE LOG BOOK REPORT/
CORRECTIVE ACTION

54 51 01 \_\_ (01=1, 02=2, 03=3, 04=4) strut indication stripe not aligned.

1. Remove the necessary access doors and open the trailing edge fairing doors for access to the midspar fuse pins (AMM 54-62-00/201). Visually examine the midspar fuse pins and attachment fittings. If a midspar fuse pin is broken, replace it (AMM 54-51-02/401). If an attachment fitting is broken, or if you find other structural damage, contact The Boeing Company for more instructions.

If you found no damage at the midspar fuse pins, remove the necessary access doors and examine these components:

- The spring beam (outboard struts)
- The spring beam bearing bolt (outboard struts)
- The spring beam support fitting (outboard struts)
- The fuse pins for the upper link and diagonal brace
- The attachment fittings for the upper link and diagonal brace. If a spring beam, spring beam bearing bolt, spring beam support fitting or fuse pin has damage, replace it (AMM 54-51-03/401, AMM 54-51-06/401, AMM 54-51-02/401). If an attachment fitting is broken, or if you find other structural damage, contact The Boeing Company for more instructions.

If you found no structural damage, and the stripe is on the trailing edge fairing door, adjust the trailing edge fairing door (AMM 54-62-03/501).

NOTE: Revision 2 of SB 54A2151 gives an alternative indication stripe location above the trailing edge fairing door. At this location, the adjustment of the trailing edge fairing door does not affect the alignment of the indication stripe.

EFFECTIVITY-



#### NACELLES/PYLONS - DESCRIPTION AND OPERATION

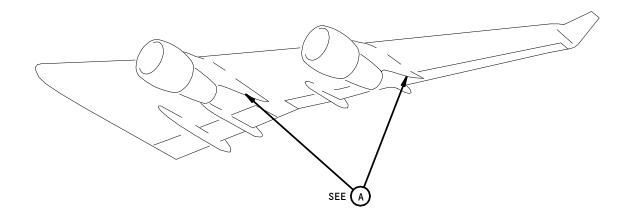
#### 1. General

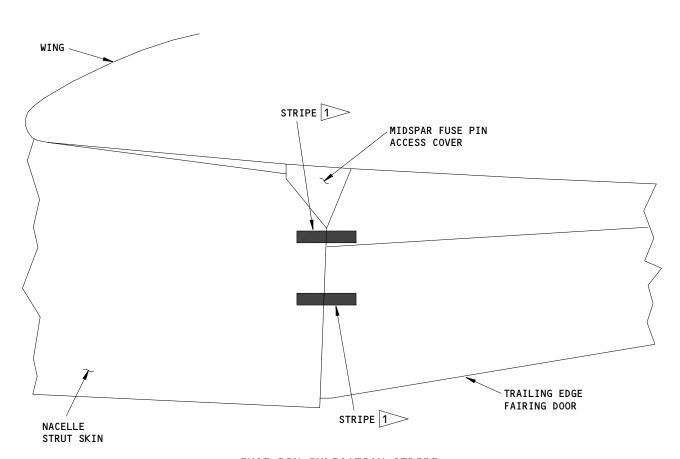
- A. Nacelles/Pylons consist of the items that follow:
  - (1) Nacelle Strut Assembly, AMM 54-51-00/001
  - (2) Fireseal and Firewall, AMM 54-52-00/001
  - (3) Strut Drains, AMM 54-53-00/001
  - (4) Fairings, AMM 54-61-00/001
  - (5) Nacelle Strut Access Panels, AMM 54-62-00/001
- B. Refer to AMM 71-11-00/001 for description of Engine Nacelles.
- C. Two engines are installed on each wing by means of nacelle struts (pylons). Struts are essentially frame and skin structures riveted and bonded together to form a torque box. Outside skins are adhesive bonded laminates which are rivet bonded to stringers, bulkheads, spars and frames to form the strut understructure. Lower spar and engine mount bulkheads are made of steel. Stainless steel or titanium is used where high strength and heat and fire resistance is required.
- D. The nacelles and strut fairings fair the wing to the engine. Access doors in strut fairings are provided where necessary to allow access to components located in the strut.
- E. A one-inch wide stripe is located below the strut midspar fuse pin acces cover, on the inboard and outboard sides of each strut (Fig. 1). When the stripe is not aligned between the strut skin and the trailing edge fairing door or skirt beam fairing, it can show a fully fractured midspar fuse pin or midspar attach fitting (FIM 54-10-00/101).
- F. Alignment stripe AMM references:
  - (1) AMM 54-51-02/401, Nacelle Strut Attach Pin/Bolt
  - (2) AMM 54-51-03/401, Spring Beam
  - (3) AMM 54-51-03/601, Spring Beam
  - (4) AMM 54-62-00/201, Nacelle Strut Access Panels
  - (5) AMM 54-62-03/501, Trailing Edge Fairing Door

54-00-00

01







FUSE PIN INDICATION STRIPE

NOTE: TYPICAL INBOARD OR OUTBOARD STRUT.

1 ALTERNATIVE LOCATIONS

Nacelles/Pylons Figure 1

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#### NACELLE STRUT - FAULT ISOLATION

#### 1. General

A. This procedure has two tasks which are performed when the alignment stripe on the strut does not line up with the portion of the stripe on the skirt beam or the aft fairing door. The first task is to gain access to the attach fuse pin/bolt. The second task is to visully inspect the fuse pin/bolt for damage or any sign of migration.

#### 2. Alignment Stripe Trouble Shooting

- A. References
  - (1) AMM 54-51-02/401, Nacelle Strut Attach Pin/Bolt
  - (2) AMM 54-51-03/401, Spring Beam
  - (3) AMM 54-51-03/601, Spring Beam
  - (4) AMM 54-62-00/201, Nacelle Strut Access Panels
  - (5) AMM 54-62-03/501, Trailing Edge Fairing Door
- B. Access
  - (1) Location Zone

```
452
        Nacelle Strut 1 - Torque Box
454
        Nacelle Strut 1 - Aft Fairing
462
        Nacelle Strut 2 - Torque Box
464
        Nacelle Strut 2 - Aft Fairing
        Nacelle Strut 3 - Torque Box
472
474
        Nacelle Strut 3 - Aft Fairing
482
        Nacelle Strut 4 - Torque Box
484
        Nacelle Strut 4 - Aft Fairing
```

#### C. Procedure

- (1) Remove access doors as necessary, to gain access to the attach fuse pins/bolts.
- (2) Refer to Figure 102 for the steps to visually inspect the attach fuse pin/bolt for damage or migration.

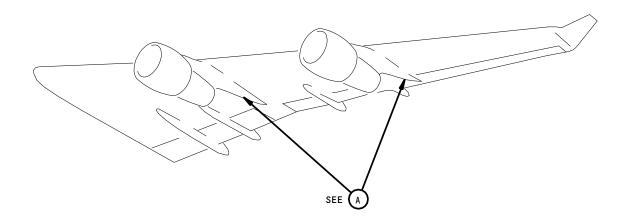
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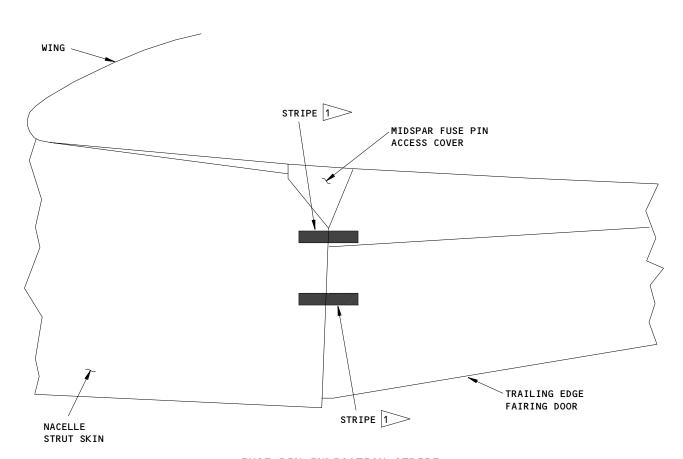
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## FUSE PIN INDICATION STRIPE

NOTE: TYPICAL INBOARD OR OUTBOARD STRUT.

1 ALTERNATIVE LOCATIONS

Nacelles/Pylons Figure 101

54-10-00

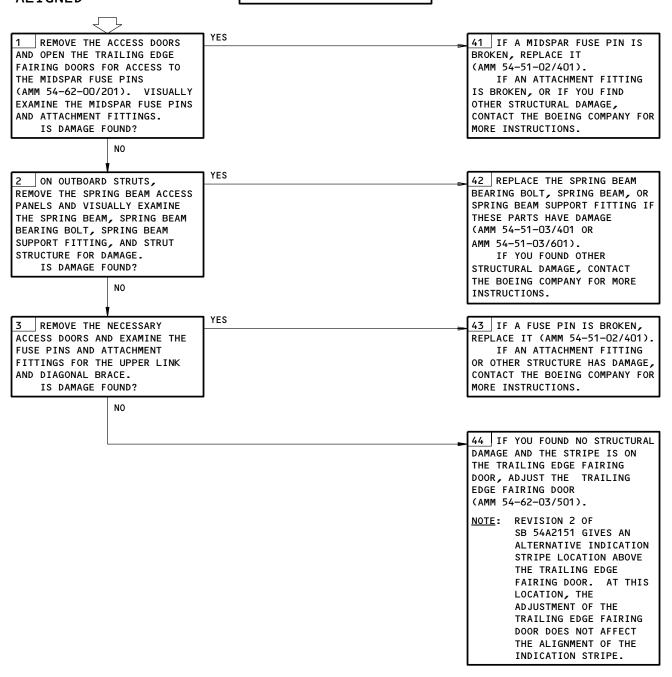
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## STRUT INDICATION STRIPE NOT ALIGNED

PREREQUISITES
NONE



Strut Indication Stripe Not Aligned Figure 102

ALL 54-10-00

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#### THRUST REVERSER HINGE BEARING - REMOVAL/INSTALLATION

#### 1. General

- A. This procedure contains the data to remove and install the bearing assembly in the thrust reverser hinge which is on the strut.
- B. The bearing assembly is made up of the bearing ball and the bearing race assembly. The bearing race assembly has a locking element in the threads.
- C. The bearing race assembly is designed to be installed only one time. If the assembly becomes loose, both parts of the race should be replaced.

TASK 54-31-01-004-001

- 2. Bearing Assembly Removal from the Hinge (Fig. 401)
  - A. Equipment
    - (1) Socket Wrench, ST 2580-177
  - B. References
    - (1) AMM 78-31-01/401, Thrust Reverser
    - (2) AIPC 78-31-51, Fig. 5
  - C. Access
    - (1) Location Zone

415 Engine 1 - Thrust Reverser

425 Engine 2 - Thrust Reverser

435 Engine 3 - Thrust Reverser

445 Engine 4 - Thrust Reverser

D. Procedure

s 014-002

(1) Do the procedure to remove the thrust reverser half (AMM 78-31-01/401).

s 034-003

(2) Remove the ball from the race.

s 024-004

(3) Remove the race from the thust reverser hinge.

s 164-013

(4) Clean the thrust reverser hinge.

s 214-014

(5) Examine the thrust reverser hinge for damage.

s 424-012

(6) If the thrust reverser hinge is damaged, replace the hinge.

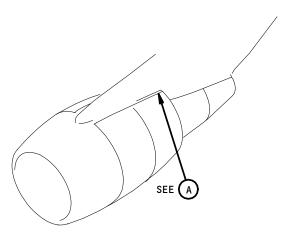
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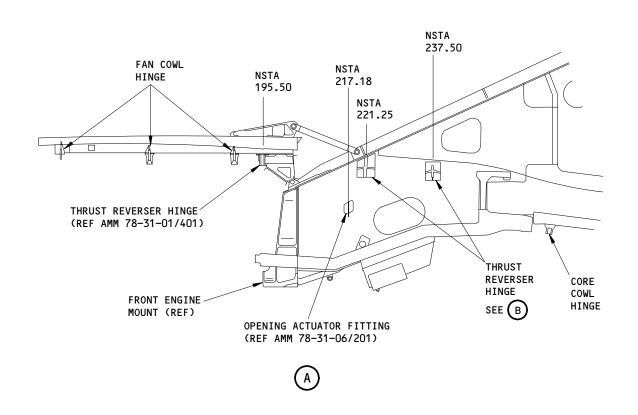
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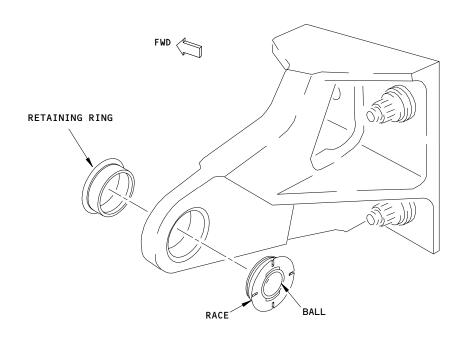
Thrust Reverser Hinge Fitting Figure 401 (Sheet 1)

EFFECTIVITY-ALL 01

54-31-01

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(B)

# Thrust Reverser Hinge Fitting Figure 401 (Sheet 2)

54-31-01

01

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TASK 54-31-01-404-005

- Bearing Assembly Installation in the Hinge (Fig. 401)
  - A. Equipment
    - (1) Socket Wrench, ST 2580-177
  - B. Consumable Materials
    - (1) DOOO15 Corrosion Preventative, Grease BMS 3-24
  - C. References
    - (1) AMM 78-31-01/401, Thrust Reverser
    - (2) AIPC 78-31-51, Fig. 5
  - D. Access
    - (1) Location Zone

415 Engine 1 - Thrust Reverser

425 Engine 2 - Thrust Reverser

435 Engine 3 - Thrust Reverser

445 Engine 4 - Thrust Reverser

E. Procedure

s 624-006

(1) Apply a thin layer of grease to the exterior of the retaining ring.

NOTE: Do not apply grease to the threads on the ring.

s 624-007

(2) Apply a thin layer of grease to the exterior of the race.

NOTE: Do not apply grease to the threads on the race.

s 424-007

(3) Put the race into the hinge from the aft side.

s 424-008

(4) Hold the race in place with the socket wrench.

NOTE: Keep the slot in the vertical position.

s 424-009

(5) Put the retaining ring into the hinge lug from the forward side.

s 434-008

ALL

(6) Using the socket wrench, tighten the retaining ring to 120 - 140 pound-inches.

EFFECTIVITY-

54-31-01



s 164-009

(7) Remove any excess grease from the surface of the race and hinge.

s 424-010

(8) Put the ball into the race.

s 424-015

(9) If you will not immediately install the thrust reverser half, hold the ball in place with a small piece of rope.

s 414-011

(10) Do the procedure to install the thrust reverser half (AMM 78-31-01/401).

EFFECTIVITY-

ALL

54-31-01



#### NACELLE STRUT ASSEMBLY - DESCRIPTION AND OPERATION

#### 1. General (Fig. 1)

A. The nacelle strut assembly consists of the torque box, fan cowl support beam, strut-to-wing attach hardware, engine attach fittings, firewall, and strut drain system.

#### 2. Torque Box

- A. The torque box transmits loads between the engine and wing through attaching hardware.
- B. The torque box is constructed of spars, bulkheads, ribs, and stiffeners. The inboard and outboard struts differ in length, quantity of ribs, and structure at the stepped-down portion of the closure spar area.
  - (1) Spars in the torque box include the forward upper spar, closure spar at the upper aft end of the torque box, midspar, and forward and aft lower spars.
  - (2) Bulkheads in the torque box include the forward and aft engine mount bulkheads, and torque bulkhead at the aft end of the torque box.

#### 3. Fan Cowl Support Beam

- A. The fan cowl support beam extends forward of the torque box. The fan cowl panels attach to hinges mounted on the fan cowl support beam.
- B. The fan cowl support beam is attached to the forward engine mount bulkhead by attach fittings and to the forward upper spar by a support link.

#### 4. Strut-to-Wing Attach Hardware

- A. The strut is attached to the wing by the upper link, diagonal brace, side brace or side links, spring beams on the outboard struts, and attach/fuse pins.
- B. Attach/fuse pins are located at each end of the upper link, diagonal brace, and the aft end of the midspar on inboard struts and the spring beam on outboard struts.

#### 5. Engine Attach Fittings

A. Engine attach fittings, located below the forward and aft engine mount bulkheads, transmit loads between engine and strut. For description of engine attach fittings, refer to 71-21-00/001.

#### 6. Firewall

- A. The firewall protects the nacelle strut and systems installed in the strut from high temperatures generated in the engine combustor and turbine sections below the strut.
- B. The firewall consists of steel or steel clad structural members along the entire lower section of the strut. A fireseal depressor is installed along the forward lower section of the strut to mate with a bulb seal installed on the thrust reversers.

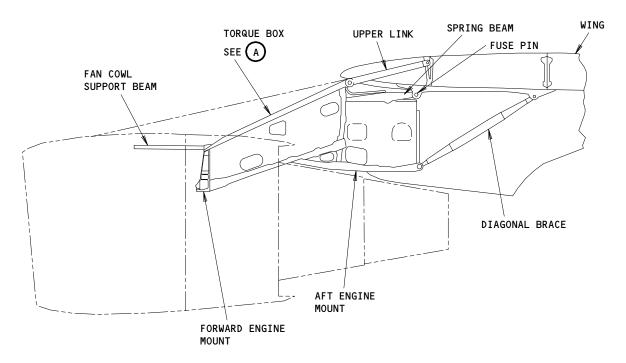
#### 7. Strut Drain System

- A. The strut drain system provides a means for disposal of accumulated fuel or other fluids leaking from system plumbing routed through the strut. Fluids are drained overboard or routed through tubes to the engine drain system.
- B. Strut drain inlets are provided at the bottom of internal strut compartments. Screens are installed on all strut drain inlets to prevent debris from entering drain tubes.

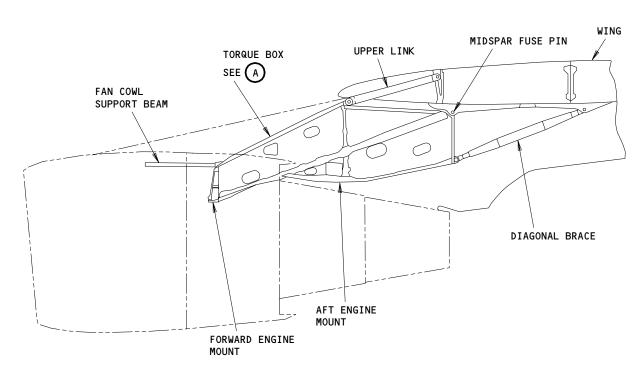
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#### OUTBOARD NACELLE STRUT



INBOARD NACELLE STRUT

Nacelle Strut

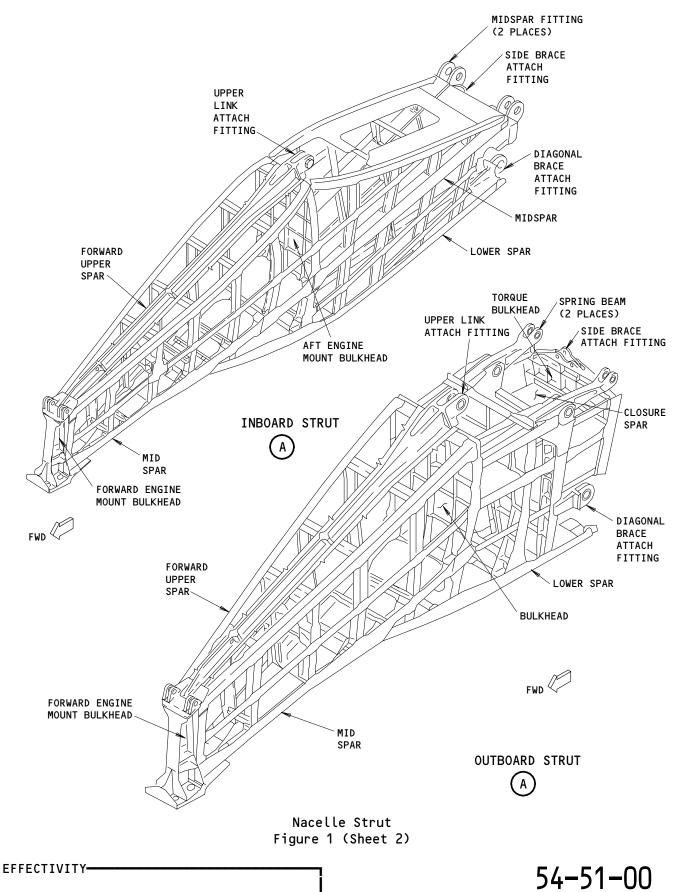
Figure 1 (Sheet 1)

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#### NACELLE STRUT ASSEMBLY

COMPONENT	FIG. 102 SHT	QTY	ACCESS/AREA	AMM REFERENCE
ATTACH BOLT - DIAGONAL BRACE FORWARD, OUTBOARD STRUT	1	2	454AL,454AR, STRUT 1 484AL,484AR, STRUT 4	54-51-02
ATTACH BOLT - UPPER LINK AFT	1	4	521FT, STRUT 1 511CT, STRUT 2 611CT, STRUT 3 621FT, STRUT 4	54-51-02
BEAM - SPRING	2	4	452TR,452TL, STRUT 1 482TL,482TR, STRUT 4	54-51-03
BOLT - SPRING BEAM BEARING	2	4	452TR,452TL, STRUT 1 482TL,482TR, STRUT 4	54-51-03
FUSE PIN - DIAGONAL BRACE AFT	1	4	454AL,454AR, STRUT 1 464AL,464AR, STRUT 2 474AL,474AR, STRUT 3 484AL,484AR, STRUT 4	54-51-02
FUSE PIN - DIAGONAL BRACE FORWARD, INBOARD STRUT	1	2	464AL,464AR, STRUT 2 474AL,474AR, STRUT 3	54-51-02
FUSE PIN - MIDSPAR	1	8	452FL,452FR, STRUT 1 462HL,462HR, STRUT 2 472HL,472HR, STRUT 3 482FL,482FR, STRUT 4	54-51-02
FUSE PIN - UPPER LINK FORWARD	1	4	521FT, STRUT 1 511CT, STRUT 2 611CT, STRUT 3 621FT, STRUT 4	54-51-02

Nacelle Strut Assembly - Component Index Figure 101

EFFECTIVITY-

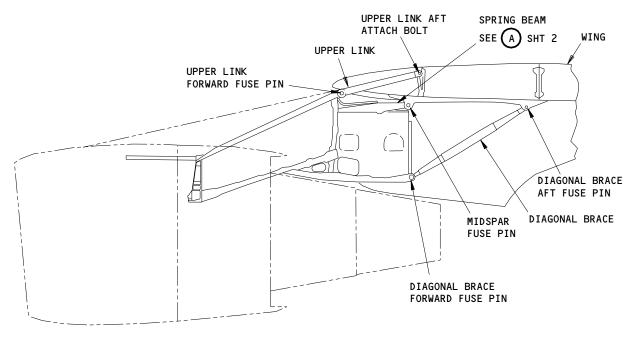
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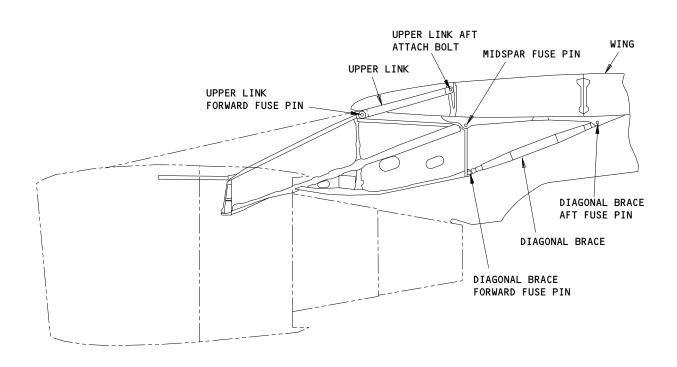
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OUTBOARD NACELLE STRUT



INBOARD NACELLE STRUT
Component Location
Figure 102 (Sheet 1)

EFFECTIVITY ALL

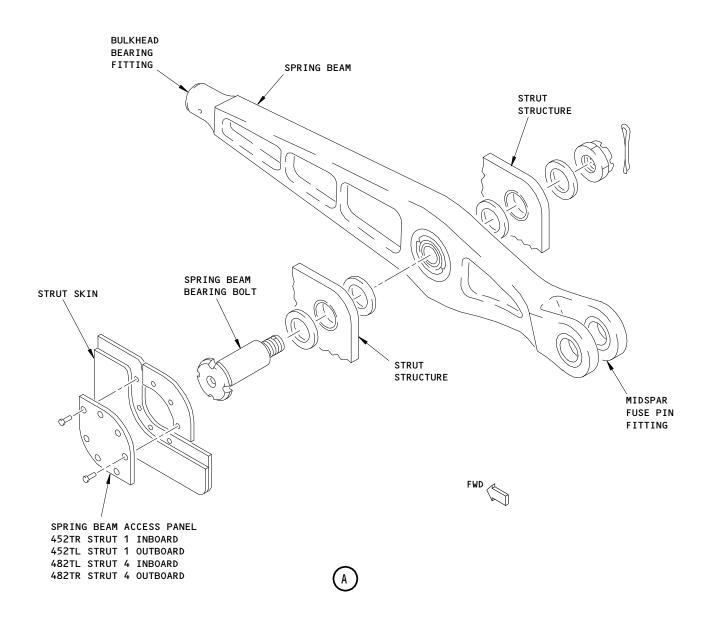
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NOTE: LEFT SIDE INSTALLATION SHOWN.
RIGHT SIDE INSTALLATION SIMILAR.

## Component Location (Details from Sht 1) Figure 102 (Sheet 2)

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#### NACELLE STRUT - REMOVAL/INSTALLATION

#### 1. General

- A. This procedure has two tasks. One task is the removal of the nacelle strut. The other task is for the installation the nacelle strut. The procedure has these parts:
  - (1) The removal of the engine and thrust reversers
  - (2) The deactivation of all the airplane and engine systems in the strut
  - (3) Open the cover of the wing leading edge and all the access panels interface
  - (4) Remove the hydraulic pump and drive
  - (5) Disconnect all the tubes and wires at the strut to the wing interface
  - (6) Install the unload sling
  - (7) Remove the load from the diagonal brace assembly
  - (8) Remove the unload sling
  - (9) Install the overhead sling (referred to as sling)
  - (10) Remove all the attach pins/bolts and links
  - (11) Remove the strut from the wing with the aid of the sling
  - (12) Do a check on all the attached hardware for corrosion
  - (13) Install the strut on the wing with the aid of the sling
  - (14) Install all the attached pins/bolts and links
  - (15) Remove the sling
  - (16) Install the hydraulic pump and drive
  - (17) Connect all the tubes and wires at the strut to the wing interface and seal again if it is necessary
  - (18) Close the cover of the wing leading edge and all the strut access panels
  - (19) Do a test on all the airplane and engine systems in the strut
  - (20) Install the thrust reversers and the engine
- B. The strut structure is attached to the wing by these attach:
  - (1) The upper link
  - (2) The side brace
  - (3) The spring beam (mid spar fittings) which is installed on the closure spar
  - (4) The diagonal brace which is installed aft of the torque bulkhead
- C. Access to the area above the closure spar is through the cover of the wing leading edge. Access to the area aft of the torque bulkhead is through the trailing edge (TE) fairing doors.
- D. If it is necessary, remove the sealant when you disconnect the engine systems equipment and the strut attach pins/bolts.
- E. During the strut removal, seal all the tube ends, ducts and electrical connectors with a cap as soon as possible after you disconnected them. During the strut installation, do not remove the caps until the connections are to be made. Use the external caps only.

TASK 54-51-01-004-001

#### 2. Remove the Nacelle Strut

- A. Special Tools and Equipment
  - (1) G54004 Overhead Mechanical Equipment, Inboard and Outboard Nacelle Strut Installation

 54-51-01

02



- (2) G54007 Overhead Mechanical Equipment, Diagonal Brace Unload Sling
- (3) 3MIT65B90100 Wrench Set, Strut Installation, Upper Link Aft Attach Bolt
- B. Standard Tools and Equipment
  - (1) Crane, capable of lifting 3000 pounds
  - (2) Mat protective, for wing upper surface
- C. References
  - (1) AMM 24-22-00/201, Manual Control
  - (2) AMM 27-81-00/201, Leading Edge Flaps
  - (3) AMM 28-00-00/201, Fuel System
  - (4) AMM 29-11-00/201, Main Hydraulic Supply System
  - (5) AMM 29-11-08/401, Air-Driven Pump Turbine Drive
  - (6) AMM 29-11-17/401, Air-Driven Pump
  - (7) AMM 29-11-19/401, AC Motor-Driven Pump
  - (8) AMM 36-11-01/401, Pneumatic Duct
  - (9) AMM 54-51-02/401, Nacelle Strut Attach Pin/Bolt
  - (10) AMM 54-62-00/201, Nacelle Strut Access Panels (Opening/Closing)
  - (11) AMM 54-62-04/401, Forward Fairings
  - (12) AMM 71-00-02/401, Power Plant
  - (13) AMM 78-31-01/401, Thrust Reverser System
  - (14) AIPC 54-51-02 Fig. 3 and 4
  - (15) WDM Chapter 20
- D. Access
  - (1) Location Zone
    - 451 Nacelle Strut 1 Forward Fairing
    - 452 Nacelle Strut 1 Torque Box
    - 454 Nacelle Strut 1 Aft Fairing
    - 521 Nacelle Strut 1 Leading Edge to Front Spar
    - 461 Nacelle Strut 2 Forward Fairing
    - 462 Nacelle Strut 2 Torque Box
    - 464 Nacelle Strut 2 Aft Fairing
    - 521 Nacelle Strut 2 Leading Edge to Front Spar
    - 471 Nacelle Strut 3 Forward Fairing
    - 472 Nacelle Strut 3 Torque Box
    - 474 Nacelle Strut 3 Aft Fairing
    - 621 Nacelle Strut 3 Leading Edge to Front Spar
    - 481 Nacelle Strut 4 Forward Fairing
    - 482 Nacelle Strut 4 Torque Box
    - 484 Nacelle Strut 4 Aft Fairing
    - 621 Nacelle Strut 4 Leading Edge to Front Spar
  - (2) Access Panel

454	Trailing Edge Fairing Door - Nacelle Strut 1
521FT	Wing Leading Edge Cover - Nacelle Strut 1
464	Trailing Edge Fairing Door - Nacelle Strut 2
511CT	Wing Leading Edge Cover - Nacelle Strut 2
474	Trailing Edge Fairing Door - Nacelle Strut 3
611CT	Wing Leading Edge Cover - Nacelle Strut 3
484	Trailing Edge Fairing Door - Nacelle Strut 4
621FT	Wing Leading Edge Cover - Nacelle Strut 4

EFFECTIVITY-

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E. Prepare for the Removal (Fig. 401 and 402)

s 494-002

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Do this task: "Leading Edge Flap Retraction" (AMM 27-81-00/201).

s 014-003

(2) Remove the engine (AMM 71-00-02/401).

s 014-004

(3) Remove the thrust reverser halves (AMM 78-31-01/401).

s 864-005

(4) Remove the electrical power from the nacelle strut (AMM 24-22-00/201).

S 864-006

(5) Make sure that the external electrical power is disconnected.

s 864-106

(6) Make sure that the airplane is grounded.

s 864-007

(7) Make sure that the toggle switches of the fuel control on the engine start module are in the CUTOFF position.

S 864-008

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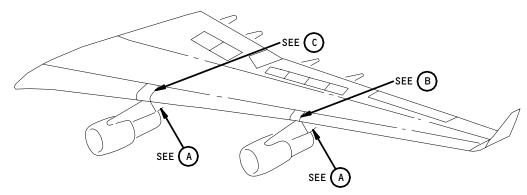
(8) Make sure that the hydraulic system is released of the pressure (AMM 29-11-00/201).

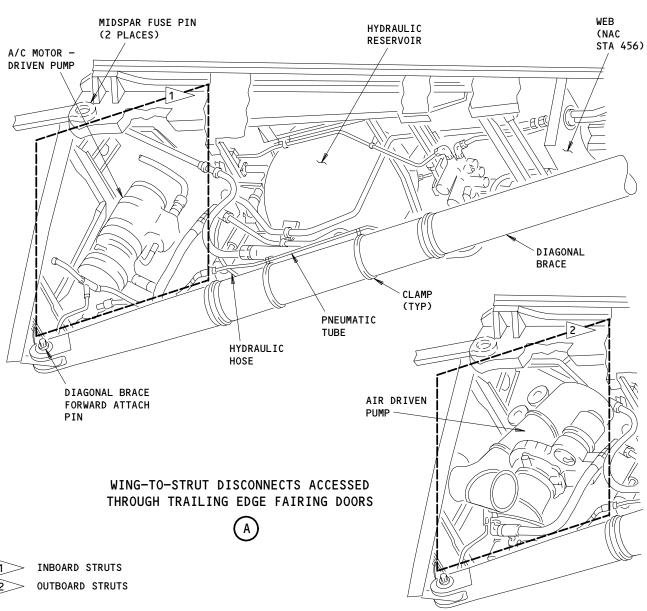
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Nacelle Strut Access Figure 401 (Sheet 1)

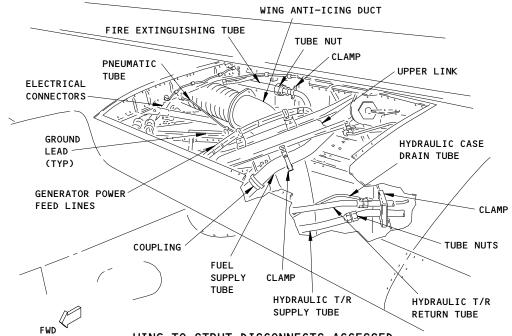
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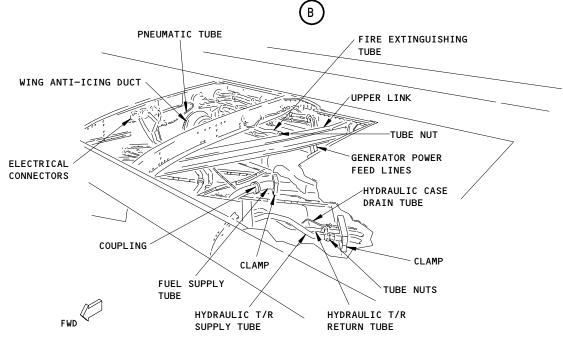
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WING-TO-STRUT DISCONNECTS ACCESSED
THROUGH WING LEADING EDGE COVER - OUTBOARD STRUT



WING-TO-STRUT DISCONNECTS ACCESSED
THROUGH WING LEADING EDGE COVER - INBOARD STRUT

(c)

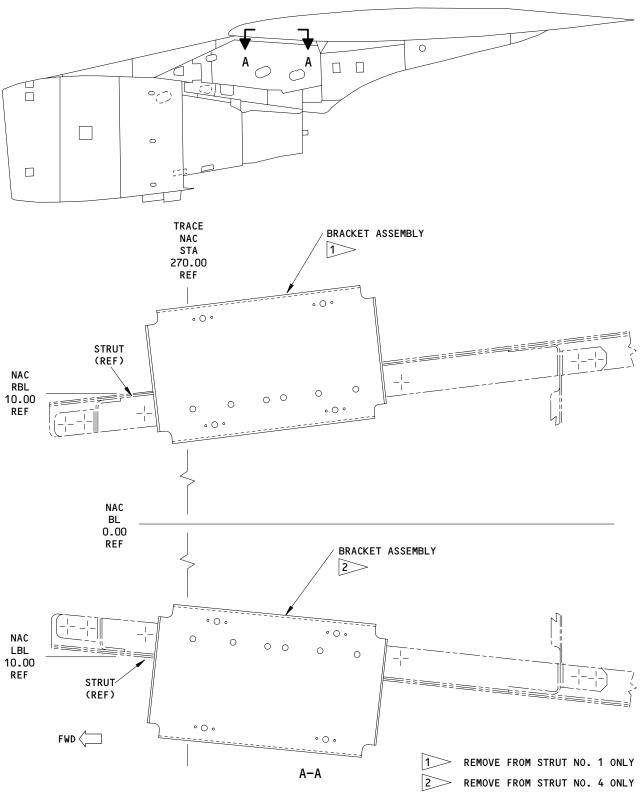
Nacelle Strut Access Figure 401 (Sheet 2)

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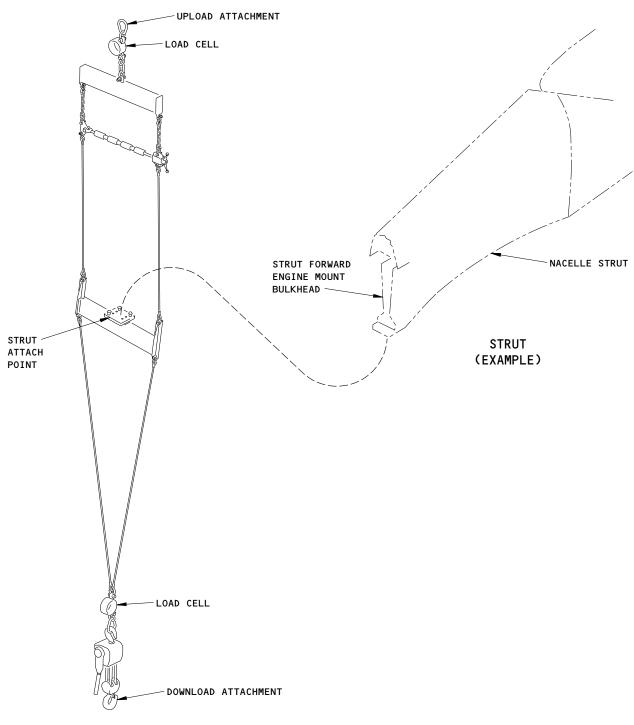
Nacelle Strut Access Figure 401 (Sheet 3)

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DIAGONAL BRACE UNLOAD SLING G54007

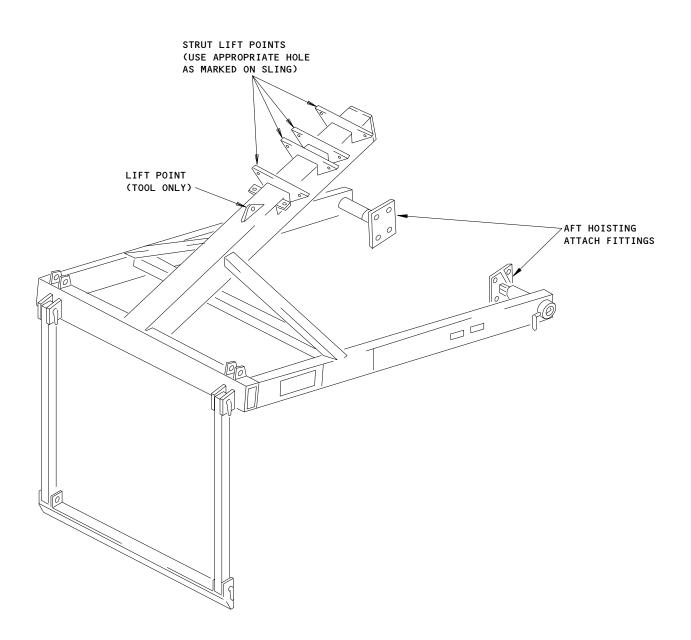
Nacelle Strut Removal/Installation Overhead Mechanical Equipment Figure 402 (Sheet 1)

54-51-01

05

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HOISTING SLING G54004

Nacelle Strut Removal/Installation Overhead Mechanical Equipment Figure 402 (Sheet 2)

54-51-01

04

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S 864-009

(9) Make sure that the engine fuel and hydraulic supply shutoff valves are closed.

s 864-107

(10) Make sure that the electrical plugs are disconnected from the valves.

s 684-010

(11) Make sure that the fuel supply line and hydraulic fluid lines connected to the engine are drained.

s 014-011

(12) Open the TE fairing doors (AMM 54-62-00/201).

S 014-169

(13) On inboard struts, remove the forward fixed fairing (AMM 54-62-04/401).

s 014-013

- (14) On inboard struts, remove 12 screws and washers that attach the lower section of the web to the fixed fairing support.
  - (a) This is found at Nac. Sta. 456 on the aft edge of the TE fairing doors.

s 014-108

(15) Remove the lower section of the web.

s 014-016

(16) Open all the strut access and pressure relief doors (AMM 54-62-00/201).

S 014-166

(17) On outboard struts, remove the forward fairing No. 4 (AMM 54-62-04/401).

S 014-164

(18) On outboard struts, remove the outboard strut bracket assembly (Fig. 401).

s 014-019

(19) Open the cover of the wing leading edge.

s 034-020

- (20) Disconnect these tubes which are found on the closure spar (Fig. 401):
  - (a) The fuel supply tube
    - 1) Disconnect the coupling on the fuel supply tube (AMM 28-00-00/201).

EFFECTIVITY-

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- 2) Remove the clamp block that connects the fuel supply tube to the upper link (on the outboard struts) or to the strut (on the inboard struts).
- 3) Disconnect the ground lead from the fuel tube section in the wing.
- (b) The pneumatic tube
  - Disconnect the tube nut, at the wing bulkhead, on the pneumatic tube.
- (c) The hydraulic tubes
  - 1) Disconnect the tube nuts on the case drain tube.
  - 2) Disconnect the thrust reverser pressure and return tubes.
  - 3) Remove the clamp block that attaches the three hydraulic tubes to the strut.
- (d) The fire extinguisher tube
  - 1) Disconnect the tube nut on the fire extinguisher tube.
  - 2) Remove the clamp that attaches the fire extinguisher tube to the strut.
  - 3) On outboard struts disconnect the strut drain line exit at the bulkhead penetration at NAC STA 241.

#### s 034-021

- (21) Disconnect these pneumatic ducts (AMM 36-11-01/401):
  - (a) On outboard struts, disconnect the pneumatic supply duct which
    - is found at the aft of the torque bulkhead.
    - 1) Remove the duct coupling clamp.
    - 2) Disconnect the pneumatic tube from the pneumatic duct.
    - 3) Disconnect the two duct support links which are found near the coupling clamp.
      - a) Remove the bolt, bushing, washer, and nut for each of the link.
  - (b) The wing anti-icing duct which is found above the closure spar
    - 1) Remove the duct coupling clamp.

#### s 034-022

ALL

WARNING: CONNECT AND DISCONNECT ELECTRICAL LINES ONLY WITH THE ELECTRICAL POWER OFF. HIGH VOLTAGE CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (22) Do these steps to remove the generator power feeder from the strut (WDM Chapter 20).
  - (a) Take the seal housing apart at the strut raceway.
  - (b) Disconnect the seal block clamp where the power feeder goes through the midspar web of the strut.
    - Remove the sealant from the power feeder and from around the power feeder.
  - (c) Disconnect the clamps that attach the power feeder to the structure.
  - (d) Disconnect the seal fittings at the strut bulkhead.
  - (e) Pull the power feeder back through the strut and put it on a protective mat on the top of the wing.

EFFECTIVITY-

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04.1

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s 034-129

(23) On inboard struts, disconnect the flight control wire bundles from the clamp that is attached to the upper link.

s 034-023

- (24) Disconnect the electrical connectors for the applicable strut as follows:
  - (a) At the strut to wing interface above the closure spar:

Nac. Strut 1	Nac. Strut 2	Nac. Strut 3	Nac. Strut 4		
D7528P	D7538P	D7548P	D7537P		
D7528P	D7538P	D7548P	D7537P		
D7529P	D7539P	D7549P	D7547P		
D7530P	D7540P	D7550P	D7564P		
D7531P	D7541P	D7551P	D7565P		
D7532P	D7542P	D7552P	D7567P		
D7534P	D7544P	D7554P	D7568P		
D7535P	D7545P	D7555P	D7569P		
D12040P	D12041P	D12042P	D12043P		

(b) At the strut to wing interface above the closure spar:

Nac. Strut 1	Nac. Strut 2	Nac. Strut 3	Nac. Strut 4

(c) At the strut to wing interface aft of the torque bulkhead:

Nac. Strut 1	Nac. Strut 4	

EFFECTIVITY---

54-51-01

ALL



D8450	P	D8453P	
D8451	Р	D8454P	

- (d) If it is necessary, tag the electrical connectors for identification.
  - 1) Pull the wire bundles to the aft end of the strut.
  - 2) Put the wire bundles on the top of the wing.

S 034-025

(25) On outboard struts, remove the air-driven pump aft of the torque bulkhead (AMM 29-11-17/401).

s 034-027

(26) On outboard struts, remove the air-driven pump turbine drive aft of the torque bulkhead (AMM 29-11-08/401).

s 034-028

(27) On inboard struts, remove the AC motor-driven pump aft of the torque bulkhead (AMM 29-11-19/401).

s 034-029

(28) Disconnect the hydraulic hose from the clamps that attach the hose to the diagonal brace.

s 034-030

(29) Disconnect the pneumatic tube from the clamps that attach the tube to the diagonal brace.

s 034-031

(30) On outboard struts, disconnect the cables from the two clamps installed on the upper link.

s 034-032

(31) Disconnect the ground lead between the strut and wing.

s 034-033

- (32) Remove the screws and break the seal along the lower edge of the wing front spar.
- F. Remove the Nacelle Strut (Fig. 403)

s 494-143

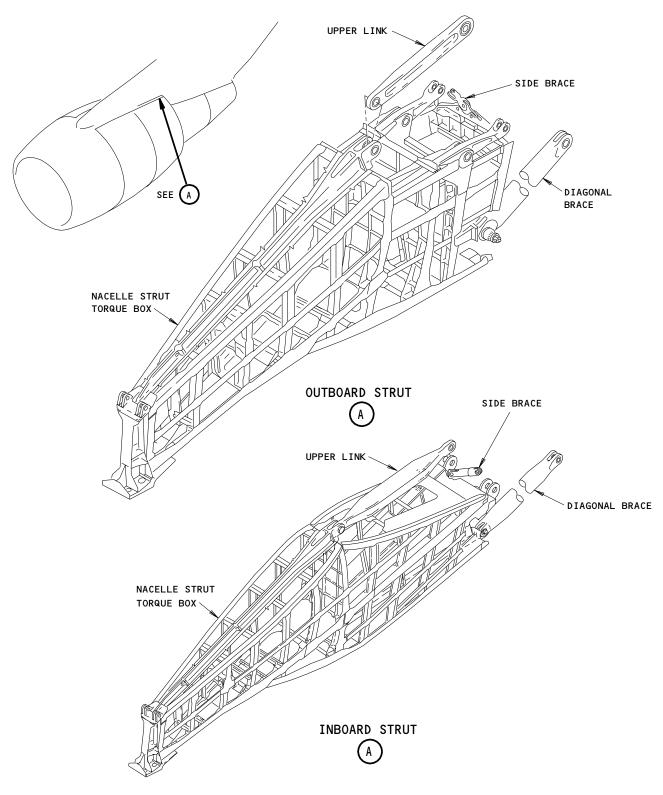
ALL

(1) Use the tool placard to install the strut preload sling G54007 (Fig. 402).

EFFECTIVITY-

54-51-01





Nacelle Strut - Removal/Installation Figure 403

EFFECTIVITY ALL

54-51-01

04

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S 984-144

CAUTION: DO NOT EXCEED UPLOAD NECESSARY TO PERMIT PIN/BOLT ROTATION WITH THE APPLICATION OF 125 POUND-INCHES MAXIMUM TORQUE. DO NOT LIFT THE STRUT OR PULL DOWN ON THE STRUT WITH MORE THAN 3,000 POUNDS OF FORCE ON THE INBOARD STRUTS OR 1,800 POUNDS OF FORCE ON THE OUTBOARD STRUTS. IF YOU APPLY A FORCE THAT IS MORE THAN NECESSARY, DAMAGE TO THE STRUCTURE CAN OCCUR.

(2) Gently apply a load sufficient to remove the strut preload.

NOTE: This is to remove the load from the pin/bolt that you will remove.

(a) Make sure the pin/bolt to be removed can be rotated by applying no more than 125 pound-inches (14.3 N.m) torque.

NOTE: Castellated nuts may have to be tightened up to 200 pound-inches (22.6 N.m) to allow the fuse pin assembly to rotate as a unit with 125 pound-inches (14 N.m) applied torque.

s 034-035

(3) Disconnect the diagonal brace at the forward end (AMM 54-51-01/401).

s 034-036

(4) Remove the aft fuse pin of the diagonal brace (AMM 54-51-02/401).

s 034-037

(5) Remove the diagonal brace.

S 094-146

(6) Slowly release the load on the diagonal brace unload sling and remove the sling.

s 494-034

ALL

- (7) Install the strut overhead sling (Fig. 402)
  - (a) Remove the No. 3 forward fairing.
  - (b) Attach the sling to the front of the strut with the forward hoisting attach fitting.
  - (c) Attach the sling to the lower aft attach points of the strut with the aft hoisting attach fittings.
  - (d) Use the lift point as marked on the sling for the engine and strut location.
  - (e) Use the hole in the lift point as follows:
    - 1) Engines 1 & 2 left hole
    - 2) Engines 3 & 4 right hole.

EFFECTIVITY-

54-51-01



s 034-038

(8) Remove the attach bolts of the side brace (AMM 54-51-02/401).

s 034-039

(9) Remove the side brace.

s 034-040

(10) Remove the forward fuse pin of the upper link (AMM 54-51-02/401).

s 034-041

(11) Remove the aft attach bolt of the upper link (AMM 54-51-02/401).

s 034-042

(12) Remove the upper link.

S 034-043

(13) Remove the two fuse pins of the midspar/spring beam (AMM 54-51-02/401).

S 024-044

CAUTION: USE APPLICABLE PROTECTION BELOW THE ENGINE MOUNT FITTINGS
TO PREVENT DAMAGE TO THE DUCTS, TUBING, AND LINES. DAMAGE
TO THESE ITEMS COULD CAUSE THE HYDRAULIC SYSTEM TO LEAK.

(14) Lower the nacelle strut on the dolly.

s 034-045

- (15) Remove the strut-to-wing seal.
  - (a) On outboard struts, remove the seven screws and washers that attach the seal to the strut.

TASK 54-51-01-404-046

- 3. <u>Install the Nacelle Strut</u>
  - A. Special Tools and Equipment
    - (1) G54004 Overhead Mechanical Equipment, Inboard and Outboard Nacelle Strut Installation
    - (2) G54007 Overhead Mechanical Equipment, Diagonal Brace Unload Sling
    - (3) 3MIT65B90100 Wrench Set, Strut Installation, Upper Link Aft Attach Bolt
  - B. Standard Tools and Equipment

ALL

- (1) Crane, capable of lifting 3000 pounds
- C. Consumable Materials
  - (1) A00344 Compound Corrosion Preventive, MIL-C-11796, Class 1
  - (2) A00247 Sealant BMS 5-95

EFFECTIVITY-

54-51-01



(3) A00310 Sealant - BMS 5-79 (optional to BMS 5-95) (4) A00160 Sealant - BMS5-63, Class B References AMM 24-20-00/501, AC Generation (1) AMM 27-81-00/201, Leading Edge Flaps (2) (3) AMM 28-00-00/201, Fuel System (4) AMM 29-11-00/201, Main Hydraulic Supply System AMM 29-11-00/601, Main Hydraulic Supply System (5) (6) AMM 29-11-08/401, Air-Driven Pump Turbine Drive (7) AMM 29-11-17/401, Air-Driven Pump (8) AMM 29-11-19/401, AC Motor-Driven Pump (9) AMM 30-11-00/501, Wing Thermal Anti-Icing (10) AMM 36-11-00/501, Engine Bleed Air Distribution System (11) AMM 36-11-01/401, Pneumatic Duct (12) AMM 51-21-00/001, Interior and Exterior Finishes (13) AMM 54-51-02/401, Nacelle Strut Attach Pins/Bolts (14) AMM 54-51-03/601, Spring Beam (15) AMM 54-53-01/201, Strut Systems Sealant (16) AMM 54-62-00/201, Nacelle Strut Access Panels (17) AMM 54-62-04/401, Forward Fairings (18) AMM 71-00-00/501, Power Plant (19) AMM 71-00-02/401, Power Plant (20) AMM 78-31-01/401, Thrust Reverser System (21) CPM Part III, 54-10-47 (22) IPC 54-51-02 Fig. 3 and 4 (23) OHM 54-00-01 (24) WDM Chapter 20 Access (1) Location Zone 451 Nacelle Strut 1 - Forward Fairing 452 Nacelle Strut 1 - Torque Box 454 Nacelle Strut 1 - Aft Fairing 521 Nacelle Strut 1 - Leading Edge to Front Spar 461 Nacelle Strut 2 - Forward Fairing Nacelle Strut 2 - Torque Box 462 464 Nacelle Strut 2 - Aft Fairing 521 Nacelle Strut 2 - Leading Edge to Front Spar 471 Nacelle Strut 3 - Forward Fairing Nacelle Strut 3 - Torque Box 472 Nacelle Strut 3 - Aft Fairing 474 621 Nacelle Strut 3 - Leading Edge to Front Spar Nacelle Strut 4 - Forward Fairing 481 Nacelle Strut 4 - Torque Box 482

484 621

ALL

04

Nacelle Strut 4 - Aft Fairing

Nacelle Strut 4 - Leading Edge to Front Spar



(2) Access Panel

454	Trailing Edge Fairing Door - Nacelle Strut 1
521FT	Wing Leading Edge Cover - Nacelle Strut 1
464	Trailing Edge Fairing Door - Nacelle Strut 2
511CT	Wing Leading Edge Cover - Nacelle Strut 2
474	Trailing Edge Fairing Door - Nacelle Strut 3
611CT	Wing Leading Edge Cover - Nacelle Strut 3
484	Trailing Edge Fairing Door - Nacelle Strut 4
621FT	Wing Leading Edge Cover - Nacelle Strut 4

## F. Prepare for Installation

S 864-135

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Make sure that the wing leading edge flaps are retracted (AMM 27-81-00/201).

S 864-048

(2) Make sure that the external electrical power is disconnected.

S 864-112

(3) Make sure that the airplane is grounded.

s 864-049

(4) Make sure that the toggle switches of the fuel control which are found on the engine start module are in the CUTOFF position.

s 864-050

(5) Make sure that the applicable hydraulic system is released of the pressure (AMM 29-11-00/201).

s 864-051

(6) Make sure that the applicable engine fuel and hydraulic fluid shutoff valves are closed.

S 864-113

ALL

(7) Make sure that the electrical plugs are disconnected from the valves.

EFFECTIVITY-

54-51-01



#### s 214-052

- (8) Make sure that all of the attach pins, bolts, retain caps and washers at the installation points of the nacelle strut are free from corrosion.
  - (a) Also do this check on the inside of the hollow fuse pins, bolts and the inner diameter (ID) of the fitting bushings.
  - (b) If there are corrosion, do one of these two steps:
    - 1) Replace the part.
    - 2) Remove the corrosion and apply the corrosion protection (CPM Part III, 54-10-47).
    - 3) Apply two layers of primer to all open surfaces which includes the ID, but does not include the chrome plate OD.
    - 4) Apply a 0.05 inch (1.3 mm) thick layer of corrosion preventive compound to the ID of each attach pin/bolt.

### s 624-053

- (9) Make sure that all the attach fitting bushings at the installation points are sealed from corrosion.
  - (a) If the bushings are not sealed, apply the sealant (BMS 5-79) to the bushings (AMM 51-31-01/201).
    - 1) Apply the seal to the flange end of all the bushings.
    - 2) Apply a layer of the seal (maximum thickness 0.010 inch) to the entire area of the unflanged bushing ends (except the upper link and wing fitting of the diagonal brace) which is opened to the mating surface of the parent part.

NOTE: No seal is necessary for the bushing end that is not opened to the mating surface of the parent part.

Corrosion in this area is done when you use grease during the installation of pins or bolt.

3) Apply a layer of the seal to all area of the unflanged bushing end at the wing fitting of the diagonal brace.

#### S 434-054

(10) Install the strut-to-wing seal.

# s 494-055

- (11) Install the sling
  - (a) Find the lift point for the inboard or outboard strut.
  - (b) Use the attach fitting on the forward hoisting to attach the sling to the front of the strut.
  - (c) Use the attach fittings on the aft hoisting to attach the sling to the sides of the strut.
  - (d) Carefully lift the strut with the crane.

## s 424-056

(12) Put the strut in the correct position for installation on the wing.

 54-51-01



G. Install the Nacelle Strut (Fig. 403)

s 434-057

(1) Install the two fuse pins of the midspar/spring beam (AMM 54-51-02/401).

s 434-136

CAUTION: ON THE OUTBOARD STRUTS, MAKE SURE YOU INSTALL AN UPPER LINK AND DIAGONAL BRACE IN THEIR CORRECT PAIRS. THE PAIRS CAN BE A TITAMIUM UPPER LINK AND DIAGONAL BRACE OR A STEEL UPPER LINK AND ALUMINUM DIAGONAL BRACE. ALSO, MAKE SURE YOU ATTACH THE CORRECT SYSTEMS HARDWARE FOR THE TYPE OF MATERIAL IN THE UPPER LINK AND DIAGONAL BRACE. IF YOU DO NOT INSTALL THE CORRECT PARTS, YOU CAN CAUSE DAMAGE TO THE AIRPLANE.

(2) Put the upper link between the wing and strut attach fitting.

s 434-059

(3) Install the aft attach bolt of the upper link (AMM 54-51-02/401).

s 434-060

(4) Install the forward fuse pin of the upper link (AMM 54-51-02/401).

s 434-061

(5) Put the side brace between the wing attach fitting and strut attach fitting.

s 434-062

(6) Install the attach bolts of the side brace (AMM 54-51-02/401).

s 434-137

CAUTION: ON THE OUTBOARD STRUTS, MAKE SURE YOU INSTALL AN UPPER LINK AND DIAGONAL BRACE IN THEIR CORRECT PAIRS. THE PAIRS CAN BE A TITAMIUM UPPER LINK AND DIAGONAL BRACE OR A STEEL UPPER LINK AND ALUMINUM DIAGONAL BRACE. ALSO, MAKE SURE YOU ATTACH THE CORRECT SYSTEMS HARDWARE FOR THE TYPE OF MATERIAL IN THE UPPER LINK AND DIAGONAL BRACE. IF YOU DO NOT INSTALL THE CORRECT PARTS, YOU CAN CAUSE DAMAGE TO THE AIRPLANE.

(7) Put the diagonal brace between the wing attach fitting and strut attach fitting.

S 434-064

(8) Install the aft fuse pin of the diagonal brace (AMM 54-51-02/401).

s 094-147

(9) Slowly release the load on the overhead sling and remove the sling.

EFFECTIVITY-

54-51-01

ALL



S 414-152

(10) Install the No. 3 forward fairing.

s 494-148

(11) Use the tool placard to install the strut preload sling G54007 (Fig. 402).

s 984-149

CAUTION: DO NOT EXCEED THE LOAD NECESSARY TO PERMIT PIN INSTALLATION. IN NO CASE SHALL THE MAXIMUM UPLOAD OR DOWNLOAD AT THE FORWARD ENGINE MOUNT OF THE STRUT EXCEED 3,000 POUNDS OF FORCE ON THE INBOARD STRUTS OR 1,800 POUNDS OF FORCE ON THE OUTBOARD STRUTS. IF YOU APPLY A FORCE THAT IS MORE THAN NECESSARY, DAMAGE TO THE STRUCTURE CAN OCCUR.

(12) Gently apply a load sufficient to install the pin at the forward end of the diagonal brace.

s 434-115

(13) Install the forward fuse pin of the diagonal brace (AMM 54-51-02/401).

s 094-138

(14) Slowly release the load on the diagonal brace preload sling and remove the sling.

s 224-066

- (15) On outboard struts, do a check on the rotational torque of the bearing bolt on the spring beam (AMM 54-51-03/601).
- H. Put the Airplane to Its Usual Condition (Fig. 401 and 402)

s 434-068

(1) Install the screws and seal along the lower edge of the wing front spar.

s 434-069

- (2) Connect the hydraulic hose to the diagonal brace.
  - (a) Do this task with the clamps that are attached to the diagonal brace.

s 434-070

(3) Connect the pneumatic tube to the diagonal brace with the clamps that are attached to the diagonal brace.

s 434-071

ALL

(4) Connect the ground lead between the strut and wing.

EFFECTIVITY-

54-51-01



s 434-073

(5) On outboard struts, install the air-driven pump turbine drive aft of the torque bulkhead (AMM 29-11-08/401).

s 434-075

(6) On outboard struts, install the air-driven pump aft of the torque bulkhead (AMM 29-11-17/401).

s 434-076

(7) On inboard struts, install the AC motor-driven pump aft of the torque bulkhead (AMM 29-11-19/401).

s 424-171

(8) On outboard struts, install the strut drain line exit at the bulkhead penetration at NAC STA 241.

s 434-077

- (9) Connect the tubes found above the closure spar as follows:
  - (a) The fuel supply tube
    - 1) Connect the coupling on the fuel supply tube (AMM 28-00-00/201).
    - 2) Install the clamp that attaches the fuel supply tube to the upper link (on outboard struts) or to the strut (on inboard struts).
    - 3) Connect the ground lead to the fuel tube.
  - (b) The pneumatic tube
    - 1) Connect the tube nut on the pneumatic tube.
  - (c) The hydraulic tubes
    - 1) Connect the tube nuts on the case drain tube.
    - 2) Connect the thrust reverser pressure and return tubes.
    - 3) Install the clamp that attaches the three hydraulic tubes to the strut.
  - (d) The fire extinguisher tube
    - 1) Connect the tube nut on the fire extinguisher tube.
    - Install the clamp that attaches the fire extinguisher tube to the nacelle strut.

s 434-078

- (10) Connect the pneumatic ducts as follows (AMM 36-11-01/401):
  - (a) On outboard struts, the pneumatic supply duct which is found at aft of the torque bulkhead
    - Connect the two duct support links which are found near the coupling clamp.
      - a) Do this by the installation of the bolt, bushing, washer, and nut for each of the link.
    - 2) Connect the pneumatic tube to the pneumatic duct.
    - 3) Install the duct coupling clamp.
  - (b) The wing anti-icing duct which is found above the closure spar
    - 1) Install the duct coupling clamp.

EFFECTIVITY-

54-51-01

ALL

02.1



s 434-079

WARNING: CONNECT AND DISCONNECT ELECTRICAL LINES ONLY WITH THE ELECTRICAL POWER OFF. HIGH VOLTAGE CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (11) Do these steps to install the generator power feeder into the strut (WDM Chapter 20).
  - (a) Install the power feeder into the strut with the correct routing.
  - (b) Connect the seal housing at the strut raceway.
  - (c) Add sealant (BMS5-63 Class B) to the power feeder seal fitting.
  - (d) Connect the seal clamp block at the midspar web of the strut.
  - (e) Connect all the clamps that attach the power feeder to the structure.

s 434-130

(12) On inboard struts, connect the flight control wire bundles to the clamp that is attached to the upper link.

s 434-080

- (13) Connect the electrical connectors for the applicable strut as follows:
  - (a) Remove the identification tags from the wire bundles and pull the wire bundles into the strut.
  - (b) At the strut to wing interface above the closure spar:

Nac. Strut 1	Nac. Strut 2	Nac. Strut 3	Nac. Strut 4		
D7528P	D7538P	D7548P	D7537P		
D7529P	D7539P	D7549P	D7547P		
D7530P	D7540P	D7550P	D7564P		
D7531P	D7541P	D7551P	D7565P		
D7532P	D7542P	D7552P	D7567P		
D7534P	D7544P	D7554P	D7568P		
D7535P	D7545P	D7555P	D7569P		
D12040P	D12041P	D12042P	D12043P		

EFFECTIVITY-

ALL

54-51-01



(c) At the strut to wing interface aft of the torque bulkhead:

Nac. Strut 1	Nac. Strut 4	
D8450P	D8453P	
D8451P	D8454P	

s 344-131

(14) Apply sealant (BMS5-79) around the tubes and wire bundles that pass through the strut (AMM 54-53-01/201).

S 864-082

(15) Supply the electrical power to the nacelle strut (AMM 24-22-00/201)

S 414-083

(16) Install the thrust reverser halves (AMM 78-31-01/401).

s 414-084

(17) Install the engine (AMM 71-00-02/401).

s 864-085

(18) Make sure that the engine fuel and hydraulic fluid shutoff valves are open.

s 864-116

(19) Make sure that the electrical plugs are connected to the valves.

s 864-087

(20) Make sure that the external electrical power is connected.

S 864-117

ALL

(21) Make sure that the airplane ground leads are removed.

EFFECTIVITY-



s 734-089

(22) Do the applicable test(s) in the power plant test reference table (AMM 71-00-00/501).

s 734-092

(23) Do the hydraulic system external leakage check (AMM 29-11-00/601).

s 734-094

(24) Do a test on the wing thermal anti-ice system (AMM 30-11-00/501).

s 944-118

CAUTION: REMOVE ALL OF THE TOOLS, AND LOOSE UNWANTED MATERIAL IN THE STRUT. THESE COULD CAUSE A BLOCKAGE TO THE STRUT DRAIN SYSTEM.

(25) Remove the tools, and loose unwanted materials from the strut before you install the access doors.

s 414-096

(26) On inboard struts, install 12 screws and washers that attach the lower section of the web to the fixed fairing support.

(a) This is found at Nac. Sta. 456 at the aft edge of the TE fairing doors.

S 414-167

(27) On inboard struts, install the forward fixed fairing (AMM 54-62-04/401).

s 414-100

CAUTION: MAKE SURE THAT THE SUPPORT RODS ARE TIGHTENED WHEN
THE TE FAIRING DOORS ARE CLOSED. SUPPORT RODS THAT
ARE LOOSELY HELD CAN CAUSE DAMAGE TO THE DIAGONAL BRACE.

(28) Close the TE fairing doors (AMM 54-62-00/201).

s 434-132

(29) Install the door support rods on the torque bulkhead.

s 414-101

(30) Install all the strut access and pressure relief doors (AMM 54-62-00/201).

S 414-165

(31) On outboard struts, install the outboard strut bracket assembly (Fig. 401).

EFFECTIVITY-

54-51-01

ALL



s 414-168

(32) On outboard struts, install the forward fairing No. 4 (AMM 54-62-04/401).

s 414-104

(33) Close the cover of the wing leading edge.

S 864-153

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT DO THE STEPS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(34) Do this task: "Safety Lock Removal and Leading Edge Flap Activation" (AMM 27-81-00/201).

S 864-133

ALL

(35) Do this task: "Leading Edge Flap Retraction" (AMM 27-81-00/201).

EFFECTIVITY-

54-51-01



#### NACELLE STRUT - INSPECTION/CHECK

## 1. General

- A. This subject has two tasks. The first task is to examine the structure of the spring beam support. The second task is to do a check of the nacelle strut wear limits. The procedures to gain access to, and remove/install the components, are referenced from this task.
- B. To examine the structure of the spring beam support, it is necessary to do these steps:
  - (1) The opening of the applicable access panels
  - (2) The borescope inspection of the structural parts in the spring beam support for cracks
  - (3) Ask Boeing for repair if cracks are found
  - (4) Close the applicable access panels.
- C. To do a check of the nacelle strut wear limits, it is necessary to do these steps:
  - (1) Get access to the applicable components.
  - (2) Remove and reinstall the applicable components as necessary.
- D. For inspection of the strut when it overheats, refer to 5-51-32.

TASK 54-51-01-206-001

- 2. Borescope Inspection of the Outboard Nacelle Strut (Fig. 601)
  - A. Special Tools and Equipment
    - (1) The units that follow, can be used for borescope inspection (the equipment below is offered by Circon ACMI Div. of Circon Corp., 300 Stillwater Ave, P.O. Box 1971, Stamford, CT 06904-1971)
      - (a) Light Source High Intensity, Model LS-300
      - (b) Flexible Borescope 1 meter Superscope, Model F8AD10
      - (c) Monitor Color Videosystem, Model CVES-10, or B&W Videosystem, Model VES-10
      - (d) Coupler Video, Model CCTV-45
  - B. References
    - (1) 54-62-00/201, Nacelle Strut Access Panels
    - (2) 27-81-00/201, Leading Edge Flaps
    - (3) IPC 54-51-01 Fig. 11
  - C. Access
    - (1) Location Zone

452 Nacelle Strut 1 - Torque Box 482 Nacelle Strut 4 - Torque Box

(2) Access Panel

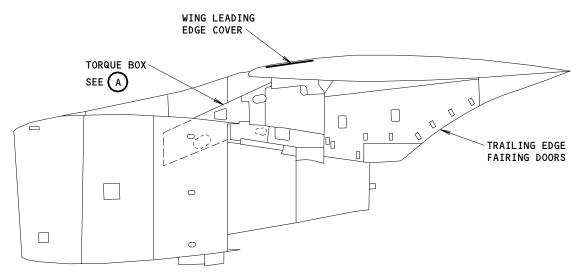
454AL Left Trailing Edge Fairing Door - Nacelle Strut 1
454AR Right Trailing Edge Fairing Door - Nacelle Strut 1
521FT Wing Leading Edge Cover - Nacelle Strut 1
484AL Left Trailing Edge Fairing Door - Nacelle Strut 4
484AR Right Trailing Edge Fairing Door - Nacelle Strut 4
621FT Wing Leading Edge Cover - Nacelle Strut 4

EFFECTIVITY-

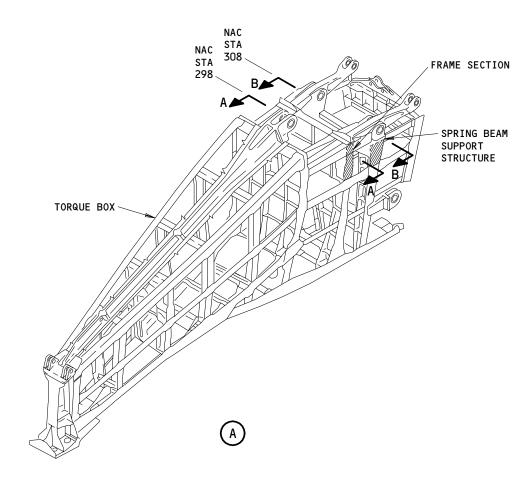
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# **OUTBOARD STRUT**



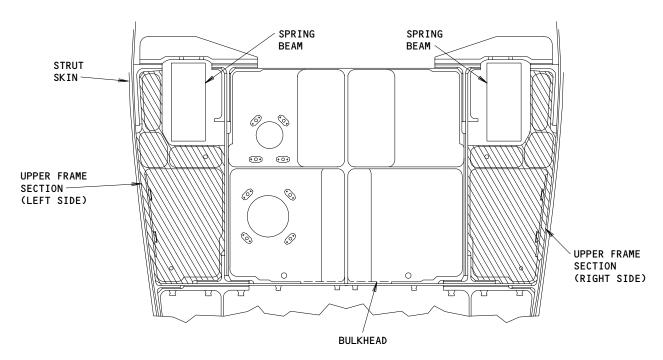
NOTE: LEFT SIDE STRUCTURAL MEMBERS SHOWN, RIGHT SIDE SIMILAR.

Spring Beam Support Structure Inspection Figure 601 (Sheet 1)

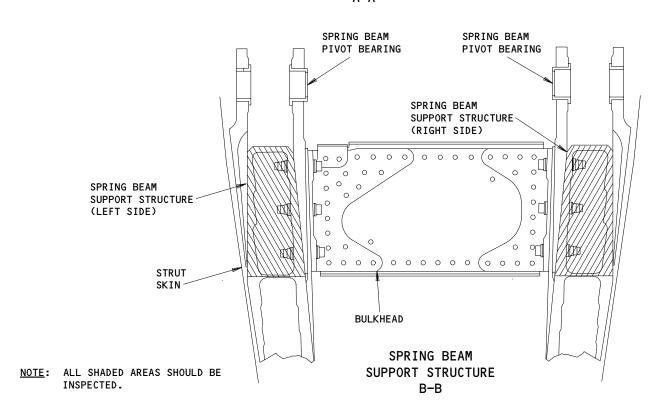
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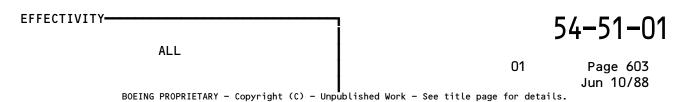




FRAME SECTION A-A



Spring Beam Support Structure Inspection Figure 601 (Sheet 2)





#### D. Procedure

s 496-012

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL
THE LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU
DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE
INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(1) Retract leading edge flaps and install leading edge flap drive unit lock (Ref 27-81-00/201).

s 016-003

(2) Open the trailing edge (TE) fairing doors (Ref 54-62-00/201).

s 016-004

(3) Remove the cover of the wing leading edge.

s 146-005

(4) Clean the area for the inspection.

s 296-006

- (5) Do a borescope inspection on the structural parts above the closure spar web as follows:
  - (a) Inspect the parts for cracks which have started from the fastener locations and tooling holes (access is through the cover of the wing leading edge, except as noted).
  - (b) The top section of the bulkhead of the spring beam support (NAC STA 308) (Fig. 601, Section A-A).

NOTE: Access to the bulkhead is from the aft through the TE fairing doors on the right side of strut no. 1 and the left side of strut no. 4.

(c) The top section of the frame which is forward of the bulkhead of the spring beam pivot (NAC STA 298) (Fig. 601, Section B-B).

s 296-007

(6) Tell Boeing Customer Support Engineering if cracks are found.

s 416-009

ALL

(7) Close the TE fairing doors (Ref 54-62-00/201).

EFFECTIVITY-



s 416-010

(8) Install the cover of the wing leading edge.

s 096-014

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE

FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO

EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE

LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT DO THE STEPS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS

OR DAMAGE TO EQUIPMENT.

(9) Remove safety locks from leading edge flaps (Ref 27-81-00/201).

TASK 54-51-01-206-015

- 3. Nacelle Strut Wear Limits
  - A. References
    - (1) AMM 54-51-02/401, Nacelle Strut Attach Pin/Bolt
    - (2) AMM 54-51-03/401, Spring Beam
    - (3) OHM 54-00-01, Nacelle Strut to Component
    - (4) SRM 54-51-02, Allowable Damage Strut Attachment Fitting
    - (5) SRM 57-20-90, Allowable Damage Pylon Attachment Fitting
  - B. Access
    - (1) Location Zone

451 Nacelle Strut	1 - Forward	Fairing
-------------------	-------------	---------

- 452 Nacelle Strut 1 Torque Box
- 454 Nacelle Strut 1 Aft Fairing
- 521 Nacelle Strut 1 Leading Edge to Front Spar
- 461 Nacelle Strut 2 Forward Fairing
- 462 Nacelle Strut 2 Torque Box
- 464 Nacelle Strut 2 Aft Fairing
- 521 Nacelle Strut 2 Leading Edge to Front Spar
- 471 Nacelle Strut 3 Forward Fairing
- 472 Nacelle Strut 3 Torque Box
- 474 Nacelle Strut 3 Aft Fairing
- 621 Nacelle Strut 3 Leading Edge to Front Spar
- 481 Nacelle Strut 4 Forward Fairing
- 482 Nacelle Strut 4 Torque Box
- 484 Nacelle Strut 4 Aft Fairing
- 621 Nacelle Strut 4 Leading Edge to Front Spar

EFFECTIVITY-

54-51-01

ALL



#### (2) Access Panel

454	Trailing Edge Fairing Door - Nacelle Strut 1
521FT	Wing Leading Edge Cover - Nacelle Strut 1
464	Trailing Edge Fairing Door - Nacelle Strut 2
511CT	Wing Leading Edge Cover - Nacelle Strut 2
474	Trailing Edge Fairing Door - Nacelle Strut 3
611CT	Wing Leading Edge Cover - Nacelle Strut 3
484	Trailing Edge Fairing Door - Nacelle Strut 4
621FT	Wing Leading Edge Cover - Nacelle Strut 4

#### C. Procedure

s 016-017

(1) Get access to the applicable component (AMM 54-51-02/401).

#### s 226-016

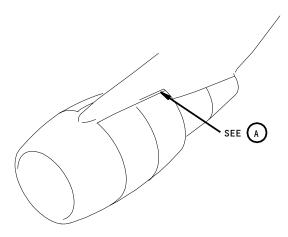
- (2) Do a check of the nacelle strut wear limits:
  - Remove the nacelle strut attach pins/bolts that you will examine (AMM 54-51-02/401).
  - Examine the attach pins/bolts.
    - 1) See Figure 602 for inboard strut wear limits.
    - 2) See Figure 603 for outboard strut wear limits.
  - Install the nacelle strut attach pins/bolts that you removed (AMM 54-51-02/401).

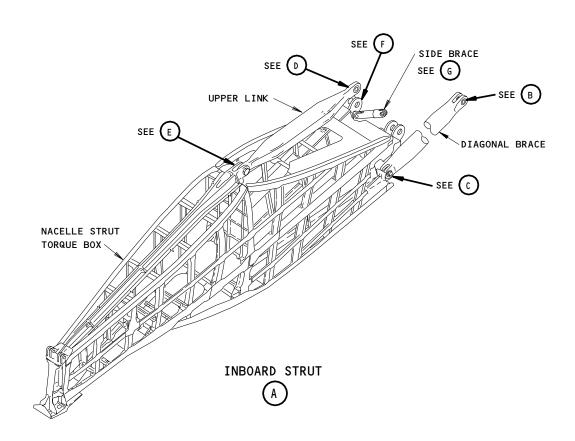
EFFECTIVITY-

ALL

54-51-01







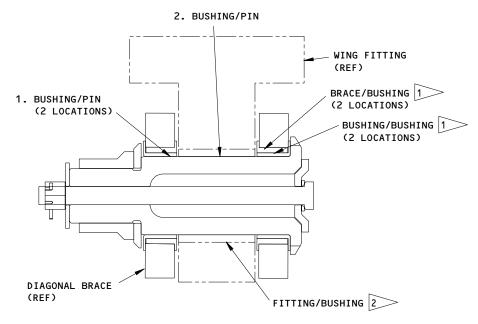
Inboard Strut Wear Limits Figure 602 (Sheet 1)

54-51-01

01

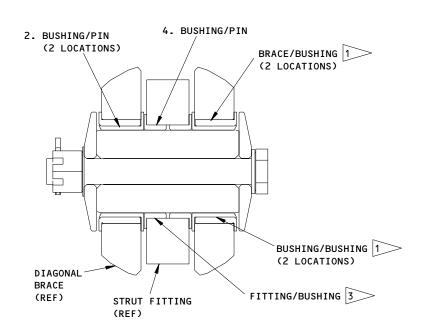
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## DIAGONAL BRACE AFT FUSE PIN





## DIAGONAL BRACE FORWARD FUSE PIN



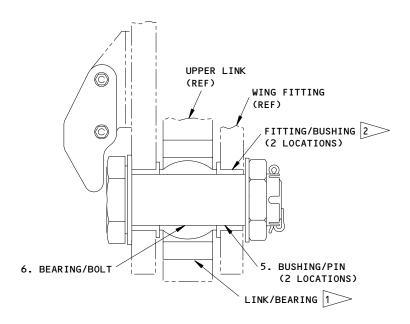
Inboard Strut Wear Limits Figure 602 (Sheet 2)

54-51-01

01

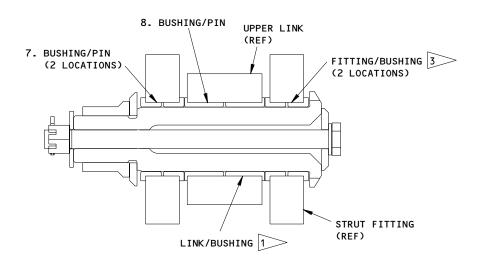
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# UPPER LINK AFT ATTACH BOLT (VIEW IN THE DOWN DIRECTION)





# UPPER LINK FORWARD FUSE PIN



Inboard Strut Wear Limits Figure 602 (Sheet 3)

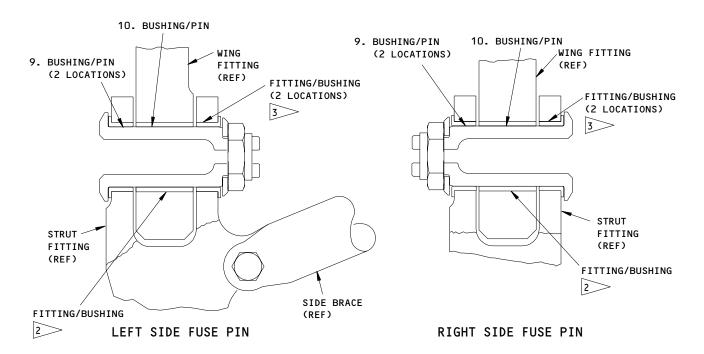
AIRPLANES WITH SB 747
54-2155

54-51-01

01

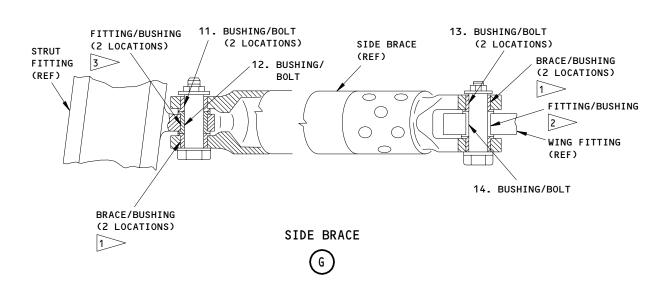
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#### MIDSPAR FUSE PIN





Inboard Strut Wear Limits Figure 602 (Sheet 4)

54-51-01

01

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			DESIGN LIMITS		WEAR LIMITS				
INDEX NO.	PART NAME	DIM.	DIAMETER		PERMITTED WEAR	MAX DIA.	REPLACE WORN	REPAIR WORN	REPAIR INSTR.
			MIN	MAX	DIA.	CLEAR- ANCE	PART	PART	
1	BUSHING	ID	1.8760	1.8772	1.8805	0.0050	4>		
1	PIN	OD	1.8748	1.8755	1.8708	0.0000	5>		
2	BUSHING	ID	1.8760	1.8780	1.8805	0.0050	6>		
2	PIN	OD	1.8748	1.8755	1.8708	0.0050	5>		
7	BUSHING	ID	2.0000	2.0012	2.0049	0.0070	4>		
3	PIN	OD	1.9966	1.9979	1.9926	0.0070	5>		
,	BUSHING	ID	2.0000	2.0012	2.0049	0.0070	7>		
4	PIN	OD	1.9966	1.9979	1.9926	0.0070	5>		
5	BUSHING	ID	1.8788	1.8793	1.8800	0.0060	6>		
,	BOLT	OD	1.8728	1.8740	1.8688	0.0000	5>		
6	BEARING	ID	1.8760	1.8765	1.8800	0.0060	8>		
	BOLT	OD	1.8728	1.8740	1.8688	0.0000	5>		
7	BUSHING	ID	1.7195	1.7205	1.7232	0.0050	7>		
7	PIN	OD	1.7175	1.7182	1.7135	0.0000	5		
8	BUSHING	ID	1.7195	1.7205	1.7232	0.0050	8		
0	PIN	OD	1.7175	1.7182	1.7135	0.0050	5>		
9	BUSHING	ID	2.2130	2.2142	2.2175	0.0050	7>		
9	PIN	OD	2.2118	2.2125	2.2078	0.0050	5>		
10	BUSHING	ID	2.2130	2.2150	2.2175	0.0050	6>		
10	PIN	OD	2.2118	2.2125	2.2078	0.0050	5>		
11	BUSHING	ID	0.7500	0.7510	0.7517	0.0034	9>		
	BOLT	OD	0.7486	0.7493	0.7476	0.0034	5>		
12	BUSHING	ID	0.7500	0.7510	0.7517	0.0034	7>		
''-	BOLT	OD	0.7486	0.7493	0.7476	0.0054	5>		

Inboard Strut Wear Limits Figure 602 (Sheet 5)



			DESIGN LIMITS		WEAR LIMITS				
INDEX NO.	PART NAME	DIM.	DIAMETER		PERMITTED	MAX DIA.	REPLACE WORN	REPAIR WORN	REPAIR INSTR.
			MIN	MAX	WEAR DIA.	CLEAR- ANCE	PART	PART	INSTR.
13	BUSHING	ID	0.7500	0.7510	0.7517	0.007/	9>		
13	BOLT	OD	0.7486	0.7493	0.7476	0.0034	5>		
14	BUSHING	ID	0.7500	0.7510	0.7520	0.0034	6>		
14	BOLT	OD	0.7486	0.7493	0.7476	0.0034	5>		

1 >> REFER TO OHM 54-00-01.

2 REFER TO SRM 57-20-90.

3 REFER TO SRM 54-51-02.

REPLACE THE DIAGONAL BRACE (AMM 54-51-02/401).
TO REPLACE THE DIAGOINAL BRACE BUSHING, SEE 1.

5 REPLACE THE PIN/BOLT (AMM 54-51-02/401).

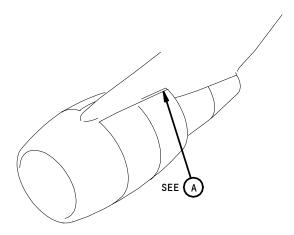
6 REPLACE THE BUSHING/BEARING, SEE 2.

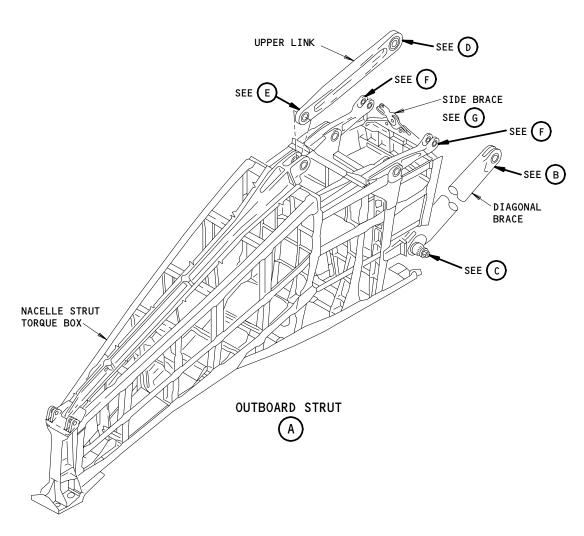
> REPLACE THE BUSHING/BEARING, SEE  $\overline{\mathfrak{Z}}$ .

REPLACE THE UPPER LINK (AMM 54-51-02/401).
TO REPLACE THE UPPER LINK BUSHING/BEARING,
SEE 1.

Inboard Strut Wear Limits Figure 602 (Sheet 6)







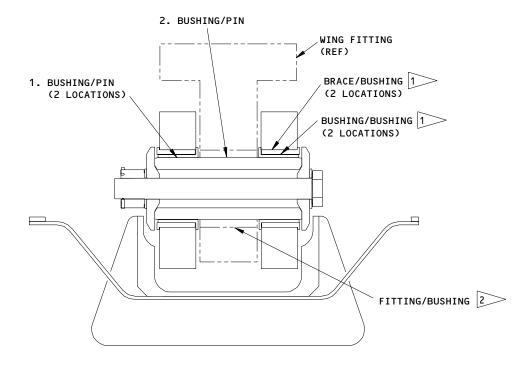
Outboard Strut Wear Limits Figure 603 (Sheet 1)

54-51-01

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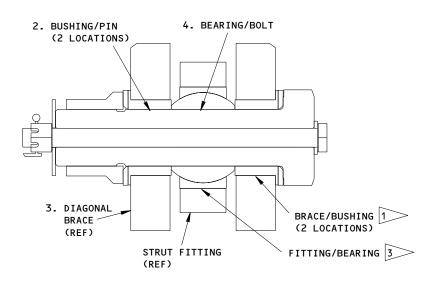
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# DIAGONAL BRACE AFT FUSE PIN





# DIAGONAL BRACE FORWARD FUSE PIN



Outboard Strut Wear Limits Figure 603 (Sheet 2)

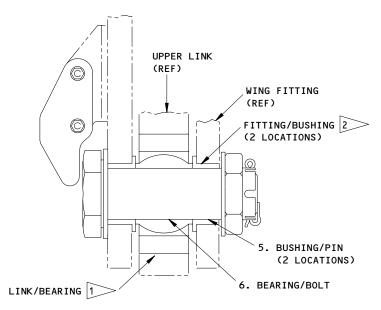
EFFECTIVITY-AIRPLANES WITH SB 747 54-2155

54-51-01

01

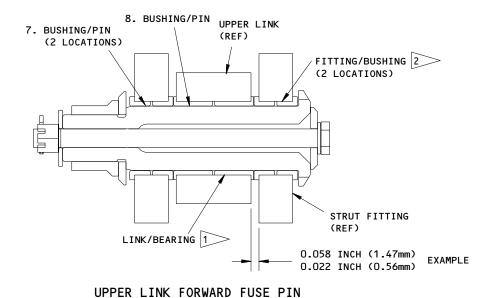
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UPPER LINK AFT ATTACH BOLT (VIEW IN THE DOWN DIRECTION)





Outboard Strut Wear Limits Figure 603 (Sheet 3)

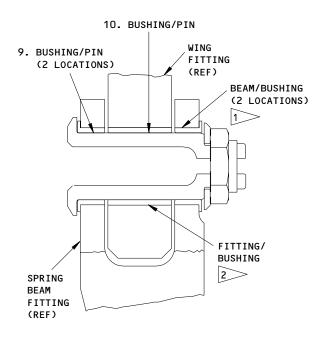
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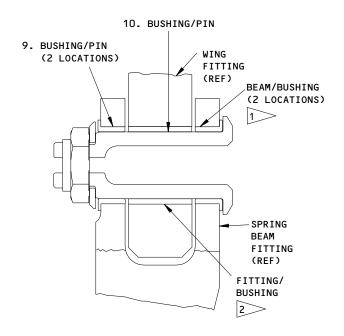
54-51-01

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LEFT SIDE FUSE PIN

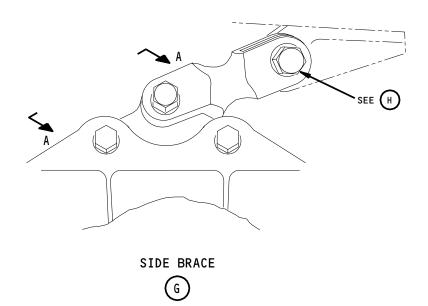
RIGHT SIDE FUSE PIN

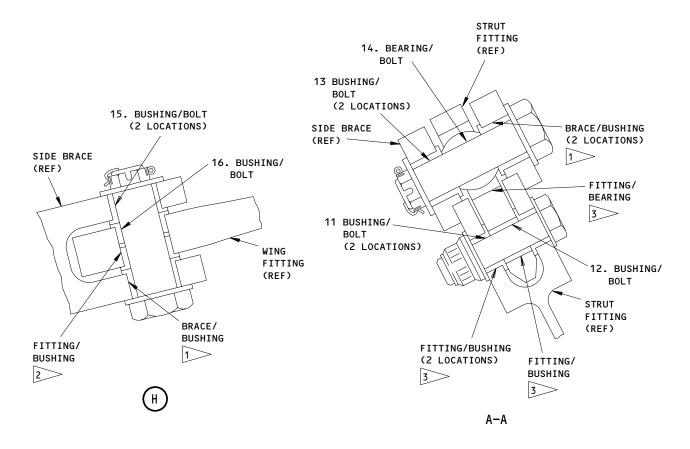
SPRING BEAM FUSE PIN



Outboard Strut Wear Limits Figure 603 (Sheet 4)







Outboard Struts Wear Limits Figure 603 (Sheet 5)

AIRPLANES WITH SB 747
54-2155
01

54-51-01

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			DESIGN LIMITS		WEAR LIMITS				
INDEX	PART NAME	DIM.	DIAM	IETER	PER-	MAX	REPLACE		REPAIR
NO.	I AKT NAME	טווי.	MIN	MAX	MITTED WEAR DIM.	DIA CLEAR- ANCE	WORN PART	WORN PART	INSTR
4	BUSHING	ID	1.8760	1.8772	1.8805	0.0050	4>		
1	PIN	OD	1.8748	1.8755	1.8708	0.0050	5>		
2	BUSHING	ID	1.8760	1.8780	1.8805	0.0050	6>		
2	PIN	OD	1.8748	1.8755	1.8708	0.0050	5>		
7	BUSHING	ID	1.4995	1.5000	1.5040	0.0050	4>		
3	BOLT	OD	1.4975	1.4990	1.4935	0.0050	5>		
,	BEARING	ID	1.4995	1.5000	1.5040	0.0050	7>		
4	BOLT	OD	1.4975	1.4990	1.4935	0.0050	5>		
5	BUSHING	ID	1.8788	1.8793	1.8800	0.0060	6>		
,	BOLT	OD	1.8728	1.8740	1.8688	0.0000	5>		
6	BEARING	ID	1.8760	1.8765	1.8800	0.0060	8>		
0	BOLT	OD	1.8728	1.8740	1.8688	0.0000	5>		
7	BUSHING	ID	1.7795	1.7805	1.7832	0.0050	7>		
7	PIN	OD	1.7775	1.7782	1.7735	0.0000	5>		
8	BUSHING	ID	1.7795	1.7805	1.7832	0.0050	8>		
•	PIN	OD	1.7775	1.7782	1.7735	0.0050	5>		
9	BUSHING	ID	2.1529	2.1541	2.1575	0.0050	9>		
9	PIN	OD	2.1518	2.1525	2.1478	0.0050	5>		
10	BUSHING	ID	2.1530	2.1550	2.1575	0.0050	6>		
10	PIN	OD	2.1518	2.1525	2.1478	0.0050	5>		
11	BUSHING	ID	0.6245	0.6255	0.6265	0.0075	7>		
	BOLT	OD	0.6230	0.6240	0.6220	0.0035	5>		
12	BUSHING	ID	0.6245	0.6255	0.6265	0.0035	7>		
12	BOLT	OD	0.6230	0.6240	0.6220	0.0033	5>		
						]			

Outboard Strut Wear Limits Figure 603 (Sheet 6)



INDEX NO.	PART NAME	DIM.	DESIGN LIMITS		WEAR LIMITS				
			DIAMETER		PER-	MAX	REPLACE WORN	REPAIR WORN	REPAIR
			MIN	MAX	MITTED WEAR DIM.	DIA CLEAR- ANCE	PART	PART	INSTR
13	BUSHING	ID	0.7500	0.7510	0.7517	0.0031	10>		
	BOLT	OD	0.7486	0.7493	0.7479		5>		
14	BEARING	ID	0.7495	0.7500	0.7507	0.0021	7>		
	BOLT	OD	0.7486	0.7493	0.7497		5>		
15	BUSHING	ID	0.7500	0.7510	0.7517	0.0031	10>		
	BOLT	OD	0.7486	0.7493	0.7479		5		
16	BUSHING	ID	0.7415	0.7530					
	BOLT	OD	0.7486	0.7493					

REFER TO OHM 54-00-01. > REFER TO SRM 57-20-90. > REFER TO SRM 54-51-02. > REPLACE THE DIAGONAL BRACE (AMM 54-51-02/401). TO REPLACE THE DIAGOINAL BRACE BUSHING, SEE 1>. 5 REPLACE THE PIN/BOLT (AMM 54-51-02/401). > REPLACE THE BUSHING/BEARING, SEE  $\boxed{2}$  . > REPLACE THE BUSHING/BEARING, SEE  $]\!\!>$  . REPLACE THE UPPER LINK (AMM 54-51-02/401). TO REPLACE THE UPPER LINK BUSHING/BEARING, SEE 1>. 9 REPLACE THE SPRING BEAM (AMM 54-51-03/401). TO REPLACE THE SPRING BEAM BUSHING, SEE 1 10 REPLACE THE SIDE BRACE (AMM 54-51-02/401). TO REPLACE THE SIDE BRACE BUSHING/BEARING, SEE 1

Outboard Strut Wear Limits Figure 603 (Sheet 7)



## NACELLE STRUT ATTACH PIN/BOLT - REMOVAL/INSTALLATION

## 1. General

- A. This procedure provides instructions for removal/installation of all strut attach pin/bolts with the engine removed or installed. If a mid spar pin is to be removed, both upper link pins/bolts and both diagonal brace pins/bolts must be installed. Both upper link pins/bolts or both diagonal brace pins/bolts may be removed simultaneously but only one link should be free at any one time, unless nacelle strut is to be removed. Only one midspar pin can be removed at a time, unless the strut is removed.
- B. Removal of attach pin/bolts consists of obtaining access, unloading pin/bolt to be removed, and removing pin/bolt. Installation of attach pin/bolts consists of checking attach pins/bolts for corrosion, installing attach pin/bolt, and testing strut systems.
  - (1) The diagonal brace or upper link may be removed or replaced using this procedure by removing both forward and aft attach pins/bolts of the applicable link. Any cables or tubes clamped to the applicable link must be disconnected and installed again.
    - (a) If an optional (custom fitted) diagonal brace is replaced, follow the steps for an optional diagonal brace.

<u>CAUTION</u>: USE EXTREME CARE WHEN HANDLING ENGINE AND STRUT BECAUSE OF WEIGHT INVOLVED.

- C. Care must be used to avoid the application of excessive lifting forces on the strut. A dynamometer or precision load positioner must be used in the hoisting arrangement unless the crane incorporates an adjustable load limiter.
  - (1) Platforms and stands are required in order to gain access to required strut attach points. Depending upon the airplane gross weight, most of the inboard points are located from 12-1/2 to 16 feet (3.8 4.9 m) above the ground line. Similarly, most of the outboard points are located from 14 to 18-1/2 feet (4.3 5.6 m) above the ground line.
- D. Observe the following precautions while performing attach pin/bolt removal/installation:

WARNING: KEEP ELECTRICAL POWER OFF DURING DISCONNECTION OR CONNECTION OF FUEL, HYDRAULIC, AND ELECTRICAL LINES TO PREVENT INJURY TO PERSONNEL THAT COULD RESULT FROM ACCIDENTAL APPLICATION OF PRESSURIZED FLUIDS, ENERGIZING OF ELECTRICAL CIRCUITS, OR FIRE.

(1) Electrical power must not be on during the time the fuel, hydraulic, and electrical lines are being disconnected from or connected to the strut.



(2) During power plant removal or installation, all openings must be blanked off with approved caps. During power plant removal, all tube ends, ducts and electrical connectors must be capped as soon as possible after disconnection. During power plant installation, the caps must not be removed until connections are to be made. External caps must be used, not internal plugs.

TASK 54-51-02-004-133-001

- Remove the Attach Pin/Bolt (Engine Removed) 2.
  - Special Tools and Equipment
    - (1) G54004 Overhead Mechanical Equipment, Inboard and Outboard Nacelle Strut Installation (required if the midspar pin is to be removed).
    - (2) G54007 Overhead Mechanical Equipment, Diagonal Brace Unload Sling
    - (3) MIT SM311U2730 measuring tool, diagonal brace bushing center-to-center measurement
    - (4) 3MIT65B90100 - Wrench Set, Strut Installation, Upper Link Aft Attach Bolt
  - Standard Tools and Equipment
    - (1) Lock leading edge flap drive unit
    - (2) Crane, capable of lifting 5,000 pounds (Engine removed)
  - References
    - (1) 27-81-00/201, Leading Edge Flaps
    - (2) 29-11-00/201, Main Hydraulic Supply System
    - (3) 29-11-08/401, Air-Driven Pump Turbine Drive
    - (4) 29-11-17/401, Air-Driven Pump
    - (5) 29-11-19/401, AC Motor-Driven Pump
    - (6) 54-62-00/201, Nacelle Strut Access Panels
    - (7) 71-00-02/401, Power Plant
    - (8) 78-31-01/401, Thrust Reverser
    - (9) IPC 54-51-02 Fig. 3 and 4
  - D. Access
    - (1) Location Zone

451	Nacelle Strut 1 - Forward Fairing
452	Nacelle Strut 1 - Torque Box
454	Nacelle Strut 1 - Aft Fairing

- Nacelle Strut 1 Leading Edge to Front Spar 521
- 461 Nacelle Strut 2 - Forward Fairing
- Nacelle Strut 2 Torque Box 462
- 464 Nacelle Strut 2 - Aft Fairing
- 521 Nacelle Strut 2 - Leading Edge to Front Spar
- 471 Nacelle Strut 3 - Forward Fairing
- 472 Nacelle Strut 3 - Torque Box
- Nacelle Strut 3 Aft Fairing 474
- 621 Nacelle Strut 3 - Leading Edge to Front Spar
- Nacelle Strut 4 Forward Fairing 481
- 482 Nacelle Strut 4 - Torque Box
- 484 Nacelle Strut 4 - Aft Fairing
- 621 Nacelle Strut 4 - Leading Edge to Front Spar

EFFECTIVITY-KLM 001-005, 025-034 WITHOUT SB 54-2155 AND SB 54A2156



(2)	A	D I
(2)	Access	Panei

454	Trailing Edge Fairing Door - Nacelle Strut 1
521FT	Wing Leading Edge Cover - Nacelle Strut 1
464	Trailing Edge Fairing Door - Nacelle Strut 2
511CT	Wing Leading Edge Cover - Nacelle Strut 2
474	Trailing Edge Fairing Door - Nacelle Strut 3
611CT	Wing Leading Edge Cover - Nacelle Strut 3
484	Trailing Edge Fairing Door - Nacelle Strut 4
621FT	Wing Leading Edge Cover - Nacelle Strut 4

E. Prepare for the removal (engine removed).

s 494-002-001

WARNING: LEADING EDGE FLAPS ARE FAST ACTING. LOCKS MUST BE INSTALLED TO PREVENT POSSIBLE INJURY DUE TO INADVERTENT OPERATION OF FLAPS.

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER.

(1) Make sure the leading edge flaps are retracted and leading edge flap drive unit lock is installed (Ref 27-81-00/201).

s 014-126-001

(2) Remove the thrust reverser (AMM 78-31-01/401).

s 014-003-001

(3) Remove the engine (Ref 71-00-02/401).

s 864-004-001

(4) Make sure the external electrical power is disconnected and that the airplane is grounded.

s 864-005-001

(5) Make sure the FUEL CONTROL toggle switches, located on engine start module, are in the CUTOFF position.

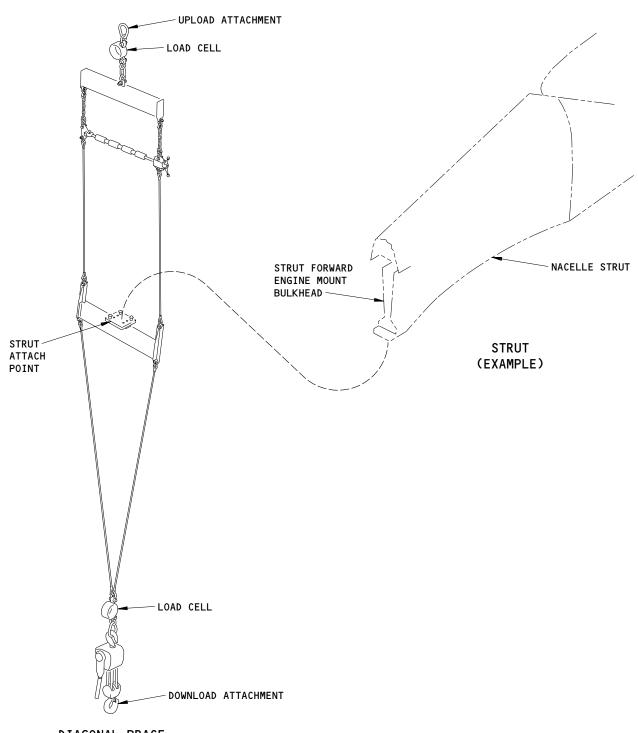
s 864-006-001

(6) Make sure the engine fuel and hydraulic supply shutoff valves are closed, and that the electrical plugs are disconnected from valves.

S 864-007-001

(7) Make sure the hydraulic system is depressurized (Ref 29-11-00/201).





DIAGONAL BRACE UNLOAD SLING G54007

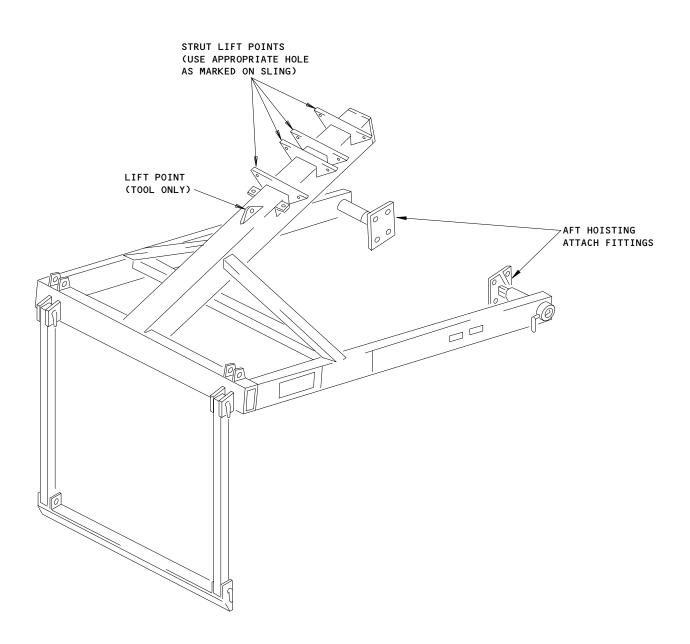
Overhead Mechanical Equipment Figure 401 (Sheet 1)

54-51-02

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CONFIG 1 Page 404 Oct 10/94





HOISTING SLING G54004

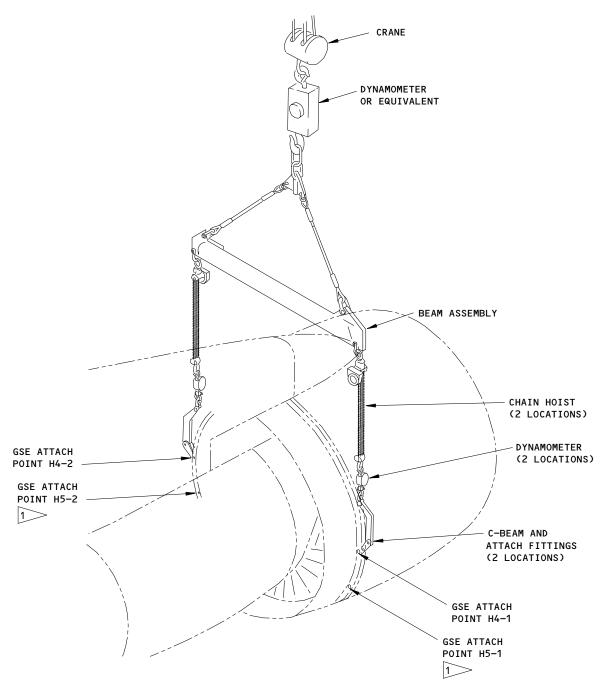
Overhead Mechanical Equipment Figure 401 (Sheet 2)

54-51-02

18

CONFIG 1 Page 405 Oct 10/94





A54001-136 SLING

DO NOT ATTACH THE C-BEAM ATTACH FITTINGS TO THIS POINT.

Overhead Mechanical Equipment Figure 401 (Sheet 3)

EFFECTIVITY KLM 001-005, 025-034 WITHOUT SB 54-2155 AND SB 54A2156 54 - 51 - 02

17

ONFIG 1 Page 406 Oct 10/97



s 684-008-001

(8) Make sure the fuel supply line and hydraulic fluid lines to engine are drained.

s 014-009-001

(9) Open trailing edge fairing doors (Ref 54-62-00/201), if it is necessary for access to diagonal brace attach pins/bolts.

s 014-077-001

- (10) Prop the doors open with a suitable rod, and remove the door support rods from the nacelle strut torque bulkhead.
  - (a) On the inboard struts, remove 12 screws and washers securing lower section of web to fixed fairing support, located at Nac. Sta. 456 at aft edge of trailing edge fairing doors. Remove lower section of web.

s 014-011-001

(11) Open all the strut access doors (Ref 54-62-00/201).

s 014-012-001

(12) On the outboard struts, remove forward fairing no. 4.

s 014-013-001

(13) Open the wing leading edge cover, if it is necessary for access to the upper link attach pins/bolts.

s 034-015-001

(14) On outboard struts:

Remove the air-driven pump (Ref 29-11-17/401) aft of the torque bulkhead, if it is necessary for access to spring beam pins.

s 034-017-001

(15) On outboard struts:

Remove the air-driven pump turbine drive (Ref 29-11-08/401) aft of torque bulkhead, if it is necessary for access to spring beam pins.

s 034-018-001

(16) On inboard struts:

Remove the AC motor-driven pump (Ref 29-11-19/401) aft of torque bulkhead, if it is necessary for access to midspar pins.

s 494-019-001

(17) Use the tool placard to install the diagonal brace unload sling.



S 864-020-001

CAUTION: DO NOT EXCEED UPLOAD NECESSARY TO PERMIT PIN/BOLT ROTATION WITH THE APPLICATION OF 125 POUND-INCHES MAXIMUM TORQUE. DO NOT LIFT THE STRUT OR PULL DOWN ON THE STRUT WITH MORE THAN 3,000 POUNDS OF FORCE ON THE INBOARD STRUTS OR 1,800 POUNDS OF FORCE ON THE OUTBOARD STRUTS. IF YOU APPLY A FORCE THAT IS MORE THAN NECESSARY, DAMAGE TO THE STRUCTURE CAN OCCUR.

(18) Unload the attach pin/bolt of the diagonal brace, upper link, or side brace.

<u>NOTE</u>: If the midspar fuse pin is to be replaced it is first necessary to disconnect one end of the diagonal brace to remove the preload.

- (a) Gently apply a load sufficient to remove the strut preload. The intent is to unload the pin/bolt to be removed.
  - 1) Make sure the pin/bolt to be removed can be rotated by applying no more than 125 pound-inches (14.3 N.m) torque.

NOTE: Castellated nuts may have to be tightened up to 200 pound-inches (22.6 N.m) to allow the fuse pin assembly to rotate as a unit with 125 pound-inches (14 N.m) applied torque.

S 864-141-001

- (19) Unload the midspar (spring beam) fuse pins.
  - (a) Unload and remove one of the diagonal brace attach pins.

<u>NOTE</u>: You can use a rope to temporarily support the loose end of the diagonal brace.

- 1) Slowly release the load on the diagonal brace unload sling and remove the sling.
- (b) Use the tool placard to install the strut overhead sling.
  - 1) Remove the No. 3 forward fairing.
  - 2) Attach the sling to the front of the strut with the forward hoisting attach fitting.
  - 3) Attach the sling to the lower aft attach points of the strut with the aft hoisting attach fittings.
  - 4) Use the lift point as marked on the sling for the engine and strut location.
  - 5) Use the hole in the lift point as follows:
    - a) Engines 1 & 2 left hole
    - b) Engines 3 & 4 right hole.



- Unload the midspar (spring beam) fuse pins.
  - Gently apply a load to unload the midspar fuse pin to be removed.
  - Make sure the pin to be removed can be rotated by applying 2) no more than 125 pound-inches (14.3 N.m) torque.
  - The fuse pin, caps, and bolt must rotate as an assembly. The intent is to have no load on the pin to be removed.
- Remove the Applicable Attach Pin/Bolt.

s 044-122-001

CAUTION: ALL THE UPPER LINK AND MIDSPAR PINS/BOLTS MUST BE INSTALLED, OR DAMAGE TO THE STRUCTURE CAN OCCUR.

- Remove the diagonal brace forward attach pin/bolt.
  - On inboard struts:
    - 1) Remove two nuts (22), four washers (21), and two bolts (20) securing attach pin retainer (23) to strut, and remove retainer.
    - Remove cotter pin (26), nut (25), bolt (29), and two 2) washers (24).
    - 3) Remove two retaining caps (27) and fuse pin (28).
      - Push out the pin with a greased new pin or a greased brass slug. Make sure the clevis and the lug stay aligned.
  - On outboard struts: (b)
    - Remove the two screws that attach each of the two access plate assemblies to gain access to the forward diagonal brace attach bolt.
    - Remove cotter pin (18), nut (17), bolt (16), and two washers (15).
    - Remove self-locking nut (19), two washers (13), and attach bolt (14).
      - a) Push out the bolt with a greased brass slug. Make sure the clevis and the lug stay aligned.

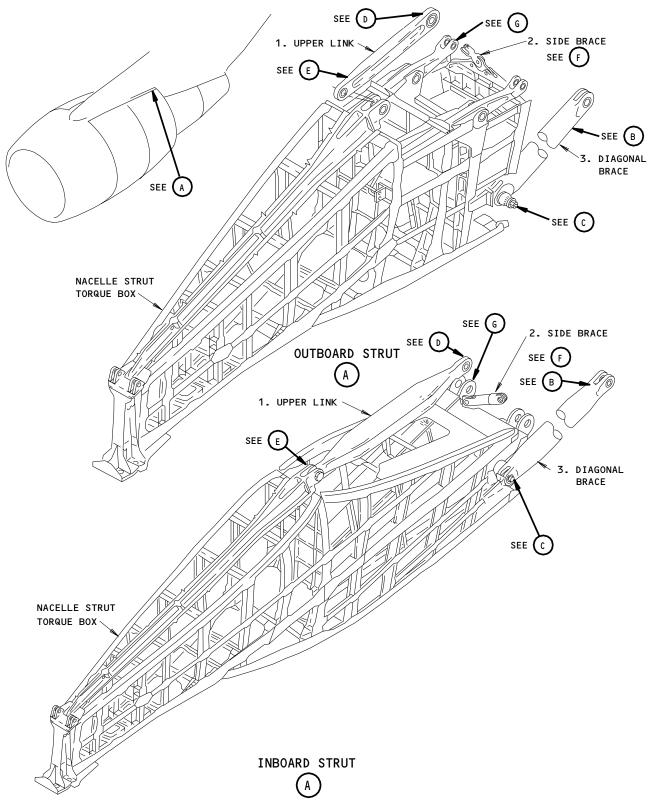
s 024-123-001

CAUTION: ALL THE UPPER LINK AND MIDSPAR PINS/BOLTS MUST BE INSTALLED, OR DAMAGE TO THE STRUCTURE CAN OCCUR.

- (2) Remove the diagonal brace aft fuse pin.
  - Remove four nuts (77), eight washers (76), and four bolts (75) securing fuse pin retainer (11) to bracket, and remove retainer.

EFFECTIVITY-KLM 001-005, 025-034 WITHOUT SB 54-2155 AND SB 54A2156

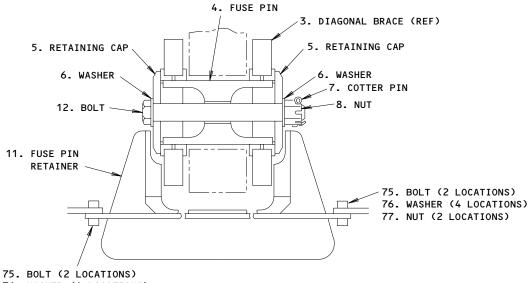




Nacelle Strut Attach Pin/Bolt - Removal/Installation Figure 402 (Sheet 1)

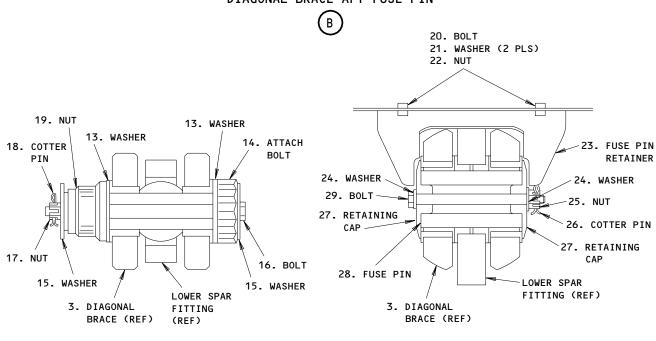
EFFECTIVITY KLM 001-005, 025-034 WITHOUT SB 54-2155 AND SB 54A2156





76. WASHER (4 LOCATIONS)
77. NUT (2 LOCATIONS)

### DIAGONAL BRACE AFT FUSE PIN



OUTBOARD STRUTS

INBOARD STRUTS

# DIAGONAL BRACE FORWARD FUSE PIN

 $\bigcirc$ 

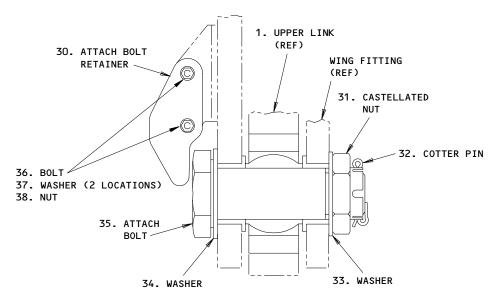
Nacelle Strut Attach Pin/Bolt - Removal/Installation Figure 402 (Sheet 2)

54-51-02

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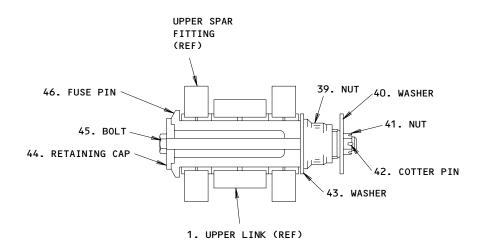
CONFIG 1 Page 411 Oct 10/94





# UPPER LINK AFT ATTACH BOLT





# UPPER LINK FORWARD FUSE PIN



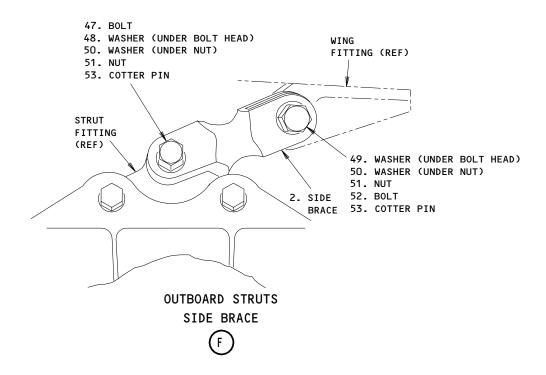
Nacelle Strut Attach Pin/Bolt - Removal/Installation Figure 402 (Sheet 3)

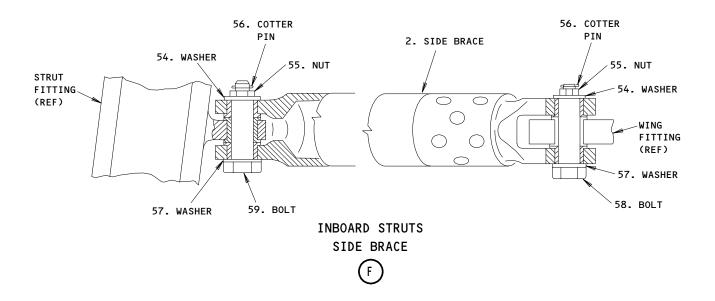
54-51-02
CONFIG 1

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ONFIG 1 Page 412 Oct 10/94







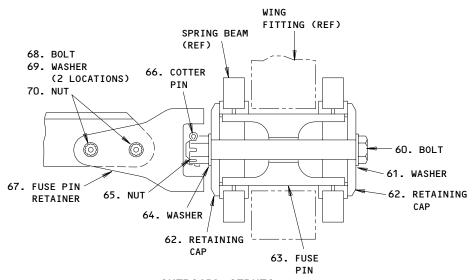
Nacelle Strut Attach Pin/Bolt - Removal/Installation Figure 402 (Sheet 4)

54-51-02 CONFIG 1

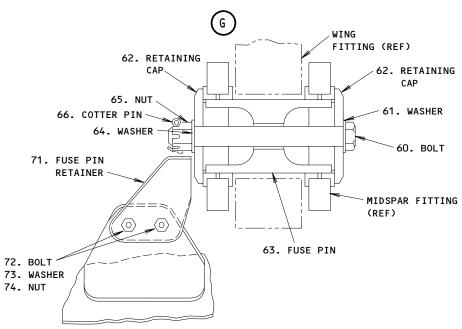
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# OUTBOARD STRUTS SPRING BEAM FUSE PIN (2 LOCATIONS)



INBOARD STRUTS MID SPAR FUSE PIN (2 LOCATIONS)



Nacelle Strut Attach Pin/Bolt - Removal/Installation Figure 402 (Sheet 5)

54-51-02 CONFIG 1 Page 414

18

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- (b) Remove cotter pin (7), nut (8), bolt (12), two washers (6), two retaining caps (5) and fuse pin (4).
  - 1) Push out the pin with a greased new pin or a greased brass slug. Make sure the clevis and the lug stay aligned.

#### s 214-032-001

- (3) If you remove the diagonal brace, do these steps:
  - (a) Look for markings on the brace that identify the airplane, strut position and center to center distance.

NOTE: If the brace is marked with this information, it is an optional (custom) brace.

- (b) If you remove an optional diagonal brace (custom fitted brace), this same brace or a new brace with the same center to center diameter must be installed on the strut and airplane where it was removed.
  - 1) Tag the brace with the airplane number and strut location or make sure this information is marked on the brace.

s 024-036-001

- (4) Remove side brace attach bolts.
  - (a) OUTBOARD STRUTS; Remove the nut (51), bolt (47 and 52), two washers (48 or 49, and 50), and cotter pin (53) at each end.
  - (b) INBOARD STRUTS; Remove the nut (55), bolt (58 and 59), two washers (54 and 57), and cotter pin (56) at each end.

s 024-124-001

<u>CAUTION</u>: ALL THE DIAGONAL BRACE AND MIDSPAR PINS/BOLTS MUST BE INSTALLED. DAMAGE TO THE STRUCTURE CAN OCCUR.

- (5) Remove upper link forward fuse pin.
  - (a) Remove cotter pin (42), nut (41), washer (40), bolt (45), retaining cap (44), self-locking nut (39), washer (43), and fuse pin (46).
    - Push out the pin with a greased a greased brass slug. Make sure the clevis and the lug stay aligned.

s 024-125-001

CAUTION: ALL THE DIAGONAL BRACE AND MIDSPAR PINS/BOLTS MUST BE INSTALLED. DAMAGE TO THE STRUCTURE CAN OCCUR.

- (6) Remove upper link aft attach bolt.
  - (a) Remove two nuts (38), four washers (37), and two bolts (36) securing attach bolt retainer (30) to strut, and remove retainer.



- Remove cotter pin (32), nut (31), two washers (33 and 34), and attach bolt (35) (use wrench set 3MIT65B90100 to remove nut from attach bolt).
  - 1) Push out the bolt with a greased brass slug. Make sure the clevis and the lug stay aligned.

#### s 014-146-001

- Remove the midspar (inboard) or spring beam (outboard) fuse pin.
  - Make sure that one end of the diagonal brace has been disconnected.

NOTE: This will remove the diagonal brace preload from the strut.

- Make sure that the strut overhead sling is installed.
- Remove two fuse pin retainers (67 or 71).
  - On outboard struts, remove two nuts (70), four washers (69), and two bolts (68) securing each fuse pin retainer (67) to strut.
  - 2) On inboard struts, remove two nuts (74), four washers (73), and two bolts (72) securing each fuse pin retainer (71) to strut.
- Remove cotter pin (66), nut (65), two washers (61 and 64), bolt (60), two retaining caps (62), and fuse pins (63).
  - 1) Push out the pin with a greased new pin or a greased brass slug. Make sure the clevis and the lug stay aligned.

#### S 864-144-001

(8) Make sure the load on the strut is kept the same until you install the pin/bolt again.

# TASK 54-51-02-404-134-001

- Install the Attach Pin/Bolt (Engine Removed)
  - Special Tools and Equipment
    - (1) G54004 Overhead Mechanical Equipment, Inboard and Outboard Nacelle Strut Installation
    - G54007 Sling, Diagonal Brace Preload (Engine removed) (2)
    - (3) 3MIT65B90100 Wrench Set, Strut Installation, Upper Link Aft Attach Bolt
  - Standard Tools and Equipment
    - (1) Crane, capable of lifting 5,000 pounds (engine removed)
  - Consumable Materials
    - (1) A00964 Primer Fluid Resistant, BMS 10-11, type I
    - (2) A00344 Compound Corrosion Preventive, MIL-C-11796, Class 1
    - (3) A00310 Sealant BMS 5-95 or A00247 Sealant - BMS 5-79

EFFECTIVITY-KLM 001-005, 025-034 WITHOUT SB 54-2155 AND SB 54A2156



(4) D00294 Grease - Corrosion Preventative, BMS 3-24



### D. Parts

AMM		AIPC		
FIG ITE	NOMENCLATURE	SUBJECT	FIG	ITEM
402 1 1 2 2 2 3 3 4 4 4 5 5 6 6 6 7 7 8 8 11 11 12 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 30 30 30 30 30 30 30 30 30 30 30 30	Upper Link (Outboard) Upper Link (Inboard) Side Brace (Left Outboard) Side Brace (Right Outboard) Side Brace (Inboard) Diagonal Brace (Outboard) Diagonal Brace (Inboard) Fuse Pin (Outboard) Retaining Cap (Outboard) Retaining Cap (Inboard) Washer (Outboard) Washer (Inboard) Cotter Pin (Outboard) Nut (Outboard) Nut (Inboard) Fuse Pin Retainer (Outboard) Fuse Pin Retainer (Inboard) Bolt (Outboard) Bolt (Inboard) Washer Attach Bolt Washer Attach Bolt Washer Nut Cotter Pin Nut Cotter Pin Retainer (Caliper) Washer Nut Cotter Pin Retaining Cap Fuse Pin Bolt Attach Bolt Retainer (Outboard) Attach Bolt Retainer (Inboard) Attach Bolt Retainer (Inboard)	54-51-02	03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 04 04 04 04 04 04 04 04 04 04 04 04	100 100 260 265 235 375 330 370 325 365 315 300 275 305 315 305 315 325 305 325 300 260 270 255 290 320 280 55 55

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07

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АММ			AIPC		
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
	32 33 31 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54	Cotter Pin (Inboard) Washer (Outboard) Nut (Outboard) Nut (Inboard) Cotter Pin (Outboard) Washer (Inboard) Washer (Inboard) Washer (Inboard) Attach Bolt (Outboard) Attach Bolt (Inboard) Bolt (Outboard) Bolt (Inboard) Washer (Outboard) Washer (Inboard) Nut (Outboard) Nut (Inboard) Nut (Inboard) Nut (Inboard) Nut (Inboard) Washer (Outboard) Washer (Outboard) Nut (Inboard) Cotter Pin (Outboard) Cotter Pin (Inboard) Washer (Outboard) Washer (Inboard) Bolt (Inboard) Retaining Cap (Outboard) Retaining Cap (Inboard) Bolt (Inboard) Fuse Pin (Outboard) Bolt (Inboard) Bolt (Inboard) Bolt Washer		04 03 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 04 04 04 04 04 04 04 04 04 04 04 04	75 90 95 95 95 75 90 85 80 60 65 70 35 25 30 15 40 45 45 20 20 240 245 255 255 255 255 255 255 255 255 255

EFFECTIVITY-KLM 001-005, 025-034 WITHOUT SB 54-2155 AND SB 54A2156

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АММ					
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
	55	Nut		04	210
1	56	Cotter Pin		04	185
1	57	Washer		04	200
1	58	Bolt		04	195
1	59	Bolt		04	190
1	60	Bolt (Outboard)		03	145
1	60	Bolt (Inboard)		04	150
1	61	Washer (Outboard)		03	150
1	61	Washer (Inboard)		04	155
1	62	Retaining Cap (Outboard)		03	165
1	62	Retaining Cap (Inboard)		04	170
1	63	Fuse Pin (Outboard)		03	170
1	63	Fuse Pin (Inboard)		04	175
1	64	Washer (Outboard)		03	155
1	64	Washer (Inboard)		04	160
1	65	Nut (Outboard)		03	160
1	65	Nut (Inboard)		04	165
1	66	Cotter Pin (Outboard)		03	140
1	66	Cotter Pin (Inboard)		04	145
1	67	Fuse Pin Retainer		03	190
68		Bolt		03	175
69		Washer		03	180
70		Nut		03	185
71		Fuse Pin Retainer		04	125
72		Bolt		04	130
73		Washer		04	135
	74	Nut		04	140
	75	Bolt (Outboard)		03	420
	75	Bolt (Inboard)		04	355
	76	Washer (Outboard)		03	425
	76	Washer (Inboard)	04		
77		Nut (Outboard)		03	430
	77	Nut (Inboard)		04	365

### E. References

- (1) AMM 27-81-00/201, Leading Edge Flaps
- (2) AMM 29-11-00/201, Main Hydraulic Supply System
- (3) AMM 29-11-08/401, Air-Driven Pump Turbine Drive
- (4) AMM 29-11-17/401, Air-Driven Pump
- (5) AMM 29-11-19/401, AC Motor-Driven Pump
- (6) AMM 54-62-00/201, Nacelle Strut Access Panels
- (7) AMM 71-00-02/401, Power Plant
- (8) AMM 78-31-01/401, Thrust Reverser

EFFECTIVITY-KLM 001-005, 025-034 WITHOUT SB 54-2155 AND SB 54A2156

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- (9) CPM Part III, 54-10-47 (10) IPC 54-51-02 Fig. 3 and 4
- (11) OHM 54-00-01

# F. Access

(1) Location Zone

451	Nacelle	Strut	1	-	Forward Fairing		
452	Nacelle	Strut	1	-	Torque Box		
454	Nacelle	Strut	1	-	Aft Fairing		
521	Nacelle	Strut	1	-	Leading Edge to	Front	Spar
461	Nacelle	Strut	2	-	Forward Fairing		
462	Nacelle	Strut	2	-	Torque Box		
464	Nacelle	Strut	2	-	Aft Fairing		
521	Nacelle	Strut	2	-	Leading Edge to	Front	Spar
471	Nacelle	Strut	3	-	Forward Fairing		
472	Nacelle	Strut	3	-	Torque Box		
474	Nacelle	Strut	3	-	Aft Fairing		
621	Nacelle	Strut	3	-	Leading Edge to	Front	Spar
481	Nacelle	Strut	4	-	Forward Fairing		
482	Nacelle	Strut	4	-	Torque Box		

Nacelle Strut 4 - Aft Fairing

#### (2) Access Panel

484 621

454	Trailing Edge Fairing Door - Nacelle Strut 1
521FT	Wing Leading Edge Cover - Nacelle Strut 1
464	Trailing Edge Fairing Door - Nacelle Strut 2
511CT	Wing Leading Edge Cover - Nacelle Strut 2
474	Trailing Edge Fairing Door - Nacelle Strut 3
611CT	Wing Leading Edge Cover - Nacelle Strut 3
484	Trailing Edge Fairing Door - Nacelle Strut 4
621FT	Wing Leading Edge Cover - Nacelle Strut 4

Nacelle Strut 4 - Leading Edge to Front Spar

### G. Prepare for Installation

### s 214-038-001

- (1) Check that all attach pins, bolts, caps, and washers at installation points are free from corrosion, including interior of fuse pins or hollow bolts and the inner diameter of fitting bushings.
  - (a) If corrosion exists, either replace or remove corrosion and apply corrosion protection (CPM Part III, 54-10-47).
    - Apply two coats of primer to all exposed surfaces, including ID bore, but excluding chrome plate OD, if not already primed.
    - 2) Apply a 0.05-inch (1.3 mm) thick coating of corrosion preventive compound to ID of attach pin/bolt.

## s 214-124-001

(2) Make sure the mid spar fuse pins are serviceable (SB 747-54A2150).



s 214-125-001

(3) Make sure the diagonal brace fuse pins are serviceable (SB 747-54A2153).

### s 214-039-001

- (4) Check that all bushings at installation points are sealed from corrosion.
  - If bushings are not sealed, apply sealant to bushings (a) (Ref 51-31-01/201).
    - 1) Apply fillet seal to flange end of all bushings.
    - 2) Brush coat seal (maximum thickness 0.010 inch) to entire periphery of all (except upper link wing fitting and diagonal brace wing fitting) unflanged bushing ends exposed to mating surface of parent part.

NOTE: No seal is required for bushing end not exposed to mating surface of parent part. Corrosion prevention in this area is covered by application of grease during pins or bolts installation.

3) Apply fillet seal to entire periphery of unflanged bushing end at diagonal brace wing fitting.

s 214-138-001

- (5) Do a check to make sure that you have the correct part number fuse pin(s).
- Install applicable attach pin/bolt Η.

# s 434-040-001

- Install the midspar (inboard) or spring beam (outboard) fuse pin. (1)
  - If a brass slug (instead of a new fuse pin) was used to push out the fuse pin, do this step when you install each fuse pin in the midspar:
    - 1) Push out the slug with a new greased fuse pin. Make sure the clevis and lug stay aligned.
  - (b) Apply thin coat of BMS 3-24 grease to fuse pin (63) and bolt (60).
  - (c) Install fuse pin (63). Ensure that gaps between wing attach fitting and bushing are of equal width, within 0.005 inches (0.13 mm).
  - Install bolt (60), two washers (61 and 64), retaining caps (d) (62), and nut (65) through fuse pin (63). Ensure that thin washer (61) is installed under bolthead.
    - 1) Apply wet primer (BMS 10-11, Type I) and sealant (BMS 5-95, Class B) on the retainer caps, washers, nut and bolt.

NOTE: Let the primer dry before you apply the BMS 5-95.



2) Install the retainer caps with a bead of wet BMS 5-95, Class B sealant around the bolt hole.

NOTE: Do not seal the retainer cap to the midspar fitting.

- Install the bolt, washers, and nut with wet BMS 5-95, Class B sealant.
- Ensure that bolthead faces the outside surface of the strut.
- 5) Ensure that both retaining caps (62) are securely seated against ends of fuse pin (63).
- Install cotter pin (66).
  - 1) Tighten nut to 100-400 pound-inches (11.4-45.6 N.m).
  - 2) To align nut slot with cotter pin hole within required torque range, or to adjust for cotter pin depth in nut slot, use thin washer or combination of washers under nut.
  - 3) Apply sealant BMS 5-79 to both ends of cotter pin (66) approximately 0.10 inch (2.54 mm) thick to prevent cotter pin movement.
- Inject grease (BMS 3-24) into grease fitting, located aft of fuse pin, until grease appears around edge of pin. Remove excess grease from around pin.
- Install fuse pin retainer (67 or 71) on bracket by each fuse pin (63).

CAUTION: MAKE SURE YOU INSTALL THE SECONDARY RETAINER BELOW THE ATTACH ANGLE. IF YOU INSTALL THE RETAINER ON TOP OF THE ATTACH ANGLE, DAMAGE TO THE EDP SUPPLY TUBE CAN OCCUR.

- 1) On outboard struts, install two bolts (68), four washers (69), and two nuts (70) securing fuse pin retainer (67) to bracket.
- On inboard struts, install two bolts (72), four washers (73), and two nuts (74) securing fuse pin retainer (71) to strut.
- Install the diagonal brace fuse pin/bolt that was removed. (h)
  - 1) Slowly release the load on the overhead sling and remove the sling.
  - 2) Use the tool placard to install the diagonal brace preload
  - 3) Do the procedure to install the diagonal brace fuse pin/bolt that was removed.

#### s 434-041-001

- Install the upper link aft attach bolt. (2)
  - (a) If a brass slug was used to push out the bolt, do this step when you install the bolt in the aft attach point of the upper link:
    - Push out the slug with a new greased bolt. Make sure the clevis and lug stay aligned.

EFFECTIVITY-KLM 001-005, 025-034 WITHOUT SB 54-2155 AND SB 54A2156



- (b) Apply thin film of BMS 3-24 grease to attach bolt (35).
- (c) Install attach bolt (35) and two washers (33 and 34).
  - Install nut (31) finger-tight ensuring that washer (34) is securely seated against bolt (35), and nut (31) is securely seated against washer (33).
- (d) Install cotter pin (32).
  - 1) Tighten nut (31) up to a maximum of 200 pound-inches, as necessary, to line up nut slot with hole in bolt (35), and install cotter pin (use wrench set 3MIT65B90100 to tighten nut).
  - 2) Apply sealant (BMS 5-79) to both ends of cotter pin (32) approximately 0.10 inch (2.54 mm) thick to prevent cotter pin movement.
- Install attach bolt retainer (30).
  - 1) Position attach bolt retainer (30) on strut mounted bracket.
  - Install two bolts (36), four washers (37), and two nuts (38) securing attach bolt retainer (30) to bracket.

# s 434-042-001

- (3) Install the upper link forward fuse pin.
  - If a brass slug was used to push out the fuse pin, do this step when you install the fuse pin at the forward attach point of the upper link:
    - 1) Push out the slug with a new greased fuse pin. Make sure the clevis and lug stay aligned.
  - Apply thin coat of grease (BMS 3-24) to fuse pin (46). (b)
  - (c) Install fuse pin (46), thick washer (43), and self-locking nut (39).
    - Check that self-locking torque of nut (39) is a minimum of 117 pound-inches (13.3 N.m). Nuts that do not meet this requirement must be replaced and self-locking torque rechecked.
    - 2) Tighten nut (39) to 1200-1400 pound-inches (137-160 N.m).
  - Install bolt (45), retaining cap (44), thin washer (40), and (d) nut (41).
    - 1) Install nut (41) finger-tight ensuring that retaining cap (44) is securely sealed against bolthead and nut (41) is securely seated against washer (40).
  - (e) Install cotter pin (42).
    - Tighten nut (41) up to a maximum of 200 pound-inches (22.8) N.m), as necessary, to line up nut slot with hole in bolt (45), and install cotter pin..
    - Apply sealant (BMS 5-79) to both ends of cotter pin (42) approximately 0.10 inch (2.54 mm) thick to prevent cotter pin movement.



#### s 424-043-001

- Install the side brace attach bolts (must be installed before preload is applied to strut).
  - (a) Apply thin coat of grease (BMS 3-24) to bolts (47 and 52, or 58 and 59) and install bolts.
    - 1) INBOARD STRUTS;

Make sure that a minimum of 0.060 inch clearance exists between the midspar fittings and wing attach fittings (4 places) after side brace bolts (58 and 59) are installed.

- INBOARD STRUTS; Install washers (54 and 57) and nuts (55). Install nut finger-tight ensuring that washer (57) is securely seated on bolt (58 and 59) and nut (55) is securely seated on washer (54).
- 3) OUTBOARD STRUTS; Make sure that a minimum of 0.060 inch clearance exists between spring beam fittings and the wing attach fittings (4 places) after side brace bolts (47 and 52) are installed.
- 4) OUTBOARD STRUTS; Install washers (48 or 49, and 50) and nuts (51). Install nut finger-tight ensuring that washer (50) is securely seated on bolt (47 and 52) and nut (51) is securely seated on washer (48 or 49).
- (b) Install cotter pin (53 or 56).
  - Tighten nut (51 or 55) up to a maximum of 200 pound-inches (22.8 N.m), as necessary, to line up nut slot with hole in bolt, and install cotter pin.
  - 2) Apply sealant (BMS 5-79) to both ends of cotter pin (53 or 56) approximately 0.10 inch (2.54 mm) thick to prevent cotter pin movement.

#### s 434-044-001

- Install the diagonal brace aft fuse pin (4). (5)
  - If the diagonal brace assembly was removed, make sure you install the same diagonal brace assembly that was removed from this airplane and strut.
    - 1) Look for a tag or markings on the brace that identify the airplane, strut position and center to center diameter.

NOTE: If the brace is tagged or marked with this information, it is an optional (custom) brace.



- 2) If you install a new diagonal brace, do these steps:
- 3) Remove the engine if it is installed (AMM 71-00-02/401)

NOTE: This wil allow for the measurement for, and installation of the new brace with no preload on the strut

- 4) Use the MIT SM311U2730 measuring tool to determine the required distance between pin centers, wing fitting / strut lower spar fitting, with no load on the strut.
- 5) Install the bushing at the required location, on the aft end of the diagonal brace (AMM 54-00-01).
- 6) Tag the brace with the bore-bore center distance, the strut location and the basic airplane number.
- (b) If a brass slug was used to push out the fuse pin, do this step when you install each fuse pin in the aft attach point of the diagonal brace:
  - 1) Push out the slug with a new greased fuse pin. Make sure the clevis and lug stay aligned.
- (c) Apply thin coat of grease (BMS 3-24) to exterior of fuse pin (4).
- (d) Install fuse pin (4), two retaining caps (5), two washers (6), bolt (12), and nut (8).
  - Apply wet primer (BMS 10-11, Type I) and sealant (BMS 5-95, Class B) on the retainer caps, washers, nut and bolt.

NOTE: Let the primer dry before you apply the BMS 5-95.

2) Install the retainers caps with a bead of wet BMS 5-95, Class B sealant around the bolt hole.

NOTE: Do not seal the retainer cap to the midspar fitting.

- 3) Install the bolt, washers, and nut with wet BMS 5-95, Class B sealant.
- 4) Install nut (8) finger-tight ensuring that retaining caps (5) are securely seated against fuse pin, washer (6) is correctly seated on bolt (12) shoulder, and nut (8) is correctly seated on washer (6).
- (e) Install cotter pin (7).
  - Tighten nut (8) to 100-400 pound-inches (11.3-45.4 N.m) and install cotter pin (7). An additional washer (6) may be used, if required, to line up nut slot with hole in bolt (12).
  - 2) Apply sealant (BMS 5-79) to both ends of cotter pin (7) approximately 0.10 inch (2.54 mm) thick to prevent cotter pin movement.
- (f) Inject grease (BMS 3-24) into grease fitting, located on aft side of fuse pin, until grease appears around edge of pin.

  Remove excess grease from around pin.



- (g) Install fuse pin retainer (11).
  - 1) Install four bolts (75), eight washers (76), and four nuts (77) securing retainer to brackets.
  - 2) Ensure that retainer is centered around fuse pin assembly.

#### s 434-045-001

- (6) Install the diagonal brace forward attach bolt (On outboard struts).
  - (a) If a brass slug (instead of a new attach bolt) was used to push out the pin, do this step when you install the pin in the forward attach point of the diagonal brace:
    - 1) Push out the slug with a new greased pin. Make sure the clevis and lug stay aligned.
  - (b) Apply thin film of grease (BMS 3-24) to attach bolt (14).
  - (c) Install attach bolt (14) through clevis and diagonal brace holes.
  - (d) Install two washers (13) and self-locking nut (19).
    - Check that self-locking torque of nut (19) is a minimum of 195 pound-inches (22.2 N.m). Nuts that do not meet this requirement must be replaced and self-locking torque rechecked.
    - 2) Tighten nut (19) to 1600-1900 pound-inches (182-217 N.m). a) Do a check to make sure that the torque value is
  - (e) Install bolt (16), two thin washers (15), and nut (17).
    - 1) Install nut (17) finger-tight ensuring that washer (15) is securely seated against bolt (16) shoulder and nut (17) is securely seated against washer (15).
  - (f) Install cotter pin (18).
    - 1) Tighten nut (17) to a maximum of 200 pound-inches (22.8 N.m), as necessary, to line up nut slot with hole in bolt (16), and install cotter pin (18).
    - 2) Apply sealant (BMS 5-79) to both ends of cotter pin approximately 0.10 inch (2.54 mm) thick to prevent cotter pin movement.
  - (g) Inject grease (BMS 3-24) into grease fitting, if installed, until grease appears around edge of pin. Remove excess grease from around pin.
  - (h) Install each of the two access plate assemblies with the two screws.
  - (i) Examine the clamps on the diagonal brace that route the electrical conduits and pneumatic duct.
    - Make sure that the extended bolt threads will not touch the trailing edge door when it closes.
      - a) Make sure that each clamp is positioned so that it's extended bolt threads are not on the side of the diagonal brace (horizontal position).
      - b) Turn the clamp if necessary, to get more clearance with the door when it closes.



#### s 434-046-001

- Install the diagonal brace forward hollow pin (On inboard struts).
  - If a brass slug (instead of a new pin) was used to push out the pin, do this step when you install the pin in the forward attach point of the diagonal brace:
    - 1) Push out the slug with a new greased pin. Make sure the clevis and lug stay aligned.
  - (b) Apply thin coat of grease (BMS 3-24) to outside diameter of bolt (29), under bolthead, and under retaining caps (27).
  - Install fuse pin (28) through clevis and diagonal brace holes. (c)
  - Install bolt (29), two retaining caps (27), two washers (24), and nut (25) through fuse pin (28). Tighten nut to 100-200 pound-inches (11.4-22.8 N.m).
    - Ensure that both retaining caps (27) are securely seated against ends of fuse pin (28).
  - Install cotter pin (26).
    - 1) Tighten nut (25) to 100-200 pound-inches (11.3-22.7 N.m) and install cotter pin (26). An additional washer (24) may be used, if required, to line up nut slot with hole in bolt (29).
    - 2) Apply sealant (BMS 5-79) to both ends of cotter pin (26) approximately 0.10 inch (2.54 mm) thick to prevent cotter pin movement.
  - Inject grease (BMS 3-24) into grease fitting, if installed, until grease appears around edge of pin. Remove excess grease from around pin.
  - Install fuse pin retainer (23). (q)
    - Install two bolts (20), four washers (21), and two nuts (22) securing fuse pin retainer (23) to strut.
  - Examine the clamps on the diagonal brace that route the electrical conduits and pneumatic duct.
    - 1) Make sure that the extended bolt threads will not touch the trailing edge door when it closes.
      - a) Make sure that each clamp is positioned so that it's extended bolt threads are not on the side of the diagonal brace (horizontal position).
      - b) Turn the clamp if necessary, to get more clearance with the door when it closes.

# s 224-048-001

(8) OUTBOARD STRUTS (IF ENGINE IS REMOVED); Check spring beam bearing bolt rotational torque (AMM 54-51-03/601).

#### s 214-139-001

- (9) Do a check to make sure that the fuse pin/bolts and the applicable secondary retention devices are installed correctly.
  - Make sure that the midspar (inboard) or spring beam (outboard) fuse pins are installed correctly.
    - 1) Make sure that the secondary retention devices are installed.

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- (b) Make sure that the upper link fuse pin and attach bolt are installed correctly.
  - 1) Make sure that the secondary retention device is installed at the aft attach bolt.
- (c) Make sure that the side brace attach bolts are installed correctly.
- (d) Make sure that the diagonal brace fuse pins are installed correctly.
  - Make sure that the secondary retention devices are installed at the aft fuse pin and the forward inboard fuse pin.
- I. Restore the Airplane to Normal

s 094-049-001

- (1) Slowly release the load on the sling and remove the sling.
  - (a) Gently release crane lift from strut.

s 434-052-001

(2) On outboard struts:

Install air-driven pump turbine drive (Ref 29-11-08/401) aft of torque bulkhead, if removed.

s 434-053-001

(3) On outboard struts:

Install air-driven pump (Ref 29-11-17/401) aft of torque bulkhead, if removed.

s 434-054-001

(4) On inboard struts:

Install AC motor-driven pump (Ref 29-11-19/401) aft of torque bulkhead, if removed.

s 414-055-001

(5) Install engine (Ref 71-00-02/401).

s 414-127-001

(6) Install the thrust reverser (AMM 78-31-01/401).

s 864-056-001

(7) Check that applicable engine fuel and hydraulic fluid shutoff valves are open and that electrical plugs are connected to valves.

S 864-057-001

(8) Check that hydraulic system No. 1, 2, 3, or 4, as applicable for engine being installed, is pressurized (Ref 29-11-00/201).

s 864-058-001

(9) Check that external electrical power is disconnected and that grounding is removed.

54-51-02

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s 414-061-001

(10) On inboard struts, install 12 screws and washers to secure lower section of web to fixed fairing support, located at Nac. Sta. 456 at aft edge of trailing edge fairing doors.

s 864-064-001

CAUTION: TOOLS, LOOSE MATERIAL, AND DEBRIS IN STRUT CAVITIES MAY BLOCK DRAINS, RENDERING DRAIN SYSTEM INEFFECTIVE.

(11) Check that tools and loose material are removed and strut cavities are free of debris before installing access doors.

s 414-065-001

(12) Install all access panels, and close trailing edge fairing doors (Ref 54-62-00/201).

S 094-066-001

WARNING: LEADING EDGE FLAPS ARE FAST ACTING AND CAN CAUSE SERIOUS INJURY TO PERSONNEL.

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER.

(13) Remove leading edge flap drive unit lock (Ref 27-81-00 MP).

TASK 54-51-02-024-081-001

- 4. Remove the Attach Pin/Bolt (Engine Supported)
  - A. General
    - (1) The purpose of this procedure is to remove and install the upper link, diagonal brace and midspar pins/bolts with the engine installed.

<u>CAUTION</u>: USE EXTREME CARE WHEN HANDLING ENGINE AND STRUT BECAUSE OF WEIGHT INVOLVED.

(2) Steps are provided to replace all pins/bolts that attach the upper link and diagonal brace. Only one pin/bolt must be replaced at a time. Each attach point requires a different unload force. If more than one pin is to be replaced, then the engine support sling needs to be adjsuted for each pin/bolt to provide the proper upload.

(a) If an optional (custom fitted) diagonal brace is replaced, follow the steps for an optional diagonal brace.



- (3) Care must be used to avoid the application of excessive lifting forces on the strut. A dynamometer or precision load positioner must be used in the hoisting arrangement unless the crane incorporates an adjustable load limiter.
- (4) Platforms and stands are required in order to gain access to required strut attach points. Depending upon the airplane gross weight, most of the inboard points are located from 12-1/2 to 16 feet (3.8 - 4.9 m) above the ground line. Similarly, most of the outboard points are located from 14 - 18 - 1/2 feet (4.3 - 5.6 m) above the ground line.
- Observe the following precaution while performing attach pin/bolt -(5) R/I:

CAUTION: DO NOT LEAVE TOOLS, HARDWARE, OR OTHER OBJECTS IN AIR INLET. FOREIGN OBJECTS CAN CAUSE SEVERE DAMAGE TO THE ENGINE WHEN INGESTED.

- When the engine is operated, the mass airflow tends to draw foreign objects into the engine; therefore, the importance of power plant and surrounding area cleanliness cannot be overemphasized.
- After performance of these procedures, the engine compartment, air inlet, and work area should be thoroughly cleaned and checked to ensure freedom from foreign objects before engine operation.
- Special Tools and Equipment
  - (1) A54001-136 Sling Strut Unload, Pin Removal/Installation
  - (2) G54006-24 Slug Kit

NOTE: Do not use the G54006-1 engine support sling.

- G78002-1 Hold Open Set Thrust Reverser Cowl, CF6-80C Engine
- (4) 3MIT65B90100 Wrench set, Strut Installation, Upper Link Aft Attach Bolt
- Standard Tools and Equipment
  - (1) Lock leading edge flap drive unit
  - (2) Lift Equipment
    - Crane, approved to lift 20,000 pounds, with micro-positioning capabilities (recommended), or with Pull Pac Cylinder (alternative)
      - Pull Pac Cylinder BRP-306, P-80 Pump, HC-941 Hose Assembly (alternative) ENERPAC, Division of Applied Power, Inc. Butler, Wisconsin
    - Dynamometer, 0-20,000 pound capacity, ± 2% accuracy
      - Two dynamometers are necessary if the crane has an adjustable load limiter or if you use a precision load
      - 2) Three dynamometers are necessary if the crane does not have an adjustable load limiter and you do not use a precision load positioner.

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- (c) Precision Load Positioner, 10 ton capacity, Model D Hydra-Set (alternative) Del Mar Engineering Laboratories, Hydra-Set Division International Airport Los Angeles, California
- (d) Chain Hoist, 9,000 pound capacity (2 are necessary)
- (3) Tag Lines use for control of the engine sling
- D. Consumable Materials
  - (1) D00015 Grease Corrosion Preventative, BMS 3-24
- E. References
  - (1) AMM 27-81-00/201, Leading Edge Flaps
  - (2) AMM 29-11-00/201, Main Hydraulic Supply System
  - (3) AMM 54-62-00/201, Nacelle Strut Access Panels
  - (4) AMM 71-11-04/401, Fan Cowl Panels
  - (5) AMM 78-31-00/201, Thrust Reverser System
  - (6) IPC 54-51-02 Fig. 1 through 4
- F. Access
  - (1) Location Zone
    - 451 Nacelle Strut 1 Forward Fairing
    - 452 Nacelle Strut 1 Torque Box
    - 454 Nacelle Strut 1 Aft Fairing
    - 521 Nacelle Strut 1 Leading Edge to Front Spar
    - 461 Nacelle Strut 2 Forward Fairing
    - 462 Nacelle Strut 2 Torque Box
    - 464 Nacelle Strut 2 Aft Fairing
    - 521 Nacelle Strut 2 Leading Edge to Front Spar
    - 471 Nacelle Strut 3 Forward Fairing
    - 472 Nacelle Strut 3 Torque Box
    - 474 Nacelle Strut 3 Aft Fairing
    - 621 Nacelle Strut 3 Leading Edge to Front Spar
    - 481 Nacelle Strut 4 Forward Fairing
    - 482 Nacelle Strut 4 Torque Box
    - 484 Nacelle Strut 4 Aft Fairing
    - 621 Nacelle Strut 4 Leading Edge to Front Spar
  - (2) Access Panel
    - 454 Trailing Edge Fairing Door Nacelle Strut 1
    - 521FT Wing Leading Edge Cover Nacelle Strut 1
    - 464 Trailing Edge Fairing Door Nacelle Strut 2
    - 511CT Wing Leading Edge Cover Nacelle Strut 2
    - 474 Trailing Edge Fairing Door Nacelle Strut 3
    - 611CT Wing Leading Edge Cover Nacelle Strut 3
    - 484 Trailing Edge Fairing Door Nacelle Strut 4
    - 621FT Wing Leading Edge Cover Nacelle Strut 4
- G. Prepare for the removal



s 494-082-001

WARNING: LEADING EDGE FLAPS ARE FAST ACTING. LOCKS MUST BE INSTALLED TO PREVENT POSSIBLE INJURY DUE TO INADVERTENT OPERATION OF FLAPS.

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER.

(1) Make sure the leading edge flaps are retracted and install the leading edge flap lever lock (Ref 27-81-00/201).

s 864-083-001

(2) Make sure the external electrical power is disconnected and that the airplane is grounded.

s 864-084-001

(3) Make sure the FUEL CONTROL toggle switches, located on engine start module, are in the CUTOFF position.

s 864-085-001

(4) Make sure the engine fuel and hydraulic supply shutoff valves are closed, and that the electrical plugs are disconnected from valves.

s 864-086-001

(5) Make sure the hydraulic system is depressurized (Ref 29-11-00/201).

s 014-087-001

(6) Open trailing edge fairing doors (Ref 54-62-00/201) for access to the diagonal brace attach points.

s 014-088-001

(7) Hold the doors open with a suitable rod, and remove the door support rods from the nacelle strut torque bulkhead.

s 014-089-001

(8) INBOARD STRUTS;

Remove the right and left forward wedge assemblies of the fixed aft fairing, for access to the aft diagonal brace attach point.

- (a) On each side, remove the two fasteners that attach the secondary retainer to the fairing.
- (b) On each side, remove twenty six fasteners that attach the fairing assembly to the forward web assembly.
- (c) On each side, remove the thrity four fasteners that attach the fairing assembly to the skate angle.



s 014-090-001

(9) Open the wing leading edge cover, if it is necessary for access to the upper link attach pins/bolts.

s 014-091-001

(10) Remove the engine fan cowls (Ref 71-11-04/401).

s 014-134-001

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST WARNING: REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (11) Open the thrust reversers (AMM 78-31-00/201).
  - Install the G78002-1 hold open set and do not engage the thrust reverser hold-open rods.

NOTE: You cannot install the engine sling with the thrust reverser hold-open rods engaged.

s 494-128-001

CAUTION: DO NOT USE THE G54006 ENGINE SUPPORT SLING. DAMAGE TO THE ENGINE CAN OCCUR IF YOU USE THIS SLING.

> DO NOT INSTALL THE A54001-74 ENGINE SUPPORT SLING TO THE GSE ATTACH POINTS H5-1 OR H5-2. DAMAGE TO THE ENGINE CAN OCCUR IF YOUR USE THESE ATTACH POINTS.

- (12) Use the tool placard to install the engine support sling, A54001-102 (Fig. 401).
  - (a) Install the C-beam attach fittings of the A54001-74 engine support sling to the GSE attach points H4-1 and H4-2.

The GSE attach points H4-1 and H4-2 are located at NOTE: the 3:00 o'clock and 9:00 o'clock positions, respectively.



s 034-129-001

# DO NOT LIFT THE ENGINE WITH A FORCE THAT IS MORE THAN NECESSARY CAUTION: TO PERMIT THE PIN/BOLT TO TURN WHEN YOU APPLY 125 POUND-INCHES MAXIMUM TORQUE. DO NOT APPLY A TOTAL LOAD OF MORE THAN 17,000 POUNDS (MORE THAN THE WEIGHT OF THE EQUIPMENT). DO NOT APPLY A LOAD OF MORE THAN 8,500 POUNDS ON ONE ATTACH POINT. DO NOT APPLY A LOAD WITH A DIFFERENCE BETWEEN THE TWO SIDES OF MORE THAN 1,500 POUNDS. LIFT THE ENGINE VERTICALLY. IF THE CRANE LIFTS THE ENGINE WITH TOO MUCH FORCE, OR AT AN INCORRECT ANGLE, DAMAGE TO THE ENGINE CAN OCCUR.

- (13) Do these steps to remove the load from the pin/bolt that you will remove:
  - Slowly apply a small load with the crane. (a)
  - Adjust the lever hoists so the load on the inboard and outboard dynamometers is approximately equal.
  - Move the crane as necessary to apply a vertical load at the tool attach points.
    - 1) At the side of the engine, visually align the engine sling between the flanges on the fan case so the beam assembly is directly above the flanges.
    - 2) At the front or rear of the engine, visually align the engine sling vertically side-to-side.
  - Slowly apply a load to the sling until you reach a load of 2500 pounds.

THE C-FITTINGS MUST BE CENTERED BETWEEN THE FLANGES. CAUTION: DAMAGE TO THE ENGINE CAN OCCUR IF THE C-FITTINGS ARE NOT CENTERED.

- (e) Make sure that the C-fittings are centered between the flanges.
  - 1) Monitor the angle of the engine sling side-to-side and forward/aft during the procedure.
- Slowly increase the load until you can turn the pin/bolt that you will remove with a maximum torque of 125 pound-inches (14.3 N.m).
  - 1) Make sure the fuse pin, caps, and bolt turn as an assembly.
    - a) If it is necessary, you can tighten the fuse pin castellated nut to a maximum torque of 200 pound-inches (22.6 N.m) so the assembly turns.
  - You can make these adjustments to more accurately find the correct load:

NOTE: When the load is removed correctly, the pin/bolt that you will remove should turn easily.

a) Adjust the individual load on each of the two chain hoists.

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- b) Move the lifting point of the overhead crane inboard or outboard a minimum distance from the center position.
- Remove the Applicable Attach Pin/Bolt.

Remove only one or both pins/bolts from one link/brace in these NOTE: steps.

s 024-097-001

ALL THE MID SPAR AND UPPER LINK PINS/BOLTS MUST BE INSTALLED OR CAUTION: DAMAGE TO THE STRUCTURE CAN OCCUR.

- Remove the diagonal brace forward attach pin/bolt.
  - If you remove the diagonal brace, do these steps:
    - 1) Look for markings on the brace that identify the airplane, strut position and center to center diameter.

NOTE: If the brace is marked with this information, it is an optional (custom) brace.

- If you remove an optional diagonal brace (custom fitted brace), this same brace or a new brace with the same center to center diameter must be installed on the strut and airplane where it was removed.
  - a) Tag the brace with the airplane number and strut location or make sure this information is marked on the brace.
- (b) On inboard struts:
  - Remove two nuts (22), four washers (21), and two bolts (20) securing attach pin retainer (23) to strut, and remove
  - 2) Remove cotter pin (26), nut (25), bolt (29), and two washers (24).
  - Remove two retaining caps (27).
  - 4) Push the hollow pin (28) out with a greased new pin or a greased brass slug.
  - Make sure the diagonal brace clevis and the strut lug stay aligned.

Gently rock the engine from side to side to ease the old pin removal and new pin or slug installation.

- On outboard struts:
  - Remove cotter pin (18), nut (17), bolt (16), and two washers (15).
  - Remove self-locking nut (19) and two washers (13).
  - 3) Push the attach bolt (14) out with a greased brass slug.
  - 4) Make sure the diagonal brace clevis and the strut lug stay aligned.

EFFECTIVITY-KLM 001-005, 025-034 WITHOUT SB 54-2155 AND SB 54A2156



S 024-098-001

CAUTION: ALL THE MID SPAR AND UPPER LINK PINS/BOLTS MUST BE INSTALLED OR DAMAGE TO THE STRUCTURE CAN OCCUR.

- (2) Remove the diagonal brace fuse pin at the aft end of the brace.
  - (a) Remove four nuts (77), eight washers (76), and four bolts (75) securing fuse pin retainer (11) to bracket, and remove retainer.
  - (b) Remove cotter pin (7), nut (8), bolt (12), two wahsers (6), and two retaining caps (5).
  - (c) INBOARD STRUTS; Push the fuse pin (4) out with a new greased fuse pin or a greased brass slug.
  - (d) Make sure the diagonal brace clevis and the wing lug stay aligned.
  - (e) OUTBOARD STRUTS; Push the fuse pin (4) out with a greased brass slug (from inboard to outboard).
  - (f) Make sure the diagonal brace clevis and the wing lug stay aligned.

s 034-145-001

- (3) Remove the side brace attach bolts.
  - (a) OUTBOARD STRUTS; Remove the nut (51), bolt (47 and 52), two washers (48 or 49, and 50), and cotter pin (53) at each end.
  - (b) INBOARD STRUTS; Remove the nut (55), bolt (58 and 59), two washers (54 and 57), and cotter pin (56) at each end.

s 024-099-001

<u>CAUTION</u>: ALL THE MID SPAR AND DIAGONAL BRACE PINS/BOLTS MUST BE INSTALLED OR DAMAGE TO THE STRUCTURE CAN OCCUR.

- (4) Remove the upper link fuse pin from the forward end of the link.
  - (a) Remove cotter pin (42), nut (41), washer (40), bolt (45), retaining cap (44), self-locking nut (39), and washer (43).
  - (b) Use a spanner wrench to hold the fuse pin head when you remove the self-locking nut.
  - (c) Push the fuse pin (46) out with greased brass slug.
  - (d) Make sure the upper link lug and the strut clevis stay aligned.



s 024-100-001

CAUTION: ALL THE MID SPAR AND DIAGONAL BRACE PINS/BOLTS MUST BE INSTALLED OR DAMAGE TO THE STRUCTURE CAN OCCUR.

- Remove upper link attach bolt at the aft end of the link.
  - Remove two nuts (38), four washers (37), and two bolts (36) securing attach bolt retainer (30) to strut, and remove retainer.
  - Remove cotter pin (32), nut (31), and two washers (33 and 34) (b) (use wrench set 3MIT65B90100 to remove nut from attach bolt).
  - Push the attach bolt (35) out with a greased brass slug.
  - (d) Make sure the upper link lug and the strut clevis stay aligned.

s 024-101-001

ALL THE UPPER LINK AND DIAGONAL BRACE PINS/BOLTS MUST BE CAUTION: INSTALLED , AND ONLY ONE MIDSPAR FUSE PIN CAN BE REMOVED AT A TIME, OR DAMAGE TO THE STRUCTURE CAN OCCUR.

- (6) Remove the midspar fuse pin.
  - Remove two fuse pin retainers (67 or 71).
    - 1) On outboard struts, remove two nuts (70), four washers (69), and two bolts (68) securing each fuse pin retainer (67) to strut.
    - 2) On inboard struts, remove two nuts (74), four washers (73), and two bolts (72) securing each fuse pin retainer (71) to strut.
  - Remove cotter pin (66), nut (65), two washers (61 and 64), bolt (60), two retaining caps (62), and fuse pins (63).
    - 1) Push out the pin with a greased new pin or a greased brass slug. Make sure the clevis and the lug stay aligned.

s 864-102-001

(7) Make sure the load on the strut is kept the same until you install the pin/bolt again.

TASK 54-51-02-424-103-001

- Install Attach Pin/Bolt (Engine Supported)
  - Special Tools and Equipment
    - (1) A54001-136 Sling Strut Unload, Pin Removal/Installation
    - (2) G54006-24 Slug Kit

NOTE: Do not use the G54006-1 engine support sling.

- (3) G78002-1 Hold Open Set Thrust Reverser Cowl, CF6-80C Engine
- (4) 3MIT65B90100 Wrench Set, Strut Installation, Upper Link AFt Attach Bolt
- Standard Tools and Equipment
  - (1) Lock leading edge flap drive unit

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- (2) Lift Equipment
  - (a) Crane, approved to lift 20,000 pounds, with micro-positioning capabilities (recommended), or with Pull Pac Cylinder (alternative)
    - 1) Pull Pac Cylinder BRP-306, P-80 Pump, HC-941 Hose Assembly (alternative) ENERPAC, Division of Applied Power, Inc. Butler, Wisconsin
  - (b) Dynamometer, 0-20,000 pound capacity,  $\pm 2\%$  accuracy
    - Two dynamometers are necessary if the crane has an adjustable load limiter or if you use a precision load positioner.
    - 2) Three dynamometers are necessary if the crane does not have an adjustable load limiter and you do not use a precision load positioner.
  - (c) Precision Load Positioner, 10 ton capacity, Model D Hydra-Set (alternative) Del Mar Engineering Laboratories, Hydra-Set Division International Airport Los Angeles, California
  - (d) Chain Hoist, 9,000 pound capacity (2 are necessary)
- (3) Tag Lines use for control of the engine sling
- C. Consumable Materials
  - (1) A00964 Primer Fluid Resistant, BMS 10-11, Type I
  - (2) A00344 Compound Corrosion Preventive, MIL-C-11796, Class 1
  - (3) A00310 Sealant BMS 5-95 or A00247 Sealant - BMS 5-79
  - (4) D00294 Grease Corrosion Preventative, BMS 3-24
- D. Parts

АММ			AIPC		
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
402	1 1 2 2 2	Upper Link (Outboard) Upper Link (Inboard) Side Brace (Left Outboard) Side Brace (Right Outboard) Side Brace (Inboard)	54-51-02	03 04 03 03 04	100 100 260 265 235

54-51-02

05

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АММ			AIPC		
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
	3 3 4 4 5 5 6 6 7 7 8 8 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 30 31 31 31 31 31 31 31 31 31 31 31 31 31	Diagonal Brace (Outboard) Diagonal Brace (Inboard) Fuse Pin (Outboard) Retaining Cap (Outboard) Retaining Cap (Inboard) Washer (Outboard) Washer (Inboard) Cotter Pin (Outboard) Cotter Pin (Inboard) Nut (Outboard) Nut (Inboard) Fuse Pin Retainer (Outboard) Fuse Pin Retainer (Inboard) Bolt (Outboard) Bolt (Inboard) Washer Attach Bolt Washer Bolt Nut Cotter Pin Nut Bolt Washer Nut Cotter Pin Retainer (Caliper) Washer Nut Cotter Pin Retaining Cap Fuse Pin Bolt Attach Bolt Retainer (Outboard) Attach Bolt Retainer (Inboard) Cotter Pin (Inboard) Washer (Outboard) Nut (Outboard) Nut (Outboard) Nut (Inboard) Cotter Pin (Inboard) Cotter Pin (Inboard) Nut (Inboard) Cotter Pin (Outboard)		03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 04 04 04 04 04 04 04 04 04 04 04 04	375 330 370 325 365 315 340 295 300 275 355 400 335 315 285 300 325 300 265 270 255 290 300 275 310 320 280 55 75 90 95 75

EFFECTIVITY-KLM 001-005, 025-034 WITHOUT SB 54-2155 AND SB 54A2156

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АММ			AIPC		<del> </del>
FIG :	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
	33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 50 50 50 50 50 50 50 50 50 50 50 50	Washer (Inboard) Washer (Outboard) Attach Bolt (Outboard) Bolt (Outboard) Bolt (Inboard) Bolt (Inboard) Washer (Outboard) Washer (Outboard) Washer (Inboard) Nut (Outboard) Nut (Inboard) Nut (Inboard) Nut (Inboard) Washer (Outboard) Washer (Outboard) Washer (Inboard) Nut (Inboard) Nut (Inboard) Cotter Pin (Outboard) Washer (Inboard) Bolt (Outboard) Bolt (Inboard) Fuse Pin (Outboard) Fuse Pin (Outboard) Bolt Washer Washer Washer Washer Washer Washer Nut Cotter Pin Washer Nut Cotter Pin Washer Bolt Bolt		04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 03 04 04 04 04 04 04 04 04 04 04 04 04 04	90 85 85 80 60 65 70 35 25 30 15 40 45 40 45 20 230 245 255 205 210 185 200 190

EFFECTIVITY-KLM 001-005, 025-034 WITHOUT SB 54-2155 AND SB 54A2156

54-51-02

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АММ			AIPC		
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
	60 60 61 61 62	Bolt (Outboard) Bolt (Inboard) Washer (Outboard) Washer (Inboard) Retaining Cap (Outboard)		03 04 03 04 03	145 150 150 155 165
	62 63 63 64 64 65 65 66 66 67 68 69 70 71 72 73	Retaining Cap (Inboard) Fuse Pin (Outboard) Fuse Pin (Inboard) Washer (Outboard) Washer (Inboard) Nut (Outboard) Nut (Inboard) Cotter Pin (Outboard) Cotter Pin (Inboard) Fuse Pin Retainer Bolt Washer Nut Fuse Pin Retainer Bolt Washer		04 03 04 03 04 03 04 03 04 03 03 04 04 04 04	170 170 175 155 160 160 165 140 145 190 175 180 185 125 130
	74 75 75 76 76 77 77	Nut Bolt (Outboard) Bolt (Inboard) Washer (Outboard) Washer (Inboard) Nut (Outboard) Nut (Inboard)		04 03 04 03 04 03 04	140 420 355 425 360 430 365

## E. References

- (1) AMM 27-81-00/201, Leading Edge Flaps
- (2) AMM 29-11-00/201, Main Hydraulic Supply System
- (3) AMM 54-62-00/201, Nacelle Strut Access Panels
- (4) AMM 71-11-04/401, Fan Cowl Panels
- (5) AMM 78-31-00/201, Thrust Reverser System
- (6) CPM Part III, 54-10-47
- (7) IPC 54-51-02 Fig. 1 through 4



#### F. Access

- (1) Location Zone
  - 451 Nacelle Strut 1 - Forward Fairing
  - 452 Nacelle Strut 1 - Torque Box
  - Nacelle Strut 1 Aft Fairing 454
  - 521 Nacelle Strut 1 - Leading Edge to Front Spar
  - 461 Nacelle Strut 2 - Forward Fairing
  - Nacelle Strut 2 Torque Box 462
  - Nacelle Strut 2 Aft Fairing 464
  - 521 Nacelle Strut 2 - Leading Edge to Front Spar
  - Nacelle Strut 3 Forward Fairing 471
  - Nacelle Strut 3 Torque Box 472
  - 474 Nacelle Strut 3 - Aft Fairing
  - 621 Nacelle Strut 3 - Leading Edge to Front Spar
  - Nacelle Strut 4 Forward Fairing 481
  - Nacelle Strut 4 Torque Box 482
  - 484 Nacelle Strut 4 - Aft Fairing
  - 621 Nacelle Strut 4 - Leading Edge to Front Spar
- (2) Access Panel
  - Trailing Edge Fairing Door Nacelle Strut 1 454
  - 521FT Wing Leading Edge Cover - Nacelle Strut 1
  - Trailing Edge Fairing Door Nacelle Strut 2 464
  - 511CT Wing Leading Edge Cover - Nacelle Strut 2
  - Trailing Edge Fairing Door Nacelle Strut 3 474
  - 611CT Wing Leading Edge Cover - Nacelle Strut 3
  - Trailing Edge Fairing Door Nacelle Strut 4 484 621FT Wing Leading Edge Cover - Nacelle Strut 4
- G. Prepare for Installation

# s 214-104-001

- Make sure that all attach pins, bolts, caps, and washers at installation points are free from corrosion, including interior of fuse pins or hollow bolts and the inner diameter of fitting bushings.
  - (a) If corrosion exists, either replace or remove corrosion and apply corrosion protection (CPM Part III, 54-10-47).
    - 1) Apply two coats of primer to all exposed surfaces, including ID bore, but excluding chrome plate OD, if not already primed.
    - 2) Apply a 0.05-inch (1.3 mm) thick coating of corrosion preventive compound to ID of attach pin/bolt.

### s 284-097-001

(2) Make sure the mid spar fuse pins are serviceable (SB 747-54A2150).

# s 284-098-001

(3) Make sure the diagonal brace fuse pins are serviceable (SB 747-54A2153).

EFFECTIVITY-KLM 001-005, 025-034 WITHOUT SB 54-2155 AND SB 54A2156



#### s 214-105-001

- (4) Make sure that all bushings at installation points are sealed from corrosion.
  - (a) If bushings are not sealed, apply sealant to bushings (Ref 51-31-01/201).
    - 1) Apply fillet seal to flange end of all bushings.
    - Brush coat seal (maximum thickness 0.010 inch) to entire periphery of all (except upper link wing fitting and diagonal brace wing fitting) unflanged bushing ends exposed to mating surface of parent part.

NOTE: No seal is required for bushing end not exposed to mating surface of parent part. Corrosion prevention in this area is covered by application of grease during pins or bolts installation.

3) Apply fillet seal to entire periphery of unflanged bushing end at diagonal brace wing fitting.

s 414-140-001

- (5) Do a check to make sure that you have the correct part number fuse pin(s).
- Install applicable attach pin/bolt Η.

s 424-111-001

- (1) Install the midspar fuse pin.
  - (a) Push out the slug with a new greased fuse pin.
    - 1) Make sure the clevis and lug stay aligned.
  - Apply thin coat of BMS 3-24 grease to fuse pin (63) and bolt (b) (60).
  - Install fuse pin (63). Ensure that gaps between wing attach fitting and bushing are of equal width, within 0.005 inches (0.13 mm).
  - Install bolt (60), two washers (61 and 64), retaining caps (d) (62), and nut (65) through fuse pin (63). Ensure that thin washer (61) is installed under bolthead.
    - 1) Apply wet primer (BMS 10-11, Type I) and sealant (BMS 5-95, Class B) on the retainer caps, washers, nut and bolt.

NOTE: Let the primer dry before you apply the BMS 5-95.

Install the retainer caps with a bead of wet BMS 5-95, Class B sealant around the bolt hole.

<u>NOTE</u>: Do not seal the retainer cap to the midspar fitting.

- 3) Install the bolt, washers, and nut with wet BMS 5-95, Class B sealant.
- 4) Ensure that bolthead faces the outside surface of the strut.

EFFECTIVITY-KLM 001-005, 025-034 WITHOUT SB 54-2155 AND SB 54A2156



- 5) Ensure that both retaining caps (62) are securely seated against ends of fuse pin (63).
- (e) Install cotter pin (66).
  - 1) Tighten nut to 100-400 pound-inches (11.4-45.6 N.m).
  - 2) To align nut slot with cotter pin hole within required torque range, or to adjust for cotter pin depth in nut slot, use thin washer or combination of washers under nut.
  - 3) Apply sealant BMS 5-79 to both ends of cotter pin (66) approximately 0.10 inch (2.54 mm) thick to prevent cotter pin movement.
- (f) Inject grease (BMS 3-24) into grease fitting, located aft of fuse pin, until grease appears around edge of pin. Remove excess grease from around pin.
- (g) Install fuse pin retainer (67 or 71) on bracket by each fuse pin (63).

CAUTION: MAKE SURE YOU INSTALL THE SECONDARY RETAINER BELOW THE ATTACH ANGLE. IF YOU INSTALL THE RETAINER ON TOP OF THE ATTACH ANGLE, DAMAGE TO THE EDP SUPPLY TUBE CAN OCCUR.

1) OUTBOARD STRUTS; Install the two bolts (68), four washers (69), and two nuts (70) securing fuse pin retainer (67) to bracket.

2) INBOARD STRUTS; Install the two bolts (72), four washers (73), and two nuts (74) that hold the fuse pin retainer (71) to the strut.

## s 424-106-001

- (2) Install upper link attach bolt at the aft end of the link.
  - (a) Apply thin film of BMS 3-24 grease to attach bolt (35).
  - (b) Install attach bolt (35) and two washers (33 and 34).
    - 1) Push out the brass slug with a new attach bolt (35).
      - a) Make sure the upper link lug and the wing clevis stay aligned.
    - 2) Install nut (31) finger-tight ensuring that washer (34) is securely seated against bolt (35), and nut (31) is securely seated against washer (33).
  - (c) Install cotter pin (32).
    - 1) Tighten nut (31) up to a maximum of 200 pound-inches, as necessary, to line up nut slot with hole in bolt (35), and install cotter pin (use wrench set 3MIT65B90100 to tighten nut).
    - 2) Apply sealant (BMS 5-79) to both ends of cotter pin (32) approximately 0.10 inch (2.54 mm) thick to prevent cotter pin movement.
  - (d) Install attach bolt retainer (30).
    - 1) Position attach bolt retainer (30) on strut mounted bracket.
    - 2) Install two bolts (36), four washers (37), and two nuts (38) securing attach bolt retainer (30) to bracket.



#### s 424-107-001

- Install upper link fuse pin at the forward end of the link.
  - Apply thin coat of grease (BMS 3-24) to fuse pin (46).
  - Install fuse pin (46), thick washer (43), and self-locking nut
    - 1) Push out the brase slug with a new fuse pin (46).
      - a) Make sure the upper link lug and the strut clevis stay aligned.
    - Check that self-locking torque of nut (39) is a minimum of 117 pound-inches (13.3 N.m).
    - Nuts that do not meet this requirement must be replaced and self-locking torque rechecked.
    - 4) Tighten nut (39) to 1200-1400 pound-inches (137-160 N.m).
      - a) Do a check to make sure that the torque value is correct.
  - Install bolt (45), retaining cap (44), thin washer (40), and nut (41).
    - 1) Install nut (41) finger-tight ensuring that retaining cap (44) is securely sealed against bolthead and nut (41) is securely seated against washer (40).
  - Install cotter pin (42). (d)
    - 1) Tighten nut (41) up to a maximum of 200 pound-inches (22.8 N.m), as necessary, to line up nut slot with hole in bolt (45), and install cotter pin.
    - 2) Apply sealant (BMS 5-79) to both ends of cotter pin (42) approximately 0.10 inch (2.54 mm) thick to prevent cotter pin movement.

# s 424-149-001

(4) Install the side brace attach bolts.

NOTE: You must install these bolts before you apply a preload to the strut.

- Apply a thin coat of grease (BMS 3-24) to the bolts (47 and 52, or 58 and 59) and install the bolts.
  - 1) INBOARD STRUTS;

Make sure that a minimum of 0.060 inch clearance exists between the midspar fittings and wing attach fittings (4 places) after side brace bolts (58 and 59) are installed.

- 2) INBOARD STRUTS;
  - Install the washers (54 and 57) and nuts (55). Install nut finger-tight ensuring that washer (57) is securely seated on bolt (58 and 59) and nut (55) is securely seated on washer (54).
- 3) OUTBOARD STRUTS;

Make sure that a minimum of 0.060 inch clearance exists between the spring beam fittings and the wing attach fittings (4 locations) after the side brace bolts (47 and 52) are installed.

EFFECTIVITY-KLM 001-005, 025-034 WITHOUT SB 54-2155 AND SB 54A2156



- 4) OUTBOARD STRUTS; Install the washers (48 or 49, and 50) and nuts (51). Install nut finger-tight ensuring that washer (50) is securely seated on bolt (47 and 52) and nut (51) is securely seated on washer (48 or 49).
- (b) Install cotter pin (53 or 56).
  - 1) Tighten nut (51 or 55) up to a maximum of 200 pound-inches (22.8 N.m), as necessary, to line up nut slot with hole in bolt, and install cotter pin.
  - 2) Apply sealant (BMS 5-79) to both ends of cotter pin (53 or 56) approximately 0.10 inch (2.54 mm) thick to prevent cotter pin movement.

#### s 424-108-001

- (5) Install diagonal brace fuse pin (4) at the aft end of the brace.
  - (a) If the diagonal brace assembly was removed, make sure you install the same diagonal brace assembly that was removed from this airplane and strut, if the brace that was removed was an optional brace (custom fitted).
    - Look for a tag or markings on the brace that identify the airplane, strut position and center to center diameter.

NOTE: If the brace is tagged or marked with this information, it is an optional (custom) brace.

- (b) Apply thin coat of grease (BMS 3-24) to exterior of fuse pin (4).
- (c) Install fuse pin (4), two retaining caps (5), two washers (6), bolt (12), and nut (8).
  - 1) INBOARD STRUTS;

Push out the brass slug with a new fuse pin (4).

- Make sure the diagonal brace clevis and the wing lug stay aligned.
- 2) OUTBOARD STRUTS;

Push out the brass slug with a new fuse pin (4), (from outboard to inboard).

- Make sure the diagonal brace clevis and the wing lug stay aligned.
- 3) Apply wet primer (BMS 10-11, Type I) and sealant (BMS 5-95, Class B) on the retainer caps, washers, nut and bolt.

NOTE: Let the primer dry before you apply the BMS 5-95.

4) Install the retainer caps with a bead of wet BMS 5-95, Class B sealant around the bolt hole.

NOTE: Do not seal the retainer cap to the midspar fitting.

5) Install the bolt, washers, and nut with wet BMS 5-95, Class B sealant.



- 6) Install nut (8) finger-tight ensuring that retaining caps (5) are securely seated against fuse pin, washer (6) is correctly seated on bolt (12) shoulder, and nut (8) is correctly seated on washer (6).
- (d) Install cotter pin (7).
  - 1) Tighten nut (8) to 100-400 pound-inches (11.3-45.4 N.m) and install cotter pin (7).
  - An additional washer (6) may be used, if required, to line up nut slot with hole in bolt (12).
  - Apply sealant (BMS 3-24) to both ends of cotter pin (7) approximately 0.10 inch (2.54 mm) thick to prevent cotter pin movement.
- Inject grease (BMS 3-24 into grease fitting, located on aft (e) side of fuse pin, until grease appears around edge of pin.
- (f) Remove excess grease from around pin.
- (g) Install fuse pin retainer (11).
  - Install four bolts (75), eight washers (76), and four nuts (77) securing retainer to brackets.
  - 2) Ensure that retainer is centered around fuse pin assembly, and that a gap of 0.09 - 0.11 inch exists between the retainer and the side of the clevis of the brace.

#### s 424-109-001

(6) OUTBOARD STRUTS;

Install diagonal brace forward attach bolt.

- (a) Apply thin film of grease (BMS 3-24) to attach bolt (14).
- (b) Install attach bolt (14) through clevis and diagonal brace holes.
  - 1) Push out the brass slug with a new attach bolt (14).
    - a) Make sure the diagonal brace clevis and the strut lug stay aligned.
- Install two washers (13) and self-locking nut (19).
  - 1) Check that self-locking torque of nut (19) is a minimum of 195 pound-inches (22.2 N.m).
  - Nuts that do not meet this requirement must be replaced and self-locking torque rechecked.
  - Tighten nut (19) to 1600-1900 pound-inches (182-217 N.m).
    - a) Do a check to make sure that the torque value is
- Install bolt (16), two thin washers (15), and nut (17).
  - Install nut (17) finger-tight ensuring that washer (15) is securely seated against bolt (16) shoulder and nut (17) is securely seated against washer (15).
- Install cotter pin (18).
  - 1) Tighten nut (17) to a maximum of 200 pound-inches (22.8 N.m), as necessary, to line up nut slot with hole in bolt (16), and install cotter pin (18).
  - Apply sealant (BMS5-79) to both ends of cotter pin approximately 0.10 inch (2.54 mm) thick to prevent cotter pin movement.

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- (f) Inject grease (BMS 3-24) into grease fitting, if installed, until grease appears around edge of pin.
- (g) Remove excess grease from around pin.
- (h) Examine the clamps on the diagonal brace that route the electrical conduits and pneumatic duct.
  - Make sure that the extended bolt threads will not touch the trailing edge door when it closes.
    - a) Make sure that each clamp is positioned so that it's extended bolt threads are not on the side of the diagonal brace (horizontal position).
    - b) Turn the clamp if necessary, to get more clearance with the door when it closes.

#### s 424-110-001

(7) INBOARD STRUTS;

Install diagonal brace forward hollow pin.

- (a) Apply thin coat of grease (BMS 3-24) to outside diameter of the bolt (29), under bolthead, and under retaining caps (27).
- (b) Push out the brass slug with a new pin (28).
  - Make sure the diagonal brace clevis and the strut lug stay aligned.
- (c) Install bolt (29), two retaining caps (27), two washers (24), and nut (25) through fuse pin (28).
- (d) Tighten nut to 100-200 pound-inches (11.4-22.8 N.m).
  - 1) Ensure that both retaining caps (27) are securely seated against ends of the pin (28).
- (e) Install cotter pin (26).
  - 1) Tighten nut (25) to 100-200 pound-inches (11.3-22.7 N.m) and isntall cotter pin (26).
  - 2) An additional washer (24) may be used, if required, to line up nut slot with hole in bolt (29).
  - 3) Apply sealant (BMS 5-79) to both ends of cotter pin (26) approximately 0.10 inch (2.54 mm) thick to prevent cotter pin movement.
- (f) Inject grease (BMS 3-24) into grease fitting, if installed, until grease appears around edge of pin.
- (g) Remove excess grease from around pin.
- (h) Install pin retainer (23).
  - 1) Install two bolts (20), four washers (21), and two nuts (22) securing pin retainer (23) to strut.
- (i) Examine the clamps on the diagonal brace that route the electrical conduits and pneumatic duct.
  - Make sure that the extended bolt threads will not touch the trailing edge door when it is closed.
    - a) Make sure that each clamp is positioned so that it's extended bolt threads are not on the side of the diagonal brace (horizontal possition).



b) Turn the clamp, if necessary, to get more clearance with the door when it closes.

## s 214-148-001

- (8) Do a check to make sure that the fuse pin/bolts and the applicable secondary retention devices are installed correctly.
  - (a) Make sure that the midspar (inboard) or spring beam (outboard) fuse pins are installed correctly.
    - Make sure that the secondary retention devices are installed.
  - (b) Make sure that the upper link fuse pin and attach bolt are installed correctly.
    - Make sure that the secondary retention device is installed at the aft attach bolt.
  - (c) Make sure that the side brace attach bolts are installed correctly.
  - (d) Make sure that the diagonal brace fuse pins are installed correctly.
    - Make sure that the secondary retention devices are installed at the aft fuse pin and the forward inboard fuse pin.
- I. Restore Airplane to Normal

s 094-112-001

- (1) Remove the engine unload sling.
  - (a) Gently release the load from the engine.
  - (b) Disconnect and remove the sling.

s 414-099-001

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Remove the G78002-1 hold open set and close the thrust reversers (AMM 78-31-00/201).

s 414-113-001

(3) Install the fan cowl panels (Ref 71-11-04/401).

s 714-114-001

(4) Do a check of the hydraulic system No. 1, 2, 3, or 4, as applicable for engine being installed, is pressurized (Ref 29-11-00/201).

s 864-115-001

(5) Do a check that the aplicable engine fuel and hydraulic fluid shutoff valves are open and that electrical plugs are connected to valves.

s 794-116-001

(6) Make sure that there are no leaks in hydraulic lines.

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s 864-117-001

(7) Do a check that the external electrical power is disconnected and that grounding is removed.

s 414-118-001

(8) INBOARD STRUTS;

Install the right and left forward wedge assemblies of the fixed aft fairing, if necessary.

- (a) On each side, install the thrity four fasteners that attach the fairing assembly to the skate angle.
- (b) On each side, install twenty six fasteners that attach the fairing assembly to the forward web assembly.
- (c) On each side, install the two fasteners that attach the secondary retainer to the fairing.

s 214-119-001

CAUTION: TOOLS, LOOSE MATERIAL, AND DEBRIS IN STRUT CAVITIES MAY BLOCK DRAINS, RENDERING DRAIN SYSTEM INEFFECTIVE.

(9) Check that tools and loose material are removed and strut cavities are free of debris before installing access doors.

s 414-120-001

(10) Install all access panels, and close trailing edge fairing doors (Ref 54-62-00/201).

s 094-121-001

<u>WARNING</u>: LEADING EDGE FLAPS ARE FAST ACTING AND CAN CAUSE SERIOUS INJURY TO PERSONNEL.

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS ANDF FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER.

(11) Remove the leading edge flap lever lock (Ref 27-81-00/201).



# NACELLE STRUT ATTACH PIN/BOLT - REMOVAL/INSTALLATION

## 1. General

- A. This procedure provides instructions for removal/installation of all strut attach pin/bolts with the engine removed or installed. If a mid spar pin is to be removed, both upper link pins/bolts and both diagonal brace pins/bolts must be installed. Only one midspar pin is to be removed at a time. Both upper link pins/bolts or both diagonal brace pins/bolts may be removed simultaneously but only one link should be free at any one time, unless nacelle strut is to be removed.
- B. Removal of attach pin/bolts consists of obtaining access, unloading pin/bolt to be removed, and removing pin/bolt. A brass slug should be used to push out the pin/bolt so the clevis and lugs remain aligned. Installation of attach pin/bolts consists of checking attach pins/bolts for corrosion, installing attach pin/bolt, and testing strut systems.
  - (1) The diagonal brace or upper link may be removed or replaced using this procedure by removing both forward and aft attach pins/bolts of the applicable link. Any cables or tubes clamped to the applicable link must be disconnected and installed again.
    - (a) If an optional (custom fitted) diagonal brace is replaced, follow the steps for an optional diagonal brace.

<u>CAUTION</u>: USE EXTREME CARE WHEN HANDLING ENGINE AND STRUT BECAUSE OF WEIGHT INVOLVED.

- C. Care must be used to avoid the application of excessive lifting forces. A load cell must be used in the hoisting arrangement unless the crane incorporates an adjustable load limiter.
- D. Observe the following precautions while performing attach pin/bolt removal/installation:

WARNING: KEEP ELECTRICAL POWER OFF DURING DISCONNECTION OR CONNECTION OF FUEL, HYDRAULIC, AND ELECTRICAL LINES TO PREVENT INJURY TO PERSONNEL THAT COULD RESULT FROM ACCIDENTAL APPLICATION OF PRESSURIZED FLUIDS, ENERGIZING OF ELECTRICAL CIRCUITS, OR FIRE.

- (1) Electrical power must not be on during the time the fuel, hydraulic, and electrical lines are being disconnected from or connected to the strut.
- (2) During power plant removal or installation, all openings must be blanked off with approved caps. During power plant removal, all tube ends, ducts and electrical connectors must be capped as soon as possible after disconnection. During power plant installation, the caps must not be removed until connections are to be made. External caps must be used, not internal plugs.



## TASK 54-51-02-004-001-002

- 2. Remove the Attach Pin/Bolt
  - A. Special Tools and Equipment
    - (1) A54001-136 Sling Strut Unload, Pin Removal/Installation (Engine Supported)
    - (2) G54004 Overhead Mechanical Equipment, Inboard and Outboard Nacelle Strut Installation (Engine removed; required for midspar pin removal).
    - (3) G54007 Sling Diagonal Brace Preload (Engine Removed)
    - (4) G54008-37 Removal/Installation Kit Fuse Pin (Includes fuse pin adapter wrenches and brass slugs)
    - (5) G78002-1 Hold Open Set Thrust Reverser Cowl, CF6-80C Engine
  - B. Standard Tools and Equipment
    - (1) Lock leading edge flap drive unit
    - (2) Lift Equipment (Engine removed)
      - (a) Crane, approved to lift 5,000 pounds
      - (b) Dynamometer, 0-5,000 lb capacity,  $\pm 2\%$  accuracy
    - (3) Lift Equipment (Engine supported)
      - (a) Crane, approved to lift 20,000 pounds, with micro-positioning capabilities (recommended), or with Pull Pac Cylinder (alternative)
        - Pull Pac Cylinder BRP-306, P-80 Pump, HC-941 Hose Assembly (alternative)
           ENERPAC, Division of Applied Power, Inc. Butler, Wisconsin
      - (b) Dynamometer, 0-20,000 pound capacity,  $\pm$  2% accuracy
        - Two dynamometers are necessary if the crane has an adjustable load limiter or if you use a precision load positioner.
        - 2) Three dynamometers are necessary if the crane does not have an adjustable load limiter and you do not use a precision load positioner.
      - (c) Precision Load Positioner, 10 ton capacity, Model D Hydra-Set (alternative)

Del Mar Engineering Laboratories, Hydra-Set Division International Airport Los Angeles, California

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- (d) Chain Hoist, 9,000 pound capacity (2 are necessary)
- (4) Tag Lines use for control of the engine sling
- C. References
  - (1) AMM 07-11-01/201, Jacking Airplane
  - (2) AMM 27-81-00/201, Leading Edge Flaps
  - (3) AMM 29-11-00/201, Main Hydraulic Supply System
  - (4) AMM 29-11-08/401, Air-Driven Pump Turbine Drive
  - (5) AMM 29-11-17/401, Air-Driven Pump
  - (6) AMM 29-11-19/401, AC Motor-Driven Pump
  - (7) AMM 54-62-00/201, Nacelle Strut Access Panels
  - (8) AMM 71-00-02/401, Power Plant
  - (9) AMM 71-11-04/401, Fan Cowl Panels
  - (10) AMM 78-31-00/201, Thrust Reverser System
  - (11) AMM 78-31-01/401, Thrust Reverser
- D. Access
  - (1) Location Zone

```
451 Nacelle Strut 1 - Forward Fairing
452 Nacelle Strut 1 - Torque Box
```

- 454 Nacelle Strut 1 Aft Fairing
- 521 Nacelle Strut 1 Leading Edge to Front Spar
- 461 Nacelle Strut 2 Forward Fairing
- 462 Nacelle Strut 2 Torque Box
- 464 Nacelle Strut 2 Aft Fairing
- 521 Nacelle Strut 2 Leading Edge to Front Spar
- 471 Nacelle Strut 3 Forward Fairing
- 472 Nacelle Strut 3 Torque Box
- 474 Nacelle Strut 3 Aft Fairing
- 621 Nacelle Strut 3 Leading Edge to Front Spar
- 481 Nacelle Strut 4 Forward Fairing
- 482 Nacelle Strut 4 Torque Box
- 484 Nacelle Strut 4 Aft Fairing
- 621 Nacelle Strut 4 Leading Edge to Front Spar
- (2) Access Panel

454	Trailing Edge Fairing Door - Nacelle Strut 1
521FT	Wing Leading Edge Cover - Nacelle Strut 1
464	Trailing Edge Fairing Door - Nacelle Strut 2
511CT	Wing Leading Edge Cover - Nacelle Strut 2
474	Trailing Edge Fairing Door - Nacelle Strut 3
611CT	Wing Leading Edge Cover - Nacelle Strut 3
484	Trailing Edge Fairing Door - Nacelle Strut 4
621FT	Wing Leading Edge Cover - Nacelle Strut 4

E. Prepare for the removal (engine removed).

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s 494-002-002

WARNING: LEADING EDGE FLAPS ARE FAST ACTING. LOCKS MUST BE INSTALLED TO PREVENT POSSIBLE INJURY DUE TO INADVERTENT OPERATION OF FLAPS.

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER.

(1) Make sure the leading edge flaps are retracted and leading edge flap drive unit lock is installed (AMM 27-81-00/201).

s 014-088-002

(2) Remove the thrust reverser (AMM 78-31-01/401).

s 014-003-002

(3) Remove the engine (AMM 71-00-02/401).

S 864-004-002

(4) Make sure the external electrical power is disconnected and that the airplane is grounded.

s 864-005-002

(5) Make sure the FUEL CONTROL toggle switches, located on engine start module, are in the CUTOFF position.

s 864-006-002

(6) Make sure the engine fuel and hydraulic supply shutoff valves are closed, and that the electrical plugs are disconnected from valves.

S 864-007-002

(7) Make sure the hydraulic system is depressurized (AMM 29-11-00/201).

S 684-008-002

(8) Make sure the fuel supply line and hydraulic fluid lines to engine are drained.

s 014-009-002

(9) Open trailing edge fairing doors (AMM 54-62-00/201), if it is necessary for access to diagonal brace attach pins/bolts.

s 494-085-002

(10) Prop the doors open with a suitable rod, and remove the door support rods from the nacelle strut torque bulkhead.

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s 014-086-002

(11) INBOARD STRUTS;

Remove the right and left forward wedge assemblies of the fixed aft fairing, for access to the aft diagonal brace attach point.

- (a) On each side, remove the two fasteners that attach the secondary retainer to the fairing.
- (b) On each side, remove twenty six fasteners that attach the fairing assembly to the forward web assembly.
- (c) On each side, remove the thrity four fasteners that attach the fairing assembly to the skate angle.

s 014-011-002

(12) Open all the strut access doors (AMM 54-62-00/201).

s 014-012-002

(13) OUTBOARD STRUTS;

Remove forward fairing no. 4.

s 014-013-002

(14) Open the wing leading edge cover, if it is necessary for access to the upper link attach pins/bolts.

s 034-015-002

(15) OUTBOARD STRUTS;

Remove the air-driven pump (AMM 29-11-17/401) aft of the torque bulkhead, if it is necessary for access to spring beam pins.

s 034-017-002

(16) OUTBOARD STRUTS;

Remove the air-driven pump turbine drive (AMM 29-11-08/401) aft of torque bulkhead, if it is necessary for access to spring beam pins.

s 034-018-002

(17) INBOARD STRUTS;

Remove the AC motor-driven pump (AMM 29-11-19/401) aft of torque bulkhead, if it is necessary for access to midspar pins.

s 494-019-002

(18) Use the tool placard to install the diagonal brace unload sling G54007.

54-51-02

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S 864-020-002

CAUTION: DO NOT EXCEED UPLOAD NECESSARY TO PERMIT PIN/BOLT ROTATION WITH THE APPLICATION OF 125 POUND-INCHES MAXIMUM TORQUE. DO NOT LIFT THE STRUT OR PULL DOWN ON THE STRUT WITH MORE THAN 3,000 POUNDS OF FORCE ON THE INBOARD STRUTS OR 1,800 POUNDS OF FORCE ON THE OUTBOARD STRUTS. IF YOU APPLY A FORCE THAT IS MORE THAN NECESSARY, DAMAGE TO THE STRUCTURE CAN OCCUR.

(19) Unload the attach pin/bolt of the diagonal brace, upper link, or side brace.

NOTE: If the midspar fuse pin is to be replaced it is first necessary to disconnect one end of the diagonal brace to remove the preload.

- (a) Gently apply a load sufficient to remove the strut preload. The intent is to unload the pin/bolt to be removed.
  - 1) Make sure the pin/bolt to be removed can be rotated by applying no more than 125 pound-inches (14.3 N.m) torque.

NOTE: Castellated nuts may have to be tightened up to 200 pound-inches (22.6 N.m) to allow the fuse pin assembly to rotate as a unit with 125 pound-inches (14 N.m) applied torque.

S 864-089-002

(20) Unload the midspar (inboard) or spring beam (outboard) fuse pins.(a) Unload and remove one of the diagonal brace attach pins.

<u>NOTE</u>: You can use a rope to temporarily support the loose end of the diagonal brace.

 Slowly release the load on the diagonal brace unload sling and remove the sling.



- (b) Use the tool placard to install the strut overhead sling.
  - 1) Remove the No. 3 forward fairing.
  - 2) Attach the sling to the front of the strut with the forward hoisting attach fitting.
  - 3) Attach the sling to the lower aft attach points of the strut with the aft hoisting attach fittings.
  - 4) Use the lift point as marked on the sling for the engine and strut location.
  - 5) Use the hole in the lift point as follows:
    - a) Engines 1 & 2 left hole
    - b) Engines 3 & 4 right hole.
- (c) Unload the midspar (inboard) or spring beam (outboard) fuse pins.
  - Gently apply a load to unload the midspar fuse pin to be removed.
  - 2) Make sure the pin to be removed can be rotated by applying no more than 125 pound-inches (14.3 N.m) torque.
  - 3) The fuse pin, caps, and bolt must rotate as an assembly. The intent is to have no load on the pin to be removed.
- F. Prepare for removal (engine supported).

s 864-021-002

(1) Ground airplane to an approved grounding lug.

S 494-022-002

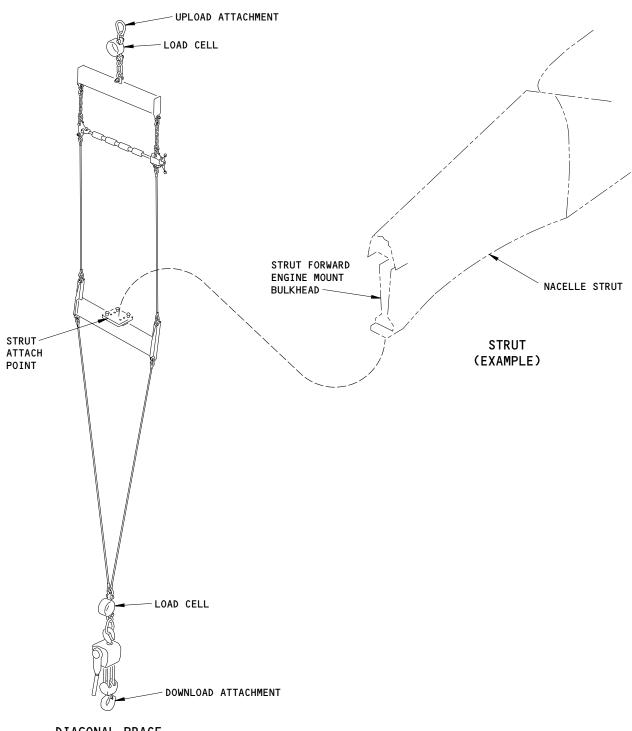
WARNING: LEADING EDGE FLAPS ARE FAST ACTING. LOCKS MUST BE INSTALLED TO PREVENT POSSIBLE INJURY DUE TO INADVERTENT OPERATION OF FLAPS.

(2) Make sure leading edge flaps are retracted and leading edge flap drive unit lock is installed (AMM 27-81-00/201).

s 014-023-002

(3) Open trailing edge fairing doors (AMM 54-62-00/201), if necessary for access to diagonal brace attach pins/bolts. Prop doors open with suitable rod. Remove door support rods from nacelle strut torque bulkhead.



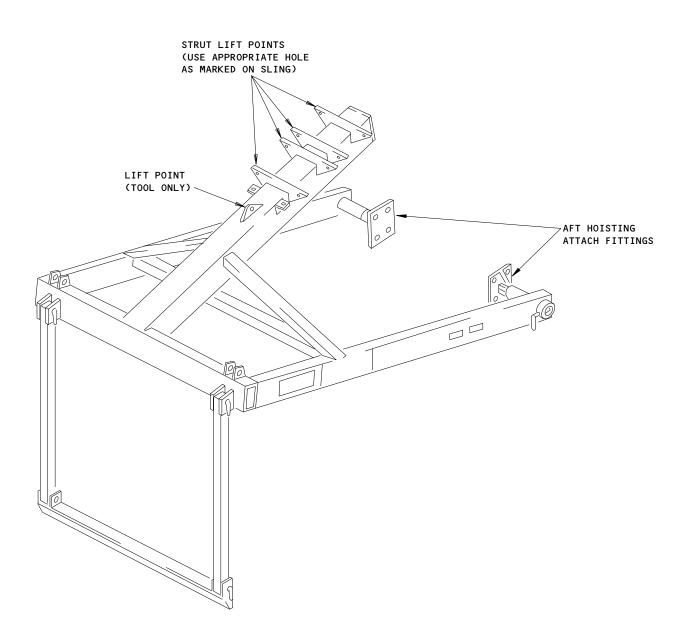


DIAGONAL BRACE UNLOAD SLING G54007

Overhead Mechanical Equipment Figure 401 (Sheet 1)

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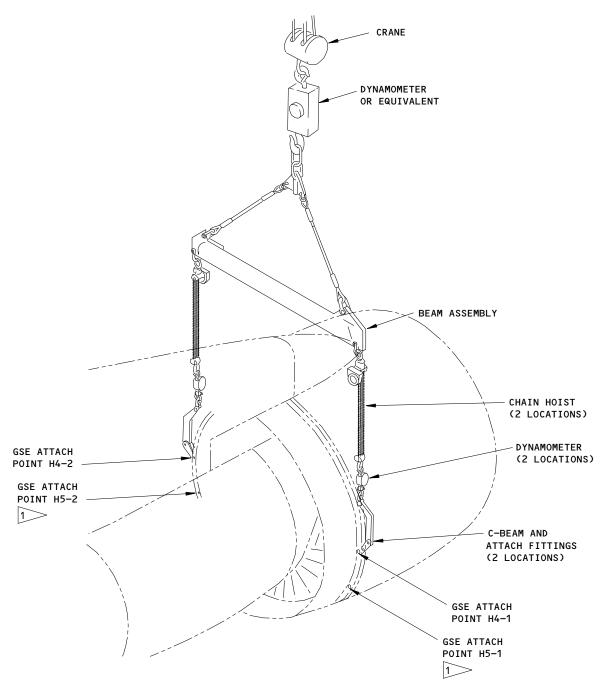
HOISTING SLING G54004

Overhead Mechanical Equipment Figure 401 (Sheet 2)

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A54001-136 SLING

DO NOT ATTACH THE C-BEAM ATTACH FITTINGS TO THIS POINT.

Overhead Mechanical Equipment Figure 401 (Sheet 3)

EFFECTIVITY— KLM 001-005, 025-034 POST-SB 54-2155 AND PRE-SB 54A2156; KLM 035 PRE-SB 54A2156 54-51-02

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s 014-091-002

(4) OUTBOARD STRUTS;

Remove the air-driven pump turbine drive (AMM 29-11-08/401) aft of the torque bulkhead, if it is necessary for access to spring beam pins.

S 014-092-002

(5) INBOARD STRUTS;

> Remove the AC motor-driven pump (AMM 29-11-19/401) aft of the torque bulkhead, if it is necessary for access to midspar pins.

s 014-093-002

(6) Open the wing leading edge cover, if it is necessary for access to the upper link attach pins/bolts.

s 014-100-002

(7) INBOARD STRUTS;

> Remove the right and left forward wedge assemblies of the fixed aft fairing, for access to the aft diagonal brace attach point.

- (a) On each side, remove the two fasteners that attach the secondary retainer to the fairing.
- On each side, remove twenty six fasteners that attach the fairing assembly to the forward web assembly.
- (c) On each side, remove the thrity four fasteners that attach the fairing assembly to the skate angle.

s 014-024-002

Open wing leading edge cover, if necessary for access to upper link attach pins/bolts.

s 014-025-002

(9) Remove the forward fairing.

s 014-096-002

(10) Remove the engine fan cowls (AMM 71-11-04/401).

s 014-099-002

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST WARNING: REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (11) Open the thrust reversers (AMM 78-31-00/201).
  - (a) Install the G78002-1 hold open set and do not engage the thrust reverser hold-open rods.

NOTE: You cannot install the engine sling with the thrust reverser hold-open rods engaged.

EFFECTIVITY-KLM 001-005, 025-034 POST-SB 54-2155 AND PRE-SB 54A2156; KLM 035 PRE-SB 54A2156

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S 864-027-002

(12) Position FUEL CONTROL toggle switches, located on engine start module, to CUTOFF. Attach DO-NOT-OPERATE identifier to switches.

s 864-097-002

(13) Close the fuel shutoff valve.

S 864-098-002

(14) Close the hydraulic supply shutoff valve.

s 494-090-002

<u>CAUTION</u>: DO NOT USE THE G54006 ENGINE SUPPORT SLING. DAMAGE TO THE ENGINE CAN OCCUR IF YOU USE THIS SLING.

DO NOT INSTALL THE A54001-136 ENGINE SUPPORT SLING TO THE GSE ATTACH POINTS H5-1 OR H5-2. DAMAGE TO THE ENGINE CAN OCCUR IF YOU USE THESE ATTACH POINTS.

- (15) Use the tool placard to install the engine support sling, A54001-136 (Fig. 401).
  - (a) Install the C-beam attach fittings of the A54001-136 engine support sling to the GSE attach points H4-1 and H4-2.

NOTE: The GSE attach points H4-1 and H4-2 are located at the 3:00 o'clock and 9:00 o'clock positions, respectively.

s 034-000-002

CAUTION: DO NOT LIFT THE ENGINE WITH A FORCE THAT IS MORE THAN NECESSARY TO PERMIT THE PIN/BOLT TO TURN WHEN YOU APPLY 125 POUND-INCHES MAXIMUM TORQUE. DO NOT APPLY A TOTAL LOAD OF MORE THAN 17,000

MAXIMUM TORQUE. DO NOT APPLY A TOTAL LOAD OF MORE THAN 17,000 POUNDS (MORE THAN THE WEIGHT OF THE EQUIPMENT). DO NOT APPLY A LOAD OF MORE THAN 8,500 POUNDS ON ONE ATTACH POINT. DO NOT APPLY A LOAD WITH A DIFFERENCE BETWEEN THE TWO SIDES OF MORE THAN 1,500 POUNDS.

LIFT THE ENGINE VERTICALLY. IF THE CRANE LIFTS THE ENGINE WITH TOO MUCH FORCE, OR AT AN INCORRECT ANGLE, DAMAGE TO THE ENGINE CAN OCCUR.

- (16) Do these steps to remove the load from the pin/bolt that you will remove:
  - (a) Slowly apply a small load with the crane.
  - (b) Adjust the chain hoists so the load on the inboard and outboard dynamometers is approximately equal.

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- Move the crane as necessary to apply a vertical load at the tool attach points.
  - 1) At the side of the engine, visually align the engine sling between the flanges on the fan case so the beam assembly is directly above the flanges.
  - 2) At the front or rear of the engine, visually align the engine sling vertically side-to-side.
- Slowly apply a load to the sling until you reach a load of 2500 pounds.

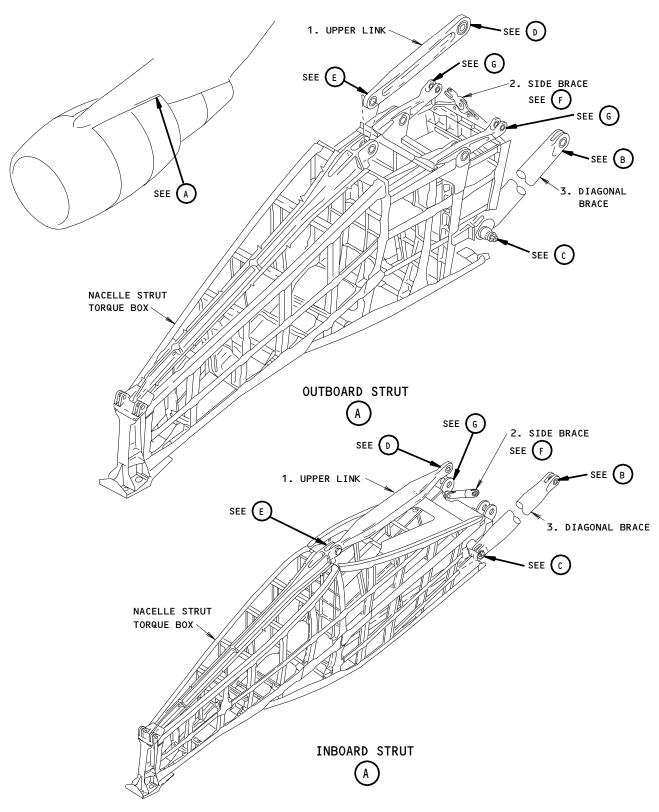
THE C-FITTINGS MUST BE CENTERED BETWEEN THE FLANGES. CAUTION: DAMAGE TO THE ENGINE CAN OCCUR IF THE C-FITTINGS ARE NOT CENTERED.

- Make sure that the C-fittings are centered between the flanges.
  - 1) Monitor the angle of the engine sling side-to-side and forward/aft during the procedure.
- Slowly increase the load until you can turn the pin/bolt that you will remove with a maximum torque of 125 pound-inches (14.3 N.m).
  - Make sure the fuse pin, caps, and bolt turn as an assembly.
    - a) If it is necessary, you can tighten the fuse pin castellated nut to a maximum torque of 200 pound-inches (22.6 N.m) so the assembly turns.
  - 2) You can make these adjustments to more accurately find the correct load:

NOTE: When the load is removed correctly, the pin/bolt that you will remove should turn easily.

- a) Adjust the individual load on each of the two chain
- Move the lifting point of the overhead crane inboard or outboard a minimum distance from the center position.
- G. Remove the Applicable Attach Pin/Bolt.



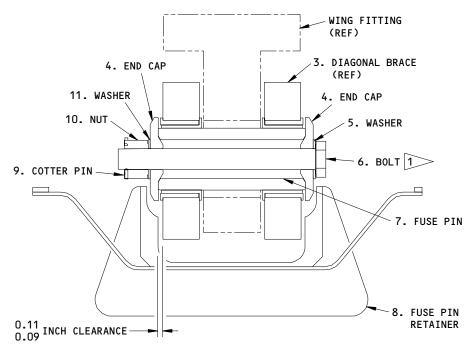


Nacelle Strut Attach Pin/Bolt - Removal/Installation Figure 402 (Sheet 1)

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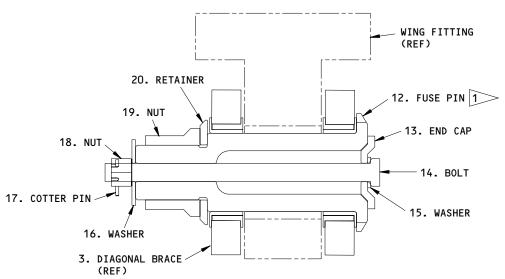
22





DIAGONAL BRACE AFT FUSE PIN
(NO. 1 OUTBOARD STRUT IS SHOWN,
NO. 4 OUTBOARD STRUT IS OPPOSITE)





DIAGONAL BRACE AFT FUSE PIN (NO. 2 INBOARD STRUT IS SHOWN, NO. 3 INBOARD STRUT IS OPPOSITE)

1 HEAD DIRECTION OPTIONAL



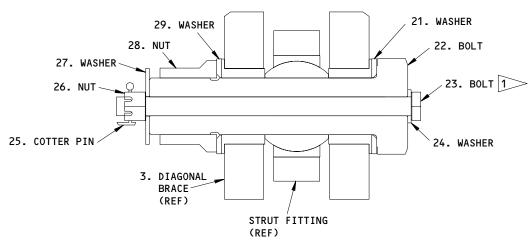
Nacelle Strut Attach Pin/Bolt - Removal/Installation Figure 402 (Sheet 2)

EFFECTIVITY— KLM 001-005, 025-034 POST-SB 54-2155 AND PRE-SB 54A2156; KLM 035 PRE-SB 54A2156

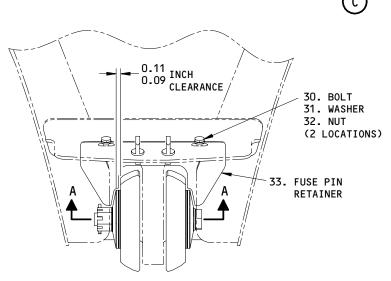
54-51-02 CONFIG 2 Page 415 Feb 18/00

22



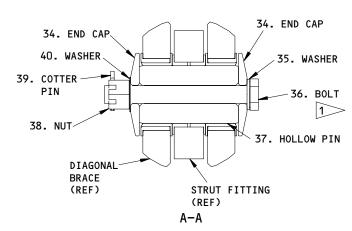


# DIAGONAL BRACE FORWARD FUSE PIN OUTBOARD STRUTS



DIAGONAL BRACE FORWARD FUSE PIN (NO. 2 INBOARD STRUT IS SHOWN, NO. 3 INBOARD STRUT IS OPPOSITE) (VIEW IN THE FORWARD DIRECTION)





22

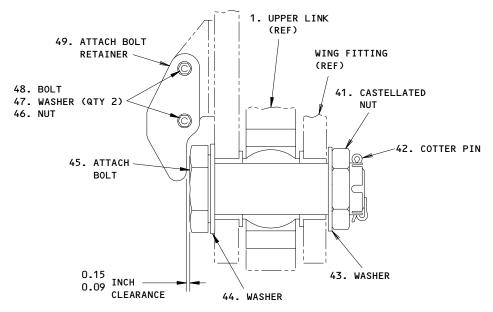
1>> HEAD DIRECTION OPTIONAL

Nacelle Strut Attach Pin/Bolt - Removal/Installation Figure 402 (Sheet 3)

EFFECTIVITY
KLM 001-005, 025-034 POST-SB 54-2155 AND
PRE-SB 54A2156;
KLM 035 PRE-SB 54A2156

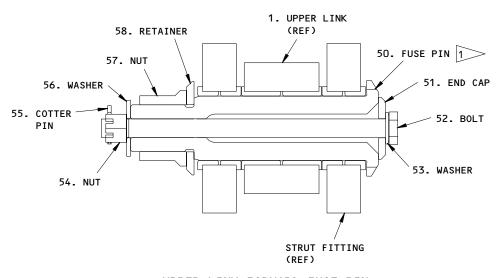
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UPPER LINK AFT ATTACH BOLT (VIEW IN THE DOWN DIRECTION) (EXAMPLE OF ALL STRUTS)





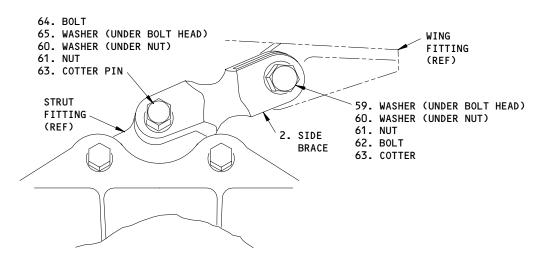
UPPER LINK FORWARD FUSE PIN (EXAMPLE OF ALL STRUTS)

1 HEAD DIRECTION OPTIONAL

Nacelle Strut Attach Pin/Bolt - Removal/Installation Figure 402 (Sheet 4)

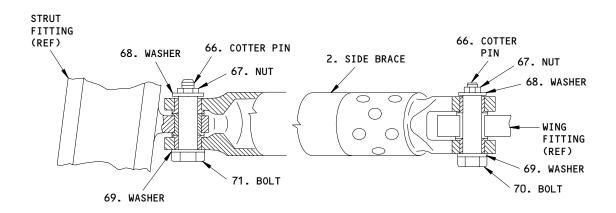
EFFECTIVITY— KLM 001-005, 025-034 POST-SB 54-2155 AND PRE-SB 54A2156; KLM 035 PRE-SB 54A2156





SIDE BRACE
(NO. 1 OUTBOARD STRUT IS SHOWN,
NO. 4 OUTBOARD STRUT IS OPPOSITE)
(VIEW IN THE FORWARD DIRECTION)





SIDE BRACE
(NO. 2 INBOARD STRUT IS SHOWN,
NO. 4 INBOARD STRUT IS OPPOSITE)

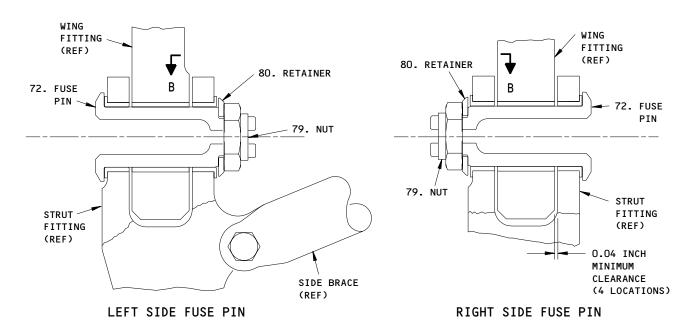


Nacelle Strut Attach Pin/Bolt - Removal/Installation Figure 402 (Sheet 5)

EFFECTIVITY— KLM 001-005, 025-034 POST-SB 54-2155 AND PRE-SB 54A2156; KLM 035 PRE-SB 54A2156 54-51-02 CONFIG 2 Page 418 Feb 18/00

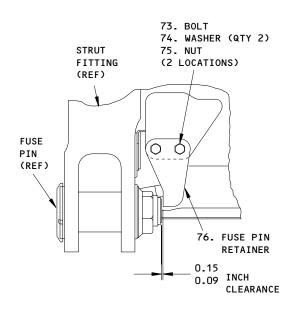
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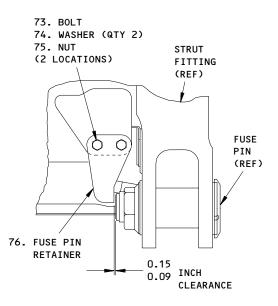




MID SPAR FUSE PIN
(NO. 2 INBOARD STRUT IS SHOWN,
NO. 3 INBOARD STRUT IS OPPOSITE)
(VIEW IN THE FORWARD DIRECTION)







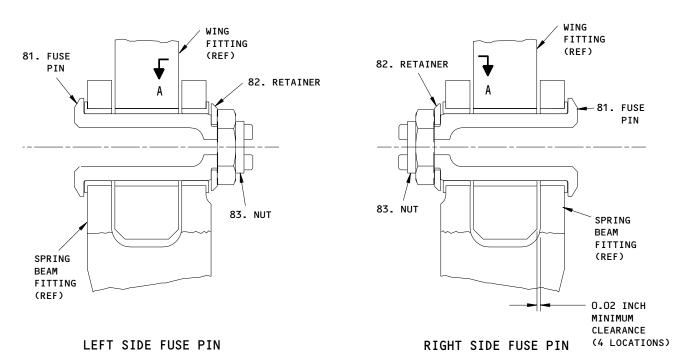
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В-В

Nacelle Strut Attach Pin/Bolt - Removal/Installation Figure 402 (Sheet 6)

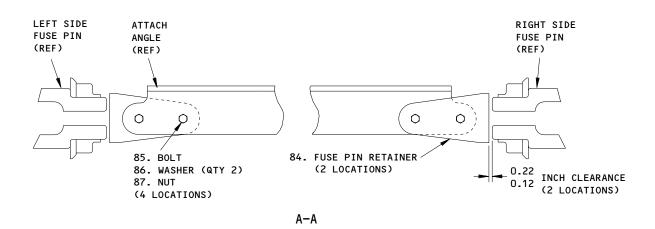
EFFECTIVITY— KLM 001-005, 025-034 POST-SB 54-2155 AND PRE-SB 54A2156; KLM 035 PRE-SB 54A2156 54-51-02 CONFIG 2 Page 419 Feb 18/00





SPRING BEAM FUSE PIN
(NO. 1 OUTBOARD STRUT IS SHOWN,
(NO. 4 OUTBOARD STRUT IS OPPOSITE)
(VIEW IN THE FORWARD DIRECTION)





Nacelle Strut Attach Pin/Bolt - Removal/Installation Figure 402 (Sheet 7)

EFFECTIVITY

KLM 001-005, 025-034 POST-SB 54-2155 AND

PRE-SB 54A2156;

KLM 035 PRE-SB 54A2156

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S 024-077-002

CAUTION: MAKE SURE YOU USE A BRASS SLUG TO PUSH OUT THE ATTACH BOLTS AND THE FUSE PINS WITH A HEAD. IF YOU DO NOT USE A BRASS SLUG, THE CLEVIS MAY NOT ALIGN WITH THE LUG AND DAMAGE TO THE BUSHINGS OR STRUCTURE CAN OCCUR.

CAUTION: ALL THE UPPER LINK AND MIDSPAR PINS/BOLTS MUST BE INSTALLED, OR DAMAGE TO THE STRUCTURE CAN OCCUR.

- (1) Remove the diagonal brace forward attach pin/bolt.
  - (a) If you remove the diagonal brace, do these steps:
    - Look for markings on the brace that identify the airplane, strut position and center to center diameter.

<u>NOTE</u>: If the brace is marked with this information, it is an optional (custom) brace.

- 2) If you remove an optional diagonal brace (custom fitted brace), this same brace or a new brace with the same center to center diameter must be installed on the strut and airplane where it was removed.
  - a) Tag the brace with the airplane number and strut location or make sure this information is marked on the brace.
- (b) INBOARD STRUTS;

Do these steps:

- 1) Remove two nuts (32), two washers (31), and two bolts (30) that attach the pin retainer (33) to strut, and remove retainer.
- 2) Remove cotter pin (39), nut (38), bolt (36), and two washers (35 and 40).
- 3) Remove two end caps (34) and hollow pin (37).
  - a) Push out the pin with a greased new pin or a greased brass slug. Make sure the clevis and the lug stay aligned.
- (c) OUTBOARD STRUTS;

Do these steps:

- Remove the two screws that attach each of the two access plate assemblies to gain access to the forward diagonal brace attach bolt.
- 2) Remove cotter pin (25), nut (26), bolt (23), and two washers (24 and 27).
- 3) Remove the nut (28), two washers (21 and 29), and attach bolt (22).
  - a) Push out the bolt with a greased brass slug. Make sure the clevis and the lug stay aligned.

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s 024-073-002

CAUTION: ALL THE UPPER LINK AND MIDSPAR PINS/BOLTS MUST BE INSTALLED, OR DAMAGE TO THE STRUCTURE CAN OCCUR.

- (2) Remove the diagonal brace aft fuse pin.
  - (a) OUTBOARD STRUTS;

Do these steps:

- 1) Remove the nuts, washers, and bolts that attach the fuse pin retainer (8) to the bracket, and remove retainer.
- 2) Remove cotter pin (9), nut (10), bolt (6), two washers (5 and 11), two end caps (4) and fuse pin (7).
  - a) Push out the pin with a greased new pin or a greased brass slug. Make sure the clevis and the lug stay aligned.
- (b) INBOARD STRUTS;

Do these steps:

- 1) Remove the cotter pin (17), nut (18), bolt (14), two washers (15 and 16) and end cap (13).
- 2) Remove the nut (19), retainer (20) and fuse pin (12).
  - a) Push out the pin with a greased brass slug. Make sure the clevis and the lug stay aligned.

s 024-074-002

<u>CAUTION</u>: ALL THE MIDSPAR AND DIAGONAL BRACE PINS/BOLTS MUST BE INSTALLED, OR DAMAGE TO THE STRUCTURE CAN OCCUR.

- (3) Remove the upper link forward fuse pin.
  - (a) Remove the cotter pin (55), nut (54), bolt (52), end cap (51) and two washers (53 and 56).
  - (b) Remove the nut (57), retainer (58) and fuse pin (50).
    - 1) Push out the pin with a greased brass slug. Make sure the clevis and the lug stay aligned.

s 024-075-002

<u>CAUTION</u>: ALL THE MIDSPAR AND DIAGONAL BRACE PINS/BOLTS MUST BE INSTALLED, OR DAMAGE TO THE STRUCTURE CAN OCCUR.

(4) Remove the upper link aft attach bolt.

<u>NOTE</u>: To make installation easier, keep the parts from this assembly together. If it is necessary, tag each component to identify the assembly location.

(a) Remove two nuts (46), four washers (47), and two bolts (48) that attach the bolt retainer (49) to strut, and remove retainer.

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- (b) Remove cotter pin (42), nut (41), two washers (43 and 44), and attach bolt (45) (use wrench set 3MIT65B90100 to remove nut from attach bolt).
  - 1) Push out the bolt with a greased brass slug. Make sure the clevis and the lug stay aligned.

s 024-076-002

CAUTION: ALL THE UPPER LINK AND DIAGONAL BRACE PINS/BOLTS MUST BE INSTALLED, AND ONLY ONE MIDSPAR FUSE PIN CAN BE REMOVED AT A TIME, OR DAMAGE TO THE STRUCTURE CAN OCCUR.

- (5) Remove the midspar (inboard) or spring beam (outboard) fuse pin.
  - (a) If the engine is removed,

Make sure that one end of the diagonal brace has been disconnected.

<u>NOTE</u>: This will remove the diagonal brace preload from the strut.

(b) If the engine is removed,

Make sure that the strut overhead sling is installed.

(c) INBOARD STRUTS;

Do these steps:

- 1) Remove the bolts (73), washers (74), nuts (75) and fuse pin retainers (76).
- 2) Remove the nut (79), retainer (80) and fuse pin (72).
  - a) Push out the pin with a greased brass slug. Make sure the clevis and the lug stay aligned.
- (d) OUTBOARD STRUTS;

Do these steps:

- 1) Remove the bolts (85), washers (86), nuts (87) and fuse pin retainers (84).
- 2) Remove the nut (83), retainer (82) and fuse pin (81).
  - a) Push out the pin with a greased brass slug. make sure the clevis and the lug stay aligned.

s 024-036-002

- (6) Remove the side brace attach bolts.
  - (a) OUTBOARD STRUTS;

Remove nut (61), bolt (64 and 62), two washers (65 or 59, and 60), and cotter pin (63) at each end.

(b) INBOARD STRUTS;

Remove nut (67), bolt (70 and 71), two washers (68 and 69), and cotter pin (66) at each end.

s 824-093-002

(7) Make sure the load on the strut is kept the same until you install the pin/bolt again.

54-51-02

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H. Remove the Overhead Crane with the Engine Installed (Optional)

<u>NOTE</u>: The overhead crane can be removed if the upper link OR diagonal brace has a fuse pin removed.

s 944-096-002

WARNING: DO NOT MOVE THE AIRPLANE IF THE FUSE PIN IS REMOVED FROM THE UPPER LINK OR DIAGONAL BRACE FITTING. THE MOVEMENT OF THE AIRPLANE MAY CAUSE DAMAGE TO THE STRUCTURE OR SYSTEMS BETWEEN THE WING AND THE STRUT.

(1) Do the procedure to Jack the Airplane (AMM 07-11-01/201).

s 214-092-002

WARNING: REMOVE ONLY ONE STRUT-TO-WING FUSE PIN AT A TIME. THE STRUT CAN MOVE SUDDENLY AND INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION: REMOVE ONLY ONE FUSE PIN/BOLT FROM THE UPPER LINK OR DIAGONAL BRACE. IF BOTH ATTACH FITTINGS ARE REMOVED, THE UPPER LINK OR DIAGONAL BRACE CAN HANG FROM ELECTRICAL BUNDLES OR HYDRAULIC LINES AND CAUSE DAMAGE TO THEM.

(2) Make sure the remaining strut to wing fittings are correctly installed.

s 024-093-002

WARNING: DO NOT USE YOUR HANDS TO REMOVE THE ALIGNMENT PIN FROM THE FITTING. THE FITTING CAN MOVE SUDDENLY AND CAUSE INJURIES TO PERSONS.

CAUTION: REMOVE THE BRASS ALIGNMENT PIN IF YOU REMOVE THE ENGINE MOUNTED STRUT HOISTING SLING. THE BRASS ALIGNMENT PIN COULD BE DAMAGED OR BE WEDGED IN PLACE IF THE ENGINE OR WING ARE ACCIDENTLY MOVED.

(3) Remove the alignment pin from the fitting.

s 934-094-002

(4) Put a strap through the lug and clevis and attach a red flag.

S 094-095-002

- (5) Remove the overhead crane and sling equipment:
  - (a) Make a note of the dynamometer loads.
  - (b) Make a note of the crane location.
  - (c) Slowly remove the load from the crane.
  - (d) Remove the overhead crane.

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### TASK 54-51-02-404-037-002

- Install the Attach Pin/Bolt
  - Special Tools and Equipment
    - (1) A54001-136 Sling Strut Unload, Pin Removal/Installation (Engine supported)
    - (2) G54004 - Overhead Mechanical Equipment, Inboard and Outboard Nacelle Strut Installation (Engine Removed)
    - (3) G54007 Sling, Diagonal Brace Preload (Engine removed)
    - (4) G54008-37 Removal/Installation Kit Fuse Pin (Includes fuse pin adapter wrenches and brass slugs)
    - (5) MIT SM311U2730 Measuring Tool Strut Modification, Diagonal Brace
    - (6) G78002-1 Hold Open Set Thrust Reverser Cowl, CF6-80C Engine
  - Standard Tools and Equipment
    - (1) Lock leading edge flap drive unit
    - (2) Lift Equipment (Engine removed)
      - (a) Crane, approved to lift 5,000 pounds
      - Dynamometer, 0-5,000 pound capacity, ±2% accuracy
    - Lift Equipment (Engine supported)
      - (a) Crane, approved to lift 20,000 pounds, with micro-positioning capabilities (recommended), or with Pull Pac Cylinder (alternative)
        - 1) Pull Pac Cylinder BRP-306, P-80 Pump, HC-941 Hose Assembly (alternative) ENERPAC, Division of Applied Power, Inc. Butler, Wisconsin
      - Dynamometer, 0-20,000 pound capacity, ± 2% accuracy (b)
        - Two dynamometers are necessary if the crane has an adjustable load limiter or if you use a precision load positioner.
        - 2) Three dynamometers are necessary if the crane does not have an adjustable load limiter and you do not use a precision load positioner.
      - (c) Precision Load Positioner, 10 ton capacity, Model D Hydra-Set (alternative)

Del Mar Engineering Laboratories, Hydra-Set Division International Airport Los Angeles, California

EFFECTIVITY-KLM 001-005, 025-034 POST-SB 54-2155 AND PRE-SB 54A2156; KLM 035 PRE-SB 54A2156

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- (d) Chain Hoist, 9,000 pound capacity (2 are necessary)
- (4) Tag Lines use for control of the engine sling
- C. Consumable Materials
  - (1) A00310 Sealant BMS 5-95 or A00247 Sealant - BMS 5-79
  - (2) A00344 Compound Corrosion Preventive, MIL-C-11796, Class 1
  - (3) A00964 Primer Fluid Resistant, BMS 10-11, type I
  - (4) CO0032 Enamel Exterior Decorative, BMS 10-60, Type I
  - (5) D00006 Lubricant Antiseize, BAC 5008, Type 7-3 (NEVER-SEEZ)
  - (6) D00294 Grease Corrosion Preventative, BMS 3-24
- D. References
  - (1) AMM 27-81-00/201, Leading Edge Flaps
  - (2) AMM 29-11-00/201, Main Hydraulic Supply System
  - (3) AMM 29-11-08/401, Air-Driven Pump Turbine Drive
  - (4) AMM 29-11-17/401, Air-Driven Pump
  - (5) AMM 29-11-19/401, AC Motor-Driven Pump
  - (6) AMM 54-62-00/201, Nacelle Strut Access Panels
  - (7) AMM 71-00-02/401, Power Plant
  - (8) AMM 71-11-04/401, Fan Cowl Panels
  - (9) AMM 78-31-00/201, Thrust Reverser System
  - (10) AMM 78-31-01/401, Thrust Reverser
  - (11) CPM Part III, 54-10-47
  - (12) OHM 54-00-01
- E. Access
  - (1) Location Zone
    - 451 Nacelle Strut 1 Forward Fairing
      - 452 Nacelle Strut 1 Torque Box
      - 454 Nacelle Strut 1 Aft Fairing
      - 521 Nacelle Strut 1 Leading Edge to Front Spar
      - 461 Nacelle Strut 2 Forward Fairing
      - 462 Nacelle Strut 2 Torque Box
      - 464 Nacelle Strut 2 Aft Fairing
      - 521 Nacelle Strut 2 Leading Edge to Front Spar
      - 471 Nacelle Strut 3 Forward Fairing
      - 472 Nacelle Strut 3 Torque Box
      - 474 Nacelle Strut 3 Aft Fairing
      - 621 Nacelle Strut 3 Leading Edge to Front Spar
      - 481 Nacelle Strut 4 Forward Fairing
      - 482 Nacelle Strut 4 Torque Box
      - 484 Nacelle Strut 4 Aft Fairing
      - 621 Nacelle Strut 4 Leading Edge to Front Spar

20.1



#### (2) Access Panel

454	Trailing Edge Fairing Door - Nacelle Strut 1
521FT	Wing Leading Edge Cover - Nacelle Strut 1
464	Trailing Edge Fairing Door - Nacelle Strut 2
511CT	Wing Leading Edge Cover - Nacelle Strut 2
474	Trailing Edge Fairing Door - Nacelle Strut 3
611CT	Wing Leading Edge Cover - Nacelle Strut 3
484	Trailing Edge Fairing Door - Nacelle Strut 4
621FT	Wing Leading Edge Cover - Nacelle Strut 4

# F. Prepare for the Installation

#### S 214-038-002

- (1) Do a check that all attach pins, bolts, caps, and washers at installation points are free from corrosion, including interior of fuse pins or hollow bolts and the inner diameter of fitting bushings.
  - (a) If corrosion exists, either replace part or remove corrosion and apply corrosion protection (CPM Part III, 54-10-47).
    - 1) Apply two coats of primer to all exposed surfaces, including ID bore, but excluding chrome plate OD, if not already primed.
    - 2) Apply a 0.05-inch (1.3 mm) thick coating of corrosion preventive compound to ID of attach pin/bolt.

### s 214-039-002

- (2) Make sure all the bushings at installation points are sealed from corrosion.
  - If bushings are not sealed, apply sealant to bushings (Ref 51-31-01/201).
    - 1) Apply fillet seal to flange end of all bushings.
    - 2) Brush coat seal (maximum thickness 0.010 inch) to entire periphery of all (except upper link wing fitting and diagonal brace wing fitting) unflanged bushing ends exposed to mating surface of parent part.

No seal is required for bushing end not exposed to mating surface of parent part. Corrosion prevention in this area is covered by application of grease during pins or bolts installation.

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3) Apply fillet seal to entire periphery of unflanged bushing end at diagonal brace wing fitting.

### s 214-096-002

- (3) Do a check to make sure you have the correct part number fuse pin(s).
- G. Install the applicable attach pin/bolt

# s 424-102-002

- (1) Install the midspar (inboard) or spring beam (outboard) fuse pins (two locations on each strut).
  - (a) INBOARD STRUTS;

Do the steps that follow:

- 1) Apply a thin layer of grease (BMS 3-24) to the fuse pin (72).
- 2) Apply antiseize compound (Never-seez or equivalent) to the threads of the self-locking nut (79).
- 3) Push out the slug with a greased fuse pin (72). Make sure the clevis and lug stay aligned.
  - a) Make sure the head of the fuse pin (72) is located on the outside of the strut.
- 4) Install the retainer (80) and nut (79) on the threaded end of the fuse pin (72).
- 5) Do a check of the self-locking torque of the nut (79).
  - a) If the self-locking torque is not 195-1250 pound-inches (22.2-142.5 N.m), replace the nut and do the check again.

NOTE: The torque wrench must be installed on the nut and not the head of the bolt.

- 6) Tighten the nut (79) to 1600-1900 pound-inches (182.4-216.6 N.m).
  - a) Do a check to make sure that the torque value is correct.



- 7) Make sure the joint is not clamped.
  - a) A minimum gap of 0.010 inch (0.255 mm) is required in the joint.

NOTE: The gap may be located between the retainer (80) and the bushing flange of the strut fitting and/or the head of the fuse pin (72) and the bushing flange of the strut fitting.

- 8) Inject grease (BMS 3-24) into grease fitting, if installed, until grease appears around edge of pin. Remove excess grease from around pin.
- 9) Install the fuse pin retainers (76) (two locations) with the bolts (73), washers (74) and nuts (75).
  - a) Make sure the clearance between the retainers and the fuse pins is as shown on the illustration.
- (b) OUTBOARD STRUTS;

Do the steps that follow:

- 1) Apply a thin layer of grease (BMS 3-24) to the fuse pin (81).
- 2) Apply antiseize compound (Never-seez or equivalent) to the threads of the self-locking nut (83).
- 3) Push out the slug with a greased fuse pin (81). Make sure the clevis and lug stay aligned.
  - a) Make sure the head of the fuse pin (81) is located on the outside of the strut.
- 4) Install the retainer (82) and nut (83) on the threaded end of the fuse pin (81).
- 5) Do a check of the self-locking torque of the nut (83).
  - a) If the self-locking torque is not 195-1250 pound-inches (22.2-142.5 N.m), replace the nut and do the check again.

NOTE: The torque wrench must be installed on the nut and not the head of the bolt.

- 6) Tighten the nut (83) to 1600-1900 pound-inches (182.4-216.6 N.m).
  - a) Do a check to make sure that the torque value is correct.
- 7) Make sure the joint is not clamped.
  - a) A minimum gap of 0.010 inch (0.255 mm) is required in the joint.

NOTE: The gap may be located between the retainer (82) and the bushing flange of the strut fitting and/or the head of the fuse pin (81) and the bushing flange of the strut fitting.

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8) Inject grease (BMS 3-24) into grease fitting, if installed, until grease appears around edge of pin. Remove excess grease from around pin.

CAUTION: MAKE SURE YOU INSTALL THE FUSE PIN RETAINER ON THE CORRECT SIDE OF THE ATTACH ANGLE, OR DAMAGE TO THE HYDRAULIC LINES CAN OCCUR.

- 9) Install the fuse pin retainers (84) (two locations) to the attach angle with the bolts (85), washers (86) and nuts (87).
  - a) Make sure the clearance between the retainers and the fuse pins is as shown on the illustration.
- (c) Do a check for clearance between the springbeam pin nut/washer and the EDP hydraulic supply tube.
  - 1) INBOARD STRUTS;

The clearance must be 0.15 inch or greater between the EDP hydraulic supply tube and the nearest part of the nut or washer.

2) OUTBOARD STRUTS;

The clearance must be 0.25 inch or greater between the EDP hydraulic supply tube and the nearest part of the nut or washer.

- 3) If clearance minimums cannot be met:
  - a) Depressurize the hydraulic reservoir (AMM 29-11-00)
  - b) Install/splice a new hydraulic tube (AMM 20-11-05)
  - c) Repressurize the hydraulic reservoir (AMM 29-11-00 or operator equivalent)
  - d) Do the EDP test (AMM 29-11-05 or operator's equivalent).
- (d) If the engine is removed,

Install the diagonal brace fuse pin/bolt that was removed.

- Slowly release the load on the overhead sling and remove the sling.
- 2) Use the tool placard to install the diagonal brace preload sling.
- Do the procedure to install the diagonal brace pin/bolt that was removed.

#### s 434-041-002

- (2) Install the upper link aft attach bolt.
  - (a) If you install different parts than you removed, do this check to find the correct number of adjustment washers:

NOTE: This check will help you align the slot in the nut with the hole in the bolt for installation of the cotter pin. Do this check without sealant. This check is optional if you install the same parts that you removed.

- 1) Hold the head of the bolt (45).
- 2) Put the washer (43) on the bolt.

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- 3) Make sure the washer aligns correctly on the bolt.
- 4) Install the nut (41) and tighten it to 1600-1900 pound-inches (182.4-216.6 N.m.)
- Make sure the slot in the nut aligns with the hole in the bolt.
- 6) If the slot in the nut does not align with the hole in the bolt, do the assembly again and use adjustment washers.

NOTE: You can use a maximum of three adjustment washers between the nut (41) and the washer (43) to align the hole for the cotter pin. It cab be necessary to use a different nut.

- 7) Disassemble the nut, washers and bolt.
- 8) Keep the nut, washers and bolt together.
- (b) Apply thin film of grease (BMS 3-24) to the bolt (45).
- (c) If a brass slug was used to push out the bolt, do this step when you install the bolt in the aft attach point of the upper link:
  - 1) Push out the slug with a greased bolt. Make sure the clevis and lug stay aligned.
- (d) Install attach bolt (45) and two washers (43 and 44).
  - Make sure the bolt head is located on the outboard side of the strut.
  - 2) Apply fay surface sealant (BMS 5-95) between the washer (43) and the shoulder of the bolt (45), and between the washer (44) and the head of the bolt (45).
- (e) Install the nut (41) with your hand.
  - 1) Make sure the washer (44) is correctly seated against the bolt (45), and the nut (41) is correctly seated against the washer (43).
- (f) Tighten the nut to 1600-1900 pound-inches (182.4-216.6 N.m).
  - 1) Tighten the nut again after the sealant squeezes out.
  - 2) Do a check to make sure the torque value is correct.
  - 3) Make sure the notch in the nut for ther cotter pin is aligned with the hole in the bolt.
  - 4) You can install a maximum of three washers under the nut to align the hole for the cotter pin.
- (g) Install the cotter pin (42).

NOTE: If you cannot install the cotter pin and you did the check to find the correct number of adjustment washers, reduce the torque a minimum amount (Min. 600 pound-inches) until the pin can be inserted.

1) Apply sealant (BMS 5-79) approximately 0.10 inch (2.54 mm) thick, to both ends of the cotter pin (42) to prevent cotter pin movement.

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- (h) Make sure the joint is not clamped.
  - 1) A minimum gap of 0.010 inch (0.255 mm) is required in the joint.

NOTE: The gap may be located between the washer (43) and the wing fitting and/or the washer (44) and the wing fitting.

- (i) Install attach bolt retainer (49).
  - 1) Put the attach bolt retainer (49) on the bracket.
  - 2) Install the retainer (49) to the bracket with the two bolts (48), four washers (47), and two nuts (46).
    - a) Make sure the clearance between the retainer and the bolt head is as shown on the illustration.

### s 434-042-002

- (3) Install the upper link forward fuse pin.
  - (a) Apply a thin coat of grease (BMS 3-24) to the fuse pin (50).
    - 1) Apply antiseize compound (Never-seez or equivalent) to the threads of the self-locking nut (57).
  - (b) Push out the slug with a greased fuse pin (50). Make sure the clevis and lug stay aligned.
    - 1) INBOARD STRUTS; Make sure the head of the fuse pin is on the inboard side of the strut.
  - (c) Install the retainer (58) and the nut (57) to the threaded end of the fuse pin (50).
  - (d) Do a check of the self-locking torque of the nut (57).
    - 1) If the self-locking torque is not 143-1000 pound-inches (16.3-114.0 N.m), replace the nut and do the check again.

<u>NOTE</u>: The torque wrench must be installed on the nut and not the head of the bolt.

- (e) Tighten the nut (57) to 1300-1500 pound-inches (148.2-171 N.m).

  1) Do a check to make sure that the torque value is correct.
- (f) Install the end cap and two washers (53 and 56) with the bolt (52).
- (g) Install the nut (41) on the bolt (52) and tighten with your hand.
  - 1) Make sure the washer (56) is correctly seated on the shoulder of the bolt (52) and the nut (54) is correctly seated on the washer (56).
- (h) Install cotter pin (55).
  - 1) Tighten the nut (54) to 50-200 pound-inches.
    - a) Make sure the notch in the nut for the cotter pin is aligned with the hole in the bolt.

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- b) You can install a maximum of three washers under the nut to align the hole for the cotter pin.
- 2) Apply sealant (BMS5-79), approximately 0.10 inch (2.54 mm) thick, to both ends of the cotter pin (55) to prevent cotter pin movement.
- (i) Make sure the joint is not clamped.
  - 1) A minimum gap of 0.010 inch (0.255 mm) is required in the joint.

NOTE: The gap may be located between the head of the fuse pin (50) and the bushing flange of the wing fitting and/or the retainer (58) and the bushing flange of the wing fitting.

(j) Inject grease (BMS 3-24) into grease fitting, if installed, until grease appears around edge of pin. Remove excess grease from around pin.

#### s 424-043-002

- (4) Install the side brace attach bolts
  - (a) Apply thin coat of grease (BMS 3-24) to bolts (62 and 64, or 70 and 71) and install bolts.
    - OUTBOARD STRUTS;
       Make sure the clearance, between the spring beam fittings and wing attach fittings (4 locations), is as shown on the illustration (after side brace bolts (62 and 64) are installed).
    - 2) INBOARD STRUTS; Make sure the clearance, between the midspar fittings and wing attach fittings (4 locations), is as shown on the illustration (after side brace bolts (70 and 71) are installed).
    - 3) OUTBOARD STRUTS;

Install the washers (59 and 60) and the nuts (61) and tighten the nuts with your hand.

- a) Make sure the washer (59) is correctly seated on bolt (62 and 64) and nut (61) is correctly seated on washer (68).
- 4) INBOARD STRUTS;

Install washers (68 or 69) and nuts (67), and tighten the nuts with your hand.

- a) Make sure the washer (69) is correctly seated on bolt (70) and nut (67) is correctly seated on washer (68).
- (b) Install cotter pin (63 or 66).
  - Tighten nut (61 or 67) to a maximum of 200 pound-inches (22.8 N.m), to align the hole for the cotter pin (63 or 66).
  - 2) Apply sealant (BMS 5-79), approximately 0.10 inch (2.54 mm) thick to both ends of cotter pin (63 or 66) to prevent cotter pin movement.

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- (c) Make sure the joint is not clamped.
  - 1) The gap tolerances are 0.001 to 0.040 inches. The nut and washer under the nut should rest on the shoulder of the bolt.

NOTE: One AN9601216L washer may be added to the head end of the bolt between the side brace and the existing countersink washer to meet gap requirements.

S 424-044-002

- (5) Install the diagonal brace aft fuse pin.
  - (a) If the diagonal brace assembly was removed and you do not install a new diagonal brace, make sure you install the same diagonal brace assembly that was removed from this airplane and location.
    - 1) Look for a tag or markings on the brace that identify the airplane, strut position and center-to-center distance.

NOTE: If the brace is tagged or marked with this information, it is an optional (custom) brace.

- (b) If you install a new diagonal brace, do these steps:
  - 1) You have the option to apply an upload or download of 1500 pounds before you determine the required distance between pin centers.
  - 2) Use the MIT SM311U2730 measuring tool to determine the required distance between pin centers, from wing fitting to the strut lower spar fitting.
  - 3) Install the bushing at the required location (OHM 54-00-01).
  - 4) Tag the brace with the bore center-to-center distance, basic airplane number, and strut location, or make sure this data is marked on the brace. Apply a clear enamel overcoat over the tag dats.
- (c) OUTBOARD STRUTS;

Do the steps that follow:

- Apply thin layer of grease (BMS3-24) to the exterior of the fuse pin (7).
- 2) If a brass slug was used to push out the fuse pin, do this step when you install each fuse pin in the aft attach point of the diagonal brace:
  - a) Push out the slug with a new greased fuse pin. Make sure the clevis and lug stay aligned.
- 3) Install the fuse pin (7), two end caps (4), two washers (5 and 11), and bolt (6).
  - a) The direction of the bolt head (6) is optional.



- 4) Install the nut (10), tighten to 125-500 pound-inches (14.3-57.0 N.m), and install the cotter pin (9).
  - a) Make sure the end caps (4) are correctly seated against the fuse pin (7).
  - You can install a maximum of three washers under the nut to align the hole for the cotter pin.
  - Apply sealant (BMS 5-79), approximately 0.10 inch (2.54mm) thick to both ends of cotter pin (9) to prevent cotter pin movement.
- 5) Make sure the joint is not clamped.
  - a) A minimum gap of 0.010 inch (0.255 mm) is required in the joint.

NOTE: The gap may be located between either of the end caps (4) and the applicable bushing flange of the diagonal brace (3).

- Inject grease (BMS 3-24) into grease fitting, if installed, until grease appears around edge of pin. Remove excess grease from around pin.
- 7) Install the retainer (8) to the bracket with the nuts, washers and bolts.
  - a) Make sure the clearance between the side of the diagonal brace and the retainer is as shown on the illustration.
- INBOARD STRUTS;

Do the steps that follow:

- Apply a thin layer of grease (BMS3-24) to the fuse pin
- Apply antiseize compound (Never-seez or equivalent) to the threads of the self-locking nut (19).
- 3) Push out the slug with a greased fuse pin (12). Make sure the clevis and lug stay aligned.
  - a) The direction of the head of the fuse pin (12) is optional.
- 4) Install the retainer (20) and nut (19) on the threaded end of the fuse pin (12).
- 5) Do a check of the self-locking torque of the nut (19).
  - If the self-locking torque is not 195-1250 pound-inches (22.2-142.5 N.m), replace the nut.

The torque wrench must be installed on the nut NOTE: and not the head of the bolt.

- 6) Tighten the nut (19) to 1600-1900 pound-inches (182.4-216.6 N.m).
  - a) Do a check to make sure that the torque value is correct.

EFFECTIVITY-KLM 001-005, 025-034 POST-SB 54-2155 AND PRE-SB 54A2156; KLM 035 PRE-SB 54A2156

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- Install the end cap (13) and two washers (15 and 16) with the bolt (14).
- Install the nut (18) and tighten with your hand.
  - a) Make sure the washer (16) is correctly seated on the shoulder of the bolt (44) and the nut (18) is correctly seated on the washer (16).
- Install the cotter pin (17).
  - a) Tighten the nut (18) to 50-200 pound-inches.
  - b) Make sure the notch in the nut for the cotter pin is aligned with the hole in the bolt.
  - c) You can install a maximum of three washers under the nut to align the hole for the cotter pin.
  - d) Apply sealant (BMS5-79), approximately 0.10 inch (2.54 mm) thick, to both ends of the cotter pin (17) to prevent cotter pin movement.
- 10) Make sure the joint is not clamped.
  - a) A minimum gap of 0.010 inch (0.255 mm) is required in the joint.

The gap may be located between the head of NOTE: the fuse pin (12) and the bushing flange of the diagonal brace and/or the retainer (20) and the bushing flange of the diagonal brace.

11) Inject grease (BMS3-24) into grease fitting, if installed, until grease appears around edge of pin. Remove excess grease from around pin.

### S 424-045-002

- Install the diagonal brace forward attach bolt (On outboard struts). (6)
  - Apply a thin coat of grease (BMS 3-24) to the bolt (22).
    - 1) Apply antiseize compound (Never-seez or equivalent) to the threads of the self-locking nut (19).
    - Install the washer (21) on the bolt (22).
      - Apply fay surface sealant (BMS 5-95) between the washer (21) and the bolt head (22).
  - Push out the slug with the bolt (22). Make sure the clevis and lug stay aligned.
    - 1) The direction of the head of the bolt is optional.
  - Install the washer (29) and the nut (28) to the threaded end of the bolt (22).
    - Apply fay surface sealant (BMS 5-95) between the washer (29) and the shoulder of the bolt (22).
  - Do a check of the self-locking torque of the nut (28).
    - If the self-locking torque is not 195-1250 pound-inches (22.2-142.5 N.m), replace the nut and do the check again.

NOTE: The torque wrench must be installed on the nut and not the head of the bolt.

EFFECTIVITY-KLM 001-005, 025-034 POST-SB 54-2155 AND PRE-SB 54A2156; KLM 035 PRE-SB 54A2156

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- (e) Tighten the nut (57) to 1600-1900 pound-inches (182.4-216.6 N.m).
- AIRPLANES POST-747-SB 54-2181; Tighten the nut (57) to 2100 to 2400 pound-inches (237.27 to 271.16 Nm).
  - 1) Do a check to make sure that the torque value is correct.
  - 2) Apply torque stripe on the fuse pin primary nut and fuse pin threads with torque seal marking lacquer per operator's standard shop procedures.
- Install the two washers (24 and 27) with the bolt (23).
  - 1) Apply fay surface sealant (BMS5-95) between the washer (27) and the bolt (22).
- (h) Install nut (26) on the bolt (23) and tighten with your hand.
  - 1) Make sure the washer (27) is correctly seated on the shoulder of the bolt (22) and the nut (26) is correctly seated on the washer (27).
- (i) Install cotter pin (25).
  - You can tighten the nut (26) to 200 pound-inches (22.8 N.m) maximum to align the hole for the cotter pin (25).
    - Tighten the nut again after the sealant comes out.
    - You can install a maximum of two washers under the nut to align the hole for the cotter pin.
    - Apply sealant (BMS5-79), approximately 0.10 inch (2.54 mm) thick, to both ends of the cotter pin (25) to prevent cotter pin movement.
- (j) Inject grease (BMS 3-24) into grease fitting, if installed, until grease appears around edge of pin. Remove excess grease from around pin.
- Install each of the two access plate assemblies with the two screws.

### s 424-046-002

- Install the diagonal brace forward hollow pin (On inboard struts).
  - (a) Apply a thin coat of grease (BMS3-24) to the pin (37).
  - (b) If a brass slug (instead of a new pin) was used to push out the pin, do this step when you install the pin in the forward attach point of the diagonal brace:
    - 1) Push out the slug with a greased pin. Make sure the clevis and lug stay aligned.
  - (c) Install the hollow pin (37), two end caps (34), two washers (35) and 34) and the bolt (36).
    - 1) The direction of the head of the bolt is optional.



- 2) Apply fay surface sealant (BMS5-95) between the end caps (34) and the hollow pin (37).
- (d) Install the nut (38), tighten to 125-500 pound-inches (14.3-57.0 N.m), and install the cotter pin (39).
  - 1) Make sure the end caps (34) are correctly seated against the hollow pin (37).
  - 2) Tighten the nut again after the sealant comes out.
  - 3) You can install a maximum of two washers under the nut to align the hole for the cotter pin.
  - 4) Apply sealant (BMS 5-79), approximately 0.10 inch (2.54 mm) thick, to both ends of the cotter pin (39) to prevent cotter pin movement.
- (e) Make sure the joint is not clamped.
  - 1) A minimum gap of 0.010 inch (0.255 mm) is required in the joint.

NOTE: The gap may be located between either of the two end caps (34) and the applicable bushing flange of the diagonal brace.

- (f) Install the retainer (33) to the bracket with the bolts (30), washers (31) and nuts (32).
  - 1) Make sure the clearance between the sides of the diagonal brace and the retainer is as shown on the illustration.
- (g) Inject grease (BMS 3-24) into grease fitting, if installed, until grease appears around edge of pin. Remove excess grease from around pin.
- (h) Examine the clamps on the diagonal brace that route electrical conduits and pneumatic duct.
  - 1) Make sure that the extended bolt threads will not touch the trailing edge door when it closes.
    - Set the clamp so that the extended bolt threads are not on the side of the diagonal brace (horizontal position).
    - b) Turn the clamp if necessary, to get more clearance with the door when it closes.

s 224-048-002

(8) OUTBOARD STRUTS (IF ENGINE IS REMOVED);
Do the procedure for the rotational torque of the bolt of the spring beam bearing (AMM 54-51-03/601).

S 214-090-002

- (9) Do a check to make sure that the fuse pin/bolts and the applicable secondary retention devices are installed correctly.
  - (a) Make sure that the midspar (spring beam) fuse pins are installed correctly.
    - Make sure that the secondary retention devices are installed.

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- (b) Make sure that the upper link fuse pin and attach bolt are installed correctly.
  - 1) Make sure that the secondary retention device is installed at the aft attach bolt.
- (c) Make sure that the side brace attach bolts are installed correctly.
- (d) Make sure that the diagonal brace fuse pins are installed correctly.
  - Make sure that the secondary retention devices are installed at the aft fuse pin and the forward inboard fuse pin.
  - 2) Make sure the clevis and lug stay aligned.

<u>NOTE</u>: On inboard struts, make sure the fuse pin head faces inboard.

H. Restore the Airplane to Normal (Engine removed)

S 094-085-002

CAUTION: DO NOT REMOVE SLING SUPPORT UNTIL THE WORKSTANDS ARE CLEAR. IF YOU DO NOT MOVE THE WORK STANDS, DAMAGE TO THE STRUT, WING STRUCTURE OR STANDS CAN OCCUR.

- (1) Make sure the workstands are clear of the airplane, and slowly remove the load from the sling.
  - (a) Remove the sling from the strut and return the sling to storage.

s 434-052-002

(2) OUTBOARD STRUTS; Install air-driven pump turbine drive (AMM 29-11-08/401) aft of torque bulkhead, if removed.

s 434-053-002

(3) OUTBOARD STRUTS; Install air-driven pump (AMM 29-11-17/401) aft of torque bulkhead, if removed.

EFFECTIVITY KLM 001-005, 025-034 POST-SB 54-2155 AND PRE-SB 54A2156; KLM 035 PRE-SB 54A2156

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s 434-054-002

(4) INBOARD STRUTS;

Install AC motor-driven pump (AMM 29-11-19/401) aft of torque bulkhead, if removed.

s 414-055-002

(5) Do the procedure to install the engine (Ref 71-00-02/401).

s 414-080-002

(6) Do the procedure to install the thrust reverser (AMM 78-31-01/401).

s 864-056-002

(7) Do a check that applicable engine fuel and hydraulic fluid shutoff valves are open and that electrical plugs are connected to valves.

s 864-057-002

(8) Do a check that hydraulic system No. 1, 2, 3, or 4, as applicable for engine being installed, is pressurized (Ref 29-11-00/201).

s 864-058-002

(9) Do a check that the external electrical power is disconnected and that grounding is removed.

S 434-086-002

(10) INBOARD STRUTS;

Install the right and left forward wedge assemblies of the fixed aft fairing, if necessary.

- (a) On each side, install the thrity four fasteners that attach the fairing assembly to the skate angle.
- (b) On each side, install twenty six fasteners that attach the fairing assembly to the forward web assembly.
- (c) On each side, install the two fasteners that attach the secondary retainer to the fairing.

s 214-062-002

<u>CAUTION</u>: TOOLS, LOOSE MATERIAL, AND DEBRIS IN STRUT CAVITIES MAY BLOCK DRAINS, RENDERING DRAIN SYSTEM INEFFECTIVE.

(11) Check that tools and loose material are removed and strut cavities are free of debris before installing access doors.

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s 414-065-002

(12) Install all access panels, and close trailing edge fairing doors (Ref 54-62-00/201).

S 094-066-002

WARNING: LEADING EDGE FLAPS ARE FAST ACTING AND CAN CAUSE SERIOUS INJURY

TO PERSONNEL.

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP

CONTROL LEVER.

(13) Remove leading edge flap drive unit lock (Ref 27-81-00 MP).

I. Restore the Airplane to Normal (Engine Supported)

S 094-067-002

CAUTION: DO NOT REMOVE SLING SUPPORT UNTIL THE WORKSTANDS ARE CLEAR.

IF YOU DO NOT MOVE THE WORK STANDS, DAMAGE TO THE ENGINE,

STRUT, WING STRUCTURE OR STANDS CAN OCCUR.

- (1) Make sure the workstands are clear of the airplane, and slowly remove the load from the sling.
  - (a) Remove the sling from the engine and return the sling to storage.

s 434-065-002

(2) OUTBOARD STRUTS;

Install air-driven pump turbine drive (AMM 29-11-08/401) aft of torque bulkhead, if removed.

s 434-066-002

(3) OUTBOARD STRUTS;

Install air-driven pump (AMM 29-11-17/401) aft of torque bulkhead, if removed.

EFFECTIVITY KLM 001-005, 025-034 POST-SB 54-2155 AND PRE-SB 54A2156; KLM 035 PRE-SB 54A2156

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17.101

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s 434-067-002

(4) INBOARD STRUTS;

Install AC motor-driven pump (AMM 29-11-19/401) aft of torque bulkhead, if removed.

S 864-066-002

(5) Open hydraulic supply shutoff valve.

s 864-067-002

(6) Open fuel shutoff valve.

s 864-070-002

(7) Remove DO-NOT-OPERATE identifiers from FUEL CONTROL switches.

s 414-071-002

(8) Install the forward fairing.

s 414-085-002

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(9) Remove the G78002-1 hold open set and close the thrust reversers (AMM 78-31-00/201).

s 434-068-002

(10) Install the fan cowl panels (Ref 71-11-04/401).

s 414-069-002

(11) INBOARD STRUTS;

Install the right and left forward wedge assemblies of the fixed aft fairing, if necessary.

(a) On each side, install the thrity four fasteners that attach the fairing assembly to the skate angle.

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- (b) On each side, install twenty six fasteners that attach the fairing assembly to the forward web assembly.
- (c) On each side, install the two fasteners that attach the secondary retainer to the fairing.

s 214-072-002

CAUTION: TOOLS, LOOSE MATERIAL, AND DEBRIS IN STRUT CAVITIES MAY BLOCK DRAINS, RENDERING DRAIN SYSTEM INEFFECTIVE.

(12) Check that tools and loose material are removed and strut cavities are free of debris before installing access doors.

s 414-075-002

(13) Install all access panels, and close trailing edge fairing doors (Ref 54-62-00/201).

s 094-076-002

<u>WARNING</u>: LEADING EDGE FLAPS ARE FAST ACTING AND CAN CAUSE SERIOUS INJURY TO PERSONNEL.

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER.

(14) Remove leading edge flap drive unit lock (Ref 27-81-00 MP).

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# NACELLE STRUT ATTACH PIN/BOLT - REMOVAL/INSTALLATION

## 1. General

- A. This procedure provides instructions for removal/installation of all strut attach pin/bolts with the engine removed or installed. If a mid spar/spring beam pin is to be removed, both upper link pins/bolts and both diagonal brace pins/bolts must be installed. Only one midspar/spring beam pin is to be removed at a time. Both upper link pins/bolts or both diagonal brace pins/bolts may be removed simultaneously but only one link should be free at any one time, unless nacelle strut is to be removed.
- B. Removal of attach pin/bolts consists of obtaining access, unloading pin/bolt to be removed, and removing pin/bolt. A brass slug should be used to push out the pin/bolt so the clevis and lugs remain aligned. Installation of attach pin/bolts consists of checking attach pins/bolts for corrosion, installing attach pin/bolt, and testing strut systems.
  - (1) The diagonal brace or upper link may be removed or replaced using this procedure by removing both forward and aft attach pins/bolts of the applicable link. Any cables or tubes clamped to the applicable link must be disconnected and installed again.

<u>CAUTION</u>: USE EXTREME CARE WHEN HANDLING ENGINE AND STRUT BECAUSE OF WEIGHT INVOLVED.

- C. Care must be used to avoid the application of excessive lifting forces. A load cell must be used in the hoisting arrangement unless the crane incorporates an adjustable load limiter.
- D. Observe the following precautions while performing attach pin/bolt removal/installation:

WARNING: KEEP ELECTRICAL POWER OFF DURING DISCONNECTION OR CONNECTION OF FUEL, HYDRAULIC, AND ELECTRICAL LINES TO PREVENT INJURY TO PERSONNEL THAT COULD RESULT FROM ACCIDENTAL APPLICATION OF PRESSURIZED FLUIDS, ENERGIZING OF ELECTRICAL CIRCUITS, OR FIRE.

- (1) Electrical power must not be on during the time the fuel, hydraulic, and electrical lines are being disconnected from or connected to the strut.
- (2) During power plant removal or installation, all openings must be blanked off with approved caps. During power plant removal, all tube ends, ducts and electrical connectors must be capped as soon as possible after disconnection. During power plant installation, the caps must not be removed until connections are to be made. External caps must be used, not internal plugs.

54-51-02



### TASK 54-51-02-004-001-003

# 2. Remove the Attach Pin/Bolt

### A. General

WARNING: DO NOT REMOVE THE UPPER LINK AND THE DIAGONAL BRACE AT THE SAME TIME, UNLESS YOU WILL REMOVE THE STRUT. IF YOU REMOVE THE UPPER LINK AND THE DIAGONAL BRACE AT THE SAME TIME THE STRUT CAN MOVE DOWN AND CAUSE INJURY TO PERSONS AND DAMAGE TO THE STRUCTURE.

- (1) Obey this warning during all of this task.
- B. Special Tools and Equipment
  - (1) A54001-136 Sling Strut Unload, Pin Removal/Installation (Engine Supported)
  - (2) G54004 Overhead Mechanical Equipment, Inboard and Outboard Nacelle Strut Installation (Engine Removed; required if the midspar fuse pin is to be removed).
  - (3) G54007 Sling Diagonal Brace Preload (Engine Removed)
  - (4) G54008-37 Removal/Installation Kit Fuse Pin (Includes fuse pin adapter wrenches and brass slugs)
  - (5) G54014 Adaptor, Spring Beam Pivot Bplt
  - (6) G78002-1 Hold Open Set Thrust Reverser Cowl, CF6-80C Engine
- C. Standard Tools and Equipment
  - (1) Lock leading edge flap drive unit
  - (2) Lift Equipment (Engine removed)
    - (a) Crane, approved to lift 5,000 pounds
    - (b) Dynamometer, 0-5,000 lb capacity,  $\pm 2\%$  accuracy
  - (3) Lift Equipment (Engine supported)
    - (a) Crane, approved to lift 20,000 pounds, with micro-positioning capabilities (recommended), or with Pull Pac Cylinder (alternative)
      - Pull Pac Cylinder BRP-306, P-80 Pump, HC-941 Hose Assembly (alternative)
         ENERPAC, Division of Applied Power, Inc. Butler, Wisconsin
    - (b) Dynamometer, 0-20,000 pound capacity, ± 2% accuracy
      - Two dynamometers are necessary if the crane has an adjustable load limiter or if you use a precision load positioner.
      - 2) Three dynamometers are necessary if the crane does not have an adjustable load limiter and you do not use a precision load positioner.
    - (c) Precision Load Positioner, 10 ton capacity, Model D Hydra-Set (alternative)

Del Mar Engineering Laboratories, Hydra-Set Division International Airport Los Angeles, California

- (d) Chain Hoist, 9,000 pound capacity (2 are necessary)
- (4) Tag Lines use for control of the engine sling

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- D. References
  - (1) AMM 07-11-01/201, Jacking Airplane
  - (2) AMM 20-11-05/401, Flareless Tubing
  - (3) AMM 27-81-00/201, Leading Edge Flaps
  - (4) AMM 29-11-00/201, Main Hydraulic Supply System
  - (5) AMM 29-11-08/401, Air-Driven Pump Turbine Drive
  - (6) AMM 29-11-17/401, Air-Driven Pump
  - (7) AMM 29-11-19/401, AC Motor-Driven Pump
  - (8) AMM 54-62-00/201, Nacelle Strut Acces Panels
  - (9) AMM 71-00-02/401, Power Plant
  - (10) AMM 71-11-04/401, Fan Cowl Panels
  - (11) AMM 78-31-00/201, Thrust Reverser System
  - (12) AMM 78-31-01/401, Thrust Reverser
- E. Access
  - (1) Location Zone

```
Nacelle Strut 1 - Forward Fairing
451
452
        Nacelle Strut 1 - Torque Box
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- 454 Nacelle Strut 1 - Aft Fairing
- 521 Nacelle Strut 1 - Leading Edge to Front Spar
- 461 Nacelle Strut 2 - Forward Fairing
- 462 Nacelle Strut 2 - Torque Box
- Nacelle Strut 2 Aft Fairing 464
- 521 Nacelle Strut 2 - Leading Edge to Front Spar
- 471 Nacelle Strut 3 - Forward Fairing
- 472 Nacelle Strut 3 - Torque Box
- 474 Nacelle Strut 3 - Aft Fairing
- Nacelle Strut 3 Leading Edge to Front Spar 621
- 481 Nacelle Strut 4 - Forward Fairing
- Nacelle Strut 4 Torque Box 482
- 484 Nacelle Strut 4 - Aft Fairing
- 621 Nacelle Strut 4 - Leading Edge to Front Spar
- (2) Access Panel

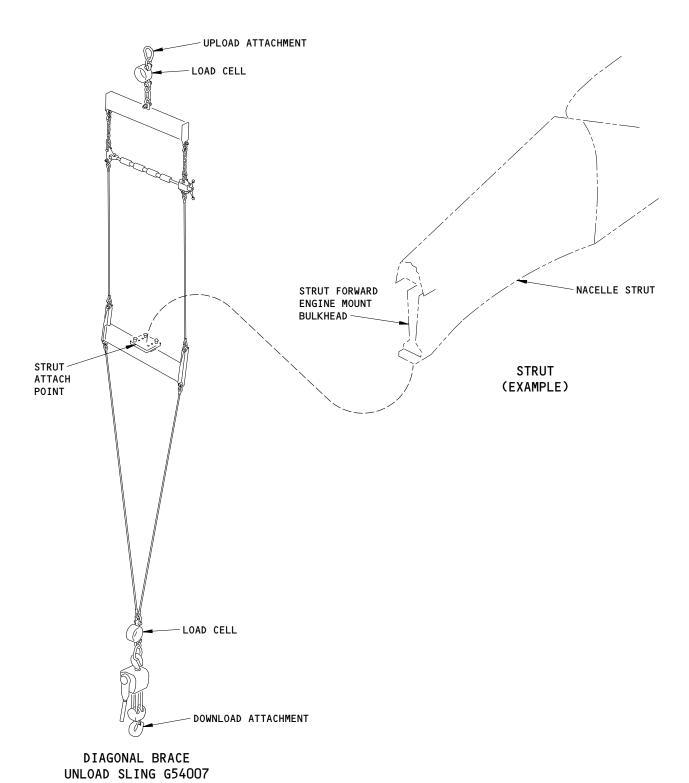
454	Trailing Edge Fairing Door - Nacelle Strut 1
521FT	Wing Leading Edge Cover - Nacelle Strut 1
464	Trailing Edge Fairing Door - Nacelle Strut 2
511CT	Wing Leading Edge Cover - Nacelle Strut 2
474	Trailing Edge Fairing Door - Nacelle Strut 3
611CT	Wing Leading Edge Cover - Nacelle Strut 3
484	Trailing Edge Fairing Door - Nacelle Strut 4
621FT	Wing Leading Edge Cover - Nacelle Strut 4

F. Prepare for the removal (engine removed).

EFFECTIVITY-KLM 001-005, 025-035 WITH SB 54A2156, AND KLM 006-024, 035-999

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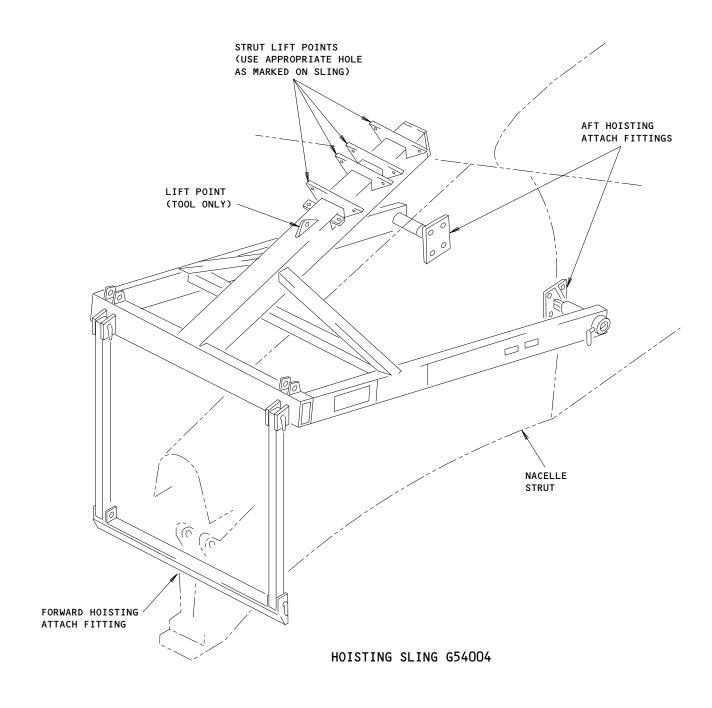
Overhead Mechanical Equipment Figure 401 (Sheet 1)

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Overhead Mechanical Equipment Figure 401 (Sheet 2)

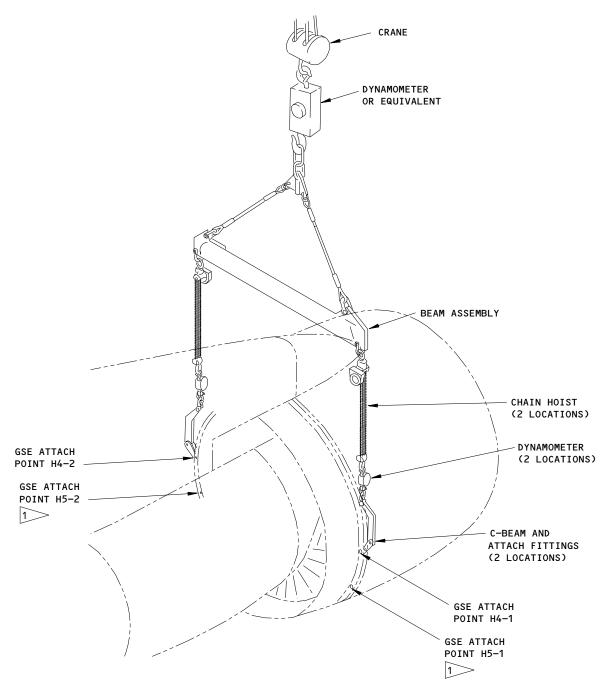
EFFECTIVITY KLM 001-005, 025-035 WITH SB 54A2156, AND KLM 006-024, 035-999

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A54001-136 SLING

DO NOT ATTACH THE C-BEAM ATTACH FITTINGS TO THIS POINT.

Overhead Mechanical Equipment Figure 401 (Sheet 3)

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ONFIG 3 Page 406 Oct 10/97



s 494-002-003

WARNING: LEADING EDGE FLAPS ARE FAST ACTING. LOCKS MUST BE INSTALLED TO PREVENT POSSIBLE INJURY DUE TO INADVERTENT OPERATION OF FLAPS.

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER.

(1) Make sure the leading edge flaps are retracted and leading edge flap drive unit lock is installed (AMM 27-81-00/201).

s 014-003-003

(2) Remove the thrust reverser (AMM 78-31-01/401).

s 014-004-003

(3) Remove the engine (AMM 71-00-02/401).

S 864-005-003

(4) Make sure the external electrical power is disconnected and that the airplane is grounded.

s 864-006-003

(5) Make sure the FUEL CONTROL toggle switches, located on engine start module, are in the CUTOFF position.

s 864-007-003

(6) Make sure the engine fuel and hydraulic supply shutoff valves are closed, and that the electrical plugs are disconnected from valves.

S 864-008-003

(7) Make sure the hydraulic system is depressurized (AMM 29-11-00/201).

s 684-009-003

(8) Make sure the fuel supply line and hydraulic fluid lines to engine are drained.

s 014-010-003

(9) Open trailing edge fairing doors (AMM 54-62-00/201), if it is necessary for access to diagonal brace attach pins/bolts.

s 494-011-003

(10) Prop the doors open with a suitable rod, and remove the door support rods from the nacelle strut torque bulkhead.

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s 014-012-003

(11) ON INBOARD STRUTS;

Remove the right and left forward wedge assemblies of the fixed aft fairing, for access to the aft diagonal brace attach point.

- (a) On each side, remove the two fasteners that attach the secondary retainer to the fairing.
- (b) On each side, remove twenty six fasteners that attach the fairing assembly to the forward web assembly.
- (c) On each side, remove the thrity four fasteners that attach the fairing assembly to the skate angle.

S 014-013-003

(12) Open all the strut access doors (AMM 54-62-00/201).

s 014-014-003

(13) ON OUTBOARD STRUTS;
Remove forward fairing no. 4.

s 014-015-003

(14) Open the wing leading edge cover, if it is necessary for access to the upper link attach pins/bolts.

s 034-016-003

(15) ON OUTBOARD STRUTS;

Remove the air-driven pump (AMM 29-11-17/401) aft of the torque bulkhead, if it is necessary for access to spring beam pins.

s 034-017-003

(16) ON OUTBOARD STRUTS;

Remove the air-driven pump turbine drive (AMM 29-11-08/401) aft of torque bulkhead, if it is necessary for access to spring beam pins.

s 034-018-003

(17) ON INBOARD STRUTS;

Remove the AC motor-driven pump (AMM 29-11-19/401) aft of torque bulkhead, if it is necessary for access to midspar pins.

s 494-019-003

(18) Use the tool placard to install the diagonal brace unload sling G54007.

54-51-02



S 864-020-003

CAUTION: DO NOT EXCEED UPLOAD NECESSARY TO PERMIT PIN/BOLT ROTATION WITH THE APPLICATION OF 125 POUND-INCHES MAXIMUM TORQUE. DO NOT LIFT THE STRUT OR PULL DOWN ON THE STRUT WITH MORE THAN 3,000 POUNDS OF FORCE ON THE INBOARD STRUTS OR 1,800 POUNDS OF FORCE ON THE OUTBOARD STRUTS. IF YOU APPLY A FORCE THAT IS MORE THAN NECESSARY, DAMAGE TO THE STRUCTURE CAN OCCUR.

(19) Unload the attach pin/bolt of the diagonal brace, upper link, or side links.

NOTE: If the midspar fuse pin is to be replaced it is first necessary to disconnect one end of the diagonal brace to remove the preload.

- (a) Gently apply a load sufficient to remove the strut preload. The intent is to unload the pin/bolt to be removed.
  - 1) Make sure the pin/bolt to be removed can be rotated by applying no more than 125 pound-inches (14.3 N.m) torque.

NOTE: Castellated nuts may have to be tightened up to 200 pound-inches (22.6 N.m) to allow the fuse pin assembly to rotate as a unit with 125 pound-inches (14 N.m) applied torque.

S 864-021-003

- (20) Unload the midspar (inboard) or spring beam (outboard) fuse pins.

  (a) Unload and remove one of the diagonal brace attach pins.
  - <u>NOTE</u>: You can use a rope to temporarily support the loose end of the diagonal brace.
  - Slowly release the load on the diagonal brace unload sling and remove the sling.
  - (b) Use the tool placard to install the strut overhead sling.
    - 1) Remove the No. 3 forward fairing.
    - 2) Attach the sling to the front of the strut with the forward hoisting attach fitting.
    - 3) Attach the sling to the lower aft attach points of the strut with the aft hoisting attach fittings.
    - 4) Use the lift point as marked on the sling for the engine and strut location.



- 5) Use the hole in the lift point as follows:
  - a) Engines 1 & 2 left hole
  - b) Engines 3 & 4 right hole.
- (c) Unload the midspar (inboard) or spring beam (outboard) fuse pins.
  - Gently apply a load to unload the midspar fuse pin to be removed.
  - 2) Make sure the pin to be removed can be rotated by applying no more than 125 pound-inches (14.3 N.m) torque.
  - The fuse pin, caps, and bolt must rotate as an assembly. The intent is to have no load on the pin to be removed.
- G. Prepare for removal (engine supported).
  - s 864-022-003
  - (1) Ground airplane to an approved grounding lug.
    - s 494-023-003

WARNING: LEADING EDGE FLAPS ARE FAST ACTING. LOCKS MUST BE INSTALLED TO PREVENT POSSIBLE INJURY DUE TO INADVERTENT OPERATION OF FLAPS.

(2) Make sure leading edge flaps are retracted and leading edge flap drive unit lock is installed (AMM 27-81-00/201).

s 014-024-003

(3) Open trailing edge fairing doors (AMM 54-62-00/201), if necessary for access to diagonal brace attach pins/bolts. Prop doors open with suitable rod. Remove door support rods from nacelle strut torque bulkhead.

s 014-025-003

(4) ON OUTBOARD STRUTS;

Remove the air-driven pump turbine drive (AMM 29-11-08/401) aft of the torque bulkhead, if it is necessary for access to spring beam pins.

s 014-026-003

(5) ON INBOARD STRUTS;

Remove the AC motor-driven pump (AMM 29-11-19/401) aft of the torque bulkhead, if it is necessary for access to midspar pins.

s 014-027-003

(6) Open the wing leading edge cover, if it is necessary for access to the upper link attach pins/bolts.

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s 014-028-003

(7) ON INBOARD STRUTS;

Remove the right and left forward wedge assemblies of the fixed aft fairing, for access to the aft diagonal brace attach point.

- (a) On each side, remove the two fasteners that attach the secondary retainer to the fairing.
- (b) On each side, remove twenty six fasteners that attach the fairing assembly to the forward web assembly.
- (c) On each side, remove the thirty four fasteners that attach the fairing assembly to the skate angle.

s 014-029-003

(8) Open wing leading edge cover, if necessary for access to upper link attach pins/bolts.

s 014-030-003

(9) Remove the forward fairing.

s 014-031-003

(10) Remove the engine fan cowls (AMM 71-11-04/401).

s 014-032-003

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (11) Open the thrust reversers (AMM 78-31-00/201).
  - (a) Install the G78002-1 hold open set and do not engage the thrust reverser hold-open rods.

<u>NOTE</u>: You cannot install the engine sling with the thrust reverser hold-open rods engaged.

S 864-033-003

(12) Position FUEL CONTROL toggle switches, located on engine start module, to CUTOFF. Attach DO-NOT-OPERATE identifier to switches.

S 864-034-003

(13) Close the fuel shutoff valve.

S 864-035-003

(14) Close the hydraulic supply shutoff valve.

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s 494-036-003

DO NOT USE THE G54006 ENGINE SUPPORT SLING. DAMAGE TO THE CAUTION: ENGINE CAN OCCUR IF YOU USE THIS SLING.

> DO NOT INSTALL THE A54001-112 ENGINE SUPPORT SLING TO THE GSE ATTACH POINTS H5-1 OR H5-2. DAMAGE TO THE ENGINE CAN OCCUR IF YOU USE THESE ATTACH POINTS.

- (15) Use the tool placard to install the engine support sling, A54001-136 (Fig. 401).
  - (a) Install the C-beam attach fittings of the A54001-136 engine support sling to the GSE attach points H4-1 and H4-2.

The GSE attach points H4-1 and H4-2 are located at the 3:00 o'clock and 9:00 o'clock positions, respectively.

s 034-037-003

DO NOT LIFT THE ENGINE WITH A FORCE THAT IS MORE THAN NECESSARY CAUTION: TO PERMIT THE PIN/BOLT TO TURN WHEN YOU APPLY 125 POUND-INCHES MAXIMUM TORQUE. DO NOT APPLY A TOTAL LOAD OF MORE THAN 17,000 POUNDS (MORE THAN THE WEIGHT OF THE EQUIPMENT). DO NOT APPLY A LOAD OF MORE THAN 8,500 POUNDS ON ONE ATTACH POINT. DO NOT APPLY A LOAD WITH A DIFFERENCE BETWEEN THE TWO SIDES OF MORE THAN 1,500 POUNDS. LIFT THE ENGINE VERTICALLY. IF THE CRANE LIFTS THE ENGINE WITH TOO MUCH FORCE, OR AT AN INCORRECT ANGLE, DAMAGE TO THE ENGINE CAN OCCUR.

- (16) Do these steps to remove the load from the pin/bolt that you will remove:
  - Slowly apply a small load with the crane. (a)
  - Adjust the chain hoists so the load on the inboard and outboard dynamometers is approximately equal.
  - Move the crane as necessary to apply a vertical load at the tool attach points.
    - 1) At the side of the engine, visually align the engine sling between the flanges on the fan case so the beam assembly is directly above the flanges.
    - 2) At the front or rear of the engine, visually align the engine sling vertically side-to-side.
  - Slowly apply a load to the sling until you reach a load of 2500 pounds.



CAUTION: MAKE SURE THE C-FITTINGS ARE CENTERED BETWEEN THE FLANGES. DAMAGE TO THE ENGINE CAN OCCUR IF THE C-FITTINGS ARE NOT CENTERED.

- Make sure that the C-fittings are centered between the flanges.
  - 1) Monitor the angle of the engine sling side-to-side and forward/aft during the procedure.
- (f) Slowly increase the load until you can turn the pin/bolt that you will remove with a maximum torque of 125 pound-inches (14.3 N.m).
  - 1) Make sure the fuse pin, caps, and bolt turn as an assembly.
    - If it is necessary, you can tighten the fuse pin castellated nut to a maximum torque of 200 pound-inches (22.6 N.m) so the assembly turns.
  - You can make these adjustments to more accurately find the correct load:

<u>NOTE</u>: When the load is removed correctly, the pin/bolt that you will remove should turn easily.

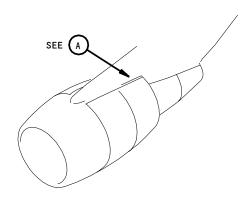
- a) Adjust the individual load on each of the two chain hoists.
- Move the lifting point of the overhead crane inboard or outboard a minimum distance from the center position.
- Remove the applicable attach pin/bolt.

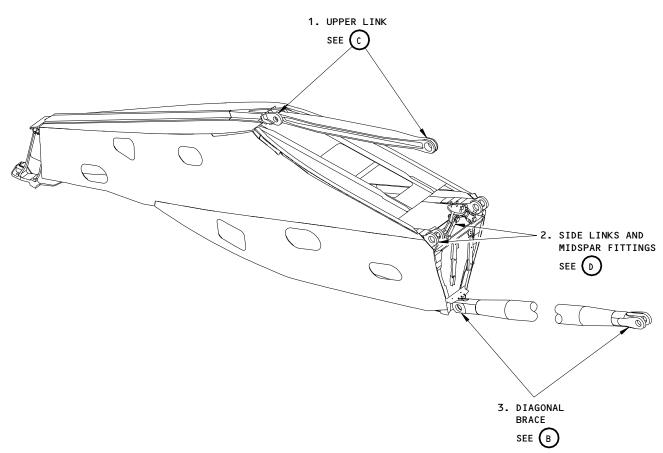
s 024-083-003

MAKE SURE THE UPPER LINK AND BOTH MIDSPAR (INBOARD) OR BOTH CAUTION: SPRING BEAM (OUTBOARD) FUSE PINS ARE INSTALLED. IF THESE FUSE PINS ARE NOT INSTALLED AND YOU REMOVE A DIAGONAL BRACE PIN/BOLT, DAMAGE TO THE STRUCTURE CAN OCCUR.

- (1) Remove the diagonal brace aft fuse pin.
  - Make sure that the upper link and both midspar/spring beam fuse pins are installed.







NO. 2 STRUT SHOWN (NO. 3 STRUT OPPOSITE)

A

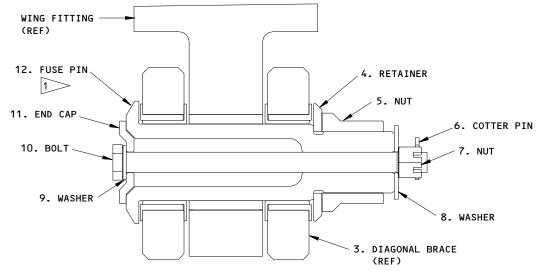
Inboard Nacelle Strut Attach Pin/Bolt Installation Figure 402 (Sheet 1)

54 - 51 - 02

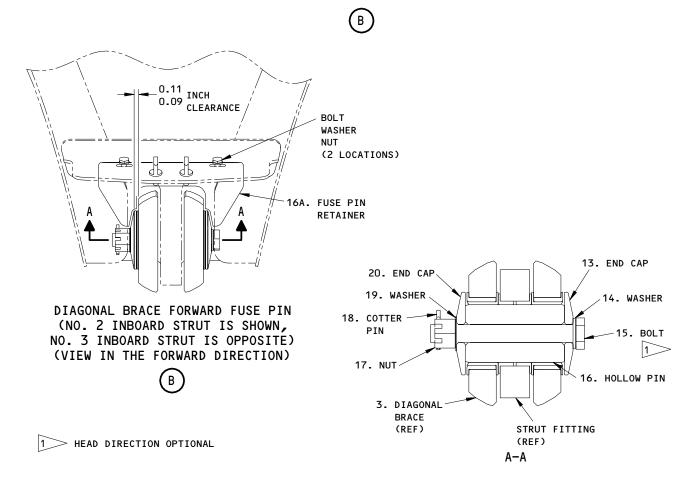
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DIAGONAL BRACE AFT FUSE PIN (NO. 2 INBOARD STRUT IS SHOWN, NO. 3 INBOARD STRUT IS OPPOSITE)



Inboard Nacelle Strut Attach Pin/Bolt Installation Figure 402 (Sheet 2)

EFFECTIVITY

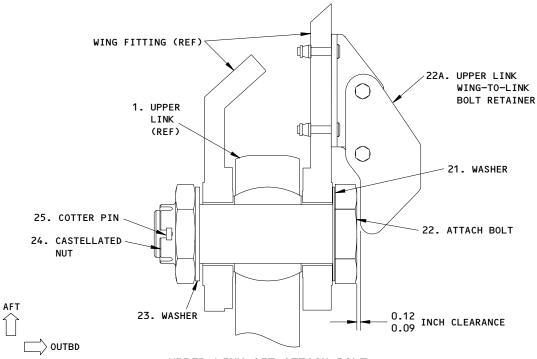
KLM 001-005, 025-035 WITH SB 54A2156,
AND KLM 006-024, 035-999

CONFIG 3

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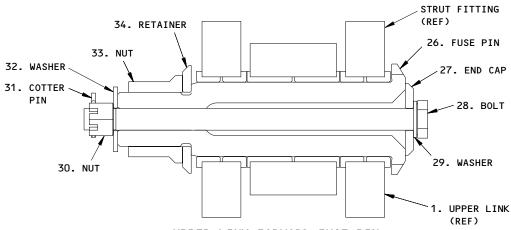
BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.





UPPER LINK AFT ATTACH BOLT (NO. 2 INBOARD STRUT IS SHOWN, NO. 3 INBOARD STRUT IS OPPOSITE) (TOP VIEW)





UPPER LINK FORWARD FUSE PIN (NO. 2 INBOARD STRUT IS SHOWN, NO. 3 INBOARD STRUT IS OPPOSITE) (VIEW IN THE FORWARD DIRECTION)



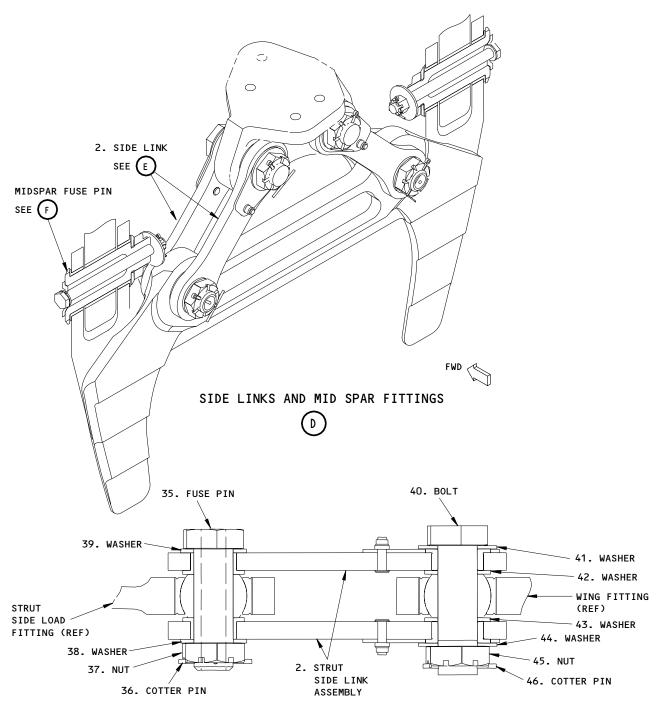
Inboard Nacelle Strut Attach Pin/Bolt Installation Figure 402 (Sheet 3)

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SIDE LINK
(NO. 2 STRUT SHOWN, NO. 3 STRUT OPPOSITE)
(2 LOCATIONS EACH STRUT)



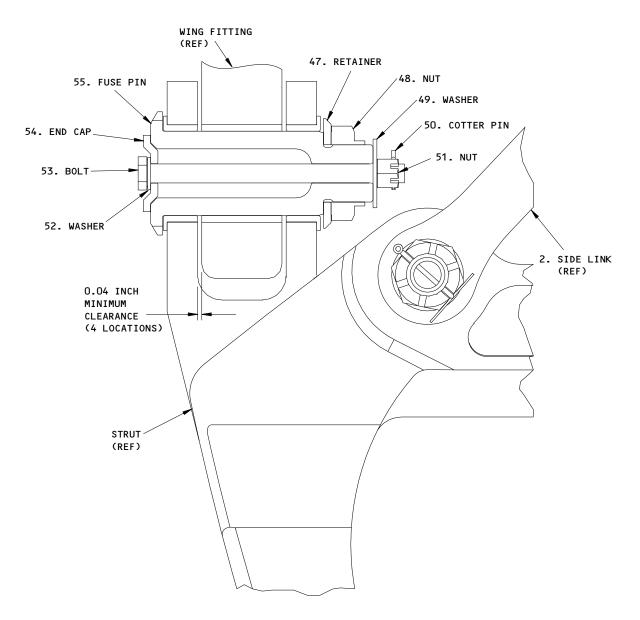
Inboard Nacelle Strut Attach Pin/Bolt Installation Figure 402 (Sheet 4)

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MIDSPAR FUSE PIN
(NO. 2 INBOARD STRUT IS SHOWN,
NO. 3 INBOARD STRUT IS OPPOSITE)
(2 LOCATIONS EACH STRUT)



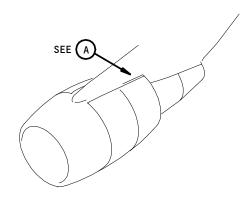
Inboard Nacelle Strut Attach Pin/Bolt Installation Figure 402 (Sheet 5)

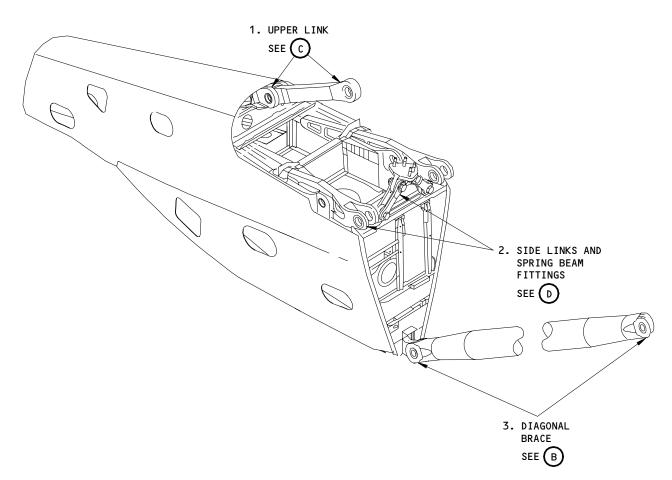
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NO. 1 STRUT SHOWN
(NO. 4 STRUT OPPOSITE)

A

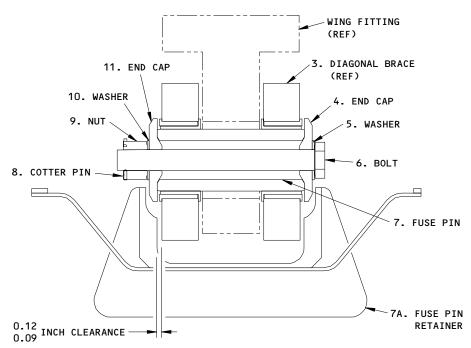
Outboard Nacelle Strut Attach Pin/Bolt Installation Figure 403 (Sheet 1)

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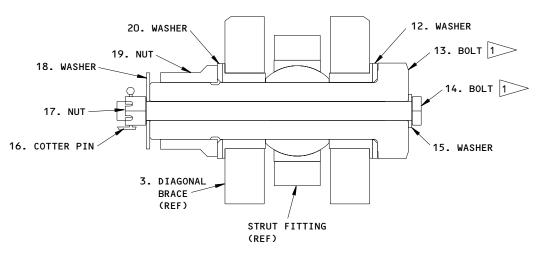
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DIAGONAL BRACE AFT FUSE PIN
(NO. 1 OUTBOARD STRUT IS SHOWN,
NO. 4 OUTBOARD STRUT IS OPPOSITE)





OLIAGONAL BRACE FORWARD ATTACH BOLT (NO. 1 OUTBOARD STRUT IS SHOWN, NO. 4 OUTBOARD STRUT IS OPPOSITE)

1 HEAD DIRECTION OPTIONAL



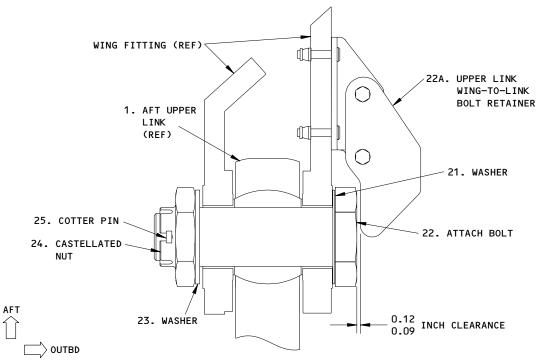
Outboard Nacelle Strut Attach Pin/Bolt Installation Figure 403 (Sheet 2)

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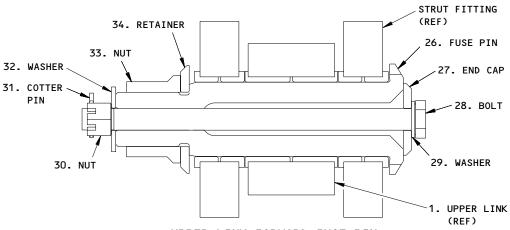
ONFIG 3 Page 420 Jun 10/96





UPPER LINK AFT ATTACH BOLT (NO. 1 OUTBOARD STRUT IS SHOWN, NO. 4 OUTBOARD STRUT IS OPPOSITE) (TOP VIEW)





UPPER LINK FORWARD FUSE PIN (NO. 1 OUTBOARD STRUT IS SHOWN, NO. 4 OUTBOARD STRUT IS OPPOSITE) (VIEW IN THE FORWARD DIRECTION)

C

Outboard Nacelle Strut Attach Pin/Bolt Installation Figure 403 (Sheet 3)

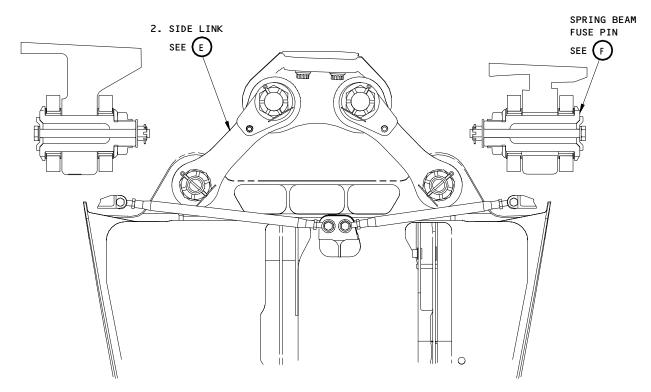
EFFECTIVITY-KLM 001-005, 025-035 WITH SB 54A2156, AND KLM 006-024, 035-999

54-51-02

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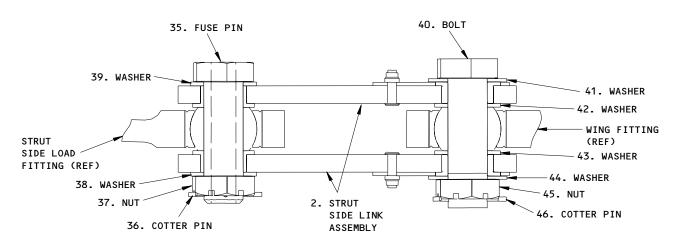
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### SIDE LINKS AND SPRING BEAM FITTINGS





SIDE LINK
(NO. 1 STRUT SHOWN, NO. 4 STRUT OPPOSITE)
(2 LOCATIONS EACH STRUT)



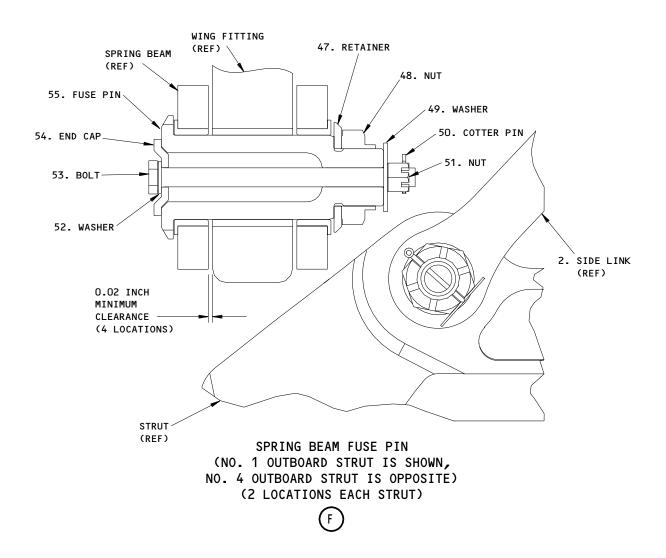
Outboard Nacelle Strut Attach Pin/Bolt Installation Figure 403 (Sheet 4)

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Outboard Nacelle Strut Attach Pin/Bolt Installation Figure 403 (Sheet 5)

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- (b) If you will remove the diagonal brace, do these steps:
  - If you remove the diagonal brace this same brace or a new brace with the same center-to-center distance must be installed on the strut and airplane where it was removed.
    - a) Tag the brace with the airplane number and strut location or make sure that this information is marked on the brace.
- (c) ON INBOARD STRUTS;
  - Do these steps (Fig. 402):
  - 1) Remove the cotter pin (6), nut (7), bolt (10), washers (8 and 9), and end cap (11).
  - 2) Remove the nut (5), retainer (4), and the fuse pin (12).
    - a) If you will not remove the strut, push out the pin with a greased brass slug.

NOTE: Make sure the clevis and the lug stay aligned.

- (d) ON OUTBOARD STRUTS;
  - Do these steps (Fig. 403):
  - 1) Remove the nuts, washers, and bolts that attach the fuse pin retainer (7A) to the bracket, and remove the retainer.
  - 2) Remove the cotter pin (8), nut (9), bot (6), and two washers (5 and 10).
  - 3) Remove the two end caps (4 and 11), and the fuse pin (7).
    - a) If you will not remove the strut, push out the pin with a greased brass slug.

NOTE: Make sure the clevis and the lug stay aligned.

# s 024-039-003

- (2) Remove the diagonal brace forward attach pin/bolt.
  - (a) Make sure that the upper link and both midspar/spring beam fuse pins are installed.
  - (b) If you will remove the diagonal brace, do these steps:
    - If you remove the diagonal brace this same brace or a new brace with the same center-to-center distance must be installed on the strut and airplane where it was removed.
      - a) Tag the brace with the airplane number and strut location or make sure that this information is marked on the brace.
  - (c) ON INBOARD STRUTS;
    - Do these steps (Fig. 402):
    - 1) Remove the nuts, washers, and bolts that attach the fuse pin retainer (16A) to the bracket, and remove the retainer.
    - 2) Remove the cotter pin (18), nut (17), bolt (15), and two washers (14 and 19).



- 3) Remove the two end caps (13 and 20) and remove the hollow pin (16).
  - a) If you will not remove the strut, push out the pin with a greased brass slug.

NOTE: Make sure the clevis and the lug stay aligned.

- (d) ON OUTBOARD STRUTS;
  - Do these steps (Fig. 403):
  - Remove the two screws that attach each of the two access plate assemblies to gain access to the forward diagonal brace attach bolt.
  - 2) Remove the cotter pin (16), nut (17), bolt (14), and two washers (15 and 18).
  - 3) Remove the nut (19), two washers (12 and 20), and the attach bolt (13).
    - a) If you will not remove the strut, push out the attach bolt with a greased brass slug.

NOTE: Make sure the clevis and the lug stay aligned.

s 024-040-003

(3) Remove the upper link aft attach bolt.

<u>NOTE</u>: To make installation easier, keep the parts from this assembly together. If it is necessary, tag each component to identify the assembly location.

- (a) Remove the nuts, washers, and bolts that attach the bolt retainer (22A) to the bracket, and remove the retainer.
- (b) Remove the cotter pin (25), nut (24), and two washers (21 and 23), and remove the attach bolt (22).
  - If you will not remove the strut, push out the bolt with a greased brass slug.

NOTE: Make sure the clevis and the lug stay aligned.

s 024-041-003

- (4) Remove the upper link forward fuse pin.
  - (a) Remove the cotter pin (31), nut (30), bolt (28), two washers (29 and 32), and end cap (27).
  - (b) Remove the nut (33), retainer (34), and fuse pin (26).
    - If you will not remove the strut, push out the pin with a greased brass slug.

NOTE: Make sure the clevis and the lug stay aligned.

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s 024-042-003

(5) Remove the side link attach pin/bolt.

There are two pairs of side links for each strut. The NOTE: removal is the same for each pair.

- If you remove the side link assembly, do these steps:
  - 1) If you remove the side link assembly this same assembly or a new assembly with the same center-to-center distance must be installed on the strut and airplane where it was removed.
    - a) Tag the side link assembly with the airplane number and strut location or make sure this information is marked on the side link.
- Remove the side link upper attach bolt (40).
  - Remove the cotter pin (46), nut (45), four washers (41, 42, 43, and 44), and attach bolt (40).
- Remove the side link lower fuse pin (35).
  - 1) Remove the cotter pin (36), nut (37), two washers (38 and 39), and fuse pin (35).

s 024-043-003

CAUTION: REMOVE ONLY ONE MIDSPAR/SPRING BEAM FUSE PIN AT A TIME, UNLESS THE STRUT IS TO BE REMOVED. IF YOU REMOVE BOTH MIDSPAR/SPRING BEAM FUSE PINS AT THE SAME TIME, DAMAGE TO THE STRUT CAN OCCUR.

- Remove the midspar (inboard) or spring beam (outboard) fuse pin.
  - If the engine has been removed, do these steps:
    - 1) Make sure that one end of the diagonal brace has been disconnected.

NOTE: This will remove the diagonal brace preload from the strut.

- 2) Make sure that the strut overhead sling is installed.
- Remove the cotter pin (50), nut (51), bolt (53), two washers (49 and 52), and end cap (54).
- Remove the nut (48), retainer (47), and fuse pin (55).
  - 1) If you will not remove the strut, push out the pin with a greased brass slug.

NOTE: Make sure the clevis and the lug stay aligned.

s 864-084-003

(7) Make sure the load on the strut is kept the same until you install the pin/bolt again, unless the strut is removed.

EFFECTIVITY-KLM 001-005, 025-035 WITH SB 54A2156, AND KLM 006-024, 035-999

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I. Remove the Overhead Crane with the Engine Installed (Optional)

<u>NOTE</u>: The overhead crane can be removed if the upper link OR diagonal brace has a fuse pin removed.

s 944-085-003

WARNING: DO NOT MOVE THE AIRPLANE IF THE FUSE PIN IS REMOVED FROM THE UPPER LINK OR DIAGONAL BRACE FITTING. THE MOVEMENT OF THE AIRPLANE MAY CAUSE DAMAGE TO THE STRUCTURE OR SYSTEMS BETWEEN THE WING AND THE STRUT.

(1) Do the procedure to Jack the Airplane (AMM 07-11-01/201).

s 214-086-003

WARNING: REMOVE ONLY ONE STRUT-TO-WING FUSE PIN AT A TIME. THE STRUT CAN MOVE SUDDENLY AND INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION: REMOVE ONLY ONE FUSE PIN/BOLT FROM THE UPPER LINK OR DIAGONAL BRACE. IF BOTH ATTACH FITTINGS ARE REMOVED, THE UPPER LINK OR DIAGONAL BRACE CAN HANG FROM ELECTRICAL BUNDLES OR HYDRAULIC LINES AND CAUSE DAMAGE TO THEM.

(2) Make sure the remaining strut to wing fittings are correctly installed.

s 024-087-003

WARNING: DO NOT USE YOUR HANDS TO REMOVE THE ALIGNMENT PIN FROM THE FITTING. THE FITTING CAN MOVE SUDDENLY AND CAUSE INJURIES TO PERSONS.

CAUTION: REMOVE THE BRASS ALIGNMENT PIN IF YOU REMOVE THE ENGINE MOUNTED STRUT HOISTING SLING. THE BRASS ALIGNMENT PIN COULD BE DAMAGED OR BE WEDGED IN PLACE IF THE ENGINE OR WING ARE ACCIDENTLY MOVED.

(3) Remove the alignment pin from the fitting.

s 934-088-003

(4) Put a strap through the lug and clevis and attach a red flag.

s 094-089-003

- (5) Remove the overhead crane and sling equipment:
  - (a) Make a note of the dynamometer loads.
  - (b) Make a note of the crane location.
  - (c) Slowly remove the load from the crane.
  - (d) Remove the overhead crane.

54-51-02



### TASK 54-51-02-404-044-003

- Install the Attach Pin/Bolt
  - A. Special Tools and Equipment
    - (1) A54001-136 Sling Strut Unload, Pin Removal/Installation (Engine supported)
    - (2) G54004 Overhead Mechanical Equipment, Inboard and Outboard Nacelle Strut Installation (Engine Removed)
    - (3) G54007 Sling, Diagonal Brace Preload (Engine removed)
    - (4) G54008-37 Removal/Installation Kit Fuse Pin (Includes fuse pin adapter wrenches and brass slugs)
    - (5) MIT SM321U2750 Locating & Align Jig, Strut Modification, Side Link Assembly
    - (6) MIT SM311U2730 Measuring Tool, Strut Modification, Diagonal Brace
    - (7) G78002-1 Hold Open Set Thrust Reverser Cowl, CF6-80C Engine
  - B. Standard Tools and Equipment
    - (1) Lock leading edge flap drive unit
    - (2) Lift Equipment (Engine removed)
      - (a) Crane, approved to lift 5,000 pounds
      - (b) Dynamometer, 0-5,000 pound capacity, ±2% accuracy
    - (3) Lift Equipment (Engine supported)
      - (a) Crane, approved to lift 20,000 pounds, with micro-positioning capabilities (recommended), or with Pull Pac Cylinder (alternative)
        - Pull Pac Cylinder BRP-306, P-80 Pump, HC-941 Hose Assembly (alternative)
           ENERPAC, Division of Applied Power, Inc.

Butler, Wisconsin

- (b) Dynamometer, 0-20,000 pound capacity,  $\pm$  2% accuracy
  - Two dynamometers are necessary if the crane has an adjustable load limiter or if you use a precision load positioner.
  - 2) Three dynamometers are necessary if the crane does not have an adjustable load limiter and you do not use a precision load positioner.
- (c) Precision Load Positioner, 10 ton capacity, Model D Hydra-Set (alternative)

Del Mar Engineering Laboratories, Hydra-Set Division International Airport Los Angeles, California

- (d) Chain Hoist, 9,000 pound capacity (2 are necessary)
- (4) Tag Lines use for control of the engine sling
- C. Consumable Materials
  - (1) A00310 Sealant BMS 5-95 or A00247 Sealant - BMS 5-79
  - (2) A00344 Compound Corrosion Preventive, MIL-C-11796, Class 1
  - (3) A00964 Primer Fluid Resistant, BMS 10-11, type I
  - (4) CO0032 Enamel Exterior Decorative, BMS 10-60, Type I

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- (5) D00006 Lubricant Antiseize, BAC 5008, Type 7-3 (NEVER-SEEZ)
- (6) D00294 Grease Corrosion Preventative, BMS 3-24

#### D. Parts

АММ			AIPC		
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
		TO BE FURNISHED			

#### E. References

- (1) AMM 20-11-05/401, Flareless Tubing
- (2) AMM 27-81-00/201, Leading Edge Flaps
- (3) AMM 29-11-00/201, Main Hydraulic Supply System
- (4) AMM 29-11-08/401, Air-Driven Pump Turbine Drive
- (5) AMM 29-11-17/401, Air-Driven Pump
- (6) AMM 29-11-19/401, AC Motor-Driven Pump
- (7) AMM 54-62-00/201, Nacelle Strut Access Panels
- (8) AMM 71-00-02/401, Power Plant
- (9) AMM 71-11-04/401, Fan Cowl Panels
- (10) AMM 78-31-00/201, Thrust Reverser System
- (11) AMM 78-31-01/401, Thrust Reverser
- (12) CPM Part III, 54-10-47
- (13) OHM 54-00-01

#### F. Access

(1) Location Zone

451 Nacelle Strut 1 - Forward Fairing Nacelle Strut 1 - Torque Box 452 Nacelle Strut 1 - Aft Fairing 454 521 Nacelle Strut 1 - Leading Edge to Front Spar 461 Nacelle Strut 2 - Forward Fairing 462 Nacelle Strut 2 - Torque Box 464 Nacelle Strut 2 - Aft Fairing 521 Nacelle Strut 2 - Leading Edge to Front Spar 471 Nacelle Strut 3 - Forward Fairing 472 Nacelle Strut 3 - Torque Box Nacelle Strut 3 - Aft Fairing 474 621 Nacelle Strut 3 - Leading Edge to Front Spar Nacelle Strut 4 - Forward Fairing 481 482 Nacelle Strut 4 - Torque Box 484 Nacelle Strut 4 - Aft Fairing

Nacelle Strut 4 - Leading Edge to Front Spar

621



#### (2) Access Panel

454	Trailing Edge Fairing Door - Nacelle Strut 1
521FT	Wing Leading Edge Cover - Nacelle Strut 1
464	Trailing Edge Fairing Door - Nacelle Strut 2
511CT	Wing Leading Edge Cover - Nacelle Strut 2
474	Trailing Edge Fairing Door - Nacelle Strut 3
611CT	Wing Leading Edge Cover - Nacelle Strut 3
484	Trailing Edge Fairing Door - Nacelle Strut 4
621FT	Wing Leading Edge Cover - Nacelle Strut 4

G. Prepare for the Installation

#### s 214-045-003

- (1) Do a check that all attach pins, bolts, caps, and washers at installation points are free from corrosion, including interior of fuse pins or hollow bolts and the inner diameter of fitting bushings.
  - (a) If corrosion exists, either replace the part or remove corrosion and apply corrosion protection (CPM Part III, 54-10-47).
    - 1) Apply two coats of primer to all exposed surfaces, including ID bore, but excluding chrome plate OD, if not already primed.
    - 2) Apply a 0.05-inch (1.3 mm) thick coating of corrosion preventive compound to ID of attach pin/bolt.

#### s 214-046-003

- (2) Make sure all the bushings at installation points are sealed from corrosion.
  - If bushings are not sealed, apply sealant to bushings (a) (Ref 51-31-01/201).
    - Apply fillet seal to flange end of all bushings.
    - 2) Brush coat seal (maximum thickness 0.010 inch) to entire periphery of all (except upper link wing fitting and diagonal brace wing fitting) unflanged bushing ends exposed to mating surface of parent part.

NOTE: No seal is required for bushing end not exposed to mating surface of parent part. Corrosion prevention in this area is covered by application of grease during pins or bolts installation.

3) Apply fillet seal to entire periphery of unflanged bushing end at diagonal brace wing fitting.

# s 214-047-003

(3) Do a check to make sure you have the correct part number fuse pin(s).

EFFECTIVITY-KLM 001-005, 025-035 WITH SB 54A2156, AND KLM 006-024, 035-999

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Install the applicable attach pin/bolt.

#### s 424-048-003

- (1) Install the midspar (inboard) or spring beam (outboard) fuse pin.
  - (a) Apply a thin layer of grease to the fuse pin (55).
  - Apply antiseize compound (Never-Seez or equivalent) to threads of the self-locking nut (48).
  - If a slug is installed, push it out with the greased pin (55). Make sure the clevis and the lug stay aligned.
  - Install the retainer (47) and nut (48) to the threaded end of the fuse pin (55).
    - 1) Install the retainer (47) and nut (48), and begin to turn the nut before you slide the fuse pin (55) to its fully engaged position.
  - Do a check of the self-locking torque of the nut (48).
    - 1) If the self-locking torque is not 195-1250 pound-inches (22.2-142.5 N.m), replace the nut.

The torque wrench must be installed on the nut and not the head of the bolt.

- (f) Tighten the nut (48) to 1600-1900 pound-inches (182.4-216.6 N.m).
  - Do a check to make sure that the torque value is correct.
- Install the end cap (54) with the bolt (53) and two washers (49 and 52).
- (h) Install the nut (51) on the bolt (53) and tighten with your hand.
  - make sure that the washer (49) is correctly seated on the end of the fuse pin (55), and the nut (51) is correctly seated on the washer (49).
- Install the cotter pin (50).
  - 1) Tighten the nut (51) to a 50-200 pound-inches to align the hole for the cotter pin (50).
    - You can install a maximum of three adjustment washers, between the nut (51) and the washer (49), to align the hole for the cotter pin (50).



- Do a check to make sure that the bolt, end cap, nut, washers, and cotter pin are installed correctly.
- Apply sealant, approximately 0.10 inch (2.54 mm) thick, to both ends of the cotter pin to prevent cotter pin movement.
- Make sure the joint is not clamped.
  - 1) A minimum gap of 0.010 inch (0.254 mm) is required in the joint.

NOTE: The gap may be located between the end cap (47) and the bushing flange of the midspar/spring beam and/or the head of the fuse pin (55) and the bushing flange of the midspar/spring beam.

- (k) Inject grease into the grease fitting, if installed, until grease appears around edge of the pin.
  - 1) Remove excess grease from around the pin.
- Make sure the clearance between the midspar/spring beam fittings and the wing fittings is as shown on the illustration.
- Do a check for clearance between midspar/springbeam pin nut/washer and the EDP hydraulic supply tube.
  - 1) On inboard struts, the clearance must be 0.15 inch or greater between EDP tube and nearest part of the nut or washer.
  - On outboard struts, there must be clearance of 0.25 inch or greater between the nut or washer and the EDP hydraulic supply tube.
  - 3) If clearance minimums cannot be met:
    - a) Depressurize the hydraulic reservoir (AMM 29-11-00)
    - b) Install/splice a new hydraulic tube (AMM 20-11-05)
    - c) Repressurize the hydraulic reservoir (AMM 29-11-00 or operator equivalent)
    - d) Do the EDP test (AMM 29-11-05)
    - e) Do a check of the new/spliced tube for leaks (AMM 29-11-00 or operator equivalent)
- If the engine is removed, and the nacelle strut has not been removed from the wing, do these steps:
  - Slowly release the load on the overhead sling and remove the sling.

ONLY PERSONNEL INSTRUCTED IN PROPER USAGE SHOULD WARNING: OPERATE HOISTS.

> MAKE SURE YOU OBEY ALL SAFETY PRECAUTIONS FOR OVERHEAD MECHANICAL EQUIPMENT OR DAMAGE TO THE AIRPLANE OR INJURY TO PERSONNEL CAN OCCUR.

2) Use the tool placard to install the diagonal brace preload sling (Fig. 401).

EFFECTIVITY-KLM 001-005, 025-035 WITH SB 54A2156, AND KLM 006-024, 035-999



3) Do the procedure to install the diagonal brace fuse pin/bolt that was removed.

### s 424-049-003

- (2) Install the upper link aft attach bolt.
  - (a) If you install different parts than you removed, do this check to find the correct number of adjustment washers:

NOTE: This check will help you align the slot in the nut with the hole in the bolt for the cotter pin. Do this check without sealant. This check is optional if you install the same parts that you removed.

- 1) Hold the head of the bolt (22).
- 2) Put the washer (23) on the bolt.
- 3) Make sure the washer is aligned correctly on the bolt.
- 4) Install the nut (24).
- 5) Tighten the nut to 1600-1900 pound-inches (182.4-216.6 N.m).
- 6) Make sure the slot in the nut is aligned with the hole in the bolt.
- 7) If the slot in the nut does not align with the hole in the bolt, do the assembly again and use adjustment washers.

NOTE: You can use a maximum of three adjustment washers between the nut (24) and the washer (23) to align the hole for the cotter pin. It can be necessary to use a different nut.

- 8) Disassemble the nut, washers and bolt.
- 9) Keep the nut, washers and bolt together.
- (b) Apply a thin film of grease to the bolt (22).
- (c) If a slug is installed, push it out with the greased bolt (22). Make sure the clevis and lug stay aligned.
- (d) Install the attach bolt (22) and two washers (21 and 23).
  - 1) Apply fay surface sealant between the washer (21) and the shoulder of the bolt (22), and between the washer (23) and the head of the bolt (22).
- (e) Install the nut (24).
  - 1) Install the nut (24) with your hand.
    - a) Make sure the washer (21) is correctly seated against the shoulder of the bolt (22), and the washer (23) is correctly seated against the nut (24).
  - 2) Tighten the nut to 1600-1900 pound-inches (182.4-216.6 N.m).
    - a) Tighten the nut again after the sealant squeezes out.
    - b) Do a check to make sure the torque value is correct.
    - c) Make sure the notch in the nut for the cotter pin is aligned with the hole in the bolt.

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- d) You can install a maximum of three adjustment washers, between the nut (24) and the washer (23), to align the hole for the cotter pin (25).
- (f) Install the cotter pin (25).

NOTE: If you can not install the cotter pin and you did the check to find the correct number of adjustment washers, you can reduce the minimum torque to 600 pound-inches.

- 1) Do a check to make sure that the bolt, washers, nut, and cotter pin are installed correctly.
- Apply sealant approximately 0.10 inch (2.54 mm) thick, to both ends of the cotter pin to prevent cotter pin movement.
- Make sure the joint is not clamped.
  - 1) A minimum gap of 0.010 inch (0.254 mm) is required in the joint.

The gap may be located between either of the washers (21 and 23) and the applicable wing fitting.

- Inject grease into grease fitting, if installed, until grease appears around edge of the pin.
  - 1) Remove excess grease from around the pin.
- Install the attach bolt retainer (22A).
  - 1) Put the attach bolt retainer on the bracket.
  - 2) Install the retainer to the bracket with the bolts, washers, and nuts.
  - Make sure the clearance between the retainer and the head of the bolt is as shown on the illustration.

### s 424-050-003

- Install the upper link forward fuse pin.
  - (a) Apply a thin coat of grease to the fuse pin (26).
  - (b) Apply antiseize compound (Never-Seez or equivalent) to the threads of the self-locking nut (33).
  - If a slug is installed, push it out with the greased pin (26). Make sure the clevis and lug stay aligned.
  - Install the retainer (34) and nut (33) to the threaded end of the fuse pin (26).
  - Do a check of the self-locking torque of the nut (33).
    - 1) If the self-locking torque is not 143-1000 pound-inches (16.3-113.8 N.m), replace the nut (33).

The torque wrench must be installed on the nut and not the head of the bolt.

- Tighten the nut (33) to 1300-1500 pound-inches (148.2-171.0 N.m).
  - Do a check to make sure that the torque value is correct.

EFFECTIVITY-KLM 001-005, 025-035 WITH SB 54A2156, AND KLM 006-024, 035-999

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- Install the end cap (27) with the bolt (28) and two washers (29 and 32).
- Install the nut (30) on the bolt (28) and tighten with your hand.
  - 1) Make sure the washer (32) is correctly seated on the end of the fuse pin (26), and the nut (30) is correctly seated on the washer (32).
- (i) Install the cotter pin (31).
  - Tighten the nut (30) to 50-200 pound-inches to align the hole for the cotter pin (31).
    - a) You can install a maximum of three adjustment washers, between the nut (30) and the washer (32), to align the hole for the cotter pin (31).
  - 2) Do a check to make sure that the bolt, end cap, washers, nut, and cotter pin are installed correctly.
  - Apply sealant, approximately 0.10 inch (2.54 mm) thick, to both ends of the cotter pin to prevent cotter pin movement.
- Make sure the joint is not clamped. (j)
  - 1) A minimum gap of 0.010 inch (0.254 mm) is required in the joint.

NOTE: The gap may be located between the retainer (34) and the bushing flange of the upper link and/or the head of the fuse pin (26) and the bushing flange of the upper link.

- (k) Inject grease into grease fitting, if installed, until grease appears around edge of the pin.
  - 1) Remove excess grease from around the pin.

s 424-051-003

(4) Install the side link assembly.

> There are two pairs of side links for each strut. The NOTE: installation is the same for each pair.

- If the side link assembly was removed, make sure you install the side link assembly that was identified for this airplane and strut location.
- If the side link assembly is new, do these steps:
  - Make sure the clearance between the midspar/spring beam fittings and the wing fittings is as shown on the illustrations.
  - 2) Use the MIT SM321U2750 locating tool to determine the required distance between pin centers, from the wing fitting to the strut side load fitting, with no load applied to the strut.
  - Adjust the new side link assembly to match the measured distance as follows:
    - Install the eccentric bushings into the links with wet sealant.

EFFECTIVITY-KLM 001-005, 025-035 WITH SB 54A2156, AND KLM 006-024, 035-999



b) Rotate the eccentric bushings in the links to adjust the bushing center-to-center distances to the measured value.

NOTE: The hole center in the eccentric bushing is to be located so that the link after installation is in the lower of the two possible positions.

- c) Install the retainer keys.
  - Locate the fastener hole for each retainer key.

The retainer can be turned over at assembly to allow 30 degrees of rotation and to ensure a minimum edge margin of .40 inch (10.16 mm) at fastener installation.

- Install each retainer key with the fastener.
- d) Tag the side link assembly with the bore center-to-center distance, basic airplane number, and strut location, or make sure this data is marked on the side link assembly. Apply a thin enamel overcoat over the tag data.
- (c) Install the side link (upper) attach bolt.
  - Apply a thin layer of grease to the bolt (40).
  - Install the bolt (40), four washers (41, 42, 43, and 44), and nut (45).

NOTE: The bolt head direction is optional.

- a) Tighten the nut (45) to 1500-2000 pound-inches (171.0-228.1 N.m).
  - Do a check to make sure that the torque value is 1 correct.
- Install the cotter pin (46).
  - You can install a maximum of three adjustment washers, between the nut (45) and the washer (44), to align the hole for the cotter pin (46).
  - b) Do a check to make sure that the bolt, washers, nut, and cotter pin are installed correctly.
  - c) Apply sealant, approximately 0.10 inch (2.54 mm) thick, to both ends of the cotter pin to prevent cotter pin movement.
- Install the side link (lower) fuse pin.
  - 1) Apply a thin layer of grease to the fuse pin (35).



2) Install the fuse pin (35), the two washers (38 and 39), and the nut (37).

NOTE: The fuse pin head direction is optional.

- a) Tighten the nut (37) to 1500-2000 pound-inches (171.0-228.1 N.m).
  - Do a check to make sure that the torque value is correct.
- 3) Install the cotter pin (36).
  - a) You can install a maximum of three adjustment washers, between the nut (37) and the washer (38), to align the hole for the cotter pin (36).
  - b) Do a check to make sure that the fuse pin, washers, nut, and cotter pin are installed correctly.
  - c) Apply sealant, approximately 0.10 inch (2.54 mm) thick, to both ends of the cotter pin to prevent cotter pin movement.

### s 424-052-003

- (5) Install the diagonal brace aft fuse pin.
  - (a) If the diagonal brace assembly was removed and you do not install a new diagonal brace, make sure you install the diagonal brace assembly that was identified for this airplane and strut location.
  - (b) If you install a new diagonal brace, do these steps:
    - 1) Remove the engine if it is installed (AMM 71-00-02/401).

NOTE: This will allow measurement for, and installation of the new brace with no load applied to the strut.

- 2) Use the MIT SM311U2730 measuring tool to determine the required distance between pin centers, from wing fitting to the strut lower spar fitting, with no load applied to the strut.
  - a) Do not change the load on the wing or the strut, from the time the distance is measured to the time the new brace is installed.

NOTE: If the load condition is changed, the diagonal brace cannot be installed unless a preload is applied to the strut.

- 3) Install the bushing at the required location, on the aft end of the diagonal brace (OHM 54-00-01).
- 4) Tag the brace with the bore center-to-center distance, basic airplane number, and strut location, or make sure this data is marked on the brace. Apply a clear enamel overcoat over the tag data.

54-51-02



- (c) ON INBOARD STRUTS;
  - Do these steps (Fig. 402):
  - 1) Apply a thin layer of grease to the fuse pin (12).
  - 2) Apply antiseize compound (Never-Seez) to the threads of the self-locking nut (5).
  - Install the fuse pin (12). 3)
    - a) If a slug is installed, push it out with the new greased pin (12). Make sure the clevis and lug stay aligned.

DO NOT EXCEED AN UPLOAD OF 1500 POUNDS OR CAUTION: DOWNLOAD OF 500 POUNDS TO INSTALL THE DIAGONAL BRACE. EXCEEDING THESE LIMITS CAN CAUSE DAMAGE TO THE DIAGONAL BRACE WHEN INSTALLATION IS COMPLETED.

- b) If necessary, change the load on the strut to align the clevis and lug or to make the brass slug free to move.
  - 1 If you cannot install the diagonal brace in the allowable load range, you must install a new diagonal brace.
- Install the retainer (4) and nut (5) on the threaded end of the fuse pin (12).
- Do a check of the self-locking torque of the nut (5).
  - a) If the self-locking torque is not 195-1250 pound-inches (22.2-142.5 N.m), replace the nut.

The torque wrench must be installed on the nut and not the head of the bolt.

- Tighten the nut to 1600-1900 pound-inches (182.4-216.6 N.m).
  - a) Do a check to make sure that the torque value is
- Install the end cap (11) with the bolt (10) and two washers (8 and 9).
- Install the nut (7) and tighten with your hand. 8)
  - a) Make sure the washer (8) is correctly seated on the front end of the fuse pin (12), and the nut (7) is correctly seated on the washer (8).
- Install the cotter pin (6).
  - a) Tighten the nut (7) to a 50-200 pound-inches to align the hole for the cotter pin (6).
  - You can install a maximum of three adjustment washers, between the nut (7) and the washer (8), to align the hole for the cotter pin (6).
  - c) Do a check to make sure that the bolt, end cap, nut, washers, and cotter pin are installed correctly.
  - d) Apply sealant, approximately 0.10 inch (2.54 mm) thick, to both ends of the cotter pin to prevent cotter pin movement.



- 10) Make sure the joint is not clamped.
  - a) A minimum gap of 0.010 inch (0.254 mm) is required in the joint.

NOTE: The gap may be located between the head of the fuse pin (12) and the bushing flange of the diagonal brace and/or the retainer (4) and the bushing flange of the diagonal brace.

- 11) Inject grease into grease fitting, if installed, until grease appears around edge of the pin.
  - a) Remove excess grease from around the pin.
- (d) ON OUTBOARD STRUTS;
  - Do these steps (Fig. 403):
  - 1) Apply a thin layer of grease to the exterior of the fuse pin (7).
  - 2) Install the fuse pin (7).
    - a) If a slug is installed, push it out with the new greased fuse pin (7). Make sure the clevis and lug stay aligned.

DO NOT EXCEED AN UPLOAD OF 1500 POUNDS OR CAUTION: DOWNLOAD OF 500 POUNDS TO INSTALL THE DIAGONAL BRACE. EXCEEDING THESE LIMITS CAN CAUSE DAMAGE TO THE DIAGONAL BRACE WHEN INSTALLATION IS COMPLETED.

- b) If necessary, change the load on the strut to align the clevis and lug or to make the brass slug free to move.
  - 1 If you cannot install the diagonal brace in the allowable load range, you must install a new diagonal brace.
- 3) Install the two end caps (4 and 11), two washers (5 and 10), and bolt (6).
- 4) Install the nut (9), and tighten to 125-500 pound-inches (14.3-57.0 N.m).
  - a) Make sure the end caps (4 and 11) are correctly seated against the fuse pin (7).
  - Do a check to make sure that the torque value is b) correct.
- Install the cotter pin (8).
  - a) You can install a maximum of three adjustment washers, between the nut (9) and the washer (10), to align the hole for the cotter pin (8).
  - b) Do a check to make sure that the bolt, end caps, washers, nut, and cotter pin are installed correctly.
  - Apply sealant, approximately 0.10 inch (2.54 mm) thick to both ends of cotter pin to prevent cotter pin movement.



- 6) Make sure the joint is not clamped.
  - a) A minimum gap of 0.010 inch (0.254 mm) is required in the joint.

NOTE: The gap may be located between either of the end caps (4 and 11) and the applicable bushing flange of the diagonal brace.

- 7) Inject grease into grease fitting, if installed, until grease appears around edge of the pin.
  - a) Remove excess grease from around the pin.
- 8) Install the retainer (7A) to the bracket with the nuts, washers, and bolts.
  - a) Do a check to make sure that the clearance between the side of the fuse pin and the retainer is as shown on the illustration.

#### s 424-053-003

- (6) Install the diagonal brace forward fuse pin/bolt.
  - (a) ON INBOARD STRUTS;

Do these steps (Fig. 402):

- 1) Apply a thin coat of grease to the pin (16).
- 2) Install the fuse pin (16).
  - a) If a slug is installed, push it out with the greased pin (16). Make sure the clevis and lug stay aligned.

CAUTION: DO NOT EXCEED AN UPLOAD OF 1500 POUNDS OR DOWNLOAD OF 500 POUNDS TO INSTALL THE DIAGONAL BRACE. EXCEEDING THESE LIMITS CAN CAUSE DAMAGE TO THE DIAGONAL BRACE WHEN INSTALLATION IS COMPLETED.

- b) If necessary, change the load on the strut to align the clevis and lug or to make the brass slug free to move.
  - 1 If you cannot install the diagonal brace in the allowable load range, you must install a new diagonal brace.
- 3) Install the two end caps (13 and 20), two washers (14 and 19), and the bolt (15).
- 4) Install the nut (17), and tighten to 125-500 pound-inches (14.2-56.8 N.m).
  - a) Make sure the end caps (13 and 20) are correctly seated against the hollow pin (16).
  - b) Do a check to make sure that the torque value is correct.
- 5) Install the cotter pin (18).
  - a) You can install a maximum of three adjustment washers, between the nut (17) and the washer (19), to align the hole for the cotter pin (18).
  - b) Do a check to make sure that the bolt, end caps, washers, nut, and cotter pin are installed correctly.

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- c) Apply sealant, approximately 0.10 inch (2.54 mm) thick, to both ends of the cotter pin to prevent cotter pin movement.
- 6) Make sure the joint is not clamped.
  - a) A minimum gap of 0.020 inch (0.51 mm) is required in the joint.

NOTE: The gap may be located between either of the end caps (13 and 20) and the applicable bushing flange of the diagonal brace.

- 7) Install the fuse pin retainer (6A) to the bracket with the nuts, washers, and bolts.
- 8) Do a check to make sure that the clearance between the diagonal brace and the hold open rod eyebolt threads is a minimum of .03 inch.
  - a) Add washers as required under the eyebolt head to meet the clearance requirement.
  - b) Make sure that at least two threads protrude from the nut.
- (b) ON OUTBOARD STRUTS;
  - Do these steps (Fig. 403):
  - 1) Apply a thin coat of grease to the attach bolt (13).
  - 2) Apply antiseize compound (Never-Seez or equivalent) to the threads of the self-locking nut (19).
  - 3) Install the attach bolt (13).
    - a) If a slug is installed, Install the washer (12) on the greased bolt (13) and push out the slug with the greased bolt. Make sure the clevis and lug stay aligned.

CAUTION: DO NOT EXCEED AN UPLOAD OF 1500 POUNDS OR DOWNLOAD OF 500 POUNDS TO INSTALL THE DIAGONAL BRACE. THE LOAD THAT RESULTS CAN CAUSE DAMAGE TO THE DIAGONAL BRACE WHEN INSTALLATION IS COMPLETED.

- b) If necessary, change the load on the strut to align the clevis and lug or to make the brass slug free to move.
  - 1 If you cannot install the diagonal brace in the allowable load range, you must install a new diagonal brace.
- 4) Install the washer (20), and the nut (19) on the threaded end of the bolt (13).
- 5) Do a check of the self-locking torque of the nut (19).
  - a) If the self-locking torque is not 195-1250 pound-inches (22.2-142.5 N.m), replace the nut.

NOTE: The torque wrench must be installed on the nut and not the head of the bolt.

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- 6) Tighten the nut (19) to 1600-1900 pound-inches (182.4-216.6 N.m).
- 7) AIRPLANES WITH SB 747-54-2181; Tighten the nut to 2100 to 2400 pound-inches (237.27 to 271.16 Nm).
  - a) Do a check to make sure that the torque value is correct.
- Install the bolt (14), washers (15 and 18), and nut (17). a) Tighten the nut (17) with your hand.
- Make sure the washer (18) is correctly seated on the end of the bolt (13), and the nut (17) is correctly seated on the washer (18).
- 10) Install the cotter pin (16).
  - a) Tighten the nut (17) to a 50-200 pound-inches to align the hole for the cotter pin (16).
    - You can install a maximum of three adjustment washers, between the nut (17) and the primary washer (18), to align the hole for the cotter pin (16).
  - b) Do a check to make sure that the bolt, washers, nut, and cotter pin are installed correctly.
  - Apply sealant, approximately 0.10 inch (2.54 mm) thick, to both ends of the cotter pin to prevent cotter pin movement.
- 11) Install each of the two access plate assemblies with the two screws.
- Examine the clamps on the diagonal brace that route the electrical conduits and pneumatic duct.
  - Make sure that the extended bolt threads will not touch the trailing edge door when it is closed.
    - a) Set the clamp so that the extended bolt threads are not on the side of the diagonal brace (horizontal position).
    - b) Turn the clamp if necessary, to get more clearance with the door.

## s 714-054-003

(7) ON OUTBOARD STRUTS (IF ENGINE IS REMOVED); Do the spring beam bolt rotation check procedure (AMM 54-51-03/601).

### s 214-055-003

- Do a check to make sure that the fuse pins/bolts and the applicable secondary retention devices are installed correctly (Fig. 402 and 403).
  - (a) Make sure that the diagonal brace fuse pins/bolt are installed correctly.
    - 1) Make sure that the identification on the diagonal brace matches the airplane and strut location.

EFFECTIVITY-KLM 001-005, 025-035 WITH SB 54A2156, AND KLM 006-024, 035-999



- 2) Make sure that the secondary retention devices are installed at these locations:
  - a) Inboard, forward diagonal brace
  - b) Outboard, aft diagonal brace.
- 3) Make sure that grease has been injected into grease fitting (if installed) at inboard, aft diagonal brace.
- (b) Make sure that the upper link fuse pins/bolt are installed correctly.
  - 1) Make sure that the secondary retention devices are installed at these locations:
    - a) Inboard, aft upper link
    - b) Outboard, aft upper link.
- (c) Make sure that the side link assembly fuse pins/bolts are installed correctly.
  - 1) Make sure that the identification on the side links match the airplane and strut location.
- (d) Make sure that the midspar (inboard) and spring beam (outboard) fuse pins are installed correctly.
  - Make sure that grease has been injected into grease fitting (if installed).
- I. Restore the Airplane to Normal (Engine removed)

s 094-056-003

CAUTION: DO NOT REMOVE SLING SUPPORT UNTIL THE WORKSTANDS ARE CLEAR.

IF YOU DO NOT MOVE THE WORK STANDS, DAMAGE TO THE STRUT,

WING STRUCTURE OR STANDS CAN OCCUR.

- (1) Make sure the workstands are clear of the airplane, and slowly remove the load from the sling.
  - (a) Remove the sling from the strut and return the sling to storage.

s 434-057-003

(2) ON OUTBOARD STRUTS;

Install air-driven nump turbi

Install air-driven pump turbine drive (Ref 29-11-08/401) aft of torque bulkhead, if removed.

s 434-058-003

(3) ON OUTBOARD STRUTS;

Install air-driven pump (Ref 29-11-17/401) aft of torque bulkhead, if removed.

s 434-059-003

(4) ON INBOARD STRUTS;

Install AC motor-driven pump (Ref 29-11-19/401) aft of torque bulkhead, if removed.

s 414-060-003

(5) Do the procedure to install the engine (Ref 71-00-02/401).

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s 414-061-003

(6) Do the procedure to install the thrust reverser (AMM 78-31-01/401).

s 864-062-003

(7) Do a check that applicable engine fuel and hydraulic fluid shutoff valves are open and that electrical plugs are connected to valves.

s 864-063-003

(8) Do a check that hydraulic system No. 1, 2, 3, or 4, as applicable for engine being installed, is pressurized (Ref 29-11-00/201).

s 864-064-003

(9) Do a check that the external electrical power is disconnected and that grounding is removed.

S 434-065-003

(10) ON INBOARD STRUTS;

Install the right and left forward wedge assemblies of the fixed aft fairing, if necessary.

- (a) On each side, install the thirty four fasteners that attach the fairing assembly to the skate angle.
- On each side, install twenty six fasteners that attach the fairing assembly to the forward web assembly.
- On each side, install the two fasteners that attach the secondary retainer to the fairing.

s 214-066-003

TOOLS, LOOSE MATERIAL, AND DEBRIS IN STRUT CAVITIES MAY BLOCK DRAINS, RENDERING DRAIN SYSTEM INEFFECTIVE.

(11) Check that tools and loose material are removed and strut cavities are free of debris before installing access doors.

S 414-067-003

(12) Install all access panels, and close trailing edge fairing doors (Ref 54-62-00/201).

s 094-068-003

WARNING: LEADING EDGE FLAPS ARE FAST ACTING AND CAN CAUSE SERIOUS INJURY TO PERSONNEL.

> MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER.

(13) Remove leading edge flap drive unit lock (Ref 27-81-00 MP).

J. Restore the Airplane to Normal (Engine Supported)

EFFECTIVITY-KLM 001-005, 025-035 WITH SB 54A2156, AND KLM 006-024, 035-999



s 094-069-003

CAUTION: DO NOT REMOVE SLING SUPPORT UNTIL THE WORKSTANDS ARE CLEAR.

IF YOU DO NOT MOVE THE WORK STANDS, DAMAGE TO THE ENGINE,

STRUT, WING STRUCTURE OR STANDS CAN OCCUR.

- (1) Make sure the workstands are clear of the airplane, and slowly remove the load from the sling.
  - (a) Remove the sling from the engine and return the sling to storage.

s 434-070-003

(2) ON OUTBOARD STRUTS;

Install air-driven pump turbine drive (Ref 29-11-08/401) aft of torque bulkhead, if removed.

s 434-071-003

(3) ON OUTBOARD STRUTS;

Install air-driven pump (AMM 29-11-17/401) aft of torque bulkhead, if removed.

s 434-072-003

(4) ON INBOARD STRUTS;

Install AC motor-driven pump (AMM 29-11-19/401) aft of torque bulkhead, if removed.

s 864-073-003

(5) Open hydraulic supply shutoff valve.

s 864-074-003

(6) Open fuel shutoff valve.

s 864-075-003

(7) Remove DO-NOT-OPERATE identifiers from FUEL CONTROL switches.

s 414-076-003

(8) Install the forward fairing.

s 414-077-003

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(9) Remove the G78002-1 hold open set and close the thrust reversers (AMM 78-31-00/201).

s 434-078-003

(10) Install the fan cowl panels (Ref 71-11-04/401).

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s 414-079-003

(11) ON INBOARD STRUTS;

Install the right and left forward wedge assemblies of the fixed aft fairing, if necessary.

- (a) On each side, install the thirty four fasteners that attach the fairing assembly to the skate angle.
- (b) On each side, install twenty six fasteners that attach the fairing assembly to the forward web assembly.
- (c) On each side, install the two fasteners that attach the secondary retainer to the fairing.

s 214-080-003

CAUTION: TOOLS, LOOSE MATERIAL, AND DEBRIS IN STRUT CAVITIES MAY BLOCK DRAINS, RENDERING DRAIN SYSTEM INEFFECTIVE.

(12) Check that tools and loose material are removed and strut cavities are free of debris before installing access doors.

s 414-081-003

(13) Install all access panels, and close trailing edge fairing doors (Ref 54-62-00/201).

S 094-082-003

WARNING: LEADING EDGE FLAPS ARE FAST ACTING AND CAN CAUSE SERIOUS INJURY TO PERSONNEL.

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER.

(14) Remove the leading edge flap drive unit lock (AMM 27-81-00/201).



# SPRING BEAM - REMOVAL/INSTALLATION

## 1. General

- A. This subject has two tasks, one for the removal and one for the installation of the spring beam.
- B. Spring beams must be removed if the spherical bearings are to be examined or replaced.
- C. Spring beams are not interchangeable between the left side and right side of the strut or between nacelle strut No. 1 and nacelle strut No. 4.
- D. Spring beams must be tagged when removed to make sure that the beam is installed in the same position as removed.

TASK 54-51-03-004-001

- 2. Remove the Spring Beam (Fig. 401)
  - A. References
    - (1) AMM 54-51-01/401, Nacelle Strut
    - (2) AIPC 54-51-03 Fig. 1
  - B. Access
    - (1) Location Zone

452 Nacelle Strut 1 - Torque Box

454 Nacelle Strut 1 - Aft Fairing

482 Nacelle Strut 4 - Torque Box

484 Nacelle Strut 4 - Aft Fairing

(2) Access Panel

452FL Left Spring Beam Bearing Panel - Nacelle Strut 1
452HRX Right Spring Beam Bearing Panel - Nacelle Strut 1
482FL Left Spring Beam Bearing Panel - Nacelle Strut 4
482HRX Right Spring Beam Bearing Panel - Nacelle Strut 4

# C. Procedure

s 034-002

(1) Disconnect the nacelle strut (AMM 54-51-01/401).

S 864-048

CAUTION: MAKE SURE THE DUCTS AND PLUMBING ARE DISCONNECTED AND THAT THE WIRING IS LOOSE BEFORE YOU LOWER THE STRUT. FAILURE TO DO THIS CAN CAUSE DAMAGE TO STRUT SYSTEMS AND COMPONENTS.

(2) Lower the nacelle strut approximately 10 inches (254 mm).

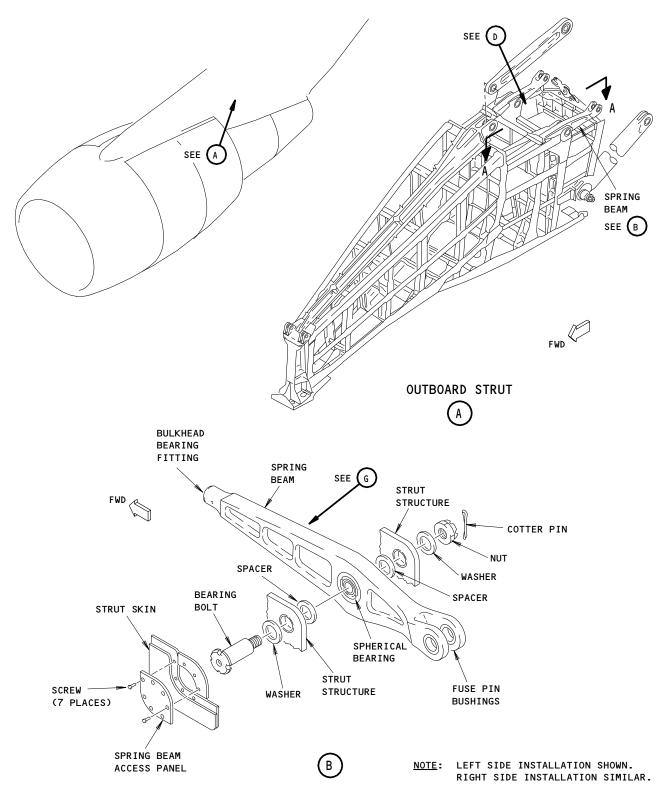
NOTE: Spring beam removal can be done without disconnecting the electrical harness from the strut. You must remove all of the clamps from the electrical harness for approximately 5 feet along the wing front spar. This will supply sufficient free electrical harness for the strut to be lowered approximately ten inches.

EFFECTIVITY——OUTBOARD STRUTS

54-51-03

04





Spring Beam Installation Figure 401 (Sheet 1)

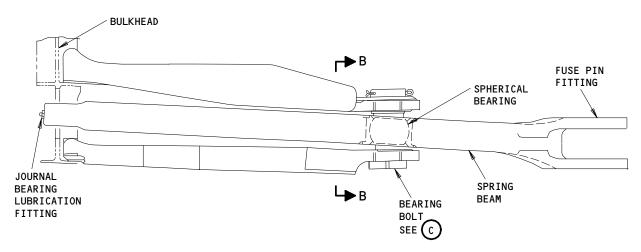
EFFECTIVITY-OUTBOARD STRUTS

54-51-03

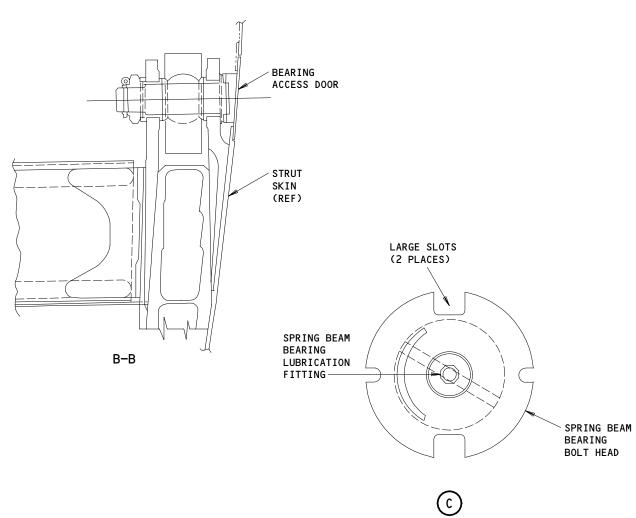
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A-A



Spring Beam Installation Figure 401 (Sheet 2)

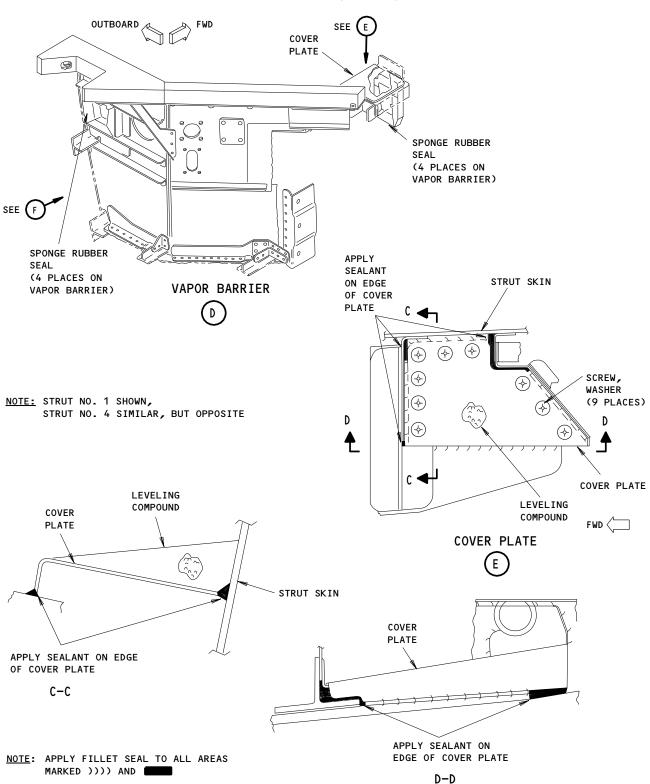
EFFECTIVITY—OUTBOARD STRUTS

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02

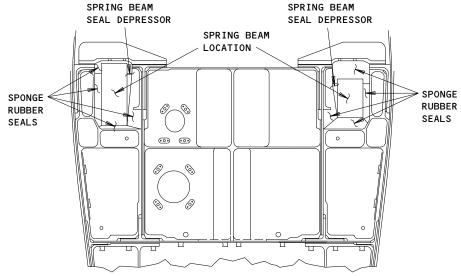
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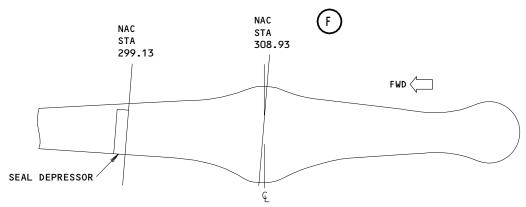


Spring Beam Installation Figure 401 (Sheet 3)

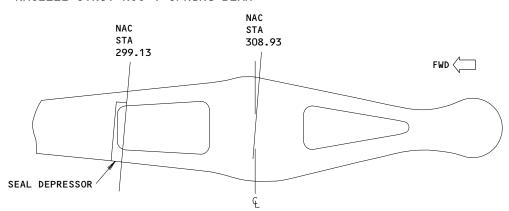




SPRING BEAM SEALS



# NACELLE STRUT NO. 1 SPRING BEAM



NACELLE STRUT NO. 4 SPRING BEAM

# SPRING BEAM SEAL DEPRESSORS



Spring Beam Installation Figure 401 (Sheet 4)

EFFECTIVITY-OUTBOARD STRUTS

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02

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580272



s 014-004

(3) Remove the spring beam bearing access panel.

s 034-005

(4) On the spring beams on the outboard side of the strut, remove nine screws and washers (below the leveling compound) that attach the spring beam cover plate to the vapor barrier.

s 014-039

(5) Break the leveling compound and sealant.

s 014-040

(6) Remove the cover plate.

s 014-041

(7) Remove the leveling compound from the cover plate.

s 014-042

(8) Remove the spherical bearing bolt, cotter pin, nut, spacers, and washers.

s 034-008

(9) Remove the upper seal bracket by the removal of the screws that attach it.

s 024-009

WARNING: DO NOT NICK, SCRATCH, OR DAMAGE SURFACE OF SPRING BEAM.

IF SPRING BEAM IS DAMAGED, SEE SRM 54-50-02 FOR DAMAGE
LIMITS.

(10) Lift the spring beam up to break the seal and withdraw the beam aft from the strut.

s 034-010

(11) If the spring beam is damaged, remove the four sponge rubber seals which are bonded to the vapor barrier and the seal depressor which is bonded to the spring beam.

s 934-013

(12) Tag the beam to show location in which the seals were removed from.

(a) This is to make sure that the installation is in the correct location.

TASK 54-51-03-404-014

- Install the Spring Beam (Fig. 401)
  - A. Consumable Materials
    - (1) A00027 Adhesive BAC 5010, Type 60
    - (2) A00246 Sealant BMS 5-95
    - (3) A00310 Sealant BMS 5-79 (optional to BMS 5-95)

EFFECTIVITY——OUTBOARD STRUTS

54-51-03



- (4) A00102 Sealant, silicone rubber (leveling compound) RTV560
- (5) A00433 Sealant, silicone rubber (leveling compound) RTV60 (optional to RTV560)
- (6) A00803 Sealant, fire resistant BMS 5-63
- (7) B00148 Solvent Methyl Ethyl Ketone (MEK), TT-M-261
- (8) COO317 Primer Sealant BMS5-63, Class B-4 Compound.
- (9) C00580 Primer DC1200
- (10) D00013 Grease BMS 3-24
- B. References
  - (1) AMM 54-51-01/401, Nacelle Strut
  - (2) AIPC 54-51-03 Fig. 1
  - (3) OHM 54-00-01
- C. Access
  - (1) Location Zone
    - 452 Nacelle Strut 1 Torque Box 454 Nacelle Strut 1 — Aft Fairing
    - 482 Nacelle Strut 4 Torque Box
    - 484 Nacelle Strut 4 Aft Fairing
  - (2) Access Panel

452FL	Left Spring Beam Bearing Panel - Nacelle Strut 1
452HRX	Right Spring Beam Bearing Panel - Nacelle Strut 1
482FL	Left Spring Beam Bearing Panel - Nacelle Strut 4
482HRX	Right Spring Beam Bearing Panel - Nacelle Strut 4

## D. Procedure

s 214-015

- (1) Examine the spring beam bearing and bushings.
  - (a) Repair or replace the bearing or bushings, if necessary (0HM 54-00-01).

S 284-016

CAUTION: DO NOT REMOVE OR CHANGE THE SPRING BEAM INTERFERENCE.
THIS CAN CAUSE THE SPRING BEAM TO BE INSTALLED NOT
CORRECTLY.

(2) Make sure that the correct spring beam is to be installed in the proper position (as tagged when it was removed).

s 434-017

(3) If the spring beam was removed, bond four sponge rubber seals to the vapor barrier with adhesive.

EFFECTIVITY——OUTBOARD STRUTS



s 344-043

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS

FOR PROPER HANDLING PROCEDURES.

- (4) If the depressor was removed, bond seal to the spring beam with adhesive.
  - (a) Before the bond clean both surfaces with MEK, Acetone, IPA, or Ethyl alcohol.
  - (b) Apply primer to the surfaces.

s 644-021

(5) Apply a thin layer of grease to the forward end (journal bearing) of the spring beam.

S 424-022

- Install the beam in the strut.
  - (a) Put the forward end of the beam into the bulkhead journal bearing.
  - (b) Make sure that the seals are engaged properly with the spring beam.

s 434-023

(7) Install the upper seal bracket.

S 644-044

(8) Apply a thin layer of grease to the spherical bearing, bolt, bolt threads, washers and spacers.

s 414-045

(9) Install the bolt, washer and spacer, with the bolthead outboard, adjacent to the strut skin.

S 414-046

- (10) Install the washer, spacer and nut.
  - (a) Make sure that the washers are attached tightly under the head of the bolt and nut.

s 434-027

- (11) Turn the bolt to ensure that the lugs on the door engage the slots in the bolt.
  - (a) Make sure that the lugs on the access door will engage slots on the bolthead when the door is closed.

EFFECTIVITY-OUTBOARD STRUTS



s 434-028

(12) Install the nut tightly up to 200 pound-inches (22.7 N.m), to line up the nut slot with the cotter pin hole.

s 434-037

(13) Install the cotter pin.

s 344-029

(14) Apply the sealant (BMS 5-79) approximately 0.10 inch (2.5 mm) thick to both ends of the cotter pin and nut slot.

s 644-031

(15) Put the grease into the spring beam spherical bearing and bulkhead journal bearing fittings until the grease shows up around the bearing areas.

s 434-032

WARNING: THE SPRING BEAM COVER PLATE MUST BE SEALED AGAIN TO MAKE SURE THAT THE VAPOR SEAL REQUIREMENTS ARE MET.

(16) Install the spring beam cover plate and reseal.

s 344-038

(17) Seal the spring beam cover plate again.

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON

YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE

FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS

FOR PROPER HANDLING PROCEDURES.

- (a) Clean the surfaces to be engaged with solvent , Series 84 (AMM 20-30-84).
- (b) Apply primer to the surfaces to be engaged.
- (c) Install nine screws and washers that attach the cover plate to the vapor barrier.
- (d) Apply the sealant (BMS 5-63) between the cover plate and strut (Fig. 401, Sheet 2).

EFFECTIVITY——OUTBOARD STRUTS



s 344-033

WARNING: THE LEVELING COMPOUND MUST BE APPLIED AFTER THE COVER PLATE IS SEALED TO SUPPLY THE PROPER FLOW OF THE FLUIDS.

- (18) Apply the leveling compound to the cover plate.
  - (a) Make sure that the sealant (BMS 5-63) which was applied to the cover plate is dry and tack free.
  - (b) Turn the assembly 2.7° nose up.1) Use the Nac. WL as the horizontal reference plane.
  - (c) Turn the assembly 4.5° from vertical (CW on strut position no. 1, or CCW on strut position no. 4; view looking forward).

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS.

SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (d) Clean cover plate surface that are not sealed with solvent , Series 84 (AMM 20-30-84).
- (e) Apply primer to the areas above.
- (f) Pour the leveling compound (sealant RTV60 or RTV560) into the lowest pocket that was formed by the structure (Fig. 401, Sheet 3).
  - 1) Make sure that the drain inlets are not blocked.
  - 2) Do not move the assembly until the leveling compound has been cured.

s 414-034

- (19) Install the spring beam bearing access door.
  - (a) Make sure that the lugs on the door are engaged to the slots on the bolthead.

s 434-036

(20) Install the nacelle strut (AMM 54-51-01/401).

EFFECTIVITY——OUTBOARD STRUTS



## SPRING BEAM - INSPECTION/CHECK

## 1. General

- A. This procedure provides three tasks; a spring beam bolt rotation check, a spring beam bearing movement check, and a spring beam bearing radial freeplay check.
  - (1) The spring beam bolt rotation check consists of removing engine, removing access panels, checking breakaway torque of bolt, injecting grease into fitting if torque not within limits, removing beam and bolt and replacing parts as necessary if torque still not within limits, installing access panels, and installing engine.
  - (2) The spring beam bearing movement check consists of removing access panel, moving strut laterally by hand and checking for bearing movement, replacing bearing or bolt if seized, and installing access panel.
  - (3) The spring beam bearing radial freeplay check consists of removing the spring beam, doing a check of the bearing radial freeplay, replacing the bearing if the limit is exceeded, and installing the spring beam.

TASK 54-51-03-226-001

- Spring Beam Bolt Rotation Check (Fig. 601)
  - A. Consumable Materials
    - (1) A00247 Sealant BMS 5-79
    - (2) D00294 Grease BMS 3-24
  - B. References
    - (1) AMM 27-81-00/201 Leading Edge Flaps
    - (2) AMM 54-51-03/401 Spring Beam
    - (3) AMM 71-00-02/401 Power Plant
    - (4) AIPC 54-51-03 Fig. 1
  - C. Access
    - (1) Location Zone

452 Nacelle Strut 1 - Torque Box 482 Nacelle Strut 4 - Torque Box

(2) Access Panel

452FR	Spring Beam Bearing Access Panel - Nacelle Strut 1
452GL	Spring Beam Bearing Access Panel - Nacelle Strut 1
521FT	Wing Leading Edge Cover - Nacelle Strut 1
482FR	Spring Beam Bearing Access Panel - Nacelle Strut 4
482GL	Spring Beam Bearing Access Panel - Nacelle Strut 4
621FT	Wing Leading Edge Cover - Nacelle Strut 4

#### D. Procedure

s 016-002

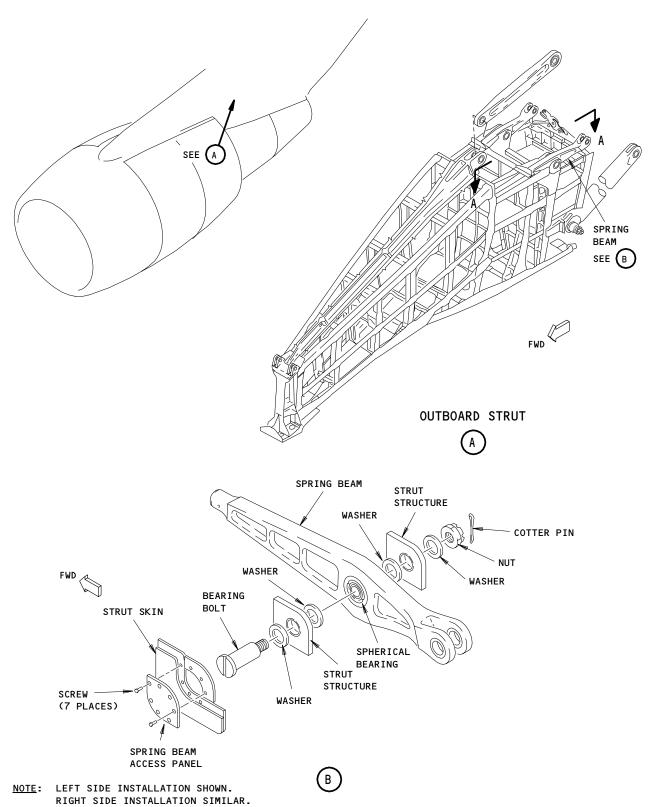
(1) Do the procedure the remove the engine (AMM 71-00-02/401).

s 016-003

(2) Remove the access panel for the spring beam bearing.

EFFECTIVITY—OUTBOARD STRUTS





Spring Beam Bolt and Bearing Inspection Figure 601 (Sheet 1)

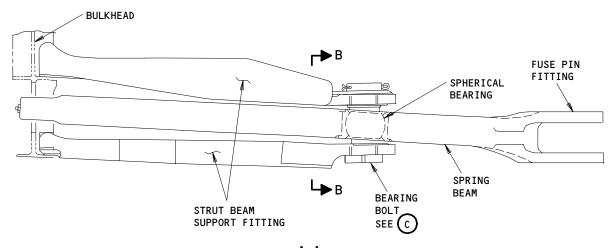
OUTBOARD STRUTS

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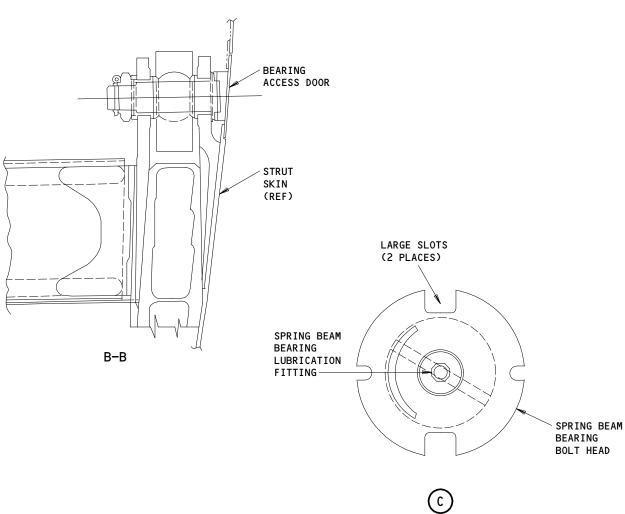
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Spring Beam Bolt and Bearing Inspection Figure 601 (Sheet 2)

EFFECTIVITY—OUTBOARD STRUTS

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s 016-004

(3) Remove the wing leading edge cover.

s 226-005

- (4) Do a check of the bearing bolt.
  - (a) Remove the cotter pin or retainer.

NOTE: This will make sure that the cotter pin does not contact the retainer, and that the torque value is correct.

(b) Apply a torque to the head of the bolt.

NOTE: Use dial indicator type torque wrench. Preset or releasing type torque wrench will only respond to breakaway torque. Rotational torque requirement is after breakaway.

- (c) STRUTS WITH A SIDE BRACE; If the rotational torque after breakaway is 3000 pound-inches (342 N.m) or less, the bolt and fitting are acceptable.
- (d) STRUTS WITH SIDE LINKS; If the rotational torque after breakaway is 1200 pound-inches (135.6 N.m) or less, the bolt and fitting are acceptable.
- (e) Install the cotter pin or retainer.
  - 1) If cotter pin was removed, install the cotter pin and apply BMS 5-79 sealant, approximate thickness 0.10 inch (2.5 mm), to both ends of cotter pin to prevent cotter pin movement.
- (f) STRUTS WITH A SIDE BRACE;
  If rotational torque after breakaway is greater than 3000 pound-inches (342 N.m), inject liberal amount of grease into grease fitting and rotate bolt six revolutions or until rotational torque is 3000 pound-inches (342 N.m) or less.
- (g) STRUTS WITH SIDE LINKS; If rotational torque after breakaway is greater than 1200 pound-inches (135.6 N.m), inject liberal amount of grease into grease fitting and rotate bolt six revolutions or until rotational torque is 1200 pound-inches (135.6 N.m) or less.
- (h) STRUTS WITH A SIDE BRACE; If after rotating bolt six revolutions, rotational torque is greater than 3000 pound-inches (342 N.m), perform the following:
  - 1) Loosen nut and drive bolt out approximately 1/32 inch (0.8 mm) to free washers.

EFFECTIVITY——OUTBOARD STRUTS



- 2) Inject grease into grease fitting and apply a torque to bolt head.
- (i) STRUTS WITH SIDE LINKS;

If after rotating bolt six revolutions, rotational torque is greater than 1200 pound-inches (135.6 N.m), perform the following:

- 1) Loosen nut and drive bolt out approximately 1/32 inch (0.8 mm) to free washers.
- 2) Inject grease into grease fitting and apply a torque to bolt head.
- 3) STRUTS WITH A SIDE BRACE; If rotational torque is 3000 pound-inches (342 N.m) or less, bolt and fitting are acceptable.
- 4) STRUTS WITH SIDE LINKS; If rotational torque is 1200 pound-inches (135.6 N.m) or less, bolt and fitting are acceptable.
  - a) Apply grease to washer faces and drive bolt back into fitting to seat bolt head and washer.
  - b) Install nut finger-tight ensuring that nut and washer are securely seated against fitting.
  - c) Install cotter pin. Tighten nut up to a maximum of 200 pound—inches (22.6 N.m) torque, if necessary, to line up nut slot with hole in bolt.
  - d) Apply sealant (approximate thickness 0.10 inch (2.5 mm) to both ends of cotter pin to prevent cotter pin movement.
- 5) STRUTS WITH A SIDE BRACE; If rotational torque is greater than 3000 pound-inches (342 N.m), remove bolt (AMM 54-51-03/401).
- 6) STRUTS WITH SIDE LINKS;

If rotational torque is greater than 1200 pound-inches (135.6 N.m), remove bolt (AMM 54-51-03/401).

- a) Check bolt OD, bushing, and bearing ID for galling.
   Replace if galled.
- b) Check washers for burrs and galling. Replace if necessary.
- c) Apply liberal amount of grease to all mating surfaces and install bolt (AMM 54-51-03/401).
- d) Repeat bolt rotation check.

s 946-006

CAUTION: TOOLS, LOOSE MATERIAL, AND DEBRIS IN STRUT CAVITIES MAY BLOCK DRAINS, RENDERING DRAIN SYSTEM INEFFECTIVE.

(5) Make sure that tools and loose material are removed and strut cavities are free of debris before installing access panels.

s 416-007

(6) Install the wing leading edge cover.



s 416-008

(7) Install the spring beam bearing access panel and make sure that the lugs on door engage slots on bolthead.

s 416-009

(8) Install the engine (AMM 71-00-02/401).

TASK 54-51-03-216-010

- 3. <u>Spring Beam Bearing Movement Check</u> (Fig. 601)
  - A. References
    - (1) AMM 27-81-00/201 Leading Edge Flaps
  - B. Access
    - (1) Location Zone

452 Nacelle Strut 1 - Torque Box 482 Nacelle Strut 4 - Torque Box

(2) Access Panel

452FL Access Door - Nacelle Strut 1
452HR Access Door - Nacelle Strut 1
482FL Access Door - Nacelle Strut 4
482HR Access Door - Nacelle Strut 4
521FT Wing Leading Edge Cover - Nacelle Strut 1
621FT Wing Leading Edge Cover - Nacelle Strut 4

## C. Procedure

s 496-011

WARNING: LEADING EDGE FLAPS ARE FAST ACTING. LOCKS SHOULD BE INSTALLED TO PREVENT POSSIBLE INJURY DUE TO INADVERTENT OPERATION OF FLAPS.

(1) Extend leading edge flaps and install leading edge flap drive unit lock (AMM 27-81-00/201).

s 286-017

(2) Do a check of the spring beam bearing.

NOTE: You can get access to the spring beam through the wing leading edge panels or through the spring beam bearing access doors.

(a) Remove the wing leading edge cover, 521FT or 621FT, or remove the spring beam bearing access doors, 452FL and 452HR or 482FL and 482HR.

EFFECTIVITY——OUTBOARD STRUTS



WARNING: DO NOT PUT YOUR FINGERS BETWEEN THE SPRING BEAM AND THE STRUT BEAM SUPPORT FITTING. MOVEMENT OF THE SPRING BEAM CAN CAUSE INJURY.

- (b) Do a check for movement between the spring beam and the strut beam support fitting.
  - 1) Put your fingers on the gap between the spring beam and the strut beam support fitting.
  - 2) Push on the engine with your hand to shake the engine and strut laterally.
  - 3) If you do not feel motion between the spring beam and the strut beam support fitting, remove and replace the bearing.

CAUTION: MAKE SURE THAT YOU REMOVE TOOLS AND UNWANTED MATERIAL FROM THE STRUT CAVITY BEFORE YOU INSTALL THE WING LEADING EDGE COVER. THESE ITEMS CAN BLOCK THE STRUT DRAINS AND CAUSE DAMAGE TO THE STRUT.

(c) Install the access panel(s) that you removed.

s 096-016

<u>WARNING</u>: LEADING EDGE FLAPS ARE FAST ACTING AND CAN CAUSE SERIOUS INJURY TO PERSONNEL.

(3) Remove the leading edge flap drive unit lock and retract the leading edge flaps (AMM 27-81-00/201).

TASK 54-51-03-206-018

- 4. Spring Beam Bearing Radial Freeplay Check (Fig. 601)
  - A. References
    - (1) AMM 54-51-03/401, Spring Beam
    - (2) OHM 54-00-01, Nacelle Strut to Component
  - B. Procedure

s 016-020

(1) Remove the spring beam (AMM 54-51-03/401).

EFFECTIVITY——OUTBOARD STRUTS



# s 226-019

- (2) Do a check of the spring beam bearing radial freeplay.
  - (a) If the radial freeplay is equal to or less than 0.0110 inch (0.2794 mm), the bearing is acceptable.
  - (b) If the radial freeplay is greater than 0.0110 inch (0.2794 mm), replace the bearing (OHM 54-00-01).

s 416-021

(3) Install the spring beam (AMM 54-51-03/401).

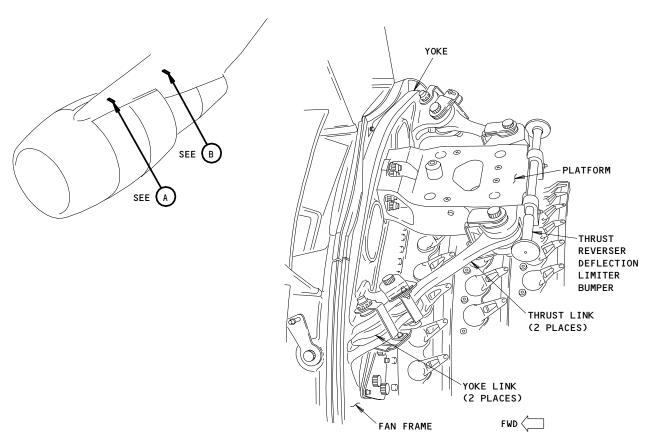


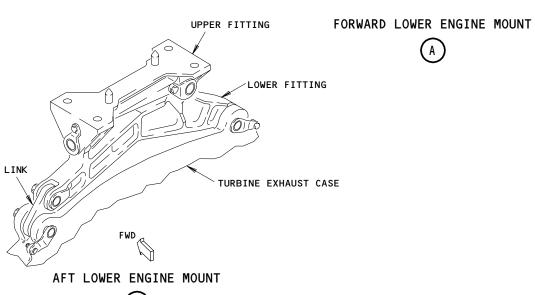
# ENGINE ATTACH FITTINGS - DESCRIPTION AND OPERATION

## 1. <u>General</u> (Fig. 1.)

- A. Forward and aft engine mounts are made of steel alloy. These fittings are designed to allow for thermal expansion of the engine and permit engine removal and installation with standard tools.
  - (1) The forward lower engine mount provides suspension of the engine at three places on the aft inner flange of the fan frame. The two yoke links and the platform attach to the fan frame. The thrust links provide a connection between the platform and the yokes, and the yokes attach to the yoke links. The forward lower engine mount is designed for thrust, vertical, and side loads. Refer to 71-21-00 for additional forward lower engine mount description.
  - (2) The aft lower engine mount provides suspension of the engine at two places on the turbine exhaust case double flange. The lower fitting and the link provide the connection between the upper fitting and the turbine exhaust case double flange. The aft lower engine mount is designed for side, vertical, and torque loads. Refer to 71-21-00 for additional aft lower engine mount description.







Forward and Aft Engine Mounts Figure 1

EFFECTIVITY-ALL

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## NACELLE STRUT SPRING BEAM SUPPORT FITTING - REMOVAL/INSTALLATION

# 1. General

- A. This procedure contains two tasks. The first task is to remove the spring beam support fitting. The second task is to install the spring beam support fitting.
- B. It is necessary to remove the spring beam support fitting to repair the front end journal (spherical) bearing. To remove the spring beam support fitting, it is first necessary to remove the spring beam.

TASK 54-51-06-004-001-001

- 2. Remove the Spring Beam Support Fitting (Fig. 401)
  - A. References
    - (1) AMM 54-51-03/401, Spring Beam
  - B. Procedure

s 014-002-001

(1) Remove the spring beam (1) (AMM 54-51-03/401).

s 024-003-001

- (2) Remove the spring beam support fitting (2).
  - (a) Remove the fasteners that attach the four radius fillers (3), and remove the radius fillers.
  - (b) Remove the fasteners that attach the five radius fillers (4), and remove the radius fillers.
  - (c) Remove the fasteners that attach the three radius fillers (5), and remove the radius fillers.
  - (d) Remove the remaining four fasteners.

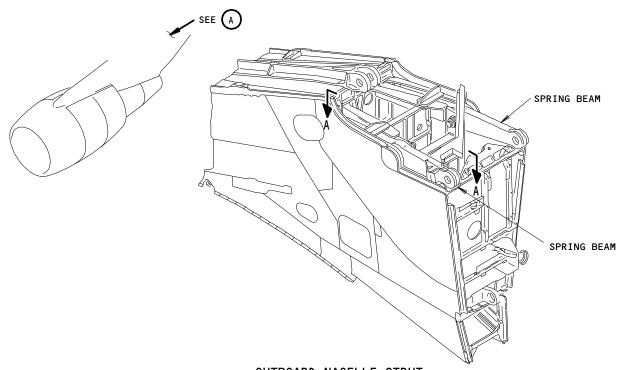
<u>NOTE</u>: It is not necessary to remove the three fasteners that attach the bearing retainer to the spring beam support fitting.

(e) Remove the spring beam support fitting (2).

EFFECTIVITY-

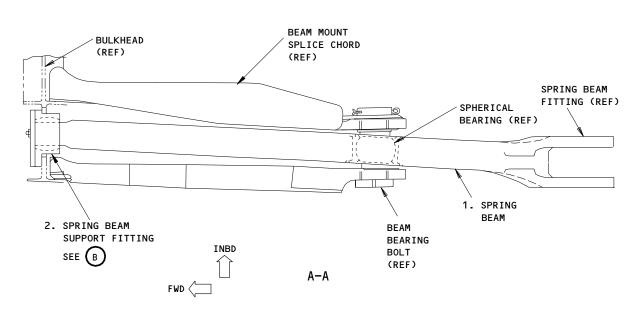
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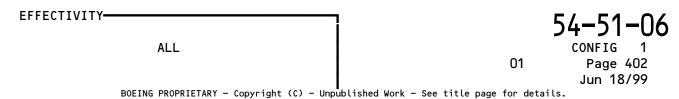
OUTBOARD NACELLE STRUT
(NO. 1 STRUT IS SHOWN, NO. 4 STRUT IS OPPOSITE)



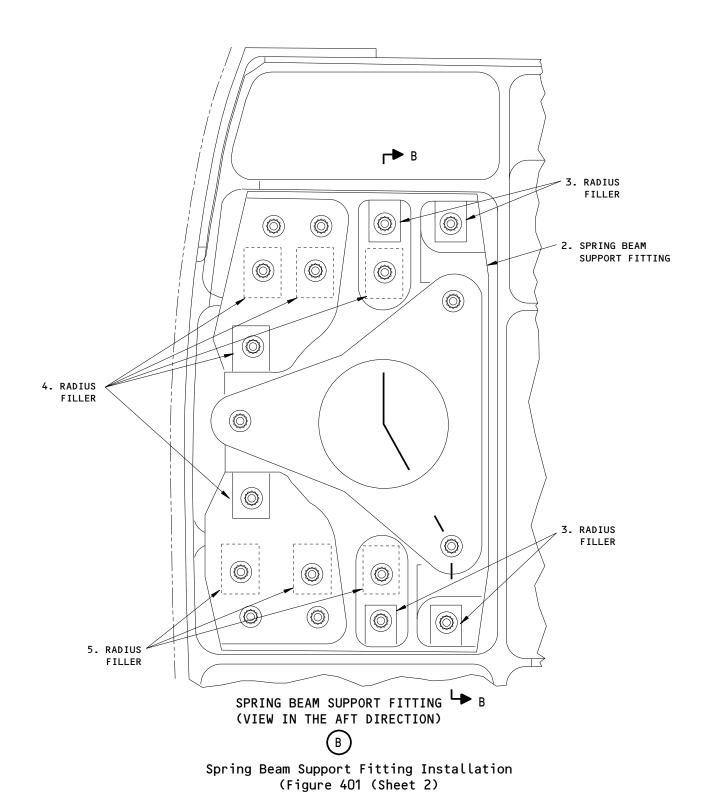


NOTE: LEFT SIDE INSTALLATION SHOWN.
RIGHT SIDE INSTALLATION OPPOSITE.

Spring Beam Support Fitting Installation Figure 401 (Sheet 1)





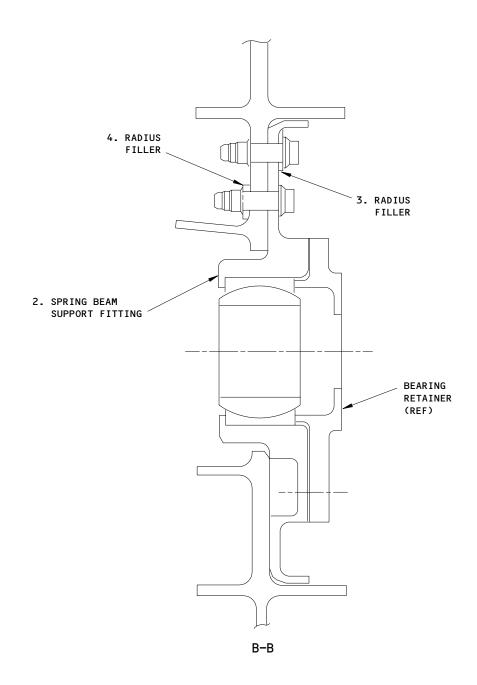


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Spring Beam Support Fitting Installation (Figure 401 (Sheet 3)

ALL

ALL

CONFIG 1

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TASK 54-51-06-404-004-001

## 3. Install the Spring Beam Support Fitting (Fig. 401)

## A. Parts

АММ			AIPC		
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
401	2 2 2 2 3 4 5	Spring Beam Fitting Spring Beam Fitting Spring Beam Fitting Spring Beam Fitting Radius Filler Radius Filler Radius Filler	54-51-01 54-51-01	16	80 85 90 95 53 55

- B. References
  - (1) AMM 54-51-03/401, Spring Beam
  - (2) SRM 51-30-02, Fastener Installation and Removal
- C. Procedure

<u>NOTE</u>: The fasteners used for this installation come in two different grip lengths. Make sure you look at the reference installation drawing to determine the correct fastener usage, and install the fasteners per SRM 51-03-02.

s 424-005-001

- (1) Install the spring beam support fitting (2).
  - (a) Install the three radius fillers (5) with the applicable fasteners.
  - (b) Install the five radius fillers (4) with the applicable fasteners.
  - (c) Install the four radius fillers (3) with the applicable fasteners.
  - (d) Install the remaining four fasteners.

s 414-006-001

ALL

(2) Install the spring beam (1)(AMM 54-51-03/401).

EFFECTIVITY-

54-51-06

1

03

CONFIG 1 Page 405 Oct 18/99



## FIRESEALS AND FIREWALL - DESCRIPTION AND OPERATION

## 1. General

- A. The firewall protects the nacelle strut and engine systems installed in the strut from exposure to high temperatures and fire damage. The fireseals prevent leakage of fluids and fire damage.
- B. Thermal insulation blankets are installed along the lower spar to protect strut systems from high temperature.

# 2. Firewall

- A. The firewall consists of steel structural members and steel clad aluminum members. Firewall protection extends from the forward engine mount bulkhead to the torque bulkhead, along the forward midspar and the lower spar, for both inboard and outboard struts.
- B. High temperature sealant is applied to the firewall to ensure a fire barrier.
- C. Access to the firewall is gained by removing the engine and also through access doors located in the lower side of the strut.

#### 3. Fireseals

- A. The fireseal depressor mates with the fireseals installed on the thrust reverser. The fireseal depressor extends from nacelle station 195 (forward of the front engine mount bulkhead) to nacelle station 261 (aft of the lower spar forward end). The depressor is identical for inboard and outboard strut installations.
- B. For inspection or repair of the thrust reverser fireseals, refer to 78-00-00.

ALL

54-52-00



# FIRESEAL AND FIREWALL - INSPECTION/CHECK

## 1. General

- A. This procedure has one task, the inspection of the fireseal and firewall.
- B. The procedure has these steps:
  - (1) Remove the engine
  - (2) Remove the strut and access doors
  - (3) Examine the firewall and fireseal for damage
  - (4) Examine the firewall and fireseal for the correct drainage
  - (5) Install the strut access doors
  - (6) Install the engine.

# TASK 54-52-00-216-001

## 2. Firewall and Fireseal Inspection

- A. References
  - (1) 27-81-00/201, Leading Edge Flaps
  - (2) 51-31-01/201, Seals and Sealant
  - (3) 54-62-00/201, Nacelle Strut Access Panels
  - (4) 71-00-02/401, Power Plant
  - (5) SRM 54-00-00
- B. Access
  - (1) Location Zone

452 Nacelle Strut 1 - Torque Box					
	452	Nacelle	Strut 1	- Torque	Roy

EFFECTIVITY-

54-52-00

ALL

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#### (2) Access Panel

452AL	Core Cowl to Strut Access Door - Nacelle Strut 1
452AR	Core Cowl to Strut Access Door - Nacelle Strut 1
452BL	Core Cowl to Strut (Aft) Access Door - Nacelle Strut 1
452DL	Mid-lower (Forward) Access - Nacelle Strut 1
452DR	Mid-lower (Forward) Access Door - Nacelle Strut 1
452FL	Mid-lower Strut (Aft) Access Door - Nacelle Strut 1
462AL	Core Cowl to Strut Access Door - Nacelle Strut 2
462AR	Core Cowl to Strut Access Door - Nacelle Strut 2
462BL	Core Cowl to Strut (Aft) Access Door - Nacelle Strut 2
462DL	Mid-lower (Forward) Access Nacelle Strut 2
462DR	Mid-lower (Forward) Access Door - Nacelle Strut 2
462FL	Mid-lower Strut (Aft) Access Door - Nacelle Strut 2
472AL	Core Cowl to Strut Access Door - Nacelle Strut 3
472AR	Core Cowl to Strut Access Door - Nacelle Strut 3
472BL	Core Cowl to Strut (Aft) Access Door - Nacelle Strut 3
472DL	Mid-lower (Forward) Access Nacelle Strut 3
472DR	Mid-lower (Forward) Access Door - Nacelle Strut 3
472FL	Mid-lower Strut (Aft) Access Door - Nacelle Strut 3
482AL	Core Cowl to Strut Access Door - Nacelle Strut 4
482AR	Core Cowl to Strut Access Door - Nacelle Strut 4
482BL	Core Cowl to Strut (Aft) Access Door - Nacelle Strut 4
482DL	Mid-lower (Forward) Access - Nacelle Strut 4
482DR	Mid-lower (Forward) Access Door - Nacelle Strut 4
482FL	Mid-lower Strut (Aft) Access Door - Nacelle Strut 4

C. Prepare to Examine the Firewall and Fireseal

s 016-002

(1) Do the procedure to remove the engine (Ref 71-00-02/401).

s 016-003

WARNING: INSTALL THE SAFETY LOCKS IN THE LEADING EDGE FLAPS. THE LEADING EDGE FLAPS CAN MOVE QUICKLY IF YOU INSTALL THE SAFETY LOCKS INCORRECTLY. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(2) Make sure the leading edge flaps are retracted, and install the safety locks in the leading edge flaps (Ref 27-81-00/201).

s 016-004

- (3) Remove the strut access doors along the bottom of the nacelle strut (Ref 54-62-00/201).
- D. Examine the Firewall and Fireseal

s 216-005

ALL

(1) Examine the firewall structure for cracks, nicks, dents, deformations or loose components or components that are not there.

(a) If you find these conditions, repair the firewall (Ref SRM 54-00-00).

EFFECTIVITY-

54-52-00



s 216-006

- (2) Make sure the top surface of the firewall is clean and drains
  - (a) If the fireseal collects fluids, do the procedure to seal the fireseal (Ref 51-31-01/201).
- E. Restore the Airplane to Normal

s 166-007

TOOLS OR UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN STOP CAUTION: THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(1) Remove all tools and unwanted materials from the strut cavities before you install the access doors.

s 416-008

(2) Install the access doors on the strut (Ref 54-62-00/201).

s 416-009

(3) Install the engine (Ref 71-00-02/401).

EFFECTIVITY-

ALL

54-52-00



# STRUT INSULATION BLANKET - REMOVAL/INSTALLATION

## 1. General

- A. This procedure contains two tasks, the removal and the installation of the Strut Insulation Blanket.
- B. Blanket installations may vary from the illustration (Fig. 401) which is typical (with SB 54-2178 incorporated). Insulation blankets should be handled with care, avoiding activities which may encourage cracking or tearing of the material. For repair procedures, see AMM 54-52-01/801.

TASK 54-52-01-004-001

- 2. Strut Insulation Blanket Removal
  - A. References
    - (1) AMM 71-00-02/401, Power Plant
    - (2) AMM 71-11-04/201, Fan Cowl Panels
    - (3) AMM 78-31-00/201, Thrust Reverser System
  - B. Access
    - (1) Location Zones
      - 452 Nacelle Strut 1 Torque Box
      - 462 Nacelle Strut 2 Torque Box
      - 472 Nacelle Strut 3 Torque Box
      - 482 Nacelle Strut 4 Torque Box
  - C. Remove the strut insulation blanket

s 014-002

(1) Remove the applicable engine (AMM 71-00-02/401).

s 024-010

(2) Remove the insulation blanket.

<u>NOTE</u>: Handle the blanket with care. Do not allow the blanket to fold at a sharp angle. Support the blanket when removing or installing it.

s 024-012

(3) Remove the blanket cover plate, if installed.

s 024-004

(4) Remove the attach bolts and washers (22 places typical).

s 024-013

(5) If the instalation uses capstans, remove the lockwire from the capstans.

s 024-014

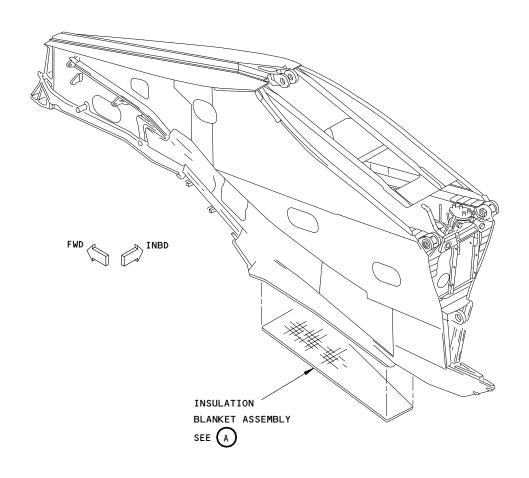
(6) Support the blanket to avoid bending and remove from place.

EFFECTIVITY-

54-52-01

ALL





STRUT (CF6-80C2 ENGINES IS SHOWN, PW4000 ENGINES IS EQUIVALENT)

Strut Inslation Blanket Figure 401 (Sheet 1)

EFFECTIVITY-ALL

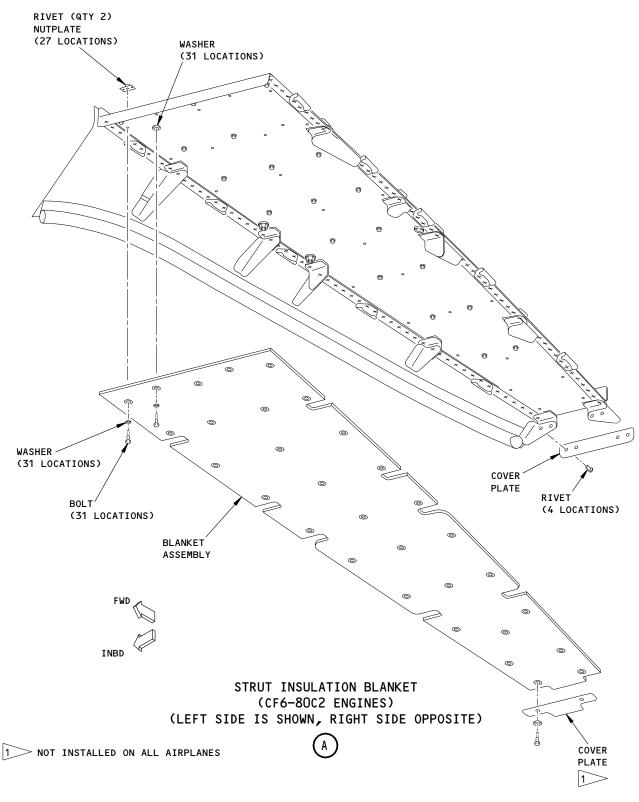
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Strut Inslation Blanket Figure 401 (Sheet 2)

ALL 54-52-01

ALL 02 Page 403
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## TASK 54-52-01-404-005

- Strut Insulation Blanket Installation
  - Consumable Materials
    - (1) Lockwire
  - References В.
    - (1) AMM 71-00-02/401, Power Plant
    - (2) AMM 71-11-04/201, Fan Cowl Panels
    - (3) AMM 78-31-00/201, Thrust Reverser System
  - Access
    - (1) Location Zones
      - 452 Nacelle Strut 1 - Torque Box 462 Nacelle Strut 2 - Torque Box
      - 472 Nacelle Strut 3 - Torque Box Nacelle Strut 4 - Torque Box 482
  - D. Procedure

s 424-006

- Install the strut insulation blanket:
  - (a) Put the insulation blanket in its correct postion on the strut.
  - (b) If the installation has capstans installed, make sure that the capstans go through the grommets in the the insulation blanket
  - Use the double twist method to install the lockwire that holds the insulation blanket in place.
    - 1) Make sure that the lockwire makes a minimum of one complete turn around each of the capstans.
  - Install the bolts and washers in the remaining attach (d) locations.
  - Install the cover plate. (e)

s 414-008

ALL

(2) Install the engine (AMM 71-00-02/401).

EFFECTIVITY-

54-52-01



## STRUT INSULATION BLANKETS - REPAIRS

## 1. General

This procedure has a task to repair the strut aluminized insulation blankets.

TASK 54-52-01-308-023

- Insulation Blanket Repairs
  - A. Equipment and Materials
    - (1) A00482 Sealant RTV106
    - AMA 138 Precured Aluminized fiberglass cloth (Style 112) (2) Hi Temp Insulation Inc, Camarillo, CA 93010 TIG Hitco, Atlanta, GA 30318
    - (3) Abrasive paper or cloth (280 grit)
    - (4) Nextel 312 flameproof ceramic fabric (or equivalent) Hexel Corp., 1913 N. King, Sequin, TX 78155
    - (5) Sealant RTV 60 (RTV 106 alternative)
    - (6) Stitching 0.0018 Diameter, Class C
    - (7) Solvent MPK, acetone or equivalent
    - (8) Wipers cheesecloth, gauze or lint free equivalent
  - References
    - (1) AMM 71-00-02/401, Power Plant
  - Access
    - (1) Location Zones
      - 452 Nacelle Strut 1 - Torque Box
      - Nacelle Strut 2 Torque Box 462
      - Nacelle Strut 3 Torque Box 472
      - 482 Nacelle Strut 4 - Torque Box
  - Repair Limitations

s 218-001

(1) Signs of moisture or fluid contamination inside the insulation layer requires replacement of the blanket.

s 218-002

(2) Total repairs of torn or damaged fabric covering (not including delaminated or torn aluminum foil) shall not exceed 10 percent of the blanket surface.

s 218-003

ALL

(3) Repairs involving repair of the delaminated or torn aluminum foil covering (not including fiberglass under layer) does not have a repair limit.

EFFECTIVITY-

54-52-01



- E. Repair of delaminated and/or torn aluminum foil.
  - s 168-004
  - (1) Remove areas of damaged or delaminated foil.
    - (a) If the foil is firmly bonded in repair area, carefully scrape it off the underlying fabric layer.
    - s 168-005
  - (2) Sand the foil to remove gloss surrounding the area of repair to provide 1 inch of overlap.
    - s 118-006
  - (3) Solvent clean the repair area with MPK or acetone.
    - s 378-007
  - (4) Prime the repair area with DC1200.
    - s 358-008
  - (5) Allow a minimum of 30 minutes, and a maximum of 2 hours curing time before applying RTV sealant.
    - s 358-009
  - (6) Apply a 0.005 to 0.010 inch coat of RTV 60 sealant to the repair surface.
    - s 358-010
  - (7) Apply a repair patch of AMA 138 precured aluminized fiberglass cloth (style 112) to the repair area.
    - s 358-011
  - (8) Cover the repair area with release film and apply weight (sand bags) to ensure that the edges of the repair patch are firmly bonded.
    - s 358-012
  - (9) Allow sufficient time to cure, depending upon the catalyst mix ratio.
    - s 358-013

ALL

- (10) Alternative to applying RTV 60 and AMA 138 patch is to apply 0.010 coat of RTV 60 or RTV 106 to repair area, overlapping at least 0.50 inch.
  - (a) Allow time to cure for RTV 106 allow 24 hours to cure before returning to service.

EFFECTIVITY-

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F. Repair of torn or damaged fabric covering.

s 358-025

(1) Remove the foil 2 inches back from the damage area by peeling and scraping the foil.

s 358-017

(2) Foil that is firmly bonded may be sanded to eliminate gloss.

s 358-014

(3) Sew a flameproof ceramic fabric patch (Nextel or Astro-quartz) over the damaged area with a 1-inch overlap.

s 358-015

(4) Ensure the stitching loops through both fabric layers, and use a minimum of three stitches per inch.

s 358-016

(5) Solvent clean the repair area (MPK or acetone).

s 358-018

(6) Prime the repair area with DC1200.

s 358-019

(7) Allow 30 minutes to 2 hours for the primer to cure.

s 358-020

(8) Apply a 0.005 to 0.010 inch coat of RTV 60 to the repair area.

s 358-021

(9) Apply a repair patch of AMA 138 aluminized fiberglass cloth (style 112).

s 358-022

(10) Cover the repair area with release film and apply weight (sand bags) to make sure the edges of the repair patch are firmly bonded.

s 358-026

ALL

(11) Allow time to cure, depending upom the catalyst mix ratio.

EFFECTIVITY-

54-52-01



#### STRUT DRAINS AND SEALANT - DESCRIPTION AND OPERATION

# 1. General (Fig. 1)

- A. The strut drain system provides a means for disposal of accumulated fluids leaking from system plumbing routed through the strut. Sealant applied to the firewall and the interior of the nacelle strut is intended to prevent the leakage of accumulated fluids between strut compartments, or onto the engine.
- B. The strut drain system consists of tubes which route fluids from sealed strut compartments to overboard drains. Entry screens are installed at all strut drain tube inlets. Sealant is applied at certain bulkheads and spars to provide sealed strut compartments.
- C. Inboard and outboard strut drain systems are functionally similiar, although drain tube routing and sealant application differ due to structural differences.

# 2. <u>Sealant</u>

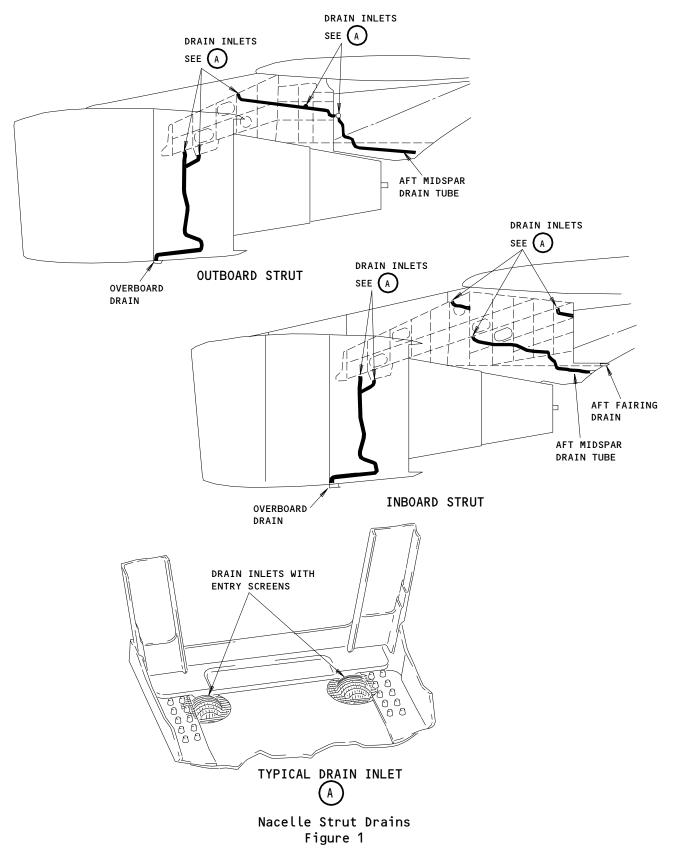
- A. Sealant is applied to the upper spar, midspar, lower spar, forward engine mount bulkhead, NAC STA (241) bulkhead above the midspar, torque bulkhead, vapor barrier, and wing front spar. Sealed compartments created by application of sealant include the forward strut compartment, aft strut compartment, and strut dry bay. The area aft of the torque bulkhead, vapor barrier, and wing front spar is sealed from the strut torque box area.
- B. Leveling compound is applied to certain areas in the strut to provide proper flow of fluids to drain tube inlets. This ensures that no fluids accumulate in low points of strut compartments without means of disposal.

## 3. <u>Drain Tubes</u>

- A. Drain tubes are installed at low points in each sealed strut compartment and route fluids to either an overboard drain or the next lower compartment. The strut dry bay has a condensate drain at the low point in the compartment.
- B. Entry screens are installed at all strut drain tube inlets to prevent debris from entering and plugging drain tubes.

54-53-00





EFFECTIVITY-ALL

54-53-00

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## STRUT DRAINS AND SEALANT - MAINTENANCE PRACTICES

## 1. General

- A. This procedure has these eleven tasks:
  - (1) Outboard Strut, Forward Tube Leak Check (T1)
  - (2) Outboard Strut, Aft Tube Leak Check (T2)
  - (3) Outboard Strut, Forward Midspar Leak Check (S1)
  - (4) Outboard Strut, Upper Spar Inlet Leak Check (S2)
  - (5) Outboard Strut, Closure Spar Leak Check (S3)
  - (6) Inboard Strut, Forward Tube Leak Check (T1)
  - (7) Inboard Strut, Aft Tube Leak Check (T2)
  - (8) Inboard Strut, Forward Midspar Leak Check (S1)
  - (9) Inboard Strut, Upper Spar Leak Check (S2)
  - (10) Inboard Strut, Aft Midspar Leak Check (S3)
  - (11) Clean the Strut Drains
- B. The T1 and T2 leak checks make sure the tubes in the strut do not have leaks.
- C. The S1, S2, and S3 leak checks make sure that the strut structure does not have leaks.
- D. You can do each of the leak check tasks independently after you do maintenance on areas of the struts.
- E. If you do more than one leak check, you can leave the access panels open until you complete the last task on that strut.
- F. All the nacelle stations (NSTA) numbers that are shown in Figures 201 - 204 and referenced in the procedure are approximate.

## TASK 54-53-00-702-040

#### 2. Outboard Strut, Forward Tube - Leak Check (T1)

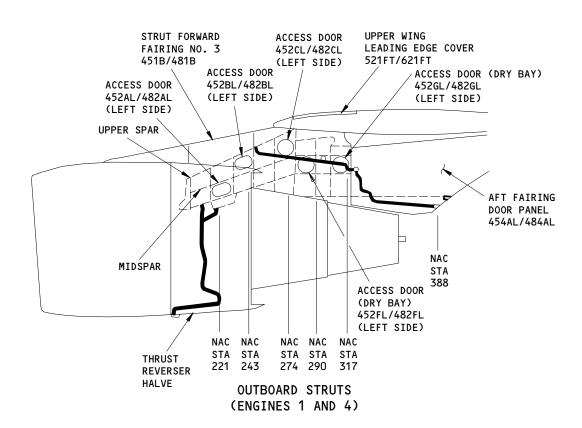
- A. General
  - (1) This task gives instuctions on how to do a leak check (T1) of the forward drain tube on the outboard engine strut.
- B. Equipment
  - (1) Water source low pressure, can spray up to 2 quarts (1.9 liters) per minute
  - (2) Container 5 gallon (19 liter) capacity, can collect and measure water to within 1 fluid ounce (30 ml) (measure can be done in smaller containers)
  - (3) Funnel long necked
- C. References
  - (1) AMM 08-00-00/201, Leveling and Weighing
  - (2) AMM 27-81-00/201, Leading Edge Flaps
  - (3) AMM 51-31-01/201, Seals and Sealing
  - (4) AMM 54-62-00/201, Nacelle Strut Access Panels
  - (5) AMM 71-11-04/201, Fan Cowl Panels
  - (6) AMM 71-11-06/201, Core Cowl Panels
  - (7) AMM 78-31-00/201, Thrust Reverser System

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Outboard Struts Drain Access Figure 201

EFFECTIVITY ALL

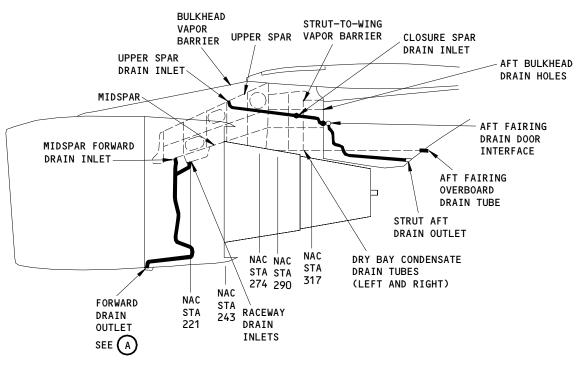
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OUTBOARD STRUTS
(ENGINES 1 AND 4)

# Outboard Struts Drain Locations Figure 202

EFFECTIVITY ALL

E22239

54-53-00

01 J

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- D. Access
  - (1) Location Zone
    - 451 Nacelle Strut 1 Forward Fairing
    - 452 Nacelle Strut 1 Torque Box
    - 481 Nacelle Strut 4 Forward Fairing
    - 482 Nacelle Strut 4 Torque Box
  - (2) Access Panel
    - 452AL Core Cowl to Strut Access Door Engine 1
    - 452BL Upper Midspar Pressure Relief Access Door Engine 1
    - 452CL Midspar Pressure Relief Access Door Engine 1
    - 482AL Core Cowl to Strut Access Door Engine 4
    - 482BL Upper Midspar Pressure Relief Access Door Engine 4
    - 482CL Midspar Pressure Relief Access Door Engine 4
- E. Prepare for the Leak Check (T1 Outboard)
  - S 012-145
  - (1) Open the left and right fan cowl panels (AMM 71-11-04/201).
    - s 012-101
  - WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.
  - (2) Open the left and right thrust reversers (AMM 78-31-00/201).
    - s 012-147
  - (3) Open the left and right core cowl panels (AMM 71-11-06/201).
    - s 042-044
  - WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.
  - WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL
    THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU
    DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE
    INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.
  - (4) Do this task: "Extended Leading Edge Flaps Deactivation and Safety Locks Installation" (AMM 27-81-00/201).

EFFECTIVITY-

54-53-00

02J



s 012-045

- (5) Remove these access panels (AMM 54-62-00/201):
  - (a) Access panel 452AL/482AL on the left side of the strut at NSTA 221.
  - (b) Access panel 452CL/482CL on the left side of the strut at NSTA 274.
  - (c) Access panel 452BL/482BL on the left side of the strut at NSTA 243.

s 582-004

(6) Level the airplane to a minimum of one-half degree (AMM 08-00-00/201).

s 162-007

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

- (7) Make sure you remove all unwanted materials (spilled sealant, fasteners, tie wires, etc.) from the midspar upper surface and the midspar forward drain inlet (NSTA 212).
- F. Forward Tube Leak Check T1 Outboard (Figs. 201 and 202)

s 942-005

(1) Put an empty container below the strut forward drain outlet (NSTA 195).

s 792-006

ALL

- (2) With a funnel and hose, apply water over the top surface of the midspar, through access door 452CL/482CL at NSTA 274 as follows:(a) Apply 254 to 258 fluid ounces (7510 to 7630 ml) of water in 3.5 to 4.5 minutes.
  - NOTE: This is approximately 64 fluid ounces (1/2 gallon or 1900 ml) per minute for 4 minutes.

EFFECTIVITY-

54-53-00



s 792-007

(3) Make sure you see no water leaks at the tube connections.

s 792-008

(4) After three minutes, make sure that a minimum of 236 fluid ounces (6980 ml) of water has collected in the container.

s 392-008

- If you found water leaks during the test, do these steps:
  - (a) If the leak is from a tube, do the procedure to repair the tube (AMM 20-11-05/801).
  - If the leak is from a seal, do the procedure to seal the applicable area of the leak (AMM 51-31-01/201).
  - After you repair the leak, do the applicable leak test again.

s 362-009

- (6) If you did not collect the correct amount of water and cannot find leaks, do these steps:
  - (a) Do the task to clear the applicable strut drain.
  - (b) If you cannot remove the blockage with air, use a thin wire to clear the applicable drain tube.
  - (c) Continue to remove the blockage in the tube and do the leak test again until you collect the correct amount of water.
- G. If you will not do more leak checks at this time, put the airplane back to its usual condition.

s 162-010

ALL

MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND CAUTION: UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(1) Make sure you remove all unwanted materials from the strut cavities.

EFFECTIVITY-

54-53-00



s 412-011

- (2) Install these access panels (AMM 54-62-00/201):
  - (a) Access panel 452AL/482AL on the left side of the strut at NSTA 221.
  - (b) Access panel 452CL/482CL on the left side of the strut at NSTA 274.
  - (c) Access panel 452BL/482BL on the left side of the strut at NSTA 243.

s 442-012

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT DO THE STEPS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Do this task: "Safety Locks Removal and Extended Leading Edge Flaps Activation" (AMM 27-81-00/201).

s 412-013

(4) Close the left and right core cowl panels (AMM 71-11-06/201).

s 412-014

ALL

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Close the left and right thrust reversers (AMM 78-31-00/201).

EFFECTIVITY-

54-53-00



s 412-015

(6) Close the left and right fan cowl panels (AMM 71-11-04/201).

## TASK 54-53-00-702-016

### Outboard Strut, Aft Tube - Leak Check (T2)

- A. General
  - (1) This task gives instuctions on how to do a leak check (T2) of the aft drain tube on the outboard engine strut. Water will be applied at two different locations, the upper spar surface and the closure spar inlet.
- B. Equipment
  - (1) Water source low pressure, can spray up to 2 quarts (1.9 liters) per minute
  - (2) Container 5 gallon (19 liter) capacity, can collect and measure water to within 1 fluid ounce (30 ml) (measure can be done in smaller containers)
  - (3) Funnel long necked
- C. References
  - (1) AMM 08-00-00/201, Leveling and Weighing
  - (2) AMM 27-81-00/201, Leading Edge Flaps
  - (3) AMM 51-31-01/201, Seals and Sealing
  - (4) AMM 71-11-04/201, Fan Cowl Panels
  - (5) AMM 71-11-06/201, Core Cowl Panels
  - (6) AMM 78-31-00/201, Thrust Reverser System
- D. Access
  - (1) Location Zone

451 Nacelle Strut 1 - Forward Fairing

452 Nacelle Strut 1 - Torque Box

481 Nacelle Strut 4 - Forward Fairing

482 Nacelle Strut 4 - Torque Box

(2) Access Panel

454AL Aft Fairing Door Panel - Engine 1

521FT Wing Leading Edge Cover - Engine 1

484AL Aft Fairing Door Panel - Engine 4

621FT Wing Leading Edge Cover - Engine 4

EFFECTIVITY-

54-53-00



## E. Prepare for the Leak Check

s 012-017

(1) Open the left and right fan cowl panels (AMM 71-11-04/201).

s 012-018

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Open the left and right thrust reversers (AMM 78-31-00/201).

s 012-019

(3) Open the left and right core cowl panels (AMM 71-11-06/201).

s 042-020

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL
THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU
DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE
INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this task: "Extended Leading Edge Flaps Deactivation and Safety Locks Installation" (AMM 27-81-00/201).

s 582-035

(5) Level the airplane to a minimum of one-half degree (AMM 08-00-00/201).

s 012-111

(6) Open the upper wing leading edge cover 521FT/621FT.

s 012-149

ALL

(7) Close and lock the aft fairing panels 454AL/484AL.

EFFECTIVITY-

54-53-00



s 162-036

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

- (8) Make sure you remove all unwanted materials (spilled sealant, fasteners, tie wires, etc.) from the upper spar surfaces and the upper spar forward drain inlet (NSTA 212).
- F. Aft Tube Leak Test T2 Outboard (Figs. 201 and 202)

s 792-113

- (1) Apply water to the upper spar surface as follows:
  - (a) Put an empty container below the outlet end of the strut aft drain.

NOTE: The drain outlet is located on the aft edge of the lower pan assembly on the right aft fairing panel (approximately NSTA 388).

- (b) With a funnel and hose, apply water to the top surface of the upper spar (forward of NSTA 282), through the upper wing leading edge cover.
  - 1) Let the water enter both the upper spar drain inlets.
  - 2) Apply 254 to 258 fluid ounces (7510 to 7630 ml) of water, in 3.5 to 4.5 minutes.

NOTE: This is approximately 64 fluid ounces (1/2 gallon or 1900 ml) per minute for 4 minutes.

s 792-023

- (2) Make sure there are no leaks as follows:
  - (a) Make sure you do not see any water leaks at the tube connections.
  - (b) After three minutes, make sure that a minimum of 236 fluid ounces (6980 ml) of water has collected in the container.

s 362-024

ALL

- (3) If you found water leaks during the test, do these steps:
  - (a) If the leak is from a tube, do the procedure to repair the tube (AMM 20-11-05/801).

EFFECTIVITY-

54-53-00



- (b) If the leak is from a seal, do the procedure to seal the applicable area of the leak (AMM 51-31-01/201).
- (c) After you repair the leak, do the applicable leak test again.

s 362-025

- (4) If you do not collect the correct amount of water and cannot find leaks, do these steps:
  - (a) Do the task to clear the applicable strut drain.
  - (b) If you cannot remove the blockage with air, use a thin wire to clear the applicable drain tube.
  - (c) Continue to remove the blockage in the tube and do the leak test until you collect the correct amount of water.

s 162-153

(5) Make sure there are no unwanted materials on the upper spar surfaces, upper spar drain inlets, closure spar surfaces, and the closure spar drain inlet.

s 792-027

- Apply water to the closure spar inlet as follows: (6)
  - (a) Put an empty container below the outlet end of the strut aft drain.

NOTE: The drain outlet is located on the aft edge of the lower pan assembly on the right aft fairing panel (approximately NSTA 388).

- (b) With a funnel and hose, apply water to the closure spar inlet which is between the NSTA 308 strut to wing vapor barrier and the NSTA 282 bulkhead.
- Apply 254 to 258 fluid ounces (7510 to 7630 ml) of water, in 3.5 to 4.5 minutes.

NOTE: This is approximately 64 fluid ounces (1/2 gallon or 1900 ml) per minute for 4 minutes.

s 792-028

ALL

- Make sure there are no leaks as follows:
  - (a) Make sure you do not see any water leaks at the tube connections.
  - (b) After three minutes, make sure that a minimum of 236 fluid ounces (6980 ml) of water has collected in the container.

EFFECTIVITY-

54-53-00



s 362-029

- (8) If you found water leaks during the test, do these steps:
  - (a) If the leak is from a tube, do the procedure to repair the tube (AMM 20-11-05/801).
  - (b) If the leak is from a seal, do the procedure to seal the applicable area of the leak (AMM 51-31-01/201).
  - (c) After you repair the leak, do the applicable leak test again.

s 362-030

- (9) If you do not collect the correct amount of water and cannot find leaks, do these steps:
  - (a) Do the task to clear the applicable strut drain.
  - (b) If you cannot remove the blockage with air, use a thin wire to clear the applicable drain tube.
  - (c) Continue to remove the blockage in the tube and do the leak test until you collect the correct amount of water.

s 162-031

- (10) Make sure there are no unwanted materials on the closure spar surfaces and the closure spar drain inlet.
- G. If you will not do more leak checks at this time, put the airplane back to its usual condition.

s 162-032

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(1) Make sure you remove all unwanted materials from the strut cavities.

s 412-033

(2) Install the upper wing leading edge cover.

s 412-097

ALL

(3) Open and unlock the aft fairing panels.

EFFECTIVITY-

54-53-00



s 442-036

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE WARNING: FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO **EQUIPMENT.** 

YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE WARNING: LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT DO THE STEPS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this task: "Safety Locks Removal and Extended Leading Edge Flaps Activation" (AMM 27-81-00/201).

s 412-037

(5) Close the left and right core cowl panels (AMM 71-11-06/201).

s 412-038

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(6) Close the left and right thrust reversers (AMM 78-31-00/201).

s 412-039

(7) Close the left and right fan cowl panels (AMM 71-11-04/201).

TASK 54-53-00-702-134

- Outboard Strut, Forward Midspar Leak Check (S1) 4.
  - General
    - This task gives instuctions on how to do a leak check (S1) of the forward midspar structure on the outboard engine strut.
  - Equipment
    - (1) Water source low pressure, can spray up to 2 quarts (1.9 liters) per minute
    - (2) Container 5 gallon (19 liter) capacity, can collect and measure water to within 1 fluid ounce (30 ml) (measure can be done in smaller containers)
    - (3) Funnel long necked
  - References
    - (1) AMM 08-00-00/201, Leveling and Weighing

EFFECTIVITY-ALL 54-53-00



- (2) AMM 27-81-00/201, Leading Edge Flaps
- (3) AMM 51-31-01/201, Seals and Sealing
- (4) AMM 54-62-00/201, Nacelle Strut Access Panels
- (5) AMM 71-11-04/201, Fan Cowl Panels
- AMM 71-11-06/201, Core Cowl Panels
- (7) AMM 78-31-00/201, Thrust Reverser System
- D. Access
  - (1) Location Zone
    - 451 Nacelle Strut 1 Forward Fairing
    - 452 Nacelle Strut 1 Torque Box
    - 481 Nacelle Strut 4 Forward Fairing
    - 482 Nacelle Strut 4 Torque Box
  - (2) Access Panel
    - 452AL Core Cowl to Strut Access Door - Engine 1
    - Upper Midspar Pressure Relief Access Door Engine 1 452BL
    - Midspar Pressure Relief Access Door Engine 1 452CL
    - 482AL Core Cowl to Strut Access Door - Engine 4
    - 482BL Upper Midspar Pressure Relief Access Door - Engine 4
    - 482CL Midspar Pressure Relief Access Door - Engine 4
- E. Prepare for the Leak Check
  - s 012-156
  - (1) Open the left and right fan cowl panels (AMM 71-11-04/201).
    - s 012-138
  - WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.
  - (2) Open the left and right thrust reversers (AMM 78-31-00/201).
    - s 012-140

ALL

(3) Open the left and right core cowl panels (AMM 71-11-06/201).

EFFECTIVITY-

54-53-00



s 042-105

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE WARNING: FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO **EQUIPMENT.** 

YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL WARNING: THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this task: "Extended Leading Edge Flaps Deactivation and Safety Locks Installation" (AMM 27-81-00/201).

s 012-106

- (5) Remove these access panels (AMM 54-62-00/201):
  - Access panel 452AL/482AL on the left side of the strut at NSTA 221.
  - (b) Access panel 452CL/482CL on the left side of the strut at NSTA 274.
  - (c) Access panel 452BL/482BL on the left side of the strut at NSTA 243.

s 582-038

(6) Level the airplane to a minimum of one-half degree (AMM 08-00-00/201).

s 162-039

ALL

MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND CAUTION: UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(7) Make sure you remove all unwanted materials (spilled sealant, fasteners, tie wires, etc.) from the midspar upper surface and the midspar forward drain inlet (NSTA 212).

EFFECTIVITY-

54-53-00



s 032-107

- (8) Disconnect the raceway drain fitting form the drain line just below the raceway.
  - (a) Install a cap or plug into the raceway drain fitting.
- F. Do Leak Check S1 Outboard (Figs. 201 and 202)

s 942-108

(1) Put an empty container below the strut forward drain outlet (NSTA 195).

s 792-109

- (2) With a funnel and hose, apply water over the top surface of the midspar, through access door 452CL/482CL at NSTA 274 as follows:
  - (a) Apply 254 to 258 fluid ounces (7510 to 7630 ml) of water in 3.5 to 4.5 minutes.

NOTE: This is approximately 64 fluid ounces (1/2 gallon or 1900 ml) per minute for 4 minutes.

(b) Make sure you completely wet the midspar upper surface and all the system penetrations into the midspar forward cavity.

s 792-110

- (3) Look for leaks as follows:
  - (a) Make sure you see no water leaks at the midspar lower surface.
  - (b) Make sure there is no water leakage from the left and right dry bay condensate drain tubes.
  - (c) Make sure there is no water leakage near the midspar forward drain fitting.

s 792-111

(4) After three minutes, make sure that a minimum of 236 fluid ounces (6980 ml) of water has collected in the container.

s 792-112

ALL

- (5) Look for leaks from the raceway drain as follows:
  - (a) Put a small empty container below the raceway drain fitting.
  - (b) Remove the cap or plug from the raceway drain fitting, and let the water drain into the container.
  - (c) Measure the water that leaked from the raceway drain into the container.

EFFECTIVITY-

54-53-00



(d) 4 ounces (120 ml) of water is permitted.

NOTE: It is permitted for 2 ounces (60 ml) of water to leak into the fully enclosed cavity of the strut system raceway for each gallon (128 ounce) of applied water. If 2 gallons (256 ounce or 720 ml) was applied, 4 ounces (60 ml) of water leakage is permitted.

- (e) Connect the raceway drain fitting to the drain line just below the raceway.
- (f) Make sure there is no puddling of water in the strut area.

NOTE: Puddling is defined as more than 0.5 fluid ounce (15 ml) of water in a continuous pool.

s 362-113

- If you found water leaks during the test, do these steps:
  - (a) If the leak is from a tube, do the procedure to repair the tube (AMM 20-11-05/801).
  - If the leak is from a seal, do the procedure to seal the applicable area of the leak (AMM 51-31-01/201).
  - (c) After you repair the leak, do the applicable leak test again.

s 362-114

- (7) If you did not collect the correct amount of water and cannot find leaks, do these steps:
  - (a) Do the task to clear the applicable strut drain.
  - (b) If you cannot remove the blockage with air, use a thin wire to clear the applicable drain tube.
  - (c) Continue to remove the blockage in the tube and do the leak test again until you collect the correct amount of water.
- G. If you will not do more leak checks at this time, put the airplane back to its usual condition.

s 162-115

ALL

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(1) Make sure you remove all unwanted materials from the strut cavities.

EFFECTIVITY-

54-53-00



s 412-158

- (2) Install these access panels (AMM 54-62-00/201):
  - (a) Access panel 452AL/482AL on the left side of the strut at NSTA 221.
  - (b) Access panel 452CL/482CL on the left side of the strut at NSTA 274.
  - (c) Access panel 452BL/482BL on the left side of the strut at NSTA 243.

s 442-119

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT DO THE STEPS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Do this task: "Safety Locks Removal and Extended Leading Edge Flaps Activation" (AMM 27-81-00/201).

s 412-115

(4) Close the left and right core cowl panels (AMM 71-11-06/201).

s 412-120

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Close the left and right thrust reversers (AMM 78-31-00/201).

s 412-121

ALL

(6) Close the left and right fan cowl panels (AMM 71-11-04/201).

TASK 54-53-00-702-101

- 5. Outboard Strut, Upper Spar Inlet Leak Check (S2)
  - A. General
    - (1) This task gives instuctions on how to do a leak check (S2) of the upper spar inlet structure on the outboard strut.

EFFECTIVITY-

54-53-00

02J

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- B. Equipment
  - (1) Water source low pressure, can spray up to 2 quarts (1.9 liters) per minute
  - (2) Container 5 gallon (19 liter) capacity, can collect and measure water to within 1 fluid ounce (30 ml) (measure can be done in smaller containers)
  - (3) Funnel long necked
- C. References
  - (1) AMM 08-00-00/201, Leveling and Weighing
  - (2) AMM 27-81-00/201, Leading Edge Flaps
  - (3) AMM 51-31-01/201, Seals and Sealing
  - (4) AMM 71-11-04/201, Fan Cowl Panels
  - (5) AMM 71-11-06/201, Core Cowl Panels
  - (6) AMM 78-31-00/201, Thrust Reverser System
- D. Access
  - (1) Location Zone
    - 451 Nacelle Strut 1 Forward Fairing
    - 452 Nacelle Strut 1 Torque Box
    - 481 Nacelle Strut 4 Forward Fairing
    - 482 Nacelle Strut 4 Torque Box
  - (2) Access Panel

451B No. 3 Forward Fairing - Engine 1 454AL Aft Fairing Door Panel - Engine 1 521FT Wing Leading Edge Cover - Engine 1 481B No. 3 Forward Fairing - Engine 4 484AL Aft Fairing Door Panel - Engine 4 621FT Wing Leading Edge Cover - Engine 4

E. Prepare for the Leak Check

s 012-081

(1) Open the left and right fan cowl panels (AMM 71-11-04/201).

s 012-135

- WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.
- (2) Open the left and right thrust reversers (AMM 78-31-00/201).

s 012-083

(3) Open the left and right core cowl panels (AMM 71-11-06/201).

EFFECTIVITY-

54-53-00



s 042-085

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL
THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU
DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE
INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this task: "Extended Leading Edge Flaps Deactivation and Safety Locks Installation" (AMM 27-81-00/201).

s 012-123

(5) Open the upper wing leading edge cover 521FT/621FT.

s 012-232

(6) Remove the strut forward fairing #3 451B/481B.

s 012-236

(7) Close and lock the aft fairing panels 454AL/484AL.

s 582-087

(8) Level the airplane to a minimum of one-half degree (AMM 08-00-00/201).

s 162-088

ALL

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(9) Make sure you remove all unwanted materials (spilled sealant, fasteners, tie wires, etc.) from the upper surface and the upper spar drain inlet.

EFFECTIVITY-

54-53-00



F. Do Leak Check S2 - Outboard (Figs. 201 and 202)

s 942-089

- (1) Apply water to the upper spar surface as follows:
  - (a) Put an empty container below the outlet end of the strut aft drain.

NOTE: The drain outlet is located on the aft edge of the lower pan assembly on the right aft fairing panel (approximately NSTA 388).

- (b) With a funnel and hose, apply water to the top surface of the upper spar (forward of NSTA 282), let the water enter the NSTA 251 bulkhead vapor barrier and both the upper spar drain inlets.
  - 1) Apply 1 gallon (128 fl oz or 3785 ml) of water, in 3.5 to 4.5 minutes.

NOTE: This is approximately 32 fluid ounces (1/4 gallon or 950 ml) per minute for 4 minutes.

s 792-233

(2) Make sure there is no water leakage from the strut forward drain outlet.

s 792-091

(3) Make sure you see no water leakage through the NSTA 251 bulkhead vapor barrier.

s 792-092

(4) After three minutes, make sure that a minimum of 115 fluid ounces (3401 ml) of water has collected in the container.

s 392-093

- (5) If you found water leaks during the test, do these steps:
  - (a) If the leak is from a tube, do the procedure to repair the tube (AMM 20-11-05/801).
  - (b) If the leak is from a seal, do the procedure to seal the applicable area of the leak (AMM 51-31-01/201).
  - (c) After you repair the leak, do the applicable leak test again.

s 362-094

- (6) If you did not collect the correct amount of water and cannot find leaks, do these steps:
  - (a) Do the task to clear the applicable strut drain.

EFFECTIVITY-

54-53-00



- (b) If you cannot remove the blockage with air, use a thin wire to clear the applicable drain tube.
- (c) Continue to remove the blockage in the tube and do the leak test again until you collect the correct amount of water.
- G. If you will not do more leak checks at this time, put the airplane back to its usual condition.

s 162-095

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(1) Make sure you remove all unwanted materials from the strut cavities.

s 412-122

(2) Install the upper wing leading edge cover 521FT/621FT.

s 412-160

(3) Install the strut forward fairing #3 451B/481B.

s 412-096

(4) Open and unlock the aft fairing panels 454AL/484AL.

s 442-097

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT DO THE STEPS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(5) Do this task: "Safety Locks Removal and Extended Leading Edge Flaps Activation" (AMM 27-81-00/201).

s 412-098

ALL

(6) Close the left and right core cowl panels (AMM 71-11-06/201).

EFFECTIVITY-

54-53-00



s 412-142

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(7) Close the left and right thrust reversers (AMM 78-31-00/201).

s 412-100

(8) Close the left and right fan cowl panels (AMM 71-11-04/201).

TASK 54-53-00-702-126

- 6. Outboard Strut, Closure Spar Leak Check (S3)
  - A. General
    - (1) This task gives instuctions on how to do a leak check (S3) of the closure spar structure on the outboard strut.
  - B. Equipment
    - (1) Water source low pressure, can spray up to 2 quarts (1.9 liters) per minute
    - (2) Container 5 gallon (19 liter) capacity, can collect and measure water to within 1 fluid ounce (30 ml) (measure can be done in smaller containers)
    - (3) Funnel long necked
  - C. References
    - (1) AMM 08-00-00/201, Leveling and Weighing
    - (2) AMM 27-81-00/201, Leading Edge Flaps
    - (3) AMM 51-31-01/201, Seals and Sealing
    - (4) AMM 54-62-00/201, Nacelle Strut Access Panels
    - (5) AMM 71-11-04/201, Fan Cowl Panels
    - (6) AMM 71-11-06/201, Core Cowl Panels
    - (7) AMM 78-31-00/201, Thrust Reverser System
  - D. Access
    - (1) Location Zone
      - 451 Nacelle Strut 1 Forward Fairing
      - 452 Nacelle Strut 1 Torque Box
      - 481 Nacelle Strut 4 Forward Fairing
      - 482 Nacelle Strut 4 Torque Box

EFFECTIVITY-

54-53-00



### Access Panel

452FL Spring Beam Bearing Access Door Panel - Engine 1 452GL Spring Beam Pin Access Door Panel - Engine 1

454AL Aft Fairing Door Panel - Engine 1

521FT Wing Leading Edge Cover - Engine 1

482FL Spring Beam Bearing Access Door Panel - Engine 4

482GL Spring Beam Pin Access Door Panel - Engine 4

484AL Aft Fairing Door Panel - Engine 4

621FT Wing Leading Edge Cover - Engine 4

E. Prepare for the Leak Check

s 012-061

(1) Open the left and right fan cowl panels (AMM 71-11-04/201).

s 012-137

- WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.
- (2) Open the left and right thrust reversers (AMM 78-31-00/201).

s 012-063

(3) Open the left and right core cowl panels (AMM 71-11-06/201).

s 042-065

- WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.
- WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL
  THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU
  DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE
  INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.
- (4) Do this task: "Extended Leading Edge Flaps Deactivation and Safety Locks Installation" (AMM 27-81-00/201).

s 012-139

ALL

(5) Remove the upper wing leading edge cover 521FT/621FT.

EFFECTIVITY-

54-53-00



s 012-066

(6) Remove the dry bay access panels 452FL/482FL and 452GL/482GL.

s 012-098

(7) Close and lock the aft fairing panels 454AL/484AL.

s 582-067

(8) Level the airplane to a minimum of one-half degree (AMM 08-00-00/201).

s 162-068

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

- (9) Make sure you remove all unwanted materials (spilled sealant, fastenrs, tie wires, etc.) from the closure spar surfaces and the closure spar drain inlet.
- F. Do Leak Check S3 Outboard (Figs. 201 and 202)

s 792-127

(1) Put an empty container below the outlet end of the strut aft drain.

NOTE: The drain outlet is located on the aft edge of the lower pan assembly on the right aft fairing panel (approximately NSTA 388).

s 792-070

- (2) With a funnel and hose, apply water to the closure spar surface as follows:
  - (a) Use the upper wing leading edge cover (removed) for access.
  - (b) Apply the water to the pneumatic duct boot seal and the system penetrations between the 308 strut to wing barrier and the NSTA 282 bulkhead.

EFFECTIVITY-

54-53-00



(c) Apply 254 to 258 fluid ounces (7510 to 7630 ml) of water in 3.5 to 4.5 minutes.

NOTE: This is approximately 64 fluid ounces (1/2 gallon or 1900 ml) per minute for 4 minutes.

- 1) Make sure that all surfaces receive the same amount of water.
- 2) Do not apply water to the strut to wing sponge seal.

s 792-071

- (3) Make sure there is no water leakage through the closure spar into the dry bay area.
  - (a) Leakage from the left and right dry bay drain tubes into the dry bay is not permitted.

s 792-128

(4) Make sure there is no leakage through the strut to wing vapor barrier wire bundle and tubing penetrations or through the strut to wing vapor barrier.

NOTE: Use the aft fairing panels for access.

s 792-072

(5) After three minutes, make sure that a minimum of 236 fluid ounces (6980 ml) of water has collected in the container.

s 792-129

(6) Make sure there is no puddling of water in the strut area.

NOTE: Puddling is defined as more than 0.5 fluid ounce (15 ml) of water in a continuous pool.

s 792-124

ALL

- (7) Look for gaps at the strut to wing sponge seal as follows:
  - (a) Put a bright shop light into the strut, a small distance aft of the strut to wing vapor barrier at NSTA 308.
  - Use the upper wing leading edge cover for access to view the strut to wing sponge seal.
  - Make sure there are no gaps between the sponge seal and the (c) structure.

NOTE: Light will show through gaps.

EFFECTIVITY-

54-53-00



s 392-073

- (8) If you found water leaks during the test, do these steps:
  - (a) If the leak is from a tube, do the procedure to repair the tube (AMM 20-11-05/801).
  - (b) If the leak is from a seal, do the procedure to seal the applicable area of the leak (AMM 51-31-01/201).
  - (c) After you repair the leak, do the applicable leak test again.

s 362-074

- (9) If you did not collect the correct amount of water and cannot find leaks, do these steps:
  - (a) Do the task to clear the applicable strut drain.
  - (b) If you cannot remove the blockage with air, use a thin wire to clear the applicable drain tube.
  - (c) Continue to remove the blockage in the tube and do the leak test again until you collect the correct amount of water.
- G. If you will not do more leak checks at this time, put the airplane back to its usual condition.

s 162-075

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(1) Make sure you remove all unwanted materials from the strut cavities.

s 412-125

(2) Install the upper wing leading edge cover 521FT/621FT.

S 412-141

(3) Open and unlock the aft fairing panels 454AL/484AL.

s 412-076

ALL

(4) Install the dry bay access panels 452FL/482FL and 452GL/482GL.

EFFECTIVITY-

54-53-00



s 442-077

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT DO THE STEPS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(5) Do this task: "Safety Locks Removal and Extended Leading Edge Flaps Activation" (AMM 27-81-00/201).

s 412-078

(6) Close the left and right core cowl panels (AMM 71-11-06/201).

s 412-079

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(7) Close the left and right thrust reversers (AMM 78-31-00/201).

s 412-080

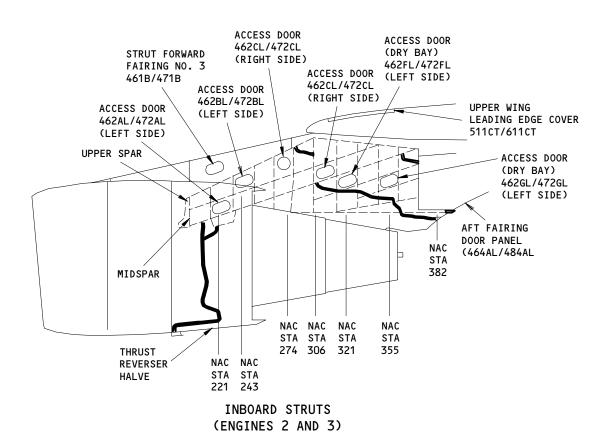
(8) Close the left and right fan cowl panels (AMM 71-11-04/201).

TASK 54-53-00-702-229

- 7. Inboard Strut, Forward Tube Leak Check (T1)
  - A. General
    - (1) This task gives instuctions on how to do a leak check (T1) of the forward drain tube on the inboard engine strut.
  - B. Equipment
    - (1) Water source low pressure, can spray up to 2 quarts (1.9 liters) per minute
    - (2) Container 5 gallon (19 liter) capacity, can collect and measure water to within 1 fluid ounce (30 ml) (measure can be done in smaller containers)
    - (3) Funnel long necked
  - C. References
    - (1) AMM 08-00-00/201, Leveling and Weighing

54-53-00





Inboard Struts Drain Access Figure 203

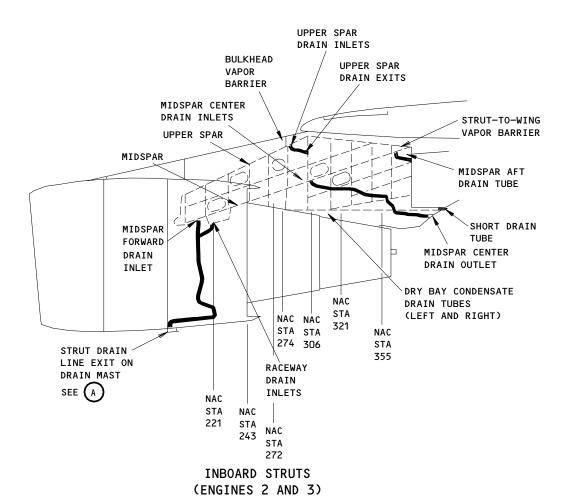
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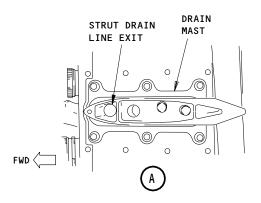
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Inboard Struts Drain Locations Figure 204

E30925

54-53-00

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- (2) AMM 27-81-00/201, Leading Edge Flaps
- (3) AMM 51-31-01/201, Seals and Sealing
- (4) AMM 54-62-00/201, Nacelle Strut Access Panels
- (5) AMM 71-11-04/201, Fan Cowl Panels
- (6) AMM 71-11-06/201, Core Cowl Panels
- (7) AMM 78-31-00/201, Thrust Reverser System
- D. Access
  - (1) Location Zone

461 Nacelle Strut 2 - Forward Fairing

462 Nacelle Strut 2 - Torque Box

471 Nacelle Strut 3 - Forward Fairing

472 Nacelle Strut 3 - Torque Box

(2) Access Panel

462AL Core Cowl to Strut Access Door - Engine 2

462BL Upper Midspar Pressure Relief Access Door - Engine 2

462CL Midspar Pressure Relief Access Door - Engine 2

472AL Core Cowl to Strut Access Door - Engine 3

472BL Upper Midspar Pressure Relief Access Door - Engine 3

472CL Midspar Pressure Relief Access Door - Engine 3

E. Prepare for the Leak Check

s 012-144

(1) Open the left and right fan cowl panels (AMM 71-11-04/201).

s 012-105

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Open the left and right thrust reversers (AMM 78-31-00/201).

s 012-146

(3) Open the left and right core cowl panels (AMM 71-11-06/201).

EFFECTIVITY-

54-53-00



s 042-045

MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE WARNING: FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO **EQUIPMENT.** 

YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL WARNING: THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this task: "Extended Leading Edge Flaps Deactivation and Safety Locks Installation" (AMM 27-81-00/201).

s 012-046

- (5) Remove these access panels (AMM 54-62-00/201):
  - (a) Access panel 462AL/472AL on the left side of the strut at NSTA 221.
  - (b) Access panel 462CL/482CL on the left side of the strut at NSTA 274.
  - Access panel 462BL/472BL on the left side of the strut at NSTA 243.

s 582-047

(6) Level the airplane to a minimum of one-half degree (AMM 08-00-00/201).

s 162-048

ALL

MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND CAUTION: UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(7) Make sure you remove all unwanted materials (spilled sealant, fasteners, tie wires, etc.) from the midspar upper surface and the midspar forward drain inlet (NSTA 212).

EFFECTIVITY-

54-53-00



F. Do Leak Check T1 - Inboard (Figs. 203 and 204)

s 942-049

(1) Put an empty container below the strut forward drain outlet (NSTA 195).

s 792-050

- (2) With a funnel and hose, apply water through access door 462CL/472CL at NSTA 274 and onto the midspar upper surface as follows:
  - (a) Apply 254 to 258 fluid ounces (7510 to 7630 ml) of water in 3.5 to 4.5 minutes.

NOTE: This is approximately 64 fluid ounces (1/2 gallon or 1900 ml) per minute for 4 minutes.

s 792-051

(3) Make sure you see no water leaks at the tube connections.

s 792-052

(4) After three minutes, make sure that a minimum of 236 fluid ounces (6980 ml) of water has collected in the container.

s 392-053

- (5) If you found water leaks during the test, do these steps:
  - (a) If the leak is from a tube, do the procedure to repair the tube (AMM 20-11-05/801).
  - (b) If the leak is from a seal, do the procedure to seal the applicable area of the leak (AMM 51-31-01/201).
  - (c) After you repair the leak, do the applicable leak test again.

s 362-054

- (6) If you did not collect the correct amount of water and cannot find leaks, do these steps:
  - (a) Do the task to clear the applicable strut drain.
  - (b) If you cannot remove the blockage with air, use a thin wire to clear the applicable drain tube.
  - (c) Continue to remove the blockage in the tube and do the leak test again until you collect the correct amount of water.
- G. If you will not do more leak checks at this time, put the airplane back to its usual condition.

EFFECTIVITY-

54-53-00



s 162-055

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(1) Make sure you remove all unwanted materials from the strut cavities.

s 412-056

- (2) Install these access panels (AMM 54-62-00/201):
  - (a) Access panel 462AL/472AL on the left side of the strut at NSTA 221.
  - (b) Access panel 462CL/482CL on the left side of the strut at NSTA 274.
  - (c) Access panel 462BL/472BL on the left side of the strut at NSTA 243.

s 442-057

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT DO THE STEPS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Do this task: "Safety Locks Removal and Extended Leading Edge Flaps Activation" (AMM 27-81-00/201).

s 412-058

ALL

(4) Close the left and right core cowl panels (AMM 71-11-06/201).

EFFECTIVITY-

54-53-00



s 412-059

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Close the left and right thrust reversers (AMM 78-31-00/201).

s 412-060

(6) Close the left and right fan cowl panels (AMM 71-11-04/201).

TASK 54-53-00-702-230

- 8. Inboard Strut, Aft Tube Leak Check (T2)
  - A. General
    - (1) This task gives instuctions on how to do a leak check (T2) of the aft drain tube on the inboard engine strut.
  - B. Equipment
    - (1) Water source low pressure, can spray up to 2 quarts (1.9 liters) per minute
    - (2) Container 5 gallon (19 liter) capacity, can collect and measure water to within 1 fluid ounce (30 ml) (measure can be done in smaller containers)
    - (3) Funnel long necked
  - C. References
    - (1) AMM 08-00-00/201, Leveling and Weighing
    - (2) AMM 27-81-00/201, Leading Edge Flaps
    - (3) AMM 51-31-01/201, Seals and Sealing
    - (4) AMM 54-62-00/201, Nacelle Strut Access Panels
    - (5) AMM 71-11-04/201, Fan Cowl Panels
    - (6) AMM 71-11-06/201, Core Cowl Panels
    - (7) AMM 78-31-00/201, Thrust Reverser System
  - D. Access
    - (1) Location Zone

461 Nacelle Strut 2 - Forward Fairing

462 Nacelle Strut 2 - Torque Box

471 Nacelle Strut 3 - Forward Fairing

472 Nacelle Strut 3 - Torque Box

(2) Access Panel

462CL Midspar Pressure Relief Door Panel - Engine 2

511CT Wing Leading Edge Cover - Engine 2

472CL Midspar Pressure Relief Door Panel - Engine 3

611CT Wing Leading Edge Cover - Engine 3

EFFECTIVITY-

54-53-00



# E. Prepare for the Leak Check

s 012-130

(1) Open the left and right fan cowl panels (AMM 71-11-04/201).

s 012-148

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Open the left and right thrust reversers (AMM 78-31-00/201).

s 012-133

(3) Open the left and right core cowl panels (AMM 71-11-06/201).

s 042-135

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL
THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU
DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE
INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this task: "Extended Leading Edge Flaps Deactivation and Safety Locks Installation" (AMM 27-81-00/201).

s 012-227

(5) Remove the upper wing leading edge cover 511CT/611CT.

s 012-155

(6) Remove access panel 462CL/472CL (AMM 54-62-00/201) on the right side of the strut that is below the wing leading edge at NSTA 306.

s 582-137

ALL

(7) Level the airplane to a minimum of one-half degree (AMM 08-00-00/201).

EFFECTIVITY-

54-53-00

02J

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s 162-138

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(8) Make sure you remove all unwanted materials (spilled sealant, fasteners, tie wires, etc.) from the upper spar surfaces and the upper spar forward drain inlet (NSTA 212).

s 862-117

- (9) Make sure the trailing edge doors on the aft strut are closed and latched (AMM 54-62-03/401).
- F. Aft Tube Leak Test T2 Inboard (Figs. 203 and 204)

s 792-228

- (1) Apply water to the upper spar surface as follows:
  - (a) Put an empty container below the outlet end of the midspar center drain.

<u>NOTE</u>: The drain outlet is located on the aft edge of the lower pan assembly on the right aft fairing panel (approximately NSTA 388).

- (b) With a funnel and hose, apply water to the top surface of the upper spar (forward of NSTA 282), let the water enter both the upper spar drain inlets.
  - 1) Apply 128 fluid ounces (1 gallon or 3785 ml) of water, in 3.5 to 4.5 minutes.

NOTE: This is approximately 32 fluid ounces (1/4 gallon or 950 ml) per minute for 4 minutes.

(c) Look through access panel 462HR/472HR to make sure that water flows freely from both the upper spar drain outlets.

s 792-139

ALL

- (2) Make sure there are no leaks as follows:
  - (a) Make sure you do not see any water leaks at the tube connections.
  - (b) After three minutes, make sure that a minimum of 115 fluid ounces (3401 ml) of water has collected in the container.

EFFECTIVITY-

54-53-00



s 362-140

- (3) If you found water leaks during the test, do these steps:
  - (a) If the leak is from a tube, do the procedure to repair the tube (AMM 20-11-05/801).
  - (b) If the leak is from a seal, do the procedure to seal the applicable area of the leak (AMM 51-31-01/201).
  - (c) After you repair the leak, do the applicable leak test again.

s 362-141

- (4) If you do not collect the correct amount of water and cannot find leaks, do these steps:
  - (a) Do the task to clear the applicable strut drain.
  - (b) If you cannot remove the blockage with air, use a thin wire to clear the applicable drain tube.
  - (c) Continue to remove the blockage in the tube and do the leak test until you collect the correct amount of water.
- G. If you will not do more leak checks at this time, put the airplane back to its usual condition.

s 162-148

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(1) Make sure you remove all unwanted materials from the strut cavities.

s 412-149

(2) Install the upper wing leading edge cover 511CT/611CT.

s 412-157

ALL

(3) Install access panel 462CL/472CL (AMM 54-62-00/201) on the right side of the strut that is below the wing leading edge at NSTA 306.

EFFECTIVITY-

54-53-00



s 442-152

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT DO THE STEPS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this task: "Safety Locks Removal and Extended Leading Edge Flaps Activation" (AMM 27-81-00/201).

s 412-153

(5) Close the left and right core cowl panels (AMM 71-11-06/201).

s 412-159

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(6) Close the left and right thrust reversers (AMM 78-31-00/201).

s 412-155

(7) Close the left and right fan cowl panels (AMM 71-11-04/201).

TASK 54-53-00-702-156

- 9. Inboard Strut, Forward Midspar Leak Check (S1)
  - A. General
    - (1) This task gives instuctions on how to do a leak check (S1) of the forward midspar structure on the inboard engine strut.
  - B. Equipment
    - (1) Water source low pressure, can spray up to 2 quarts (1.9 liters) per minute
    - (2) Container 5 gallon (19 liter) capacity, can collect and measure water to within 1 fluid ounce (30 ml) (measure can be done in smaller containers)
    - (3) Funnel long necked
  - C. References
    - (1) AMM 08-00-00/201, Leveling and Weighing

EFFECTIVITY-

54-53-00



- (2) AMM 27-81-00/201, Leading Edge Flaps
- (3) AMM 51-31-01/201, Seals and Sealing
- (4) AMM 54-62-00/201, Nacelle Strut Access Panels
- (5) AMM 71-11-04/201, Fan Cowl Panels
- (6) AMM 71-11-06/201, Core Cowl Panels
- (7) AMM 78-31-00/201, Thrust Reverser System
- D. Access
  - (1) Location Zone

461 Nacelle Strut 2 - Forward Fairing

462 Nacelle Strut 2 - Torque Box

471 Nacelle Strut 3 - Forward Fairing

472 Nacelle Strut 3 - Torque Box

(2) Access Panel

462AL Core Cowl to Strut Access Door - Engine 2

462BL Upper Midspar Pressure Relief Access Door - Engine 2

462CL Midspar Pressure Relief Access Door - Engine 2

472AL Core Cowl to Strut Access Door - Engine 3

472BL Upper Midspar Pressure Relief Access Door - Engine 3

472CL Midspar Pressure Relief Access Door - Engine 3

E. Prepare for the Leak Check

s 012-157

(1) Open the left and right fan cowl panels (AMM 71-11-04/201).

s 012-158

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Open the left and right thrust reversers (AMM 78-31-00/201).

s 012-159

ALL

(3) Open the left and right core cowl panels (AMM 71-11-06/201).

EFFECTIVITY-

54-53-00



s 042-160

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL
THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU
DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE
INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this task: "Extended Leading Edge Flaps Deactivation and Safety Locks Installation" (AMM 27-81-00/201).

s 012-161

- (5) Remove these access panels (AMM 54-62-00/201):
  - (a) Access panel 462AL/472AL on the left side of the strut at NSTA 221.
  - (b) Access panel 462CL/482CL on the left side of the strut at NSTA 274.
  - (c) Access panel 462BL/472BL on the left side of the strut at NSTA 243.

s 582-162

(6) Level the airplane to a minimum of one-half degree (AMM 08-00-00/201).

s 162-163

ALL

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(7) Make sure you remove all unwanted materials (spilled sealant, fasteners, tie wires, etc.) from the midspar upper surface and the midspar forward drain inlet (NSTA 212).

EFFECTIVITY-

54-53-00



s 032-164

- (8) Disconnect the raceway drain fitting from the drain line just below the raceway.
  - (a) Install a cap or plug into the raceway drain fitting.
- F. Forward Midspar Leak Check S1 Inboard (Figs. 203 and 204)

S 942-165

(1) Put an empty container below the strut forward drain outlet (NSTA 195).

s 792-166

- (2) With a funnel and hose, apply water over the top surface of the midspar, through access door 462CL/472CL at NSTA 274 as follows:
  - (a) Apply 254 to 258 fluid ounces (7510 to 7630 ml) of water in 3.5 to 4.5 minutes.

NOTE: This is approximately 64 fluid ounces (1/2 gallon or 1900 ml) per minute for 4 minutes.

(b) Make sure you completely wet the midspar upper surface and all the system penetrations into the midspar forward cavity.

s 792-167

- (3) Look for leaks as follows:
  - (a) Make sure you see no water leaks at the midspar lower surface.
  - (b) Make sure there is no water leakage from the left and right dry bay condensate drain tubes.
  - (c) Make sure there is no water leakage near the midspar forward drain fitting.

s 792-168

(4) After three minutes, make sure that a minimum of 236 fluid ounces (6980 ml) of water has collected in the container.

s 792-169

ALL

- (5) Look for leaks from the raceway drain as follows:
  - (a) Put a small empty container below the raceway drain fitting.
  - (b) Remove the cap or plug from the raceway drain fitting, and let the water drain into the container.
  - (c) Measure the water that leaked from the raceway drain into the container.

EFFECTIVITY-

54-53-00



(d) Four ounces (120 ml) of water is permitted.

NOTE: It is permitted for 2 ounces (60 ml) of water to leak into the fully enclosed cavity of the strut system raceway for each gallon (128 ounce) of applied water. If 2 gallons (256 ounce or 720 ml) was applied, 4 ounces (60 ml) of water leakage is permitted.

- (e) Connect the raceway drain fitting to the drain line just below the raceway.
- (f) Make sure there is no puddling of water in the strut area.

NOTE: Puddling is defined as more than 0.5 fluid ounce (15 ml) of water in a continuous pool.

s 362-170

- (6) If you found water leaks during the test, do these steps:
  - (a) If the leak is from a tube, do the procedure to repair the tube (AMM 20-11-05/801).
  - (b) If the leak is from a seal, do the procedure to seal the applicable area of the leak (AMM 51-31-01/201).
  - (c) After you repair the leak, do the applicable leak test again.

s 362-171

- (7) If you did not collect the correct amount of water and cannot find leaks, do these steps:
  - (a) Do the task to clear the applicable strut drain.
  - (b) If you cannot remove the blockage with air, use a thin wire to clear the applicable drain tube.
  - (c) Continue to remove the blockage in the tube and do the leak test again until you collect the correct amount of water.
- G. If you will not do more leak checks at this time, put the airplane back to its usual condition.

s 162-172

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(1) Make sure you remove all unwanted materials from the strut cavities.

EFFECTIVITY-

54-53-00



s 412-175

- (2) Install these access panels (AMM 54-62-00/201):
  - (a) Access panel 462AL/472AL on the left side of the strut at NSTA 221.
  - (b) Access panel 462CL/482CL on the left side of the strut at NSTA 274.
  - (c) Access panel 462BL/472BL on the left side of the strut at NSTA 243.

s 442-176

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT DO THE STEPS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Do this task: "Safety Locks Removal and Extended Leading Edge Flaps Activation" (AMM 27-81-00/201).

s 412-133

(4) Close the left and right core cowl panels (AMM 71-11-06/201).

s 412-177

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Close the left and right thrust reversers (AMM 78-31-00/201).

s 412-178

ALL

(6) Close the left and right fan cowl panels (AMM 71-11-04/201).

TASK 54-53-00-702-179

- 10. <u>Inboard Strut, Upper Spar Inlet Leak Check</u> (S2)
  - A. General
    - (1) This task gives instuctions on how to do a leak check (S2) of the upper spar inlet structure on the inboard strut.

EFFECTIVITY-

54-53-00



- B. Equipment
  - (1) Water source low pressure, can spray up to 2 quarts (1.9 liters) per minute
  - (2) Container 5 gallon (19 liter) capacity, can collect and measure water to within 1 fluid ounce (30 ml) (measure can be done in smaller containers)
  - (3) Funnel long necked
- C. References
  - (1) AMM 08-00-00/201, Leveling and Weighing
  - (2) AMM 27-81-00/201, Leading Edge Flaps
  - (3) AMM 51-31-01/201, Seals and Sealing
  - (4) AMM 54-62-00/201, Nacelle Strut Access Panels
  - (5) AMM 71-11-04/201, Fan Cowl Panels
  - (6) AMM 71-11-06/201, Core Cowl Panels
  - (7) AMM 78-31-00/201, Thrust Reverser System
- D. Access
  - (1) Location Zone

461 Nacelle Strut 2 - Forward Fairing

462 Nacelle Strut 2 - Torque Box

471 Nacelle Strut 3 - Forward Fairing

472 Nacelle Strut 3 - Torque Box

(2) Access Panel

461B No.3 Forward Fairing - Engine 2

511CT Wing Leading Edge Cover - Engine 2

471B No. 3 Forward Fairing - Engine 3

611CT Wing Leading Edge Cover - Engine 3

E. Prepare for the Leak Check

s 012-180

(1) Open the left and right fan cowl panels (AMM 71-11-04/201).

s 012-107

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Open the left and right thrust reversers (AMM 78-31-00/201).

s 012-182

ALL

(3) Open the left and right core cowl panels (AMM 71-11-06/201).

EFFECTIVITY-

54-53-00



s 042-184

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this task: "Extended Leading Edge Flaps Deactivation and Safety Locks Installation" (AMM 27-81-00/201).

s 012-185

(5) Open the upper wing leading edge cover 511CT/611CT.

s 012-231

(6) Remove the strut No. 3 forward fairing 461B/471B.

s 582-187

(7) Level the airplane to a minimum of one-half degree (AMM 08-00-00/201).

s 162-188

ALL

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(8) Make sure you remove all unwanted materials (spilled sealant, fasteners, tie wires, etc.) from the upper surfaces and the upper spar drain inlet (NSTA 212).

EFFECTIVITY-

54-53-00



F. Upper Spar Inlet Leak Check S2 - Inboard (Figs. 203 and 204)

s 942-189

- (1) Apply water to the upper spar surface as follows:
  - (a) Put an empty container below the outlet end of the midspar center drain.

NOTE: The drain outlet is located on the aft edge of the lower pan assembly on the right aft fairing panel (approximately NSTA 382).

- (b) With a funnel and hose, apply water to the top surface of the upper spar (forward of NSTA 298), let the water enter the NSTA 282 bulkhead vapor barrier and both the upper spar drain inlets.
  - 1) Apply 1 gallon (128 fl oz or 3785 ml) of water, in 3.5 to 4.5 minutes.

NOTE: This is approximately 32 fluid ounces (1/4 gallon or 950 ml) per minute for 4 minutes.

s 792-234

(2) Make sure there is no water leakage from the strut forward drain outlet.

s 792-191

(3) Make sure you see no water leakage through the bulkhead vapor barrier at NSTA 282.

s 792-192

(4) After three minutes, make sure that a minimum of 115 fluid ounces (3401 ml) of water has collected in the container.

s 392-193

- (5) If you found water leaks during the test, do these steps:
  - (a) If the leak is from a tube, do the procedure to repair the tube (AMM 20-11-05/801).
  - (b) If the leak is from a seal, do the procedure to seal the applicable area of the leak (AMM 51-31-01/201).
  - (c) After you repair the leak, do the applicable leak test again.

s 362-194

- (6) If you did not collect the correct amount of water and cannot find leaks, do these steps:
  - (a) Do the task to clear the applicable strut drain.

EFFECTIVITY-

54-53-00



- (b) If you cannot remove the blockage with air, use a thin wire to clear the applicable drain tube.
- (c) Continue to remove the blockage in the tube and do the leak test again until you collect the correct amount of water.
- G. If you will not do more leak checks at this time, put the airplane back to its usual condition.

s 162-195

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(1) Make sure you remove all unwanted materials from the strut cavities.

s 412-196

(2) Install the upper wing leading edge cover 511CT/611CT.

s 412-197

(3) Install the No. 3 strut forward fairing 461B/471B.

s 442-198

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT DO THE STEPS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this task: "Safety Locks Removal and Extended Leading Edge Flaps Activation" (AMM 27-81-00/201).

s 412-199

ALL

(5) Close the left and right core cowl panels (AMM 71-11-06/201).

EFFECTIVITY-

54-53-00



s 412-200

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(6) Close the left and right thrust reversers (AMM 78-31-00/201).

s 412-201

(7) Close the left and right fan cowl panels (AMM 71-11-04/201).

TASK 54-53-00-702-202

- 11. Inboard Strut, Aft Midspar Structure Leak Check (S3)
  - A. General
    - (1) This task gives instuctions on how to do a leak check (S3) of the aft midspar structure on the inboard strut.
  - B. Equipment
    - (1) Water source low pressure, can spray up to 2 quarts (1.9 liters) per minute
    - (2) Container 5 gallon (19 liter) capacity, can collect and measure water to within 1 fluid ounce (30 ml) (measure can be done in smaller containers)
    - (3) Funnel long necked
  - C. References
    - (1) AMM 08-00-00/201, Leveling and Weighing
    - (2) AMM 27-81-00/201, Leading Edge Flaps
    - (3) AMM 51-31-01/201, Seals and Sealing
    - (4) AMM 54-62-00/201, Nacelle Strut Access Panels
    - (5) AMM 71-11-04/201, Fan Cowl Panels
    - (6) AMM 71-11-06/201, Core Cowl Panels
    - (7) AMM 78-31-00/201, Thrust Reverser System
  - D. Access
    - (1) Location Zone

461 Nacelle Strut 2 - Forward Fairing

462 Nacelle Strut 2 - Torque Box

471 Nacelle Strut 3 - Forward Fairing

472 Nacelle Strut 3 - Torque Box

EFFECTIVITY-

54-53-00



(2) Access Panel

Lower Midspar (forward) Access Door Panel - Engine 2 462FL 462GL Lower Midspar Pressure Relief (aft) Acces Door Panel -Engine 2 Aft Fairing Door Panel - Engine 2 464AL 511CT Wing Leading Edge Cover - Engine 2 Lower Midspar (forward) Access Door Panel - Engine 3 472FL Lower Midspar Pressure Relief (aft) Acces Door Panel -472GL Engine 3 Aft Fairing Door Panel - Engine 3 474AL

E. Prepare for the Leak Check

611CT

s 012-203

(1) Open the left and right fan cowl panels (AMM 71-11-04/201).

Wing Leading Edge Cover - Engine 3

s 012-108

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Open the left and right thrust reversers (AMM 78-31-00/201).

s 012-205

(3) Open the left and right core cowl panels (AMM 71-11-06/201).

s 042-207

ALL

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL
THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU
DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE
INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this task: "Extended Leading Edge Flaps Deactivation and Safety Locks Installation" (AMM 27-81-00/201).

EFFECTIVITY-

54-53-00



s 012-109

(5) Open the upper wing leading edge cover 511CT/611CT.

s 012-208

(6) Remove the dry bay access panels 462FL/472FL and 462GL/472GL.

s 012-100

(7) Remove the aft fairing panels 464AL/484AL.

s 582-209

(8) Level the airplane to a minimum of one-half degree (AMM 08-00-00/201).

s 162-210

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

- (9) Make sure you remove all unwanted materials (spilled sealant, fasteners, tie wires, etc.) from the midspar upper surface and the closure spar drain inlet (NSTA 212).
- F. Aft Midspar Leak Check S3 Inboard (Figs. 203 and 204)

s 792-211

(1) Put an empty container below the outlet end of the midspar center drain.

NOTE: The drain outlet is located on the aft edge of the lower pan assembly on the right aft fairing panel (approximately NSTA 382).

s 792-212

ALL

- (2) With a funnel and hose, apply water to the closure spar surface as
  - (a) Use the upper wing leading edge cover (removed) for access.
  - Apply the water to the pneumatic duct boot seal and the system penetrations between the 363 strut to wing vapor barrier and the NSTA 298 bulkhead.

EFFECTIVITY-

54-53-00



(c) Apply 254 to 258 fluid ounces (7510 to 7630 ml) of water in 3.5 to 4.5 minutes.

NOTE: This is approximately 64 fluid ounces (1/2 gallon or 1900 ml) per minute for 4 minutes.

- Make sure that all surfaces receive the same amount of water.
- 2) Do not apply water to the strut to wing sponge seal.

s 792-213

- (3) Make sure there is no water leakage through the midspar into the dry bay area.
  - (a) Leakage from the left and right dry bay drain tubes into the dry bay is not permitted.

s 792-214

(4) Make sure there is no leakage through the strut to wing vapor barrier wire bundle and tubing penetrations or through the strut to wing vapor barrier.

NOTE: Use the aft fairing panels for access.

s 792-215

(5) After three minutes, make sure that a minimum of 236 fluid ounces (6980 ml) of water has collected in the container.

s 792-216

(6) Make sure there is no puddling of water in the strut area.

NOTE: Puddling is defined as more than 0.5 fluid ounce (15 ml) of water in a continuous pool.

s 792-217

ALL

- (7) Look for gaps at the strut to wing sponge seal as follows:
  - (a) Put a bright shop light into the strut, a small distance aft of the strut to wing vapor barrier at NSTA 363.
  - (b) Use the upper wing leading edge cover for access to view the strut to wing sponge seal.
  - (c) Make sure there are no gaps between the sponge seal and the structure.

NOTE: Light will show through gaps.

EFFECTIVITY-

54-53-00



s 392-218

- (8) If you found water leaks during the test, do these steps:
  - (a) If the leak is from a tube, do the procedure to repair the tube (AMM 20-11-05/801).
  - (b) If the leak is from a seal, do the procedure to seal the applicable area of the leak (AMM 51-31-01/201).
  - (c) After you repair the leak, do the applicable leak test again.

s 362-219

- (9) If you did not collect the correct amount of water and cannot find leaks, do these steps:
  - (a) Do the task to clear the applicable strut drain.
  - (b) If you cannot remove the blockage with air, use a thin wire to clear the applicable drain tube.
  - (c) Continue to remove the blockage in the tube and do the leak test again until you collect the correct amount of water.
- G. If you will not do more leak checks at this time, put the airplane back to its usual condition.

s 162-220

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(1) Make sure you remove all unwanted materials from the strut cavities.

s 412-221

(2) Close the upper wing leading edge cover 511CT/611CT.

S 412-222

(3) Install the dry bay access panels 462FL/472FL and 462GL/472GL.

s 412-150

ALL

(4) Install the aft fairing panels 464AL/484AL.

EFFECTIVITY-

54-53-00



S 442-223

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT DO THE STEPS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(5) Do this task: "Safety Locks Removal and Extended Leading Edge Flaps Activation" (AMM 27-81-00/201).

s 412-224

(6) Close the left and right core cowl panels (AMM 71-11-06/201).

s 412-225

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(7) Close the left and right thrust reversers (AMM 78-31-00/201).

s 412-226

ALL

(8) Close the left and right fan cowl panels (AMM 71-11-04/201).

TASK 54-53-00-102-017

#### 12. Clean the Strut Drains

- A. Equipment
  - (1) Air source regulated, compressed, 25-35 psi (170-240 kPa)
- B. References
  - (1) AMM 20-11-05/401, Flairless Tubing Assembly
  - (2) AMM 27-81-00/201, Leading Edge Flaps
  - (3) AMM 54-62-00/201, Nacelle Strut Access Panels
  - (4) AMM 78-31-00/201, Thrust Reverser System

EFFECTIVITY-

54-53-00



- C. Access
  - (1) Location Zone
    - 451 Nacelle Strut 1 Forward Fairing
    - 452 Nacelle Strut 1 Torque Box
    - 461 Nacelle Strut 2 Forward Fairing
    - 462 Nacelle Strut 2 Torque Box
    - 471 Nacelle Strut 3 Forward Fairing
    - 472 Nacelle Strut 3 Torque Box
    - 481 Nacelle Strut 4 Forward Fairing
    - 482 Nacelle Strut 4 Torque Box
  - (2) Access Panel
    - 451B Forward Fairing No. 3 Nacelle Strut 1
    - 452AL Nacelle Strut Access Door Nacelle Strut 1
    - 454AL/R Trailing Edge Fairing Doors Nacelle Strut 1
    - 521FT Wing Leading Edge Cover Nacelle Strut 1
    - 461B Forward Fairing No. 3 Nacelle Strut 2
    - 462AL Nacelle Strut Access Door Nacelle Strut 2
    - 464AL/R Trailing Edge Fairing Doors Nacelle Strut 2
    - 511CT Wing Leading Edge Cover Nacelle Strut 2
    - 471B Forward Fairing No. 3 Nacelle Strut 3
    - 472AL Nacelle Strut Access Door Nacelle Strut 3
    - 474AL/R Trailing Edge Fairing Doors Nacelle Strut 3
    - 611CT Wing Leading Edge Cover Nacelle Strut 3
    - 481B Forward Fairing No. 3 Nacelle Strut 4
    - 482AL Nacelle Strut Access Door Nacelle Strut 4
    - 484AL/R Trailing Edge Fairing Door Nacelle Strut 4
    - 621FT Wing Leading Edge Cover Nacelle Strut 4
- D. Prepare to clean the strut drains

s 012-119

(1) Open the left and right fan cowl panels (AMM 71-11-04/201).

s 012-120

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Open the left and right thrust reversers (AMM 78-31-00/201).

s 012-121

ALL

(3) Open the left and right core cowl panels (AMM 71-11-06/201).

EFFECTIVITY-

54-53-00



s 042-122

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO INSTALL THE LE FLAP SAFETY LOCKS. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT INSTALL THE SAFETY LOCKS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(4) Do this task: "Extended Leading Edge Flaps Deactivation and Safety Locks Installation" (AMM 27-81-00/201).

s 582-124

(5) Level the airplane to a minimum of one-half degree (AMM 08-00-00/201).

s 012-021

(6) Open access doors 452AL/462AL/472AL/482AL (AMM 54-62-00/201), for the applicable strut.

s 012-022

(7) Open the trailing edge fairing doors (AMM 54-62-00/201).

s 012-023

(8) Remove the No. 3 forward fairing.

s 012-110

- (9) Open the upper wing leading edge cover.
- E. Clean the Strut Drains.

s 032-025

(1) You must disconnect the drain tube from the applicable screen before you apply the air, and connect the drain tube to the screen when this task is complete (AMM 20-11-05/401).

s 162-152

ALL

- (2) Clean the forward drains:
  - (a) Apply air pressure to the strut drain line exit at the drain mast (NSTA 190).

EFFECTIVITY-

54-53-00



- (b) Clean the center strut drain inlet (NSTA 212) and raceway drain inlet (NSTA 224) in sequence.
  - 1) Block one inlet with a plug while you cover the other inlet with a rag to collect the unwanted materials.
- (c) Make sure the the air comes out of the drain inlets freely.
- (d) Remove the air pressure from the drain line exit.
- (e) Remove the plugs, rags, and unwanted materials from the drain inlets.

#### s 162-027

- (3) Clean the aft condensate drains:
  - (a) Apply air pressure to the aft lower dry bay condensate drains (NSTA 305, right and left sides).
  - (b) Clean the condensate drain inlets (right and left sides).
    - Cover the inlets with a rag to collect the unwanted materials.
  - (c) Make sure the air comes out of the condensate drain inlets freely.
  - (d) Remove the air pressure from the condensate drains.
  - (e) Remove the rags and unwanted materials from the drain inlets.

#### s 162-028

- (4) On the inboard struts, clean the aft drains:
  - (a) Apply air pressure to the strut drain line exit on the aft edge of the lower pan assembly (NSTA 388).
    - 1) Cover the midspar drain inlet (NSTA 301) with a rag to collect the unwanted materials.
  - (b) Make sure that air comes out freely from the drain inlet.
  - (c) Remove the air pressure from the drain line exit.
  - (d) Remove the rag and unwanted materials from the drain inlet.
  - (e) Apply air pressure to the right and left upper spar drain exits (NSTA 299).
    - 1) Cover the right and left upper spar drain inlets (NSTA 285) with rags to collect the unwanted materials.
  - (f) Make sure the air comes out of the drain inlets freely.
  - (g) Remove the air pressure from the drain line exits.
  - (h) Remove the rags and unwanted materials from the drain inlets.
  - (i) Apply air pressure to the aft upper strut drain exit (NSTA 378).
    - 1) Cover the vapor barrier bay drain inlet (NSTA 364) with a rag to collect the unwanted materials.
  - (j) Make sure the air comes out of the drain inlet freely.
  - (k) Remove the air pressure from the drain line exit.
  - (l) Remove the rag and unwanted materials from the drain inlet.

EFFECTIVITY-

ALL

54-53-00



(m) Do a visual check on the short drain tube at the aft edge of the lower pan assembly to see if it has been cleaned of the debris.

s 162-029

- (5) On the outboard struts, clean the aft drains:
  - (a) Apply air pressure to the strut drain line exit on the aft edge of the lower pan assembly (NSTA 388).
    - 1) Cover the door-mounted drain fitting assembly (NSTA 330) with a rag to collect the unwanted materials.
  - (b) Make sure the air comes out of the drain inlet freely.
  - (c) Remove the air pressure from the drain line exit.
  - (d) Remove the rag and unwanted materials from the drain inlet.
  - (e) Apply air pressure to the strut-mounted drain fitting assembly (NSTA 330).
  - (f) Clean the closure spar drain inlet (NSTA 303) and upper spar drain inlet (NSTA 252) in sequence.
    - 1) Block one inlet with a plug and cover the other inlet with a rag to collect the unwanted materials.
  - (g) Make sure the air comes out of the drain inlets freely.
  - (h) Remove the air pressure from the drain fitting assembly.
  - (i) Remove the plugs, rags, and unwanted materials from the drain inlets.
- F. Put the Airplane Back to Its Usual Condition.

s 162-125

CAUTION: MAKE SURE YOU KEEP THE STRUT AREA CLEAN. TOOLS, LOOSE AND UNWANTED MATERIALS IN THE STRUT COMPARTMENTS CAN BLOCK THE REMOVAL OF THE FLUIDS THROUGH THE STRUT DRAINS. IF YOU DO NOT REMOVE THE UNWANTED MATERIALS, YOU CAN CAUSE DAMAGE TO THE STRUT.

(1) Make sure you remove all unwanted materials from the strut cavities.

s 442-127

WARNING: MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LE AND TE FLAPS AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, THE FLAPS WILL MOVE AUTOMATICALLY BY ELECTRICAL POWER WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

WARNING: YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT DO THE STEPS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(2) Do this task: "Safety Locks Removal and Extended Leading Edge Flaps Activation" (AMM 27-81-00/201).

 54-53-00



s 412-128

(3) Close the left and right core cowl panels (AMM 71-11-06/201).

s 412-129

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Close the left and right thrust reversers (AMM 78-31-00/201).

s 412-130

(5) Close the left and right fan cowl panels (AMM 71-11-04/201).

s 412-030

(6) Close the access doors 452AL/462AL/472AL/482AL (AMM 54-62-00/201), for the applicable strut.

s 412-031

(7) Install the No. 3 forward fairing.

s 412-132

(8) Close the trailing edge fairing doors (AMM 54-62-00/201).

EFFECTIVITY-

ALL

54-53-00



## STRUT SYSTEMS SEALANT - MAINTENANCE PRACTICES

## 1. General

A. This procedure contains the data to apply sealant to the systems that go through the structure.

TASK 54-53-01-392-001

- 2. Strut Systems Sealant Application (Fig. 201)
  - A. Consumable Materials
    - (1) A00160 BMS5-63, Sealant
  - B. References
    - (1) AMM 51-31-01/201, Seals and Sealing
    - (2) AMM 54-62-00/201, Nacelle Strut Access Doors
    - (3) AMM 71-11-04/201, Fan Cowl Panels
    - (4) AMM 71-11-06/201, Core Cowl Panels
    - (5) AMM 78-31-00/201, Thrust Reverser
  - C. Access
    - (1) Location Zone

452 Nacelle Strut 1 - Torque Box

462 Nacelle Strut 2 - Torque Box

472 Nacelle Strut 3 - Torque Box

482 Nacelle Strut 4 - Torque Box

(2) Access Panel

452AL Nacelle Strut - Strut #1

462AL Nacelle Strut - Strut #2

472AL Nacelle Strut - Strut #3

482AL Nacelle Strut - Strut #4

D. Procedure

s 012-002

(1) Open the left fan cowl panel (AMM 71-11-04/201).

s 012-003

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Open the left thrust reverser (AMM 78-31-00/201).

s 012-004

(3) Open the left core cowl panel (AMM 71-11-06/201).

s 012-005

(4) Do the procedure to open the applicable access doors (AMM 54-62-00/201).

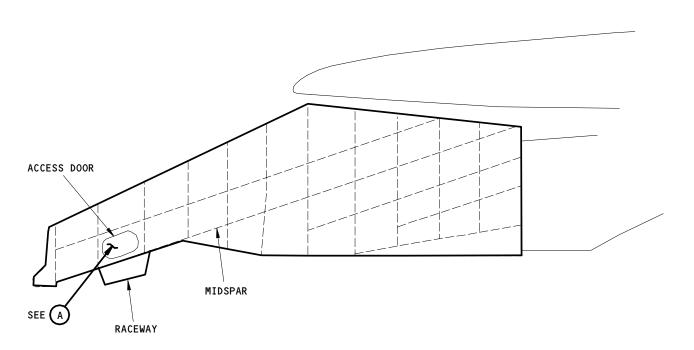
EFFECTIVITY-

54-53-01

ALL

03





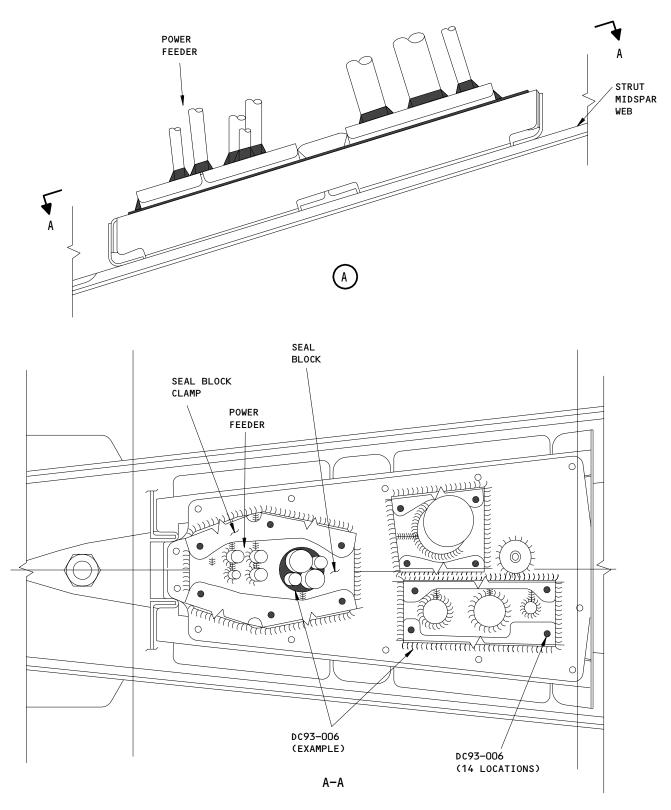
EXAMPLE OF AN INBOARD OR OUTBOARD STRUT

Strut Systems Sealant Figure 201 (Sheet 1)

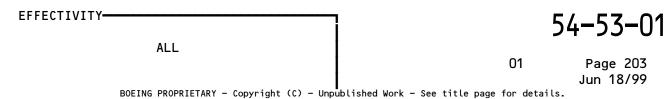
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54-53-01





Strut Systems Sealant Figure 201 (Sheet 2)





s 012-006

(5) Do the procedure to remove the forward fairing (AMM 54-60-00/201).

s 392-007

- (6) For the electrical power feeder, do the steps that follow to apply sealant:
  - (a) Do the steps that follow where the systems go through the midspar web of the strut, above the systems reaceway:
    - 1) Use a thin rectangular nozzle to apply BMS 5-63 fillet seal between individual wires on unsleeved bundles and around sleeved bundles (AMM 51-31-01/201, Fillet Seal Application Task).
    - 2) Fill the gaps between the wire bundles and the rubber block with BMS 5-63 (AMM 51-31-01/201).
    - 3) Apply BMS 5-63 fillet seal around the entire area where the systems go through the midspar web (AMM 51-31-01/201, Fillet Seal Application Task).
    - 4) Apply BMS 5-63 fillet seal all around the seal block and to the fasteners of the seal block (AMM 51-31-01/201, Fillet Seal Application Task).
  - (b) At the midspar bulkhead, where the systems go through the bulkhead, seal the bulkhead seal fitting (AMM 51-31-01/201, Electrical Fitting Sealing Task).

s 792-008

(7) Do the strut leak test for the systems raceway (AMM 54-53-00/201)

s 792-013

(8) Do the strut leak test procedure for the bulkhead (AMM 54-53-00/201).

s 412-009

(9) Do the procedure to close the applicable access doors (AMM 54-62-00/201)

s 412-010

(10) Close the left core cowl panel (AMM 71-11-06/201).

s 412-011

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE TURUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(11) Close the left thrust reverser (AMM 78-31-00/201).

s 412-012

ALL

(12) Close the left fan cowl panel (AMM 71-11-04/201).

EFFECTIVITY-

54-53-01

1



## FAIRINGS AND SKINS - DESCRIPTION AND OPERATION

#### 1. General

- A. The nacelle struts load bearing side panel assemblies consist of a bonded skin and doubler with a local tripler in the area by the rear engine mount.
- B. The interior side of the skin below the lower spar (firewall) is covered with a stainless steel sheathing for a fire barrier.
- C. Fairings cover the skin at locations where necessary to provide for smooth aerodynamic flow. AMM 54-60-00/201 contains instructions to adjust the fairings for aerodynamic smoothness.
- D. For desciption of fairings, refer to 54-61-00/001.

 54-60-00

03

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### FAIRINGS AND SKINS - MAINTENANCE PRACTICES

#### 1. General

- A. This procedure gives the aerodynamic smoothness requirements for the strut access doors, panels, and fairings to permit smooth air flow. These doors, panels, and fairings are located in areas where aerodynamic smoothness is very important.
- B. This procedure gives the aerodynamic smoothness requirements for these components:
  - (1) The strut forward fairings.
  - (2) The strut access doors.
  - (3) The strut side fairings.
  - (4) The underwing fairings.
  - (5) The strut aft doors, panels, and fairings.

#### TASK 54-60-00-202-013

- Aerodynamic Smoothness Check (Fig. 201)
  - A. References
    - (1) AMM 54-62-02/501, Nacelle Strut Access Doors
    - (2) AMM 54-62-03/501, Aft Fairing Access Doors
  - B. Access
    - (1) Location Zone
      - Nacelle Strut 1 Torque Box 452 454 Nacelle Strut 1 - Aft Fairing 462 Nacelle Strut 2 - Torque Box Nacelle Strut 2 - Aft Fairing 464 Nacelle Strut 3 - Torque Box 472 474 Nacelle Strut 3 - Aft Fairing 482 Nacelle Strut 4 - Torque Box Nacelle Strut 4 - Aft Fairing 484
  - C. Aerodynamic Smoothness Requirements

s 202-014

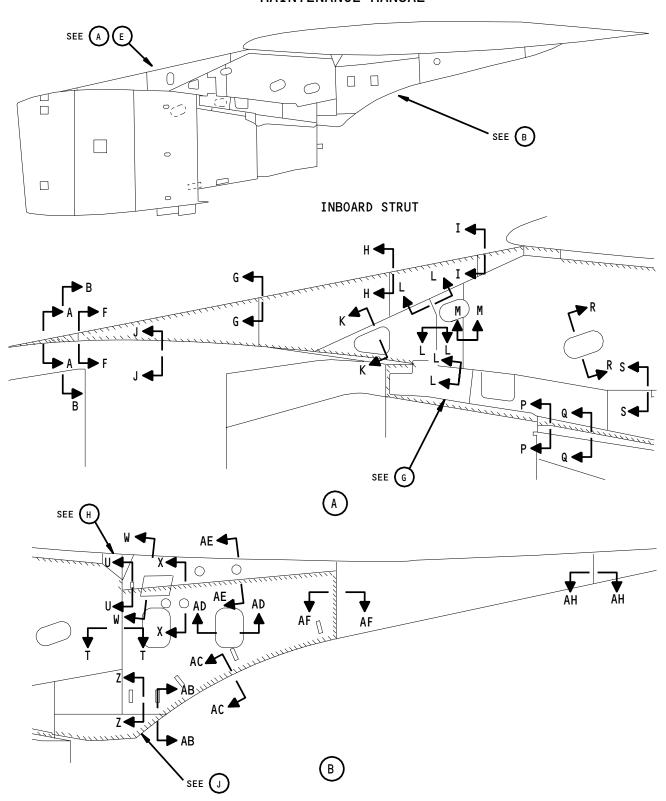
- (1) Do these steps to examine the clearance between the adjacent surfaces:
  - (a) Look for an unusually large clearance or a change in contour between adjacent surfaces.
  - (b) The clearance between the adjacent surfaces must agree with the permitted tolerances.
  - (c) If it is necessary, do the task to adjust the strut access doors and pressure relief doors (AMM 54-62-02/501).
  - (d) If it is necessary, do the task to adjust the aft fairing access doors (AMM 54-62-03/501).

 54-60-00

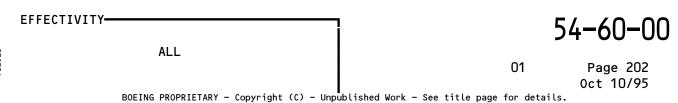
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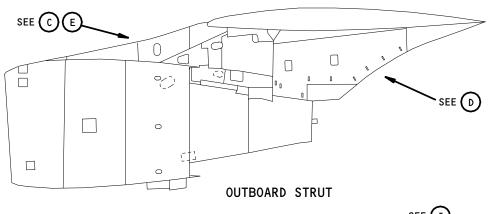
MAINTENANCE MANUAL

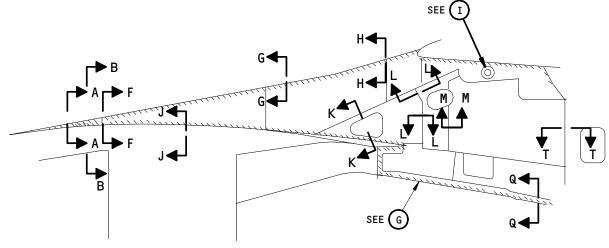


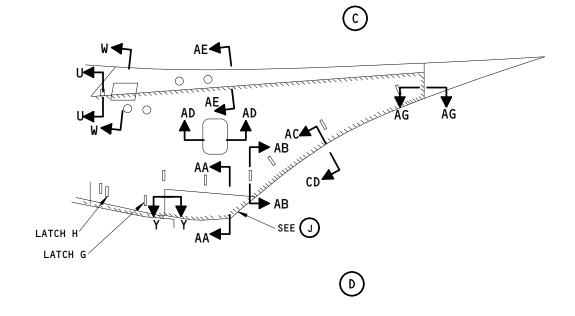
Aerodynamic Smoothness Requirements Figure 201 (Sheet 1)











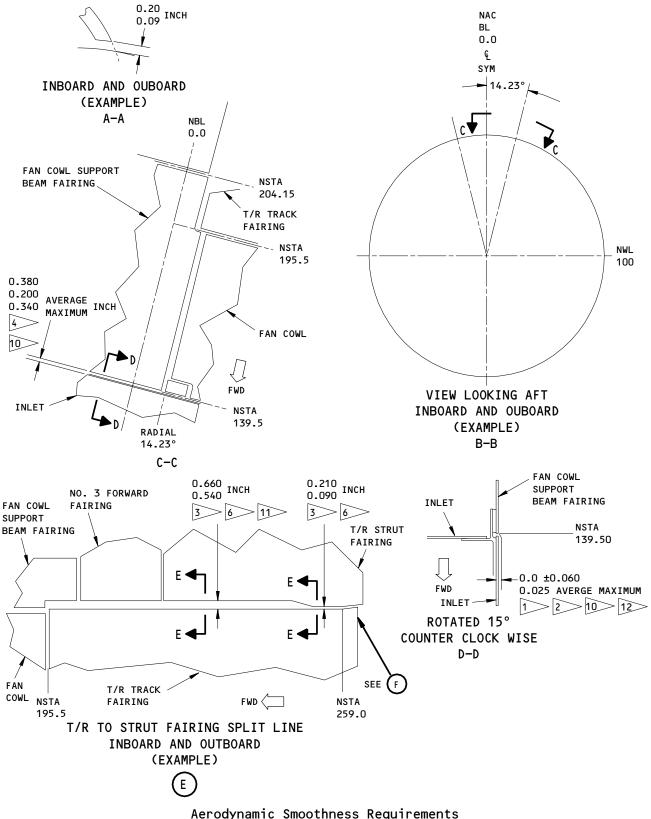
Aerodynamic Smoothness Requirements Figure 201 (Sheet 2)

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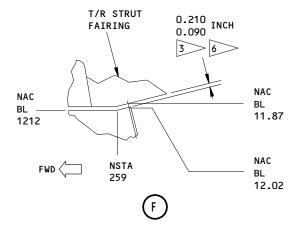
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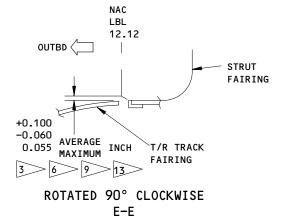




Aerodynamic Smoothness Requirements Figure 201 (Sheet 3)



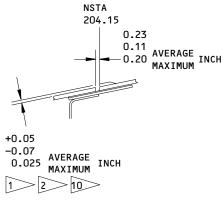




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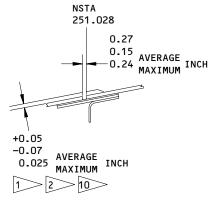
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0.14
0.23
AVERAGE MAXIMUM

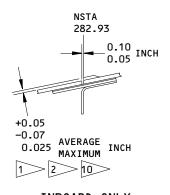
1 2 10



INBOARD AND OUTBOARD
(EXAMPLE)
F-F

INBOARD AND OUTBOARD (EXAMPLE)
G-G





INBOARD AND OUTBOARD
(EXAMPLE)
H-H

INBOARD ONLY

Aerodynamic Smoothness Requirements Figure 201 (Sheet 4)

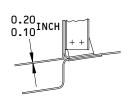
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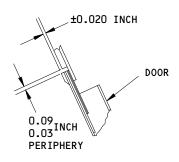
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Page 205 Feb 18/00

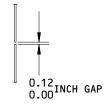




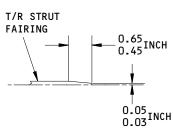
INBOARD AND OUTBOARD (EXAMPLE) J-J

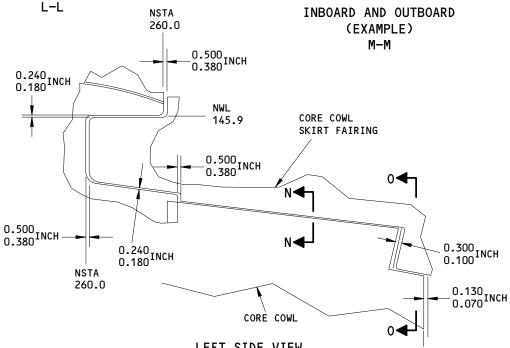


ACCESS AND PRESSURE RELIEF INBOARD AND OUTBOARD K-K



GAP (EXAMPLE)





LEFT SIDE VIEW
CORE COWL TO STRUT FAIRING SPLIT LINE
INBOARD AND OUTBOARD



Aerodynamic Smoothness Requirements Figure 201 (Sheet 5)

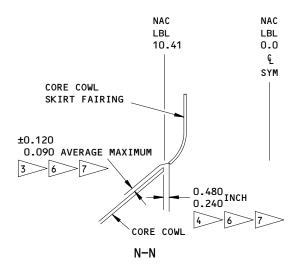
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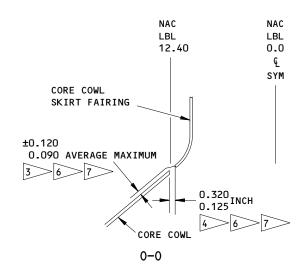
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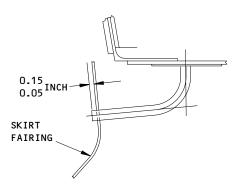
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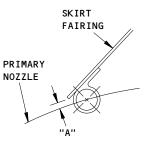
Page 206 Oct 10/95







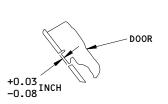


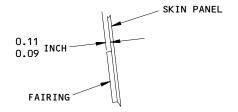


Α INBOARD OUTBOARD STATION **ENGINE ENGINE** 0.38-0.88 307.00 14 0.38-0.88 313.00 0.37-0.86 0.37-0.85 0.36-0.84 0.36-0.82 319.00 0.35-0.81 0.35-0.79 325.00 331.00 0.34-0.79 0.34-0.77 337.00 0.35-0.77 0.33-0.74 0.32-0.75 0.32-0.71 343.00 349.00 0.31-0.73 0.31-0.68 0.30-0.71 0.30-0.66 355.00

CONDENSATION DRAIN
INBOARD AND OUTBOARD
(EXAMPLE)
P-P

INBOARD AND OUTBOARD
(EXAMPLE)
Q-Q





INBOARD AND OUTBOARD STRUT ACCESS
AND PRESSURE RELIEF DOOR WITH
TOGGLE STYLE LATCH
R-R

INBOARD AND OUTBOARD
(EXAMPLE)
S-S

AeroDynamic Smoothness Requirements Figure 201 (Sheet 6)

ALL ALL

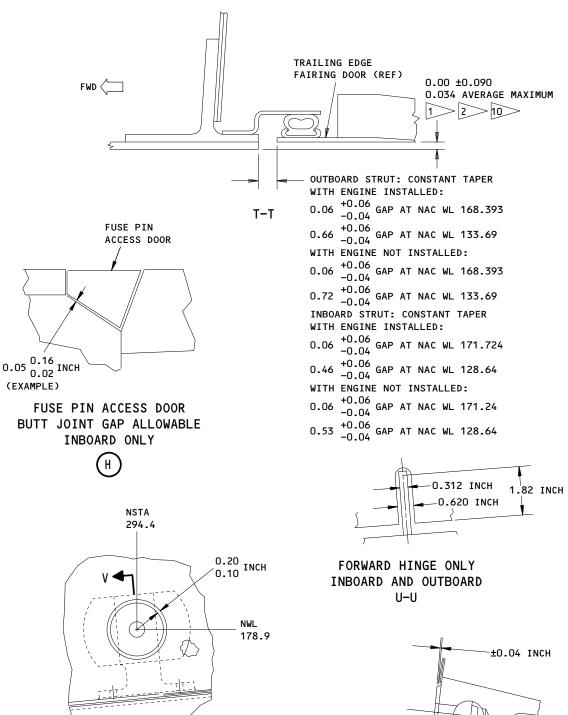
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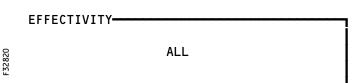
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Page 207 Jun 18/00





Aerodynamic Smoothness Requirements Figure 201 (Sheet 7)



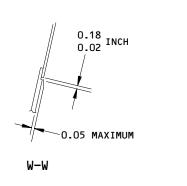
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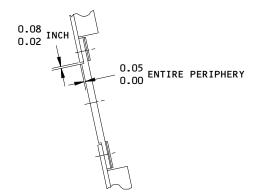
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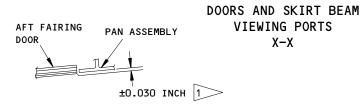
**V-V** 

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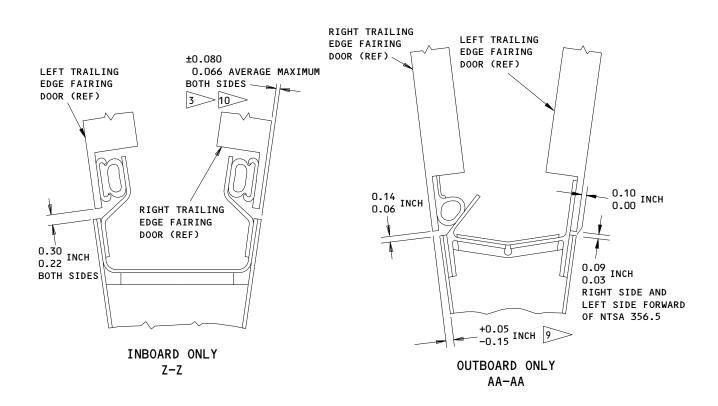








Y-Y



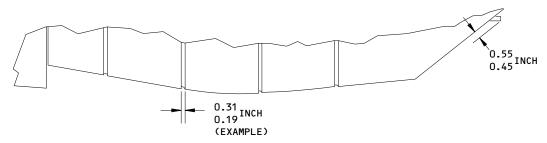
Aerodynamic Smoothness Requirements Figure 201 (Sheet 8)

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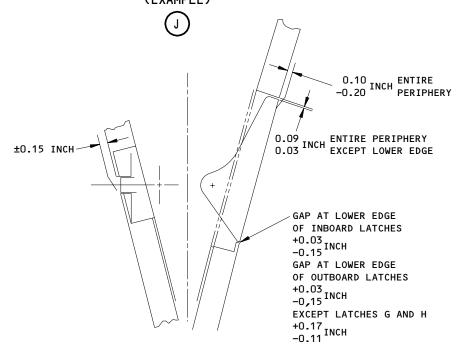
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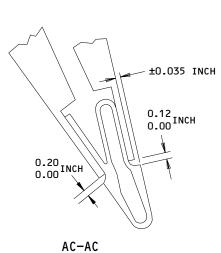
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Oct 10/95



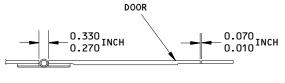


# INBOARD AND OUTBOARD (EXAMPLE)





SECTION THROUGH AFT
FAIRING DOOR SHOWING LATCH
INBOARD 5 LATCHES
OUTBOARD 9 LATCHES
AB-AB



AFT FAIRING PRESSURE RELIEF DOOR INBOARD AND OUTBOARD (EXAMPLE) AD-AD

Aerodynamic Smoothness Requiements Figure 201 (Sheet 9)

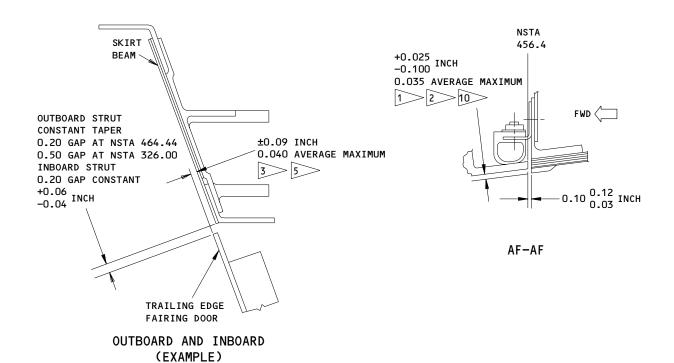
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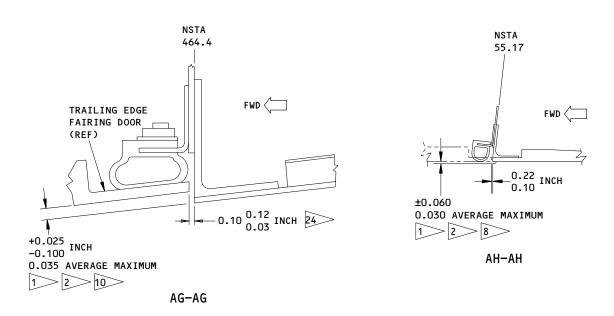
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Page 210 Oct 10/95

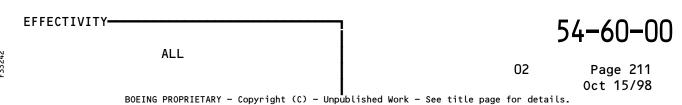






AE-AE

## Aerodynamic Smoothness Requirements Figure 201 (Sheet 10)





\_\_\_\_AIRFLOW \_\_\_\_\_AIRFLOW \_\_\_\_

 $^2$  AVERAGE TRANSVERSE FAIR IS CALCULATED FROM THE MEASURED READINGS USING THE FOLLOWING FORMULA:

(SUM OF POSITIVE STEPS) + (-0.55 X SUM OF NEGATIVE STEPS)

TOTAL NUMBER OF READINGS

"POSITIVE" OR "NEGATIVE" STEPS IN STREAMWISE INTERFACES ARE EQUIVALENT AND TREATED THE SAME. AVERAGE STREAMWISE FAIR IS CALCULATED FROM THE MEASURED READINGS USING THE FOLLOWING FORMULA (WHICH ELIMINATES ALL "NEGATIVE" STEP REFERENCES):"

(SUM OF POSITIVE STEPS) + (-1.0 X SUM OF NEGATIVE STEPS)

TOTAL NUMBER OF READINGS

4> AVERAGE GAP VALUE IS CALCULATED FROM THE MEASURED READINGS USING THE FOLLOWING FORMULA:

SUM OF GAP MEASUREMENTS

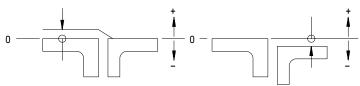
TOTAL NUMBER OF READINGS

5 TAKE A MINIMUM OF 10 EQUALLY SPACED READINGS

> TAKE A MINIMUM OF 10 EQUALLY SPACED READINGS ON EACH NACELLE HALF (≥20 TOTAL PER NACELLE)

>> THIS INTERFACE REQUIRES THE CALCULATION OF A WEIGHTED AVERAGE AS FOLLOWS:

- TAKE 7 EQUALLY SPACED GAP MEASUREMENTS AT SECTION N-N. MULTIPLY THE AVERAGE MEASUREMENT BY 0.75 TO GET A WEIGHTED AVERAGE FOR SECTION N-N.
- TAKE 3 EQUALLY SPACED GAP MEASUREMENTS AT SECTION 0-0. MULTIPLY THE AVERAGE MEASUREMENT BY 0.25 TO GET A WEIGHTED AVERAGE FOR SECTION 0-0.
- ADD THE TWO WEIGHTED AVERAGES TO GET A TOTAL WEIGHTED AVERAGE GAP MEASUREMENT FOR THE INTERFACE.
   THE ALLOWABLE WEIGHTED AVERAGE GAP MEASUREMENT IS 0.384 MAXIMUM.
- TAKE A MINIMUM OF 4 EQUALLY SPACED READINGS ON EACH NACELLE HALF (≥8 TOTAL PER NACELLE)
- NON-SYMMETRICAL (AIRFLOW NON-SPECIFIC) MISFAIR ORIENTATION CONVENTION CLARIFICATION:



- + VALUE MEANS INTERFACING PART ABOVE ORIGIN PART
- VALUE MEANS INTERFACING PART ABOVE ORIGIN PART
- 10> TAKE A MINIMUM OF 5 EQUALLY SPACED READINGS

11>> KLM 039;

ENG 1: AVERAGE GAP IS 0.33 INCH

ENG 2: AVERAGE GAP IS 0.33 INCH

ENG 3: AVERAGE GAP IS 0.27 INCH

ENG 4: AVERAGE GAP IS 0.27 INCH

12 > KLM 039;

AVERAGE MAXIMUM GAP IS 0.27 INCH

13>> KLM 039;

AVERAGE GAP IS +0.30 INCH

14>> KLM 039;

INBOARD ENGINE STA 307.00 RANGE IS +0.21/-0.09 INBOARD ENGINE STA 313.00 RANGE IS +0.17/-0.09

Aerodynamic Smoothness Requirements Figure 201 (Sheet 11)

54-60-00

17

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## FAIRINGS - DESCRIPTION AND OPERATION

## 1. General (Fig. 1)

- A. Fairings are attached to the strut to provide a low-drag aerodynamic profile between the engine nacelle and wing.
- B. Fairings attached to the nacelle strut include the forward fairings, thrust reverser-to-strut fairings, underwing fairing and skirt beam, core cowl skirt, lower strut fairings, trailing edge fairing doors, and the aft fairings.
- C. For description of the trailing edge fairing doors, refer to 54-62-00/001.
- D. Countersunk screws attach the fairings to the nacelle strut. After the fairings are removed and installed, you must check the aerodynamic smoothness, and adjust it if necessary (AMM 54-60-00/201).
- E. Access panels are installed on some fairings. For description of access panels, refer to 54-62-00/001.
- F. On some fairings, a bulb seal is installed to seal between the fairing and the nacelle strut.

#### 2. Forward Fairings

- A. The forward fairing consists of four separate fairings which extend along the forward edge of the nacelle strut from the engine inlet cowl to the wing leading edge.
- B. Forward fairings are numbered front to rear, with forward fairing No. 1 above the inlet cowl, and forward fairing No. 4 forward of the wing leading edge.
- C. The forward fairings are constructed of bonded aluminum honeycomb material.

#### 3. Thrust Reverser-to-Strut Fairings

- A. The upper, forward, mid, and aft thrust reverser-to-strut fairings cover strut skin attached to the forward end of the nacelle strut torque box.
- B. Thrust reverser-to-strut fairings are constructed of either bonded aluminum honeycomb material or injection/compression molded plastic.

## 4. Strut-to-Wing Fairings

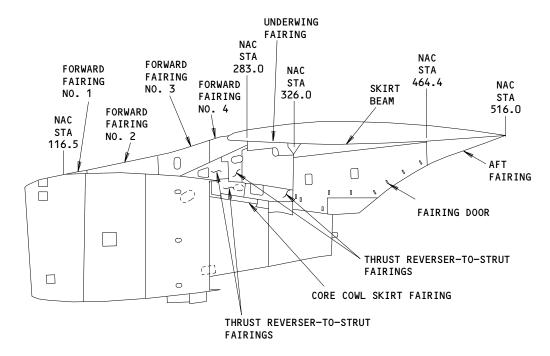
- A. The underwing fairing and skirt beam provide a smooth aerodynamic flow transition under the wing.
- B. The trailing edge fairing doors are mounted on hinges attached to the skirt beam.
- C. Strut-to-wing fairings are of aluminum skin and frame construction.

#### Aft Fairings

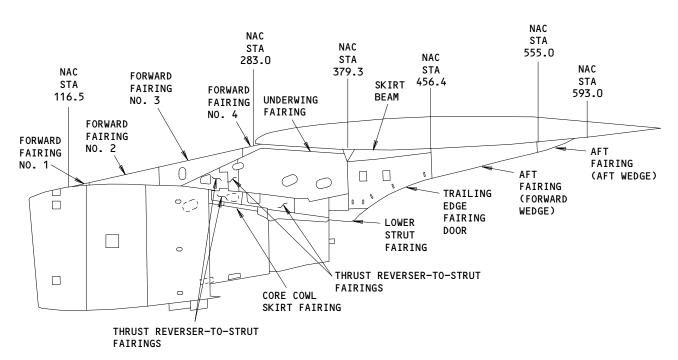
- A. On inboard nacelle struts, the aft fairing consists of forward and aft segments. On outboard nacelle struts, the aft fairing is one piece.
- B. The aft fairings are constructed of bonded aluminum honeycomb material and are fastened by screws to an angle chord attached to the lower wing surface.

 54-61-00





# OUTBOARD NACELLE STRUT FAIRINGS



INBOARD NACELLE STRUT FAIRINGS

Nacelle Strut Fairings Figure 1

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# AFT THRUST REVERSER-TO-STRUT FAIRING PANEL NO. 3 - REMOVAL/INSTALLATION

## 1. General

- A. This procedure contains two tasks:
  - (1) The removal of the the outboard aft thrust reverser-to-strut fairing panel No. 3.
  - (2) The installation of the outboard aft thrust reverser-to-strut fairing panel No. 3.
- B. The installation procedure has special fastener installation instructions to prevent cracks to the panel.

TASK 54-61-01-004-001

- 2. Outboard Aft Thrust Reverser-to-Strut Fairing Panel No. 3 Removal (Fig. 401)
  - A. Access
    - (1) Location Zone
      - 452 Nacelle Strut 1 Torque Box
      - 462 Nacelle Strut 2 Torque Box
      - 472 Nacelle Strut 3 Torque Box
      - 482 Nacelle Strut 4 Torque Box
  - B. Procedure

s 024-002

- (1) Remove the fairing panel No. 3.
  - (a) Remove the fasteners that attach the fairing panel No. 3.
  - (b) Remove the fairing panel No. 3.

TASK 54-61-01-404-003

- 3. <u>Outboard Aft Thrust Reverser-to-Strut Fairing Panel No. 3 Installation</u> (Fig. 401)
  - A. Access
    - (1) Location Zone
      - 452 Nacelle Strut 1 Torque Box
      - 462 Nacelle Strut 2 Torque Box
      - 472 Nacelle Strut 3 Torque Box
      - 482 Nacelle Strut 4 Torque Box
  - B. Procedure

s 424-004

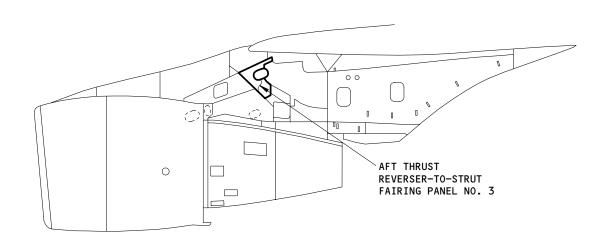
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- (1) Install the fairing panel No. 3.
  - (a) Put the fairing panel No. 3 in its location on the strut.
  - (b) Measure the run-on (self-locking) torque of each fastener.
  - (c) Install each fastener to a torque value of the run-on torque plus 10 pound-inches (1.13 N.m).

EFFECTIVITY-

54-61-01





OUTBOARD NACELLE STRUT

Outboard Aft Thrust Reverser-to-Strut Fairing Panel No. 3 Figure 401

EFFECTIVITY ALL

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#### NACELLE STRUT ACCESS PANELS - DESCRIPTION AND OPERATION

# 1. General

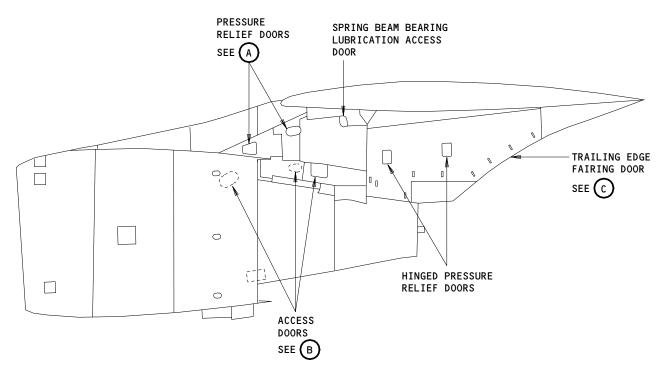
- A. Access panels include access doors, pressure relief doors, and trailing edge fairing doors.
- B. Access doors and panels are provided in the nacelle strut to gain access to engine components, tubing, wiring, lubrication fittings, and structural members and attach points.
- C. For panel number and description of each nacelle strut access panel, refer to AMM 06-09-09/201.
- D. Strut access panels cover the strut access openings where necessary to provide for smooth aerodynamic flow (AMM 54-60-00/201).

# 2. Access Doors (Fig. 1)

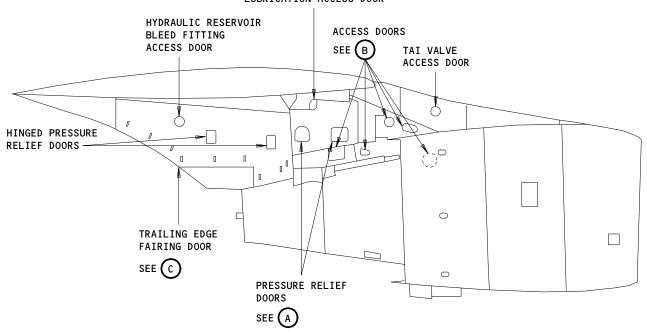
- A. Access doors provide access to the nacelle strut torque box interior, to the area under the forward fairing, to behind the trailing edge fairing doors, and to structural fuse pins and bolts.
  - (1) To provide access to the torque box interior, three doors are installed on the left side and five doors on the right side of outboard struts, and three doors are installed on the left side and seven doors on the right side of inboard struts. These access doors are secured with rotary nut latches.
    - (a) The lower midspar access doors is hidden by a removeable middle thrust reverser-to-strut fairing.
  - (2) Other access doors are provided on the nacelle strut to access specific components as follows:
    - (a) To provide access to override the thermal anti-icing valve, an access door is installed on the right side of forward fairing No. 3. This access door is secured with rotary nut latches.
    - (b) To provide access to midspar (inboard struts) or spring beam (outboard struts) fuse pins, an access panel is installed on each side of the nacelle strut with countersunk fasteners.
    - (c) To provide access to the hydraulic reservoir bleed fitting, an access door is installed on the right trailing edge fairing door of each strut. These doors are secured with rotary nut latches and attached by a retaining cable.
    - (d) To provide access to lubricate the diagonal brace aft fuse pin on inboard struts, an access door is installed on the left side of the aft fairing forward wedge. These doors are secured with rotary nut latches.

54-62-00





#### SPRING BEAM BEARING LUBRICATION ACCESS DOOR



# **OUTBOARD STRUTS**

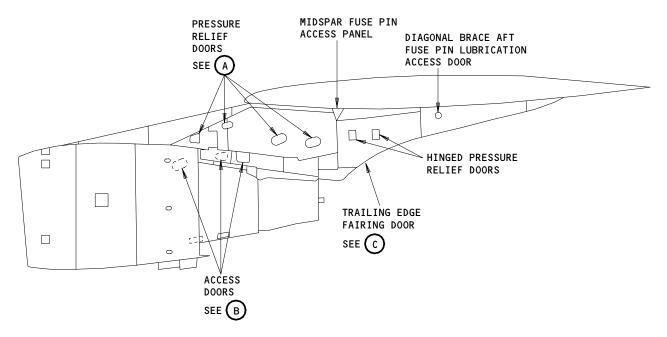
# Nacelle Strut Access Panels Figure 1 (Sheet 1)

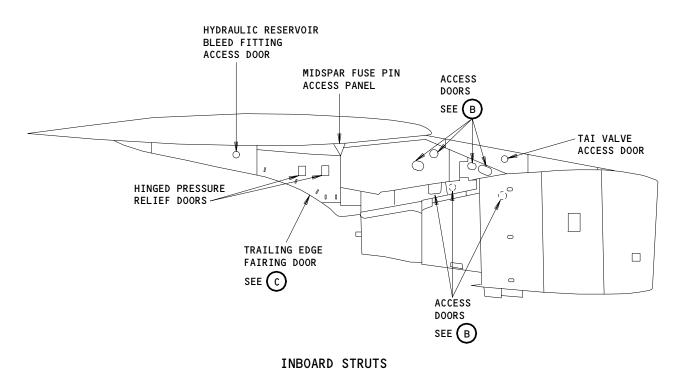
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INDOMED STROTS

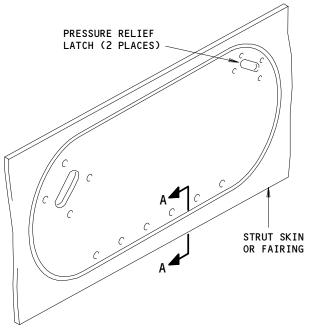
Nacelle Strut Access Panels Figure 1 (Sheet 2)

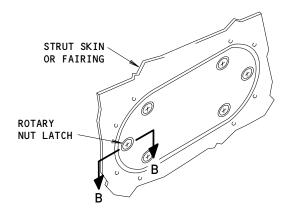
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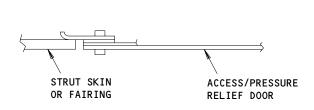


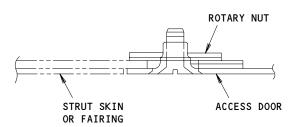


TYPICAL STRUT PRESSURE RELIEF DOOR

TYPICAL STRUT ACCESS DOOR







DOOR LIP A-A

ROTARY NUT LATCH В-В

Nacelle Strut Access Panels Figure 1 (Sheet 3)

EFFECTIVITY-ALL

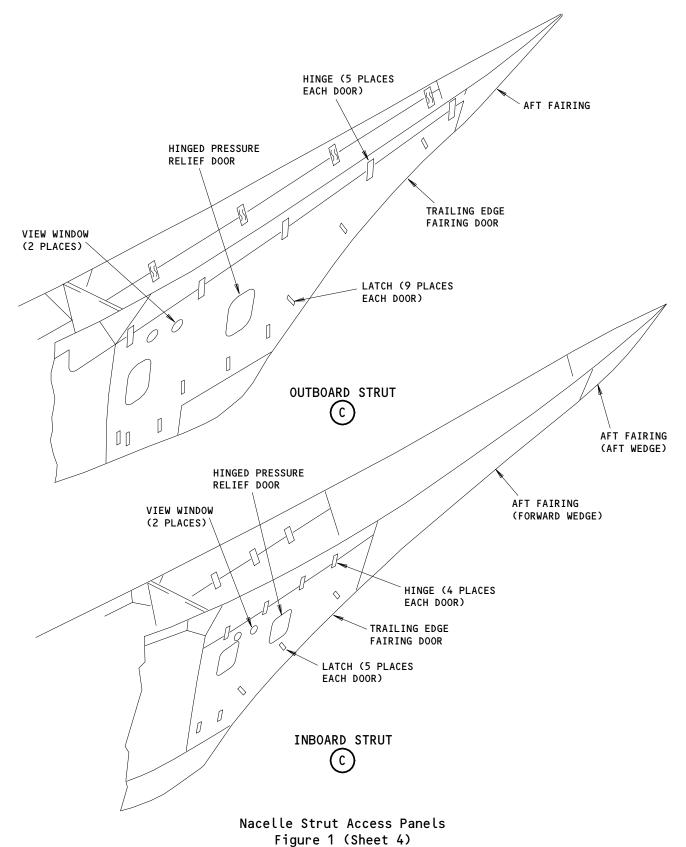
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# 3. <u>Pressure Relief Doors</u>

- A. The main function of pressure relief doors is to release internal strut pressure buildup due to a pneumatic leak or other malfunction. Latches on pressure relief doors are designed to release when internal pressure exceeds certain limits. Pressure relief doors may also be opened for access.
  - (1) Each pressure relief door has two over-center linkage latches on one edge and a lip on the opposite edge to secure the door. Doublers or triplers are installed on the strut skin around doors to provide additional strength.
  - (2) Four pressure relief doors are installed on the left side of inboard nacelle struts. Two pressure relief doors are installed on each side of outboard nacelle struts.
    - (a) Two hinged pressure relief doors are installed on each of the trailing edge fairing doors on each nacelle strut. These doors are secured with four pressure relief screws or a latch on the aft side and hinged on the forward side.

## 4. Trailing Edge Fairing Doors (Fig. 1)

- A. The left and right trailing edge fairing doors are located on the aft lower section of the strut. The diagonal brace, hydraulic system components and other equipment are accessible through the trailing edge fairing doors.
- B. The doors are hinged at the top edge and latched together at the bottom and forward edges. Pressure relief panels are provided in the event of an internal malfunction resulting in a pressure buildup. View windows are located on each door for monitoring hydraulic equipment without opening the doors.

54-62-00



## NACELLE STRUT ACCESS PANELS - MAINTENANCE PRACTICES

## 1. General

- A. This procedure provides four tasks, one for removing access doors, one for installing access doors, one for opening trailing edge fairing doors, and one for closing trailing edge fairing doors.
  - (1) Removing access doors consists of installing leading edge flap safety locks, if necessary, opening access door with screwdriver, and removing door from opening.
  - (2) Installing access doors consists of securing door to strut using screwdriver, adjusting door if necessary, and removing leading edge flaps, if installed.
  - (3) Opening trailing edge fairing doors consist of releasing all latches, rotating door outward, and engaging support rod.
  - (4) Closing trailing edge fairing doors consist of releasing support rod, rotating door inward, securing all latches, and adjusting door flushness, if necessary.

TASK 54-62-00-002-001

- 2. Remove the Access Door (Fig. 201)
  - A. References
    - (1) AMM 27-81-00/201, Leading Edge Flaps
    - (2) AMM 54-60-00/201, Fairings and Skins
    - (3) IPC 54-62-02 Fig. 2 and 3
  - B. Access
    - (1) Location Zone

452 Nacelle Strut 1 - Torque Box

462 Nacelle Strut 2 - Torque Box

472 Nacelle Strut 3 - Torque Box

482 Nacelle Strut 4 - Torque Box

## C. Procedure

s 492-002

WARNING: LEADING EDGE FLAPS ARE FAST ACTING. LOCKS MUST BE INSTALLED TO PREVENT POSSIBLE INJURY DUE TO INADVERTENT OPERATION OF FLAPS.

MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE LE FLAPS, TE FLAPS, AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, ELECTRICAL POWER WILL CAUSE THE FLAPS TO MOVE AUTOMATICALLY WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

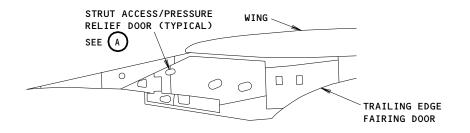
(1) Make sure the leading edge flaps are retracted and the leading edge flap drive unit lock is installed (AMM 27-81-00/201).

EFFECTIVITY-

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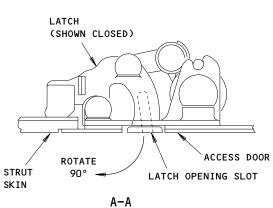
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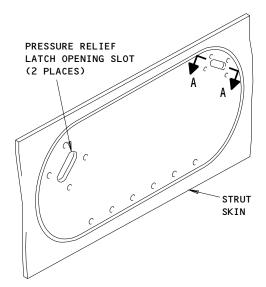


NOTE: INBOARD STRUT SHOWN

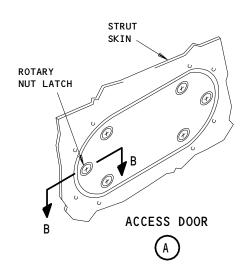
OUTBOARD STRUT SIMILAR

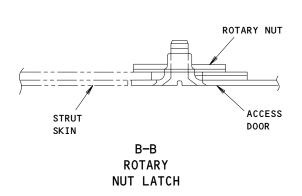


A-A OVER-CENTER LINKAGE LATCH



ACCESS/PRESSURE RELIEF DOOR





Access Doors - Opening and Closing Figure 201

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54-62-00

03

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s 012-030

(2) To gain access to lower midspar access doors hidden by middle thrust reverser-to-strut fairing, remove screws securing fairing and remove fairing.

s 032-004

(3) For access/pressure relief doors with pressure relief latches, insert screwdriver into latch handle slots and rotate screwdriver 90 degrees away from door to release latches.

s 032-005

(4) For access doors with rotary nut latches, turn each latch screw 1/4 turn using phillips screwdriver, and remove door. Check latches for damaged flanges; replace latch if damaged.

s 022-006

(5) Remove door from access opening.

TASK 54-62-00-402-007

- 3. Install the Access Door (Fig. 201)
  - A. References
    - (1) AMM 27-81-00/201, Leading Edge Flaps
    - (2) AMM 54-62-02/501, Nacelle Strut Access Doors
    - (3) IPC 54-62-02 Fig. 2 and 3
  - B. Access
    - (1) Location Zone

452 Nacelle Strut 1 - Torque Box

462 Nacelle Strut 2 - Torque Box

472 Nacelle Strut 3 - Torque Box

482 Nacelle Strut 4 - Torque Box

C. Procedure

s 492-008

WARNING: LEADING EDGE FLAPS ARE FAST ACTING. LOCKS MUST BE INSTALLED TO PREVENT POSSIBLE INJURY DUE TO INADVERTENT OPERATION OF FLAPS.

MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE LE FLAPS, TE FLAPS, AND FLAP DRIVE MECHANISMS BEFORE YOU MOVE THE FLAP CONTROL LEVER. WITH HYDRAULIC POWER REMOVED, ELECTRICAL POWER WILL CAUSE THE FLAPS TO MOVE AUTOMATICALLY WHEN YOU MOVE THE FLAP CONTROL LEVER. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Make sure the leading edge flaps are retracted and the leading edge flap drive unit lock is installed (AMM 27-81-00/201).

EFFECTIVITY-

54-62-00

ALL



s 422-009

(2) For access doors with pressure relief latches, insert edge of door in opening with door lip under skin, then insert screwdriver into latch handle slots and rotate screwdriver 90 degrees toward door to secure latches.

s 422-027

CAUTION: DO NOT APPLY EXCESSIVE FORCE TO ROTARY LATCH MECHANISM WHEN CLOSING ACCESS DOORS OR LATCH FLANGES MAY BEND AND RESULT IN LOSS OF DOOR.

(3) For access doors with rotary nut latches, position door in opening and secure by turning rotary nut latches until a torque of 20-40 pound-inches (2.3-4.6 N.m) is achieved.

s 822-011

(4) Adjust the door (AMM 54-62-02/501), if necessary.

s 412-012

(5) Install middle thrust reverser-to-strut fairing if fairing was removed for access to lower midspar access door.

s 092-013

(6) Remove safety locks from leading edge flaps if installed (AMM 27-81-00/201).

TASK 54-62-00-002-014

- 4. Open the Trailing Edge Fairing Door (Fig. 202).
  - A. Access
    - (1) Location Zone

454 Nacelle Strut 1 - Aft Fairing

464 Nacelle Strut 2 - Aft Fairing

474 Nacelle Strut 3 - Aft Fairing

484 Nacelle Strut 4 - Aft Fairing

B. Procedure

s 032-017

- (1) Release the latches on the left trailing edge fairing door (5 places on inboard struts, 9 places on outboard struts).
  - (a) Push where indicated on latch to release trigger.
  - (b) Lift the top of the latch handle out from door, with the screwdriver in assist slot if necessary, and rotate handle down to release latch halves.

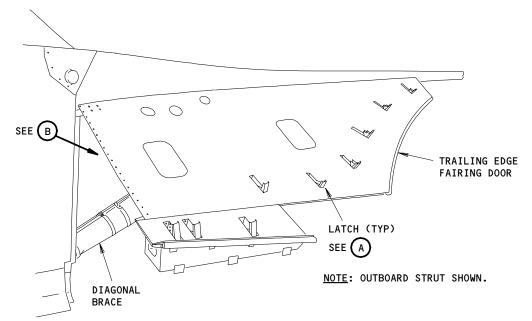
s 012-018

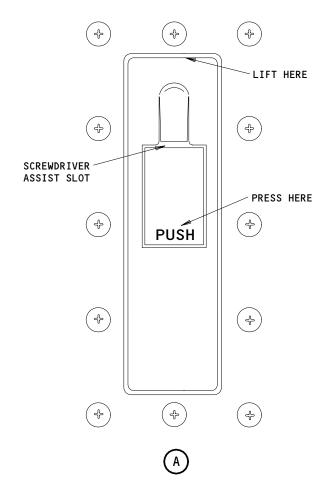
(2) Rotate the door out and upward to its maximum travel (approximately 60 degrees).

EFFECTIVITY-

54-62-00







Trailing Edge Fairing Doors - Opening and Closing Figure 202 (Sheet 1)

EFFECTIVITY-ALL

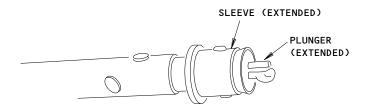
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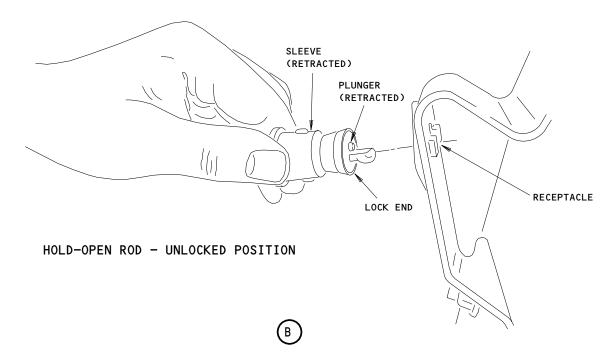
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# HOLD-OPEN ROD - LOCKED POSITION



NOTE: RECEPTACLE ON INBOARD STRUTS SHOWN. RECEPTACLE ON OUTBOARD STRUTS ATTACHED TO DIAGONAL BRACE WITH CLAMP.

Trailing Edge Fairing Door - Opening and Closing Figure 202 (Sheet 2)

ALL

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54-62-00

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s 432-019

- Engage the support rod.
  - (a) On the outboard struts, release the support rod at center of door from stowage clip on diagonal brace.
  - (b) On the inboard struts, release support rod at forward end of door from stowage clip on
  - (c) Align the lock end of rod with the mating receptacle on the forward edge of inboard fairing door or center of outboard fairing door.
  - (d) Push the lock end of rod into mating receptacle until locked.
    - 1) Manually retract the sleeve if necessary to make it easy to install.
    - 2) After you install the lock, make sure the lock plunger and sleeve are fully extended.

WARNING: LOCK SUPPORT ROD IN ENGAGED POSITION TO PROVIDE WIND RESTRAINT AND PREVENT ACCIDENTAL CLOSING (FALLING) OF TRAILING EDGE FAIRING DOOR. PERSONNEL BEING STRUCK BY FALLING FAIRING DOOR COULD BE SERIOUSLY INJURED.

- (e) Try to open the fairing door more, to do a check of the door lock.
  - 1) The support rod must remain engaged with the mating receptacle.

TASK 54-62-00-402-020

- Close the Trailing Edge Fairing Door
  - References
    - (1) AMM 54-62-03/501, Trailing Edge Fairing Doors
  - Access В.
    - (1) Location Zone

454 Nacelle Strut 1 - Aft Fairing

464 Nacelle Strut 2 - Aft Fairing

Nacelle Strut 3 - Aft Fairing 474

484 Nacelle Strut 4 - Aft Fairing

C. Procedure

s 092-021

ALL

- Disengage the support rod.
  - Manually support trailing edge fairing door and retract the sleeve on the support rod to release the lock.

EFFECTIVITY-

54-62-00



(b) Remove the rod from the mating receptacle.

CAUTION: MAKE SURE THE SUPPORT ROD IS SECURELY STOWED WHEN WHEN YOU CLOSE THE TRAILING EDGE FAIRING DOOR.

IF THE SUPPORT ROD IS NOT STOWED, IT CAN CAUSE DAMAGE TO THE DIAGONAL BRACE.

- (c) On outboard struts, rotate the support rod at the center of the door toward the diagonal brace and engage it with the stowage clip on the brace.
- (d) On the inboard struts, rotate the support rod at the forward end of door toward the door, and engage it with stowage clip on door.

s 412-022

(2) Let the door come down slowly.

s 982-041

- (3) Close the outboard trailing edge fairing door.
  - (a) Make sure that all the latch handles are fully open.

CAUTION: MAKE SURE THAT THE HOOK ARMS AND LATCH HANDLES ARE NOT ENGAGED. YOU CAN DAMAGE THE EQUIPMENT IF THE HOOK ARMS AND LATCH HANDLES ARE IN THE INCORRECT POSITON.

- (b) Do a check to make sure that the latch hook arms for latches #1 through #5 point upwards.
- (c) Make sure that the hook arms are in position and locked above the spring-loaded retainer of the latch housing.
- (d) Align the doors so that latch #2 can be correctly engaged.

NOTE: It is important to align the doors for latch #2 and to then engage each of the remaining latches in order, forward to aft.

1) Carefully pull the doors together and engage latch #6.

EFFECTIVITY-

ALL

54-62-00



- 2) Engage latch #5.
- 3) Release latch #6.
- 4) Engage latch #2.
- 5) Release latch #5.
- 6) Hold the aft edge of the doors and gently move side-to-side to make sure the fittings on latch #2 are fully engaged.
- (e) Engage latch #1, then latch #3, #4, and latch #5.
- (f) Continue to work aft and engage each latch until latch #9 is engaged.
- (g) Hand tighten the adjusting screw to ensure that no gap exists between the latch eyebolt and the latch hook after the latching sequence has been achieved.

s 982-042

(4) Close the inboard trailing edge fairing door.

CAUTION: MAKE SURE THAT THE HOOK ARMS AND LATCH HANDLES ARE NOT ENGAGED. YOU CAN DAMAGE THE EQUIPMENT IF THE HOOK ARMS AND LATCH HANDLES ARE IN THE INCORRECT POSITON.

- (a) Make sure that all the latch handles are fully open.
- (b) Carefully pull the doors together and engage the latches in order, from forward latch #1 and work aft to latch #5.
- (c) Hand tighten the adjustment screw to ensure that no gap exists between the latch eyebolt and the latch hook after the latching sequence has been achieved.

s 822-026

(5) Do the procedure to adjust the door flushness (AMM 54-62-03/501), if it is necessary.

s 202-031

ALL

(6) Make sure the trailing edge fairing doors are in the aerodynamic smoothness limits (AMM 54-60-00/201).

EFFECTIVITY-

54-62-00



## NACELLE STRUT ACCESS DOOR - ADJUSTMENT/TEST

## 1. General

- A. This procedure has three tasks. The first task performs a functional check of the nacelle strut pressure relief door latch. The second task is an adjustment of the nacelle strut pressure relief door latch. The third task is a functional check of the pressure relief door on the trailing edge (TE) fairing.
- B. The latch check consists of measuring load required to release door, comparing with the required load, and replacing door or latch if not within limits.
- C. Pressure relief door latches are designed to release the door when an outward force from internal pressure buildup due to a malfunction. The latch test procedure is provided to ensure the pressure relief latches will release within the proper limits.
  - (1) For the nacelle strut, the pressure relief door latches are designed to release when the internal pressure buildup reaches 50 to 65 pounds.
    - (a) To perform the release check procedure, you will operate the latch with a torque adapter and pivot support assembly and note the torque required to release the latch.

      (Fig. 501 Sh. 6).
    - (b) If you use the alternative procedure, you will operate the latch with a torque adapter and then change the torque that you measured into the force that is necessary to release the latch. (Fig. 501 sh. 5)
      - 1) You will then change the force that you measured into the force necessary to release the latch.
  - (2) For the trailing edge (TE) fairing, the pressure relief door latches are designed to release when the internal pressure buildup reaches 90 to 110 pounds.
    - (a) One procedure is for the pressure relief doors with the four (stud and clip) fasteners.
    - (b) A separate procedure is for the spring loaded pressure relief doors. You will operate the latch with a torque adapter and pivot support assembly. You will then measure the torque that is necessary to release the latch.
- D. Door adjustment on the nacelle strut consists of checking door looseness, checking gap around door and door flushness, and adding or removing shims, or replacing door, if necessary to bring within limits.
  - (1) A door flushness adjustment procedure is provided to assure proper fit and aerodynamic smoothness.

EFFECTIVITY----

54-62-02



(2) Door must be replaced (if not within limits) if door lip or latch is secured with hi-lok bolts and collars. Shims may be added or removed, or latch may be replaced (if not within limits) if door lip or latch is secured with bolts, nuts, and washers.

## TASK 54-62-02-725-040

- Nacelle Strut Pressure Relief Door Latch Test (Fig. 501) 2.
  - Equipment
    - (1) B71044-28 Adapter and Pivot Support Assembly, Load Test, Pressure Relief Door Latches
    - MIT65B90315 Torque Adapter, Nacelle Strut Access Door Latches (Alternative)
    - (3) Torque Wrench Adapter 1/4-inch drive to 3/8-inch drive.
  - B. References
    - (1) AMM 54-62-00/201, Nacelle Strut Access Panels
    - (2) IPC 54-62-02 Fig. 2 and 3
  - C. Access
    - (1) Location Zone

452	Nacelle S	trut 1	-	Torque Box
454	Nacelle S	Strut 1	-	Aft Fairing
462	Nacelle S	Strut 2	-	Torque Box
464	Nacelle S	Strut 2	-	Aft Fairing
472	Nacelle S	Strut 3	-	Torque Box
474	Nacelle S	Strut 3	-	Aft Fairing
482	Nacelle S	Strut 4	_	Torque Box
		ci ac i		TOT QUE DOX

- D. Do the test of the latch with a Torque Adapter and Pivot Support Assembly.
  - This procedure is preferred to the procedure which uses a torque NOTE: adaptor only, and the procedure which uses a push/pull guage.

s 945-082

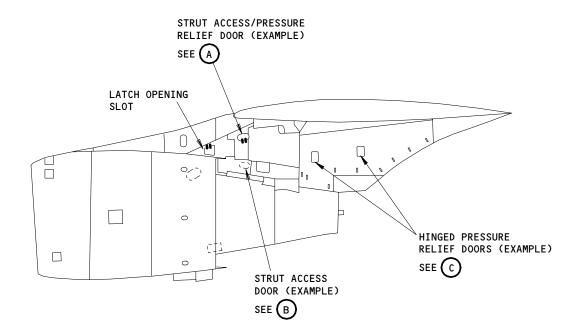
ALL

(1) Attach the tool adapter assembly to the pressure relief door latch with two screws, washers and nuts finger tight (Fig. 501).

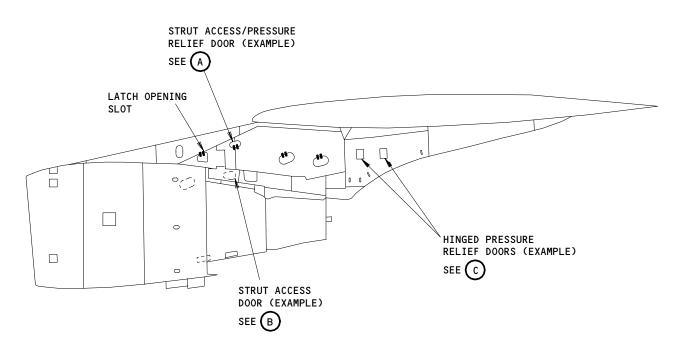
EFFECTIVITY-

54-62-02





# OUTBOARD STRUT



INBOARD STRUT

278113

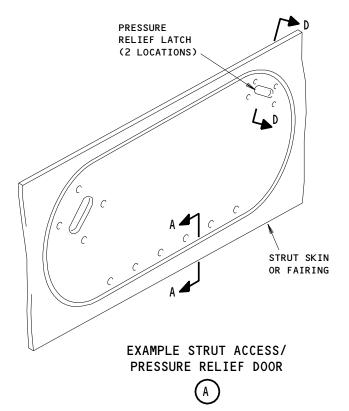
Nacelle Strut Access Door-Adjustment/Test Figure 501 (Sheet 1)

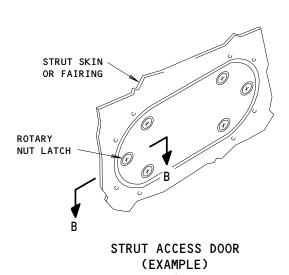
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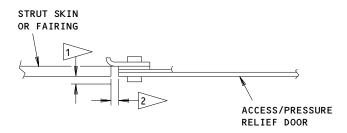
O3 Page 503
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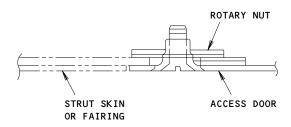








DOOR LIP A-A



ROTARY NUT LATCH В-В

> ±0.02 INCH (0.5 mm) MISMATCH ALLOWED

> 0.03-0.09 INCH (0.8-2.3 mm) WITH DOOR CENTERED IN OPENING

> Nacelle Strut Access Door - Adjustment/Test Figure 501 (Sheet 2)

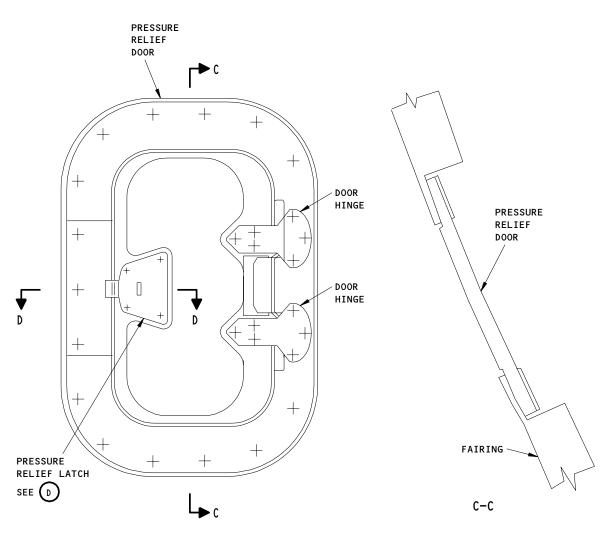
EFFECTIVITY-ALL

54-62-02

04

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HINGED PRESSURE RELIEF DOOR (EXAMPLE FAIRING)



Nacelle Strut Access Door - Adjustment/Test Figure 501 (Sheet 3)

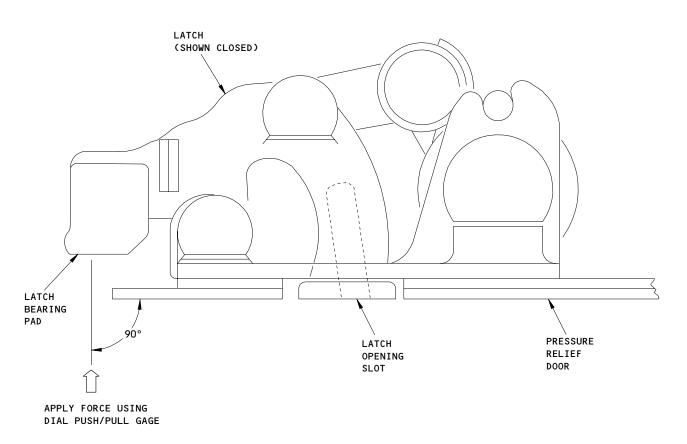
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54-62-02

03

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PRESSURE RELIEF LATCH D-D

LATCH RELEASE TEST (3) (DIAL PUSH/PULL GAGE)

3 LATCH SHOWN IN CLOSED POSITION WITH DOOR OPEN.

C26862

Nacelle Strut Access Door - Adjustment/Test Figure 501 (Sheet 4)

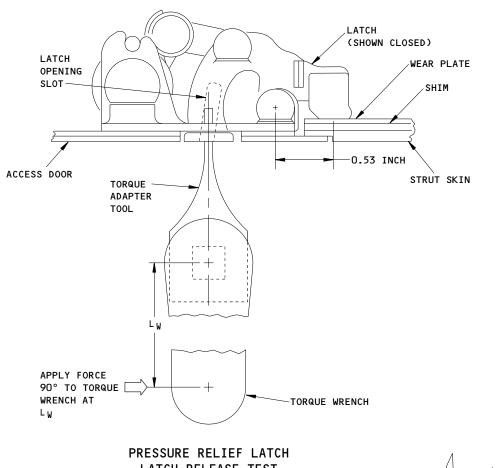
EFFECTIVITY-ALL

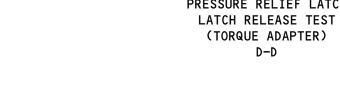
54-62-02

03

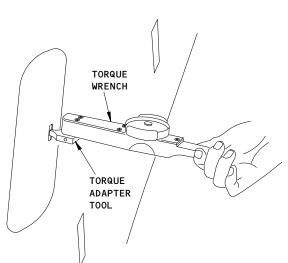
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INDICATED TORQUE =  $\frac{(0.53)(L_W)}{(L_W + 1.5)}$ (P)



Nacelle Strut Access Door - Adjustment/Test Figure 501 (Sheet 5)

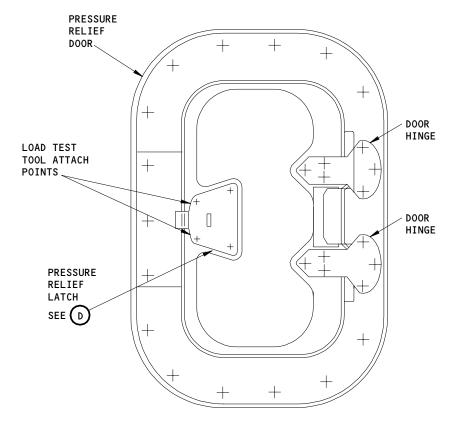
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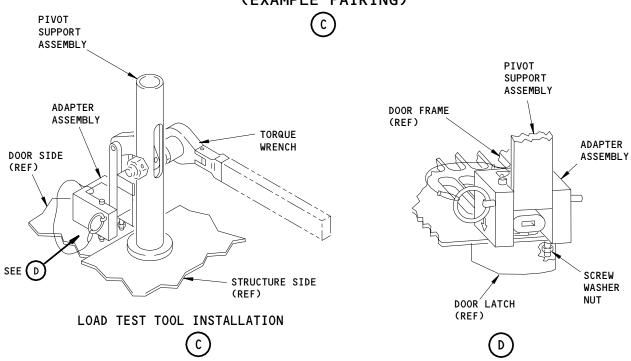
02

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# HINGED PRESSURE RELIEF DOOR (EXAMPLE FAIRING)



Nacelle Strut Access Door - Adjustment/Test Figure 501 (Sheet 6)

ALL

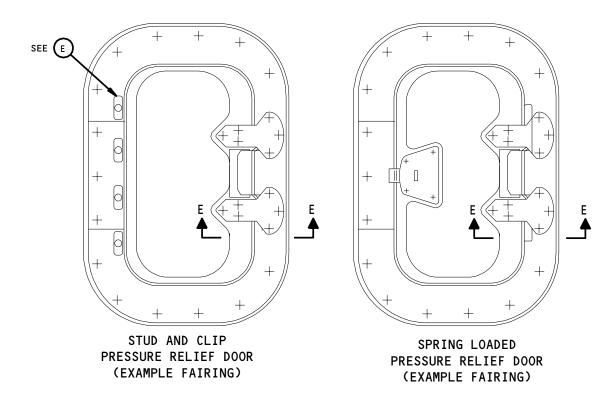
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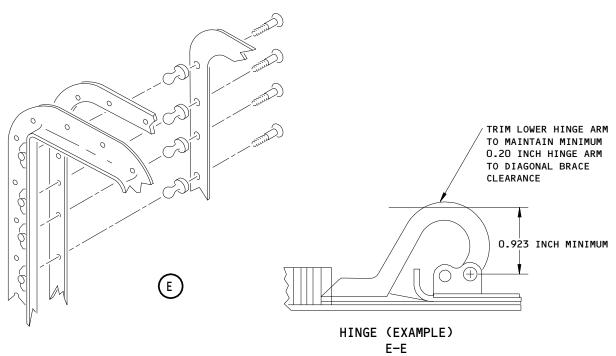
54-62-02

01

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Nacelle Strut Access Door - Adjustment/Test Figure 501 (Sheet 7)

ALL

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s 945-083

(2) Attach the pivot support assembly and torque wrench to the adapter assembly.

s 725-085

(3) With the torque wrench handle parallel to door edge, turn the handle until the latch releases, and note in writing the torque applied.

S 225-086

(4) Compare the written torque value with the requirements of the latch (50 to 65 pounds).

<u>NOTE</u>: The adapter tool assembly increases torque applied to the latch by a factor of two (2x). To calculate the torque applied, multiply the torque wrench value by 2.0.

s 905-095

YOU MUST REPLACE OR REPAIR ALL DOOR LATCHES THAT CAUTION: DO NOT RELEASE CORRECTLY. TOO MUCH FORCE ON THE LATCH CAN CAUSE DAMAGE TO THE DOORS.

(5) If the release load is not within limits, replace the latch or replace the door.

s 035-091

(6) To replace the latch, do these steps:

s 035-088

(7) Remove the bolts, washers and nuts that attach the latch, wear plate and shim pack to the door.

s 425-089

ALL

- (8) Put the replacement latch, shims and wear plate on the door sill.
  - (a) Make sure the finished side of the wear plate is against the shims.
  - (b) Install the bolts, washers and nuts.
  - (c) Do a release check of the repaired door assembly.

EFFECTIVITY-

54-62-02



(d) Trim the lower hinge arm, if necessary to insure a minimum 0.20 inch clearance between hinge and diagonal brace with the door closed (Figure 501, Sh. 7).

s 865-090

- (9) If the load is within limits, close the door (AMM 54-62-00/201).
- E. Do the latch load test with a Torque Adapter (Alternative).

s 945-028

(1) Assemble the torque adapter tool and torque wrench (Fig. 501 Sh. 5).

s 725-029

(2) Put the torque adapter tool into the latch opening slot.

s 725-031

(3) Turn the torque wrench to find the torque that is necessary to release the latch.

s 725-032

(4) Remove the torque adapter tool.

s 725-033

(5) Measure the distance Lw. Calculate the correct torque values for the necessary release load (Fig. 501).

s 725-034

(6) Compare the calculated torque with the required torque range.

s 905-035

ALL

CAUTION: YOU MUST REPLACE OR REPAIR ALL DOOR LATCHES THAT DO NOT RELEASE CORRECTLY. TOO MUCH FORCE ON THE LATCH CAN CAUSE DAMAGE TO THE DOORS.

- (7) If release load is not within limits, replace the door (if latch is secured by hi-lok bolts and collars), or replace the latch as follows (if latch is secured by bolts, nuts, and washers):
  - (a) Remove the bolts, nuts, and washers that attach the latch, wear plate, and shim pack to doorsill.

EFFECTIVITY-

54-62-02



- (b) Put the latch, shims, and wear plate on doorsill.
  - 1) Make sure the finished side of the wear plate is against the shims. Secure it with bolts, washers, and nuts.
  - 2) Install the bolts, washers, and nuts.

#### s 865-036

- (8) If the release load is within the limits, close the door (AMM 54-62-00/201).
  - (a) Do a check of the lower aft pressure relief door hinge clearance with the diagonal brace.
    - Trim the lower hinge arm, if necessary to insure a minimum 0.20 inch clearance between hinge and diagonal brace with the door closed (Figure 501, Sh. 7).

## TASK 54-62-02-825-009

- 3. Nacelle Strut Pressure Relief Door Adjustment
  - A. References
    - (1) AMM 54-60-00/201, Fairings and Skins
    - (2) IPC 54-62-02 Fig. 2 and 3
  - B. Consumable Materials
    - (1) A00964 Primer BMS 10-11, type 4
  - C. Access
    - (1) Location Zone
      - 452 Nacelle Strut 1 Torque Box
      - 454 Nacelle Strut 1 Aft Fairing
      - 462 Nacelle Strut 2 Torque Box
      - 464 Nacelle Strut 2 Aft Fairing
      - 472 Nacelle Strut 3 Torque Box
      - 474 Nacelle Strut 3 Aft Fairing
      - 482 Nacelle Strut 4 Torque Box
      - 484 Nacelle Strut 4 Aft Fairing
  - D. Do a check of the fit of the door.

#### s 825-010

ALL

(1) With door closed, manually apply pressure to door with rotating motion.

EFFECTIVITY-

54-62-02

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s 825-011

- (2) If door is loose at forward edge, replace door (if lip is secured by hi-lok bolts and collars), or remove shim from between door tongue and door as follows (if lip is secured by bolts, nuts, and washers):
  - (a) Remove bolts, nuts, and washers securing door lip to door and remove shims as required.
  - (b) Apply two coats of primer to any bare metal.

NOTE: Allow primer to cure between coats and prior to assembly. Cure time can be accelerated by applying heat.

(c) Position shim pack and door lip on inside front edge of door and secure with bolts, nuts, and washers.

s 825-013

- (3) If door is loose at aft edge, replace door (if latch is secured by hi-lok bolts and collars), or add shims under latch wear plate as follows (if latch is secured by bolts, nuts, and washers).
  - (a) Remove bolts, nuts, and washers securing each wear plate and shim pack to doorsill.
  - (b) If adding unprimered shims, apply two coats of primer to all surfaces of shims.

NOTE: Allow primer to cure between coats and prior to assembly. Cure time can be accelerated by applying heat.

(c) Position shims between wear plate and doorsill. Ensure finished side of wear plate is against shims. Secure with bolts, washers, and nuts.

s 225-015

(4) Make sure the gap around door is 0.03 - 0.09 inch (0.8 - 2.3 mm).

EFFECTIVITY-

54-62-02



E. Do a check of the door flushness.

s 225-079

(1) Make sure the door is flush with outside surface of strut (AMM 54-60-00/201).

TASK 54-62-02-725-068

- 4. Trailing Edge Fairing Door Pressure Relief Door Functional Check
  - A. Equipment
    - (1) Gage Push/Pull Dial, 0-150 pound (0-500 N.) capacity, Model DPPH-150 (DPPH-500N ), John Chatillion & Sons, Inc., 83-30 Kew Gardens, NY 11415

NOTE: Use this tool for the test procedure with the Push/Pull Dial.
Use the tools that follow for the test procedure with the
Torque Adapter.

- (2) B71044-28 Adapter and Pivot Support Assembly, Load Test, Pressure Relief Door Latches
- (3) MIT65B90315 Torque Adapter, Nacelle Strut Access Door Latches (Alternative to B71044-10).
- (4) Torque Wrench Adapter 1/4-inch drive to 3/8-inch drive.
- B. PRESSURE RELIEF DOORS WITH FOUR (STUD AND CLIP) FASTENERS; Do this check with the push/pull gage.

s 015-055

(1) Open the TE fairing doors (AMM 54-62-00/201), if not already open.

s 495-056

ALL

(2) Put a small piece of aluminum plate, 1-inch by 1-inch and 1/10-inch thick, stock at center of the inside face of the pressure relief door.

NOTE: This is to spread load over honeycomb door material.

EFFECTIVITY-

54-62-02



s 725-057

(3) Firmly support the TE fairing door and use the push/pull gage to slowly push against the center of the door (and plate). The pressure relief door should release when gage indicates 85-105 pounds.

<u>NOTE</u>: Make sure that you apply the force to the center of the door perpendicular to door surface.

s 905-058

CAUTION: REPLACE OR REPAIR A DOOR WHICH DOES NOT RELEASE IN THE LIMIT.

DAMAGE CAN OCCUR TO TE FAIRING DOOR IF PRESSURE RELIEF DOORS

ARE RESTRAINED DURING EXCESSIVE PRESSURE.

(4) If release load, as measured by push/pull gage, is not within limits, replace all four studs and spring clips or replace pressure relief door and frame. Repeat the check.

s 015-060

(5) If release load, as measured by push/pull gage, is within limits, close the pressure relief door.

s 415-061

- (6) Close the TE fairing doors (AMM 54-62-00/201).
- C. PRESSURE RELIEF DOORS WITH SPRING-LOADED TOGGLE LATCHES; Do this check with the Torque Adapter.

<u>NOTE</u>: This procedure is an alternative to the preferred procedure which uses the torque adapter and pivot support assembly.

S 945-069

ALL

(1) Assemble the torque adapter tool, torque wrench, and torque wrench adapter.

EFFECTIVITY-

54-62-02



s 725-070

(2) Put the torque adapter tool into the latch opening slot.

s 725-071

(3) Turn the torque wrench to find the torque that is necessary to release the latch.

s 725-072

(4) Remove the torque adapter tool.

s 725-073

(5) Measure the distances Lw and D. Calculate the correct torque values for the necessary release load (Fig. 501).

s 725-074

(6) Compare the calculated torque with the torque required range.

s 825-080

(7) If release load, as measured by the torque wrench, is not in limits, repair or replace the pressure relief door and do the check again.

s 865-076

- (8) If the release load is within the limits, close the door (AMM 54-62-00/201).
- D. TE FAIRING DOOR SPRING LOADED TOGGLE LATCHES; Do this check with the push/pull guage (alternative to B71044-10).

s 015-062

(1) Open the TE fairing doors (AMM 54-62-00/201), if not already open.

s 495-063

(2) Make sure the end of the push pull gage is protected to prevent damage to the pressure relief door.

s 725-064

ALL

(3) Firmly support the TE fairing door and use the dial push/pull gage to slowly push against the upper or lower aft mounting fastener of the latch mechanism. The pressure relief door should release when the gage indicates 90-110 pounds.

Make sure force applied to the aft mounting fastener of NOTE: the latch mechanism is perpendicular to door surface.

EFFECTIVITY-

54-62-02



s 905-065

CAUTION: REPLACE OR REPAIR A DOOR WHICH DOES NOT RELEASE IN THE LIMIT.

DAMAGE CAN OCCUR TO TE FAIRING DOOR IF PRESSURE RELIEF DOORS

ARE RESTRAINED DURING EXCESSIVE PRESSURE.

- (4) If release load, as measured by push/pull gage, is not within limits do these steps:
  - (a) Examine the latch, the hinges, the door and the frame for interference or damage.
  - (b) Remove all blockage. Repair or replace the damaged component as required.

S 415-066

(5) If release load, as measured by push/pull gage, is within limits, close the pressure relief door.

s 205-093

- (6) Do a check of the lower aft pressure relief door hinge clearance with the diagonal brace.
  - (a) Trim the lower hinge arm, if necessary to insure a minimum 0.20 inch clearance between hinge and diagonal brace with the door closed (Figure 501, Sh. 7).

s 415-067

(7) Close the TE fairing doors (AMM 54-62-00/201).

EFFECTIVITY-

54-62-02



# TRAILING EDGE FAIRING DOORS - REMOVAL/INSTALLATION

# 1. General

- A. This procedure contains the data to remove and install the trailing edge (T/E) fairing doors.
- B. Disconnect the door and hinges from the skirt beam and remove as one unit.
- C. Do a check of the door adjustment after you install the T/E fairing doors.

TASK 54-62-03-004-001

- 2. Remove the T/E Fairing Door (Fig. 401)
  - A. References
    - (1) 54-62-00/201, Nacelle Strut Access Panels (Opening/Closing)
    - (2) IPC 54-62-03 Fig. 3 and 4
  - B. Access
    - (1) Location Zone

454 Nacelle Strut 1 - Aft Fairing

464 Nacelle Strut 2 - Aft Fairing

474 Nacelle Strut 3 - Aft Fairing

484 Nacelle Strut 4 - Aft Fairing

C. Procedure

s 014-002

(1) Open the T/E fairing door (Ref 54-62-00/201).

NOTE: Do not use the support rod to hold the door open.

s 034-003

(2) Tightly hold the T/E fairing door and remove the nuts, washers, and bolts that attach the hinge fittings to the hinge supports.

NOTE: The outboard struts have five hinge locations, and the inboard struts have four hinge locations.

s 024-004

(3) Remove the door from the nacelle strut.

TASK 54-62-03-404-005

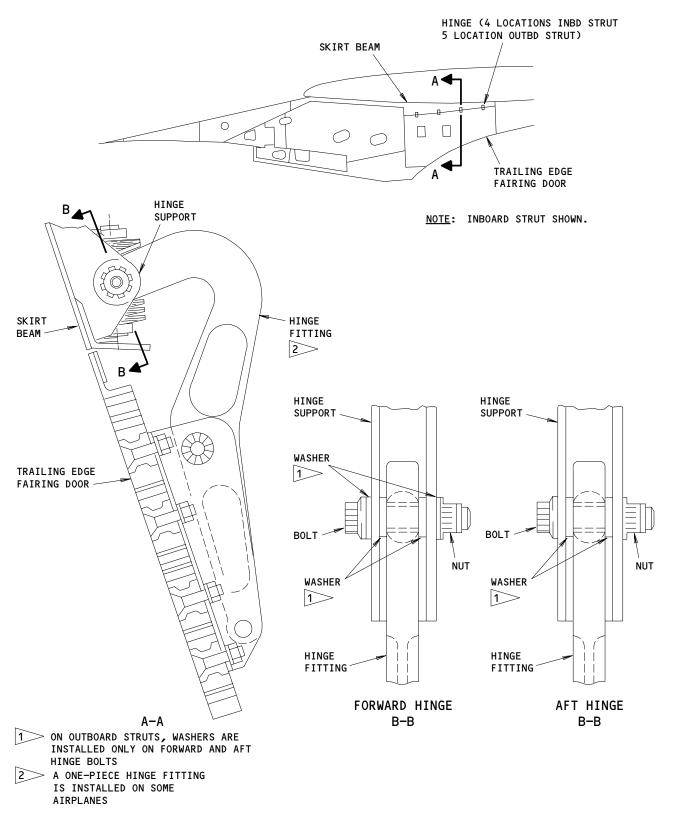
- 3. <u>Install the T/E Fairing Door</u> (Fig. 401)
  - A. References
    - (1) AMM 54-60-00/201, Fairings and Skins
    - (2) AMM 54-62-03/501, Trailing Edge Fairing Doors
    - (3) IPC 54-62-03 Fig. 3 and 4

ALL

EFFECTIVITY-

54-62-03





Trailing Edge Fairing Door Installation Figure 401



## B. Access

(1) Location Zone

454 Nacelle Strut 1 - Aft Fairing 464 Nacelle Strut 2 - Aft Fairing 474 Nacelle Strut 3 - Aft Fairing 484 Nacelle Strut 4 - Aft Fairing

#### C. Procedure

s 424-006

(1) Tightly hold the T/E fairing door and set the door on strut with the hinge fittings in the hinge supports.

s 434-007

- (2) At five locations on the outboard struts and four locations on the inboard struts, do these steps:
  - (a) Install the bolt, nut, and washers that attach the hinge to the hinge fitting.
  - (b) Install the washers only on the forward hinge of outboard struts, below the bolt and nut.

s 824-009

(3) Do the procedure to adjust the T/E fairing door latches (AMM 54-62-03/501).

s 224-010

ALL

(4) Make sure the trailing edge fairing doors are in the aerodynamic smoothness limits (AMM 54-60-00/201).

EFFECTIVITY-

54-62-03

**†** 



# TRAILING EDGE FAIRING DOORS - ADJUSTMENT/TEST

## 1. General

- A. This procedure contains a task to adjust the trailing edge fairing door (T/E door).
  - (1) The adjustment of the T/E door has these parts:
    - (a) Do a check of the fair tolerances
    - (b) Add or remove shims on the door hinges or latch shear fittings
    - (c) Add or remove shims on the latch stops to adjust the latches
    - (d) Tighten the latch tension adjusters
    - (e) Do the check of the fair tolerances again.
  - (2) The T/E doors have five latches on the inboard struts and nine latches on the outboard struts.
  - (3) On the outboard struts, you must do a check of the gap between the doors and the thrust reverser fairings and the strut aft bulkhead.
  - (4) The fair tolerances are checked to make sure the fit is correct and that the T/E door has the correct fit and aerodynamic smoothness.

TASK 54-62-03-825-001

- 2. Trailing Edge Fairing Door Adjustment (Fig. 501 and 502)
  - A. Consumable Materials
    - (1) A00964 Primer BMS 10-11, type 1
  - B. References
    - (1) AMM 54-62-00/201, Access Panels
    - (2) AMM 54-60-00/201, Fairings and Skins
    - (3) IPC 54-62-03 Fig. 3 and 4
  - C. Access
    - (1) Location Zone

454 Nacelle Strut 1 - Aft Fairing

464 Nacelle Strut 2 - Aft Fairing

474 Nacelle Strut 3 - Aft Fairing

484 Nacelle Strut 4 - Aft Fairing

#### D. Procedure

s 015-002

(1) Open the T/E doors (AMM 54-62-00/201).

s 015-003

(2) Push open the pressure relief doors for the visual inspection of the latches.

s 435-004

(3) Tighten all the loose latch and hinge screws.

s 415-005

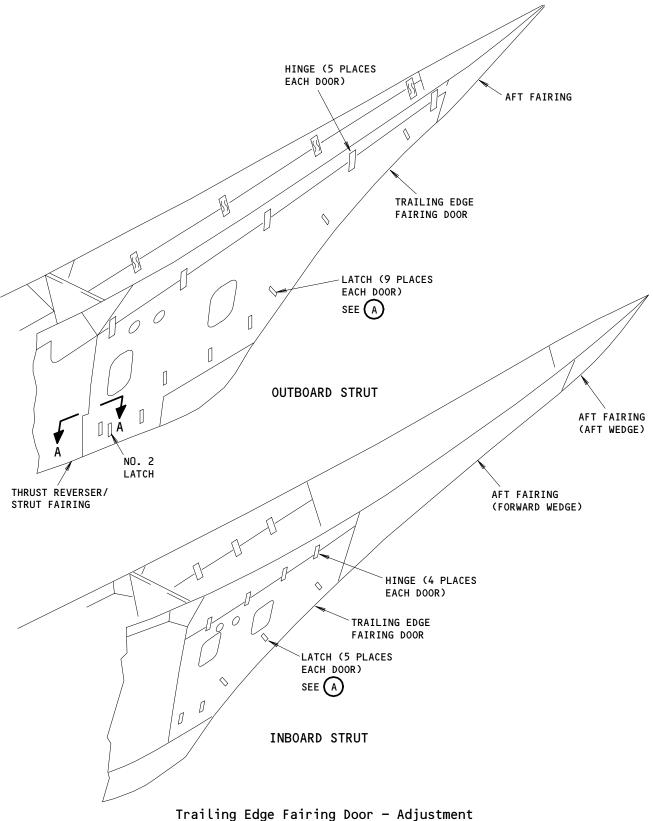
(4) Close the T/E doors (AMM 54-62-00/201).

EFFECTIVITY-

54-62-03

ALL





Trailing Edge Fairing Door - Adjustment Figure 501 (Sheet 1)

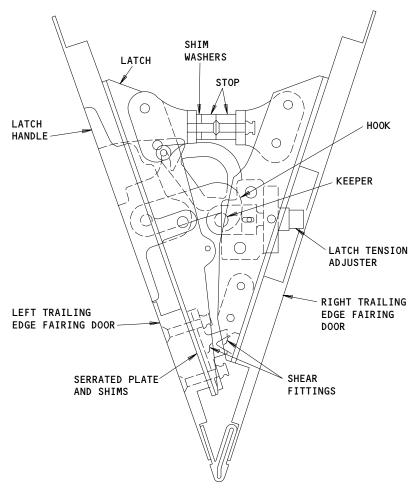
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54-62-03

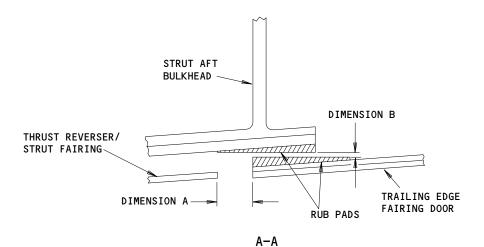
03

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AFT LOOKING FORWARD



Trailing Edge Fairing Door - Adjustment Figure 501 (Sheet 2)

ALL

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s 225-038

- (5) Make sure the trailing edge fairing doors are in the aerodynamic smoothness limits (AMM 54-60-00/201).
  - (a) If necessary, adjust the door as follows:
    - 1) Add or remove shims between the hinge brackets and the T/E door -
    - 2) Add or remove shims between the shear fittings and the door, or between the shear fitting and the latch fitting.

s 035-007

(6) On the outboard strut doors, remove all the shear fittings from the left side of the door except at the No. 2 latch.

(7) Turn the latch tension adjusters counterclockwise and loosen all the latches.

Do not apply more than 25 pound-inches (2.8 N.m) torque to the adjusters on the right door.

s 035-009

(8) Remove the shim washers from the stops on the left door.

s 825-010

ALL

- (9) Do these steps to adjust the No. 2 latch on the outboard doors:
  - (a) Close the doors and engage the No. 2 latch hook with the keeper and close the latch.
  - Turn the latch tension adjuster clockwise until there is no (b) clearance between the latch hook and keeper.

NOTE: The latch is closed when the latch handle is flush with the door fairing surface of the door.

EFFECTIVITY-

54-62-03



- (c) Measure the gap between the T/E door and the thrust reverser to strut fairing on the right and left doors (Fig. 501 dimension A).
- (d) If dimension A is different by more than 0.020 inches (0.5 mm) between the right and left doors, adjust the door as follows:1) Move the position of the shear fitting on the serrated
  - Move the position of the shear fitting on the serrated plate.
- (e) Measure the gap (Fig. 501 dimension B) between the left T/E door and the rub pads on the strut aft bulkhead.

NOTE: Make this measurement after you have no gap dimension B) on the right door.

(f) Remove the shims from the shear fittings on the right door until there is no gap (dimension B) on the left door.

s 435-011

(10) Install the eight shear fittings on the left side door of the outboard struts.

s 825-012

(11) On left door, align the shear fittings on the serrated plates with shear fittings on right door.

s 825-013

(12) Close the T/E doors (AMM 54-62-00/201).

s 835-037

(13) Close all the latches and turn the latch tension adjusters clockwise until there is no clearance between the latch hook and keeper.

NOTE: The latch is closed when the latch handle is flush with the fairing surface of the door.

s 825-014

ALL

- (14) Look at the adjuster nut on the latch.
  - (a) If the nut has a hex-head, tighten the latch tension adjusters to 195-205 pound-inches (22.0-23.2 N.m), to set the preload on the keepers.

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If the nut has a square-head, tighten the latch tension adjusters to 40-50 pound-inches (4.5-5.7 N.m), to set the preload on the keepers.

s 825-017

(15) Recheck fair tolerances.

s 825-018

(16) Adjust the door if it is necessary.

s 375-019

(17) Apply primer to all bare metal after adjustments.

s 865-042

(18) On the inboard strut doors, perform the following steps.

s 035-041

(19) Turn the keeper adjusters counterclockwise to the fully extended position on the right door. Remove the shim washers from the stops.

Do not apply more than 25 pound-inches (2.8 N.m) torque to the adjusters on the right door.

S 225-043

(20) Adjust the shear fittings on serrations on the left door to align with the shear fittings on the right door.

s 415-044

(21) Close and latch the door by adjusting the keepers (turning clockwise) until the clearances between the latch hooks and keepers are taken up (no gap).

s 415-045

ALL

(22) The latch is closed when the latch handle is flush with the fairing surface.

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s 225-046

(23) Do a check of the door fair and gaps.

s 435-047

(24) Adjust keepers as required and do a check of the gaps between stops (5 places). Add and adjust shims as required to eliminate gaps.

s 415-048

(25) Torque (clockwise) all keeper adjusters to 195-205 pound-inches (22-23 Nm) for assemblies with a hex head adjusting nut.

s 415-049

(26) Torque the square head nut to 45 pound-inches (5 Nm) for designs that use the square head adjusting nut.

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ALL

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# TRAILING EDGE FAIRING DOORS - INSPECTION/CHECK

## 1. General

- A. This procedure contains the data to do an inspection of the trailing edge (T/E) door latches.
  - (1) The inspection of the latches has these parts:
    - (a) Open the T/E fairing doors
    - (b) Do an inspection of the latches and keepers
    - (c) Adjust the latches
    - (d) Close the T/E doors.

#### TASK 54-62-03-206-001

- 2. <u>T/E Fairing Door Latch Inspection</u>
  - A. References
    - (1) AMM 54-60-00/201, Fairings and Skins
    - (2) AMM 54-62-00/201, Nacelle Strut Access Panels
    - (3) AMM 54-62-03/501, Trailing Edge Fairing Doors
  - B. Access
    - (1) Location Zone
      - 454 Nacelle Strut 1 Aft Fairing
      - 464 Nacelle Strut 2 Aft Fairing
      - 474 Nacelle Strut 3 Aft Fairing
      - 484 Nacelle Strut 4 Aft Fairing
    - (2) Access Panel
      - 454 Trailing Edge Fairing Door Nacelle Strut 1
      - 464 Trailing Edge Fairing Door Nacelle Strut 2
      - 474 Trailing Edge Fairing Door Nacelle Strut 3
      - 484 Trailing Edge Fairing Door Nacelle Strut 4
  - C. Procedure

s 016-002

(1) Open the T/E fairing doors (AMM 54-62-00/201).

s 166-003

(2) Clean these parts:

ALL

(a) Each latch trigger

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1



- (b) Each latch hook area
- (c) The area of the keeper.

## s 216-004

- (3) Do an inspection of each latch as follows:
  - (a) Do a check for damage of the latch and keeper components that follow:
    - 1) The housing
    - 2) The lever
    - 3) The springs
    - 4) The trigger
    - 5) The rivets
    - 6) The cross pins.
  - (b) Do a visual check for cracks in the components that follow:
    - 1) The latch and keeper housing
    - 2) The latch hooks
    - 3) The handles
    - 4) The triggers
    - 5) The eyebolts.
  - (c) Do a check for the correct tension of the springs (Ref 54-62-03/501).
  - (d) Do a check for loose rivets and rivet holes that are out of tolerance.

#### s 426-005

(4) Replace the latch and keeper if you find one of these conditions:

NOTE: If you remove a latch and keeper from the door, you must install a new latch and keeper.

- (a) Structurally damaged components
- (b) Cracks
- (c) A latch that does not engage or lock.

## s 826-006

(5) Do the procedure to adjust the latches on the T/E doors (AMM 54-62-03/501).

# s 416-007

ALL

(6) Close the T/E fairing doors (AMM 54-62-00/201).

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s 226-008

(7) Make sure the trailing edge fairing doors are in the aerodynamic smoothness limits (AMM 54-60-00/201).

ALL

54-62-03

03

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# FORWARD FAIRING - REMOVAL/INSTALLATION

#### 1. General

A. This procedure has instructions to remove and install the forward fairing. The forward fairing is located on the forward end of the nacelle strut and above the nose cowl.

TASK 54-62-04-004-023

- 2. Forward Fairing Removal (Fig. 401)
  - A. References
    - (1) AIPC 54-61-01 Fig. 4
    - (2) AIPC 54-61-01, Fig. 12
    - (3) AIPC 54-61-01 Fig. 10
    - (4) AIPC 54-61-01, Fig. 13
    - (5) AIPC 54-61-01, Fig. 17
    - (6) AIPC 54-61-01, Fig. 18
  - B. Access
    - (1) Location Zones
      - 451 Nacelle Strut 1 Forward Fairing
      - 461 Nacelle Strut 2 Forward Fairing
      - 471 Nacelle Strut 3 Forward Fairing
      - 481 Nacelle Strut 4 Forward Fairing
  - C. Procedure

s 024-037

- (1) Do these steps to remove the No. 1 forward fairing (strakelet) A.
  - (a) Remove the two bolts at the top forward center of the fairing (1A).
  - (b) Remove the three bolts and washers at the top forward position of the fairing.
  - (c) Remove the attach bolts along the side, 8 locations (3A).
  - (d) Remove the 6 fasteners at the bonding locations (2A).
  - (e) Remove the 2 bolts at the aft end of the fairing (4A).
  - (f) Remove the No. 1 forward fairing (strakelet).
  - S 004-024
- (2) Do these steps to remove the No. 2 forward fairing (1):
  - (a) Remove the three bolts (9).
  - (b) Remove the two bolts (8).
  - (c) Remove the six bolts (6).
  - (d) Remove the four bolts (3).
  - (e) Remove the four bolts (5).
  - (f) Remove the eleven bolts (2).
  - (g) Remove the 66 bolts (7).
  - (h) Remove the No. 2 forward fairing (1).

s 004-025

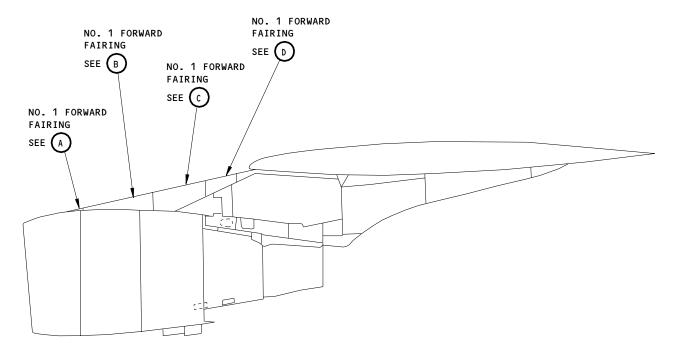
- (3) Do these steps to remove the No. 3 forward fairing (10), (11), or (12):
  - (a) Remove the four bolts (16).

EFFECTIVITY-

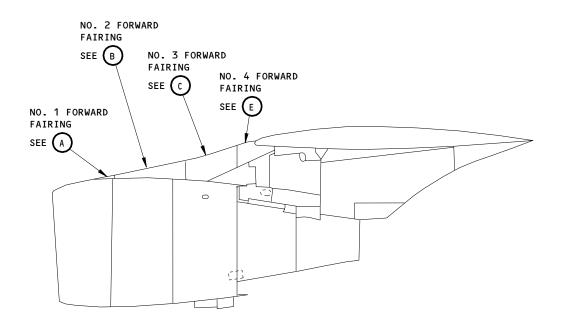
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## INBOARD STRUT



OUTBOARD STRUT

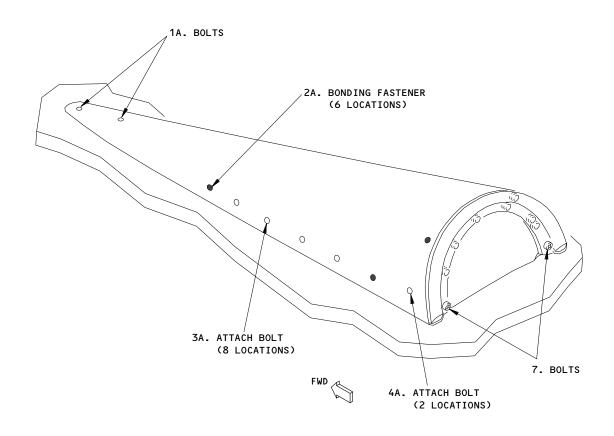
# Strut Forward Fairing Installation Figure 401 (Sheet 1)

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NO. 1 FORWARD FAIRING



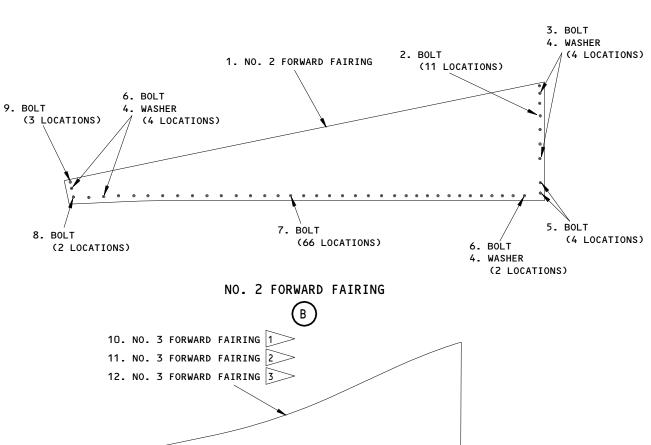
Strut Forward Fairing Installation Figure 401 (Sheet 2)

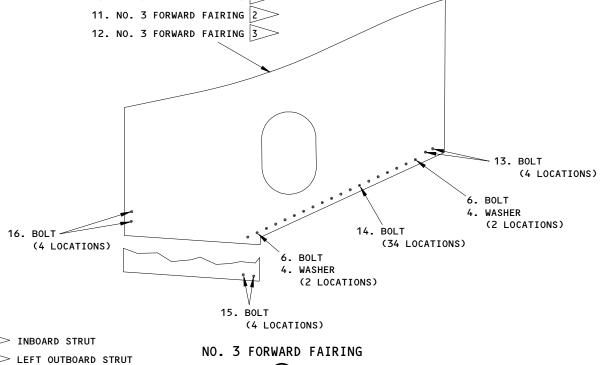
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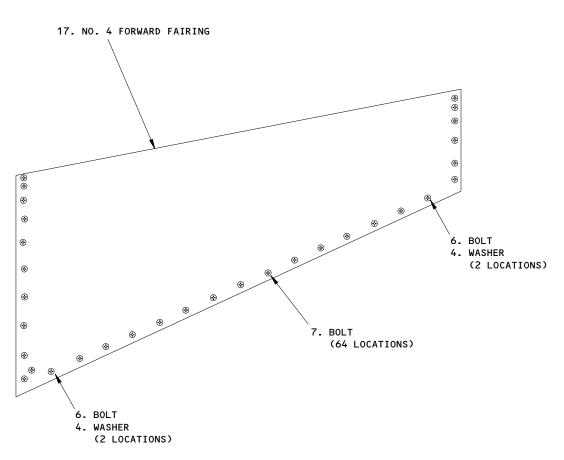
RIGHT OUTBOARD STRUT

Strut Forward Fairing Installation Figure 401 (Sheet 3)

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NO. 4 FORWARD FAIRING INBOARD STRUT

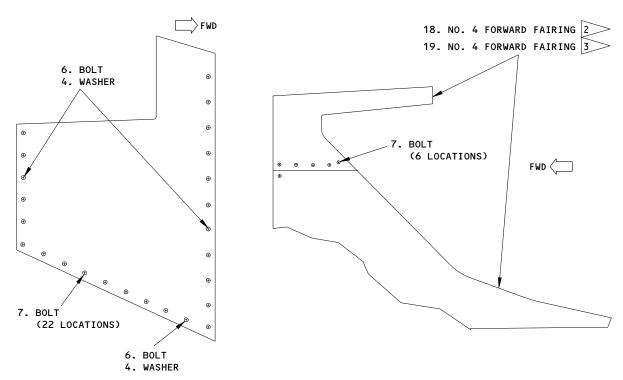
Strut Forward Fairing Installation Figure 401 (Sheet 4)

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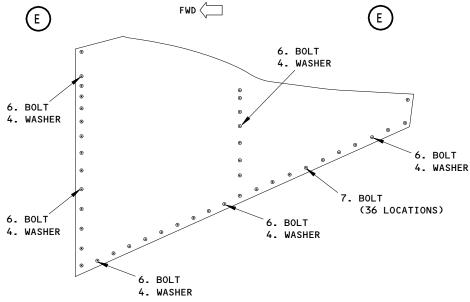
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NO. 4 FORWARD FAIRING OUTBOARD STRUT (INBOARD SIDE)

NO. 4 FORWARD FAIRING OUTBOARD STRUT (TOP SIDE)



NO. 4 FORWARD FAIRING OUTBOARD STRUT (OUTBOARD SIDE)

2 LEFT INBOARD STRUT
3 RIGHT OUTBOARD STRUT

E

Strut Forward Fairing Installation Figure 401 (Sheet 5)

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- (b) Remove the four bolts (15).
- (c) Remove the four bolts (6).
- (d) Remove the four bolts (13).
- (e) Remove the four bolts (13).
- (f) Remove the 34 bolts (14).
- (g) Remove the No. 3 forward fairing (10), (11), or (12).

# s 004-026

- (4) Do these steps to remove the inboard No. 4 forward fairing (17):
  - (a) Remove the four bolts (6).
  - (b) Remove the 64 bolts (7).
  - (c) Remove the inboard No. 4 forward fairing (17).

#### s 004-027

- (5) Do these steps to remove the outboard No. 4 forward fairing (18) or (19):
  - (a) Remove the nine bolts (6).
  - (b) Remove the 64 bolts (7).
  - (c) Remove the outboard No.4 forward fairing (18) or (19).

## TASK 54-62-04-404-028

- 3. Forward Fairing Installation (Fig. 401)
  - A. References
    - (1) AMM 54-60-00/201, Fairings and Skins
    - (2) WDM 20-20-00/1, Electrical Bonding and Grounding
  - B. Parts

АММ				AIPC		
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM	
401	1	Forward Fairing, No. 2	54-61-01	04	090	
	2	Bolt		04	115	
	3	Bolt		04	100	
	4	Washer		04	105	
	4	Washer		12	030	
401	4	Washer	54-61-01	13	015	
	4	Washer		17	015	
	4	Washer		18	040	
	4	Washer		18	080	
	4	Washer		18	190	
401	5	Bolt	54-61-01	04	İ	
	6	Bolt		04	095	
	6	Bolt		12	025	
	6	Bolt		13	010	
	6	Bolt		17	010	

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АММ			AIPC		
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
401	6	Bolt	54-61-01	18	035
	6	Bolt		18	075
	6	Bolt		18	185
	7	Bolt		04	
	7	Bolt		17	005
401	7	Bolt	54-61-01	18	010
	7	Bolt		18	065
	7	Bolt		18	180
	8	Bolt		04	ĺ
	9	Bolt		04	ĺ
401	10	Forward Fairing, No. 3, Inboard	54-61-01	12	001
	11	Forward Fairing, No. 3, Lt Outbd		13	001
	12	Forward Fairing, No. 3, Rt Outbd		13	005
	13	Bolt		12	010
	13	Bolt		13	035
401	14	Bolt	54-61-01	12	005
	14	Bolt		13	020
	15	Bolt		12	
	15	Bolt		13	
	16	Bolt		12	
401	16	Bolt	54-61-01	13	
	17	Forward Fairing, No. 4, Inboard	İ	17	001
	18	Forward Fairing, No. 4, Lt Outbd	İ	18	001
	19	Forward Fairing, No. 4, Rt Outbd		18	005
	ı	I .	I	1	I

# C. Access

(1) Location Zones

451 Nacelle Strut 1 - Forward Fairing
 461 Nacelle Strut 2 - Forward Fairing
 471 Nacelle Strut 3 - Forward Fairing

481 Nacelle Strut 4 - Forward Fairing

# D. Procedure

s 404-036

- Do these steps to install the forward fairing No. 1 (strakelet).
  - (a) Put the No. 1 fairing (strakelet) in place and align the attach holes.
  - (b) Bonding areas are the locations of the six (6) fastener bolts BACB30LR2-4.
  - (c) Remove primer down to the black anti-static coating under the BACW10U-C81P washer (excluding countersink).
  - (d) Apply BMS 10-21 Type 1 anti-static coating to the countersinks.

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- (e) After assembly measure the resistance between the bolt and adjacent structure. Maximum resistance is 0.01 OHMS.
- (f) Shim the assembly as required (BACS4OR laminate shim) to achieve flushness. Install shims with BMS 10-11 Type I.
- (g) Attach the cover panel assembly with fasteners (18 locations) and fill the countersinks with PRO SEAL 860 Class B (or equivalent), or BMS 5-79 to meet smoothness requirements.
- (h) After installation of the panel, do a check of the resistance of the conductive antistatic finish. Maximum resistance of 300,000 OHMS is allowed.

#### s 404-029

- (2) Do these steps to install the No. 2 forward fairing (1):
  - (a) Make sure a washer (4) is installed in 10 holes.
  - (b) Put the No. 2 forward fairing (1) in its position on the strut.
  - (c) Install the three bolts (9).
  - (d) Install the two bolts (8).
  - (e) Install the six bolts (6).
  - (f) Install the four bolts (3).
  - (g) Install the four bolts (5).
  - (h) Install the 11 bolts (2).
  - (i) Install the 66 bolts (7).

## s 404-030

- (3) Do these steps to install the No. 3 forward fairing (10), (11), or (12):
  - (a) Make sure a washer (4) is installed in 4 holes.
  - (b) Put the No. 3 forward fairing (10), (11), or (12) in its position on the strut.
  - (c) Install the four bolts (16).
  - (d) Install the four bolts (15).
  - (e) Install the four bolts (6).
  - (f) Install the four bolts (13).
  - (g) Install the 34 bolts (14).

#### s 404-031

- (4) Do these steps to install the inboard No. 4 forward fairing (17):
  - (a) Make sure a washer (4) is installed in four holes.
  - (b) Put the inboard No. 4 forward fairing (17) in its position on the strut.
  - (c) Install the four bolts (6).
  - (d) Install the 64 bolts (7).

## s 404-032

ALL

- (5) Do these steps to install the outboard No. 4 forward fairing (18) or (19):
  - (a) Make sure a washer (4) is installed in nine holes.
  - (b) Put the No. 4 forward fairing (18) or (19) in its position on the strut.
  - (c) Install the nine bolts (6).
  - (d) Install the 64 bolts (7).

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s 204-033

(6) Do a check of the electrical bond resistance (WDM 20-20-00/1).

s 204-034

(7) Make sure the forward fairings are in the aerodynamic smoothness limits (AMM 54-60-00/201).

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