D. Remove caps on plugs and connect the following engine equipment as applicable.

(1) Water injection line, if installed

(2) Fuel supply line tubing

(3) Hydraulic lines and drain lines

(4) Fire extinguisher flex hose lines.

(5) Pneumatic ducting

(6) Anti-ice ducting

E Install sealing as required (Ref Chapter 51, Seals and Sealing)

F. Install engine (Ref Chapter 71, Power Plant - Removal/Installation)

G Check that the following steps have been completed:

(1) Check that applicable engine fuel shutoff valve is open and electrical plug is connected to valve

(2) Check that utility hydraulic supply system is pressurized

(3) Check that external electrical power is connected and that grounding is removed

H Remove leading edge flap actuator locks on actuators adjacent to strut

I Check that there are no leaks in hydraulic lines and, if installed, in water injection line.

J. Test wing thermal anti-ice system (Ref Chapter 30, Ice and Rain Protection).

K Test pneumatic system (Ref Chapter 36)

L. Test fire detection and extinguishing system (Ref Chapter 26).

M Test water injection system if installed (Ref Chapter 82, Water Injection).

N Test fuel supply and engine operation (Ref Chapter 71, Power Plant)

O. Test throttle system (Ref Chapter 76, Engine Controls)

P Install all access panels, gap covers, and strut trailing edge fairing.

NACELLE STRUTS - MAINTENANCE PRACTICES

1 Nacelle Struts Inspection/Check

A Equipment and Materials

(1) Engine Installation Sling Assembly - F71141-501
(2) Solvent - BMS 3-2, type 1
(3) Grease - MIL-G-23827

B Prepare to Examine Nacelle Struts

(1) Support engine as described below if not previously removed
(a) Employ aft fuselage jack if any other engine is simultaneously removed or supported

CAUTION MAIN GEAR SHOCK STRUTS MUST BE DEFLATED WHEN USING AFT FUSELAGE JACK TO PRECLUDE AIRPLANE WEIGHT FROM SETTLING ON NOSE GEAR AND AFT FUSELAGE JACK

(b) Disconnect external electrical power and ground airplane to approved ground lug Position battery switch on flight engineer's upper panel to OFF
(c) Check start levers in CUTOFF position.
(d) Depressurize utility hydraulic system
(e) Check applicable engine fuel shutoff valve closed
(f) Remove main side cowl panels (Ref 71-5-21)
(g) Drain fuel supply line to engine

CAUTION FUEL FLOWMETER CIRCUIT BREAKERS MUST BE PULLED WHENEVER ENGINE FUEL SUPPLY LINE IS DRAINED OR DRY OPERATION DAMAGE TO TRANSMITTER MAY RESULT

(h) Unlatch and remove nacelle forward fairing (Ref 71-5-31)
(i) Install engine hoisting fitting on each side of engine at forward and aft mount rings.
(j) Install sling attaching shackles on engine hoisting fittings
(k) Attach hoisting sling to shackles and tape up slack in cables Adjust forward cables with hand hoist until taut

WARNING .LIGHTLY LOADED LEVER HOISTS MAY RELEASE LOAD IF CONTROL LEVER OR KNOB IS FORCED INTO NEUTRAL OR FREE CHAIN POSITION ONLY PERSONNEL INSTRUCTED IN PROPER USAGE SHOULD OPERATE LEVER CHAIN HOISTS

(l) Adjust hoist cables until engine is supported Maintain support throughout procedure

CAUTION · DO NOT EXCEED LIFT IN EXCESS OF WEIGHT OF ENGINE, STRUT AND HOISTING GEAR OR STRUCTURAL DAMAGE MAY RESULT

NOTE Lift may be varied slightly to facilitate removal/installation of pins/bolts

(m) Remove access doors and panels (Ref Chapter 12, Access Doors and Panels)

C Examine Nacelle Struts

(1) Examine forward engine mount
  (a) Check for cracks in thrust link
  (b) Remove both thrust link terminal bolts and check for wear and corrosion of bolts and holes (Fig 201) Install bolts and tighten nut 1300 to 1500 pound-inches
  (c) Check for cracks and loose or missing fasteners in aft end fitting of thrust link
  (d) Check for cracks and loose or missing fasteners on strut lower spar
  (e) Check for cracks and loose and missing fasteners in forward engine mount bulkhead
  (f) Check for cracks in forward engine mount fitting
(2) Examine rear engine mount
  (a) Check for cracks in rear engine mount support fitting between mount bulkhead on strut and mount on engine
  (b) Remove both bolts through male fittings and check for cracks, corrosion, and wear in bolts and holes (Fig 201). Install bolts (Ref 54-1-12, Engine Rear Mount Support)
(3) Check for cracks and loose or missing fasteners in skin and doublers around access openings
(4) Check for cracks and loose or missing fasteners in access opening and gap covers
(5) Check for cracks and loose or missing fasteners at ribs, bulkheads, and stiffeners on strut lower spar

(6) Examine mid spar area
  (a) Check for cracks and loose or missing fasteners in mid spar fitting at attachment to wing
  (b) Check for cracks in mid spar and torque bulkhead.
  (c) Check for cracks and loose or missing fasteners in mid spar at ribs, bulkheads, and stiffeners.
  (d) Check for cracks and loose or missing fasteners in forward drag support fitting and wing skin in same area
  (e) Remove mid spar bolts Note and record shimming, if any, at outside (bolthead side) of mid spar male fitting
  (f) Check for cracks, corrosion, and wear of bolts and holes at mid spar joint with forward drag support on wing (Fig. 201)
  (g) Clean bolts and holes with solvent and lubricate with grease
  (h) Install bolts, keeping shimming same as prior to bolt removal, and tighten nuts 400 to 500 pound-inches
(7) Examine front spar fitting
  (a) Check for cracks and loose or missing fasteners in front spar fitting at attachment to wing
  (b) Check for cracks in front spar and closure bulkhead
  (c) Check for cracks and loose or missing fasteners in front spar at ribs, bulkheads, and stiffeners
  (d) Check for cracks and loose or missing fasteners in upper surface support and wing skin in same area

    NOTE On some airplanes, an inspection hole with a plug is provided in the strut skin to allow examination of the upper surface of the front spar fitting

  (e) Remove front spar fitting bolt and check for cracks, corrosion, and wear of bolt and holes at front spar joint with upper surface support on wing (Fig 201)
  (f) Clean bolt and holes with solvent and lubricate with grease
  (g) Install bolt with a thin enough washer that clamp-up loads will not be applied to clevis arms when nut is tightened 400 to 500 pound-inches (nut should bottom against bolt shoulder and not on washer)
(8) Examine diagonal brace and fittings.
  (a) Check for cracks, loose or missing fasteners, and corrosion in diagonal brace, terminal fittings, and lower spar attachment fitting
  (b) Check for cracks and loose or missing fasteners in lower spar and torque bulkhead in area of diagonal brace
  (c) Remove diagonal brace (Ref 54-1-41).
  (d) Check for cracks, corrosion and wear of terminal bolts and holes of diagonal brace (Fig 201)

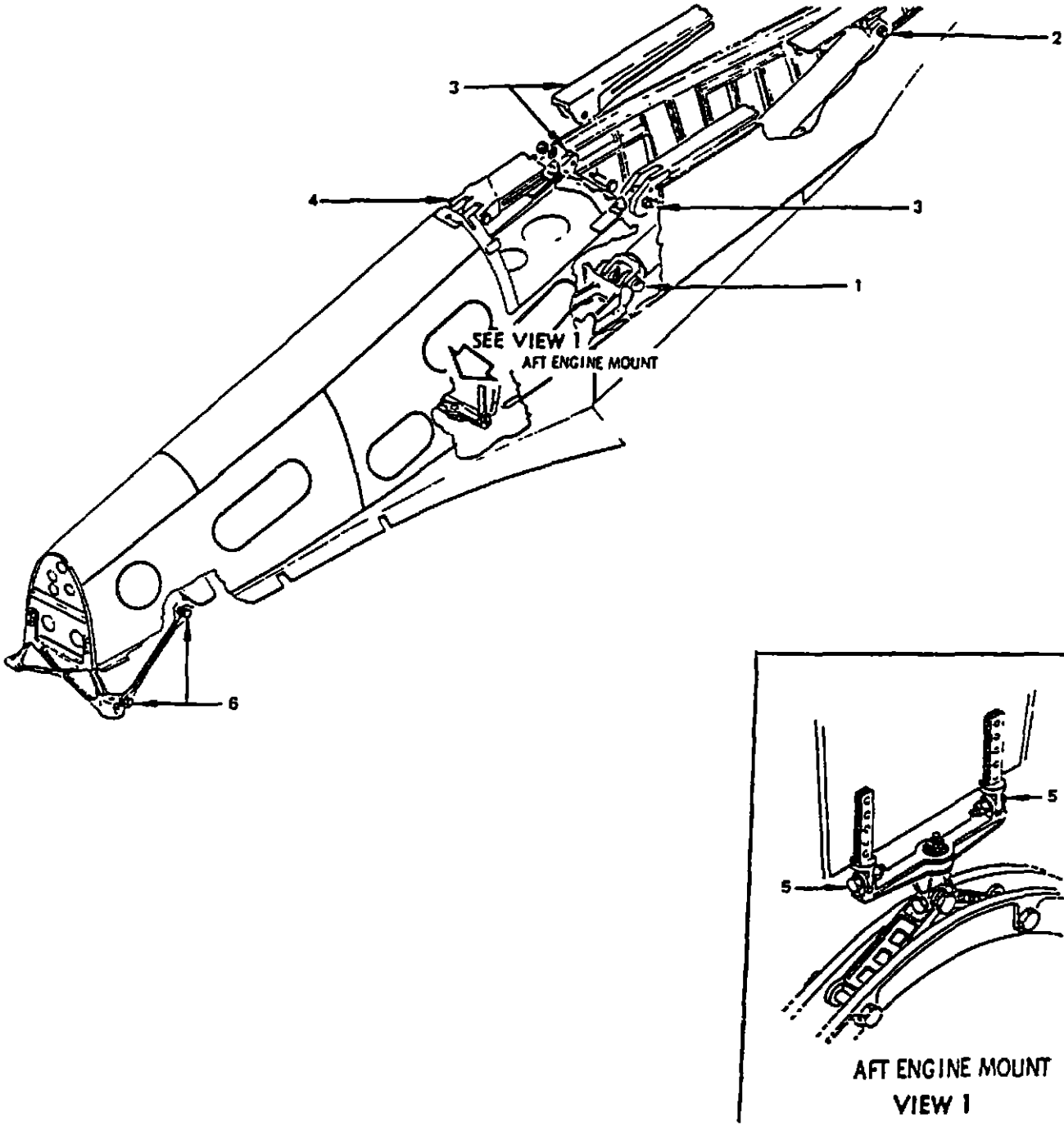
(e) Check for cracks and loose or missing fasteners in aft diagonal brace support fitting and wing skin in same area.
(f) Clean bolts and holes with solvent and lubricate with grease
(g) Install diagonal brace (Ref 54-1-41)

(9) Check for cracks, loose or missing fasteners, and corrosion in fairings at hinge fittings, hinge spacers, and guide pins
(10) Check for cracks and loose or missing fasteners in trailing edge and aft nacelle fairings
(11) On airplanes painted with droop stripe on each side of the inboard and outboard nacelles,
check stripes for offset which may indicate broken nacelle support structure
(a) Disassemble as required to determine cause and repair or replace broken structure (Ref SRM 54-4-4)

D Restore Airplane to Normal
(1) Remove engine support.
(a) Slack off hoist
(b) Remove forward and aft engine hoisting fittings from engine
(c) Check for free working of power and start control linkage by moving power and start levers on pilot's control stand through working range
(2) Pressurize hydraulic system
(3) Install nacelle forward fairing (Ref 71-5-31)
(4) Open applicable engine fuel shutoff valve
(5) Close FUEL FLOWMETER circuit breakers
(6) Position and install left and right engine side cowl panels (Ref 71-5-21)
(7) Install access doors and panels (Ref Chapter 12, Access Doors and Panels)

2 Nacelle Strut Wear Limits (Fig 201)

NOTE If rework limits are required, contact Boeing Customer Support Engineering



Nacelle Struts - Allowable Wear
Figure 201 (Sheet 1)

NACELLE STRUTS ALLOWABLE WEAR - INBOARD

INDEX N°	PART DESCRIPTION	DESIGN LIMITS DIAMETER* MIN	DESIGN LIMITS DIAMETER* MAX	WEAR LIMITS DIAMETER* MIN	WEAR LIMITS DIAMETER* MAX	DIAM CLEARANCE (MAX)
1	Fitting, Lower Diagonal Brace (I/D)	8735	8763		8789	0045
	Bolt, Lower Diagonal Brace Fitting (O/D)	8730	8740	8718		
	Fitting, Lower Spar Attach (I/D)	8735	8763		8789	0045
2	Fitting, Nacelle Strut Upper Diagonal Brace (I/D)	1 0619	1 0647		1 0675	0060
	Bolt, Upper Diagonal Brace Fitting (O/D)	1 0601	1 0615	1 0561		
	Fitting, Wing to Nacelle Strut Upper Diagonal Brace (I/D)	1 0623	1 0647		1 0675	0060
3	Fitting, Mid Spar to Wing (I/D)	1 2189	1 2217		1 2245	0060
	Bolts, Mid Spar to Wing (O/D)	1.2171	1.2185	1.2135		
	Fitting, Wing to Mid Spar (I/D)	1 2193	1 2217		1 2245	0060
4	Fitting, Nacelle Strut Front Spar to wing (I/D)	9382	9410		9430	0050
	Bolt, Nacelle Strut Front Spar to Wing (O/D)	9364	9378	9324		
	Fitting, Nacelle strut Wing to Front Spar (I/D)	9384	9410		9430	0050
5	Fitting, Rear Engine Mount Support Bracket (I/D)	4995	5005		5018	0030
	Bolt, Rear Engine Mount Support (O/D)	4982	4 991	4976		
	Fitting, Rear Engine Mount Support (I/D)	4995	5005		5018	0030
6	Fitting, Engine Mount Thrust Link to Strut (I/D)	7486	7506		7530	0045
	Bolt, Engine Mount Thrust Link (O/D)	7480	7490	7468		
	Fitting, Engine Mount Thrust Link to Forward Engine Mount Support (I/D)	7486	7506		7530	0045
	Fitting, Strut to Engine Mount Thrust Link (I/D)	7486	7506		7530	0045
	Bolt, Engine Mount Thrust Link (O/D)	7480	7490	7468		
	Fitting, Forward Engine Mount Support to Engine Mount Thrust Link (I/D)	7486	7506		7530	0045

* ALL DIMENSIONS IN INCHES

Figure 201 (Sheet 2)

NACELLE STRUTS ALLOWABLE WEAR - OUTBOARD

INDEX N°	PART DESCRIPTION	DESIGN LIMITS DIAMETER* MIN	DESIGN LIMITS DIAMETER* MAX	WEAR LIMITS DIAMETER* MIN	WEAR LIMITS DIAMETER* MAX	DIAM CLEARANCE (MAX)
1	Fitting, Lower Diagonal Brace (I/D)	9990	1 0018		1 0046	0060
	Bolt, Lower Diagonal Brace Fitting (O/D)	9980	9990	9966		
	Fitting, Lower Spar Attach (I/D)		9990	1 0018	1 0046	0060
2	Fitting, Nacelle Strut Upper Diagonal Brace (I/D)	1 2494	1 2522		1 2550	0070
	Bolt, Upper Diagonal Brace Fitting (O/D)	1 2476	1 2490	1 2436		
	Fitting, Wing to Nacelle Strut Upper Diagonal Brace (I/D)	1 2498	1 2522		1 2550	0070
3	Fitting, Mid Spar to Wing (I/D)	1 1564	1 1592		1 1620	0060
	Bolts, Mid Spar to Wing (O/D)	1 1546	1 1560	1 1510		
	Fitting, Wing to Mid Spar (I/D)	1 1568	1 1592		1 1620	0060
4	Fitting, Nacelle Strut Front Spar to wing (I/D)	8438	8465		8485	0050
	Bolt, Nacelle Strut Front Spar to Wing (O/D)	8419	8434	8379		
	Fitting, Nacelle strut Wing to Front Spar (I/D)	8440	8466		8485	0050
5	Fitting, Rear Engine Mount Support Bracket (I/D)	4995	5005		5018	0030
	Bolt, Rear Engine Mount Support (O/D)	4982	4 991	4976		
	Fitting, Rear Engine Mount Support (I/D)	4995	5005		5018	0030
6	Fitting, Engine Mount Thrust Link to Strut (I/D)	7486	7506		7503	0045
	Bolt, Engine Mount Thrust Link (O/D)	7480	7490	7468		
	Fitting, Engine Mount Thrust Link to Forward Engine Mount Support (I/D)	7486	7506		7503	0045
	Fitting, Strut to Engine Mount Thrust Link (I/D)	7486	7506		7503	0045
	Bolt, Engine Mount Thrust Link (O/D)	7480	7490	7468		
	Fitting, Forward Engine Mount Support to Engine Mount Thrust Link (I/D)	7486	7506		7503	0045

* ALL DIMENSIONS IN INCHES

Figure 201 (Sheet 3)

ENGINE REAR MOUNT SUPPORT - MAINTENANCE PRACTICES

1. Removal/Installation Engine Rear Mount Support

   A. Equipment and Materials

      (1) Grease - MIL-G-25760 (Ref 20-30-03)

      (2) Shim Stock - CRES AISI 301, Hard Surface, Condition 2B, Composition 301, per MIL-S-5059

   B. Remove Engine (Refer to Chapter 71 - Power Plant - Removal/Installation).

   C. Remove Engine Rear Mount Support (Fig. 201).

      (1) Remove cotter pin, nut, shims, and bolt (2 places).

      (2) Remove engine rear mount support.

   D. Install Engine Rear Mount Support (Fig. 201).

      (1) Apply thin film of grease to inside surfaces of engine rear mount support holes (2 places).

      (2) Position engine rear mount support.

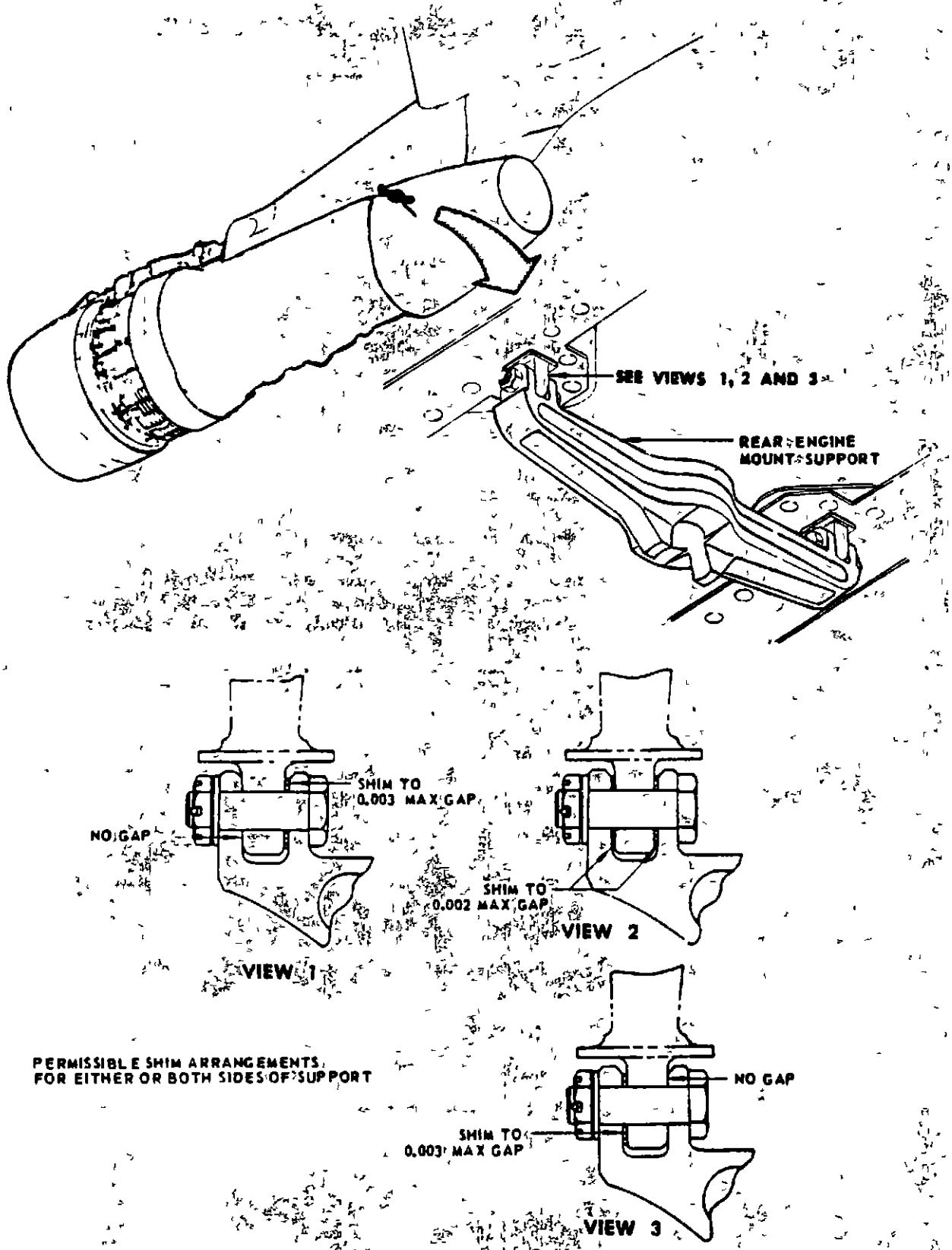
      (3) Shim as necessary to obtain 0.003 maximum allowable gap. (Conditions shown in Views 1, 2 or 3 may occur on one or both sides of the strut as determined by the installation of the engine rear support).

         NOTE: If old shims are worn or corroded, make new shims from solid steel shim stock, thickness 0.001 to 0.015, as required. Apply no finish.

      (4) Insert bolts and tighten nuts to torque range of 95 to 110 pound-inches (2 places). Back off each nut to permit free rotation of support.

      (5) Install cotter pin (2 places).

   E. Install Engine (Refer to Chapter 71, Power Plant - Removal/Installation).



Engine Rear Mount Support
Figure 201

NACELLE STRUT PRESSURE RELIEF PANELS - MAINTENANCE PRACTICES

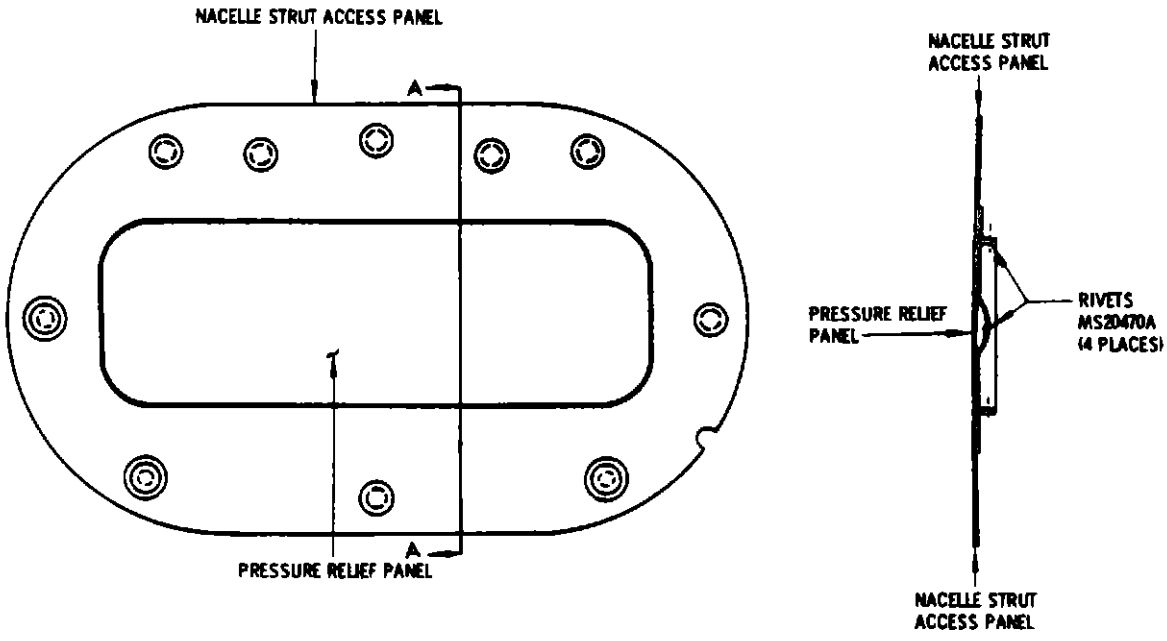
1. Approved Repairs

A. General

(1) The pressure relief panels are located within the nacelle strut access panels. Figure 201 shows a typical nacelle strut access panel with a pressure relief panel. The pressure relief panel is attached to the nacelle strut access panel by means of angles and special rivets. When the pressure within the strut rises to a certain level, the rivets are sheared and the relief panel blows out.

B. Repair Pressure Relief Panel

(1) Install the pressure relief panel with MS20470A 1/16 inch diameter rivets. No substitute for these rivets is allowed. (See figure 201.)



NACELLE STRUT LOWER SPAR AND DIAGONAL BRACE FORWARD FITTINGS - INSPECTION/CHECK

1. Nacelle Strut Lower Spar and Diagonal Brace Forward Fittings Inspection

A. General

(1) The inboard and outboard nacelle strut lower spar and diagonal brace forward fittings must be inspected for heat damage during next overhaul, if there is evidence of the following.

(a) Thrust reverser clamshell door seals do not meet requirements stated in Chapter 78, Aft Thrust Reverser - Maintenance Practices.

(b) Improper rigging of thrust reverser clamshell doors. Refer to Chapter 78, Aft Thrust Reverser - Maintenance Practices.

(c) Blocker skin cracks beyond allowable limits. Refer to Chapter 78, Aft Thrust Reverser - Maintenance Practices.

B. Equipment and Materials

(1) Direct reading conductivity instruments

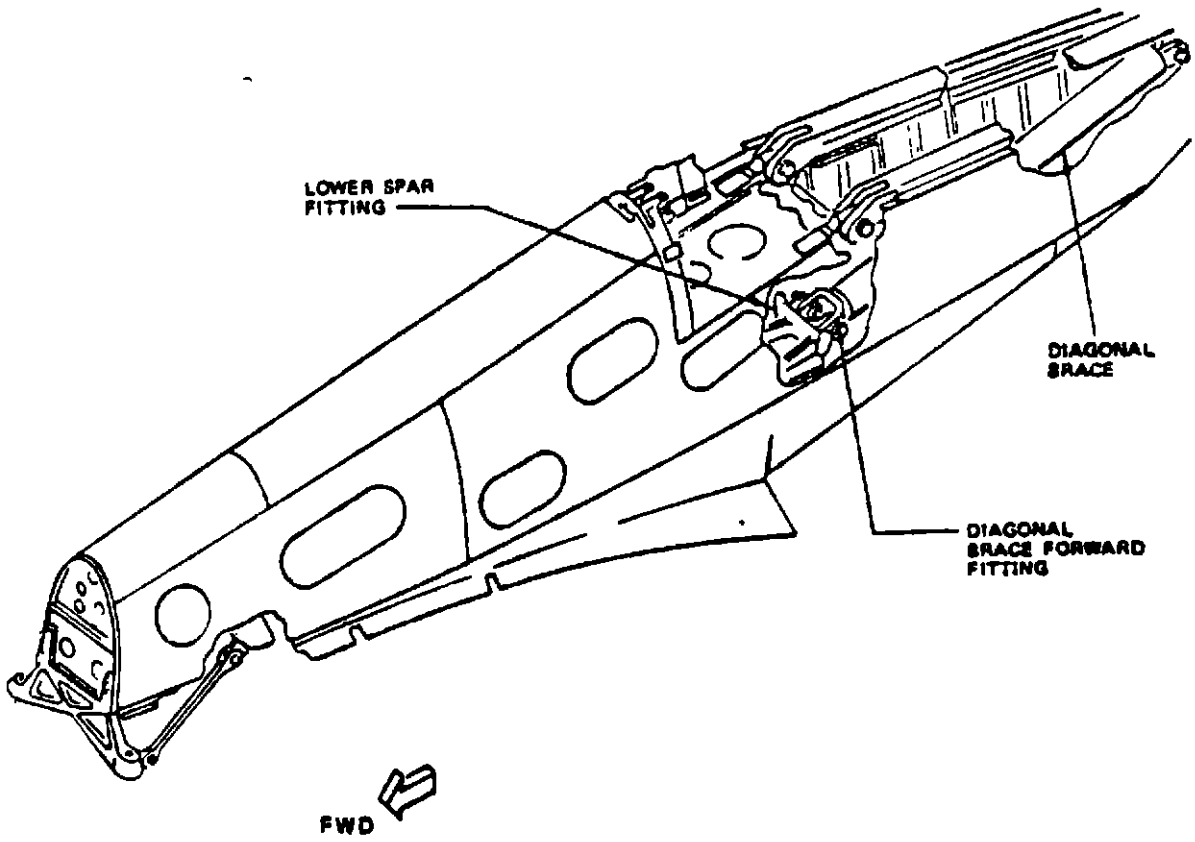
(a) FM110 or FM120 (manufactured by Magnaflux), or Sigma Test 2.607 (manufactured by Automation-Forster), or equivalent

C. Prepare for Inspection

(1) Calibrate conductivity instrument before each use and not less than once each hour of continuous use. Accurate readings can be taken through paint systems up to 0.003 inch thick. Normal primer systems applied per Boeing specifications are 0.001 inch thick. Paint thickness above 0.003 inch thick must be removed prior to making conductivity measurements.

D. Inspect Nacelle Strut Lower Spar and Diagonal Brace Forward Fittings (See figure 601.)

NOTE: Conductivity readings must be taken on a flat surface of 1 square inch area minimum (approximately 1.13-inch diameter circle). On the lower spar fitting, the readings shall be taken on the forward vertical flange and on the inside of each vertical longitudinal rib. On the diagonal brace forward fitting, the readings shall be taken on the lug sides and edges. A reading on any detail which exceeds the limits given in figure 602 will be cause for corrective action.


LOWER SPAR FITTING
DIAGONAL BRACE
DIAGONAL BRACE FORWARD FITTING
FWD

(1) Inspect lower spar fitting If fitting is satisfactory, diagonal brace forward fitting need not be inspected

(2) If lower spar fitting conductivity values exceed allowable limits, then inspection of diagonal brace foward fitting is required

(3) In the event that heat damage exceeding the limits shown in Fig 602 is found, approved repairs per 54-1-31, Nacelle strut Lower Spar and Diagonal Brace Forward Fittings - Approved Repairs, must be done

Inboard and Outboard Nacelle Strut		
Part	Location	Maximum Conductivity Value (in % International) Annealed Copper Standard)
Lower Spar Fitting (7075-T6 Forging)	Vertical longitudinal rib	40 0
	Fwd vertical flange	43 5
Diag Brace Fwd Fitting (7075-T6) Forging)	Lug sides and edges	35 0
Diag Brace Fwd Fitting (7075-T73 Forging)	Lug sides and edges	42 5

Conductivity Limits
Figure 602

NACELLE STRUT LOWER SPAR AND DIAGONAL BRACE FORWARD FITTINGS - APPROVED REPAIRS

1. General

A. Approved repairs contained in this section must be done on nacelle strut lower spar and diagonal brace forward fittings if conductivity test in 54-1-31, Nacelle Strut Lower Spar and Diagonal Brace Forward Fittings - Inspection/Check, indicates that fittings are heat damaged.

2. Repair Nacelle Strut Lower Spar and Diagonal Brace Forward Fittings (See figure 801.)

A. Lower Spar Fitting

(1) Remove fitting from strut and remove bushings.

(2) Strip surface finishes per Overhaul Manual, Subject 20-30-02, prior to reheat treatment.

(3) Solution reheat treat fitting at 860 to 880°F for 3 hours. Quench fitting at 140 to 160°F. Fitting should be quenched with the base of the part level and the legs pointing upward.

(4) Finish fitting by applying two coats of BMS 10-11, Type 1, primer all over.

(5) Install (shrink fit) bushings per Overhaul Manual, Subject 20-50-03. Machine bushing ID to size per 54-1-0, Nacelle Struts - Maintenance Practices.

(6) Reinstall fitting in strut. All strut structural surfaces which fay with the fitting should be cleaned and primed according to normal procedures for similar and dissimilar metal contacting surfaces.

B. Diagonal Brace Forward Fitting

(1) Repair per paragraph A, except fitting should be quenched with lugs up.

C. If and when the fittings are removed for rework or replacement, the following structural rework should be done once per figure 802.

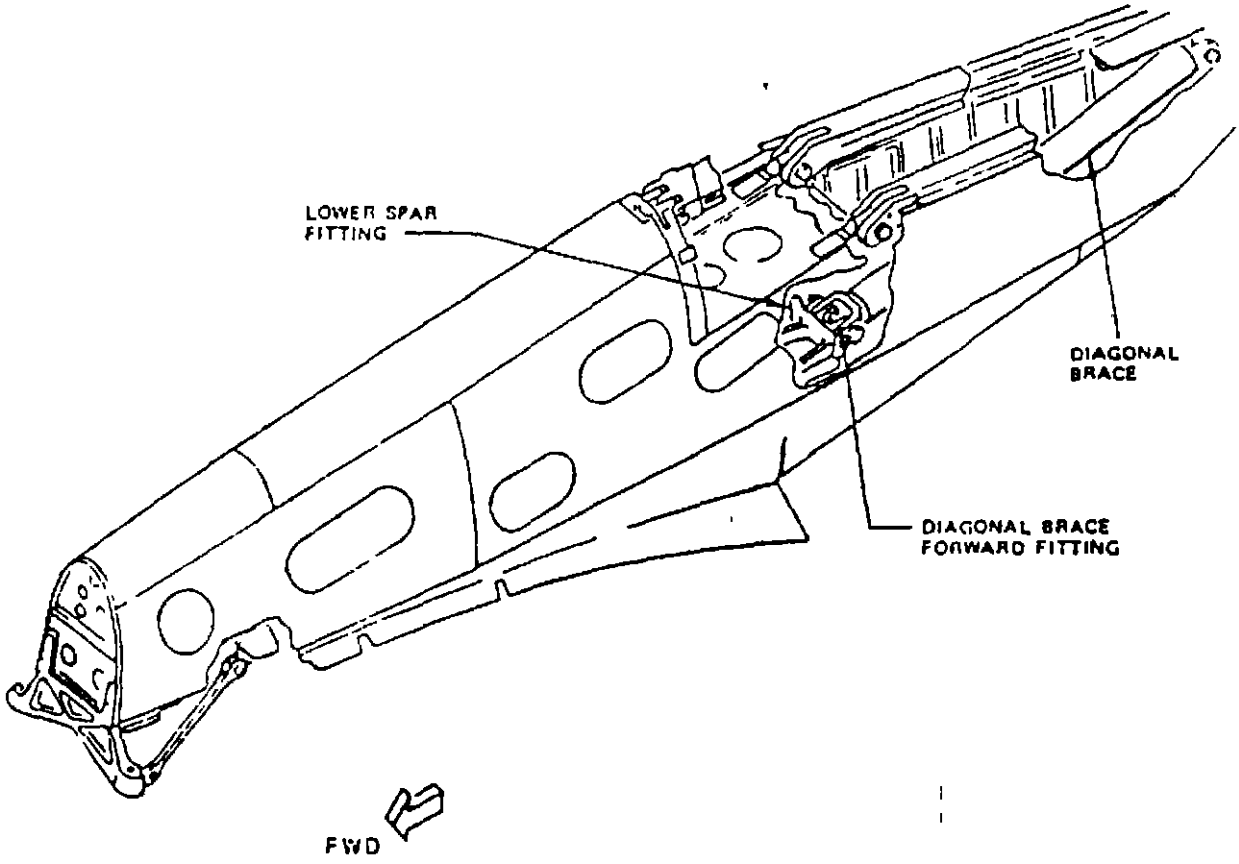
(1) Inboard strut stiffener.

(a) Replace inboard strut stiffener left and right with identical part made of 301 stainless steel, 1/4 hard. Finish by applying two coats of BMS 10-11, Type 1, primer. Standard oversize fastener practices are allowed.

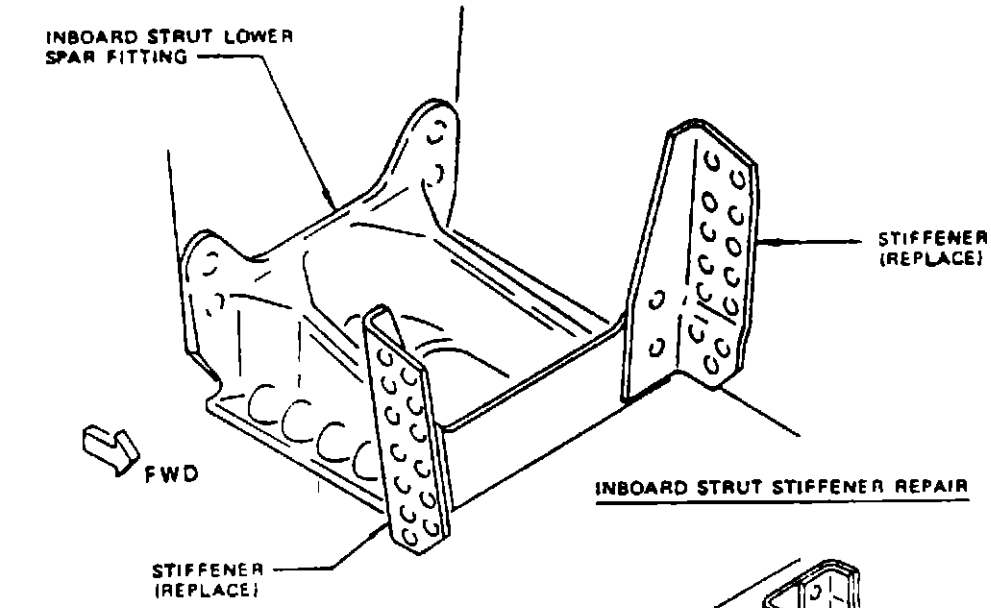
(2) Outboard strut rib.

(a) On left side of strut, replace lower angle with an angle of identical configuration but made of 301 stainless steel, 1/4 hard. Finish by applying two coats of BMS 10-11, Type 1, primer. Install new angle using existing hole locations. Standard oversize fastener practices are allowed.

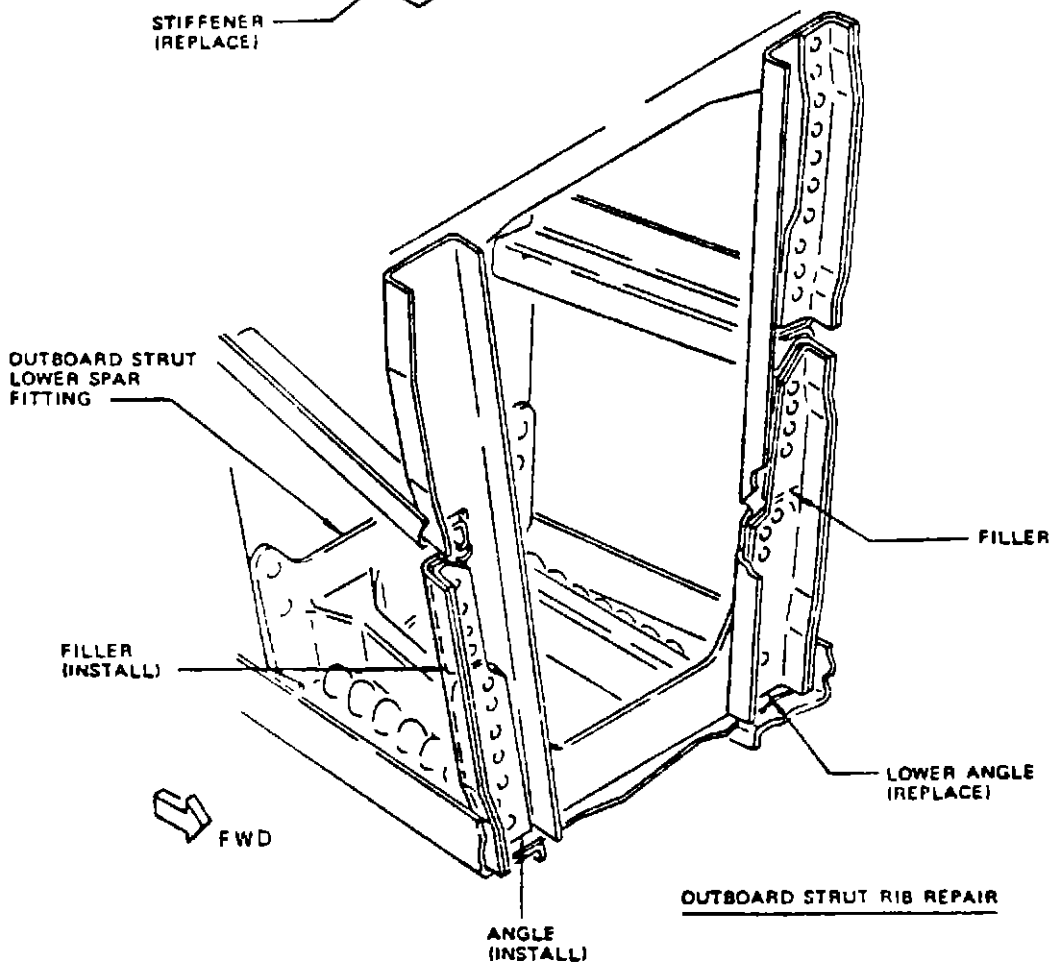
(b) On right side of strut, install new filler (7075-T6 sheet, QQ-A-283, T6 temper) and new angle (similar to angle on left side, made of 301 stainless steel, 1/4 hard) Finish both parts with two coats of BMS 10-11, Type 1, primer. Standard oversize fastener practices are allowed.



Nacelle Strut Installation
Figure 801
TR 54-1



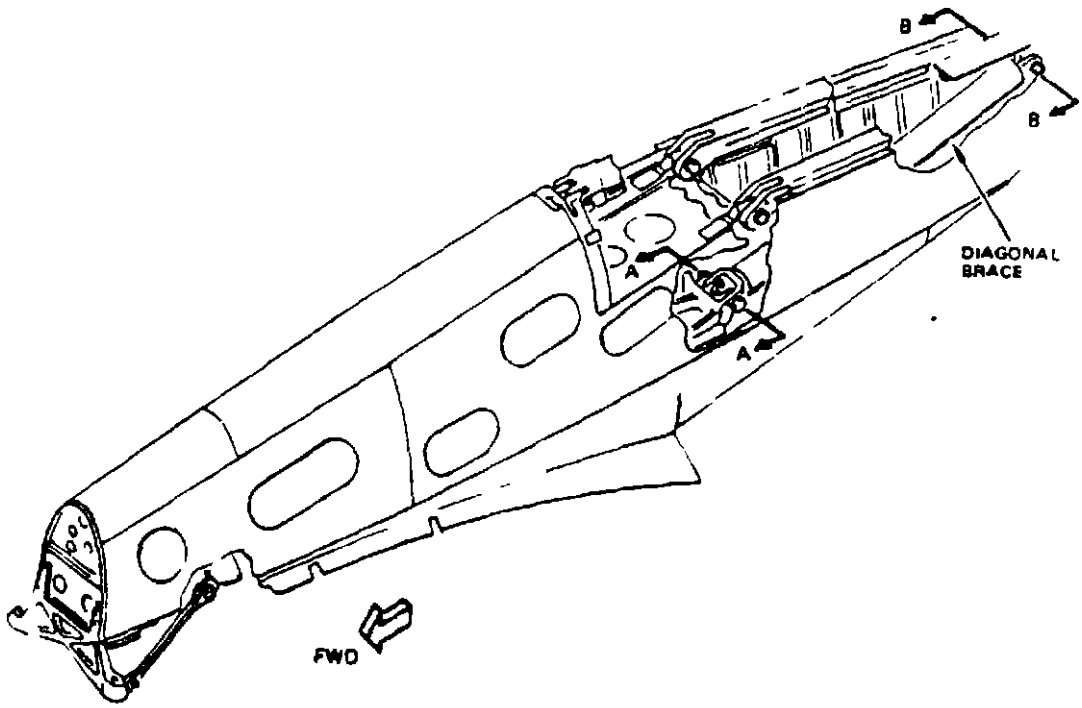
INBOARD STRUT STIFFENER REPAIR

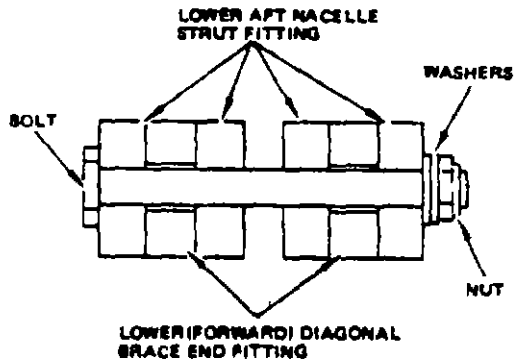


OUTBOARD STRUT RIB REPAIR

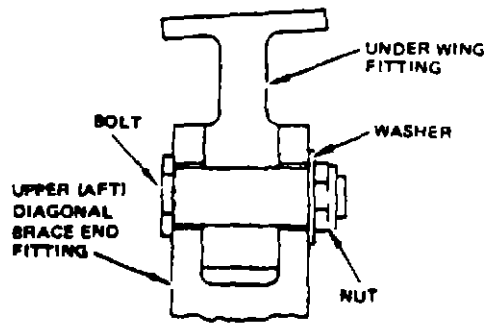
NACELLE STRUT DIAGONAL BRACE - REMOVAL/INSTALLATION

1. General
   A. A replacement diagonal brace consists of an upper (aft) fitting attached to a tube and an unattached lower (forward) fitting. The lower (forward) fitting and the lower (forward) end of the tube are predrilled with matching 5/16-inch diameter pilot holes. Final attachment of the lower end fitting to the tube is accomplished during installation of the diagonal brace on the airplane.
   B. Replacement of the individual end fittings consists of removing the existing 18 fasteners, drilling 18 holes in the end fitting to match the holes in the tube, and installing the 18 fasteners attaching the end fitting to the tube.
2. Equipment and Materials
   A. Zinc Chromate Primer - MIL-P-8585 (Ref 13-1-4)
   B. Corrosion Preventive Compound - MIL-C-11796, Class 3 (Ref 13-1-3)
   C. Grease - MIL-G-23827 (Ref 13-1-2)
   D. Leading Edge Flap Actuator Lock Assembly - F70144
3. Remove Nacelle Strut Diagonal Brace (Fig. 401)
   A. Remove engine (Ref Chapter 71).
   B. Install leading edge flap actuator locks on actuators adjacent to strut.
   C. Remove strut trailing edge fairing.
   D. Remove diagonal brace nuts, washers, and bolts and remove diagonal brace.
4. Prepare for Installation
   A. Install leading edge flap actuator locks on actuators adjacent to strut.
   B. Check for wear at installation points (Ref 54-1-0, Maintenance Practices).
   C. When replacing diagonal brace, proceed as follows
      (1) Temporarily attach upper (aft) end of diagonal brace to under-wing fitting.
      (2) Insert lower (forward) end fitting in diagonal brace tube.
      (3) Temporarily attach lower end fitting to mating fitting on lower aft end of nacelle strut with existing bolt.
      (4) Mark lower end fitting and tube for vertical alignment.
      (5) Remove diagonal brace from nacelle strut.
      (6) Maintain vertical alignment noted in step 4.C.(4) and set length of diagonal brace to maintain 51.05 ±0.01 inches (outboard nacelle strut) or 51.05 ±0.01 inches (inboard nacelle strut) between centers of upper and lower end fitting attach holes.
      (7) Drill 18 class 1 holes in lower end fitting to match diameter of fasteners and to match holes in tube.





SECTION A–A



SECTION B–B

Nacelle Strut Diagonal Brace Installation
Figure 401

(8) Remove lower end fitting from diagonal brace and temporarily insert the 18 lower end fitting attach fasteners into fitting. Check for ± 1/2 degree (0.006-inch) gap permissible between manufactured head of fastener and inside surfaces of fitting. If gap is greater than requirement, spotface inside surfaces of fitting as necessary.

(9) Insert lower end fitting in diagonal brace. Maintain vertical alignment noted in step 4.C.(4).

(10) Install the same type 18 lower end fitting attach fasteners in same location as that of the diagonal brace which was removed. Install fasteners with wet zinc chromate primer.

D. When replacing lower (forward) end fitting in existing diagonal brace, proceed as follows

(1) Remove fasteners attaching end fitting to diagonal brace tube and remove existing lower end fitting. Note location and type of fasteners. Discard fitting.

(2) Perform step 4.C.

E. When replacing upper (aft) end fitting in existing diagonal brace, proceed as follows

(1) Remove fasteners attaching end fitting to diagonal brace tube and remove existing upper end fitting. Note location and type of fasteners. Discard fitting.

(2) Temporarily attach lower (forward) end fitting end of diagonal brace to mating fitting on lower aft end of nacelle strut.

(3) Insert upper (aft) end fitting in diagonal brace.

(4) Temporarily attach upper (aft) end fitting end of diagonal brace to under-wing fitting.

(5) Mark upper end fitting and tube for vertical alignment.

(6) Remove diagonal brace from nacelle strut.

(7) Maintain vertical alignment noted in step 4.E.(5) and set length of diagonal brace to maintain 51.65 ±0.01 inches (outboard nacelle strut) or 51.05 ±0.01 inches (inboard nacelle strut) between centers of upper and lower end fitting attach holes.

(8) Drill 18 class 1 holes in upper end fitting to match diameter of fasteners and to match holes in tube.

(9) Remove upper end fitting from diagonal brace and temporarily insert the 18 upper end fitting attach fasteners into fitting Check for ± 1/2 degree (0.006-inch) gap permissible between manufactured head of fastener and inside surfaces of fitting. If gap is greater than requirement, spotface inside surfaces of fitting as necessary

(10) Insert upper end fitting in diagonal brace. Maintain vertical alignment noted in step 4.E.(5).

(11) Install the same type 18 upper end fitting attach fasteners in same location as that of the upper end fitting which was removed. Install fasteners with wet zinc chromate primer.

F. When replacing upper (aft) and lower (forward) end fitting in existing diagonal brace, proceed as follows:
   (1) Measure and record dimensions between centers of upper and lower end fitting attach holes and edge of diagonal brace tube.
   (2) Remove fasteners attaching end fittings to diagonal brace tube and remove existing upper and lower end fittings. Note location and type of fasteners for each end fitting. Discard fittings.
   (3) Insert upper end fitting in diagonal brace tube and position end fitting to dimension measured in step 4.F.(1). Check that centerline of drain holes in lower end of tube is parallel to lugs of end fitting.
   (4) Drill 18 class 1 holes in upper end fitting to match diameter of fasteners and to match holes in tube.
   (5) Remove upper end fitting from diagonal brace and temporarily insert the 18 upper end fitting attach fasteners into fitting. Check for ± 1/2 degree (0.006-inch) gap permissible between manufactured head of fastener and inside surfaces of fitting. If gap is greater than requirement, spotface inside surfaces of fitting as necessary
   (6) Insert upper end fitting in diagonal brace. Maintain vertical alignment noted in step 4.F.(3).
   (7) Install the same type 18 upper end fitting attach fasteners in same location as that of the upper end fitting which was removed Install fasteners with wet zinc chromate primer.
   (8) Perform step 4.C.

5. Install Nacelle Strut Diagonal Brace (Fig. 401)
   A. Install diagonal brace by installing bolt, washer and nut at lower (forward) and upper (aft) end of brace. On bolts with grease fitting, apply a film of grease to outside diameter of bolt. On bolts without grease fitting apply a film of corrosion preventive compound to outside diameter of bolt. Use wrench to hold bolthead and tighten nuts as follows:
      (1) Tighten nut at lower (forward) end of diagonal brace 600 to 700 lb-in. at inboard and outboard struts.
      (2) Tighten nut at upper (aft) end of diagonal brace 800 to 1000 lb-in. at inboard and outboard struts.

6. Restore Airplane to Normal
   A. Install engine (Ref Chapter 71).
   B. Check that the following steps have been completed:
      (1) Check that applicable engine fuel shutoff valve is open and electrical plug is connected to valve.
      (2) Check that utility hydraulic supply system is pressurized.
      (3) Check that external electrical power is connected and that grounding is removed.

C. Remove leading edge flap actuator locks on actuators adjacent to strut.
D. Check that there are no leaks in hydraulic lines and, if installed, in water injection line.
E. Test wing thermal anti-ice system (Ref Chapter 30).
F. Test pneumatic system (Ref Chapter 36).
G. Test fire detection and extinguishing systems (Ref Chapter 26).
H. Test water injection system if installed (Ref Chapter 82).
I. Test fuel supply and engine operation (Ref Chapter 71).
J. Test throttle system (Ref Chapter 76).
K. Install all access panels, gap covers, and strut trailing edge fairing.

ENGINE FRONT MOUNT SUPPORT - REMOVAL/INSTALLATION

1. General

   A. The forward engine mount is attached to the nacelle strut forward torque bulkhead. Thrust loads are taken up by a link attached to the left side of the mount.

2. Remove Support (Fig. 401)

   A. Remove Engine (Ref Chapter 71, Power Plant - Removal/Installation).

   B. Remove nut, washers, and bolt (2 places) and remove thrust link.

   C. Remove nuts and bolts (10 places) and remove support.

3. Install Support

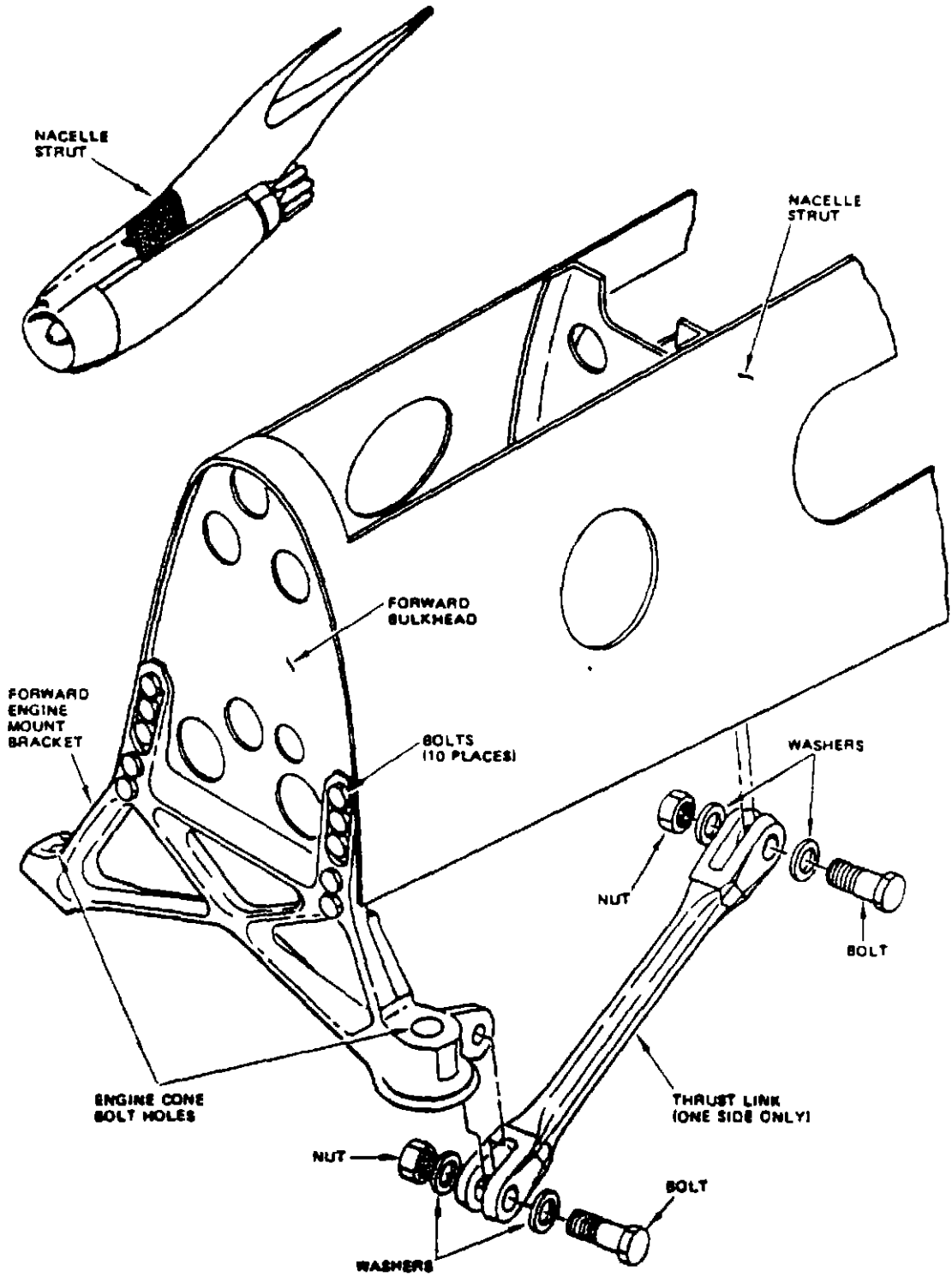
   A. Position support and install nuts and bolts (10 places).

   B. Install thrust link.

      (1) Position link and install bolts (2 places) with CSK washer under bolthead and CSK facing bolthead.

      (2) Install nuts and tighter to torque range of 1300 to 1500 pound-inches.

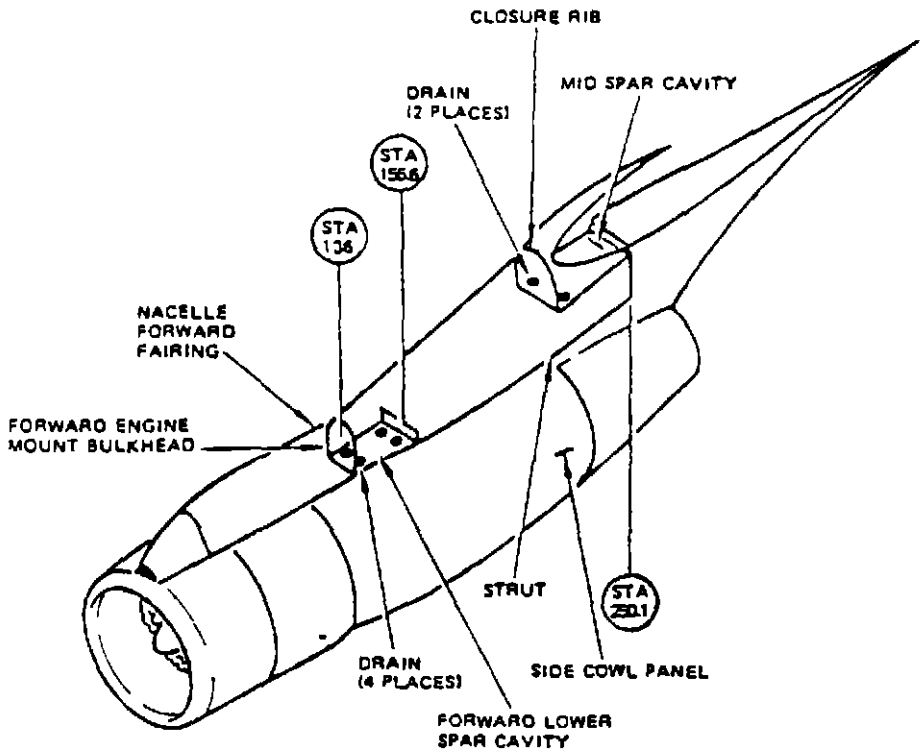
   C. Install Engine (Ref Chapter 71, Power Plant - Removal/Installation).



Nacelle Strut Engine Mount Bracket and Thrust Link 2
Figure 401
TR 54-10

NACELLE STRUT LEAKAGE - INSPECTION/CHECK

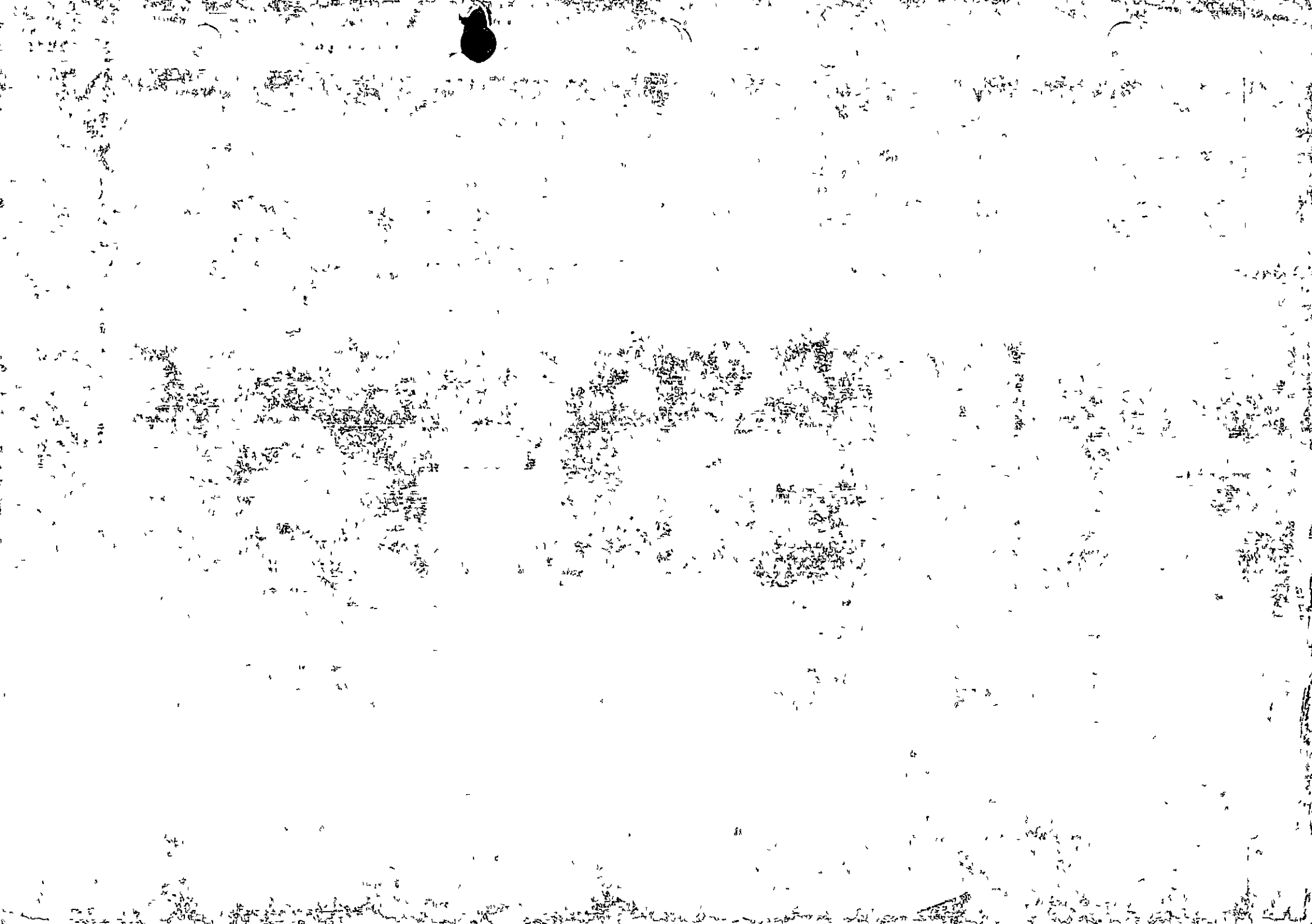
1. Nacelle Strut Leakage Check (Fig. 601)
   A. General
      (1) Sealant applied to the firewall and interior of the nacelle strut (Ref 51-3-0, Maintenance Practices) is intended to prevent the leakage of fuel and/or hydraulic fluids between the strut compartments or into the engine compartment. This section checks the nacelle strut for such leakage.
   B. Prepare for Check
      (1) Remove strut access panels (Ref 12-2-0).
      (2) Plug drains in forward and aft strut compartments. See Fig. 601 for drain locations.
      (3) Protect electrical connectors located on bottom surface of forward lower spar from water during test. This may be accomplished by use of dam or other suitable technique.
      (4) If engine is removed, plug strut-engine interface fitting.
      (5) If engine is installed, remove side cowls (Ref 71-5-21, Maintenance Practices) and nacelle forward fairing (Ref 71-5-31, Maintenance Practice).
   C. Midspar Leakage Check
      (1) Fill mid spar cavity (between closure rib and nacelle station 250.1) with water. Use hose or spout to wet all midspar surfaces including strut walls (skins and doublers) to a height of 3 inches above midspar web.
      (2) Check lower surface of midspar for leaks.
      (3) If leakage is noted, seal midspar by completing sealant installation per applicable drawing (Ref 51-3-0, Description and Operation) and repeat check until there is no leakage.
   D. Forward Lower Spar Leakage Check
      (1) Fill forward lower spar cavity (between nacelle station 136 and 156.6) with water. Use hose or spout to wet entire surface of forward lower spar to a height of 3 inches.
      (2) Check lower surface of forward lower spar for leaks.
      (3) If leakage is noted, seal forward lower spar by completing sealant installation per applicable drawing (Ref 51-3-0, Description and Operation) and repeat check until there is no leakage.
   E. Restore Airplane to Normal
      (1) Remove all plugs to evacuate water.
      (2) Remove all residual water.
      (3) Remove cable clamps and wired contacts from the connnectors that are exposed to water during test. Thoroughly dry or allow to air dry all parts prior to reassembly.
      (4) Install strut access panels.
      (5) Install nacelle forward fairing (Ref 71-5-31, Maintenance Practices).
      (6) Install side cowls (Ref 71-5-21, Maintenance Practices).



Nacelle Strut Leakage Check
Figure 601
TR 54-21

CHAPTER

55



* = REVISED, ADDED OR DELETED F= FOLDOUT PAGE

CHAPTER 55
STABILIZERS
TABLE OF CONTENTS

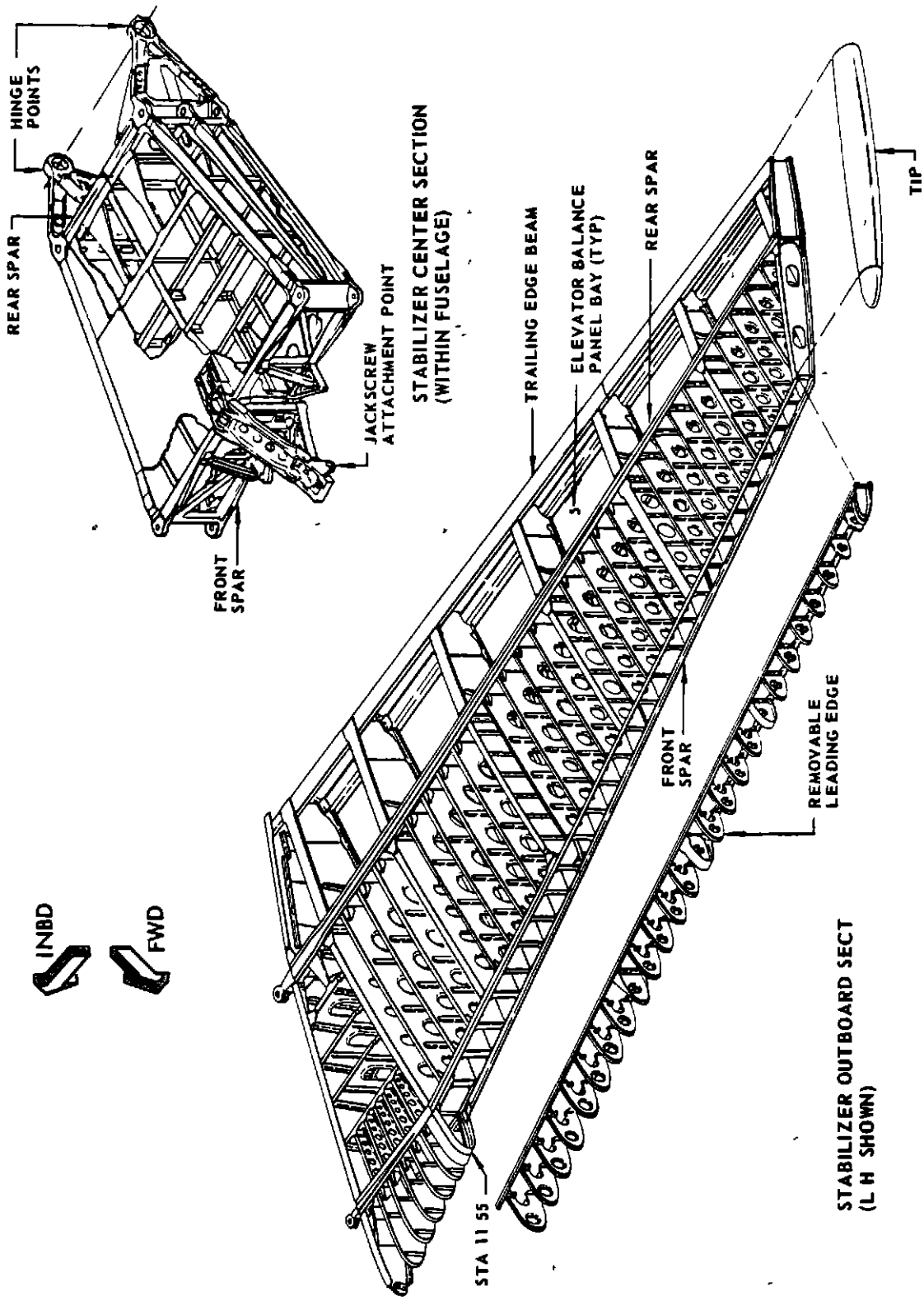
HORIZONTAL STABILIZER - DESCRIPTION AND OPERATION

1. General

A. The horizontal stabilizer assembly consists of left and right sections attached to a center section torque box, located within the fuselage. The stabilizer is pivoted on two self-aligning bushing-type hinge joint attached to a heavy bulkhead in the fuselage, and the angle of attack i adjusted by means of an electrically driven or manually operated ball nut and jackscrew, which is attached to the forward side of the center section torque box. Refer to "Stabilizer Trim System", Chapter 27. Al vertical load distributions on the stabilizer are reacted at these thre above mentioned attachment points. On turbojet airplanes the removable leading edge is provided with an electrical deicing system. Refer to "Empennage Deicing System," Chapter 30. The tip is also removable. A rubber aerodynamic seal fills the gap between the stabilizer (left and right sections) and the fuselage. A brush seal integral with the stabilizer fairing, and a sliding plate seal are located respectively at points where the front and rear spars pass into the fuselage.

2. Stabilizer Structure

A. The front and rear spars and the skin, form a box beam which is the mai structural member of the stabilizer. (See figures 1 and 2.) The stabilizer outboard panel is of two spar construction, the front spar web extending to station 11.55 only. The spars provide the only spanwise stiffness except for the trailing edge beam at 75 per cent chord. Airfoil contour and torsional strength are maintained by ribs at nine inch spacing. The bending moment and beam shear are carried by the spars and local effective skin. The stabilizer torsion is reacted by torsional shear in the skin and rear spar web. Attachment of the outboard panels and center section is at the front and rear spar only, with no structural tie between the outboard panel skin and center sectic



Horizontal Stabilizer Structure
Figure 1

Horizontal Stabilizer Skin Diagram.

Boeing pages 3 and 4 have been deleted.

For SRM (Structural Repair Manual) references see Conversion Table below.

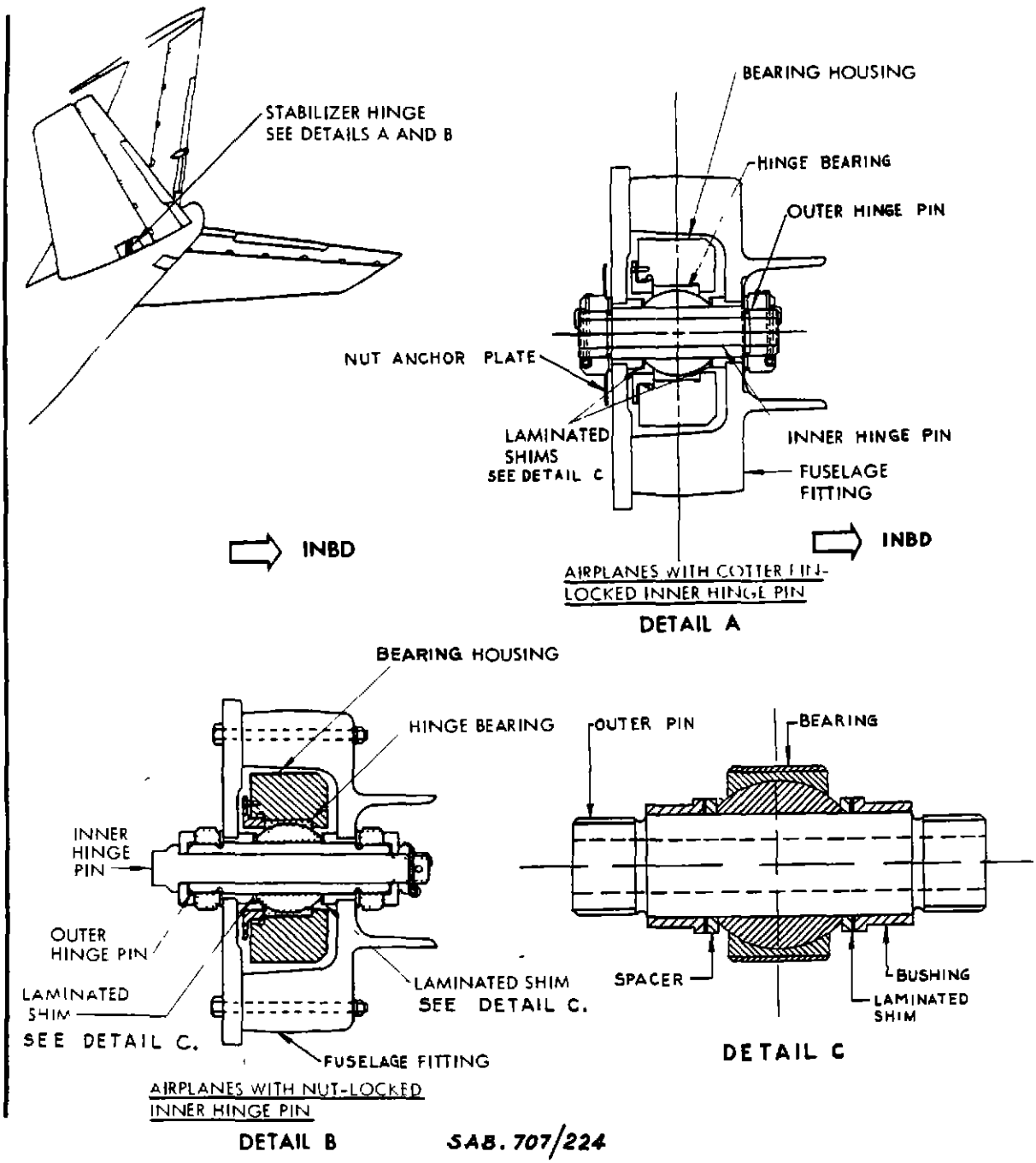
Page No.	DATE	FIGURE No. / TITLE	REFERENCE S.R.M.
3	15/2/63	Figure 2 (Sheet 1 of 2) Horizontal Stabilizer Skin Diagram	55-3-1 figure 1 (sheet 1 of 3) page 1
4	15/2/63	Figure 2 (Sheet 2 of 2) Horizontal Stabilizer Skin Diagram	55-3-1 figure 1 (sheet 2 of 3) page 2

Conversion Table

SAB REV 17 JAN 1967

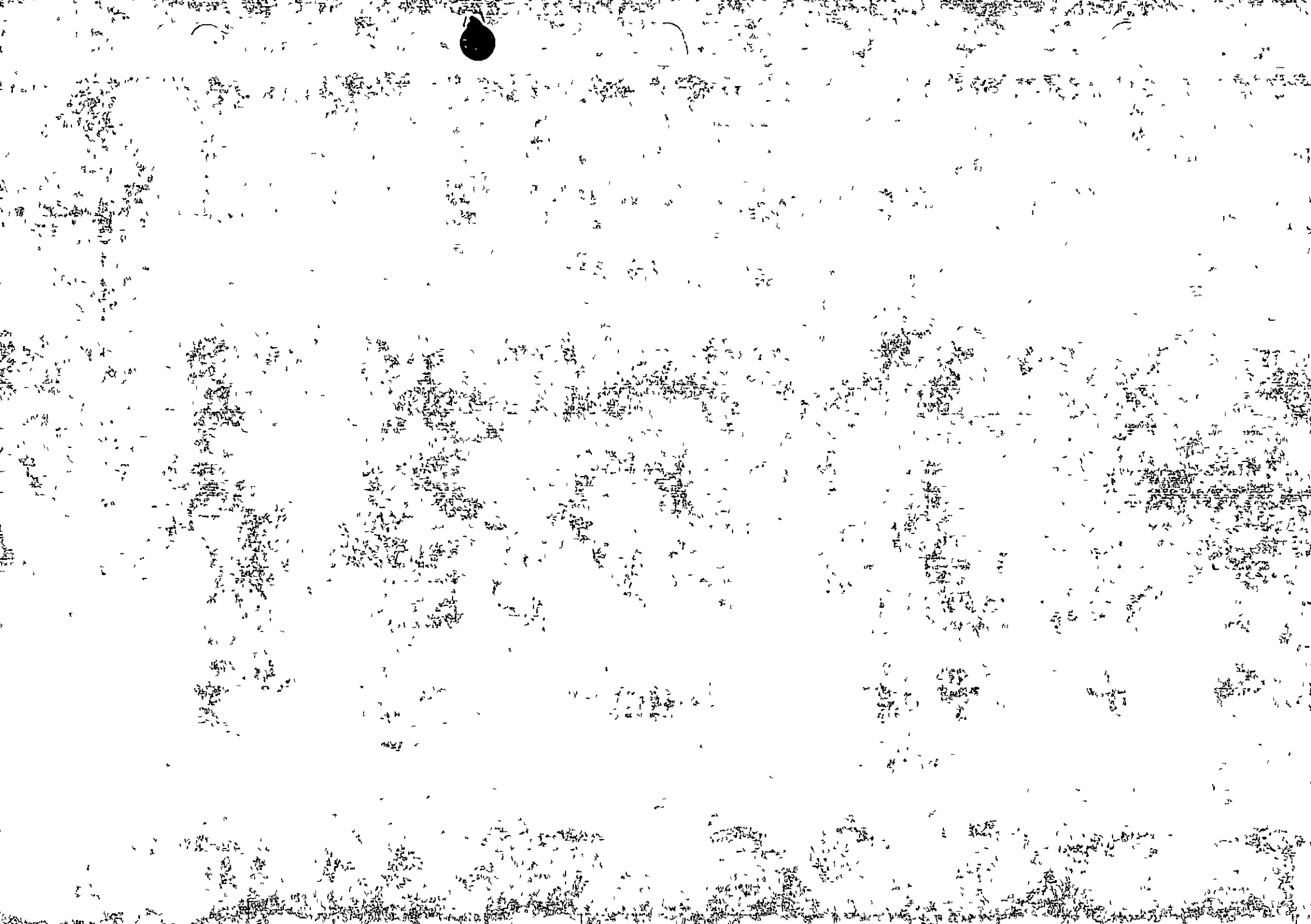
3. Stabilizer Hinges

A. The stabilizer hinge pins, or shafts, are mounted in heavy fuselage fittings at body station 1592 The self-aligning bushings are housed in fittings on the aft end of the stabilizer center section of torque box (See figure 3.) The bearing consists of a simple teflon self-aligning bushing which requires no lubrication



SAB.707/224

Stabilizer Hinge
Figure 3



HORIZONTAL STABILIZER - MAINTENANCE PRACTICES

1. Inspection/Check Horizontal Stabilizer

   A. Access-Horizontal Stabilizer

      (1) Leading edge, tip, and access doors; Refer to Chapter 12, Access Doors and Panels.

      (2) Fuselage station 1592 bulkhead access panel.

   B. Examine the following:

      (1) Skins on outboard stabilizer panel and center section for cracks, loose fasteners, and corrosion.

      (2) Leading edge attaching screws for specified torque (100 to 125 pound-inches). A total of six screws may be missing from upper and lower surfaces of leading edge, provided a minimum of four screws remain between any two that are missing.

      (3) Tip for security.

      (4) Front spar, rear spar, and rib chords, stiffeners and webs on outboard panel and center section for cracks, distortion, loose fasteners and corrosion.

      (5) Center section jackscrew fittings for cracks and loose fasteners.

      (6) Center section hinge fittings, station 1592, for cracks and loose fasteners.

      (7) Front and rear spar terminal fittings on outboard panel and center section for cracks, corrosion, loose and missing fasteners.

      (8) Bolts and holes at front spar (1, figure 201) and at rear spar (2 and 3) joint of outboard panel and center stabilizer section, for wear and corrosion.

         (a) Provide adequate support for outboard panel before removing a bolt. For example, use a crane and stabilizer hoisting sling (See 55-1-21, Outboard Stabilizer Panel).

         (b) Limits and rework for corrosion.

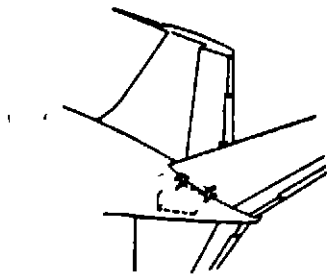
            1) Examine fitting hole surface for fatigue cracks by a sensitive, fluorescent penetrant inspection (Z L22, Super Pentrex or equivalent) and measure depth of deepest corrosion pits.

2) If maximum corrosion of fretting pit depth is less than 0.010 inches, and no fatigue cracks are revealed by careful and accurate inspection, rework is not required. The extent of the corrosion shall be limited to a maximum loss of bearing surface area (load carrying area) of 40%. Corrosion pits in the hole edges shall be dressed out.

3) If the fretting or corrosion pit maximum depth is greater than 0.010 inch, repair hole per paragraph 2.B.(1).

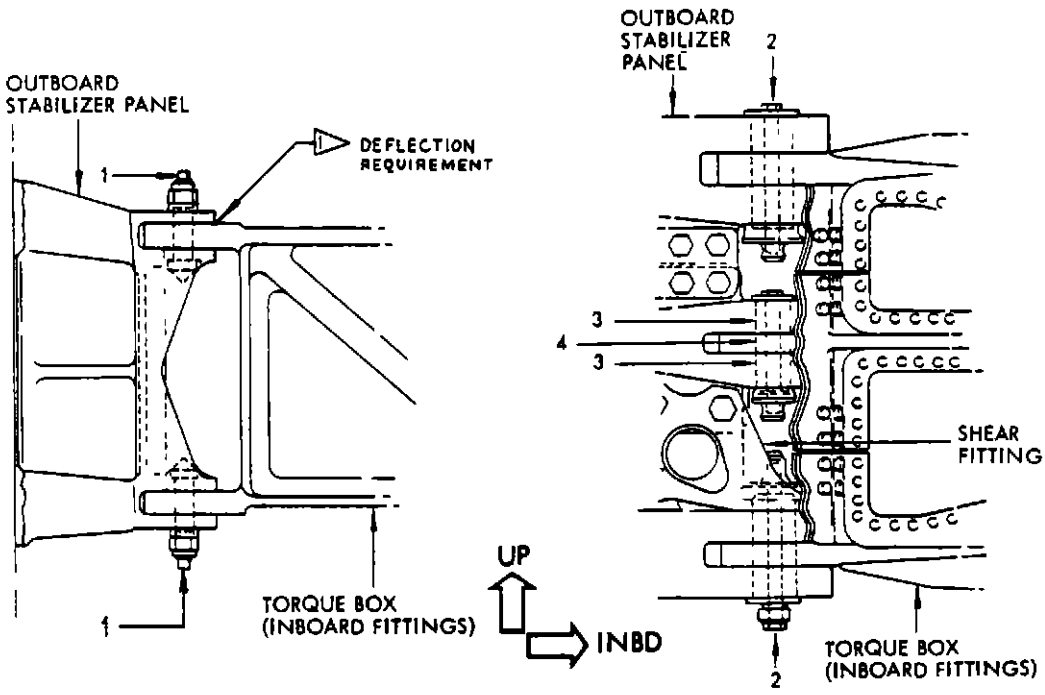
4) If cracks are detected, repair hole per paragraph 2.C.(1).

(c) Reinstall bolts and pins with Aeroshell Compound No. 2, MIL-C-16173 Type II, on faying surfaces of pins, bolts and holes.



1 - Measure gap between inboard end of upper clevis lug and center section lug with nut loosened.
-Torque nut until .003 to .006 inch deflection of lug is obtained.

(SB.2686.)



FRONT SPAR JOINT

REAR SPAR JOINT

Horizontal Stabilizer Allowable Wear and Rework
Figure 201 (Sheet 1)

INDEX NO.		DIM	DESIGN LIMITS DIAMETER MIN	DESIGN LIMITS DIAMETER MAX	WEAR LIMITS MAX WEAR DIM	WEAR LIMITS MAX DIAM CLEARANCE
F S JOINT	1	ID	.8750	.8765	.8786	.0076
		OD	.8699	.8710	.8695	
R S JOINT	2	ID	2.0000	2.0015	2.0040	
		OD	1.9949	1.9960	1.9945	.0060
	3	ID	1.6230	1.6245	1.6280	.0090
		OD	1.6175	1.6180	1.6166	
	4	ID	1.6300	1.6350	1.6390	.020
		OD	1.6175	1.6180	1.6166	

NOTE: All dimensions are in inches

REMARK: Bushings P/N.66-11433 and 69-11969 will be manufactured from existing wrough bushings in stock following drawing 1-4622, sheet 1, 2 and 3.(SB.942)

REPLACEMENT BUSHINGS

LOCATION	PART NUMBER	BUSHING OD	FITTING HOLE SIZE (+0.0008/-0 0000)
STAB REAR SPAR UPPER	65-99574-1 *[4]	2 1482 +0 0000/-0 0010	2.1450
STAB REAR SPAR UPPER	65-99574-2 *[4]	2.1682 +0.0000/-0 0010	2.1650
STAB REAR SPAR UPPER	65-99574-3 *[4]	2 1882 +0.0000/-0.0010	2 1850
STAB REAR SPAR UPPER	65-99574-73 *[5]	2.2108 +0 0000/-0 0012	2 2075
STAB REAR SPAR UPPER	65-99574-74 *[5]	2 2334 +0 0000/-0 0012	2 2300
STAB REAR SPAR CENTER	65-99574-4 *[4]	1.7708 +0.0000/-0 0008	1 7680
STAB REAR SPAR CENTER	65-99574-5 *[4]	1 7908 +0.0000/-0.0008	1.7880
STAB REAR SPAR CENTER	65-99574-6 *[4]	1 8108 +0 0000/-0 0008	1.8080
STAB REAR SPAR CENTER	65-99574-75 *[5]	1 8332 +0.0000/-0.0007	1.8305
STAB REAR SPAR CTR SECT - LOWER	69-34905-90 *[3]	2.1277 +0.0000/-0.0009	2.1250
STAB REAR SPAR CTR SECT - LOWER	69-34905-91 *[3]	2.2487 +0.0000/-0.0009	2.2460
STAB REAR SPAR LOWER	65-99574-7 *[4]	2.1482 +0.0000/-0.0007	2.1450
STAB REAR SPAR LOWER	65-99574-8 *[4]	2.1682 +0.0000/-0.0007	2.1650
STAB REAR SPAR LOWER	65-99574-9 *[4]	2.1882 +0.0000/-0 0007	2.1850
STAB REAR SPAR LOWER	65-99574-10 *[4]	2.1482 +0.0000/-0 0007	2.1450
STAB REAR SPAR LOWER	65-99574-11 *[4]	2.1682 +0.0000/-0.0007	2.1650
STAB REAR SPAR LOWER	65-99574-12 *[4]	2.1882 +0 0000/-0.0007	2.1850

Horizontal Stabilizer Allowable Wear and Rework
Figure 201 (Sheet 3)

LOCATION	PART NUMBER	BUSHING OD	FITTING HOLE SIZE
STAB REAR SPAR LOWER	69-34905-103 *[5]	2.1280 +0.0000/-0.0005	2.1269 +0.0003/-0.0000
STAB REAR SPAR LOWER - SLEEVE	69-34905-104 *[5]	2.2471 +0.0000/-0.0005	2.2460 +0.0003/-0.0000
STAB REAR SPAR LOWER - SHEAR FITTING	69-34905-105 *[5]	2.2471 +0.0000/-0.0005	2.2460 +0.0003/-0.0000
STAB REAR SPAR LOWER	69-34905-106 *[5]	2.1280 +0.0000/-0.0005	2.1269 +0.0003/-0.0000
STAB REAR SPAR CTR SECT - UPPER	65-99574-13 *[2]	2.1477 +0.0000/-0.0009	2.1450 +0.0008/-0.0000
STAB REAR SPAR CTR SECT - UPPER	65-99574-14 *[2]	2.1677 +0.0000/-0.0009	2.1650 +0.0008/-0.0000
STAB REAR SPAR CTR SECT - UPPER	65-99574-15 *[2]	2.1877 +0.0000/-0.0009	2.1850 +0.0008/-0.0000
STAB REAR SPAR CTR SECT - UPPER	65-34905-97 *[3]	2.1677 +0.0000/-0.0009	2.1650 +0.0008/-0.0000
STAB REAR SPAR CTR SECT - UPPER	65-34905-98 *[3]	2.1877 +0.0000/-0.0009	2.1850 +0.0008/-0.0000
STAB REAR SPAR CTR SECT - UPPER	65-34905-99 *[3]	2.2478 +0.0000/-0.0009	2.2460 +0.0008/-0.0000
STAB REAR SPAR SHEAR FITTING	65-99574-66	2.1482 +0.0000/-0.0010	2.1450 +0.0008/-0.0000
STAB REAR SPAR SHEAR FITTING	65-99574-67	2.1682 +0.0000/-0.0010	2.1650 +0.0008/-0.0000
STAB REAR SPAR SHEAR FITTING	65-99574-68	2.1882 +0.0000/-0.0010	2.1850 +0.0008/-0.0000
STAB REAR SPAR CTR SECT - LOWER	65-99574-16 *[2]	2.1477 +0.0000/-0.0009	2.1450 +0.0008/-0.0000

LOCATION	PART NUMBER	BUSHING OD	FITTING HOLE SIZE (+0 0008/-0 0000)
STAB REAR SPAR CTR SECT - LOWER	65-99574-17 *[2]	2.1677 +0.0000/-0.0009	2.1650
STAB REAR SPAR CTR SECT - LOWER	65-99574-18 *[2]	2.1877 +0.0000/-0.0009	2.1850
STAB FRONT SPAR UPPER	65-99574-19 *[4]	1.0221 +0.0000/-0.0007	1 0180
STAB FRONT SPAR UPPER	65-99574-20 *[4]	1 0421 +0.0000/-0.0007	1.0400
STAB FRONT SPAR UPPER	65-99574-21 *[4]	1 0621 +0.0000/-0.0007	1.0600
STAB FRONT SPAR UPPER	65-99574-76 *[4]	1 0871 +0 0000/-0.0007	1 0850
STAB FRONT SPAR UPPER	65-99574-77 *[4]	1 1671 +0 0000/-0.0007	1.1650
STAB FRONT SPAR UPPER	65-99574-78 *[4]	1.2525 +0.0000/-0.0011	1.2500
STAB FRONT SPAR LOWER	65-99574-22 *[4]	1.0221 +0.0000/-0 0007	1.0180
STAB FRONT SPAR LOWER	65-99574-23 *[4]	1.0421 +0.0000/-0.0007	1.0400
STAB FRONT SPAR LOWER	65-99574-24 *[4]	1.0621 +0.0000/-0.0007	1.0600
STAB FRONT SPAR LOWER	65-99574-79 *[5]	1.0871 +0.0000/-0.0007	1.0850
STAB FRONT SPAR LOWER	65-99574-80 *[5]	1 1671 +0.0000/-0.0007	1.1650
STAB FRONT SPAR LOWER	65-99574-81 *[5]	1.2525 +0.0000/-0.0011	1.2500
STAB FRONT SPAR CTR SECT - UPPER	65-99574-25 *[1]	1.0221 +0.0000/-0.0007	1.0200
STAB FRONT SPAR CTR SECT - UPPER	65-99574-26 *[1]	1 0421 +0.0000/-0.0007	1.0400
STAB FRONT SPAR CTR SECT - UPPER	65-99574-27 *[1]	1 0621 +0.0000/-0.0007	1 0600
STAB FRONT SPAR CTR SECT - UPPER	65-99574-57 *[1]	1 1122 +0.0000/-0.0007	1.1100
STAB FRONT SPAR CTR SECT - LOWER	65-99574-28 *[1]	1 0221 +0.0000/-0 0007	1.0200

Horizontal Stabilizer Allowable Wear and Rework
Figure 201 (Sheet 5)

LOCATION	PART NUMBER	BUSHING OD	FITTING HOLE SIZE (+0.0008/-0.0000)
STAB FRONT SPAR CTR SECT - LOWER	65-99574-29 *[1]	1.0421 +0.0000/-0.0007	1.0400
STAB FRONT SPAR CTR SECT - LOWER	65-99574-30 *[1]	1.0621 +0.0000/-0.0007	1.0600

NOTE ALL DIMENSIONS ARE IN INCHES.
SLEEVE BUSHING FITTINGS REQUIRING SLEEVE BUSHINGS AS REPLACEMENT MUST BE REWORKED PER ABOVE TABLE
SLEEVE BUSHING FITTINGS REQUIRING FLANGED BUSHINGS AS REPLACEMENT MUST BE REWORKED PER BOEING SB 2243, SB 3243, OR SB 3253
FLANGED BUSHING FITTINGS REQUIRING FLANGED BUSHINGS AS REPLACEMENT MUST BE REWORKED PER ABOVE TABLE
REPLACEMENT WITH BUSHINGS NOT LISTED IN ABOVE TABLE MUST BE APPROVED BY BOEING. REPLACEMENT OF BUSHINGS IN STABILIZER CENTER SECTION REAR SPAR CENTER FITTING MUST BE HANDLED ON AN INDIVIDUAL BASIS THROUGH BOEING

Seal bushings as follows:

1. Thoroughly degrease all faying surfaces.
2. Apply brush alodine and BMS 10-11 primer to reworked areas.
3. Install bushing using wet primer.
4. Apply BMS 5-95 sealant per BAC5000 around flanged heads in counterbore and exposed portion of bushing.

*[1] Use 69-34905 bushings as replacement.
*[2] Airplanes not incorporating SB 3243.
*[3] Airplanes incorporating SB 3243.
*[4] Airplanes not incorporating SB 3253.
*[5] Airplanes incorporating SB 3253.

Horizontal Stabilizer Allowable Wear and Rework
Figure 201 (Sheet 6)

(d) Torque nut per 55-1-21, Outboard Stabilizer Panel.

(9) Brush and sliding seals at front and rear spar joints respectively, stabilizer to fuselage, for loose or missing fasteners and deterioration.

(10) Bonded panels for failure of bonding.

(11) Water drain holes for clogging and water accumulation.

(12) On airplanes with empennage deicing, deicing boots for rupture of stainless steel cladding.(SAB.707/167).

(13) Lower surface for damaged, insecure or missing vortex generators on applicable airplanes.

NOTE: On Turbojet airplanes (except SAA) any combination of vortex generators may be missing provided airplane performance is not affected. On Turbofan airplanes and SAA turbojet airplanes two vortex generators may be missing on each side.

2. Approved Repairs Horizontal Stabilizer

A. General

(1) Approved repair of attachment bolt holes at joint of outboard stabilizer panel and torque box entails reworking holes if excessive corrosion and cracking appear.

NOTE: Though the following is acceptable, it is recommended that if fretting or corrosion pits are present that the hole be reamed out to remove all possible corrosion and cracks and a bushing be installed. Proper corrosion preventative measures shall be applied to the bushing installation.

B. Repair Bolt Hole Corrosion Damage

(1) If the fretting or corrosion pit maximum depth is greater than 0.010 inches, and no cracks are found by careful inspection, the corrosion pitting shall be removed to at least the allowable pit depth provided the loss in bearing area (load carrying area) does not exceed 40% and the permissible wear and rework tolerances are not exceeded.

C. Repair Bolt Hole Cracks

(1) If cracks are detected, the hole surface should be removed 0.03 inches deeper than the root of the detectable crack. Local removal of cracks by filing with a local radius at least, equal to 1/3 the basic hole diameter may be done if bearing area requirements are met.

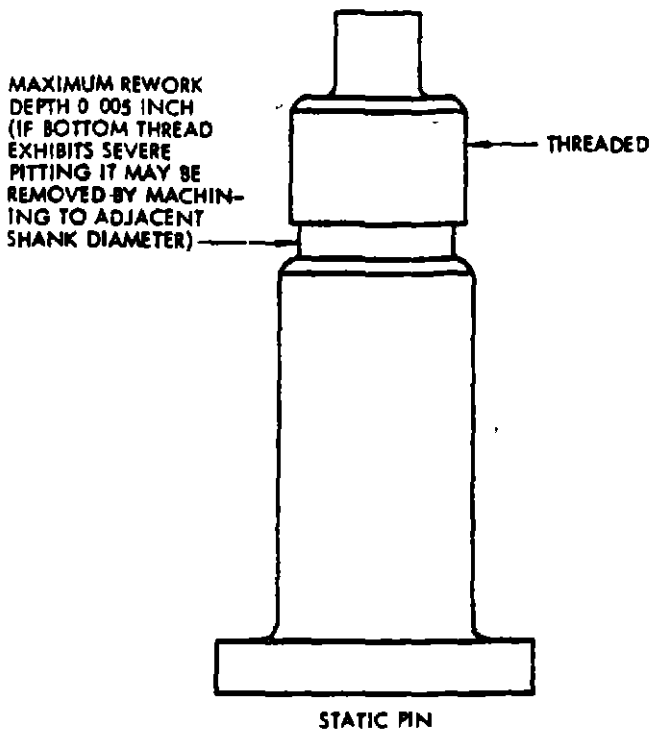
D. Repair Horizontal Stabilizer Outboard Panel Static Pins and Bolts (See figure 202.)

(1) Rework Shank of Horizontal Stabilizer Outboard Panel Static Pins

NOTE: Static pins with pitting and corrosion on the shank may be reworked per detail A.

	Min. Rework Dia. Before Plating	Grind Chrome Finished Dia
Rear Spar Upper Terminal Pin	1.9750	1.9949 - 1 9960
Rear Spar Center Terminal Pin	1.5980	1.6175 - 1 6180
Rear Spar Lower Terminal Pin	1.9750	1.9949 - 1.9960
Front Spar Attachment Bolts, Upper and Lower	0.8500	0.8699 - 0.8710

Bolts are to be reworked following drawings 1-45528 (rear spar upper), 1-45466 (rear spar center), 1-45529 (rear spar lower) and 1-45530 (front spar upper and lower).



DETAIL A

HORIZONTAL STABILIZER LEADING EDGES - MAINTENANCE PRACTICES

1. Removal/Installation Horizontal Stabilizer Leading Edge

A Remove Horizontal Stabilizer Leading Edge

(1) On turbojet airplanes open all empennage deicing circuit breakers on main a-c power shield (J6) and radio and T-R circuit breaker panel (P5).

(2) Remove screws attaching lower surface of leading edge to front spar

(3) Remove screws attaching upper surface of leading edge to front spar

CAUTION: DO NOT ALLOW LEADING EDGE TO SLIP OFF FRONT SPAR UNTIL ALL ATTACHING SCREWS ARE REMOVED.

(4) Support each end of leading edge.

(5) On turbojet airplanes lower leading edge enough to gain access to electrical connectors on front spar at inboard end of removable leading edge.

(6) On turbojet airplanes disconnect electrical connectors.

(7) Remove leading edge.

B. Install Horizontal Stabilizer Leading Edge

(1) On turbojet airplanes check that all empennage deicing circuit breakers on the main a-c power shield (J6), and radio and T-R circuit breaker panel are open (P5).

(2) On turbojet airplanes support leading edge in position just clear of the front spar and connect electrical connectors at inboard end.

(3) Place leading edge in position on stabilizer front spar.

(4) Install screws attaching upper surface of leading edge to front spar

(5) Install screws attaching lower surface of leading edge to front spar

NOTE Tighten screws within torque range of 100 to 125 pound-inches

(6) On turbojet airplanes close all empennage deicing circuit breakers on J6 power shield and P5 circuit breaker panel.

STABILIZER VORTEX GENERATORS - MAINTENANCE PRACTICES

1. Removal/Installation Vortex Generators

A. Equipment and Materials

(1) Adhesive - BMS 5-19, Type B-1

(2) Cleaner - Methyl Ethyl Ketone, TT-M-261 or equivalent

(3) Hardwood scraper

(4) Blind Bolt (s) - F200-5, National Screw and Manufacturing Co., Los Angeles, California or equivalent.

(5) Blind Bolt Installation Tool - ST 1062-2 or equivalent, Pneumatic Power or Hand Operated, Lok-Fast Inc., 2207 Bordar Avenue, Torrance, California.

(6) Protractor

B. Remove Vortex Generator

(1) Remove blind bolt by drilling.

NOTE It is recommended that bolt be drilled using a drill bushing adapted to fit the bolt head.

(2) Remove old vortex generator by inserting thin bladed tool between faying surfaces.

C. Install Vortex Generator

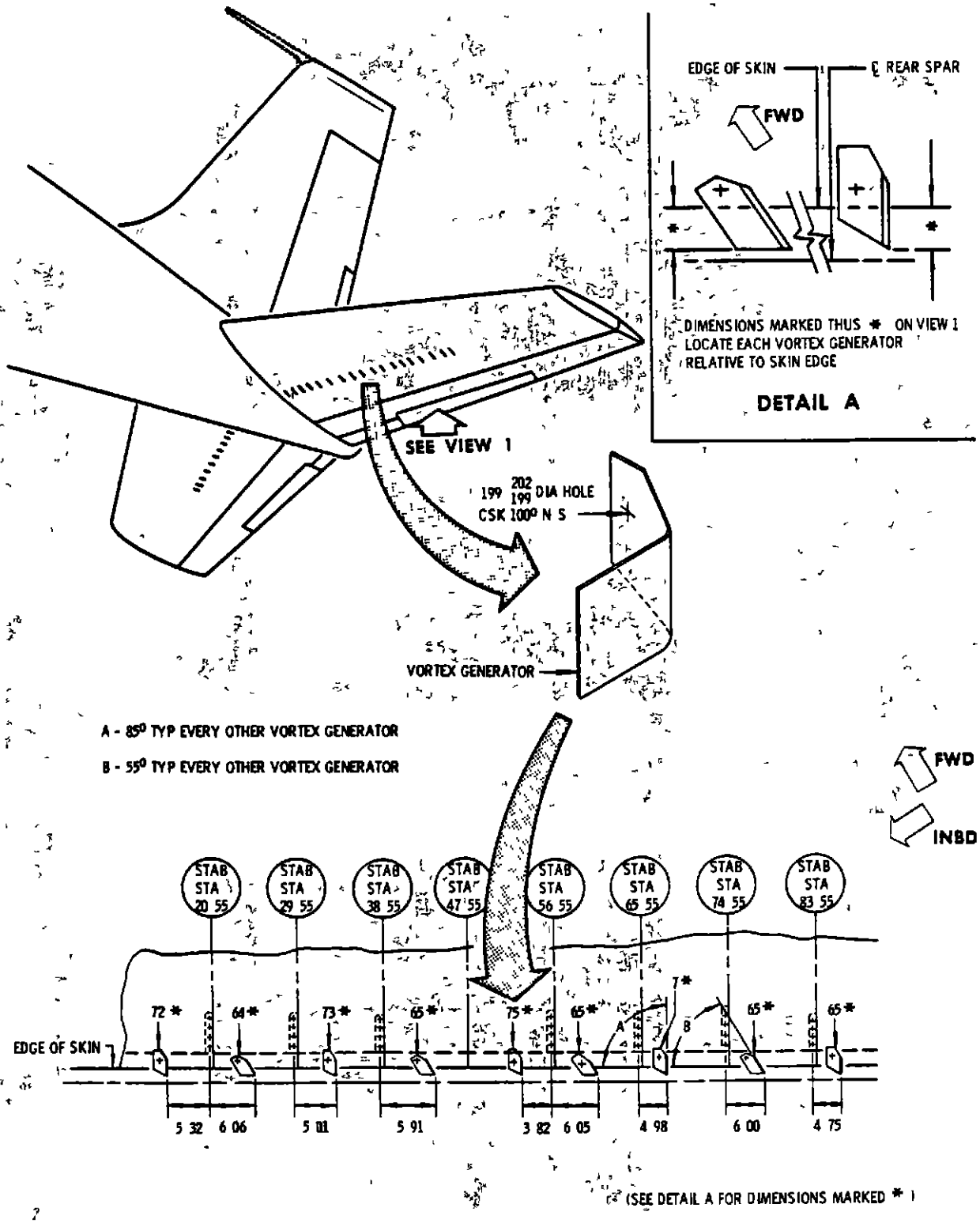
(1) Prepare surface of stabilizer

(a) Gently scrape old adhesive from skin.

CAUTION TO AVOID MARRING SKIN SURFACE, USE HARDWOOD SCRAPER.

(b) Thoroughly clean skin surface with methyl ethyl ketone.

CAUTION: USE ONLY OIL FREE MATERIAL SUCH AS NEW CHEESECLOTH



VIEW 1
(NOT TO SCALE)

Vortex Generator Installation
Figure 201 (Sheet 1 of 2)

(2) Position vortex generator on stabilizer in accordance with locations shown on figure 201.

(3) Transfer location of bolt hole from stabilizer to vortex generator. Drill and countersink (100°) hole.

NOTE. If available, old vortex generator may be used as pattern.

(4) Clean faying surface of vortex generator with methyl ethyl ketone.

(5) Mix adhesive in accordance with manufacturers recommendations.

CAUTION: DO NOT THIN MIXED ADHESIVE.

(6) Knife coat a thin uniform layer of mixed compound on both surfaces to be bonded.

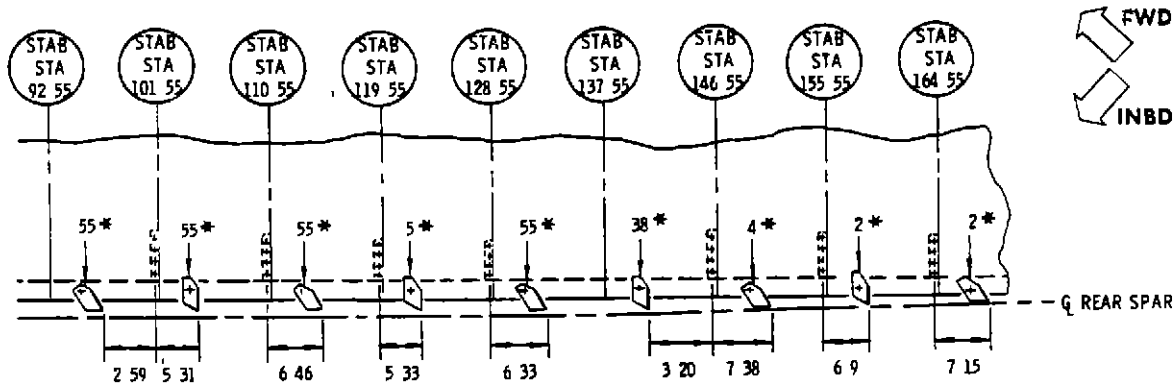
(7) Assemble immediately using sufficient pressure to insure complete contact

NOTE The presence of a continuous bead of extruded adhesive usually indicates proper contact.

(8) Install blind bolts (F200-5)

(9) Wipe off excess adhesive with a clean cloth and clean with methyl ethyl ketone.

NOTE: Vortex generators can slip before adhesive is cured. Curing time may be speeded up with hot air, approximately as follows 24 hours at 75°, 4 hours at 120°; 5 minutes at 200°.



Vortex Generator Installation
Figure 201 (Sheet 2 of 2)

OUTBOARD STABILIZER PANEL - MAINTENANCE PRACTICES

1 Removal/Installation Outboard Stabilizer - Panel

A. General

(1) The left and right sections of the horizontal stabilizer are identical, but opposite components. The two components are referred to in the following procedures as outboard panels. The outboard panels are attached to the stabilizer center section, or torque box, just inside the fuselage skin. The removal and installation procedures for both outboard panels are the same. Three men will be stationed inside the fuselage. One man will gain access to the stabilizer front spar area through the stabilizer jackscrew access panel 1185 Another man will gain access to the rear spar area through the tail cone access panel 1076 or 1188 and then by removing stabilizer attachment access panel from upper part of bulkhead at body station 1592, just aft of stabilizer center section A small and agile man will be able to get through this latter access panel for stationing at the aft attachments. A third man will be stationed below the stabilizer center section.

B Equipment and Materials

(1) Stabilizer sling, F71130-501 (without elevator and balance panels), or F70172-1 (with or without elevator and balance panels, see figure 202), or equivalent

(2) Grease, Aeroshell Compound N°2, MIL-C-16173 type II.

(3) Cleaning Solvent, BMS 3-2 or equivalent

(4) Crane, with hook height of 21 feet, and capable of lifting 1000 pounds

(5) Pin Puller and Thread Protector, MIT 65-6088

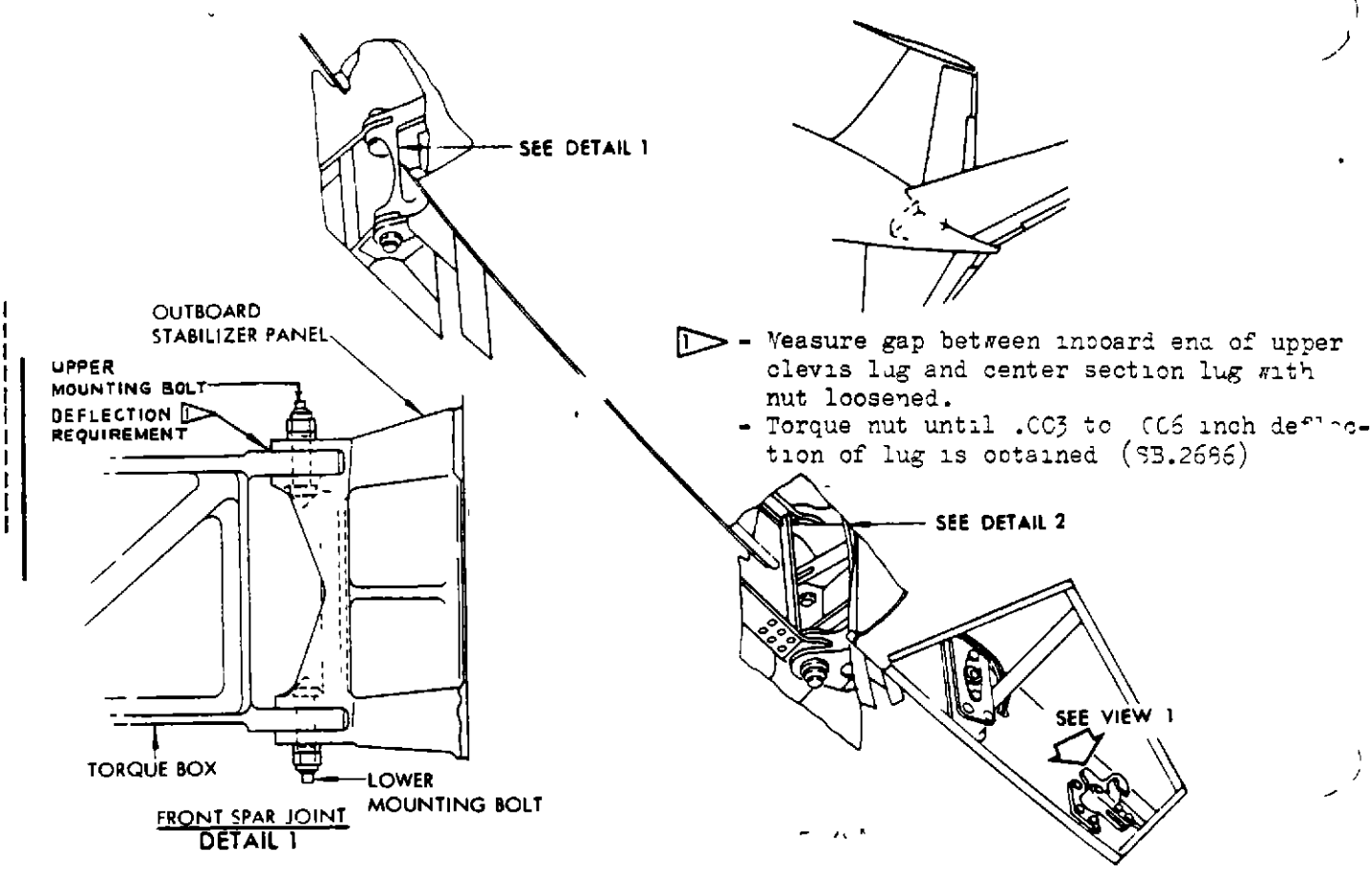
C Remove Outboard Stabilizer Panel

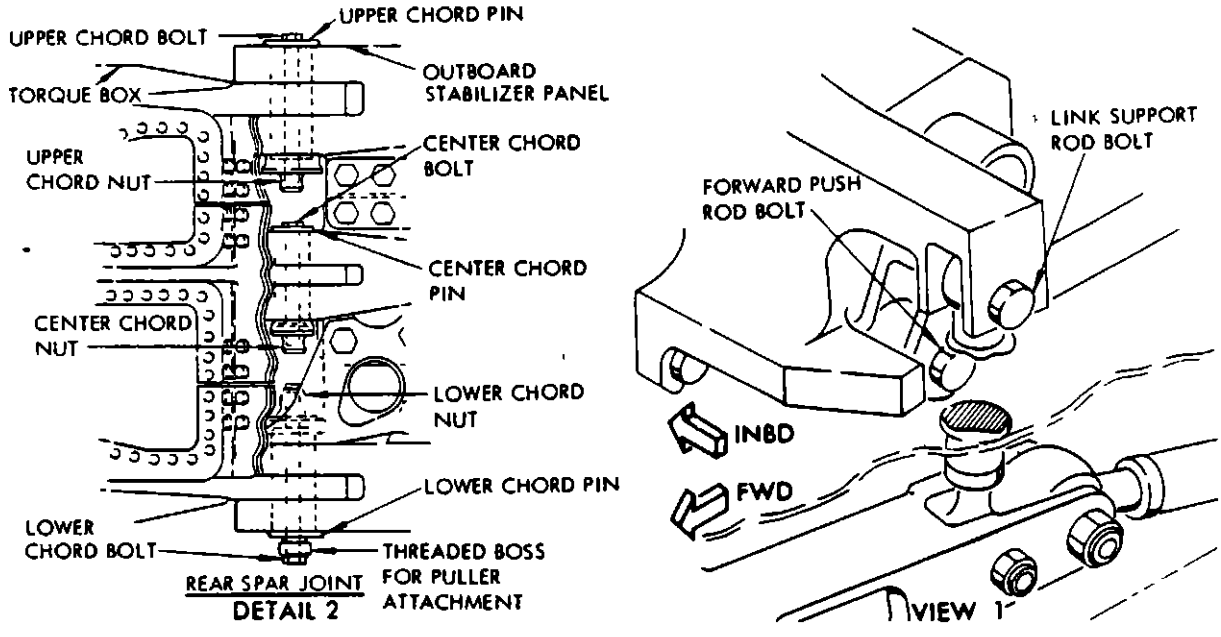
(1) If necessary, remove elevator and elevator balance panels, See Chapter 27, Elevators and Elevator Balance Panels and Seals.

NOTE. Elevator and elevator balance panels must be removed if sling F71130-501 is used.

(2) Remove access panels 1185, 1611, 1076 or 1188 See Chapter 12, Access Doors and Panels.

(3) Inside fuselage remove stabilizer attachment access panel from upper part of bulkhead at body station 1592, just aft of stabilizer center section.





Outboard Stabilizer Panel Installation
Figure 201

(4) Remove forward pushrod bolt from stabilizer actuated elevator tab mechanism (view 1, figure 201).

(5) Remove link support rod bolt from stabilizer actuated elevator tab mechanism.

(6) Remove spring between fuselage and stabilizer actuated elevator tab mechanism.

(7) Remove aft elevator control pushrod. The control rod is secured at both ends with a nut, a cotter pin and a washer.

(8) Deleted

(9) Deleted

(10) Deleted

(11) Remove sliding seal attachment screws and slip upper and lower sliding seals free from their tracks at rear spar.

(12) Raise stabilizer to extreme nose up position and remove all accessible screws attaching brush seal and stabilizer attachment access panel at front spar.

NOTE: If external electric power is being supplied to airplane, stabilizer may be moved by operating trim control switch on pilot's control column. If electric power is not available, stabilizer may be moved by turning trim control wheel on control stand.

(13) Lower stabilizer to extreme nose down position and remove remaining screws attaching brush seal and access panel.

NOTE: To facilitate installation of brush seals and access panel note relation between screw lengths and installed position

(14) Remove brush seal and access panel.

(15) Remove screws from sling attaching points and install sling. (See figure 202.)

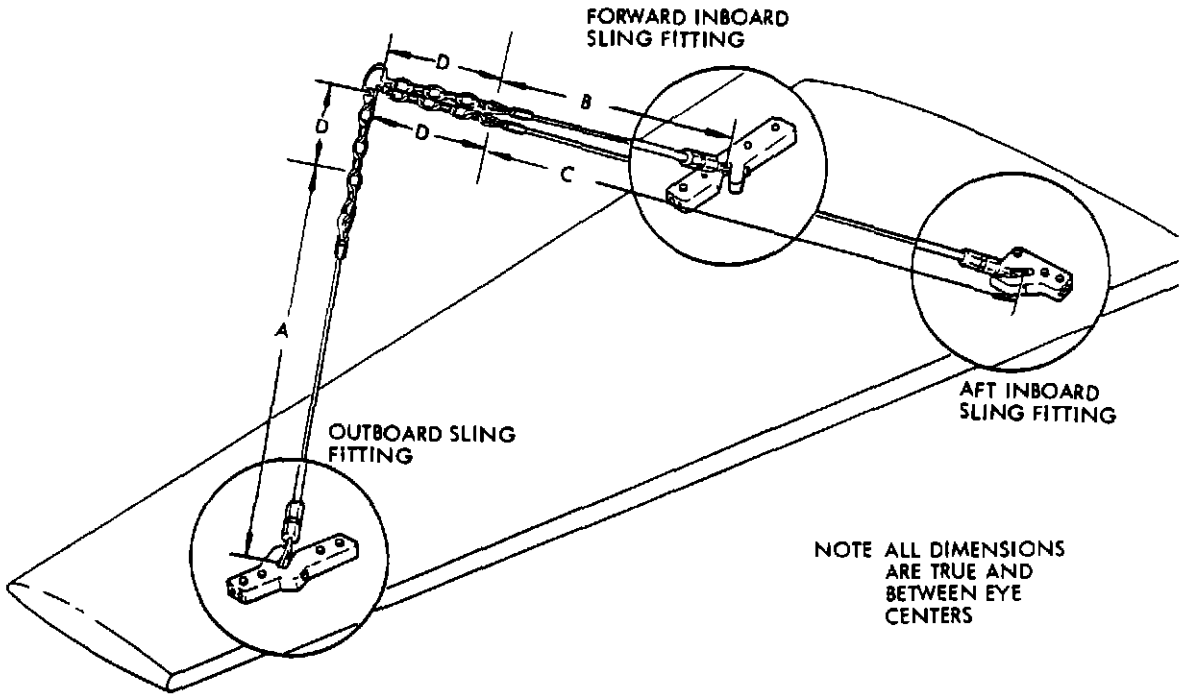
(16) Remove bonding jumpers between stabilizer closure rib and stiffener on body at station 1589 (just aft of rear spar joint)

(17) Apply wrench from above center section torque box to upper rear spar chord bolt head. (See figure 201.) Remove bolt.

NOTE As bolt is removed, nut must be supported and retrieved from the front between body frames and torque box Access is from inside body, above torque box.

(18) Set stabilizer to 3 units AIRPLANE NOSE DOWN trim.

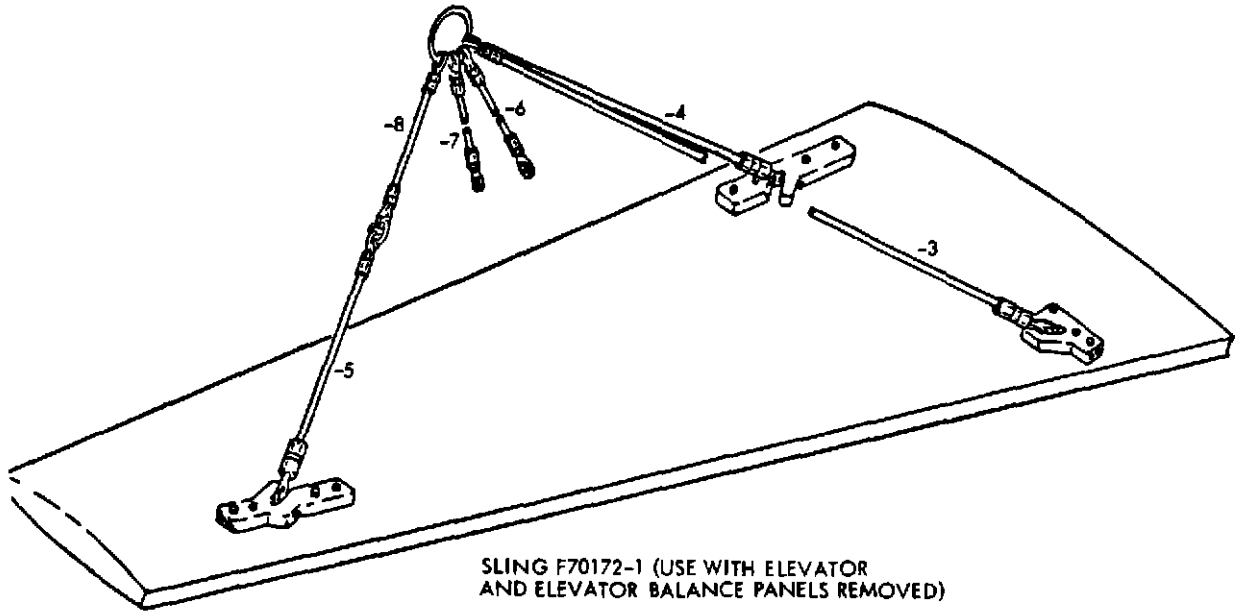
WARNING. CHECK THAT LENGTH OF SLING CABLES CONFORM WITH FIGURE 202 AND PLACE CRANE IN SUCH A POSITION THAT ALL CABLES BECOME TAUT SIMULTANEOUSLY WHEN SLING IS RAISED WITH LINE FROM CRANE VERTICAL.



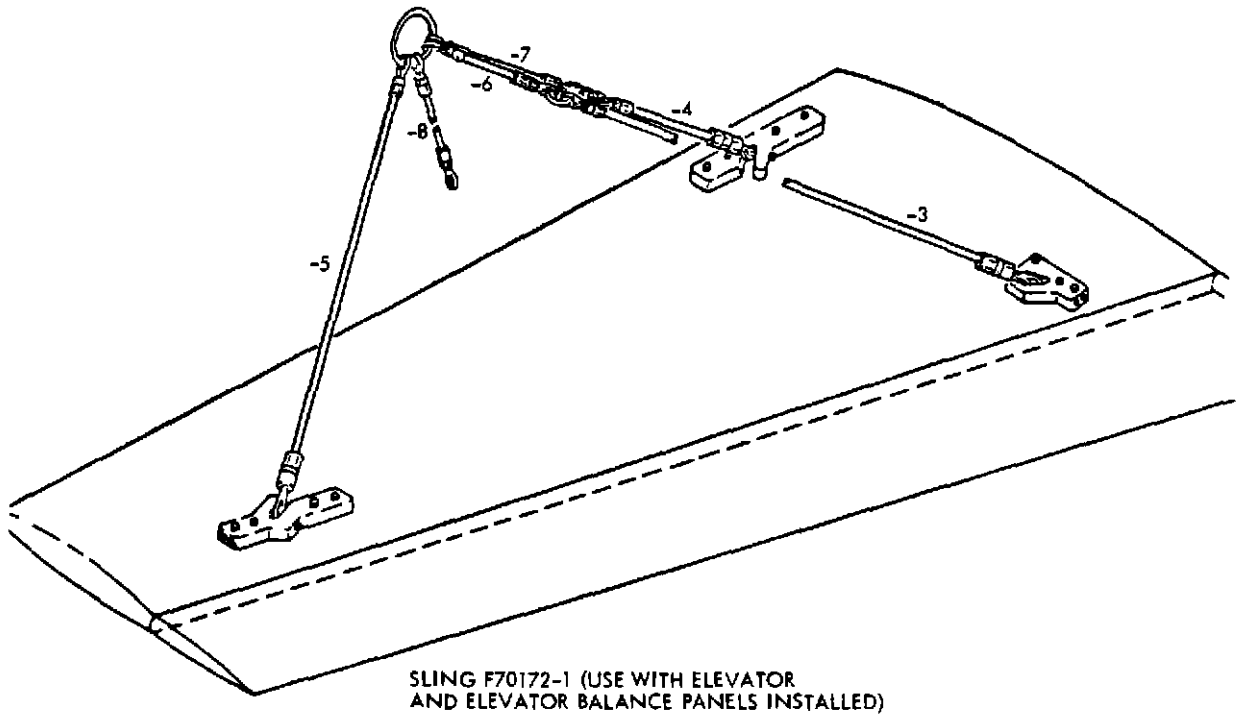
SLING F71130-501 (USE WITH ELEVATOR AND ELEVATOR BALANCE PANELS REMOVED)

A	B	C	D
102 55"	87 55"	92 38"	12 57"
102 31"	87 31"	92 12"	

Attachment of Stabilizer Hoisting Sling
Figure 202 (Sheet 1)



SLING F70172-1 (USE WITH ELEVATOR AND ELEVATOR BALANCE PANELS REMOVED)



SLING F70172-1 (USE WITH ELEVATOR AND ELEVATOR BALANCE PANELS INSTALLED)

(19) Support weight of stabilizer with sling.

(20) Remove lower front spar attachment bolt.

(21) Remove lower rear spar chord bolt, getting at it from beneath torque box.

NOTE. Nut is part of outboard stabilizer panel assembly and can be removed only when latter is free of airplane.

(22) Remove lower rear spar chord pin with pin puller.

(23) Remove upper rear spar chord pin with pin puller.

(24) Remove center rear spar chord bolt by inserting an extension wrench through hole in horizontal structure and through upper rear spar pin hole.

NOTE. As bolt is removed, nut must be supported and retrieved from front between body frames and torque box. Access is from inside body under torque box.

(25) Remove upper front spar attachment bolt.

(26) Remove center rear spar chord pin with pin puller.

WARNING BEFORE REMOVING THE CENTER REAR SPAR CHORD PIN, CHECK THAT THERE IS NO OUTWARD PULL ON THE OUTBOARD PANEL. A SUDDEN AND UNCONTROLLED RELEASE OF THE OUTBOARD PANEL MAY CAUSE INJURY TO PERSONNEL AND DAMAGE TO AIRPLANE.

(27) Pull stabilizer clear of spar attachment fittings, swing clear of airplane and lower on to a well padded cradle or on sandbags placed under spars, taking care not to damage any vortex generators (on applicable airplanes). The stabilizer may be pulled clear by removing stabilizer tip leading edge panel 1648 and attaching rope to bracket.

NOTE. On all airplanes, as stabilizer is removed, collect shims (if any) from the front spar upper attachment and keep for use if original stabilizer is reinstalled.

(28) Remove sling from stabilizer and replace original screws in sling attachment holes.

(29) Store sling attachment bolts in threaded holes in sling attachment fittings.

D. Install Outboard Stabilizer Panel

(1) Clean chord pins, bolts, and inside surfaces of bolt holes with solvent. (See figure 201.)

(2) Apply grease to faying surfaces of pins, bolts, and holes.

(3) Remove screws from sling attaching points and install sling (figure 202).

(4) Set stabilizer to 3 units AIRPLANE NOSE DOWN trim.

(5) Hoist outboard stabilizer panel into position and maneuver until holes in terminal fittings of panel and torque box match up.

NOTE: Access to torque box area is gained through stabilizer jackscrew access panel, 1185. Refer to Chapter 12, Access Doors and Panels.

(6) Insert center rear spar chord pin by passing pin through hole in horizontal structure, and through upper rear spar pin hole (figure 201).

NOTE: Bulkhead Station 1592 is just aft of the torque box.

(7) Install upper bolt in front spar using thread protector.

(8) Connect bonding jumpers between stabilizer closure rib and stiffener on body at station 1589, just aft of rear spar joint.

(9) Insert center rear spar chord bolt. Access as in step (6).

(10) Position center chord nut from the front between body frames and torque box. Access from inside body under torque box.

(11) Orient nut so that antirotation lugs are located against horizontal stabilizer.

NOTE: The nut can be centered by engaging nut on protruding portion of chord pin.

(12) Dry torque center rear spar chord bolt to 480 to 690 pound-inches with an extension wrench through upper rear spar pin hole.

(13) Insert upper rear spar chord pin and bolt. Access as in step (6).

(14) Insert lower rear spar chord pin. Access from inside body under torque box.

(15) Install lower rear spar chord bolt and dry torque to 2400 to 3100 pound-inches.

(16) Install lower bolt in front spar, using thread protector, and dry torque nut 2300 to 2500 pound-inches. (SB. 2243)

CAUTION: ALL THREADS OF NUTS TORQUED IN THIS STEP AND THE FOLLOWING STEP MUST BE ENGAGED.

(17) Torque nut on front spar upper bolt to meet deflection requirement shown in figure 201.

(18) Slack off tension on sling and trim stabilizer to full nose down position.

(19) Position upper rear spar chord nut from above torque box. (The nut is inserted from between body frames and torque box.)

(20) Orient nut so that antirotation lugs are located against horizontal stabilizer.

NOTE: The nut can be centered by engaging protruding portion of chord pin.

(21) Dry torque upper rear spar chord bolt to 480 to 690 pound-inches.

(22) Remove stabilizer sling and install original screws in sling attachment holes

(23) Store sling attachment volts in threaded holes in sling attachment fittings.

(24) Position brush seal and install screws in all accessible screw location holes.

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(25) Place stabilizer attachment access panel in position at front spar and install screws in all accessible screw location holes.

(26) Raise stabilizer to full nose up position and install remaining brush seal and access panel attaching screws.

(27) Slide upper and lower sliding seals into their tracks at rear spar and install seal attachment screws.

(28) Install stabilizer attachment access panel on bulkhead at body station 1592.

(29)) Deleted

(30) Deleted

(31) Install link support rod bolt in stabilizer actuated tab mechanism (view 1, figure 201).

(32) Install forward pushrod bolt in stabilizer actuated tab mechanism.

(33) If removed, install elevator and elevator balance panels. See Chapter 27, Elevators.

(34) Install aft elevator control pushrod. Secure rod at both ends with a nut, a cotter pin and a washer. For adjustment of the control rod, see Chapter 27, Flight Controls."

(35) Install spring between fuselage and stabilizer actuated elevator tab mechanism.

(36) Check for correct location of stabilizer to body seal.

(a) Trim stabilizer until dimension A at stabilizer jackscrew (figure 203) is 14.2 (± 0.10) inches. (This is equivalent to a stabilizer position at 11 units AIRPLANE NOSE UP trim.)

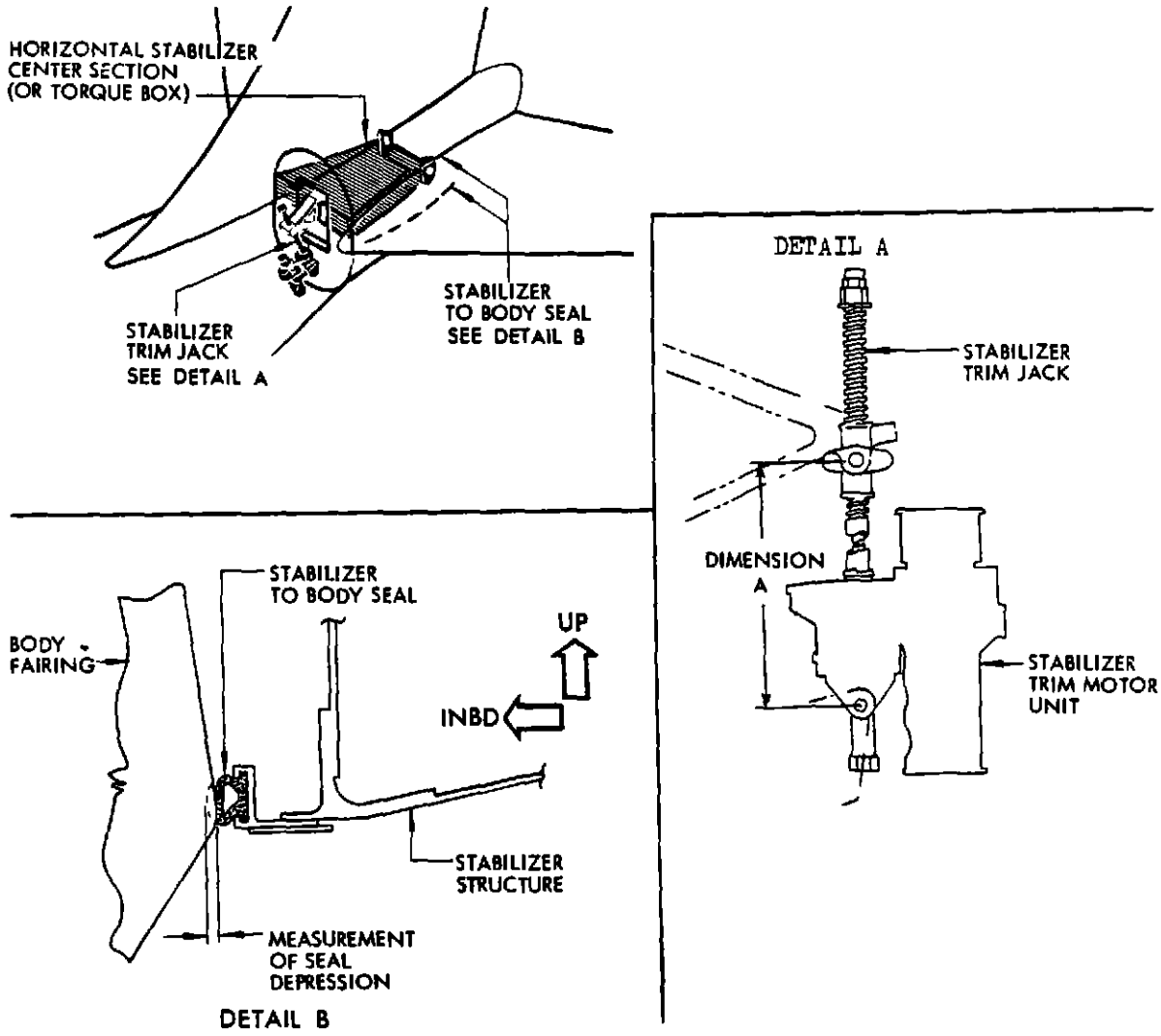
(b) Adjust upper seal to be depressed 0.10 (± 0.05) inch.

(c) Trim stabilizer until dimension A is 38.58 (± 0.10) inches. (This is equivalent to a stabilizer position at 3-1/2 units AIRPLANE NOSE DOWN trim.)

CAUTION: WHEN RAISING OR LOWERING STABILIZER DURING SEAL ADJUSTMENT KEEP CHECK ON SEAL TO ENSURE THAT INTERFERENCE BETWEEN SEAL AND BODY DOES NOT BECOME EXCESSIVE AND CAUSE DAMAGE TO SEAL OR SKIN.

(d) Adjust lower seal to be depressed 0.10 (± 0.05) inch.

(e) Operate stabilizer slowly over full travel in both directions and check seal location. Seal should make contact with body fairing throughout entire stabilizer travel between neutral and full nose down attitudes. Depression should not exceed 0.15 inch at any point. Readjust seals if necessary.



Stabilizer to Body Seal Adjustment
Figure 203

SAB REV. 27 MAR 1967

STABILIZER CENTER SECTION HINGE - REMOVAL/INSTALLATION

1. General

   A. Access to the forward two bearing cover bolts and inboard ends of hinge must be made through passage over the stabilizer inside the tail compartment.

2. Equipment and Materials

   A. Hinge Pin and Hinge Bearing Puller F70158

   B. Stabilizer Sling per 55-1-21, Outboard Stabilizer Panel

   C. Stabilizer Control Wheel Lock F71336-501

   D. Special Offset Box-end Adapter

      NOTE A suitable adapter must be used to torque hinge inboard end nuts.

3. Prepare to Remove Stabilizer Center Section Hinge

   A. Remove tail cone access panel and elevator tab control access panel from inboard end of stabilizer lower surface.

   B. Install stabilizer control wheel lock.

   C. Open stabilizer control circuit breakers on P2 and P5.

   D. Install stabilizer sling and apply a lifting force of approximately 400 pounds.

   E. Remove elevator control rod above work area. The control rod is secured at both ends with a nut, a cotter pin and a washer.

4. Remove Stabilizer Center Section Hinge

A. Remove inner hinge pin (8, figure 401) or (26) as follows.

(1) On airplanes with cotter pin-locked inner hinge pin (8):

(a) Remove outboard cotter pin (17), outboard end nut (18), and outboard washer (16).

(b) Remove inboard cotter pin (9), inboard end nut (7) and inboard washer (6).

(c) Remove inner hinge pin (8).

(2) On airplanes with nut-locked inner hinge pin (26):

(a) Remove cotter pin (22), nut (23), washer (21), inboard end nut (20) and washer (6).

(b) Remove inner hinge pin (26) with washer (25).

(c) Remove inboard end nut (24) and washer (16).

B. Install F70158 washer (28) and F70158 guide (27) per figure 401, step 1.

C. Remove four mount bolts (14) on coverplate (2) by drifting out bolts.

NOTE: The four mount bolts will be used with F70158 tool when hinge pin and hinge bearing are removed.

D. Remove coverplate (2).

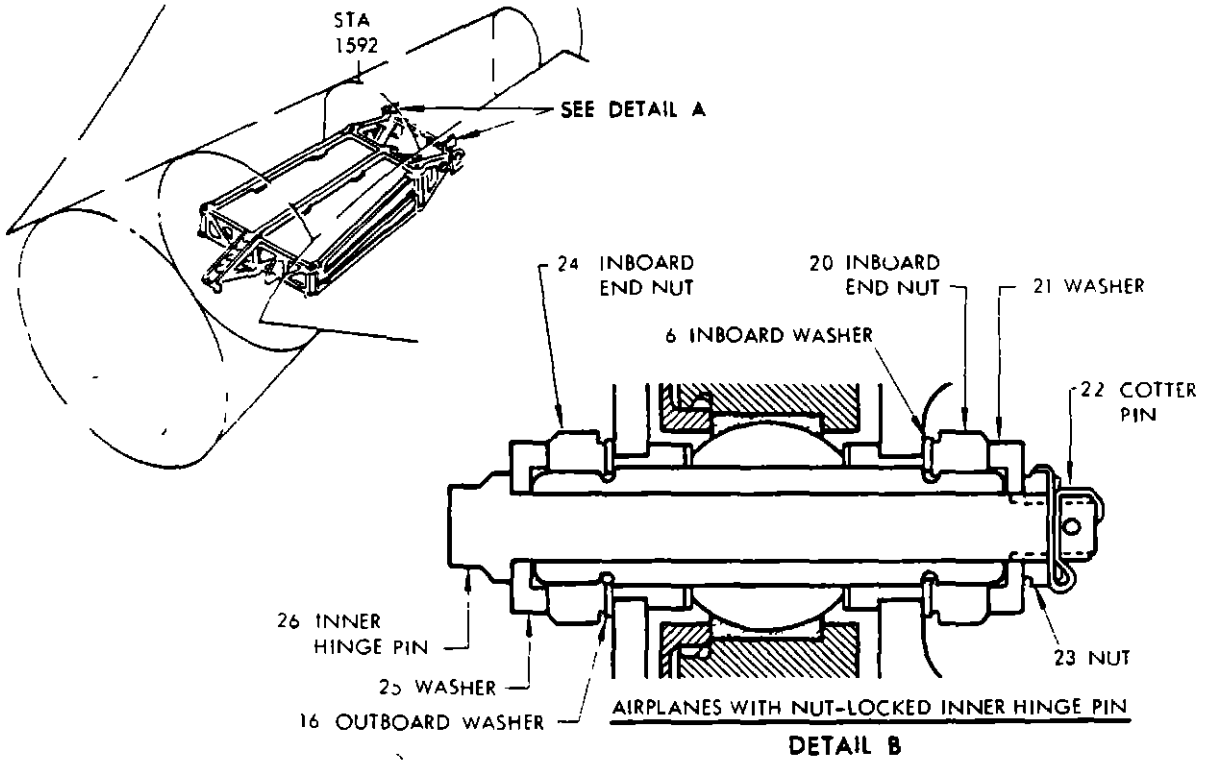
E. Remove spring lockpin (1) from bearing nut (19). This is accomplished by drilling out lockpin.

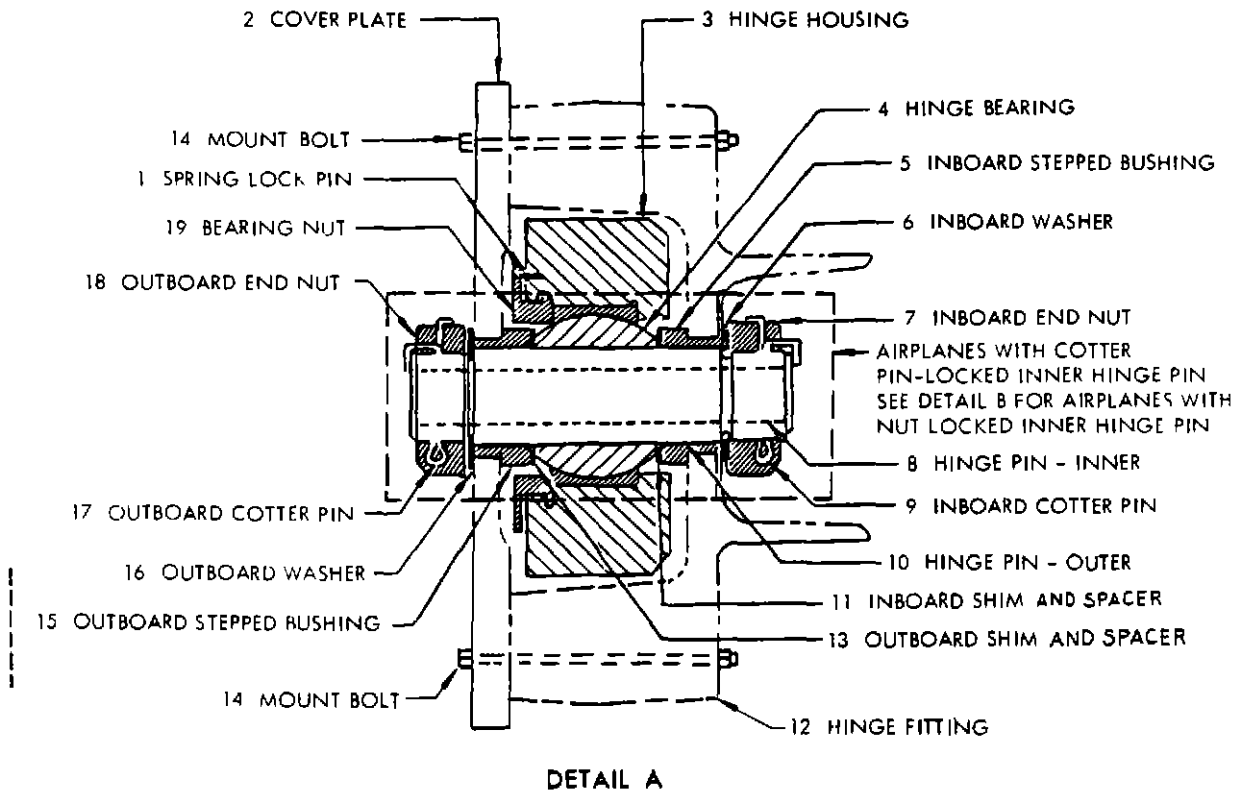
F. Remove bearing nut (19) by using the following procedure.

(1) Assemble puller tool F70158 per figure 401, step 1.

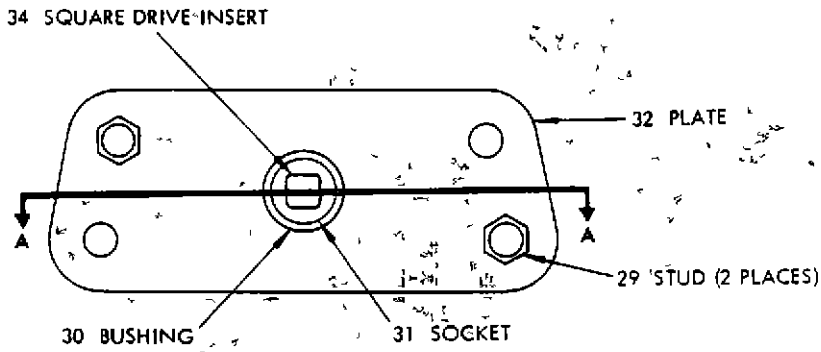
NOTE: The 12 pins on the tube (33) are to fit into the 12 holes on the bearing nut (19).

(2) Insert a square drive in square drive insert (34) and apply torque to remove bearing nut (19). Do not allow tool to slip.



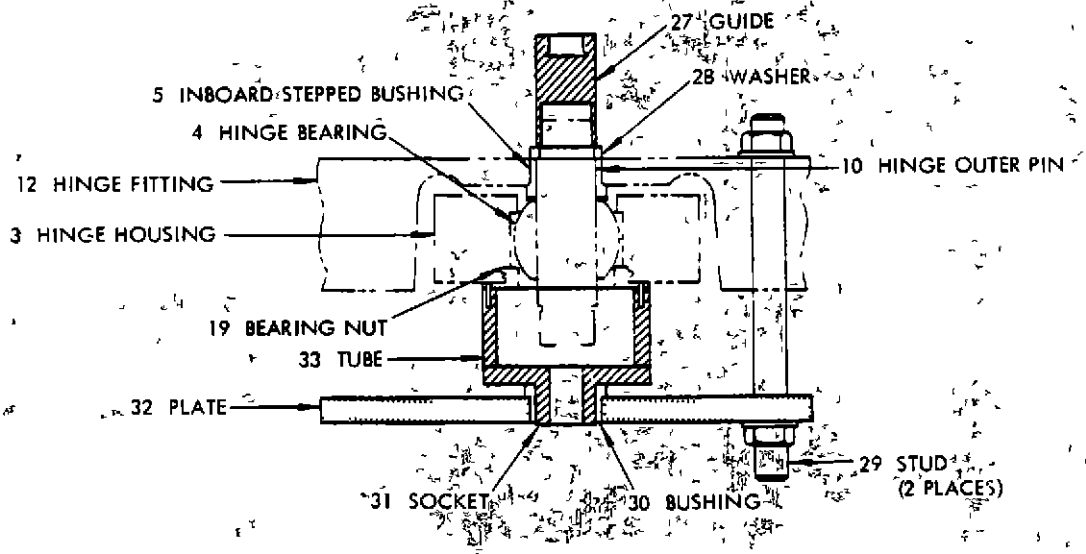


Horizontal Stabilizer Center Section Hinge Installation
Figure 401 (Sheet 1)



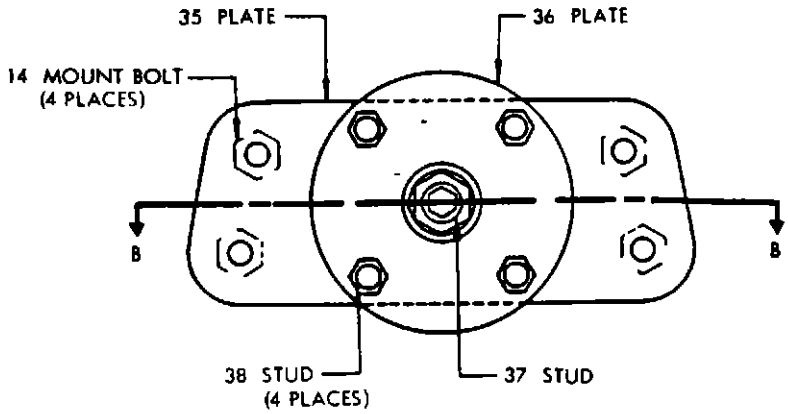
STEP 1

BEARING NUT REMOVAL

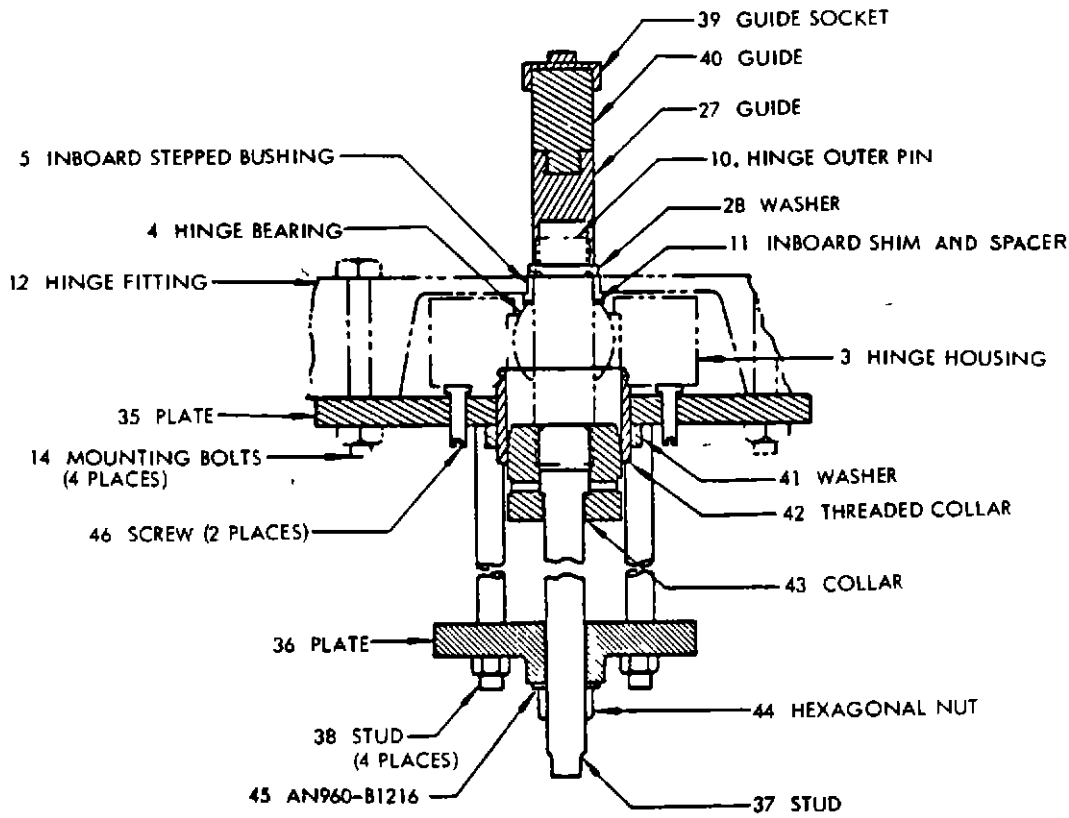


SECTION A-A

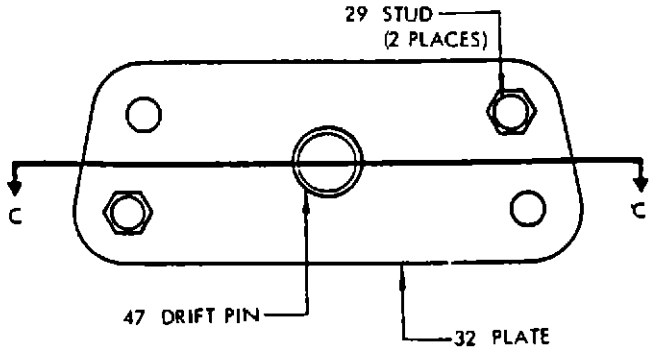
Horizontal Stabilizer Center Section Hinge Installation
Figure 401 (Sheet 2)



STEP 2
BEARING PULLER

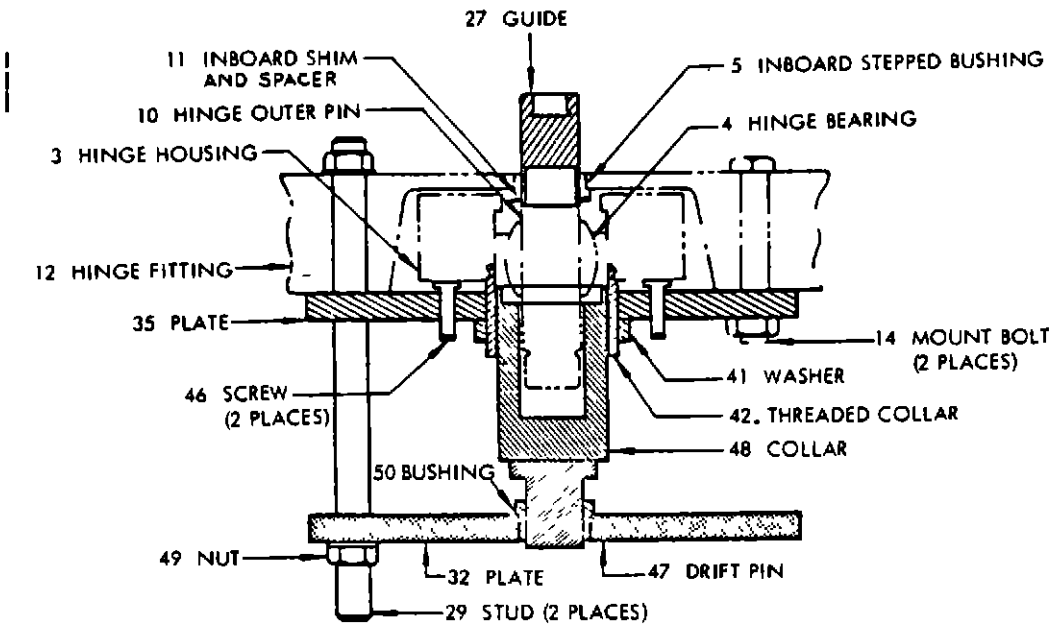


SECTION B B



STEP 3

BEARING INSTALLATION



SECTION C-C

G. Check for a correct counterbalance load of approximately 400 pounds on stabilizer sling.

H. Remove hinge pin (10) and hinge bearing (4) by using the following procedure.

(1) Assemble puller tool F70158 per figure 401, step 2.

NOTE The washer (28) is used to remove the inboard stepped bushing (5). If only the hinge pin (10) and the hinge bearing (4) are to be removed, do not install the washer (28).

(2) Hold stud (37) stationary.

NOTE The screws (46) must fit flush against the hinge housing (3).

(3) Apply pulling force on hinge pin (10) and hinge bearing (4) through stud (37) by turning hexagonal nut (44)

I. Leave screws (46), washer (41), threaded collar (42) and plate (35) in place for installation procedure.

5. Install Stabilizer Center Section Hinge

A. Assemble hinge bearing (4, figure 401), hinge pin (10), inboard shim and spacer (11) and inboard stepped bushing (5) and insert in place inside threaded collar (42).

B. Place collar (48) against bearing (4) per figure 401, step 3, and tap lightly to seat.

C In order to align hinge pin (10) and inboard stepped bushing (5) with hinge housing (3), the stabilizer tip may be oscillated while observing the alignment proceedings from inside the tail cone area.

D. If greater pressure is required to seat the hinge bearing (4) and the inboard stepped bushing (5) use the following procedure.

(1) Assemble puller tool F70158 per figure 401, step 3.

(2) Apply pressure by tightening nuts (49) and gently tapping on drift pin (47).

E. Remove puller tool F70158.

F. Install outboard shim and spacer (13).

NOTE Total interference for the inboard shim (11) and the outboard shim (13) must be within 0.000 to 0.006 inch.

G. Install bearing nut (19) and spring lockpin (1).

H. Install outboard stepped bushing (15).

I. Install coverplate (2) with four mount bolts (14).

J. Install inner hinge pin (8) or (26) as follows:

(1) On airplanes with cotter pin-locked inner hinge pin (8):

(a) Install inner hinge pin (8).

(b) Install inboard end nut (7) with inboard washer (6), and install outboard end nut (18) with outboard washer (16).

NOTE: Tighten nuts (7) and (18) to 5400-6600 pound-inches torque with equal thread exposure when cotter pin holes are aligned.

(c) Install inboard cotter pin (9) and outboard cotter pin (17).

(2) On airplanes with nut-locked inner hinge pin (26):

(a) Install end nuts (24) and (20) with washers (16) and (6).

(b) Tighten end nuts (24) and (20) to 5400-6600 pound-inches torque with equal thread exposure.

(c) Install inner hinge pin (26) with washers (25) and (21), nut (23) and cotter pin (22).

(d) Tighten nut (23) to 1300-1500 pound-inches torque.

6. Restore Airplane to Normal Configuration

A. Install elevator control rod above work area. The control rod must be secured at both ends with a nut, a cotter pin and a washer.

B. Remove stabilizer sling.

C. Close stabilizer control circuit breakers on P2 and P5.

D. Remove stabilizer control wheel lock.

E. Install access panels.

STABILIZER CENTER SECTION HINGE - INSPECTION/CHECK

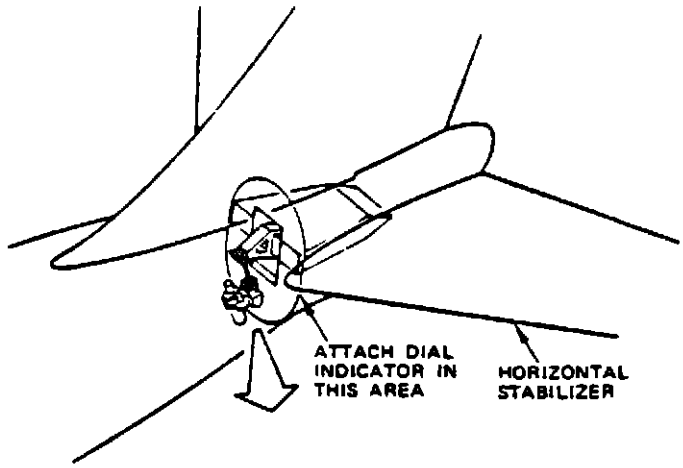
1. General
   A. This procedure is a method of determining the amount of horizontal stabilizer free play as indicated by stabilizer hinge bearing and jackscrew mechanism wear. Total free play of the stabilizer is the accumulation of free play of the jackscrew and hinge mechanisms.
2. Equipment and Materials
   A. Weight equal to W_1 ±50 pounds (Ref Fig. 601).
   B Weight equal to W_2 ±25 pounds (Ref Fig. 601) (2 required).
   C. Dial indicator gage
   D. Suction cup (used for attaching indicator gage to fuselage) or other suitable device
3. Check Center Section Hinge for Free Play
   A. Measure stabilizer center section hinge joint free play (referred to in following as X for left joint and Y for right joint):
      (1) Set stabilizer at 3 units of trim (stabilizer neutral position).
      (2) Attach dial indicator to left side of fuselage, at body station 1592 just outboard of fuselage surface, so that plunger on indicator is depressed at least 1/8 inch and is touching stabilizer lower surface.
      (3) Slowly apply weight W_1 to left stabilizer tip near front spar. Slowly remove W_1. Set dial indicator to zero.
      (4) Slowly apply weight W_1 to right stabilizer tip near front spar. Record dial indicator reading. Slowly remove weight. Value X is obtained from following equation. The value of CHB is from Fig. 601.
          X = DIAL READING - CHB X W_1; If quantity is negativex X = 0
      (5) Mount dial indicator on right side as in step (2). Set dial indicator to zero.
      (6) Slowly apply weight W_1 to left stabilizer tip near front spar. Record dial indicator reading. Slowly remove weight. Value Y is obtained from following equation:
          Y = DIAL READING - CHB X W_1; If quantity is negative, Y = 0
   B. Measure stabilizer jackscrew joint free play (referred to in following as Z):
      (1) Check that stabilizer is at 3 units of trim (stabilizer neutral position).
      (2) Slowly place weights W_2 near root of stabilizer aft of body station 1594, one on each side. Slowly remove weights.
      (3) Attach dial indicator to fuselage at approximately body station 1505 so that plunger is depressed at least 1/4 inch and is touching stabilizer lower surface. Set indicator to zero.
      (4) Slowly place weights W_2 on tip of and at the root of stabilizer, one on each side opposite jackscrew.
      (5) Record reading on dial indicator. Slowly remove weights. Value Z is obtained from following equation
          Z = DIAL READING - CJS X $2W_2$; If quantity is negative, Z = 0.

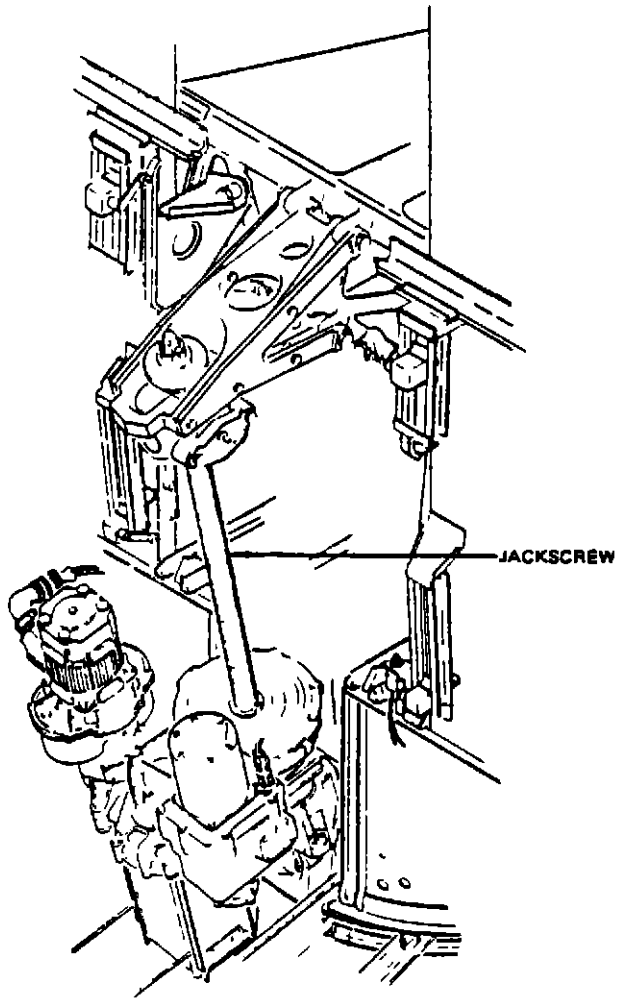
MODEL-SERIES	W_1 (LB)	W_2 (LB)	CHB	CJS
707-100 707-200 720	500	400	.0000165	.0000135
707-100B 720B	500	400	.0000179	.0000135
707-300 707-400	550	700	.0000191	.0000135

Stabilizer Center Section Hinge Free-Play Inspection
Figure 601

C. Determine total stabilizer free play (referred to in following as H)
   (1) Apply values X, Y, and Z from steps A and B to following equation
   $H = (X + Y)/2 + Z$
D. Determine if replacement of stabilizer center section hinge bearings is required
   (1) Prior to hinge bearing replacement check center section hinge housing and thrust braces between housing and rear spar upper and lower chords for cracks, loose fasteners and proper shim installation. Maximum permissable gap without shims is 0.005 inch.
   (2) If value H obtained in step C is equal to or less than 0.0584, total wear limits of hinge bearings have not been exceeded.
   (3) If value H is greater than 0.0584, replace stabilizer center section hinge bearings and/or overhaul jackscrew mechanism
   (4) If value Y exceeds 0.060 inch, replace left hinge bearing. If value Y exceeds 0.060 inch, replace right hinge bearing.
   (5) If value Z exceeds 0.050 inch, overhaul jackscrew mechanism per overhaul procedure.
E. Remove dial indicator.

4. Examine Stabilizer Center Section Hinge Pin for Corrosion
   A. Remove hinge pin (Ref Stabilizer Center Section Hinge - Removal/Installation).
   B. Examine hinge pin for corrosion. If corrosion exists, refer to Stabilizer Center Section Hinge - Approved Repairs.
5. Examine Stabilizer Center Section Hinge Shims for Wear
   A. Remove hinge shims (Ref Stabilizer Center Section Hinge - Removal/Installation).
   B. Examine shims for wear. If wear seems excessive, replace with stainless steel shims.


ATTACH DIAL INDICATOR IN THIS AREA
HORIZONTAL STABILIZER


JACKSCREW

STABILIZER CENTER SECTION HINGE - APPROVED REPAIRS

1 Approved Repairs Stabilizer Center Section Hinge

A. Approved Repairs Stabilizer Center Section Hinge Pins

(1) Outer pin

(a) Allowable rework on outside and inside diameters of pin is 0.02 inch based on original dimensions.

(b) Chrome plate outside and inside diameters to original dimensions of 1.3740 (+0.0000/-0.0005) inches for OD and 0 7486 (+0.0020/-0.0000) inches for ID.

(2) Inner pin

(a) Allowable rework of diameter of pin is 0.02 inch based on original dimension.

(b) Chrome plate diameter of pin to original dimension of 0.7466 (+0.0000/-0.0010) inch.

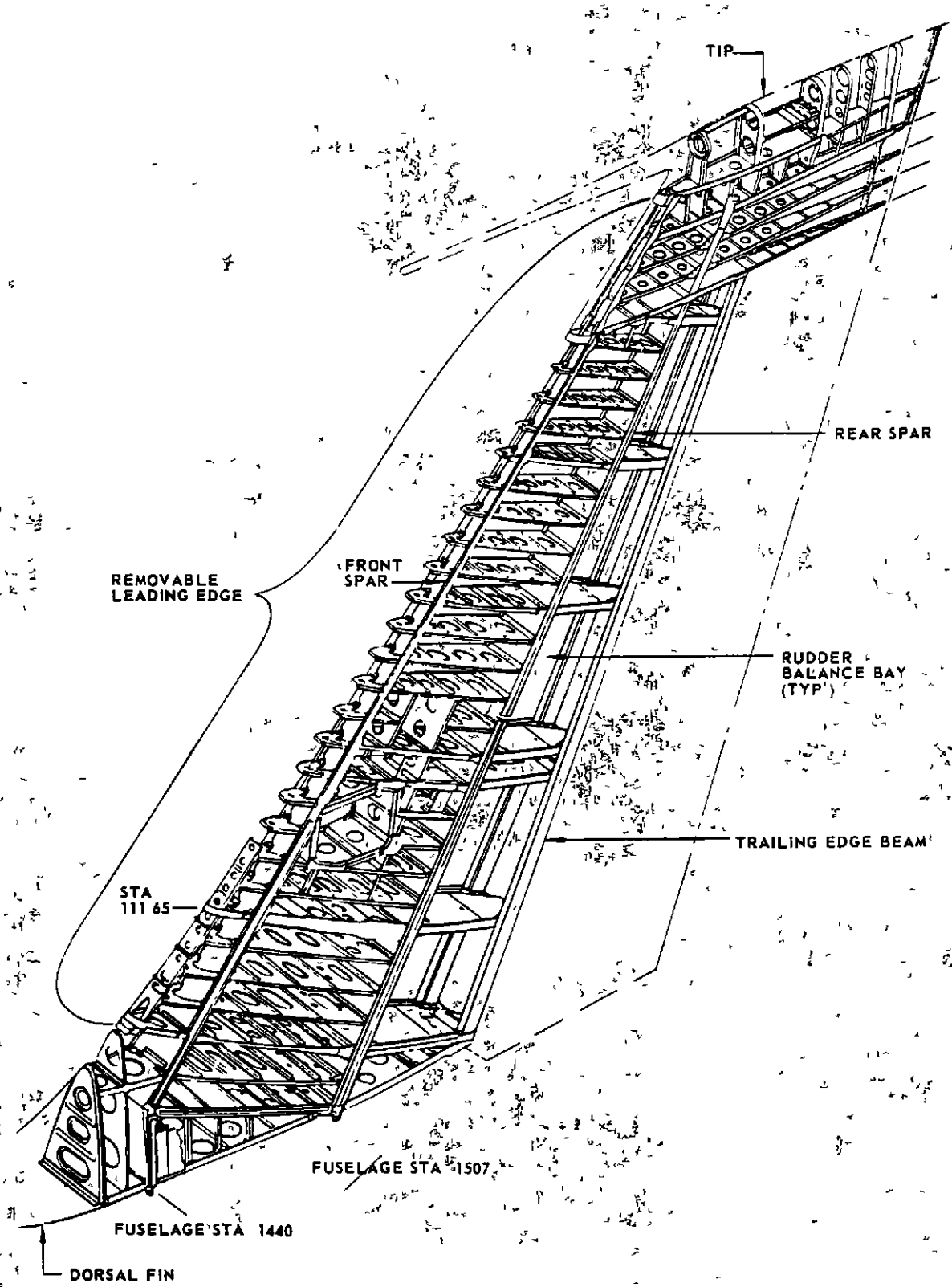
VERTICAL FIN - DESCRIPTION AND OPERATION

1. General

A. The vertical fin is a fixed auxiliary airfoil surface the function of which is to give directional stability to the aircraft. Its purpose is to reduce the yawing tendencies about the vertical axis. The fin is attached to the fuselage by fittings at fuselage stations 1440 and 1507. There is no structural tie between the fin skin and fuselage. Torsion on the fin is reacted by side couple loads at fuselage station 1440 and 1507. The HF probe and Loran antennas are positioned on the fin tip. The fin and rudder may be folded to the right and may be removed from the airplane as a unit or the rudder may be removed independently after the folding operation. The leading edge is detachable and provides access to internal structure and to the anti-icing system on turbojet airplanes. The dorsal fin is not structurally connected to the main vertical fin and may be removed from the aircraft as a separate unit. Turbojet airplanes have a ventral fin which is not structurally connected to the lower part of the rear fuselage and may be removed from the aircraft as a separate unit.

2 Fin Structure

A. The fin is of two spar construction, although the front spar web does not extend beyond fin station 111.65. There is no other spanwise stiffening. Airfoil contour and torsional strength are maintained by ribs spaced at approximately nine inches. The bending moment and bear shear are carried by the spars and local effective skin. The torsion is reacted by torsional shear in the skin and rear spar web. For details of structure and skin of vertical and ventral fins see figures 1 thru 4



Vertical Fin Structure
Figure 1

Vertical Fin Skin Diagram / Ventral Fin Structure and Skin Diagram.

Boeing pages 3 through 5 have been deleted.

For SRM (Structural Repair Manual) references see Conversion Table below.

Page No.	DATE	FIGURE No. / TITLE	REFERENCE S.R.M.
3	15/12/63	Figure 2 Vertical Fin Skin Diagram	55-5-1 figure 1 (sheet 1 of 2) page 1
4	15/12/63	Figure 3 Ventral Fin Structure	55-8-2 figure 1, page 1
5	15/12/63	Figure 4 Ventral Fin Skin Diagram	55-8-1 figure 1, page 1

Conversion Table

VERTICAL FIN - MAINTENANCE PRACTICES

1. Folding/Hoisting Vertical Fin

A. Equipment and Materials

(1) Crane, with 30-foot boom, capable of lifting 2500 pounds

(2) Winch having a cable equal to or greater than the size of cable used between the "A" Frame (item (5) (b)) and the fin

(3) Support Assembly - F71140 (airplanes without bolted aft fitting side strut), F71140-500 (airplanes with bolted aft fitting side strut), or equivalent. The -0 assembly may be reworked into the -500 assembly

(4) Adapter Assembly - F70020 or equivalent

(5) Either of following. Sling Assembly, F71131-502, or "A" Frame Assembly, F70030-500, or equivalent

(6) MIL-C-16173 Type II Aeroshell Compound No. 2.

(7) Cleaning Solvent, Kerosene, VV-K-221 or equivalent

(8) Rope of sufficient length to reach item (4) with fin in vertical position

(9) Rigging pins (rudder pedals and rudder aft control quadrant)

B. Fold Vertical Fin

(1) Head airplane into wind.

(2) Place chocks in front of and behind at least one tandem set of main gear wheels per truck.

(3) Install tail jack and apply steadying load (500-1500 pounds).

CAUTION: BEFORE INSTALLING JACK, DEFLATE MAIN GEAR OLEOS TO PREVENT POSSIBILITY OF AIRPLANE SETTLING AND OVERLOADING FUSELAGE AND NOSE GEAR STRUCTURE.

NOTE: This step is only necessary if a combination of adverse conditions, such as light weight, CG on aft limit, and wind strking left side of fin, exist. In such a case there is a possibility that the winch may pull the airplane tail down, tilting the airplane about its main gear.

(4) Deleted

(5) Depressurize auxiliary hydraulic system.

WARNING: AUXILIARY HYDRAULIC SYSTEM MUST BE DEPRESSURIZED BEFORE WORKING IN AREA OF RUDDER. HYDRAULIC OPERATION OF RUDDER MAY CAUSE PERSONNEL INJURY.

(a) Position systems interconnect valve switch to "CLOSED."

(b) Position auxiliary pump switches to "OFF."

(c) Open systems interconnect valve circuit breaker on external power shield (J9).

(d) Open auxiliary hydraulic motor circuit breakers on panel P1 and panel P3.

(e) Position rudder switch on pilots' overhead panel to "ON."

(f) Unscrew utility reservoir filler cap three turns to vent pressurization air.

(g) Cycle rudder pedals until rudder stops operating hydraulically.

(h) On airplanes fitted with a rudder hydraulic manual shutoff valve, position this valve to "OFF."

CAUTION: WHEN THE AUXILIARY HYDRAULIC SYSTEM IS RETURNED TO NORMAL, THIS VALVE SHOULD BE LOCKWIRED IN THE "ON" POSITION.

(6) Remove fin to fuselage fairings 1502, 1503, 1504, 1538 and 1539. Refer to "Access Doors and Panels," Chapter 12.

(7) Remove stabilizer jack screw access panel, 1185.

(8) On SABENA airplanes OO-SJD and on, BOAC airplanes G-APFF and on, disconnect and plug the two hydraulic line connections at base of fin. (See figure 204.)

NOTE: Provide container for hydraulic fluid draining from system.

(9) Install pilot's and copilot's rudder pedal rigging pins (figure 208), and rudder aft control quadrant rigging pin (figure 209).

(10) Disconnect following turnbuckles:

(a) On all airplanes, rudder control cables. Remove panel 1185 for access.

(b) On airplanes without series yaw damper, rudder servo control cables. Remove panel 1185 for access.

(c) On airplanes with series yaw damper, power trim gearbox cables. Remove panel 1561 for access.

(11) Remove pin from torsion tube on rudder trim torsion bar and disconnect tube from shaft by sliding down over gearbox shaft. (See figure 207.)

(12) Install sling assembly. (See also alternative, step 13.)

(a) Remove screws from upper sling attachment point on left-hand side of fin. (See figure 201.)

(b) Install upper sling fitting.

(13) Install "A" frame assembly (alternative to sling assembly.)

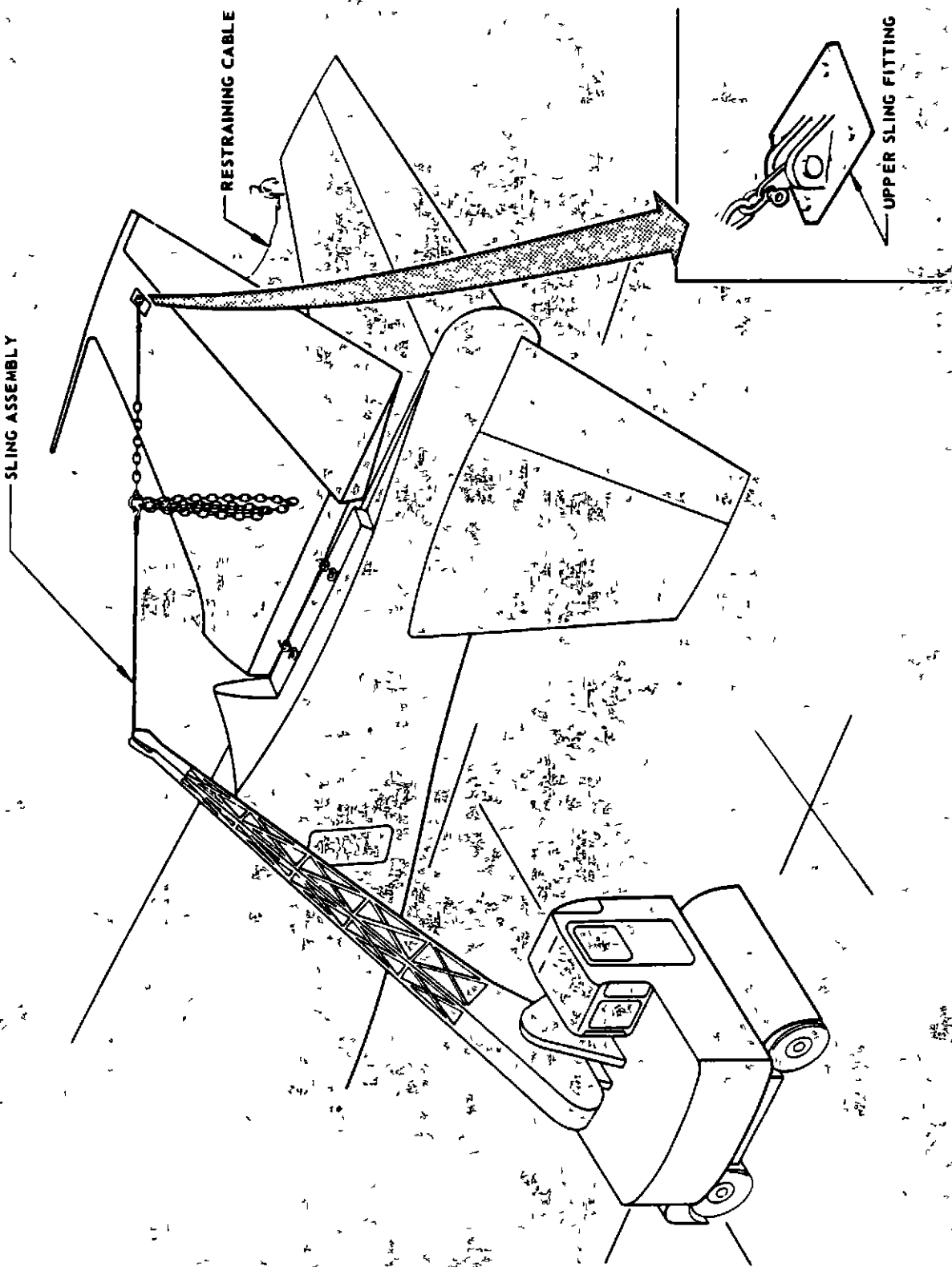
(a) Remove screws from "A" frame attachment points at base of front and rear spars and upper sling attachment point.

(b) Install "A" frame assembly. (See figure 202.)

NOTE: There are several factors governing the use of the "A" frame. Two sets of conditions are here stated as a rough guide to the "A" frame limitations.

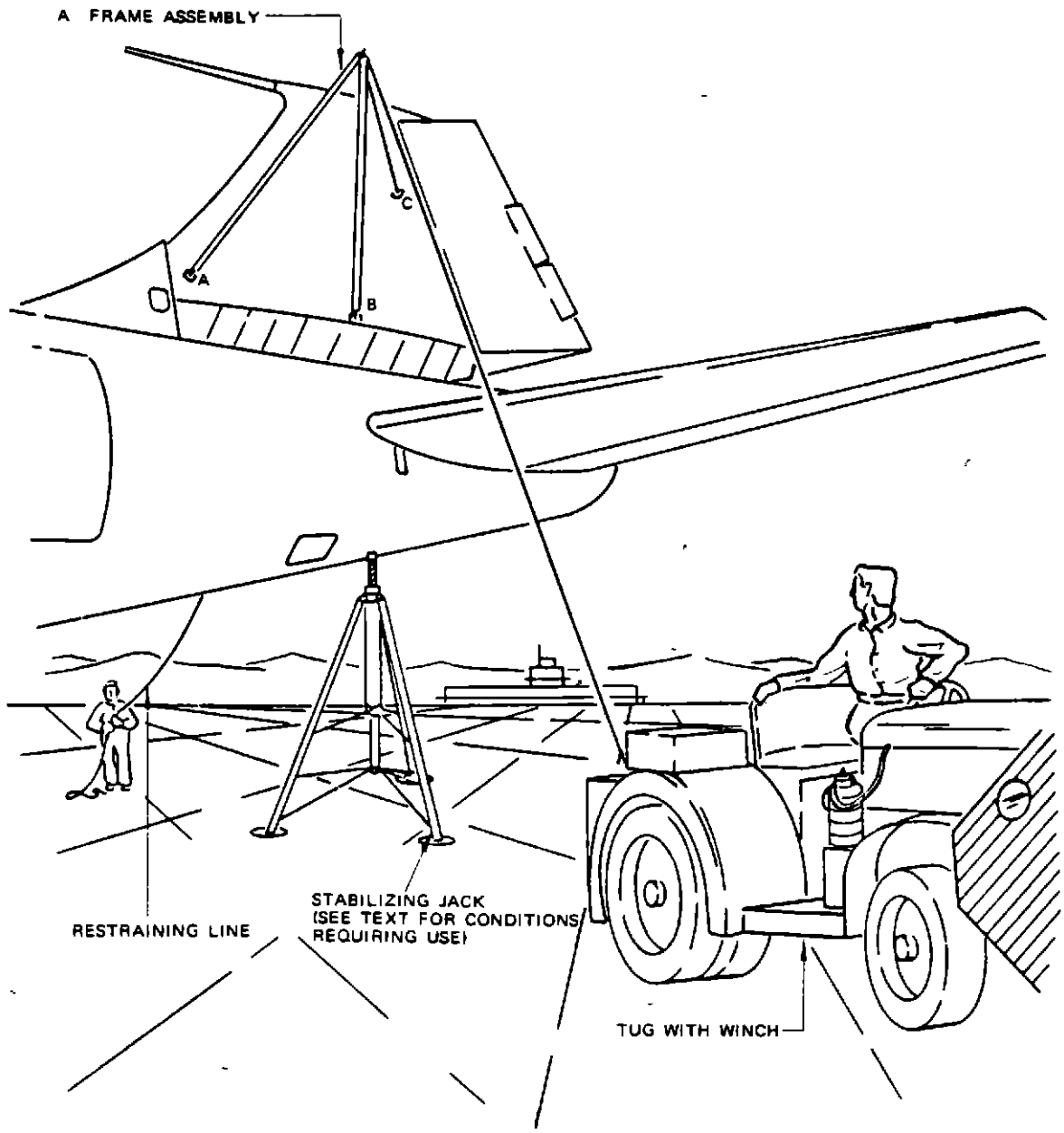
Assuming winch is located in recommended position (figure 203), winds up to 40 MPH, acting normal to fin and against its left side, are acceptable.

Assuming winch is located 20 feet out from airplane centerline and at an angle 15° aft of perpendicular to centerline, winds up to only 17 MPH are acceptable.



Sling Installation
Figure 201

NOTE A IS AT INTERSECTION BETWEEN FRONT SPAR AND FIN STATION 50 53
B IS AT INTERSECTION BETWEEN REAR SPAR AND FIN STATION 50 53
C IS AT INTERSECTION BETWEEN REAR SPAR AND FIN STATION 210 65



"A" Frame Installation
Figure 202

(14) Remove screws from adapter attachment point on right hand side of fin just aft of fin rear spar. (See figure 203.)

(15) Install adapter and attach restraining line.

(16) Position winch as recommended in figure 203.

CAUTION: MAKE CERTAIN THAT THE WINCH IS WELL ANCHORED, ESPECIALLY IF IT IS TUG MOUNTED, AGAINST HORIZONTAL AND VERTICAL COMPONENTS OF CABLE TENSION.

NOTE. If the crane-sling combination (refer to step 12) is being used, position of the crane will depend on boom length and maneuverability of the crane and should be decided on the site.

(17) Attach cable from crane or winch to sling or "A" frame.

(18) Pull on restraining line attached to adapter to relieve load on attachment bolts in left side fin to fuselage attachment fittings.

(19) Remove bolts from left side fittings and loosen nut on right side rear fitting.

(20) Pull fin over center with restraining line, keeping tension on sling or "A" frame cable.

(21) Lower fin until it is almost horizontal and attach support assembly to fuselage fitting and fin using fitting bolt and support bolt. (See figure 204.)

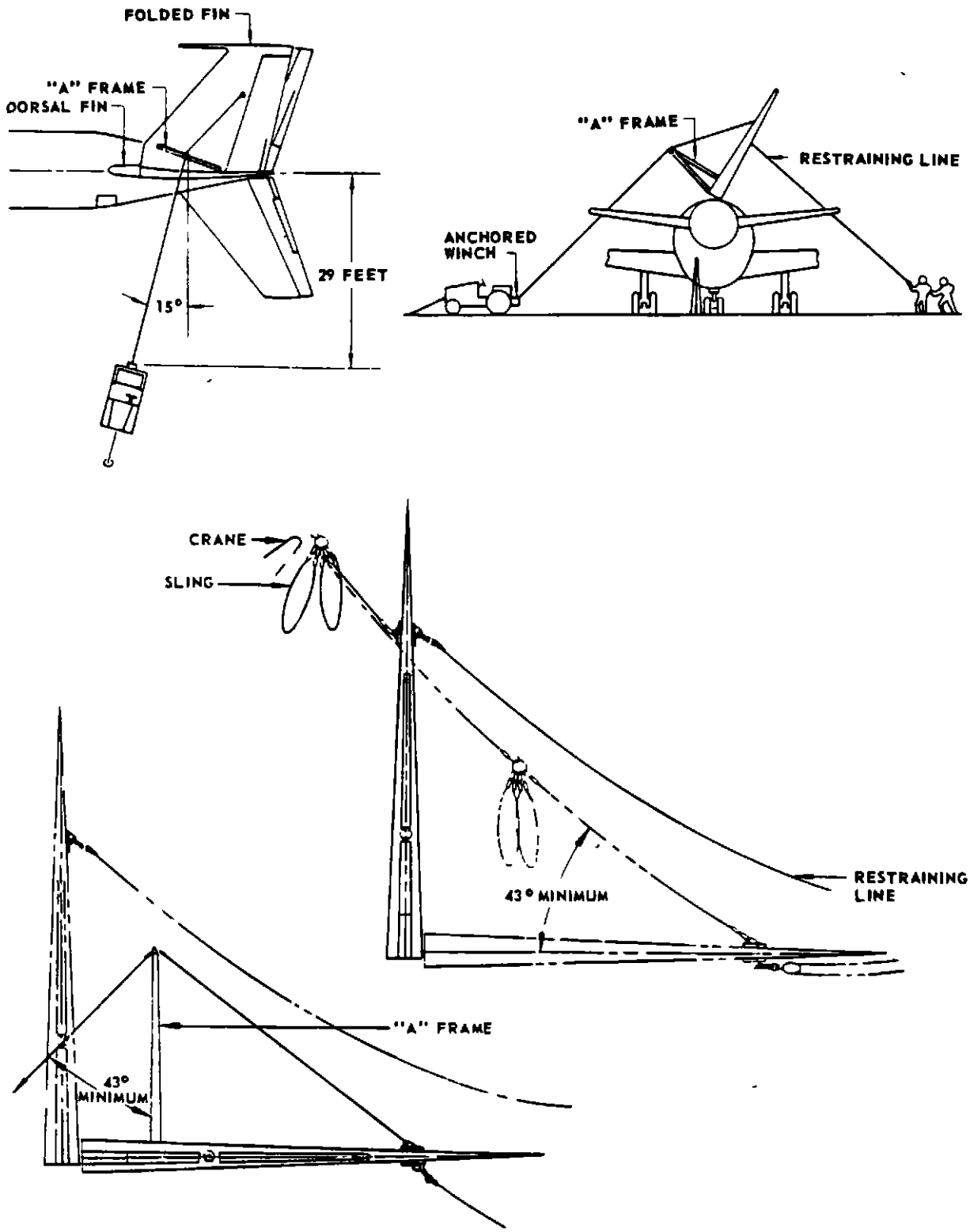
CAUTION: TO PREVENT STRUCTURAL DAMAGE, DO NOT ALLOW INCLUDED ANGLE BETWEEN FIN CENTERLINE AND SLING CABLE OR "A" FRAME AND WINCH CABLE TO BECOME LESS THAN 43° (SEE FIGURE 203.)

(22) Continue lowering fin until fin support assembly locking pin can be inserted

(23) Remove sling or "A" frame, restraining cable, and adapter assemblies.

(24) Replace screws at equipment attachment points on fin surface.

(25) Cover exposed structure.



(8)
Mar 15/60
Revised

Fin Folding
Figure 203

C. Hoist Vertical Fin

(1) Check that auxiliary hydraulic system is in a properly depressurized condition, that rudder switch on pilots' overhead panel is OFF and that rudder hydraulic manual shutoff valve, on applicable airplanes, is in its OFF position.

(2) Carry out steps B.(1) through B.(3) and B.(12) through B.(17) in preparation for hoisting fin.

(3) Place just enough tension on sling or "A" frame cable to support fin.

(4) Remove support assembly at fin to fuselage attachment point.

(5) Raise fin into vertical position.

CAUTION: AS FIN IS BEING RAISED TO VERTICAL POSITION RESTRAIN MOVEMENT WITH RESTRAINING LINE ON RIGHT-HAND SIDE OF FIN, TO PREVENT DAMAGE DUE TO FIN FALLING OVER CENTER. TO PREVENT STRUCTURAL DAMAGE DO NOT ALLOW INCLUDING ANGLE BETWEEN FIN CENTERLINE AND SLING CABLE OR "A" FRAME AND WINCH CABLE TO BECOME LESS THAN 43°. (SEE FIGURE 203.)

(6) Use restraining line to line up holes in fuselage and fin fittings, and install fin to fuselage attachment bolts with heads pointing forward.

NOTE: Prior to installation clean bolts and holes with solvent and lubricate with corrosion preventive grease.

(7) Tighten nuts on rear attachment fittings to 2200-3300 pound-inches torque.

(8) Tighten nuts on front attachment fittings finger-tight only. Rotate to nearest cotter pin hole that will maintain specified gap. (See figure 205.)

(9) Connect rudder control cable turnbuckles.

(10) Connect torsion tube to rudder trim torsion bar by sliding tube up to engage splines so that pin hole is aligned. Install pin and cotter pin. (See figure 207.)

(11) Remove pilot's and copilot's rudder pedal rigging pins (figure 208), and rudder aft control quadrant rigging pin (figure 209), and check for correct rigging of rudder controls. Refer to Rudder, Chapter 27.

(12) On PAA airplanes N757PA thru N759PA and all PAA Turbofan airplanes, and on all TWA airplanes except N761TW thru N767TW, AF airplanes F-BHSG and on, SABENA airplanes OO-SJD and on, BOAC airplanes G-APFF and on, DLH airplanes D-ABOD and on, remove plugs and connect hydraulic lines at base of fin.

CAUTION: ON ANY AIRPLANE NOT FITTED WITH A RUDDER HYDRAULIC MANUAL SHUTOFF VALVE, CHECK THAT THERE IS A RELIABLE ELECTRICAL POWER SUPPLY TO THE AIRPLANE BEFORE AND DURING REMOVAL OF PLUGS FROM DISCONNECTED HYDRAULIC LINES, AND RECONNECTION OF SUCH LINES. IN THE EVENT THAT THE AUXILIARY HYDRAULIC SYSTEM OF SUCH AN AIRPLANE BECAME PRESSURIZED, LOSS OF ELECTRICAL POWER WOULD DE-ENERGIZE THE VALVE SOLENOID AND ALLOW PRESSURE IN THE CAPPED LINES.

(13) On PAA airplanes N757PA thru N759PA and on all PAA Turbofan airplanes, and on all TWA airplanes except N761TW thru N767TW, AF airplanes F-BHSG and on, SABENA airplanes OO-SJD and on, BOAC airplanes G-APFF and on, DLH airplanes D-ABOD and on, bleed hydraulic system and check for leaks in reconnected hydraulic lines under operating pressure.

(14) On all airplanes remove sling or "A" frame, restraining cable, and adapter assemblies.

(15) Replace original screws at equipment attachment points on fin surface.

(16) Remove tail jack and inflate main gear oleos with clean, dry air per placard in wheel well.

(17) Replace fairings and access panels.

(18) Test rudder operation. Refer to Chapter 27, Rudder.

2. Removal/Installation Vertical Fin

A. Equipment and Materials

(1) Crane equipped with a 30 foot boom and capable of lifting 2500 pounds

(2) Support Assembly - F71140 or equivalent

(3) Adapter Assembly - F70020 or equivalent

(4) Sling Assembly

(a) F71131-502 or equivalent

(5) MIL-C-16173 Type II Aeroshell Compound N°2

(6) Cleaning Solvent, Kerosene, VV-K-221 or equivalent

(7) Rope of sufficient length to reach item (3) with fin in vertical position

(8) Rigging Pins (rudder pedals and rudder aft control quadrant)

B. Remove Vertical Fin

(1) Open the HF and Loran circuit breakers on radio and T-R circuit breaker panel (P5), and on turbojet airplanes open empennage deicing circuit breakers on main ac power shield (J6). Position rudder Q-spring inlet heater switch on pilots' overhead panel to OFF. On airplanes with series yaw damper, open RUDDER CONTROL circuit breaker on P5.

(2) Deleted

(3) Depressurize auxiliary hydraulic system.

WARNING: AUXILIARY HYDRAULIC SYSTEM MUST BE DEPRESSURIZED BEFORE WORKING IN AREA OF RUDDER. HYDRAULIC OPERATION OF RUDDER MAY CAUSE PERSONNEL INJURY.

(a) Position systems interconnect valve switch to "CLOSED."

(b) Position auxiliary pump switches to "OFF."

(c) Open systems interconnect valve circuit breaker.

(d) Open auxiliary hydraulic motor circuit breakers on panels P1 and P3.

(e) Position rudder switch on pilots' overhead panel to "ON."

(f) Unscrew utility reservoir filler cap three turns to vent pressurization air.

(g) Cycle rudder pedals until rudder stops operating hydraulically.

(h) On airplanes fitted with a rudder hydraulic manual shutoff valve, position this valve to "OFF."

CAUTION: WHEN THE AUXILIARY HYDRAULIC SYSTEM IS RETURNED TO NORMAL, THIS VALVE SHOULD BE LOCKWIRED IN THE "ON" POSITION.

(4) Remove dorsal fin access panel 1534.

(5) Remove leading edge access panel 1505.

(6) Fold fin, carrying out steps B.(1) through B.(3) and B.(6) through B.(22) of Folding/Hoisting Vertical Fin.

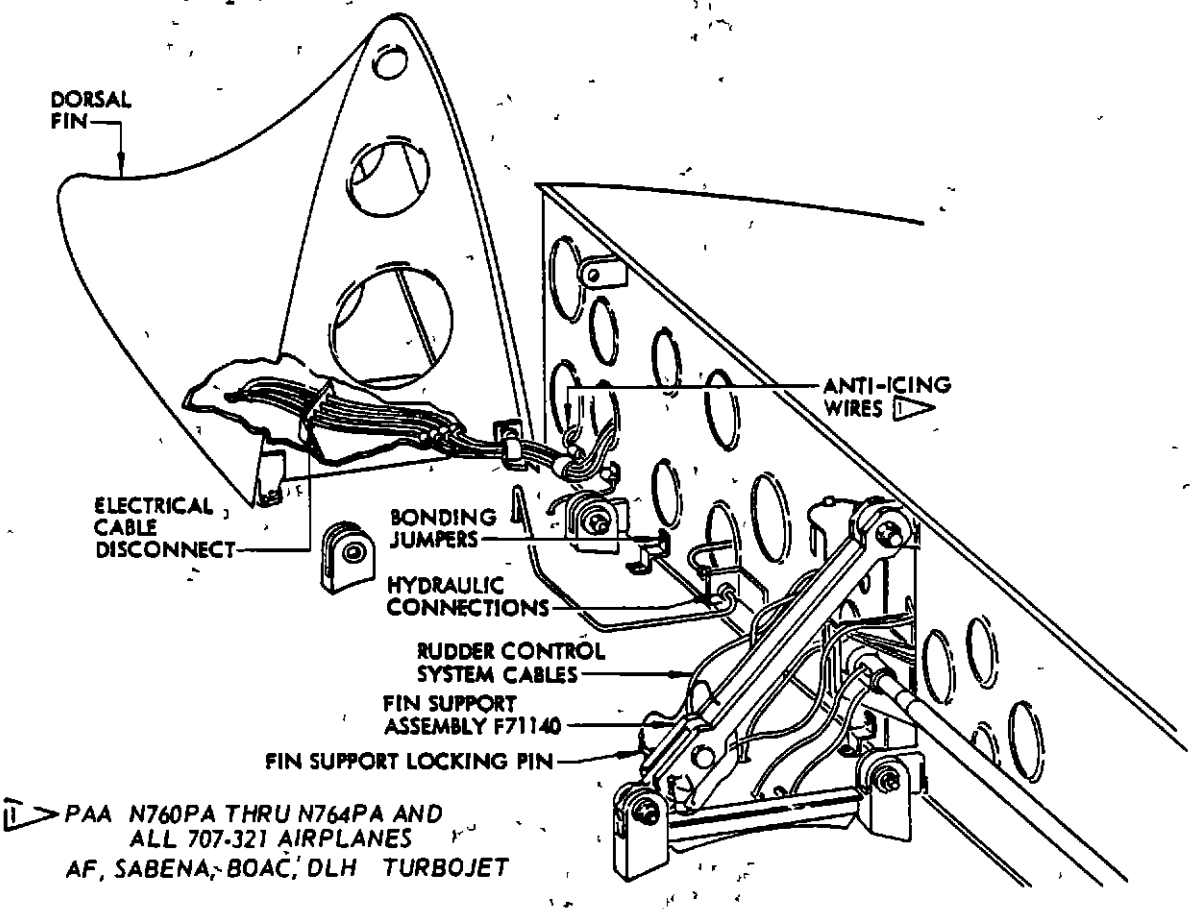
NOTE: On PAA airplanes N714PA through N730PA, AF airplanes F-BHSA through F-BHSF, SABENA airplanes OO-SJA through OO-SJC, BOAC airplanes G-APFB through G-APFE, DLH airplanes D-ABOB and D-ABOC, it should be noted that, in step B.(8), the swivel joints which are used in place of rigid joints must be disconnected and plugged.

Since crane-sling combination must be used to remove fin after folding, it will probably be the preferable means of folding the fin.

(7) Remove restraining line and adapter.

(8) Replace original screws at adapter attachment point.

(9) Remove sling from crane and move crane to the right side of airplane.



Fin Installation
Figure 204

(10) Remove screws from forward sling attachment point and attach forward sling fitting (See figure 206.)

(11) Slip lower sling fitting over fin support assembly and attach it with bolt through hollow support attaching bolt.

(12) Reattach sling to crane and tension sling cables equally.

(13) Disconnect bonding jumpers adjacent to right-hand fin to fuselage fittings. (See figure 204.)

(14) Disconnect electrical cables at connector location on dorsal fin.

(15) On turbojet airplanes disconnect anti-icing wire bundle at connector location at lower end of removable leading edge.

(16) On turbojet airplanes unclip anti-icing wire bundle in base of fin and withdraw clear of structure.

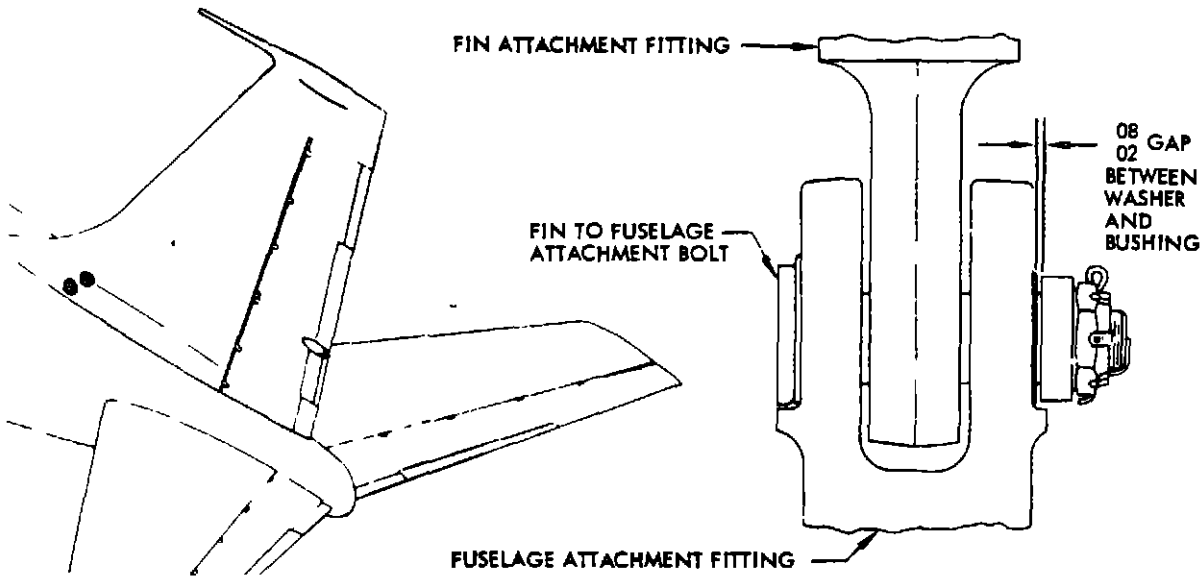
(17) Disconnect rudder Q-spring inlet heater cable in fin leading edge and withdraw clear of structure. Refer to Chapter 30, Q-Spring Inlet Anti-Icing.

(18) Tension sling so that load on fin attachment bolts is relieved.

(19) Remove fin attachment bolts and bolt attaching support assembly to fuselage and hoist fin clear of airplane.

(20) Lower onto a well padded cradle or sandbags placed under the spars

CAUTION: BE SURE SUPPORT ASSEMBLY IS PULLED UP AND CLEARS ANY OBSTRUCTION BEFORE LOWERING FIN.



Fin to Fuselage Forward Attachment
Figure 205

(21) Remove sling attachment fittings and fin support assembly.

(22) Replace original screws in attachment holes in fin surface.

(23) Replace leading edge access panel 1505.

(24) Cover exposed structure on fuselage.

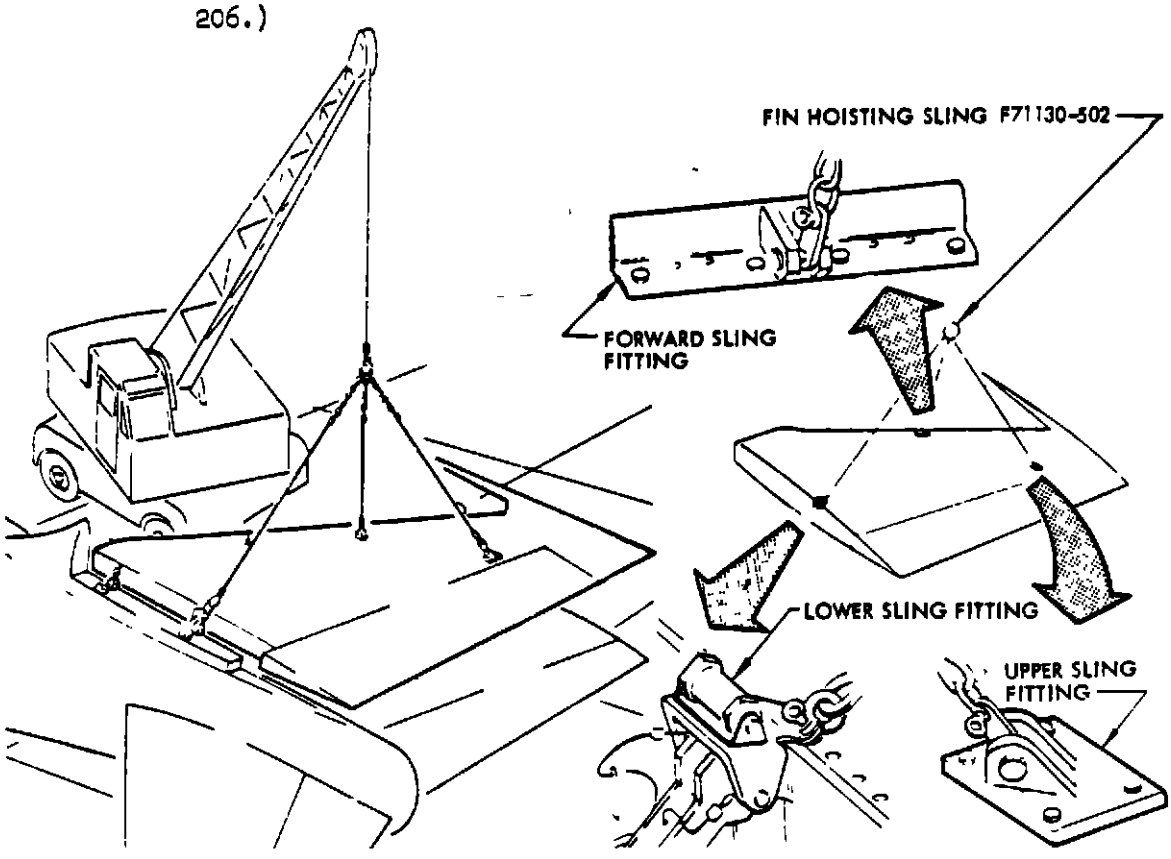
C Install Vertical Fin

(1) Check that the HF and Loran circuit breakers on radio and T-R circuit breaker panel (P5) are open, and position rudder switch on pilots' overhead panel to OFF. On turbojet airplanes check that empennage deicing circuit breakers on the main ac power shield (J6) are open. On airplanes with series yaw damper, check that RUDDER CONTROL circuit breaker on P5 is open

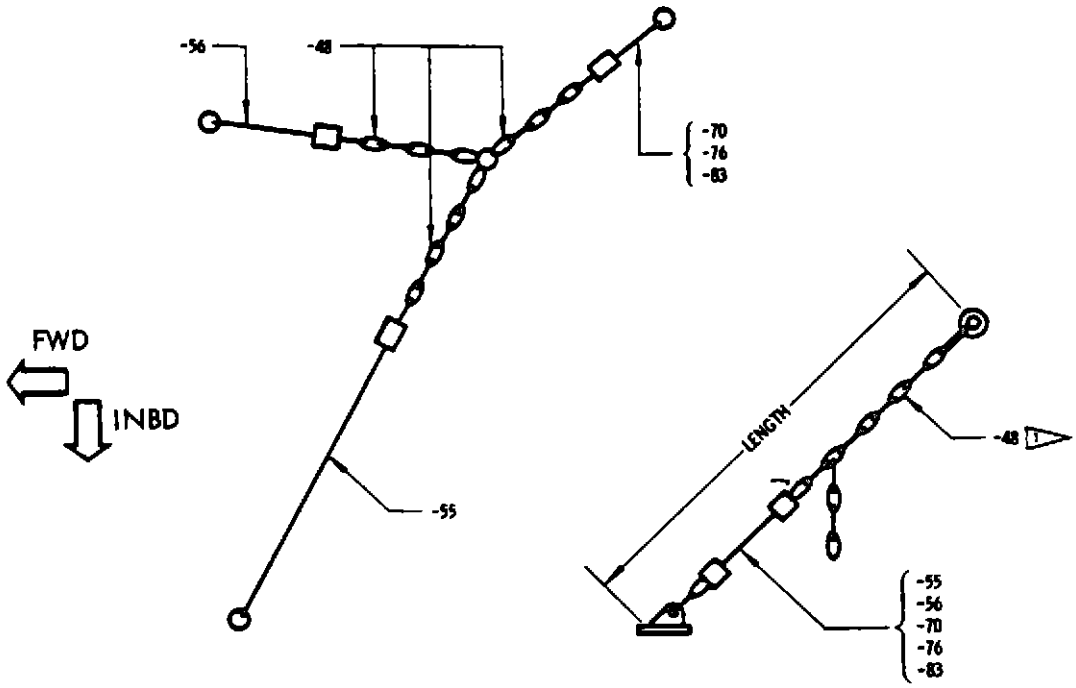
(2) Clean old grease from fin attaching bolts and holes with solvent and lubricate with grease.

(3) Attach fin support assembly to fin with hollow bolt. (See figure 204.)

(4) Remove screws from sling upper and forward attachment points on left-hand surface of fin and attach sling fittings. (See figure 206.)



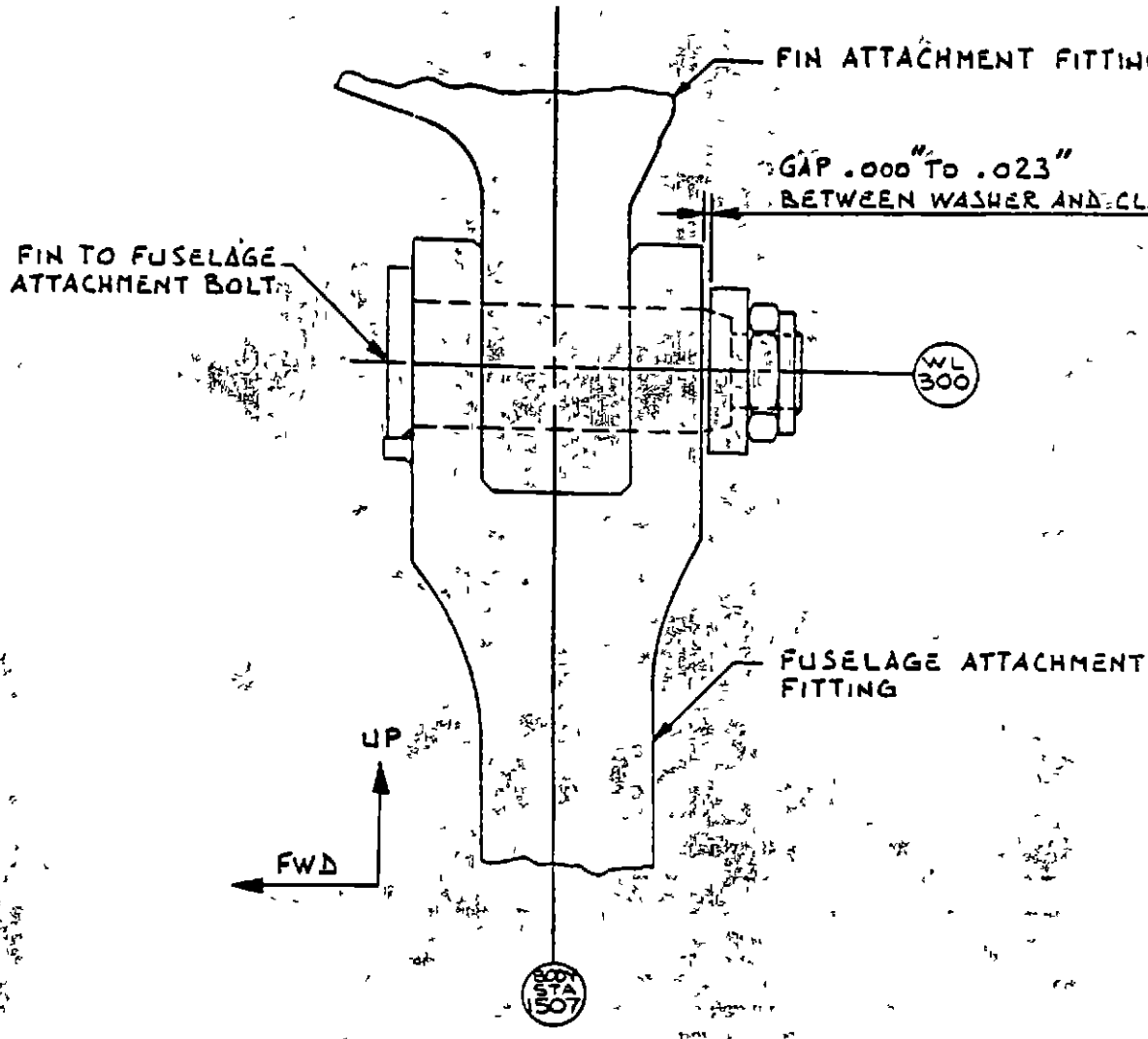
Sling Attachment - Fin Installation
Figure 206 (Sheet 1)



EXTENDED FIN SLING CABLE AND CHAIN LENGTHS (APPROX.)

	WITHOUT BAL PANELS AND RUDDER	WITH BAL PANELS AND RUDDER
WITH PROBE	-55 PLUS -48 = 133" -56 PLUS -48 = 88" -76 OR -83 PLUS -48 = 88"	-55 PLUS -48 = 138" -56 PLUS -48 = 96" -76 OR -83 PLUS -48 = 82"
WITHOUT PROBE	-55 PLUS -48 = 121" -56 PLUS -48 = 87" -76 OR -83 PLUS -48 = 95"	-55 PLUS -48 = 130" -56 PLUS -48 = 95" -76 OR -83 PLUS -48 = 86"

1 THE -48 CHAIN IS THE ADJUSTABLE PART OF THE SLING



Ref. SAB 707/879
SN TR 55-1

Fin to Fuselage Aft Attachment
Figure 206A
T.EG.CEL.

(5) Slip lower sling fitting over fin support assembly and attach it with bolt through hollow support attaching bolt.

(6) With crane on right-hand side of airplane, hoist fin into position.

(7) Align holes in fin and fuselage fittings, right-hand side, and install attaching bolts with heads pointing forward. Torque finger-tight only.

(8) Raise fin slightly and install bolt attaching support assembly to fuselage.

(9) Lower fin and install fin support locking pin. (See figure 204.)

(10) Remove forward and lower sling attachment fittings and remove sling from crane. Replace original screws in forward attachment holes.

(11) Move crane to left side of airplane and reattach sling to crane, taking up slack in sling cable.

(12) Connect bonding jumpers, adjacent to right hand fin to fuselage fittings.

(13) Connect electrical cables at connector location on dorsal fin.

(14) On turbojet airplanes clip anti-icing wire bundle in base of fin.

(15) Connect rudder Q-spring inlet heater cable at connector location inside fin leading edge. Refer to Chapter 30, Q-Spring Inlet Anti-Icing.

(16) Remove fin support assembly and install adapter and restraining line on right-hand side of fin.

(17) Raise fin into vertical position. (See figure 203.)

CAUTION: TO PREVENT STRUCTURAL DAMAGE, DO NOT ALLOW INCLUDED ANGLE BETWEEN FIN CENTERLINE AND SLING CABLE TO BECOME LESS THAN 43°. AS FIN IS BEING RAISED TO VERTICAL POSITION, RESTRAIN IT WITH RESTRAINING LINE TO PREVENT DAMAGE DUE TO FIN FALLING OVER CENTER.

(18) Line up holes in fuselage and fin fittings using restraining line and install fin to fuselage attachment bolts with heads pointing forward.

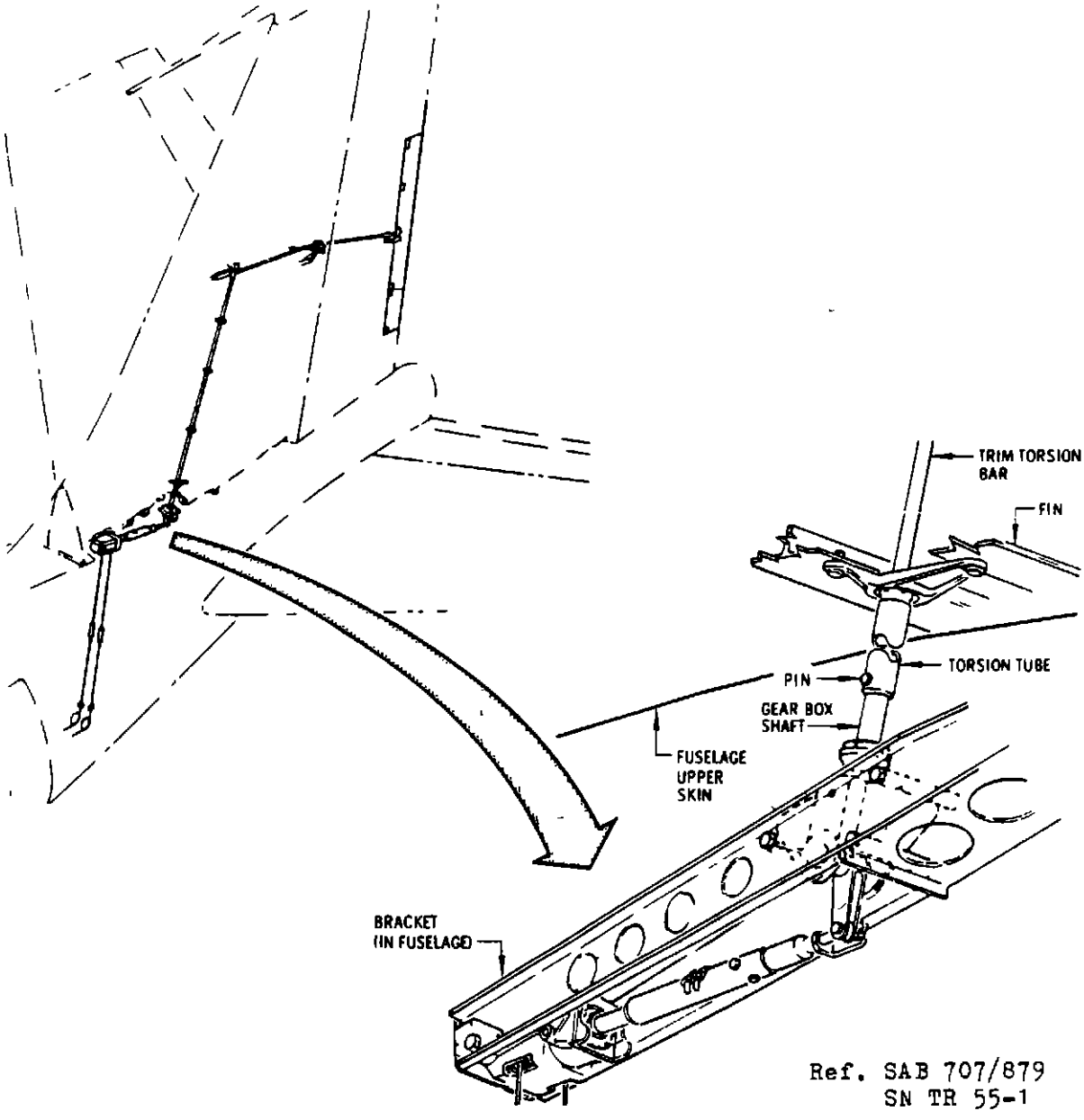
NOTE: Prior to installation clean bolts and holes with solvent and lubricate with grease.

(19) Tighten nuts on rear attachment fittings to 2200-3300 pound-inches torque.
CAUTION : CHECK FOR SPECIFIED GAP. (SEE FIGURE 206A)

(20) Tighten nuts on front attachment fittings finger tight only. Rotate to nearest cotter pin hole that will maintain specified gap. (See figure 205.)

(21) Remove adapter and upper sling attachment fittings.

(22) Replace original screws in attachment point holes.



Ref. SAB 707/879
SN TR 55-1

Rudder Trim Torsion Tube Installation
Figure 207
T.EG.CEL.

(23) Remove leading edge access panel 1505 Refer to Chapter 12, Access Doors and Panels.

(24) On turbojet airplanes connect anti-icing wire bundle at connector location at lower end of removable leading edge.

(25) Replace leading edge access panel 1505

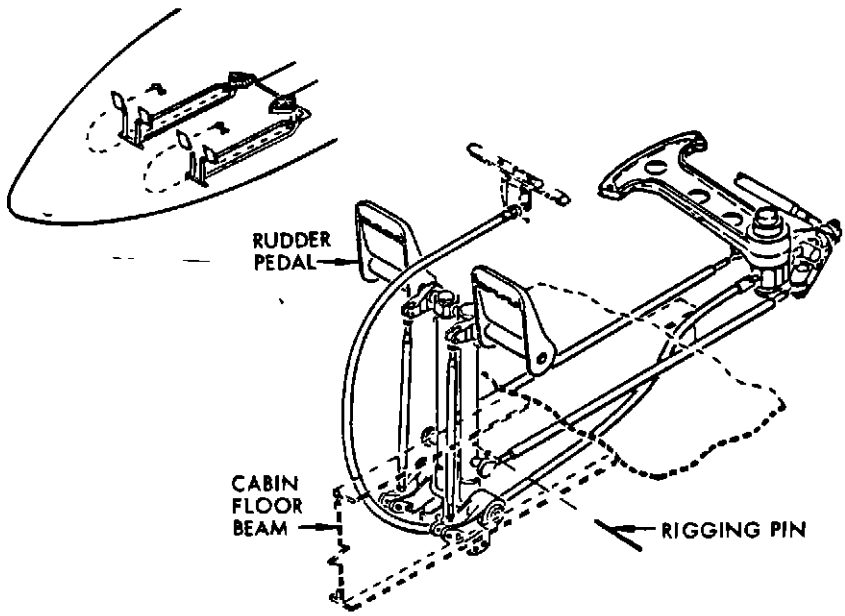
(26) Connect rudder control system cable turnbuckles.

(27) Connect torsion tube to rudder trim torsion bar by sliding tube up to engage splines so that pin hole is aligned. Install pin and cotter pin (See figure 207.)

(28) Remove pilot's and copilot's rudder pedal rigging pins (figure 208), and rudder aft control quadrant rigging pin (figure 209), and check for correct rigging of rudder controls. Refer to Chapter 27, Rudder.

(29) Remove plugs and connect hydraulic lines at base of fin.

CAUTION: ON ANY AIRPLANE NOT FITTED WITH A RUDDER HYDRAULIC MANUAL SHUTOFF VALVE, CHECK THAT THERE IS A RELIABLE ELECTRICAL POWER SUPPLY TO THE AIRPLANE BEFORE AND DURING REMOVAL OF PLUGS FROM DISCONNECTED HYDRAULIC LINES, AND RECONNECTION OF SUCH LINES. IN THE EVENT THAT THE AUXILIARY HYDRAULIC SYSTEM OF SUCH AN AIRPLANE BECAME PRESSURIZED, LOSS OF ELECTRICAL POWER WOULD DE-ENERGIZE THE VALVE SOLENOID AND ALLOW PRESSURE IN THE CAPPED LINES.



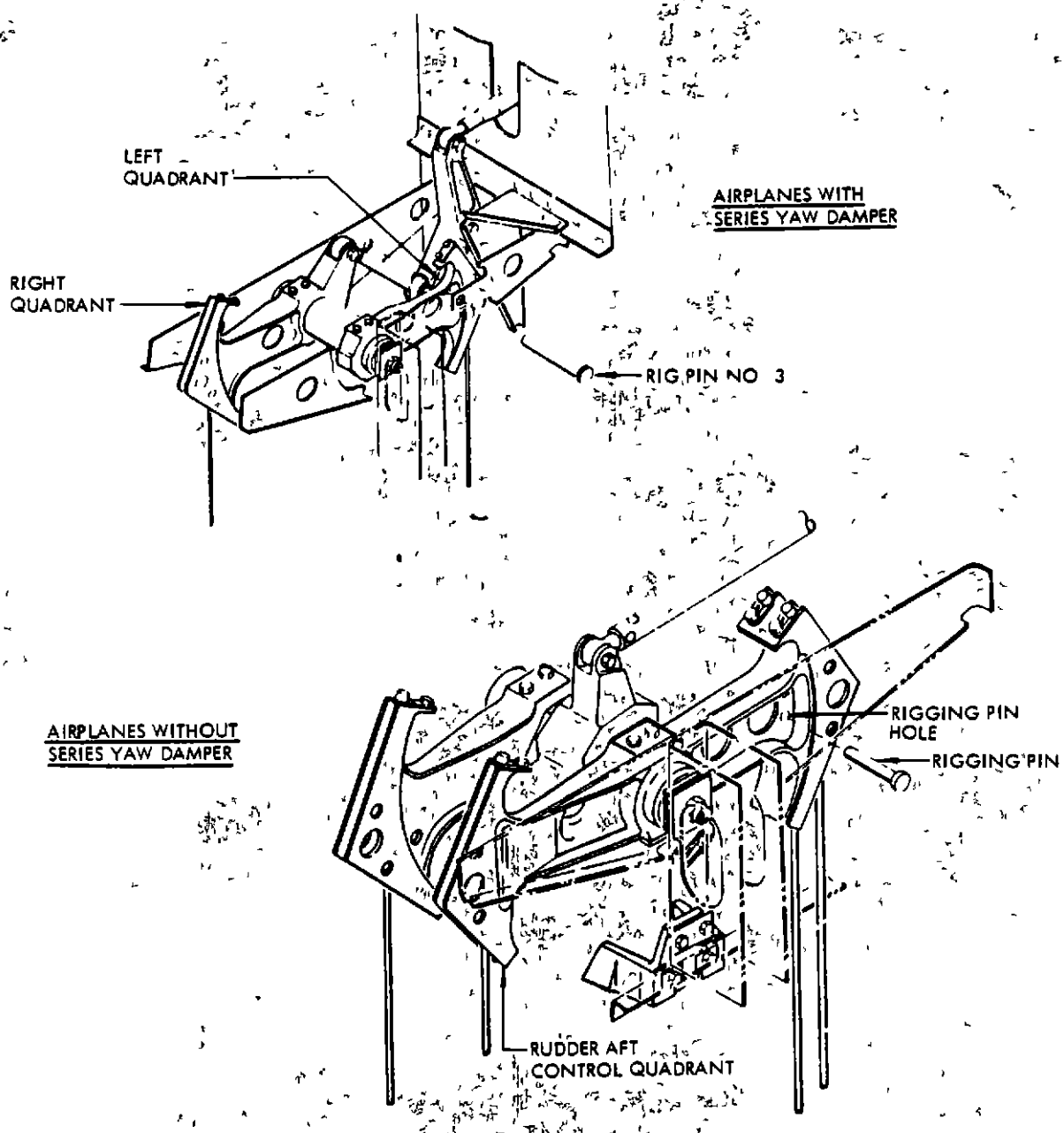
Rudder Pedal Rigging Pin Installation
Figure 208

(30) Bleed hydraulic system, and check for leaks in reconnected hydraulic lines under operating pressure.

(31) Replace fairings and access panels.

(32) Remove tail jack and inflate main gear oleos with clean, dry air per placard in wheel well.

(33) Test rudder operation. Refer to Rudder, Chapter 27.



Rudder Aft Control Quadrant Rigging Pin Installation
Figure 209

3. Inspection/Check Vertical Fin

A Equipment and Materials

(1) Scarf Joint Nut Remover Kit, F70145 or equivalent.

(2) Bolt Puller Kit, F70025 or equivalent

(3) Grease, MIL-C-16173 type II, Aeroshell Compound N° 2

B. Access - Vertical Fin

(1) Leading edge, tip, access doors, and fin to fuselage fairings. Refer to Chapter 12, Access Doors and Panels.

C Examine the following

(1) Skins for cracks, corrosion and loose fasteners, particularly at splices, spar chord attachments, and at access door cutouts.

(2) Front spar, rear spar and rib chords for cracks, distortion, loose fasteners and corrosion.

(3) Spar and rib webs and stiffeners for cracks, distortion, loose fasteners and corrosion

(4) Tip antenna for security.

(5) Leading edge attaching screws for specified torque (65 to 90 pound-inches.) A total of six screws may be missing from left and right surfaces of leading edge, provided a minimum of four screws remain between any two that are missing.

(6) Fuselage fin attachment fittings at stations 1440 and 1507 and adjacent structure for cracks and corrosion.

(7) Front and rear spar terminal fittings at end of spars for cracks and corrosion.

(8) Upper bolt and hole through rear spar terminal fitting (1, figure 210) for condition.

NOTE: Alternate left and right-hand bolt at each inspection interval.

(a) Remove scarf joint nut using remover kit

NOTE A 3/4-inch male/female extension 3 inches long is required to avoid contact with control tab torsion bar when applying torque to the right-hand scarf joint nut

(b) Remove bolt using puller kit

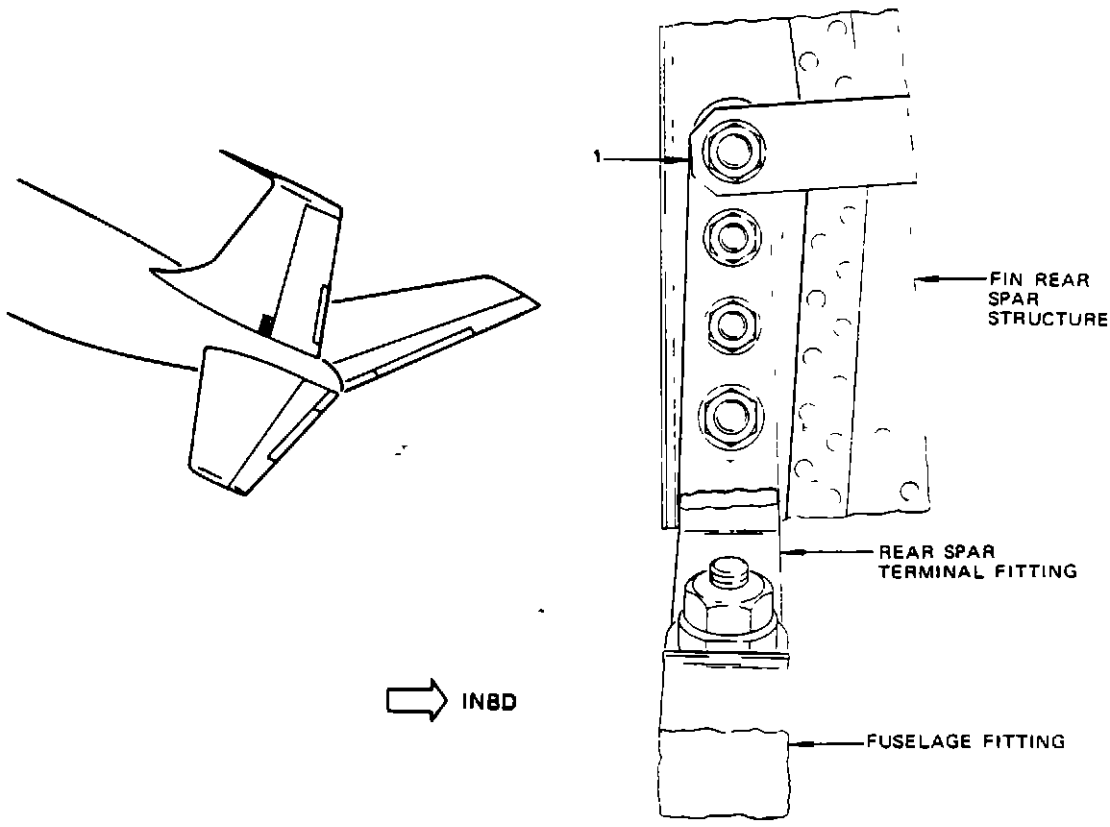
(c) Install bolt with grease

(d) Tighten nut within torque range of 2500 to 3000 pound-inches

NOTE Due to offset in F70145 wrench, the prescribed torque, 2500 to 3000 pound-inches, will be indicated on the torque wrench scale as follows R=LxT/L-E, where R= Reading on indicator scale of wrench, L= Effective moment arm of wrench, T= Prescribed torque of 2500 to 3000 pound-inches, E= Offset (1.75") on F70145 wrench

(9) Fin to fuselage attachment bolts and holes at front spar (1 and 2, figure 211) for wear and corrosion.

NOTE Alternate left and right hand bolt at each inspection interval



Rear Spar Lower Terminal Fitting
Figure 210

(a) Check existing bushings for corrosion and maximum wear dimensions.

(b) If existing bushings must be removed for any reason, proceed with the following before reinstallation of new bushings:

(1) Examine fitting hole surface for fatigue cracks by a sensitive, fluorescent penetrant inspection (Z L22, Super Pentrex or equivalent) and for corrosion.

(2) If cracks are detected, repair hole per paragraph 4.C.(1).

(3) If corrosion exists, repair per paragraph 4.B.(1).

(C) Install bolt with compound.

(d) Tighten nut to maintain required gap between washer and bushing.

(10) Fin to fuselage attachment bolts and holes at rear spar (3) for wear and corrosion.

NOTE Alternate left and right-hand bolt at each inspection interval.

(a) Examine terminal fitting hole as described in 3.C.(9)(a) and (b).

(b) Install bolt with compound.

(c) Tighten nut to 2200-3300 pound-inches torque.

(11) Bonded panels for failure or bonding.

(12) Water drain holes for clogging and water accumulation.

(13) On turbojet airplanes, deicing boot for rupture of stainless steel cladding.

4. Approved Repairs Vertical Fin

A. General

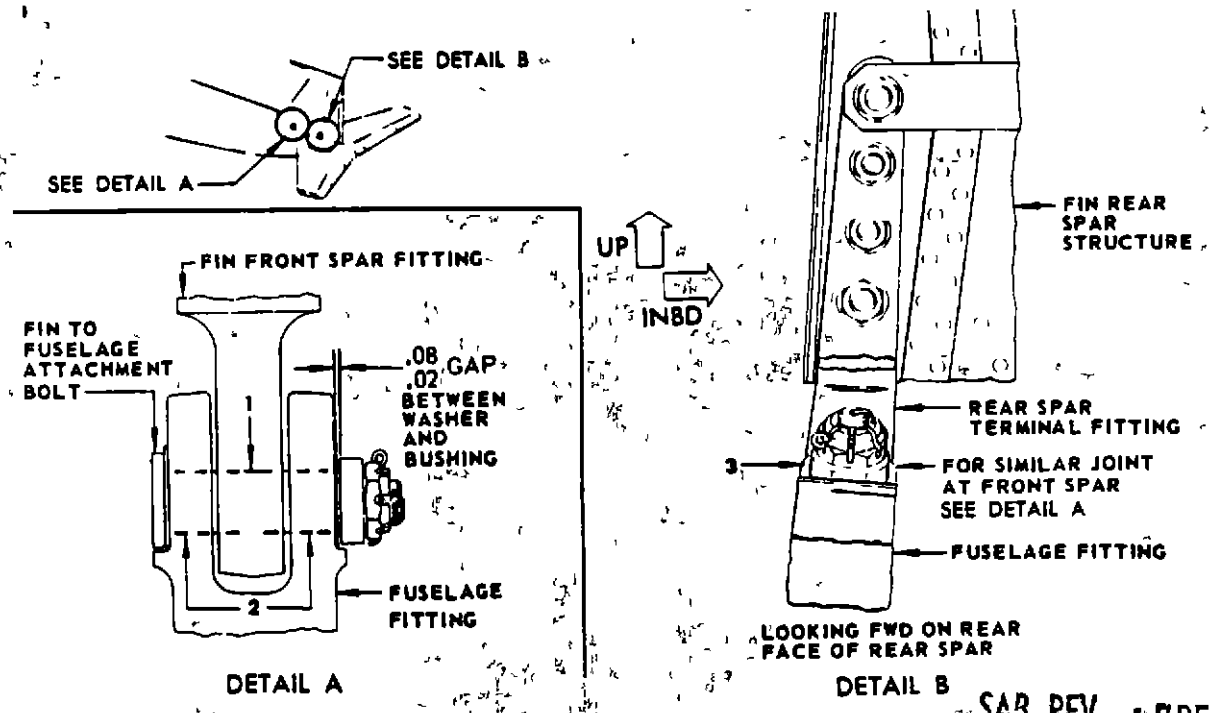
(1) Approved repair of fin to fuselage attachement bolt holes at front and rear spars entails reworking holes if excessive corrosion and cracking appear.

B. Repair Bolt Hole Corrosion

(1) If corrosion is detected after bushing removal, ream hole within limits of figure 211 (sheet 2 of 2) to remove corrosion and install oversize bushing.

C. Repair Bolt Hole Cracks

(1) If cracks are detected, the hole surface should be removed 0.03 inches deeper than the root of the detectable crack and an oversize bushing should be installed within limits of figure 211 (sheet 2 of 2).



Vertical Fin - Allowable Wear and Rework
Figure 211 (Sheet 1)

SAB REV 17 DEC 1966
May 15/66

	INDEX NO	DIM	DESIGN LIMITS DIAMETER MIN	DESIGN LIMITS DIAMETER MAX	WEAR LIMITS MAX WEAR DIM	WEAR LIMITS MAX DIAM CLEARANCE
F.S JOINT	1 & 2	ID	1 0000	1 0015	1 0040	0080
		OD	9949	9960	9945	
R.S JOINT	3	ID	1 5000	1 5015	1 5036	0076
		OD	1 4949	1 4960	1 4931	

NOTE All dimensions are in inches

BUSHING REPLACEMENT			
LOCATION	65 99574	BUSHING OD	FITTING HOLE SIZE
FIN FRONT SPAR	71	1 1265 (+0 0004/ 0 0003)	1 1250 TO 1 1258
FIN FRONT SPAR	-60	1 1466 (+0 0004/ 0 0003)	1 1450 TO 1 1458
FIN FRONT SPAR	-61	1 1666 (+0 0004/ 0 0003)	1 1650 TO 1 1658
FIN FRONT SPAR	62	1 1866 (+0 0004/ 0 0003)	1 1850 TO 1 1858
FIN REAR SPAR	72	1 6270 (+0 0004/ 0 0005)	1 6250 TO 1 6258
FIN REAR SPAR	-63	1 6470 (+0 0004/ 0 0005)	1 6450 TO 1 6458
FIN REAR SPAR	-64	1 6670 (+0 0004/ 0 0005)	1 6650 TO 1 6658
FIN REAR SPAR	-65	1 6870 (+0 0004/-0 0005)	1 6850 TO 1 6858

NOTE ALL DIMENSIONS ARE IN INCHES

SLEEVE BUSHING FITTINGS REQUIRING FLANGED BUSHINGS AS REPLACEMENT MUST BE REWORKED PER BOEING SERVICE BULLETIN 2174.

FLANGED BUSHING FITTINGS REQUIRING FLANGED BUSHINGS AS REPLACEMENT MUST BE REWORKED PER ABOVE TABLE

REPLACEMENT WITH BUSHINGS NOT LISTED IN ABOVE TABLE MUST BE APPROVED BY BOEING

See Drawing 1- 6365 pages 1 and 2

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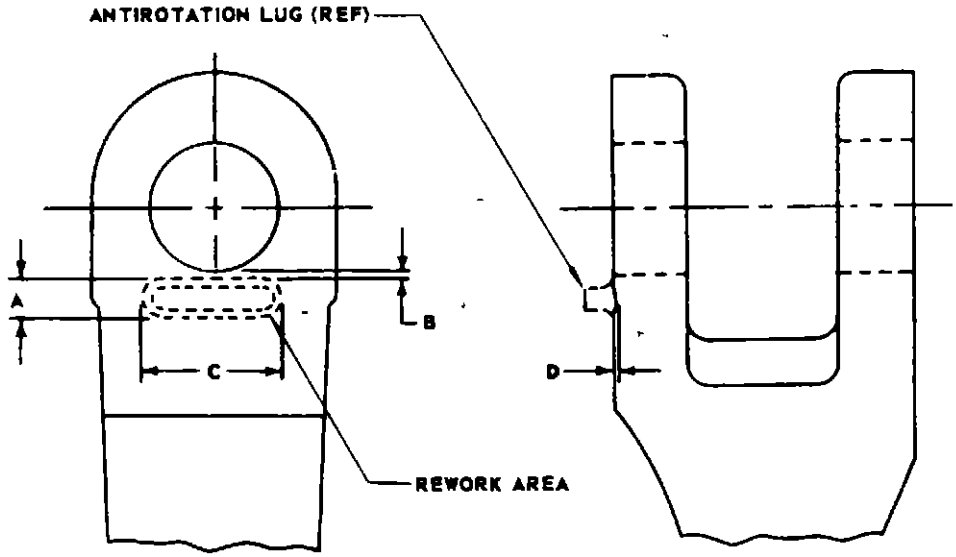
D. Repair antirotation lug on vertical fin aft terminal fitting.

(1) If the antirotation lug develops a crack, remove the lug using rotary file. (Do not grind.)

(2) Blend out face of fitting approximately as shown on figure 212. Polish reworked area to a 63 microinch finish using #280 wet-or-dry sandpaper.

(3) Perform dye penetrant inspection of repaired area.

(4) Apply several coats of zinc chromate primer to reworked area.



Vertical Fin Antirotation Lug Repair
Figure 212

E. Repair Vertical Fin Static Pins

	Min. Rework Dia. Before Plating	Grind Chrome Finished Dia.
Rear Spar Terminal Pin	1.4745	1.4949 - 1.4960
Front Spar Terminal Pin	0.9760	0.9949 - 0.9960

Bolts are to be reworked following drawings 1-45459 (Rear Spar) and 1-45460 (Front Spar).

Vertical Fin Static Pin Rework Limits
Figure 213

SB 902

FIN LEADING EDGE - MAINTENANCE PRACTICES

1. Removal/Installation Fin Leading Edge

A. Remove Fin Leading Edge

(1) On turbojet airplanes open all empennage deicing circuit breakers on main a-c power shield (J6) and radio and T-R circuit breaker panel (P5).

(2) Remove leading edge access panel 1505. Refer to Chapter 12, "Access Doors and Panels."

(3) On turbojet airplanes disconnect anti-icing wire bundle at bottom end of removable leading edge.

(4) Remove screws attaching leading edge to front spar and leading edge ribs at top and bottom.

(5) Remove leading edge, and support on a well padded cradle.

B. Install Fin Leading Edge

(1) On turbojet airplanes check that all empennage deicing circuit breakers on main a-c power shield (J6) and radio and T-R circuit breaker panel (P5) are open.

(2) Support leading edge in place and install screws along front spar and leading edge ribs at top and bottom.

NOTE: Torque screws within a torque range of 65 to 90 pound-inches.

(3) On turbojet airplanes connect anti-icing wire bundle at bottom end of removable leading edge.

(4) Install leading edge access panel 1505. Refer to Chapter 12, "Access Doors and Panels."

FIN TIP - MAINTENANCE PRACTICES

1. Removal/Installation Fin Tip

A. Equipment and Materials

(1) Solvents

(a) Methyl ethyl ketone

(b) Toluene

(2) Rubber Cement EC 1403. Minnesota Mining and Manufacturing Co.

B. Remove Fin Tip

(1) Open the H.F. No. 1 and Loran circuit breakers on radio and T-R circuit breaker panel (P5).

(2) Remove fin tip lightning arrester access panel 1529, HF antenna coupler access panel 1531, Loran coupler access panel 1532, and open HF antenna coupler access door 1530. (See figure 201)

(3) Remove the rain erosion shoe in the following manner. Starting at the lower edge of the shoe apply solvent (methyl ethyl ketone or toluene) to the seam line at the same time peeling back shoe.

NOTE: For removal of fin tip as a whole, or forward tip fairing alone, it is only necessary to peel back enough of the shoe to uncover screws securing the probe fairing to leading edge rib. If the shoe is not torn or damaged during this peeling back, it can easily be re-cemented on installation. However, if shoe is damaged in any way it should be removed completely and a new one installed when fin tip is replaced.

(4) Disconnect and unclip cables to HF coupler and Loran antenna coupler. Pull cable and connector from latter through conduit into bay just aft of coupler bay.

(5) Remove screws attaching forward fairing bulkhead to closure rib.

(6) Remove screws attaching forward tip fairing around fin leading edge, closure rib chord and mid fairing bulkhead chord.

(7) Disconnect by sliding forward, the HF antenna connector from lightning arrester assembly.

(8) Remove forward tip fairing complete with HF probe antenna

(9) Remove screws attaching mid fairing forward and aft bulkheads to fin closure rib.

NOTE If just the mid fairing or coupler bay area requires maintenance it can be removed, separately from the aft fairing, at this time by removing screws around left side of mid fairing aft bulkhead and along left side of fin closure rib.

(10) Remove screws from inside forward end of aft fairing, gaining access through hole in aft bulkhead on mid fairing.

(11) Remove screws attaching mid and aft fairing to fin closure rib chord.

(12) Remove fairing complete with HF coupler, lightning arrester and Loran antenna assembly.

CAUTION: CARE MUST BE TAKEN WHEN REMOVING FIN TIP TO INSURE THAT ALL CABLES ARE FREE TO BE WITHDRAWN FROM TIP AND WILL NOT BE SUBJECT TO DAMAGE.

C. Install Fin Tip

(1) Open the H.F. No. 1 and Loran circuit breakers on radio and T-R circuit breaker panel (P5).

(2) Place mid and aft tip fairing in position on fin closure rib, routing cables through fairing structure to HF and Loran antenna units. (See figure 201)

(3) Install screws attaching fairings to closure rib chords.

(4) Install screws inside forward end of aft fairing, gaining access through hole in aft bulkhead on mid fairing.

(5) Install screws attaching mid fairing forward and aft bulkheads to fin closure rib.

(6) Place forward tip fairing in position on fin closure rib and install screws attaching fairing, around fin leading edge, closure rib chord and mid fairing bulkhead chord.

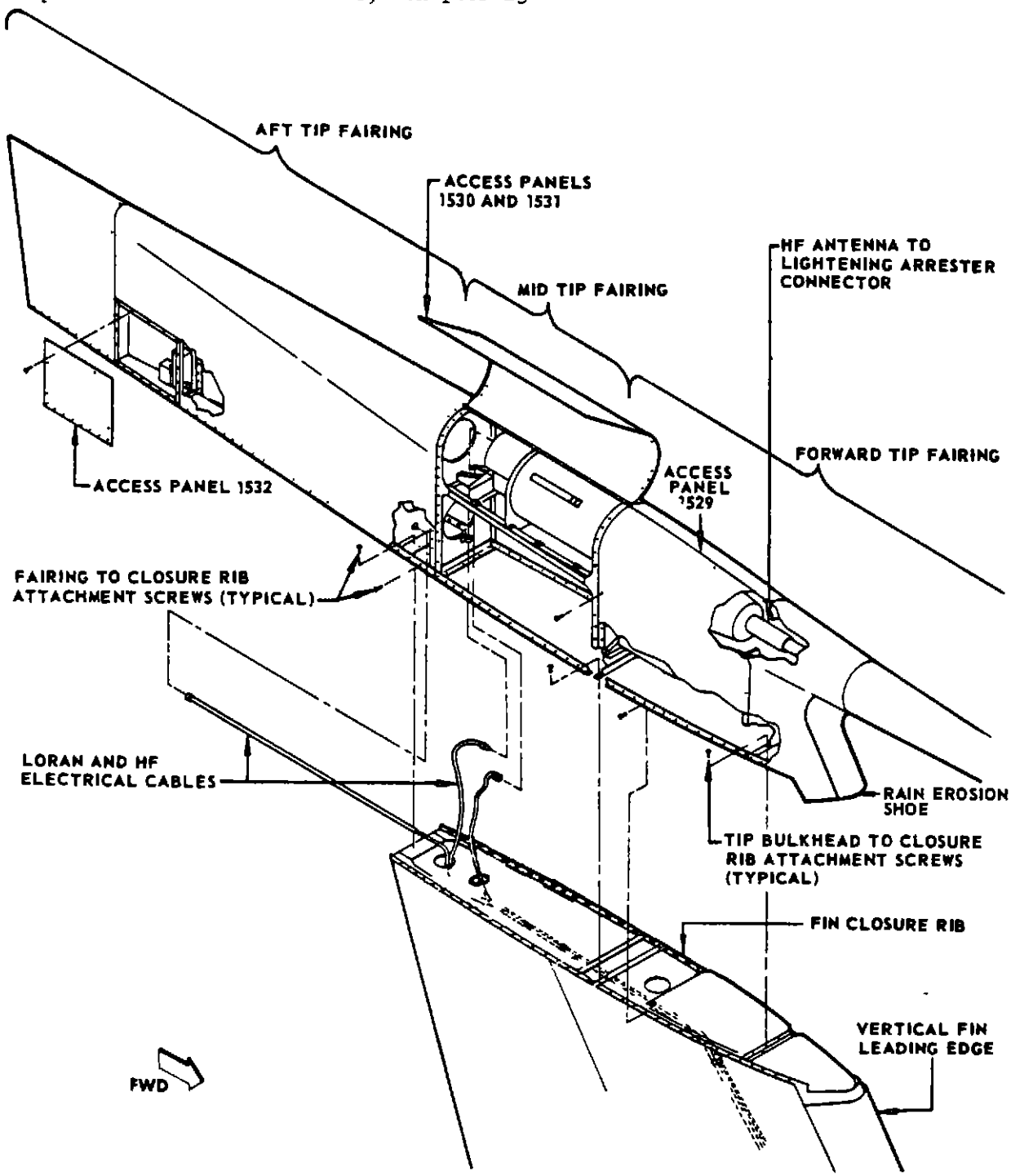
(7) Install screws attaching forward fairing bulkhead to closure rib

(8) Connect, by sliding aft, the HF antenna connector to the lightning arrester assembly.

(9) Connect and clip cables to HF coupler and Loran antenna coupler.

(10) Install fin tip lightning arrester access panel 1529, HF antenna coupler access panel 1531, Loran coupler access panel 1532, and close HF antenna coupler access door 1530.

(11) Install rain erosion shoe on leading edge of probe fairing Refer to "Erosion Shoe," Chapter 13



Fin Tip Installation
Figure 201

1 Removal/Installation Fin Tip

A Equipment and Materials

(1) Solvents

(a) Methyl ethyl ketone

(b) Toluene

(2) Rubber Cement EC 1403 Minnesota Mining and Manufacturing Co

B Remove Fin Tip

(1) Open the H F N° 1 and Loran circuit breakers on radio and T-R circuit breaker panel (P5)

(2) Remove fin tip lightning arrester access panel 1529, open HF antenna tuner access door 1530, remove access panel below access door 1530, and remove Loran tuner access panel 1528 (See figure 201)

(3) Remove the rain erosion shoe in the following manner Starting at the lower edge of the shoe apply solvent (methyl ethyl ketone or toluene) to the seam line at the same time peeling back shoe

NOTE For removal of fin tip as a whole, or forward tip fairing alone, it is only necessary to peel back enough of the shoe to uncover screws securing the probe fairing to leading edge rib If the shoe is not torn or damaged during this peeling back, it can easily be re-cemented on installation However, if shoe is damaged in any way it should be removed completely and a new one installed when fin tip is replaced

(4) Disconnect and unclip cables to HF tuner and Loran antenna tuner

NOTE On some airplanes two HF tuners are installed

(5) Remove screws attaching forward fairing bulkhead to closure rib

(6) Remove screws attaching forward tip fairing around fin leading edge, closure rib chord and mid fairing bulkhead chord

(7) Disconnect by sliding forward, the HF antenna connector from lightning arrester assembly.

(8) Remove forward tip fairing complete with HF probe antenna

(9) Remove screws attaching mid fairing forward and aft bulkheads to fin closure rib

NOTE On airplanes installed with two HF tuners it will be necessary to remove the lower tuner and its forward mounting plate in order to remove screws attaching forward bulkhead to fin closure rib Refer to Chapter 23, "Communications"

(10) Remove screws attaching aft fairing to fin structure
Remove fairing complete with HF coupler, lightning arrester and Loran antenna assembly

CAUTION CARE MUST BE TAKEN WHEN REMOVING FIN TIP TO INSURE THAT ALL CABLES ARE FREE TO BE WITHDRAWN FROM TIP AND WILL NOT BE SUBJECT TO DAMAGE

C Install Fin Tip

(1) Open the H F N° 1 and Loran circuit breakers on radio and T-R circuit breaker panel (P5)

(2) Place mid and aft tip fairing in position on fin closure rib, routine cables through fairing structure to HF and Loran antenna units (See figure 201)

(3) Install screws attaching aft fairing to fin structure

(4) Install screws attaching mid fairing forward and aft bulkheads to fin closure rib

(5) Install lower HF tuner mounting plate and lower HF tuner if these were removed Refer to Chapter 23, "Communications"

(6) Place forward tip fairing in position on fin closure rib an install screws attaching fairing, around fin leading edge, closure rib chord and mid fairing bulkhead chord

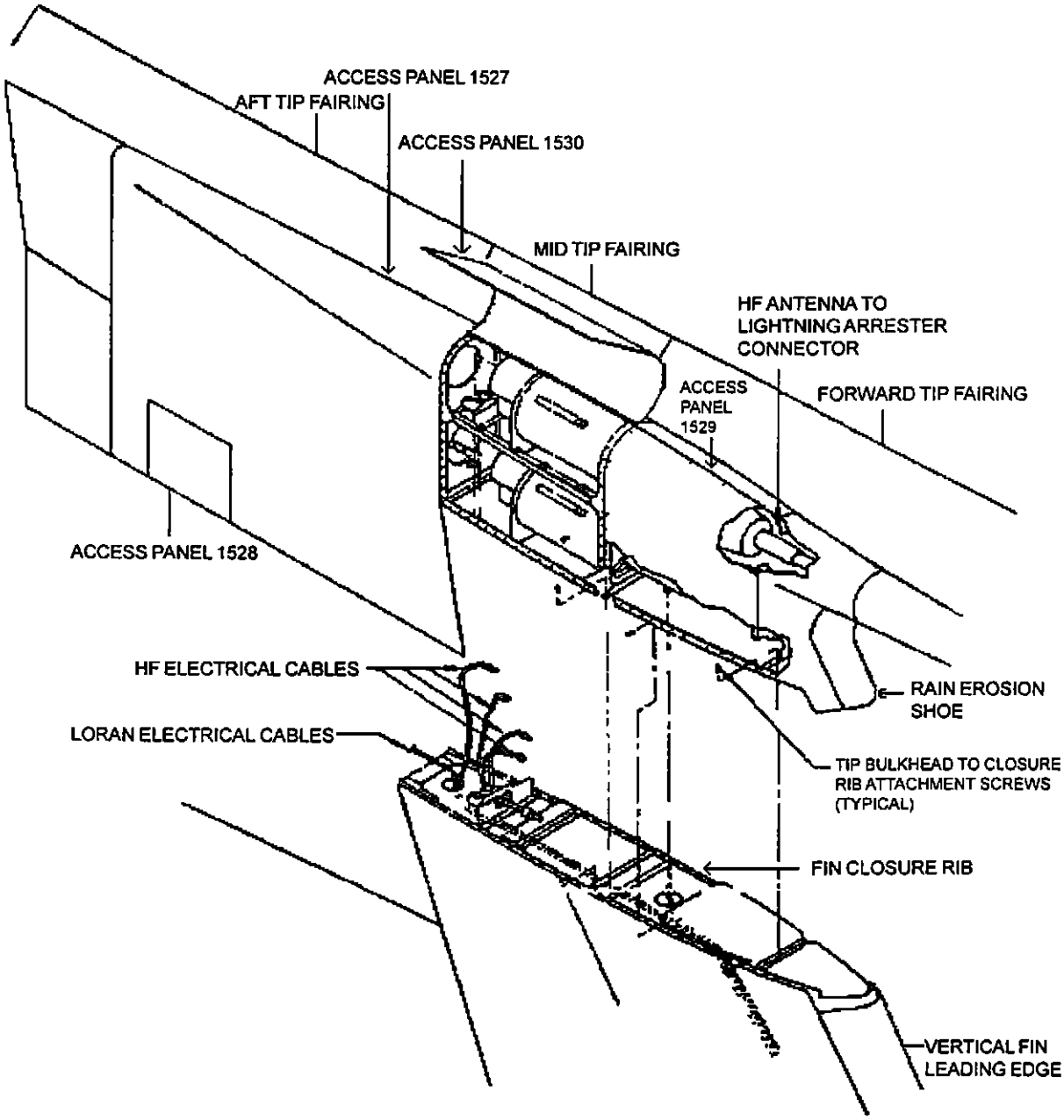
(7) Install screws attaching forward fairing bulkhead to closure rib

(8) Connect, by sliding aft, the HF antenna connector to the lightning arrester assembly

(9) Connect and clip cables to HF tuner(s) and Loran antenna coupler

(10) Install fin tip lightning arrester access panel 1529, close HF antenna tuner access door 1530, install access panel below access door 1530, and install Loran tuner access panel 1528, and close HF antenna coupler access door 1530

(11) Install rain erosion shoe on leading edge of probe fairing Refer to "Erosion Shoe", Chapter 13



Fin Tip Installation
Figure 201

DORSAL FIN - MAINTENANCE PRACTICES

1. Removal/Installation Dorsal Fin

A. Remove Dorsal Fin

(1) Remove dorsal fin access panel, 1534 (See figure 201.)

(2) Open the two master radio power switches on radio and TR circuit breaker panel (P5).

(3) Disconnect electrical cables at disconnect panel within dorsal fin.

(4) Unclip cables from dorsal fin aft rib.

(5) Remove lower ceiling panels and insulation blankets within aft fuselage, station 1340 to pressure bulkhead station 1440 to gain access to dorsal fin attachment bolts.

(6) Remove dorsal fin attachment bolts.

NOTE. To facilitate installation, note type and location of bolts.

(7) Lift dorsal fin away from fuselage, withdrawing electrical cables through cutout in dorsal fin aft rib.

B. Install Dorsal Fin

(1) Check that the two master radio power switches on radio and TR circuit breaker panel (P5) are in open position.

(2) Place dorsal fin in position on fuselage, passing electrical cables through cutout in dorsal fin aft rib. (See figure 201.)

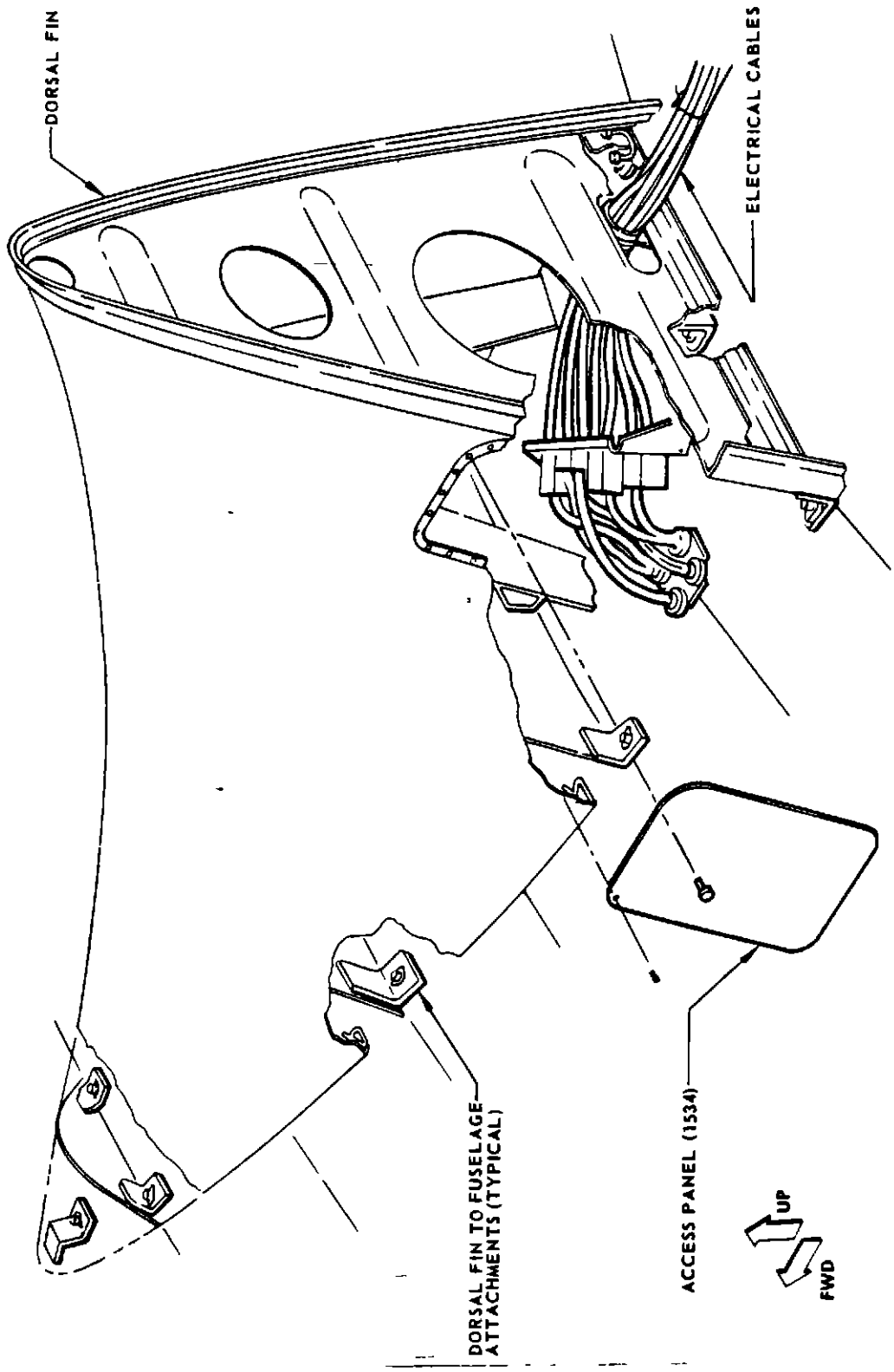
(3) Install attachment bolts with pressure sealant from within fuselage. For sealant application refer to "Sealing", Chapter 51.

(4) Connect electrical cables to panel within dorsal fin.

(5) Clip cables to dorsal fin aft rib.

(6) Replace insulation blanket and lower ceiling panel within aft fuselage.

(7) Install dorsal fin access panel, 1534.



Dorsal Fin Installation
Figure 201

Rudder Power Actuator Clevis Fitting P/N 65-68392-3

Description Airplanes which have a Rudder Actuator Aft Support Fitting with 7079T6 material installed, are modified per Service Bulletin 3042 (NA 05-55-15) by installation of a clevis-fitting bolted on aft Fitting

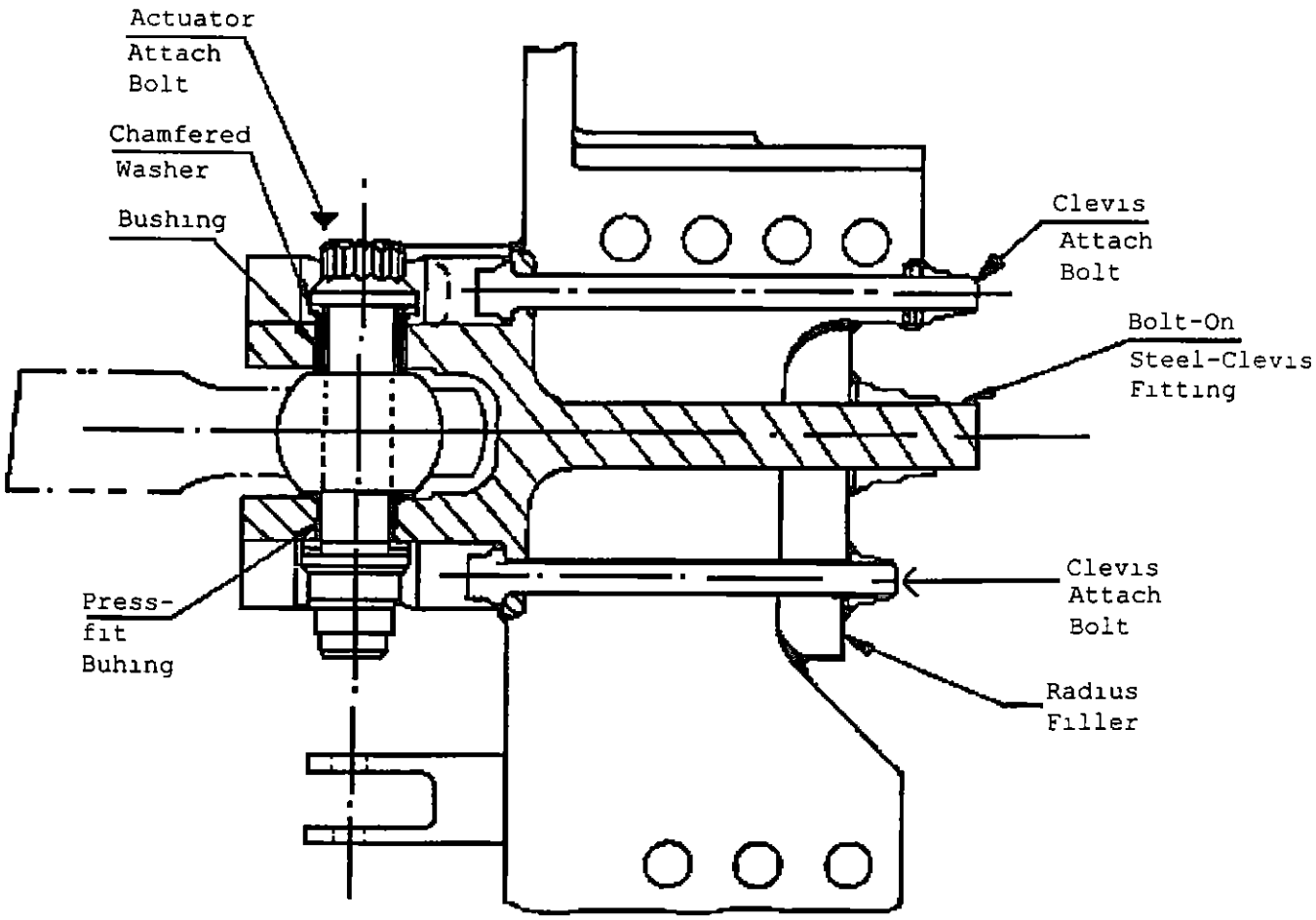


Figure 1

MAINTENANCE PRACTICES

Normal torque range of actuator attach bolt is 1300-1500 inch lbs

If by loosening the actuator attach bolt the torque value is below 800 inch lbs, proceed as follows ·

1 Remove upper bushing from clevis fitting and check for abrasion Diameter limits see table 1

1 1 Further check, whether inner bearing ball can be rotated within a torque value of 120 inch lbs maximum

2 If no abrasion on bushing and clevis fitting is found, reinstall bushing using BM3 5-26A sealant and install actuator attach bolt Torque range of bolt 1300-1500 inch lbs (see DWG 69-63432 [6]) Apply inspection seal on bolt and nut

3 If abreasion on bushing is found, but no abrasion on upper hole of clevis fitting, change bushing
Obtain diameter limits given in Table 1A for non reworked fittings, resp Table 1B for reworked fittings P/N 65-68392-3 DLH Install bushing per step 2

4 If abrasion is found on upper hole of clevis fitting and Limits are exceeded, remove fitting Overhaul of clevis fitting assy see TBH-G, Chapter 55-40-01

5 An oversize bushing is required when the upper hole has been reworked, to obtain maximal clearance between hole diameter of clevis fitting and OD of bushing This clearance shall not exceed 0021 inches (0 053 mm)

6 Flanged bushings with deflected flanges may be serviceable, if upper lug of clevis comes not in contact with the flange

Part	Design Limits		Rework Limits	Clearance between Bushings + Clevis-Fitting-Hole	
	min	max		min	max
Bushing 65-25465-1	71" ID 19,05 mm	72" 19,09 mm		- 0 09" [1] - 0 023 mm	- 003" [1] - 0 076 mm
	8769" OD 22 241 mm	8776" 22 273mm			
Bushing 65-25465-2	7510" ID 19,07 mm	7520" 19,10 mm		+/- 000" +/- 0,00 mm	- 0021" - 0,053 mm
	8739" OD 22,197 mm	8746" 22,215 mm			
lower hole of clevis fitting	8746" 22,215 mm	8760" 22,250 mm			
upper hole of clevis-fitting	8746" 22,215 mm	8760" 22,250 mm	Rework per TBH-G, Chapter 55-40-01		

[1] press fit

Table 1 A

Tolerances and Rework Limits

for non reworked Fitting P/N 65-68392-3

Part		Design Limits		Rework Limits	Clearance between Bushings + Clevis-Fitting-Hole	
		min	max		min	max
Bushing 66-25465-1	ID	71" 19,05 mm	72" 19,09 mm		- 0 09" [1] - 0 023 mm	- 003" [1] - 0 076 mm
	OD	8769" 22 241 mm	8776" 22 273mm			
Bushing 66-25465-3	ID	7510" 19,07 mm	7520" 19,10 mm		000" 0,00 mm	0021" 0,050 mm
	OD	9989" 25,37 mm	9996" 25,39 mm			
lower hole of clevis fitting		8746" 22,215 mm	8760" 22,250 mm			
upper hole of clevis-fitting		9996" 25,39 mm	1 0010" 25,42 mm	up to 1 125" (28,575 mm) is satisfactory [2]		

[1] press fit

[2] fabricate O/S=bushing

Table 1 B

Tolerances and Rework Limits

for non reworked Fitting P/N 65-68392-3 DLH

REMOVAL-INSTALLATION

A Removal

1 Disconnect Rudder Power Control Unit in accordance with MM (TBH-A) Chapter 27-17-121

1 1 Remove attach bolt, obtain torque value, when loosening nut

2 Remove upper flanged bushing from clevis fitting

3 Remove the two clevis attach bolts

4 Remove bolt-on steel clevis

B Installation

1 Install bolt-on steel clevis using BMS 5-26A sealant at all faying surfaces with the rudder fitting and under radius filler tighten nut (BACN10HR12) within torque range of 2400-3100 inch pounds

2 Install the two clevis attach bolts using BMS5-26A sealant under head and shaft Tighten nuts (BACN10HR6) within torque range of 300-500 inch pounds

3 Apply a continuous fillet seal (BMS5-26A) to all open edges between clevis- and rudder-fitting, and on bolt ends

4 Install upper bushing with BMS5-26A sealant

5 Install actuator attach bolt using Aeroshell Grease 17 on bolt-Shaft Avoid that grease migrates into bolt thread The bolt thread has to be completely dry and free of any grease, oil and sealant to obtain a proper torque, value.

6 Tighten nut within torque range 1300-1500 inch lbs Apply inspection seal on bolt end and nut

7 Spray entire support fitting with water displacing corrosion inhibitor, such as LPS-3 or equivalent

NOTE Inhibitor may not come incontact with Teflon

NOTE See Chapter 27-17-121 for restoring airplane to normal