

AIRCRAFT AND MAINTENANCE PARTS

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REVISED

NORTH AMERICAN—INSTALLATION OF METAL-COVERED ELEVATORS—

P-51D, P-51K, F-6D, AND F-6K + HORIZ TO 1/2°

NOTE As prescribed in T. O. No. 00-20A, appropriate reference to this Technical Order will be entered on AAF Forms 60-A for the aircraft affected. The work directed herein will be accomplished as soon as possible and not later than the next 100-hour inspection period by service activities with the aid of base maintenance facilities, if necessary. Spare vertical stabilizers, part Nos. 73-23001-100 and 73-23001-300, and spare horizontal stabilizers, part No. 73-21001-200, in stock, will be reworked as outlined in paragraph 4.

1. a. During dives in which the pilots' indicated air speed, corresponding to 75 percent of the speed of sound is approached or exceeded, and during dives to very high indicated air speeds, the airplanes may be subjected to severe longitudinal oscillations. (Also termed pitching or porpoising.) This phenomenon has been attributed to bulging of the fabric on the elevators. In order to improve the dive characteristics, metal-covered elevators will be installed, and the angle of incidence of the horizontal stabilizer will be reduced to 1/2 degree on the following listed airplanes in accordance with the instructions contained in paragraph 2.

MODEL	AF SERIAL NOS.
P-51D and F-6D	44-11153 to 44-11352 inclusive
	44-13253 to 44-15752 inclusive
	44-63160 to 44-64159 inclusive
	44-72027 to 44-73826 inclusive
P-51K and F-6K	44-11353 to 44-12752 inclusive

b. The following airplanes, and all subsequent P-51D and P-51K airplanes, will be modified by the contractor prior to delivery:

MODEL	AF SERIAL NOS.
P-51D and F-6D	44-12853 to 44-13252 inclusive
	44-73827 to 44-75026 inclusive
	44-84390 to 44-84989 inclusive
P-51K and F-6K	44-12753 to 44-12852 inclusive

2. The instructions for accomplishing this change, as contained in North American Service Bulletin P-51-296, are as follows:

2. REMOVAL OF ELEVATORS AND RUDDER.

NOTE Paragraphs 2.a.(1) to (5) inclusive apply to both elevators.

- (1) Disconnect the elevator trim tab actuating rod at the trim tab.
- (2) Remove all stabilizer fillets and the dorsal fin from the airplane.

- (3) Disconnect the elevator from the elevator horn assembly located between the elevators by removing the three attaching bolts and nuts.

- (4) Remove the bolt from the elevator outboard hinge fitting. Support the elevator and remove the bolt from the elevator center hinge fitting.

- (5) Guide the elevator straight aft from the horizontal stabilizer until it clears the trim tab rod.

- (6) Disconnect the rudder trim tab actuating rod at the trim tab and remove the rod fairing from the rudder.

- (7) Remove the metal cap from the bottom of the rudder and disconnect the rudder actuating rod at the lower hinge casting.

- (8) Remove the bolt from the upper and lower hinge fittings. Support the rudder, remove the bolt from the center hinge fitting, disconnect the navigation light wire, and guide the rudder straight aft from the vertical stabilizer until it is clear of the trim tab rod.

b. REMOVAL OF VERTICAL AND HORIZONTAL STABILIZERS.

- (1) Disconnect the transmitter antenna at the top of the vertical stabilizer.

- (2) Tape the rudder trim tab cables to the drum in the vertical stabilizer and in the cockpit to facilitate reinstallation. Disconnect the trim tab drum an lower it through the lightning holes in the vertical stabilizer.

- (3) Disconnect the elevator upper control cable at the elevator horn. Tie the cables to maintain proper tension.

- (4) Remove the bolts and nuts securing the forward spar of the vertical stabilizer to the horizontal stabilizer.

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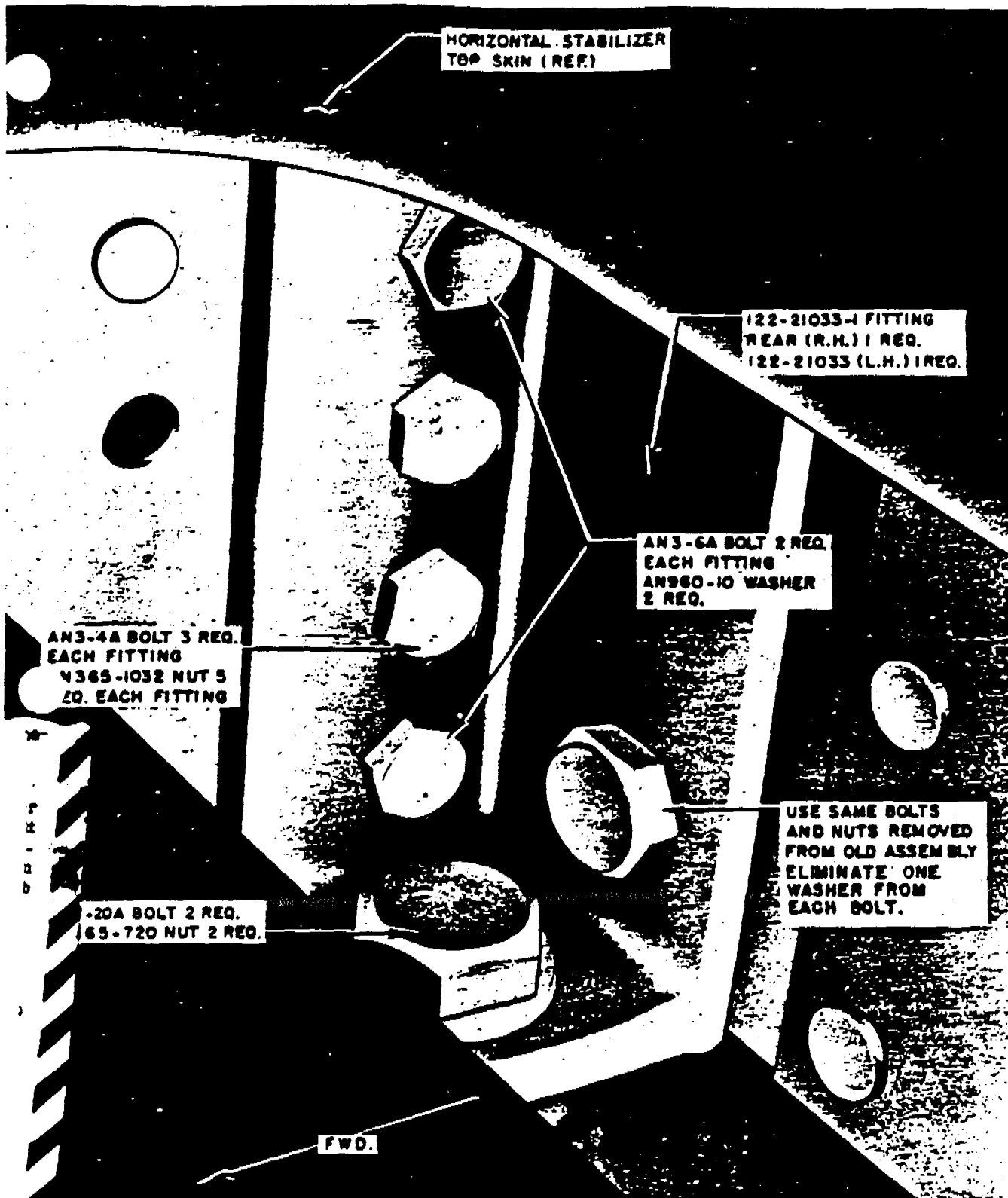


Figure 1 - View Showing Rear Casting Installed - Horizontal Stabilizer

5) Remove the bolts and nuts securing the vertical stabilizer to the fuselage and remove the stabilizer from the airplane.

Remove the access covers from the upper surface of the horizontal stabilizer and tape the trim

tab cables to the drums. Also tape cables to drum in cockpit.

(7) Ascertain that the elevator trim tab cables are identified at both ends of the turnbuckles in the aft section of the fuselage; then disconnect the cables

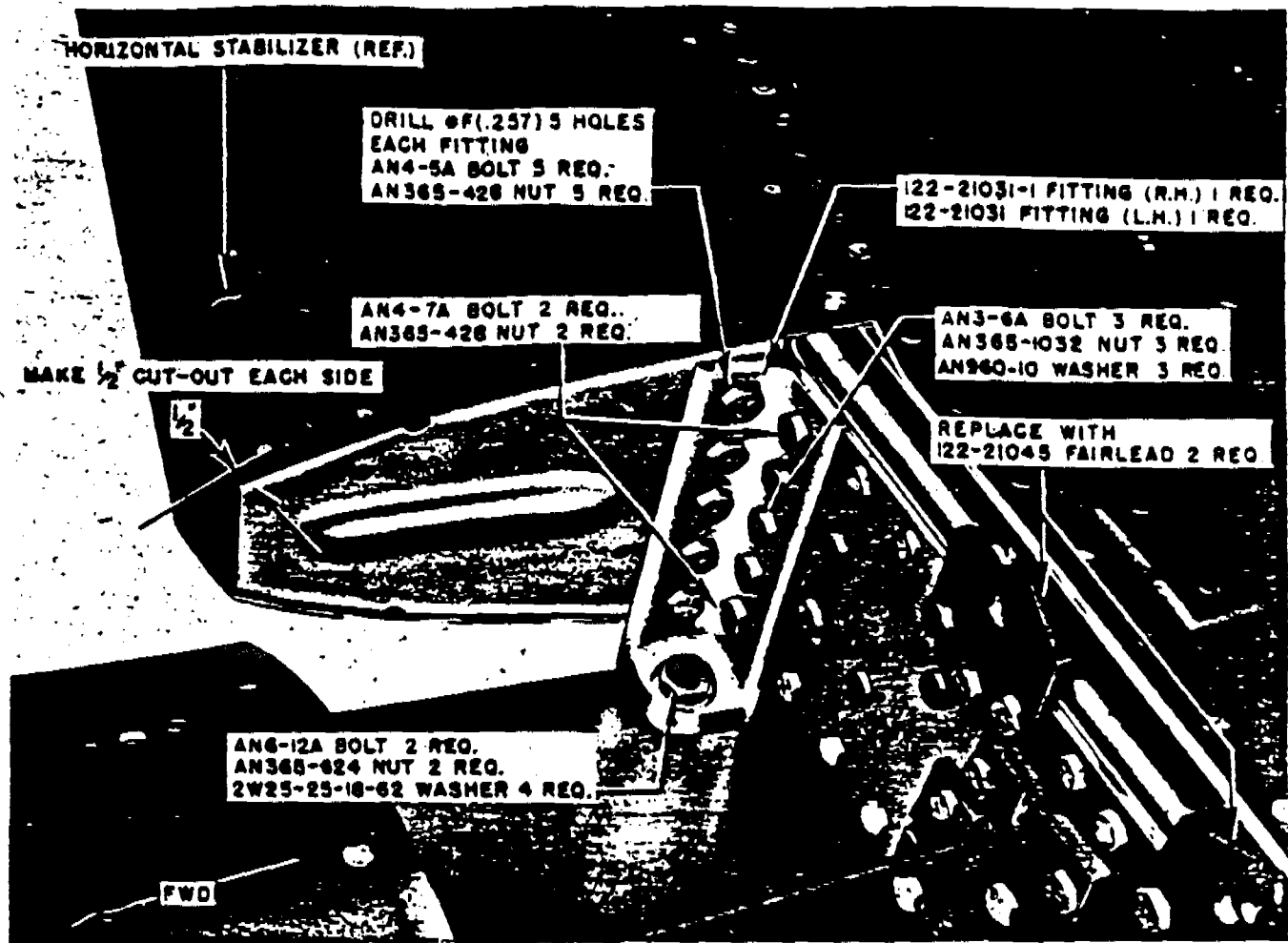


Figure 2 - View Showing Front Casting Installed - Horizontal Stabilizer

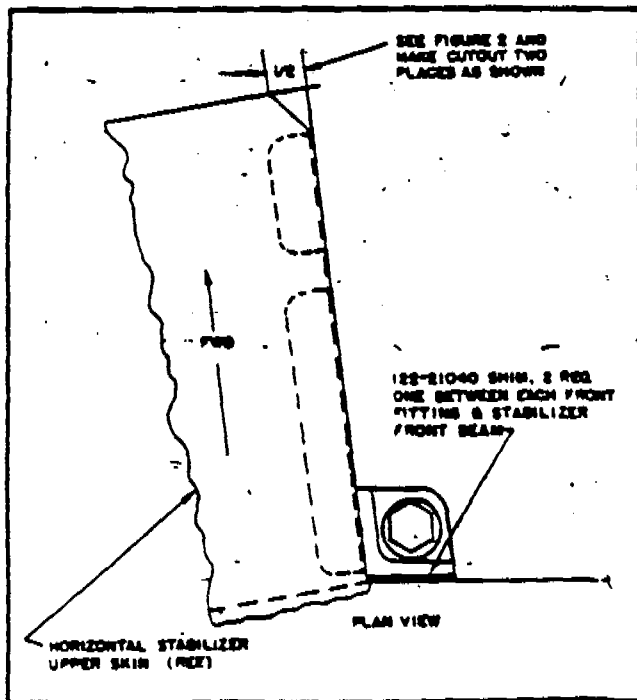


Figure 3 - Front Fitting Installed

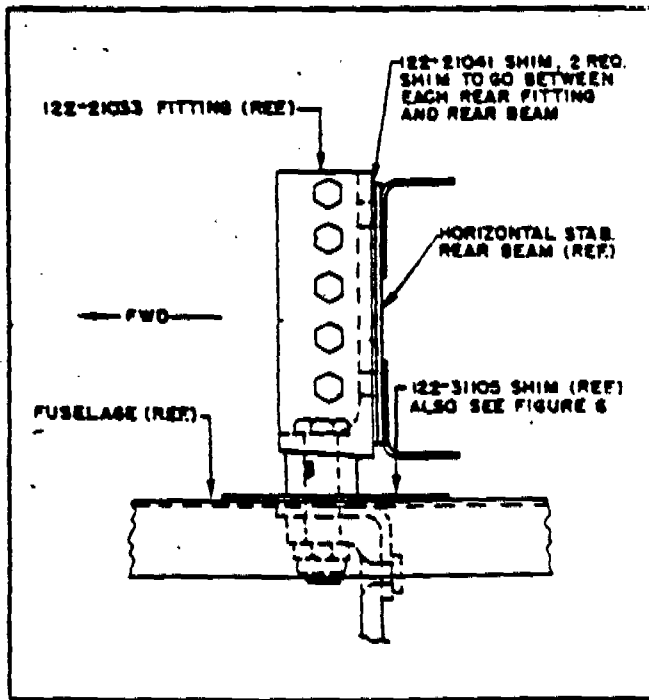


Figure 4 - Looking Inboard - Rear Fitting Installed

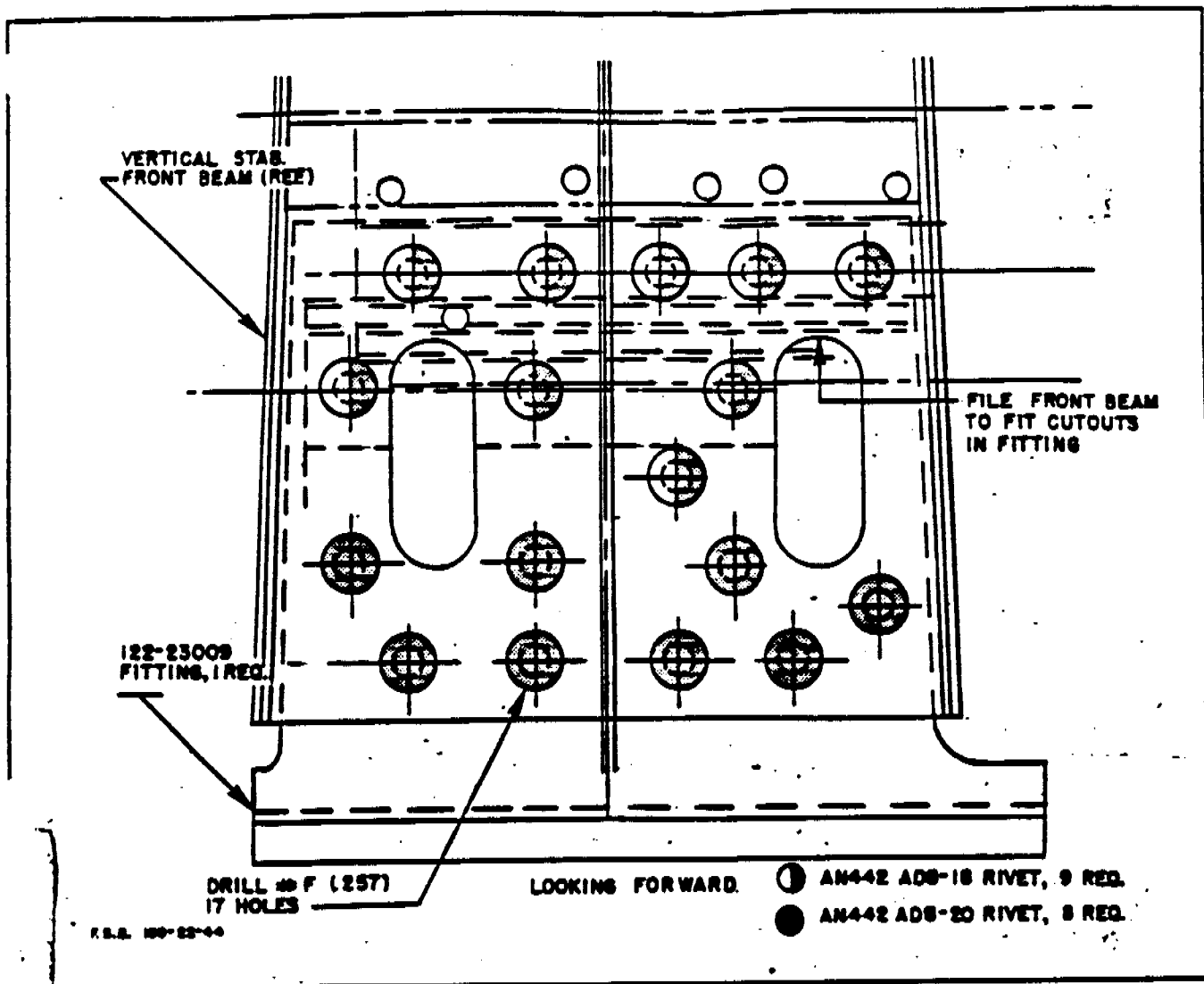


Figure 5 - Looking Forward - Fitting, Vertical Stabilizer

the turnbuckles. Pull the cables out of the fuselage and coil them to prevent damage of the cables.

(8) Disconnect the elevator horn assembly from the bracket on the rear spar of the horizontal stabilizer.

(9) Remove the two bolts and nuts securing the front spar of the stabilizer to the fuselage. Remove the two bolts and nuts securing the rear spar of the stabilizer to the fuselage and lift the stabilizer from the airplane.

5. REWORK OF HORIZONTAL STABILIZER.

(1) Remove the elevator horn assembly bracket from the center of the rear spar of the horizontal stabilizer by removing the four bolts and nuts securing it to the beam.

(2) Remove the two bolts and nuts securing each of the two rear castings to the horizontal stabilizer. Remove the three rivets securing each casting. (See figure 1.)

CAUTION Use a No. 21 (.159-inch diameter) drill and drill only the heads of the rivets. Then remove heads and use punch to remove remainder of rivets.

(3) Remove the five bolts and nuts securing each of the two front castings to the horizontal stabilizer. Remove the five rivets securing each casting. (See figure 2.)

NOTE On a few P-51D airplanes, each front casting may be found secured with 10 rivets rather than 5 bolts and 5 rivets.

CAUTION Use a No. 12 drill and drill only the heads of the rivets. Then remove heads and use punch to remove remainder of rivets.

(4) Make a 1/2-inch cut-out in both leading edge center corners as shown in figure 2. This will provide an opening through which a wrench may be inserted to install the new castings. (See figures 2 and 3.)

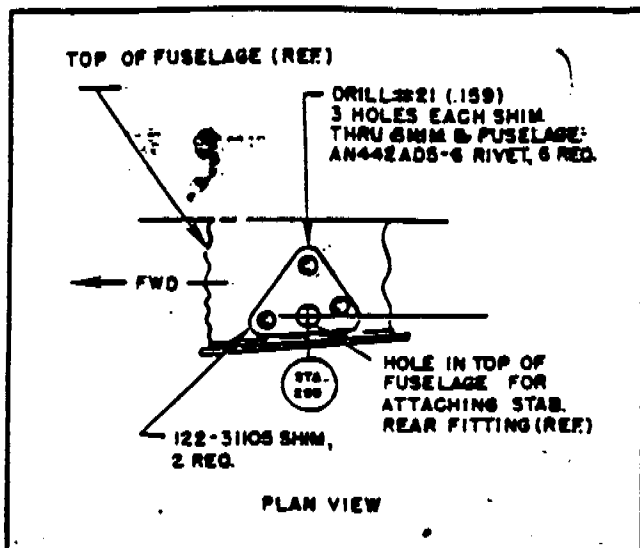


Figure 6 - Installation of Shims - Fuselage Rear Section

(5) Temporarily bolt the fitting, part No. 73-21031, and the new fitting, part No. 122-21031, back with a new shim, part No. 122-21040, between the fittings. In this manner the holes in the old fitting will act as pilots when drilling holes in the new fitting. Use a No. 12 (.189-inch diameter) drill for holes in leg of fitting attaching to front beam of stabilizer. Follow the same procedure for the fitting, part No. 122-21031-1. (See figures 2 and 3.)

(6) Secure the left-hand fitting, part No. 122-21031 (right-hand fitting, part No. 122-21031-1), and the shim, part No. 122-21040, to the front beam of the horizontal stabilizer at the top and bottom holes with two each bolts, part No. AN4-7A, and nuts, part No. AN365-428. Install three each bolts, part No. AN3-6A, washers, part No. AN960-10, and nuts, part No. AN365-1032, in the remaining holes through fitting and beam. Nuts shall be on aft side of beam. Enlarge the five holes in the stabilizer rib through the holes in the fitting with a No. F (.257-inch diameter) drill. Install five each bolts, part No. AN4-5A, and nuts, part No. AN365-428. Nuts shall be on outboard side of rib. (See figures 2 and 3.)

(7) Follow the instructions given in paragraph 2.g.(5) and drill the No. 12 (.189-inch diameter) holes in the new left-hand fitting, part No. 122-21033 (right-hand fitting, part No. 122-21033-1), and shim, part No. 122-21041. Secure the fittings and shims to the forward side of the stabilizer rear beam. Use the bolts, nuts, and washers formerly removed from this point. These bolts also attach the elevator horn assembly bracket on the aft side of the beam. This bracket is to be installed at this time. (See figures 1 and 4.)

(8) Install two each bolts, part No. AN3-6A, washers, part No. AN960-10, and nuts, part No. AN365-1032, through two of the holes of the fitting and the stabilizer rib. Enlarge the three remaining holes in the rib through the holes in the fitting with a No. 12 (.189-inch diameter) drill. Install three each bolts, part No. AN3-4A, washers, part No. AN960-10, and nuts, part No. AN365-1032. Remove the shim located

on top of the stabilizer over the rear beam. Use a No. 30 (.1285-inch diameter) drill. Plug these holes with rivets, part No. AN426AD4-5. Countersink holes 100-degree x 7/32-inch diameter.

d. REWORK OF FUSELAGE REAR SECTION.

(1) Install a new shim, part No. 122-31105, over each horizontal stabilizer rear fitting attaching hole in the fuselage. Secure each shim with three rivets, part No. AN442AD5-6, as shown in figure 6. (See figures 4 and 6.)

(2) Locate the two holes in the fuselage station 291 beam where the elevator control cables pass through. (See figure 7.)

(3) Install a new bracket and roller assembly over each hole on the forward side of the beam in the position shown. (See figure 7.)

(4) Remove the two bearings from the lower end of the right-hand elevator horn and replace them as shown with a new roller assembly, part No. 122-21034. Secure with one clevis bolt, part No. AN24-28, and one nut, part No. AN320-4. (See figure 8.)

(5) Remove the two fair-leads as shown on figure 2 and replace with two fair-leads; part No. 122-20148. Attach with two each bolts, part No. AN3-7A, washers, part No. AN960-10, and nuts, part No. AN365-1032.

e. REWORK OF VERTICAL STABILIZER.

(1) Secure the horizontal stabilizer to the airplane with two each bolts, part No. AN7-20A, and nuts, part No. AN365-720, at the rear fittings and two each bolts, part No. AN6-12A, and nuts, part No. AN365-624, at the front fittings. Secure the elevator trim tab cables at the turnbuckles and safety with .032 brass wire. Remove the tape from the cable drums in the stabilizer and cockpit. Secure the elevator horn assembly to the bracket on the rear spar of the horizontal stabilizer.

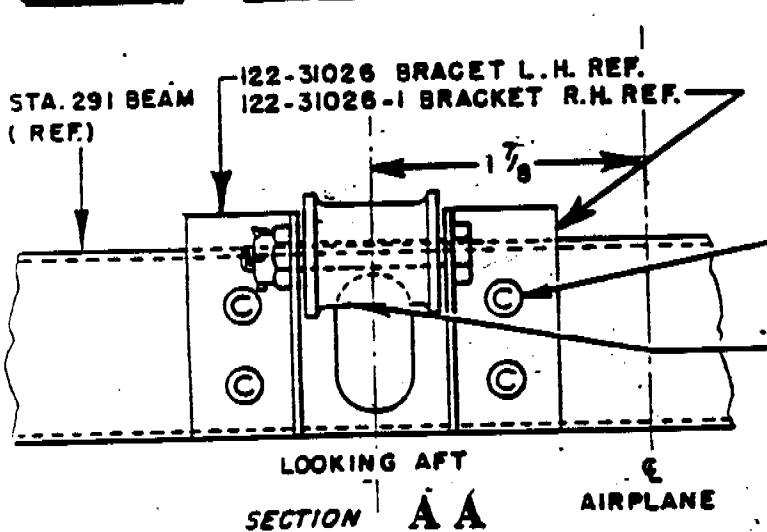
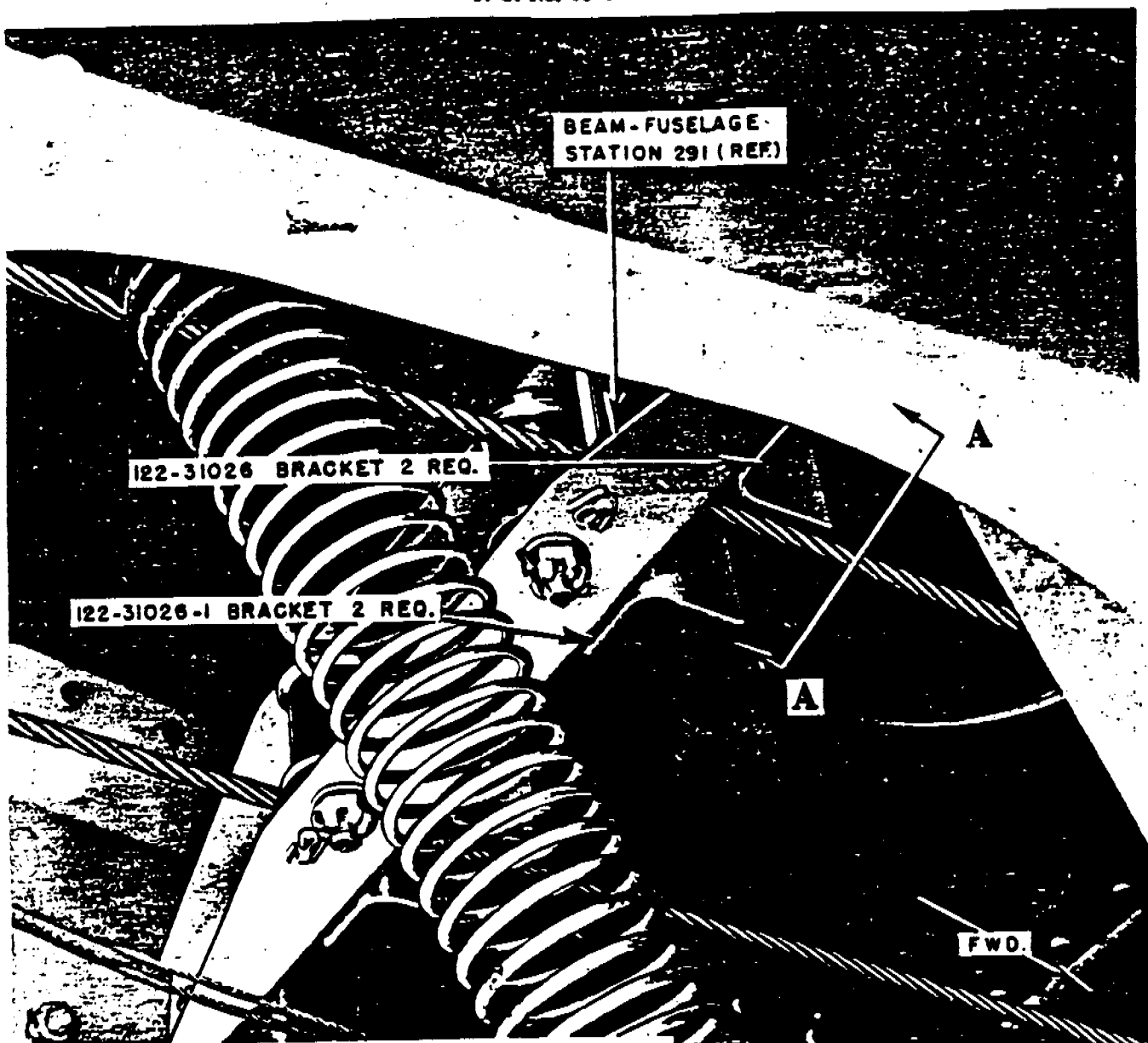
(2) Remove the rivets securing the fitting, part No. 73-23009, to the lower end of the vertical stabilizer front beam. Use a 1/4-inch (.250-inch diameter) drill and drill only the heads of the rivets off. Carefully punch the remainder of each rivet out. DO NOT ENLARGE HOLES.

(3) Secure the new fitting, part No. 122-23009, in place of the one removed in the following manner: (See figure 5.)

(a) Secure the fitting, part No. 122-23009, in place on the horizontal stabilizer using the four bolts, nuts, and washers which secured the old one.

(b) Place the vertical stabilizer on the airplane and secure it at the rear attachment points (rear beam to fuselage), using the original attaching parts.

(c) Procure two 1/4-inch rivets and drill a No. 40 (.098-inch diameter) hole down through the center



DRILL FOUR #30(.128) HOLES
THRU BRACKET AND BEAM.
AN 442 AD4-5 RIVET 4 REQ.

- 6P2 PULLEY, 1 REQ. EACH SIDE
- AN3-14 BOLT, 1 REQ. EACH SIDE
- 109-33562 SPACER, 1 REQ. EACH SIDE
- AN310-3 NUT, 1 REQ. EACH SIDE
- AN380-2-2 COTTER, 1 REQ. EACH SIDE

109-22-4

Figure 7 - Installation of Bracket and Roller Assemblies

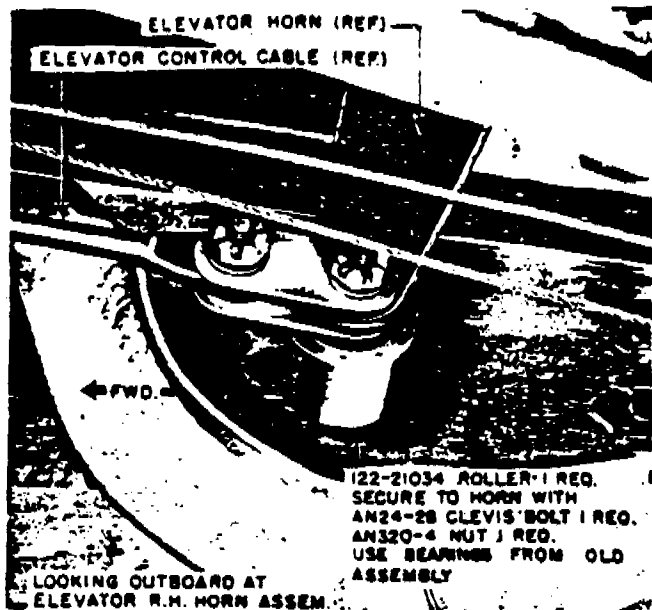


Figure 6 - Installation of Roller Decutching Mechanism

of each rivet. These two rivets and a long piece of string may be used to assure alignment of rudder hinge points on stabilizer. Insert the rivets in upper and lower hinge fittings. Insert string through holes drilled in rivets. When string is pulled tight and runs through exact center of center hinge point, they are aligned.

(d) Clamp the front beam of vertical stabilizer to the front fitting and remove the bolts securing fitting to horizontal stabilizer. Remove the vertical stabilizer from the airplane and proceed as follows:

(e) Drill 17 holes through the new fitting with a No. F (.257-inch diameter) drill. Use the holes in the beam as pilots.

NOTE It is suggested that 1/4-inch (.250-inch diameter) holes be drilled first; then these enlarged to No. F (.257-inch diameter).

(f) Drive eight rivets, part No. AN442AD8-20, and nine rivets, part No. AN442AD8-18, in the positions as shown in figure 6.

NOTE Angle removed from from beam will be reinstalled.

(g) File the cable cut-outs in the beam to fit those in the new fitting.

4. REINSTALLATION OF STABILIZERS, RUDDER, AND ELEVATORS.

(1) Secure the vertical stabilizer to the airplane with all the original attaching parts. Reconnect the elevator upper control cables to the horn assembly. Reinstall the trim tab drum in the vertical stabilizer. Remove the tape from the drum and from the one in the cockpit.

(2) Reconnect the transmitter antenna to the top of the vertical stabilizer.

(3) Reinstall the rudder on the vertical stabilizer with the original attaching parts. Reconnect the navigation light wires. Reconnect the rudder actuating rod at the lower hinge casting and reinstall the metal cap on the bottom of the rudder. Reconnect the rudder trim tab rod and reinstall the rod fairing.

(4) Remove the counterbalance weights from the old fabric-covered elevators and install them on the new metal elevators, part No. 122-22001. Install two new metal-covered elevators, part No. 122-22001, on the horizontal stabilizer, using the same attaching bolts and nuts which held the old ones. Reconnect the elevator-trim tab actuating rod.

NOTE Use old trim tabs on new elevators.

(5) Reinstall the fillets and dorsal fin. Reform the fillets and fin to fit the newly positioned stabilizers.

3. g. The following parts are required per airplane to accomplish this change. These parts are furnished as complete kits for initial installation, and will be requisitioned in accordance with T. O. No. 00-35A-15. Parts required for replacement purposes after the initial installation and for rework of spare stabilizers upon installation to replace damaged or defective stabilizers, will be requisitioned as individual parts from property supply classes as indicated:

QTY	STOCK NO.	PART NO.	NOMENCLATURE	CLASS	SOURCE
1	1300TO-01-60-100		KIT, "Installation of Metal-covered Elevators - P-51D; P-51K, F-6D, and F-6K," consisting of the following parts:	15	AF Stock
1		122-21031	Fitting - Left-hand	01-M	
1		122-21031-1	Fitting - Right-hand	01-M	
4		AN4-7A	Bolt - Aircraft plain, steel (1/4-28) 7/8-inch length	04-A	
14		AN365-428	Nut - Self-locking steel (1/4-28)	04-A	
10		AN4-5A	Bolt - Aircraft plain, steel (1/4-28) 5/8-inch length	04-A	
10		AN3-6A	Bolt - Aircraft plain, steel (No. 10-32) 3/4-inch length	04-A	

RESTRICTED
T. O. No. 01-60-100

QTY	STOCK NO.	PART NO.	NOMENCLATURE	CLASS	SOURCE
		AN3-4A	Bolt - Aircraft plain, steel (No. 10-32) 1/2-inch length	04-A	
1		122-21033	Fitting - Left-hand	01-M	
1		122-21033-1	Fitting - Right-hand	01-M	
2		122-21041	Shim	01-M	
2		122-21040	Shim	01-M	
1		122-23009	Fitting	01-M	
8		AN442AD8-20	Rivet - Alum.-alloy flathead type AD, 1/4 x 1-1/4 inches	29	
9		AN442AD8-18	Rivet - Alum.-alloy flathead type AD, 1/4 x 1-1/8 inches	29	
2		122-31105	Shim	01-M	
6		AN442AD5-6	Rivet - Alum.-alloy flathead type AD, 5/32 x 3/8 inch	29	
1		122-21034	Roller	01-M	
1		AN24-28	Bolt - Clevis (1/4-28) 1-3/4 inches long	04-A	
1		AN320-4	Nut - Aircraft castle shear, steel, 1/4-28	04-A	
2		122-21045	Fair-lead	01-M	
4		AN3-7A	Bolt - Aircraft plain steel (No. 10-32) 7/8-inch length	04-A	
20		AN960-10	Washer - Plain, steel No. 10 bolt size	04-A	
20		AN365-1032	Nut - Self-locking steel 10-32	04-A	
2		AN7-20A	Bolt - Aircraft plain, steel (7/16-20) 2-inch length	04-A	
2		AN365-720	Nut - Self-locking steel (7/16-20)	04-A	
		AN6-12A	Bolt - Aircraft plain, steel (3/8-24) 1-1/4 inch length	04-A	
		AN365-624	Nut - Self-locking steel (3/8-24)	04-A	
2		122-22001	Elevator Assembly	01-M	
2		122-31026	Bracket - Left-hand	01-M	
2		122-30126-1	Bracket - Right-hand	01-M	
2		109-33562	Spacer	01-M	
2		6P2	Pulley	01-M	
2		AN3-14	Bolt - Aircraft drilled, steel (No. 10-32) 1-1/2 inch length	04-A	
2		AN310-3	Nut - Aircraft castle, steel (No. 10-32)	04-A	
2		AN380-2-2	Pin - Cotter, steel 1/16 x 1/2 inch	29	
4		2W25-25-18-62	Washer	01-M	
8		AN442AD4-5	Rivet	29	
2		AN426AD4-5	Rivet	29	

b. One complete kit of parts packed for shipment, measures 120 x 12 x 15 inches and weighs 35 pounds.

4. The following spare parts in stock will be reworked as follows:

a. Spare horizontal stabilizer assemblies:

PART NO.	NOMENCLATURE	CLASS
73-21001-200	Stabilizer Assembly - Horizontal	01-M

TO BE TAGGED, "This part to be reworked, when installed on any P-51D, P-51K, F-6D, or F-6K airplanes, in accordance with paragraph 2.c. of T. O. No. 01-60-100."

b. Spare vertical stabilizer assemblies:

RESTRICTED

PART NO.	NOMENCLATURE	CLASS
73-21001-100	Stabilizer Assembly - Vertical	01-M
73-21001-300	Stabilizer Assembly - Vertical	01-M

TO BE TAGGED. "This part to be reworked, when installed on any P-51D, P-51K, F-6D, or F-6K airplanes, in accordance with paragraph 2.g. of T. O. No. 01-60-100."

5. Parts removed and not reinstalled in accordance with the preceding instructions will be disposed of as follows:

a. The following parts will be inspected and returned to stock if found to be serviceable:

PART NO.	NOMENCLATURE	CLASS
73-23009	Fitting	01-M
73-21031	Fitting	01-M
73-21031-1	Fitting	01-M
73-21033	Fitting	01-M
73-21033-1	Fitting	01-M
73-22001	Elevator	01-M

NOTE Any of the afore-mentioned items, which are not serviceable without repair or reconditioning, will be condemned at once and so tagged for disposition as condemned property.

b. Fair-leads, part No. 73-21045, and all other parts not reinstalled (except those listed previously), will be condemned and so tagged for disposition as condemned property.

6. WEIGHT CHANGE.

a. Weight empty: Increase of 3 pounds at 346 inches aft of reference datum.

b. Useful load: No change.

c. Special equipment: No change.

7. Approximately 24 man-hours are required to effect this change.

BY COMMAND OF GENERAL ARNOLD:

Prepared by
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Hq. ATSC.

B. E. MEYERS
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