



AIRCRAFT MAINTENANCE MANUAL

REAR TORQUE TUBES - REMOVAL/INSTALLATION

EFFECTIVITY: ALL

1. General

- A. This section gives the procedures to remove and install the rear torque tubes of the elevator control system.
- B. These procedures are applicable to the LH and RH rear torque tubes.
- C. The procedures in this section are given in the sequence below. The tasks identified with (♦) are part of the Scheduled Maintenance Requirements Document (SMRD).

TASK NUMBER	DESCRIPTION	EFFECTIVITY
27-31-03-000-801-A	TORQUE TUBE - REMOVAL	ALL
27-31-03-400-801-A	TORQUE TUBE - INSTALLATION	ALL



EMB145 - EMB135

AIRCRAFT
MAINTENANCE MANUAL

TASK 27-31-03-000-801-A

EFFECTIVITY: ALL

2. TORQUE TUBE - REMOVAL

A. General

- (1) This procedure gives the instructions to remove the rear torque tubes of the elevator control system.

B. References

REFERENCE	DESIGNATION
AMM TASK 55-36-00-000-801-A/400	TAIL BOOM - REMOVAL
S.B.145-27-0094	-

C. Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
325		Top of the vertical stabilizer

D. Tools and Equipment

ITEM	DESCRIPTION	PURPOSE	QTY
GSE 058	Kit, rig pins, flight controls	To lock the elevator control system in the neutral position	

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

QTY	FUNCTION	PLACE
1	Does the task	Top of the vertical stabilizer

I. Preparation

SUBTASK 841-002-A

- (1) Remove upper and rear fairings 321 of the vertical stabilizer ([AMM TASK 55-36-00-000-801-A/400](#)).
- (2) Install the rig pins to the elevator control system to lock it in the neutral position.



J. Removal (Figure 401) (Figure 402)

SUBTASK 020-002-A

(1) Remove the cotter pin (10) and washer (9), and remove the cable guard (7) from the support (8).

(2) Release the tension on the control cables (21) and (22).

(3) Remove the cotter pins (11) and (19), cotter pin (48), and pin (47), and disconnect the ends of the control cables (21) and (22) from the bellcrank at the LH torque tube (20).

NOTE: Identify the positions at which the control cables (21) and (22) were installed to install them again in the same positions.

(4) Release the tension on the control cables (26) and (27).

(5) Remove the cotter pins (5) and (24), cotter pin (48), and pin (47), and disconnect the ends of the control cables (26) and (27) from the bellcrank at the RH torque tube (25).

NOTE: Identify the positions at which the control cables (26) and (27) were installed to install them again in the same positions.

(6) Disconnect the ends of the rods (6) and (12) as follows:

(a) Disconnect the end of the bonding strap (35) from the bellcrank at the LH torque tube (20). For this, remove the nut (32), washers (33), (34), (36), and (37), and bolt (38). Refer to DET. C.

(b) Remove the cotter pin (31), nut (30), washer (29), bushing (40), and bolt (39) (DET. C).

(c) Disconnect the end of the bonding strap (55) from the bellcrank at the RH torque tube (25). For this, remove the nut (58), washers (57), (56), (54), and (53), and bolt (52). Refer to DET. G.

(d) Remove the cotter pin (59), nut (60), washer (61), bushing (50), and bolt (51) (DET. G).

(e) Disconnect the end of the rod (6) or (12).

(7) Disconnect the ends of the bonding straps (18) and (28) from the supports (13) and (4). For this, remove the nut (41), washers (42), (43), (44), and (45), and bolt (46) (DET. D).

(8) (Only for aircraft PRE-MOD. [S.B.145-27-0094](#)). Remove the cotter pin (17), nut (16), washers (2) and (15), bushings (3) and (14), and bolt (1).

(9) (Only for aircraft POST-MOD. [S.B.145-27-0094](#)). Remove the cotter pin (17), nut (16), washers (2) and (15), retaining rings (62), (63), (64) and (65), bushings (3) and (14), and bolt (1).

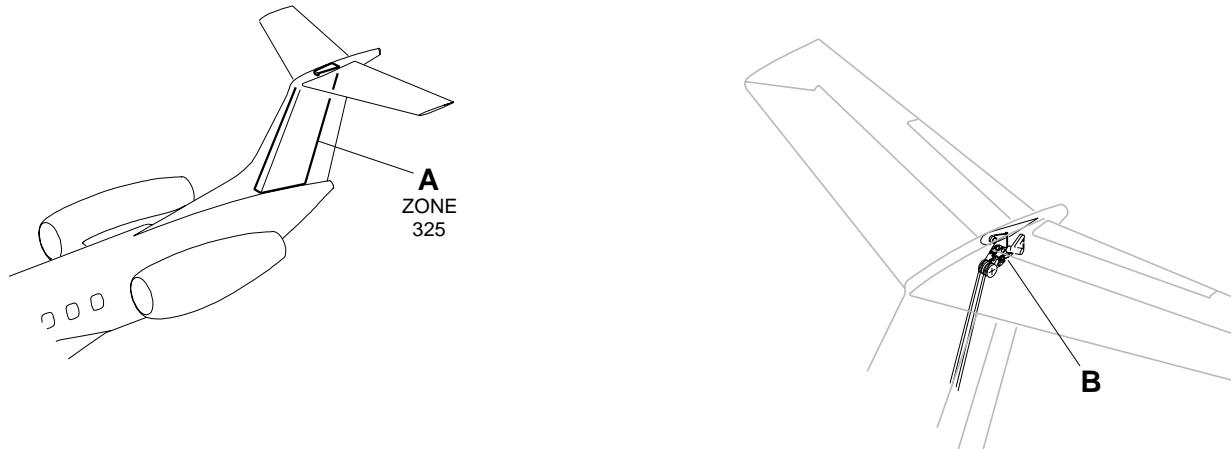
NOTE: Due to assemblage clearance, it is possible to find retaining rings on the left side and/or on the right side. Identify the correct position of these parts to guarantee the installation.

(10) Remove the LH torque tube (20) and RH torque tube (25).

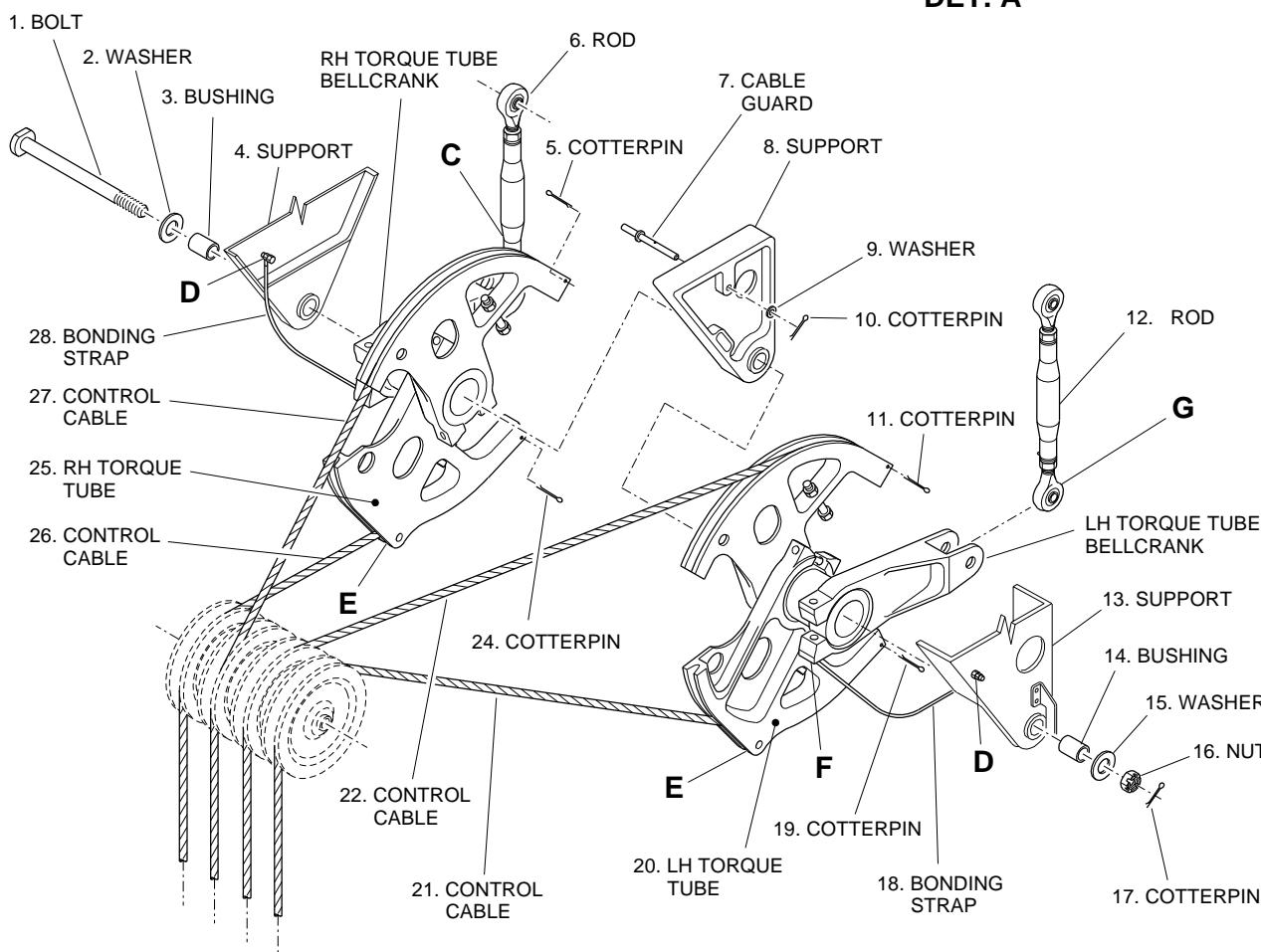
EFFECTIVITY: PRE-MOD S.B. 145-27-0094

Torque Tube - Removal/Installation

Figure 401 - Sheet 1



DET. A



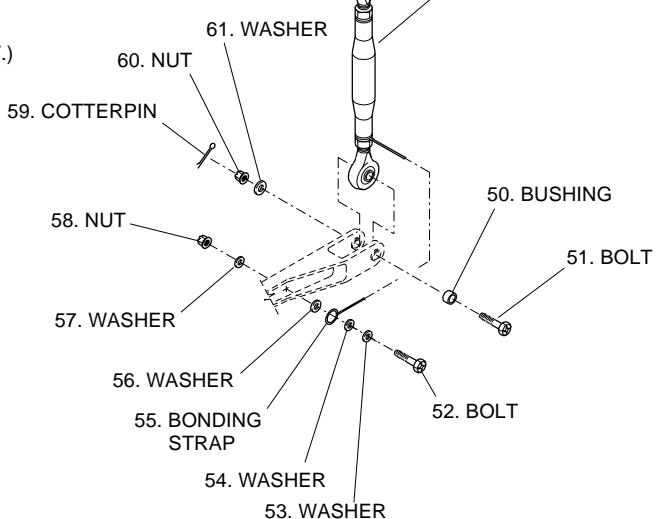
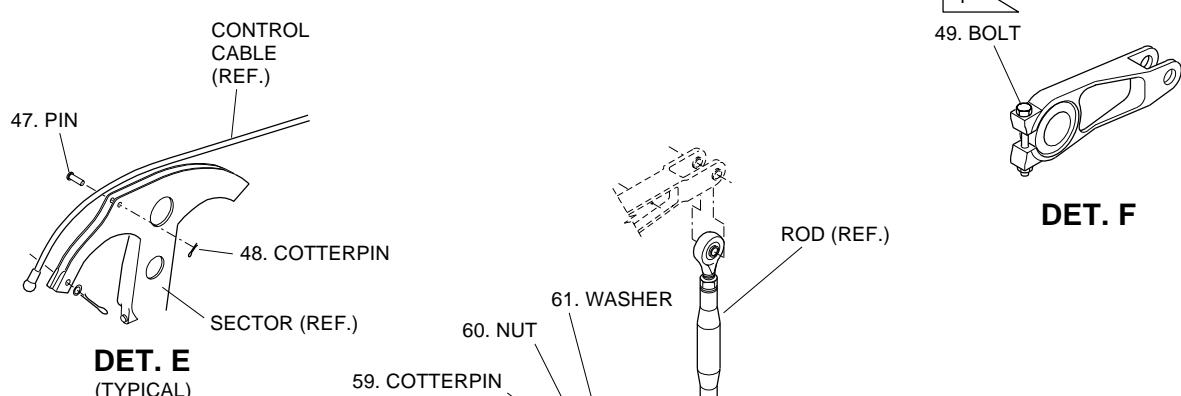
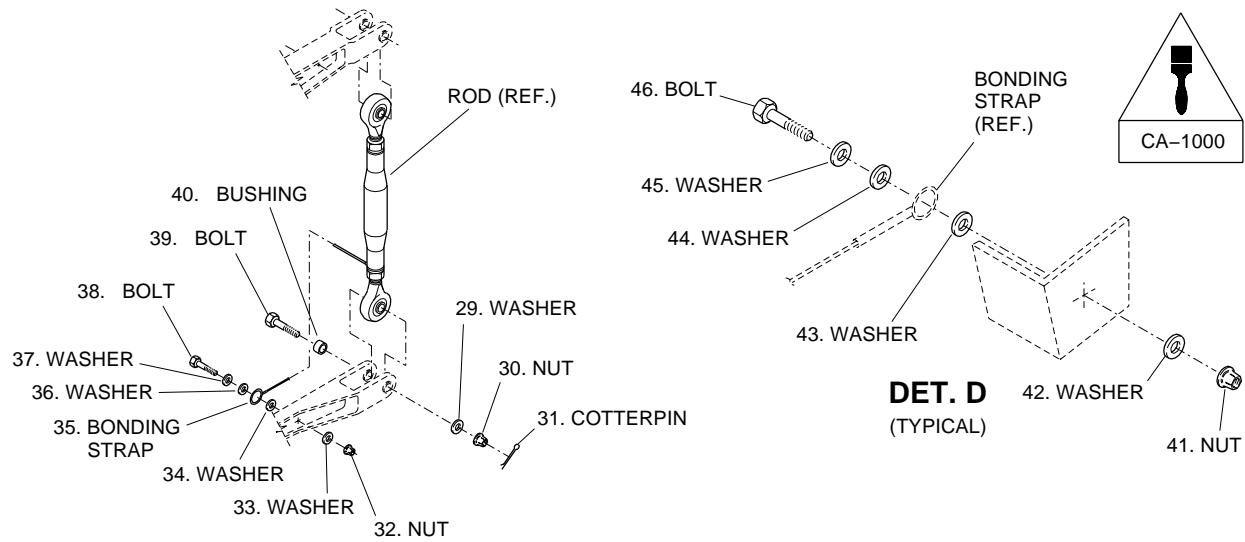
DET. B

EM145AMM270254F.DGN

EFFECTIVITY: PRE-MOD S.B. 145-27-0094

Torque Tube - Removal/Installation

Figure 401 - Sheet 2



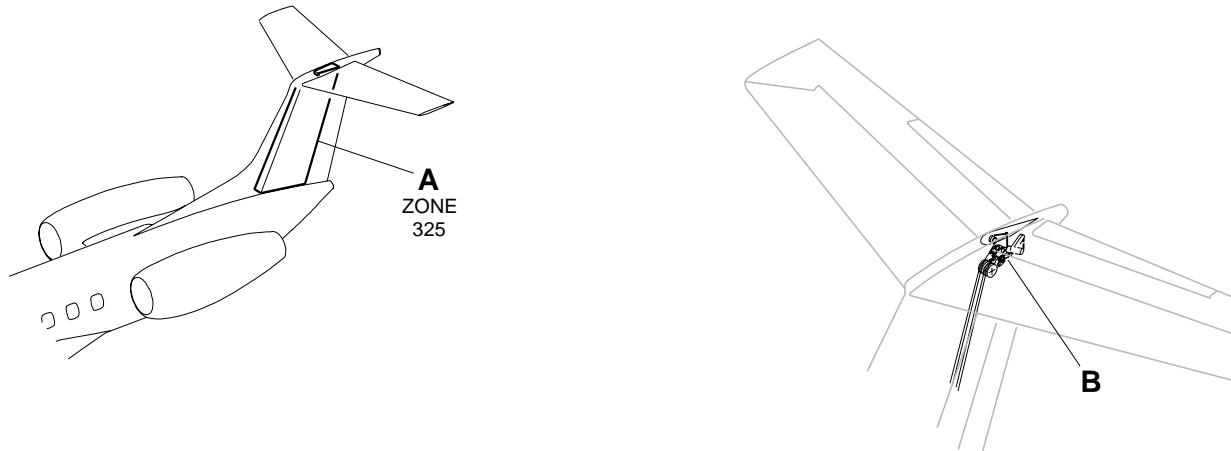
TORQUE: 4.52 – 5.08 N.m (40 – 45 lb.in)

EM145AMM270743B.DGN

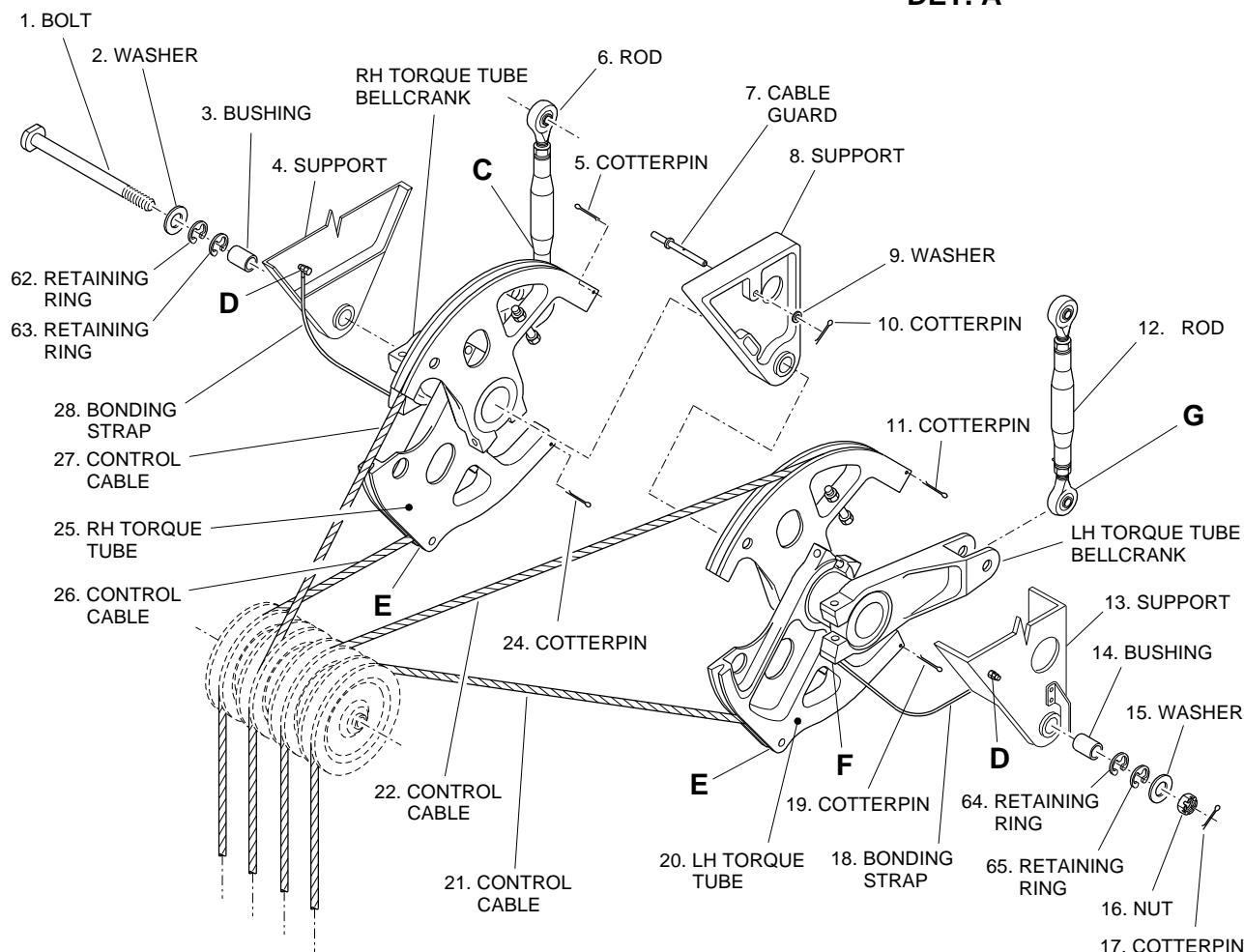
EFFECTIVITY: POST-MOD S.B. 145-27-0094

Torque Tube - Removal/Installation

Figure 402 - Sheet 1



DET. A



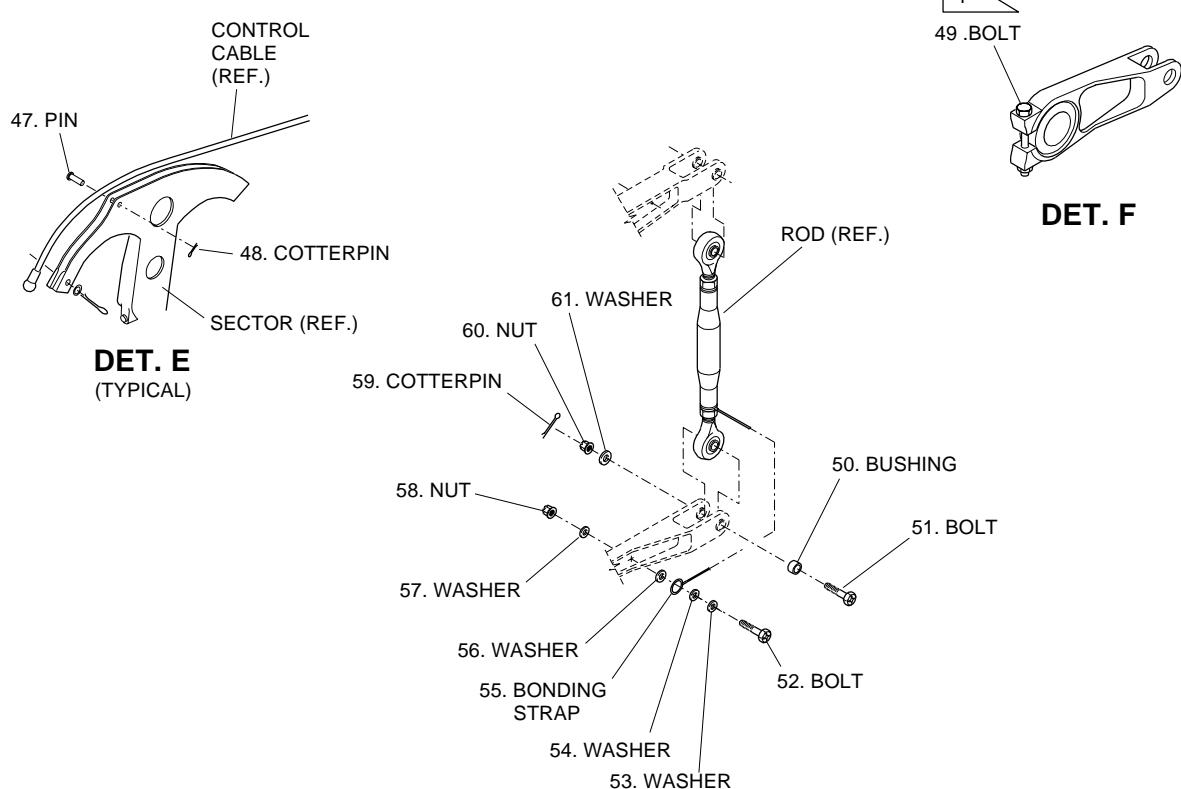
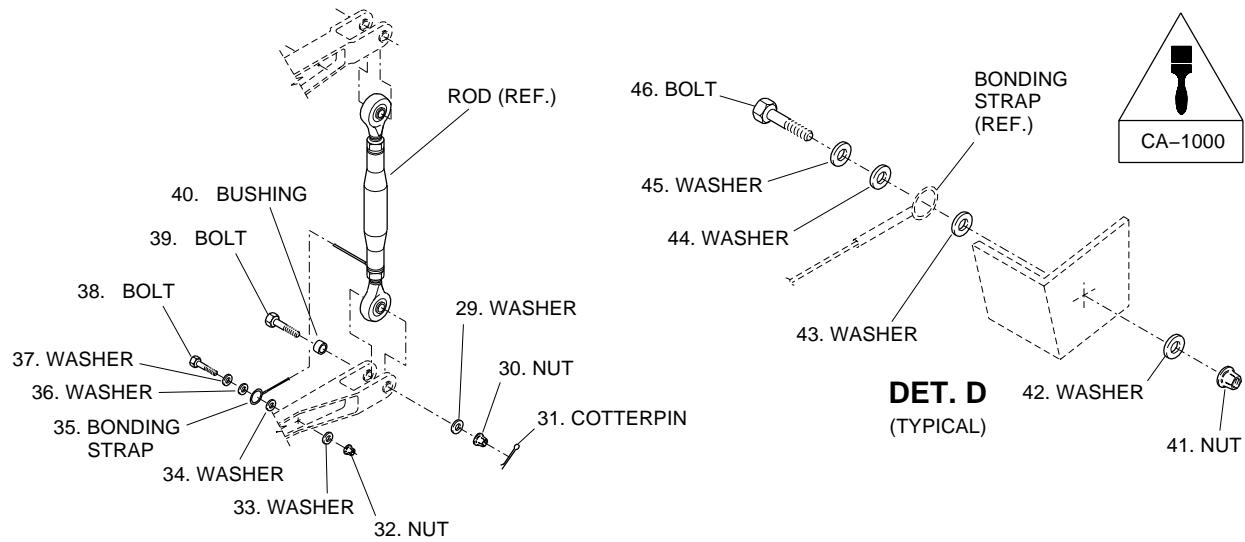
DET. B

EM145AMM270615G.DGN

EFFECTIVITY: POST-MOD S.B. 145-27-0094

Torque Tube - Removal/Installation

Figure 402 - Sheet 2



TORQUE: 4.52 – 5.08 N.m (40 – 45 lb.in)

EM145AMM270744B.DGN



AIRCRAFT MAINTENANCE MANUAL

TASK 27-31-03-400-801-A

EFFECTIVITY: ALL

3. TORQUE TUBE - INSTALLATION

A. General

- (1) This procedure gives the instructions to install the rear torque tubes of the elevator control system.

B. References

REFERENCE	DESIGNATION
AMM TASK 20-13-21-910-801-A/200	TYPES OF ELECTRICAL BONDING AND SURFACE PREPARATION - STANDARD PROCEDURES
AMM TASK 27-31-00-700-803-A/500	ELEVATOR - DEFLECTIONS
AMM TASK 27-31-01-700-801-A/500	TENSION OF THE ELEVATOR CONTROL CABLES - FUNCTIONAL CHECK
AMM TASK 55-36-00-400-801-A/400	TAIL BOOM - INSTALLATION
IPC 27-31-00	ELEVATOR PRIMARY MECHANICAL CONTROL
S.B.145-27-0094	-

C. Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
325		Top of the vertical stabilizer

D. Tools and Equipment

ITEM	DESCRIPTION	PURPOSE	QTY
GSE 058	Kit, rig pins, flight controls	To lock the elevator control system in the neutral position	

E. Auxiliary Items

ITEM	DESCRIPTION	PURPOSE	QTY
Commercially available	Rubber Gloves	Protection for the hands	1 pair
Commercially available	Goggles	Protection for the eyes	1 pair

F. Consumable Materials

SPECIFICATION (BRAND)	DESCRIPTION	QTY
MS24665-170	Cotter pin	4
MEP 09-060	Corrosion-Inhibiting Compound	AR

G. Expendable Parts

ITEM	IPC REFERENCE (VENDOR REFERENCE)	QTY
Cotter pin	IPC 27-31-00	4
Cotter pin	IPC 27-31-00	1
Cotter pin	IPC 27-31-00	1
Cotter pin	IPC 27-31-00	1

H. Persons Recommended

QTY	FUNCTION	PLACE
1	Does the task	Top of the vertical stabilizer

I. Installation (Figure 401) (Figure 402)

SUBTASK 420-002-A

WARNING: CA-1000 CORROSION-INHIBITING COMPOUND IS TOXIC TO SKIN, EYES AND RESPIRATORY TRACT. USE PVC GLOVES AND EYE PROTECTION. USE ONLY IN WELL VENTILATED AREAS. OBEY THE MANUFACTURERS' HEALTH AND SAFETY INSTRUCTIONS.

- (1) Apply corrosion-inhibiting compound to the bolt (1) and bushings (03) and (14) as shown in (Figure 401), (Figure 402).

- (2) Put the LH torque tube (20) between the supports (13) and (8).

- (3) Put the RH torque tube (25) between the supports (8) and (4).

- (4) (Only for aircraft PRE-MOD [S.B.145-27-0094](#)) Install the bolt (1), washer (2), bushings (3) and (14), washer (15), nut (16), and cotter pin (17) to attach the LH and RH torque tubes (20) and (25).

NOTE: If you removed the bellcrank(s), install it(their) and apply a final torque of 4.52 - 5.08 N.m (40 - 45 lbf.in) to the bolt(s) (49) (refer to Figure 401 DET. F).

- (5) (Only for aircraft POST-MOD [S.B.145-27-0094](#)) Install the bolt (1), washers (2) and (15), retaining rings (62), (63), (64) and (65), bushings (3) and (14), nut (16), and cotter pin (17) to attach the LH and RH torque tubes (20) and (25).

NOTE: If you removed the bellcrank(s), install it(their) and apply a final torque of 4.52 - 5.08 N.m (40 - 45 lbf.in) to the bolt(s) (49) (refer to Figure 402 DET. F).

- (6) Connect the ends of the bonding straps (18) and (28) to the supports (13) and (4). Attach the bonding straps (18) and (28) as shown in DET. D, with the bolt (46), washers (45), (44), (43), and (42), and nut (41).

NOTE: Refer to [AMM TASK 20-13-21-910-801-A/200](#) for the correct installation of the bonding straps (18) and (28).

- (7) Connect the end of the rod (12) to the bellcrank at the LH torque tube (20) as follows:

- (a) Put the end of the rod (12) in the bellcrank at the LH torque tube (20).

- (b) Install the bolt (39), bushing (40), washer (29), nut (30), and cotter pin (31) (refer to DET. C).
 - (c) Connect the end of the bonding strap (35) to the bellcrank at the LH torque tube (20) with the bolt (38), washers (37), (36), (34), and (33), and nut (32) (refer to DET. C).

NOTE: Refer to [AMM TASK 20-13-21-910-801-A/200](#) for the correct installation of the bonding strap (35).
- (8) Connect the end of the rod (6) to the bellcrank at the RH torque tube (25) as follows:
- (a) Put the end of the rod (6) in the bellcrank at the RH torque tube (25).
 - (b) Install the bolt (51), bushing (50), washer (61), nut (60), and cotter pin (59) (refer to DET. G).
 - (c) Connect the end of the bonding strap (55) to the bellcrank at the RH torque tube (25) with the bolt (52), washers (53), (54), (56), and (57), and nut (58) (refer to DET. G).

NOTE: Refer to [AMM TASK 20-13-21-910-801-A/200](#) for the correct installation of the bonding strap (55).
- (9) Connect the ends of the control cables (21) and (22) to the bellcrank at the LH torque tube (20) and attach with cotter pins (19) and (11), pin (47), and cotterpin (48).
- NOTE: The control cables (21) and (22) must be installed in the same positions as those they were removed from. Refer to their position identification.
- (10) Connect the ends of the control cables (26) and (27) to the bellcrank at the RH torque tube (25) and attach with the cotter pins (24) and (5), pin (47), and cotter pin (48).
- NOTE: The control cables (26) and (27) must be installed in the same positions as those they were removed from. Refer to their position identification.
- (11) Put the cable guard (7) in the support (8) and attach with the washer (9) and cotter pin (10).

J. Follow-on

SUBTASK 842-002-A

- (1) Apply tension to the control cables of the elevator control system ([AMM TASK 27-31-01-700-801-A/500](#)).
- (2) Remove the rig pins from the elevator control system.
- (3) Do a check on the elevator control system ([AMM TASK 27-31-00-700-803-A/500](#)).
- (4) Install upper and rear fairings 321 of the vertical stabilizer ([AMM TASK 55-36-00-400-801-A/400](#)).