

Procedure 3.050A**INSTALLATION OF AILERON TORQUE TUBE ASSEMBLY**

In this procedure...

The aileron torque tube will be assembled and installed in the wing.

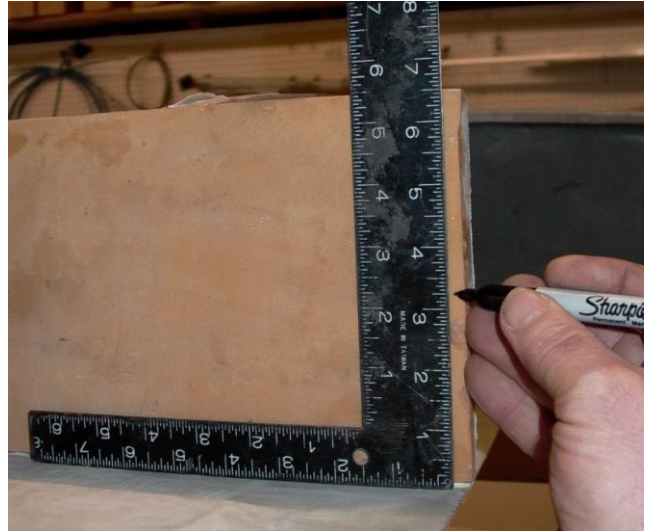
<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>
111-24-050	Torque Tube, Aft	2
111-24-051	Torque Tube, Forward	2
111-24-052	Torque Tube, Collar	2
111-24-053-01	Bearing Bracket, Spar	2
111-24-053-02	Bearing Bracket, Shear Web	2
111-24-054	Washer, Nylon	2
J1812	Bearing	4
111-24-055	Backing Plate, Shear Web	2
AN3-8A	Bolt	8
K2000-3	Anchor Nut	8
AN3-10A	Bolt	8
AN960-10	Washer	24
AN365-1032	Nut	4
AN4-15A	Bolt	2
AN960-416	Washer	4
AN365-428	Nut	2

Before starting:

Be sure hard points (40lb foam) have been installed and forward shearweb height trimmed to 5.70" at BL 23.50 and 4.00" at BL 176.00.

Step 1. FORWARD AILERON CONTROL/PUSH-PULL TUBE ASSEMBLY INSTALL.

A. On the forward shearweb, place a mark at the center of the inboard end (2.85" from the wing skin to center). Place another mark at the opposite, outboard shearweb end, again at the center (2.0" from wing skin) and snap a chalk line between these two marks. (Figs. 50.1 through 50.3)

**Fig. 50.1****Fig. 50.2****Fig. 50.3**

B. Locate bellcrank locations as follows:

- Inboard bellcrank bracket at BL 36.00.
- Mid-way bellcrank bracket at BL 91.12.
- Outboard bellcrank bracket at BL 145.25
- Forward carry-thru-tube centerline at BL 147.15

Mark these locations on the forward shearweb hard points, 90° to the wing skin as shown. Now center bellcrank brackets at centerline locations and center on chalkline also, clamp in place and back drill 3/16" holes, (4) places each through shearweb. (Figs. 50.4 through 50.6)

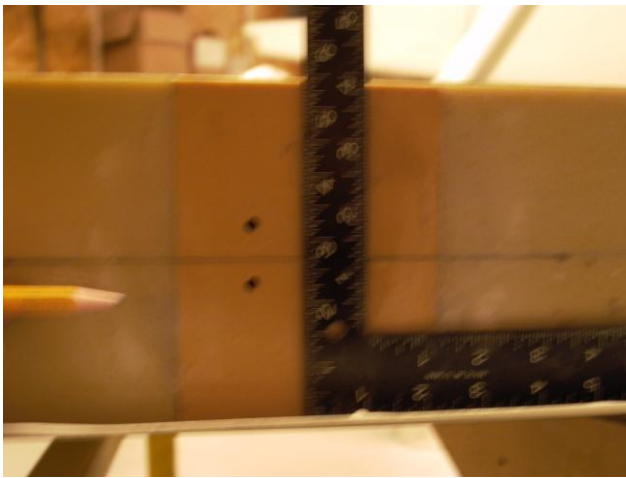


Fig. 50.4



Fig. 50.5



Fig. 50.6

C. Fabricate and install bellcrank bracket backing plates in fuel cell and seal off.

Note: Cut ribs forward of shearweb to facilitate installation of backing plates at BL 36.00, BL 91.12, and BL 145.25. These areas will be closed out (sealed) from fuel cell later. Back drill backing plate material, clamped to bracket to use as a drill template, to 3/8" dia. Countersink and install nut plates as shown and install with bolts and bracket to shearweb. Once brackets and plates are snug, drill pop-rivet locations (up to 4 places) through plate and into shearweb from back side and install #30 or 1/8" pop-rivets. Do not back drill through brackets! Leave brackets and bellcrank installed for now.

D. Install the push-pull carry-thru-tube in the fuel cell area between the forward shear web and the spar. Holesaw 1 3/4" dia. hole through outboard shearweb centerline of hardpoint, BL 147.15 (Fig. 50.7) and through spar with center hole 3.60" outboard of rib F-1 surface and down 1.65" from under side of spar cap. Prep exterior ends of tube, forward spar face, and back side face of forward shearweb to bond tube to wing. Install so it is flush on aft side of spar face and front side of forward shearweb (Fig. 50.8). Now radius around tube and face of spar web and apply 2 plies around forward and aft ends, inside of fuel cell to seal from "leaking".



Fig. 50.7

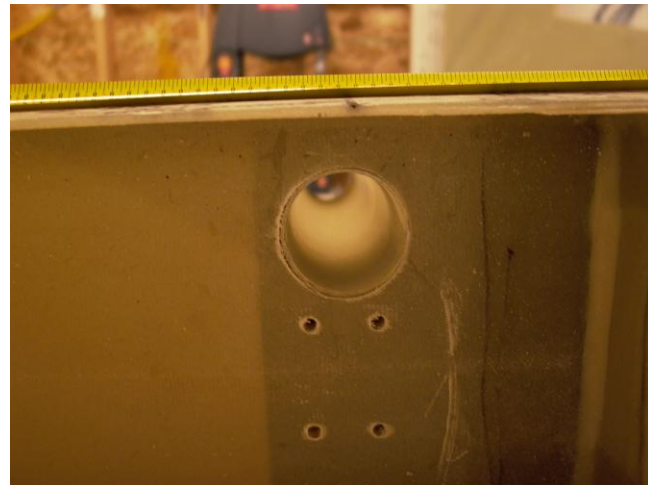


Fig. 50.8

E. Locate aft spar face bellcrank bracket common to the aileron and carry thru-tube. Hot glue bracket to spar face aft as shown (Fig. 50.9) and backdrill through spar and install with nutplate backing plate, as before with other brackets.

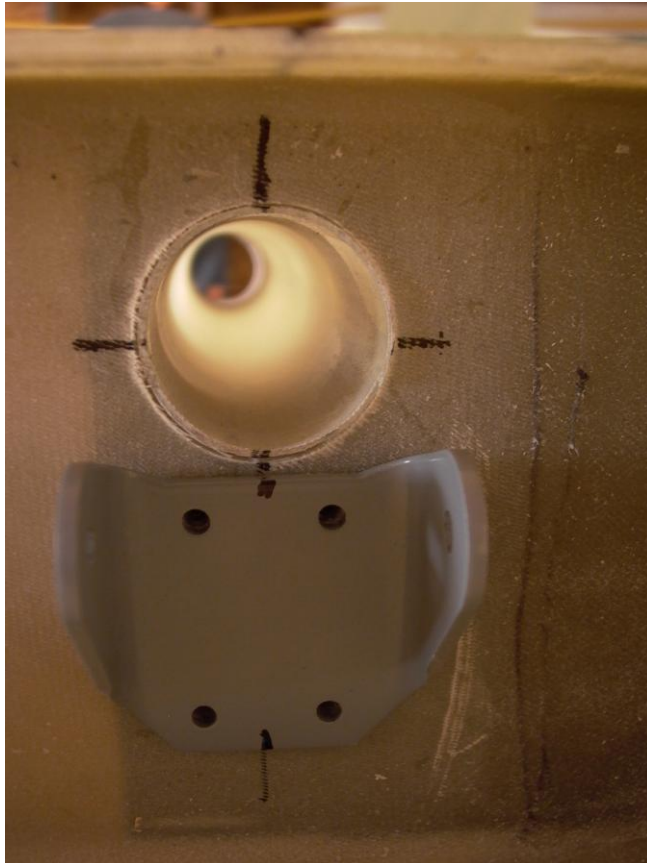


Fig. 50.9

F. Fabricate foam backing plate covers to seal fuel cell from leaks.

Relieve (remove) forward part of rib common to forward shearweb to facilitate installation of pop-rivet plate to shearweb. (Fig. 50.10). Position a 4"x4" X 1/2" 5lb. foam block to backplate. Depress against plate to imprint locations of nutplate, rivets, and bolt holes into foam. Remove and relieve marks slightly deeper into foam for clearance (Fig. 50.11).

Hot glue another 4"x 4" x 1/2" 5lb. to top of first one, bevel similar to the one show. (Fig. 50.12)

Remove "foam pad" and prep area around plate for install of "pad". Hot glue middle and press and hold in place until cool. Brush Q-Cell/resin slurry over exposed foam generously so as to soak into foam pad. Cover pad and overlap onto shearweb 1" all around pad. Don't be too skimpy with resin. Don't worry about drips. Just soak it good around edges to seal. (3) forward locations, (1) forward of spar at carry through bracket backplate. (Fig. 50.13)



Fig. 50.10

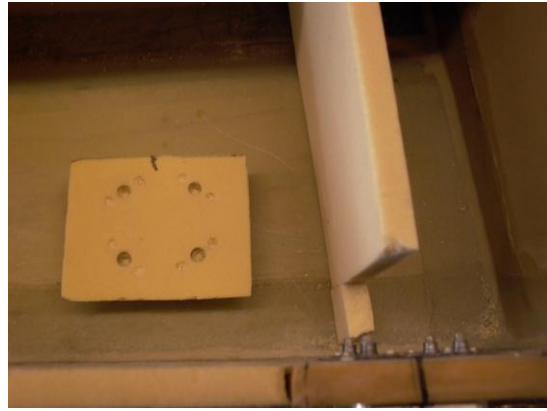


Fig. 50.11



Fig. 50.12



Fig. 50.13

G. Locate and install aileron forward hinges to aft shearweb (Fig. 50.14)

Locate center hinge on centerline common to carry thru-tube at BL 147.15. Transfer mark to aft shearweb hardpoint. From this mark, measure outboard along top of shearweb and place another mark at 26 .5". This is the centerline of your outboard aileron hinge. Measuring inboard from the center hinge, place another mark at 25.25". This is the centerline for your inboard aileron hinge location. Now, mark lines with square from top of shearweb to wing skin at marks. These are your hinge centerlines.

Snap line at top of trimmed shearweb to check for straightness. Ensure that Shearweb is 4.00" tall at BL 176.00 and 6.50" tall at BL 23.50. If not, trim/sand down to straight line. Now, at centerline marks, measure down 1/2" from top of trimmed/straight shearweb. For edge of hinge line, temporarily clamp hinges in place 1/2" down from top of shearweb and centered on the vertical centerline.



Fig. 50.14

Use one of the following methods to check alignment before drilling holes:

Method #1- Run a 3/16" steel rod 55" long through hinge bearings.

Method #2- Pull a string, with a washer attached to one, end through all (3) hinge pivot holes. (Fig. 50.15)

Move center as necessary to achieve straight true line. Clamp and then drill holes. Now fabricate nutplate backing plates for hinges. Install same as forward brackets. Foam pad brackets are only necessary in the fuel cell areas, so you won't be installing them here. (Fig. 50.16)



Fig. 50.15

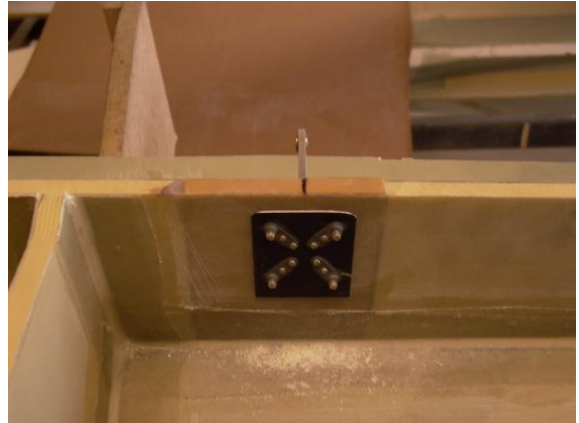


Fig. 50.16

H. Fabricate and install aileron push-pull tubes on forward shearweb, through carry-through to center aileron hinge actuator bracket.

1) Using $\frac{3}{4}$ " O.D. steel tubing, center, inboard and middle bellcranks 90° to shearweb. Temporarily install bolts, rod ends, and rod inserts onto bellcranks. Now measure distance between the threaded ends. Set (position) outboard bellcrank so that centerline of hole (on bellcrank that connects thru-tube to spar bracket) is 1.80" from forward shearweb. (Fig. 50.17)



Fig. 50.17

Approximate measurements are as follows:

- Inboard to center bellcrank – 51”.
- Center to outboard bellcrank – 51.5”
- Outboard bellcrank (thru-tube to aft spar bellcrank) - 14.25”.
Fab. from ½” steel tubing.
- Rear spar bracket to aft shearweb center hinge/aileron actuator – 7”.
Fab. From ½” steel tubing. (Fig. 50.18 through 50.19)



Fig. 50.18



Fig. 50.19

2) Cut tubing to lengths, deburr ends, and install rod end inserts in tubing. Drill holes through locations marked on tubing as follows. (Fig. 50.20 through 50.21)

- #40 (3/32”) holes – ½” dia. Tubing/rod insert installed with solid rivet (AN470AD3-10).
- #30 (1/8”) holes – ¾” dia. Tube/end insert installed with pop-rivet (#30 (1/8”) Cherry Max rivets only!!).



Fig. 50.20



Fig. 50.21

3) Install push-pull tube/rod-end insert/rod-end assemblies on bellcranks at aft shearweb center bracket/aileron hinge. At centerline on shearweb, measure up from skin 1.30". Mark and drill #30 pilot hole. Holesaw up to 1" dia. Hole. Elongate or enlarge as necessary for tube to have adequate clearance during operation when attached to aileron actuator bracket. (Fig. 50.22 through 50.23)



Fig. 50.22



Fig. 50.23

4) Now with linkage assembled, temporarily attach forward center aileron bracket with bolt to center hinge and aft push-pull tube. (Fig. 50.24)

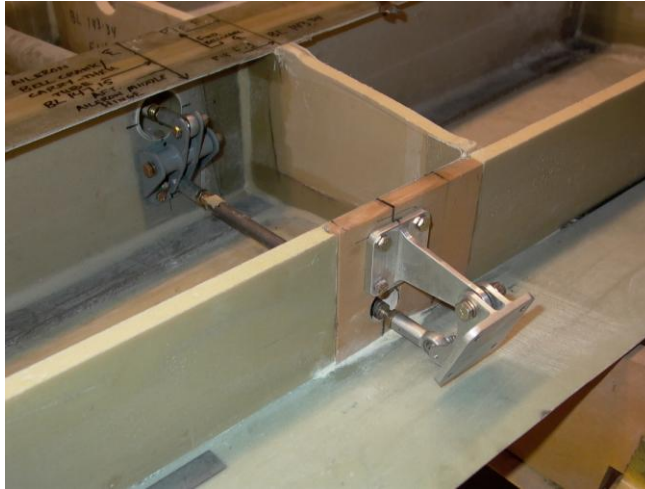


Fig. 50.24

Now check operation... smooth operation? No hang-ups? Great!!

Done when satisfied.

Now on to Torque Tube Assembly

Note: Aileron and flap will be fabricated and fit to wing after close.