

PROCEDURE 4.190 HORIZONTAL STABILIZER ASSEMBLY

In this procedure...

The horizontal stabilizer fixture will be constructed and the horizontal stabilizer will be laid out, assembled and closed out.

For this Procedure, the following parts will be required...

<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>
213-11-003	Horizontal Stabilizer, skin	2
213-11-005	Horizontal Stabilizer, Spar	1
213-91-001	Horizontal Stabilizer, template BL 3.2	2
213-91-002	Horizontal Stabilizer, template BL 11.8	2
213-91-003	Horizontal Stabilizer, template BL 30.5	2
213-91-004	Horizontal Stabilizer, template BL 50.0	2
213-91-005	Horizontal Stabilizer, template BL 65.25	2
113-14-005	Hinges "U"	6
213-11-006	Horizontal Stabilizer, front bracket	1
213-13-031	Horizontal Stabilizer, rear bracket	1
213-11-008	Horizontal Stabilizer, shear web	1
213-13-001	Horizontal Stabilizer, Rib Aft BL30.5	2
213-13-002	Horizontal Stabilizer, Rib FWD BL 3.2	2
213-13-003	Horizontal Stabilizer, Rib AFT BL 11.8	2
213-13-004	Horizontal Stabilizer, Rib AFT BL 50.0	2
213-12-005	Horizontal Stabilizer, Rib AFT BL 3.2	2
213-13-006	Horizontal Stabilizer, Rib End Rib Stab Tip	2
213-13-007	Horizontal Stabilizer, Rib FWD BL 11.8	2
213-13-008	Horizontal Stabilizer, Rib FWD BL 50.0	2
213-13-009	Horizontal Stabilizer, Rib FWD BL 30.5	2
AN3-10A	Bolt	28
AN3-7A	Bolt	4
AN960-10	Washer	36
K2000-3	Anchor Nut	36
AD426-3-5	Rivets	60
113-14-016	Backing Plates	18
213-11-006A	Backing Plate	1
MS24694S56	Machine Screws	4
BSP-43	Pop Rivets	20
213-13-032	Conduit, Trim Tab	1

Step 1. Construct the Horizontal Stabilizer fixture.

- A. Use the Horizontal Stabilizer templates to cut out the stabilizer saddles for BL 3.2, 11.8, 30.5, 50.0 and 65.25 (2 sets – for both right and left side of stabilizer).
- B. Locate and mark a fixture centerline (BL 0) on your construction table and position the saddles at the appropriate BL's based on this point. Make sure saddles are square on the BL's.
- C. Take special care to align the saddles so that the saddle hinge centerline is accurately located in both the vertical and lateral planes. For reference, construct a string guide across the hinge centerline approximately 4-1/8" off the table surface. This will insure the correct positioning of the hinges later.

Step 2. Install lower stabilizer skin on fixture.

- A. Place the lower stabilizer skin on the fixture. Check for proper fit in the saddles.
- B. Center the stabilizer laterally (spar centerline on fixture centerline) and insure that the EOP (end of part) is aligned on the hinge centerline.
- C. Secure the skin on the fixture with clamps.
- D. Make a mark 2.6" on each side of the centerline on the lower skin at the forward edge of the spar. Make a second mark 3.125" on each side of the centerline at the leading edge of the stabilizer skin. Draw a line between the marks on each side of the centerline. Cut along these lines and remove the skin. This area will have to be trimmed to fit the fuselage when the stabilizer is installed on the fuselage.



Step 3. Position and mount aft shear web.

A. Position U hinges on aft shear web located at BL 11.8, 30.5 and 50.0. Make sure the hinges are positioned in the center of the aft shear web (vertically) and install using hot glue or similar temporary adhesive.

B. Position the aft shear web on the skin so that the hinge centerline is located over the hinge centerline location on the fixture. **NOTE: the alignment string added in step 1 should run directly through the center of the hinge holes. This will insure the correct alignment.**

C. Once properly aligned, mark the location of the shear web on the skin, remove the shear web and prepare the mating surfaces by sanding and cleaning both surfaces.

D. Bond the aft shear web to the lower skin using a milled fiber / resin solution.



NOTE: ON KITS SHIPPED AFTER 01/01/2001 THE ABOVE PROCEDURE HAS BEEN COMPLETED AT THE FACTORY.

Step 4. Install ribs in horizontal stabilizer.

A. Fit all ribs into the horizontal stabilizer at their appropriate BL locations. Make sure to properly align them to the aft shear web and stabilizer skin using a carpenter's square or other suitable tool.

B. Q-cell all radius between the ribs, aft shear web, main spar and stabilizer skin.

C. Laminate all ribs with two layers of 2" fiberglass tapes.

Step 5. Install spar-mounting plate.

A. Locate the center of the horizontal spar in the vertical and lateral planes (i.e. Locate a drill point on the spar vertically in the center of the spar centerline).

B. Drill a #21 hole at this location. This hole will be used as a location guide for the forward spar mounting plate.

C. Position the forward spar mounting plate on the forward side of the spar with the center hole aligned with the previously drilled hole. Make sure the bracket is level and drill the eight #12 holes through the spar.

D. Countersink the 4 inboard holes and install (4) MS24694-S-52 machine screws. **NOTE: Make sure the screw heads are flush to the bracket face so the face is flat and that you have the required two threads showing past the anchor nut.**

E. Drill and install anchor nuts to the backing plates and secure the backing plates to the spar web using pop rivets.

F. Install AN3-10A bolts and washers. Torque all bolts & screws to 20-25 inch pounds.

F. Install ribs 213-13-002 on BL3.2 with the forward end angles outboard to BL3.5. Do not attach to forward mounting plate. Ribs should be placed 1/2" outboard of the lines marked in Step 2 D.

**Step 6. Install the electric trim tab wire conduit.**

A. Locate and drill a 1/2" hole on the lower skin, 9" forward of the aft EOP on the stabilizer centerline.

B. Locate and drill 1/2" holes in the ribs located at BL 3.2 and 11.8.

C. Locate and drill a 1/2" hole in the aft shear web at BL 21.1.

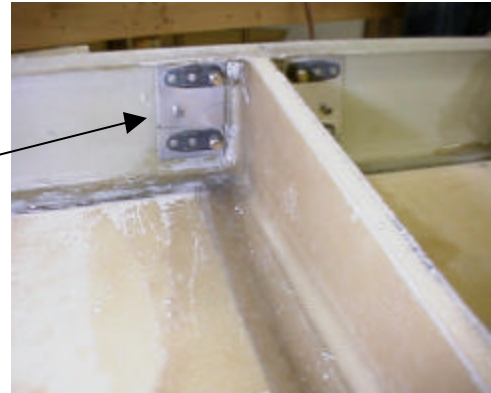
D. Secure both ends of tube using Pro Seal or other equivalent sealant.



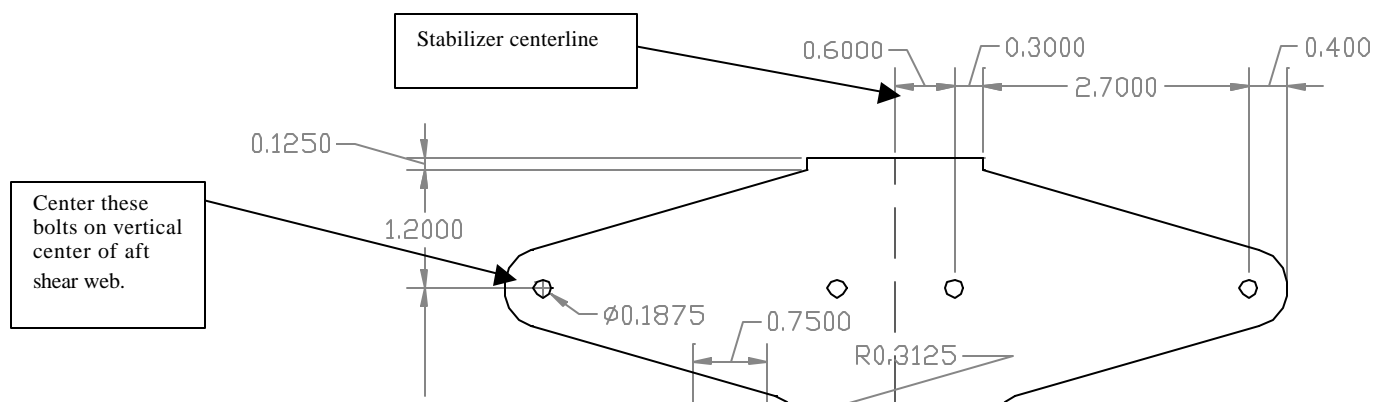
Step 7. Install anchor nuts to aft shear web.

- A. Drill all hinge mounting holes through aft shear web.
- B. Temporarily mount hinges with AN3-10A bolts.
- C. Install K2000-3 anchor nuts and pop rivet in place.

Install hinges with bolts to properly install anchor nuts. Pop rivet nut plate through aft shear web.

**Step 8. Install rear mounting bracket anchor nuts.**

- A. Locate and drill the rear mounting bracket attaching holes and anchor nuts to the aft shear web. These bolts are centered on stabilizer horizontal centerline. Use dimensions shown in drawing below to locate holes. Make a drill guide from a scrap piece of aluminum so that you can drill the holes in the aft mounting bracket when installed during a latter procedure.
- B. Drill and install the rear bracket mounting bolts using (4) AN3-7A bolts and anchor nuts.



Step 9. Horizontal stabilizer closeout.

- A. Notch all ribs and perform a pre closeout inspection. *NOTE: Insure that vent holes have been drilled into all ribs to insure proper venting.*
- B. Perform a dry fitting of the upper skin onto the stabilizer assembly to insure a proper fit.
- C. With the upper skin still in position, drill an alignment hole at each end of the stabilizer at the aft shear web. These holes will be referenced for final closeout.
- D. Apply two layers of mat to the horizontal spar.
- E. Apply a milled fiber, cabosil and resin mixture to the top of all ribs and shear webs and position the top skin on the stabilizer assembly. Insure the alignment holes are correct and install a cleco fastener to secure the skin.
- F. Apply weight to the top of the skin. Make sure the weight is distributed evenly across the stabilizer spar; shear web and ribs to insure solid bonding of all surfaces.

Step 12. Finishing the horizontal stabilizer.

- A. Once the closeout has been complete and the adhesives set, finish the stabilizer by applying 3 layers of 7781 over the leading edge.
- B. Remove all hinges and apply 3 layers of 7781 in the trailing edge trough. Make sure all layers wrap onto both skins.
- C. Re-drill the hinge mounting holes and re-attach the hinges using AN3-10A bolts and AN960-10 washers. Use caution when re-drilling the holes not to allow the drill bit to come in contact with the anchor nuts.
- D. Torque the hinge mount bolts to 20-25 inch pounds.