PROCEDURE 4.010
BUILDING THE FUSELAGE FIXTURE

DESCRIPTION:

A fixture will support your lower fuselage, during the next phases of construction. The fixture consists of three sawhorses. Two of them will have saddles contoured to the shape of the lower fuselage. They support the ends of the fuselage. A third sawhorse will be under the middle of the fuselage. Sawhorses you used during wing construction will be modified.

SUPPLIED MATERIAL:

Part No.	Qty.	Description
112-91-005	1	Template, saddle 1
112-91-006	1	Template, saddle 2
112-11-002	1	Assembly, fuselage/carry-through

OTHER ITEMS REQUIRED:

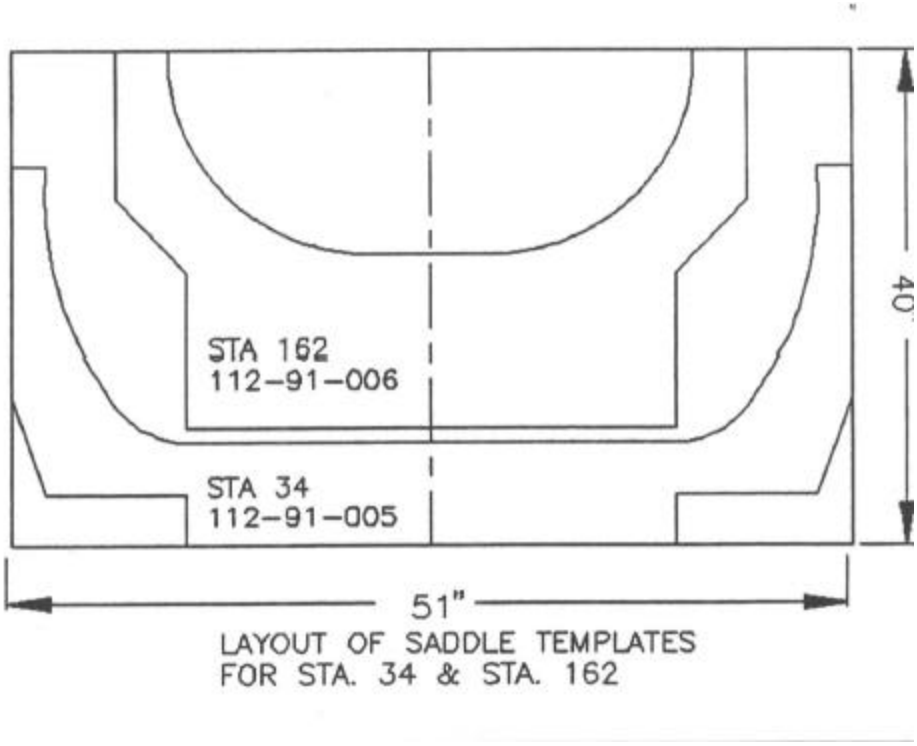
Plywood (3/4" X 51" X 40") Spray adhesive Sandpaper (med. grit) 3/4" Electrical tape 4 - 1/4" X 4" bolts (hex head or stove) 4! - 1/4" nut 8-- 1/4" flat washer 1" X 4" wood scraps Sawhorses (from wing)*

TOOLS:

Crosscut saw Saber saw or jig saw Carpenter's chalk line Carpenter's framing square, 2-foot Electric Drill (1/4" or 3/8") Drill bit - 1/4" Plumb bob Carpenter's level 4 - 6" C-clamps

Step 1. <u>Trim two wing sawhorses to new heights</u>.

Trim 6" from each leg of one sawhorse. Trim 2" from each leg of another sawhorse. These two sawhorses should now be 23" and 27" high respectively. The 23" high sawhorse will be used as the forward support for the fuselage at Station 34. The 27" high sawhorse will be used as the middle support for the fuselage at Station 89. A full height sawhorse will be used at Sta. 162.



LAYOUT OF SADDLE TEMPLATES
FOR STA. 34 & STA. 162

Step 2. **<u>Arrange templates on 3/4" plywood</u>**.

Arrange templates 112-91-005 and 112-91-006 so the least amount of plywood is wasted, but still accessible to be sawn out easily.

Step 3. **<u>Cut out and sand fuselage saddles.</u>**

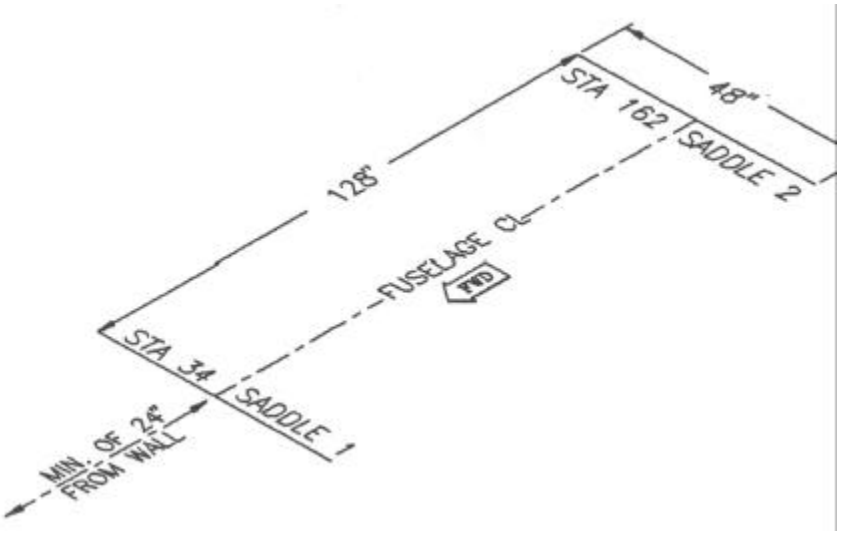
Saw out saddles, sand them smooth and apply electrical tape along the edges, as you did for the wings.

Step 4. <u>Plan your workspace layout.</u>

Plan the location of the fuselage jig within your work area so you won't need to move it during the lower fuselage, upper fuselage, and empennage phases of construction. Station 34, the firewall, should be at least 2' from one end of your workspace. Your workspace should be at least 14' wide to accommodate the 11' wide empennage and still have room to work around it.

Step 5. <u>Draw location lines on floor</u>.

Snap a 20' chalk line along the middle of the workspace floor representing the longitudinal centerline of the fuselage (fuselage CL). You'll need at least 24" working space all around the fuselage. Mark a point on the CL at least 24" from one end of your workspace, to represent the location of Sta. 34. Mark another point 128" aft from Station 34 along the fuselage CL. This mark will be Station 162.

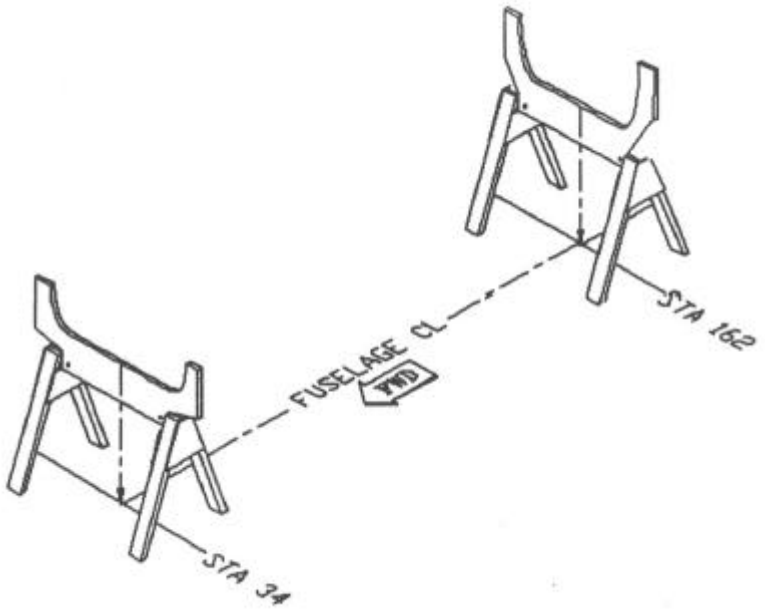


Using a 2' carpenters square, draw two 4' lines perpendicular to the fuselage CL at Sta. 34 and at Sta. 162. These lines will be used to accurately position the saddles and to align your sawhorses, so make them visible. Mark the points where the lines intersect the fuselage CL.

Step 6. <u>Attach saddle 1 to sawhorse</u>.

Center saddle 1 (temp. 112-91-005) on the 23" high sawhorse main web allowing the bottom of the saddle to hang 1/2" below main web. Clamp Saddle 1 to the sawhorse main web with two spring clamps. Level the upper surface of the saddle.

When level, drill a 1/4" hole through the saddle, using one of the holes previously drilled through the sawhorse main web as a guide. Finger tighten the nut on a bolt through the saddle and web. The other end of the saddle remains temporarily clamped to the sawhorse web.



Step 7. <u>Place saddle I on location line.</u>

Hang a plumb bob at the fuselage centerline marked on temp. 11291-005 till it just clears the floor. Position the sawhorse astride and parallel to the Sta. 34 location line. The plumb bob must be directly over the intersection of the Sta. 34 and fuselage CL mark. The template side of the saddle must face to the "front" of your airplane. Check the alignment of the saddle to be sure it's lined up along the Sta. 34 line on the floor by dropping the plumb bob at several locations along the face of the template. The plumb bob should always be directly over the Sta. 34 line. When the saddle is in the proper position, hot glue the sawhorse legs to the floor. Small wood scraps glued against the legs and the floor will help prevent accidental kicks from moving the sawhorse.

Step 8. <u>Level and tighten saddle 1.</u>

Check the level of saddle 1 again to be sure. If not level, loosen the spring clamp, adjust, and re-clamp. When satisfied, drill a second hole through the saddle near the clamp end, using a hole previously made during wing assembly as a guide. Bolt the end in place and tighten both ends securely.

Step 9. <u>Place sawhorse at Sta. 162.</u>

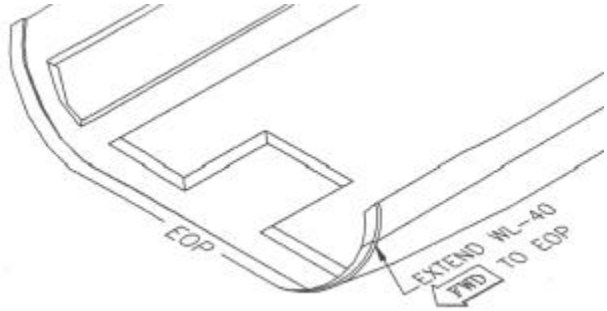
Position a full height sawhorse over the fuselage CL at the mark on the floor representing Sta. 162.

Step 10. **<u>Clamp saddle 2 to sawhorse at Sta. 162.</u>**

Attach saddle 2 (temp. 112-91-006) with two C-clamps to the sawhorse main web.

Step 11. **<u>Align sawhorse and saddle 2 with Sta. 162.</u>**

Drop a plumb bob from the fuselage centerline marked on temp. 112-98-006, with the plumb bob just clearing the floor. Position the sawhorse astride and parallel to Sta. 162, with the plumb bob directly over the intersection of the Sta. 162 and the fuselage CL lines. The face of saddle 2, with the template adhered, should be towards the front of your airplane. Plumb the Sta. 162 line at several points along the template to check its position. When the sawhorse is in proper position, hot glue the legs to the floor Glue small wood scraps against the legs and floor to prevent accidental kicks from moving the sawhorse.



Step 12. **Set the lower fuselage in place on the saddles.**

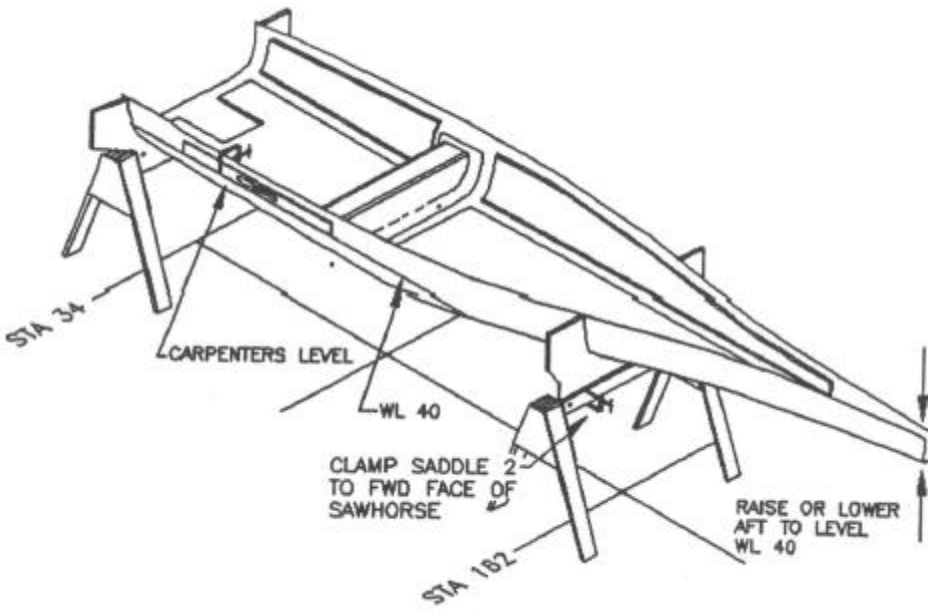
Enlist a friend to help you lift the lower fuselage into the saddles. Align the inscribed centerline of the fuselage near station 34 with Saddle 1. The aft end of the fuselage will temporarily rest on saddle 2 clamped to the sawhorse at Sta. 162.

Step 13. **Extend WL 40 to the forward end of the fuselage.**

On the left and right sides of the fuselage, a tine was inscribed along the skin at the factory. It extends aft from near the front of the lower fuselage, parallel to the fuselage floor about 6'. This line is WL 40 (Water Uni 40). The line must be extended to the forward fuselage EOP to help establish the transverse levelness of the fuselage in later steps. Use a straightedge to draw a pencil line extending WL 40 forward to EOP.

Step 14. **Clamp a bubble level on fuselage side along WL 40.**

Hold a carpenter's level along one side of the fuselage on the inscribed line at WL 40. The level must be aligned with the WL 40 line.



Step 15. Raise saddle 2 at Sta. 162.

Have your friend raise the aft end of the lower fuselage until you see the carpenter's level bubble showing that AIL 40 is level. With two C-clamps, fasten Saddle 2 (temp. 112-91-006) to the forward face of the sawhorse main web.

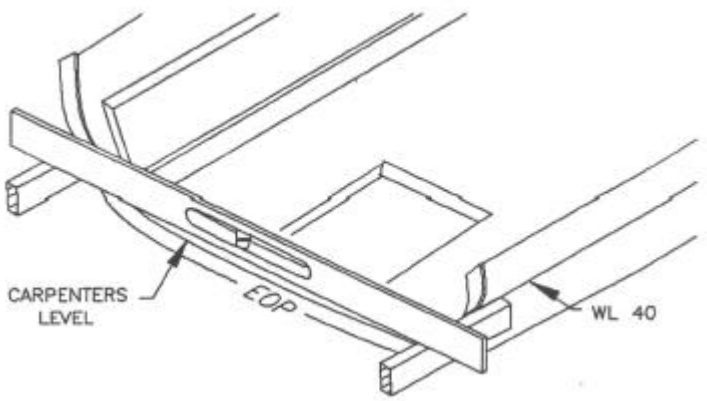
Check that saddle 2 is at Sta. 162.
Plumb and move the saddle as necessary to position saddle 2 directly over the intersection of the CL and the Sta. 162 mark on the floor. The lines inscribed on the fuselage at Sta. 34 must be aligned with temp. 112-91-005 on saddle 1. Adjust saddle 2 till the bubble in the carpenter's level along WL40 shows level.

Step 16. Bolt saddle 2 to sawhorse main web.

Bolt saddle 2 to the sawhorse. Use existing holes near each end of the sawhorse main web as drill guides for the 1/4" holes through saddle 2. Fasten securely with 1/4" bolts, washers and nuts.

Step 17. Check transverse level of lower fuselage.

Tack glue straight pieces of wood to each side of the fuselage at the front extending past the EOP about 2". Their top faces must be aligned with WL 40. Your long carpenter's level laid across the wood pieces will show whether the lower fuselage is level across WL 40. Adjust fuselage in the fixture if necessary. Re-check to insure the fuselage is level, both fore and aft and lateral.



Step 18. **Place a third sawhorse under the carry-thru.**

Your 27" high sawhorse can be positioned under the lower fuselage at Sta. 89, under the factory installed wing spar carry-thru. Pad this sawhorse with some strips of electrical tape to protect the fuselage finish. The sawhorse should support the lower fuselage without deforming it.

Step 19. **Tack-glue the lower fuselage in place.**

When you are certain the fuselage is properly located and supported hot Glue several 3" long beads along the lower fuselage to the "wood side" (opposite the paper templates) of the saddles at stations 34 and 162 to prevent shifting.