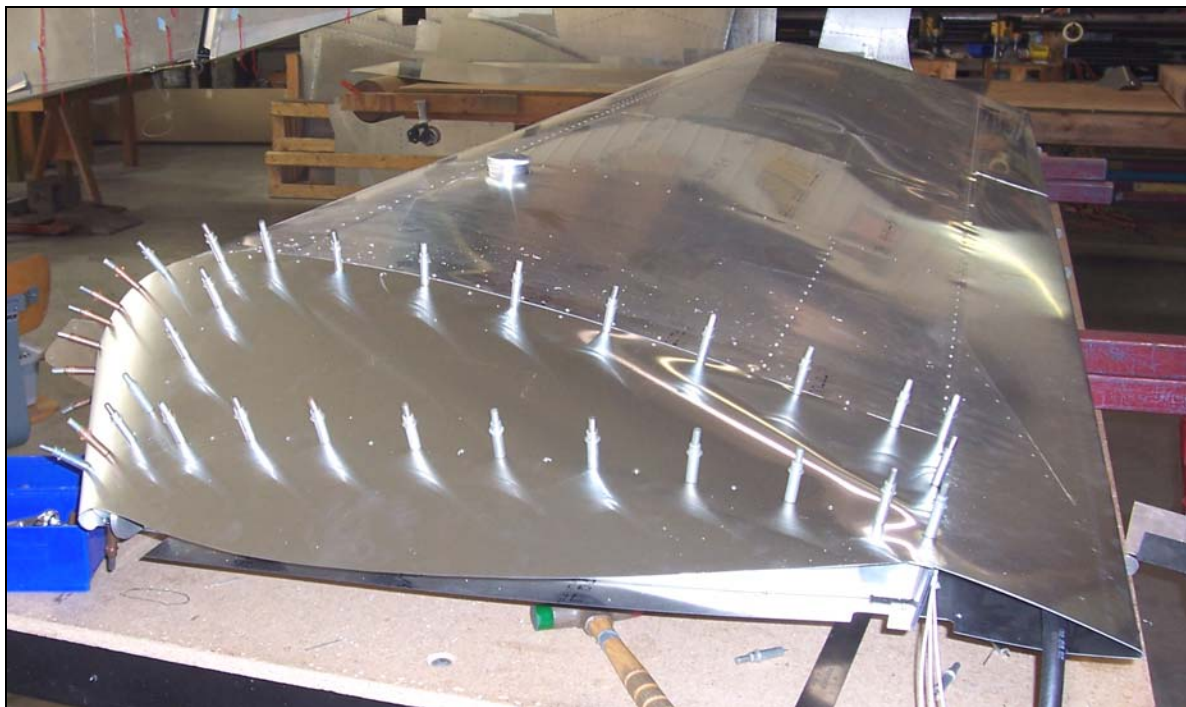
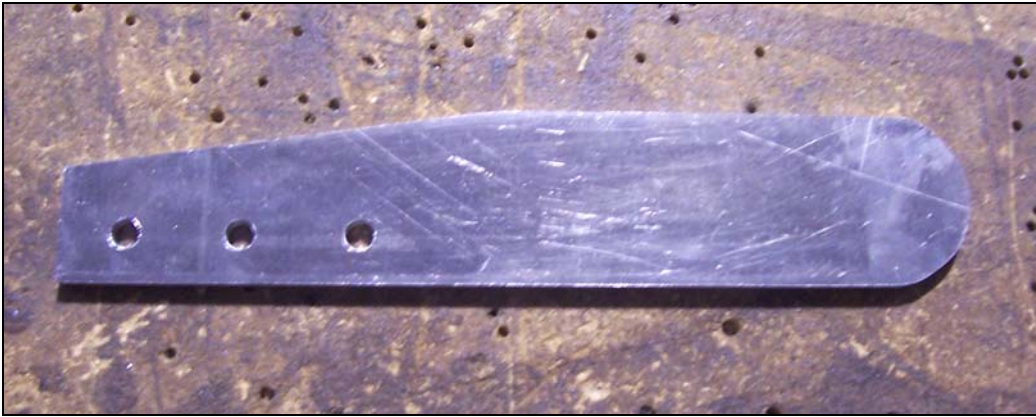


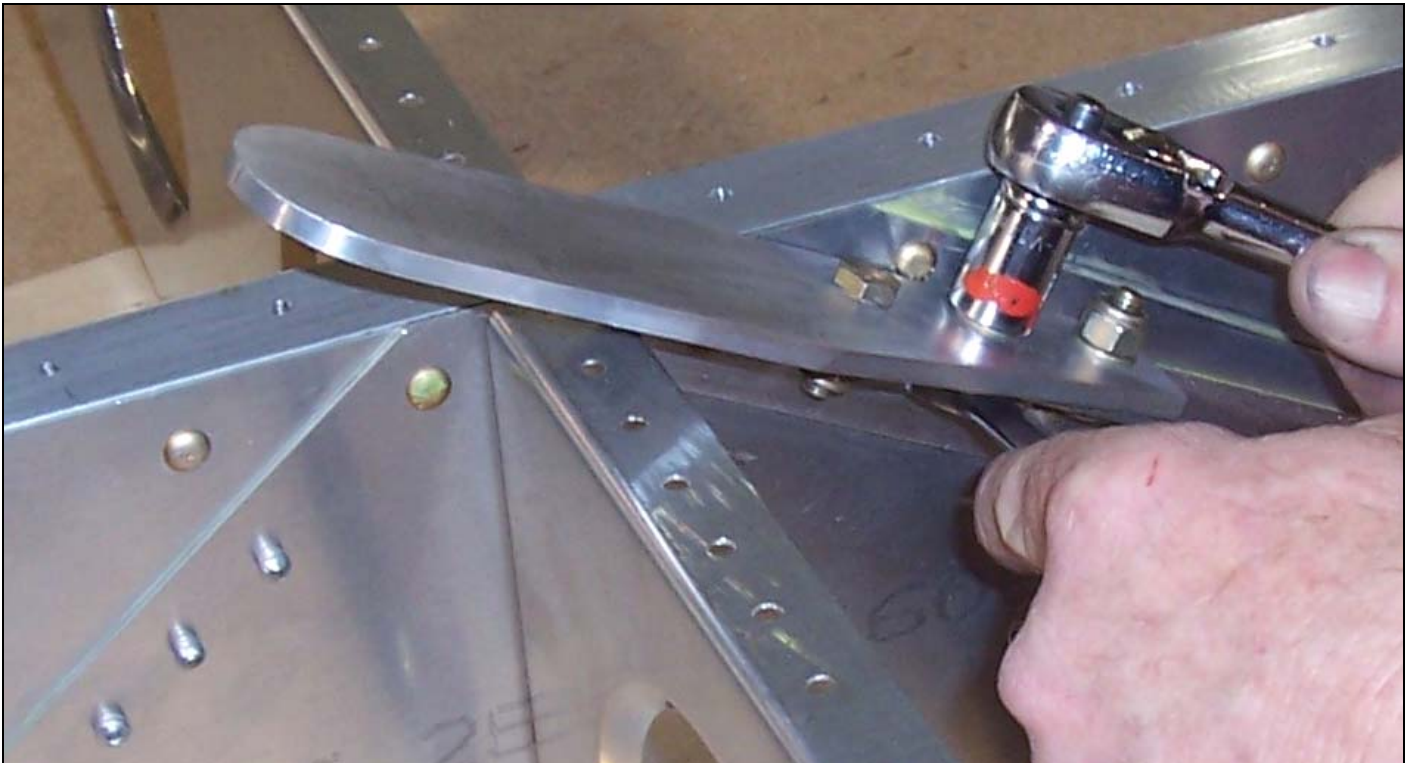
Section 75-WA-2 Wing Skins



This manual has been prepared for assembly of the wing skins supplied with match drilled parts. This photo assembly manual is intended as a supplement to the drawings. If there is any discrepancy between this manual and the drawings, the drawings supersede this manual. For more information on building standards and allowable tolerances see "Construction Standards for Zenair Light Aircraft" available from Zenith Aircraft Co.



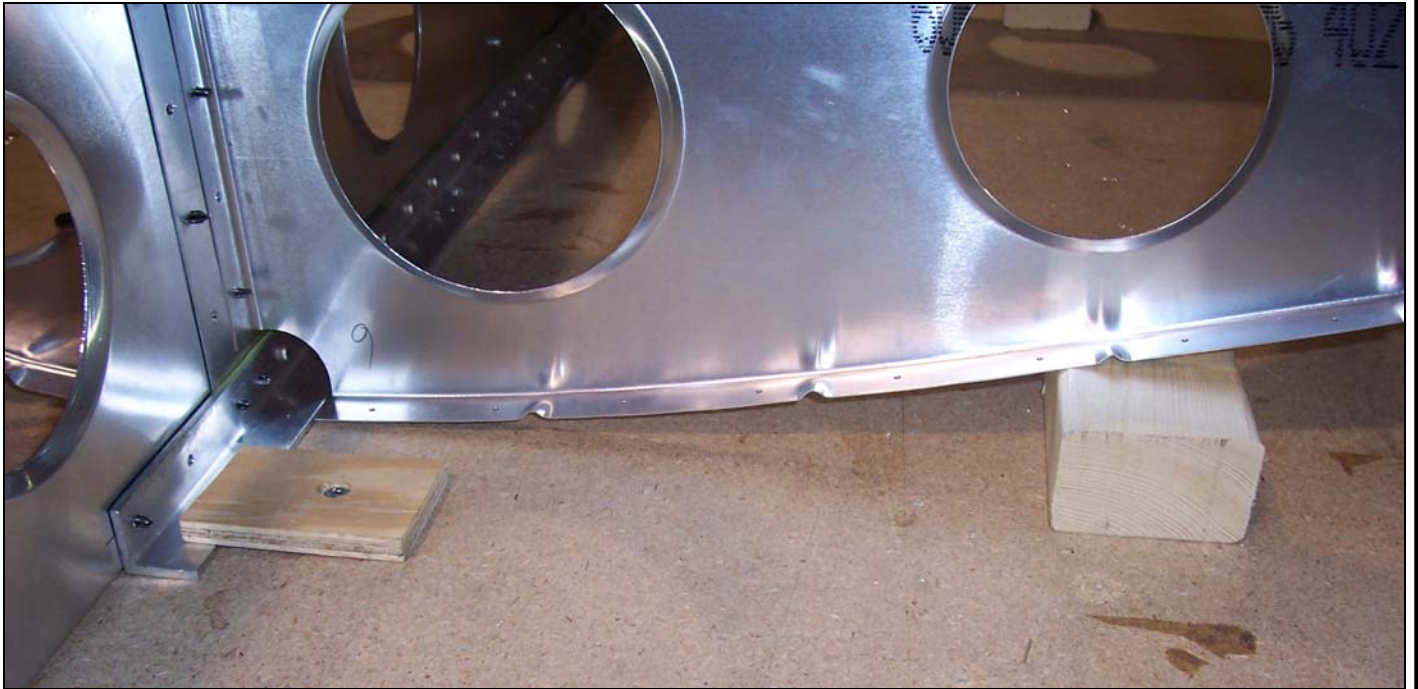
P/N: 75W2-5
Front Upper Strut
Fitting



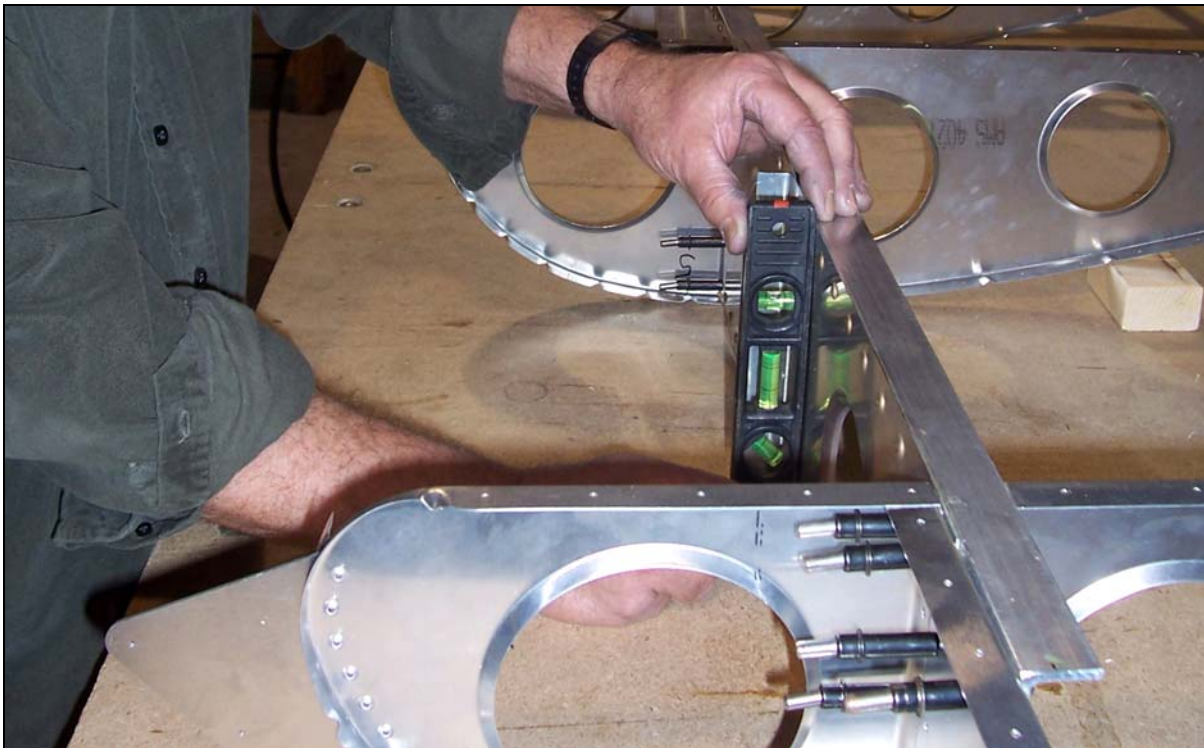
Bolt the Front Upper Strut Fitting to the Strut Angle on the Spar with 3 AN4 bolts.

Orientation: The taper is the forward side of the Front Upper Strut Angle.

Note: The first bolt must be inserted from the bottom with the nut towards the inside of the wing to clear the Nose Skin.



Screw pieces of plywood to the workbench to secure the Wing Skeleton. Slide pieces of 2"x4" under the Rear Ribs to rotate the Spar till it is vertical.



Use a small level to determine if the Spar is vertical.

Check: Check that the Spar is vertical at several locations down the length of the Spar. This will prevent twist being built into the Wing.



Cut six L angles to 660mm long, two L angles 380mm long, one L angle 309mm long, and one L angle 460mm long to fit between the Rear Ribs. Mark the flange center line on the L angles and mark a rivet location 10mm from the end of the L angle. Use a #40 drill bit to predrill the first rivet location in the L angles.



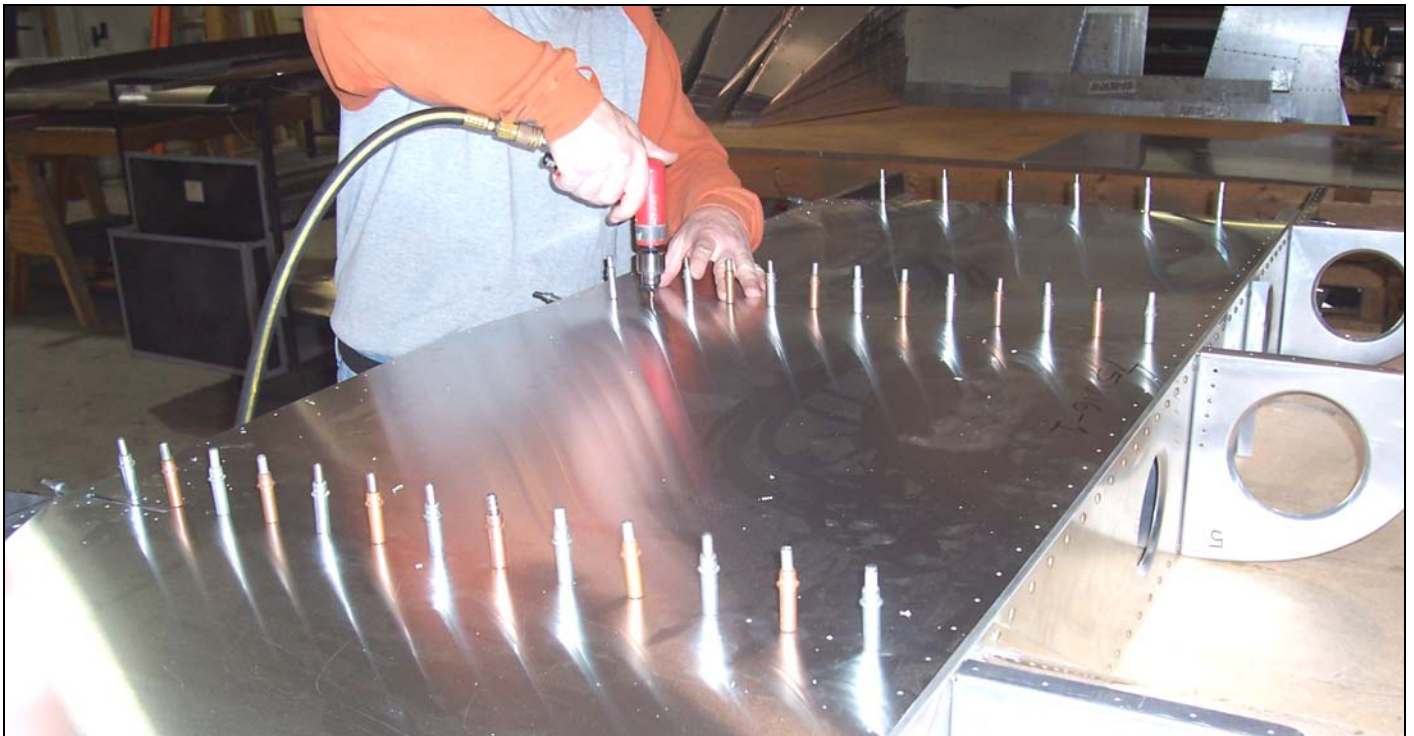
P/N: 75W6-1
I/B Bottom Skin

Cleco the predrilled hole in the L angle to the first hole past the rib rivet line. Position the L angle so the center line is visible through the holes in the Bottom Skin. Back drill through the Bottom Skin into the L angle and Cleco. Use a #30 drill bit to expand the holes and Cleco. Do this for the O/B Bottom Skin and the O/B Top Skin.



Sometimes a Pick is helpful to line up the holes to Cleco.

Cleco the I/B Bottom Skin to the Rear Ribs with #40 Clecos in every other hole.



With a # 30 drill bit, expand the holes in the I/B Bottom Skin and Rear Ribs. Drill between the #40 Clecos then remove them and finish expanding the holes in the Skin.

Note: Do not drill the holes in the Rear Channels till the Trailing Edge Skins are installed.



P/N: 75W5-1
I/B Nose Skin

Using #40 Clecos, Cleco the I/B Nose Skin to the Nose Ribs. Let the top portion of the Nose Skin over hang the workbench. With a #30 drill bit, expand the holes including the Spar rivet line. Use a #20 drill bit to expand the holes into the Spar.



P/N: 75W5-2
O/B Nose Skin

Cleco the O/B Nose Skin to the Nose Ribs.



P/N: 75W6-2
O/B Bottom Skin

Cleco the O/B Bottom Skin to the Rear Rib and O/B Nose Skin. With a #30 drill bit, expand the holes. Use a #20 drill bit to expand the holes in the Spar Tip and the overlap on the O/B Bottom Skin.

Note: Wait to drill the holes in the Rear Channel till the Trailing Edge Skins are installed.

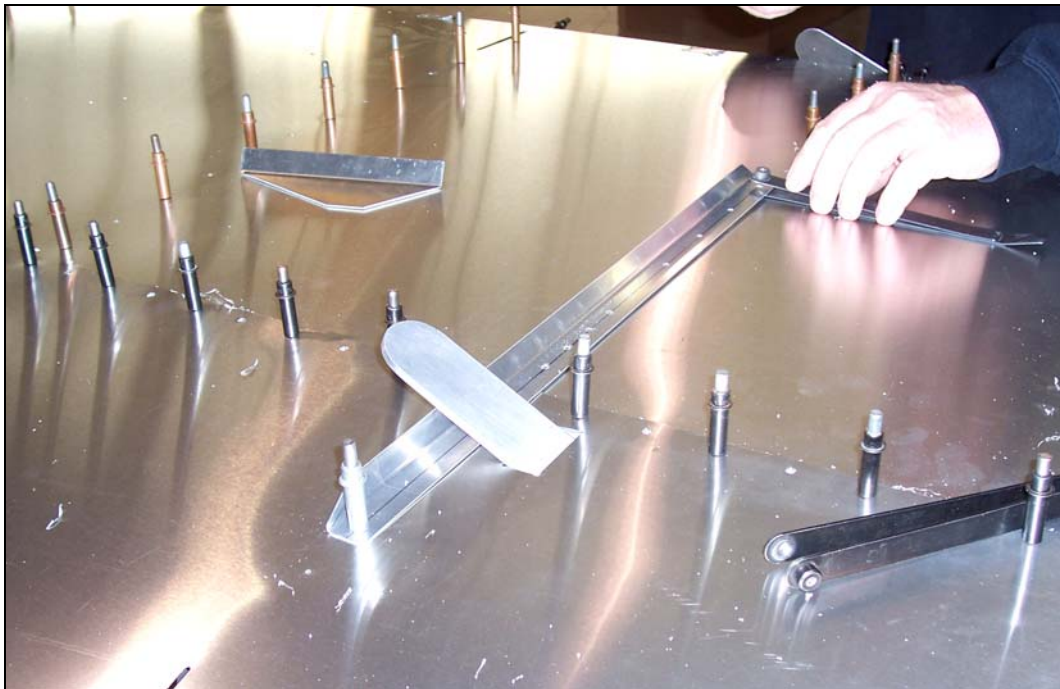


P/N: 75W6-3
I/B Trailing Edge Skin

P/N: 75W6-4
O/B Trailing Edge Skin

Slide the Trailing Edge Skins under the Bottom Skins. Cleco the Trailing Edge Skins to the Bottom Skins and Rear Channels. With a #30 drill bit, expand the holes in the Bottom Skins, Trailing Edge Skins, and Rear Channels.

Note: Rivets and Flaperon Arms shown in above photo are installed later in the photo assembly manual.



P/N: 75W7-8
Strut Angle

Mark the center line on the Strut Angle. Place a mark 10mm from the front end of the Strut Angle. Drill a hole on the mark and Cleco the Strut Angle to the Nose Rib at the hole 140mm forward of the Spar rivet line.



Use a hole finder to locate the remaining holes for the Strut Angle.

Check: Be sure the Strut Angle center line is visible through the hole in the hole-finder. This way the center line will be in line with the rivet line in the Skin and Rib.

Use a #30 drill to drill the remaining holes and cleco.



Remove the Angle from the Wing. Mark a line 30mm from each end of the Angle on the undrilled flange. Draw a line from the bend to the mark. Trim the flange of the angle on the line.



P/N: 75W7-1
Front Strut Fitting
Doubler

Position the Front Strut Fitting Doubler on the Front Strut Fitting and Angle so the radii are aligned. Clamp the Doubler to the Angle. Back drill through the Doubler into the Angle with a #30 and Cleco. Expand the holes with a #20 drill bit and cleco.



Mark the center line on the Strut Fitting. Mark a rivet hole location 35mm from the end of the Fitting. Use a #40 drill bit to drill through the Fitting into the Doubler. Expand the hole to a #20 drill bit.



Remove the Skins from the Skeleton, deburr, reassemble, and rivet the Skins to the bottom of the Skeleton. Wait to rivet the first nose rib until the Wing Root Nose Skin has been installed.

Note: It is a good idea to check that the Spar is still vertical before reassembling the Skins and riveting. Even after the holes are drilled there is enough play in the Clecos to introduce twist if the Spar isn't vertical.



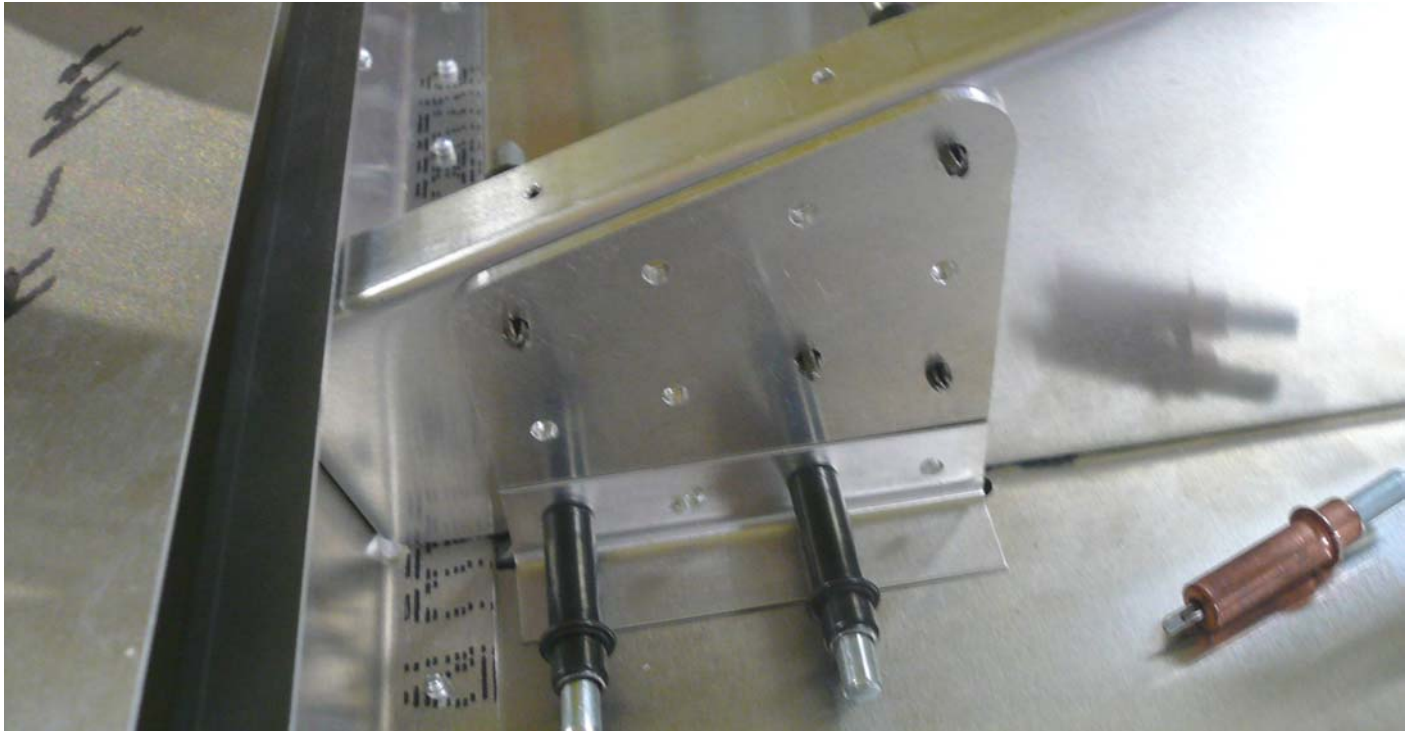
Flip the Wing over and set it on several beams. 2"x2" steel beams are used in the photo above but any rectangular or square beam 2" tall will work to lift the wing above the workbench. It is a good idea to place a piece of plywood under the Rear Channels on the beams to prevent the Wing from rocking.

Note: It is best to have someone help when flipping the wing over to prevent damage.

Check: Once the wing has been flipped and set on the beams, check that there isn't any twist in the Wing. With a small level check that the Spar is vertical in several places along the Spar. If required, place shims between the beams and the workbench to remove any twist.

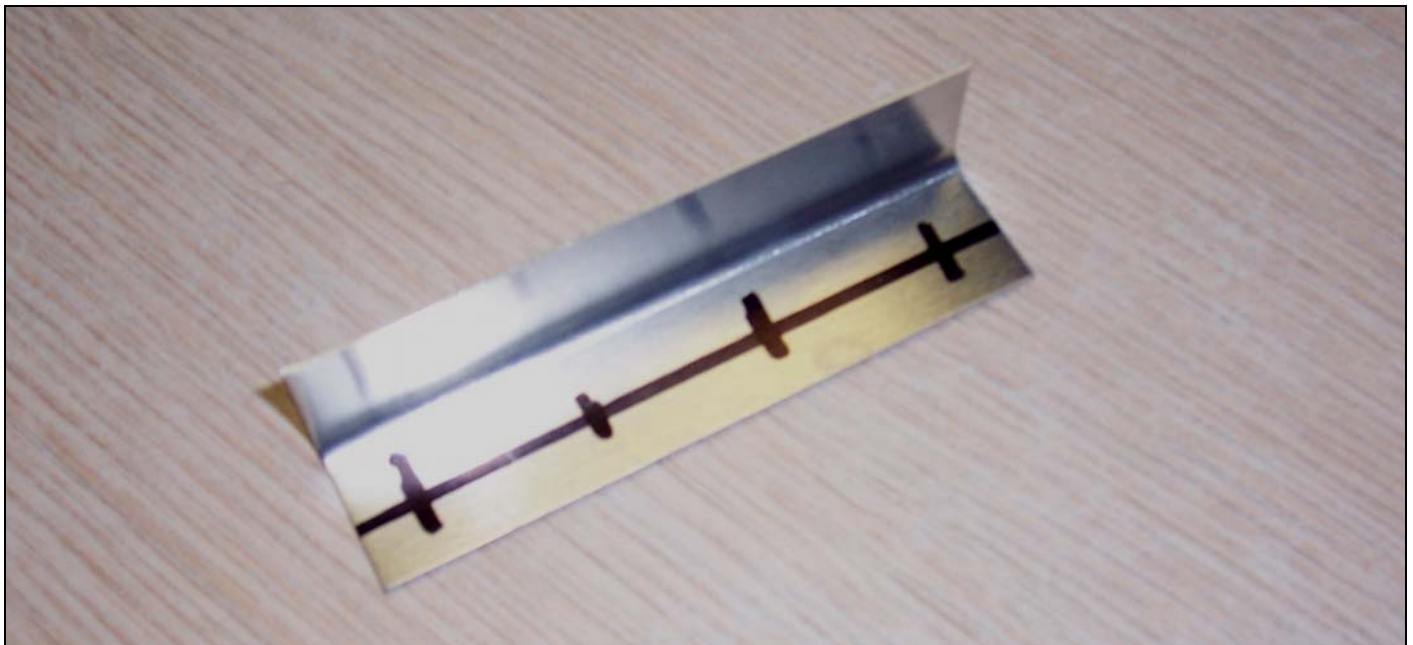


P/N: 75W3-5
Flaperon Arm

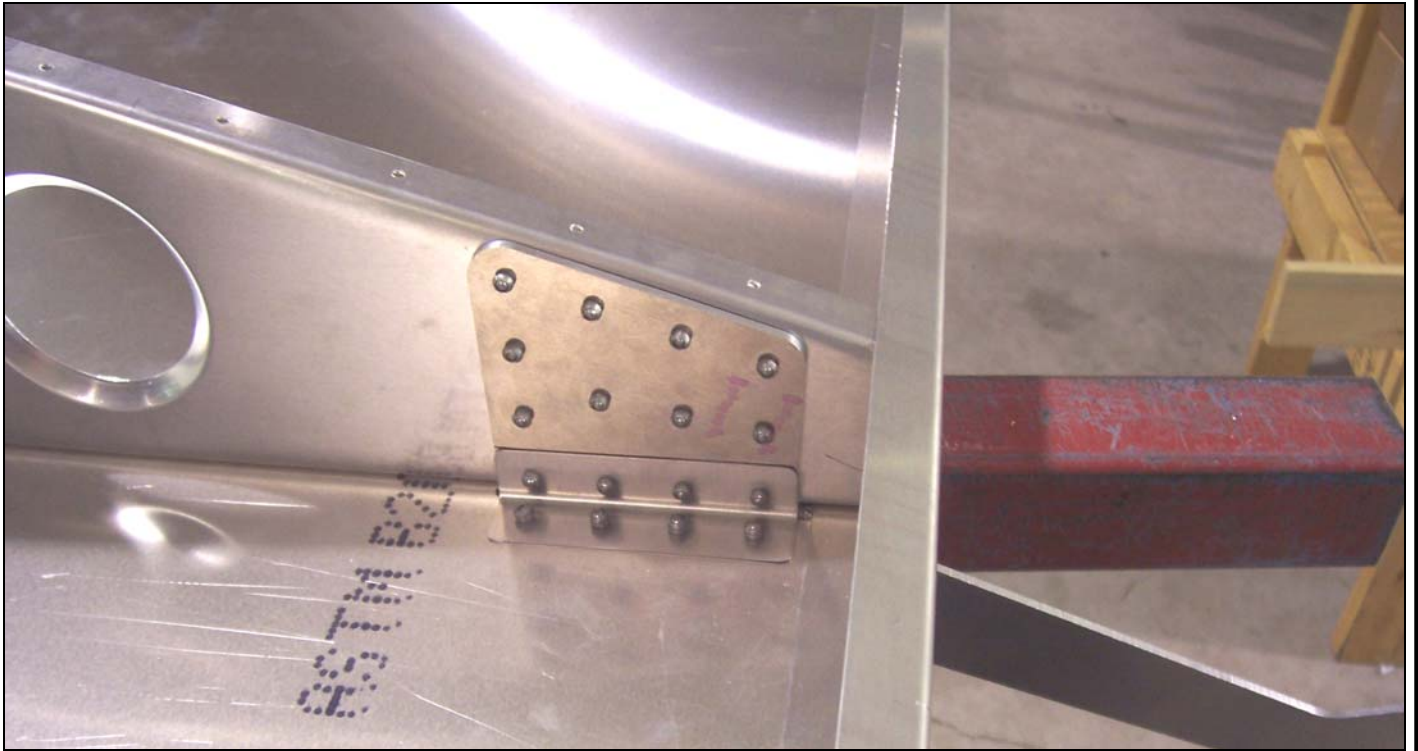


Cleco the Flaperon Arms to the Rear Ribs at Stns. 280, 1640, 2040, and 3400. With a #20 drill expand the holes in the Flaperon Arm through the Rear Rib. Leave the bottom 4 holes pilot holes to better position the L angle shown in the above photo.

Cut 4 pieces of L angle 87mm long each. Position the L angle on the Flaperon Arm and back drill through the Flaperon Arm into the L Angle and cleco.



Mark a center line on the bottom flange of the L angle. Mark a rivet location 10mm from each end of the L angle. Layout 2 additional rivet location evenly spaced between the end rivet locations. Pre-drill the holes in the L angle with a #40 drill bit.



Cleco the Flaperon Arm and the L angle to the Rear Rib. Back drill the holes in the L angle into the Rear Skin. Expand the holes with a #20 drill bit. Remove the Flaperon Arm and L angle from the Rear Rib, deburr the holes, and rivet the Flaperon Arm and L angle to the Rear Rib.



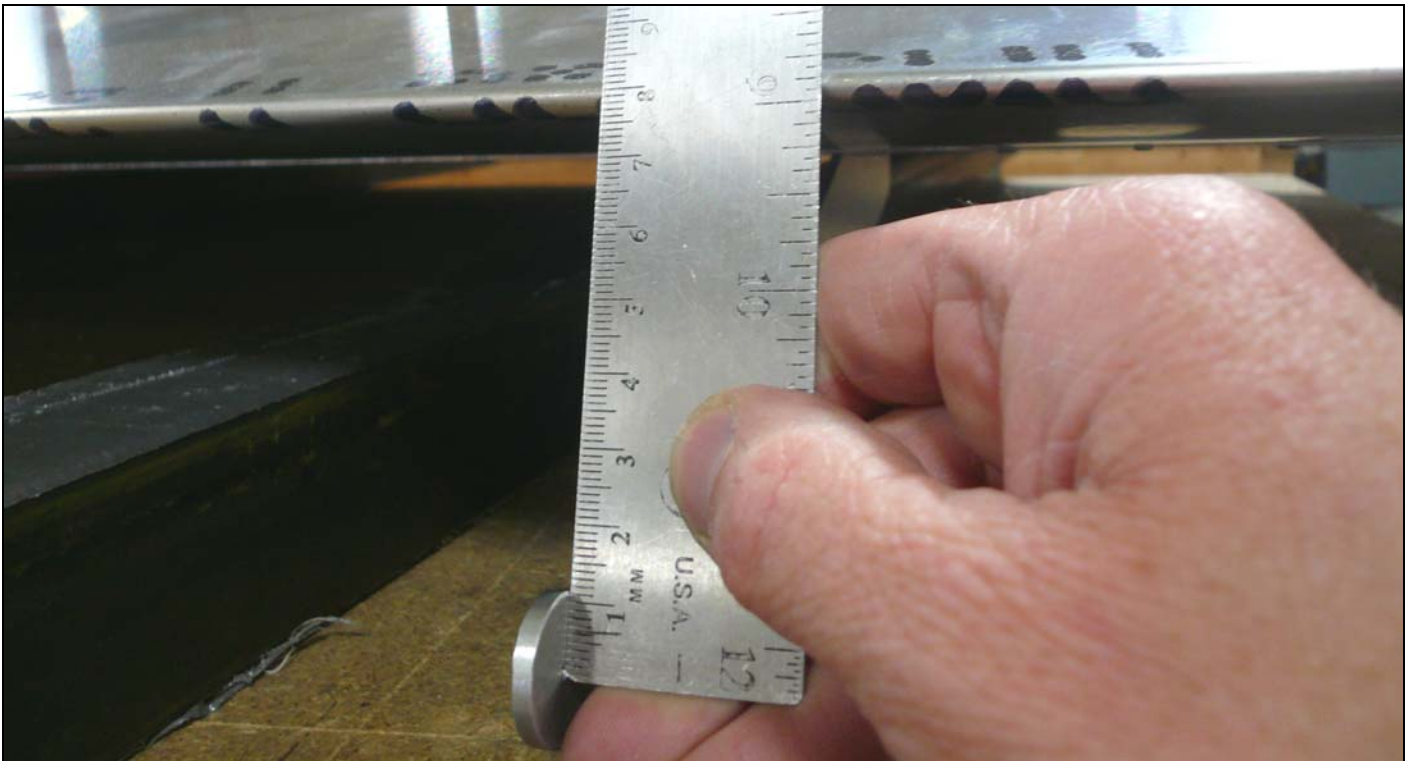
P/N: 75W5-4
O/B Top Skin

Cleco the O/B Top Skin to the Rear Ribs.



P/N: 75W5-3
I/B Top Skin

Cleco the I/B Top Skin to the Rear Ribs.



Set the Trailing Edge Skin height at 80mm from the hole in the Flaperon Arm to the center of the radius of the Trail Edge Skins.

Check: Check the distance at each Flaperon Arm to prevent the Trailing Edge from being installed with twist.



Back drill through the Top Skins in the Trailing Edge Skins and Rear Channels with a #40 drill bit when the Trailing Edge is set at the correct distance. With a #30 drill, expand the holes. Use a #20 drill bit to expand the holes on the inboard end of the wing. Expand the holes into the Rear Channel and the I/B Rear Channel Angle. See drawing 75-WA-1 and 75-WA-2 for details.

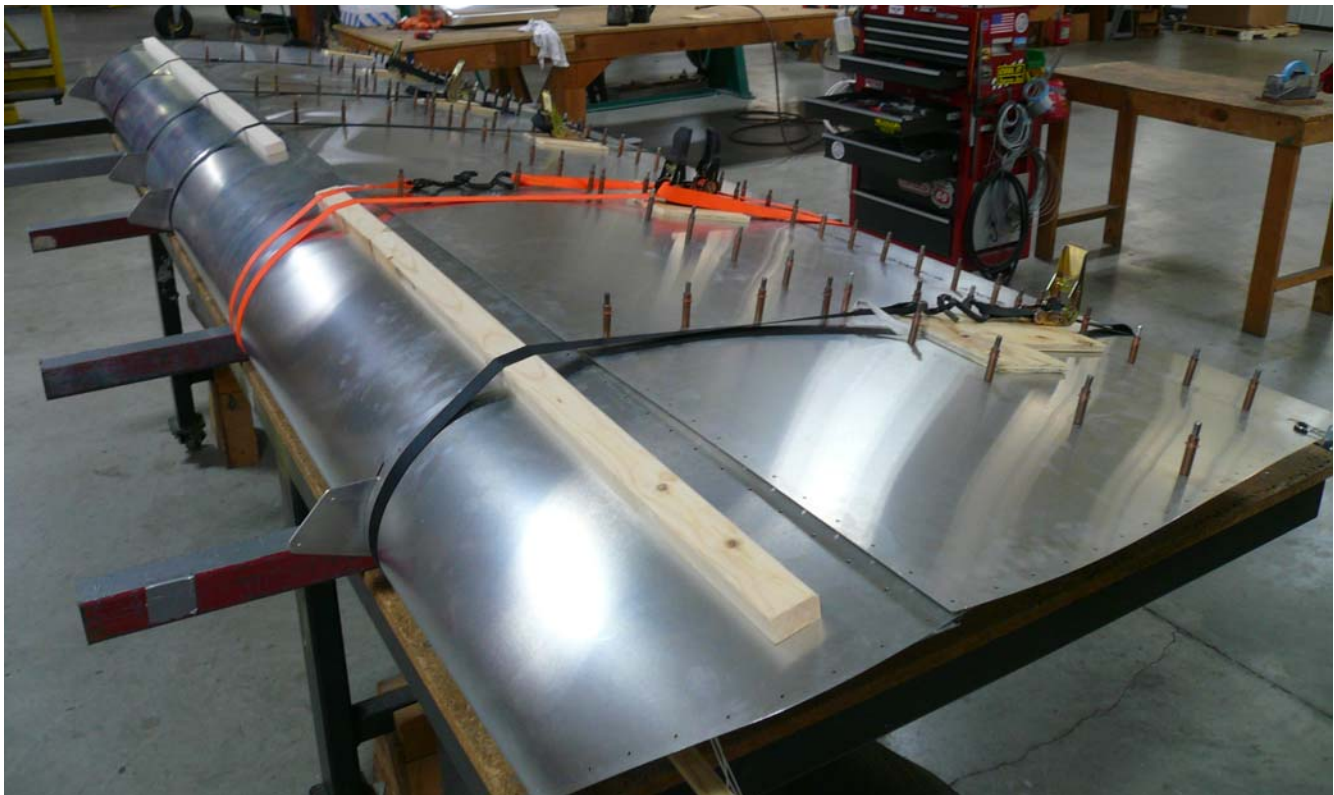


Using ratchet straps and a 1" x 2" board pull the Nose Skin around the Nose Ribs. The Nose Skin should slide under the Top Skins to be drilled. The Nose Skins will be riveted on top of the Top Skins after deburring. Be sure to place a piece of plywood under the ratchet on the strap or the metal ratchet will dent the Top Skins.

Check: The Nose Ribs can flex to the left or right, be sure the Slat Supports are in line with the slots in the Nose Skin. If too much pressure is applied from the straps with a misalignment, the Slat Supports can dent in the Nose Skin. Make sure there isn't any twist in the wing. Its possible to twist the wing when strapping the Nose Skin.



With the I/B Nose Skin strapped tight to the Nose Ribs, back drill, with a #40 drill bit, the holes into the Nose Ribs and Spar. Cleco every hole in the Nose Ribs and every other hole in the Spar.



With 2 ratchet straps, pull the O/B Nose Skin around the Nose Ribs. Slide the O/B Nose Skin under the Top Skin to drill the skins. When reassembled the Nose Skins will set on the outside of the Top Skins.



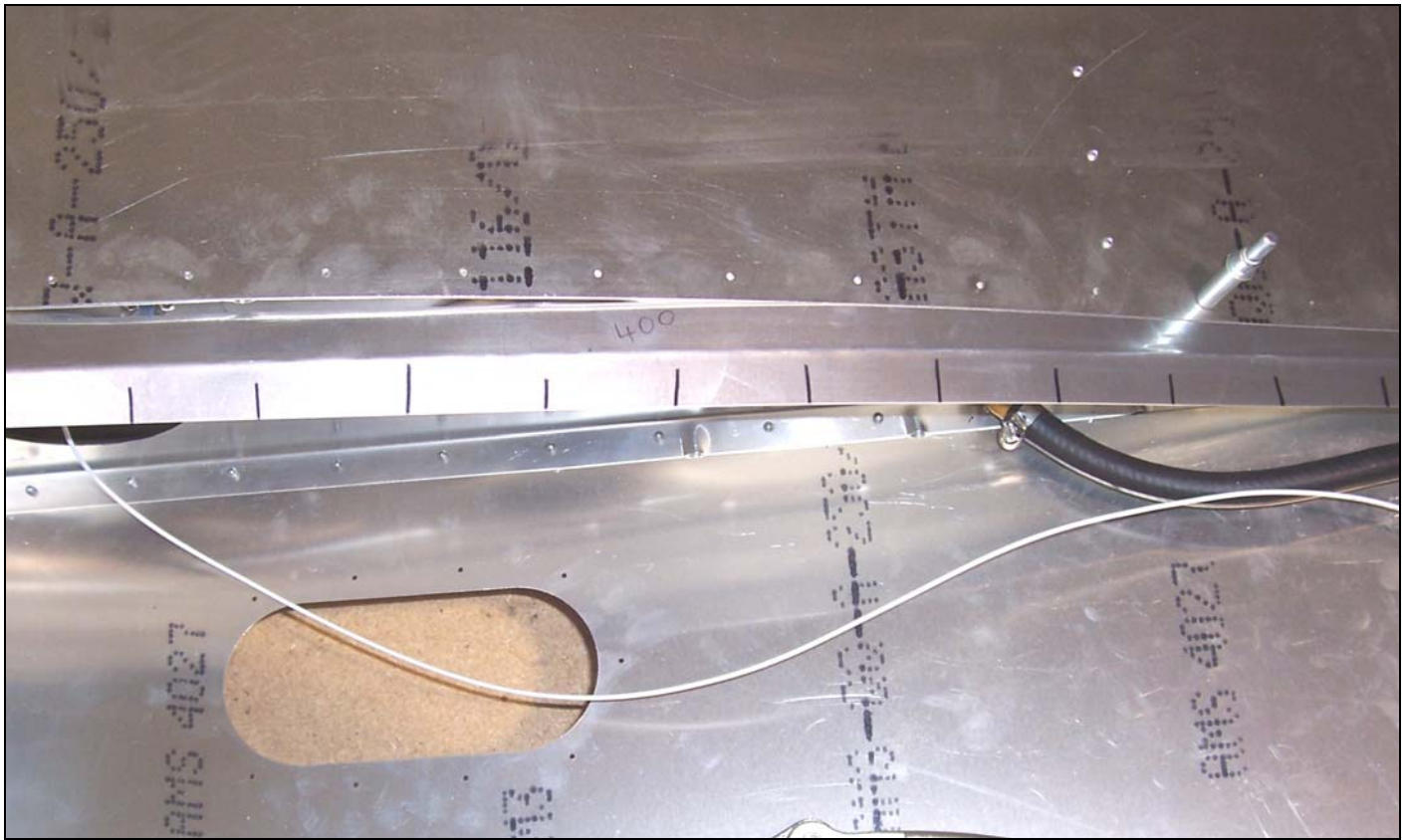
With a #30 drill bit, expand the holes in the Top Skins, Nose Skins, Ribs, and Spar Caps. Cleco every other hole as it is drilled. Use a #20 drill bit to expand the holes into the Spar.

Reference: See drawing 75-WA-2 for specific information.

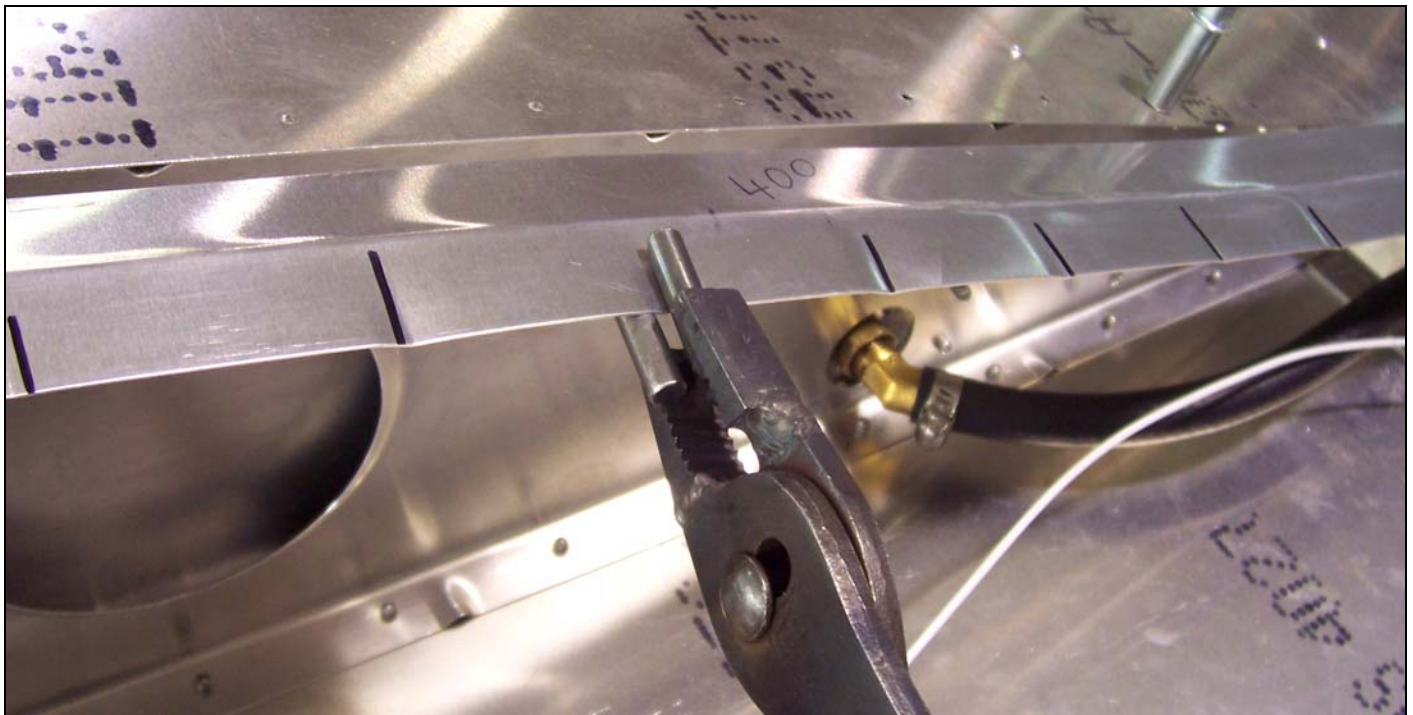


P/N: 75W6-5
Wing Root Angle

Place a mark at 400mm from the rear end. With a plastic hammer flatten the angle from 0 degrees at the aft end to 30 degrees at the 400mm mark.



Lay the Wing Root Angle on the Wing. Place a mark between the rivet locations.



Put crimps on the marks in the flange of the Wing Root Angle to match the curvature of the Ribs.

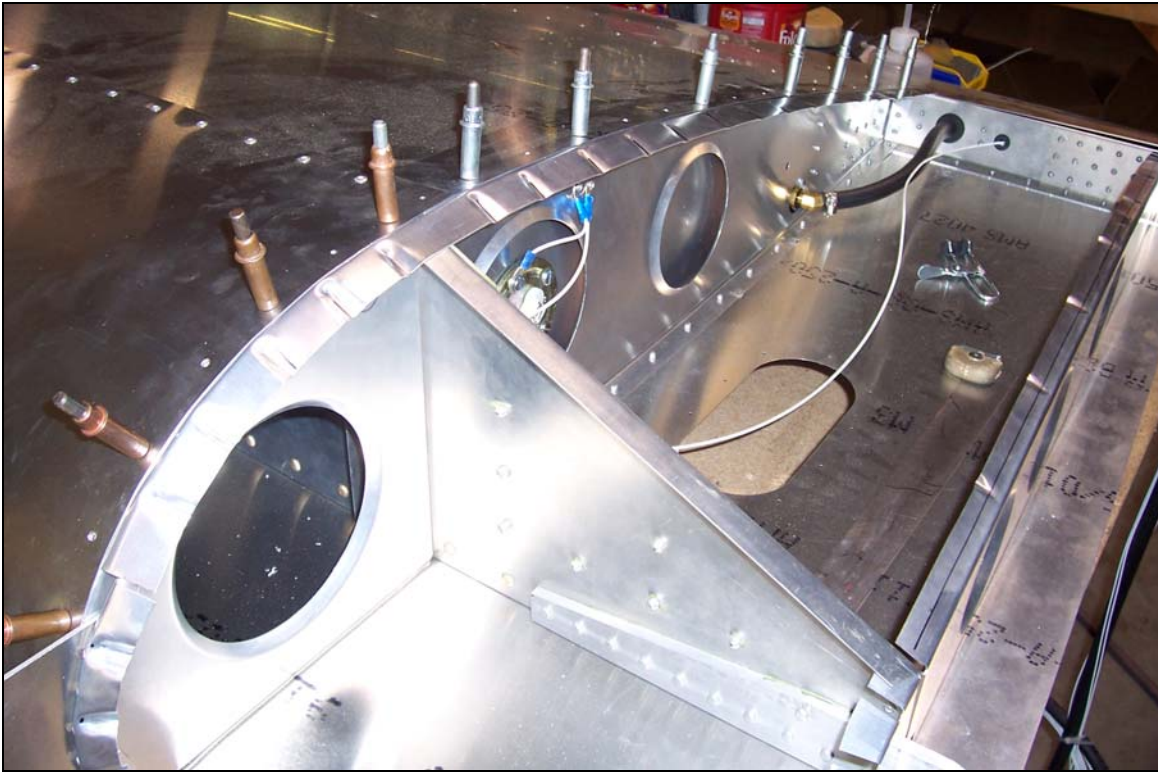


Note: The Wing Root Angle may require trimming to fit properly. The Wing Root Angle Should end where the L angle for the Slat Support begins.



Crimp the L angle to match the angle of the Wing Root Angle and the Root Nose Rib. Be sure the Crimps are between rivets locations.

Check: An easy check to see if the angle is correct is to set a ruler on the Root Nose Rib and the L angle.



Slide the Wing Root Angle under the Nose Skin and I/B Top Skin. Back drill with a #30 drill bit through the Nose Skin and I/B Top Skin into the Wing Root Angle.



P/N: 75W5-5
Wing Root Top Skin

Draw a center line on the Spar Root Doubler, 75W3-1, flange and on the Root Rear Rib. Position the Wing Root Top Skin on the Wing with the center lines visible through the predrilled holes. Using a #40 drill bit, back drill the holes in the Wing Root Top Skin. Start at the Rear Channel and work forward. Cleco every hole as they are drilled.

Check: The rivet line for the Rear Channel in the Wing Root Top Skin should be in line with the Rear Channel rivet line in the Top Skin.



P/N: 75W5-6
Wing Root Nose Skin

Slide the Wing Root Nose Skin between the first Nose Rib and the Nose Skin. Cleco the Root Nose Skin to the Nose Skin and Rib. Starting at the bottom of the Spar, back drill through the Root Nose Skin into the Spar, Angle, and Root Nose Rib with a #40 drill bit. Expand the holes with a #30 drill bit and cleco.



Trim an L angle to 255mm. Draw a center line on the inside of one flange. Place a mark 10mm from each end of the L angle. Layout 4 rivet locations evenly between the end marks. Position the L angle on the Spar Tip. The start of the radius of the bend in the L angle should be placed at the edge of the Spar Tip. Clamp the L angle in place, drill with a #30 drill bit, and Cleco the L angle in place.



Cut an L angle to 50mm long. Mark a center line on the inside flange. Place a mark 10mm from both ends of the L angle and one in the center. Clamp the L angle to the Rear Channel. Drill the holes to #30 and Cleco the L angle to the Rear Channel.



P/N: 75W6-8
Wing Tip

Slide the Wing Tip inside the Skins. Position the Wing Tip for the best overall fit. The Skin edge should end approximately where the radius of the fiberglass flange starts. When the Wing Tip is positioned, back drill and Cleco the Skins to the Wing Tip.



Wait to rivet the Root Top Skin until after the Wings are installed on the Fuselage. Also wait to rivet the Top Skins and Trailing Edge Skins until after the Fuel System and wiring has been installed in the Wings.