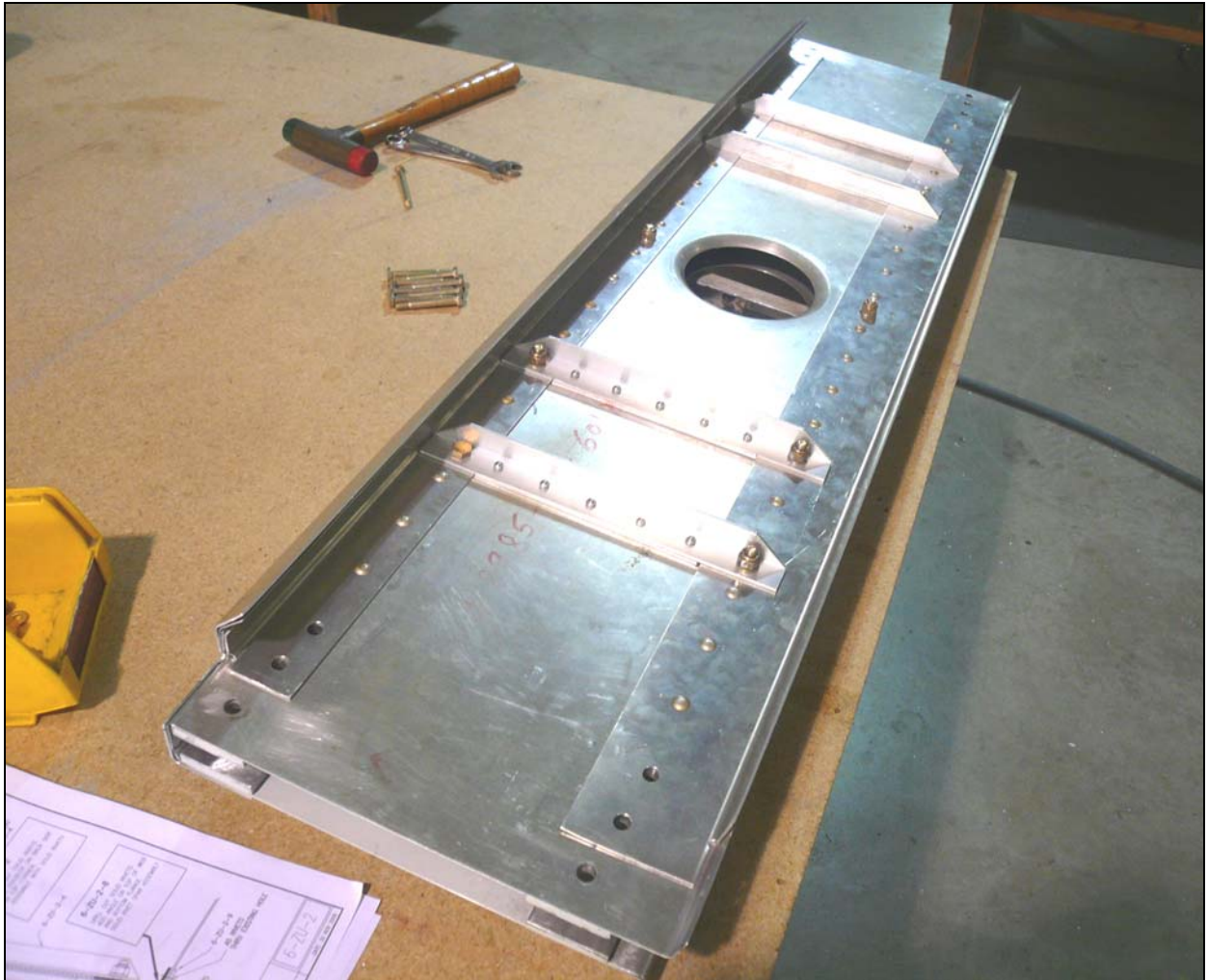


Section 6-ZU-2 Zodiac CH 601 XL Upgrade Package

Center Spar Section



This Photo Assembly Guide was prepared by Zenith Aircraft Co. to guide builders through the process of installing the Upgrade Package kit to an existing (completed) Zodiac CH 601 XL aircraft.

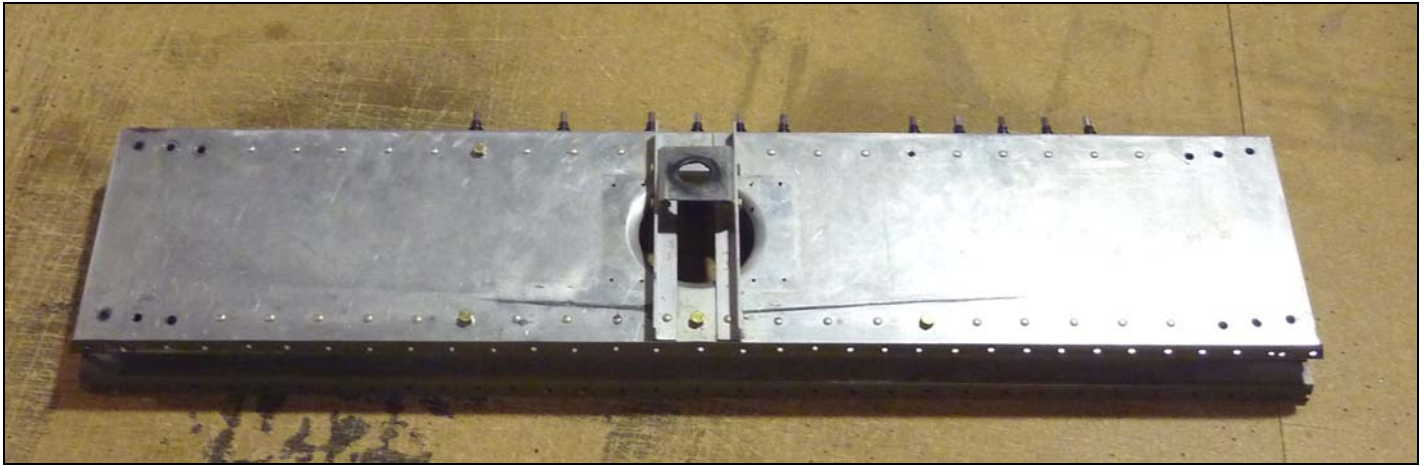
For details and background information on the Upgrade Package kit,

See <http://www.zenithair.com/news/ntsb-astm-4-09a.html>

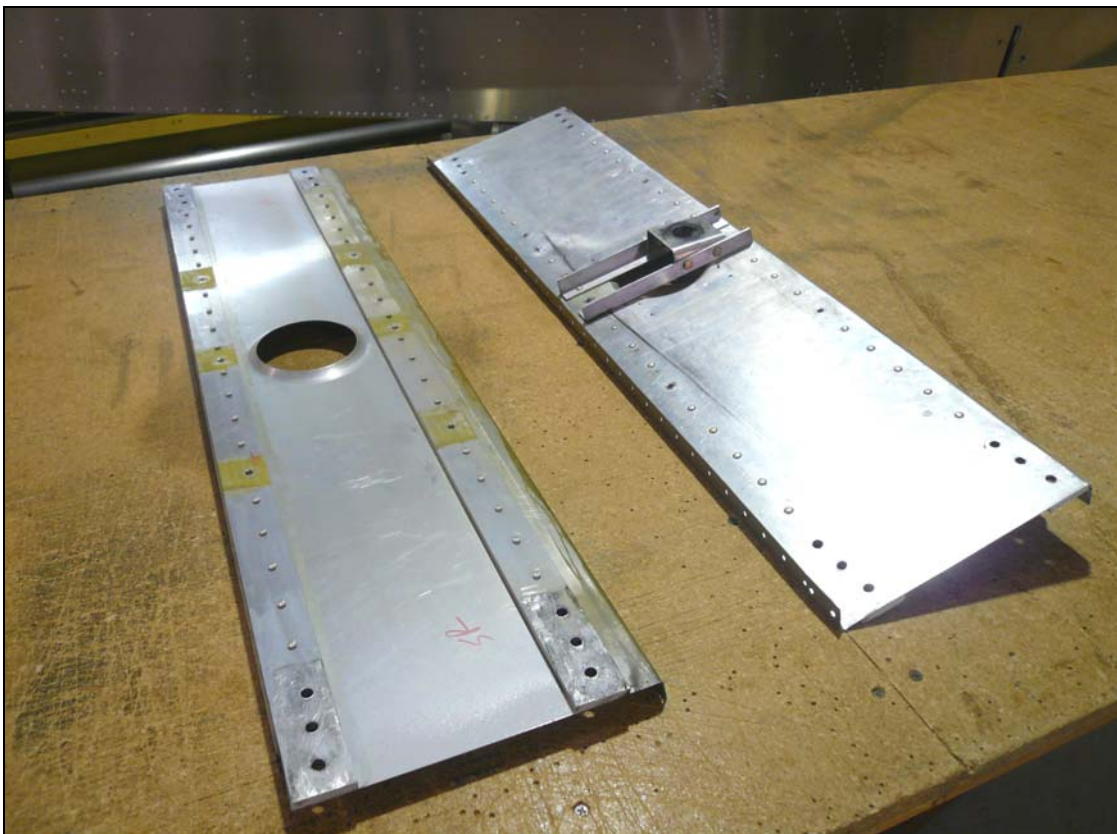
This photo assembly manual is a supplement to the issued Drawings (6-ZU-1 to 6-ZU-4).

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.



Remove the Center Spar from the Fuselage (if already installed).



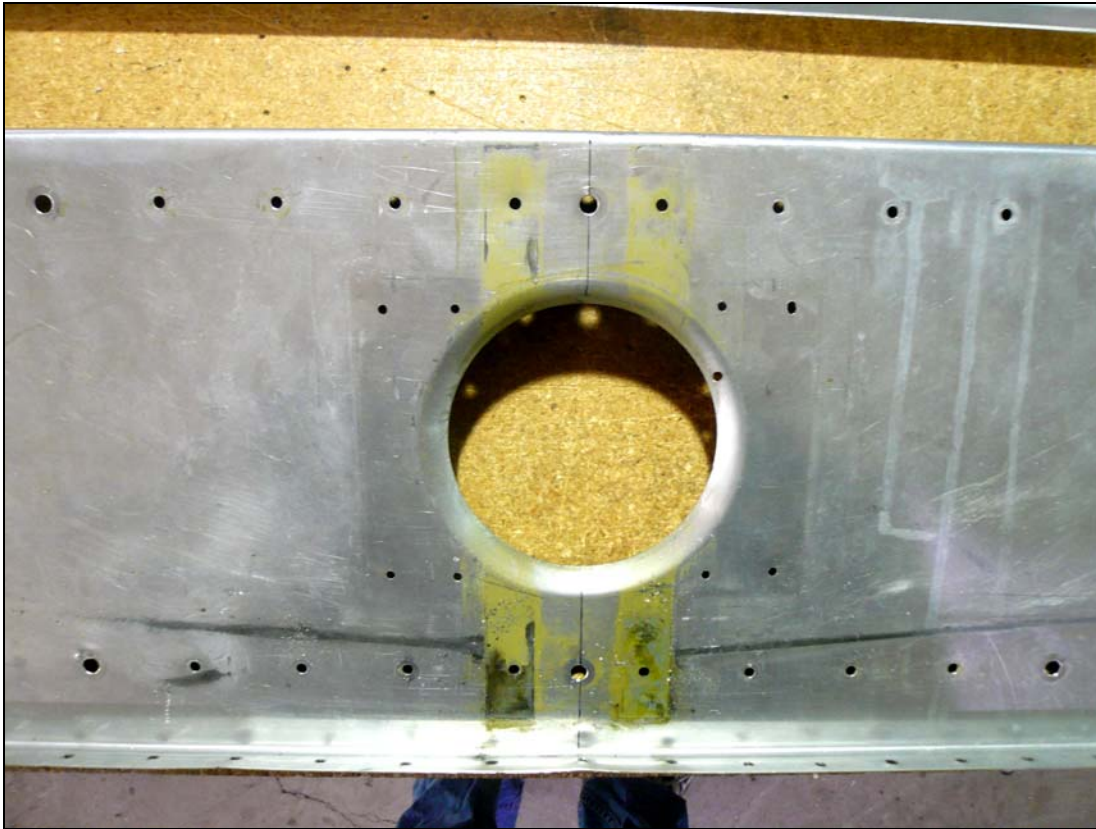
Drill out the A5 rivets on the top of the Center Spar connecting the front and rear halves of the Center Spar then remove the AN4 bolts. Put the Spacers in a safe place to be reused when reassembling the Center Spar.



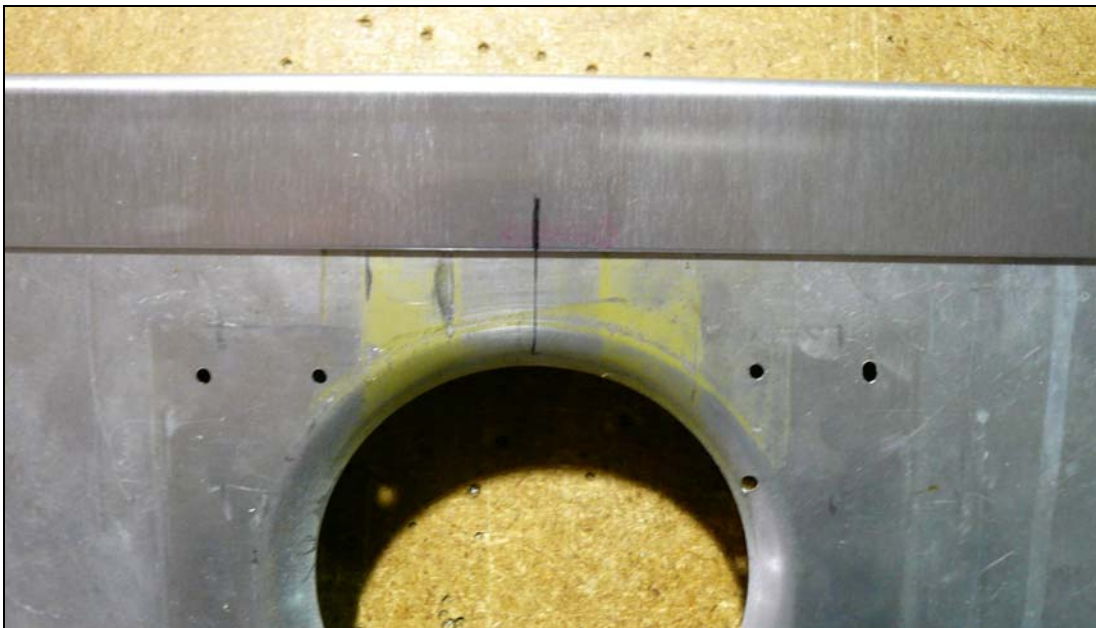
Drill out the solid rivets holding the Caps to the Webs of the Center Spar. Label each Cap so that it is easier to reinstall the Caps later.



Once the head has been drilled off, the Cap should come free of the Web easily. Use two blocks of wood to support the Cap while you drive out the remaining solid rivet. A hammer and punch works best to do this.



Mark the center line of the Center Spar Webs on the top and bottom on the front side of the front half and the aft side of the rear half.



P/N: 6ZU2-1
Top Doubler

Mark the center of the Top Doubler on the vertical flange. Set the Top Doubler on the front half of the Center Spar. Align the center line marks and clamp the Top Doubler to the Web.



Use a #20 drill bit to back drill through the Web into the Doubler. Cleco as the holes are drilled. Wait to drill the 5/16" hole for the bolts at each end of the Center Spar.



P/N: 6ZU1-7
Front Bottom Angle

Mark the center line on the Front Bottom Angle. Align the center line marks on the Angle and Web. Clamp the Angle to the Web.



With a #20 drill bit back drill through the Web into the Angle and Cleco.



Cleco the Caps back to the Web. Use a 1/4" drill bit to back drill through the Cap and Web into the Top Doubler and Front Bottom Angle for the AN4 bolts. It's best to use a Drill Press to drill these holes to avoid elongating the holes in the Caps.



P/N: 6ZU2-2
Seat Front Angle

Mark the center line on the Seat Front Angle. Align the Seat Front Angle center line mark to the center line marked on the rear Web of the Center Spar. Use a #20 drill bit to back drill through the Web into the Seat Front Angle and Cleco.



P/N: 6ZU2-8
Rear Bottom Angle

Mark the center line on the Rear Bottom Angle. Align the Rear Bottom Angle center line mark to the center line marked on the rear Web of the Center Spar. Use a #20 drill bit to back drill through the Web into the Rear Bottom Angle and Cleco.



Cleco the Caps on the Web of the rear half of the Center Spar. With a 1/4" drill bit, back drill through the Cap and Web into the Seat Front Angle and Rear Bottom Angle for the AN4 bolts. It's best to use a Drill Press to avoid elongating the holes.



Check the diameter of the 5/16" holes to ensure they are within tolerance, maximum tolerance is +0.004". If the holes are larger than 0.3165", special oversized bolts will be required. Contact Zenith Aircraft if the holes are out of tolerance.

Use a transfer punch to mark the 5/16" bolt holes in the Doublers on the Center Spar sections. Remove the Doublers and drill the bolt holes on a Drill Press. **DO NOT** drill the holes with a 5/16" drill bit, drill the holes undersized and ream them to final size.



Mark the edges of the Doublers to match the edges of the existing flanges on the Center Spar. Trim the excess material off the Doublers.



Be sure to file a round stress relief in the corner of the cutouts.

Note: The top and bottom flanges will end at different locations than the flange on the Web of the Center Spar; minimum edge distance must be maintained on the 5/16" bolt holes.



P/N: 6ZU2-4
Spar Uprights

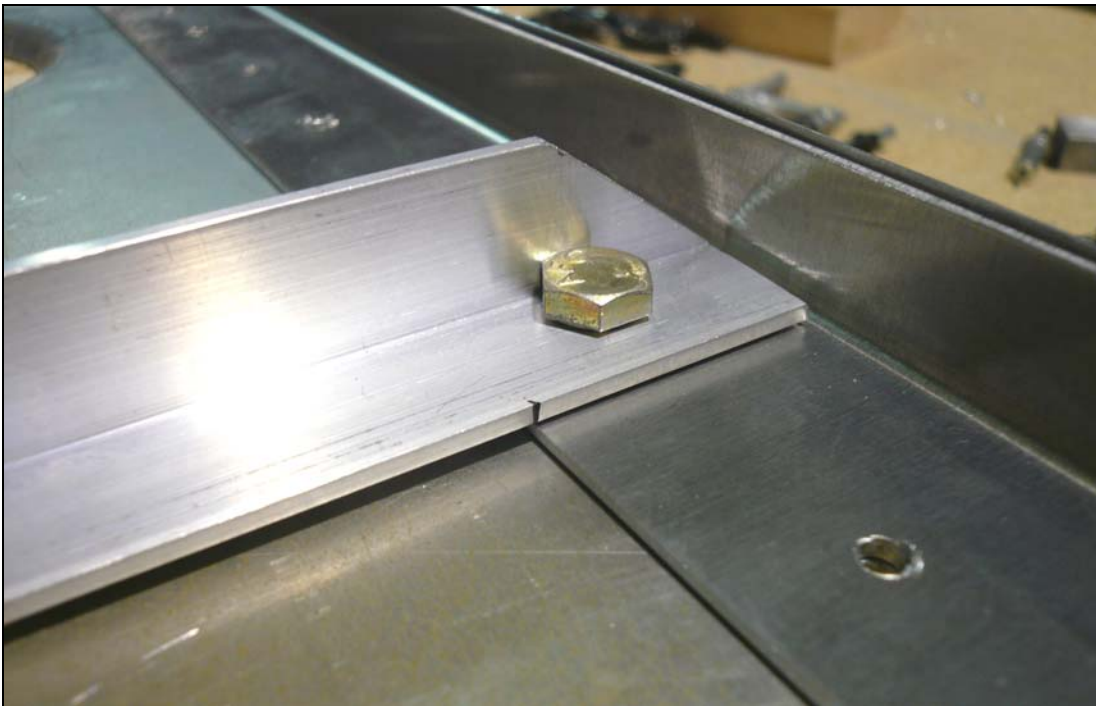
Place a mark 20mm from the end of the Spar Uprights on one flange. Mark a line from the inside corner of the Spar Upright to the 20mm mark.



Use a band saw or hacksaw to cut the Spar Upright along the line. Then file any rough edges smooth.



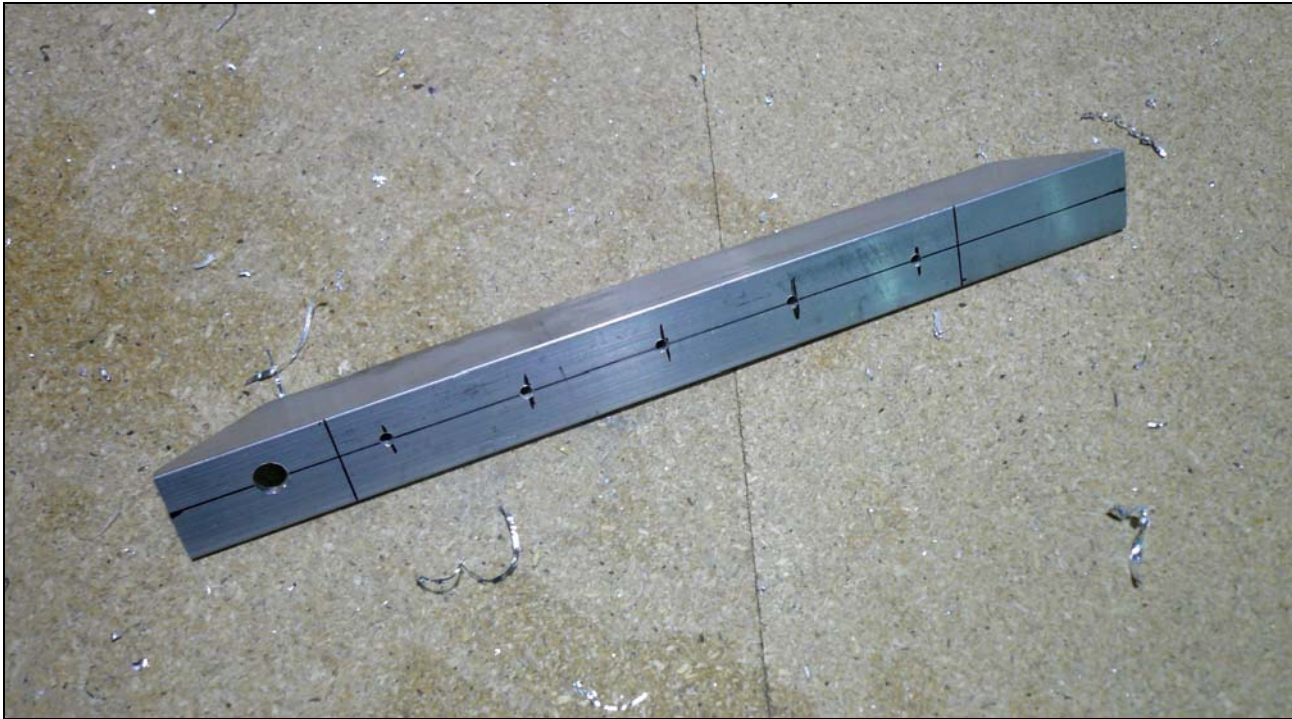
Draw a line on the flange that hasn't been cut 10mm from the edge; be careful there is sufficient edge distance. Mark the AN4 bolt location 20mm from one end of the Spar Upright. **Mark only one end of the Spar Upright.** With a #40 drill bit, drill a hole at the bolt hole location. Expand the hole to 1/4".



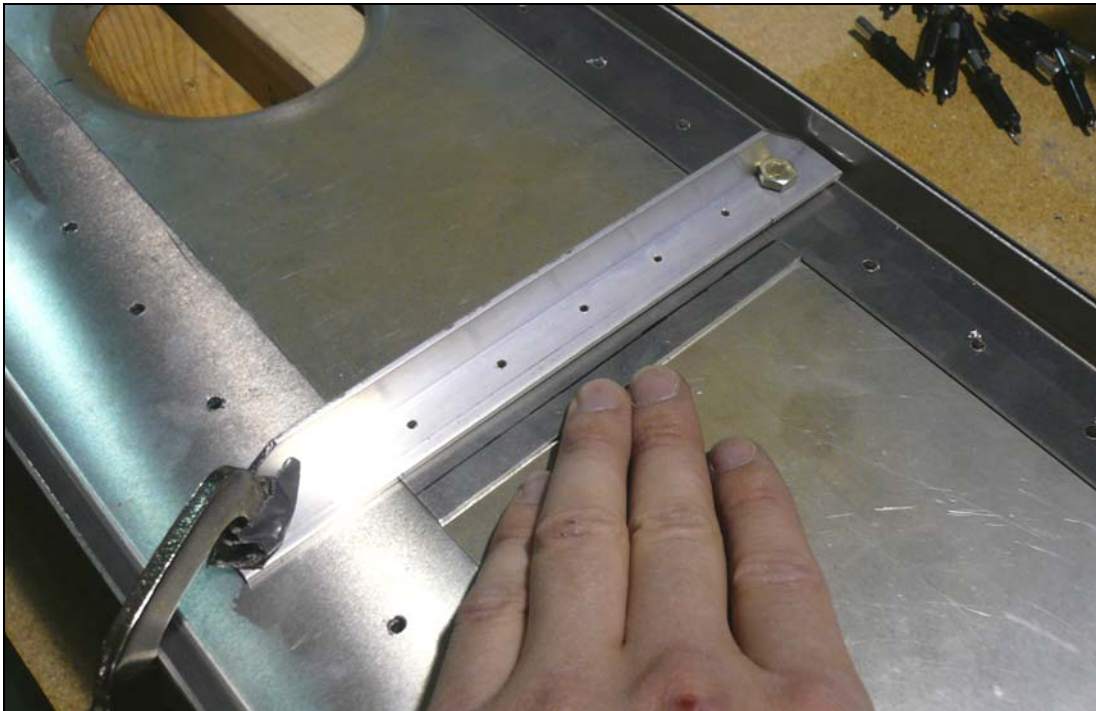
Use an AN4 bolt to position the Spar Upright on the rear half of the Center Spar. Mark the edges of the Seat Front Angle and the Rear Bottom Angle on the Spar Upright.

Orientation: The trimmed flange is installed towards the inboard side.

The photo above has the bolt through the Seat Front Angle; it is easier to position the predrilled bolt hole on the Rear Bottom Angle. This will allow the Spar Upright to be clamped to the Spar to drill the remaining AN4 bolt hole. Be careful which end of the Spar Upright that is predrilled, this will determine the orientation.

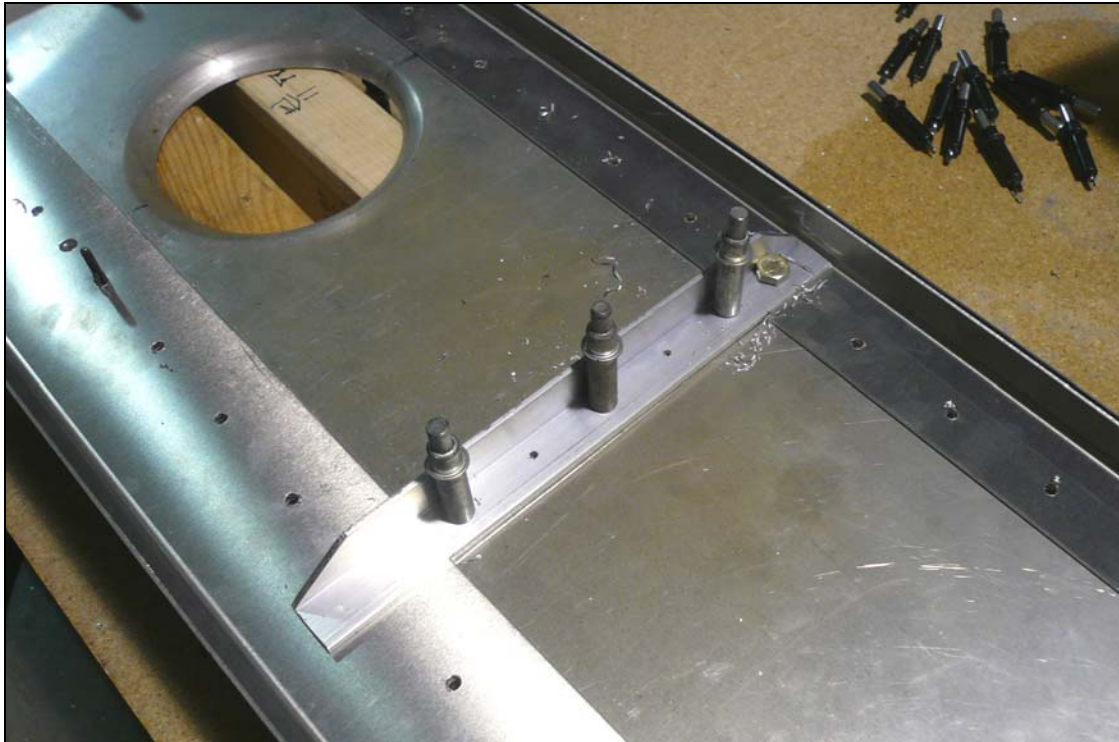


Use a square to transfer the edge marks to the flange. Mark a line 10mm from the edge marks and evenly space three additional rivet hole locations. With a #40 drill bit, drill the rivet locations on the Spar Upright.

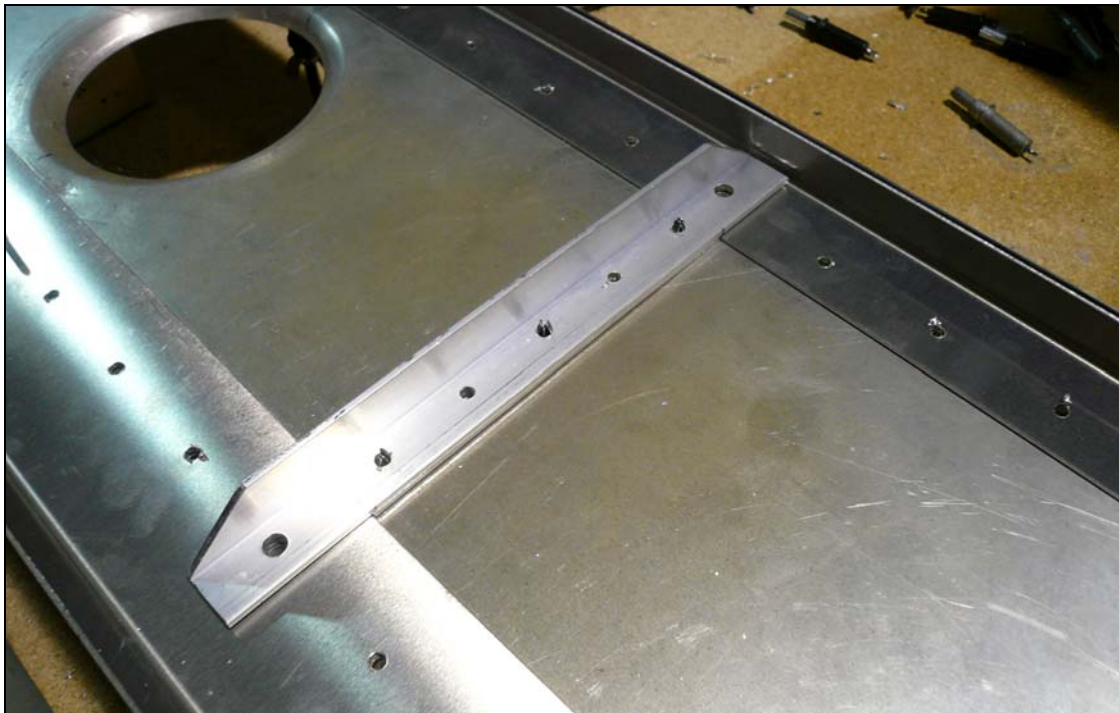


P/N: 6ZU2-5
Upright Shims

Position the Spar Upright on the rear half of the Center Spar at the 1/4" hole already drilled in the Spar. With the flange center line visible through the 1/4" hole, clamp the Upright to the Spar. Draw a center line on the Upright Shim and slide it under the Spar Upright.



With the center line on the Shim visible through the holes in the Upright, back drill the holes through the Upright into the Shim and Web of the Center Spar.



With a #20 drill bit, expand the rivet holes and Cleco. With a 1/4" drill bit, back drill through the Cap into the Upright. It's best to use a Drill Press to avoid elongating the holes. Repeat the same procedure to install the Spar Upright on the opposite side of the lightening hole and the front half of the Center Spar if not installed for the Dual Stick Option.



Mark a line 288mm from the center line of the Center Spar on top and bottom. Mark a hole in line with the rivet holes for the Cap. With a #40 drill bit, drill the AN4 bolt location; then expand it to 1/4".

Note: Only do this on one of the two halves of the Center Spar. The outer Spar Uprights on the second half will be installed when the Center Spar is reassembled to ensure the holes are in alignment.



Follow the same procedures to install the outer Spar Uprights onto one half of the Center Spar as was done previously. The doublers have been riveted on in the picture above, this is done later.



Back drill through the top flange of the REAR half of the Center Spar into the Seat Front Angle with a #20 drill bit and Cleco. Then place a rivet hole half way between the existing holes to give a rivet pitch of 20mm.



Install the AN4 bolts through the Spar Uprights on one half of the Center Spar. Install two Penny Washers on the 6 bolts that reuse the original Spacers, one on each side. The above photo has the Web Spacers shown on the outboard holes, this is done later.



Position the two Center Spar halves together; be careful not to knock the Penny Washers off the end of the Bolts. Push the AN4 bolts through the second half of the Center Spar. It's a good idea to put a nut on the end of the bolts to secure the two halves together.



P/N: 6ZU2-3
Web Spacer

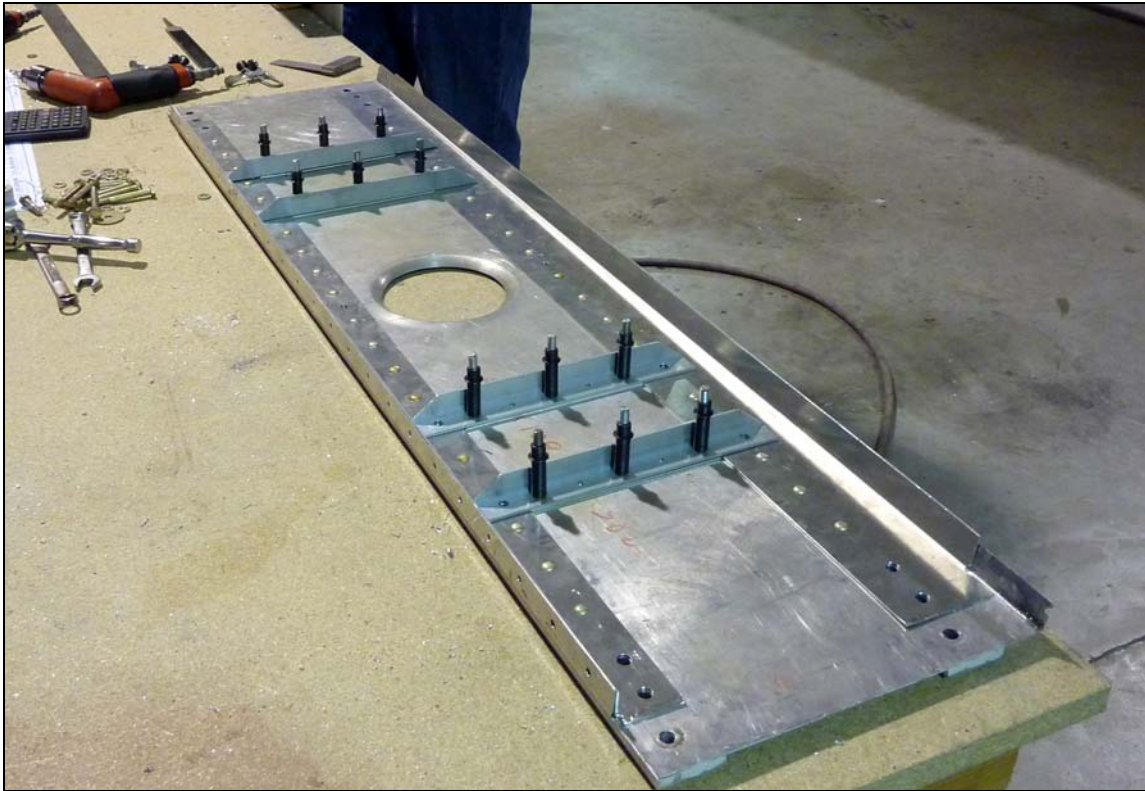
Use a pair of long handled pliers to hold the Web Spacer in place. Slide the Web Spacer between the front and rear Caps in line with the 1/4" hole for the outboard Spar Upright.



Hold the Spacer with the pliers when drilling to prevent it from spinning and scarring the Cap surfaces. Use a 1/4" drill bit to back drill through the Spar Upright into the Spar Cap on the opposite half. Use some light oil on the drill bit to help it stay centered on the existing hole. **BE CAREFUL** not to enlarge the existing hole and is best done with a Drill Press. Drill all of the 1/4" holes into the Spar Cap for the Spar Uprights.



Back drill through the Seat Front Angle into the Top Doubler with a #20 drill bit and Cleco.



Disassemble the two halves of the Center Spar. Install the remaining two Spar Uprights following the same procedures used to install the others.



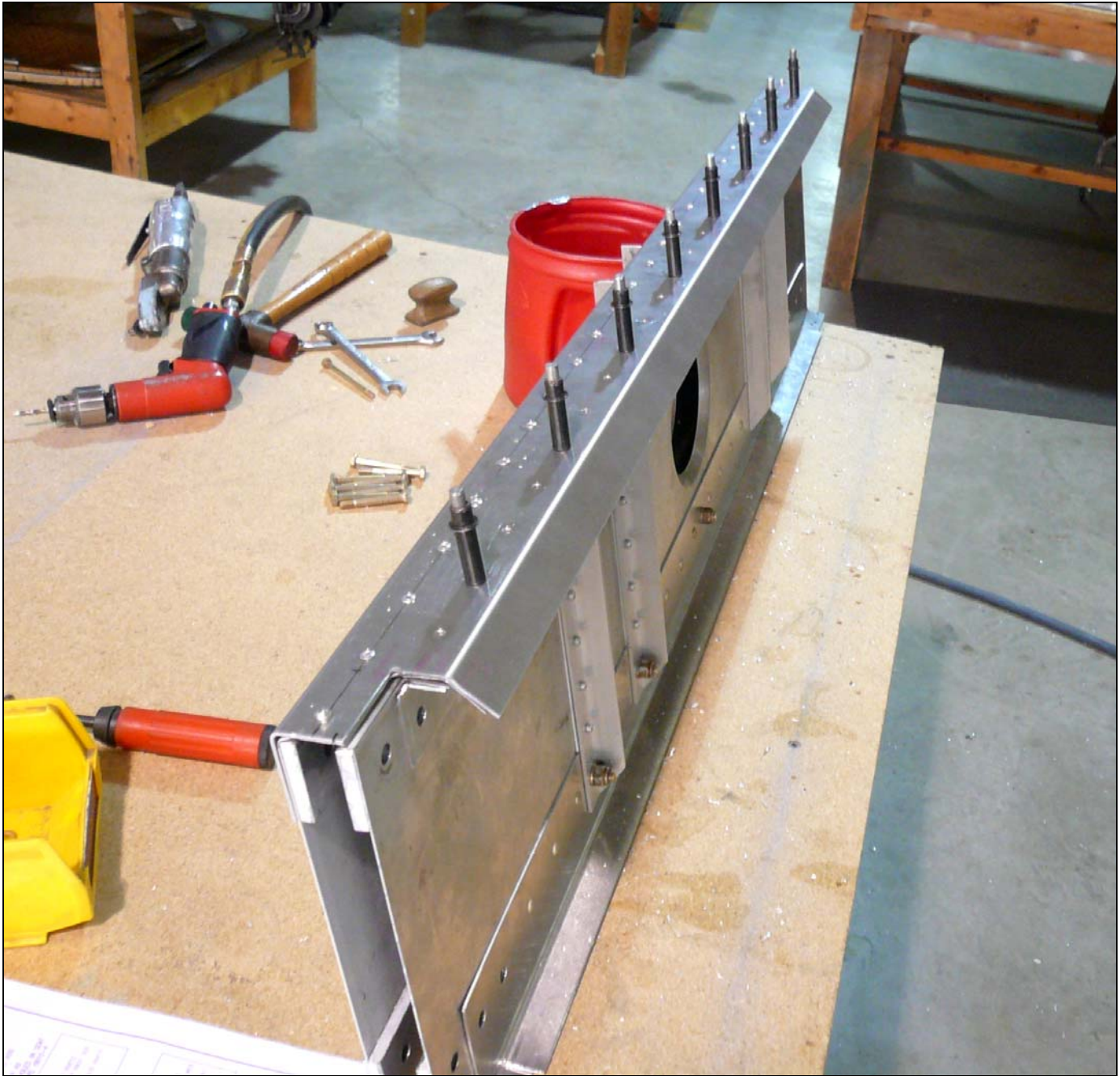
Use a Web Spacer to mark the inside of the rear half of the Center Spar on the Top Doubler at each end. This will be used to layout the rivets through the Top Doubler into the flange of the Center Spar.



Transfer the mark to the top of the Top Doubler. Center a line between the mark and the Spar Cap. Layout rivet locations starting 10mm from the edge with a pitch of 40mm. Use a #40 drill bit to drill through the Top Doubler into the top flange of the Center Spar and Cleco. Expand the holes with a #20 drill bit.



Disassemble the Center Spar. Deburr the holes and solid rivet the Spar Caps and Doublers to the Webs.



Rivet the Spar Uprights and Shims to the Webs, the rivet head should be on the Web side. Reassemble the Center Spar halves and bolt them together. Solid Rivet the Top Doubler and Seat Front Angle together, make sure to put a spacer at the ends of the Center Spar when riveting the Top Doubler to the Seat Front Angle to prevent the Center Spar from becoming too narrow for the outboard Wing Spar. See drawing 6-ZU-2 for rivet size information.