



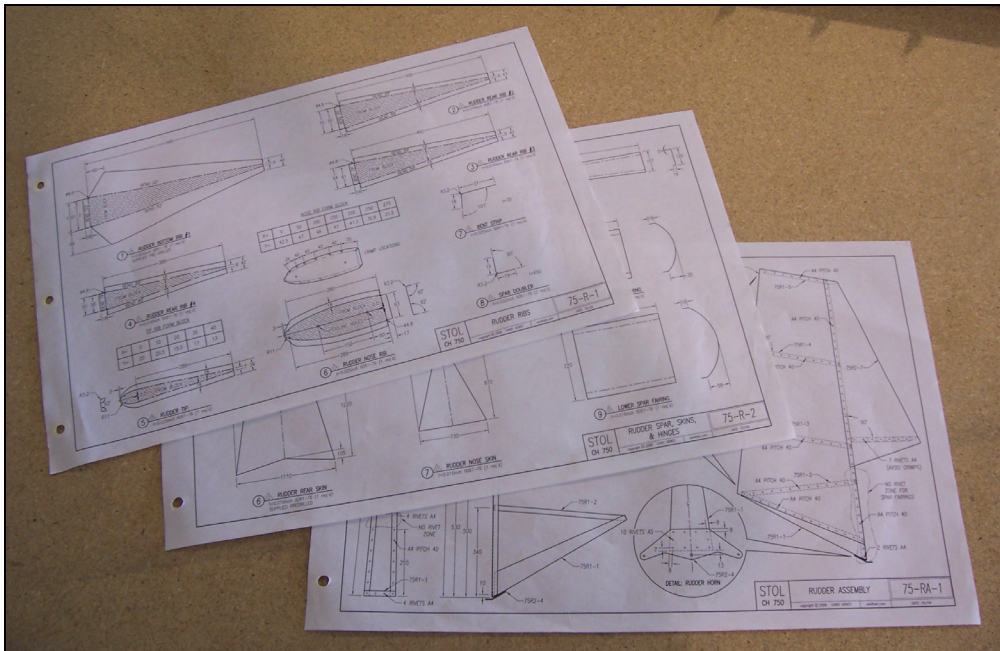
## STOL CH 701 / 750 Rudder Assembly

Parts are labeled for easy identification with a part number and description:

Part number example:  
**7R2-1 Rudder Spar**

- 7** - STOL CH 701 model.
- R** - Rudder section of the aircraft drawings.
- 2** - Page 2 of the Rudder drawings.
- 1** - Part 1 on page 2.

Above: The kit parts that make up the rudder skeleton.



Drawing 7-R-0 is for reference only: for building sequence use this step by step photo assembly guide.

This manual has been prepared for assembly of the Rudder Starter Kit supplied with the predrilled Rudder Spar, (starting May 2007), and match drilled Bottom Rib, (starting Jan. 2008). Previous versions did not include the predrilled Rudder Spar or match drilled Bottom Rib.

In addition to the photo assembly guide, also refer to drawings 7-R-1, 7-R-2 and 7-R-3 (701) or 75-R-1, 75-R-2, and 75RA-1 (750) (drawing number in right bottom corner of the title block). Always refer to the drawings for technical information: material thickness, part dimension, part orientation, layout distances, and rivet sizes, location and spacing.

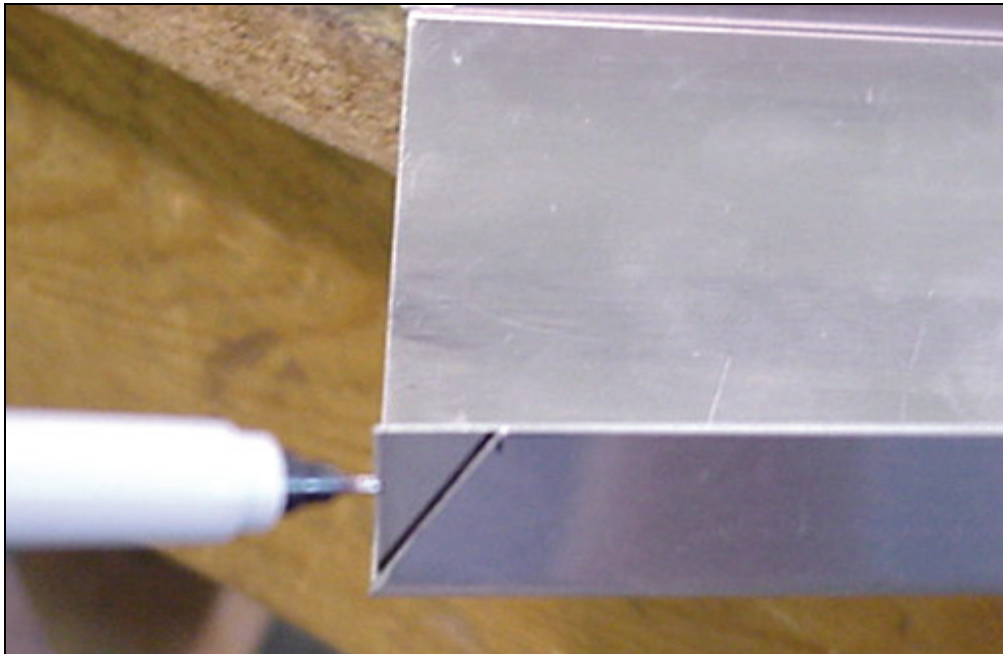


7R2-1 Spar  
or  
75R2-3 Spar

**Spar Web** - term used to refer to the flat area between the flanges.

**Tool:** half round 6" fine (smooth) double cut hand file.

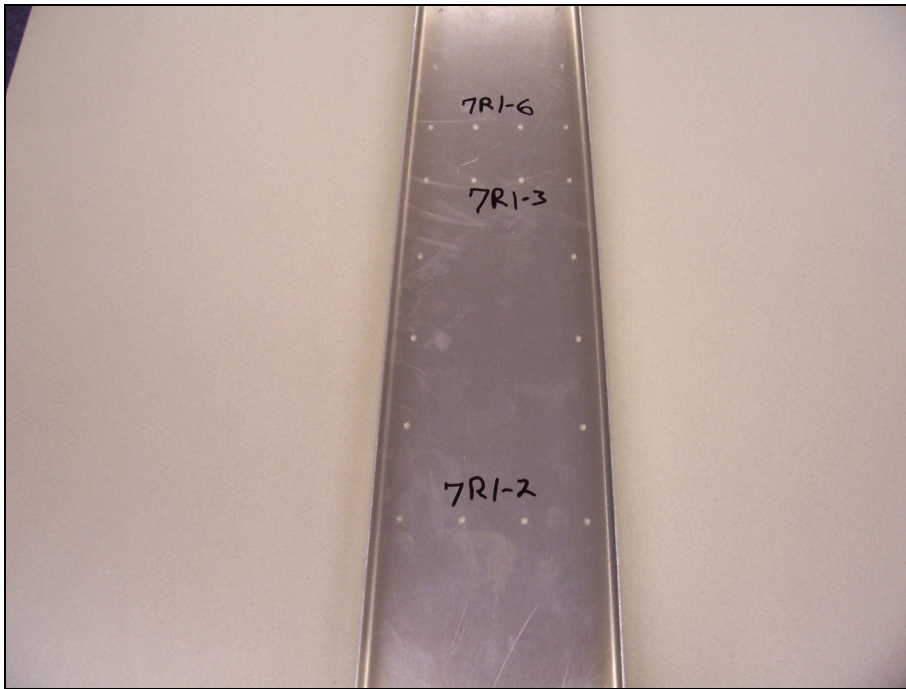
Use a file to remove any burrs on the edges of the parts and lightly round off corners.



7R2-1 Spar  
7R2-2 Doublers  
or  
75R2-3 Spar  
75R1-8 Doublers

Do not use a scribe or pencil.

Position the Spar Doublers inside the Spar, flush with the bottom of the Spar. Trace along the cutout to mark the Doubler. Remove the Doubler from the Spar and snip the marked corner off the Spar Doublers, and file edges.



**7R2-1 Spar  
or  
75R2-3 Spar**

**Intersection hole:** The intersection of the rib station with the rivet line on the Doubler will be used to align the rib on the Spar.

Label the rib stations with the following part numbers (rib names):

- 10mm:** RR # 1 (7R1-1 or 75R1-1)
- 340mm:** RR # 2 (7R1-2 or 75R1-2)
- 500mm:** RR # 3 (7R1-3 or 75R1-3)
- 530mm:** Nose Rib (7R1-6 or 75R1-6)
- 890mm:** RR # 4 (7R1-4 or 75R1-4)

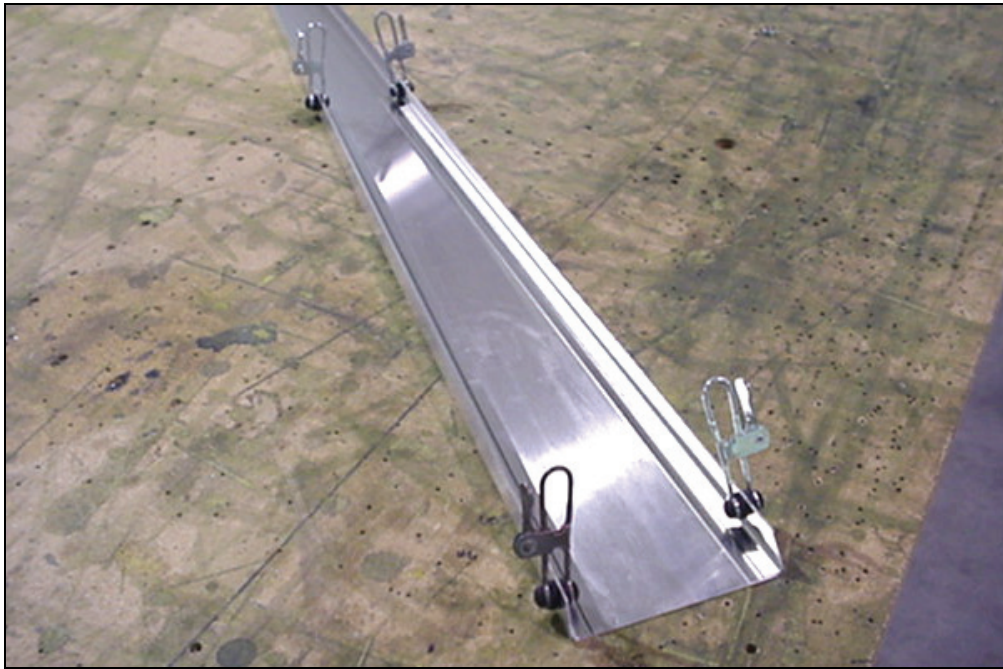


**7R2-1 Spar  
or  
75R2-3 Spar**

**No Rivet Zone:** Designates an area where the holes will be drilled later when the assembly is installed.

During the Rudder assembly the Upper Rudder Hinge Angles 7R2-4 or 75R2-5 are not installed. Mark the area between 270mm and 340mm (7R1-2 or 75R1-2) as a **No Rivet Zone**.

The correct position of the Upper Rudder Hinge Angles will be determined when the Fuselage has been built - this will allow for exact alignment with the fuselage attachment points.



Handi-Clamp  
**P/N:** TP640HC  
U.S. Industrial Tool  
1-800-521-4800

Clamp each Doubler to the spar flange. Check that there is no gap between the spar and doublers.



**Edge Distance = e**

This is the distance from the center of a hole to the edge of the material.

In general  $e = 3 \times D$

D is the diameter of the hole.

For the A4 and A5 rivets  
**e = 10mm**

**Drill Sizes:**

A3 rivet/pilot hole: #40

A4 rivet: #30

A5 rivet: #20

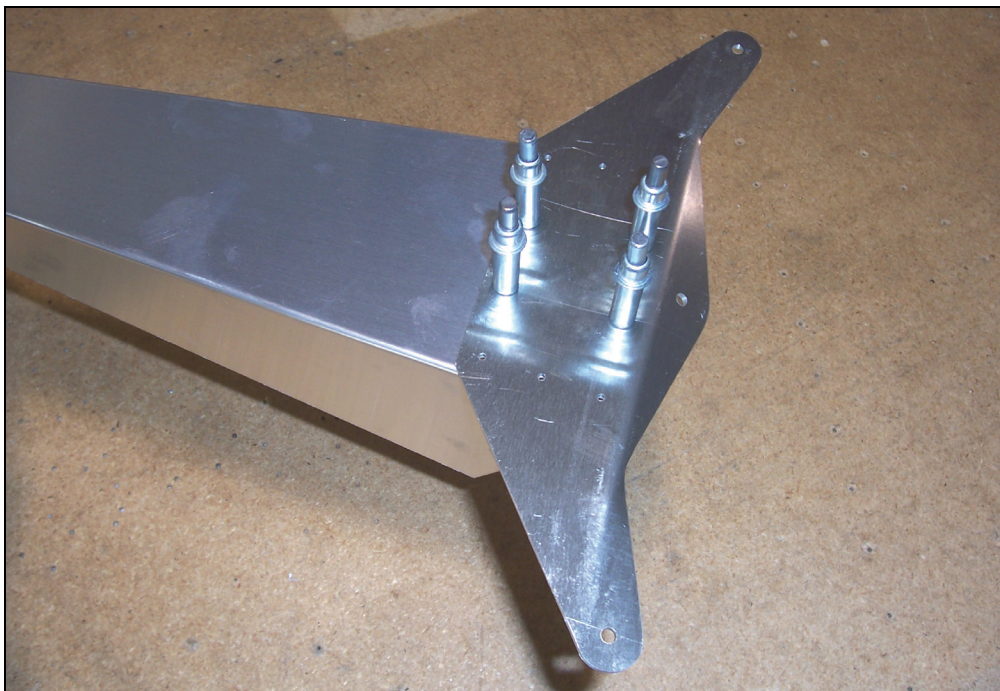
Support the spar on wood blocks. Drill and cleco the Spar Doublers to the Spar at every other hole, then drill the remaining holes without adding more clecos for A4 rivets.



**TOOLS:** Cleco Pliers

**COMMENT:** Do not drill the side flange; it is drilled later when the skins are installed.

It is not necessary to add more Clecos or to place a Cleco in every hole. The clamps are no longer needed once the parts are Clecoed together.

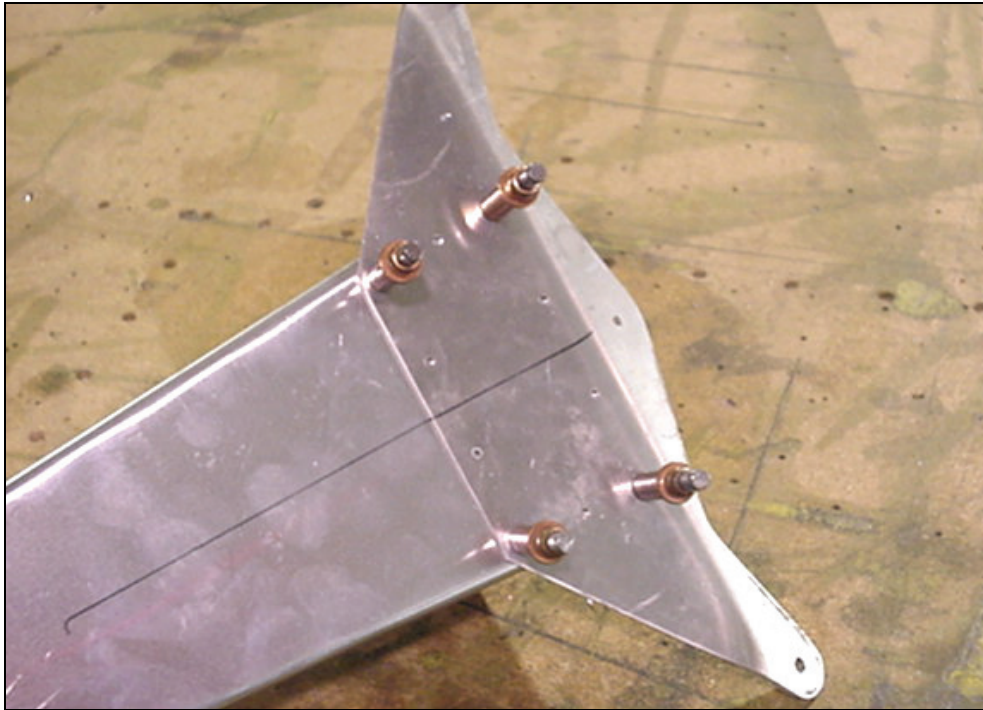


**7R2-3 Horn**  
or  
**75R2-4 Horn**

**7R1-1 Rudder Bottom Rib #1**  
or  
**75R1-1 Rudder Bottom Rib #1**

Cleco the Horn to the **Bottom Rib** using 3/32" Clecos (Silver Clecos).

**NOTE:** The Horn is installed on the bottom of the **RUDDER BOTTOM RIB #1**.



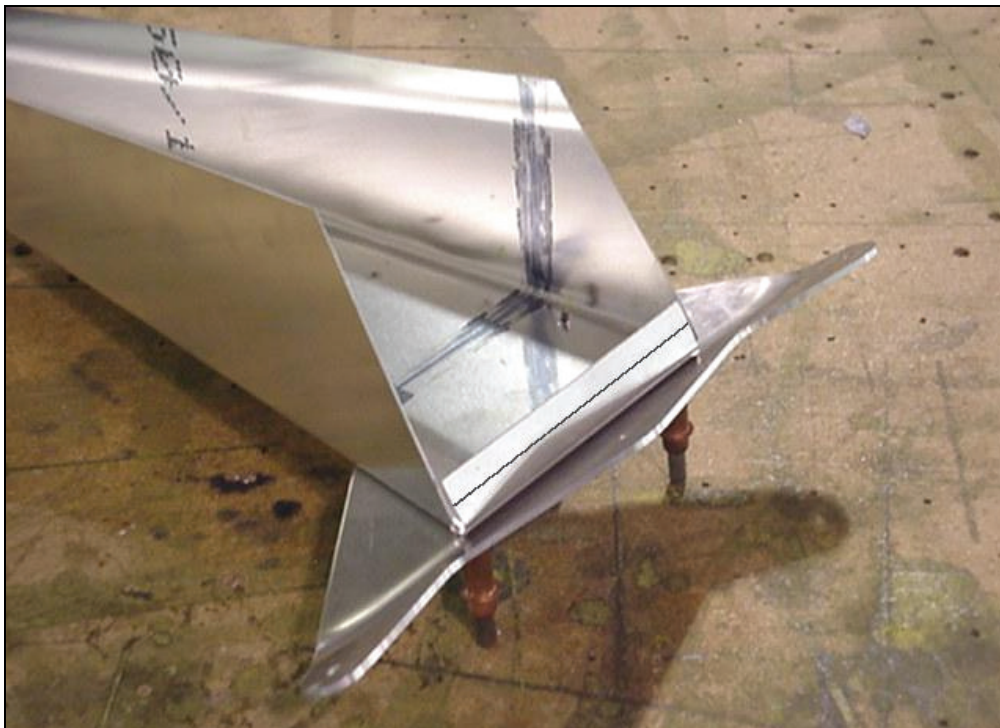
Cleco the 4 middle holes with 5/32" clecos (Black Clecos). Remove the 1/8" Clecos and open the remaining holes with #20 drill bit.

**NOTE:** Reinstall the #30 drill bit in the drill.

**7R1-1 Bottom Rib  
7R2-3 Horn  
or  
75R1-1 Bottom Rib  
75R2-4 Horn**

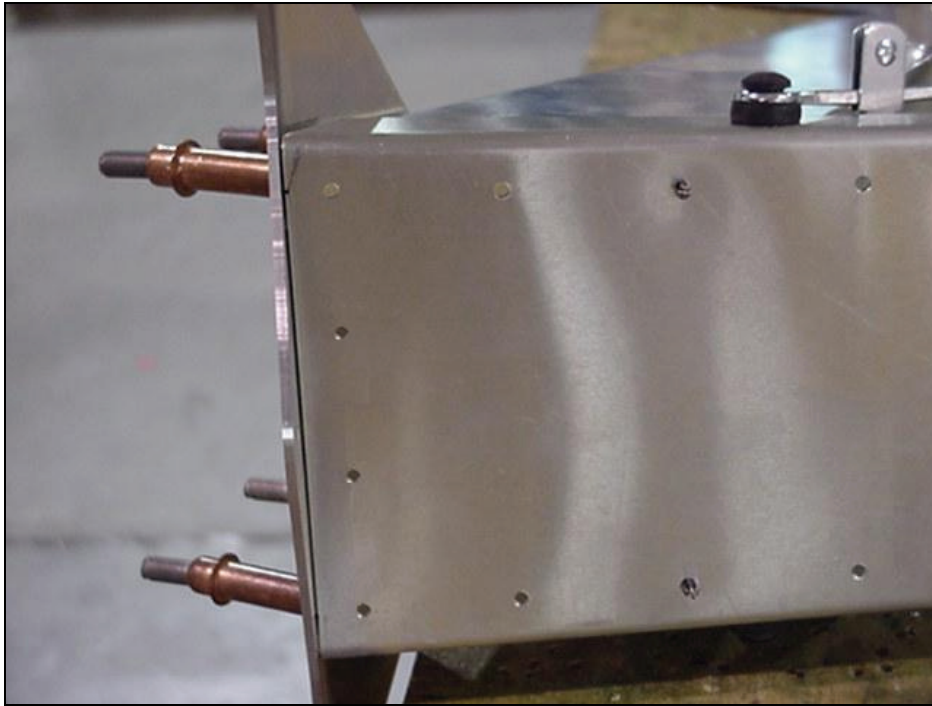
10 Rivets A5

Drill and cleco four holes with #30 drill bit. Finish drilling the holes between the Clecos with #30 drill bit. Change drill bits, re-drill the holes between the clecos with a #20 drill bit.



**7R1-1 Bottom Rib  
7R2-3 Horn  
or  
75R1-1 Bottom Rib  
75R2-4 Horn**

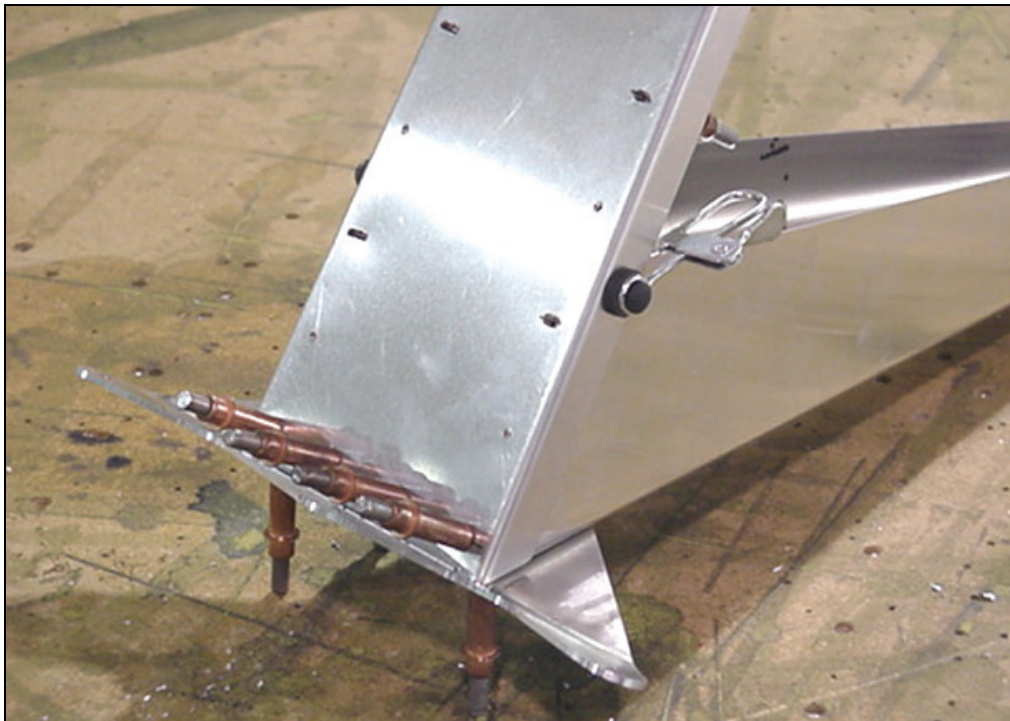
Inside view of the Bottom Rib with the Horn.



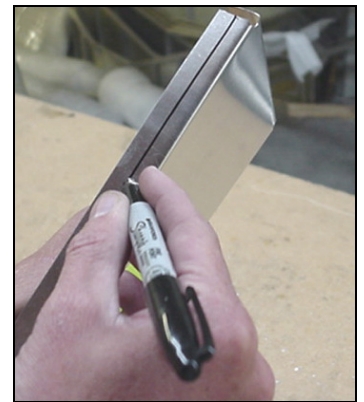
**7R2-1 Spar**  
**7R1-1 Bottom Rib**  
**7R2-3 Horn**  
 or  
**75R2-3 Spar**  
**75R1-1 Bottom Rib**  
**75R2-4 Horn**

**CHECK:** The Horn is against the bottom of the Spar.

Slide the side flanges of the Bottom Rib to overlap on the inside of the Doublers. Push the Horn against the bottom of the Spar; clamp the rib to the side flanges of the Spar.

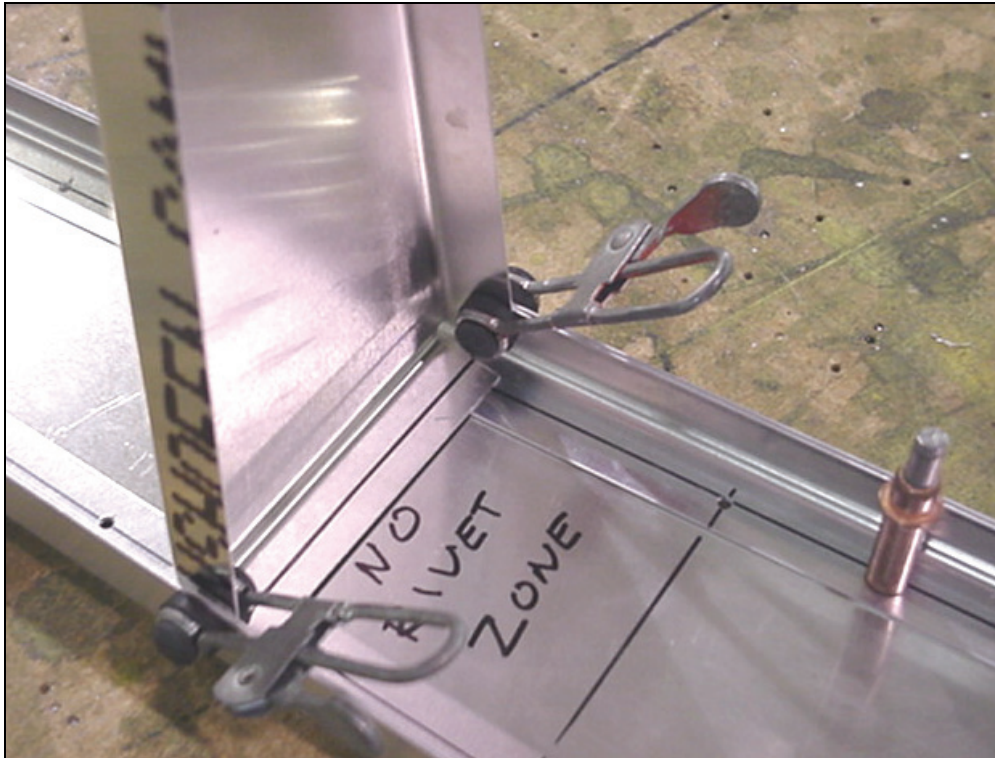


**4 RIVETS A4**



Layout flange center line on ribs 2 , 3 and 4

Drill and Cleco the front flange to the spar (#30 Holes)

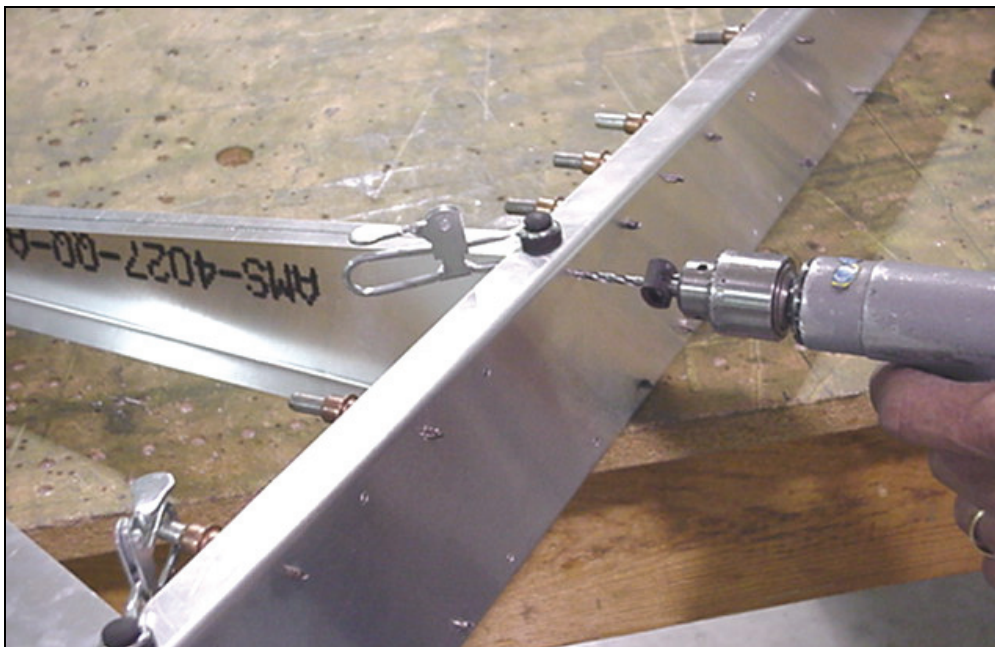


**7R1-2 Rear Rib #2  
or  
75R1-2 Rear Rib #2**

**Rib Orientation:** the flange points down (the bend is at the top of the side flanges).

**Note:** no shim is used between the spar web and the rib flange; the rivets will draw the parts together.

Mark the rivet line on both sides of the front rib flange. Position the rib inside the spar and Doubler at the appropriate station. Line up the line through the holes in the spar. Clamp both sides of the Rib to the Spar.

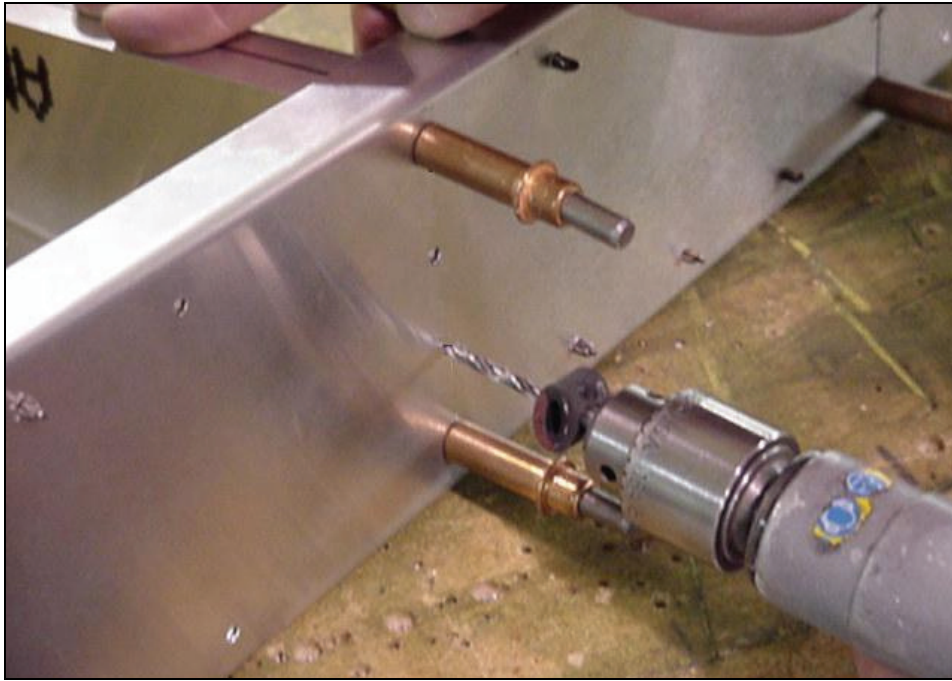


**7R1-2 Rear Rib #2  
or  
75R1-2 Rear Rib #2**

Back drill through the pre-drilled holes in the spar into the rib flange.

Position the Spar on its side, holding a backing block (wood block) against the rib flange on the inside of the Spar (not shown in photo). Drill and Cleco.

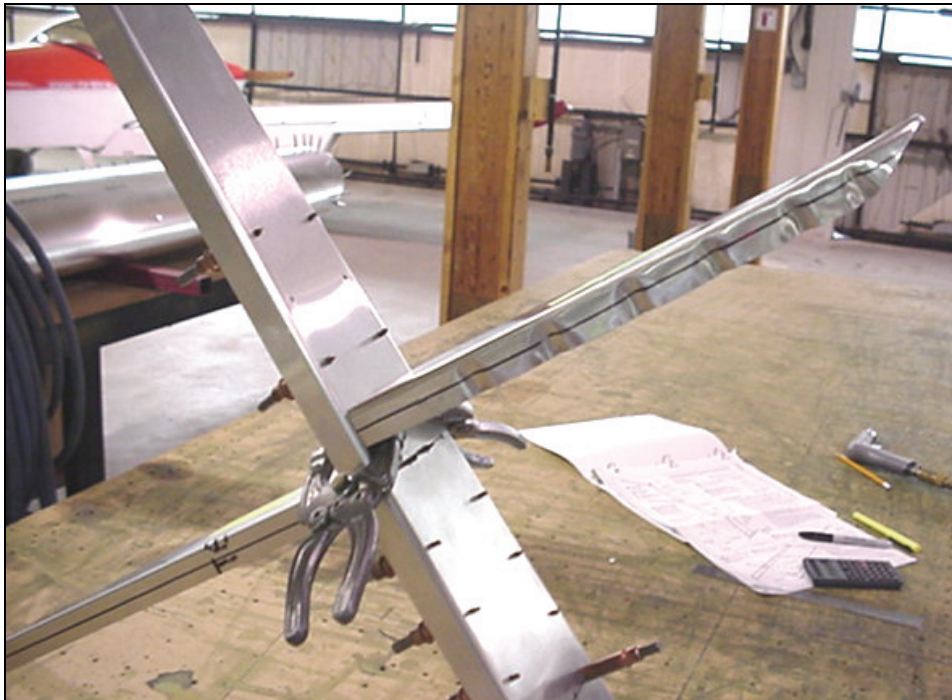




7R2-1 Spar  
 7R1-2 Rear Rib #2  
 or  
 75R2-3 Spar  
 75R1-2 Rear Rib #2

7R1-2 pr 75R1-2  
**4 RIVETS A4**  
 7R1-3 or 75R1-3  
**4 RIVETS A4**  
 7R1-4 or 75R1-4  
**3 RIVETS A4**

Continue to install Rear Ribs #3 and #4

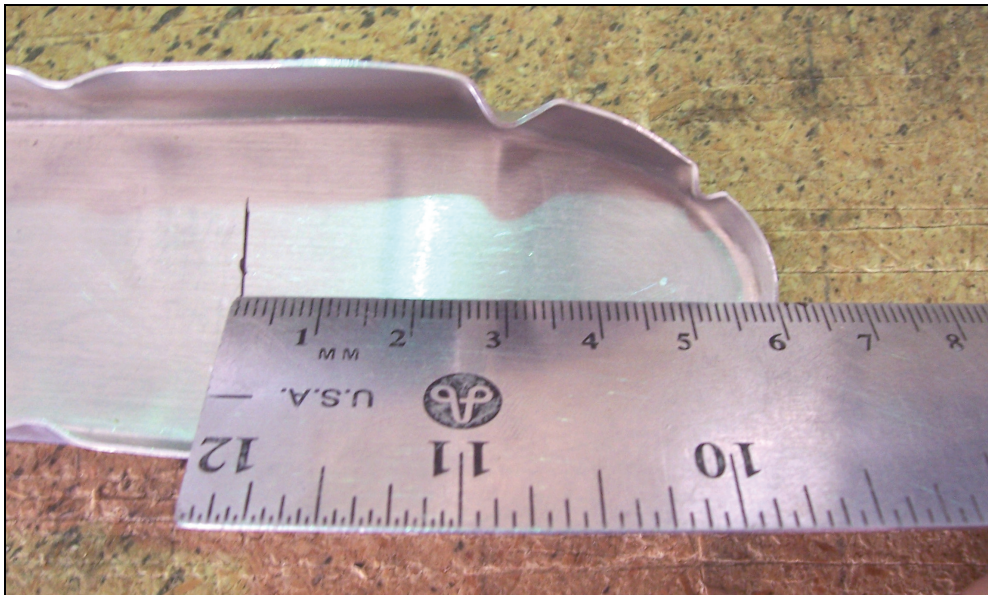


**CHECK:** Rib is centered left and right on the Spar. This can be done by clamping pieces of extrusion to the side flanges of the Nose Rib before clamping the Nose Rib to the Spar (not shown in photo).

**3 RIVETS A4**

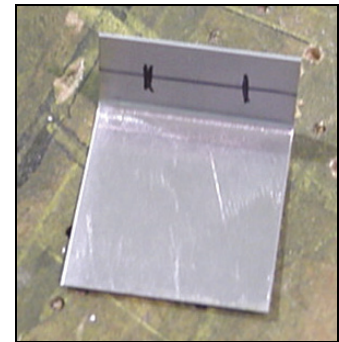
Mark the rivet line on the backside of the Nose Rib flange.  
 Position the Nose Rib over the pre-drilled holes at station 530mm, check that the rib is centered left and right, and that the rivet line is visible through the pre-drilled holes.  
 Clamp the Rib to the Spar, before drilling check that the rib has not moved (the top of the rib is square to the spar center line).  
 Drill and Cleco.

7R1-6 Nose Rib  
 or  
 75R1-6 Nose Rib



**Left:** 7R1-5 Tip Rib  
or  
75R1-5 Tip Rib

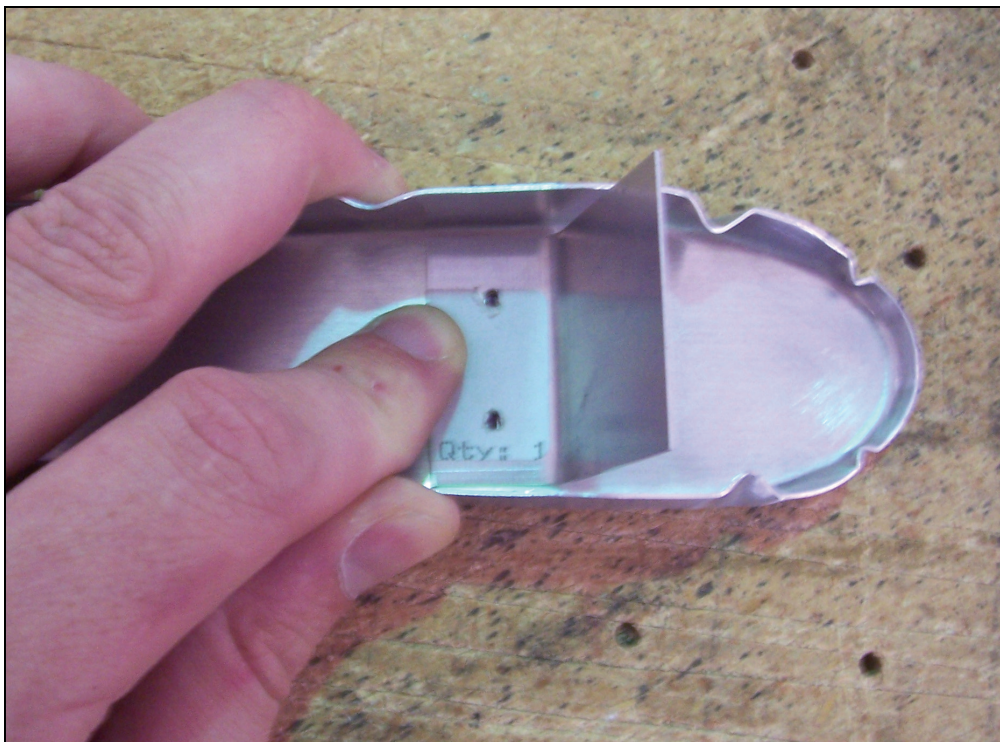
**Below:** 7R2-1A Bent Strip  
Or  
75R1-7 Bent Strip



**Rudder Tip Rib (75R1-5 or 7R1-5):**

Mark a line 60mm from the front of the rib (on the inside of the rib).

Mark and drill 2 holes #30 in the short flange (8mm edge distance).



**7R1-5 Tip Rib  
7R2-1A Bent Strip  
or  
75R1-5 Tip Rib  
75R1-7 Bent Strip**

**Note:** It is not necessary to Cleco the Bent Strip to the Tip Rib as it will be in the way to drill the Bent Strip to the Rudder Spar in the next step.

Position the **Bent Strip** on the **Tip Rib** with the line visible through the holes in the Bent Strip.

**Check:** Center the Bent Strip on the Tip Rib.

Clamp and drill the Tip Rib to the Bent Strip.



Mark a line 10mm from the bottom edge.

**NOTE:** The spar flange DOES NOT fit inside the Tip Rib, the rib is attached above the end of the Spar with the Bent Strip.

**2 RIVETS A4**

**Check:** Center the Bent Strip on the Spar.

Clamp the Bent Strip to the Spar when the 10mm line is visible through the holes in the Spar. Back drill through the Spar into the Bent Strip.



An alternative method is to use a large drill bit, and to give each hole a quarter turn. Remember to deburr both sides of every hole.

Debur the holes and rough edges, file and radius any sharp corners. Cleco the Doublers and ribs to the spar. Burs in aluminum are very small; most can be knocked off with a flat file: lay the file flat on the rivet line and push it forwards.



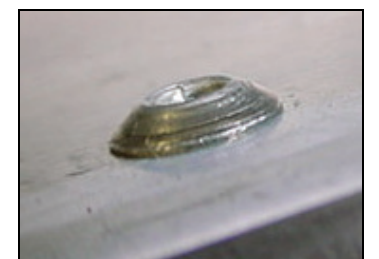
**IMPORTANT:** use the special machined riveter nose piece to rivet.



The diameter of machined nose piece is the same diameter as the rivet head



**A4 RIVET**



**CHECK** that there is no gap between edge of rivet head and sheet

**Rudder Skeleton** (when riveting, the rivet head is installed on the front side of spar).

