This article originally appeared in the June 1997 issue of the RVator newsletter. It was reprinted in the “24 Years of the RVator” book, but a few of the photos were omitted. While this copy is unfortunately very low resolution, the extra pictures may help in understanding the general method for forming the aluminum windscreen fairings.

ALUMINUM WINDSCREEN FAIRING

I have seen Tracy Saylor's RV-6 with a sliding canopy and an all aluminum windscreen fairing, including the bottom part that requires serious compound bending. Although many builders use fiberglass here, I much prefer working with aluminum, and decided to fabricate such a fairing for my RV-6A. After some unsuccessful experiments, I came up with a procedure for making the lower fairing (in left and right halves) that was so easy even I could do it.

1. Start with the windscreen in place, clearing the forward top skin by at least 1/16". Draw a line on the forward top skin around the base of the windscreen at the projected intersection of the front surface of the windscreen with the skin. Find this line by placing a short straightedge (something non-scratching) flush against the lower part of the windscreen and just touching the corner to the skin. Once you're around to the side, the extended surface of the windscreen runs almost parallel to the skin. This part of the fairing requires no compound bends, and the intersection line ends when you get there. Place some index marks along this line. I started from the windscreen center-

line and placed index marks every 5" going outboard.

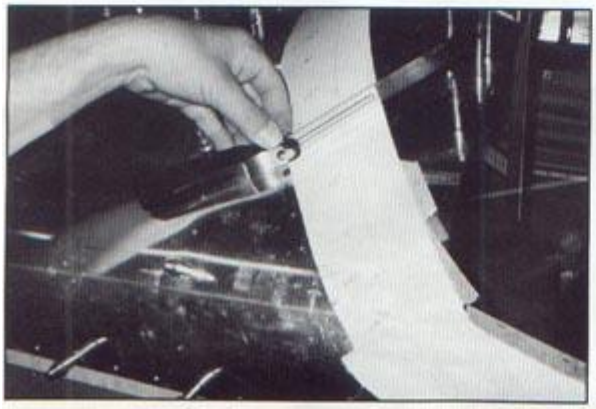
2. Make a posterboard template for each side of the windscreen. Each template wraps around the lower portion of the windscreen from the center all the way around the side clear to the rear edge. The template should be at least 3" wide at its narrowest point to prevent accidental distortion. Trim the lower edge of the template so that it just touches the line drawn on the forward top skin. Make index marks on the template that match those on the skin.

Along the side, beyond the end of the intersection line, the template should be cut to the approximate size and

A posterboard template is fit to the windscreen. The bottom edge follows the line projected on the top skin.

shape of the desired finished fairing. Because of riveting considerations, the aft part of the fairing will have to extend down to the fuselage longeron and share about 4 longeron rivets with the forward top skin. Forward of this point, you can buck rivets above the longeron ahead of the roll bar brace.

3. With each posterboard template taped in place on the windscreen, measure the angle at numerous points between the skin and the windscreen surface. At each point, measure the angle perpendicular to the intersection line on the skin. The angle should be approximately 30° at the windscreen center, gradually reducing to zero as you go outboard. I measured the angles every 2" along the line. Record the angles on the posterboard.



An adjustable gauge is used to measure the varying angle between the top skin and the windscreen.

4. Make a 2-piece wood clamp jig from a 2 x 6 board 23.5" long. The concave piece fits around the windscreen approximately parallel to the base, from the center to the end of the line. The convex cutout is the other piece. A stiff corrugated piece of cardboard can be used to make a template for the jig. The cut can be made with a band saw, and is vertical. Sand both pieces where they nest together. One jig should fit both sides well enough.

The 2x6 clamping jig follows the contour of the windscreen

5. Place the concave part of the wood jig in place on the windscreen, over the posterboard template. Check the fit. Variations up to 1/16" are acceptable. Using the top of the wood as a guide, mark a guide line on the template. Also, put index marks on the wood jig that match those on the skin and template.

6. Obtain a suitable piece of aluminum. Just what is suitable? I used .025" 2024-T3. I could have also used 6061 in various tempers at either .025 or .032. Each fairing half (left and right) requires an aluminum sheet 12" by 36", but nesting of the 2 fairing halves can reduce the total requirement slightly.

7. Tape the posterboard template to the aluminum sheet. Accurately trace the lower edge of the template (from the line on the skin) onto the aluminum. This is the bend line. Construct a second parallel curve exactly 1/2" below the bend line. This 1/2" area becomes the flange that will rivet to the skin, and the second curve becomes the cut line. Transfer the index marks from step 2, the angles from step 3, and a straight line approximation of the guide line from step 5 onto the aluminum. The angles should be written in the flange area. Also trace the rest of the template onto the aluminum.

The index marks from step 2 and the straight line from step 5 indicate how to align the aluminum to the jig. You will need at least 1" of aluminum protruding from the jig at all points along the cut line. Adding the 1 1/2" for the jig, the straight line must be at least 2 1/2" or more away from the cut line at all points for clamping. If it is not, construct a second straight line parallel to the first that meets the 2 1/2" requirement. This is the jigging line.

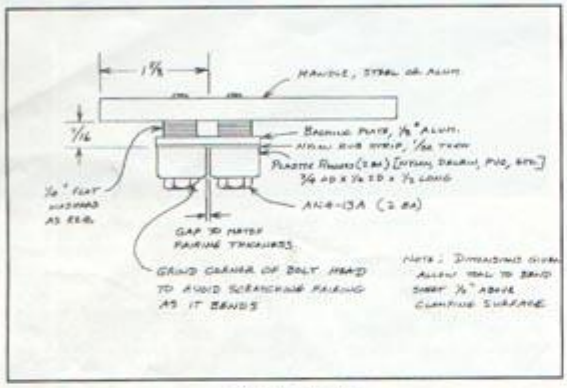
Rough cut the fairing from the aluminum sheet. Starting with the inboard part, cut along the jigging line until you need more material for the finished fairing. Leave plenty of excess material (perhaps 1/2" to 1") around the outboard part to allow for some shifting. At this time, the only finish cut is along the cut line. Be sure to thoroughly smooth and polish the edge of this curve, because it will be stretched and may crack if left

rough. Deburr the rest of the fairing to prevent scratching the windscreen and skins when test fitting.

8. Hand bend the fairing to fit the curve of the clamp jig. Be sure to align the index marks and the jigging line when doing this.

Clamp the fairing in the jig with the index marks and jigging line aligned. The bend line should be about 1/2" above the wood surface at its lowest point. Because the bend line is irregular, this height will vary. Very secure clamping is required along the full length of the jig. I clamped the center of the jig in a bench vise and used two large C-clamps on each side. This assured that the metal was clamped tightly everywhere. I notched the jig to get it into my vise and to get my C-clamps around it.

9. Now comes the fun part. Using a roller tool (see sketch. Note that this roller tool is different than the joggling tool shown in the April '97 *RVator*), smoothly work it back and forth along the edge of the aluminum,



The roller tool

slowly bending it to the desired angle at all points. Note that the bend line is formed by the roller, not the wood jig. The angles are labeled on the aluminum from step 7. Use care, and do not overbend. Keep the roller tool at full depth when bending. Check the angles frequently. I used an angle indicator (the kind where the needle always points up, and the background disc shows the angle).

Presto! You should have a lower windscreen fairing that fits extremely well (photos 9 and 10). It can now be trimmed to final size and drilled to the fuselage and windscreen. Where the two halves butt together at the

The fairing is clamped in the jig and the roller tool starts the bend.

The angle of the bend is compared to the measurement taken off the windshield, station by station.

The fairing fits the windshield and forward skin.

center, I made a small splice plate to cover the joint. This process seems rather lengthy. However, it took longer to write it down than it did to do it. I made both fairings ready for final trimming and drilling in one afternoon, including the time it took to make the jig and the roller tool. I doubt that the fairing could be made from fiberglass in such a short time.

You can also make an aluminum fairing strip over the top of the windscreen. This is straightforward, because it does not require compound forming. I made mine of 0.040" 2024-T3, because people will use it as a handhold and the heavier material will resist bending. I made it in one piece, because a splice at top center is awkward (no place for rivet shop heads). This one piece fairing required an aluminum sheet measuring 8" by 62" to start with.