

# Fitting Plexiglas Canopies

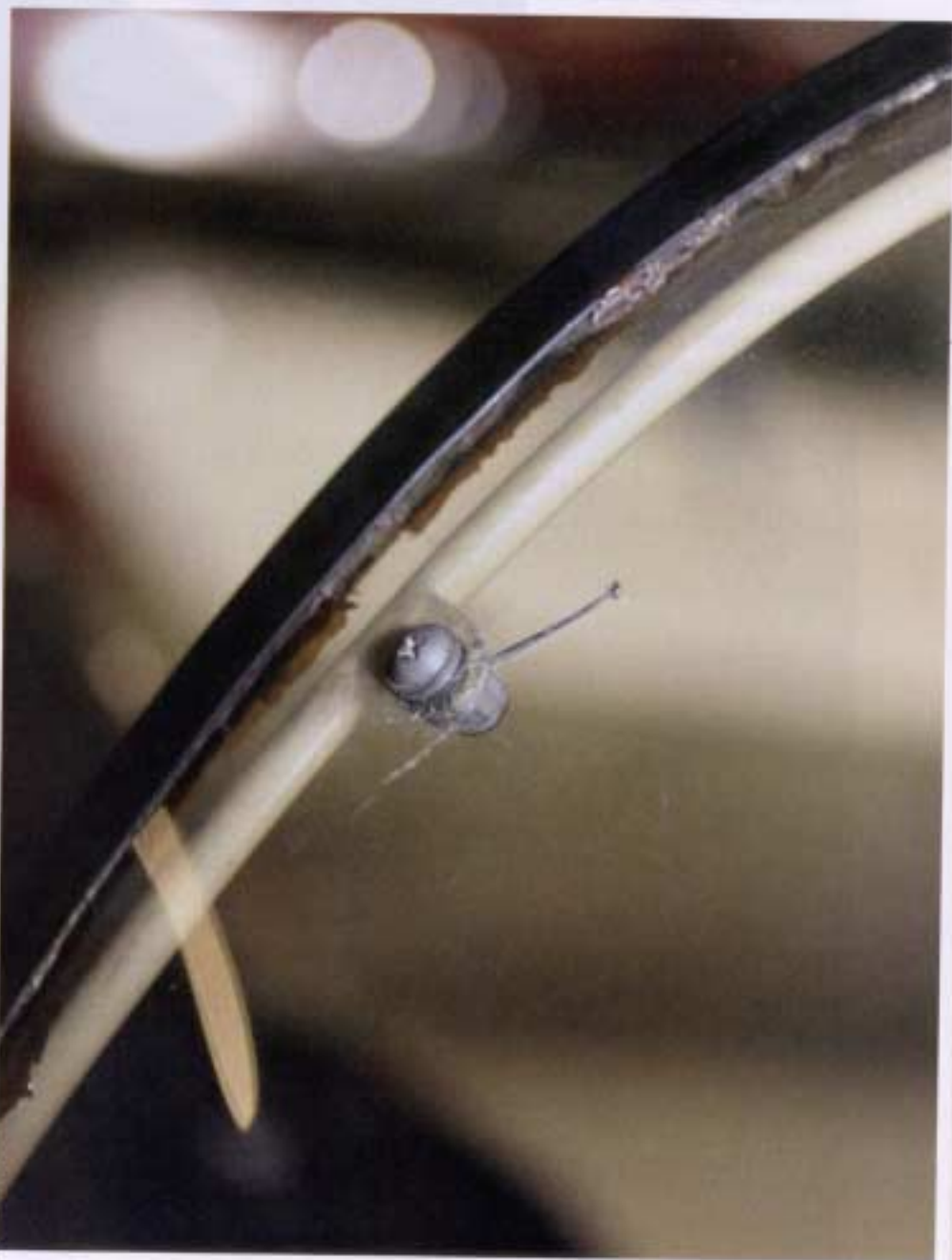
An adhesive alternative to drilling holes

**Chalkie Stobbart, EAA 273568**

In December 2000, I was preparing to fit the canopy to my RV-6. Horror, shock...it was time to call in the professionals. John McKerchar, a friend, has been working with Plexiglas for at least 20 years, so he was the natural candidate to advise me. His warning was clear: "If you apply a load to Plexiglas, it *will* crack. The only question is when."

My mind goes back a year or so; Noel Drew, in Durban, built the first RV-6 to fly in South Africa. One problem he had was with the fiberglass fairing that extends from the bottom of the windscreen to the fuselage, the movement of which allowed air into the cockpit and inflated the material covering the top of the instrument panel. This was resolved by injecting a sealant into the gap between the fairing and the fuselage structure.

Another RV builder in the Cape, having heard of Noel's problem, used Sikaflex-255 FC to seal the gap at the bottom of his windscreen. Unfortunately, this builder turned his aircraft upside-down in a landing accident. When the time came to remove the windscreen, he found that—even though he had not used any sort of primer on the metal or the Plexiglas—he still had to cut the windscreen from the airframe. This made me start thinking: *This stuff must be a real good adhesive. Why not*



*glue the canopy and windscreen down?* So I ran the idea past John, and he was most enthusiastic.

Sika makes all sorts of industrial adhesives. A relatively common product in its line is Sikaflex-252—a bit thinner than 255—used to glue windscreens into automobiles, making the windscreen an integral part of the car. Sikaflex-252 is a one-part polyurethane polymer.

After locating local resellers of the product, I paid them a visit. Needless to say, mine was the first request they had received of this nature, but they accommodated and advised me. I selected the black 252 adhesive, because my roll bar was painted black. The adhesives are available in other colors. To ensure a proper contact between the three materials—polyurethane, Plexiglas, and aluminum—two primers are needed: Sika Primer 210T for the aluminum and Sika Primer 209 for the Plexiglas.

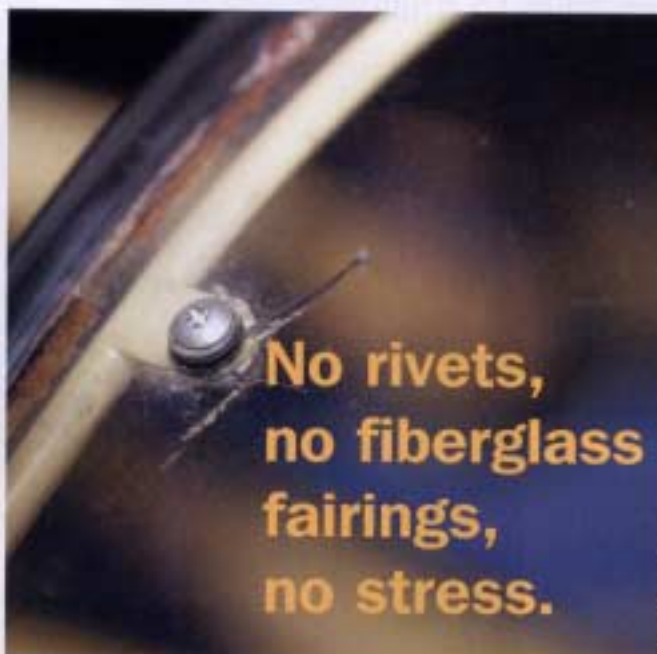
Although I won't pretend to be a master at the art of fitting an RV canopy (having done it only once), I do believe gluing it down is far superior to attaching it with pulled rivets. Here's how I attached mine.

Start by trimming the canopy to fit the frame, the roll bar, and the fuselage as per Van's plans. Mark the canopy and tape off the areas where the primer is to be applied to the mating surfaces. When applying the adhesive, the trick is to warm it up a bit to allow it to flow better. Other adhesives are thinner and have better UV properties than the one I used, but in Africa you use what's in stock at the time. At the auto glass shop the mechanics place the tube of adhesive on the hot engine when you drive in, then remove the old windscreen. By the time they're ready to use the adhe-

sive, it's nice and warm!

Apply Sika primer to the aluminum and the canopy. I had already painted my canopy frame and roll bar. Because I had used a polyurethane paint, the polyurethane adhesive would bond to it well. My prep to the painted surfaces included scuffing it with a coarse abrasive paper and wiping it down with thinner to soften the (cured) paint.

Now apply the adhesive in a tri-



**No rivets,  
no fiberglass  
fairings,  
no stress.**

angular bead as directed, with a thinner bead on the thin pipes of the canopy frame. Do not go overboard; you can always come back the following day (or week) and apply a neat fillet in the corners. Carefully lower the canopy onto the frame and clamp the lower edges in the position they will be when the side skirts are fitted. Then apply the adhesive to the front of the canopy and smooth to the desired shape.

After waiting for the adhesive to cure, I cut the canopy from the windscreen, smoothed the cut edges, and then filled the void between the windscreen and the roll bar with adhesive. This was

smoothed then with a squeegee modified to cut a semi-circular groove in the adhesive next to the Plexiglas edge. Into this groove I placed a 5 mm (3/16 inch) rubber hose so that half of the hose stood proud of the flat surface. The rubber hose is the common synthetic rubber, UV-stabilized hose used in garden irrigation to the sprinkler head.

The windscreen-to-body fairing, which I had made out of commercial aluminum, was then glued into place using the adhesive with a few pulled rivets to hold it to the fuselage. The lower sides of the canopy were then primed along with the two aluminum sheets that capture the lower edge of the Plexiglas. Adhesive was applied sparingly, and the sheets fitted and then pull-riveted to the lower 4130 pipe of the slider canopy frame. Finally, the rear skirts were glued to the top of the canopy.

To finish off the seal between the canopy and the windscreen, I built up the leading edge of the canopy frame by filling the void between the frame and the Plexiglas with adhesive. This took a few layers—each layer being ground down with a high-speed grinder and an abrasive wheel—until the canopy and the windscreen had a perfect, watertight seal courtesy of the rubber hose. Incidentally, the gap between the sliding canopy and the canopy rail can be sealed by gluing on a length of 30 mm shrink sleeving with contact adhesive, then splitting it at the upper edge. To protect the Sika from UV rays, I masked the adhesive lines, painted the area with Sika Primer 209, and then painted the areas with silver polyurethane paint, followed by the color of the aircraft.

Having attached my canopy in

rather a different way than recommended in the plans, I spoke to Dick VanGrunsven at the Sun 'n Fun EAA Fly-In in Lakeland, Florida, and passed on the literature from Sika. This was followed up, on my return to South Africa, with an e-mail to Van's Aircraft offering a description of my method and the lessons I learned.

Here at home I passed on my experience to another RV builder, George Morphis. He was completing his RV-6A and had reached the canopy-fitting stage when I suggested this method. He investigated the Sika options and settled on Sika 295 UV because of its enhanced UV qualities, but he did take the system further. The only hole he has in the canopy of his RV-6A is the hole through which the handle protrudes. George glued down the canopy as I described, but because the adhesive he used is a thinner consistency, he was able to fit the

rear canopy fairings without using the pulled rivets. He simply taped the fairings in position and waited for the adhesive to cure. At the base of the windscreen he did away with the fairing by shaping the adhesive to a pleasing profile. No rivets, no fiberglass fairings, no stress.

The benefits of this method are obvious:

- The canopy rests where it wants to be until the adhesive cures, reducing stress on the Plexiglas.

- There are no point loads, such as rivets and screws, applied to the Plexiglas.

- The adhesive remains flexible, allowing the canopy some movement.

- There are no unsightly fiberglass strips between the canopy and the windscreen. The joint is neat, clean, smooth, and watertight.

- The lower edge of the canopy has no holes or screws, and the nylon strip looks neater.

- All the stress of drilling holes in your canopy is reduced to the single hole for the canopy handle.

**Editor's Note:** Chalkie Stobbart, whose RV-6 has the South African registration ZU-EAA, landed at EAA AirVenture Oshkosh 2003 to quite a fanfare. Accompanying him on the trip were other EAAers: a Cherokee 235 crewed by Steve Marais and Monte Jeffries, and a Cessna 182 flown by Francesco Masselli and Fred Morrison. The trio of aircraft traveled 77 air hours departing Lanseria, South Africa, and heading north through Africa, across Europe, across the North Atlantic, and then down through Canada into the United States, and finally, to Oshkosh. The longest leg of the trip was from Tsumeb, Namibia, to Libreville, Gabon, a distance of 1,367 nautical miles. If you have questions about the techniques described here, e-mail Chalkie at [chalkboy@mweb.co.za](mailto:chalkboy@mweb.co.za).



# EAA MEMBERS SAVE

## Learn Aircraft Welding Techniques

Compiled from authoritative sources such as EAA Sport Aviation magazine, and U.S. Navy and Air Force construction manuals, this heavily illustrated manual will teach you the fundamentals of aircraft welding. Explore jigs, tube bending and cutting, fuselage construction, basic repair, and much more. Whether you're building or restoring an aircraft, this volume will supply the tips and techniques for a successful project.

**F37864**

Member .....\$8.95

Non-member .....\$11.95

**To Order Call: 800-843-3612**

Outside U.S. & Canada call (920) 426-4800

Visit us on-line at [www.eaa.org](http://www.eaa.org) or send your order by mail to:

EAA Mail Orders

P.O. Box 3086, Oshkosh, WI 54903-3086

Master Card, Visa, Discover • All orders add \$5.00 for shipping and handling fees in USA



The Leader In Recreational Aviation