

rib or whatever is being used as a contour guide. After the surface is fiberglassed the ribs will stick up enough to be noticeable. One way to minimize this is to cut the foam with the lightest grade sandpaper practicable. If the ribs still show, nothing much can be done except to fill in after glassing with resin and microballoons.

Invariably small surface voids will develop here and there in the foam, few ever larger than $\frac{1}{4}$ to $\frac{3}{8}$ -inch in diameter. If the surface is to be eventually glassed these voids should be filled with polyester resin and microballoons (if subsequent sanding is not required). Just mix the filler to a very heavy paste, fill the void and scrape off the filler, flush with the foam. Smaller voids can be ignored since, if the surface is later glassed, the resin will leak through the cloth and fill them. Somewhat larger voids can be ignored if plywood is used in lieu of fiberglass for the final covering.

Polyester resin and microballoons really make a very excellent mixture for filling and making shapes. Microballoons are made by Union Carbide and consist of microscopically small, incredibly light, hollow phenolic spheres. A gallon can of them weighs about a pound. One pours the resin and the catalyst into a container, mixes them well and stirs in the microballoons to the desired consistency. The trouble is that unless the mixture is extraordinarily thick it will run downhill and flow away from where it is needed — and it is almost impossible to find anything on a sailplane that lays exactly horizontally. Mixing a very thick paste is okay, and the more microballoons you use the lighter per unit volume, which is good too. (One can even heat the resin first to thin it out so that it will take more microballoons). However, the thicker (and hotter) you make it the quicker it sets up and in some cases you will have to be very fleet of foot. Microballoons mixed into the resin until the mixture “tears” as you stir it will set up in less than 5 minutes, so you have to plan ahead.

Some marine supply houses sell a “thixotropic agent,” which is a fine, white (and also very light) powder which one can mix into the resin to keep it from running downhill and still have a fairly low viscosity. One of its problems, though, is that it doesn’t sand nearly as well as the microballoons, being in this regard more like straight resin.

But back to the foam. If you are foaming to a contour, as on a wing, you can conserve foam by constructing cardboard dams loosely over the ribs. This will force the foam to go where you want it. Since the foam will stick to almost anything you can save yourself the difficult task of peeling the cardboard out of it by taping newspaper to the side of the cardboard coming in contact with the foam. Simply sand the newspaper off afterwards as you contour the foam.

Since in using newspaper I find myself wasting valuable time reading it after relieving it from the cardboard I have been trying another technique. It is not very good. I have been applying a paste wax directly to the cardboard. This relieves fine but the wax sticks to the foam, creating a crust that is incredibly hard and difficult to sand. I may try wax paper. Failing in this, it’s back to the girlies in the entertainment section of the Chronicle.

The mixing of polyurethane foam is very critical in terms of agitation, time, and mixture ratio. You have about 15 to 20 seconds before it starts coming

up out of the container like thunder out of China. On the other hand, if you don’t stir enough, big, hard and crusty bubbles will form instead of beautiful, consistent, small-cell foam. Sanding this mess is completely unproductive.

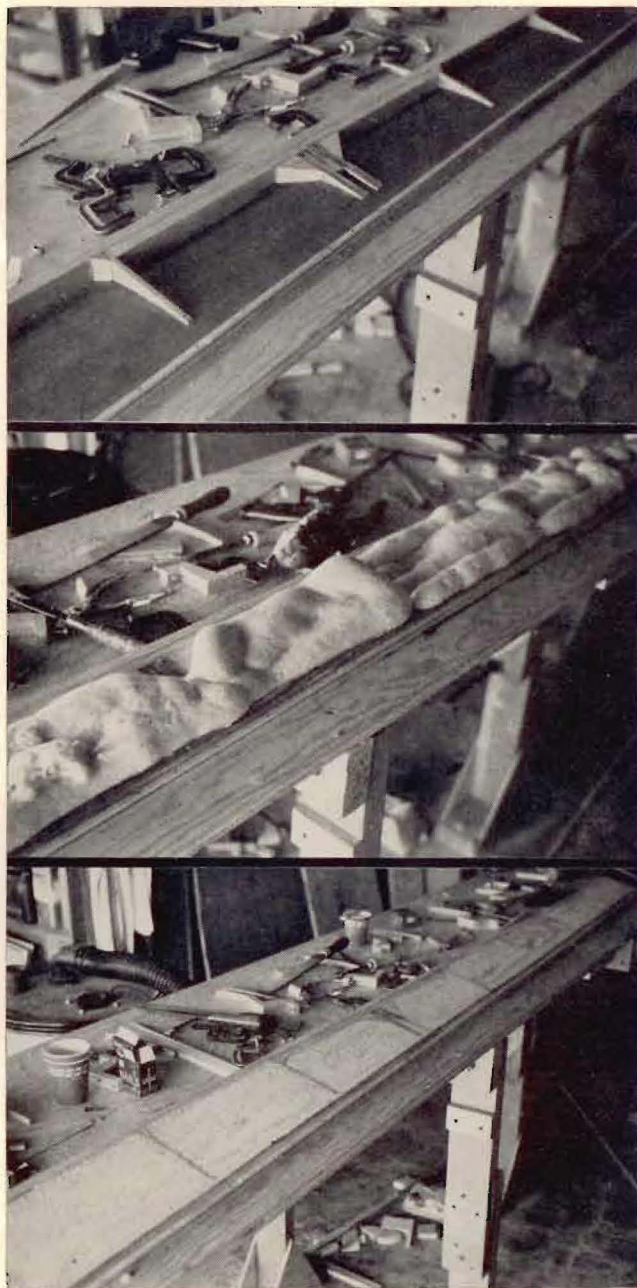


Figure 2, top to bottom, shows three steps in filling a typical small control surface with polyurethane foam.

The mixture ratio has to be just right. Too much of one part will cause the foam to shrink after initial swelling. Too much of the other will cause it to stay soft and on the rubbery side. In mixing the two liquids you will get some on your hands. Alcohol and water is supposed to take it off. I just let it wear off. As for your clothes, you can plan on simply throwing them away.

The instructions on the cans warn of the toxic hazards. You’d best believe them (I do, now) and do your foaming outside. A lot of ventilation or a vapor-filtering mask will help if you can’t go outside. If