

Fitting New Plastic

By Dennis Wolter



Aircraft renovation, as I've stated many times before, involves a certain amount of research, planning, time, money and compromise. The dollars involved are not necessarily the most important component. Some airplane owners, like seemingly most of our politicians, think that many problems can be solved by throwing money at them. We all know that doesn't work in Washington, and it often won't work when it comes to your aircraft's plastic. The point I'm making is that just investing a lot of money in purchasing new plastic trim does not always mean that a no-hassle solution is the result. Many of the things we do to keep these airplanes flying involve compromise. The two previous articles on plastic renovation are certainly proof of that.



Using aviation tin snips to do some major trimming on a new window frame.

I think that fit and durability enhancement are the two major issues with new plastic, and in this area we are certainly faced with compromise at times.

As mentioned in the previous articles, the after-market plastic component manufacturers are, for the most part, using more durable and thicker plastic. So far so good. The compromise can be at installation time: how well these parts fit, and the resulting additional labor when the fit isn't precise. Most of the after-market parts manufactured today are made from tools created by using available old parts, and those parts are often deformed or have shrunk. Fortunately, as time passes and these after-market manufacturers receive feedback from installers in the field, the molds are being modified to correct these anomalies. I work with these companies and have found all of them to be responsive to, and thankful for, this field data. They are doing a great job of progressively improving the fit of their products. (Our politicians could learn a thing or two from these folks.)

Despite the ongoing improvements from the after-market manufacturers, you should still be prepared to employ some or



Tools used for precise fine trimming and edge finishing.

all of the techniques we're discussing to make this stuff right. One would logically ask, why not buy new parts from the factory? The stuff will fit, that's true. But there are always some considerations to factor in.

First, it's possible for the new part to have been in stock for many years, sitting on a shelf in a warehouse in the sometimes extreme environment of Wichita, Kansas. We've experienced this firsthand, having to use a part that was only available from the factory and that was, shall we say, pre-aged. Definitely not as fresh and flexible as a newly manufactured part.

Second, the factory may not have the part in stock. This means a price request and order process must be initiated. The tooling will have to be located, and then renovated before the part can be manufactured. This can take months, then the bean counters need to fire up their logarithmic calculators to come up with a new (can you say, higher) price. I once bought an in-stock 210 left window frame for \$110, and a new production right window frame for the same aircraft was \$430. I am



Oversized window frame.



Location of a good consistently-shaped splice point.

probably being a little unfair to Cessna here. The old price could well have been based on very historical dollars. Thankfully Cessna does have the interest and integrity to support its older airplanes.

Third, cost. Factory-produced pieces are more expensive. After-market parts are normally about half the price. However, be prepared to pay for (or provide) the additional labor necessary for installing and fitting the sometimes less than perfect fitting after-market components.

Fourth, extinction! What if the part is not available from either the factory or an after-market manufacturer? Well, you're flying pretty low here! The only options are a salvage yard with the expectation of not receiving a perfect part, or resurrecting what's left of the piece you have. In one case we actually purchased a damaged part from a salvage yard because it was in relatively good condition in the area where ours was heavily damaged,



Formed and bonded splice doubler on back side of component.

chines, then go fix cars! I have to say that most of us doing these renovations do have that passion. Hey, we get to go to the airport every day and we're not spending our money in bars and on psychiatrists.

I guess I got up on my soapbox there, so let's get back to plastic. With those decisions made, and your new plastic in hand, grab your tools and dive in. Five distinct tasks are involved in installing this stuff: trimming, forming, reinforcing, splicing, and drilling holes.

Trimming: Regarding tools, here's what we use to trim and fit new plastic. For removing lots of material we use aviation sheet metal snips. For fine trimming we use a sanding drum



Thin fiberglass reinforcement on front side of spliced component.

and vice versa. We bonded the two good sections together to get a usable component. Many a time we've had an interior project nearly completed only to wait two or three weeks for a part to be located in order to finish the job. A lesson to be learned here is that you should never, ever, throw away an old part until your project is totally completed.

I know there are some shops out there that refuse to work on older airplanes. From a strictly business perspective, I guess that policy makes sense. I didn't get into this game just to make money, so we are very willing to tackle these old birds. If one doesn't have a passion for these ma-



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Pointed screw stud in original mounting hole.

or a paint stick with 180-grit sandpaper bonded to it. And we will use plain 180-grit sandpaper as a final edge-finishing tool. To create slots and holes, we will drill the corners and use a cut-off wheel on a dremel tool to remove the material between

out the heat gun. These forming techniques were thoroughly covered in the previous plastic articles, so I won't bore you with a review.

Reinforcing: Reinforcing and restructuring was also covered previously.

Splicing: Sometimes a piece is either too big or too small to fit. The only way out of this situation is to extend or shorten the piece by splicing in or cutting out a section and bonding the two pieces back together. The most important consideration in this process is where one makes the splice based on consistency of shape. In English that means that when material is removed, the area of the splice must be exactly the same shape or dimension at each edge so that both ends will fit properly at the splice point. In some cases one can heat and form the joining pieces slightly to facilitate a good fit. As mentioned before, we have actually spliced a section of an old part to a new one in order to get a proper fit. Never give up!

Holes: Holes come in all sizes and shapes. The most commonly found holes in these plastic trim components are mounting holes. The big challenge here is how to locate the



Tapping a dimple into the properly positioned new trim piece.



The accurately located dimple.

the holes. Large diameter holes can be hand-cut with a fly cutter. It is very important to remember that this plastic is quite soft and power tools can be difficult (ie: risky) to control. We always try to cut shapes by hand. One slip-up and a new piece can become scrap.

Forming: When a part doesn't properly fit, one must get

hole in a new piece of plastic. Once the component is fitted and trimmed, we will install screws with a pointed head in each airframe mounting hole, then precisely place the fitted trim piece in its exact to-be-mounted location. With a small rubber hammer, tap the plastic in the location of the pointed mounting screw. Remove the part and voilá! You have a perfect hole-locating dimple on the back side

of the plastic. If you are using countersunk screws, do not use a power tool to drive the countersink. Do it by hand. We mount our countersinks in an old drill chuck; it makes a great handle for more control. Don't forget to bond a crack-eliminating shim on screw holes that are not flush with the supporting structure, as mentioned in last month's article.

Odd shaped holes such as slots and rectangles are made by first drilling 1/8" to 1/4" diameter holes at the ends or corners of the desired hole or slot. Then,

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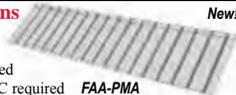
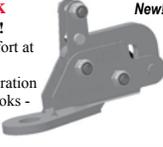
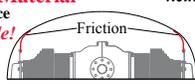
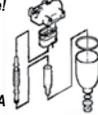
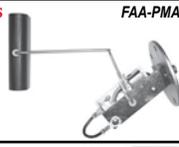
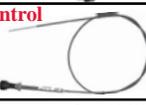
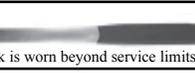
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use a cutting wheel and a moto tool to connect the holes (we mentioned this under trimming). A little edge sanding with the sandpaper stick and plain 180-grit paper and you've created the perfect hole. The picture shows it all.

Moving on to larger diameter round holes. Here's one place that I see room for improvement. A lot of new instrument panel covers come un-punched. To create a perfect hole here we use a hand-held fly cutter. To locate the center of the proposed hole, simply use a divider to scribe a crosshair center point. Then drill the correct size pilot hole for the fly cutter drill bit and begin hand milling the instrument hole into the soft plastic. A little finish sanding, and you'll have a beautiful hole.

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them with machine screws, nut plates, and bonded-on spacers. No rattles and no damage when the avionics tech removes the panels – I love it!

As stated earlier, there are undoubtedly as many tricks of the trade when it comes to fitting, trimming, and mounting plastic as there are clever people installing it. I've given you the basics of what works for us here at Air Mod. Practice on some old plastic before committing yourself to the new stuff. You will be surprised what you might learn.

Next time we'll move on to painting and refinishing inner trim and interior-related airframe components. Until then, fly safe!

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