

Building a Better Profile

Part 1 - Before You Begin



"Twister Sister", modified SIG Twister profile ship by author

Your Model Work Area

No worthwhile undertaking succeeds without a little planning and forethought. So it is with building model airplanes. And what the experienced modeler has long since learned and solved, he might not think to mention to the beginner. So before this construction series gets underway, shall we take a look at a few basic needs?

First and foremost: you need a good area to do model construction. Good lighting, a good work surface, and a comfortable chair are all part of the equation. A radio or television, and easy access to a soda or glass of tea and the cookie jar might be nice too.

Safety must always be your first goal, and you need to learn to automatically think about protecting yourself as well as others. Nothing takes the fun out of building a new model airplane quite like a trip to the emergency room to get CA glue out of an eye, sew up a bad cut, or repair some other human catastrophe. Think safety. Always.

With small people around comes the very serious responsibility of keeping dangerous items out of their hands. This includes almost any cutting tool or chemical used in your modeling. Have a way to secure every item, including the models, so that they don't end up dangerous toys for a child when you aren't around.

If you live with a spouse, mother, or big sister or brother, it goes without saying that your modeling activities will have to show consideration to them. No spilling glue or paint on the good rug or table. No stinking up the place with dope or making excessive noise at the wrong times. Simple survival skills for the modeler!

Assuming we can be safe and considerate, what else is needed? Start with your building surface. It needs to be large enough, strong, and very flat. Some people build on a door; a used or blemished door is often fairly cheap and all it needs is one good surface. In spite of our modern CA superglues, we may still need to stick pins in the building surface at time. An appropriate flat piece of cardboard, celotex, or similar material will probably be needed to use pins.

Basic Tools

Tools needed to build the better profile are essentially the same ones required to do any powered model. As a starting point, consider the following:

- Exacto knife with #11 blades and single edged razor blades
- razor saw, large (6 inch), fine tooth
- #100, #180, #280, #400, and #600 sandpaper
- three flat hardwood sanding blocks (3/4" x 3" x 12")

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- 12-inch and 24-inch aluminum T-Bar sanding tools
- rubber cement and/or 3M 77 spray adhesive
- metal yardstick/straight edge, and fine tip felt pen
- 30/60 draftsman's right triangle, plastic or metal
- 12-inch precision metal scale, with .01 and 1/64 inch scales
- 36" music wire rods, diameters 1/4", 3/16", 1/8", 3/32" and 1/16"
- hinge-slotting tool (or broken hacksaw blade)
- heavy-duty soldering iron, electrical solder and solder flux
- carpenter's block plane
- Master Airscrew plane
- moto-tool and jigsaw
- quality painter's face mask with replaceable filters
- safety glasses

Most of the items are for cutting and sanding, and are not terribly expensive. Try a paint store, hardware store, discount store, local hobby shop, and mail order, in approximately that order, to find most of them.

Beginners can initially ignore all the fancy and varied Exacto blade types and stock up on #11 (sharply pointed triangular) blades instead. Catch them on sale mail order and buy in quantity. Single edged razor blades are among the most useful simple tools, and these can be bought in quantity 100 at most hardware stores for well under \$10. Buy plenty, you will eventually use them.

While at the hardware store, take a close look at commercial construction materials you might use to advantage. As an alternative to a larger building surface, investigate pressed wood shelf or stair step stock. Inexpensive and typically available in 12-inch width and 8-foot lengths, it is easily cut to 4- or 5-foot lengths ideal for building a wing or fuselage on. Just take the time to select very flat stock for this purpose; when stacked wrong it can end up bowed badly.

Aluminum "T-bar" sanding tools are highly recommended. While not terribly expensive, they may not be readily available locally. In the meantime, you may find an aluminum extrusion stock at the hardware store which can be cut to length to make an assortment of acceptable substitutes for T-bars.

Music wire rods? Since you ask, they are great sanding guides for tapering flaps and elevators. It's tough to build a very straight airplane without them. (Stay tuned to this column for all the details!) Get them at any serious hobby shop. Remember that 3/32", 1/8", and 1/16" diameters are standard sizes for control rods, landing gear wires, and tail wheel wires as well.

A carpenter's block plane is far more efficient than rough sandpaper for removing material. Another inexpensive, excellent tool is the little Master Airscrew modeling plane. Order a supply of replacement blades as well.

The few more expensive tools on the list have long lives and are good investments for any serious modeler. In the meantime remember that having a friend with a tool is nearly as good as owning the tool. (Go talk the fellow with the Dremel Moto-shop into "demonstrating" it for you by cutting out your fuselage doublers!)

Highly recommended as one of your first modeling tool investments is a Dremel Moto-Tool or its equivalent. For model drilling, cutting, shaping, hollowing, routing, etc. this versatile tool is a labor saver.

A quality painter's face mask is a good investment, not only for painting but also for protection against balsa dust. When you buy one, remind yourself the value of your lungs.

And considering the value of our body parts, need I mention that you have only one set of eyes and that safety glasses can save them?

CA Glue

Although CA (cyanoacrylate) glues were invented in the 1940's, only in the last few decades have they virtually revolutionized model building. CA is available in at least three viscosities, and a very small bottle of it goes a long way.

I hear you saying, "Oh, Super Glue". While regular commercial Super Glue certainly IS a CA glue, you may be disappointed if you try to use just any old variety on model airplanes. The watery thin grade of CA that most expert builders love so well for models will not be found at the supermarket. Use the better model grades of CA - you will not regret it. (You CAN find an acceptable CA debonder at the supermarket.)

CA glue is pressure activated, instant (as fast as 10 seconds), and doesn't fill gaps or sand very well. All CA joints need to be tight. The penetrating power of the watery CA is incredible. Thicker grades of CA fill gaps a little better, but not well. CA has its place.

Related fact: glue fillets are not appropriate on a model airplane! When fillets are needed, use modern materials like Epoxolite or Aeropoxy putty or micro-balloons, or even make fillets out of balsa. CA simply will not make fillets, and is strongest applied in the correct, minimal amount. Excess CA turns into a glassy mess that refuses to stick.

Watery thin CA glue works so well by penetration, and is ideal for gluing soft balsa. Before actually building, practice gluing some pieces of scrap soft balsa with thin CA. Squeeze them together tightly and add just a tiny drop or two of thin CA: the strength is fantastic.

No matter how careful we are, fingers get glued at times, which can become a serious aggravation at times (when planking a wing, for example). When it occurs, do not panic. Patiently roll your finger loose! Hardened CA glue comes off fingers in the shower. Nail polish remover dissolves it, as does fancy CA solvent. (Also, the nitromethane in our fuel is a [slow] CA debonder. What does this fact tell you?)

When CA sets ("kicks") it gets quite warm. Sometimes you see a little puff of vapor. No kidding! CA vapor is hard on eyeballs. To speed up the kick even more, you can buy special CA accelerators in nice spray bottles, or use plain sawdust or baking soda as well.

NEVER chew excess CA glue from the bottle - it instantly glues lips, teeth, tongue, whatever. It will readily glue your eyeball as well - it LOVES moisture. So always re-open a clogged bottle using a **pin**.

I still keep a little acetate glue (Ambroid or Testor's) around for nostalgic reasons. Most stunt grunts agree that "Ambroid chews best" (off the fingers)! And the "golden" color and smell are appealing. But CA is ideal for a lot of modern modeling. You can even saturate a small soft, weak piece of balsa with CA, making it a rock hard and very strong. So next time you break a rib into 17

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pieces, glue it back with CA - 20 seconds later it will be good as new, and no one will be the wiser.

Future issues of this series will discuss in detail other types of modeling glues, as well as Epoxolite. So "stick" with me!

Cutting and Sanding

Building labor is mostly cutting and sanding balsa wood. Good tools and techniques pay off here, and the wise beginner practices with both before starting a serious project.

A fine Exacto razor saw is an excellent tool, providing a clean straight cut you can't easily get with a blade. As a rule, use a razor saw on 1/8" or thicker stock, and sometimes even on 1/16" stock.

Sanding is fundamental. ALWAYS use a straight sanding block or T-bar for sanding whatever needs to be straight - most everything, obviously. We tend to forget, and take sandpaper in hand to sand a piece of soft balsa that needs to be straight. It never works well, since hands aren't very flat!

Use coarse sandpaper (#80 or #100) for shaping - it goes so much faster. Switch to finer paper after shaping. Life is simple and sweet for the soul who is generous enough to change sandpaper! I know, it is more common sense. With the proper sized sanding block, a sheet of sandpaper fits almost exactly. Use a heavy stapler or large tacks to attach sandpaper on one 3/4-inch side. You can remove these staples about 50 times before a new block is needed.

Rubber cement, applied to both sandpaper and bar, can attach sandpaper to an aluminum T-bar. It easily peels off later and cleans with alcohol. A strong alternative is 3M 77 spray. Remember: your T-bar is your best sanding block - don't leave home without it!

Splicing

Accurate cutting is crucial to splicing. When joining sticks, cut at a fairly small angle (say 30-degrees) from the long axis. Use a larger angle (perhaps 45- to 60-degrees) when splicing sheets.

Suppose you are splicing two 1/16 x 3 x 36-inch sheets to get an "almost" 72-inch long sheet. Almost, since a decent splice with the factory 90-degree ends is virtually impossible. A good method is to cut about a 60-degree angle, which shortens the pieces a little.

There is a trick to getting the angled cut just right. Lay the two sheets on top of each other horizontally and carefully butt their bottom long edges against the top of a metal yard stick. Adjust the overhang on the right side of the yardstick for an inch or so. With the razor saw, GENTLY cut through both sheets at what looks like about 60-degrees - straightness is more important than a perfect angle.

Since both sheets got cut at the same time, they (should!) have the same angle. Still using the metal yardstick to butt the sheets against, flip them around to where they fit for splicing. If for some reason they do not fit, try sanding them, one on top the other again, gently with the T-bar, which IS straight. Precision is required. Get used to it!

Put Saran Wrap under the joint before gluing it. Keep the yard stick in place during gluing. Without Saran wrap, CA glues both sheets and probably the yard stick to the work bench.

Holding the joint tightly, Saran Wrap in place, drop thin CA on it. Hold it tightly for several more seconds. Although CA kicks immediately, maximum strength doesn't come for a minute or so..

Now for the **secret**: take a FINE (#320 or so) sanding block and gently sand the flat surface of the joint just glued, while it is still held tight. Just enough to make a tiny bit of sawdust. You WANT the sawdust to end up in the seam just glued.. Zzzzzzzt! It magically kicks the CA just perfectly, while filling the tight seam.

Flip the joint over and add a more CA glue to the other side, again just "touching" it with the sanding block. Finally, square up and flatten all [four] surfaces with the T-bar. Properly done, splice quality will be amazing. Did you mess up? Just saw it in two along the bad splice, do it all again, cutting about 1/4 inch back on each side (outside the hard area saturated by CA). So you lose a half an inch in length to get it right..

Balsa is almost always repairable. Try patching before you replace it. You can easily cover a patch up when finishing. If the structure of the model isn't compromised, who cares? No need to be stingy with balsa, but do not waste it either. Save USEFUL balsa scraps in a big box. With CA glue, you can often splice pieces into something useful - it wasn't practical to do that 20 years ago with Ambroid, of course. Light balsa is valuable, so never throw it away if it might end up on an airplane. Soft balsa is always lightest.

Splicing sticks is similar, BUT. The trick here is to butt the first stick against a yard stick and the second stick against it lengthwise (not on top of it). It will be difficult to get completely vertical razor saw cut, and this prevents a perfect fit. Here is where some spoiled people just make it TOO EASY, using a precision micro-miter box (highly recommended, available from Tower Hobbies). I normally do it the labor-intensive *Cowboy Way*, by SANDING, with my trusty T-bar to square things up, before and after gluing.



"Twister Sister" - nose and wheel pants

Next time we will actually get started on a profile stunt ship. So: *Hasta la vista!*

-Larry Cunningham