PEAK OF FLIGHT

NEWSLETTER

In This Issue

Shaping Scale Fin Tapers

Cover Photo: The LOC 4" Diameter V2. Get it at: www.ApogeeRockets.com/Rocket_Kits/Skill_Level_4_Kits/V2

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Shaping Scale Fin Tapers

By Chris Michielssen

At one time or another, every modeler has to cut a trapezoid shaped fin for a Nike style scale model. The fin requires a tapered diamond shape some builders have trouble forming.

In this article I'll pass on a few tips to help you get sharp, evenly tapered fins from ordinary balsa.

Here I'm showing balsa, included in most scale and semi-scale kits. You could always upgrade and use basswood for the fin stock.

Basswood is harder and closer grained. Many prefer basswood over balsa for complex fin shaping.

When tapering a leading or trailing edge it's hard to judge the thickness of the taper. This method gives you an easy way to see the black edge when sanding. You can better judge the thickness when you can easily see a black edge as opposed to light beige balsa or basswood.

I'll also show how to strengthen the thin tapered balsa edges. Like any new technique this might take a few tries to get right.

I usually cut and shape extra fins. If the model has four fins, I'll cut out six. Pick the best of the shaped fins to use on your model. Those extra fins could also come in handy for repairs later on.

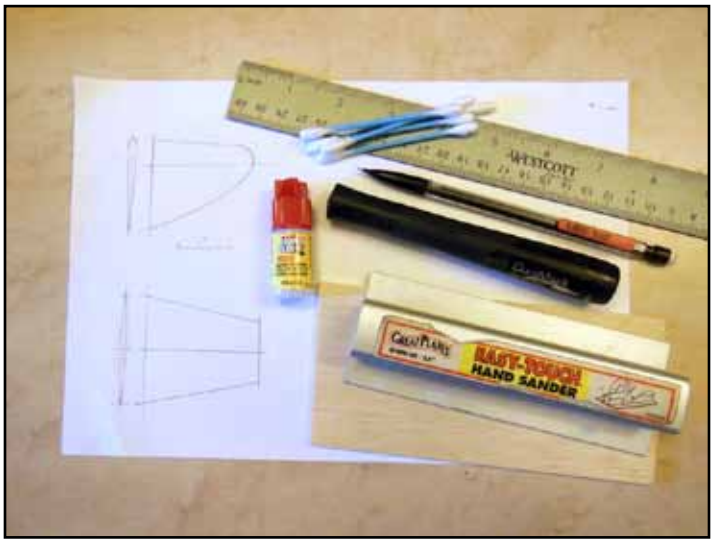

Photo 1: Tools needed for the trapezoidal fin shaping.

The techniques in this article can also be used when shaping the trailing edges of airfoiled fins.

The Tools

You probably have in your collection all the tools required to shape the fins. Photo 1 shows them. First of all, you'll need a fin template to work from. On the lower left side of the photo is a pencil drawing of the fin on cardstock.

Along with a sharp hobby knife and straightedge you'll need:

- Cotton ended Q-tip swabs for applying the Cyanoacrylate (or CA) glue
- A sharp soft lead pencil
- A wide point permanent marker
- A Sanding Block (this is essential for shaping fins)
- Medium Cyanoacrylate (not the water thin CA glue, but the thicker stuff)

Any good sanding block will work but I prefer an aluminum extruded sanding block. The one I use most is the 2" wide by 5.5" long block. I like it, because the upper side has a long raised handle for an easy grip, and the underside is perfectly flat and accepts the available self-adhesive

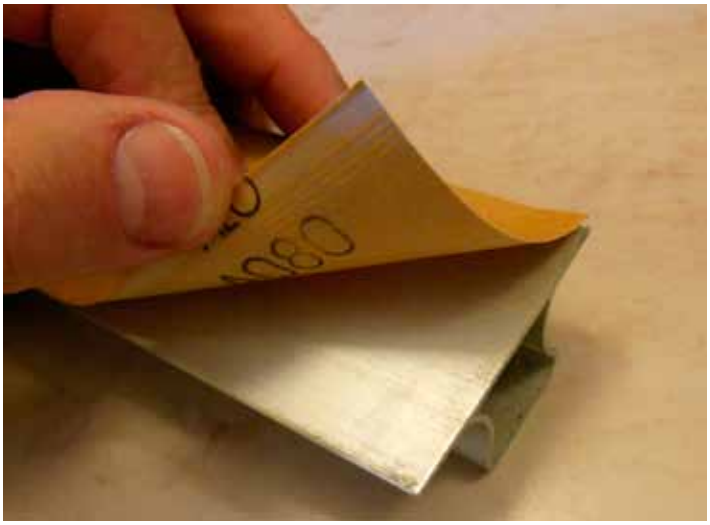

Photo 2: Sandpaper with self adhesive backing allows you to concentrate on sanding rather than gripping onto the paper.

Continued on page 3

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Continued from page 2

Shaping Scale Fin Tapers

sandpaper.

For shaping a Nike style fin I use 220 grit sandpaper. You can find it on a roll at a good hobby store, and it comes with a self-adhesive backing.

You could also cut any sandpaper to size and stick it to the block using spray adhesive.

The advantage to this style block is the adhesive backed sandpaper is “locked” on a perfectly flat sanding surface.

The sandpaper is not held with a wedge or gripped with your fingertips. You can concentrate on shaping the fin without the chance of the sandpaper working loose.

Photo 3: A Q-tip will quickly pick up CA glue.

Super Glue

You’ll be using some CA glue to stiffen and strengthen the edges.

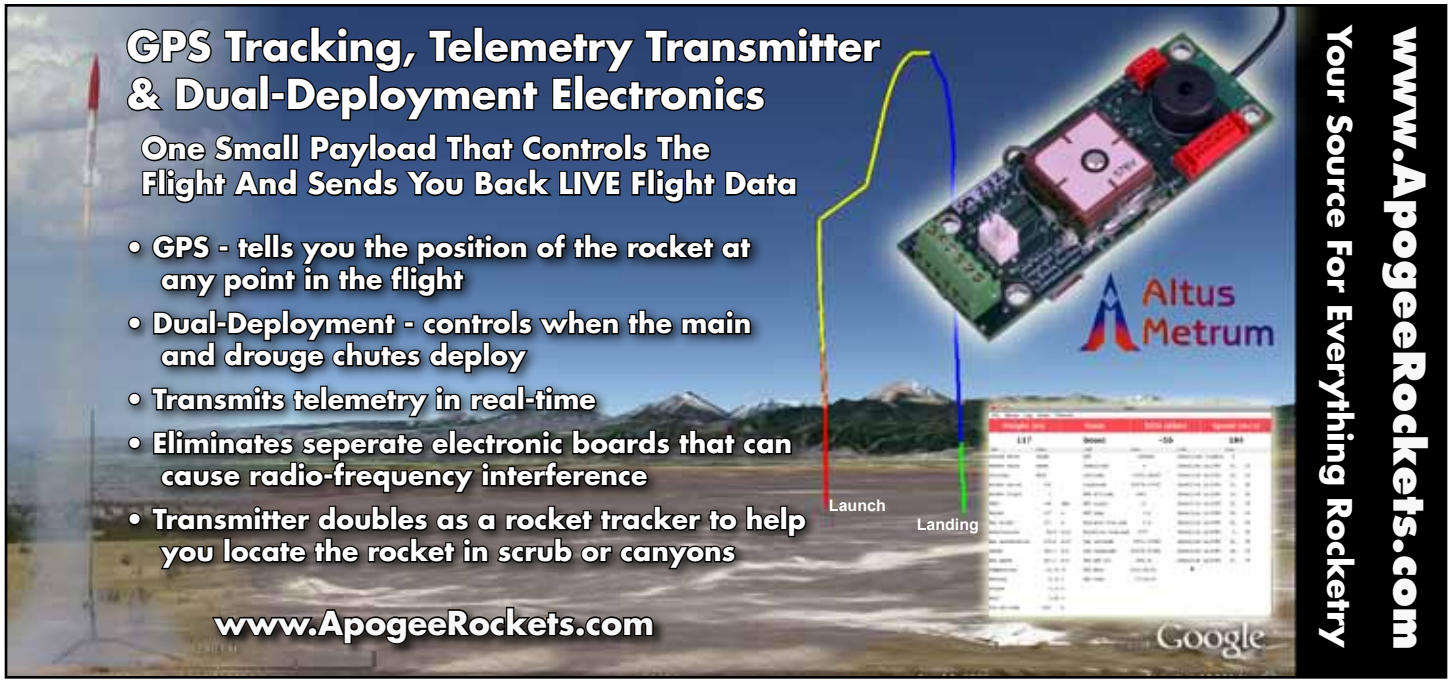
Use the thicker medium CA, because it won’t spread out or dry too quickly.

Photo 4: Use a Q-tip for applying the CA glue to the fin.

As shown in Photo 3, to transfer the CA glue to the balsa, first squeeze out a drop of CA onto some cardstock.

Dip your Q-tip into the drop and wipe it on the rear corner of the cut fin as shown in Photo 4.

Continued on page 4



Continued from page 3

Shaping Scale Fin Tapers

TIP: This back corner of the fin will usually break off down the balsa grain when it is sanded to a thin knife edge. Applying the CA glue here strengthens the balsa and help keep the trailing edge from popping off.

In Photo 4, I've shaded the balsa with pencil to show the area covered by the CA glue coat.

One of the toughest parts of sanding a consistent thickness of the "knife edge" is seeing how thick the remaining balsa is. The wood color is light without much contrast.

We are going to darken the edge with the black permanent marker.

The problem is that the marker ink is thin and too easily absorbed into soft balsa, soaking too far in to be sanded off without changing the final profile of the fins. Any ink left on fins can also bleed through a final color coat of paint.

As shown in Photo 5, CA glue is used to seal the edges and prevent the black ink from seeping too far into the wood. The ink will stay as a thin coat outside of the glue sealed edge. The CA glue coat also strengthens the balsa all along the thin sanded edges.

Squeeze another drop of medium CA onto some thick cardstock.

Dip a Q-tip swab into the drop and rub the CA into the leading, outside and trailing edges of the fin.

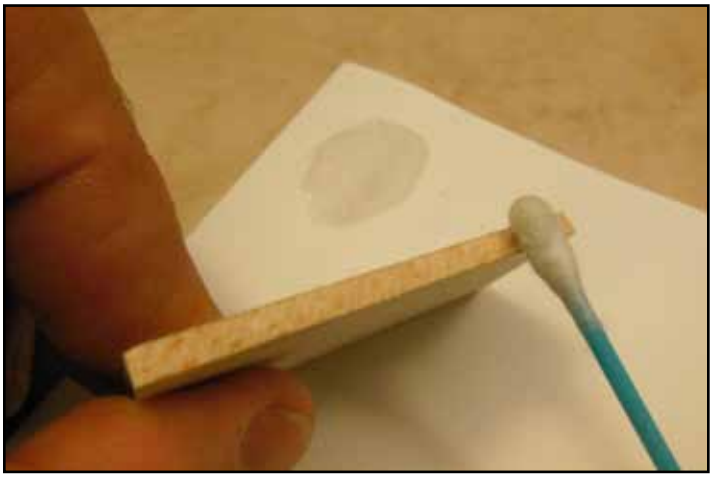


Photo 5: Coating the root edges of the fin with CA to prevent the marker from being absorbed into the wood.

Don't get the CA glue on the root edges or flat sides of the fin.

The CA glue could seal the root edge and you won't get a strong glue joint later if you're using wood glue to attach the fin to the rocket. The CA glue isn't needed on the flat side surfaces and might prevent any filler from sticking in

Continued on page 5

Continued from page 4

Shaping Scale Fin Tapers

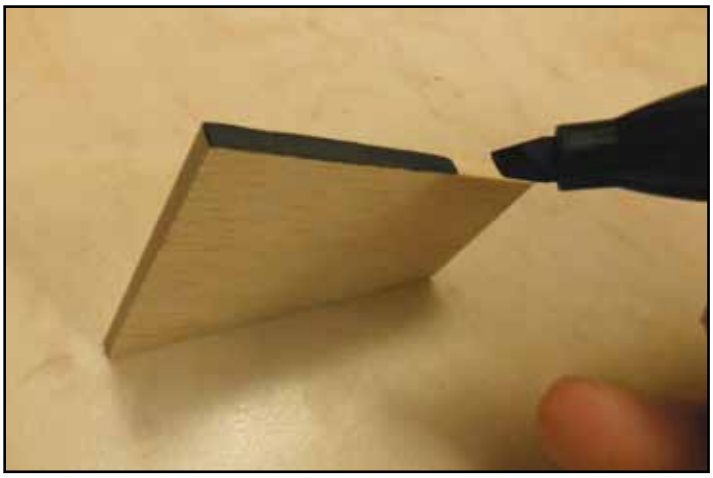


Photo 6: Color is added to the edges with a marker.

the balsa pores.

Using the wide point permanent marker, make a quick pass down the leading, trailing and outside edges of the fin. No ink is needed on the root edge. Keep the black ink only on the flat edge sides.

You are trying to get a thin dense black ink cover over the entire edge. Most of this ink will be sanded off when shaping the fin.

When shaping a fin it's sometimes hard to see how thick the tapered leading and trailing edges are. The black ink will give you a sharp contrast to better judge the thickness while sanding the knife edges.

Shaping the Nike style fins can't be done by simply sanding from the higher middle to the outside edges. It'll have to be done in several stages.

First, taper the front and rear knife edges.

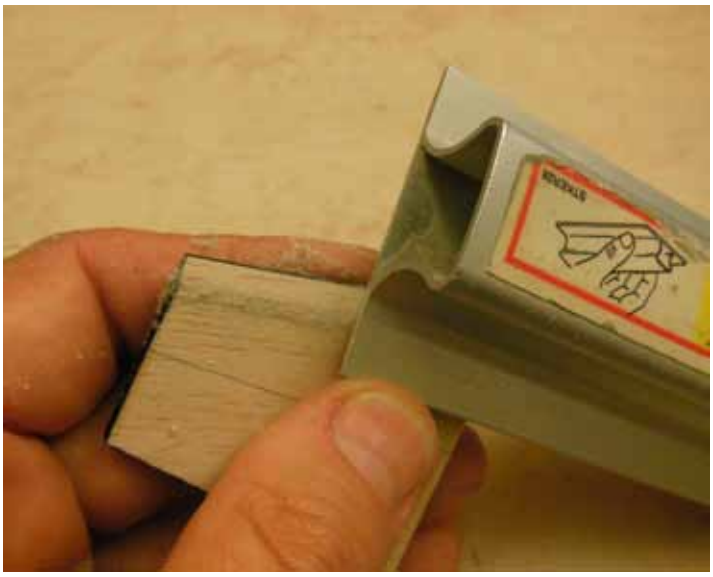


Photo 7: Tapering the fin with the sanding block.

Continued on page 6

Continued from page 5

Shaping Scale Fin Tapers

In Photo 7, you can see my left thumb being used as a guide and "stop" for the sanding block edge. I'm not sanding from the center of the fin, but just the upper quarter.

Sand one direction only, up and away - not back and forth.

Make one up pass up and lift the block off the fin. Set the block back down and make another sanding pass up and off the fin.

Turn the fin over and make an equal number of sanding passes on the other side.

Continually check the blackened edge of the fin as shown in Photo 8. It will show you any unequal thickness. Make any correction to get the remaining inked edge even from root to the outside edge.

You have to know when to stop when sanding a "knife edge". Too thin and the fin will be weak and prone to breaking on landing. Too thick and it won't be the diamond profile you are trying for.

Sand and taper until you have a thin, black line still left on the edge.

Repeat on the other side until you have what's shown in Photo 9. I've marked the fin with ink to show where the tapers start.

Don't mark your fins with ink here - this is just to show the high point of the sanded taper. The ink would bleed through the paint, and mar the appearance of your rocket.

As seen in Photo 10, next sand away the area connecting the high center line (now shown in ink, but don't draw the line) to the knife edge at the rear.

Again, keep an eye on the thin blackened trailing edge, don't sand off the corner of the fin.

Repeat this "V" shaping on the opposite root edge side.

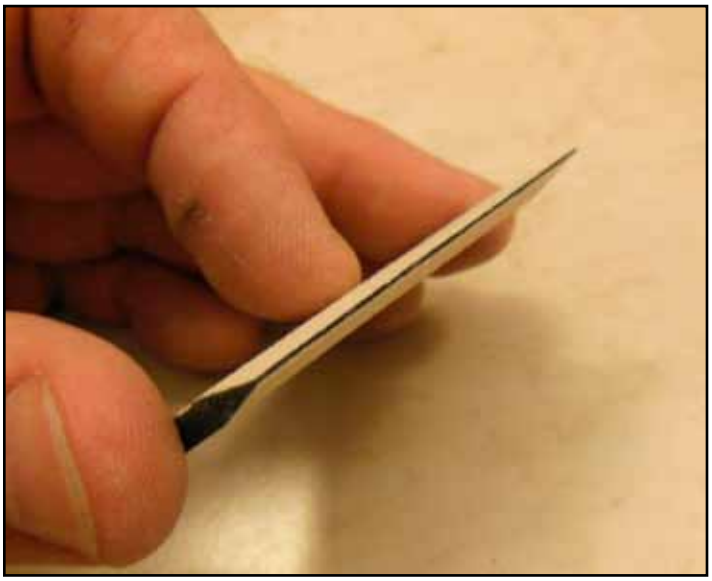


Photo 8: Constantly check the edge to make sure it is uniform.

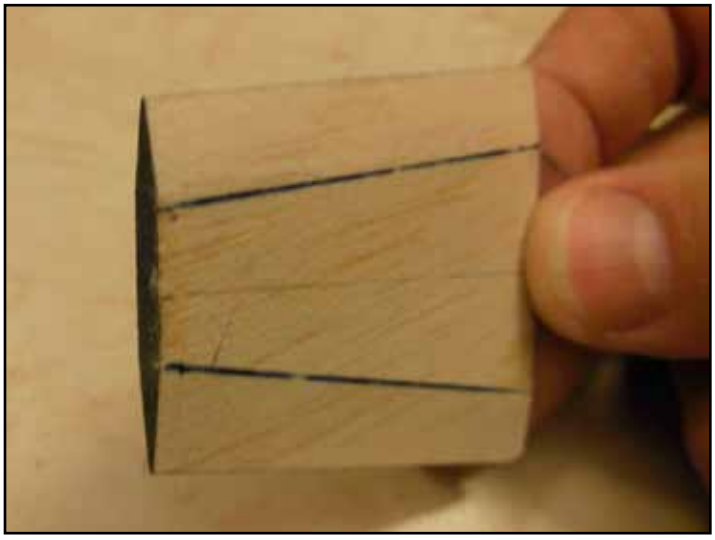


Photo 9: Double wedge airfoil.

Continued on page 7

Continued from page 6

Shaping Scale Fin Tapers

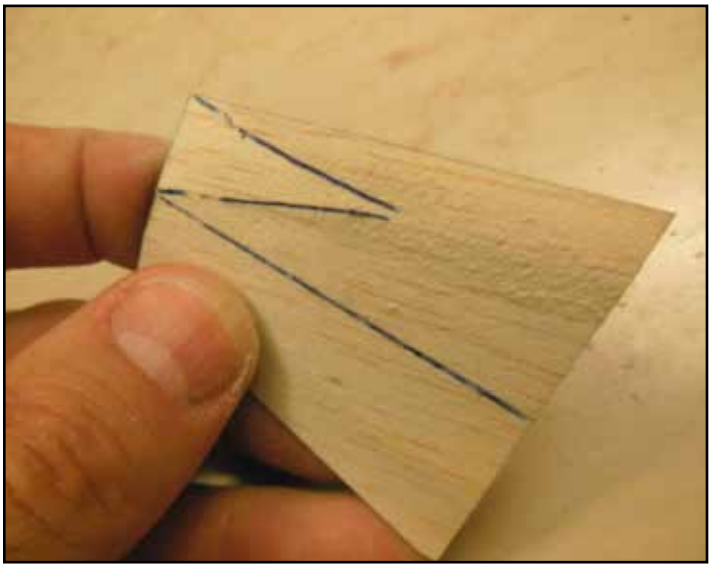


Photo 10

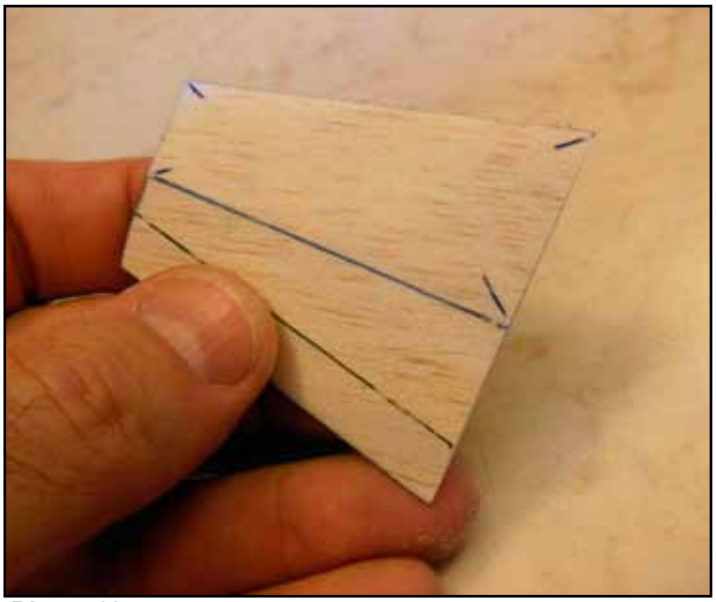


Photo 11

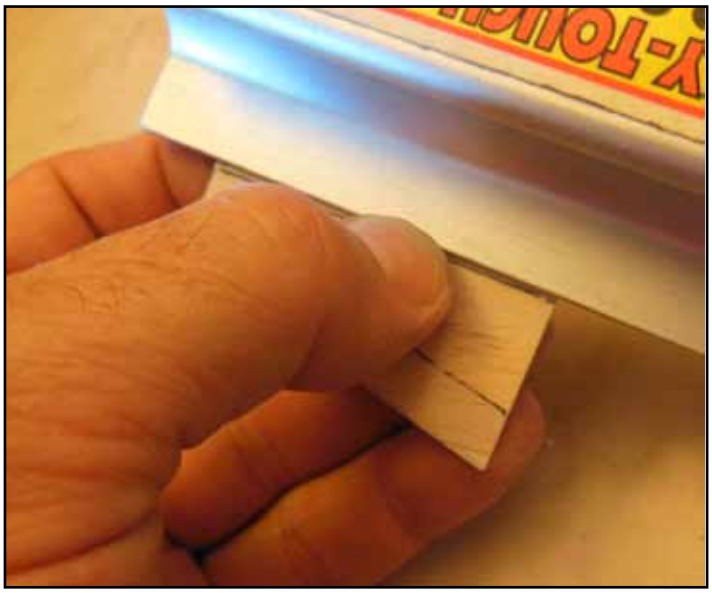


Photo 12: Use your thumb as a stop to prevent too much of the wood being sanded away.

Now sand down the remaining high center area. In Photo 11 you can see the remaining inked tic marks still left in the corners.

Again use your thumb as shown in Photo 12 as a guide to keep the block in line for straight sanding of the center area.

Optional step:

As you are sanding down the center plane you might remove some of the centerline towards the narrower width at the outside edge. This is actually desired and can be corrected when the other side of the fin taper is shaped.

Nike style fins are thicker at the root and slightly thinner on the outside edges. Here's one way to get that extra

Continued on page 8

Continued from page 7

Shaping Scale Fin Tapers

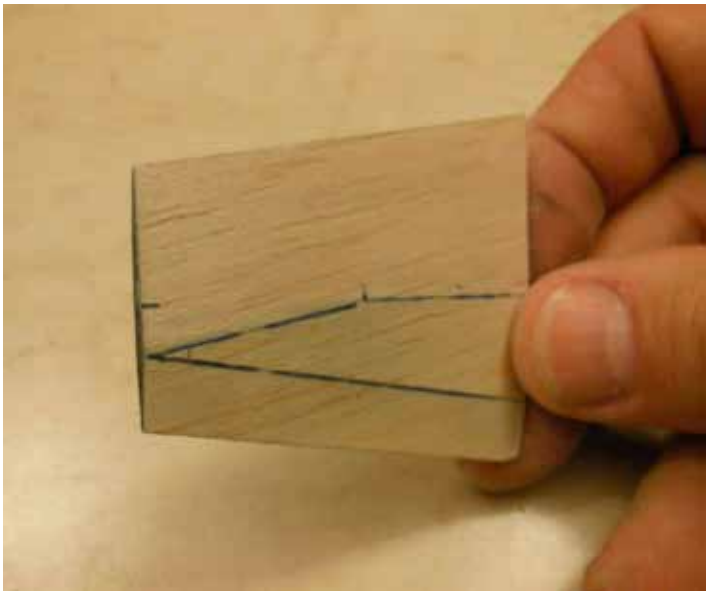


Photo 13

taper:

Sand down the center line and cut slightly into the lower side of the fin. This is shown in another inked line in Photo 13.

This has lowered the centerline starting at about the midpoint.

When the bottom trailing edge is shaped you can move this back to the center line and the fin will end up slightly narrower at the outside edge.

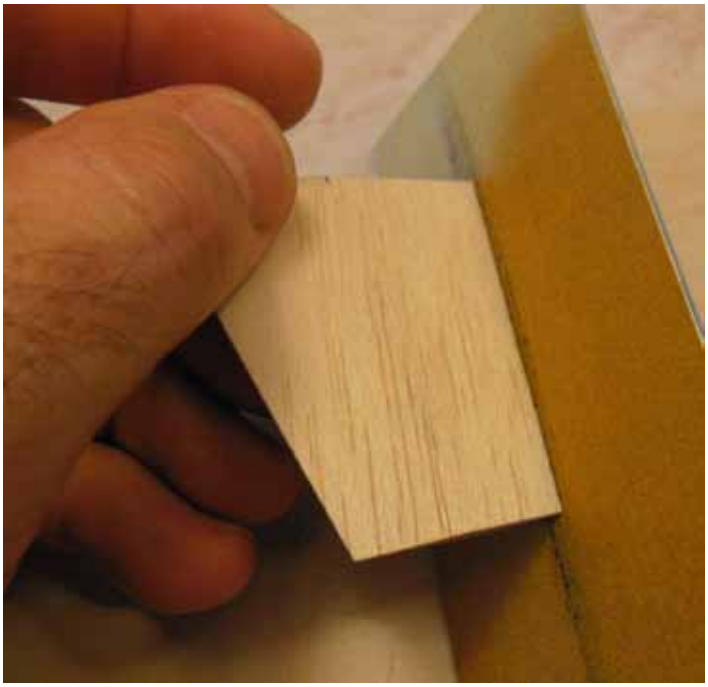


Photo 14

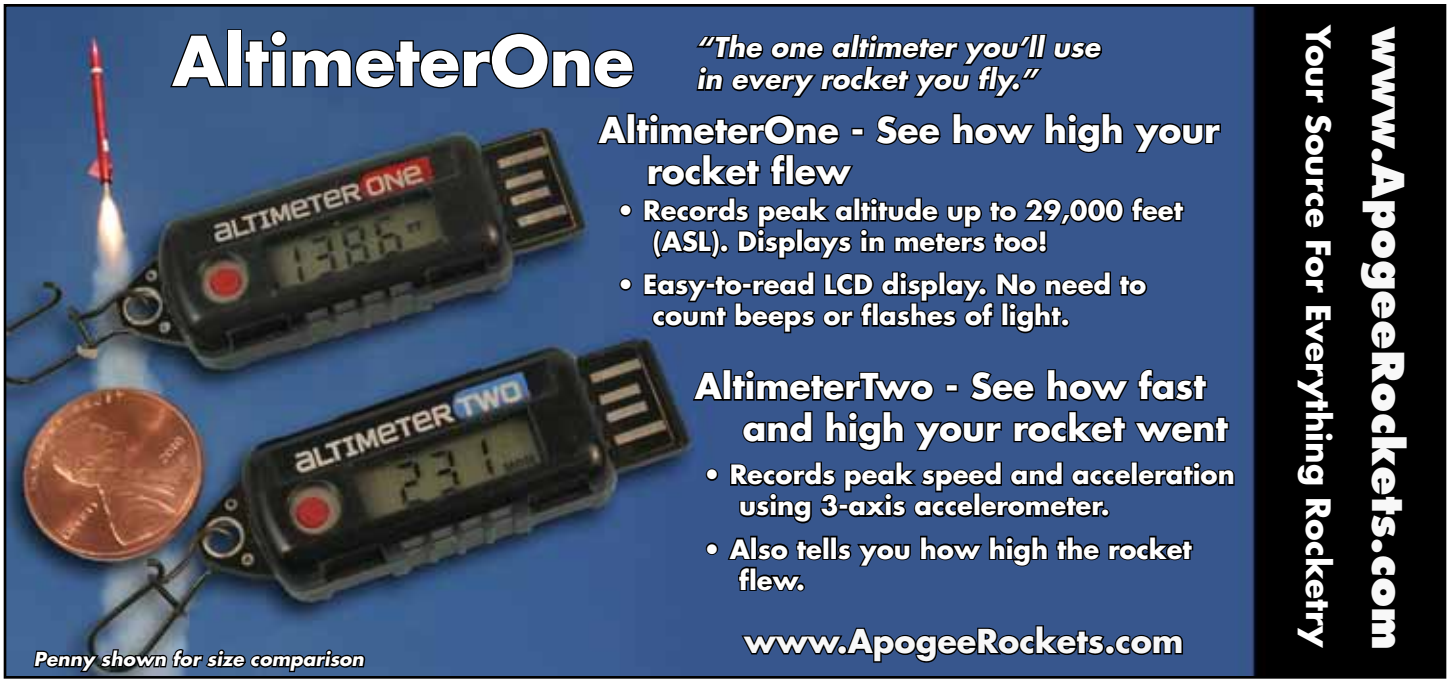
Finally, the remaining inked edge is lightly sanded off in Photo 14.

The ink is only a very thin coat outside the CA glue and easily removed. Any remaining black ink will show through your painted model. Remove it all!

The finished shaped fin is shown in Photo 15.

On the left is the root edge, on the right the outside

Continued on page 9



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Shaping Scale Fin Tapers

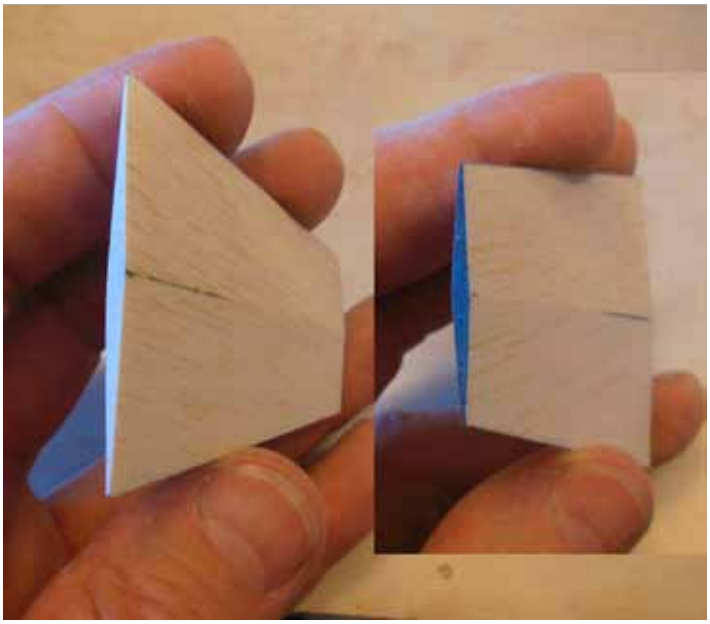

Photo 15

edge.

The ink has yet to be sanded off the outside edge in Photo 15.

There is some ink left on the centerline near the root edge. This ink was drawn on to show the centerline and shouldn't be needed or drawn on your fins.

At this point, the shaped centerline in the raw balsa will be more pronounced towards the outside edge.

When the balsa grain is correctly filled and sanded, that raised centerline should be built up and sharp from the outside edge to the root edge.

This technique was even used for wedge fin shaping on the small FlisKits Honest John shown in Photo 17.

About the Author:

Chris Michielssen is an avid builder and flyer of low power model rockets. He produces Odd'l Rockets and accessories, available from Apogee Rockets at http:/www.apogeerockets.com/Oddl_Rockets.

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