



# PEAK OF FLIGHT

N E W S L E T T E R

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## ***Make A Super Shroud***



Cover Photo: Launch of the Mad Cow Rocketry 4" diameter Black Brant rocket kit on a J-size sparky motor. Get your own kit at: [www.ApogeeRockets.com/Rocket\\_Kits/Payload-Capable\\_Rockets/Black\\_Brant\\_II\\_4in\\_Fiberglass](http://www.ApogeeRockets.com/Rocket_Kits/Payload-Capable_Rockets/Black_Brant_II_4in_Fiberglass)

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## Make A Super Shroud

By Chris Michielssen

### Introduction

In *Peak-of-Flight Newsletter #136* ([www.ApogeeRockets.com/Education/Downloads/Newsletter136.pdf](http://www.ApogeeRockets.com/Education/Downloads/Newsletter136.pdf)), you'll find instructions on how to make your own paper transition sections. At some point you may desire a stronger piece. To lead into this article by Chris Michielssen, I thought I'd pull a quote out of that original article. I wrote: *"Paper transition sections (shrouds) can be stiffened in a variety of ways. First, you can laminate another shroud over the top of the first one to increase the thickness of the shroud material. This is better than trying to make a shroud out of thicker cardboard, because thick cardboard doesn't wrap easily without creasing."*

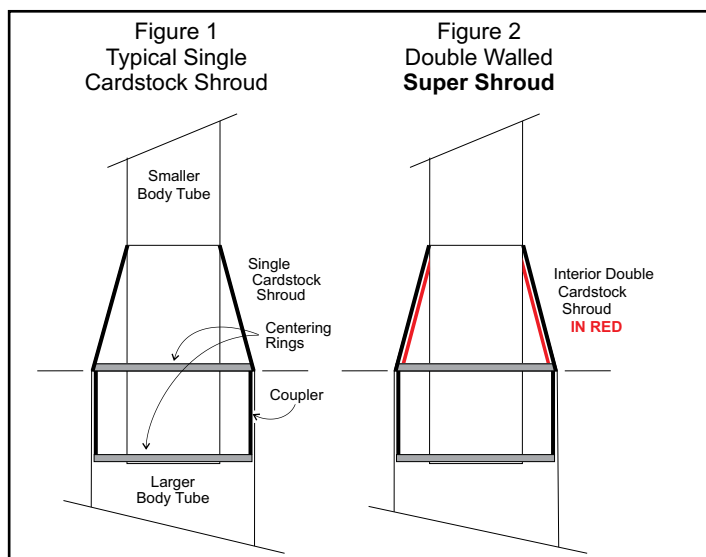
How does one go about doing this? That brings us to Chris' article...

### Make A Super Shroud

Single layer shrouds supplied in kits are sometimes printed on thin 65 lb. cardstock. Shrouds made from thinner materials rarely hold their form and are more prone to creases and crimping.

### What's a "Super Shroud?"

A "super shroud" is a double thickness shroud made by "nesting" two of the same patterns, one inside the other.



The smaller end of the two shrouds has an interior "step" that better fits the upper body tube and gives a wider gluing surface.

The larger end has twice the edge thickness, almost as thick as the adjoining body tube edge.

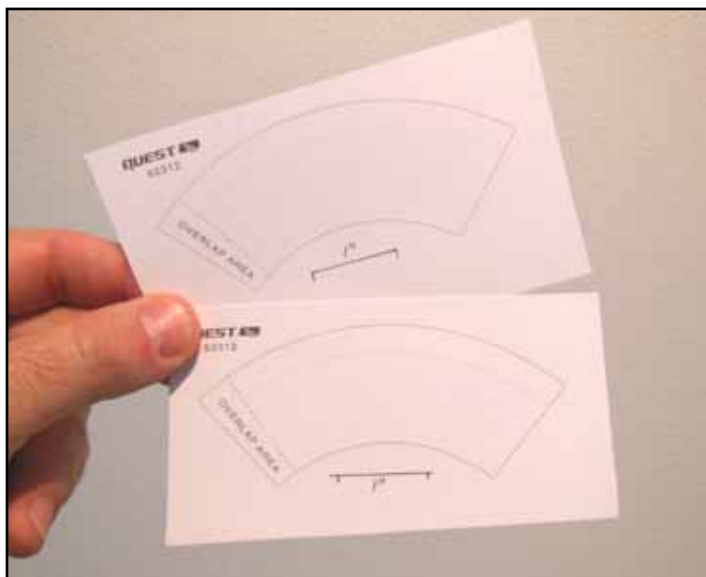
A thicker (doubled) shroud has less chance of wrinkling and is nearly as strong as the rocket's body tubes.

These instructions show how to make shrouds "old school" using white glue on an attached glue tab. This is how many kits have the shrouds constructed.

You can certainly cut off the tab and butt the shroud ends together for a less noticeable seam. The cut-off tab is used on the interior for a gluing tab, one half of the tab on each side of the shroud edges. Because of the thickness, on a "Super Shroud" I'd recommend a tab made from thinner 24 lb. paper.

Using a thinner tab stock has less chance of showing through these double thickness shrouds.

As explained in previous Apogee Peak Of Flight newsletters, rubber cement can be used instead of white glue.



**Photo 1:** Duplicate the shroud pattern onto a second piece of stiff cardstock.

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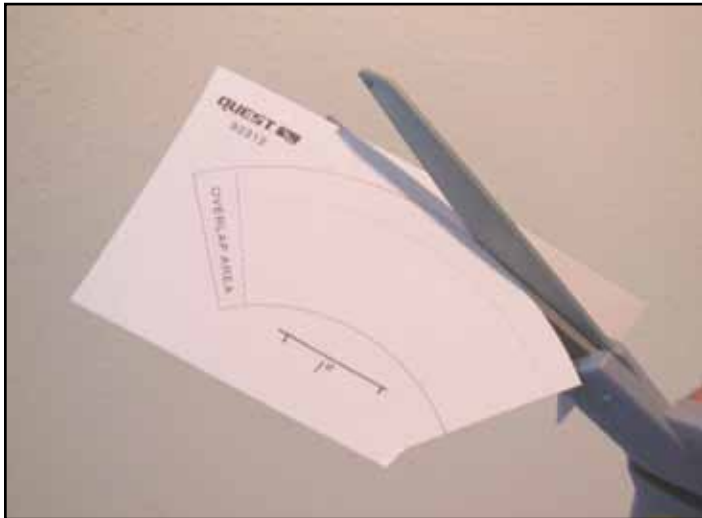
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## Make A Super Shroud

Kits typically give you one shroud and it may be of thin cardstock.

Scan your supplied shroud and print up a few extras on 110 lb. cardstock.

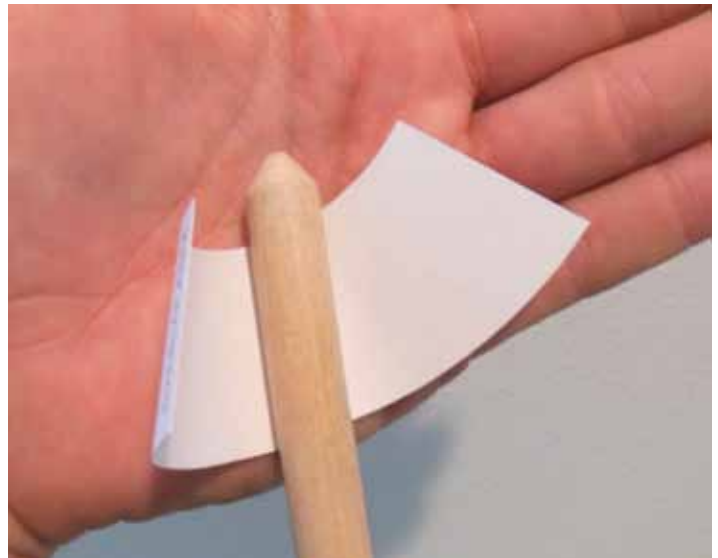
Always draw a 1" reference on the original kit part to check the printed shrouds are the correct final size.



**Photo 2:** When cutting the curved edges, use scissors, as it will look smoother than a cut using a hobby knife.

Cut out the straight tab ends with a straightedge.

Cut the curves with sharp scissors. The curved areas



**Photo 3:** Pre-curl the paper using a dowel.

will come out smoother with scissors instead of cutting the arc with a hobby knife.

Don't drag the shroud over a table edge to make it curve! That breaks up the paper fibers.

Form the shroud by rolling a clean dowel over the cut cardstock in the fleshy heel of your hand.

Use at least a 1/4" diameter dowel and the curve should be smooth.

Put a slightly tighter roll into the tab edges. (See the left side of the pictured shroud in Photo 3) This helps keep the

Continued on page 4

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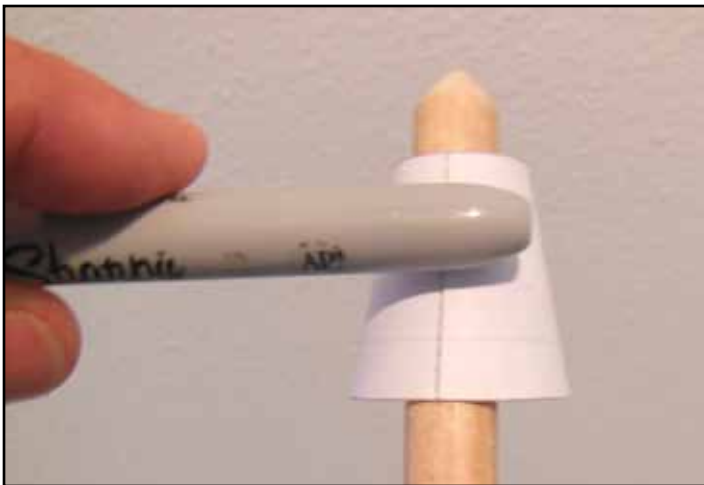
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## Make A Super Shroud



**Photo 4:** Roll the shroud over the dowel to form the curvature of the glued area.

ends down when gluing.

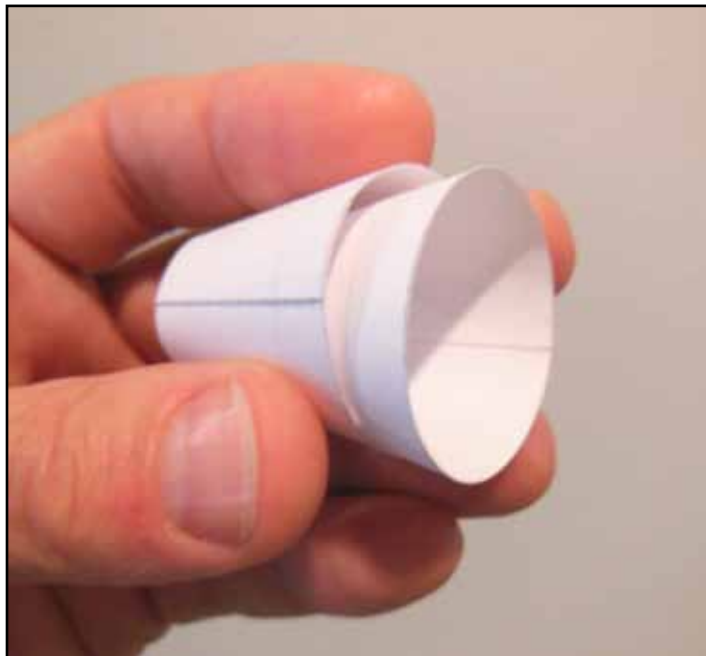
One of the tricks to making a good shroud is not to use much glue. Just a thin coat is all that's needed.

Apply glue to the overlap area then use the opposite dry side tab to smooth out the glue. This allows you to evenly "push" the glue up to the dashed line of the overlap tab and makes a thin even coverage on both sides.

Join the glue tab to the other side and pinch closed with your fingers for a moment for the glue to grab. Check the alignment of the glue tab.

To set the glue on the tab: Set the shroud over a clean  $\frac{1}{2}$ " diameter dowel. Roll another dowel over the top of the glued tab area. Stay close to the seam overlap area, Don't press and roll too far to the right or the edge or the interior tab edge will show through the finished shroud.

Pick the best of the two remaining shrouds. "Best" meaning a smooth outside surface. Also check the fit on the



**Photo 5:** The shroud with the smoothest surface will be the outside of the finished part.

two tubes that are being joined.

One will be the outside visible shroud on the finished model. The second interior (strengthening) shroud will not be seen. The better made of the two shrouds will be the visible shroud on the model.

Apply an even thin coat of glue over the inside shroud surface.

Slide the glued inside shroud into the dry outside shroud. Line up the tab seams on opposite sides. Press the inside shroud into the outside shroud.

Check the roundness of the two glued shrouds and do more forming with the dowel in the heel of your hand if

Continued on page 5



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## Make A Super Shroud

needed. Re-round the shroud while the glue is still wet and the shrouds are pliable.



**Photo 6:** The step created on the small end because of the nested pieces of paper.

The upper left image in Photo 7 shows the upper-end “step” made by stacking the two shrouds. This gives an automatic inside taper that should better fit the smaller body tube when slid in place. It’s also a much wider gluing and attachment edge.

The lower right side of Photo 6 shows the back end with the interior shroud sticking out the back.

Photo 7 shows another example, this one being the L.E.M. shroud from the Estes Saturn V kit. This shroud as a single layer cardstock is one of the weakest areas on the model. But, two layers of 110 cardstock strengthens this weak link.



**Photo 7:** An example of a larger shroud. This one is from the Estes Saturn V kit.

When trimmed (as shown in the next step) it will fit like the single layer shroud.

### SHROUD TIP:

Where you can, keep the printed side of the shroud to the inside.

Some printed inks are very hard to cover when spray

painting the model. Printed inks can bleed through the final sprayed finish.



**Photo 8:** Trim off the extending shroud with a razor blade.

Continued on page 6

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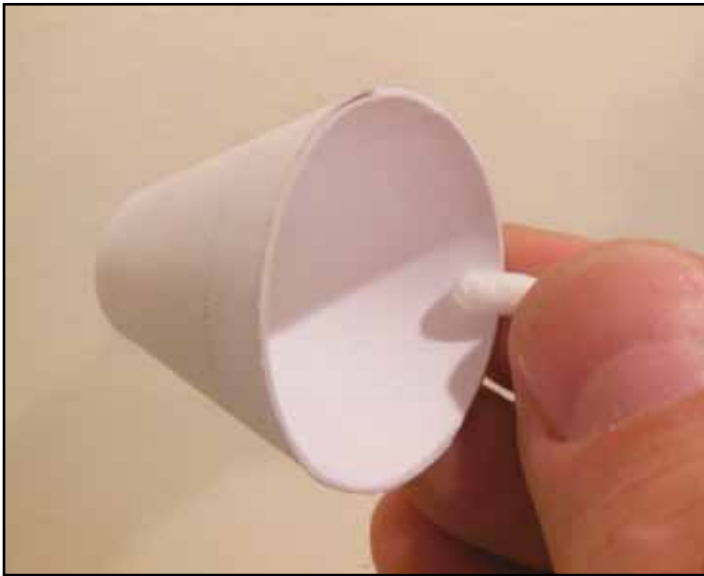
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## Make A Super Shroud

After all is dried, this extended rear interior shroud edge should be trimmed off leaving a double thickness and stronger end joint.

Even if this were a open “nozzle” on the back end of a rocket, it’s still much stronger than a single layer shroud.



**Photo 9:** Stiffen the edge with some medium-thick CA glue.

Apply a coat of medium CA around the inside of the interior shroud. Keep the CA away from the edges where the shroud will glue to the body tube edge. This interior CA coat will toughen up the shroud.

Now lightly sand the bottom edge square on a block with 400 grit fine sandpaper as shown in Photo 10. You are only trying to get a flat edge on the shroud for a better fit against the larger diameter body tube edge. Don’t sand off too much or make the diameter smaller.



**Photo 10:** Sand the bottom edge using fine grit sandpaper to flatten out the edges.

Like any other rocket assembly, you’ll get better with practice.

Shrouds and cardstock adapters have always been the “bane” of builders. A “Super Shroud” could smooth out and strengthen an otherwise rough area on your next build.

### About the author:

Chris Michielssen is an avid builder and flyer of low power model rockets. He produces Odd! Rockets and accessories, available from Apogee Rockets at [http://www.apogeerockets.com/Odd!\\_Rockets](http://www.apogeerockets.com/Odd!_Rockets).

His building blog: [www.modelrocketbuilding.blogspot.com](http://www.modelrocketbuilding.blogspot.com) is followed by 700 people each day worldwide.



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