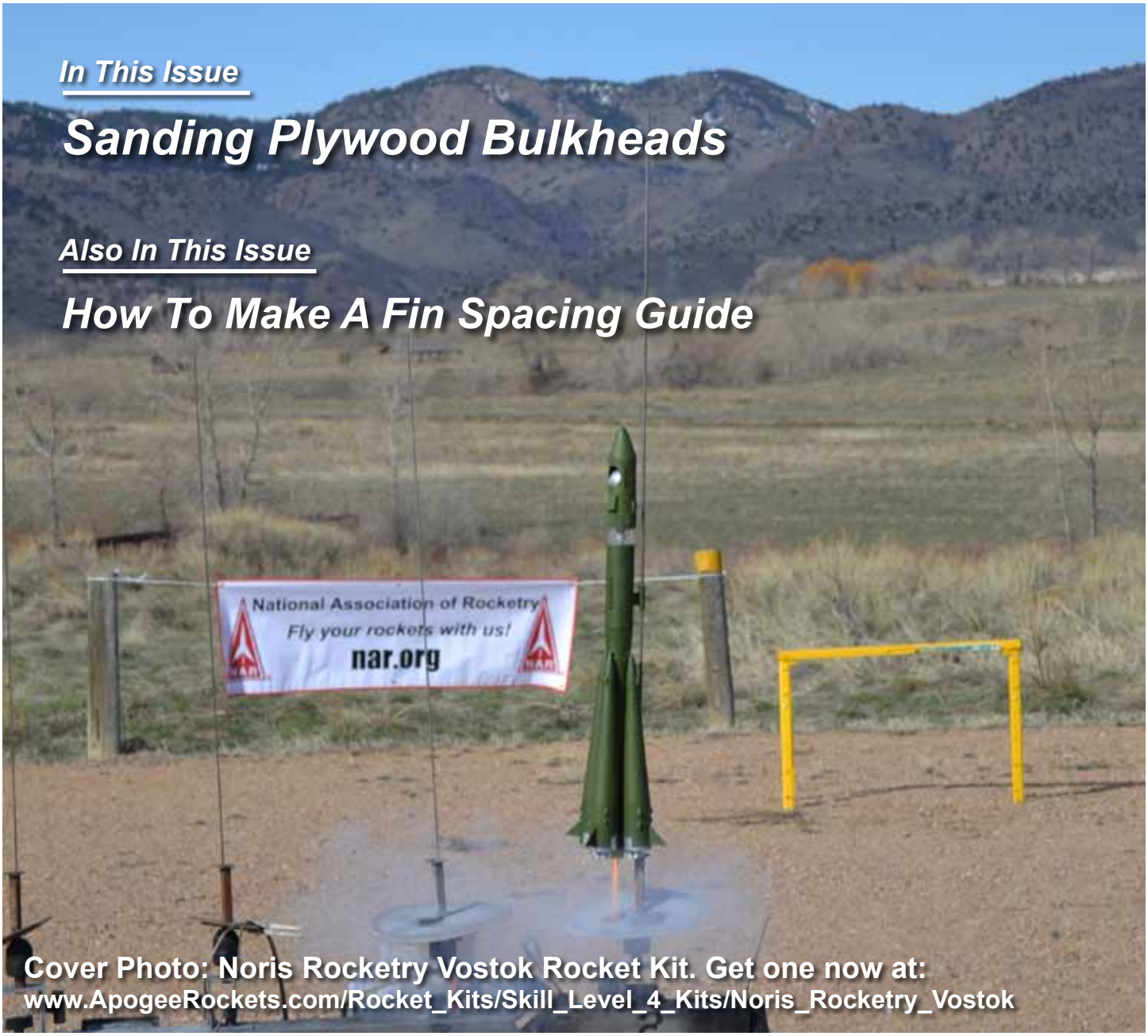
Apogee Components

PEAK OF FLIGHT

NEWSLETTER



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Cover Photo: Noris Rocketry Vostok Rocket Kit. Get one now at:
www.ApogeeRockets.com/Rocket_Kits/Skill_Level_4_Kits/Noris_Rocketry_Vostok

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Sanding Plywood Bulkheads

By Mike Momenee

Sanding Plywood Bulkheads to Size

You may be using plywood couplers in LOC high power body tubes, in Blue Tubes, or in fiberglass tubes. Because of minor differences of the inside dimensions of the tubes, and sometimes because of manufacturing tolerance drift from production run to production run of the tubes or bulkheads (still within tolerances, but at the high or low end of the tolerance), you may find that a plywood bulkhead you have is slightly too large for the body tube's inside diameter.

For years, I used the manual method of hand-sanding using a sanding block. I even placed a magic marker dot at a point on the circumference of the bulkhead, so that I would know when I sanded one complete revolution of the bulkhead. But what I usually got, after a LOT of trial and error, and a LOT of time spent, was a bulkhead that eventually fit, but was decidedly not quite round anymore.

So one day I decided to try to automate the process very simply. I placed a machine screw through the hole in the bulkhead, and securely tightened a nut against the opposite side of the bulkhead, so that the screw tightly held the bulkhead to keep it from spinning on the screw itself. One note here is that you should use a machine screw of the same diameter or of a smaller diameter, as the screw eye you will eventually place through the hole in the plywood bulkhead.

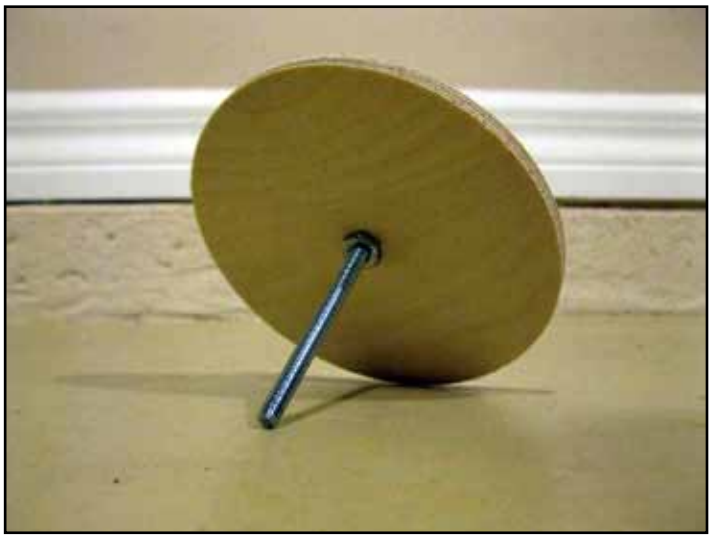

Photo 1: Mount the bulkhead on a long screw.

Photo 2: Use a drill to spin the bulkhead while you sand down the edges.

I used a 2-1/2 inch long #10 machine screw because it seemed long enough for the next step of the process. I placed the end of the screw into my cordless drill chuck, and tightened it as if it were a drill bit. I secured a sanding block into my workstand. If you don't have a sanding block, you can wrap a piece of sandpaper around a piece of 2 x 4 scrap lumber. Holding the drill and bulkhead edge perpendicular to the sanding block, I powered on the drill and started to lightly sand the edge.

I checked the process often by trying to insert it into the body tube, with the bulkhead still attached to the drill (don't accidentally turn on the drill). Use less pressure on the sandpaper than you might think. In no time, I had a bulkhead that was still perfectly round, and now fit into the body tube. Remove the nut and machine screw, and you're done.

Keeping Larger Rockets from Falling Over While Stored/Displayed at Home

I have a number of larger high-powered rockets whose fins are positioned such that the rocket doesn't stand on its fins. So the 70" or 80" tall, nose-heavy rocket is essen-

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About this Newsletter

You can subscribe to receive this e-zine FREE at the Apogee Components web site (www.ApogeeRockets.com), or by sending an e-mail to: ezine@apogeeRockets.com with "SUBSCRIBE" as the subject line of the message.

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Sanding Bulkheads - Making Rocket Stands

tially resting on the base of its 3" or 4" diameter body tube. I don't know about you, but I've had a few rockets fall over from time to time.

These larger rockets of mine use rail buttons for initial guidance utilizing the "1010" (one inch) launch rail method. I noticed the new airfoiled rail buttons in the Apogee catalog, and that gave me an idea to make a rocket stand.

You can get a rail from Apogee Components at: http://www.apogeerockets.com/Launch_Accessories/Launch_Pads/Launch_Rail_Standard, or you can do an internet search. Rail section isn't cheap but it was perfect for my plan and you can cut them to shorter sections to save costs.

Photo 3: Shelf backets hold a rail upright on a plywood base.

I then went to Home Depot and purchased a 1 foot by 2 feet piece of white laminated shelf, which I had them cut in half for free. I had a bunch of 2-1/2" corner braces and some 1" #10 machine screws, washers and wing nuts, along with some wood screws.

I started by centering a section of scrap 3" body tube on the shelf piece, because that was the diameter of the rocket I wanted to build this stand for. I used the tube to pencil-draw a template of the tube diameter on the shelf piece. I then measured out 5/8" inch from the circumference because that is the point that I want to drill a 1 1⁄4" diameter hole for the rail.

There are inexpensive hole drilling/ hole saw sets that contain a variety of hole sizes- I happened to already have one. Because the rail is slightly larger at its greatest dimension than 1-1/4", I used a round file to slightly "square" the hole so that the rail fit in snugly. Photo 3 shows you what it will eventually look like.

Place the rail into the drilled hole, and you'll notice that the rail will flop all around. That's where the corner braces, machine screws, washers and wing nuts come into play. Put a washer on a machine screw, put the end of the screw through the top hole of a corner brace, and thread a wing nut onto the end of the screw. Now slip the screw head/ washer end onto one side of the rail slot. Repeat for two more sides (don't do it for the side the rocket will slide down onto). Tighten the wing nuts so that the corner braces are snug against the white shelf board.

Use wood screws or particle board screws to screw the two side corner braces into the white shelf board. I used just one screw in the outer hole of each. Then, using a level

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Sanding Bulkheads - Making Rocket Stands

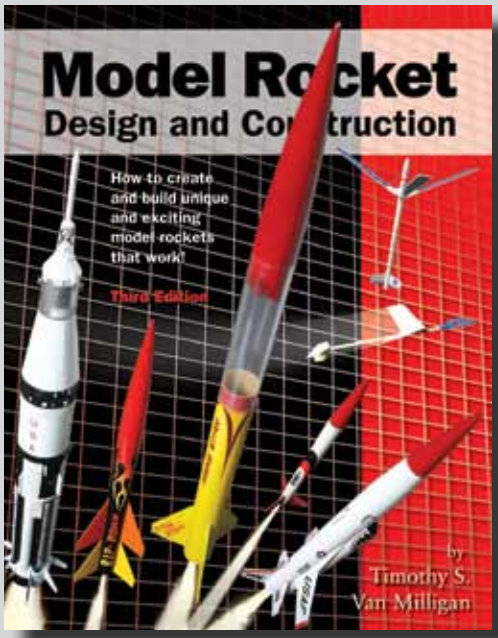
(or your best judgment), screw the last/ back corner brace down and check for level. I placed a few extra washers between the underside of the last/ back corner brace and the top of the white shelf board, which were held in place by the wood screw.

What you'll end up with is a sturdy base for your rocket. Slide the rocket's rail buttons over the rail, and you're done. I've also found this to be a handy template when I've "spaced out" and forgotten to put a second launch rail button on a rocket.

About the Author

Mike Momenee began flying model rockets during the late 1960's. He says he was a science fair and research paper nut. His paper, *"Determining the Efficiency of Ducted Propulsion Systems in Model Rocketry"*, won one of ten national scholarships in a 1971 national contest, complete with a trip to Washington, DC and a group picture on the Capitol steps. Mike graduated from Notre Dame in 1975 with a science degree, and had a successful healthcare-related sales/sales management career, from which he retired in 2008. Mike and his wife Jackie, live in sunny Valrico (Tampa) Florida, and fly at the monthly TTRA launches in Plant City.

Photo 4: The rocket on its display base that is hard to knock over.



Model Rocket Design and Construction

By Timothy S. Van Milligan

The Expanded 3rd Edition

This massive, 328 page guidebook for serious rocket designers contains the most up-to-date information on creating unique and exciting models that really work. With 566 illustrations and 175 photos, it is the ultimate resource if you want to make rockets that will push the edge of the performance envelope. Because of the number of pictures, it is also a great gift to give to beginners to start them on their rocketry future.

For more information, and to order this hefty book, visit the Apogee web site at: www.ApogeeRockets.com

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APOGEE COMPONENTS

How To Make A Fin Spacing Guide

By Charles (Ted) Macklin

Being somewhat stuck in my ways and too stubborn to learn new tricks, I thought I'd share some old tricks for marking fin locations upon a typical, cylindrical body tube. I learned this technique back in the day when architectural draftsmen used pencils, paper and scales to divide things proportionately. It may be "old school," but it still works, and you don't need a computer to use it, like you saw in Tim Van Milligan's tutorial video at: www.ApogeeRockets.com/Advanced_Construction_videos/Rocketry_Video_75.

First, make a paper wrap long enough to overlap itself when wrapped around your tube. As an example, if your tube is about one inch in diameter, then make your wrap four times that length or about four inches. The width of your wrap should be at least as long as its length, four inches in this example. Make sure the corners of your wrap are square (90 degrees) by marking from one edge and one side of a standard sheet of bond paper.

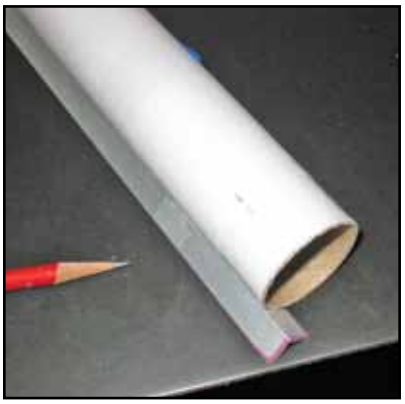

Figure 1

Next, apply a small piece of removable tape to one end of your wrap and apply the wrap to your tube. Make a pencil mark 1/4 to 1/2 inch from the end and continue wrapping the paper around the tube until it overlaps the pencil mark. Making sure the edge of the wrap stays parallel with itself and is tight, put another pencil mark at the overlap. This process will delineate one body tube circumference, whatever it is. It doesn't matter, it's One Circumference.

Figure 2: Tape the paper to the table.

Figure 3: Lay the ruler at a diagonal across the paper. The length of the diagonal should be divisible by the number of fins you want on the tube marking guide.

Now remove your wrap and lay it upon a smooth, flat surface and tape it in place with removable tape. Extend the lines from the circumference marks (see Figure 2)

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How To Make A Fin Spacing Guide

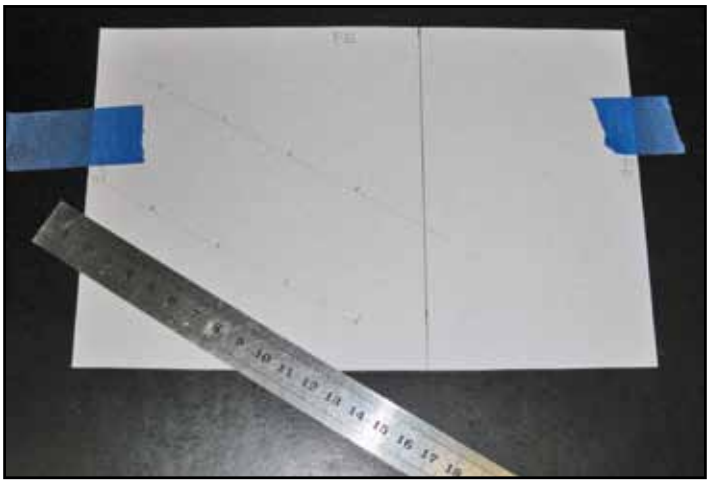

Figure 4: Put tick marks at the division points, and do a second diagonal line just like the first.

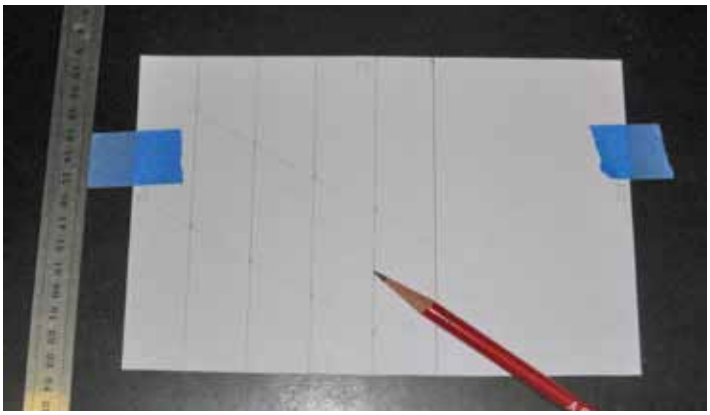

Figure 5: Extend parallel lines through the tick points.

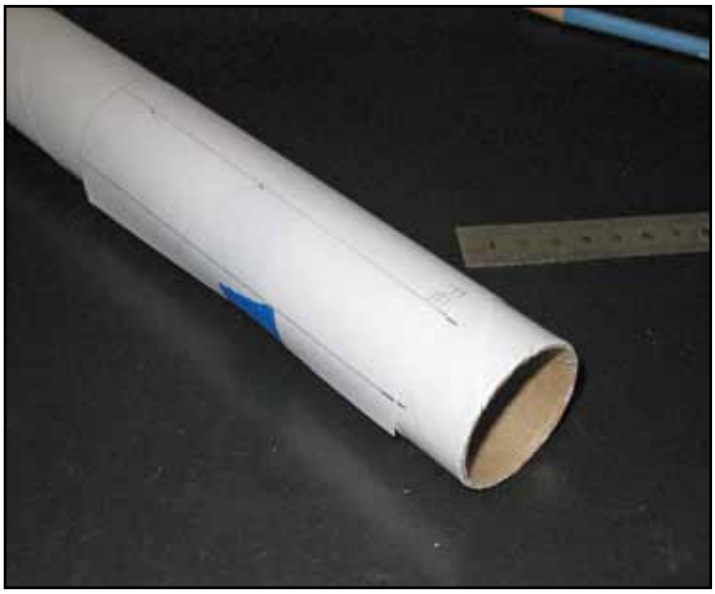

Figure 6: Wrap the template around the tube and put a pencil mark at each line.

using a pencil and straight edge, making sure these lines are parallel. By now, you should have already decided how many fins you want. Let's assume you want five fins. You could measure your circumference and divide the number by five, but why do all that math, especially when the result will most certainly be some irrational number not found on your scale or ruler?

Here's what I do. Take a scale or a ruler and lay it at an

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Figure 7: Using an aluminum angle, extend the lines along the tube.

angle, any angle, diagonally across your two parallel lines. Keeping the zero point on the left line, rotate your scale until some multiple of five lines up with your right hand line (see pictures). In my example, ten centimeters would make a convenient number to use, as it is divisible by five. Lightly mark this diagonal and put a pencil mark at each 20 centimeter increment. You have just divided an oddball number into five equal increments, which was the original objective. Congratulations!

The only thing left is to extend these points into lines parallel with the circumference marks on your wrap and then transfer them all to your body tube in the conventional manner with a pencil. This method will work on any diameter body tube with any number of fins. It's as simple as pi.

About the Author:

Charles Macklin (he prefers to be called Ted), lives in Texas and has a day job as a pharmisist. In his spare time, he invents rocket building jigs, such as the Guillotine fin alignment guide (www.ApogeeRockets.com/Building_Supplies/Tools/Guillotine_Fin_Jig), and the *Slot Machine*, a fin slot cutting fixture for high power rockets.