WHY THE LONG MUG? IS YOUR PLUG NOT SNUG?

How to make snug nose plugs.

By Mike Isermann

There must be about a thousand ways to make a nose plug these days. There are square plugs, snap-on plugs, round plugs, rubber-banded on plugs, diamond shaped plugs, vacuformed plugs, twist and lock plugs, rectangular plugs, etc… I could go on forever! I would like to share with you the way I make nose plugs and explain why I think it is one of the better ways to do it. I'm not saying it's the best way and I'm not discounting anyone's preferred method, I just want to provide readers with another option.

So what are the key elements that determine a good nose plug from a poor plug? I think there are only two in my book. Based primarily on function, snugness and ease of adjustment are the two most important factors in making a good nose plug. Plugs with front end parts that require instructions and a shot of liquor to adjust are not my cup of Long Island iced tea. I believe a round nose plug provides the best opportunity to obtain the two most important attributes.
Here's why:

Ease of fabrication- Round nose plugs can be accurately made on a Dremel tool.
Repair- When made deep enough, round plugs fit snuggly and are easy to fix when they become loose.
Simplified Adjustment- Adjusting down and right thrust is a snap with round plugs.

Note: I will explain these benefits in more detail as I describe how I make the front end of a typical model airplane.

Before you can make a snug fitting nose plug you need a fuselage with a well crafted front end that will receive the plug. Start by stacking up and gluing (I use Titebond) three to five 1/8" sheets of 4-6 lb. balsa wood, making sure the grain alternates direction. The shape and thickness of the cowling/ nose block area will determine the size and number of sheets needed for your plug. Once the rough nose block is dry, glue it to the front end of the fuselage frame. After setting up, sand the top,bottom and sides of the block out flush to the sides of the fuselage. Do Not sand it to a finished shape.

I believe it is important to use a blast tube when winding a scale rubber aircraft. So it is important to make sure the nose opening is big enough to accept a blast tube. (I like to use 1/2 inch class 200 PVC pipe for my blast tubes) The way to achieve this is simple. Slip a circle template over the blast tube and find out which hole fits over the tube. This hole will be enlarged one or two sizes on the circle template and will then become the inside diameter of my fuselage front end. Next, look at the plan view of my fuselage and determine what the outside diameter of the spinner area on the front end will be. My goal here is to create a 1/64" plywood ring to define the finished O.D. and I.D. of the spinner area on my fuselage nose. Cut a square piece of plywood a bit larger than the O.D. dimension of the spinner. Then drill a small hole in the middle of the plywood, install the mandrel and then chuck it up in a Dremel tool. The next part is easy. Measuring from the center of the plywood sheet, mark the inside and outside diameters of the ring you want. Make sure to put several marks at both dimensions so you can see them when the dermal tool is running. Now, using a sharp # 11 blade, touch the outer "ghost" ring as it is spinning on the Dremel and cut the excess material away. Always start with the outer dimension and be sure to drag the blade against the direction the Dremel is spinning. Never use a Dremel tool without safety glasses!!! Once this is completed, cut the inside dimension using the same technique. And voila! You now have a clean nose ring that defines your fuselage's spinner area. Now, using your three-view as a guide, glue the ring in the proper place on the front of your fuselage. Once it has dried you are free to sand out the front end to a finished state.

There is still one more step that must be completed. You now need a hole to stuff the rubber motor in right? Well, here's how you do it. Using a dermal tool, bore a hole with one of the many bullet–shaped abrasive tools you have. Carefully work the tool round and round until you have a hole big enough for a 3/8" sanding drum. Then, using the Dremel sanding drum attachment, sand the hole within two or three millimeters of the edge of the plywood ring. Now, it is important to sand the hole the rest of the way by hand. This will ensure that the hole remains round and square in all directions.

If you don't have a selection of round sanding dowels in your tool arsenal then I would highly recommend you make some. They make the final step in this part of the process a snap! I usually sand the opening as close to the plywood ring as I can. Choose a sanding dowel that is a 1/8" inch smaller than your opening. To finish out the hole, wrap a scrap piece of 150 sand paper around your dowel and then twist it into the fuselage hole. Only use enough sand paper to snuggly fit the hole. Now, turn in one direction about 4 or 5 times and you should have a very clean and symmetrical hole to stuff your rubber motor in. That takes care of the fuselage.

The nose block is even easier. First, cut a square piece of 1/32" plywood from your plywood stash and spin it down using your mandrel and Dremel tool to the same outside diameter as your plywood ring. Set it aside. Now, stack and glue the same number of 1/8" balsa squares as you used on your fuselage front end making sure they are slightly larger than the I.D. of your plug hole in your fuselage. Glue them together and set aside. Cut out a 1 inch square piece of 1/32" plywood. Drill a small hole in the center and chuck it up in your Dremel tool. Clip the corners of the plywood off with a pair of scissors and begin sanding into a disk. Sand the disk until it fits tightly into the fuselage front end. Now using Titebond, glue a 1/16"X1"x1" piece of balsa sheet wood to the face of the plywood disk making sure to cut a relief hole for the mandrel screw. Clip the ears off as you did with the plywood.

Your mandrel is now ready to spin up the nose plug. Using Ambroid or Duco glue, attach the stacked balsa squares to the center of your mandrel disk. Let everything dry thoroughly. Cut off the excess wood on the corners of your rough nose block so that sanding is a bit easier. Install the mandrel back into the dremel tool and begin gently sanding the assembly. If you press too hard the Ambroid glue joint will break loose. If

it does, just glue it back on. The important thing here is to be patient. The small plywood disk closest to the dermal chuck will act as your sanding gauge. Take your time and sand everything as squarely as possible. You don't want a tapered nose block. Check the fit of your nose block before you remove it from the Dremel. If you have obtained a snug fit, then remove the mandrel from the Dremel tool, grab a can of acetone and soak the Ambroid joint. Within a few minutes your nose plug should break free. Now find the center of your nose block and glue the first 1/32" disk you made in place. This disc will act as a back plate or "flange."

Setting the proper amount of down and right thrust always seems to be a guessing game and is a test in measuring accuracy at best. A great number of builders just guesstimate these angles using a pin vise and a small drill bit. Well, I have an answer to your problem. Picture this: Cut a balsa wedge at 4.25 degrees. This wedge will serve as drilling gauge on your drill press. Make other gauges for different degree angles using Pythagora's Theorem. I usually want 3 degrees right and three degrees down as my starting point during trimming. This is why I use the 4.25 degree wedge. Let me explain why. If you drill a 4.25 degree angle through your nose block and you rotate it from the 6:00 o'clock position to the 7:30 position while it is installed in your front end, you get 3 degrees down and 3 degrees right. Are you getting the picture now? Trimming becomes much easier when you can adjust the amount of down and right thrust. Especially with 4.25 degrees to work with! Again, if you want less to work with, make a different wedge.

I have found this method to be very successful and simple. Because you have taken measures to build a snug nose block the plug will not twist or move during the trimming process. Once you find the sweet spot you can key the plug and that's that. Another nice thing about this system is that it is easy to snug up the plug if it becomes loose. This happens with all plugs sooner or later. If your plug becomes loose just wrap a layer or two of tissue over the round plug and glue it in place. The plug will snug up resulting in a smile on your mug. Give this system a try and see what you think.

Smug mugs sporting snug plugs to all,

OOSMIKE