PEAK OF FLIGHT

NEWSLETTER

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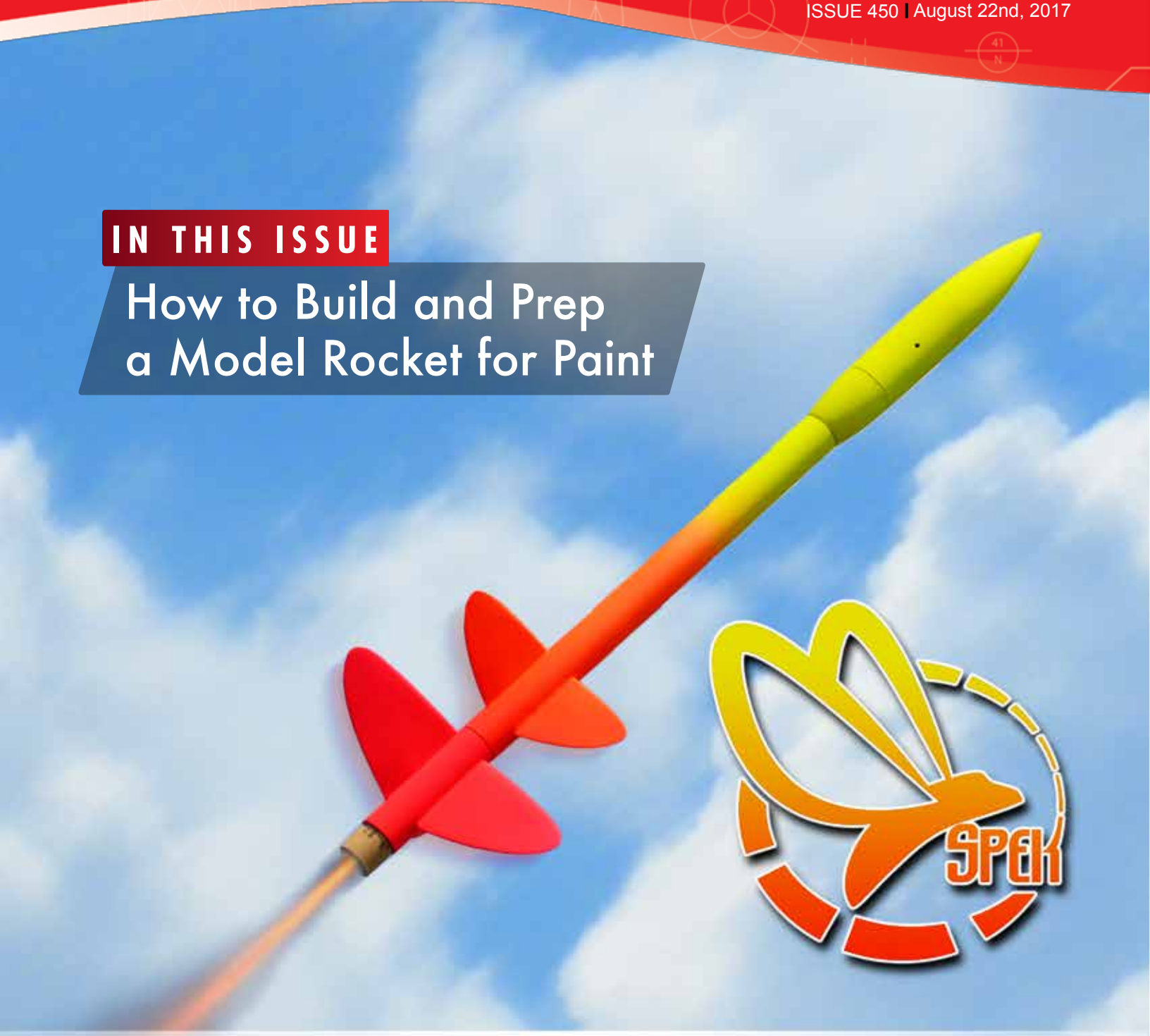

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How to Build and Prep a Model Rocket for Paint

By John Boren

I've built a lot of model rockets over the years and I still to this day hate the painting part, even though I'm pretty good at it. There are two methods by which I build and paint models. I either start with the paint finishing process, or I build the model and then do the paint finishing process.

Method one starts with a nice flat surface, the laser cut balsa sheets, a sanding sponge, and your favorite can of spray primer. For this stage of sanding, I prefer a medium grit sanding sponge, like the inexpensive kind Harbor Freight sells. For primer, the best I've found to date is Krylon Industrial Tough Coat, 341 Light Gray Sandable Primer. The only place I've found it is online. You'll have to purchase a dozen cans at a time, but it's so worth getting if you can find it. Like they say, it sands like butter. It sands so easily I use 0000 Steel Wool to sand it in those hard to get places, like the vacuum formed body wraps on the Saturn V or Little Joe II.

Figure 1: Some of the supplies I use to paint my models with. The glue bottle sports a new extended tip after easy been used on over a hundred rocket builds.

Figure 2: Laser cut sheet of wood with two coats of primer applied.

The first thing we need to do is spray two heavy coats of primer on both sides of the laser cut balsa sheets. Spray the first side, let it dry, flip it over, then spray the second side. Let the side dry, then repeat the process. The great thing about the Krylon 341 Light Gray primer is that it dries in only a few minutes instead of the hours or even days that some of the other spray primers can take. Once both sides are dry, place the primed sheets on a flat surface and quickly go over it with your sanding block or sponge. You don't have to go down to the balsa, just sand it to get rid of anything sticking up or primer runs that may be present from applying too much primer. I'd say seventy percent of the primer will still be there. Now comes the fun part.

Figure 3: Primed wood with coating of spot putty applied.

Go get Bondo Glazing and Spot Putty #907 from your local Walmart car section, or just about any home center or auto parts store across the country. This product comes in a tube much like tooth paste. You simply squeeze it out onto your figure. Spread it anywhere you see the wood grain. This often means you will coat the entire surface of both sides of the primed balsa sheets.

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You need this putty to be completely dry, which could take several hours if you apply it too thick. Assuming you don't have mounds of it sticking up you should be able to place it on the same flat surface as before and proceed to use the medium sanding sponge just like before. This time you want to take off ninety-nine percent of the putty. The only putty left should be that in the grain of the wood.

Figure 4: Sheet sanded with medium grit sanding sponge. Switch to fin grit for next application of primer and putty.

If this was everything, it would be a piece of cake and I would love to finish my models, but it's never that easy. It'll take at least one more application of primer and another coat of spot putty. Sand the surfaces just like before and then any only maybe then can we move on to the actual build of the model. You need your wood sheets to be at least ninety percent smooth and absent of most wood grain. Another application of primer and spot putty won't hurt if you feel your wood is in need of it. The remaining wood grain remaining will be taken care of later when the entire model gets primed.

Figure 5: Primer coat applied over primed, putty and sanded sheet. For sport flying this level of finish is good enough since wood surface will get additional primer after model is assembled.

I always start a new model build with a brand new #11 knife blade. Cut all the parts out from the sheets of wood just like you normally would. Now use a flat sanding block with 120 or similar grit paper on it. Great Planes offers a line of sanding blocks they call Easy-Touch Bar Sanders. They are made of extruded aluminum and come in several lengths. I find the 5-1/2" long (GPMR6169) and 11" long (GPMR6170) bars work best for most of my rocket needs. Don't forget to get several different sanding grits of sandpaper when you order the sanding bars. If you're more frugal with your rocket building funds see if you can find a piece of MDF board laying around from a past home project. A piece of Particle Board works just as well, just make sure whatever you use for a block it has a nice smooth flat surface. Cut the wood to a usable size, which for me is two inches wide and six to eleven inches long.

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Don't use a scrap piece of a 1x3 or a 2x4 lumber since they really aren't that flat. Next, apply a coat of spray adhesive to one side of the block and place the glue side down on top of a piece of standard sandpaper, paper side up, and trim around the block.

Take your sanding block and proceed to lightly sand along all the edges of the primed wood. Sand just enough to get the surface flat making sure to get rid of any of those laser cut gaps that hold the parts in place. Also, make sure you are not sanding a bevel into the edge of the wood. It needs to be flat with ninety-degree corners. Every rocket kit is a little different, so we're going to assume you're building a standard three or four fin rocket. If the design calls for it, sand the leading edge round. Use long, even strokes along the edge of the fin that needs to be rounded. Personally, I partially round one corner, then the adjacent corner. Go back over the edges until you have your desired roundness. For those fin designs that have rounded corners, take a fine grit sanding sponge and go over just those areas to smooth them out with the same radius as the other edges have. My theory of sanding is if it's supposed to be flat, use a flat sanding block. If you are sanding on a curved surface then your sanding block should have some flex to it. This brings me to two other types of sanding blocks.

Harbor Freight also sells a sanding sponge that is flexible. It is made out of a soft material like foam and only has the sanding grit on one side. I have also previously purchased and constructed sanding blocks out of Styrofoam blocks. One to two-pound density Styrofoam works nicely for this, or even the lighter density white beaded foam that's used as packing material these days works as well. You will need to use foam-safe glue when sticking your sandpaper to the foam. Both the soft sponge and beaded foam sanding blocks work great on areas of the fin that need to have a radius but are not long and straight. They will also work perfectly on those elliptically shaped fins we all love so much but hate to sand.

It's now time to follow the model building instructions that came with your kit. Build the motor mount and any other subassemblies as needed per the kit instructions. When it comes time to glue on the fins, I use Titebond II for just about everything that is made out of paper or wood. This holds true for F, G and

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some H powered models as well. Before you start gluing, do yourself a favor: go to your local Kraft or department store and purchase a one to two ounce plastic bottle of water based paint with a long narrow tip and a small opening for the paint to come out of. Take it home, empty out the paint and wash the inside of the bottle completely. When it's dry, fill this bottle up with your favorite wood glue. Bob Smith Industries just happens to sell empty two ounce bottles used with their CA glue. Any hobby shop that carries Bob Smith glues may also carry the empty glue bottles as well. Apply a very small amount of glue to the root edge of each fin. Wait a few seconds, then wipe off of the excess glue with your finger. If you applied the right amount of glue there really won't be much left to wipe off. Let the fins dry for a couple of minutes before proceeding. The purpose of this pre-gluing and wiping off is to allow the glue edge of the fin to soak up some glue. This will help in producing a stronger glue bond in the end.

For the actual gluing of each fin to your model, use whatever method you have done in the past but remember: use just a thin bead of glue along the root edge. You shouldn't have to wipe off much if you applied the right amount of glue to the fin. Take your time, use just enough glue to bond your fins, and set the model to the side to dry. Once dry, take that same glue-bottle you created and apply a very small bead of glue along the entire glue areas of each fin. Wipe off any excess glue with your finger. Again, there shouldn't be much coming off because we are putting down a very small bead of glue. Let this glue fillet dry fifteen minutes or so. It really shouldn't take long to dry since there isn't much glue there to begin with. Repeat this gluing process, making sure to wipe off any excess each time. The figure wiping also produces a concave shaped fillet that we all expect to see on our models. Four to five applications should be enough for most models and it really won't take you much more in building time since each application of glue doing it this way will dry much quicker than the heavy glue fillet applications that most people are accustomed to doing. This same process is used on those pesky launch lugs. Several small bead application of glue along the launch lugs will dry quicker and look much better. Doing all your glue-fillets in this way will prevent glue voids and bubbles along your glue joints from happening ever again.

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It's now time to go back to the primer stage of your build. Spray the entire model with Primer. When dry, apply the Bodo Spot putty just like before with your figure. Apply it to any area that needs it, including any deep spirals in the body tube and all edges of the fins that show wood grain. Use the same sanding sponge you used on the laser cut sheet for this. For really flat edges, like the edge of the fins that aren't rounded, a hard smooth sanding block is best. For rounded corners, use the soft sponge or foam sanding block.

The soft sponge sanding block also works great on body tubes since it forms to the tube's contour perfectly. Spray another coat of primer and apply another coat of spot putty and sand, however, this time switch to a finer grit sanding sponge and sanding block. Each application of primer and putty should be less and less as you apply each layer. Keep doing this until you are happy with the finish.

Figure 6: Built model with two coats of primer and spot putty applied.

Next, apply one last coat of primer. For sanding my last coat of primer I use Red Scotch Brite Pads. I also use it when I need to sand hard to reach places like the fin glue fillet areas during the primer and spot putty stage of finishing. By this stage, only light pressure should be needed to sand your final coat of primer. Another useful sanding tool is 000 or 0000 Steel Wool. It simply can't be beaten when you need to get into that tight area that no other sanding tool can reach.

Figure 6: Assembled model after sanding with medium girt sponge sander. Switch to fin grit for next application of primer and putty.

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High power, all fiberglass models are a completely different animal. Water and paper body tubes don't go together very well. I'm not saying it can't be done, but I woudn't recommend it. I also don't believe in using really fine sandpaper grit. Four hundred is about the finest sandpaper I've ever used. I'm not sure what the equivalent grit of a red Scotch Brite pad or steel wool is, which is what I use ninety-five percent of the time on my rockets. I believe the very small scratches left behind by the Scotch Brite pad allow for a better mechanical bond and they are simply not large enough for them to show through on the color coats.

Figure 7: Primer coat applied over model with sanded coating of spot putty applied. For sport flying I would sand model and apply one more coat of primer.

The hard, dirty, messy part is now over. The one thing I didn't mention earlier is what to do after each primer and putty sanding step. Nothing beats an air compressor for blowing clean the surface of your sanded model. Crank your air pressure to high and blow away. Even after blowing your model off you will most likely find a thin layer of what I like to refer to as a "fog layer" still on your model. It's there, you can see it, but it won't blow off. To remove this fog layer I use toilet paper. It's soft enough to not scratch the surface, it conforms to any shape so it can get into tight places, and it's dirt cheap and disposable. It's also useful anytime I need to wipe off my figures of excess glue during the building stage. Finally, use a Tac Cloth right before you begin to apply your paint coat.

Depending on the colors that will be applied to the model, I almost always start with a base coat of white. You can use white primer, but I simply use Flat White Paint most of the time. Flat White Paint is easy to find, sprays evenly, dries fast, and doesn't run much.

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Read the directions on the can for application time between each coat. I typically spray on a very light mist coat. Wait a few minutes, then apply a heavier but still-light coat of white. It usually takes three light coats of white to get a nice even coat applied to the entire model for my colors to go over. The main goal is you don't want the white to run or you'll have to stop, wait for it to dry, and then sand the model in the areas that need it. If you're lucky, you can proceed with the white coat but in many instances you'll need to apply at least one layer of gray primer. If the main color of your model is black you can simply spray it directly over the gray primer. For just about any other color I use a base coat of white.

This covers how I prep a model to get it ready for colored paint using method one. For the final application of the colors, no matter what type of paint you intend to use, they all need to have the surface of the model prepped in the same way in order to get a nice smooth finish. Prep work is the key to a good finish. It starts by using just enough glue to build the model, including the glue fillets all the way to the final surface coat of primer, and waiting for the color to be applied over.

Method two in building and prepping a model rocket for paint is the exact opposite as method one. First, you build the model just like you normally would using the same glue techniques used in method one. The rest is pretty much the same from this point forward. You spray the model with two coats of primer, apply the spot putty, sand the primer and spot putty, and repeat until you get your desired base for you colored paint.

Both methods work equally well. I've used both methods for show models that were going to be displayed at trade shows, the Museum of Flight in Washington or a National NAR competition. Sometimes the model might already be built before I decide to apply a nice finish to it, or I am simply not in the mood for primer and spot putty that day and simply want to build the model first.

There are exceptions to using the first method, since you know there are always exceptions to just about everything we do in life. If the fins are the type that use through-the-wall construction, I will use masking tape over the part that goes through the body tube before I spray the laser cut sheets of balsa. If there are TONS of small parts that get glued together to form a bigger part such as the air intakes used on the Estes QCC Explorer kit, it would be crazy to primer the sheet balsa first. In this instance I would build the air intakes, tape off the bottom where they are glued to the model, and prime and spot putty the rest of the rocket just like you did use either method one of method two. If the model is constructed of a bunch of parts that won't be seen such as the inside structure of the Estes Asteroid Hunter, I would again only use method one on the parts that are on the outside, like the fins, and leave the inside wood as is.

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For those of you who have seen my models in person, they may not be the best looking out there but they present themselves well, and we all know what happens to a model after it's flown just once. I like to keep those perfect finished models for display or contests instead of the ones I fly often.

About The Author:

I started building my first stick and tissue model airplanes and model rockets at the age of seven years old. Forty-seven years later, I am still actively building both RC airplanes and model rockets. I flew J & K high powered models as a member of Tripoli before NAR began their certification process. I currently have a Level 1 NAR certification. I worked for Midwest Products for a couple years, and during that time I designed the last three wood boat kits in their kit line. For the past eight years, I have been working at the Estes model rocket company as their sole designer of rocket kits and accessories. I have built hundreds of models while working at Estes and have produced about a hundred models that have been used in trade shows and sale exhibits. http://www.johnboren.com/

Figure 8: Author John Boren