Construction Tips

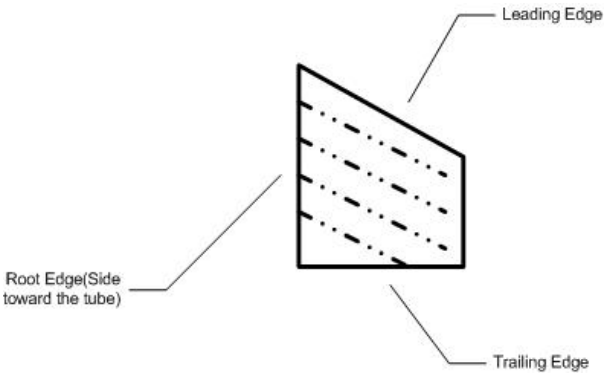
Nose Cone
Most nose cones today are made out of molded plastic. These nose cones often have a seam that must be scraped down with a sharp knife and sanded smooth with fine grit sandpaper. Balsa nose cones are typical of older models and the wood grain should be sealed in a manner similar to the fins.

Body Tubes
Use Elmer's Carpenter's Wood Filler diluted with water to fill the body tube spiral. Let it dry and then sand it smooth. A repeat application may be required.

Fins
The purpose of fins on a rocket is to give it stability during flight. The fins will provide lift to counteract the effects of wind. Getting your fins on correctly is probably the most important part of rocketry. A fin that is crooked will cause the rocket to fly wildly – which can be very dangerous.

When cutting fins out of balsa sheets, using a ruler to help guide the knife will prevent cutting into the fin. *Keep the blade at a 90° angle to the wood to avoid beveling the edges of the fin.* When cutting, make several light passes instead of one heavy cut. Take your time!

After you have cut all the fins, stack them and sand them all together to ensure uniform size and shape.

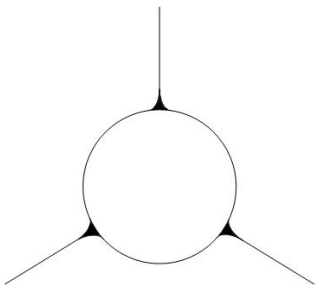


After you have cut out your fins it can be confusing which edge is which. One key feature of all fins is the grain of the wood is parallel to the leading edge.

Before gluing your fins to the body tube, always sand the flat sides of the fin with very fine grit sandpaper. Depending upon the model, you may sand a rounded edge on the leading and/or trailing edge of the fin. For lowest drag the fins should be sanded into an airfoil (sort of like an extended tear drop). Never round over the "root edge" – the edge that is glued to the body tube. It must be perfectly straight to maximize the strength of the bond with the body tube.

It's always a good idea to lightly sand the body tube where the fins are to be placed in order to remove the smooth glassy finish. This will help create a tight bond between the tube and the fin.

A fillet is a bead of glue that is placed along the joint between the fin and the tube. Glue fillets help reduce drag and strength the bond of the fin to the tube. Fillets should be added to all fins after the fins are attached (and dried). Using a toothpick, run a small bead of glue along the joint and then use a finger to smooth out the. It's very important that any excess glue be wiped off of the rocket. Once the fillets are



dried, they should be sanded lightly so that they are smooth and form a nice transition from the tube to the fin.

Well-constructed rocket models never have any balsa grain visible – and this is the first thing that good judges look for. The fin should be perfectly smooth. The easiest method is to use Elmer's Fill 'N Finish or Elmer's Wood Filler diluted with water. Apply it with a small brush and sand it smooth after it has dried. The resulting mixture should be like syrup or thickened gravy – too thin and it will run off the fin; too thick and it will be difficult to sand when dried. A long-standing method of filling the wood grain is with several coats of sanding sealer, but we have found this to be more time consuming than using Fill 'N Finish. You can also use thin cyanoacrylate (super glue) as this penetrates well, but the fumes are irritating – use ventilation and gloves if you go this route!

It is easiest to apply the wood filler and sand the fins smooth before gluing them on the body tube.

Another way of 'sealing' your fins is to cut out paper templates that exactly match the shape of your fin. Glue the paper to the side of the fin by soaking it in super glue. Once dried it can be easily sanded.

Motor Mounts
It's very important to make sure all of the parts of the motor mount are glued well, and that the motor mount itself is firmly glued into the body tube. If not, the forces of launch can dislodge the mount causing the motor to accelerate up the tube, which is never a good thing.

Glues and Adhesives
Yellow wood glue such as Titebond or Elmers Wood Glue is far superior to white glue for bonding wood and paper rocket parts. If you do use white glue, use Elmer's GlueAll – not Elmer's School Glue. Epoxy and Super Glue are typically not used on model rockets, except when making quick repairs in the field. These are used in mid and high power rockets however (as well as other exotic adhesives). If you use Epoxy or Super Glue, good ventilation and protective gloves are necessary.

Finishing Tips

Sand down all bumps and imperfections on the nose cone, tubes, and fins. Fill in the tube spiral with Elmer's Wood Filler. Start sanding with 150 or 220 grit sandpaper. Use long even strokes. Short strokes can result in unevenness. Use only light pressure!

Sand your fillets to a nice inside round shape. To do this you will need to roll up a piece of sandpaper to a shape that fits this curve, and sand lightly the entire length of the fillet. Too much pressure will create grooves that will need to be filled in and resanded. Take your time and sand it lightly.

Once the rocket is filled, sealed, and rough sanded, do a pass of final sanding with at least 220 grit sandpaper. Lightly sand the entire rocket. Wipe the rocket with a clean cloth and remove any dust. Then with a damp cloth, wipe the rocket down again.

Priming
Begin the painting of your rocket with a good primer coat or two. Pick a well-ventilated area – and one safe from siblings and pets! (We have had little brothers sit on fair rockets, and had the family dog play hockey on the garage floor with a freshly painted nose cone!)

It can be tricky to get your rocket to stand up without you having to hold it while painting. We usually put a dowel into the ground and set the rocket down on that. Launch rods will also work – but do not run it up through the launch lug or you will get unwanted lines on your rocket.

Apply a coat of primer and let it dry thoroughly. Then sand lightly and wipe the parts to remove dust. Then apply a second coat and let dry overnight. Sand completely with 220 or 320 grit sandpaper. (If you use lacquer-based paint sand with 400 grit).

We use Krylon or PlastiKote spray paint. You can use Testers or Boyd but you will pay a lot more per ounce of paint.

Painting
Painting well is not easy!!!! It takes experience to get the feel for the spray can. Hold the can 10-12" away from the rocket and start spraying off the side of the rocket, move smoothly over the rocket, and continue past the other side. NEVER START OR STOP WHILE AIMING DIRECTLY AT THE ROCKET. Then repeat. Overlap your strokes. BE PATIENT. To avoid drips and sags, move the spray at a rate that just starts to make the paint look wet. These should be more prevalent on the later coats. If you get a wet look on the first or second coat, you are probably laying it on too thick.

For best results apply a tack coat – a thin layer. Wait to apply your next coat when the thin layer is just tacky to the touch. This allows you to apply a heavier final coat of paint.

Masking and Multiple Colors
If you want multiple colors on a particular part – such as a 2-color tube, or fins a different color than the tube – you will need a high-quality masking tape. Painters or the regular tan masking tape should be avoided! Instead, look for an automotive grade or hobby grade masking tape. The edges of these kinds of tape are very smooth and result in crisp paint edges.

Plastic bags that are taped onto the rocket can protect large areas. Typically, you would paint the rocket one base color, then mask off areas and paint the specialized areas on top of that base coat. It is also much better to spray darker colors on top of lighter colors than vice versa.

Decals and Clear Coat
Let the final coat dry for several days before use.

You can apply decals that came with your rocket according to their instructions. You can also print your own from a computer if you use special paper. Note that decals from ink-jet printers tend to run in water. You either need to apply a protective finish before applying them, or use an laser-jet printer.

You can apply a protective glossy clear coat if you wish. This will protect your paint from dings and your decals from curly up or tearing off during flight. Test spray your clear coat finish on a test piece of your paint and on your decals. Some clear coat finish is not compatible with various types of paints or with the decal material.