Big Nose Cones

Difficult to build and less-than-perfect results, but low material cost and use of inexpensive tools makes this method a welcome alternative for some rocketeers.

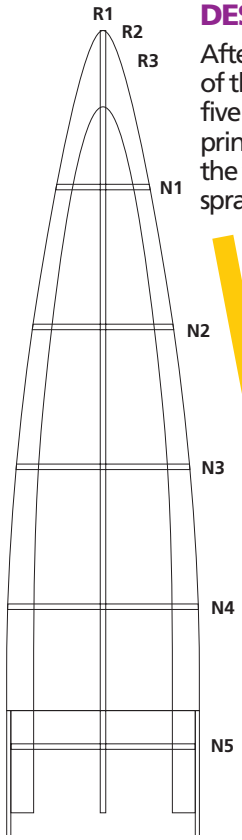
Things you need for this project will vary depending upon your application, but the following is a list of materials and tools used in this example:

MATERIALS

.25" 5-ply Baltic Birch Plywood
Wood Glue
3" x 36" Cardboard Tube
8.75" x 48" Cardboard Tube
Two-Part Expanding Foam
Masking Tape
Heavy-Duty Plastic Trash Bag
Lightweight Spackle
6 ounce Fiberglass Cloth
Spray Adhesive
Two-Part Slow Epoxy
Sandable Epoxy Fillet Powder
Sandable Primer

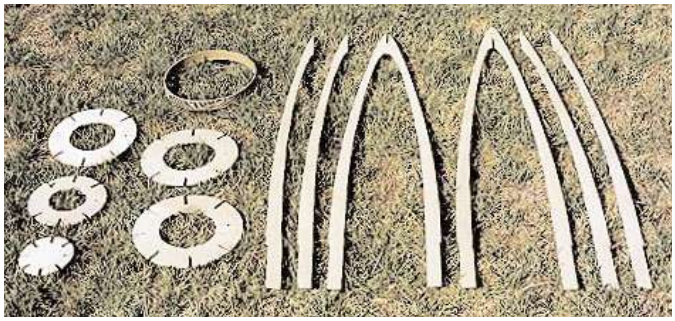
TOOLS

Hand-Held Power Jigsaw
Large Serrated Kitchen Knife
Razor Knife
50, 80, 120, & 220 grit Sandpaper
Spackle Knife
Scissors
Disposable, Epoxy-Safe Brushes
Latex Gloves
Respirator



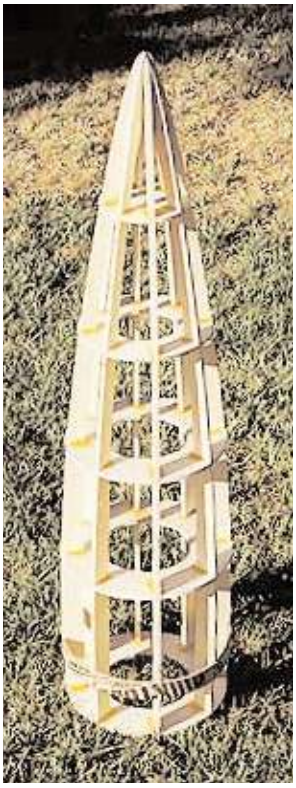
DESIGN YOUR TEMPLATE

After creating your design on paper, make a full size paper template of the profile. I made two full arch ribs, four intermediate ribs, and five rings in a computer program called Macromedia Freehand. I printed these full size drawings out on a laser printer, which became the template I would use for cutting out the plywood shapes. I used spray adhesive and stuck the templates to the plywood like a sticker.



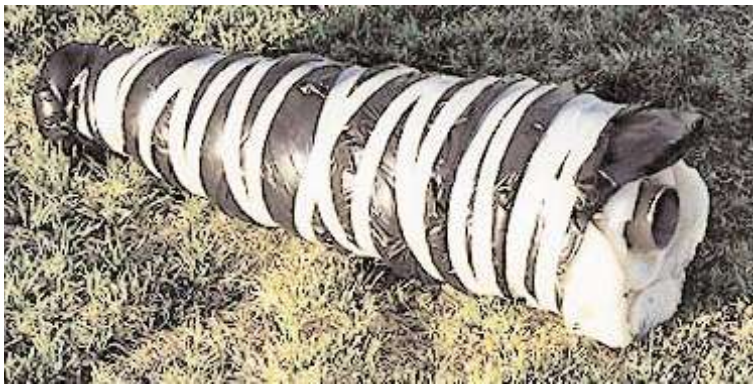
CUT OUT THE SHAPES

Using a hand-held power jigsaw, I cut the shapes I need out of the plywood. I also cut a 1 inch section of airframe tube for the shoulder. My airframe tube was an 8 inch cardboard concrete column form tube. By sticking the template directly to the wood instead of tracing, I saved time and insured a clean line to follow with the saw. Pay close attention to the outside edges of your work, as this is the critical surface of your nose cone. The framework that is made from these pieces will dictate the shape of your nose cone.



ASSEMBLE THE FRAMWORK

Put together the two arches at the tip. Then slide the section of airframe up to the shoulder. Now put the remaining four ribs in between the first four ribs (formed by the two arches) and sure the whole thing up to the airframe. Then slide the notched rings in from the bottom, from smallest to largest, and use masking tape to hold the whole thing together. Put a drop of wood glue at each of the joints and let dry. You should end up with a frame closely representing your nose cone.



FOAM THE FRAME

I wrapped the framework with a blanket then with a lawn and garden trash bag.and wound it with masking tape. Then removed it from the bag and removed the blanket. This was to create a mold based on the shape of the nose cone, but slightly larger, to contain the two-part foam. I glued a 3 inch tube down the center to use less foam and keep the center hollow for future uses. Mix up a small batch of two-part expanding foam and dump it in the bag, then drop in the frame and hold in place. Wait for the expansion to stop, and repeat until you've filled the bag to the top.

REMOVE THE BAG

Peel off the trash bag to expose the raw form and get ready to make a mess.

SHAPING THE FOAM

Using a large serrated kitchen knife, carve down the foam to the shape of the frame underneath. Don't worry too much about the shape yet, just make sure you take the foam down to the edges of the plywood framework. Always use the exposed edges of the plywood framework as a reference. Then use 50 grit sandpaper to finish cleaning up the foam surface.

SPACKLE AND SHAPE

Apply layers of lightweight indoor spackle over the foam to further smooth and shape the nose cone surface. Again using the plywood as a reference, attempt to curve the surface to match the shape of the plywood. This may take several layers. It took me three applications, sanding and shaping in between, to get this nose the shape I wanted. Use 80 grit sandpaper here.

CUTTING GLASS

Cut the 6 ounce fiberglass cloth into 8 pie-shaped strips roughly the shape of the vertical sections between the plywood ribs, but slightly larger. Use glass with a crow's feet weave as it is a bit shapable making it easier to form compound curves. Spray one side of all 8 strips with spray adhesive.

APPLY THE GLASS

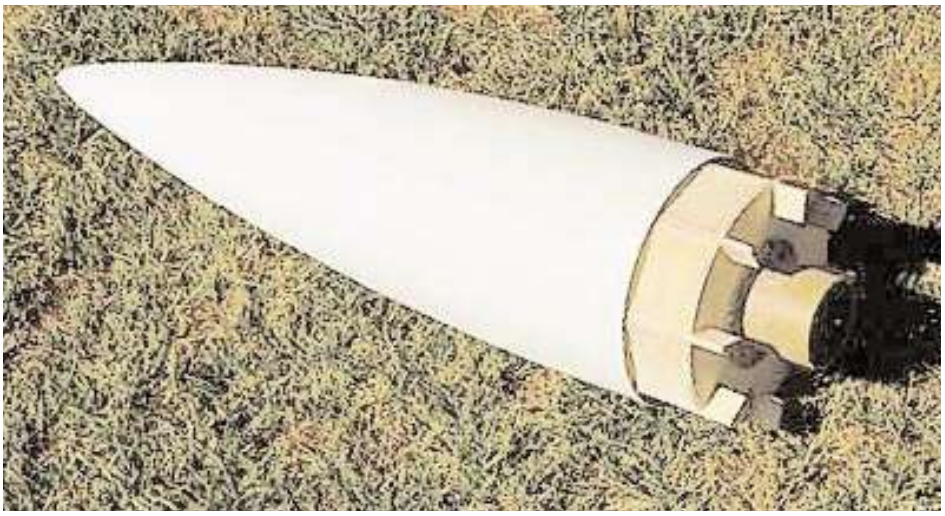
Adhere the strips of glass to the nose, overlapping the vertical plywood stripes. Hold the glass taught from top to bottom and apply, run your finger down the middle, then pull down on the bottom corners to help curve the cloth, and press down to the surface. Now smooth it down, and do the next until the whole nose is covered.

SATURATE WITH RESIN

Mix up a batch of two-part epoxy resin and brush it on in a thick, heavy coat. You want to really soak the cloth.After it cures, trim off the excess with a razor knife and sand with 80 grit sandpaper to take down drips, clumps of glass and high spots. I only used one layer of 6 ounce glass, but you can used more layers or lighter weight glass depending on your project.

FILL AND SMOOTH

Now mix a batch of filler (epoxy and fillet powder) and squeegee a coat on to further smooth out low spots and imperfections after glassing. Sand with 80 grit sandpaper, then with 120 grit to prepare it for the primer coat.



COAT WITH PRIMER

Spray a light coat of sandable primer and let dry. Sand with 220 grit sandpaper and repeat coats, sanding in between, as needed to prepare for paint. Now paint it and fly it!