

# Two Ply Balsa (Fuselage) Tubes

by Jerry Sullivan

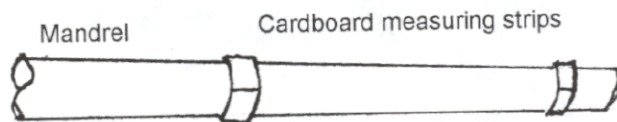
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I wanted to make a light but strong fuselage tube for a P-30 class plane that suffered an accident. I had made tubes of 1/32 sheet and 1/16 sheet in the past, but found them a little weak. This method makes a tube that is much stronger than a 1/16 inch wall tube, but still only weighs 6 grams for a tube of 18 inches in length.

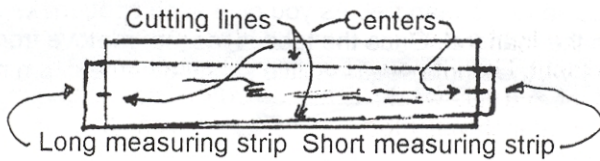
To begin, collect the following items:

- 1/32 inch x 3-inch balsa long enough for two pieces.
- Light cardboard (from the back of a tablet).
- Straight or tapered mandrel -a pool queue works great.
- Scotch tape (the hard surface kind).
- Masking tape (blue is best).
- Strips of newspaper, cut 2 inches or so wide.
- Strips of waxed paper also cut 2 inches wide.
- SARAN wrap or produce bag.
- White or yellow glue and CyA.
- Foam brush for spreading glue.
- A small supply of dihydrogen-oxide (i.e. water).

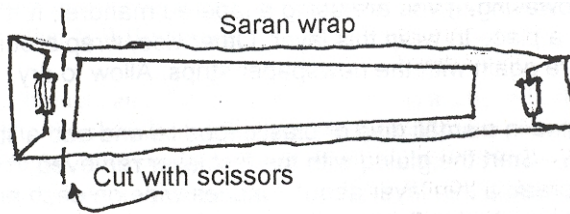
To begin, figure how long you want the tube to be, allow about 1/2 inch extra. Place marks on your mandrel at the overall length. Cut the balsa sheet full width in to two pieces of your required length. Cut two pieces of the light cardboard about 1/2 inch wide observing the grain so it will wrap easily around the mandrel. Wrap one around the mandrel at each end and trim to length so the free ends just match. Place a mark at the carefully measured center of each.



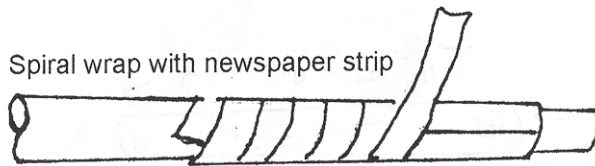
At this point we will mark out one piece of balsa to make the inner layer. Use the longer cardboard to measure the width from the best edge of the balsa sheet. Also mark the center point of the width. Repeat at the opposite end of the first layer. If using a tapered mandrel, align the center mark of the short measuring piece with the center of one end and mark the balsa from the ends. When lines are drawn from the end points, a rectangle (for the straight mandrel) or a truncated isosceles triangle is formed. This method aligns the grain of the balsa with the axis of the mandrel and prevents warps. Using a straight edge cut out this first sheet.



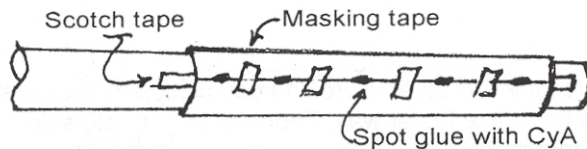
Now is the time to roll the first layer. Sure you can soak it in hot water for a half-hour or so, but there is a faster way. Thoroughly wet both sides of the sheet and leave it dripping. Wrap the sheet loosely with the Saran wrap; fold over the ends and seal with tape. Just seal the end; don't fold over the balsa. Place into a Microwave oven for about 30 seconds on high power. Remove and cut the (larger) end off with scissors and extract the balsa. Careful, it will be very hot. It should be easy to roll around the mandrel.



Spiral wind the strips of newspaper so that the joint will be closed. A small gap of 1/16 inch is O.K. Put it in the sun to dry for a few hours. The newspaper allows the excess moisture to evaporate quickly.



Now we need to glue the gap closed. Place a piece of Scotch tape along the mandrel where the gap will be positioned. Close the gap with small pieces of the masking tape. Using a *small* amount of CyA, tack glue the gap in between the tape. The Scotch tape on the mandrel prevents the CyA from sticking the balsa to the mandrel. As you glue each spot, make sure the tube is still free on the mandrel. Once the tube is tacked, remove from the mandrel and CyA the whole seam. A little sanding of the seam might be in order.



We are now ready for the second layer. Again cut a couple of measuring pieces from the cardboard. Place the tube on the mandrel and measure over the first layer. Repeat the drill as above to outline the second layer on the balsa and cut out. Give this one the same soaking and wrapping in Saran wrap and microwaving. If you are using a tapered mandrel, further along the taper might be a place to wrap this layer. Otherwise, wrap around the first layer and secure again with the newspaper strips. Allow to dry.

Put sufficient glue in a small dish or plastic food lid and add a little water (no more than 10%). Start the gluing with the first layer removed from the mandrel and spread a thin layer about 2 inches wide on each end. This keeps from getting glue on the mandrel. Next, replace the tube on the mandrel and spread glue on the rest of the tube. Getting a little help spread the second layer slightly open and insert the glue covered first layer into the second layer. Place the inner seam directly opposite the second layers seam. On a tapered mandrel, you can slide the second layer up or down to get the seam properly closed. A thin bead of glue in the new seam might be helpful. This time, spiral wrap the assembly with the wax paper strips, we don't want newspaper stuck to the surface. When dry, trim the ends and it is ready for use.

