2017 BASIC WRIGHT STUFF FLYER CONSTRUCTION

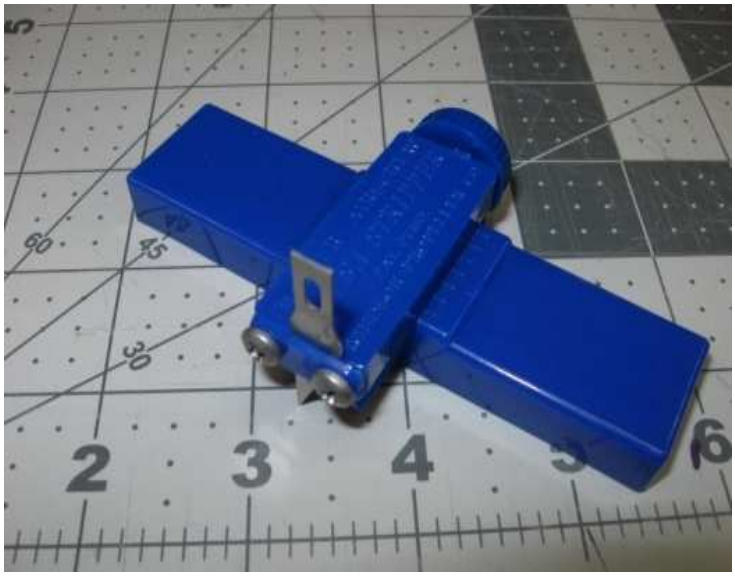
ABOUT THE DRAWINGS / PLANS

The pdf. files should plot to full scale. **CONFIRM** this by checking a few dimensions. (Adobe often defaults the "SIZE OPTIONS" to "Fit" and this should be set to "Actual size".)
The dimensions shown on the plans are in centimeters with (inches) in parenthesis under the primary dimensions.

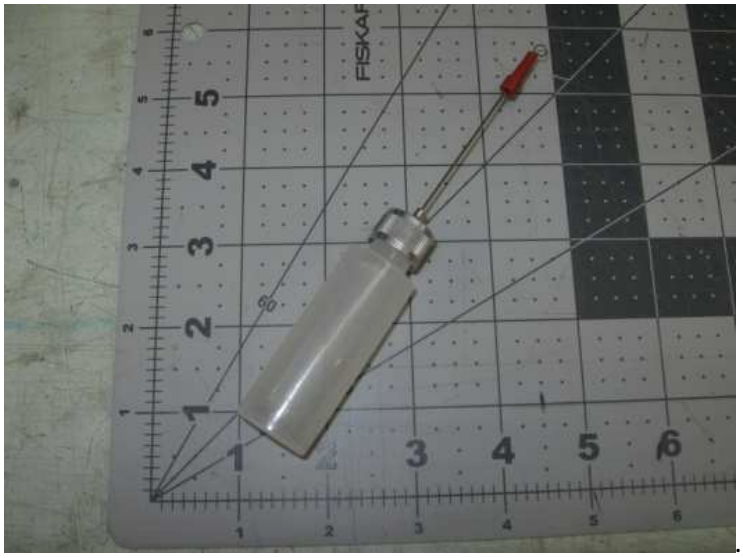
GETTING STARTED

Before you start, go to the website www.soarmd.org , click on the "Building Videos" tab and at the **VERY LEAST** watch 3 videos: # 8 Cutting Wood, #10 Sanding, #11 Gluing Wood

Become familiar with the images on Sheet 1 of 7. The names of the parts, general arrangement and terms will be used building the plane.



You will be using a Balsa Stripper



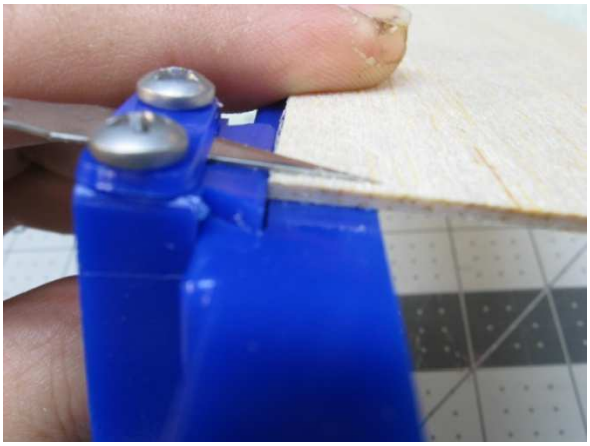
and a Hypodermic Oiler filled with glue .

MAKING THE PARTS

Drawing 2 of 7 shows the parts in actual size (except for the Wing Center Panel L.E. & T..E. Spars which are longer that the paper) and the quantities needed.

STEP 1 CUT ALL OF THE 0.16 cm (1/16”) THICK PARTS

Start with a sheet of 0.16 cm (1/16”) balsa. (This is the thinnest of the three thickness of wood provided.) Set the width of the balsa stripper to 0.16 cm to cut square strips. You can use the 0.16 cm sheet to set the width of the cutter as shown below.



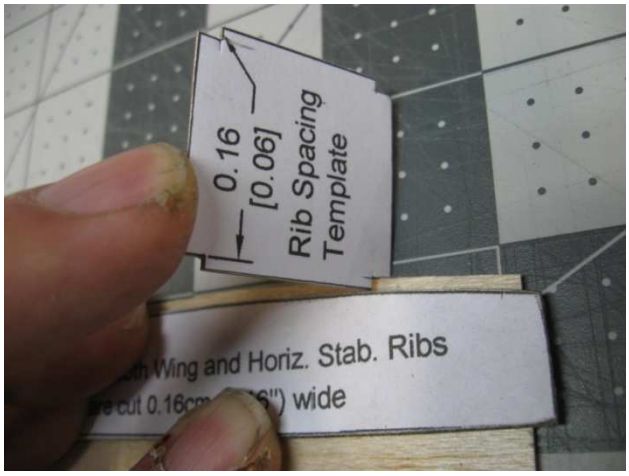
You need at least 4 strips the full length of the sheet so cut a few extra.

Increase the width of the balsa stripper to 0.24 cm (3/32”) by turning the knob on the Balsa Stripper one revolution clockwise or use the 0.24 cm (3/32”) thick piece of wood to get this setting. Again you will need 4 full length strips so cut a few extra.

Finally, open the balsa stripper (Turn the knob about 9 1/3 revolutions clockwise) to 1.0 cm and cut a full length strip from the sheet of 0.16 cm (1/16”) balsa.

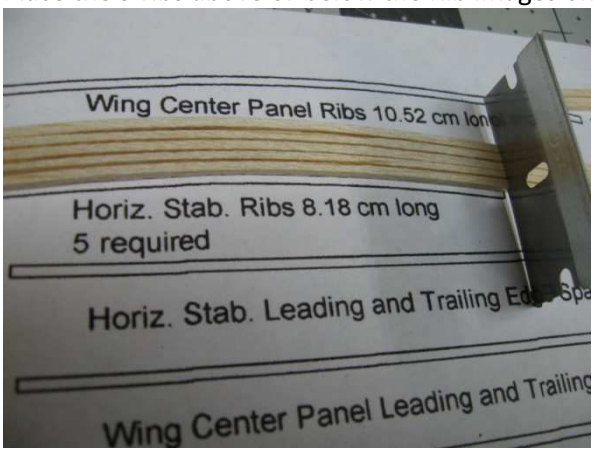
Get a new sheet of 0.16 cm (1/16”) balsa and lay it on top view of the wing, either “Drawing 4 of 7” or “Drawing 5 of 7”. Place one short end of the sheet on the inside line of either the L.E. or T.E. Spar. Place a straight edge over the other inside Spar’s line. Carefully cut this piece off.

With the Rib Template use a hobby knife and slice at least 15 ribs, sliding the template down 0.16 cm for each rib.



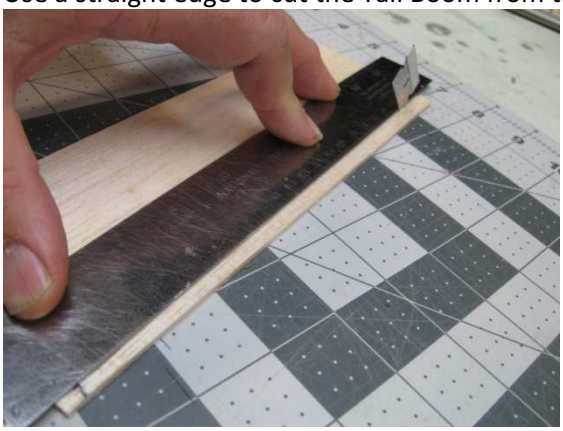
Use the “Rib Spacing Template” to get uniform width ribs. Once you have 15 ribs, 9 will need to be cut to length (the Wing Center Panel Ribs are already to size).

Place the 9 ribs above or below the Rib images on “Drawing 2 of 7”. One at a time, cut them to length.



STEP 2 CUT THE ONE 0.24 cm (3/32”) THICK PART

Use a straight edge to cut the Tail Boom from the 0.24 cm (3/32”) thick sheet.

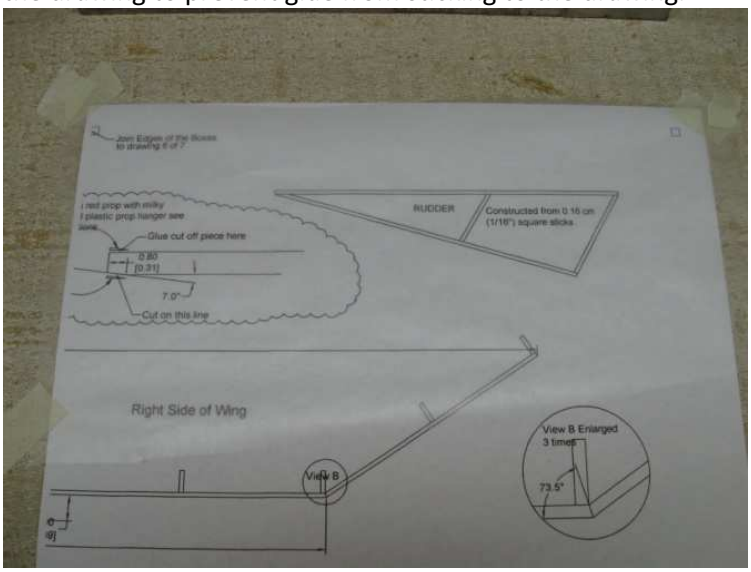


The end which attaches to the Motor Stick is 0.8 cm wide while the rudder is glued is 0.4 cm..
This taper saves weight at the rear of the plane.

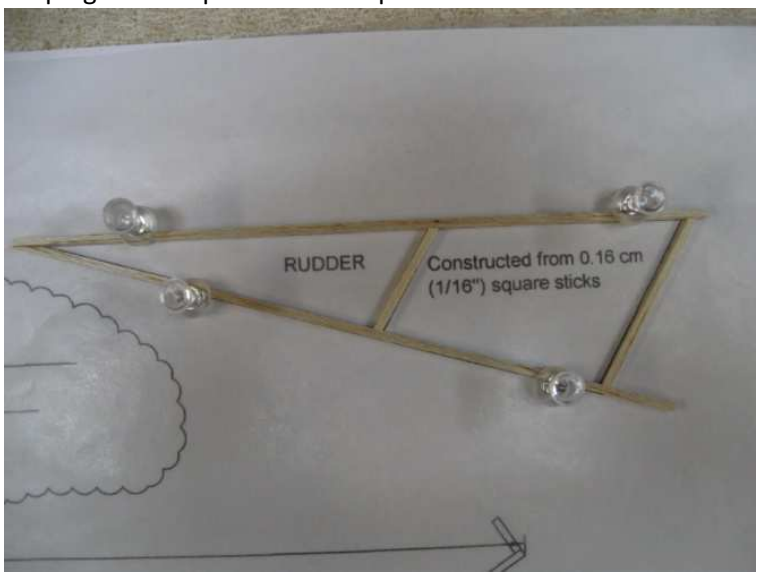
STEP 3 CUT THE ONE 0.32 cm (1/8”) THICK PART
Cut the Motor Stick from the 0.32 cm (1/8”) sheet. You can use the balsa stripper that was set at 1.0 cm for the Wing Mount or use a straight edge.

STEP 4 BUILDING THE FRAMEWORK (All glue joints will be double glued except where indicated. Review Video #11 Gluing Wood if the technique is not familiar.)

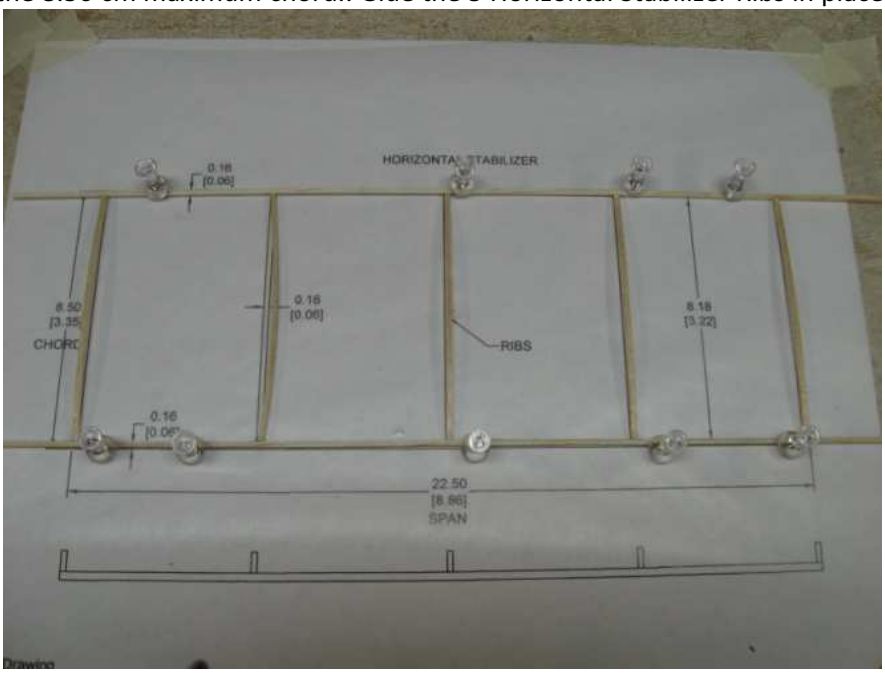
Rudder “Drawing 7 of 7”
Tape the drawing onto a foam board or other flat surface that will accept pins. Tape waxed paper over the drawing to prevent glue from sticking to the drawing.



Using 0.16 cm (1/16”) square strips, place them over the drawing and cut the 4 pieces to match the drawing. Pin the longer pieces in place first then set the other pieces in place to check the glue joints. If there are gaps where the parts meet, trim or sand the ends to get a good fit. Glue the parts together, keeping them in place with the pins.

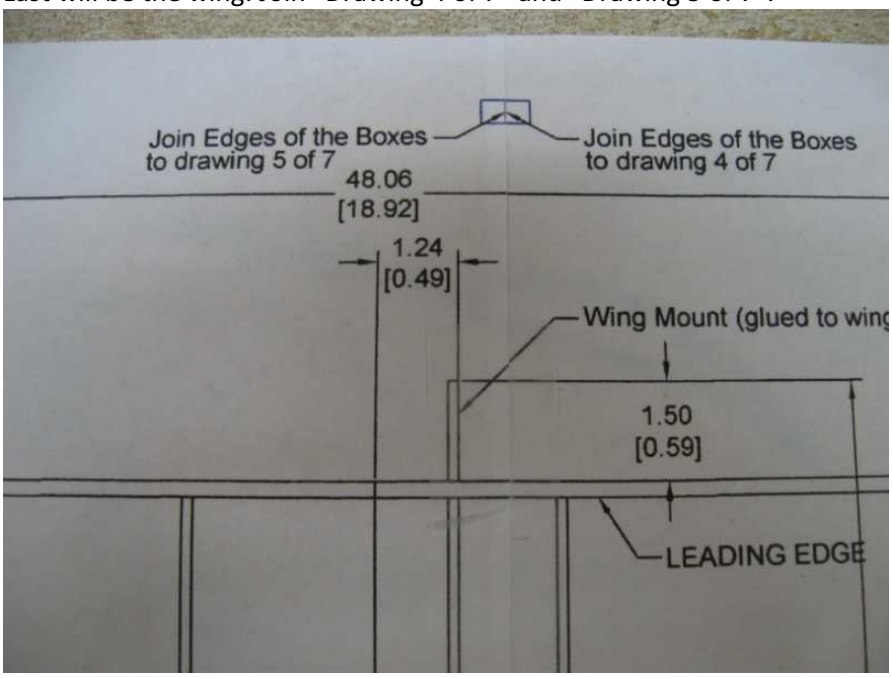


Next, build the Horizontal Stabilizer shown on “Drawing 3 of 7”. Place two strips of 0.16 cm (1/16”) square balsa, over the L.E & T.E. Spars, and pin in place. The square strips will be too long but they will be trimmed later. (This part is symmetrical so until it is attached to the model the Leading and Trailing Edges are not assigned.) Be sure the distance between the outside edges of the Spars does not exceed the 8.50 cm maximum chord.. Glue the 5 Horizontal Stabilizer Ribs in place.

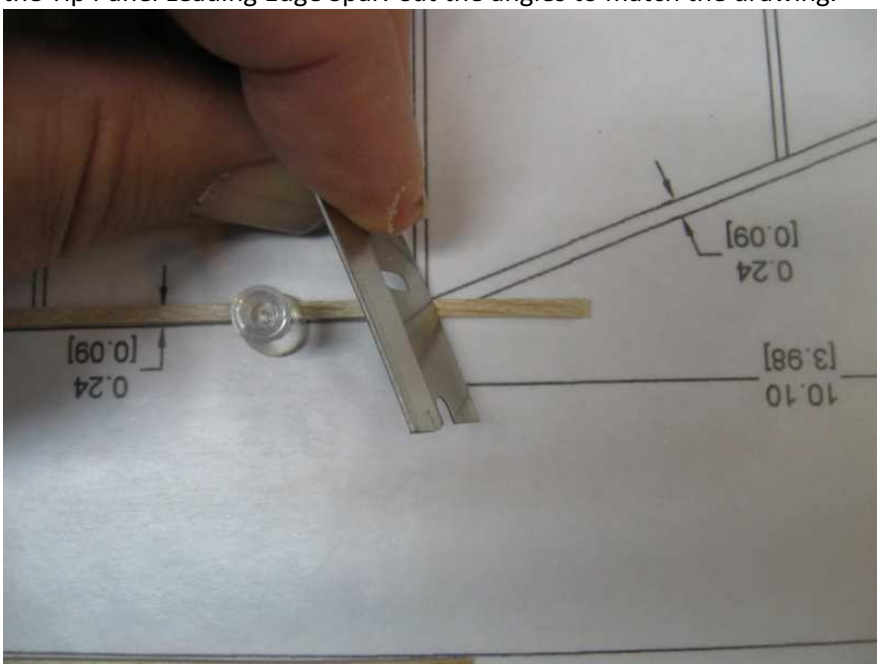


Be sure the ribs at the ends of the Horizontal Stabilizer are not outside the 22.50 cm dimension. Once the glue has dried, cut the Spars flush to the Ribs. Sand off any high spots or projections.

Last will be the wing. Join “Drawing 4 of 7” and “Drawing 5 of 7”.

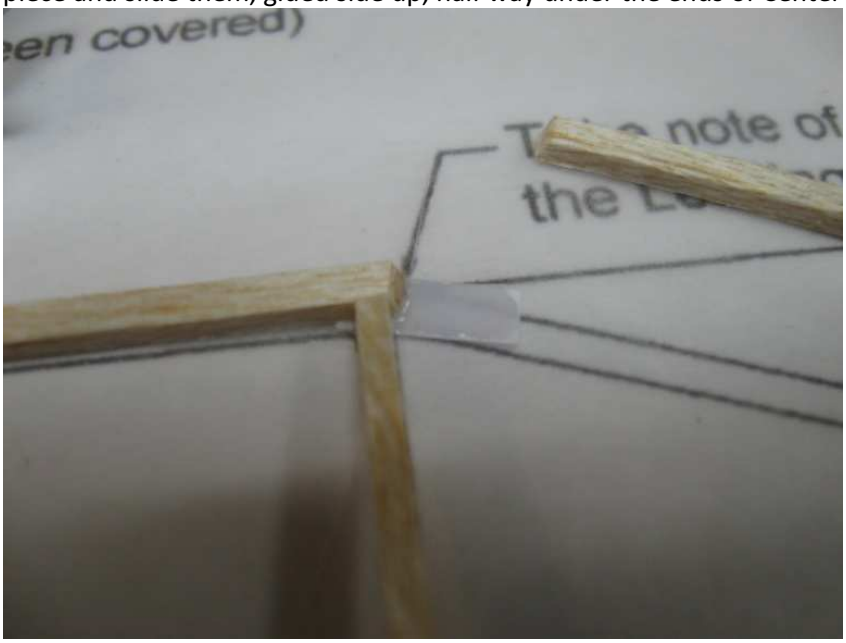


Pin 2 strips of balsa 0.16 cm thick X 0.24 wide on the L.E. and T.E. lines making certain the chord will not be more than 11.00 cm. The 0.24 cm width will be against the drawing. These Spars will need to be cut to length before gluing the ribs. Look at the enlarged view shown on “Drawing 7 of 7” to see the angle for the Trailing Edge. The Leading Edge Spar will have this angle plus another angle to create the sweep the Tip Panel Leading Edge Spar. Cut the angles to match the drawing.



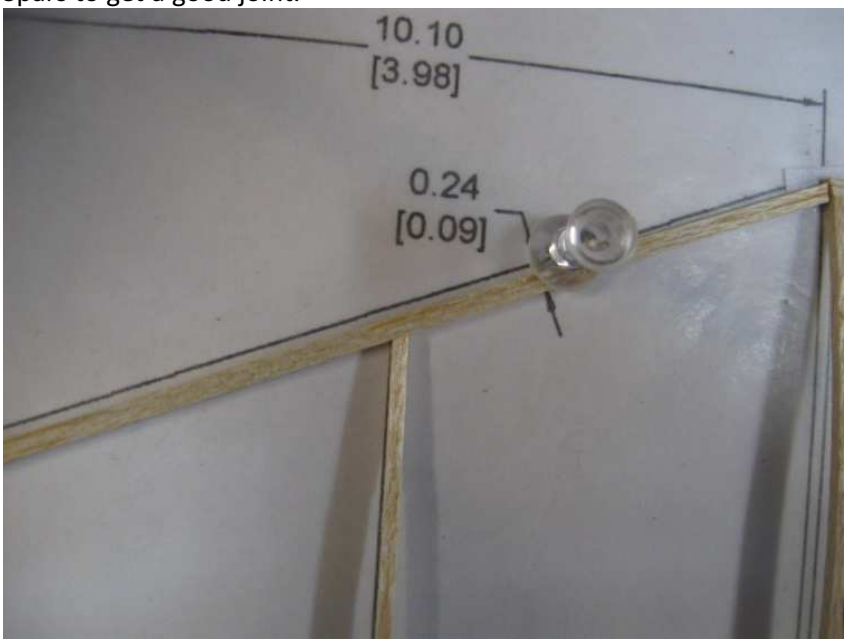
All four angles can be “fine tuned” by sanding. Glue the Wing Center Panel Ribs in place. Cut the Tip Panel Spars (0.16 cm thick X 0.24 wide) about 0.5 – 1.0 centimeter longer than what is shown on the drawing. Cut and/or sand the ends where they meet the Center Panel Spars so the joints have little to no gap <u>WHEN THEIR TIPS ARE RAISED 5.50 cm AFTER COVERING THE WING</u>. (Look at “Drawing 6 of 7”)

Cut 4 small pieces of paper approximately 0.3 cm X 1.0 cm. Spread a small drop of glue on one side each piece and slide them, glued side up, half way under the ends of Center Panel Spars.



(These will reinforce the Spar glue joints.) Spread a small drop of glue on the exposed ends of the pieces of paper, and pin the Tip Panel Leading and Trailing Edges in place. Apply a small drop of glue at each joint. (This is the first application of glue in the double gluing process.)

Sand the front edge of the Wing Tip Panel Ribs where they glue to the Wing Tip Panel Leading Edge Spars to get a good joint.

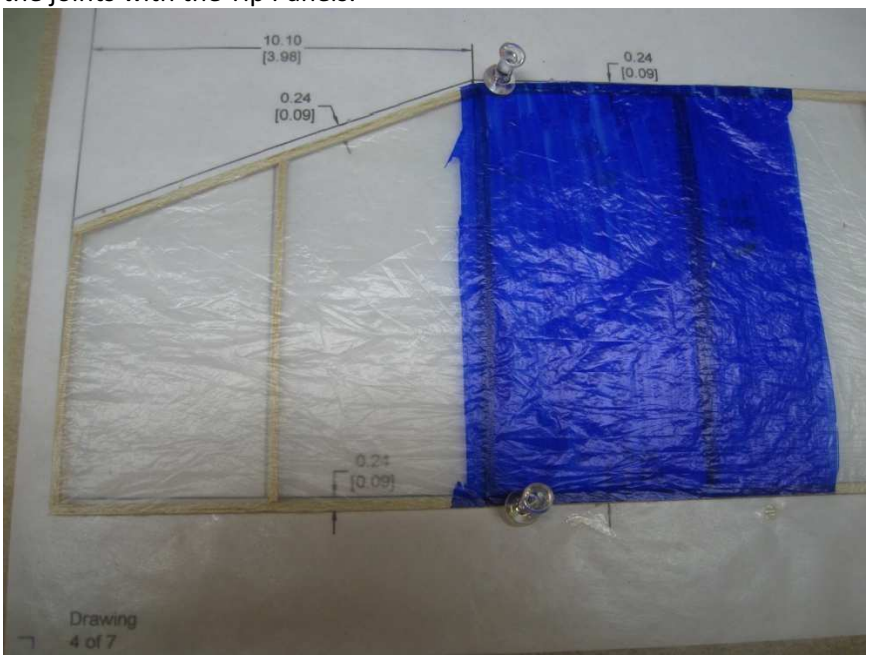


Glue the Wing Tip Panel Ribs in place making sure not to go beyond the overall width of the wing. Once everything has dried, trim the ends of the Wing Tip Panel Leading and Trailing Edge Spars flush with the Ribs. (The 48 cm flat wing span will become a 45.0 cm PROJECTED wing span after the tips are raised.) Sand off any high spots or projections.

STEP 5 COVERING

Watch Videos “#13 Covering with Tissue” and/or “#14 Covering with Film” before starting.
Cover the Rudder first since it is the easiest. Next cover the Horizontal Stabilizer and finally the Wing (which is flat at this stage) with film or tissue. Trim around the perimeter of each structure to remove all excess covering.

Place the wing on the drawing. Carefully pin the Center Panel Leading and Trailing Edge Spars down near the joints with the Tip Panels.



Repeatedly apply small amounts of Acetone using a Q-Tip® to the two joints where a Tip Panel meets the Center Panel to soften the joint.

(Watch video “#11 Gluing Wood” if you are confused.) Once BOTH joints have softened, add a small drop of glue to each joint and lift the end of the Tip panel at least 5.5 cm.

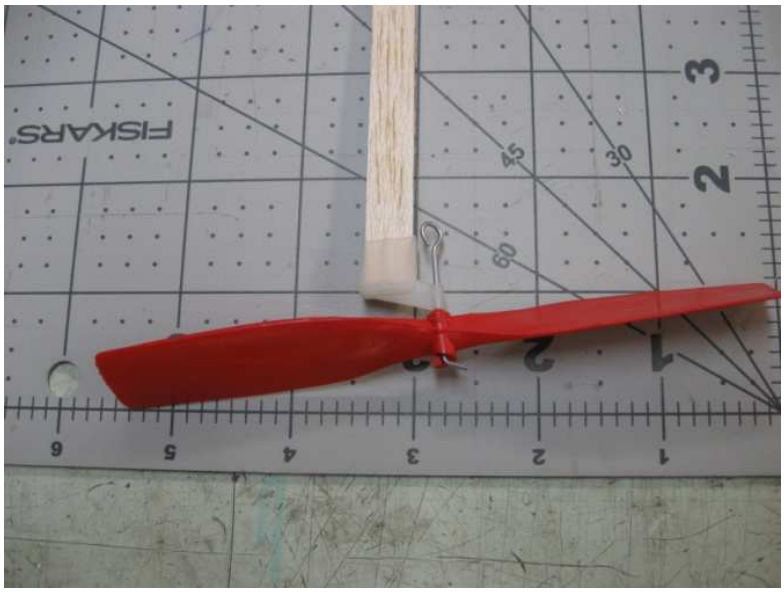
Support both the L.E. and T.E of the Tip Panel so they are level to one another until the glue has dried.

Do the same for the other side Tip Panel. (Don’t worry about the sag in the covering at the Ribs near the joints.)

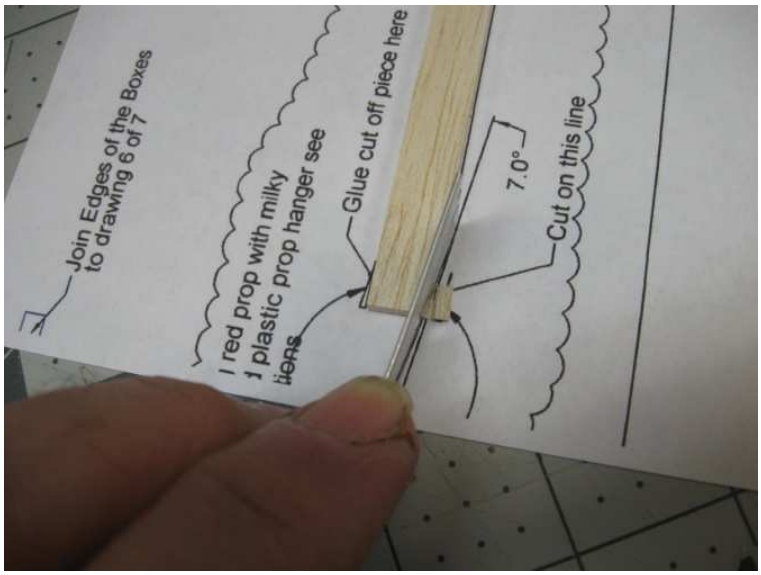
STEP 6 ASSEMBLY

Sand the wide end of the Tail Boom to get the 1.2 cm offset. Draw two parallel lines the length of a sheet of paper 1.2 cm apart. Place the Tail Boom so one end is on one line and the other end is on another line. Hold an Emory board on the line against the wider end and make a few passes to get the angle.

If you are using the red propeller assembly with the milky white prop hanger the Motor Stick will need to be modified.



This propeller assembly is manufactured with too much down-thrust for this plane. (Down-thrust means the propeller is pointed at the ground when the plane is level.) Place the Motor Stick over the diagram on “Drawing 7 of 7”. Align a razor blade or hobby knife to the line shown and slice off that small piece. Glue this small cutoff piece to the top of the motor stick as shown.

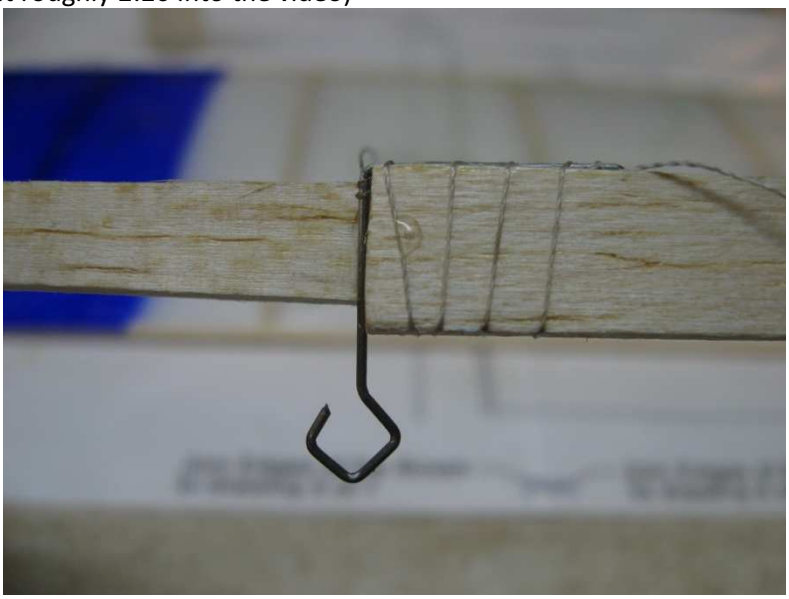


Once it is dry check the fit of the Motor Stick to the prop hanger. If it is loose a shim of balsa or paper can be inserted to get a snug fit. A touch of sanding will take care of it if it is too big.

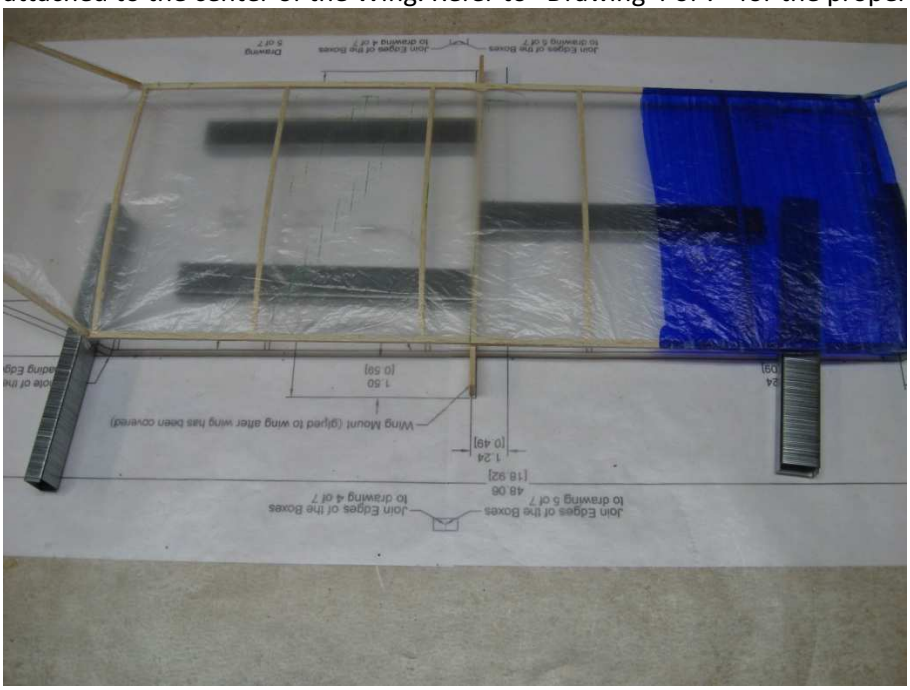
With the propeller removed from the Motor Stick, glue the sanded face of the Tail Boom to the side of the Motor Stick, near its end. The two parts should overlap about 1 cm. This is best achieved by placing the Motor Stick (with the glued piece on top) on one of the lines used to sand the Tail Boom.

Use boxes, strips of staples or similar items to keep the Motor Stick vertical. Apply glue to the sanded face of the Tail Boom. Position the small end of the Tail Boom over the other line for the 1.2 cm offset. Raise the top surface of the Tail Boom at its end, 0.7 cm above the Motor Stick. Blocks, can hold the two pieces of wood together and a pencil can be used to raise the top surface of Tail Boom to the desired height of 1.7 cm. (Remember the Motor Stick is 1.0 cm high.) Here a piece of balsa and strips of staples are doing the job.

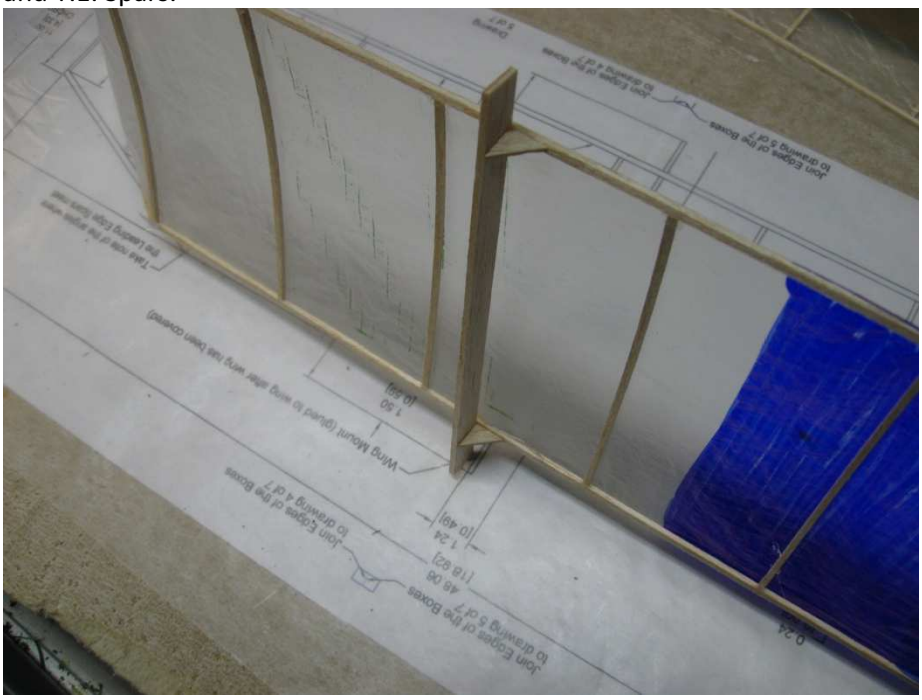
Glue the wire Rubber Tail Hook to the back of the Motor Stick. (See video "# 12 Gluing Other Materials" at roughly 2:20 into the video)



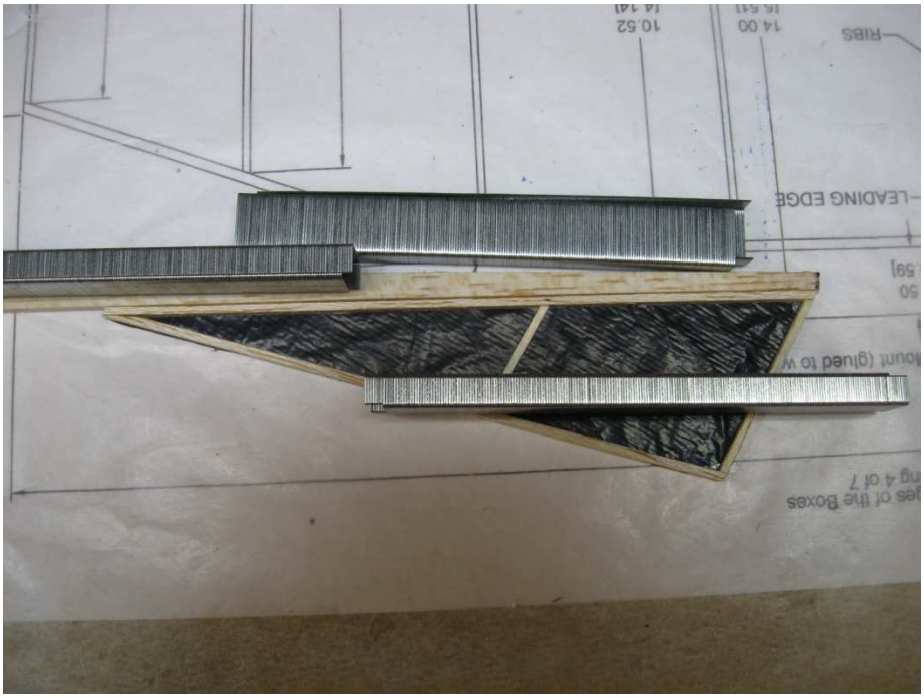
Glue the Wing Mount to the L.E and T.E. Spars of the Wing Center Panel. NOTE the Wing Mount is not attached to the center of the Wing. Refer to “Drawing 4 of 7” for the proper location.



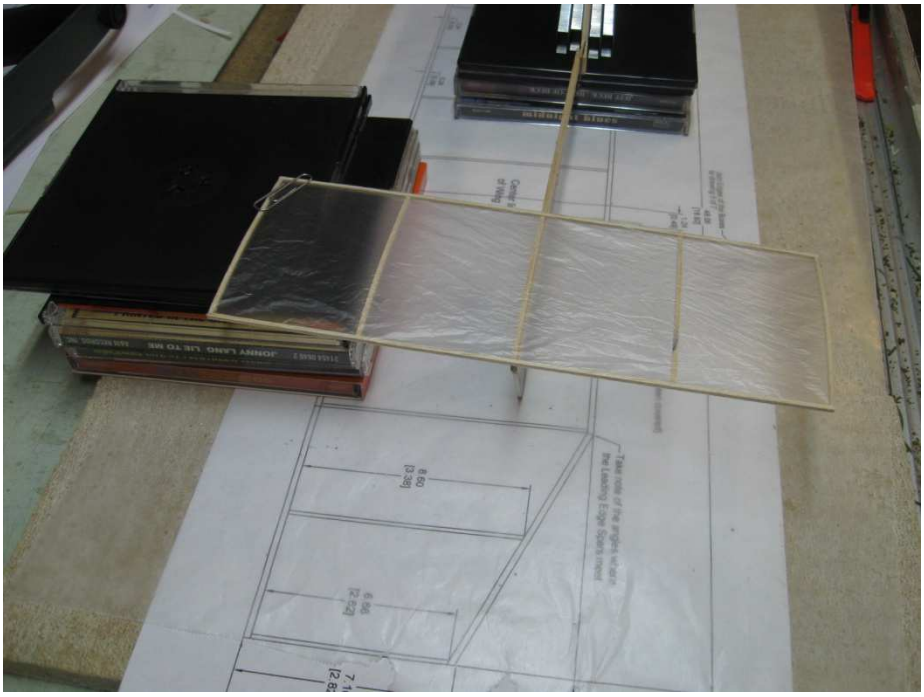
Once this is attached, glue the two triangular Wing Mount Gussets to both the Wing Mount and the L.E and T.E. Spars.



Attach the covered Rudder to the bottom of the Tail Boom. The end of the Rudder should be at the end of the Tail Boom.



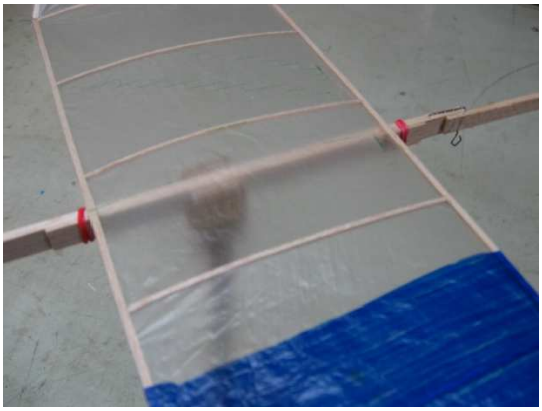
Secure the Motor Stick, Tail Boom, Rudder assembly on a raised surface and glue the Horizontal Stabilizer to the Tail Boom.



Note from the top view shown in “Drawing 1 of 7” that the Horizontal Stabilizer is in-line with the Tail Boom not the Motor Stick. The left tip of the Horizontal Stabilizer needs to be raised 0.7 cm above the center. This means the left tip is 1.4 cm higher than the right tip.

STEP 7 FINAL ASSEMBLY and TRANSPORT

Use a pen gently draw a narrow, vertical line on the right side of the Motor Stick, 4.0 – 4.5 cm from the front end of the Motor Stick. Slip 2 small rubber bands over the end of the Motor Stick. Slide one rubber band to the end near the Tail Boom. Rest the Wing on the top of the Motor Stick with the Wing Mount touching the left side of the Motor Stick. The Leading Edge of the Wing should be placed over the drawn line. Slide the rubber bands over each end of the Wing Mount.



Place the propeller on the end of the Motor Stick.

The Wright Stuff Flier is now complete!

Place your Wright Stuff Flyer on a scale. If it is less than 7.5 grams place a piece of clay on the Wing Mount near the middle of the Wing Chord.

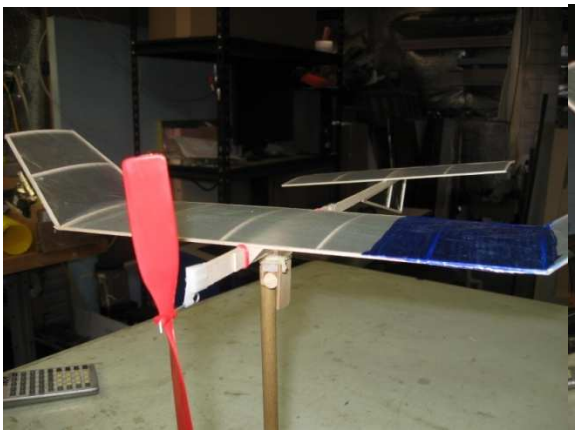
Watch Video #2 "Rubber Preparation". Make loop 38 cm (15") long. (The length does not need to be exact to the millimeter. Remember, rules require the mass of the motor to be less than 1.5 grams.)

Watch Videos #3 & #4. With about 300 turns on the motor gently release, **DO NOT THROW** your Wright Stuff Flier. If it immediately dives to the floor, place a piece of balsa 0.24cm (3/32") or 0.32cm (1/8") thick under the Leading Edge of the wing. If it dives at the end of the motor run move the Wing to the back about 0.5 cm. If it flies like a Porpoise swims, up and down, up and down, move the wing forward about 0.5 cm. Look for coming videos on how to trim rubber powered planes.

As you test your Wright Stuff Flier you will find parts break or need to be adjusted. Since you know how to make each piece you are now prepared to make replacement parts, build new structures and make back-up planes. Do not expect your first effort to be a total success. You will probably build 3 or 4 planes before you are satisfied with the results.

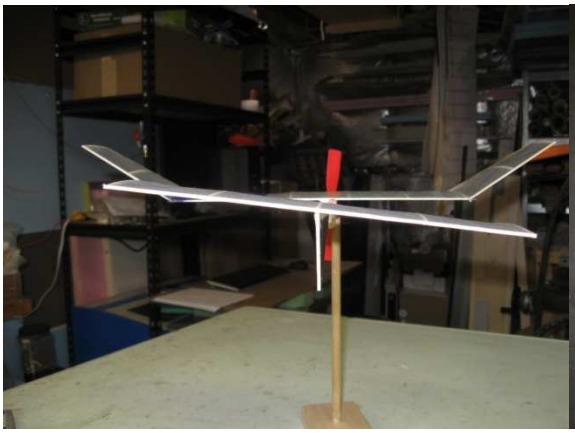
TRANSPORTATION

Trying to carry a Wright Stuff Flier outside will most likely destroy it. Get a large box that can close or has a lid to transport the plane. The wing will probably need to be removed for transport. Provisions should be made to keep the parts from sliding around in the box.

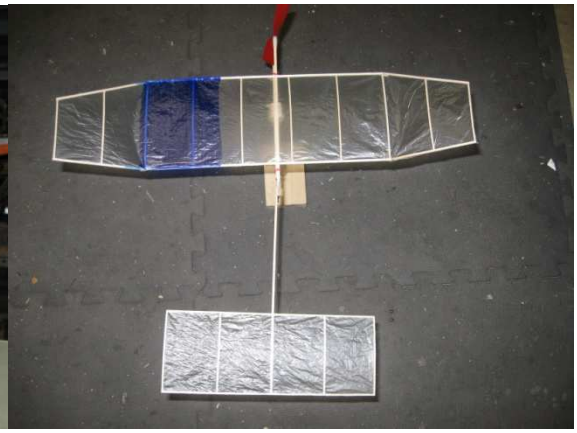


Viewed from the Front

Viewed from the Left Side



Viewed from the Rear



Viewed from the Top