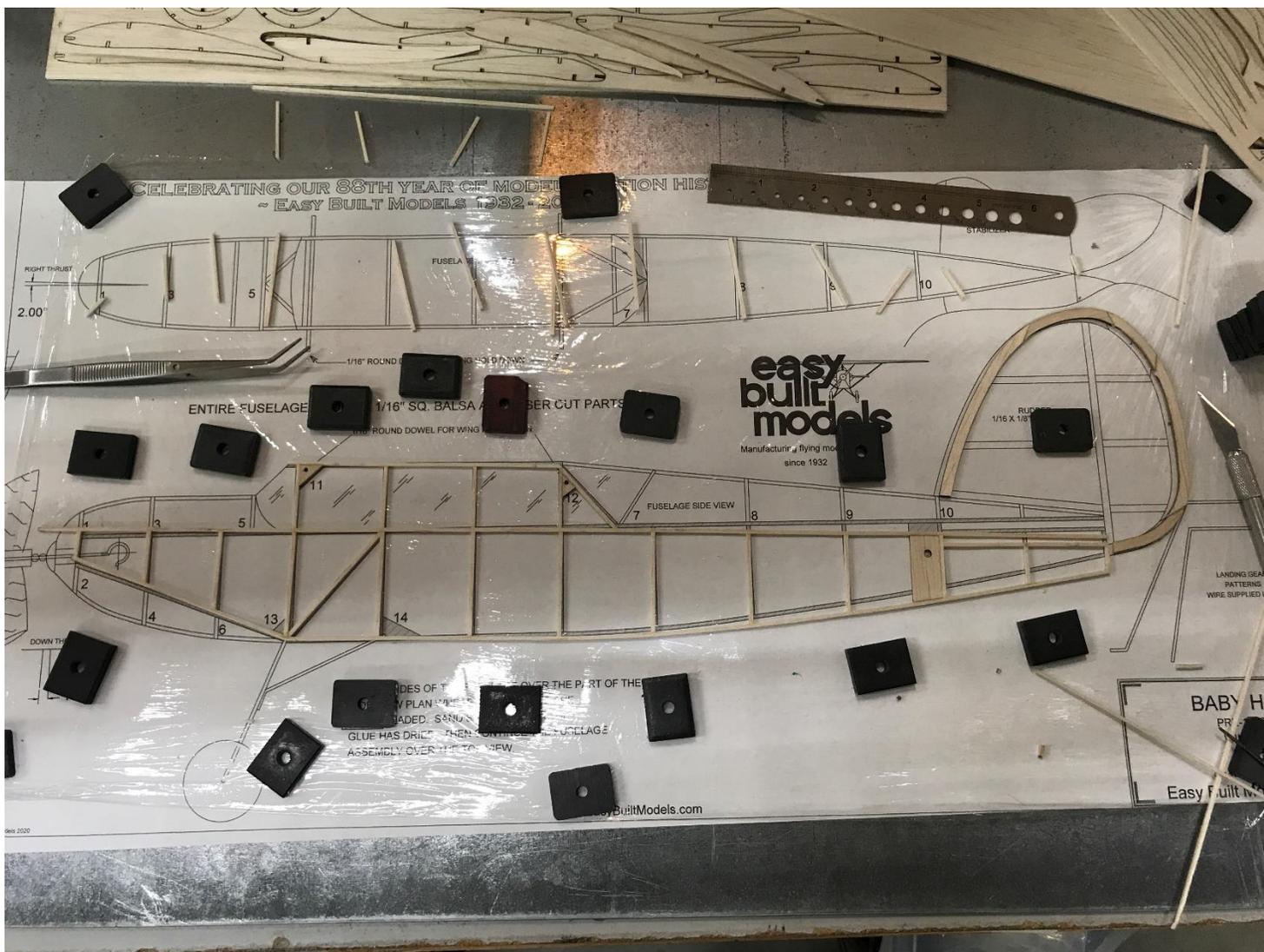


## **LC31 BABY HORNET INSTRUCTIONS**

1. This instruction document is for the LC31 BABY HORNET Plane kit from Easy Built Models. This kit was introduced before 1942. We've updated the kit to include some additional features typical on today's builds. During my build from the kit, I made a couple of modifications along the way not included in the kit but I will show you how to do or you can skip and continue on to the next step. I encourage you to use the kit as the basis for the build but to also personalize your build to reflect you and your interests. Start by laying out the plan and covering with wax paper or a plastic wrap so that the glue doesn't stick to the plan.

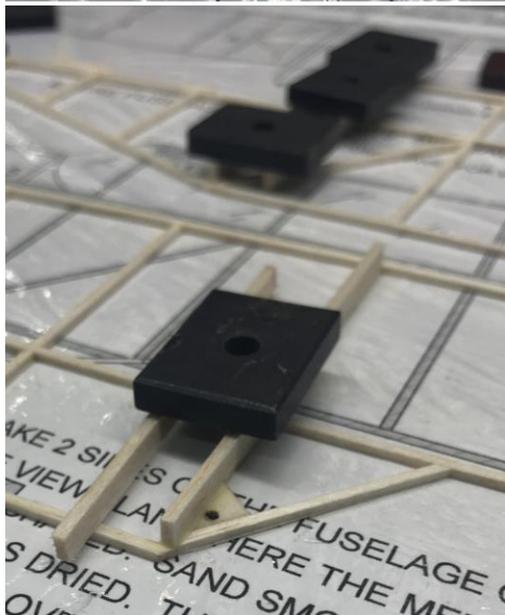
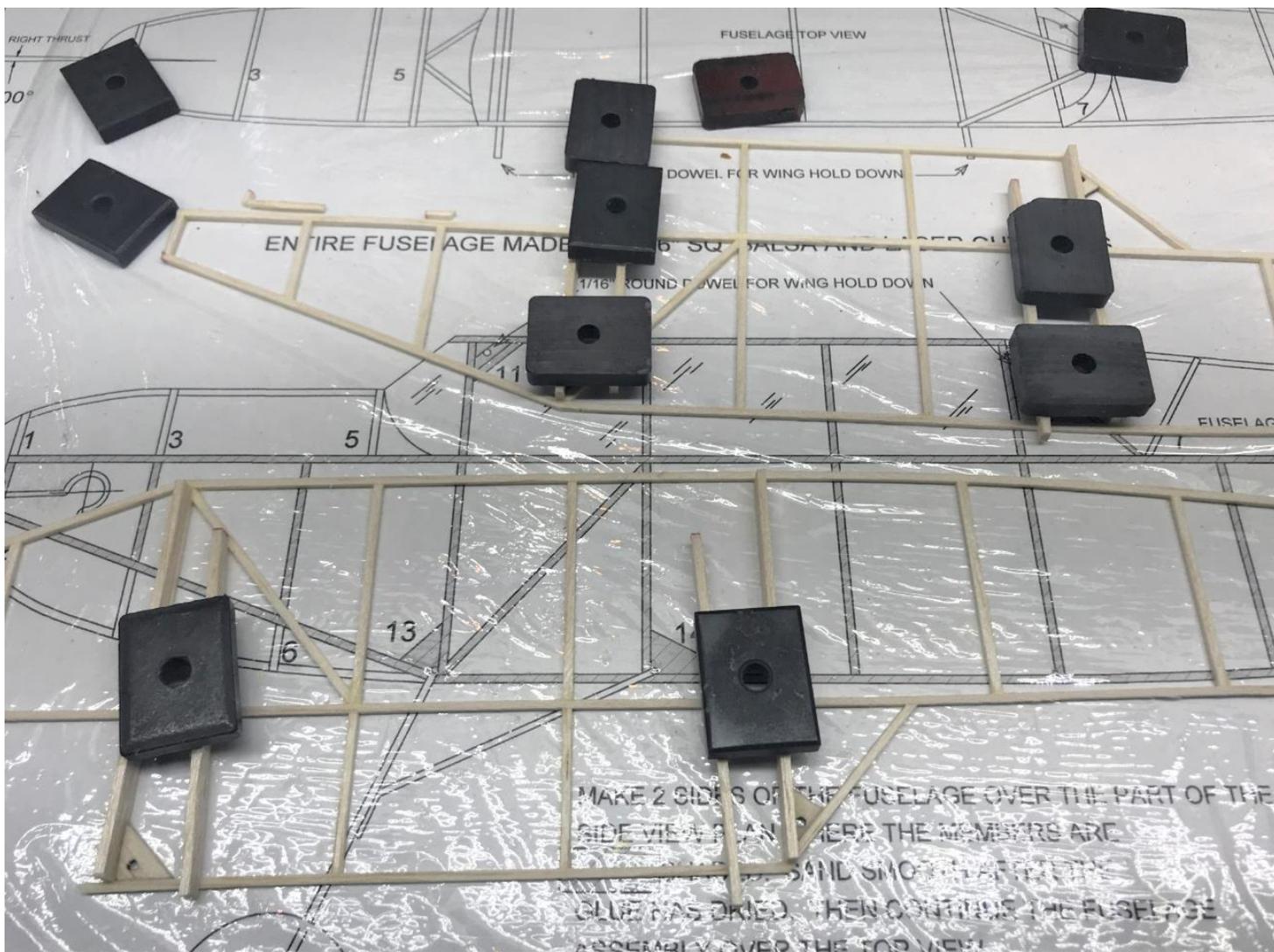


2. Before you start pulling any parts out of the laser cut sheet, now is an easy time to run a sanding block with 220 grit paper on the back and remove some of the soot marks created by the laser cutting process. Not necessary but it just looks nicer. This is a picture of sheet wood from another kit so the parts do not match what you will find in your kit.

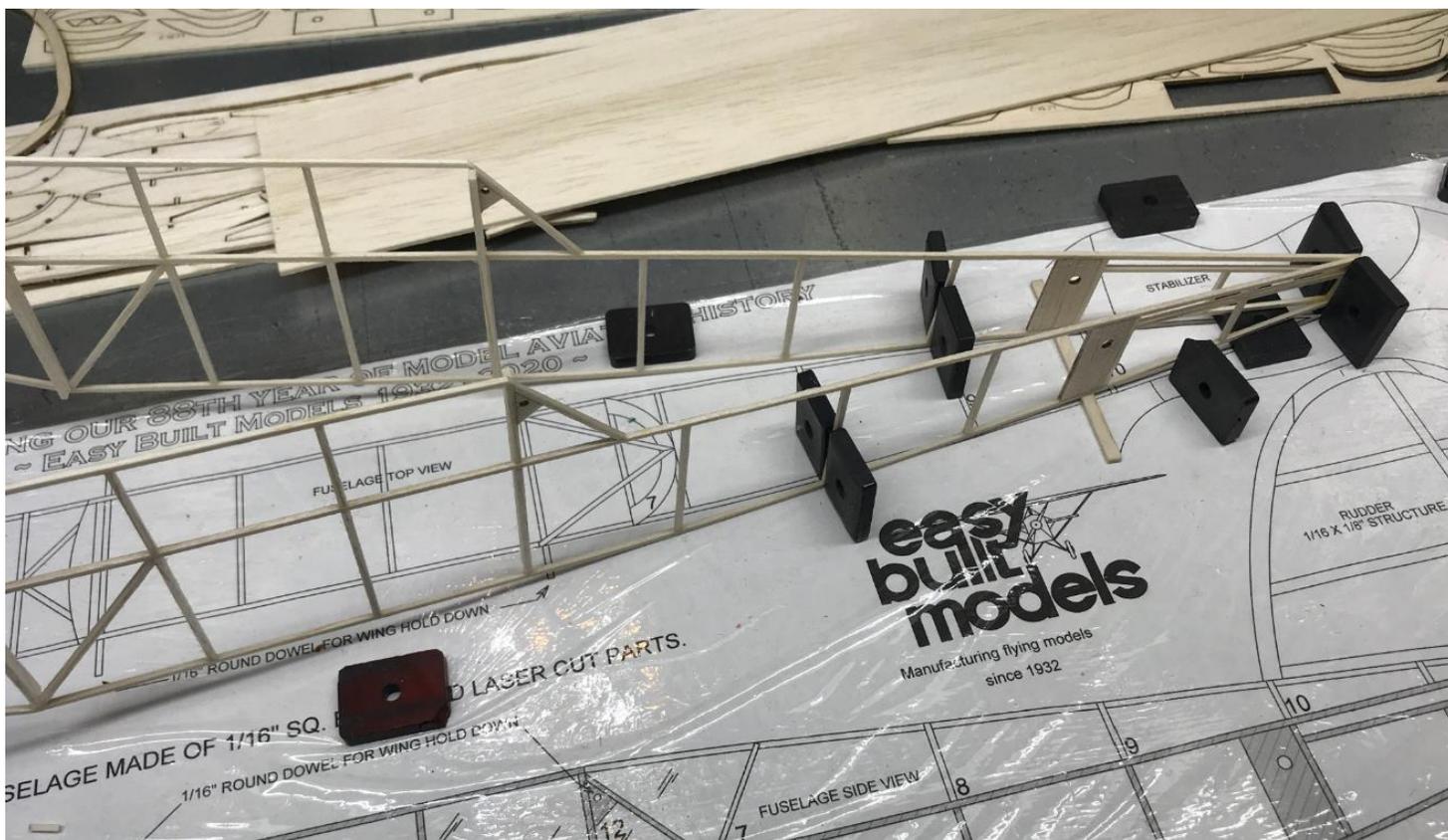


3. So, let's get started. This plane is based on a flat sided box constructed fuselage of 1/16" square balsa. We are going to build 2 identical sides of the fuselage over the parts marked with hash lines. Before I start positioning, I like to cut out all the crosspieces/uprights in advance in pairs. Here you can see the parts for the second half laid out just above the fuselage side view aligned to where they will eventually go. This seems to me to be the easiest way of getting the sides to be identical as much as possible. I don't worry about making the longerons longer than needed. I let them stick out and will sand down after the glue has dried. Sand paper is one of the most important tools to have in your tool box. It is also one of the most misused and underused tools in the tool box. I glue some of different grits to blocks and keep them readily at hand. When I cut the pairs of cross pieces, make them oversize, tap on table to even one end, sand that end square, then sand the other end to length. As in this case where there are several cross pieces of the same length, I group them and do the same. Makes for very repeatable sized pieces.

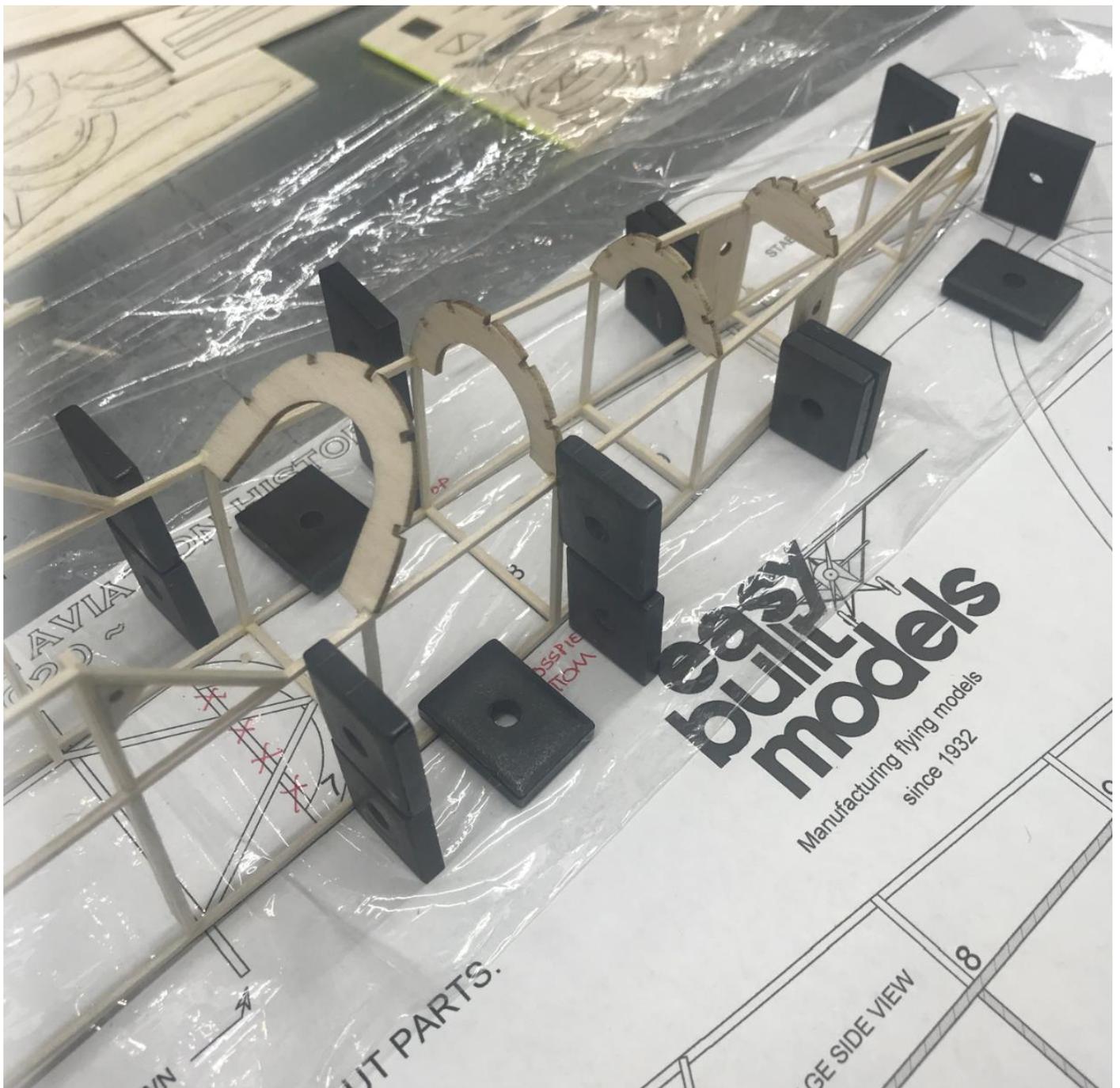
**Note**, on the very first run of kits we found an error and added a small sheet of parts for the nose block. These move the centerline of the prop a little lower so that the shaft can spin freely with lower risk of hanging up inside due to the small nature of the nose. This was corrected in subsequent kits and the similar parts eliminated.



4. One thing I find causes me problems on occasion while flying is a weakness in the center of the fuselage sides. If I happen to squeeze a bit too hard something cracks at one of the joints where the longeron passes through an intersection with an upright. To eliminate this, I like to take a piece of 1/16 x 1/8-inch balsa strip and glue it on the inside of the fuselage spanning these joints. I don't do them all but just a critical few where my hand is likely to hold it. In the picture you can see where I placed a second parallel piece without glue to allow the magnet to stay in position while holding the parts down and the glue dries



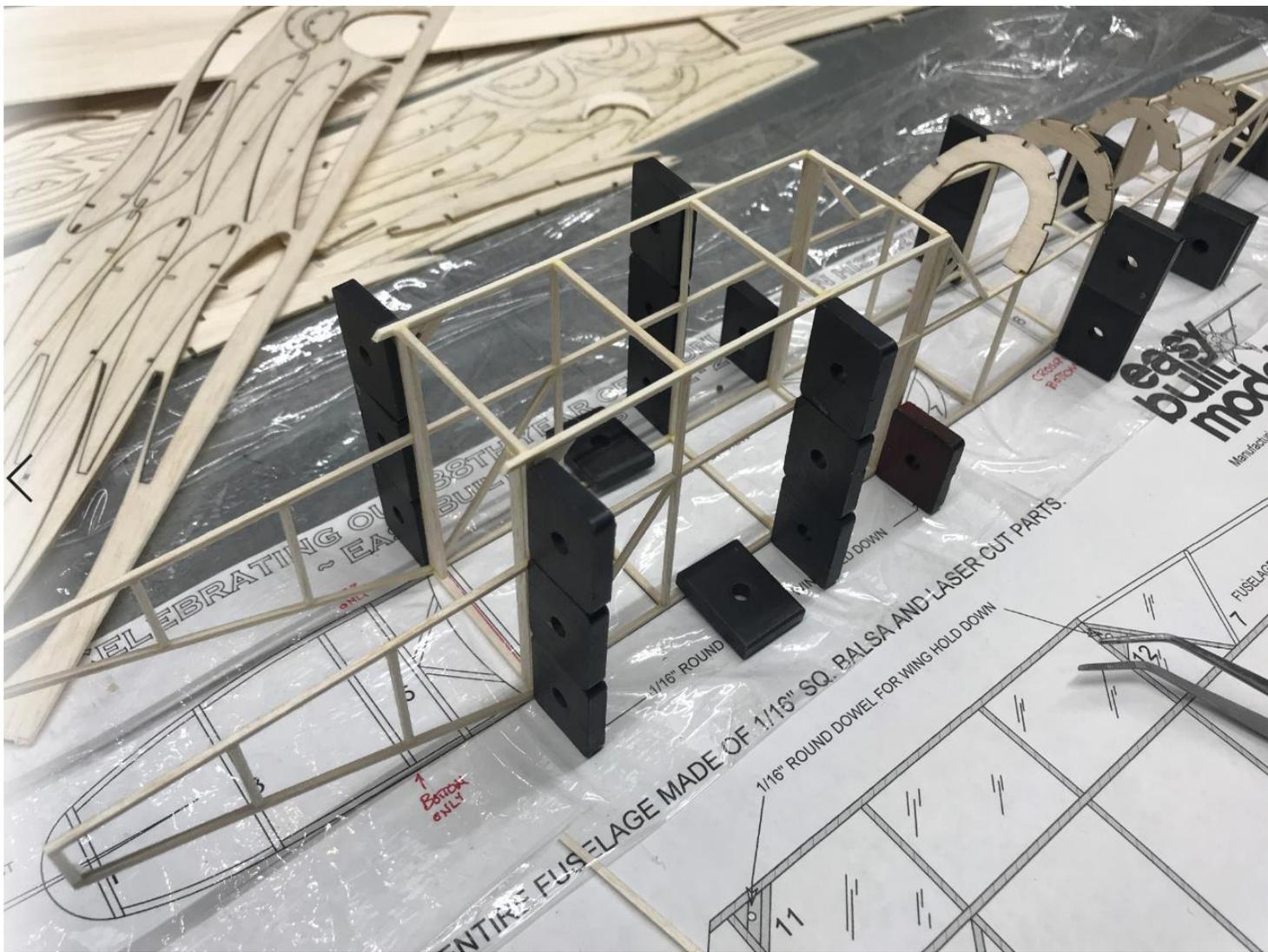
5. Time to glue the tail end of the fuselage halves together. I like to sand a complimenting angle to each half where the halves will be glued together maximizing the glue surfaces. Before I add glue, I've made sure my sides are square and parallel matching the top view angle for the sides. There is a scrap of strip wood under the fuselage to ensure both sides are the same amount above the building board since the bottom of the fuselage is not flat. The magnets work well for this. Be sure the extra side supports in prior step are oriented to the inside.



6. Working from the rear forward I start adding in the cross pieces and formers. I use multiple magnets to ensure the structure stays square and aligned with the plan. Stacking the magnets on edge allows applying pressure where needed. It's not a race. The best thing you can do to make your plane come out with a high probability of flying is to ensure the structure is built square and the flying surfaces are aligned properly.



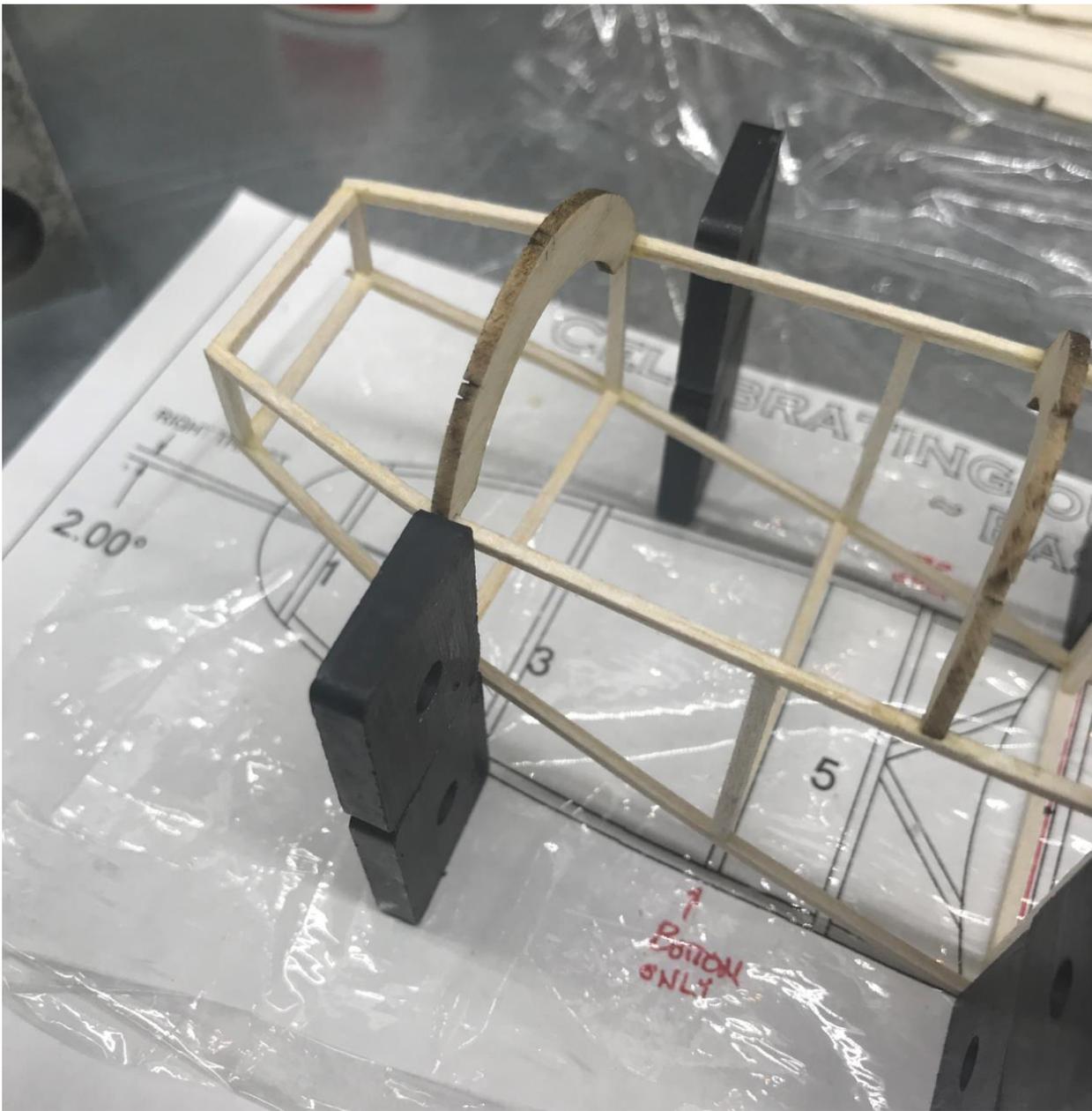
7. To get the angle right on the formers use a short ruler and make sure all are positioned to give that straight line on top. Don't start adding the stringers yet. You still have to get the rest of the fuselage cross pieces in place first.



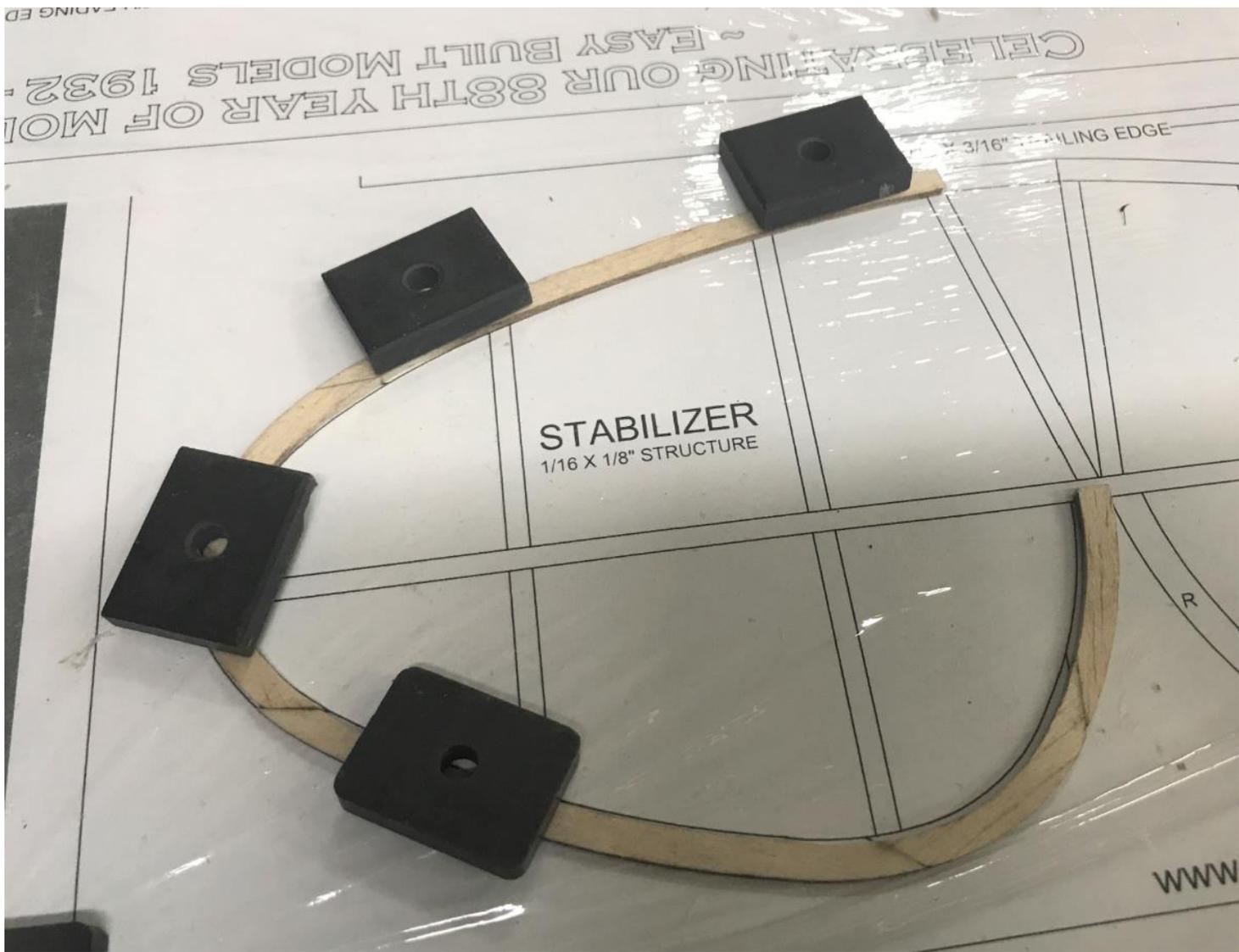
8. Continue adding the cross pieces to create the fuselage cabin. It helps to let the glue dry before moving on to the next section as pulling the nose back together will want to make some areas want to spring out. The magnets help resist this but I like to be sure I get the strongest joint possible.



9. Last section is the nose and we really have to squeeze that short last bit in. So first get sections 3 and 5 glued in along with their associated lower cross pieces. Then pickup that paint brush you see here and paint some water on the last section of longerons. This will allow them to be curved into position. You don't have to but this will give you the strongest frame structure. Let the water evaporate and the balsa will hold its new curved shape. Might take some practice to get it perfect.



10. With the nose glued and dry, sand the nose flat. Set aside for later.



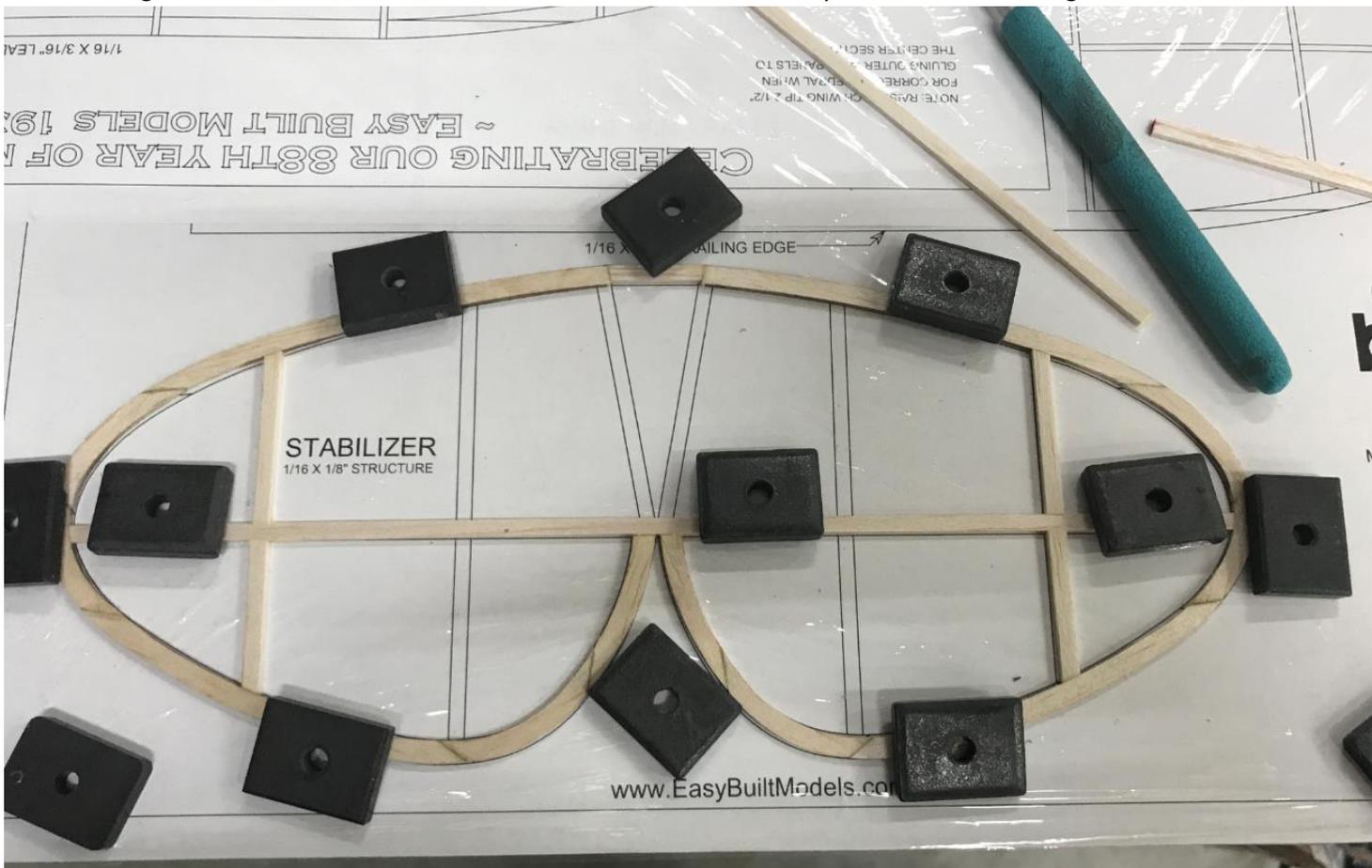
11. Time to start the stab. I like to glue up the outlines for each side and then fill in the structure within.



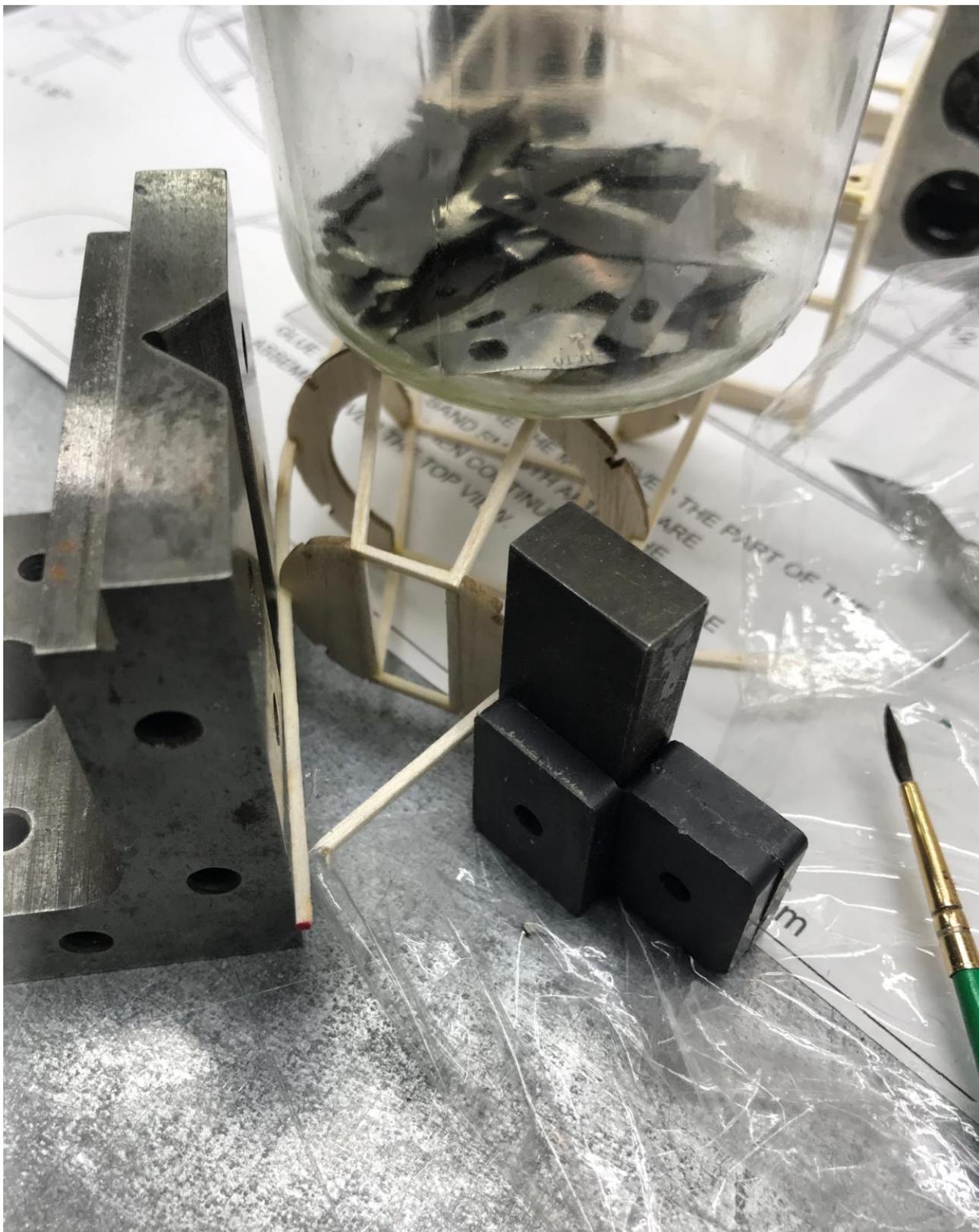
12. While the stab halves dry, I move on to the rudder which is assembled very similar to the stab.



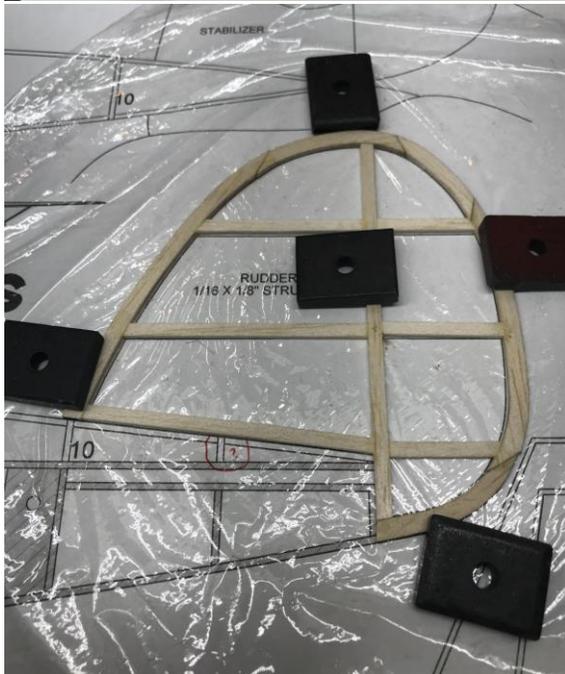
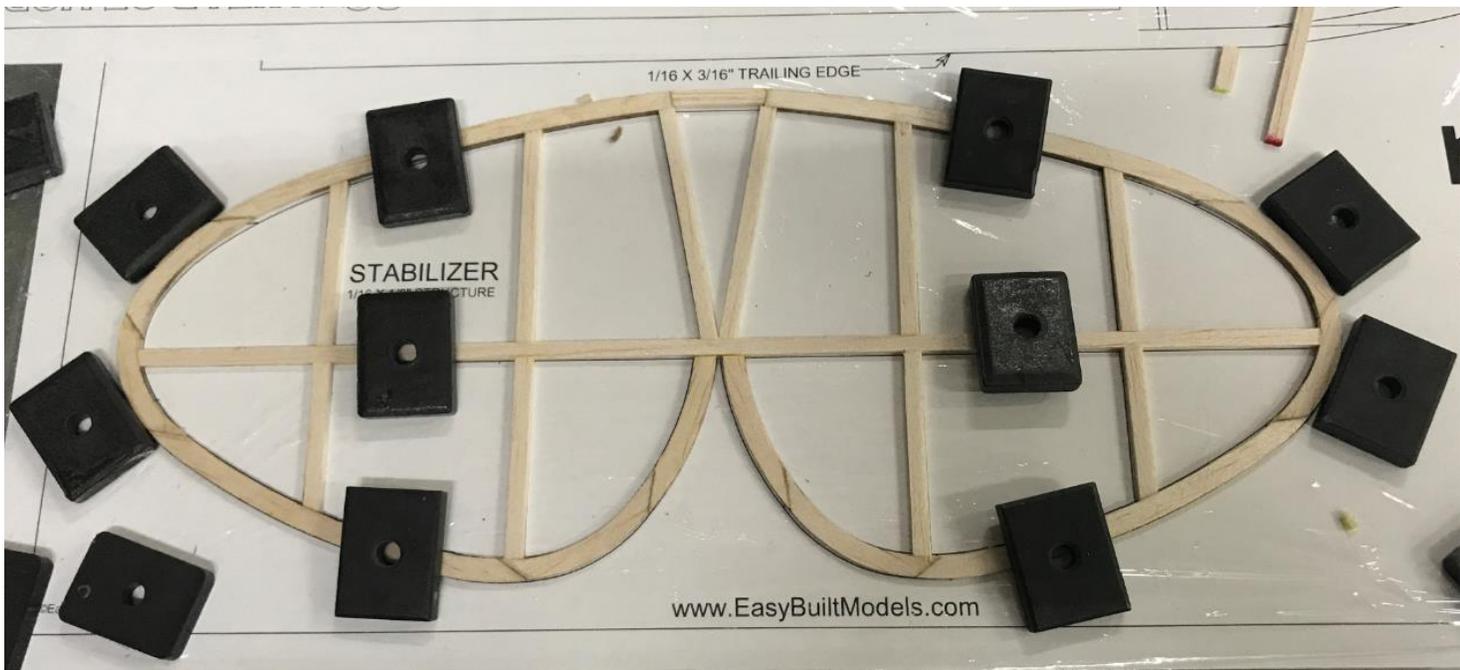
13. Since the edges of the ribs are visible, I like to stack and sand them so they have a nice clean edge.



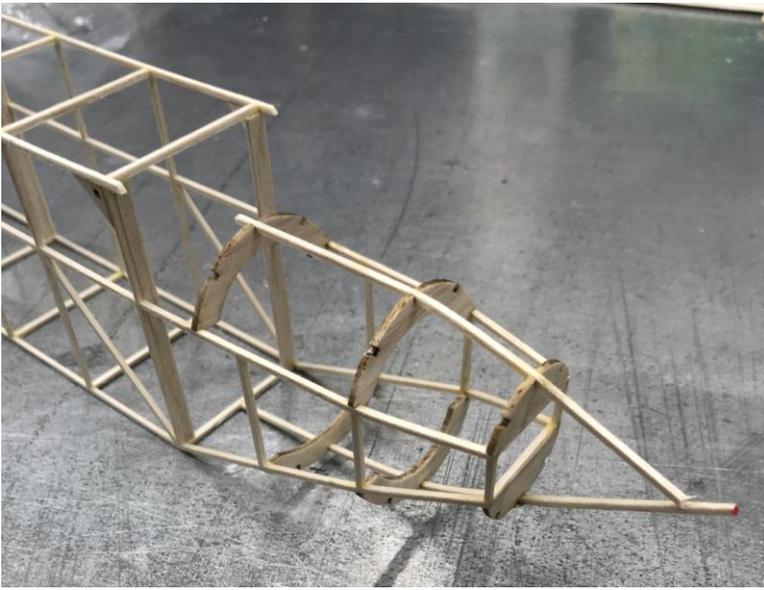
14. With the stab halves dry, time to glue in the center structure. The main spar spans the stab from side to side without any cuts for maximum strength. For all joints, the better you match the surfaces to be glued to each other the stronger the joint so use some sand paper and take your time and get it right. With all the parts in and set aside to dry.



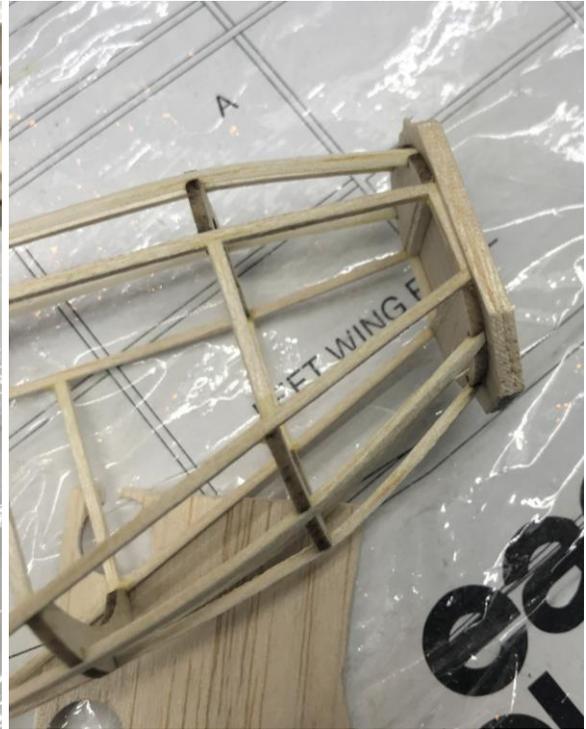
15. A lot going on here, we are adding the main center stringer to the top and bottom of the fuselage nose. The jar with used blades has just enough weight to hold the structure flat on the board while I apply pressure to help the stringers hold their shape. I started by gluing the stringers at the other end where there is minimal bend. Allowed the glue to dry. Paint with water so they will curve nicely instead of breaking. Now use your magnets or steel blocks and slowly roll the balsa into the formers' slots. Let the glue dry.



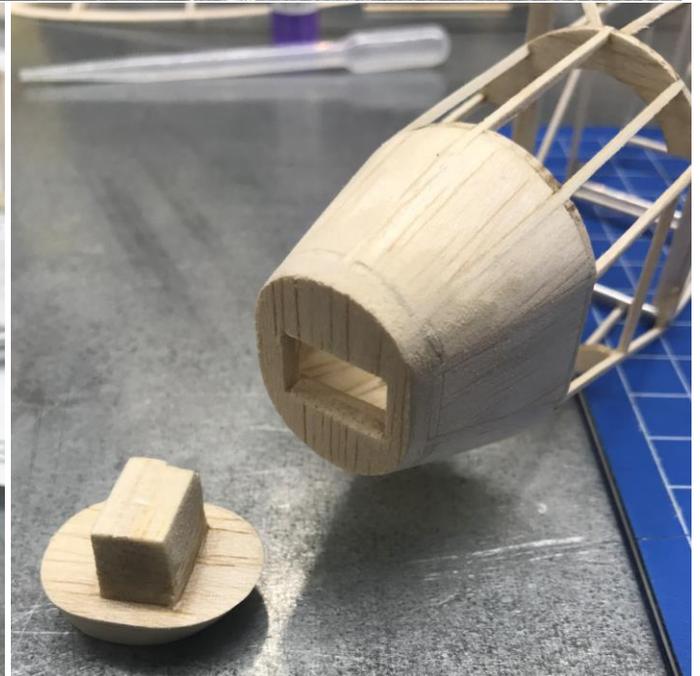
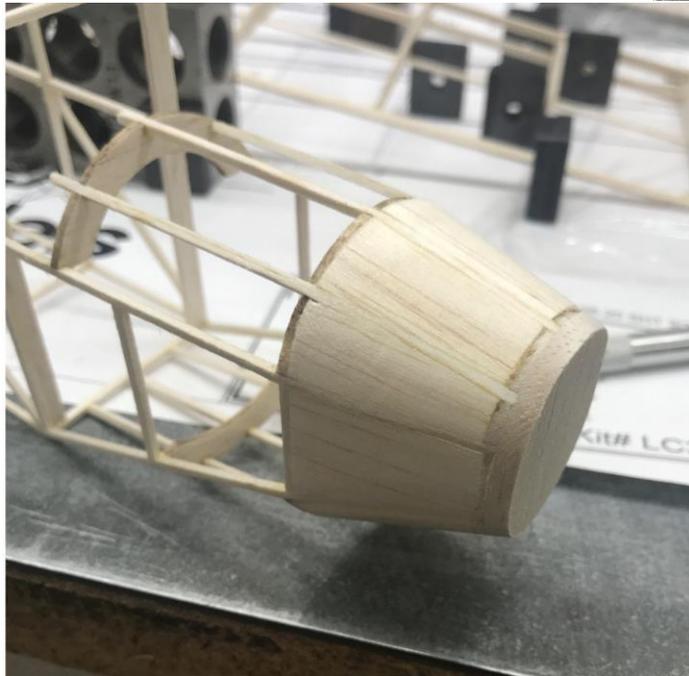
16. The glue has dried on the stab and rudder. Remove the magnets. With the part still clinging to the plastic, sand smooth.



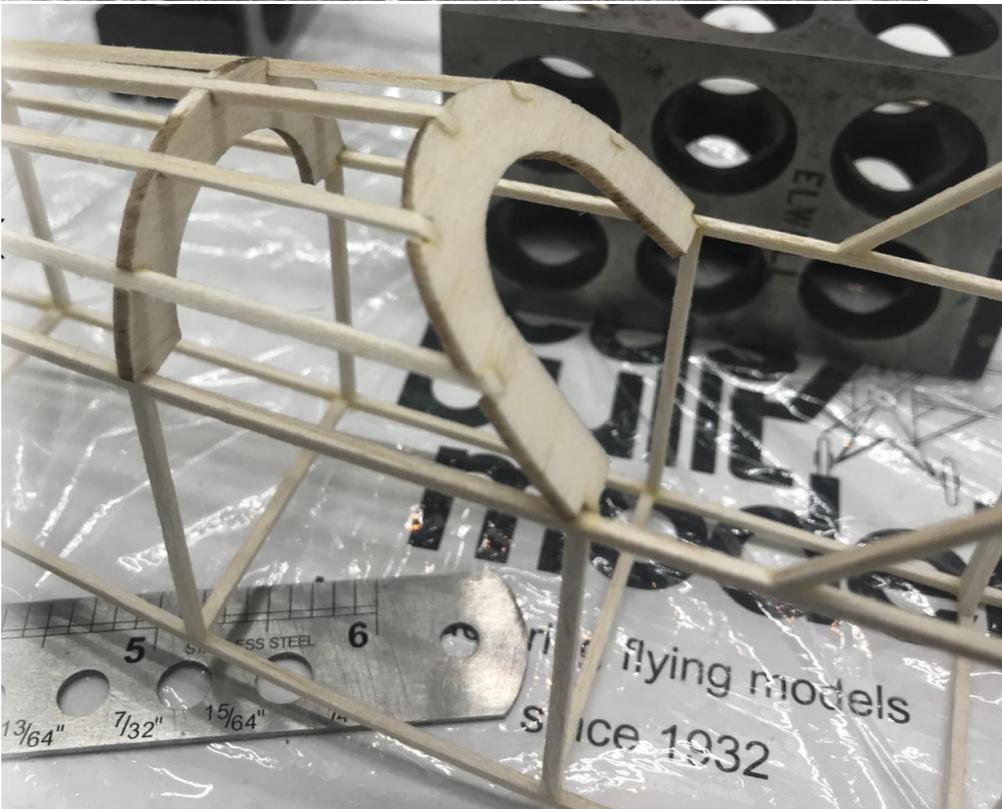
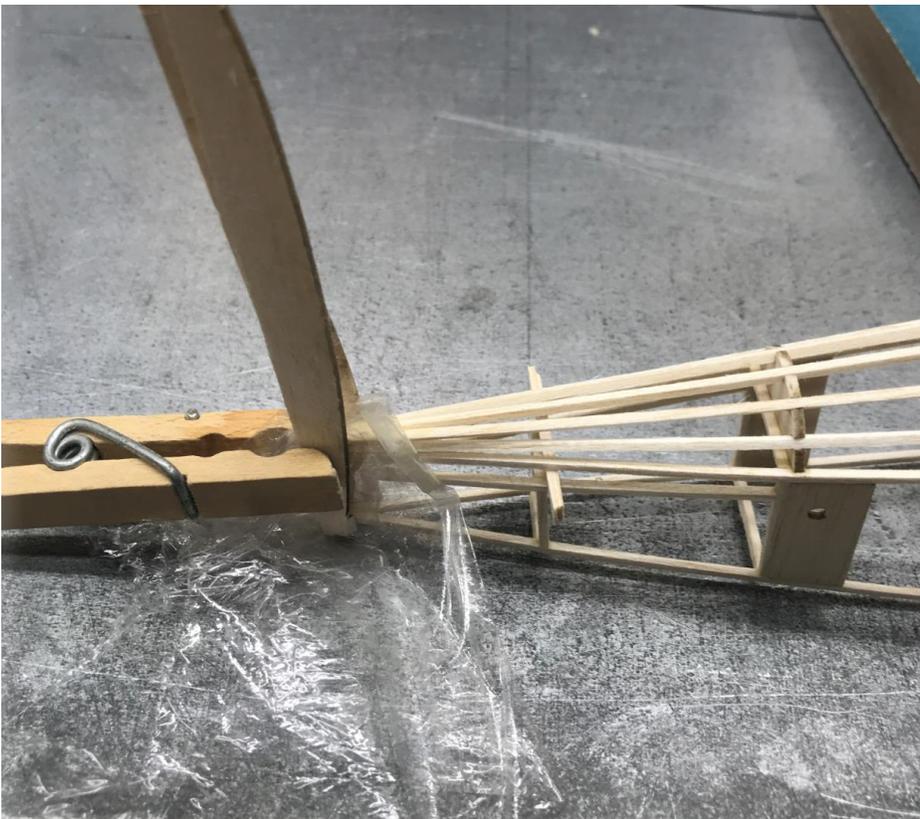
17. Back to the nose now that the glue dried. Fill in the rest of the stringers on the top and bottom. Once they dry, trim close to the former and then finish sand them flush.



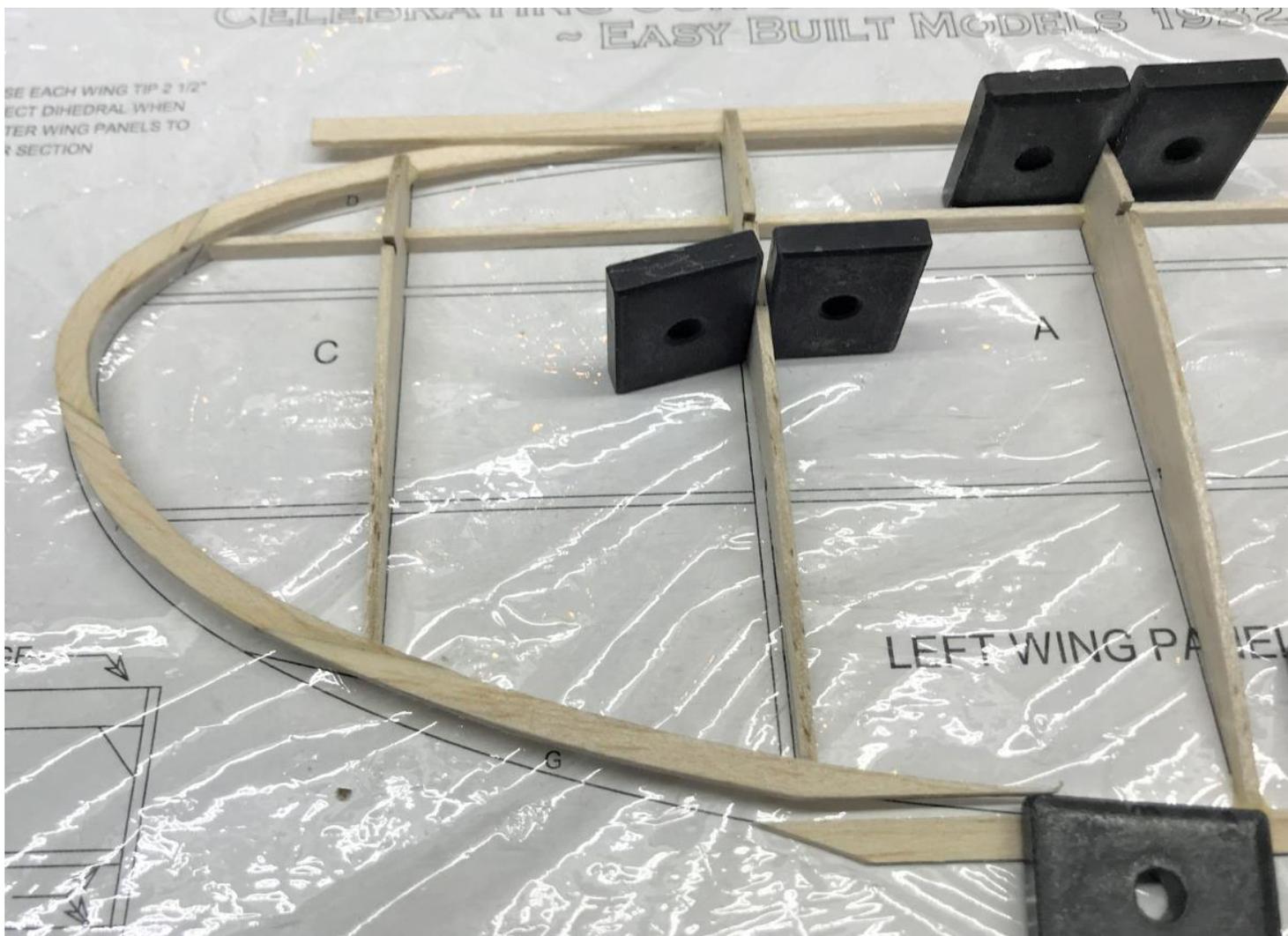
18. Cut an oversized piece to begin making the nose. Glue to the nose and then sand to match the shape of the formers. Don't go for the final dimensions and you still have the nose block to include in the sanding process and these should be combined for the task.
19. The next step is optional for those wanting to have a solid nose for handling and strength.



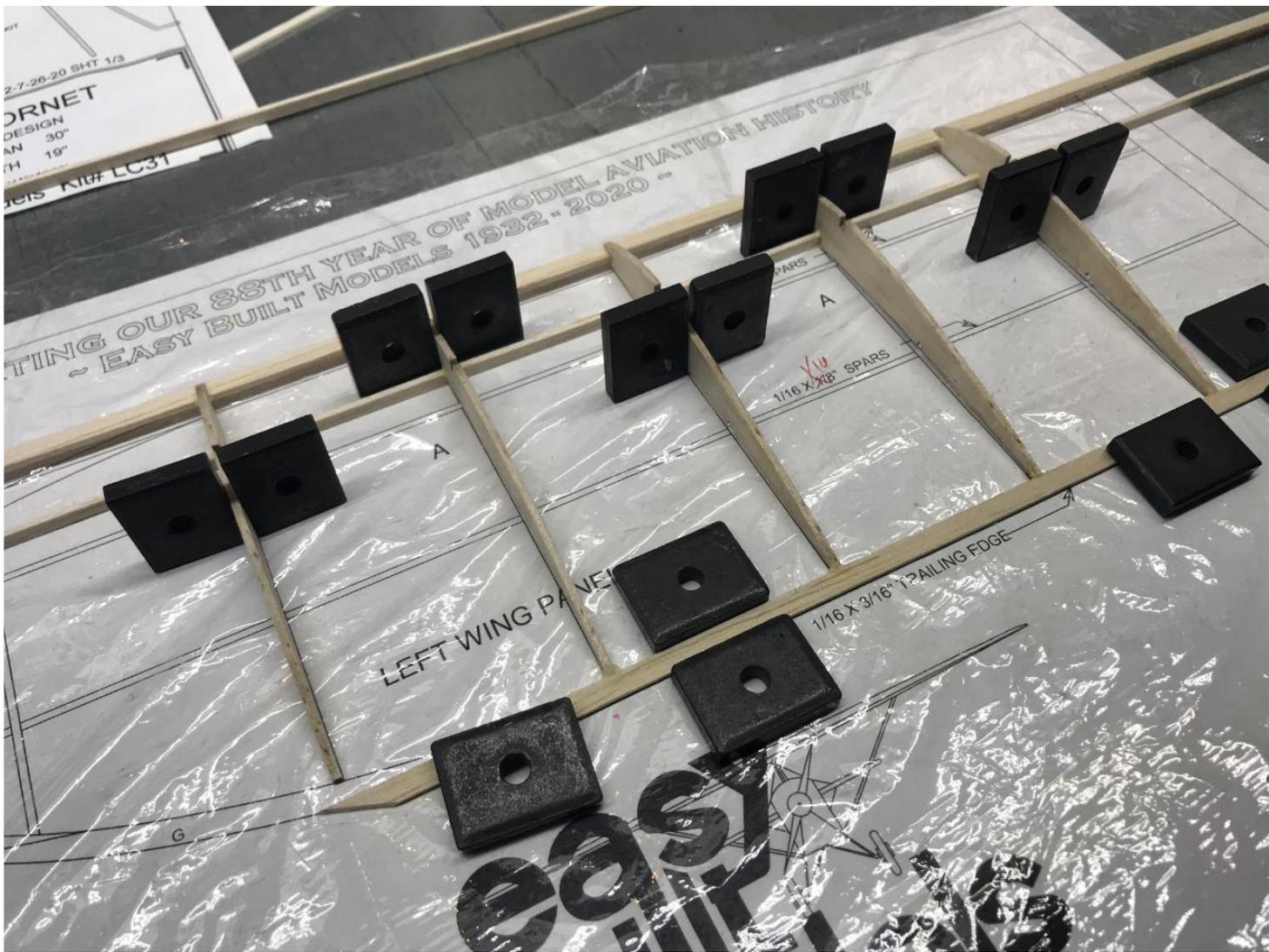
20. Cut some oversize pieces for each opening. Then one at a time sand to fit into the opening. Use light balsa and let it protrude so it can be sanded to final shape after the glue dries. I like a longer than average key on my nose block but this shows you how it all goes together for the removable nose block.



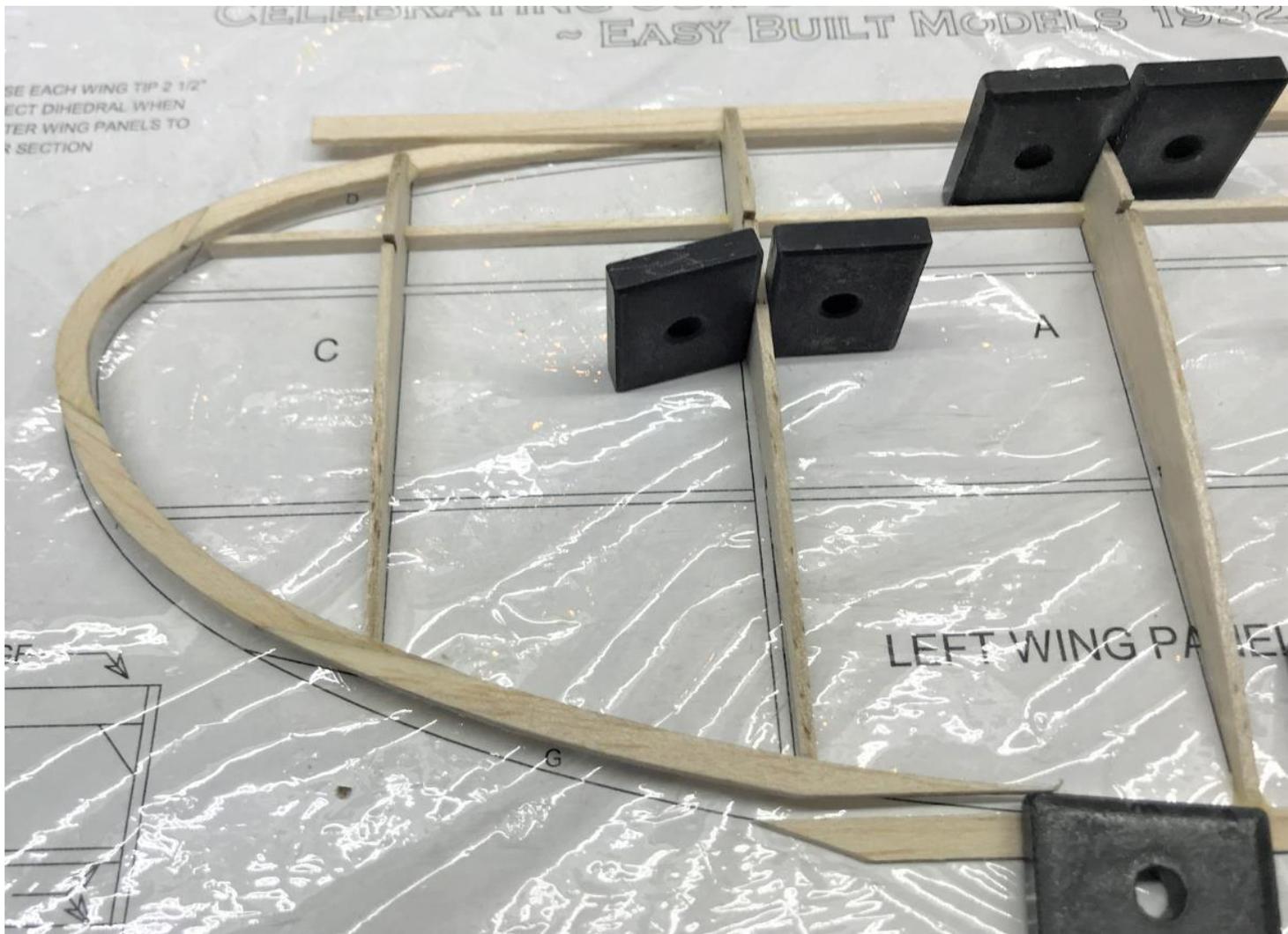
21. Top off the rear of the fuselage by adding stringers. I used a simple close pin to hold the rear in place while I added glue to the stringers. There is a piece of scrap strip wood used as a spacer for the stab slot. When dry the structure becomes surprisingly strong, trim the ends close and sand flush. The plastic keeps the glue from sticking to the clamp and the folded cardboard spreads the clamp pressure over a larger part of the structure.



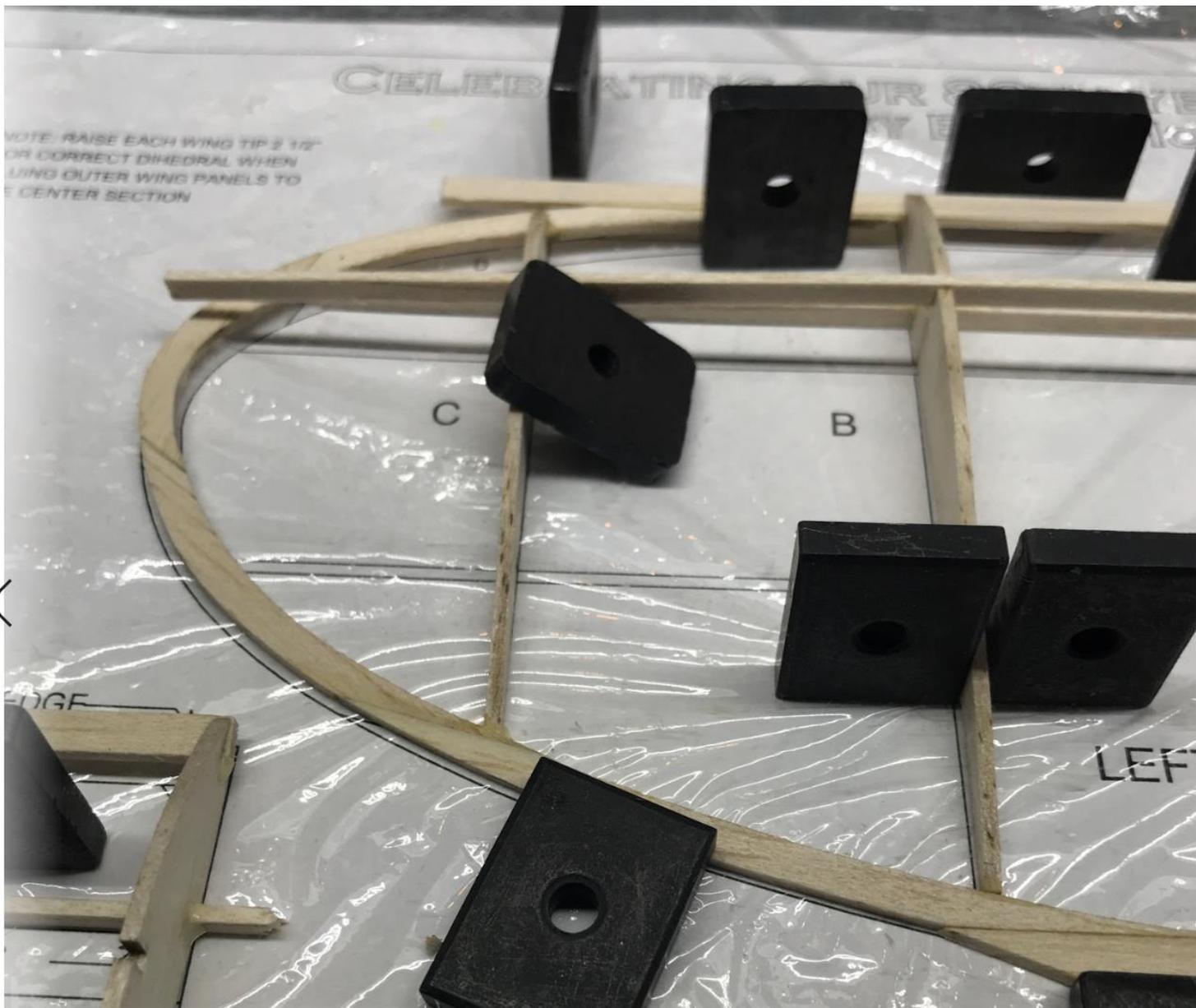
22. Sorry but I missed taking a picture of the wing tip parts laid out and glued up separate from the wing much like the stabilizer outline. This makes installing these a whole lot easier when the time comes. So make a pair of wing tips and let dry.



23. On to the wing. Position the lower front spar and then slip the ribs over their respective locations. Don't glue anything yet. Slip the leading edge (LE) into the slot in the nose of each rib. Now using the magnets to hold in place, make sure all the parts are aligned with the plan before gluing. Next trim the trailing end of the rib to align with the trailing edge (TE) on the plan. Glue the TE in place. Notice the wing tip parts are not installed yet.



24. With the wing panel dry, slide the wing tip outline into place and glue.



25. Add the top spar. The last part between rib C and the wing tip will have to be cut to fit and glued in.
26. Repeat and make the other wing panel

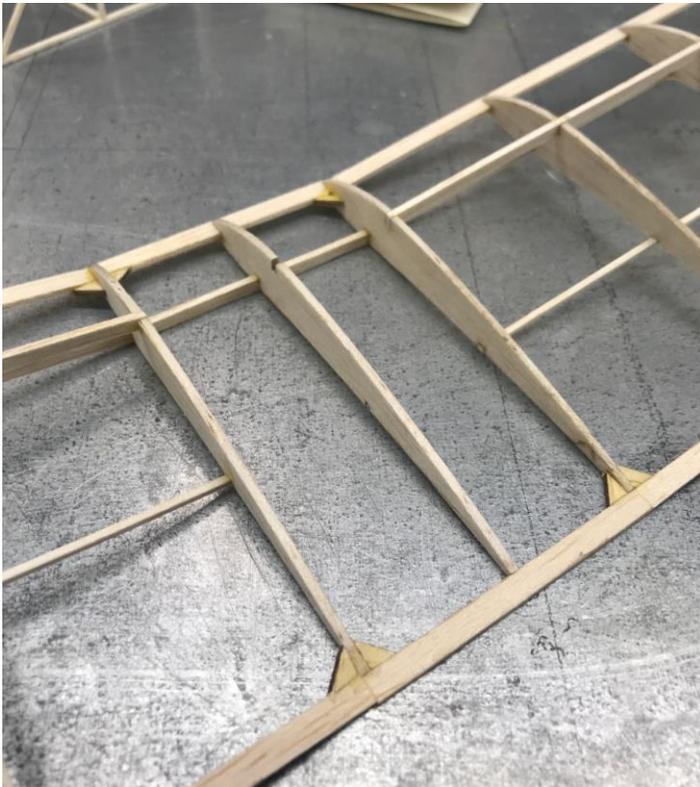


27. Make the center wing panel.

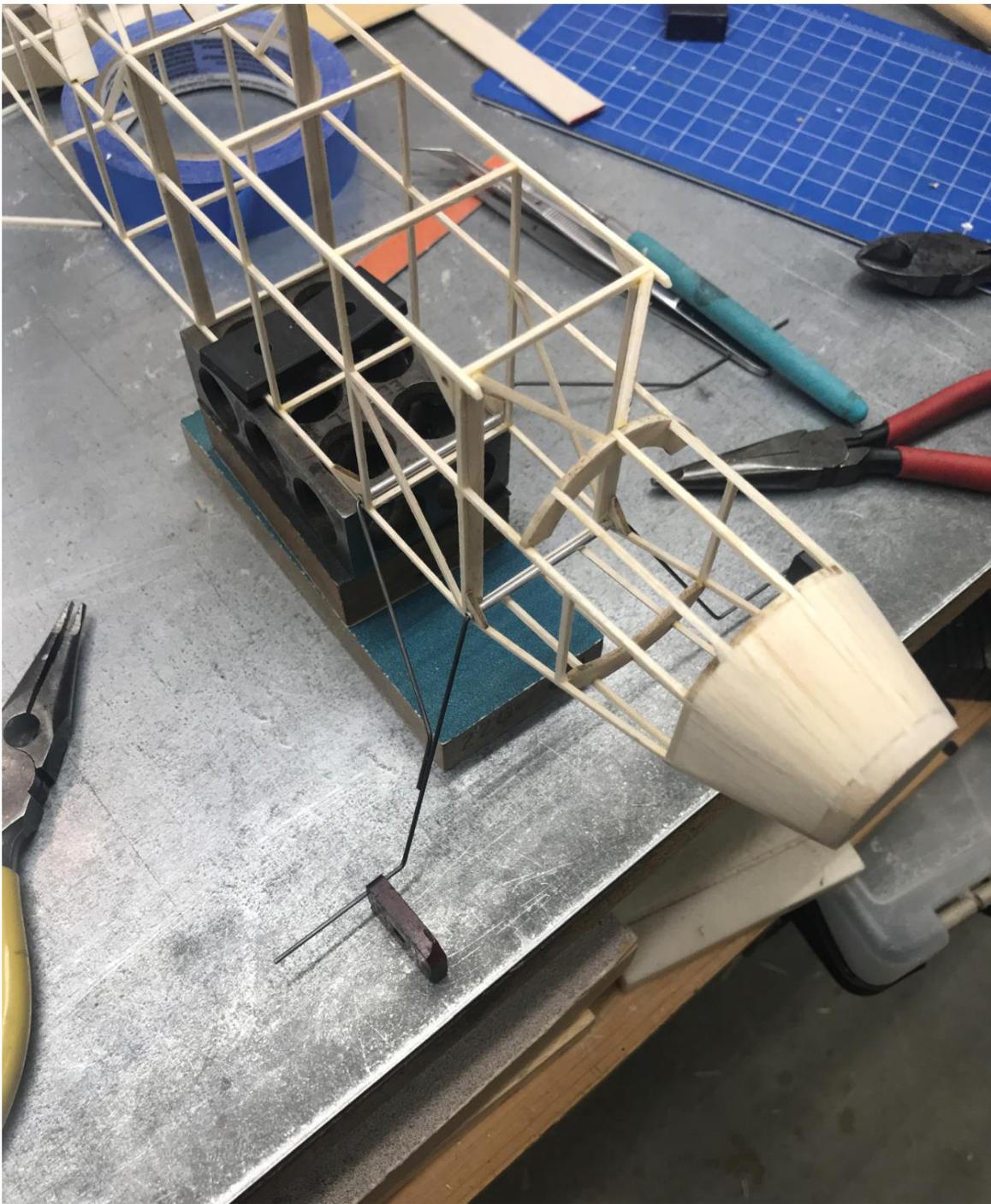
28. Take your time and sand the wing panels smooth. Sand the LE and TE to finalize the airfoil shape of the wing.



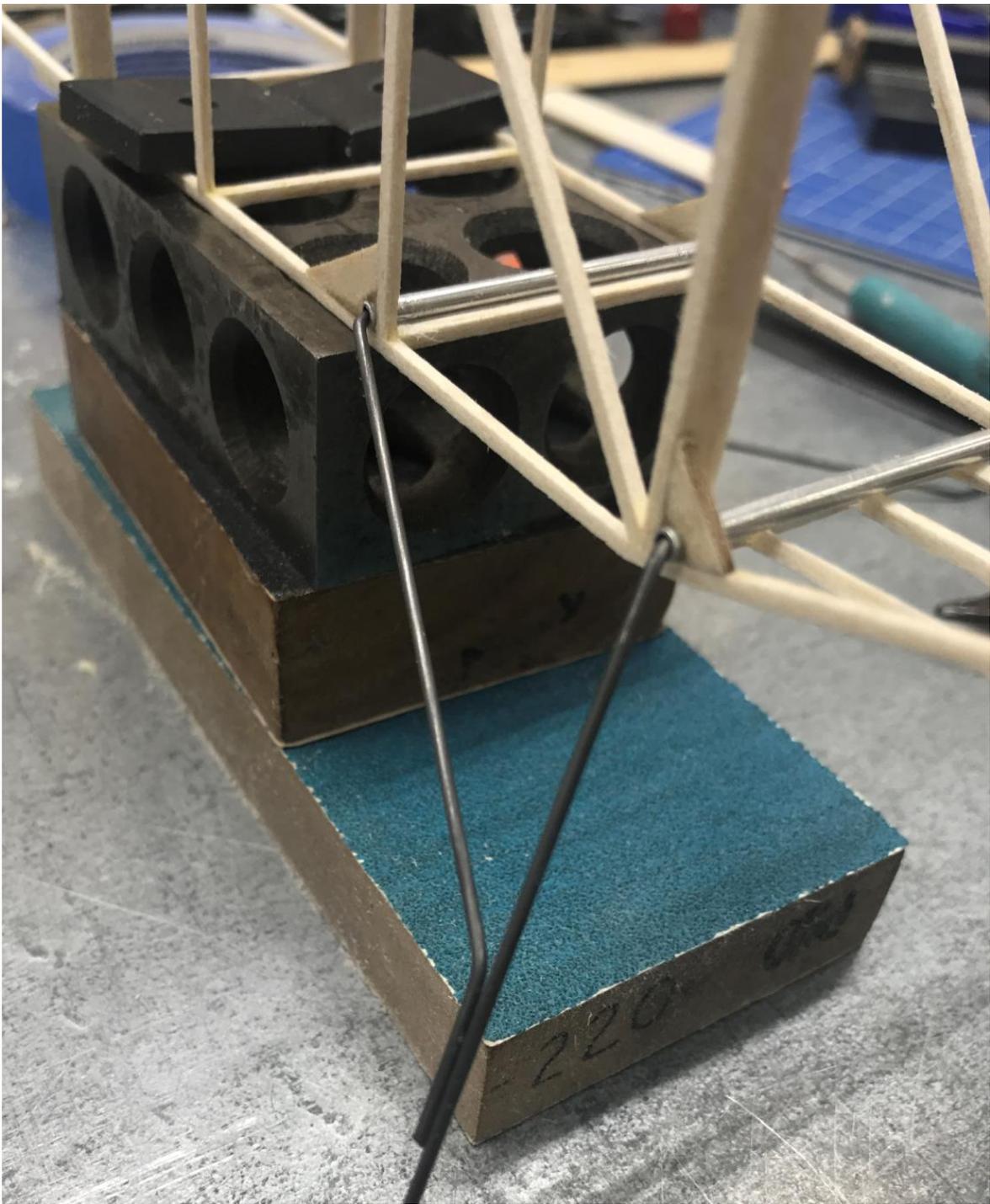
29. Time to build the dihedral into the wing. I set my wingtip height for one wing and then brought the center panel into position being sure to keep the LE and TE forming a straight line from one panel to the next.



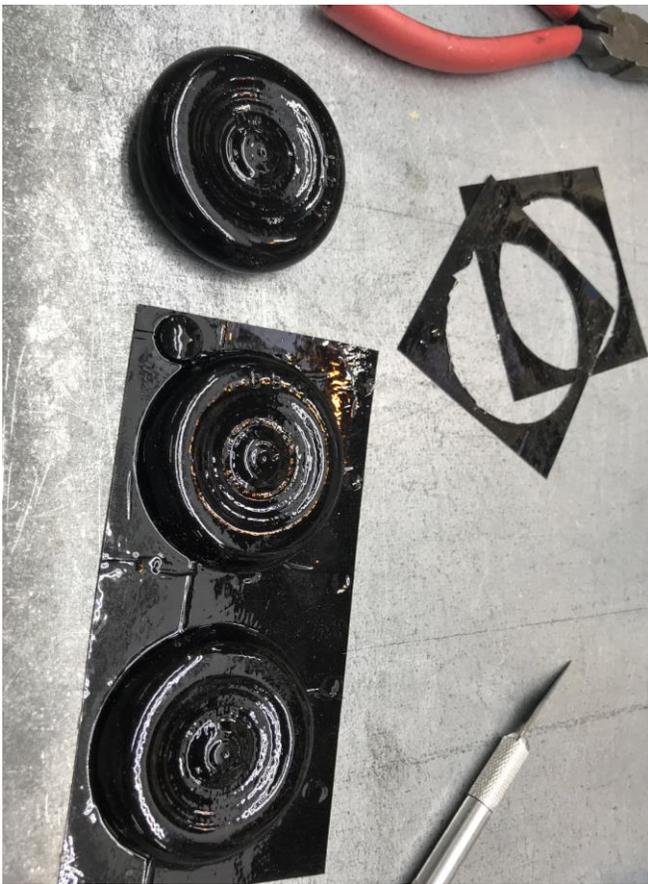
30. Once the glue dried, I repeated exact same set up for the other side's wing panel. Then added the little corner gussets for strength and last tied in the top main spar. Then do some final sanding to make the covering job look nice.



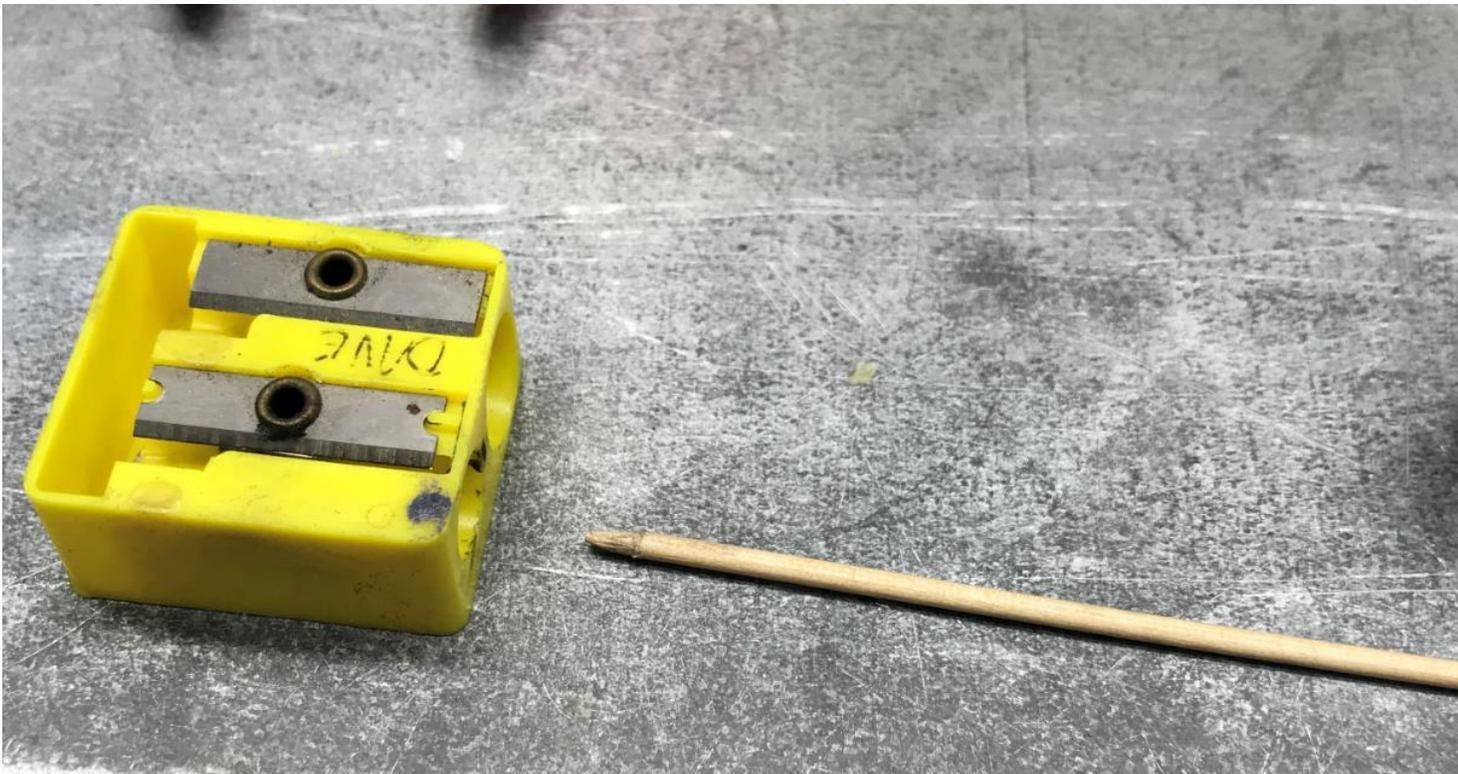
31. Landing gear (LG). Optional is to make them removable by installing two aluminum tubes internally to act as receivers for the plug in LG wire. To get the alignment as close to straight as possible I used a combination of magnets with reference lines on my building board and the building board edge. Standard installation is to bend the wires so that they span the fuselage. You will slide the wires into position before soldering or gluing together near the wheels.



32. For reference



33. I spray painted the inside black so it won't wear off. During the spraying of the tissue sealcoat, I used satin clear spray and intentionally went over the wheels to give them a more rubber like look. Go to our website for instructions on assembling the wheels. <https://easybuiltmodels.com/tutorials.htm#gsc.tab=0>



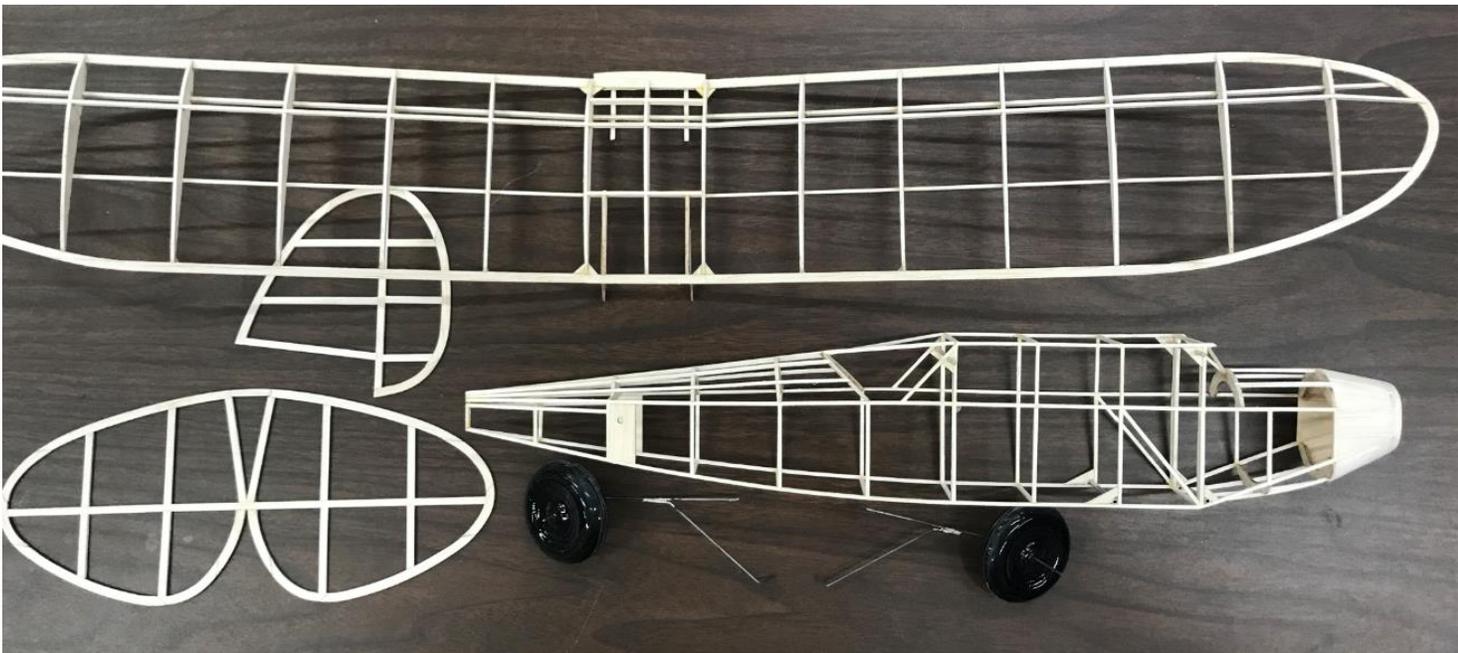
34. Get out your old pencil sharpener for the next step.



35. I find the sharpened ends to be gentler for easing the wing hold-down dowels into place. **DO NOT GLUE IN AT THIS TIME, WAIT UNTIL AFTER THE PLASTIC WINDOWS ARE INSTALLED OR YOU WILL HAVE AN ALIGNMENT NIGHTMARE.**



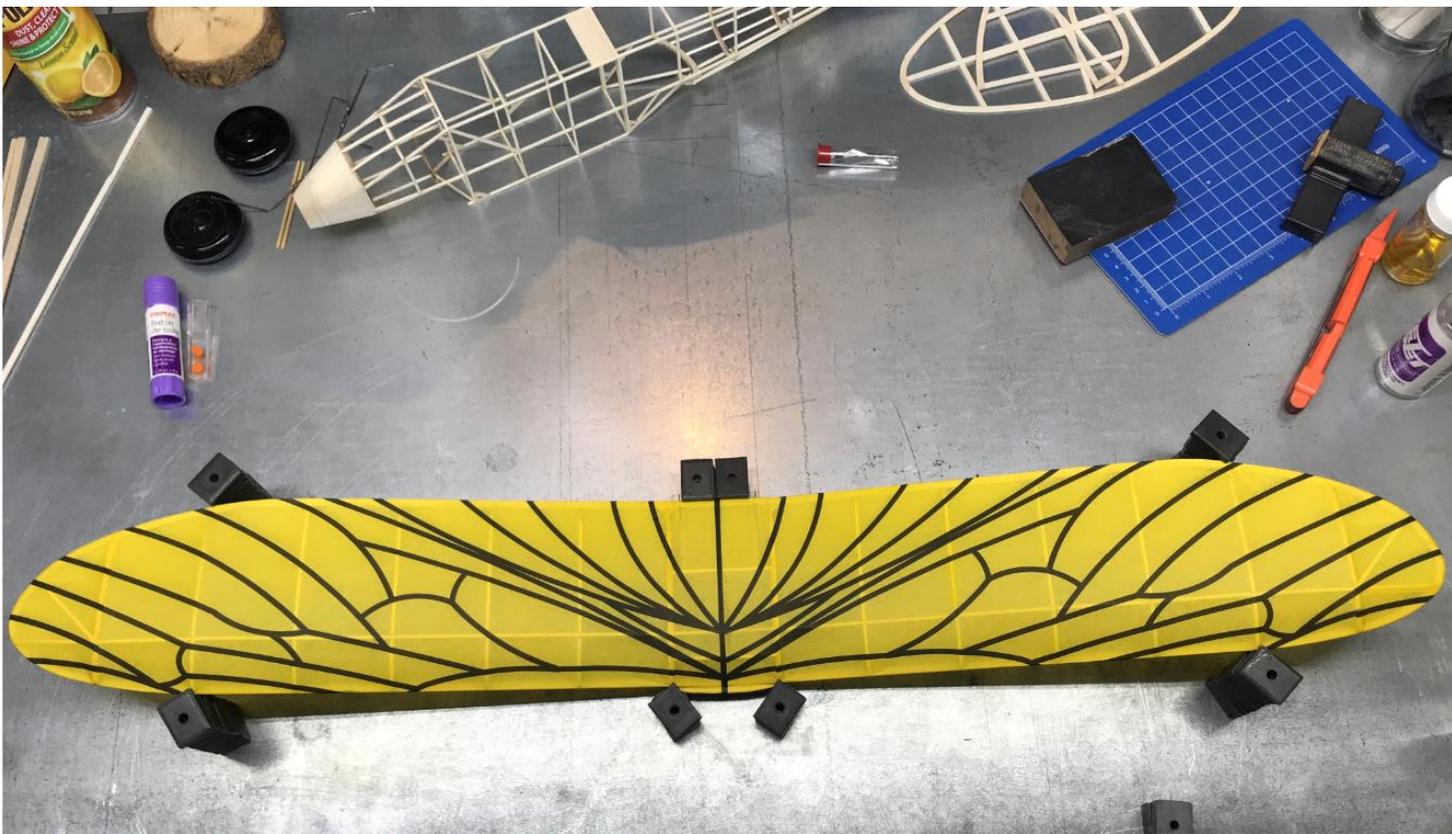
36. I like to make my wing a little more secure against shifting out of alignment. Also, I made an optional pop-up wing dethermalizer. Too much for this article but in case you were wondering why mine has extra pieces of wood. Understand each of you can personalize your airplane build to as much or as little as your heart desires so don't be limited by the plan. Have fun with your build, personalize it.



37. Woohoo! You got your bones all built. Congrats. Time to make sure you've sanded the structure smooth all around as this only improves the final appearance of the covering job.
38. I'm not going to go through each individual step for covering here. That is a whole nother book. In our Building Tips section of our website, we talk more on the topic. I'll put a few pics here with some pointers that you might add to your tool box.



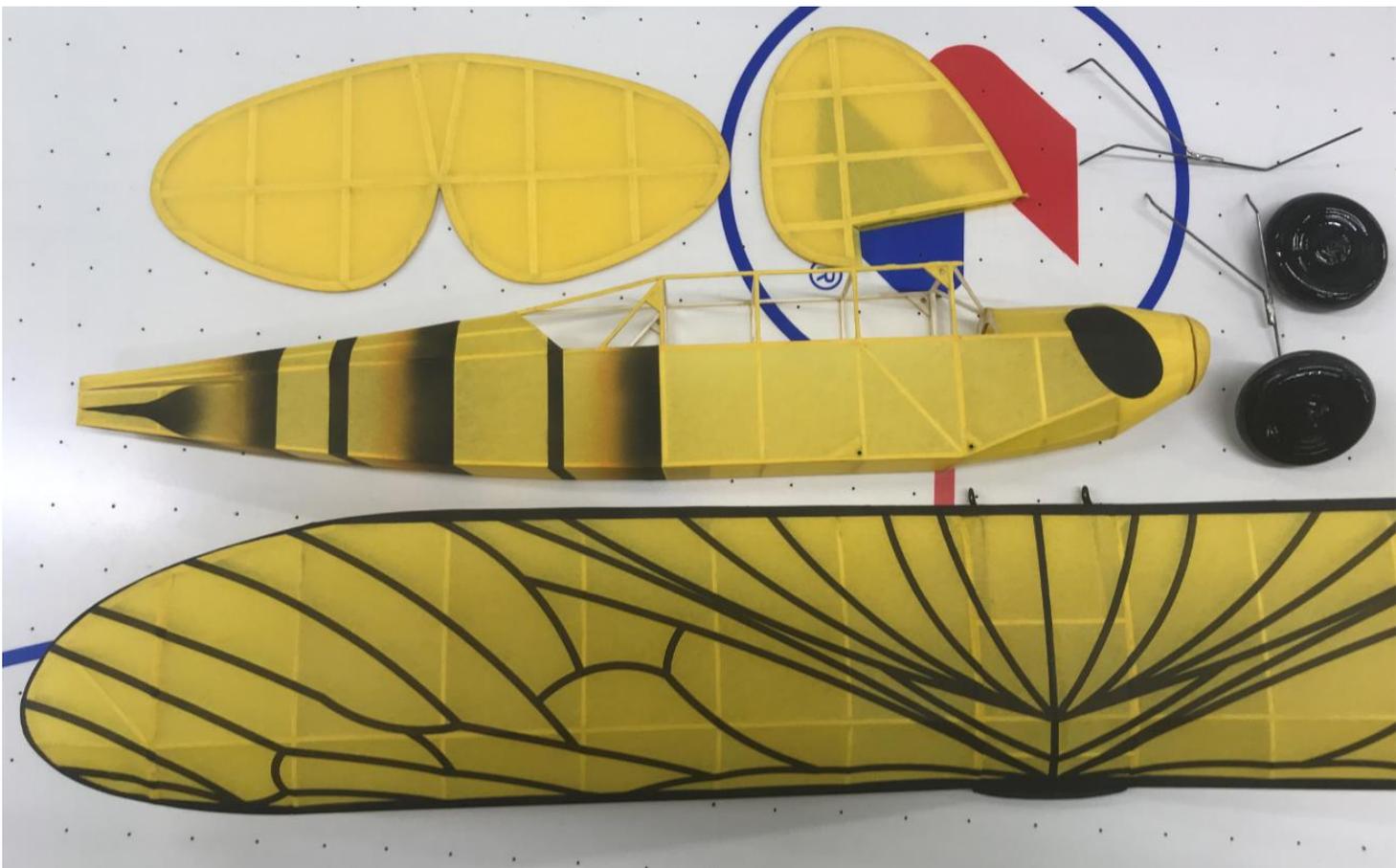
39. A brand-new sharp blade is always the best way to start out a covering job. It will cut the tissue instead of tear it. You only want to use the lightest of pressure as you guide the blade along the edge of the balsa. I use these edges as my overlap points to get the best bond of tissue to tissue.



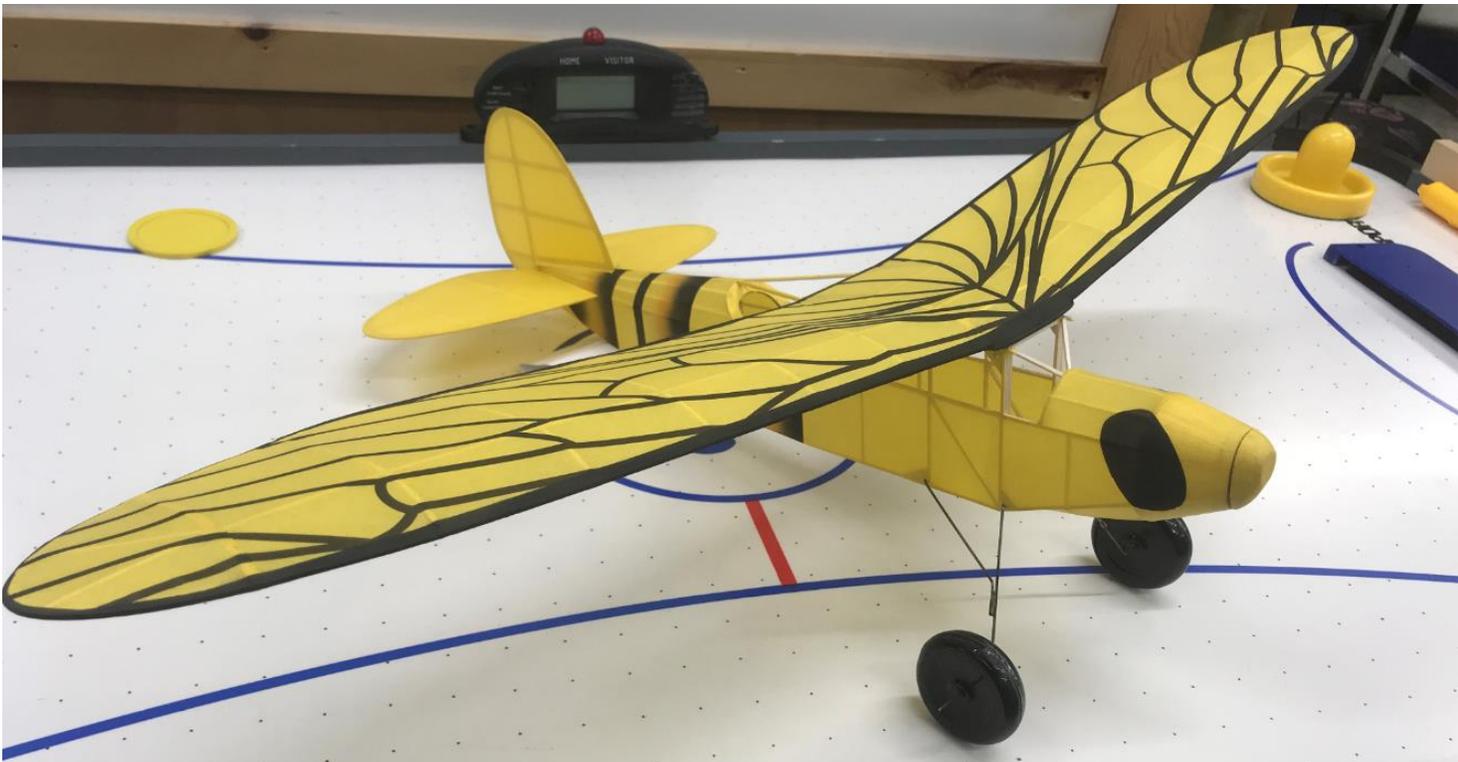
40. The wing is covered and I've sprayed it with water for the final shrink. I'm doing this on the building board so that as the tissue dries, we are hoping to minimize the entry of warps.



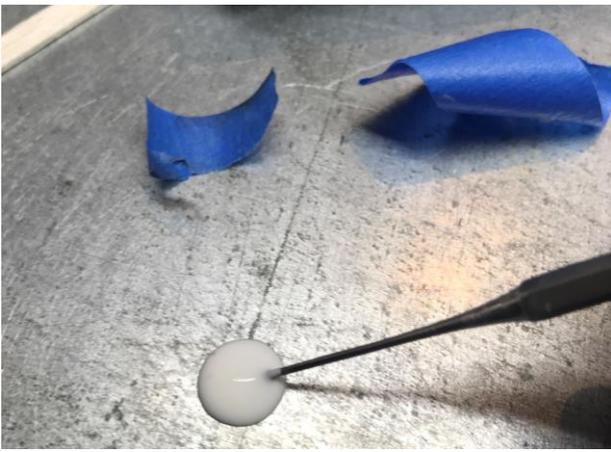
41. I actually elevate the wing on magnets when I'm clamping it down so that air can pass under and over it for even drying.



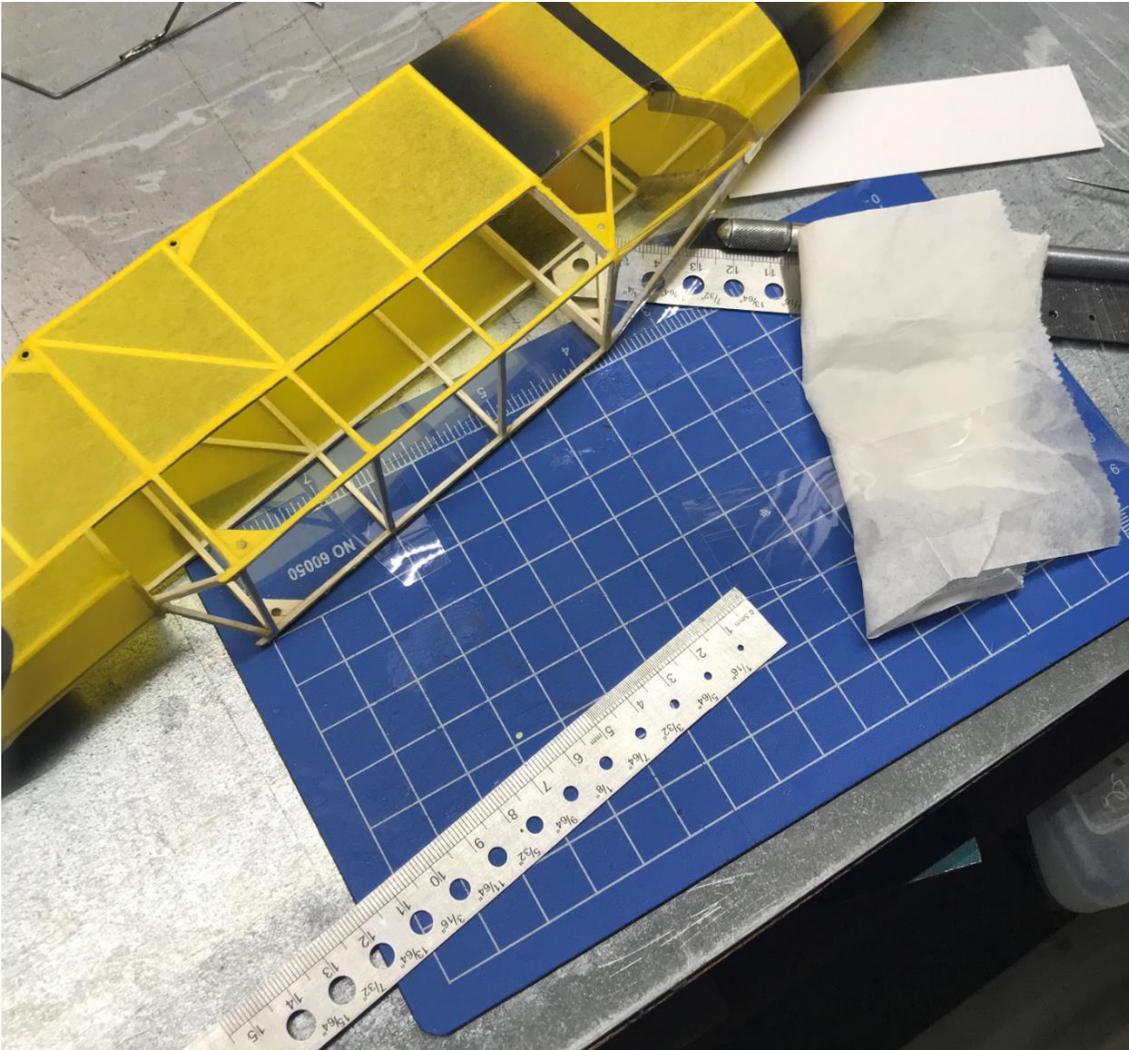
42. All the covered pieces. When I was a kid, I used to glue up the entire skeleton before starting to cover. Now I know how hard I made the task and if you are doing this, I'd encourage you to try doing in sub-assemblies. I do as much of the markings before applying to the frame as possible. The lace pattern was put on the tissue making 6 separate overlapping panels. I put the center underside first then the outer underside panels then repeated on the top in the same order. Each time I would have to make sure all those lines matched up. The fuselage eyes are large egg shape cut outs of black tissue. The banding on the rear of the fuselage was done with masks and air brushing 3 different colors. Wasn't too hard.



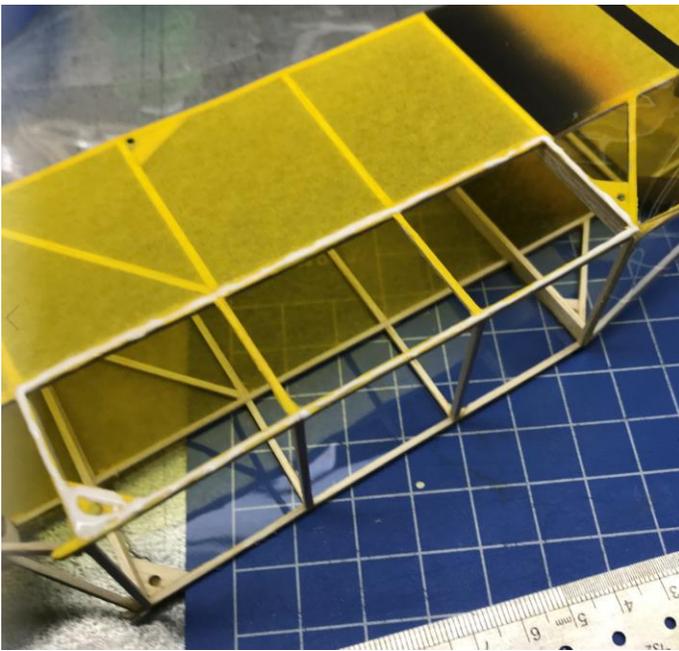
43. Looking good but missing some windows and a prop.



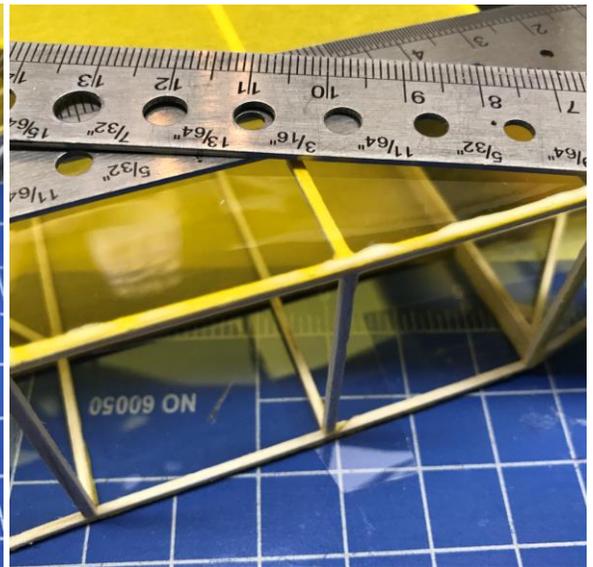
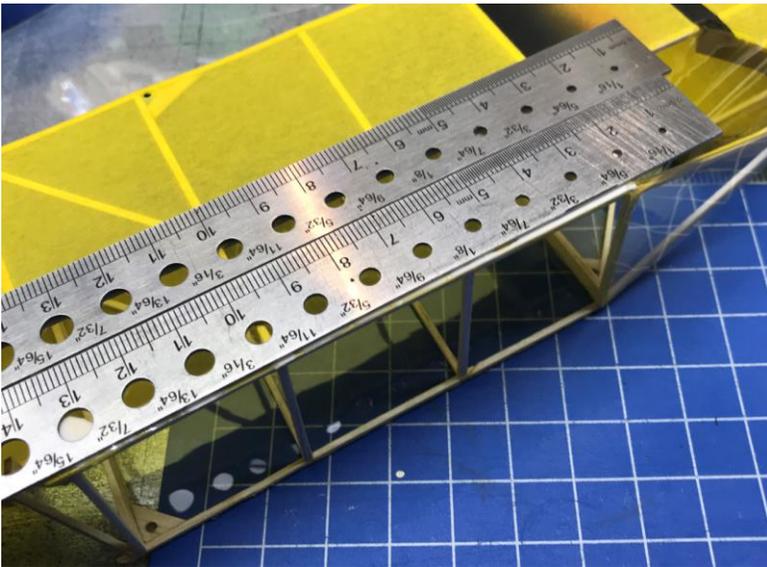
44. Important tool for putting on the windows – painter's low tack tape, a [jeweler's awl](#) and [canopy glue](#).



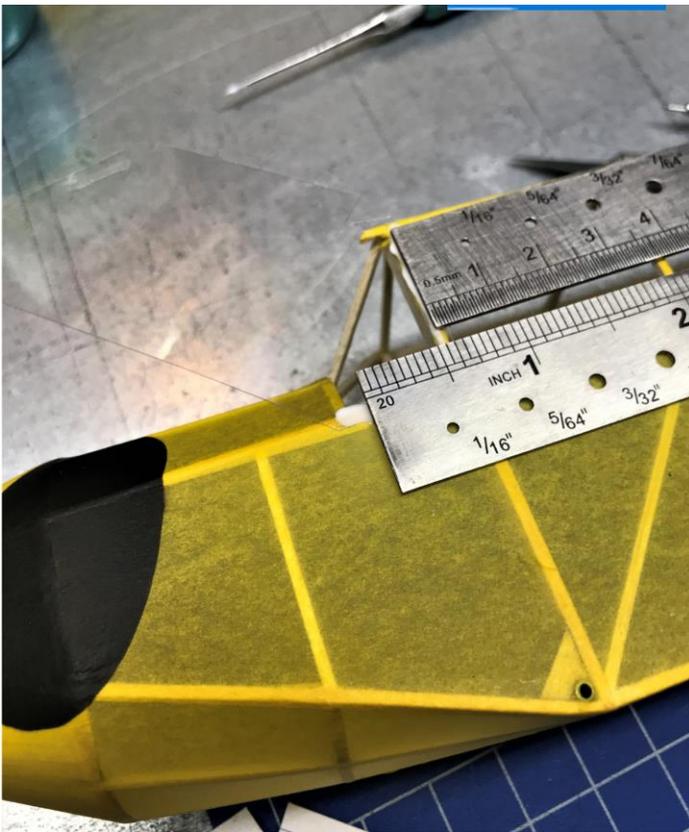
45. Other nice tools to have – [heavy stiff rulers](#), [sharp hobby knife](#), and a [cutting mat](#).



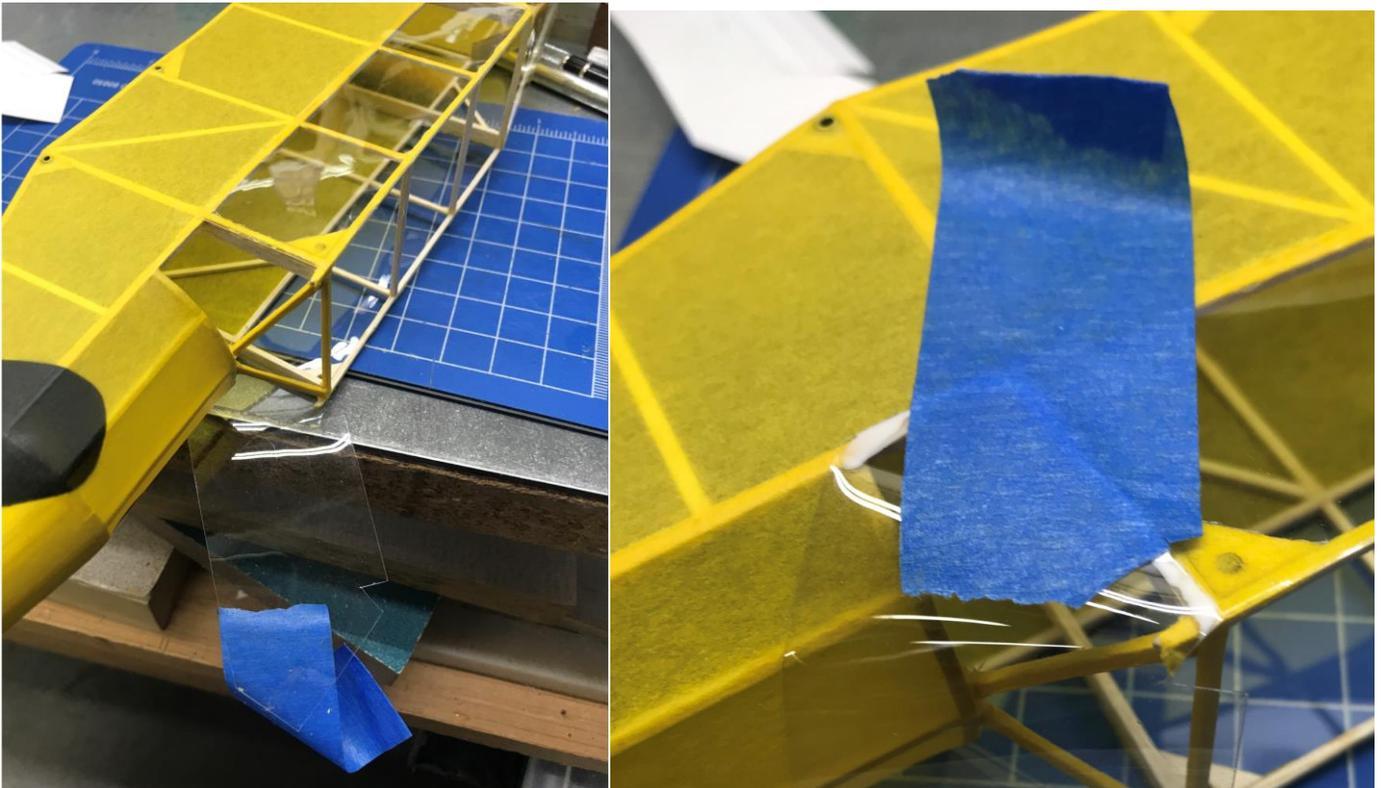
46. I did this plane with 4 separate window panels. Using the jeweler's awl, I lay a bead of canopy glue around the frame where my window panel will be placed.



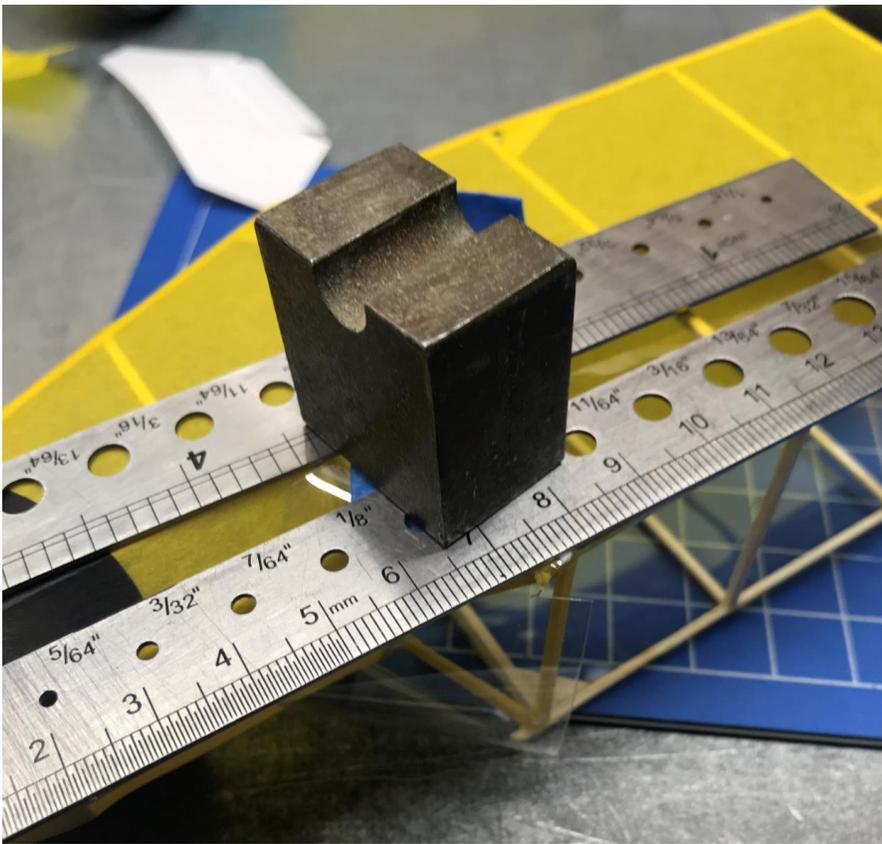
47. With the window panel in place, I laid these [small heavy rulers](#) on top the window to keep an even pressure all around while the glue dries, about 15 minutes.



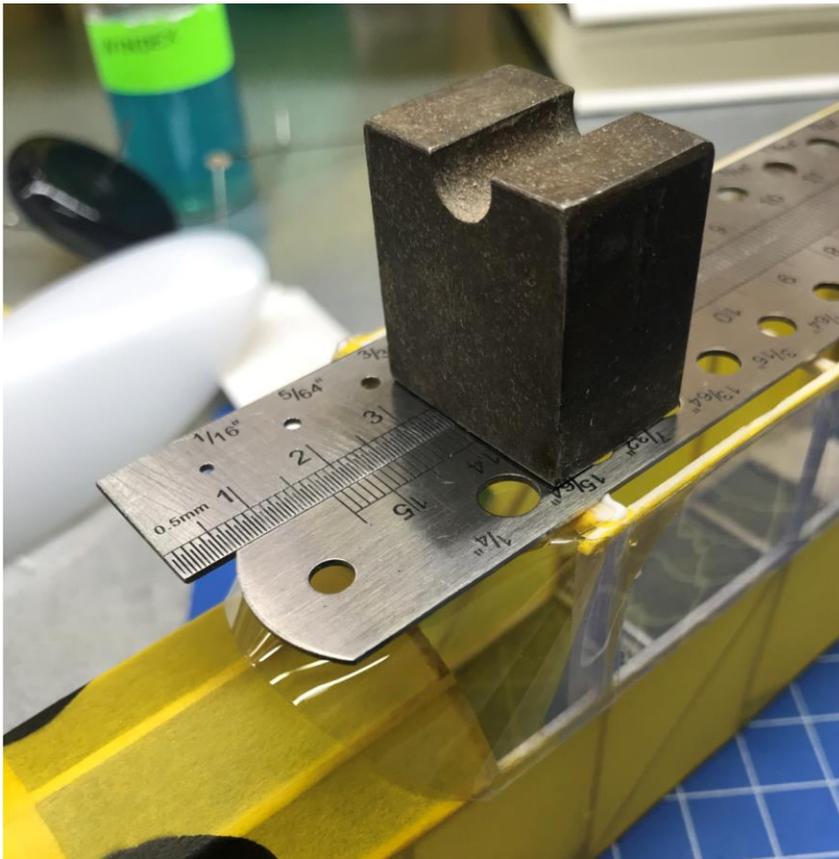
48. If you look closely the front window panel is only glued at the corner and the rest extends out. After several trial and trim efforts to get the window just right I'm able to glue in place at one point. Once dried I can then wrap it around.



49. Now with the glue dry at the initial corner to act as an anchor, I put some painter tape on the other end. I do one last check for alignment then put a bead of glue on the other end. The tape then holds this in place while the glue dries. No glue in between yet.



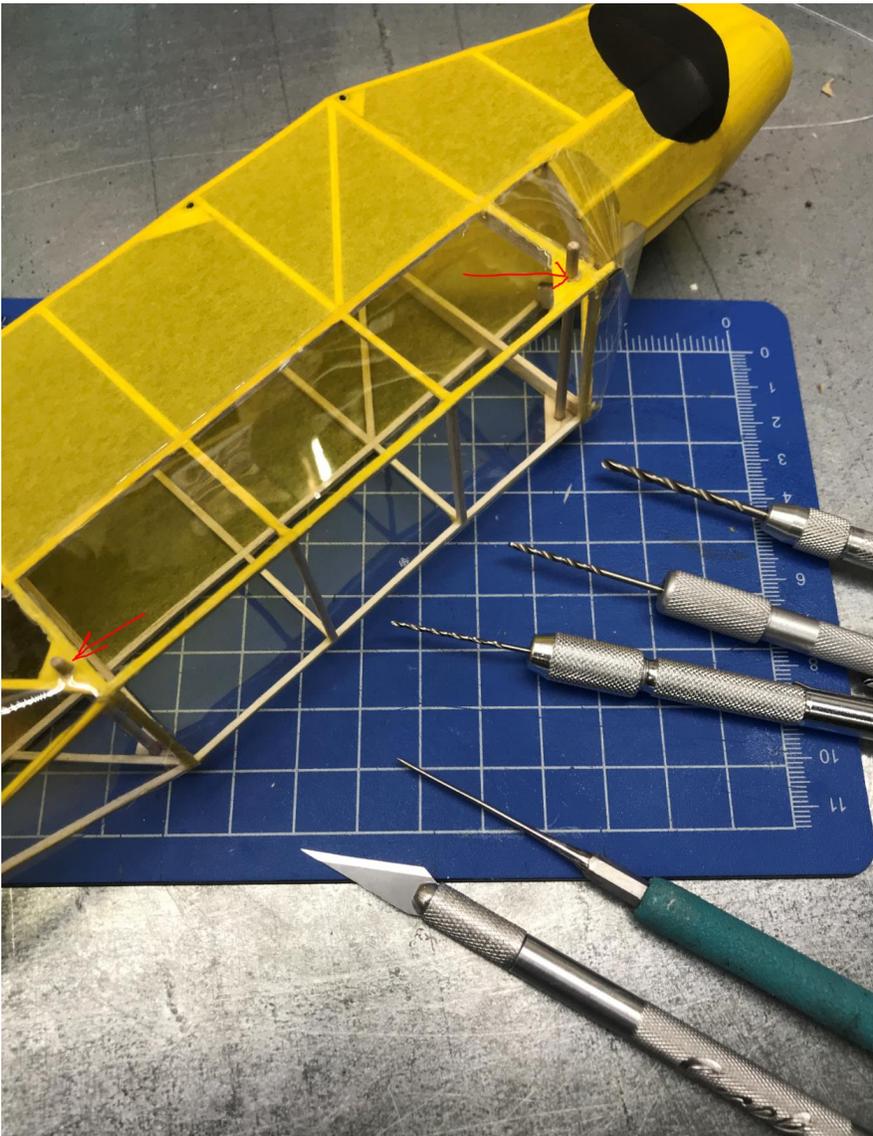
50. To ensure a good bond since the plastic is under a load to spring away, I used my trusty heavy steel rulers one more time with about a 1" cube of steel on top.



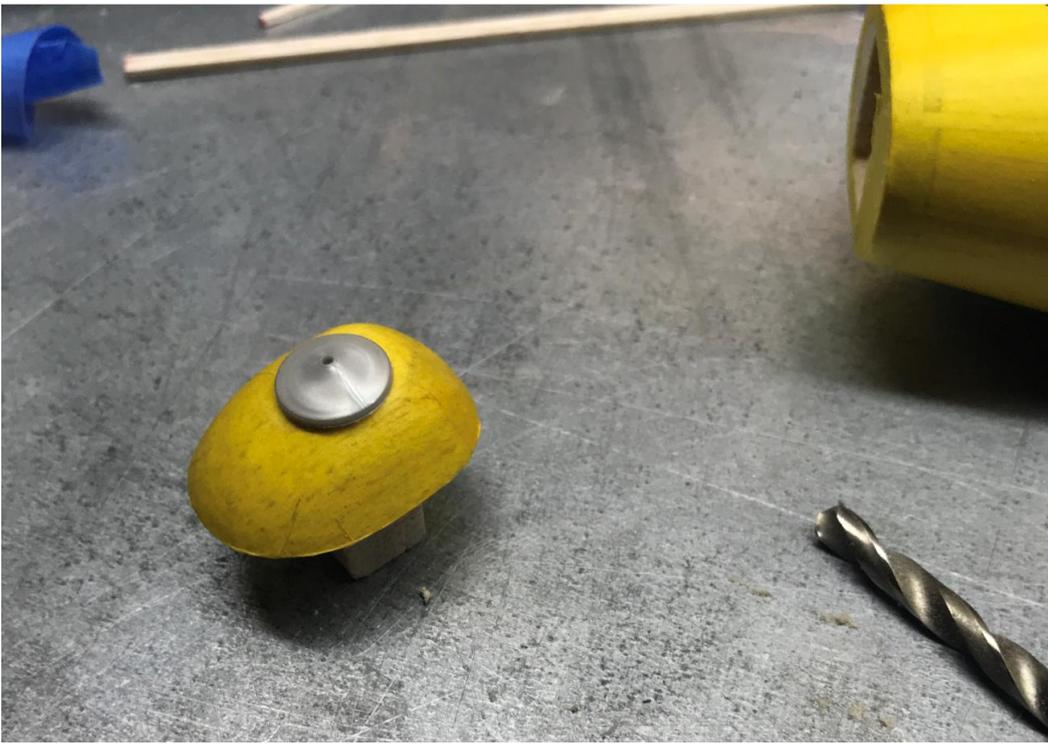
51. With the side corners glue all dried the front wind screen is now held in place sufficient to work in between. I put a bead of glue across the top crosspiece. Then carefully bend it down into place. Tough part is not sliding it or you get the smudge. Now the rulers again with the steel block will hold it until the glue dries. I'll use a strip of tissue with glue stick to carefully form a frame across the bottom of the front windscreen.



52. I made a piece to fit this wrap around rear window. To take the spring out of it I put a crease in the plastic from each of the top corners down to the center. This worked fantastic as it dropped right into place without any fight.



53. I said to not glue the dowels in earlier. Now it is time to cut the holes into the plastic. Any of these tools should work for making an opening in the plastic windows. With the dowels slid into place you can carefully glue them.



54. You'll need to put a hole in the nose block for the thrust button. I used 2 degrees each of down and right thrust. Now I'd suggest before putting your prop on that you do some trim flights to get the plane without the drag of the prop to float nicely in a glide. You will then insert the prop shaft from behind the block, slip a bead on the shaft and then the prop. See what length allows for the best prop shaft movement. Last with some needle nose pliers bend the front of the nose wire 90 degrees so it will engage the ramp on the propeller.



55. Some pictures of the finished plane.



56.



57. Here is the pop-up wing DT (dethermalizer) shown in activated mode. I still have to had a timer.



58. The Baby Hornet last seen heading for the hive. We hope you enjoyed your build and have many great flights.