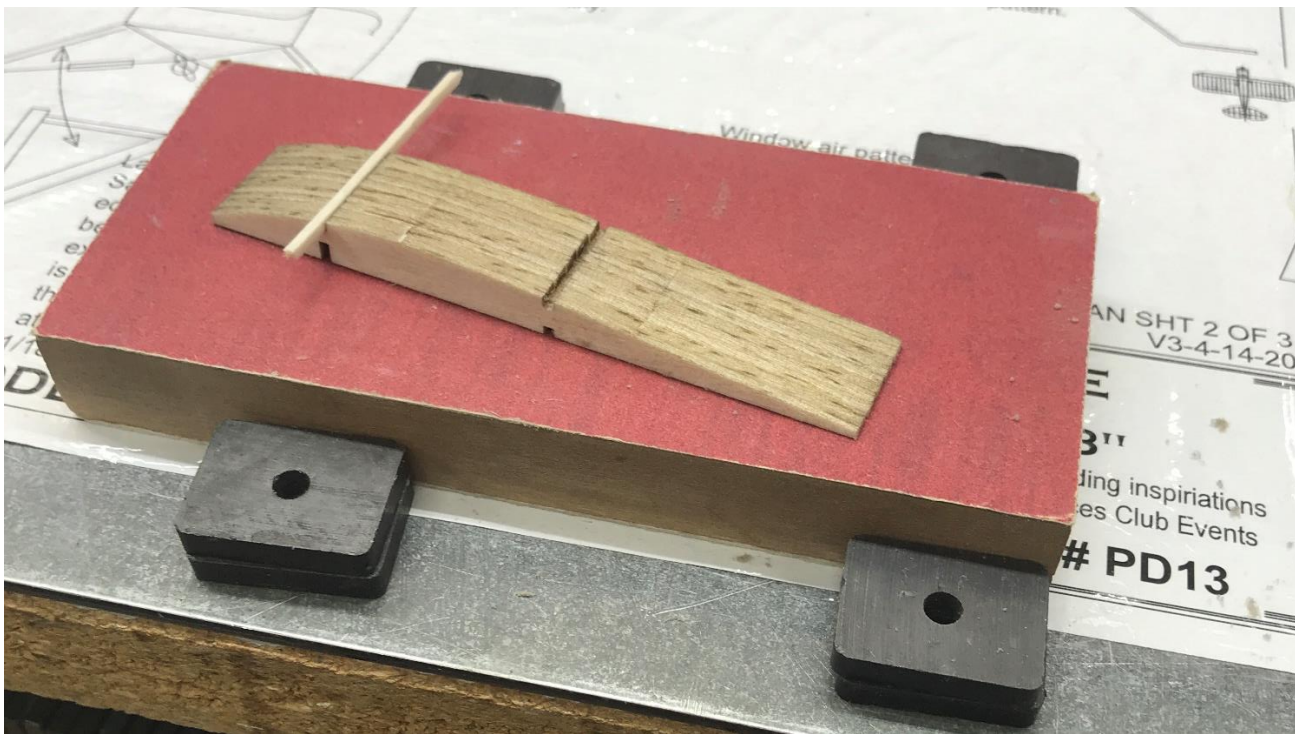


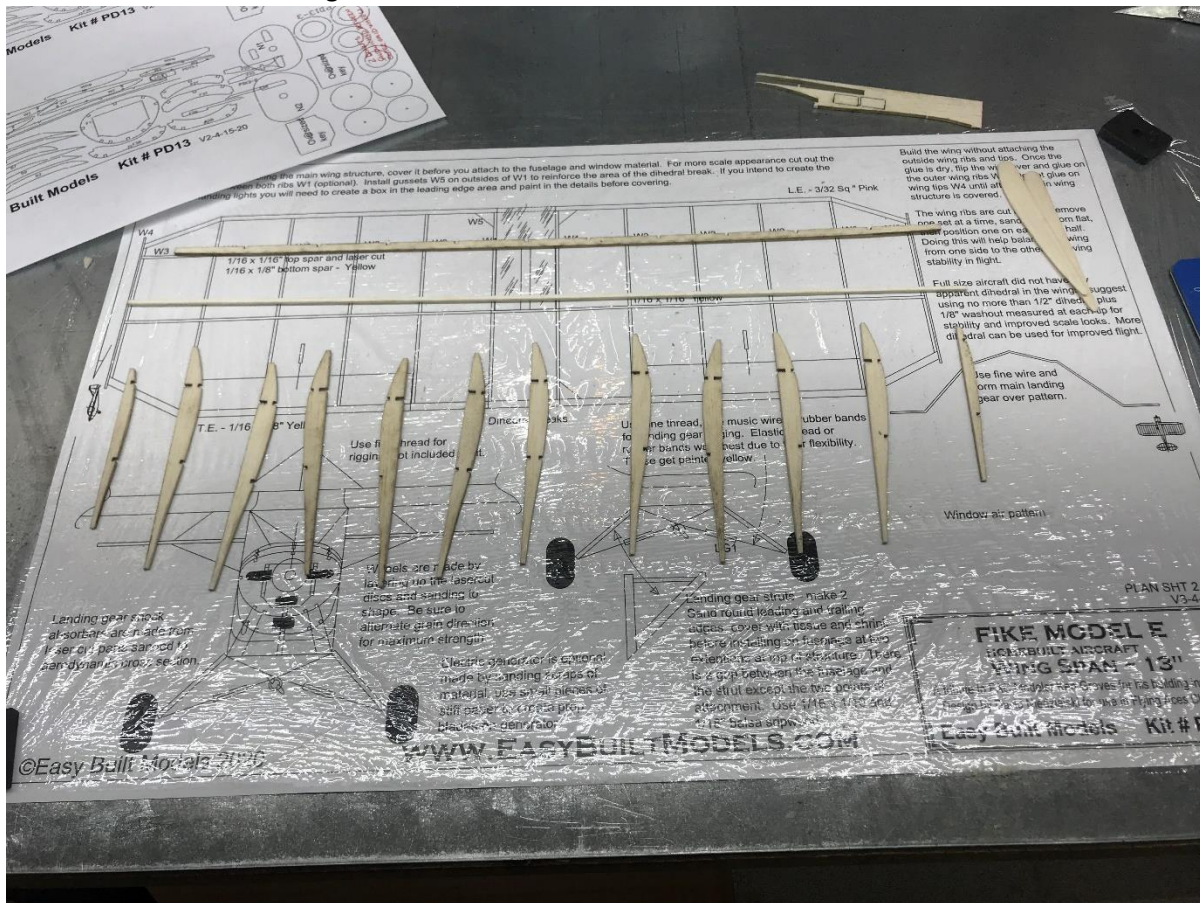
1. This instruction document uses the PD13 FIKE kit from Easy Built Models as the starting point. I've included some steps to add details not included in the kit and these can be skipped if you are doing a basic flying model build. There are several variations of this homebuilt aircraft allowing you to create your own unique model. 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 GOING ANY FURTHER TAKE THE TIME TO GO THROUGH THE ENTIRE DOCUMENT AND VISUALIZE THE BUILD BEFORE CUTTING AND GLUING ANYTHING.



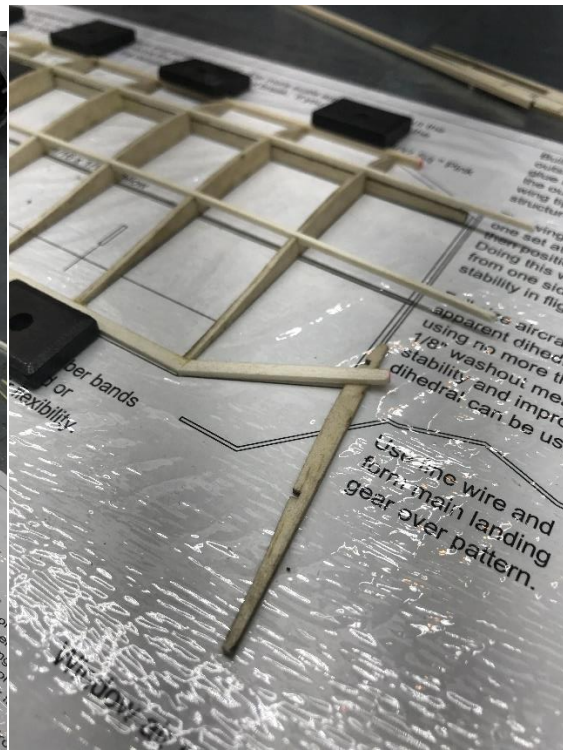
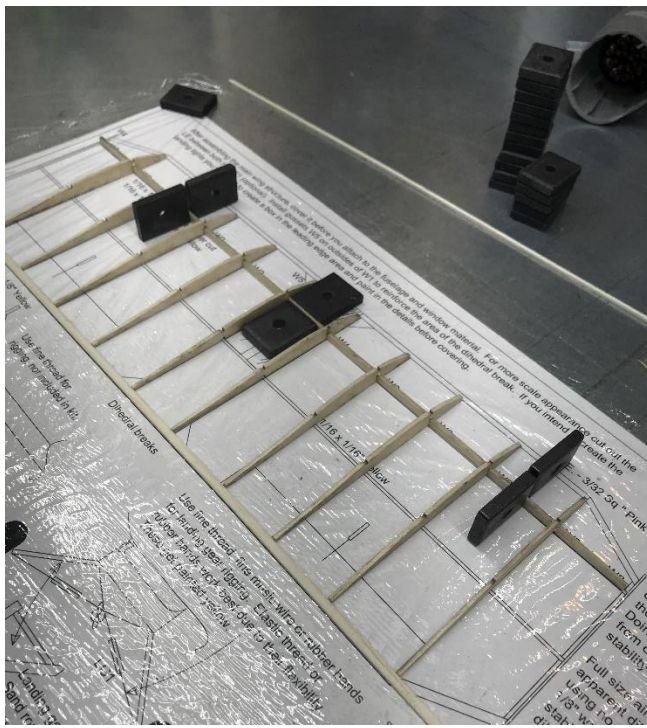
3. Separate the ribs from the sheet.



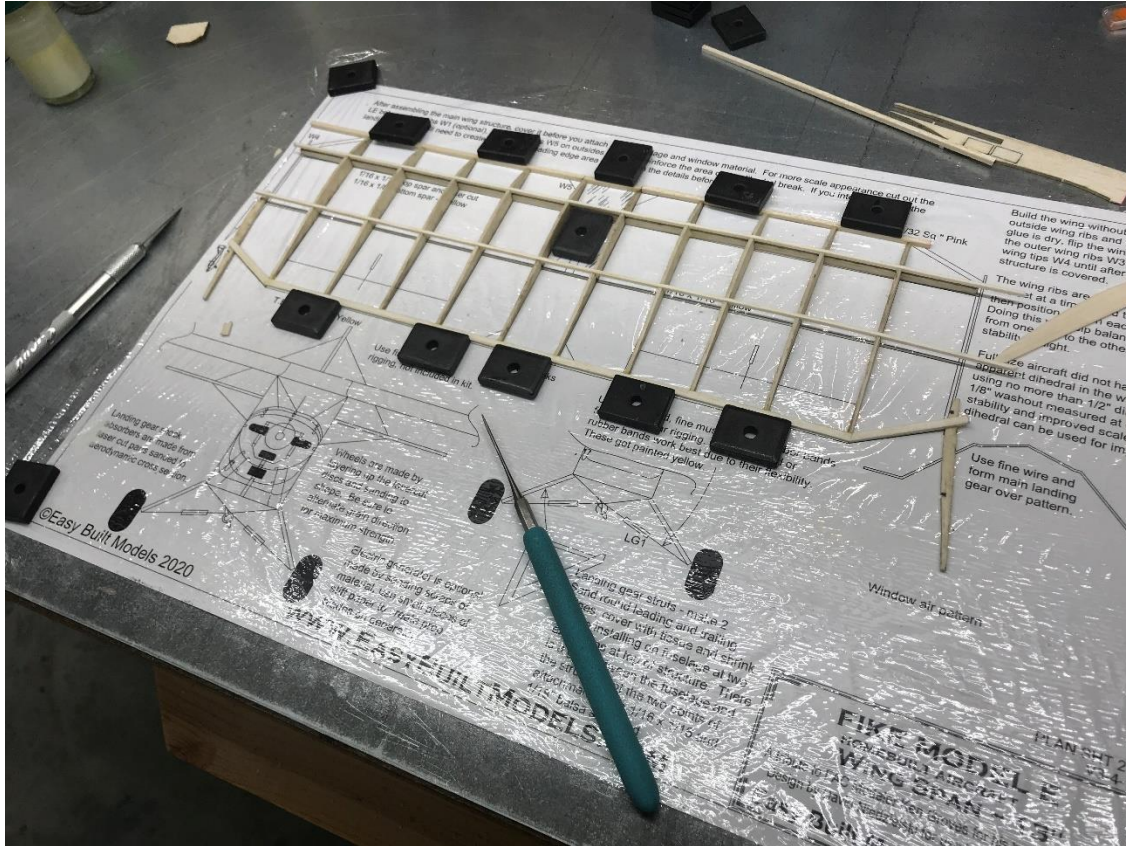
- All the ribs except for the outer ones are identical in size. Stack them up and use a short piece of wood inserted into the slots for the top main spar to align them. Now you can sand all of them to a matched size and remove any of the burn marks from the laser cutting. I'm using magnets to hold my sanding block stationary. I then move the stack of ribs in a circular motion to get a flat bottom.



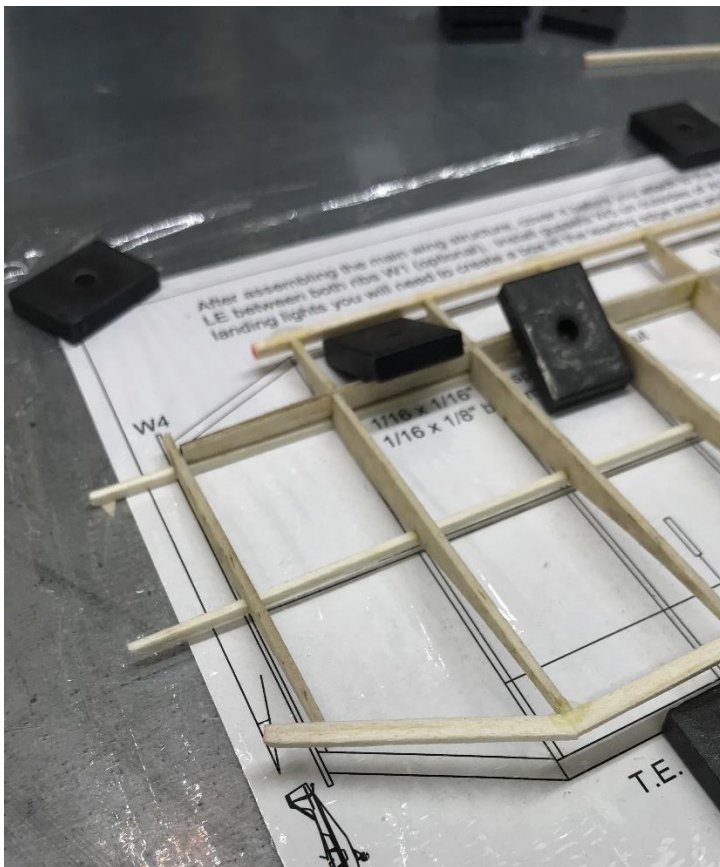
- Layout the wing parts so you can make sure ribs with extra notches or different sizes end up in the correct location.



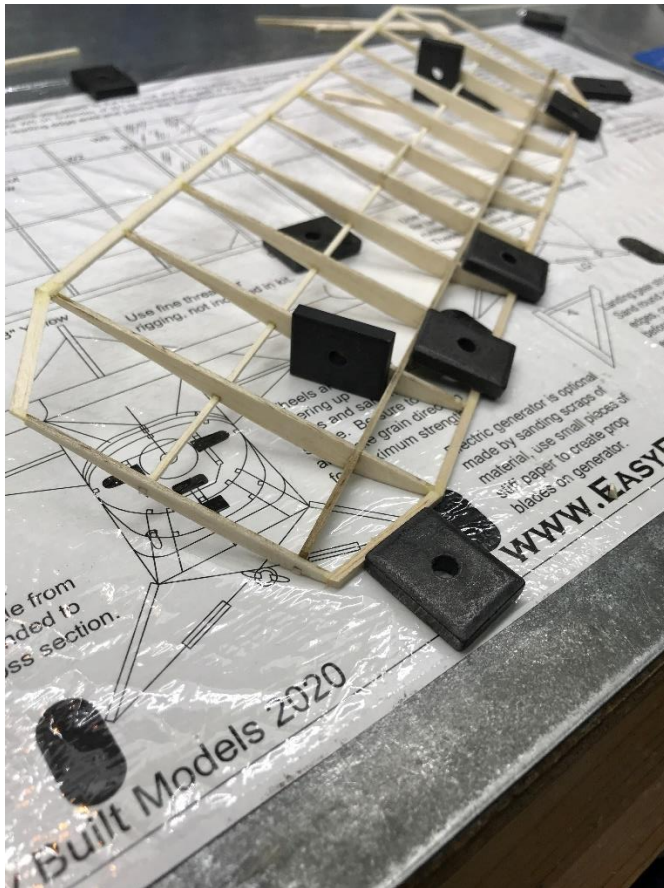
6.



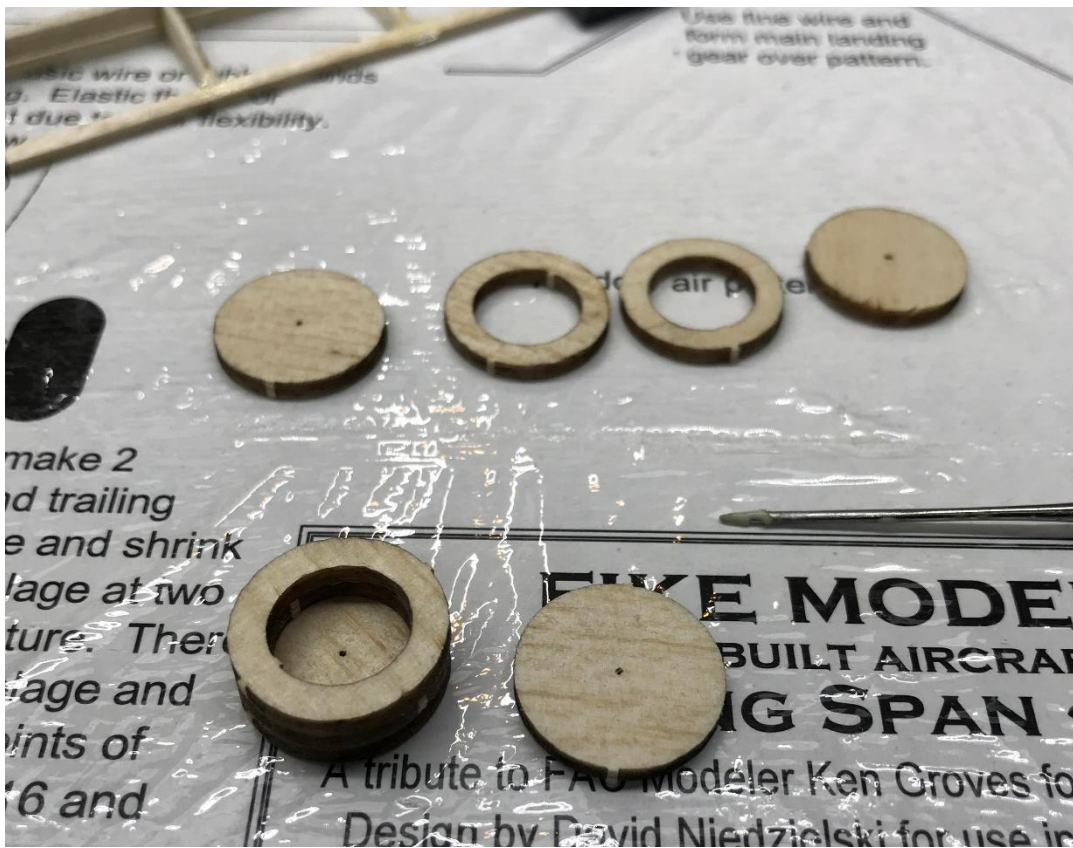
Insert the spar that goes to the underside of the ribs first. Then you can push the ribs down in their designated locations. Place the leading and trailing edges into position and last install the top spars. You can see where I used the outer rib to support the outer end of the trailing edge pointing inward. This will allow it to match the profile of the spar. Do not install the outer ribs yet. You can choose to not glue the center ribs at this time or be prepared to make a cut later to create some dihedral for flying stability.



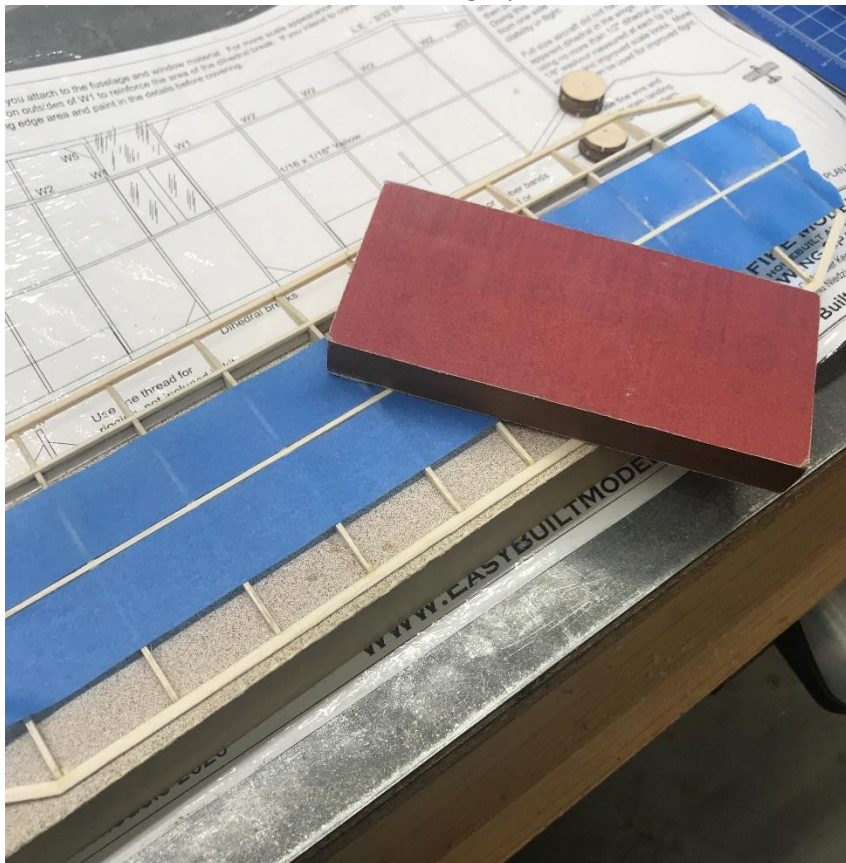
7. After the glue dries then flip the wing over and install outer rib W4. This allows for the top spar to set the height for the bottom of the outer rib and aligns the leading and trailing edges at the correct height.



8. Then you can install the last outer parts of the leading edge (LE) and trailing edge (TE) on each side of the wing.



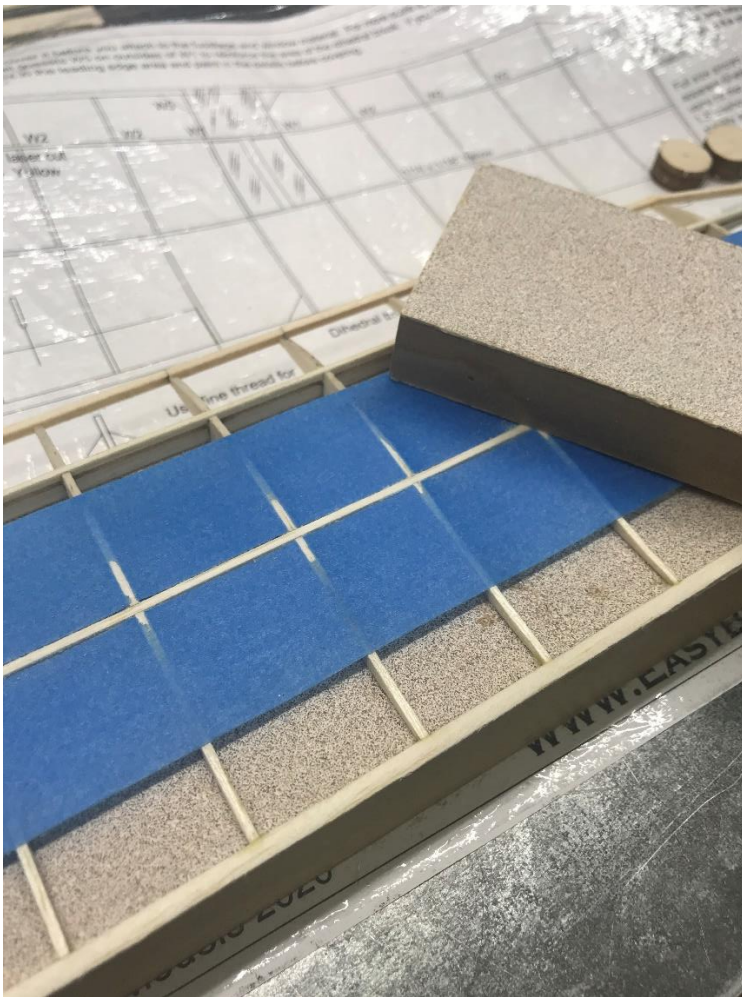
9. While the glue on the wing dries, let's make the wheels. Pop these out of the sheet. Each wheel consists of 4 pieces seen in the top line of this picture. You take a solid bottom, then stack two donuts, and then another solid to complete the assembly. Some thoughts to consider – rotate each piece so the grain is in a different direction, this will increase the strength of the wheel. Consider using a carpenter glue for assembling these to make sanding them round easier. Look on our website, “Modeling Tips”, for a video on how to turn a round set of wheels using a Dremel tool.



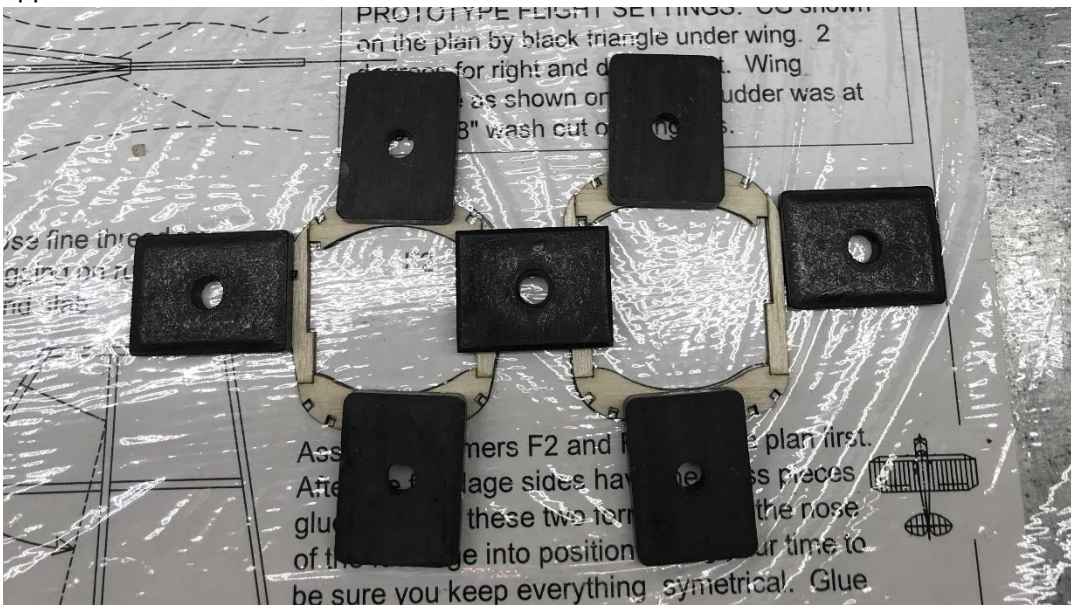
10. The glue is dry, now time to sand the wing smooth. To keep from sanding away the ribs before the spars I've placed blue painters' tape on each side.



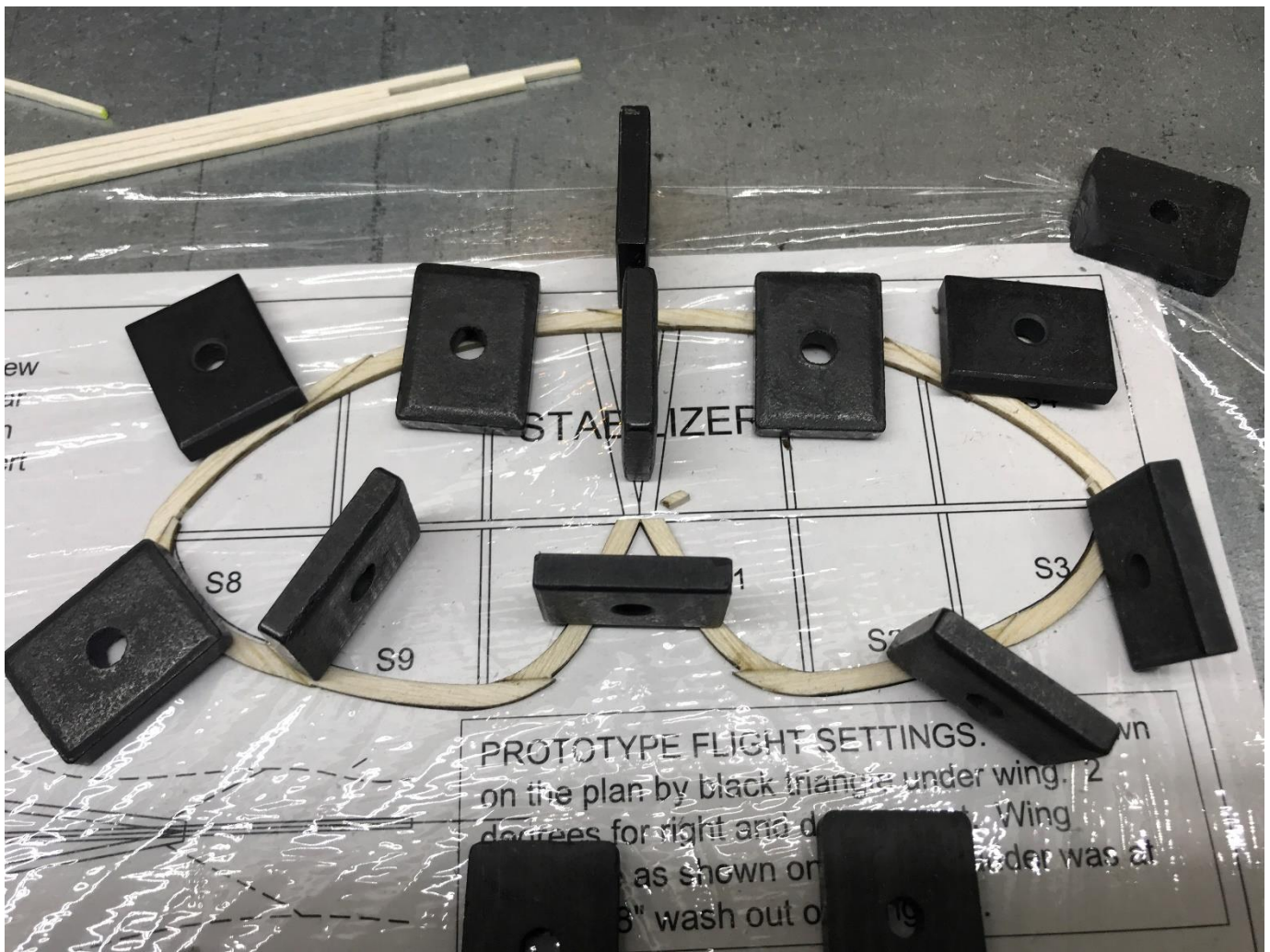
11. Next move on to the TE and perform the sanding in a similar manner only here you want to end with the outer trailing edge about $1/32$ " thick giving a nice tapered look.



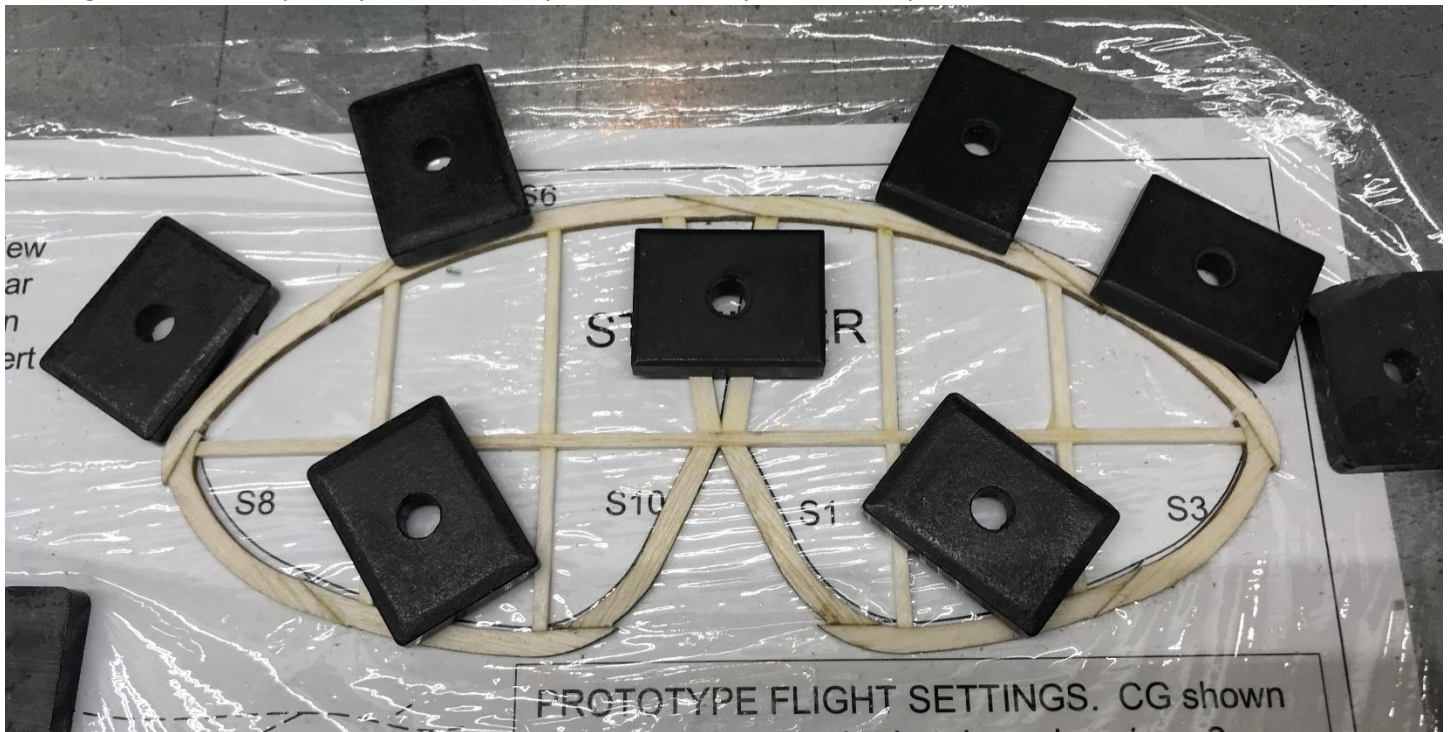
12. As I get the spar and top of the ribs matching in height it starts to wear through the tape and the rib appears. That means I've gone far enough and reached my objective. Keep moving down until all have an even or similar appearance.



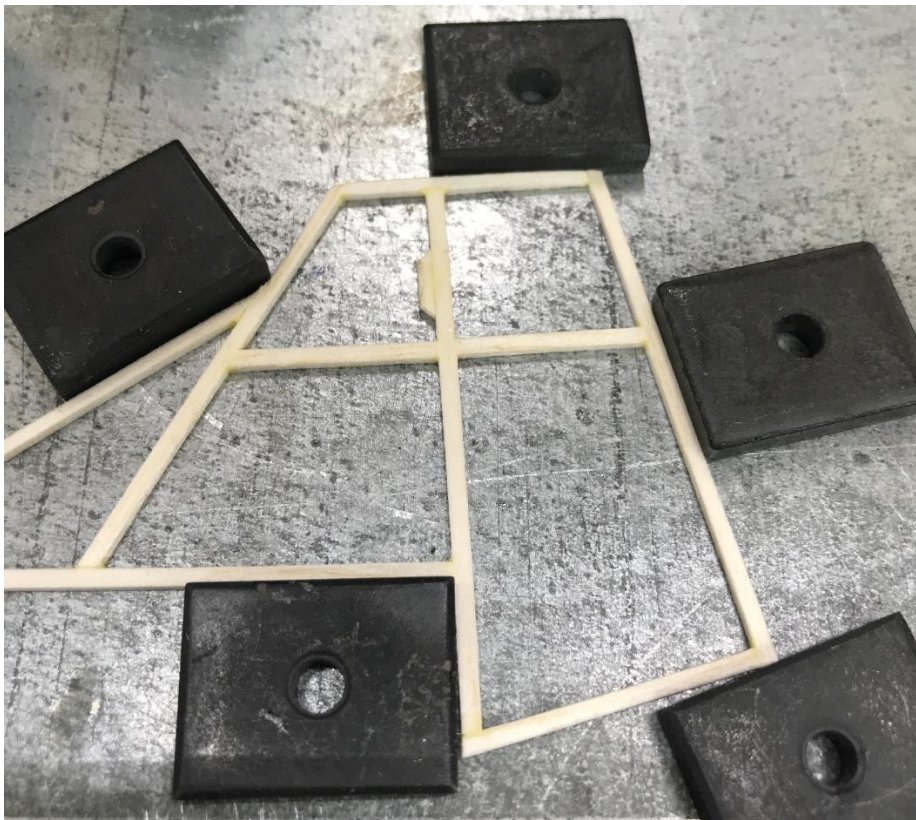
13. Time to glue up some more pieces. Here you are going to glue up the pieces for the formers that go at F2 and F3.



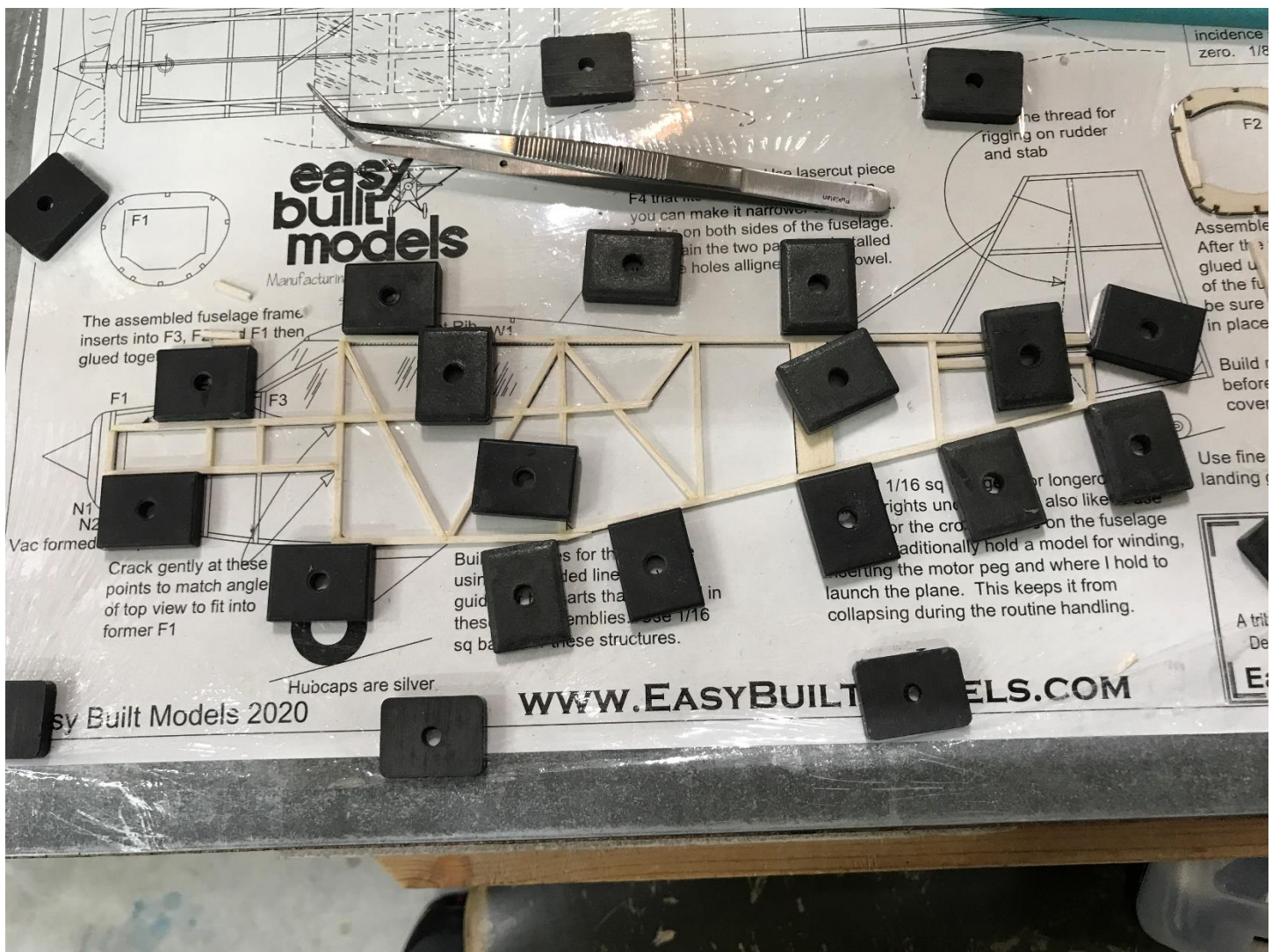
14. Now build the outline of the stabilizer. Try to get the pieces as close to the shape as possible but recognize you will be sanding to the final shape. Try to be sure they are flat before you let this dry.



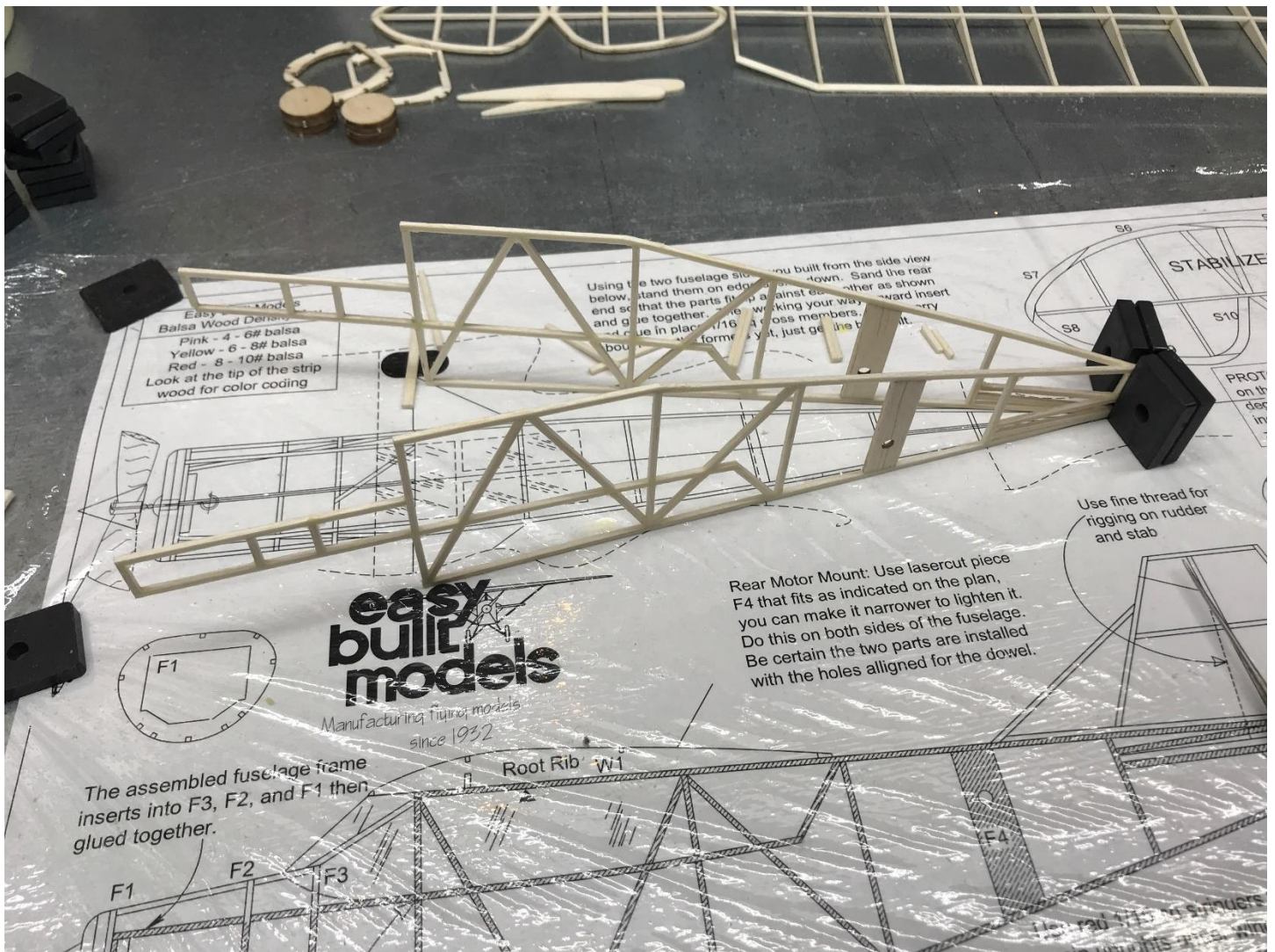
15. Accurately cut the inner pieces and then glue together. The better the parts make contact with each other the stronger the joint will be. Filling with glue and filler is a last and less desirable means to addressing gaps. Once the glue has dried then remove, sand to match the outer shape and then round the top and bottom edges all around to be more aerodynamic.



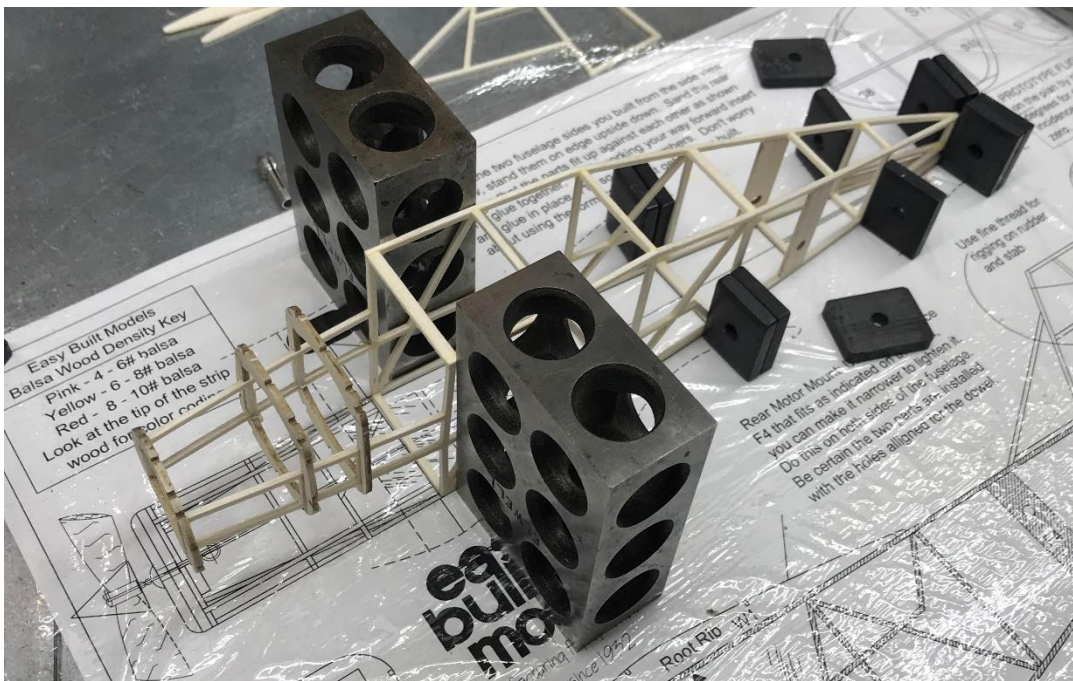
16. Like the stabilizer, build the rudder over the plan then sand to final shape. In this picture you can see a little extra piece of 1/16 sq. balsa I've glued to the front side of the vertical structure in the center of the rudder. This will give me a place to insert my rigging that the original plane used to stiffen up the stab and rudder. This actually provides functionality in the model depending on if/how you run your rigging. I'll use a fine drill to make the hole so as not to weaken the balsa wood where the penetration is made.



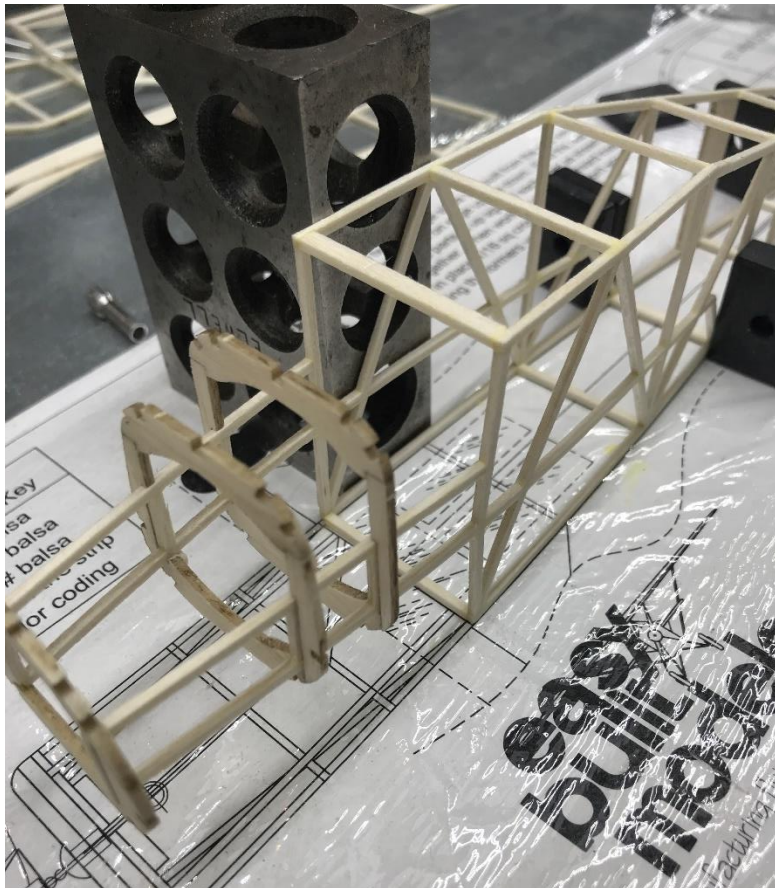
17. Now it's time to make a pair of the fuselage sides. Some people like to build one over the other, I prefer to build two separate sides. You are going to build the sides over the shaded parts on the side view of the fuselage. Best to use long strip wood for only long parts and then use the cut-offs for the shorter pieces again using the longest pieces for the longest uprights and working with the smallest pieces for the shorter parts. This will ensure you have sufficient wood for completing the model. Before removing from the plastic, I like to sand the top side while it is still clinging to the plastic protecting the plan. It helps add strength to the frame while sanding it. After sanding one side flip over and sand the other. Again, to reduce risk of breaking the frame during sanding I like to lay it on top of a sheet of 220 grit or similar sand paper. The paper keeps the frame from sliding around, allows the frame to lay flat and I can gently sand the backside of the frame so it is smooth and no odd bumps sticking up. Find a part you didn't get in position correctly? Now is the time to remove the part(s) and redo. **NOTE** – it is important to understand that the longerons on the side view extend through F1. That means don't cut the 1/16 square balsa at the rear end of F1, cut it on the front side, better too long than too short.



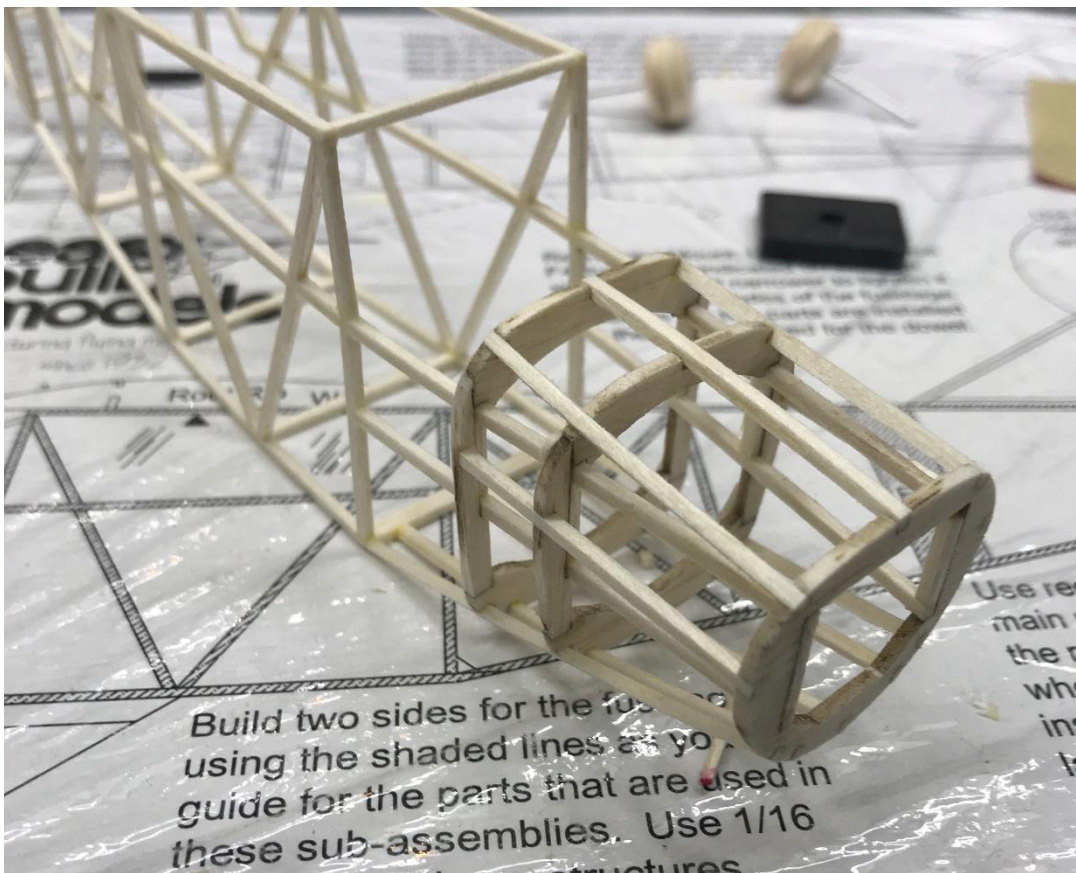
18. Now it is time to glue the two side frames together to form the box fuselage. I like to cut out all the cross pieces for the top and bottom first while I can see both lines on the top view of the plan. On this plane we are going to sand the inside of the tail end of the sides to a matching angle increasing the surface area in contact for gluing. I'm assembling the fuselage upside down because the greater portion of it is flat on the top side. I'm using square magnets set on edge to hold the parts square to the building board and together while they dry. You can see they splay outward and we will bring them together as we install each cross pieces at each station starting at the rear and working forward.



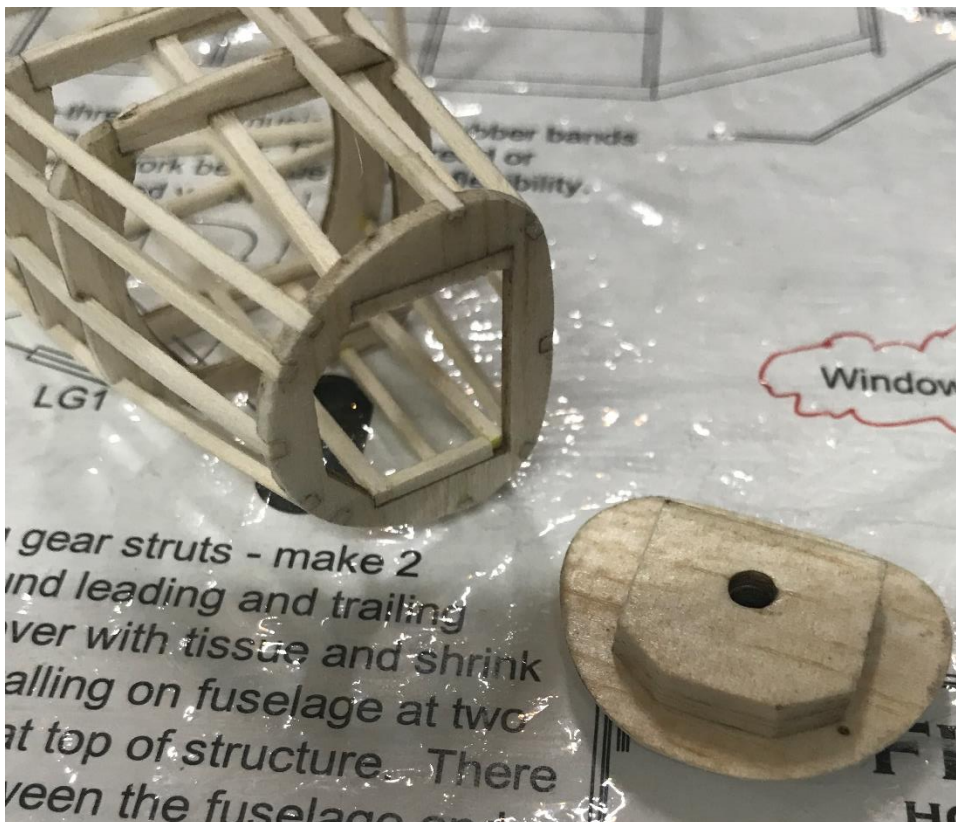
19. I'm using steel blocks and more magnets to hold the sides square and aligned to the top view of the fuselage. I do this slowly to assure I get the squarest and best alignment possible. This is key if you want to not only have a great looking scale model but also one that will be easy to trim. You will eventually get to the nose of the plane where F3, then F2 and finally F1 are slid on to the narrow nose of the fuselage.



20. NOTE – you are looking at the bottom of the fuselage in this part of the instructions. Okay now you can remove once the glue has dried. I like to do a light sanding here.

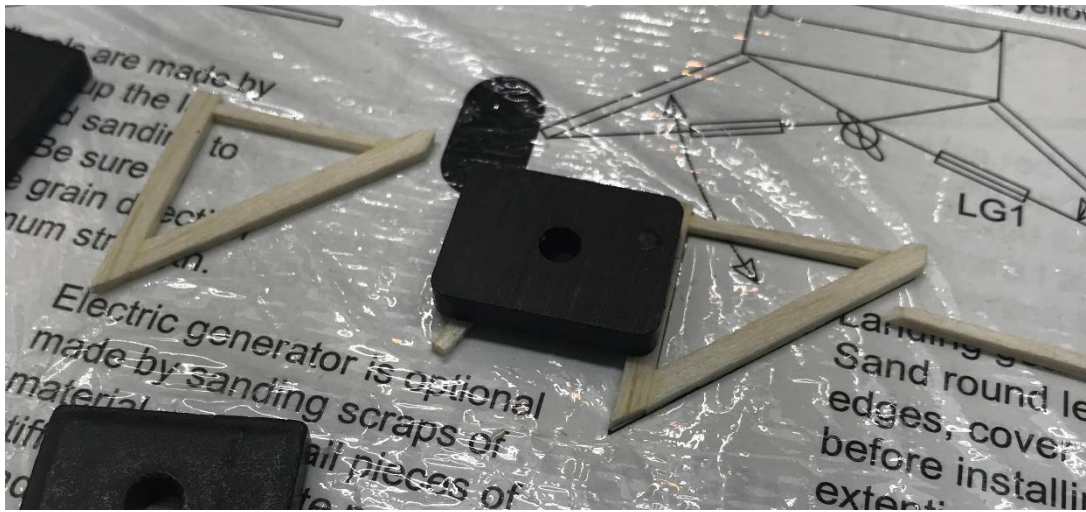


21. Okay you now install the stringers in the front slots. Where possible I like to insert and leave protrude out past the end point then come back after the glue dries, trim close and sand down to finalize.

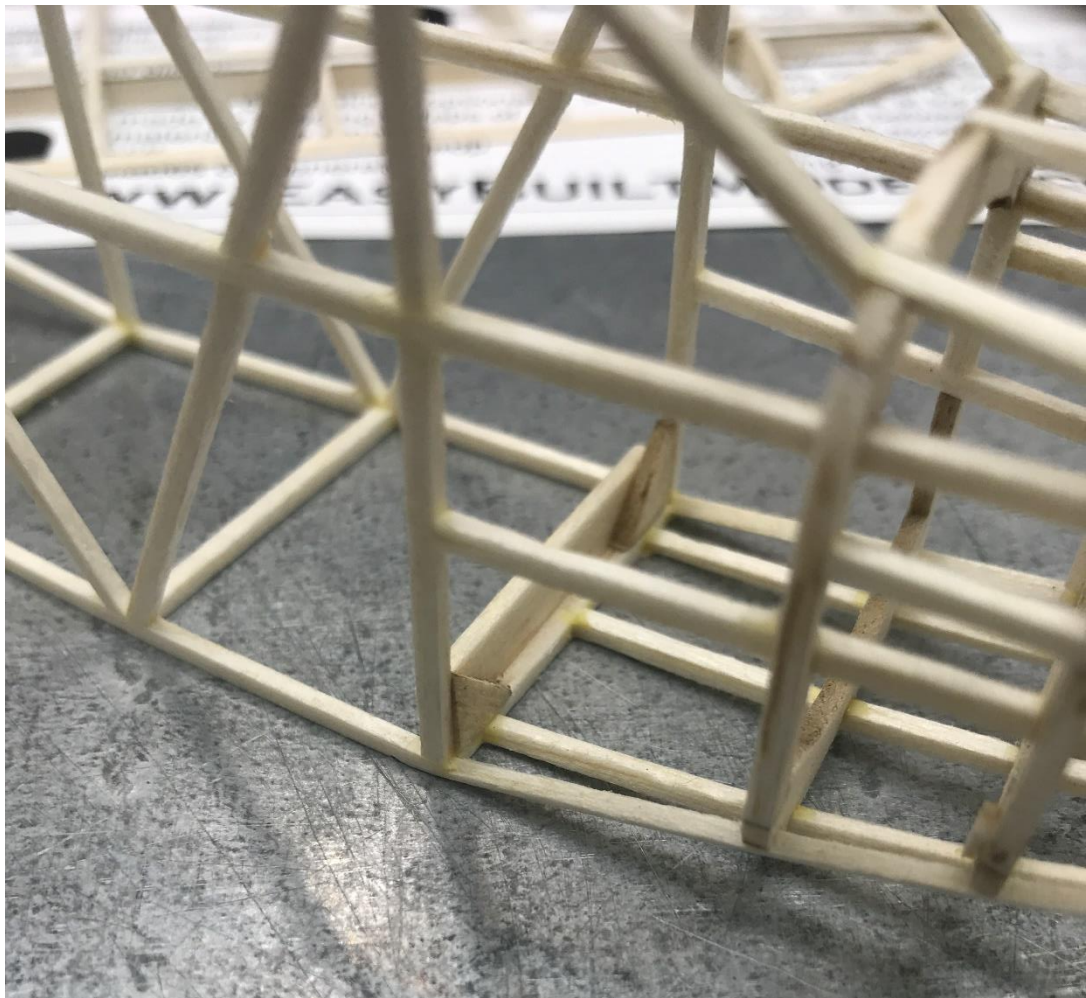


22. Now time for making the nose block. These need to be stacked and glued together assuring all the time that the holes for the thrust button all remain aligned as well as the outer shapes stay properly oriented. Before gluing the key to the back of the nose test fit into the fuselage opening and sand or build up to get a snug fit. Once you have this then

glue to the back of the nose. Now you have a rough nose assembly, insert into the fuselage and sand to shape taking care not to alter the fuselage in the process. You might want to try using the blue tape trick here.



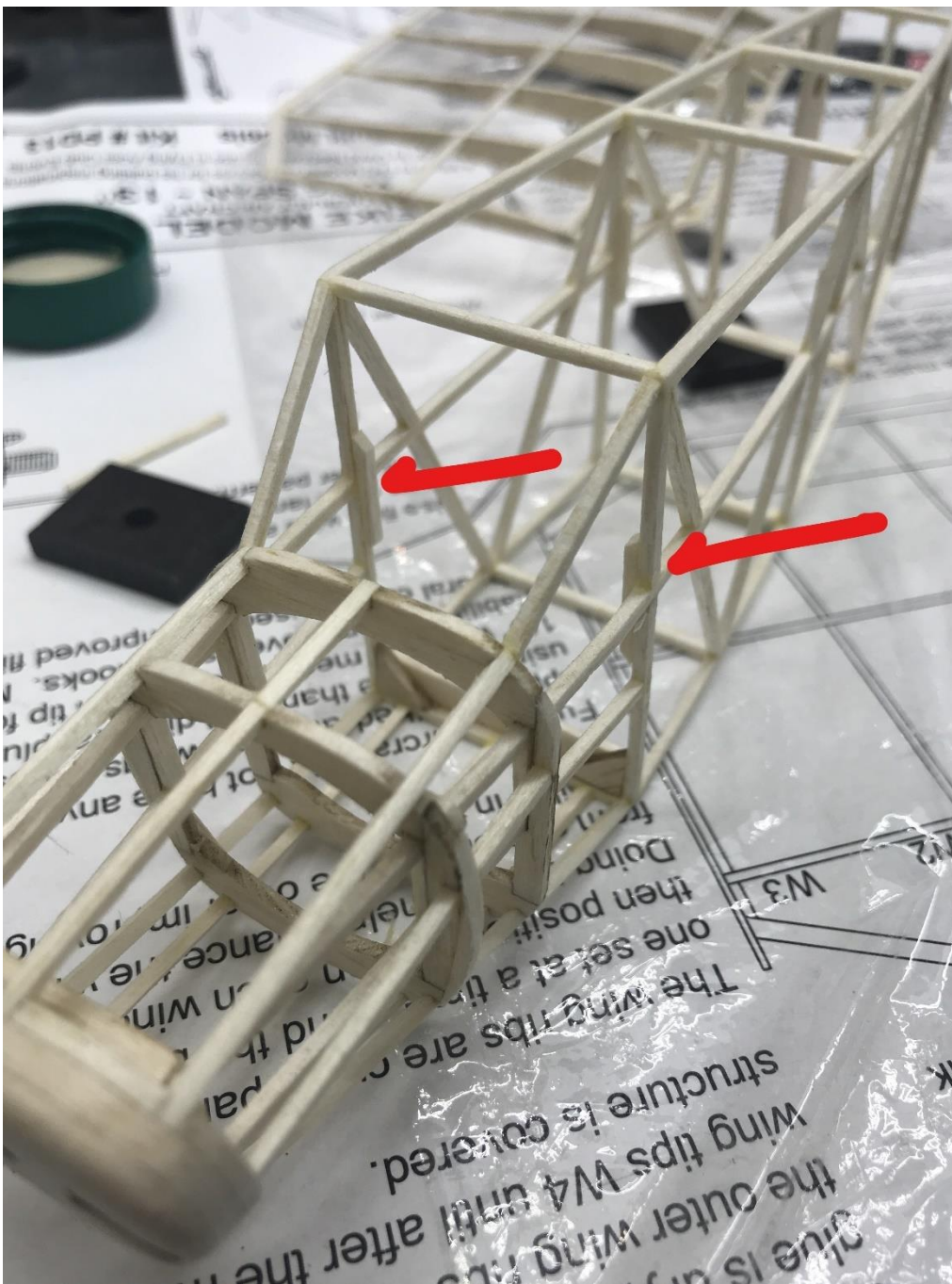
23. At some point while you are waiting for glue to dry you can make the frames for the landing gear (LG) struts. Cut close to shape, glue and then sand to final shape. Set aside until covering.



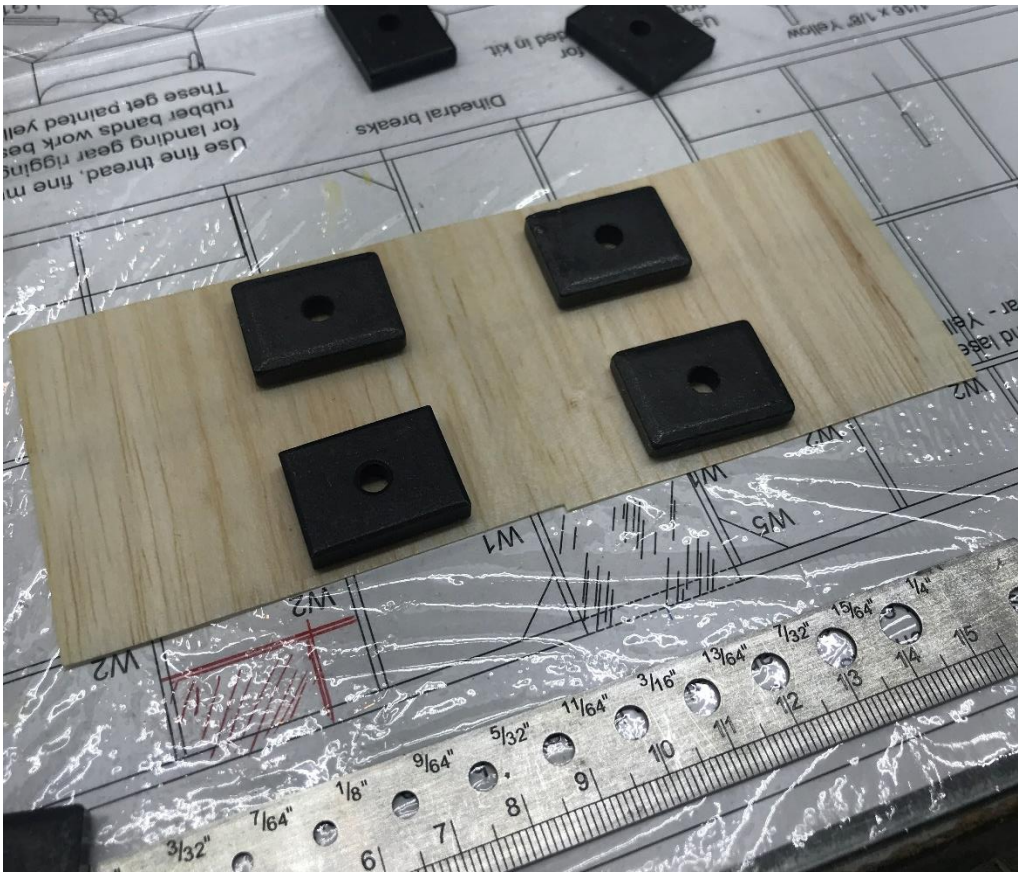
24. Now at some point you need to think about finally assembly of the model. Think about where you like to hold a plane during launching, where you are going to attach the LG wire, where you will attach the windscreen, tissue, etc. Now is the time to address these by adding your own touches. Never will a plan account for everything so you can make coming steps far easier with a little forethought. Here you can see where I've inserted some wood triangle fillets to make the fuselage stronger to side force of handling as well as another vertical crossmember that I'll attach the LG wire to.

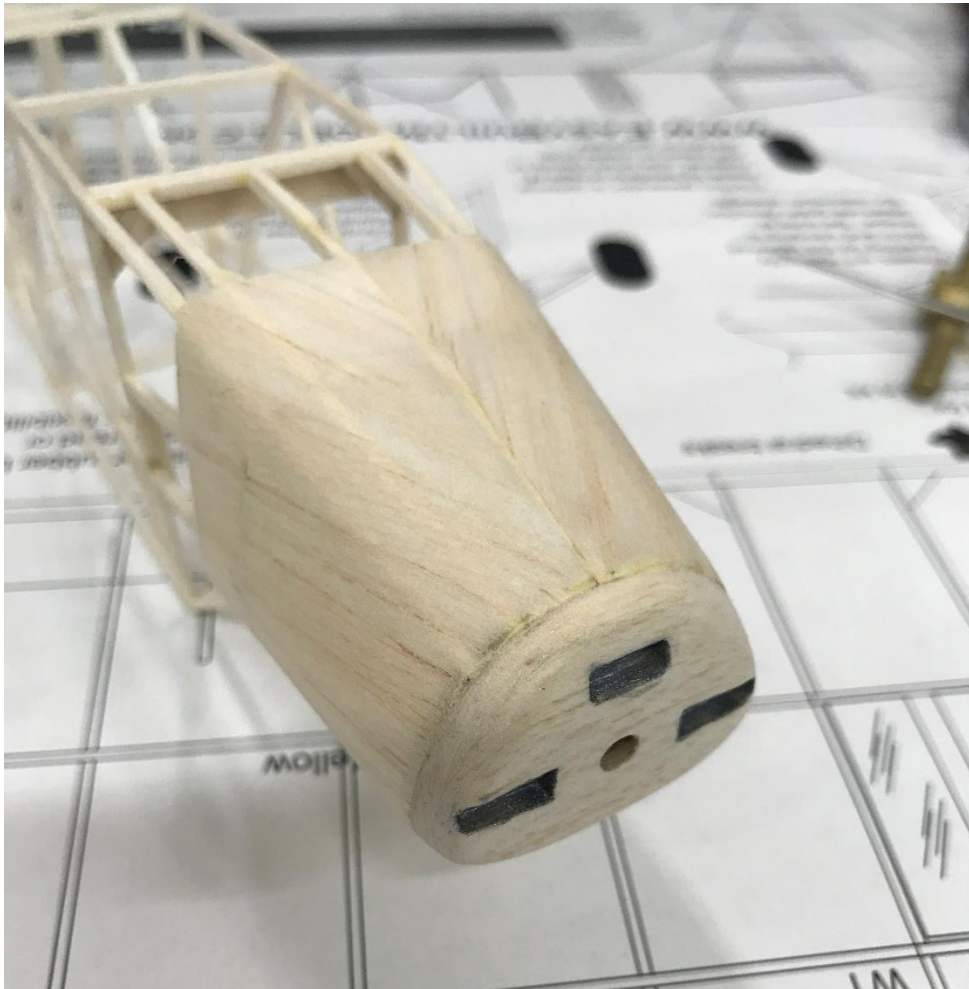
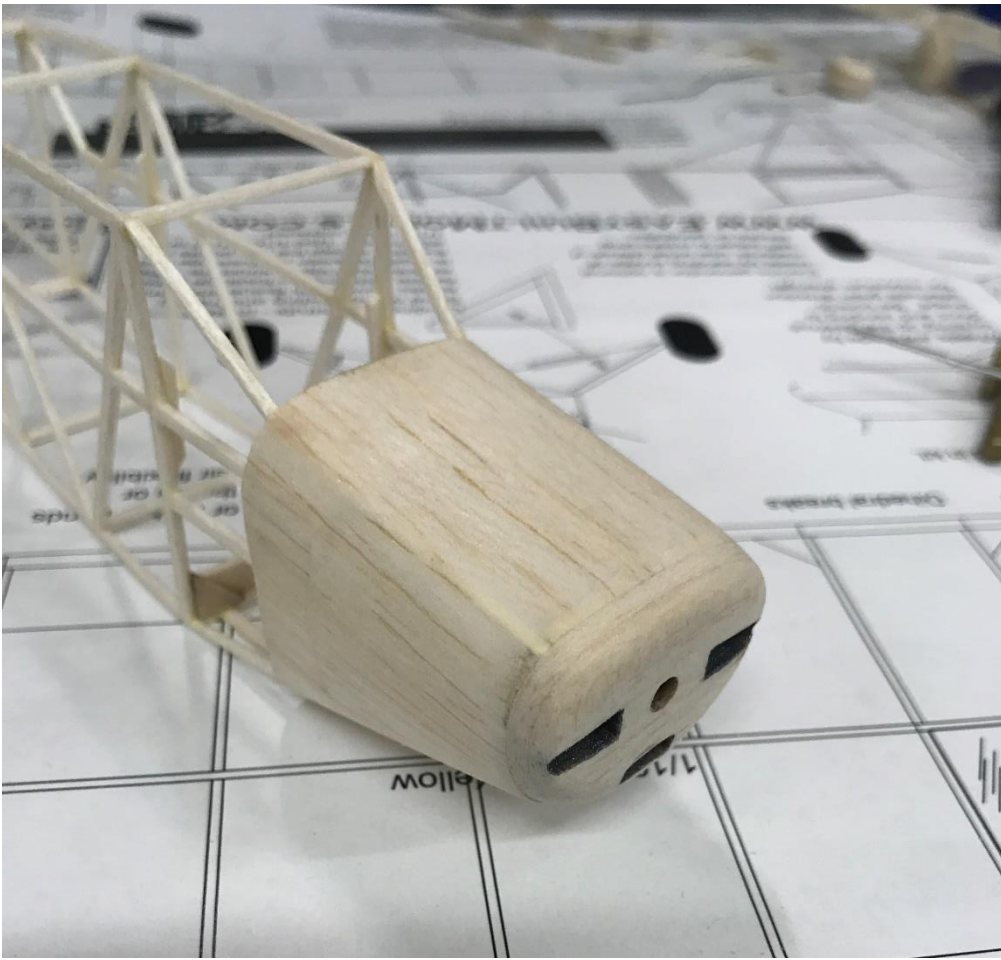


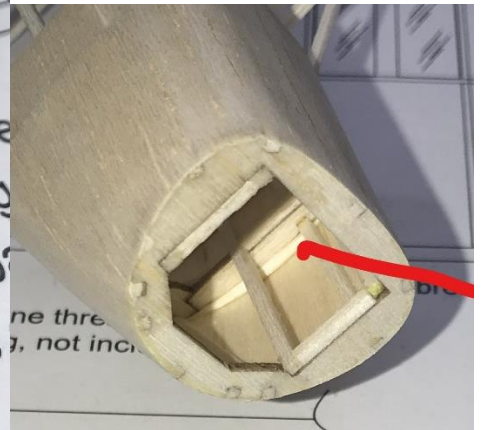
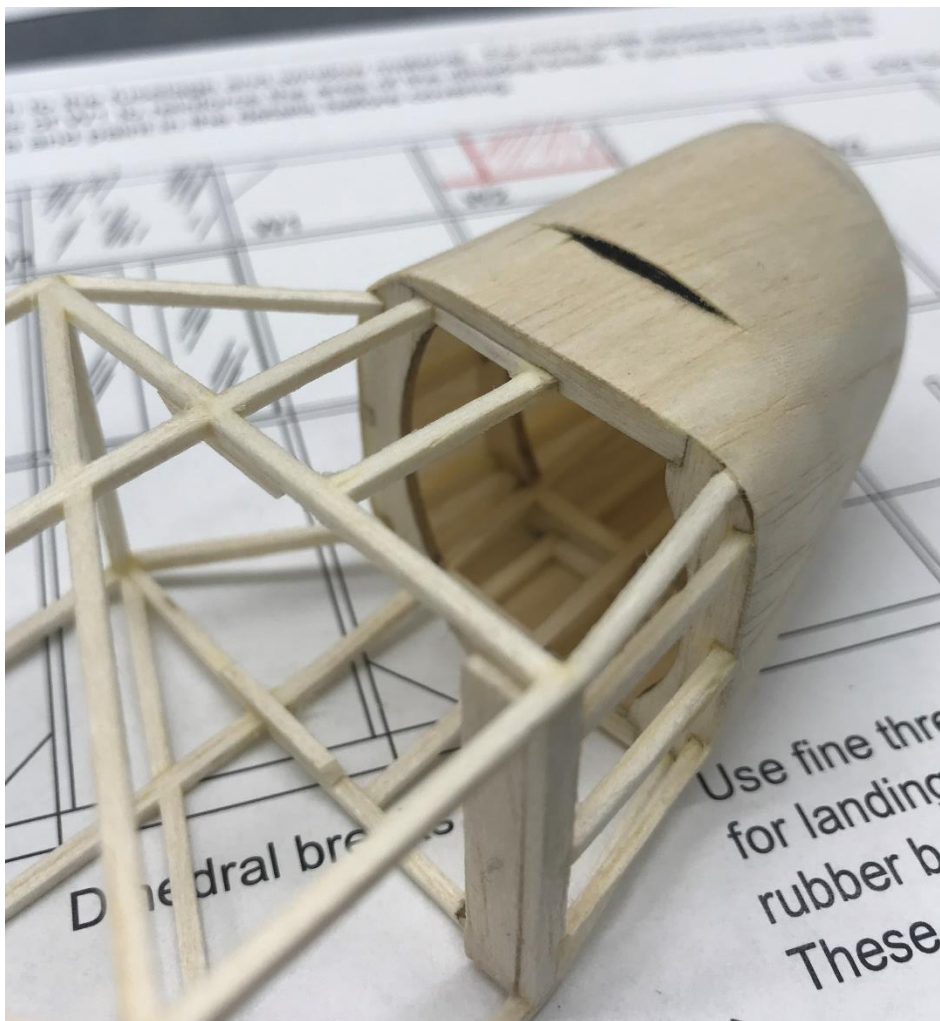
25. Bend the LG to shape and test fit. Do not glue in the LG wire at this time. You can but it will frequently get in the way and make other tasks more difficult.



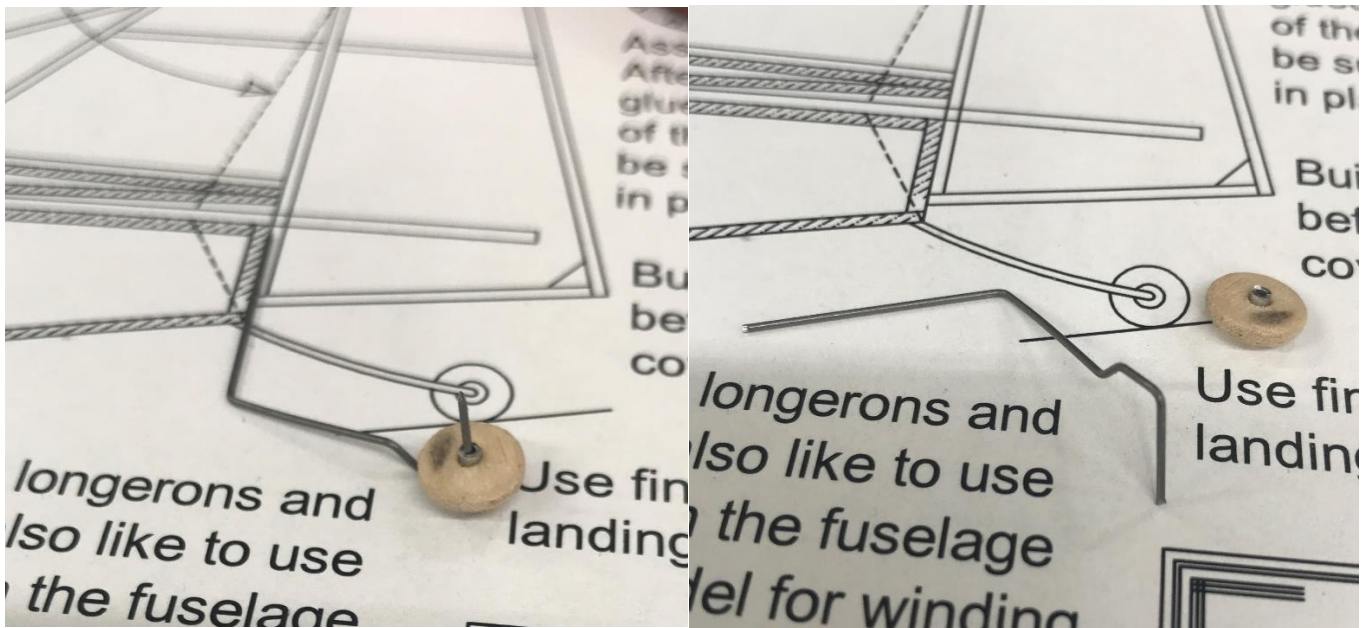
26. This is a weak point in the frame. At this intersection I cut the vertical members to allow the horizontal pieces through. I felt the horizontal needed to be kept continuous to take the load of the motor but when I'm winding or replacing the nose block, I will be holding the model in or near this area. To ensure it doesn't start caving in or outright breaking the joint, I sistered on some short pieces of 1/16 sq. balsa across the joint. Not much weight nor distracting for what you get out of doing this.



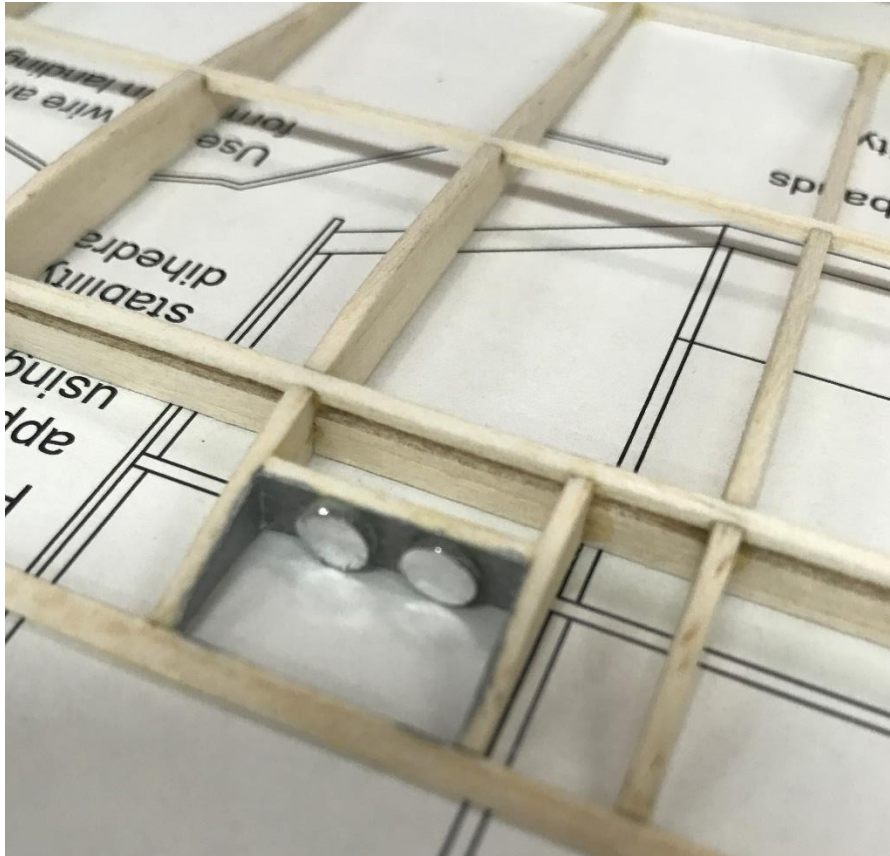
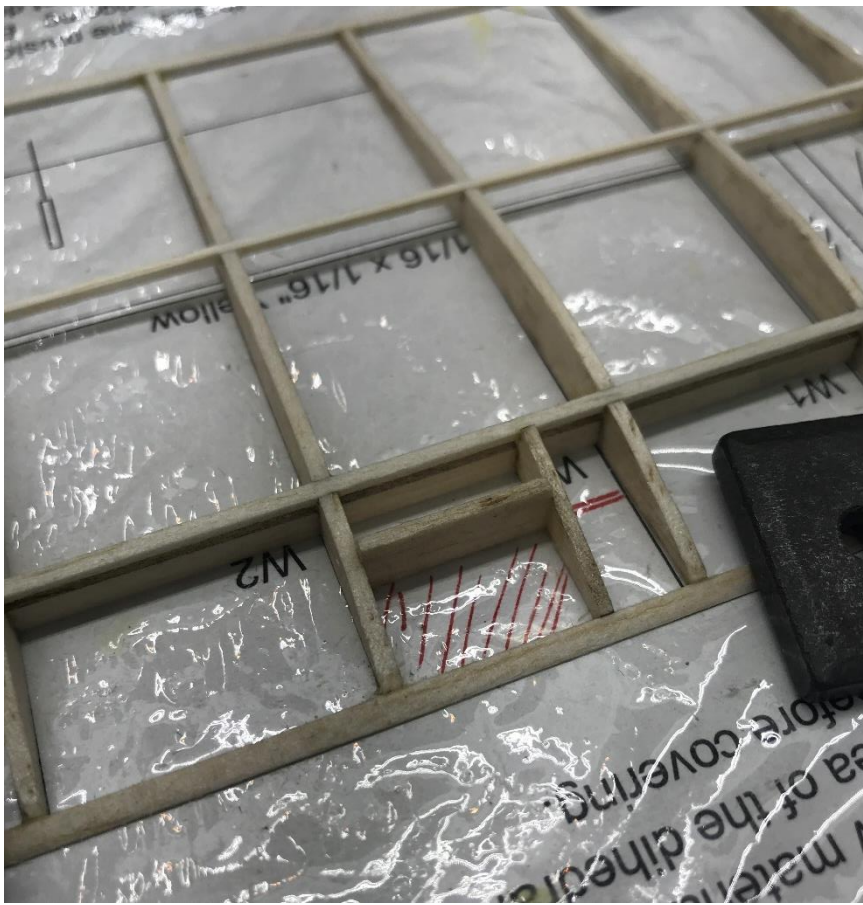




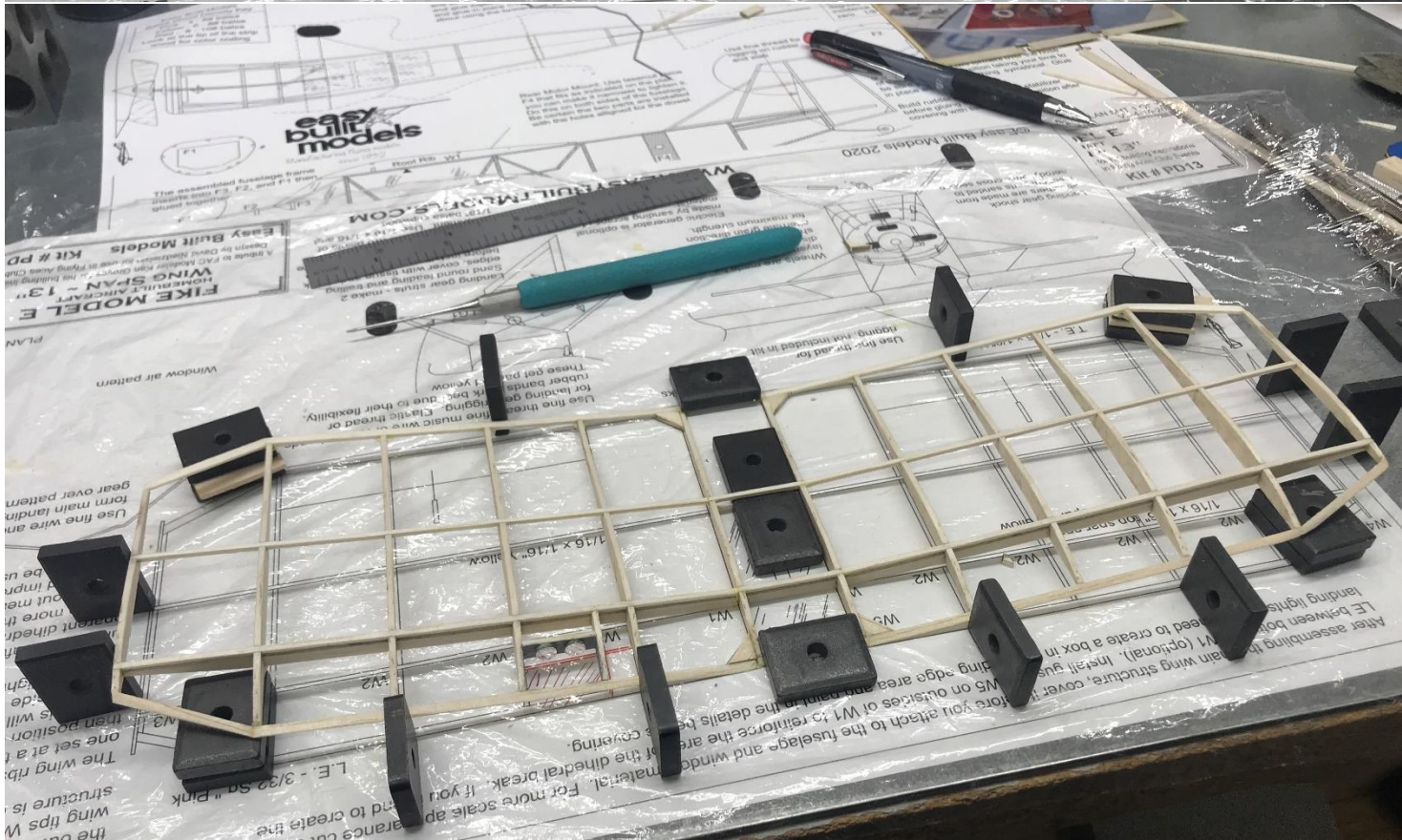
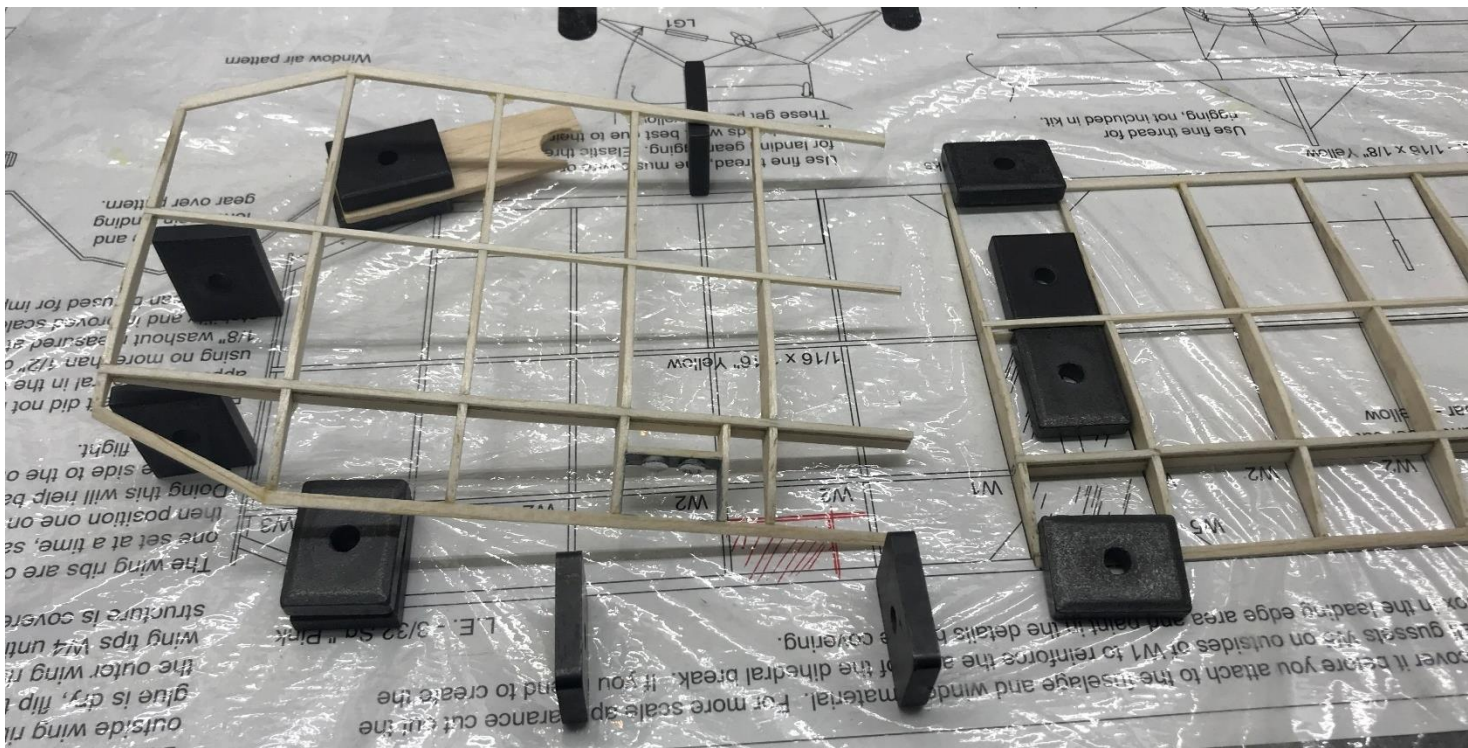
27. Not included in the kit. You can cover the nose later with simply tissue and be finished or you can opt to make it something more. I've taken 6-8 pound density 1/64" thick balsa and wrapped the nose with it. Sure, a piece of paper bends in the wind but rolled into a tube it becomes dramatically strong. Same thing here, I edged glued together two 3" wide pieces of the 1/64" thick balsa together so that I could center up on the top of the nose stringer without going through the difficulty of trying to glue together perfectly centered two separate pieces onto the fuselage. Before going further with the gluing, test and be sure you have properly aligned and that the shape of your fuselage makes sufficient contact. In the last picture you can see where I actually added a piece of shaped and painted wood underneath where I eventually cut a slit to represent where the hot air can escape. I wrapped one side and trimmed to get the excess out of my way while I wrapped the other side. The piece that was went flat below the air vent will need a sliver of wood removed to fit without creating a bump. I made the sheets about 1" longer than the area I was covering so I had enough to meet the needs of the shifting lines as I wrapped the sheet all the way around to the underside of the nose. You could use a bond or watercolor paper to do the same but sanding is much easier when working with the balsa. So, I trimmed both the front of F1 and back of F3 with a blade and then sanded to final line.



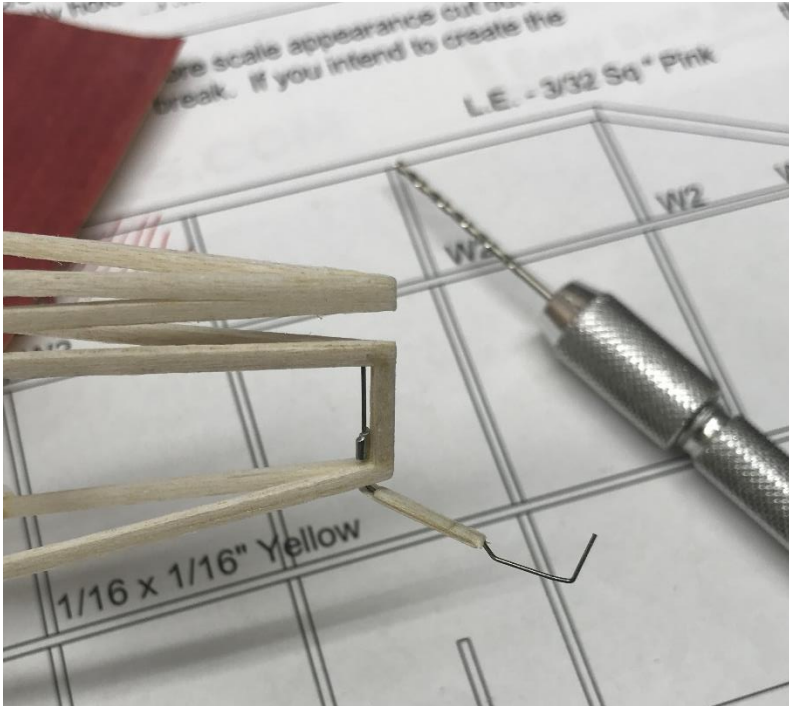
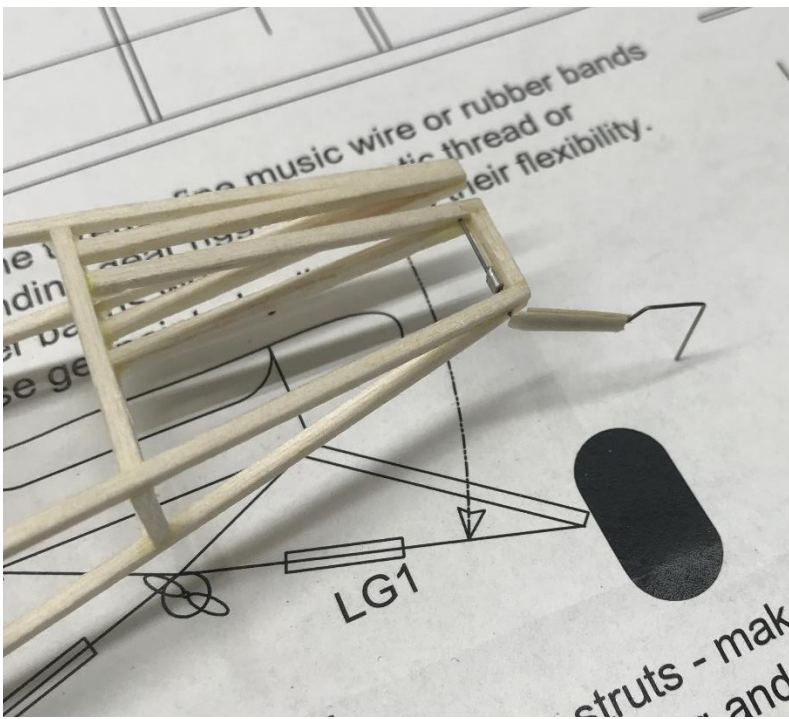
28. Time to make the tail wheel and form the wire for holding the wheel. Not included in the kit, I like to use a small diameter aluminum tube as the hub for my wheels. This gives me a place to chuck up the rough-cut wheel into my Dremel and sand to shape. I then slice off the excess tubing on each side and it is ready to paint. The LG wire is bent to shape and test fitted but I would not glue in place until the fuselage is almost done because this will frequently act like a hook and catch on everything as I'm trying to continue the build.



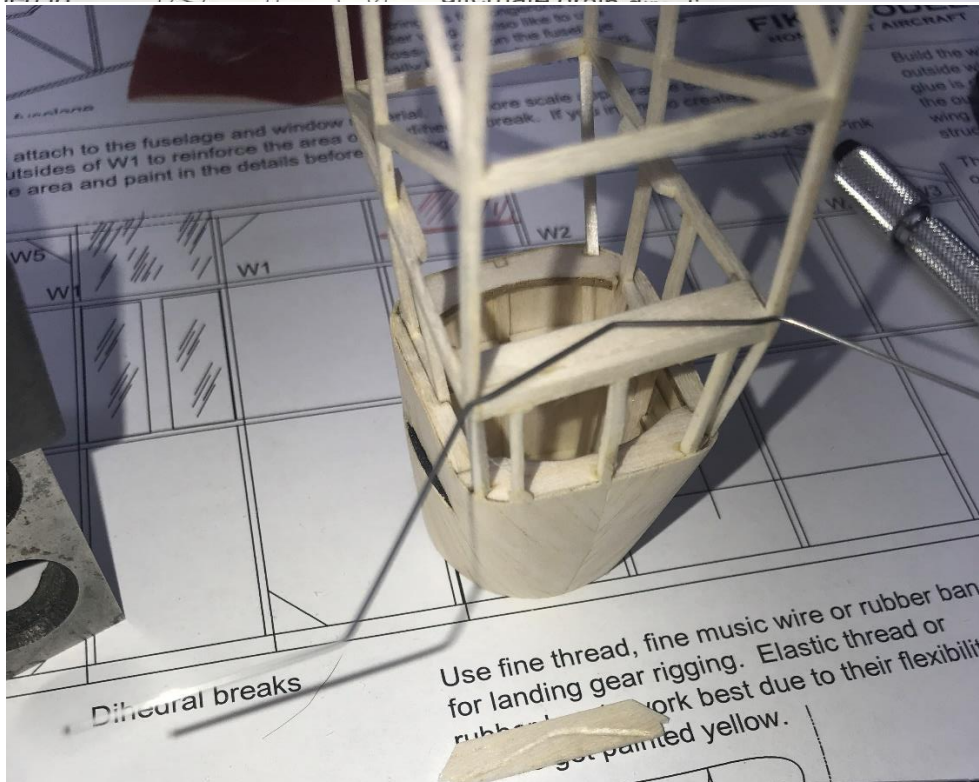
29. Here's an option I added to my build, landing gear lights. I took some scrap from the laser cut wood, made a nose rib and added a cross piece. Make a couple circles to represent the lights, cover with foil, paint the inside of the box, set aside until ready to cover.



30. Setting up for creating the wing dihedral. I aligned the center section of the wing to the plan to assure symmetry by having reference points on both wing halves. I did one side at a time. Cut one wing free and then sand in an angle on the LE, TE and all spars to assure the best joint possible while still maintaining straight lines. You can see in the pictures how I've set my magnets to keep the raised wing in alignment with the lines on the plan. I raised the wing $3/8''$ at the bottom of rib W2 in the outermost position by placing 2 magnets under the TE and LE. I also added $3/32''$ of washout by placing a piece of $3/32''$ thick piece of balsa between the two magnets under the TE. To strengthen the joints where I cut the wing free from the center section, I've glued in laser cut balsa fillets W5. Repeat for the other half.



31. Install the rear LG wire. I glued a piece of balsa over the wire to simulate the spring steel that is painted yellow. I made a mistake here on mine. I was planning on it freewheeling but the internal retaining sleeve slipped after I covered the fuselage and I also forgot then when I attached the control cables it would no longer be able to move. You can drill a small hole in the bottom of the fuselage and glue the wire in place while aligning the LG wire with the fuselage.

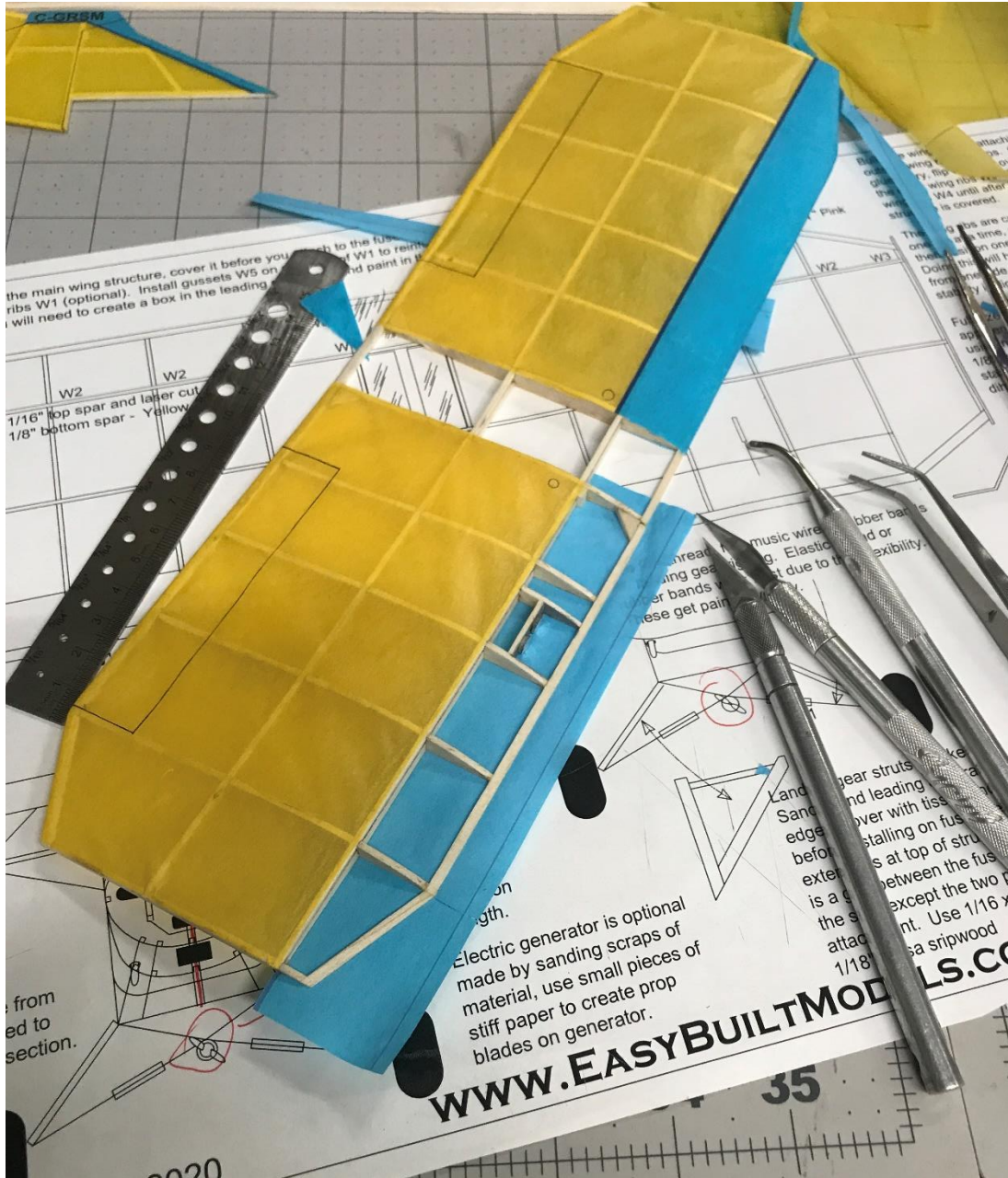


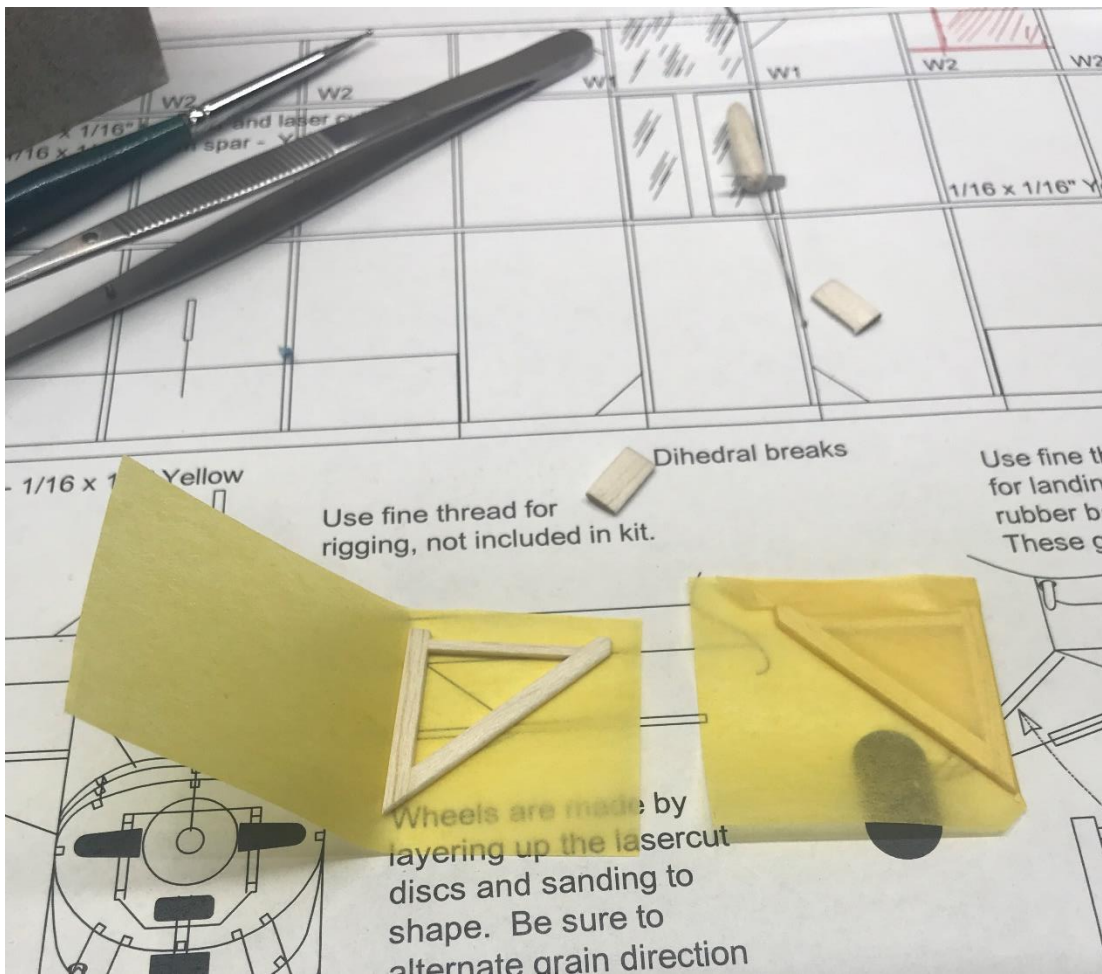
With my fuselage square to the surface I use magnets to hold the LG wire while I tack it in place with some instant glue. I then glued the piece of wood at the bottom of the picture over the wire sandwiching it in place. This is a light model so we do not need to add excessive weight to secure the LG wire.



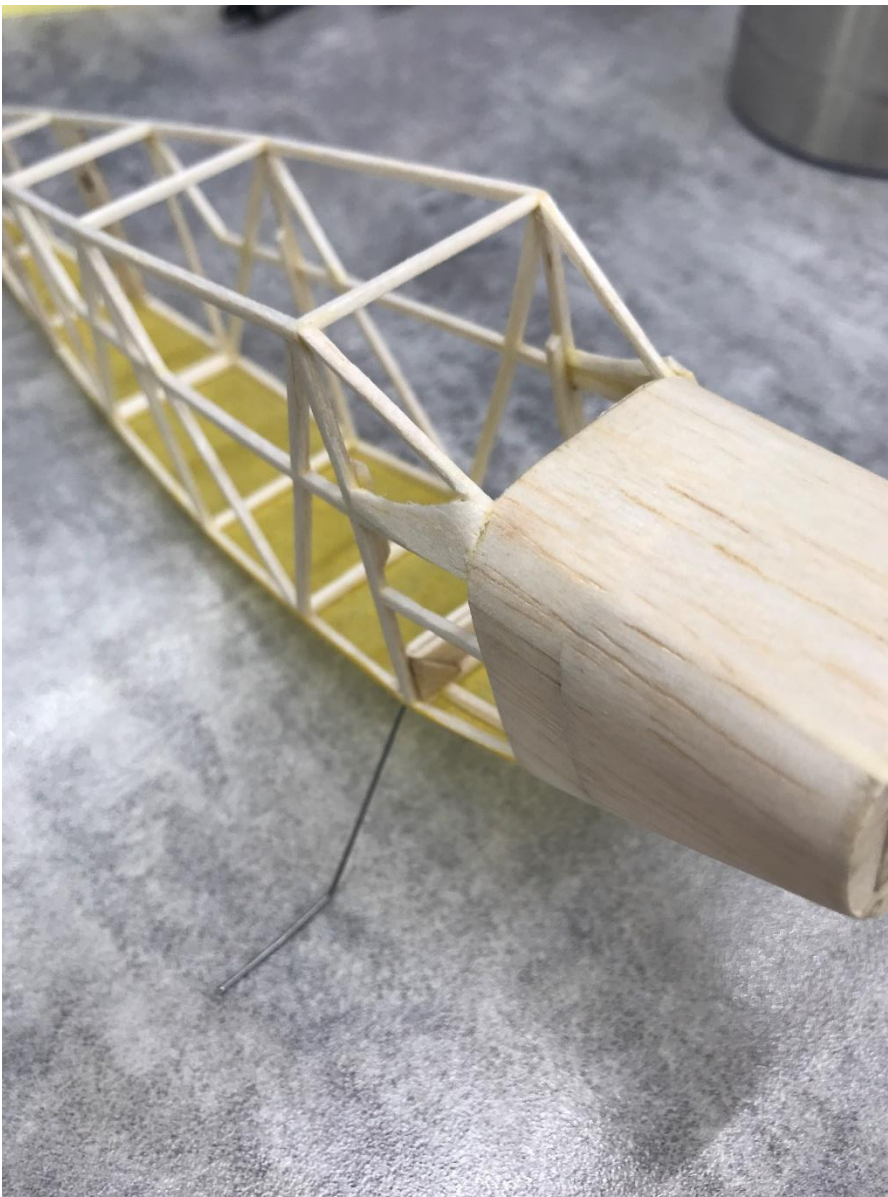
32. Time to start covering. I always like to start with the rudder, stabilizer and wing, usually the easiest pieces to cover but you don't have to. I'm doing a 2 main color scheme with this airplane. For my build used in these pictures I was going further than the average builder need or wants to go so I'll mention where I'm adding extras not included in the kit. Your kit will have two colors of Mt. Fuji Japanese tissue in yellow and deep sky blue. When overlapping tissue always put the lighter colors under the darker colors to minimize the color of the tissue underneath from influencing the color of the overlapping sheet. So blue over yellow. I rough cut a piece close but about a 1/2" plus larger all around for the area I'm covering. I do one wing panel at a time and I do the underside of all structures first and overlap them with subsequently applied tissue that will show higher up on the structure making the seams less noticeable. Another trick that makes covering easier, where possible draw your lines for control surfaces and features now before putting them on the structure. This way you can lay the tissue over your documentation or scale plan and get nice straight lines without puncture marks or squiggles. Using a glue stick I apply the tissue. Now for my model I also added a detail stripe of dark blue separating the yellow from the sky blue as seen on the real aircraft. Also, where I built in my

landing lights, I go right over it with the covering. I'll cut this out after the tissue is shrunk. One section, one color at a time. Glue in place getting most of the wrinkles out. I then trim the excess of leaving the thickness of the wood at most. If there are curves or angles, I place slits in the little tissue extending out so it will roll over the edge smoothly. I then run additional glue stick on this little remaining flap and where it will be adhered. With a damp fingertip I roll this edge over giving a strong grip to the structure. Where the tissue excess extends out into a yet to be covered section I trim it flush with the last. Going to put registration numbers on your plane? I put mine on before putting the tissue on. Since you have the tissue laid out to draw on the control surfaces, you can do the registration numbers too.

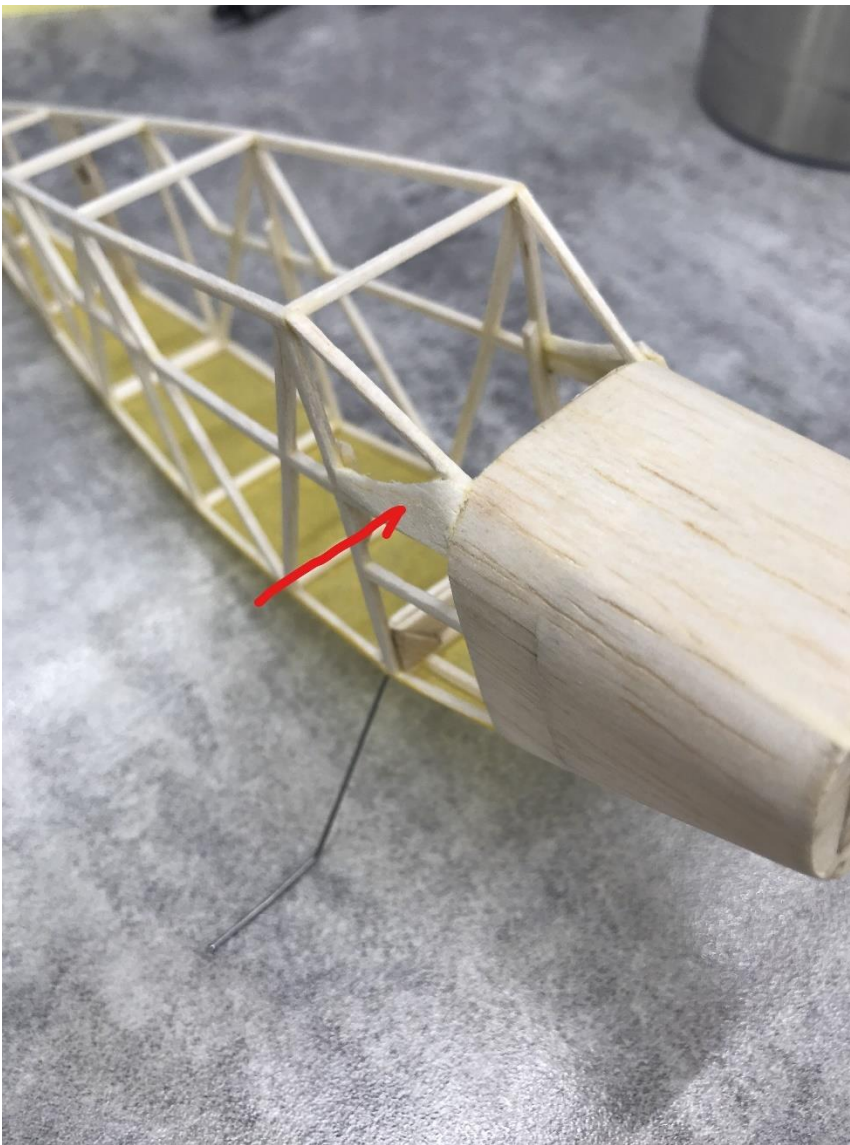




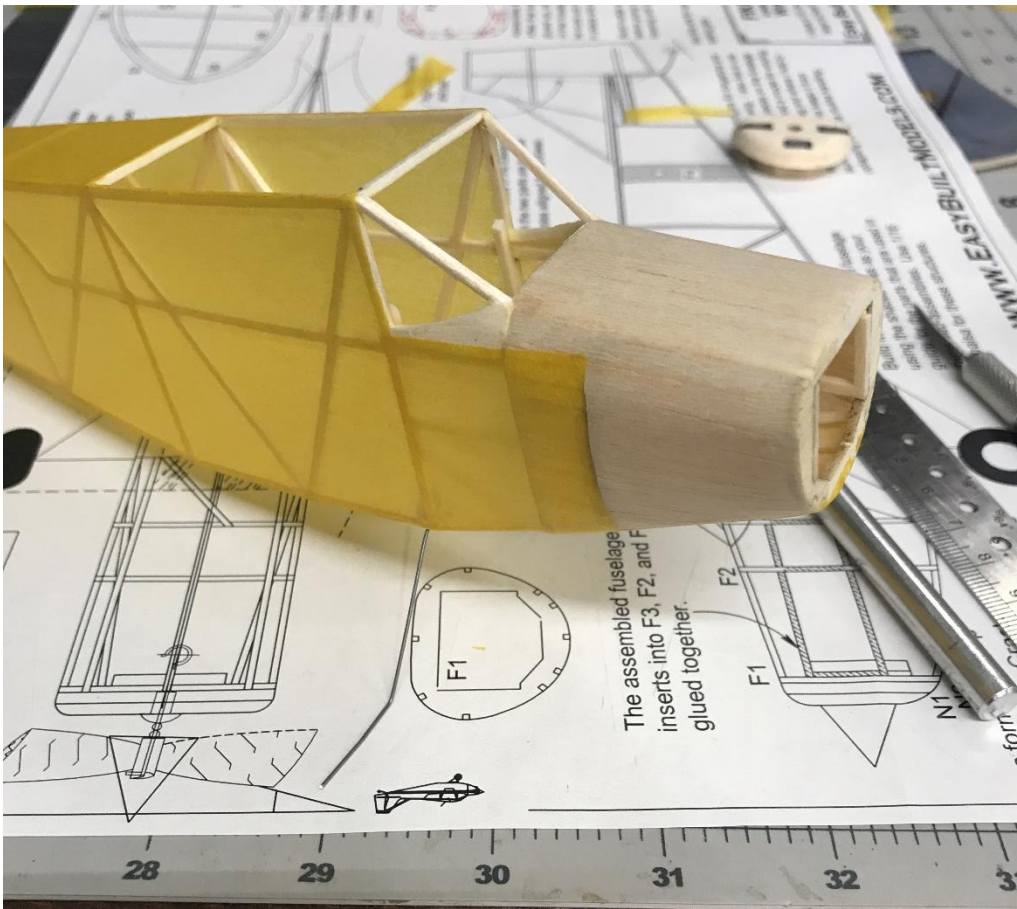
33. Cover the landing gear struts.



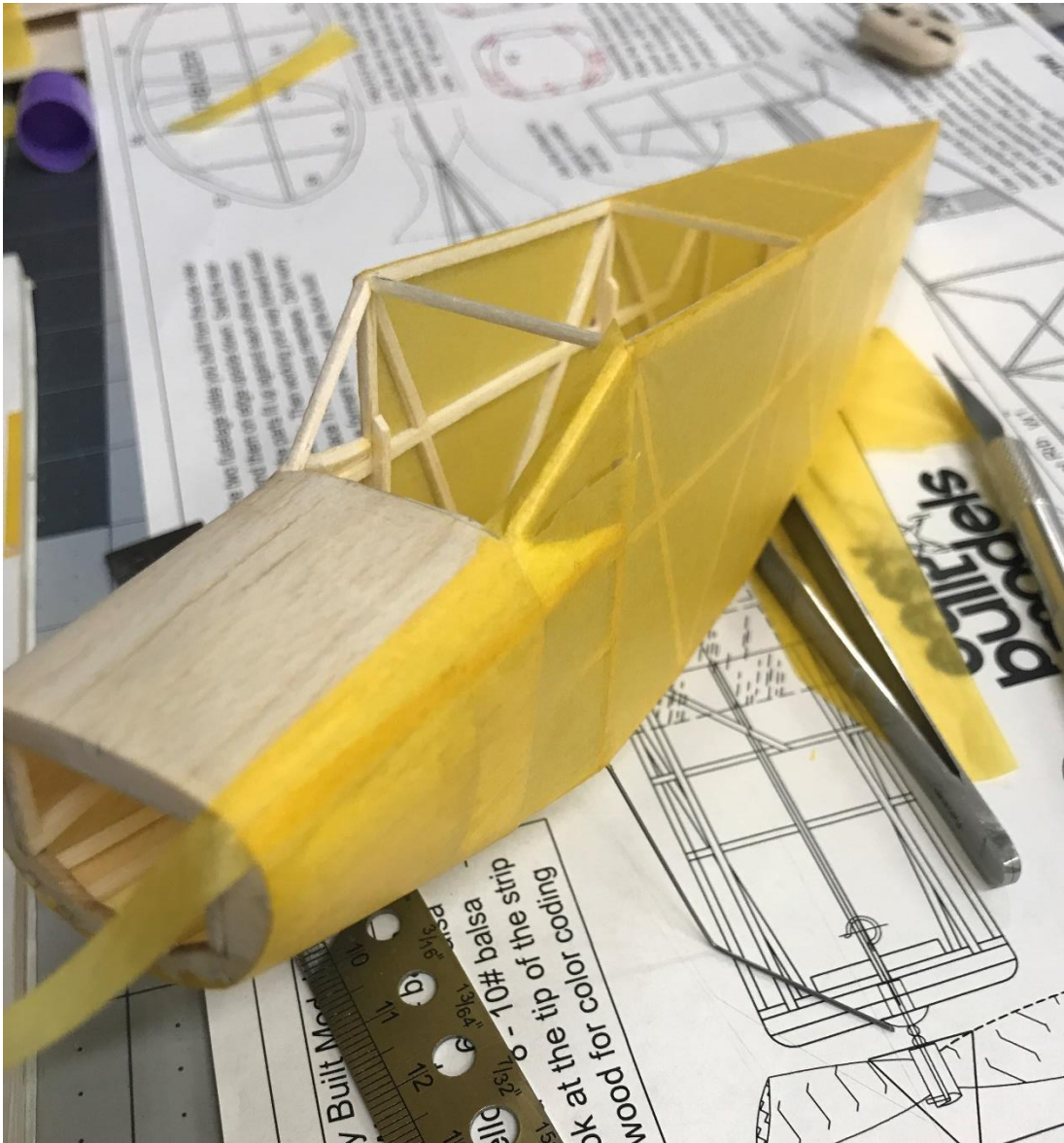
34. Cover the underside of the fuselage. Covering these flat surfaces can usually be done with fewer larger pieces. When working with round or fuselages with compound curves you will have to use smaller pieces in order to minimize wrinkles. Again, I'll trim these leaving a $1/32$ - $1/16$ " wide extension. I apply glue stick to the extension and adjacent wood and with a damp finger roll it over into position.



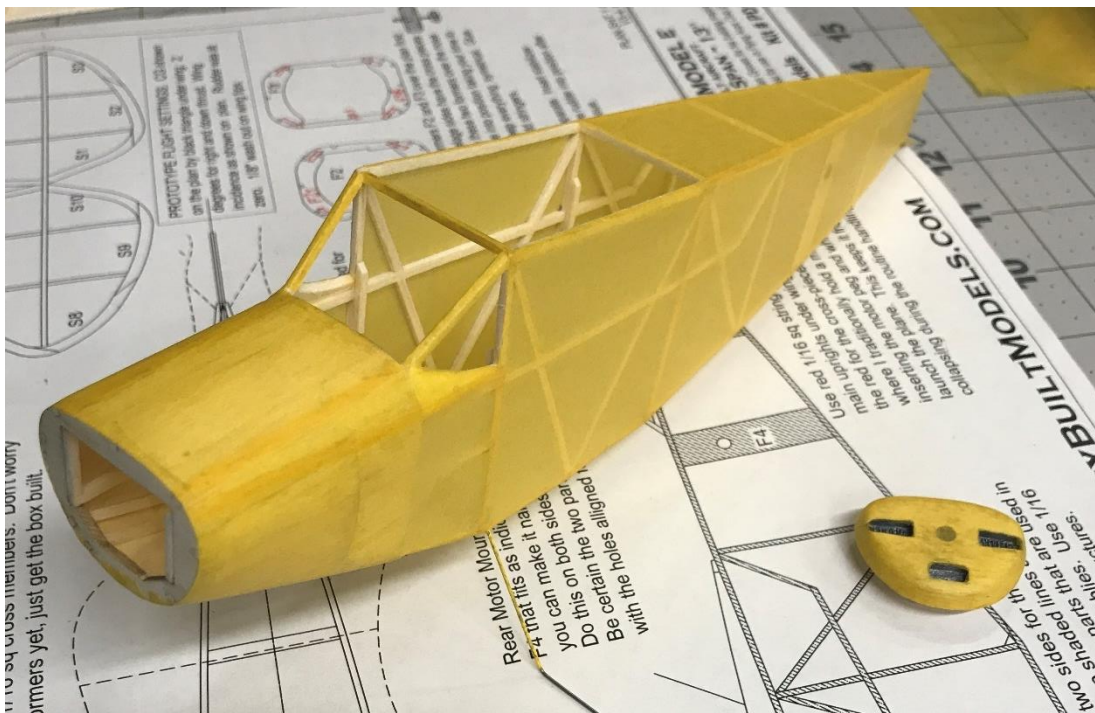
35. Oops! Found another spot that can be made easier to cover by adding some wood and sanding into shape. You don't need to as tissue can be placed across this but you'll get a nicer look and it will be easier in the end.



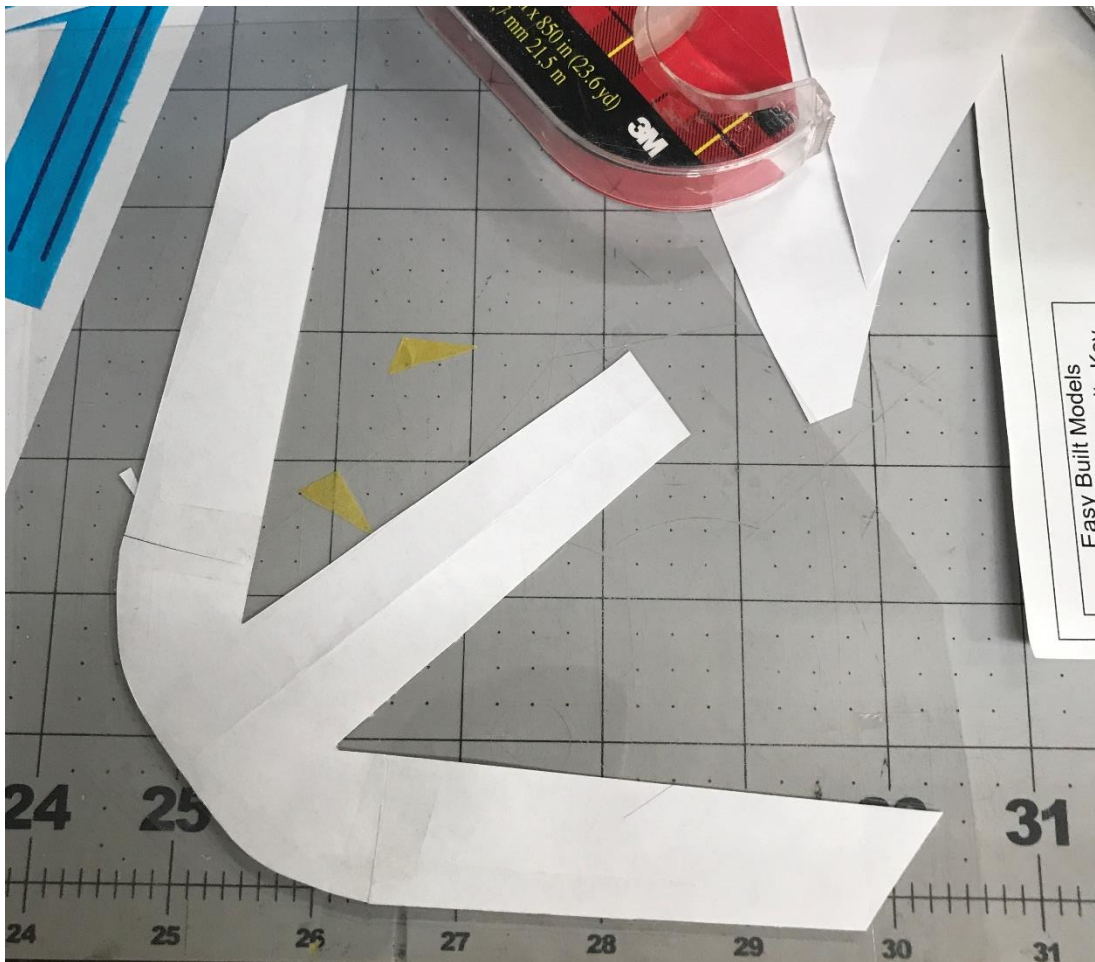
36. Covering the sides, I go right over the window openings again with the plan of cutting out the window openings after the tissue is shrunk. Two theories as for applying glue stick, some like to do the perimeter as it allows for the tissue to shrink over a larger area and should minimize wrinkles. The other is to put glue stick to all or most of the wood the tissue will contact making the wood and tissue somewhat stronger and more resistant to torsional stresses. Your call, I go and make the decision at the time of covering. If the fuselage seems like it would benefit from some extra strength, I glue it everywhere. In this picture the I used a single piece of tissue to go from the vertical upright for the start of the front windshield to the area there I cut in my vents. It is only glued around the perimeter of the tissue that was cut to size to fit perfectly. When I shrink this, it addresses and forms to a compound curve as the main fuselage structure goes inside the cowl. If I had glued it to every piece of wood underneath then it would have had some funny bumps in it. From here forward you are working with smaller pieces cut to size and overlap, most wedge shaped to address the taper of the cowl to the front of the nose. Another oops, almost forgot to get my instrument panel installed while I have easy access to it. Take your time to trim and test fit the panel into position.



37.

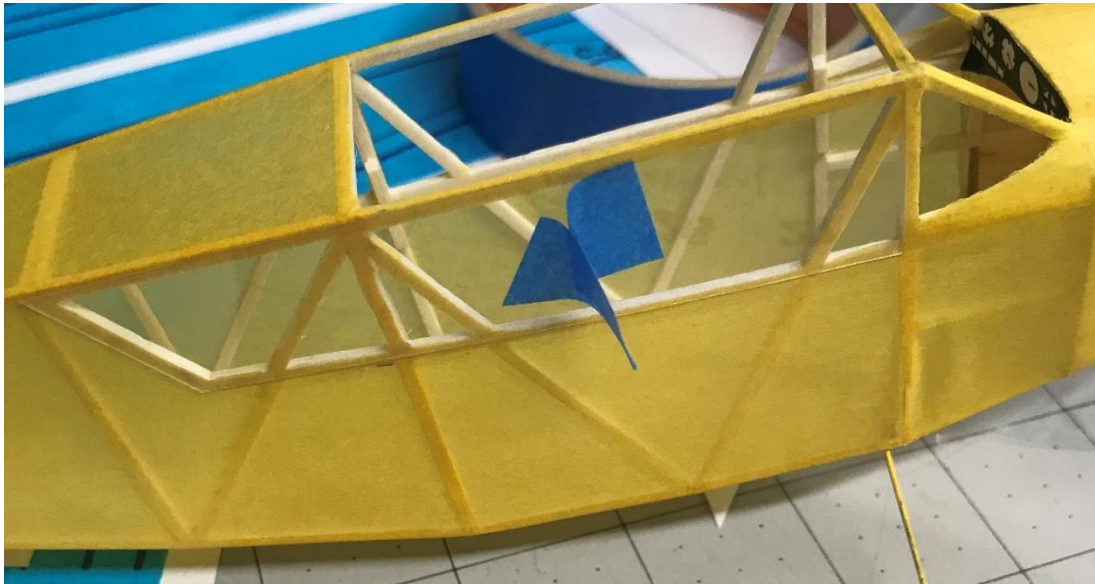


38. Yet another oops. First, I painted the interior of the engine openings silver, outlined in black and then added lines for cooling fins on the cylinders. You can get more or less exotic to your choice. At some point when I'm putting on the striping details, I realized I didn't need yellow tissue on the nose and had to remove it. I use glue stick to adhere it so simply misting with water, let it soak in a bit, the tissue and glue soften allowing fairly easy removal.



39. Your plan has a template similar to this for cutting out a windscreen. I tried to do it as one large piece of cut plastic to wrap around and over without any seams. Couldn't get it right without getting glue where I didn't want it. So as shown on the plan there are two templates, one for the side windscreens and the other for the wrap around windshield that extends up over the wing to create the skylights. I like to cut out the template oversize a bit, test fit,

trim and get it right. Cut to far tape on another piece of paper until you get it fitting just right. Next tape this tested template on to your plastic and cut with a sharp hobby knife using a ruler for a guide on the straight lines. Using a cutting pad hear will help prevent the blade's direction from being influenced by any grain on your cutting table.

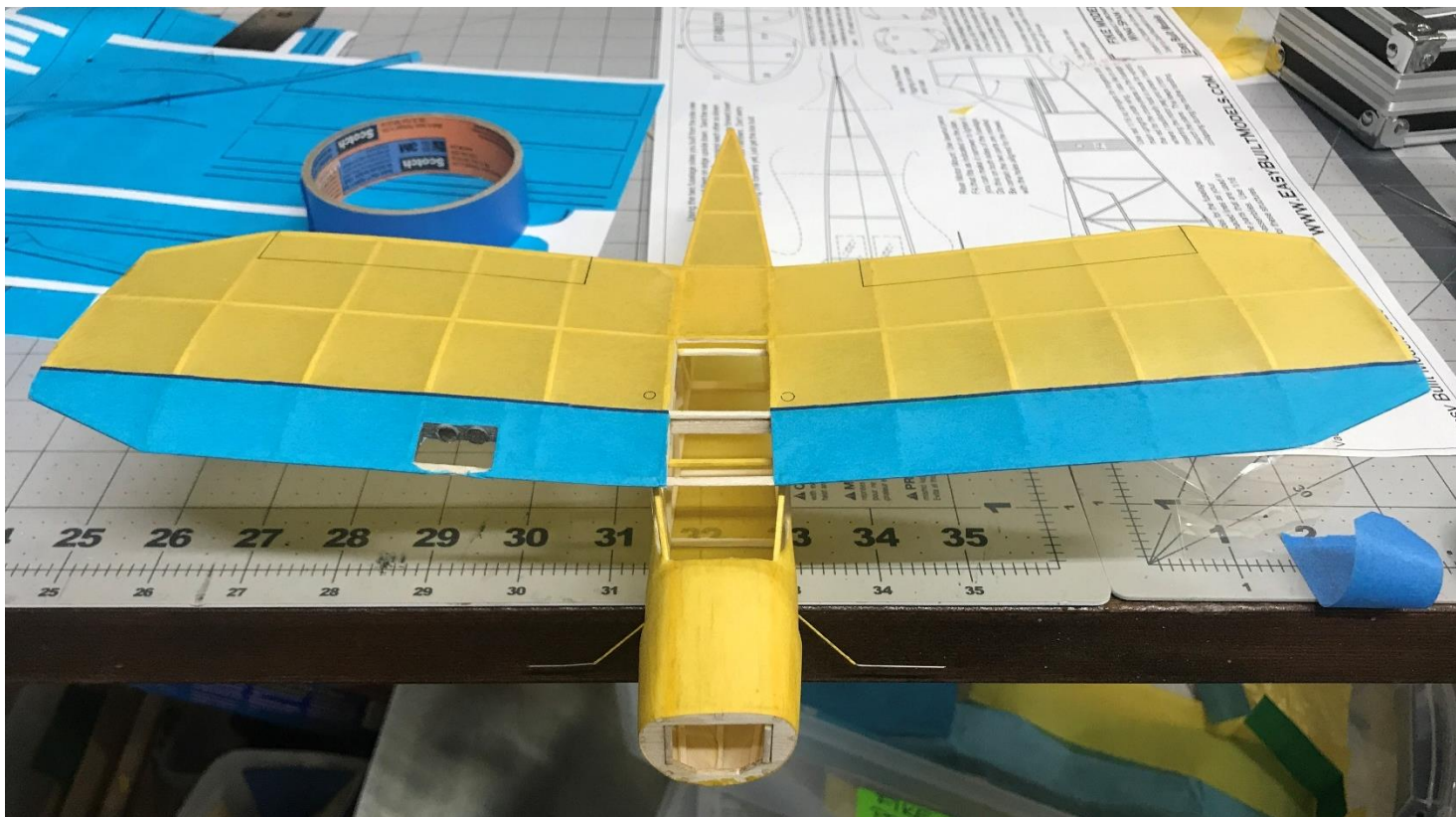


40. Couple things going on here. I find that using lens wipes with a lens cleaner work great for cleaning the plastic of finger prints without scratching the surface. Hard to believe a paper towel or cloth could scratch these surfaces but it happens. How do I keep my fingers off the plastic once cleaned – blue painter's tape handles gently adhered allow me

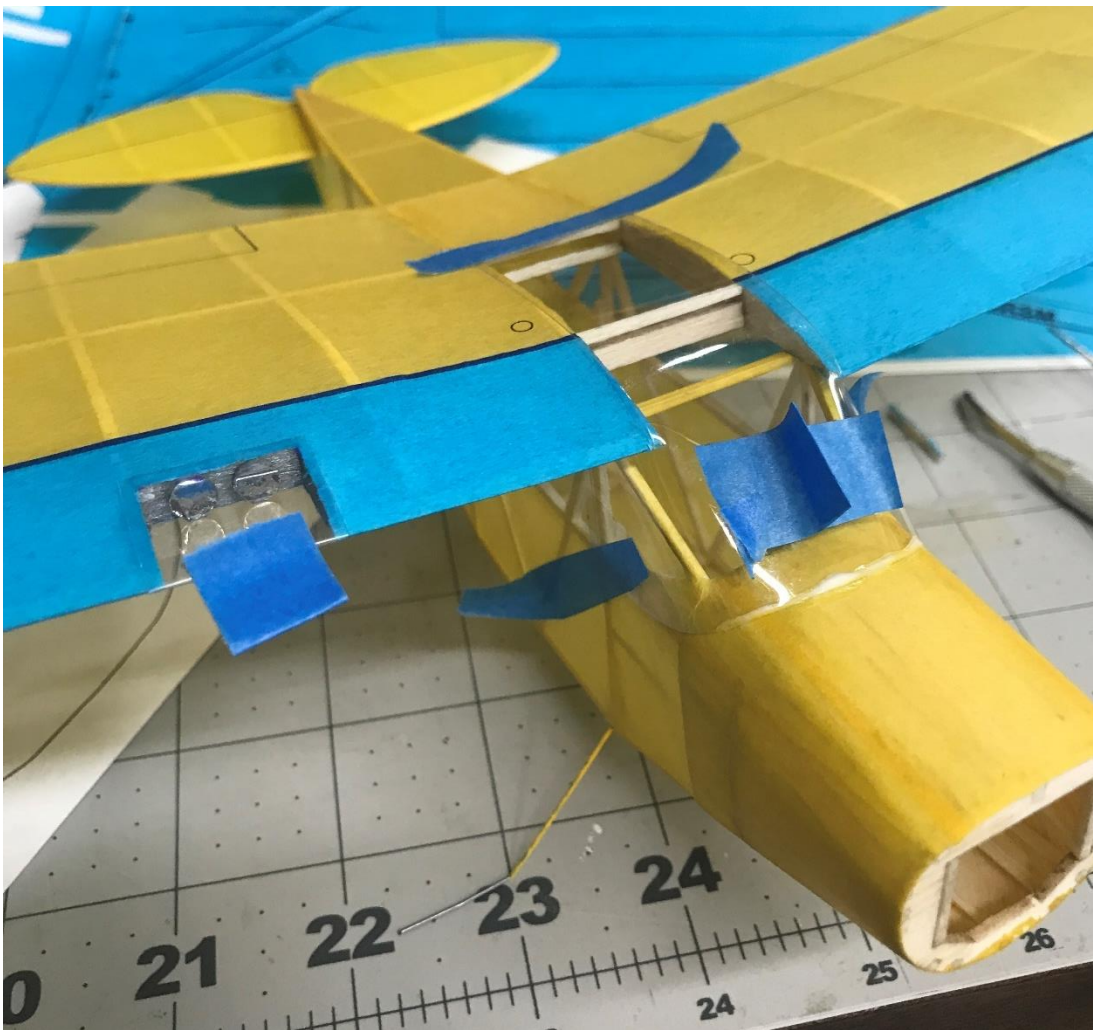
to pick up and handle through the process. I use two different glues for adhering the plastic windows. For these nice flat pieces on the side of the fuselage there will be no stressed areas on the plastic and the same glue stick I use to adhere the tissue will hold these windows in place too. I will be further capturing these when I place tissue strips over the edges much like a flange molding to cover the edges and thinner strips to cover the framework. That front upright, I have to make sure I've got the plastic cut and glued into position just right so that I don't have an overlap of plastic causing a bump. The seam will be covered with tissue. DO NOT GLUE THE FRONT WINDSCREEN ON AT THIS TIME. YOU WILL NEED TO HAVE THE WING IN POSITION FIRST.



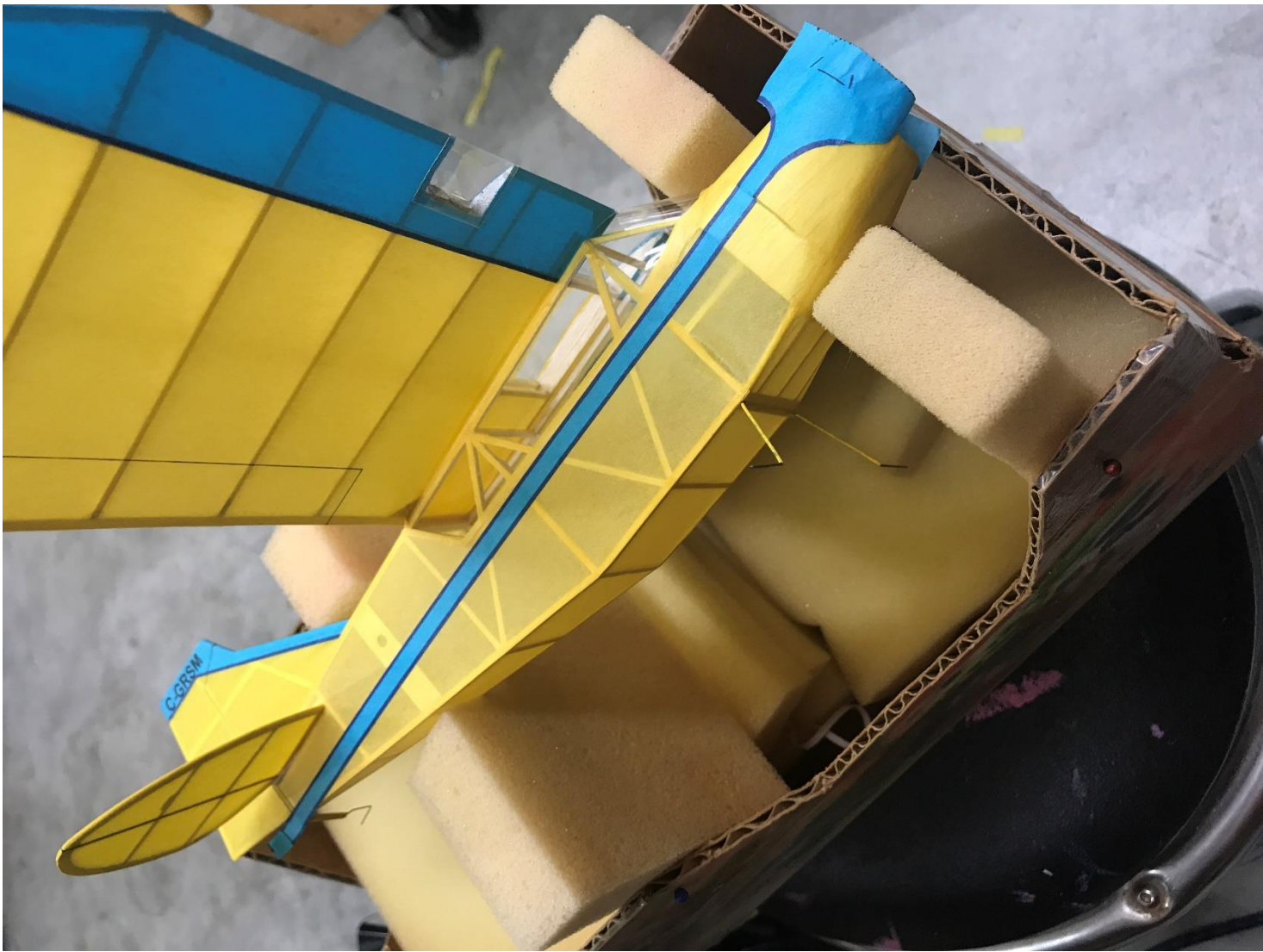
41. Another oh-oh moment. I forgot to put my pilot and co-pilots in at this point so that is why the plane is looking further along. I had to cut out some tissue in the bottom to get them in. If you do it now you can get them in while you have access to the cockpit. Pick your favorite pilot and cut out a silhouette image, glue and you have a much more realistic looking plane.



42. Let's get that wing glued on in place. Test the fit first to make sure you have good points of contacts and that warps haven't taken over control. Make sure it is as symmetrically mounted to the centerline of the fuselage as possible. Use props, a guide sheet, blocks, whatever it takes, to ensure you have the wing evenly mounted in all 3 planes of direction. You can shrink the tissue using a light misting of water. Don't soak the model down, just lightly mist so the tissue sags. Let it dry and repeat a couple of times if necessary. If you have an airbrush you can use it to mist the plane with water and target drying areas that seem to form wrinkles.



43. Do the front windscreen next. Here becomes of the natural tendency of the plastic to want to spring out and away we need to do this in stages. So first cut out and do the testing of the paper template followed by cutting the plastic to final size. Clean and use the tape as handholds. Have some extra strips of painter's tape to hold the plastic "wings" down in place against the fuselage. I apply some of our canopy glue around the front base of the screen and I use tape strips to keep the plastic in position while the glue dries. This means both side wings and the top tail have to be held so that the compound curves all are near their final position. It takes 20-30 minutes usually for the glue to become dry enough to hold the plastic. It will be nearly clear at this point. I can then release one taped section of the plastic at a time, apply a thin bead of glue around the edges of the plastic with our jeweler's awl. With the glue applied I gently roll it back into position and secure with the tape again. I repeat this for the other two portions of the same piece. Let it fully dry. During the initial time of the drying check it frequently to make sure it doesn't begin bowing out anywhere. If you opted to put in some landing lights then after the glue dries you can finish them off. Cut the leading edge out and take a piece of the plastic cut to width. Fold it over, the plastic will hold a light fold. Slip it over the and trim the top and bottom to length. Glue in place and tissue over with narrow strips around the edges.
44. Glue the stab and rudder on. Make sure these are square and then we can finish off the last necessary pieces and any other little options you might want to add.



45. I use my extra set of hands to hold the plane while I apply the tissue striping. It is much easier to do any lettering and extra pin stripes before applying the tissue. Matching up the front lines around the cowl can be a little testing. You might have to make a couple of templates to get a perfect match.
46. Make sure these are square and then we can finish off the last necessary pieces and any other little options you might want to add.



I used some fine strands separated from picture frame hanging wire for the next step. I took short pieces of the wire inserted into the ends of the LG struts and glued them into the fuselage frame. I did not glue the struts to the LG wire or wheels. I painted the LG wire to blend in with the backs of the LG struts. I made the shock struts that form an X under the fuselage from some hard sticks. I made them oversize, trimmed, test, repeat until I got a great fit. I added a number of other details to my plane not included in the kit that were identifiable in pictures - gas caps, venturis, antenna, cables, hub caps, air driven electrical generator, spinner, etc. Once the LG struts are in place and the glue dried, install the wheels all around. Once finished I mask off the windows with Post-It material and Scotch 811 removable tape. Then I'll shoot the plane with several light coats of Krylon Satin Clear finish aerosol paint.



47. Install the plastic prop, thrust button, rubber motor and rear motor peg.



48. Next couple photos show the model with all the little details one can add to improve scale view.



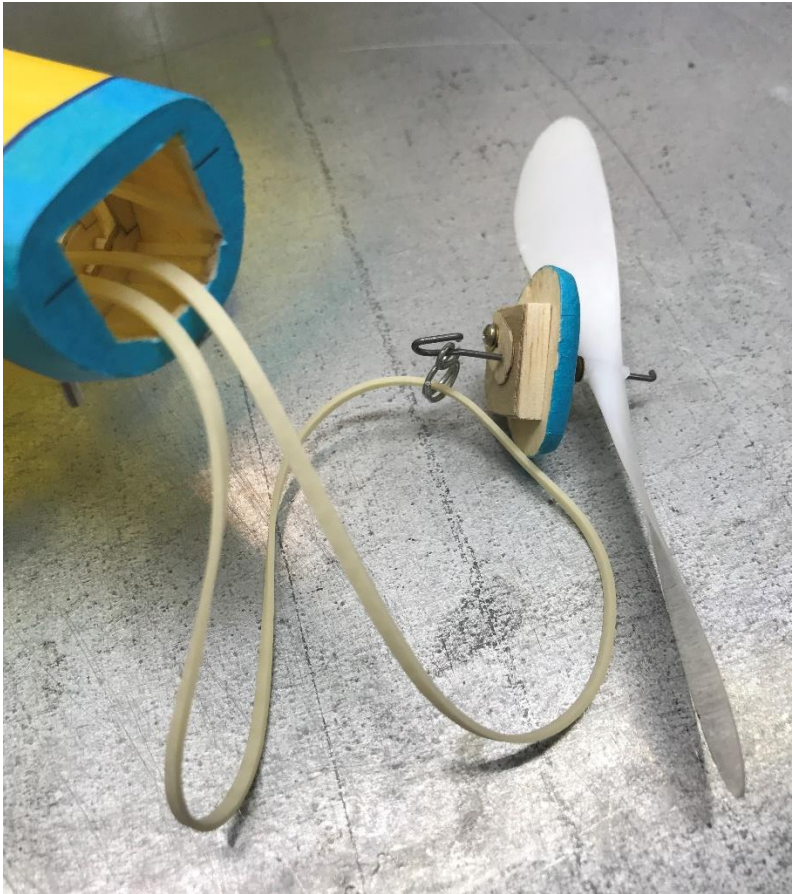








49. I opted to upgrade my rear motor peg from a wooden dowel to an aluminum tube. This allows me to use a winding stooge to hold my plane while using a geared winder to put in the winds.



50. The final step, again I've upgraded my setup for competition flying. In addition to inserting the thrust button, beads and washer, I'm using a rubber hook to make winding easier and an adjustable guide for thrust lines screwed into the back of the nose block. None of these are required for casual flying of the model.

51. Last step is to go to our tips section and follow the Air-Model Manual to get your plane up and flying.

Thermals all,

Dave