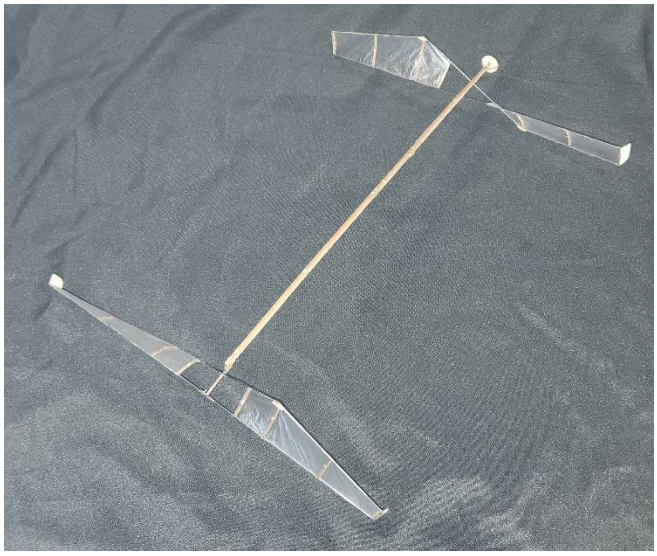
Hurricane V1.0
2026 Division B/C Helicopter

By *J&H Aerospace*

www.jhaerospace.com



Expert class helicopter legal for Science Olympiad Helicopter 2026 competition

Includes materials for two complete helicopters

Tools/materials required: ***silicone rubber lubricant****, winder, needle nose pliers/wire cutters, CA glue (or Duco/Ambroid/Sigment), razor blades, sandpaper, ruler, scissors. Optional: Torque meter, turns counter (volareproducts.com).*

Hurricane Helicopter

J&H Aerospace

Building Instructions

Congratulations on your purchase of the Hurricane helicopter! You are about to build a reliable rubber powered helicopter capable of over 2 minute flights in small gymnasiums.

Please use the Hurricane 2025 V1.1 Build Manual to guide your construction: https://jhaerospace.com/product/hurricane2025/

Direct link:

Additionally, following the build manual, IN EXACT ORDER, is absolutely critical to build a flyable helicopter. DO NOT TRY TO INNOVATE OR DO IT YOUR WAY. You can try your own tricks once you have built a flying helicopter.

1. Parts list

Before beginning construction, please verify that your kit contains all of the necessary parts listed below. Please be aware that some of the laser cut parts may have separated from their carrier sheet, so you should ensure that all of those parts are present and undamaged.

1. 0.030”x13” carbon rods (11x)
2. 0.020”x10” steel piano wire
3. Parts Sheet #1: Motorsticks, 1/8” balsa
4. Parts Sheet #2/#3: Top jig and ribs, 1/16” balsa
5. Parts Sheet #4/#5: Bottom jig and ribs, 1/16” balsa
6. Parts Sheet #6: Rotor tips, 1/32” balsa
7. ¼” sq x 5” sticks (2x)
8. ¼” sq x 10” sticks (2x)
9. Veggie bag
10. 1/8”x16’ rubber
11. O-rings (8x)
12. Thread binding
13. Ballast (modeling clay)
14. 1/16” aluminum tubing, 2” long
15. Rotor washers (white Teflon sheet)

Flight Data Log

Entry Number	Date	CG Location	Incidence Settings	Airframe Weight	Initial Rubber Length	Turns	Torque	Backoff Turns	Climb Height	Flight Time	Turns Remaining	Comments/Adjustments
1												
2												
3												
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Before beginning construction, be sure to verify that you have all of the recommended tools for building your Hurricane. Also be sure to verify that all parts are present in the kit. If anything has been damaged in shipping, please contact us IMMEDIATELY to get those issues resolved. Occasionally a component will be missing or different from wRhat's shown in the instructions. Please contact us for that as well. Sometimes minor changes are made during the production life of a model, so most confusion is simply related to these changes.

DO NOT separate all the parts out of your parts sheets. Only separate parts out as you actually need them so that they don't get damaged or lost.

Glue usage must be carefully controlled. Any excess glue will damage your Hurricane's ability to fly. Take your time and be careful and accurate. Don't accept mediocrity!

The rotor jigs are assembled in halves, and the pitch stations are labeled according to location. Their tabs are designed to produce a non-reversible installation. Despite these failsafes, please look at the photos carefully to ensure proper assembly of the jigs. **The jigs must be assembled correctly. If you assemble them incorrectly or backwards, you will have to purchase a new kit. Pay close attention!**

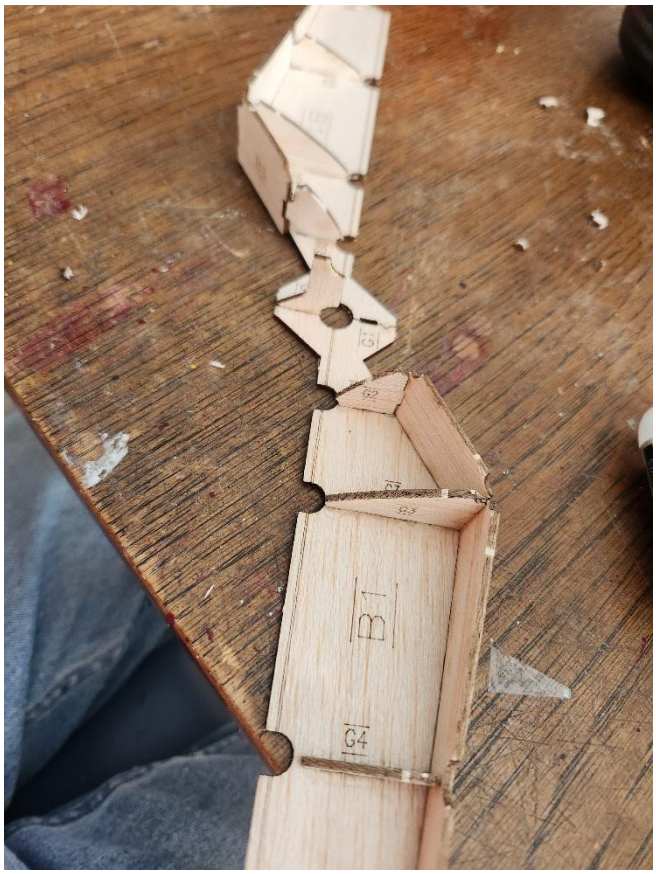
Remove the parts for one half of the top rotor jig from a parts sheet (#2 or #3). Two G1 stations are provided. You will only need one.

Assemble the jig as shown, making sure all of the tabs are fully inserted.

Install the leading edge jigs as shown, again making sure the tabs are fully inserted.

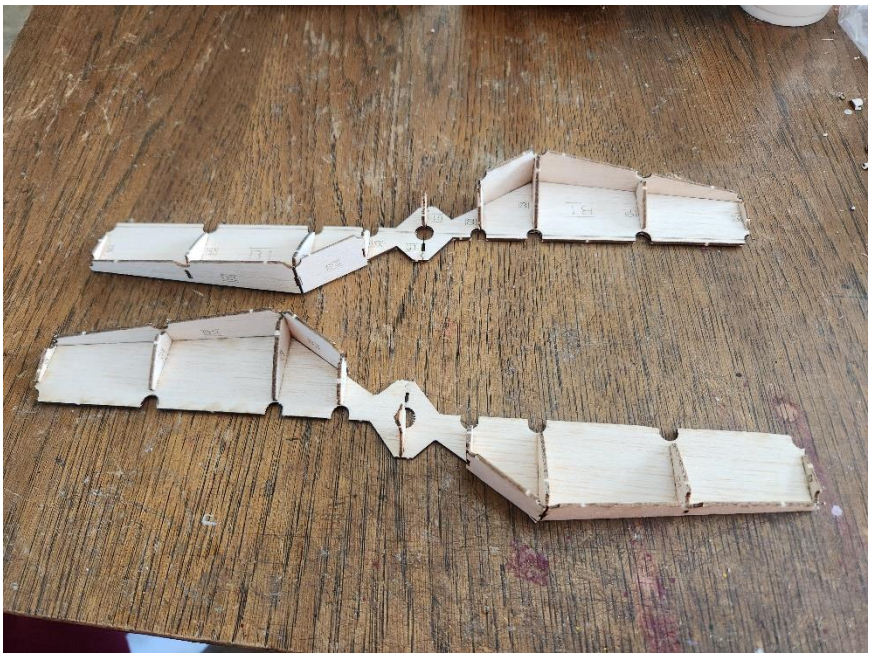
Assemble the second top rotor jig half so that it matches the first one except for the G1 station.

Join the top rotor jig halves together, being sure to keep them flat on the table so that the bottom of the jig remains straight and flat.

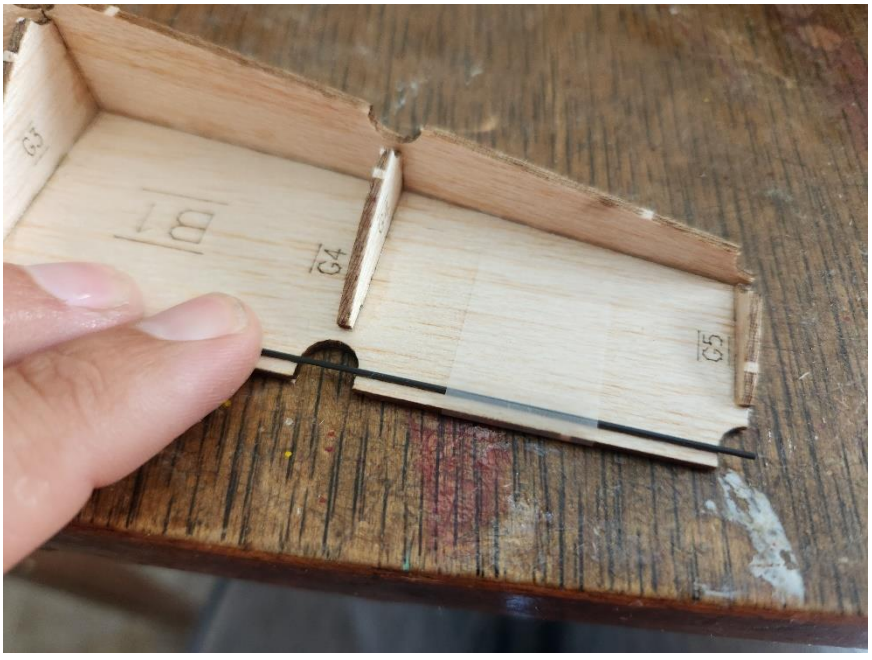


The bottom rotor jig (Sheet #3/#4) is exactly the reverse of the top sheet. Install its parts as a complete mirror image of the top rotor jig.

Join the bottom rotor jig halves together in the same manner as the top jig.



Begin construction of the top rotor by taping down a carbon rod along the engraved lines on the top rotor jig as shown, lining up the end of the rod with the outside end of the jig.

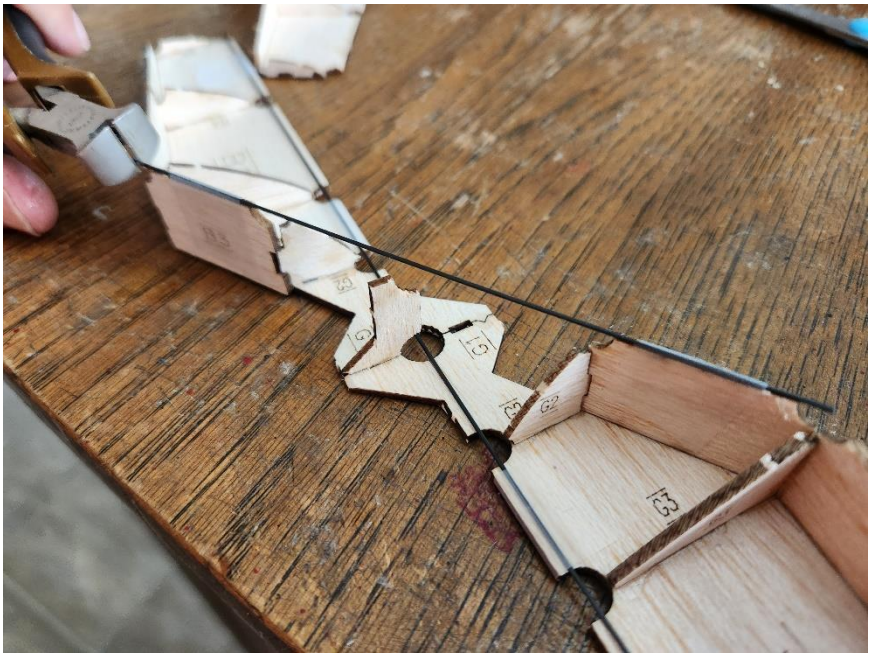


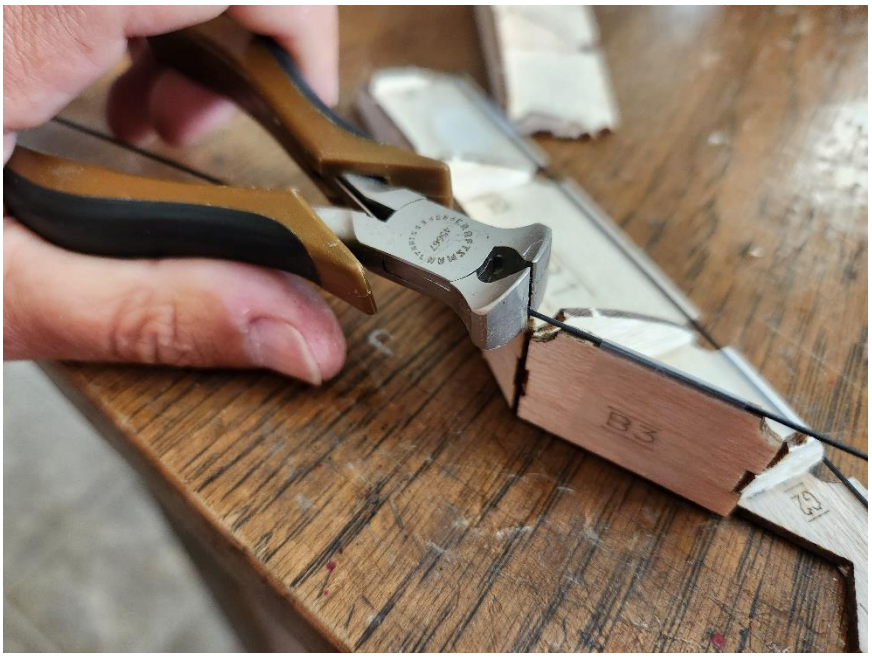
Tape the rod down closer to the center as well.

Tape the rod down at the other end of the jig and cut it flush with the outside end of the jig.

Tape a carbon rod to the top of the jig to form the center leading edge. Make sure the end of the rod is lined up with the centerline of the G3 station.

Tape the rod on the other side and trim it to the G3 centerline.

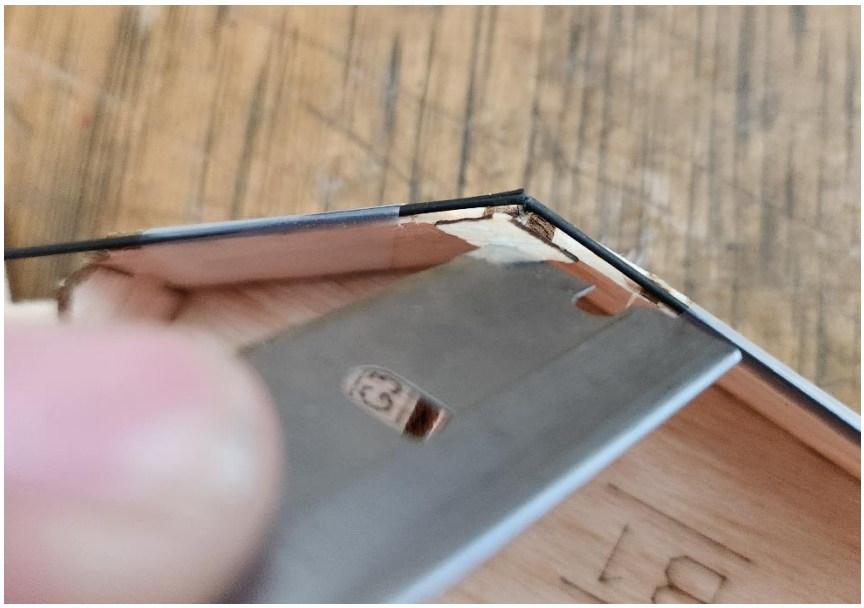




Join up a carbon rod with the segment you just installed, using CA, and holding it down with tape.

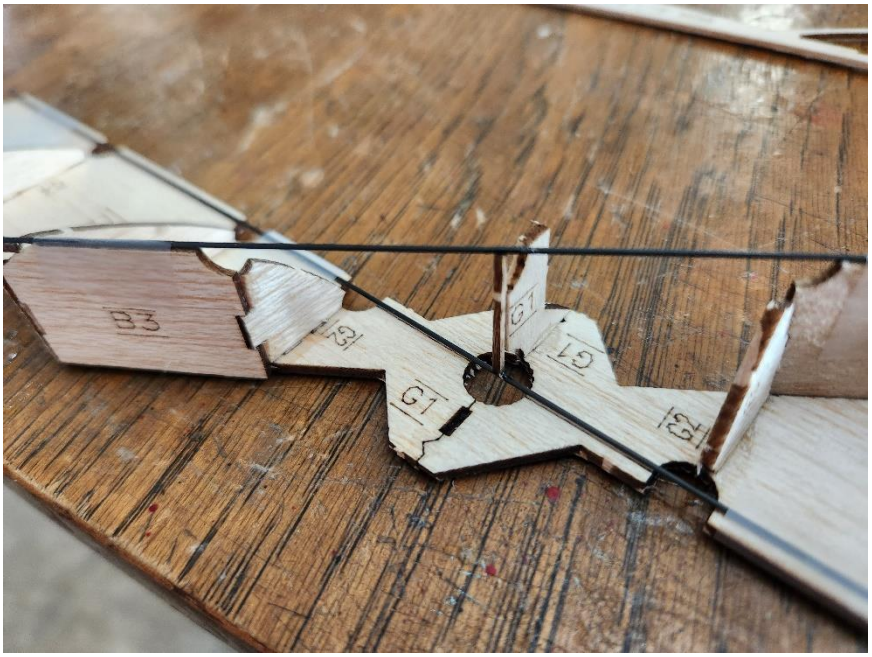
Trim the rod flush with the outside edge as shown.

Install one of the rotor leading edge gussets as shown, under the join of the two carbon rods. This is a very small part so you will need to stab it with a razor blade or very thin sewing needle to maneuver it into place.



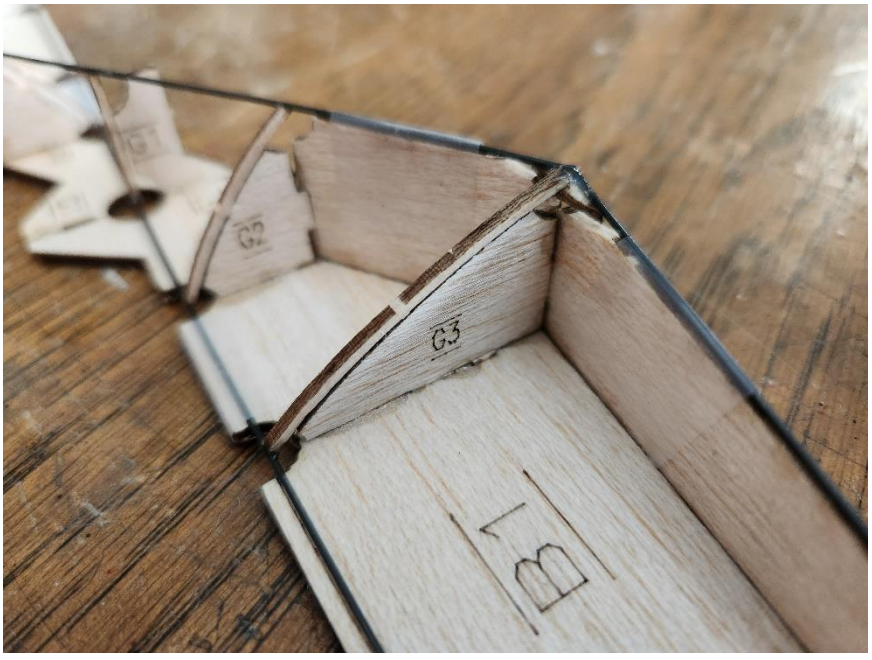
Repeat the above steps for the other side of the rotor so that all of the leading edge is installed on both sides of the jig.

Install the straight center rib.



Install the first curved rib (G2 station).

Install the second curved rib (G3 station), resting the front of it on the gusset and securely gluing that junction.



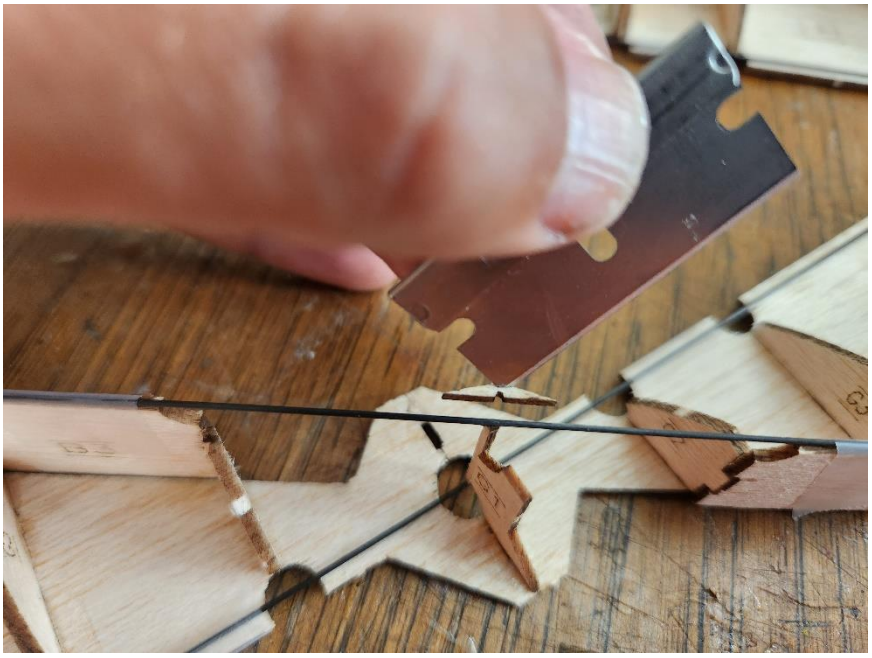
Install the G4 station rib.

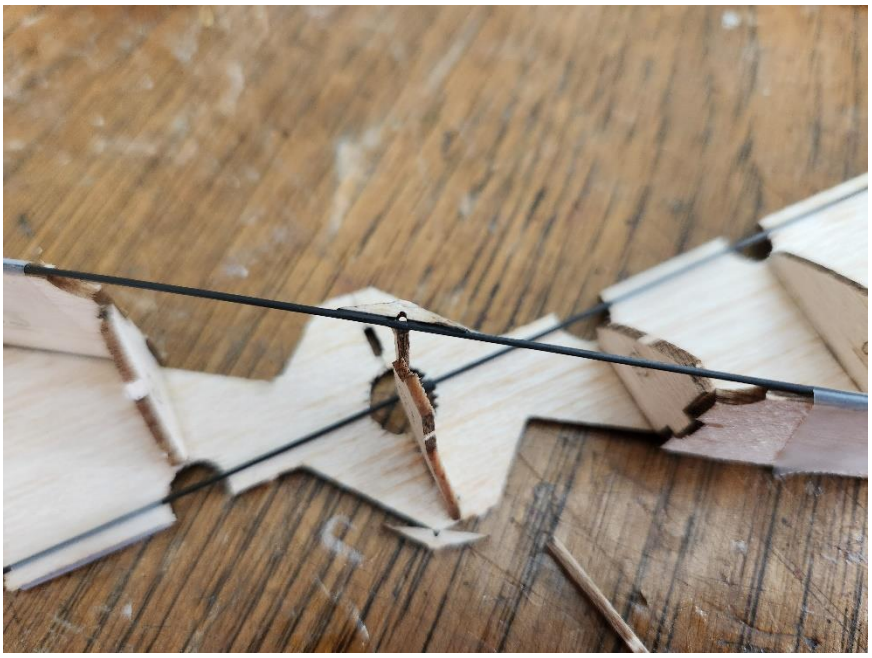
Install the tip rib, to finish out one half of the top rotor.

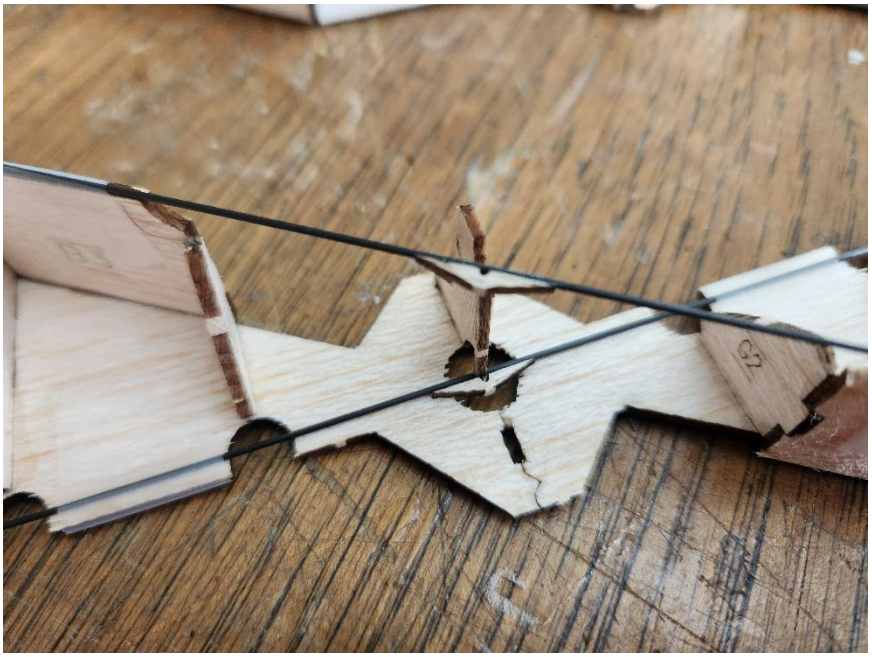
Repeat the above rib installations for the other side of the rotor.

The bottom rotor is assembled in exactly the same manner. **When you have completely assembled the bottom rotor as per the top rotor, leave it attached to the jig for one additional step.**

The **bottom rotor requires two shaft alignment plates.** These are the small notched triangles. And they are installed against the spar, lining up the notch with the center rib.

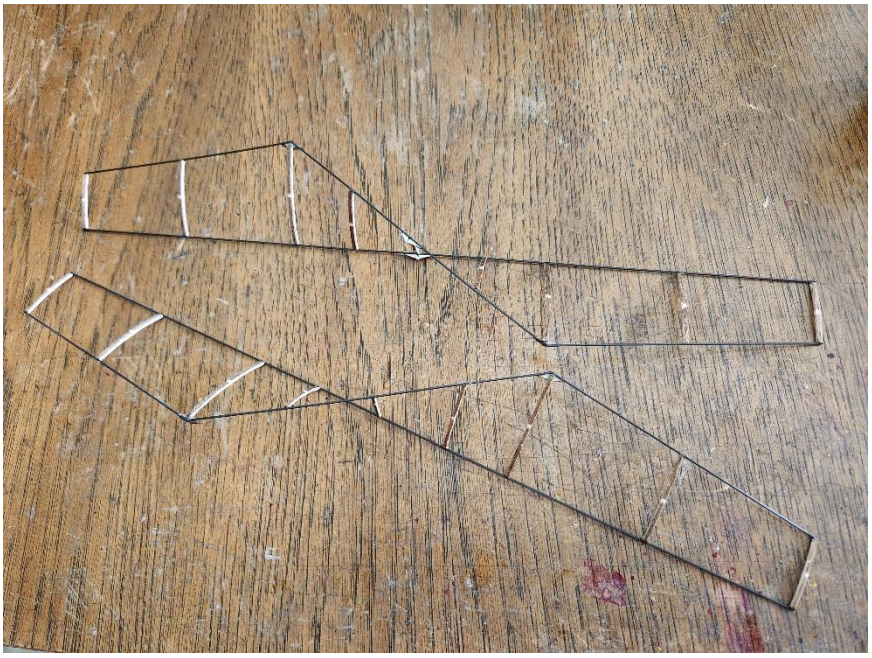






You should now have two completely assembled rotors, taped to their jigs.

Carefully remove all the tape and gently remove the rotors from the jigs. You may need a razor blade to carefully cut the blades loose in a few places since glue can seep against the jigs.

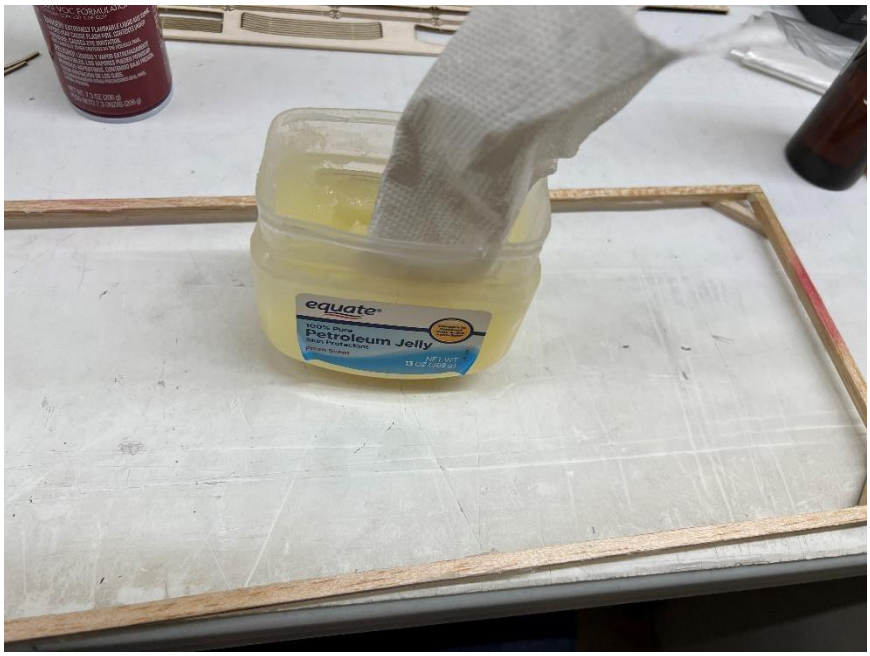


The large ¼” square sticks are used to make your covering frame. The blade design of this kit requires the covering to be free on the ends of the covering frame. Glue the sticks firmly together to form a rectangular frame **by overlapping them as show so that the shorter pieces are offset** as shown.

You will need 3M-77 spray adhesive to cover your wing and tail. Get it out and have it handy. Plan ahead—you do not want to use this product indoors because it will make everything around you extremely sticky!

You need petroleum jelly/vaseline to make the covering frame stick to the veggie bag plastic. This method allows you to reposition the covering so that it can be applied neatly to the flying surfaces. Only apply the Vaseline along the long dimensions of the frame.

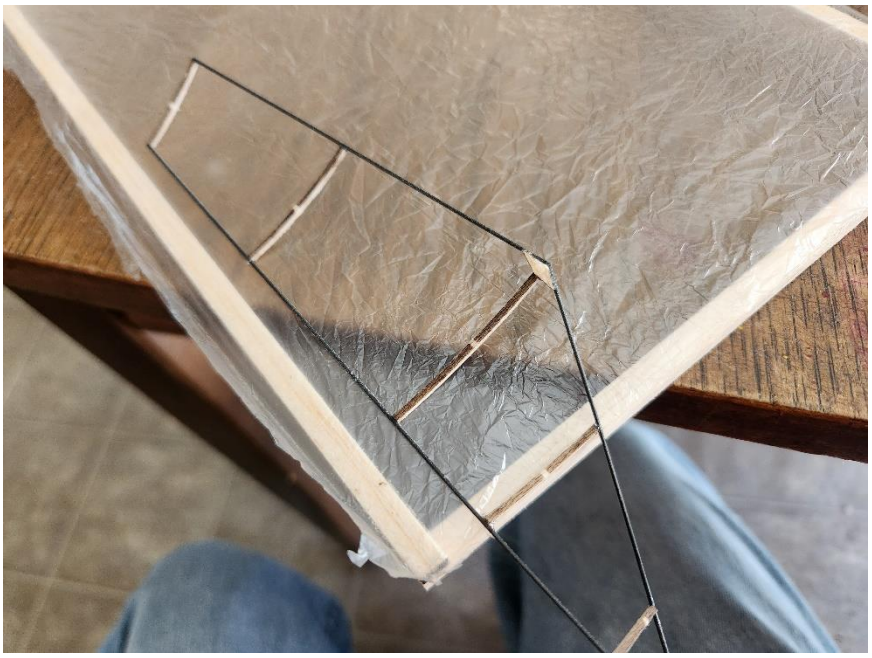
We recommend using a paper towel to smear the Vaseline onto the frame so you can limit the travel of this material. DO NOT get Vaseline/petroleum jelly near any of the rubber bands or strip in your airplane because it will destroy those materials. Also it is best to do this over an alternate workspace that you won't be using for the rest of the build.



Cut out a piece of veggie bag a bit larger than your covering frame. Make sure it is going to be large enough to have about 2 inches of excess on all sides before cutting it out and wasting covering material. You have plenty of extra covering material, so if you don't get it right the first time, try again. Take the piece of covering and wad it up tightly into a ball. Flatten the covering out BY HAND on a clean, flat surface. Now wad it up again. This time, flatten it out fully and completely, again by hand only, and get it as smooth as your hands can get it. Do not try attempt to iron it flat or use any other method than simply smoothing it out with your hands. Take your time to get it right. Once the film is smoothed out (it will now have a crinkled appearance and texture), lower your covering frame, Vaseline side down, onto the covering, and press it down all around to get it to attach to the covering. Now lift the frame-covering assembly off, flip it over, and tension out any wrinkles or excess slack to get the covering as smooth as possible (again, the crinkled texture is good, don't try to get rid of it, and never attempt to heat shrink the film). Cut the plastic flush with the ends of the frame as straight as you can.

Take your rotor blades outside, or into a spray booth, and spray the convex curved rib side of each with 3M Super 77. This will make them extremely sticky—be careful! It is very easy to damage the parts once they have been sprayed because they will stick to your hands and get damaged if you don't carefully disengage your hands from them.

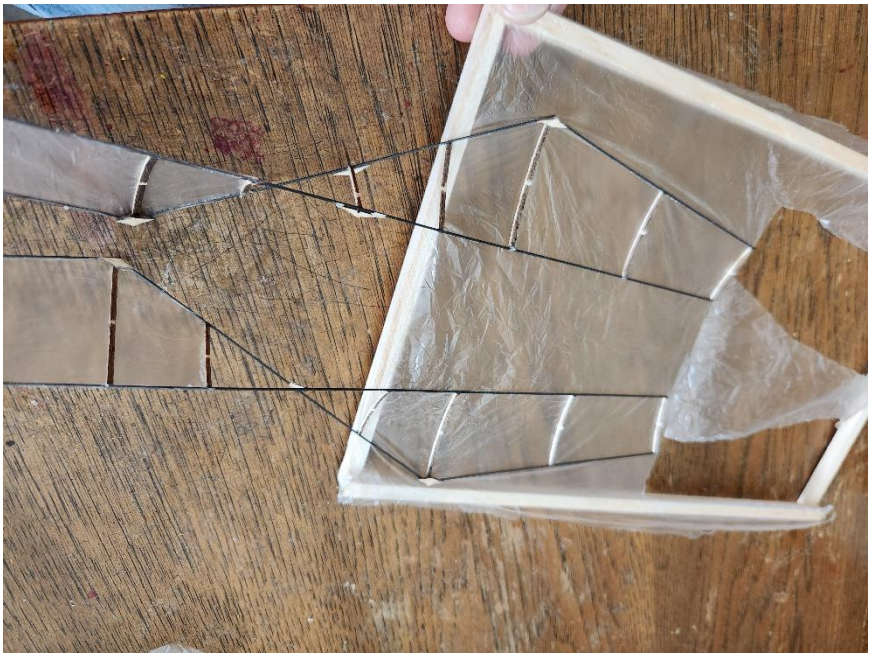
You will cover the rotors one half at a time, starting at the innermost curved rib. Lay the rib against the edge of the film and lightly press it against the film. Then rest the straight trailing edge against the film.



Carefully press the rest of the blade, one rib at a time, down against the film. Take your time to remove wrinkles from the film as you you're your way along. Once the film is fully attached, gently run your finger around the outlines of the rotor to press the film into contact with the parts. Be careful to press very, very gently so that you do not damage the fragile ribs!

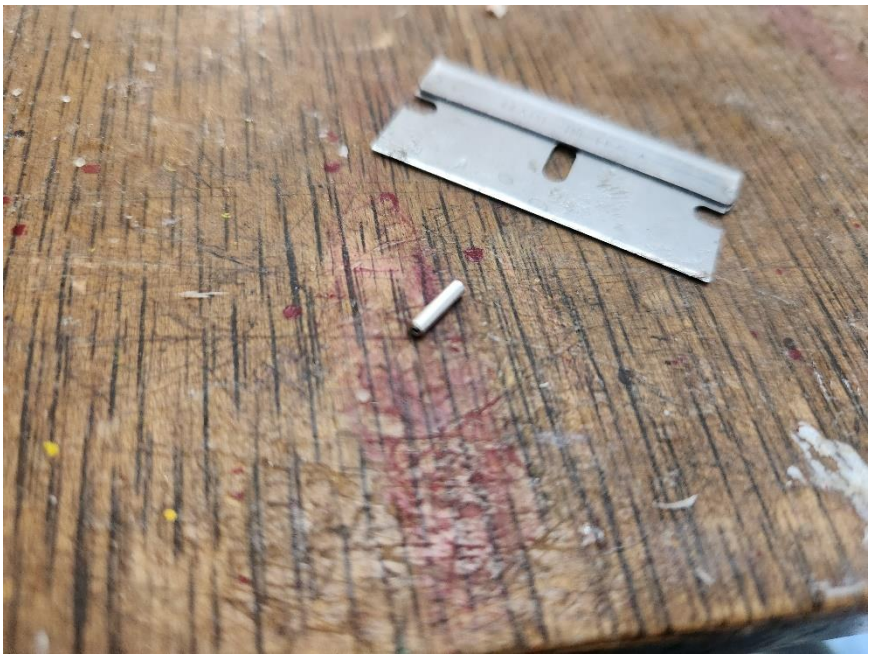
Use an electric cautery (available from indoorffsupply.com) or brand new razor blade to cut the film around the outside of the flying surfaces. Excess covering won't hurt on the leading and trailing edge, as it can be wrapped around the spars, but the tip rib must be trimmed flush.

Cover the other half of this rotor and the other rotor using the same methods.



Remove a motorstick from its carrier sheet and locate the piece of aluminum tubing. Cut a 5/16” long length of tubing using an old razor blade by rolling the blade back and forth against the tubing on a table.

Once the tubing is scored, deeply, it can be broken loose.

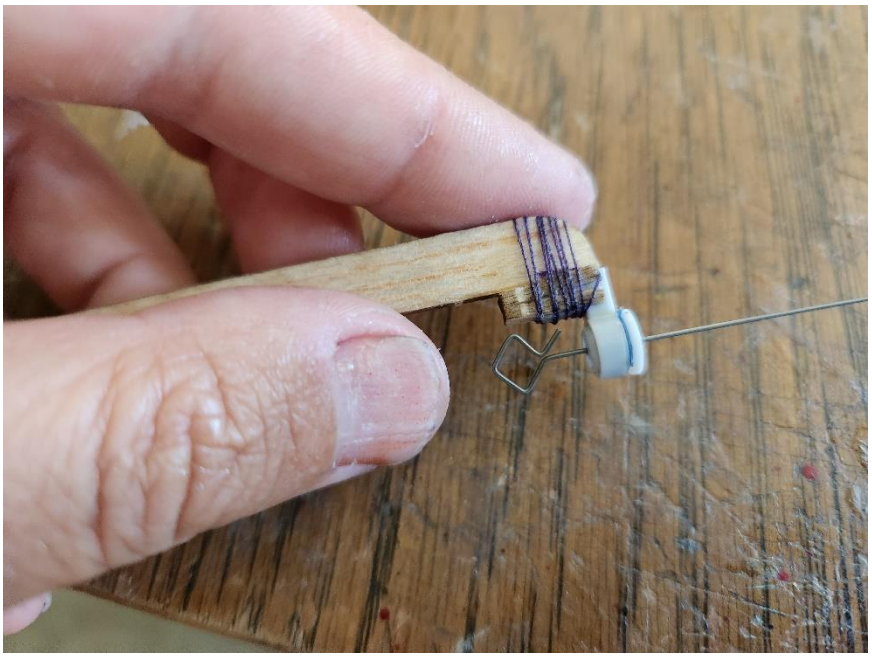


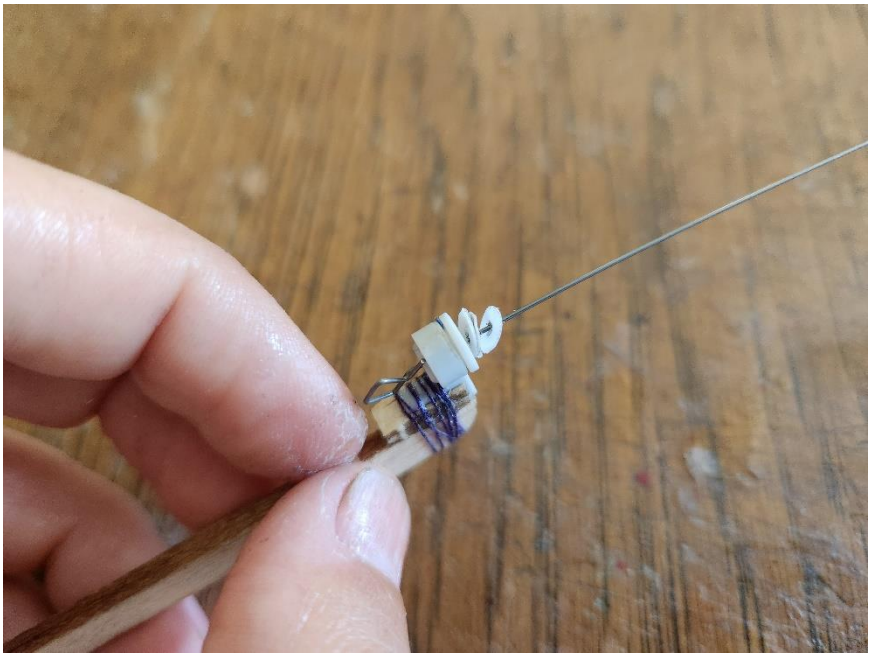
Glue the tubing in place against the offset piece on the end of the motorstick.

Bind the tubing firmly in place with thread and harden with CA glue, being **careful not to get any glue inside the tube**.

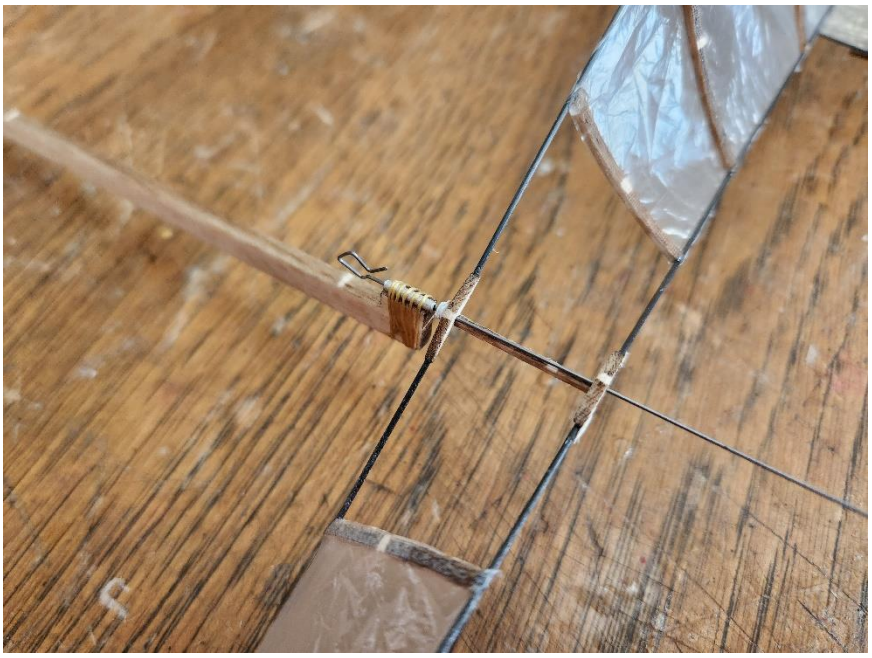
Use needle nose pliers to bend the end of the .020” steel piano wire into a diamond shape with a tab bend as shown. Take your time, grip your piers HARD and make crisp bends. Curvy bends are not acceptable. You must bend HARD. This will probably cause discomfort in your fingers. It will NOT cause injury!

Thread three (3) of the Teflon washers from the washer sheet onto the prop shaft after threading the shaft through the bearing (not that an Ikara bearing is shown, but the installation is the same).



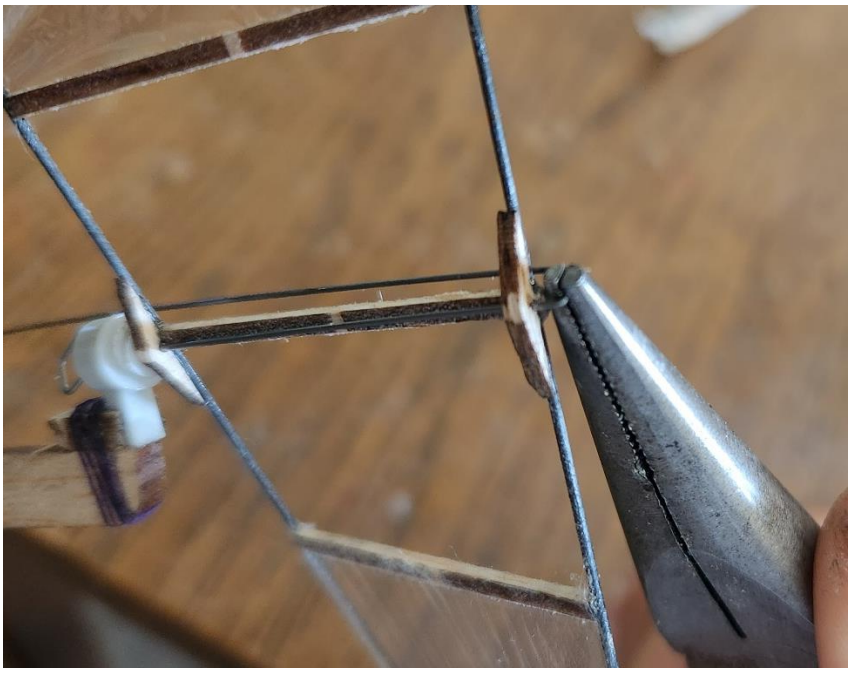


Slide the bottom rotor onto the shaft, curved, covered side toward the motorstick.

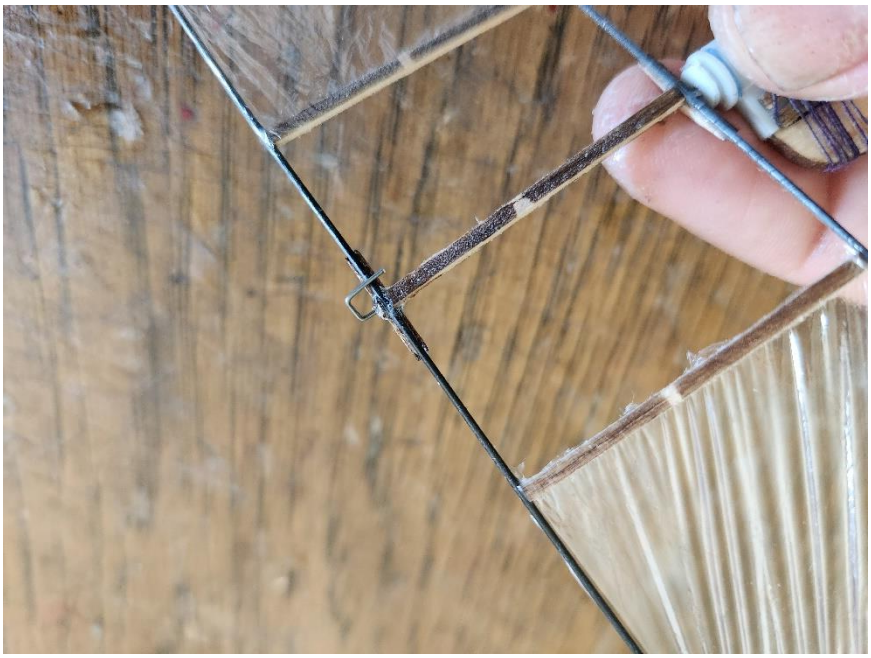


Leaving about 1/8” extra in the prop shaft, bend the wire over SHARPLY to 90 degrees.

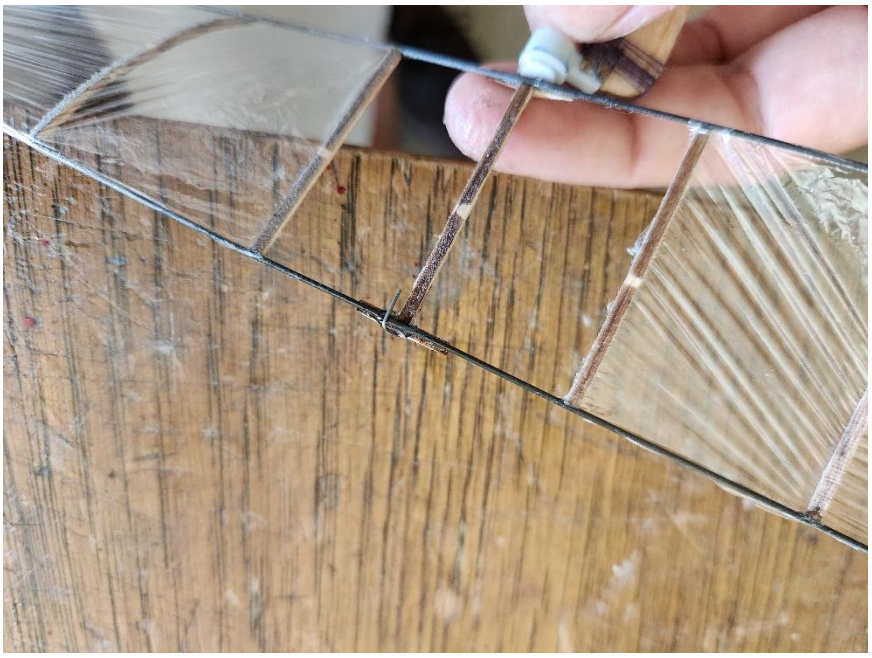
Make another 90 degree bend so that the wire laps over the rotor spar.



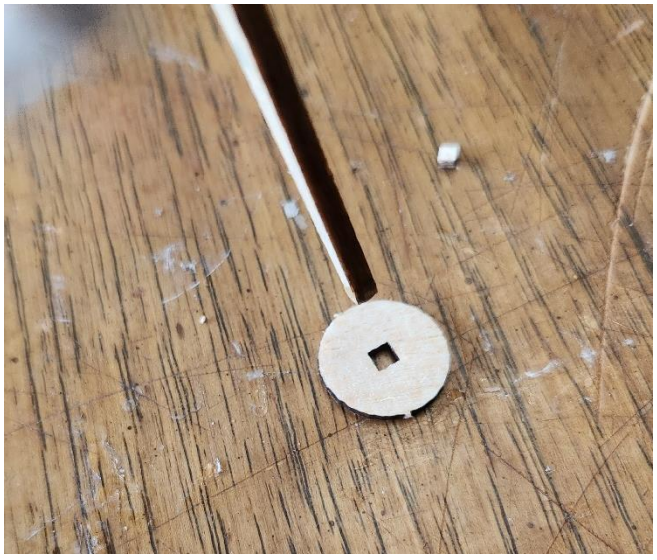
Cut the end of the wire with wire cutters.



Glue the end of the shaft firmly in place and run glue along the center rib as well. **Don’t get glue into the washers or aluminum bearing!!!**



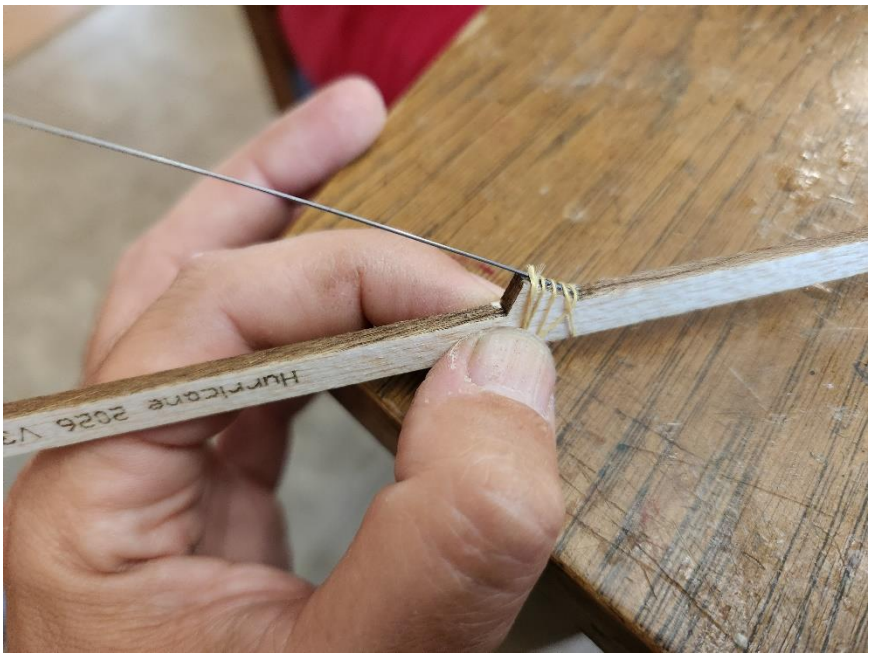
Insert the small end of the motorstick into one of the top caps.



Add gussets on the sides of the cap as shown to prevent it from breaking along the grain (note the grain direction on the top cap).

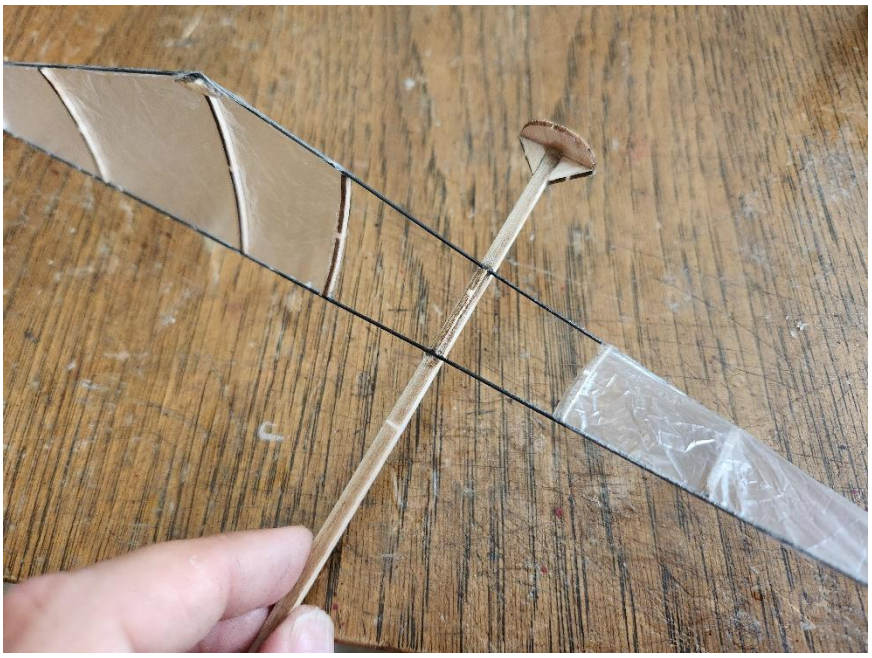
Insert the .020 piano wire into the motorstick, gluing it firmly in place.

Bind the wire firmly in place and harden with CA.



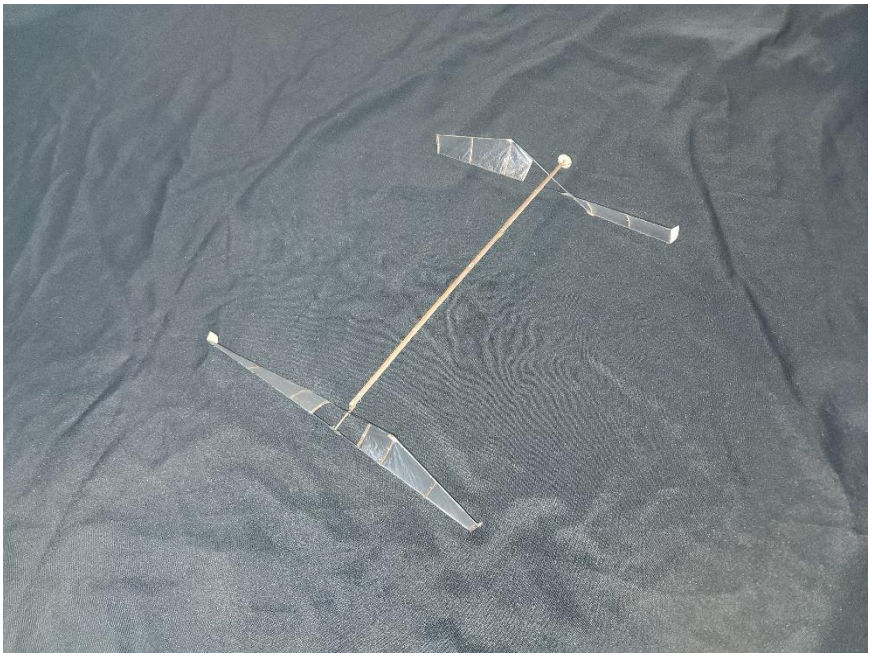
Bend the wire out from the motorstick, back, and cut to size.

Glue the top rotor in place, lining it up with the marks on the motorstick below the top cap.



Glue the winglets onto the rotor tips as shown at a roughly 45 degree dihedral angle.

Congratulations!!! Your Hurricane 2026 is now complete!

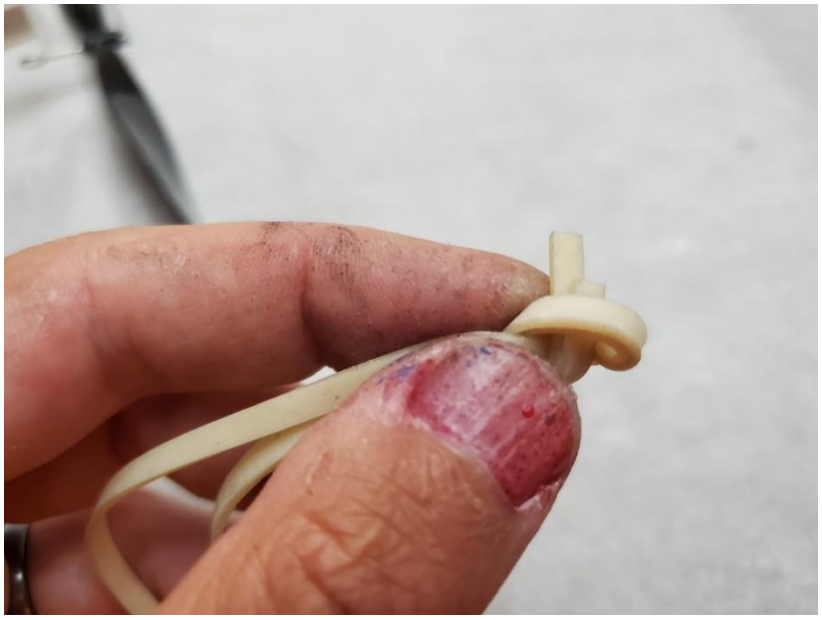


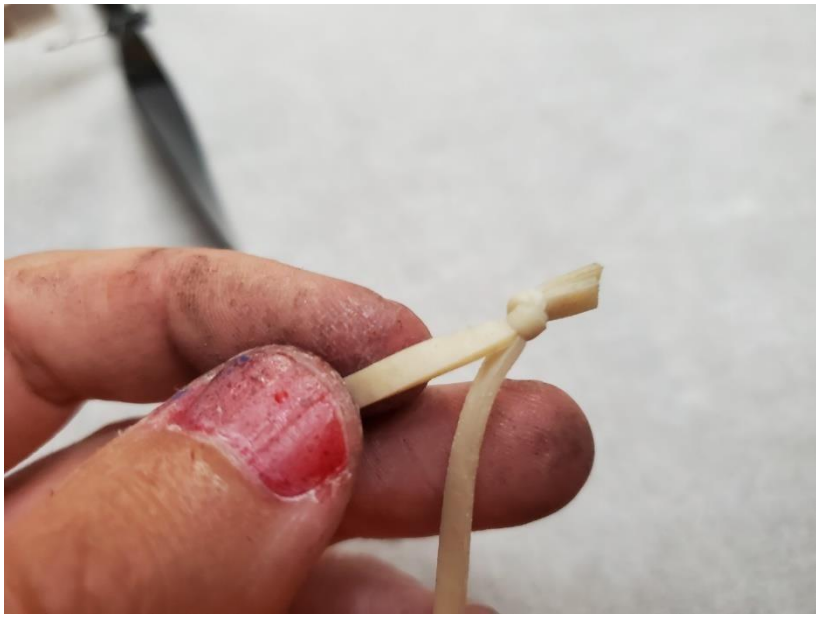
Weigh your model to verify that it meets the minimum weight of 4.00g. If not, glue clay to the top of the motorstick, below the top cap, to bring it up to the minimum weight. The weight will need to be secured with a drop of glue.

Now you will need to make some rubber motors for it.

Cut a piece of rubber about 24 inches long (this is a good size to start with—you may find that longer loops are more optimal, but start with 24 inches). Slide two of the white plastic o-rings onto the rubber. Now you will need to tie a knot to join the ends of the rubber.

Bring the ends of the strip together and tie a granny knot as shown.





Tie a second granny knot and sinch it up to the first one for added security. Add a tiny dab of glue to the knot on the outside (free ends) of the rubber loop. Trim off any excess.

Now lubricate the rubber as shown by rubbing silicone oil into it. As mentioned before, do not use petroleum products to lubricate your rubber motor because they dissolve the rubber, making it unusable.

You can now load the rubber onto the rear hook and the prop shaft. Typically the rubber will be very slack, hanging loose under the model. It's ok for the rubber to hang loose, as this will actually reduce tension on the prop bearing and allow the rubber to be wound more tightly.

Wind the rubber motor, off the model in a clockwise direction using a hand crank winder. In the absence of a torque meter, the other end of the rubber motor can be secured using a bent paperclip around a chair leg. Start with 200-300 turns (not winder cranks—calculate this based on the gear ratio of your winder) Be careful when installing the rubber onto the model that the o rings does not slip off the bottom rotor shaft. This will take some experimenting to get it right.

If your model is correctly assembled, it should hover slightly or maybe gain a little altitude. Gradually increase the number of turns in the rubber motor until the helicopter rises to the ceiling, keeping record of you turns, torque, any turns you back off to remain clear of snags in the ceiling, and the model's overall performance.

Do not expect perfect flights from your model at first. If it does not perform correctly, veryify that it is properly assembled and that you are winding in the correct direction.. All model airplanes require subtle adjustments to get them flying their best. If your model crashes, never simply try to fly it again without taking time to figure out what made it crash and what can be done to correct it. Crashes can be caused by a poor launch (throwing too hard or too softly) or by the model being out of trim.

Please contact us using the contact form at jhaerospace.com or at joshuawfinn@gmail.com if you have any questions regarding your Hurricane.

Want to become a pro at indoor flying? Try our Indoor Flight University curriculum. It contains extensive information on building, designing, and flying your airplanes to get the most out of them. Along the way you will learn a strong foundation of aerodynamic principles which will reveal the secrets of flight.

https://jhaerospace.com/product-category/curriculum/