Twister 2025
Division B/C Helicopter
Build Manual V1.0

By *J&H Aerospace*

www.jhaerospace.com

A beginner-friendly helicopter legal Science Olympiad Helicopter 2025 competition

Includes materials for two complete helicopters

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

Twister Helicopter

J&H Aerospace

Building Instructions

Congratulations on your purchase of the Twister helicopter! You are about to build a reliable rubber powered helicopter capable of over 1 minute flights in small gymnasiums.

Please use the Twister 2025 Build Tutorial video to guide your construction: http://jhaerospace.com/product/twister-so-helicopter-kit/

1. Parts list

Before beginning construction, please verify that your kit contains all of the necessary parts listed below and shown in Figure 1 and 2. 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. Parts Sheet #1: Motorsticks, 1/8” balsa
2. Parts Sheet #2: Blades, 1/32” balsa (2x)
3. Parts Sheet #3: Hooks, 1/32” plywood (2x)
4. 1/8”x16’ rubber
5. Plastic propeller assemblies (2x)
6. Bottom rotor hubs (2x)
7. Top rotor hubs (2x)
8. Ballast (modeling clay)

1. Motorsticks

2. Blades (2x)

3. Hooks (2x)

4. 1/8” rubber

6. Bottom rotor hubs

7. Top rotor hubs

5. Plastic propeller assemblies (2x)

8. Clay ballast weight

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												
4												
5												
6												
7												
8												
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Before beginning construction, be sure to verify that you have all of the recommended tools for building your Twister. 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 what'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.

Make sure you have the required tools and materials present. You will need needle-nose pliers, scissors, a single edge razor blade or xacto knife, super glue/ca in a quality dispenser bottle, and super glue/ca accelerator.

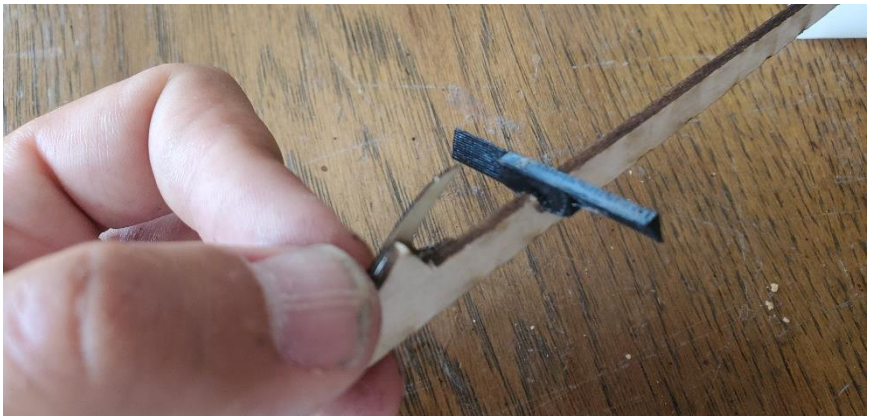
DO NOT separate all the parts out of your parts sheets. Only separate parts out as you actually need them so that they don't get damaged or lost.

Separate one of the 1/32" plywood hooks and one of the 1/8" balsa wood fuselages from their carrier sheets. Be sure to clean out the notch above the triangular protrusion on the motorstick as it will be important later.

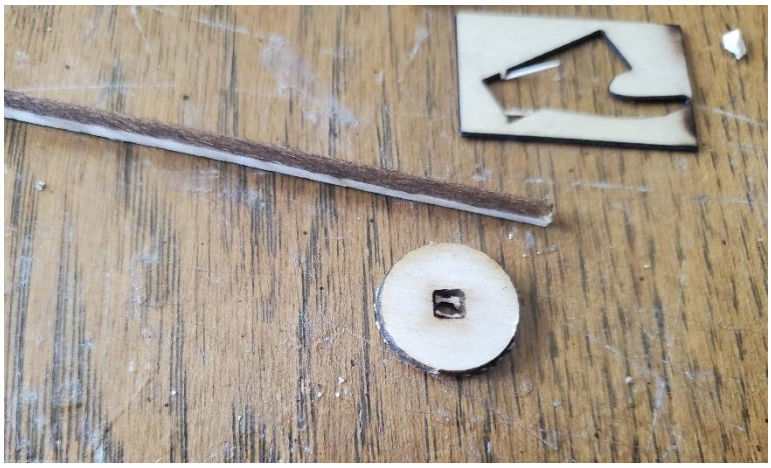
Glue the hook to the fuselage with the hook pointing toward the top (notch side).

Locate the top rotor hub (plastic hub with a notch in it and mate it to the fuselage notch. The angled side of the hub should face toward the hook.

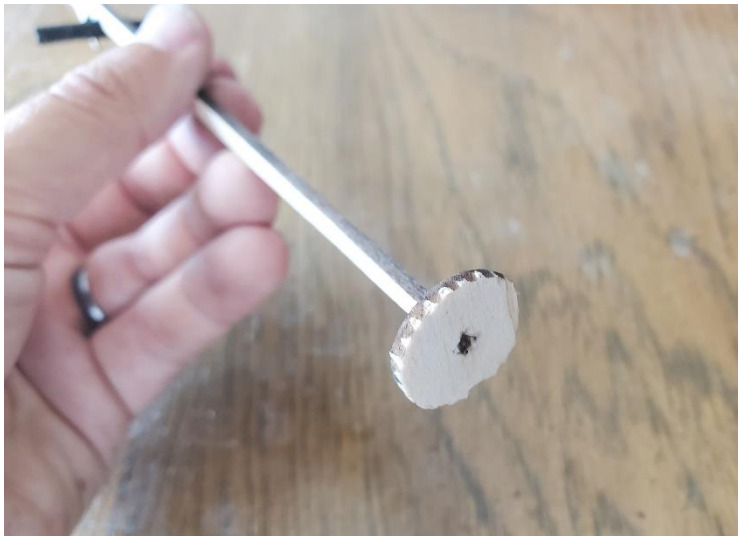
Glue the hub firmly in place, being careful to ensure that it is aligned squarely to the fuselage.



Remove one of the circular top caps from the fuselage sheet. Make sure the square center hole is cleaned out.

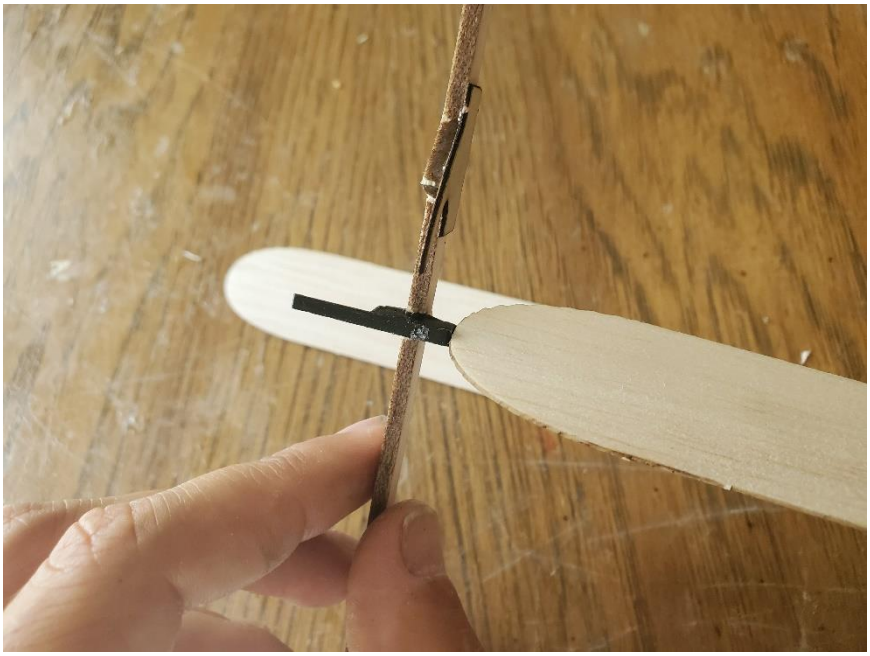


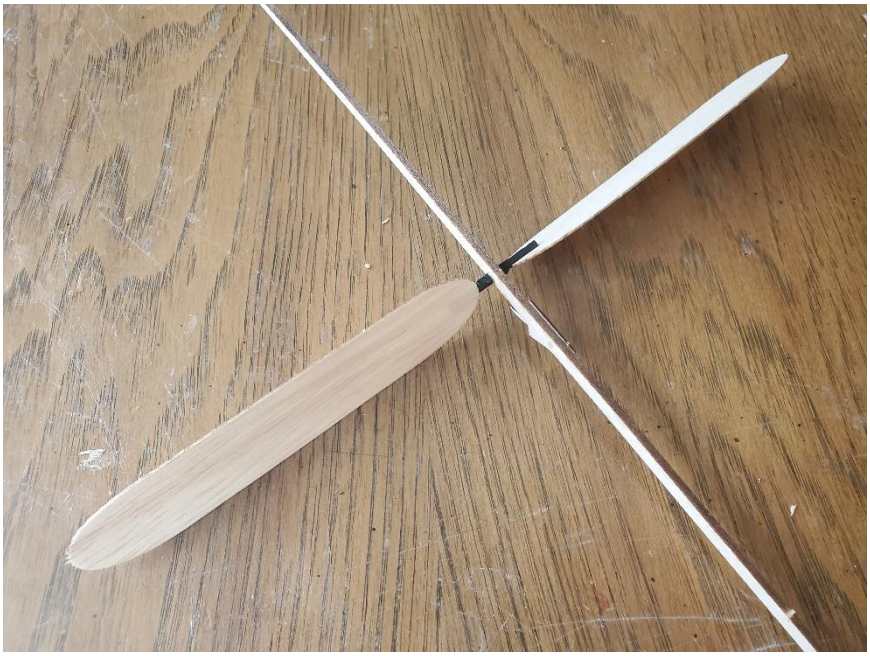
Glue the top cap securely and squarely onto the end of the fuselage



Remove two of the rotor blades from their carrier sheet.

Glue the rotor blades to the angled faces of the top rotor hub you installed on the fuselage. Align them as parallel to the hub as possible.

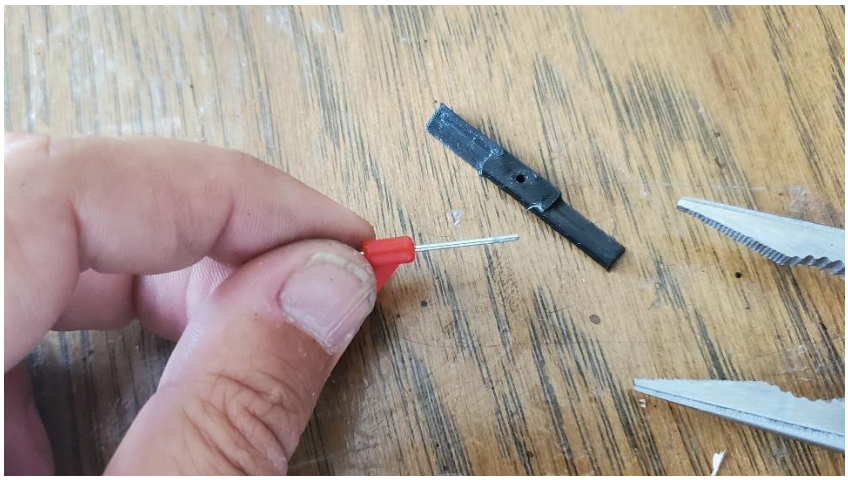




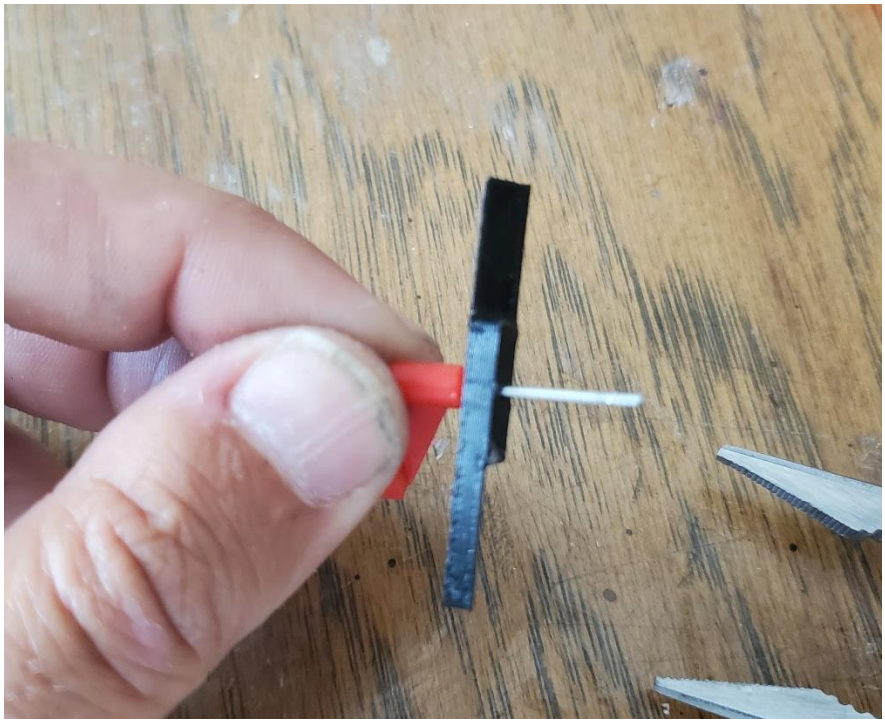
Use pliers to straighten the 90 degree retaining bend on one of the plastic propeller assemblies. If that portion of the wire breaks off, do not worry, the shaft will still be long enough.

Remove the propeller and set it aside. It cannot be used for Science Olympiad competition per the rules requiring student-built rotors.

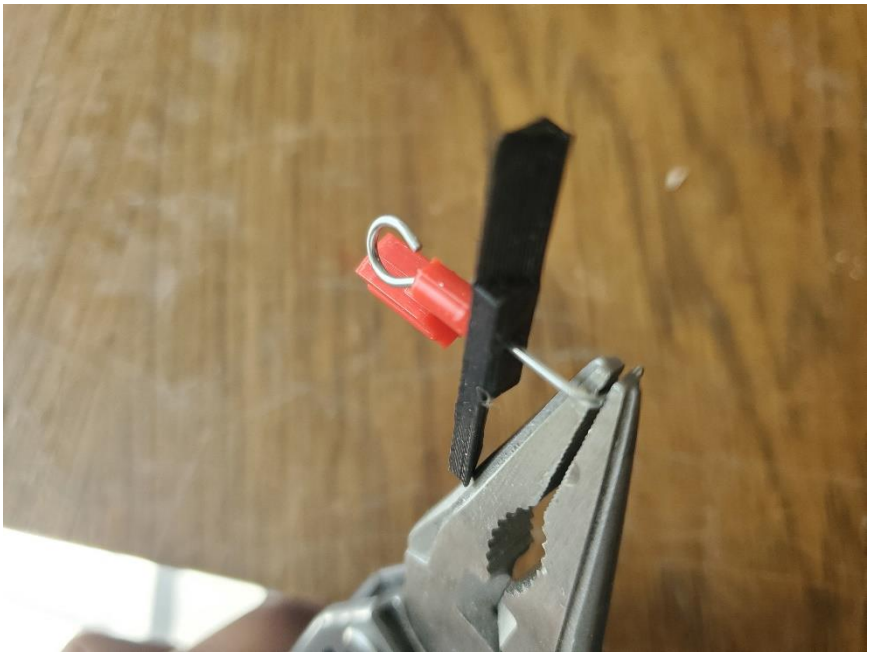
Locate a bottom rotor hub (these have a hole in them for the propeller shaft)



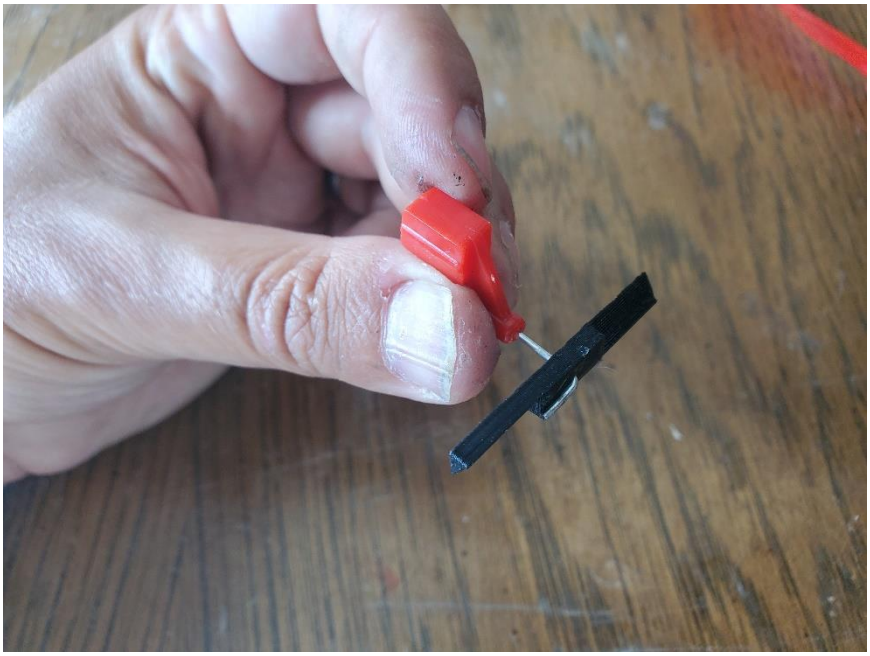
Install the hub on the propeller shaft with the ***flat side facing the red plastic bearing***.



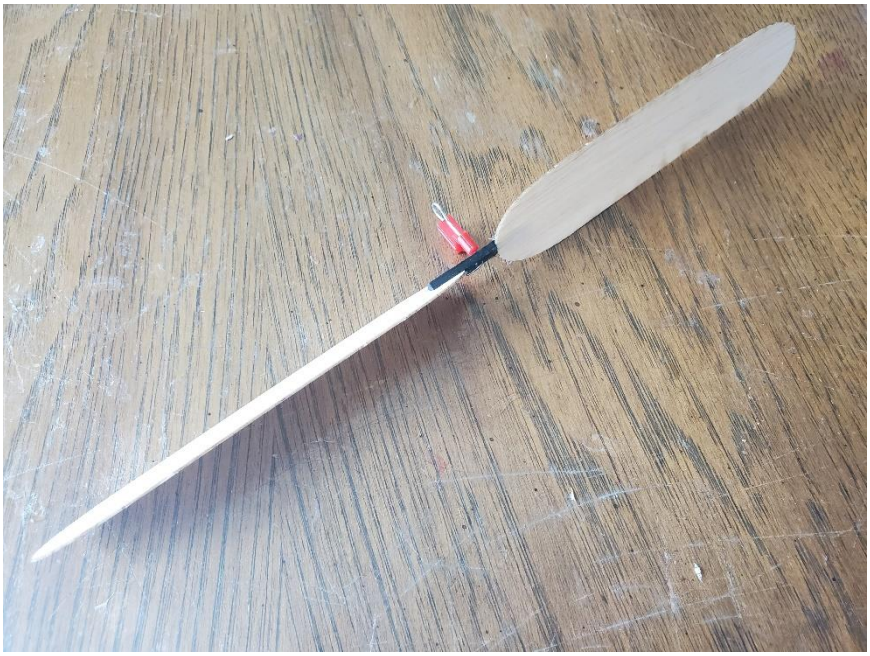
Make a SHARP 90 degree bend in the propeller shaft in a different location from where the original retaining bend was located (the shaft will break if you bend it at the same place, however there is enough shaft material present to compensate for that portion breaking off).



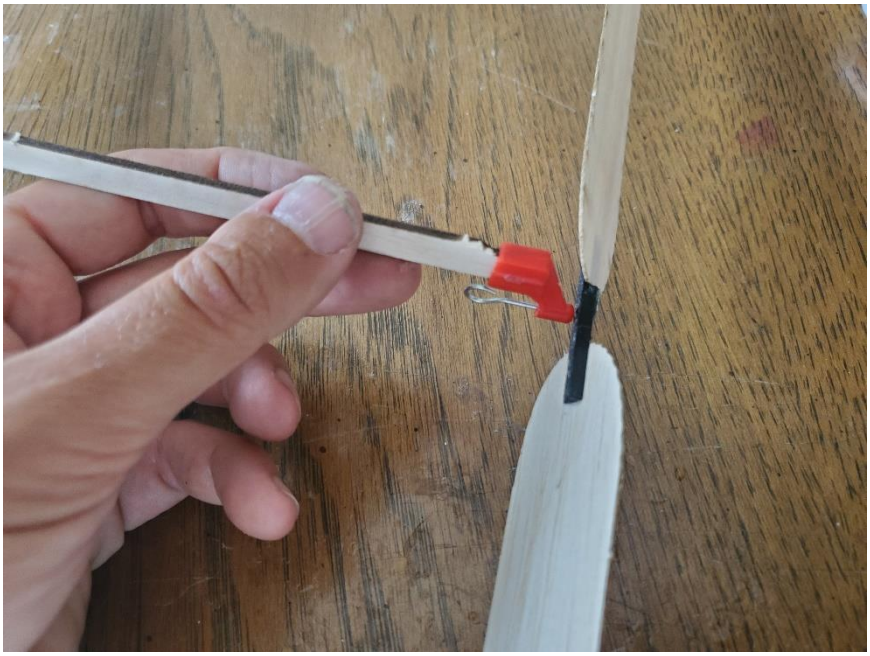
Use a dab of glue to secure the prop shaft to the hub. Production hubs have a tab to lock against the shaft, however if the hub has a lot of play on the shaft, you should still secure it with glue.



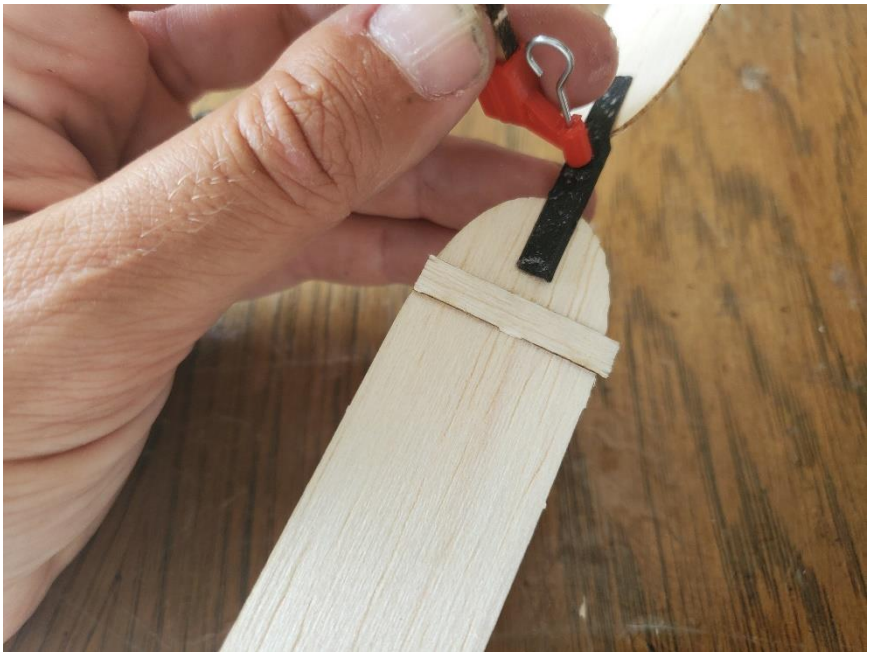
Glue the bottom rotor blades to the bottom hub in the same manner as you did the top rotor.



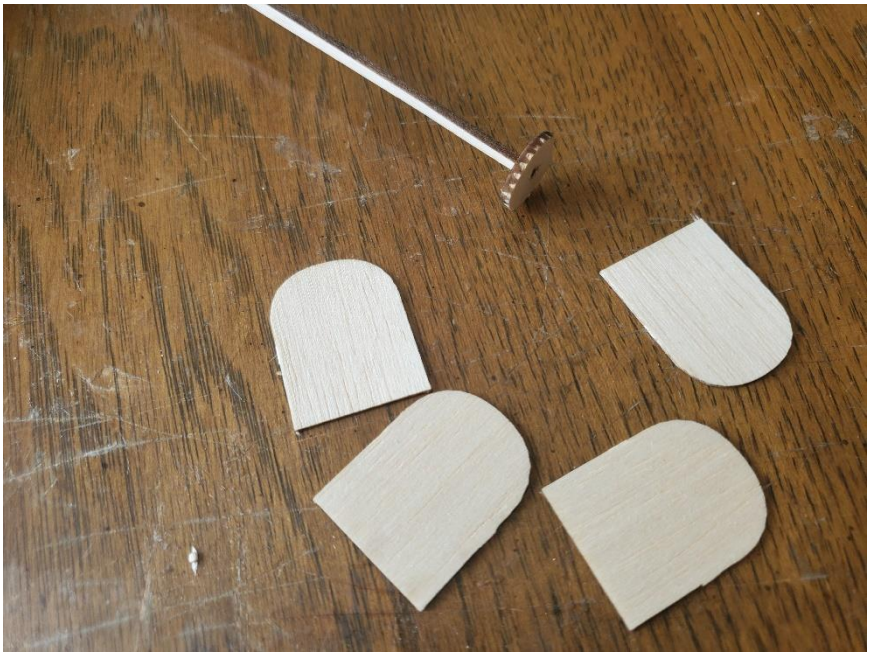
Test fit the bottom rotor to the fuselage. It may wiggle side to side, and you can correct this by shimming in scrap wood from the rotor blade sheet.



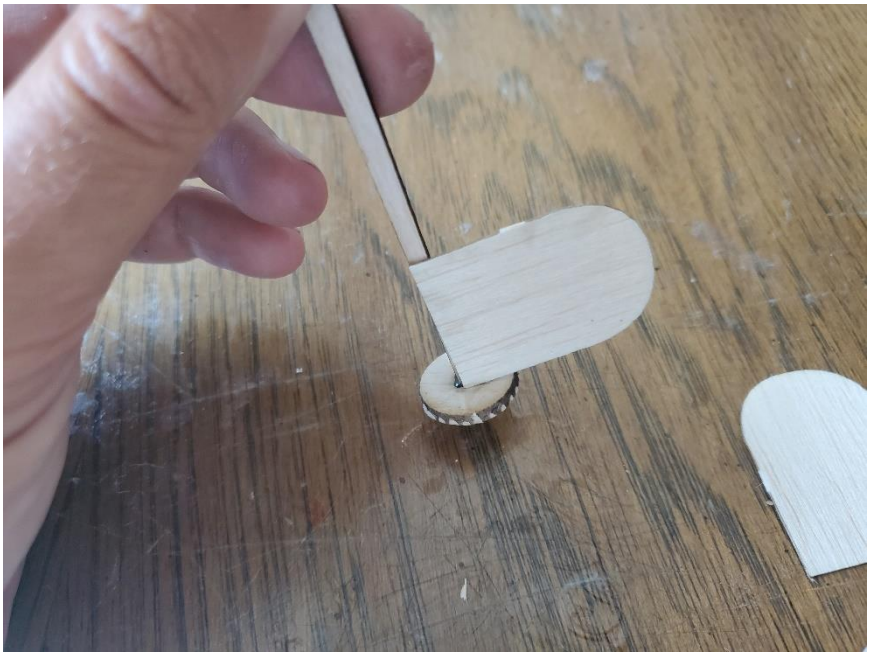
Glue one rotor stiffener to each blade near the hub as shown.

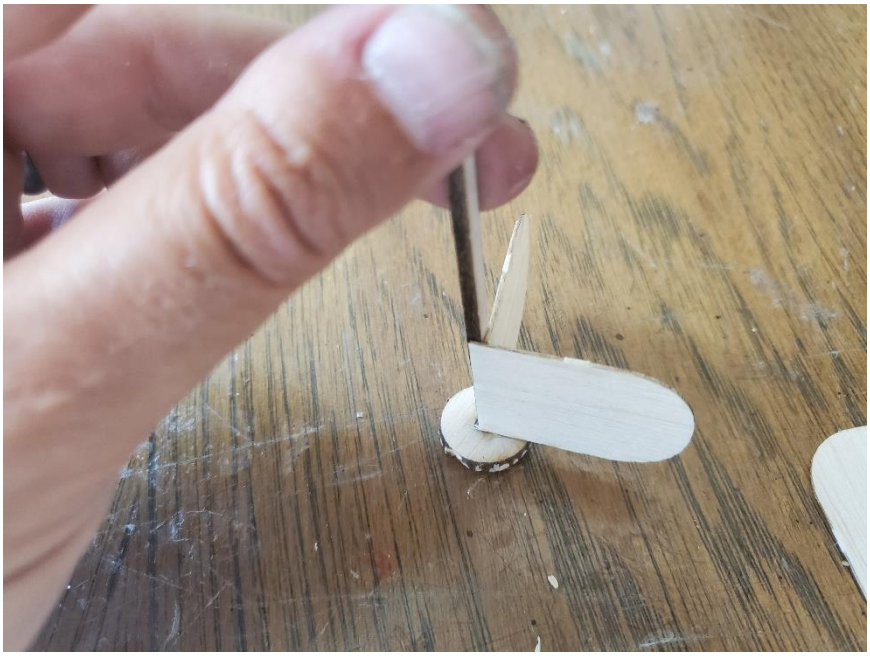


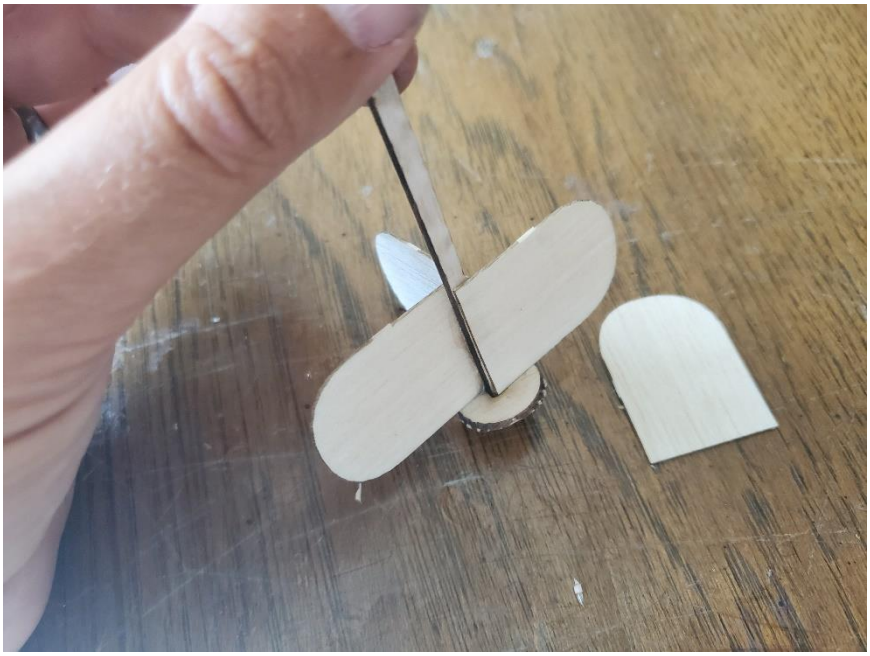
Remove four (4) top vane blades from the rotor blade carrier sheet.

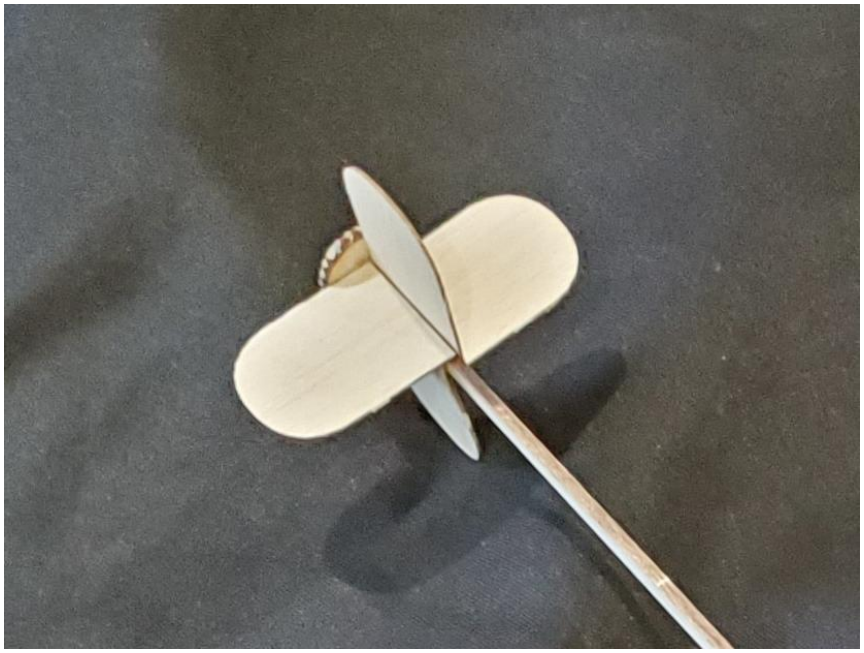


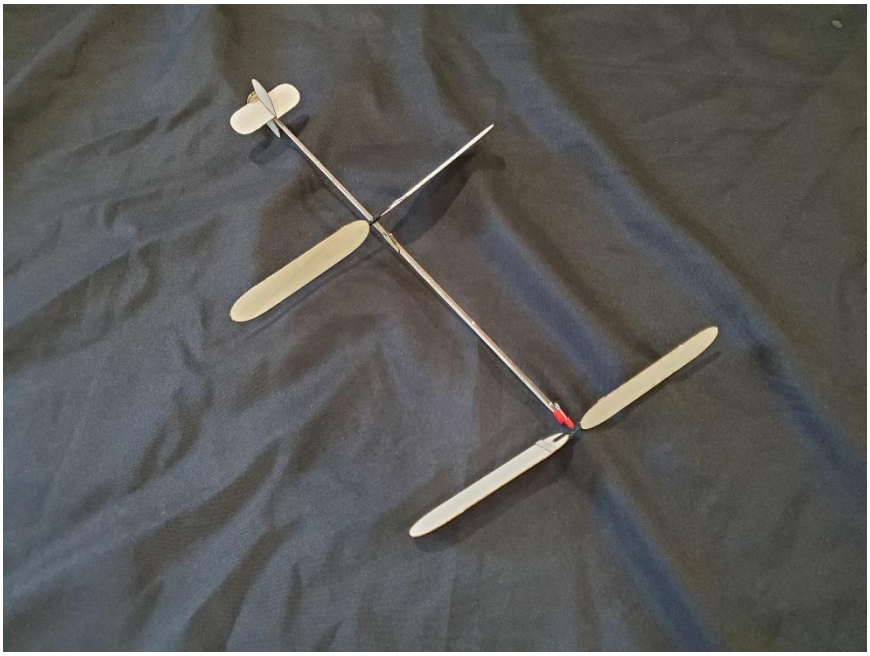
Glue the top rotor blades to the top of the fuselage against the top cap, radially, as shown. Overlap one blade against each side of the fuselage.



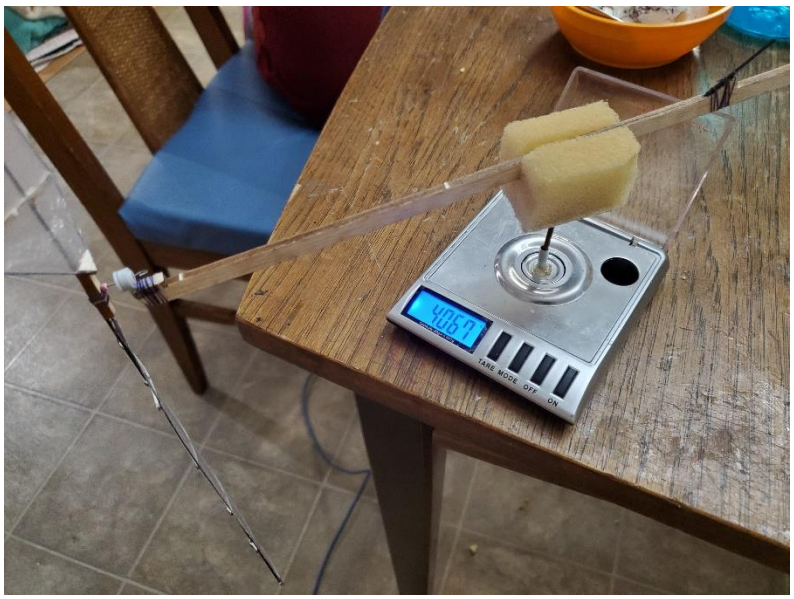








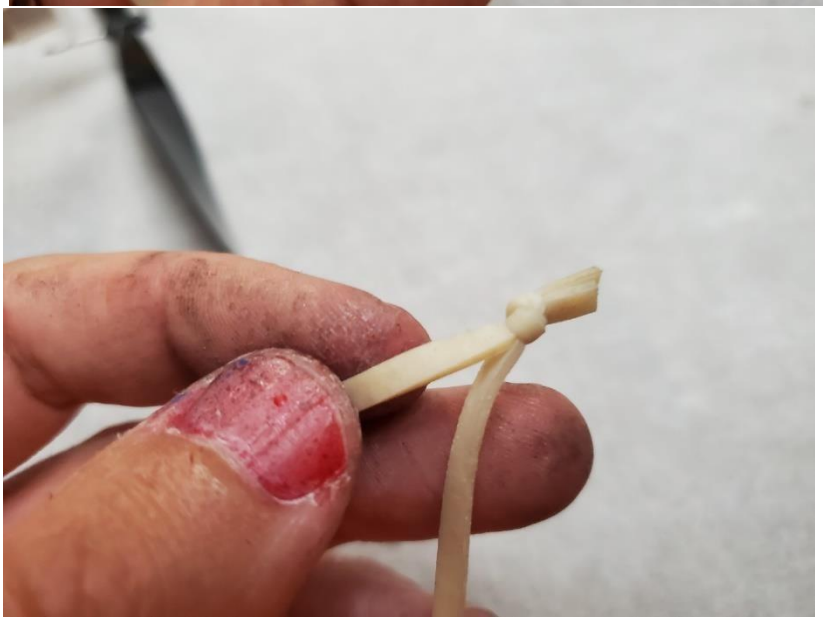
Congratulations!!! Your Twister 2025 is now complete! Weigh your model to verify that it meets the minimum weight of 4.00g. If not, glue clay to the top of the fuselage, under the top cap, to bring it up to the minimum weight.



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

Cut a piece of rubber about 20 inches long. 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). 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, verify 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 Tornado.

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.

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