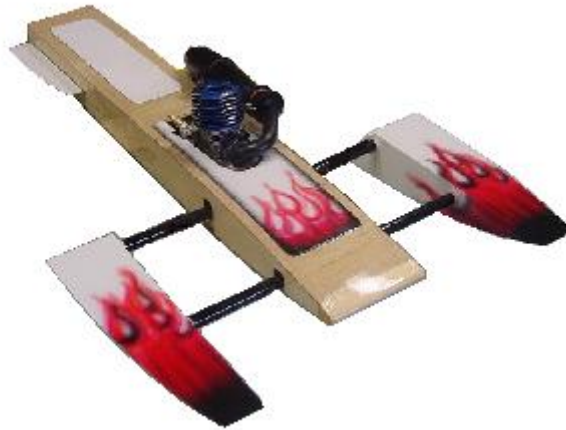




FireFighter .12 Building Instructions



A Tom Moorehouse design.



Thank-you for purchasing the .12 FireFighter. I believe that you will find it to be the best .12 rigger available. It was designed with conservative design features that allow it to be fast and stable. The FireFighter is designed to stand up to years of intense heat racing. A great deal of thought and testing went in to making this a design that is easy to build, light weight and strong. If you have any questions about the boat, feel free to contact me at tom@firefighterboats.com

Tom Moorehouse

We are always improving our building instructions by using your suggestions. The most current version is available for download from www.firefighterboats.com. If you have suggestions on how to improve these directions please let us know. Directions Rev #3 10/06/2006

Recommended Hardware:

Motor Mount: Octura 3-30

Fuel Tank: Walts Hobbies <mailto:kwb@powernet.org>

Turn Fin: Aquacraft grimracer turn fin AQUB9515

Strut and rudder: J. Solinger Mfg. Available from www.firefighterboats.com

Flex shaft: .125 or .130 size the 18" size is too small you need the longer one.

Propeller: Prather 215 is a good place to start

Rudder servo: A high torque mini such as the Hitec HS225

Throttle servo: A micro servo such as Hitec HS81

A note about the Octura motor mount:

We recommend the Octura 3-30 motor mount. The boat has been designed for it specifically. You will see two cutouts in the engine bay tub side doublers. There is one cutout on each side. These are there to allow the mount to be removed. We realize that some people might not be favorable toward a solid mount. You may use any mount you wish. We recommend this mount for several reasons. A solid mount is easy on your engines case. The 3-30 mount can be machined and made pretty light. It can be used with pull start engines. A solid mount will make the boat stronger. Best of all it is inexpensive.

General building tips:



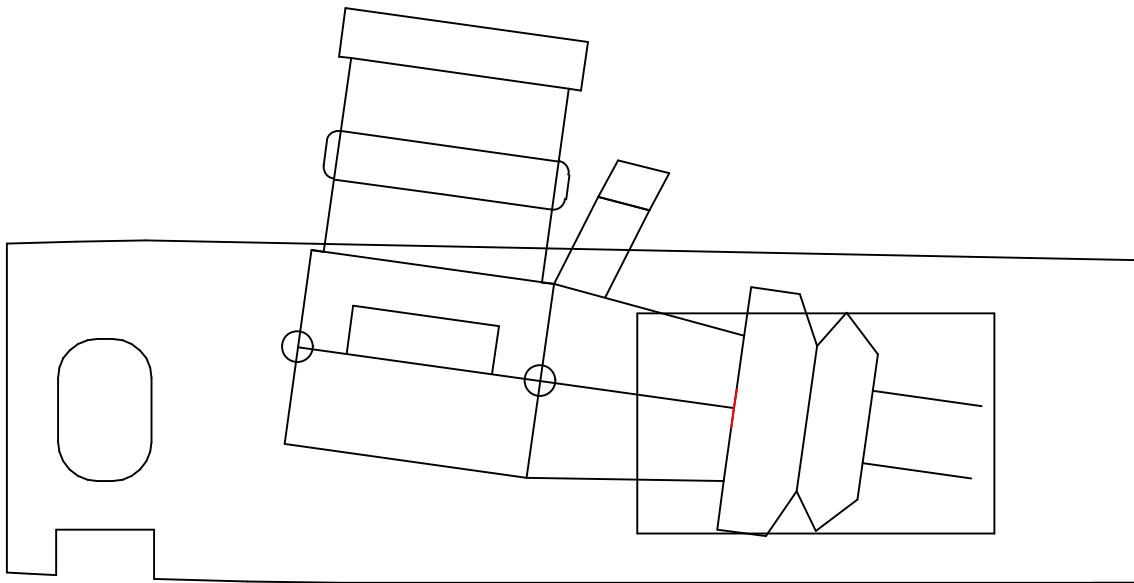
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- 1) It is recommended you read over the entire instructions before starting construction. This will familiarize you with the process.
- 2) You should sand off the burning from the laser on edges that will be glued. This will allow for better bonds.
- 3) Some parts are oversize on purpose. This allows you to be able to sand the part to the correct size and angle for the part to work properly.

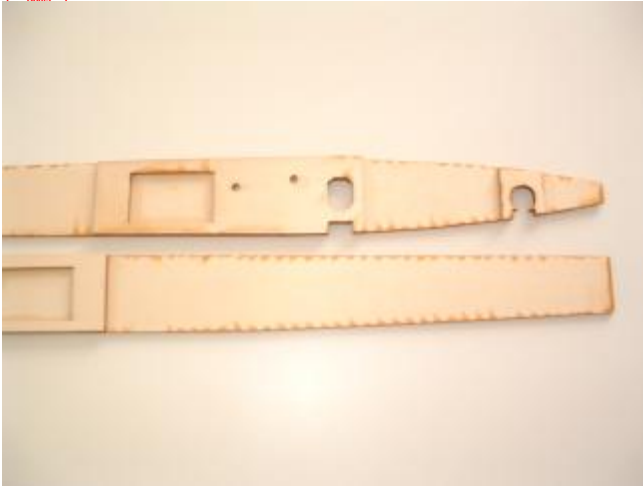
Building the tub:

- 1) Start building the tub by attaching the engine mount doubler and the front boom tube exit hole doubler. Simply line them up and glue them in place. Make sure you don't make them identical. You need a right and left side.
- 2) Drill the engine mount holes. A template is included to show where to put the holes if you are using an Octura 3-30 mount. Otherwise use the template to see where the recommended engine placement is.





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- 3) Now attach the bulkheads and transom. Place some on each tub side as that will make gluing the sides together easier. Use a square to make sure they are at 90 degrees to the tub sides.
- 4) Now it is time to glue the two tub sides together. This is a critical step. When gluing the tub sides together you need to make sure everything is square, and straight. The tub sides need to be even top to bottom, front to back. If you don't have everything nice and square you could have problems with the performance of your boat. I recommend boxing in the tub with something that you know is straight. Angle aluminum or iron will work well.



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- 5) After gluing the tub sides together, use a sanding block to sand the tub sides, bulkheads and transom so they are all even and square. Be very careful when sanding not to change the shape of the tub sides.

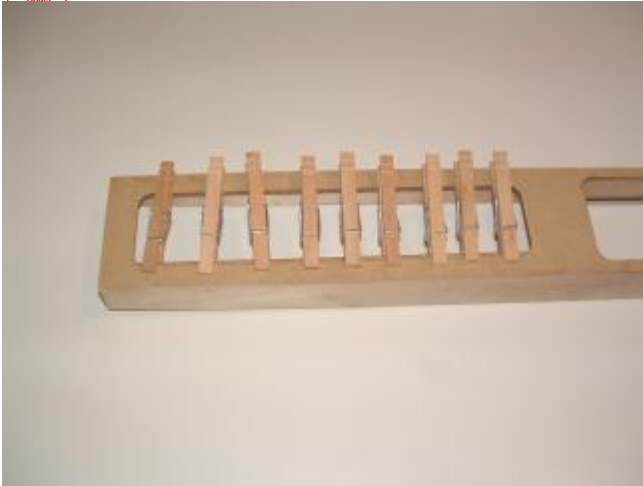


- 6) Attach the 1/32" tub top. Keep your tub boxed in when you glue on the tub top. The tub top will determine how square and straight the tub will end up. There is no going back at this point so make sure everything is perfectly square. When everything looks good glue the top on. The tub top will extend past the tub sides a little. You can sand it flush with the tub sides when the glue has dried.

- 7) Glue in the 1/32" hatch lid supports. Glue these strips so that 1/8" of an inch sticks out to support the hatch lid. Clothespins work well to hold it in place. See the parts diagrams to locate where each support part goes.



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8) Glue on the sponson boom blocks. The notch in the bottom of the tub indicates the blocks positions. For the rear boom block, the bottom block is slightly longer so that it will go all the way across the tub and fit in the notch. The top block is shorter to fit inside.

9) Sand the bottom edge of the tub sides and the bulkheads and sponson boom blocks so that they match up with the tub sides in preparation for attaching the tub bottom. Be very careful not to change the shape of the tub sides.



10) At this point you should seal the inside of the tub. This is done because after you glue the tub bottom on, it will be very difficult to seal the inside of the radio box and engine compartment.

11) Box the tub in like you did before. At this point you can still twist the hull slightly if needed to get a perfectly square tub. Make sure everything is square and even, and attach the tub bottom.

12) Attach the balsa or spruce tub tip. You can hollow out the inside with a rotary tool to make it lighter if you want.

13) Attach the 1/8" 5 ply. transom doubler. It will be over sized and need to be sanded down for a perfect fit.



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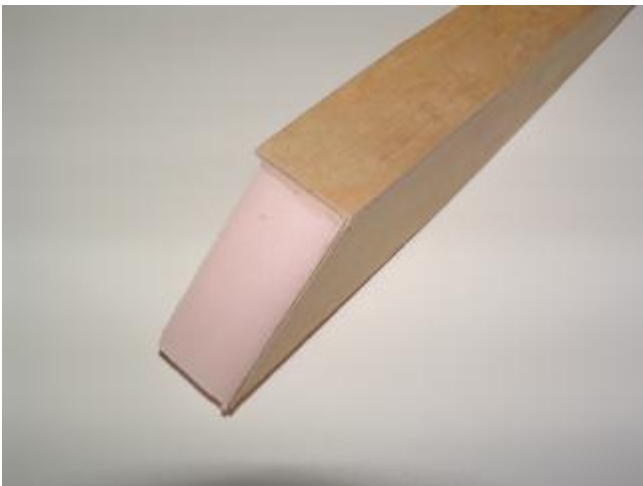
Time to build the rear sponsons!

14) Both the rear sponsons are made with the same methods. They are mirror images of each other except for the bottom angle.

15) Attach the 1/32" ply. sponson inside to the foam. Make sure it is all lined up and held against a flat table so that it won't warp.



16) Attach the sponson top. For the parts where you have an adjoining wood side use your thumbnail to make a small dent in the foam. This will make a nice fillet that you can fill with epoxy. Make sure the sponson is not twisted when you make the attachment. Sand the sponson top so when the sponson back is attached you have a nice flat surface.



NOTE: Foam in picture is slightly undersized

17) Attach the sponson back.

18) Set the bottom angle. Use the templates at the end of these instructions to set the sponson bottoms. Glue the templates to some cardboard. Carefully cut out the templates. Use them to measure the sponson bottoms. The right sponson should be at -1 and the left at $+1.5$.



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19) Attach the sponson bottom

20) You should now have your sponson with the inside, top, bottom, and back attached.

21) Shape the sponson outside. With the top, bottom, and back as a guide you can shape the sponson outside. Either rough cut and sand or hot wire it to shape.

22) Glue on the sponson outside. This part is oversized. Sand the outside until all the sides are even. It is very important that the sponson bottom have sharp edges. Do not try to round them. This will cause drag and slow your boat down.

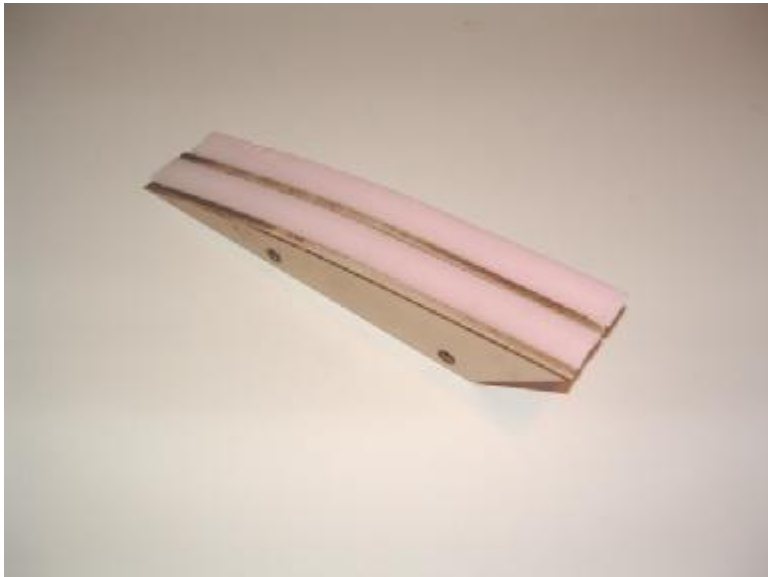
Building the front sponsons:

The sponson construction method was developed after many methods were tried. This method proved to be the easiest to build and also very light. The front sponsons are built with a hybrid balsa and foam sandwich core design with a plywood covering.

23) The sandwich explained: The sponson core is a layered plywood, balsa, and foam sandwich.

Starting with the sponson inside the order is:

- a) 1/16" plywood sponson inside
- b) 1/4" balsa sponson inside doubler
- c) 1" Pink/blue foam core.
- d) 1/4" Balsa sponson center
- e) 1" Pink/blue foam core.



24) Making your sandwich: Before you start making your sponsons keep in mind your making a right and left side. They should be mirror images to each other not identical. The Right side will be slightly different due to the turn fin spar.

25) Attach the balsa insides to the sponson insides. On the turn fin side make sure you use the one with the spar cutout.



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26) Prepare the turn fin spar: Place the turn fin spar on top of the 1/16" plywood sponson inside where you have the cutout. Turn it over and make a line where the sponson ends on the spar. This portion of the spar needs to be roughened up with rough sandpaper. I also make score marks with a sharp knife. This is done so you will get a better bond.

27) Glue on the turn fin spar. Apply epoxy to the turn fin spar where you roughened it up and place it on top of the 1/16" plywood inside of the cutout. Clamp it in place for the glue to dry.

28) Attach the foam to the balsa insides.

29) Attach the balsa centers.

30) Attach the balsa sponson centers.

31) Create the holes for the boom tubes. I have found that simply a round file works well.

32) Check that the tubes fit in the hole and that they are square. You can do this by placing it flat on a table and looking to see if the tube is parallel to the table. Also use a square to check it.

33) Attach the foam outsides.

34) Attach the sponson tops.

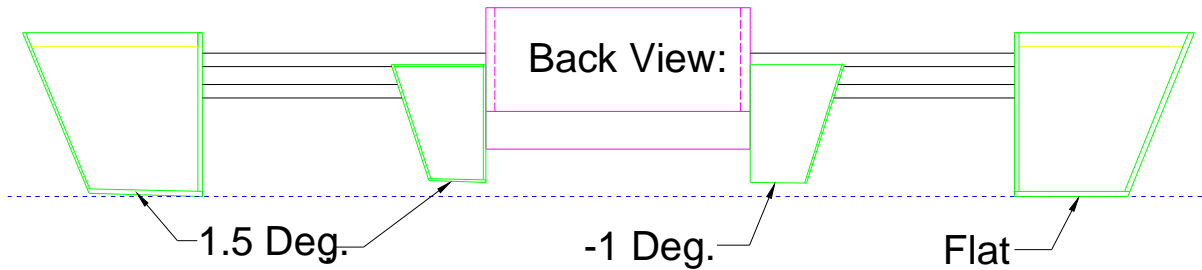


35) Attach the sponson back. The inside, top and bottom edges should stick out just a tiny bit so you can sand it flush. The difference between the two sides is only that the right side has a cutout in it for the turn fin spar.

36) Create the bottom angle (both sides): At the end of these directions you will find some templates for setting your sponson bottom angles. Glue or tape these to a sheet of cardboard. Carefully cut out the templates. Holding the correct template on the bottom of your sponson examine the angle you have. Determine what you need to sand to match the template and sand it until they match.



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37) Attach the sponson bottoms.

38) Shape the sponson outside. The sponson core needs to be shaped before attaching the sponson outside. Use a knife to rough cut off the majority of the foam. Use a sanding block to sand the foam nice and smooth up to the wood.



39) Attach the sponson outside. Sand it flush on all sides.

Time to glue in the sponson tubes:

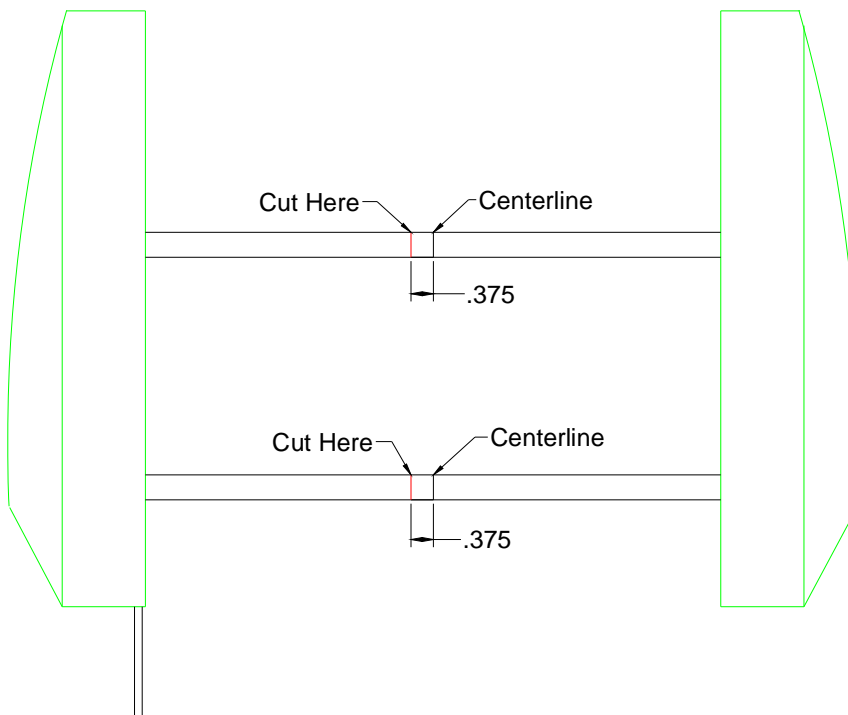
40) The best method we have found to glue the tubes in and keep everything straight is to glue both tubes and sponsons at the same time. Lay the sponsons on their tops on a flat surface. Dry fit everything together first. Be careful when pushing the tubes in to the sponson. If you push too hard you may damage the sponson outside plywood. You may need to use a round file to make slight adjustments to the sponson core to get everything lined up correctly. The tubes should go inside of the sponsons slightly past the balsa centers. Make sure that the tubes are all square to the sponson insides. Make sure that the sponson tops are flat on the table. The distance between the two sponsons should be approximately 11" +/- 1" The tops should be flat on the table without the need for weights to hold them down. When everything looks good mark the tubes to indicate what part will be inside of the sponson. Remove the tubes and roughen up the parts that will be inside to promote better adhesion. Mix up a bunch of epoxy. I usually get big gobs of epoxy on a stick and drip a bunch in to each hole. Don't try to save weight by being skimpy with the epoxy on this step. Put the tubes in to the holes and get everything lined up and square before the epoxy sets.



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41) When the glue is dry you need to cut the tubes and separate the sponsons. Mark the exact middle between the sponsons. Measure $\frac{3}{8}$ " past the mark towards the turn fin side and make a mark. Cut The Sponsons apart here.



42) Attaching the tubes and sponsons to the tub. The spenson blocks in the tub will have holes in them indicating the position of the 4-40 screws used to attach the tubes and sponsons. You will need to drill the holes clean and through the tub bottom. The larger .505 O.D. tube fits over the smaller .414 tubes and acts as a joiner. Slight sanding may be required of the .414 tubes to get the .505 tube to fit over them. Put the assembly together with the tub. The turn fin side will be $\frac{3}{8}$ " closer to the tub than the non turn fin side. Make sure the tubes are at 90 degrees from the tub and centered in the boom tube exit holes in the tub. Use a C clamp to hold the tubes in position for drilling. When you have the tubes nice and square, and the turn fin side is $\frac{3}{8}$ " closer to the tub than the non turn fin side you can drill the holes. Drill one hole at a time. After you drill the hole put the screw in that hole to help keep everything lined up.



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Installing the stuffing tube:

43) Mount your engine in the boat. Mount the strut Bracket. Mount the front sponsons with 2 shims under the rear sponson tube and no shims under the front tube.

44) Roughly bend the stuffing tube to shape and assemble the entire driveline including the engine, strut, flex shaft, and tighten your collet on the flex shaft.

45) You need to have a flat table to determine the strut location. Place the boat on the flat table. Adjust the strut depth so that flat part on the bottom of the tub is parallel to the tabletop. Make fine bend adjustments to the stuffing tube to make a nice smooth "S" bend. The strut should also be flat on the table a.k.a. at 0 degrees.

46) Make sure the tube is nice and straight side to side and fiberglass it in.

47) Since the hole in the bulkhead by the engine was a little oversize you can now fine-tune the alignment of the engine and tube. After it is lined up perfectly you can use another small piece of scrap wood with a correct size hole and glue it into place.

Final Completion:

We recommend having every hole drilled in the boat before you paint it. So at this point you will want to install your servos, radio box seals, pipe mount etc.

After this is done paint your boat.

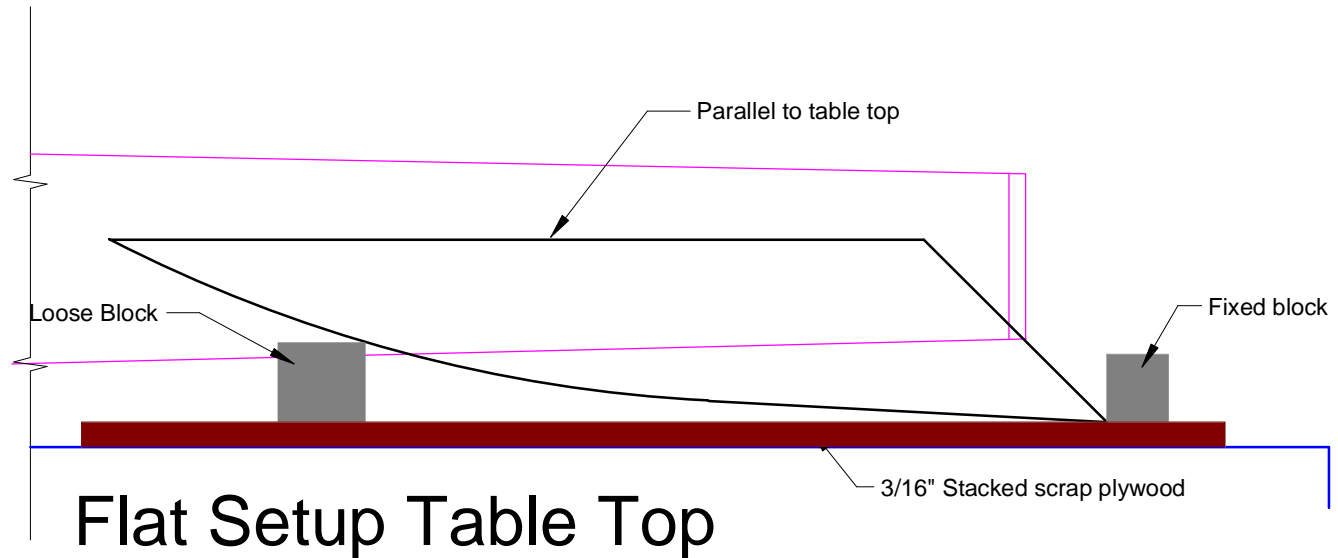
Attaching the rear sponsons:

First have 2 shims under the rear front sponson tube and none under the front tube. Have the flat part of the tub bottom parallel to the setup table.

The rear sponsons should not be permanently attached. Double sided foam servo tape should be used to attach the rears. See the diagram below for the general method. We recommend you have the rears 3/16" off the top of the setup table as a good starting point. Slide the loose block back and forth until the sponson top is parallel with the tabletop. Slide the sponson in place and get a good idea of where the tape should go. Attach the tape to the sponson and then attach the sponson to the tub.



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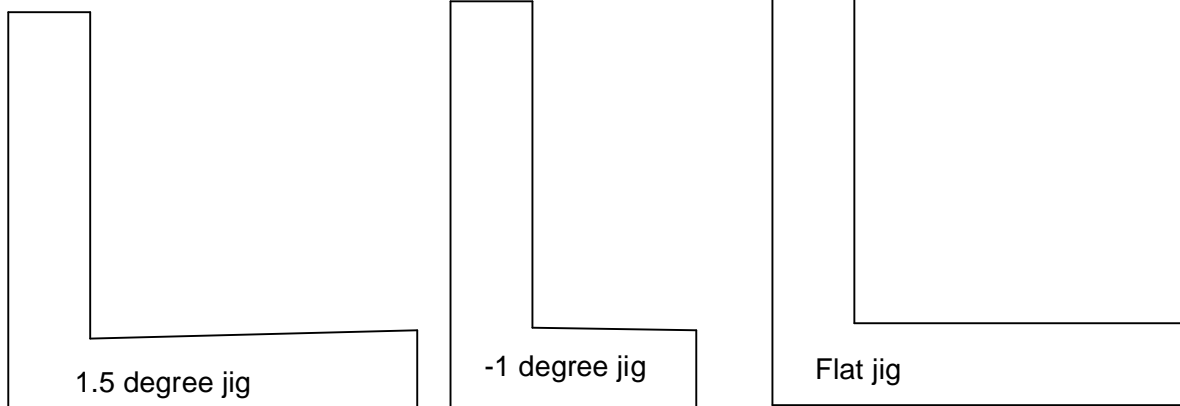
Turn Fin:

We highly recommend the www.grimracer.com .12 size turn fin. With the boat on the setup table the first bend in the turn fin should be 3/8" under the surface of the table a.k.a. the water line. The bends should be parallel to the tabletop.

Intital Setup:

Have 2 shims under the rear sponson tube and none under the front tube. The strut should be flat on the setup table or at 0 degrees. The rears attached as described above. For the boats maiden voyage we recommend a Prather 215 propeller.

Sponson angle jigs:





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Comments:

We always appreciate building pictures and the sharing of your building experiences.

We also greatly appreciate comments on the boat design, and any ideas for changes you have made to increase its performance.

Thank-you for building a FireFighter .12

Sincerely,

Tom Moorehouse

Tom@firefighterboats.com