CORO POWER BOAT 3 in 1 Design

A MULTI-PURPOSE COROPLAST BOAT Ideal for all generations to enjoy. Weighs only 20 pounds !

Drawn 06-20-2014

Rev. 09-25-2014

SPECIFICATIONS OAL = 7 feet (Power) OAL = 10 feet (Kayak) OAW = 30 inches OAH = 12 inches Weight = 20 pounds Capacity = 250 pounds max. (includes motor & battery) Speed = Approx. 4 MPH Build for less than \$100

FEATURES

Low Maintenance Design Fits in all Trucks & SUV's, and some larger Hatchback Cars. Can be built in about a week. Can easily be cartopped. Virtually unsinkable. Easy to repair.

PARTS LIST 1 Sheet 4' x 8' x 4mm COROPLAST 1 sheet 4' x 8' x 1/4" Plywood **1 roll of Scotch Tough Tape** 2 Tubes of 100% Silicone 32oz. Bottle of TB3 Glue 3 - 1 X 2 x 8' Lumber Various screws. Paint of choice.

Power Boat on ramp, ready for first outing.

This basic hull can be retrofitted with added modules to become a Kayak or Sailboat.

See end of plans for elongated versions.

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Read plans thoroughly prior to starting construction.

Page 1 of 29

This is an experimental design drawn up by an untrained amateur. The Designer accepts no liability for any loss, harm or damage sustained during construction or use. Builders may use these plans to construct a small quantity of boats for their own use only. Commercial manufacturers must ask the Designer for permission.

Print in Landscape Mode with 1/4 inch borders.

General Notes

The idea for the **CORO POWER BOAT** came from the desire for a simple, lightweight, yet useful portable hull design.. It includes an ample beam, good freeboard, generous volume, seating for up to two, and safety buoyancy. It is reasonably sturdy, easy to build, very portable and can utilize a standard trolling motor.

To have strength and yet be lightweight, the plans use some non-traditional methods of assembly, specifically the COROPLAST construction process developed and incorporated by the designer. Coroplast can be purchased at most local sign making companies, about \$25 per sheet. This provides a durable, yet truly portable, finished boat, and the building process is easily mastered by the home handyman and amateur boat builder. As a result, only hand tools, a jig-saw, a hand drill, utility knife and a carpenters square, scissors, and tape measure are all that will be required throughout the assembly process.

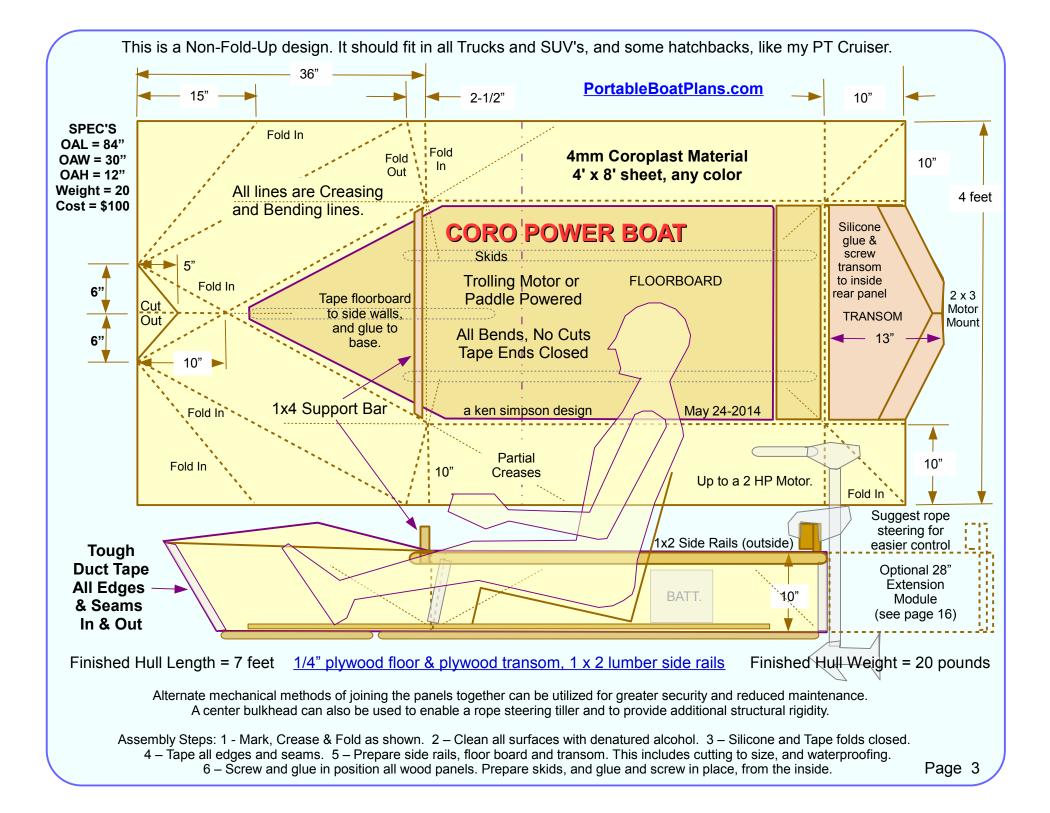
Be selective in your choice of materials. Use plywood that is preferably exterior rated. Marine Plywood is very expensive, so the use of **ACX** Grade is recommended, but be choosy. It is important to note, the final choice of materials is the decision of the builder. We have made specific recommendations, but if the builder has previous experience with different methods and materials, that is their choice, and we respect that decision. Certainly, minor changes in design are encouraged, to provide a 'custom' boat to satisfy a builders specific needs. We do not make changes to the drawings. This would be up to the individual builder, and their responsibility. Also, it is very important that none of the basic design parameters be drastically modified, as this may adversely affect overall boat safety or performance.

Seating choice is also up to the builder. The folding plastic seat shown is \$25 at Bass Pro sporting goods stores. I also have a folding plywood seat plan available for free download on the website, about \$15 to build.. It should also be noted that the hull modules can be glued and screwed together, for those that do not have limitations of storage or transportation.

Any questions or comments regarding the construction and/or design of this project will be responded to in a timely fashion. Thank you for your interest, and for purchasing these plans, and good luck with your project. And don't forget to visit www.PortableBoatPlans.Com for new designs and updates.

Happy Boating !

Ken Simpson , Designer



The construction process of this boat will primarily be made of photos and text, briefly describing the different steps in assembly. The first step is to buy the 4 MM Coroplast 4' x 8' sheet material in the color of your choice. I like yellow or white. The material can be purchased at most Sign Companies, typically at \$25 per sheet. I get mine at a franchised SIGNARAMA store. Because I do not have a truck or SUV, I have to fold the 4x8 sheet in half, to 4x4 size, to get it home in my PT Cruiser. This is done at the sign store parking lot, and does not affect the construction of the Coro Power Boat.

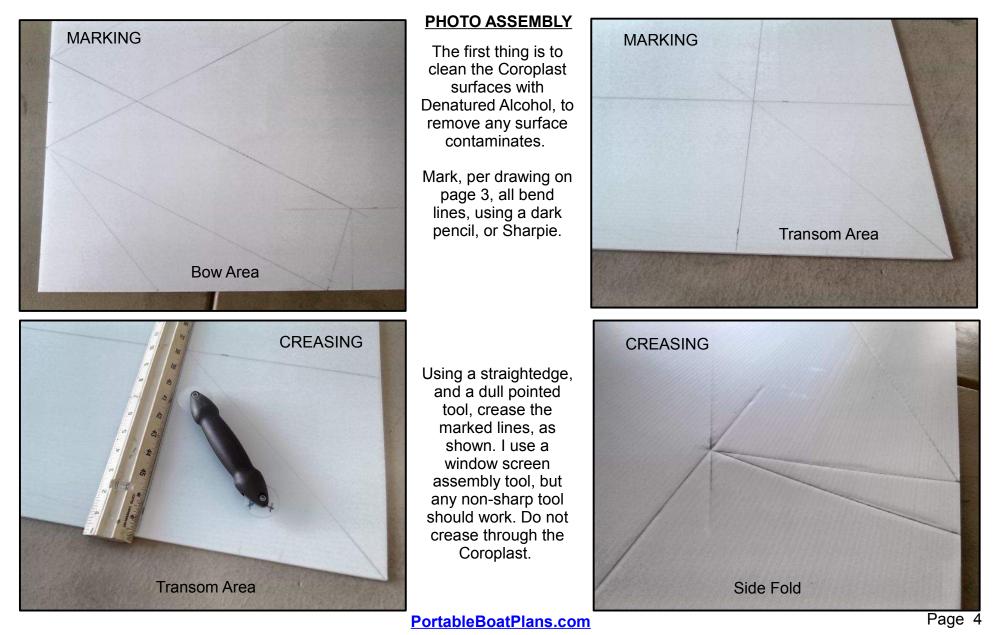
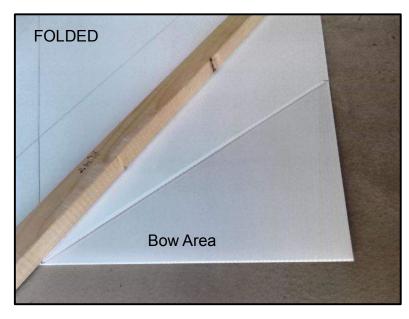


PHOTO ASSEMBLY



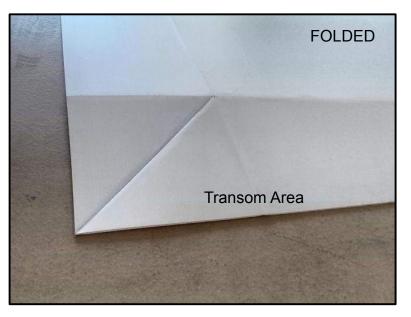


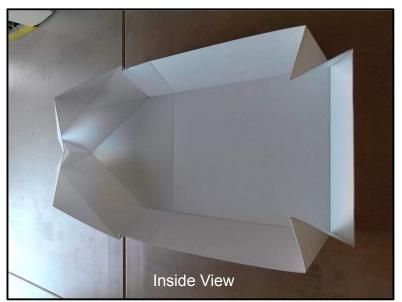
Using a strong straightedge, like a 2x3 as shown, press firmly down on the bend line, and pull the Coropalst up slowly toward the straightedge. About half way up it will snap, and you can then bend the panel over. The photo at right is a good example of a corner bend line.

Refer to Page 9 for crease & bend tools.

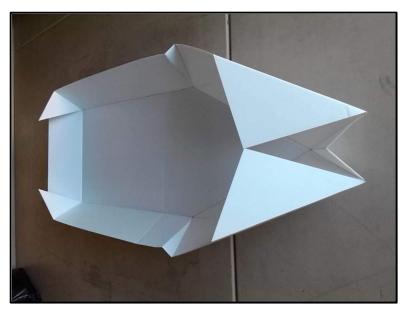
Note the center bend, this is where I had to the bend the sheet in half to get it home.

The photo at right shows all the bends. Some have to be creased and bent from the opposite side of the sheet, such as the transom inside corner and the two side folds, and the center bow.





NOTE: Some of these bends and folds are difficult to achieve, and require patience. An alternate method of assembly is to cut the corners away on the crease lines, which eliminates the folds. You can then butt the panels together, tape them on the outside, silicone the inside seam only, and then tape all the inside corners, using the Scotch Tough Duct Tape specified. Your choice. The downside is that this method can produce voids, and the possibility of allowing water to enter the hull. Folded corners prevent this from happening.



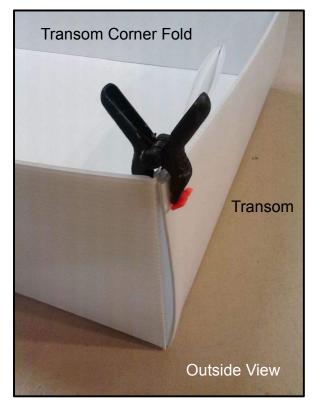
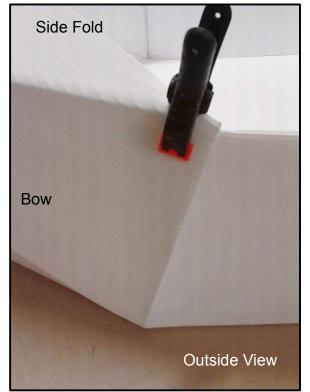


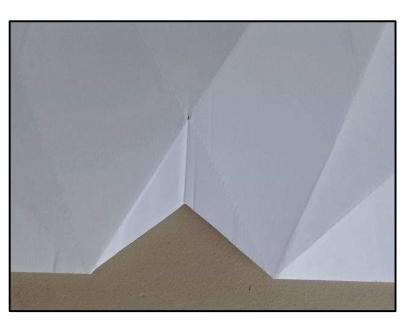
PHOTO ASSEMBLY

These 2 photos show the bow area bends. Note the 5" center cutout, the only one of the assembly.

Note also the direction of the side bends. This provides better water flow of the hull.

The photos below show what the finished bends look like at the various locations.





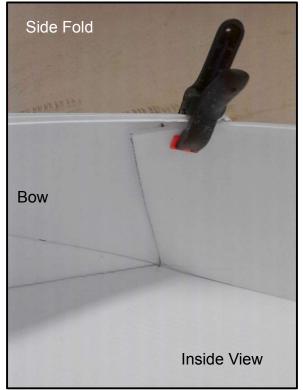
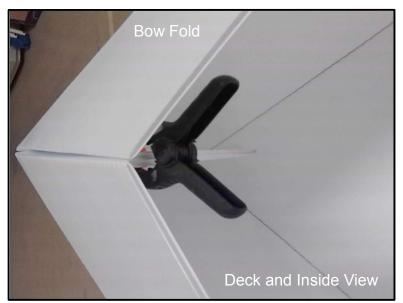
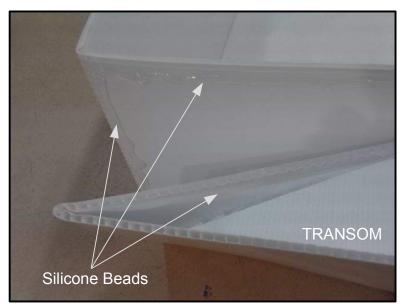


PHOTO ASSEMBLY



After all folds are made, and squeezed tight, it is now the time to add the 100% Silicone Adhesive. Lay down beads of adhesive, as shown below. Insure they are not too close to the edge, as it my squeeze out during assembly. Bring the panels together, and hold with small spring clamps. Or apply strips of Tough Tape to hold in place.

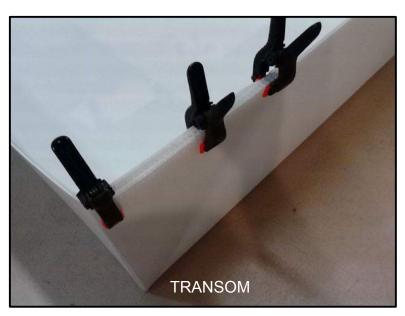




Remember to be very cautious when applying the Silicone. If you get some on your hands, wash it off immediately. I suggest using DAWN soap, as it removes the adhesive well.

Allow the bonded panels to cure for at least eight hours (overnight).

Patience is a virtue !



Remember, wherever Silicone is present nothing else will stick. So use a reasonable amount, and do not get it on the outside surfaces. The primary purpose of using Silicone is to bond the panels together, for a better mechanical assembly. Because all seams are folded, no water will enter the hull.

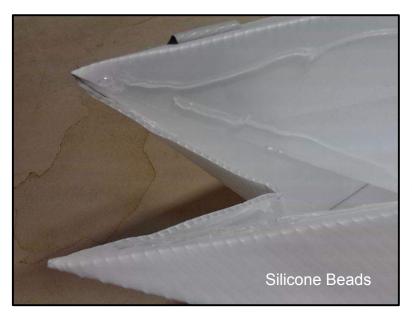
PHOTO ASSEMBLY



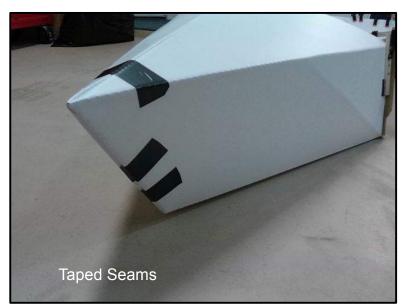
Continue the bonding process as defined on the previous page.

You may have to clamp the folds on the side panels, as shown at right. The hull also has 3 thicknesses of Coroplast here, and it is hard to get flat. Use strips of wood under the clamps so as not to indent the soft panels.





Probably the most involved part of the assembly is the bow area. There are multiple bends and awkward shapes. Take your time. Align the top deck inside ends and bow point for proper fit. Use the Tough Tape to hold the bow tight together, and across the deck at both ends. Allow to cure overnight.



Once all folds have been completed, it is time to apply Scotch Tough Tape to all the panel edges and seams. This seals the Coroplast edges, and prevents water from entering the individual corrugated cells. See photos on page 10.

PHOTO ASSEMBLY

These are the basic tools required to assemble the Coro Power Boat. The tape is very specific; It is <u>Scotch brand Tough Duct Tape, No Residue</u>. It has the best weatherability of any duct tape available. The other tools are generic, and the only requirement is that they be sharp and clean.



PHOTO ASSEMBLY

Applying the Scotch Duct Tape is easy. Unroll about a foot or two, and start at one end of a panel. Apply it so the edge of the panel is in the center of the tape. Tack it down each side of the panel at the same time. Press it firmly and smooth with your fingers. Unroll some more tape and repeat the process to the end of the panel, cut a with utility knife. Do the same for all edges, as shown below.



Remember, it's the combination of mechanical fasteners (screws) and adhesive (tape & silicone) that makes the hull strong and waterproof.

PHOTO ASSEMBLY

Method of getting 2 floorboards and transoms out of one sheet of plywood.

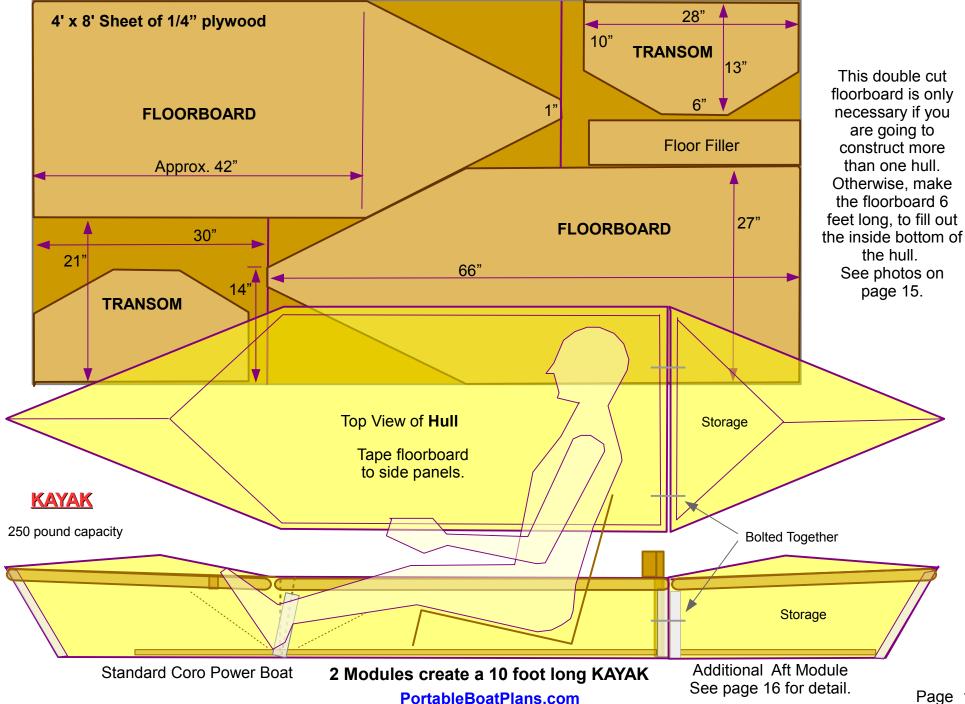


PHOTO ASSEMBLY



At the right is the inside floorboard, cut per the drawing on the previous page. The edges have been rounded smooth, and a coat of waterproofing has been brushed on both sides and edges, per the process on the following page. Next it will be painted a color to coordinate with the hull, probably blue.

NOTE : If you do not need to make duplicate floorboards, as I did for building a second boat, you should extend the floorboard to a length of 6 feet, to completely fill out the inside floor.

At left is the completed Coroplast hull. As pictured with temporarily mounted side Rubrails. They will be the next step to cut, waterproof, and paint. These are made from 1×2 lumber, each about 52" long, with the outside edges rounded, for hand comfort.

They will be held in place by $#8 \times 3/4$ " Phillips Head Truss Screws, from the inside. These are large head screws, and holes need to be pre-drilled, but the screws should not be overtightened, to protect the side panels from deforming too much.

Waterproof the rubrails, per page 13, and paint with a good water resistant paint, oil based preferred.



WATERPROOFING the HULL

Over the years I have tried quite a few waterproofing methods, as I am sure you have also. It is important to note the objective: <u>To seal out water and water vapor from penetrating the plywood surface and edges of the hull.</u> Period. The problem is that it is most difficult to accomplish. Because I recommend non-marine plywood for my boats, the problem is accentuated. As a result, even more precaution must be taken. Up until a few months ago (2013), I was recommending Thompsons Water Seal as the best waterproofing method for the ACX Plywood recommended. It penetrates the wood surface and provides a good water barrier. The downside of this method is time; after application, the manufacturer suggests at least 72 hours minimum drying time. I recommend 24 hours, but only if you use oil based paints for the finish, and sand all surfaces prior to painting. Non-oil based paints will not adhere well to a surface treated with Thompson This has proven a problem to some builders.

Well, that was then, and this is now. After more than a couple of builders suggested I try a different process, I can now recommend an alternate method. We already use Titebond III Waterproof Wood Glue for construction, so why not use it as a water barrier? That is exactly what I recommend now, and here is how to apply it.

WATERPROOFING METHOD Follow the directions and photos below, for best results.



NOTE: It is important to water seal the inside surfaces of the bow & stern openings prior to assembly of the deck panel, and also the underside of the deck panel, and then all other inside surfaces of the hull modules. So, mix a container with **1/3 water** and **2/3 Titebond III**, by volume. Shake very well. I use an empty glue container, with 1/3 markings on the bottle, as shown above. Pour some into a plastic dish, and use a 2" disposable brush to apply. Brush evenly and completely over all interior surfaces of the module assembly. Allow to dry for at least 6 hours, at room temperature. This same process will be used for <u>all waterproof sealing</u> of all the hull assemblies, all surfaces, inside and out. The brush and dish can be water cleaned and reused for the next assembly, a big advantage using TB3. After the mixture has dried on the plywood, lightly sand all surfaces in preparation for a finish. The plywood surfaces will now be smooth, water sealed, and also strengthened by the application of the TB3 mixture.

Note: If the mixture is too runny on vertical, or horizontal surfaces, change the mix ratio to 25% water and 75% TB3.

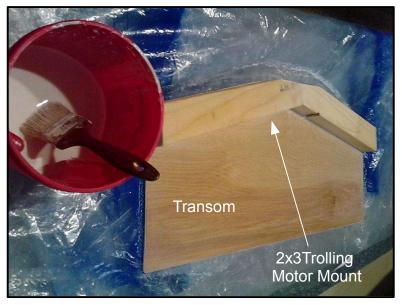
NOTE: Use this process for all wood panels and supports.

Use this method for both the Inside & Outside surfaces.

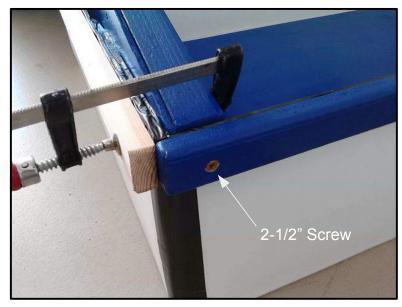
Not for use on Coroplast.

PHOTO ASSEMBLY

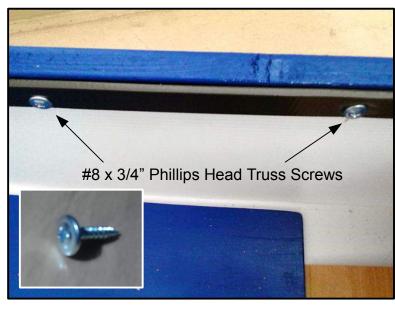
The assembly photos are becoming less detailed, because you are becoming better at building the CPB. The following are photos of the Transom area and side Rubrail assembly. Note that the motor mount may be different than the drawing shows.



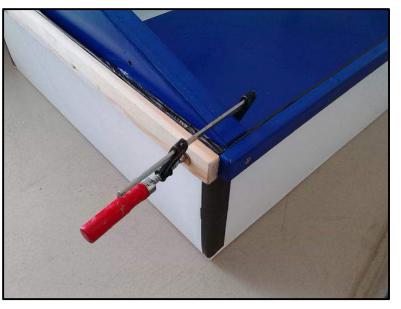
The left photo is the waterproofing of the Transom assembly. The 2x3 motor mount now extends to the outer edges of the transom panel. This provides greater support for the aft end of the hull. At right is a close-up of how the rubrail is screwed into the motor mount, for greater strength and rigidity.



Note : The 2x3 motor mount is not necessary if you decide to build and use only the KAYAK version.



At left is a photo of the #8 x 3/4" Truss Screws holding the 1x2 rubrail to the hull side panels. They are spaced about every 6". I did not silicone the rubrail to the side panels, but you could, for added strength & security. At right is another view of the transom, siliconed to inside the rear hull panel, with an outer 1x2 support bar clamped to the hull rear panel until the silicone is cured.



The next photos will concentrate on the forward support bar, and the 3 skids on the bottom of the hull, to complete the hull assembly.



The forward support bar.



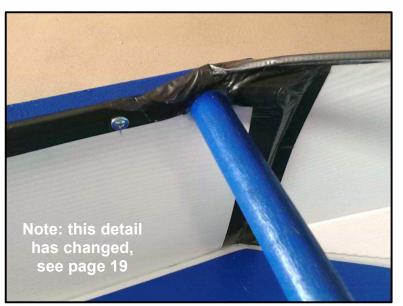
The rear skids are about 4 feet long and 17" apart. The forward skid is about 32" long and on center.

A second person is always a welcome helper !

PHOTO ASSEMBLY

The forward 27" long support bar is necessary for structural rigidity. I made mine from a 1" dowel, but a 1x2 would work fine. Fasten from the outside, through the rubrail, with a 2-1/2" long screw. Place as far forward on the rubrail as practical. Silicone in place.

The skids are necessary to protect the bottom from damage. They are also made of 1x2 lumber. with the ends and edges rounded. Waterproof all over, and paint the sides and bottom, not the surface touching the Coroplast hull. First mark their location on the bottom. Next. drill 1/8" clearance holes 2" from the skid ends, and then about every 8 inches apart. Apply Silicone to skid. Hold in place, flush to transom end, and screw from inside. through the floor, with 1" long #6 wood screws. Hand tighten.

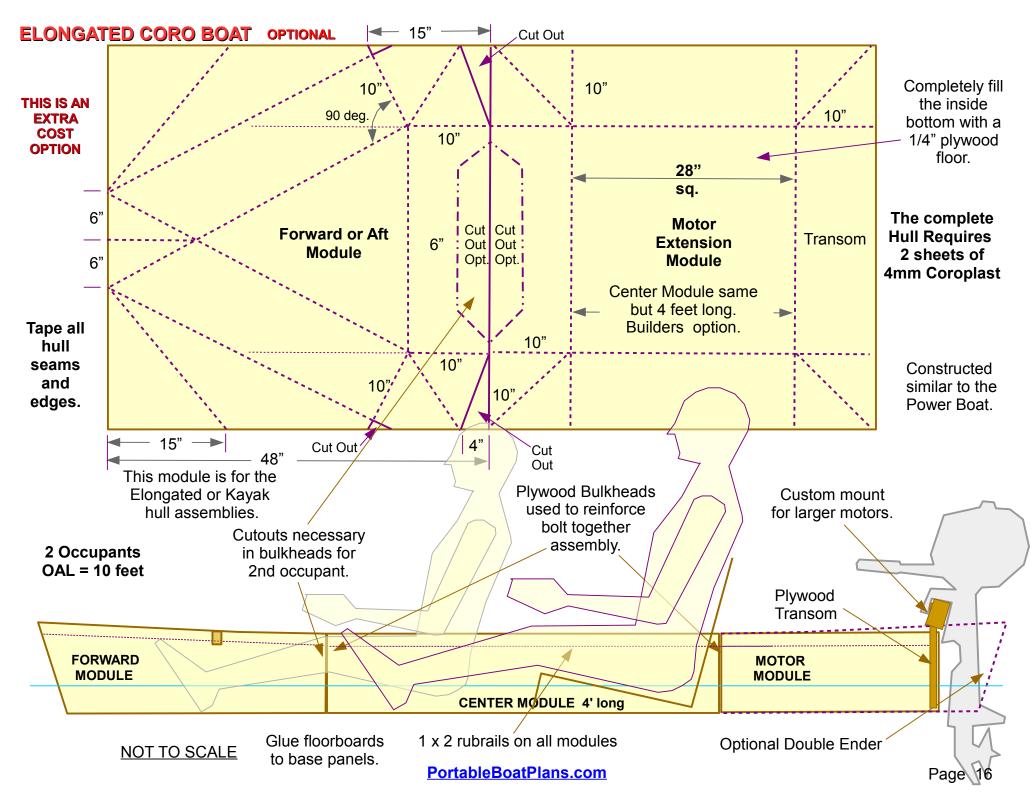


Closeup of support bar end.



Completed Hull. Only a seat and paddles required.

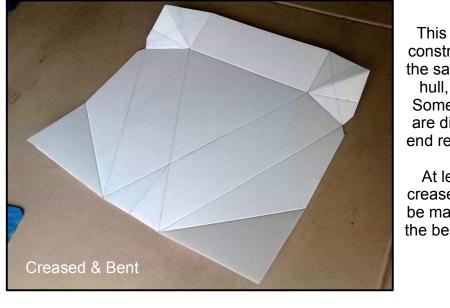
This completes the assembly, unless you want to build the hull extension, as defined next.



ELONGATED CORO BOAT OPTIONAL

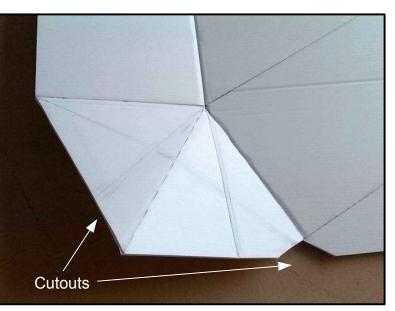
PHOTO ASSEMBLY

This is an additional tapered module, to be fastened to the hull transom, that converts the CPB into a KAYAK type hull.



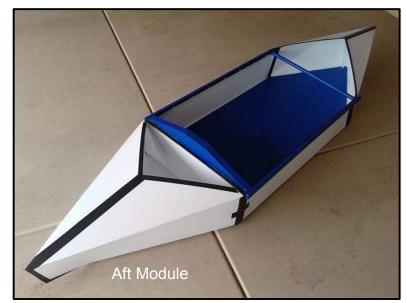
This Aft Module is constructed in much the same way as the hull, only shorter. Some of the bends are difficult, but the end result is worth it.

At left are all the creases that need to be made. At right, all the bends have been formed.





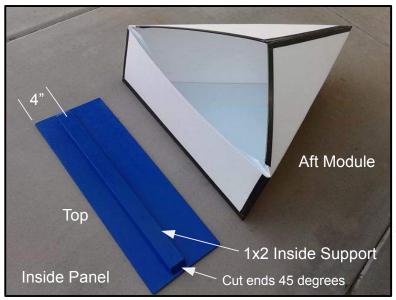
The final shape is a triangle, and it fits the transom of the hull exactly. A plywood panel will be inserted and glued to the inside of the rear panel, similar to the transom. The photo at right shows the Aft Module mounted to the boat. It extends the water line another 3 feet. and provides excellent handling.



The aft module can be modified with a floorboard and skids. It is useful for gear storage, and the opening could be covered with a tarp. The following pages display photos of the finished boat, with some further detail, and "in the water" views. This was a great project !

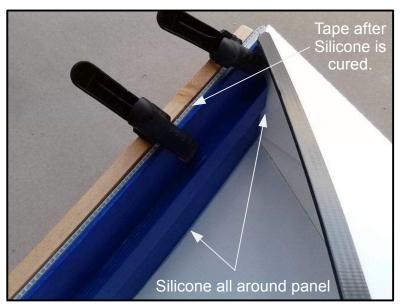
ELONGATED CORO BOAT OPTIONAL

PHOTO ASSEMBLY

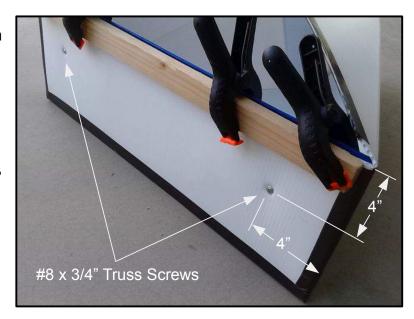


The inside Panel is about 27" long and 10" high, but should be cut to fit. Note the 1x2 support, which will be used to support the Aft Module to the Hull. Waterproof the assembly before painting. Apply Silicone to all inside folds of the Coroplast bends, and the outside that will be in contact with the Panel. Install the same way you did for the Transom.





As with the hull design in general, changes can be made to accommodate any ideas you may have for the boat. Mounting of the two modules is easy, and requires only two 5/16" x 3-1/2" long bolts. See next page for more detail. Remember to apply silicone in the 3 corners of the rear panel to hull insides.



All wood panels and attachments must be waterproofed prior to painting. The Coroplast panels require no preservation treatment.

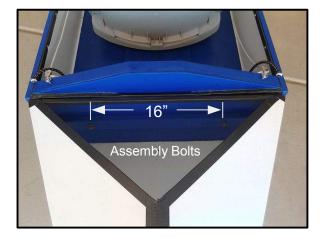


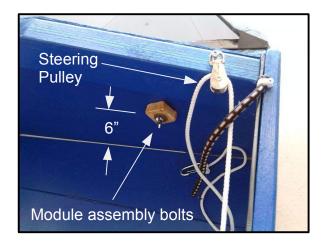


PHOTO ASSEMBLY

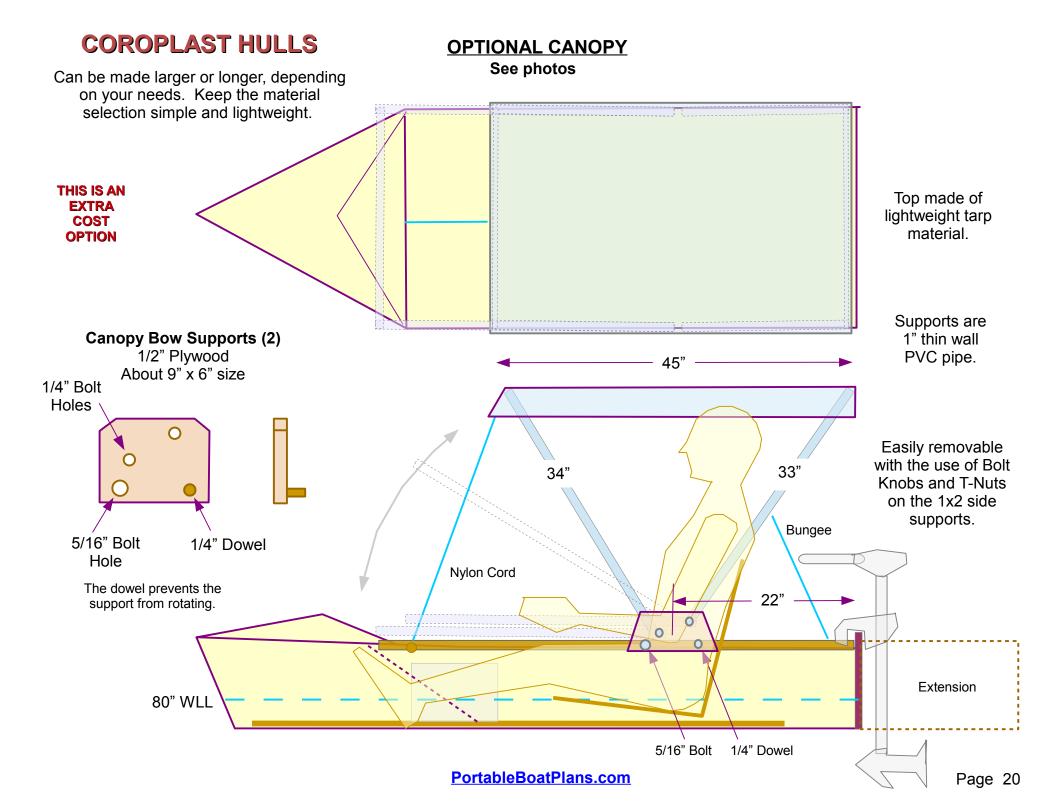
Some detail photos of the finished hull modules. The boat has been set up for rope steering while under trolling motor power. Also, a canopy top has been fitted, and the hold down bungees are attached. Also please note the change to the forward support bar. The straight one has been replaced with an arched one for better leg room. It was cut from a scrap 1 x 4 x 27" long. And, the 2 hull module assembly bolts (5/16 x 3-1/2" long) have been installed, 6" up from the bottom and 16" apart, held firm by large washers and wingnuts.











CORO POWER BOAT Optional Canopy Top

PHOTO ASSEMBLY





IN THE SHOP

The optional canopy top is necessary in sunny climates, and works best in the power boat mode. The vertical supports do hinder paddling.

The cost of the canopy assembly is less than \$20, so it is a worthwhile option. Changes to the size and setup should be made to satisfy your particular needs. Construction details are not necessary, due to the simplicity of the design.

Notice the new red tape stripes !

ON THE WATER



The CORO POWER BOAT made its maiden voyage on 8-26-2014. I first tested it in the KAYAK mode (as shown at left) for stability, ease of paddling and directional control. I weigh 160, and it only settled 2 inches into the water, providing easy handling. It paddled effortlessly, and wandered very little, due to the nice long waterline.

I then switched over to the Trolling Motor version, which takes only a few minutes. In this mode, the boat draws about 3 inches of water, due primarily to the 48 pound 80 AH deep cycle battery that I use. Still plenty of freeboard though. However, I am going to buy a 35 AH battery, to reduce the weight I have to carry by 20 pounds. The boat performs well under power, about 4 MPH with a 2 blade prop, and is comfortable and stable. No leaks were observed !

PHOTO ASSEMBLY



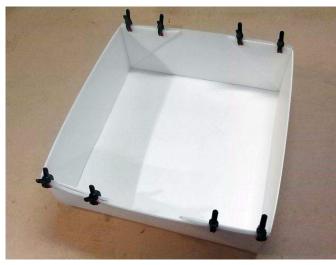


Although I enjoy not paddling (motor power), I think most people will choose the KAYAK version for its ease of use, and low entry cost.

PortableBoatPlans.com

Happy boating !

ELONGATED CORO BOAT OPTIONAL

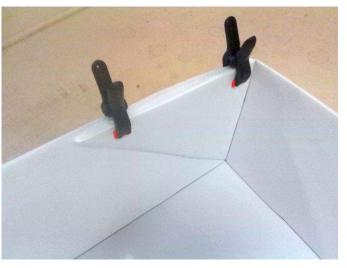


All panels creased and folded. This is the same method as used for the main hull.

PHOTO ASSEMBLY

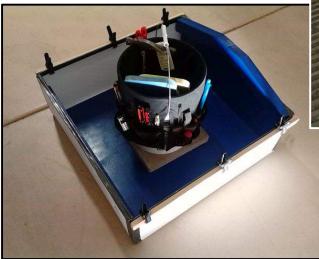
These are assembly photos of the 28 inch Motor Extension Module (see page 16). This will have a plywood floor and a plywood bulkhead and transom. The transom will have the 2x3 Motor Mount option. The purpose of the module is to increase boat load capacity by 75 pounds, and hull speed by about 1 mph.

Total hull capacity will now be 325 pounds, with a hull speed of 5 mph.



Note the 45 degree corner fold, which will be at the bulkhead and transom ends.

Bulkhead and Transom installed, and Floor is weighted down while being Silicone bonded to the hull panels.





The finished module ready for assembly to the main hull. The same 2 bolt method of securing them together as the Kayak module, page 19. Hulls assembled, motor and battery installed, and the seat repositioned. There is now a lot of legroom.



ELONGATED CORO BOAT OPTIONAL



Aft view, showing the rope steering.

PHOTO ASSEMBLY



Plenty of legroom in the extended version.



Draft, fully loaded, is only 2 inches.



Optional Sun Canopy Top



Top support assembly detail.



Canopy top folded forward, for entry & exit.

These photos depict the third configuration of the **Coro Power Boat**. There is the basic hull, which can be rowed, paddled or motorized. Then there is the **Kayak** version, strictly for effortless paddling. And finally, this **Extended** version, primarily for greater load capacity. Each has its own attributes, but combined, they provide a craft that is multi-capable. There is even a longer extended version which can be modified to accept two occupants, by lowering the center of the bulkheads, as shown on page 16. In testing, I found the hull to be very stable, as long as the seat is kept low to the floor, as shown. Hull speed is achieved quickly and smoothly, with little hull wake. But the primary feature of this design is the low hull weight, 20 pounds. Easy to lift into and out of your vehicle. And, because all modules utilize folded corners and seams, there is no chance of water entering the hull. The skids provide hull bottom protection, and also help the hull from drifting while paddling. Overall, I am very pleased with this third generation Coroplast hull design. Thanks for your interest. *Ken*

ROPE STEERING

An alternative to twisting and turning in order to steer an aft mounted trolling motor.

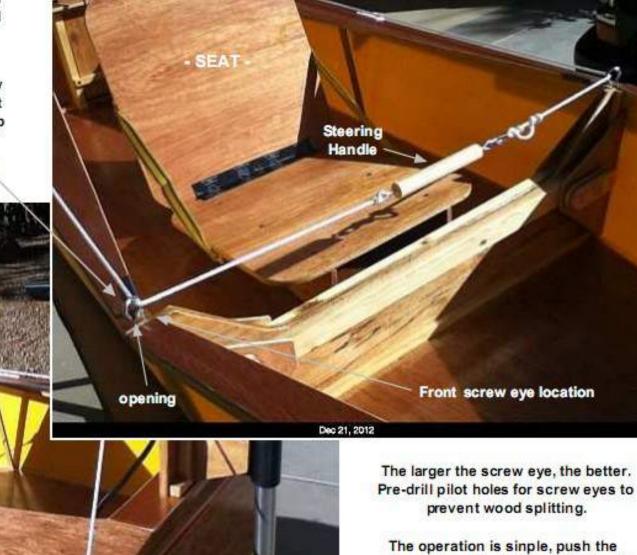


If you are like me, you must of thought there was a better way to steer a small boat with a trolling motor, instead of leaning back, turning around or just twisting your body in ways it was not intended to be twisted. Well, I have resolved the problem at least for my small boats. By simply adding screws eyes to the deck area, and attaching a nylon rope to the steering arm of the motor, a comfortable and easy to operate method of steering can be achieved. The pictures tell the story. This is for those people that need some kind of remote steering, without the complexity of adding an electric steering apparatus.



Note that the steering handle should be adjustable (knots), and sit at hand level, for effortless operation.

To easily locate the rope in the screw eyes, open the end of each eye about 1/4 inch, and then it is easy to just slip the rope in. Do this using 2 pliers, being careful not to produce sharp edges that would chaff the rope.



The operation is sinple, push the steering handle right, and the boat goes right. Push left and the boat goes left. If the rope gets wet the steering may be a bit sluggish, but never so much that you can't control the motor.

PortableBoatPlans.com

Dec 21, 2012

Rear screw eye location



You can also see that the screw eyes are inserted straight down into the deck, and at a 45 degree angle to the transom. This insures the rope is always against the inside loop of the screw eye, and will not slip out the opening.

I used clips on the ends of the rope for ease of attachment, and disassembly.

Ken



Create a bracket that the rope can attach to on the motor. Can even be made from a stiff coat-hanger wire.

It is important that the steering rope is angled back from the motor (see below) to the rear deck screw eye. This provides smooth operation when the motor is turned to more than 45 degrees.



