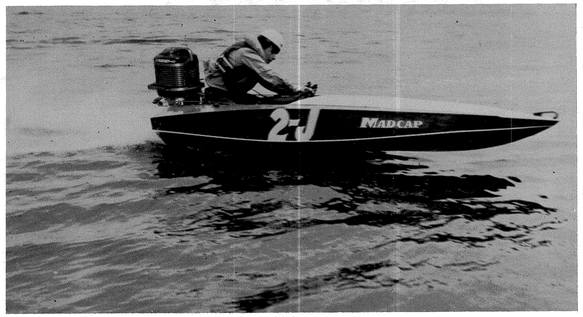
building MADCAP
13' Class 'C' 'D' and '36' Runabout
by Hal Kelly

For boat lumber and Marine Plywood
MAURICE L. CONDON CO., INC
250 Ferris Ave., White Plains, N.Y. 10603

for racing boat hardware
WILLIAMS MANUFACTURING CO.
6450 Olympic Bremerton, Wa. 98410

for A.P.B.A. Racing numbers & rule books
AMERICAN POWER BOAT ASSOCIATION
22811 Greater Mack
St. Clair Shores, Mich. 48080



MADCAP barreling down the straight...pushing 70

A home built MADCAP in action at a Marathon and no fin...

BILL OF MATERIALS

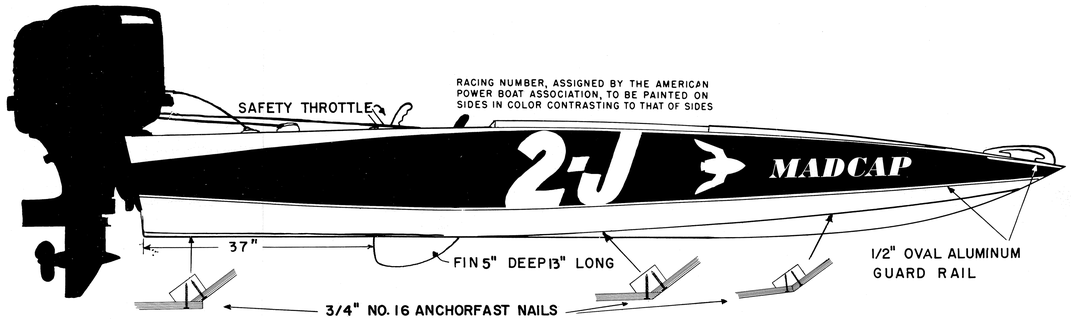
BRONZE, MONEL, or EVERDUR FASTENINGS
2 dozen ¾" #8 flathead wood screws
2 gross of ¾" #8 flathead wood screws
2 gross of 1¼" #8 flathead wood screws
4 dozen of 1½" #8 flathead wood screws
3 lbs. of 1" #16 Anchorfast nails 950 to lb.
8 carriage bolts ¼" x 4" with nuts and washers

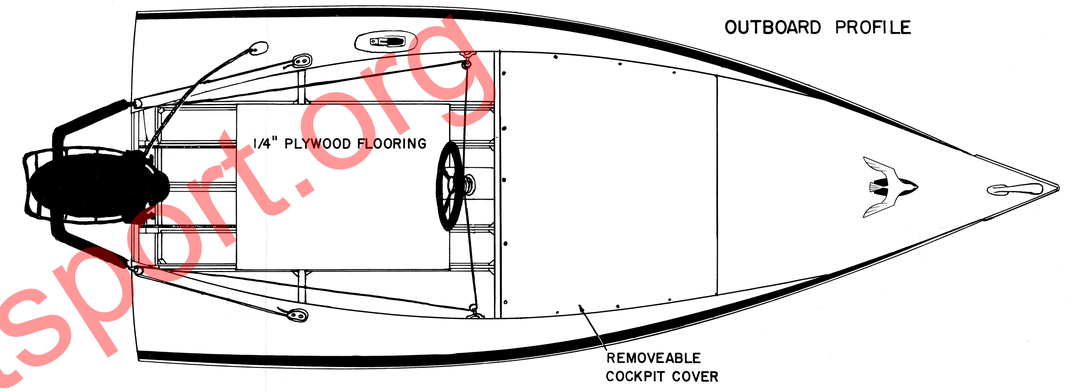
PAINT PRODUCTS
5 lbs. of Weldwood glue
1 lb. of Wood Dough or similar surface filler
1 gal. of Spar varnish for interior, decking, and exterior

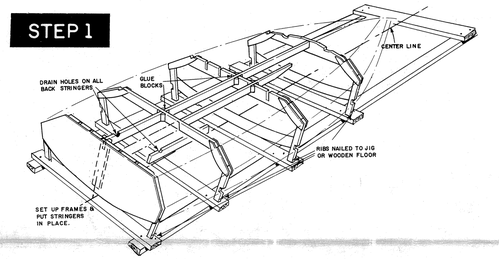
PLYWOOD
Decking, sides, non-trip, bottom, flooring and seat
4 sheets of marine plywood ¼" x 4' x 14'

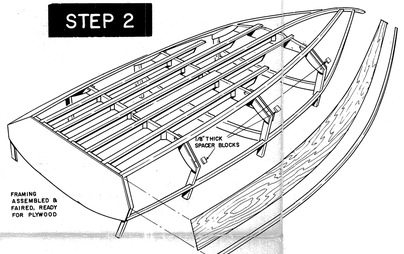
WHITE OAK
Sheers and upper chine . . . . . 4 pieces ⅞" sq. x 14'
Battens . . . . . 4 pieces ½" x 1¾" x10'
Keel . . . . . 1 piece ½" x 1½" x 14'
Bottom stringer . . . . . 1 piece ½" x 2½" x10'
Bottom stringers . . . . . 4 pieces ½" x 2½" x 9'
Frames . . . . . 1 piece ¾" x 12" x 14'
Deck frames, etc. . . . . 1 piece ½" x 8" x 14
Inside of keel at bow . . . . . 1 piece ½" x 1½" x 7
Transom framing . . . . . 1 piece ⅞" x 10"x 18'
Bottom chine . . . . . 2 pieces ⅞" x 1¾" x 14'
Dash and dash beam . . . . . 1 piece ½" x 8" x 9'

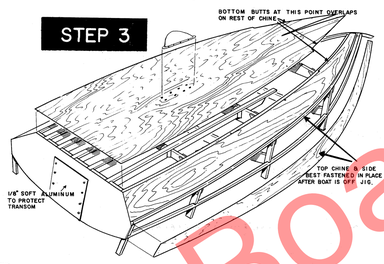
HARDWARE
1 Steering wheel
1 Piece of steering rope 26'
1 Safety throttle
1 Bowden throttle cable 5' long
1 Racing fin
2 Forward steering pulleys, with anchor straps
2 Rear pulleys
2 Steering line tieback
2 Stern lifting handles
1 Bow handle
9-4' of ½" oval aluminum
2 Steel 'S' hooks to hold rope block to steering bar

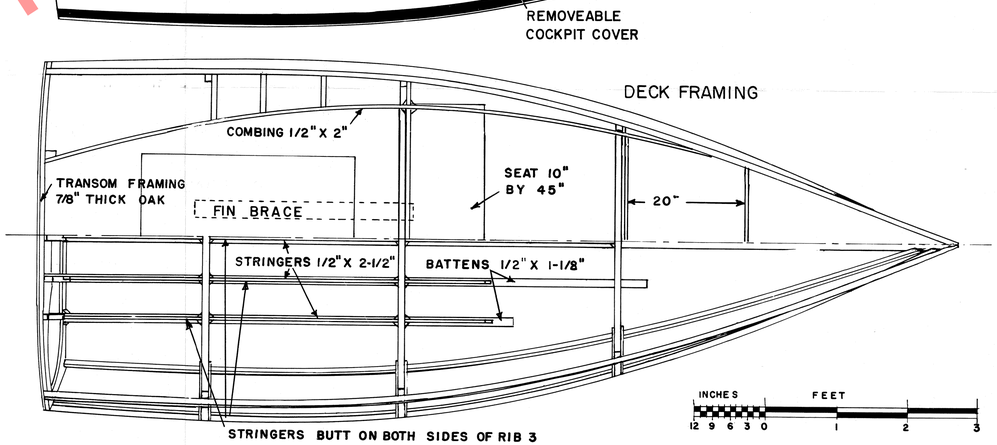


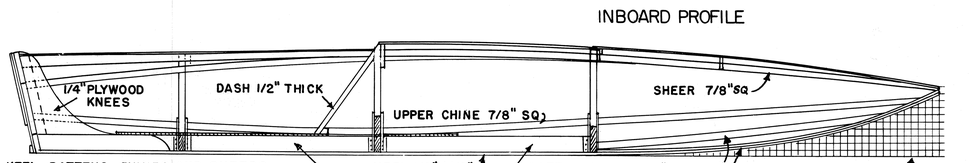


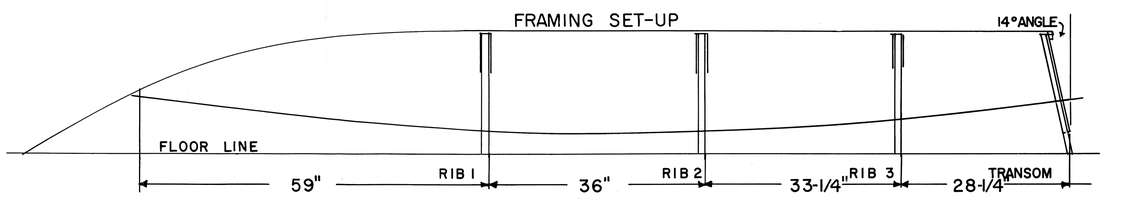












Building MADCAP

MADCAP—Will qualify under the A.P.B.A. rules for 'C', '36', and 'D' Stock Runabout. Highly maneuverable, this boat will bank right up on her side in a tight turn. Her upper chine is put on the OUTSIDE of the non-trip and this keeps her from sliding out. I have never seen this type of construction used on a plywood-planked hull. On a wider turn she can be made to ride the outside chine. As a marathon she is great. This strip of wood on the outside of her non-trip keeps her from diving into a big wave without offering a great deal of wind resistance. She rides beautifully when going into a headwind, won't wander all over the course, and runs as straight as an arrow.

She will take any motor from 15 to 50 hp, but for motors other than Mercury Quicksilver units, the transom will have to be made 17" high. Most important is getting the proper propeller for your outfit. This must be done before you try any hopping up of the motor. If you will give me the motor make, year, hp, model number, weight of boat and passengers, and what use you want to put your outfit to, I will tell you what kind of a propeller you should use, its cost and, if need be, can sell you same.

When building MADCAP, please stick to the materials listed. I suggest fiberglassing the bottom, and if fiberglassed, ¾" plywood bottom is thick enough. If not fiberglassed, suggest making the bottom ⅞" thick. Non-trip sides and deck should be ¼" thick plywood. All framing, keel, battens, etc. should be White Oak. With fiberglass and all hardware cost should be around $140.00 and take about 85 hours to build.

After accumulating the stock listed in the bill of materials, you are ready to start on the ribs. Due to space limitations only half of the ribs are shown, but since the ribs are the same on both sides this will offer no problem. Cut out all of your rib components and place them on the full-size rib drawings using Anchorfast nails and screws as indicated on the drawing. A piece of thin tracing or wax paper will keep the glue off your plans.

The bottom of each frame is continuous from chine to chine; check drawing for size and shape. The sides of the frames are 1½" wide and straight-sided; the large gussets form the non-trip chines. Place the frame components on the layout and hold them in place with temporary fastenings. Place two plywood gussets over frames (one on each side) and fasten with glue and ¾" #16 Anchorfast nails. You will not have to drill pilot holes for this size nail. Use as many and about the same placement as illustrated on your full size rib drawings. When all 4 gussets are in place, carefully inscribe the center line on both sides.

Assemble the transom and transom frame. Cut transom from ¾" thick plywood. Transom framing is 1⅞" or ¾" thick. Assemble transom frame. All lapped joints should fit snugly. Coat mating surfaces of the joints and fasten together with ⅞" #8 screws. Carefully notch for battens, keel, bottom chine, and sheer before assembling transom frame to transom. Glue and fasten transom to transom frame with ¾" #16 Anchorfast nails placed about two inches apart.

The keel and stem are one piece, ½" x 1½", but forward of Rib #1 it is backed by another piece ½" x 1½". Both are glued together when the proper shape has been obtained, and steaming is not necessary. This can be done now or later on, when all the ribs are set up.

After the glue in the frames has hardened, cut the notches for the bottom chine and sheer. Note that only in rib #2 do the bottom stringers go through, on transom, rib #3 and rib #1 they butt.

The boat should be built on a level wooden floor, or on a wooden cradle laid on a concrete floor (see step-by-step drawings) in an area about the size of a one-car garage. Lay out the center line and frame lines on the floor or cradle according to the spacings given in the drawing, using such temporary bracing as you feel necessary. Set up frames and transom; a couple of nails will hold each frame to floor or cradle. When all is securely erected, double check and make sure everything lines up. Remember, no hooks or rockers in the bottom. Coat the bottom stringers and notches with glue and slip into place. Then fasten to ribs and transom with small blocks; glue and fasten in place with 1" #16 steel brads. Next slip the keel in place with glue and 1¼" #8 flathead wood screws, using two screws to secure to transom and all ribs, and one about every 8" to the bottom stringer. The same procedure is used on all battens except that one screw is used to fasten to transom and all ribs. Next secure the bottom chine and sheers, using glue and 1½" #8 flathead wood screws. Where they butt against the stem and transom, bevel them to obtain a good landing; one screw at each frame, transom and stem. The bottom chine is cut thinner (⅝" thick) from the bow to Rib #1, where it gradually takes on its original thickness; this will allow it to bend easier and lighten the nose. Don't forget fin bracing from Rib #2 to Rib #3. Add 1" after plane to transom.

Fairing is probably one of the most important phases. If you have done a good job of setting up the frames, this should not be too difficult a task. Use a plane and a good wood file. Carefully trim and fair so the plywood planking will lay on all structural members. Check the fair from time to time as you progress by sighting battens around the structure. Remember that from Rib #2 to the transom the bottom must be perfectly flat, and the plywood bottom can't be flat unless the structural members are faired flat. The non-trip chines are fitted first. A large sheet of wrapping paper will come in handy to give you a rough idea of their shape. Cut the panels a bit oversize, clamp in place and mark the outline of the bottom chine. Remove them and cut out a wee bit over size. Remember to glue and fasten in place the ¾" thick by 1¼" sq. wood blocks at the top of the non-trip chine of each rib. The bottom goes over the edge of the chine except up towards the front where they butt each other. After the non-trip chine is fitted, glue and fasten it in place using ¾" #16 Anchorfast nails to transom, bottom chine and stem, and one nail at the top edge of the chine at the transom and each rib.

You will have to fair the bottom of the non-trip where the bottom will rest on it, and up towards the front where the bottom butts the chine. The bottom goes on much the same way and is all one piece with a V cut in the front to allow the bottom to come to a V. Up towards the front it will take a little careful fitting to make the bottom butt into the non-trip chine. Use a few screws to temporarily hold the bottom in place while you are fitting it. Mark on the bottom from the inside where all the battens, etc., come in contact.

Glue is applied to all structural members that the bottom will touch, and also to the bottom where you have marked areas the battens, etc., will contact. Put the bottom in place (a two-man job) and screw in the same screws that held it temporarily in place while you were fitting the bottom. ¾" #16 Anchorfast nails are used to fasten the bottom to the transom, keel, battens and stem. Place about every 1¾" apart and counter sink a bit (about 1/8"). The bottom is best fastened to the battens forward of Rib #2 with ¾" #8 flathead wood screws, placed about every 4" apart, and counter sink about 1/8". After the bottom is dry, plane the edge at the same angle as the chine, except towards the back where it is allowed to remain square. This gives you a little lip to help grip the water on turns.

The upper chine is now fastened in place. This is ⅞" sq. and starts to taper towards the front to nothing at the very front. This taper starts about 5' from the front. Glue and 1½" #8 flathead wood screws are used to fasten the upper chine to all ribs and transom, well countersunk. From the inside the non-trip is fastened to the upper chine with ¾" #16 Anchorfast nails set 1¾" apart. At the very front this upper chine is best clamped in place until the glue is dry. At this point take the boat off the floor or jig and set it up on two well-padded horses at a good workable height. Saw off the extra piece on transom and ribs.

Fashion the deck beam, cockpit coaming, and other braces according to the plan; all are ½" thick. The cockpit coaming runs from 3½" wide at the transom to ¾" wide where it is fastened to the inside of the sheer. Fit transom bracing and knees in place as indicated in drawings and photos. Knees are glued and fastened to the stringers and transom bracing with Anchorfast nails and screws. If you use a flush throttle, now is the time to put in the bracing for it (see photo).

Now fair off the upper chine and fit it to the sides. The side is glued and fastened in place with ¾" #16 Anchorfast nails spaced 1¾" apart. When the side is dry, fair off at the upper chine as shown in the full size Rib Drawings; also fair at the sheer line. The side decking is glued and fastened in place with ¾" #16 Anchorfast nails. The deck beam on Rib #1 is built up on one side so you can slip the removable cockpit cover in place after the front middle decking is fastened in place. See photo and full size rib drawing. Front middle decking is fastened in place in the same way as the side decking. Glue and fasten flooring in place with ¾" #16 Anchorfast nails. This forms a structural part of the bottom and will prevent it from warping or cupping.

The front seat offers no problem and is not glued in place. Use ⅝" #8 flathead wood screws. Sand the entire boat down and varnish or paint to suit your taste. Remember to varnish under the floor boards BEFORE you fasten them in place. Also, it is a good idea to varnish the entire inside before the decking is put in place. Give the inside 4 coats. The bottom, to the top of the non-trip chine, is Fiberglass. Read fiberglassing instructions. Now screw fin in place and install hardware. I built my back lifting handles in place as I use them to tie down my motor.

Now for that first test run! If you are racing, be sure to have a good, sound, safe helmet. Always wear it and a good life jacket with collar, even when testing. Motor angle and height are very important for racing and a motor ⅝" too high or low has lost many a race. A marine speedometer is handy to have while making these adjustments. Spend a little time with your outfit; learn how to handle her; get the feel; find out where the best place is to kneel in her when turning, both in calm and rough water. The first turn in a race is no place to learn the feel of your boat. Remember, you have a great boat, but it is only as good as the driver.

Some say it's luck that often wins a race, but you will note that the best drivers make their own luck. You have a good boat, but a well-tuned motor and the proper prop, plus good set-up wins the race too. Oh yes, and the driver counts too—you know darn well he does.

A mistake many new drivers make is that in testing and adjusting their motor too early the day of the race—setting their motor for the best speed at that time. A few hours later their race comes up, and perhaps by now a strong wind has roughened the water so that in the middle of the race they find they are much too high or kicked out too much.

It's always nice to test out on good water; it's nice riding and you go much faster. But I make it a point to do at least half of my testing on rough water. Try setting up some buoys and practice turns. I know a few fellows who set up their own course and practice out on it as if they were running a race; they even have a starting clock to practice on. I'll admit that there's nothing like an actual race for experience, but testing will be a big help.

Motor setup is not easy to learn. It's hard to know whether to kick it in (for rough water) or out (for calm water) or how high to run. You can look around and see how the better drivers are running their boats, but frankly this is of little help because boats and driving styles differ. I have seen two good drivers at a race both running the same make hydro, motor, and prop; one ran on the fourth motor notch, the other on the third. Both took a first and a second, and were tied on time. I'm sure this would confuse any beginner. When you practice for a race, don't just run around. Try all kind of setups.

Pick-up means a lot in short-course racing and I often sacrifice a few miles of top speed for acceleration. As an example, before one race a friend of mine was passing me on a long stretch down the river. He was running faster than anyone else. With a beautiful start he hit the first buoy first in a three-buoy turn, but coming out of the turn five fellows passed him and I think he finally finished a sad sixth. I managed to steal a second in that heat.

The main thing you can do to a stock motor and remain legal is to carefully set up your reed cage and points. Run the exact amount of oil in your motor that the manufacturer recommends—no more no less. In breaking a new motor don't run a rich oil mixture, but set your high speed jet a little richer for the first hour, with the spark on two-thirds. Run the motor at half-throttle for 15 minutes. Then give the motor a five-minute break and run again for 15 minutes. Do this for about one hour running time. Now take her out and boot it wide open for a stretch, but for the next two hours running time refrain from any continuous high speed runs.

I always run my motor with a full butterfly. In case of a flip it's much safer for you and the other drivers, and will save you from a blown motor.

All in all it's a great sport and I never met a finer group of people than those within the sport. We cover about 8,000 miles each year just going to the races. When I go, the whole family goes: wife, two kids and the dog. Win, lose, or draw, we all have a picnic. See you at the races.

FIBERGLASS

The bottom of **MADCAP** is fiberglassed, up to the top of the non-trip chine at the expense of 10 extra lbs. Costs ran me a little less than 40 cents a foot. I used a medium weight glasscloth, 50" wide, which left no seam on the bottom at all. A thin application of the plastic was applied to the bare wood with a brush. After it had hardened (the next day), I laid the cloth over the bottom and trimmed to fit. You need not cut out a V for the front as it drapes over the bow very well. A generous coat of plastic was applied to the bottom, the cloth laid over the bottom and smoothed out, and more plastic was applied with a squeegee to smooth. The cloth becomes almost invisible if applied correctly. The next day with a grinder I carefully ground down the surface so that it was smooth, flat, and even, and one more coat was applied with a brush, and carefully smoothed with a lot of elbow grease and wet sandpaper. Then a lacquer compound was used to give a plate glass finish. Fiberglass is composed of a plastic and a hardener plus the glass cloth or mats. You have to work rather fast. It's a two man job as the "pot life" is short or long depending on how much hardener you use. By short "pot life" I mean that the mixture hardens in the pot before it hardens on the boat. One minute it is liquid, but then it starts turn into a jelly and proceeds to get very hard in a matter of seconds. I would say that for the beginner it is a dog job. But the results are very rewarding. It is literally as tough as glass and just as smooth. This is not intended to be a full discussion by any means, but just a few words to let you know what you are in for if you would like to fiberglass the bottom.