

By Fred Reese

A Stand-Off Scale boat that meets the NAMBA Class A Outboard Mono rules.

SCHIADA 20 SS OUTBOARD SKI BOAT

Designed By:

Fred Reese

TYPE BOAT

Stand-Off Scale

3.5 Outboard Deep Vee

LENGTH OF HULL

30 Inches

LENGTH OVERALL

36 Inches

WIDTH

11 Inches

ANGLE OF VEE

AT TRANSOM

16 Degrees

DEPTH OF HULL

AT TRANSOM

3½ Inches

RADIO COMPARTMENT SIZE

(L) 4" (W) 10" (H) 3"

ENGINE

K & B 3.5 outboard

FUEL TANK

6 Ounce

REC. NO. CHANNELS

2

CONTROL FUNCTIONS

Rudder & Throttle

BASIC MATERIALS USED

Balsa & Plywood

Wt. Ready To Run 80 Oz.

RCM is happy to present Fred Reese's Stand-Off Scale model of the Schiada 20 SS outboard ski boat. The model is powered by the popular K & B 3.5 outboard engine and can be run for fun or competition.

I grew up in Southern California, where, in the 50s, ski boat development began. As a young man interested in boats and water skiing, I watched the developments with great interest. In 1959 I built my own ski boat powered by a Buick V-8. Outboards at the time were just reaching 50 hp but 150 to 200 hp automobile engines were cheap and plentiful. The V-drive transmission influenced boat design by allowing the

heavy engine to be placed in the stern which improved the ride and provided more room for people. The sport of water skiing called for a new breed of boat that was fast, sleek, and glamorous, and the SK type of ski boat became instantly popular. People began to race their new boats, first at the lakes and then in competition drag racing at Marine Stadium in Long Beach, California. Hot rod technology poured into the boat engines and speeds quickly went up over 100 mph. Most of the drag boats were also ski boats and were used for family skiing when they weren't being raced.

The SK ski boat that was developed in the late 50s was 16 to 18 feet long, quite wide, low freeboard and almost flat bottomed. These boats were hard riding but were designed for smooth water lakes and rivers. The original boats were made of plywood, covered with fiberglass cloth and resin, but by the early 60s, most of the boats were all fiberglass.

I can remember visiting those early boat manufactures. Most were very small backyard operations at first, but quickly grew as the sport caught on. The big names then were Mandella, Raysoncraft, Hallet, Stevens and Schiada. Leonard Schiada, (pronounced Ski-ah-dah) was a master wood worker and I remember his sleek boats with beautifully sculptured decks made from exotic woods. His boats looked fast and they were. Schiada boats dominated oval racing in the late sixties. Leonard Schiada was proud of his craftsmanship and his legend of beautiful, quality boats lives on.

At the same time a different type of boat was developed in Florida for off-shore racing. A man named Bertram with a boat called Moppie was winning all the races with a revolutionary design called the deep vee. The deep vee carried the sharp entry angle of the bow all the way to the stern. With the help of lifting strakes on the bottom, the deep vee was a planing hull. The deep vee hull was not quite as fast as a flat bottomed boat on smooth water, but it could go full speed over rough water that would stop anything else. The soft ride of the deep vee is amazing when compared to the bone jarring jolts of the flat bottom racers going over choppy water.

The deep vee bottom and the SK ski boat came together in California and soon all of the boat builders had vee

bottomed ski boats. The ski boats used a modified vee of about 15° instead of the 20° bottoms of the off-shore racers but still the ride comfort was dramatically improved.

Meanwhile, outboard engines were gaining in power and, in 1982, a 235 hp Evinrude outboard engine was bolted onto the transom of the 20' Schiada inboard ski boat hull for a **Powerboat Magazine** performance test. The outboard version ran 6 mph faster than the same hull with a stock 454 cu. in. Chevrolet engine. This 70 mph outboard Schiada is the subject of this construction article.

I scaled the 20' boat to 1½" = 1' for a hull length of 30". The Schiada model is a little wider and lower than some of the other popular deep vees and its ability to stay upright and dry is truly amazing to me.

My choice of applying model airplane technology to a boat is both natural and practical. The all balsa structure is inexpensive, easy to build, and is surprisingly strong and rugged. The hull is covered with a single layer of boat weight glass cloth and resin. Under normal operation there has been no sign of any structural weakening or damage. Twice I launched my boat with the receiver off and watched with horror as the boat raced across the lake to crash at full speed into the rocks and logs on the opposite shoreline. Both times only minor superficial damage occurred. Both times I expected the hull to be split, end to end, but no, just chips and dents and no holes.

The K & B 3.5 outboard has been available since about 1976 and has been modified and improved several times. It is now a very powerful little package that will power a boat over 30 mph right from the box. This is fast for a small boat and the three foot high roostertail is very impressive. The little Schiada would be competitive in deep vee racing but is just as much fun racing round the lake. The little Schiada is comparable in speed to a similarly powered and propped tunnel hull. When properly trimmed, the ride is smooth and level with the turn fin visible and it will turn tightly, both right and left at full throttle. This trimming procedure will take some time and patience, but if you follow my directions you should be close and need only minor corrections.

Construction

Glue the balsa bulkhead F to the



1/4" plywood transom. Glue the bulkheads and transom to the 1/8" balsa gunwales (shaded on the plan top view) laid over the plan top view. Build the 1/2" balsa keel and stem (shaded on the plan side view). Glue the keel to the bulkheads noting that you need to put a 1/8" shim under bulkhead A. The deck curves down slightly at the bow. The 1/8" x 1/4" inside chine strips must be split from bulkhead D forward to allow the wood to make the compound curve. With a large, flat sanding block (mine is 3 1/2" x 11" with #80 sandpaper) sand the edges of the gunwale and the chine strips for the 1/8" balsa side sheeting. Apply all of the side and bottom sheeting, beginning at the stern, with the grain opposite to the length of the boat, or cross grain. First cover the sides of the boat and then the bottom using three inch widths of wood and a slow CA glue such as Zap Ca Plus. You will notice that the bottom sheeting, as it approaches the bow, stops overlapping the sides and begins to butt to the side sheeting. The angle between the sides and the bottom decreases until, at the bow, it is a straight line. Trim off the excess wood with the sanding block.

Turn the boat over and glue on the top portions of the bulkheads. Brush a coat of resin over all of the forward inside wood including the deck material. At this time I would suggest that you install a 3/8" aluminum tube

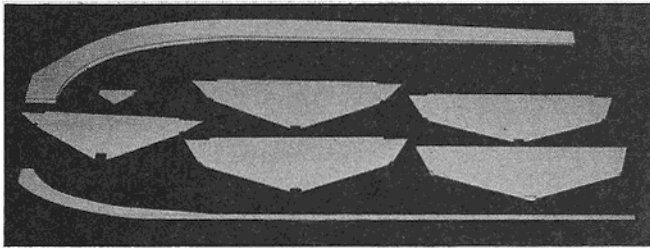
through bulkheads B, C, and D so that ballast can easily be added to the bow later if needed. End the tube flush with B so that you can use loose lead shot until final trim is achieved. Then pour in some resin to set the ballast. Without any ballast, my boat would jump right out of the water and land on its back. The open end of the aluminum tube can be plugged with a cork in the cockpit. Glue on the 1/8" balsa deck, grain lengthwise, and the 1/4" balsa deck down the sides to the transom and add the 1/2" sq. across the top of the transom.

Carve and sand the side deck pieces to match the forward deck. Glue on and rough shape the balsa nose block. Glue in the 1/4" balsa cockpit coaming, the dashboard, cabin brace, and the cabin front. Glue on the cabin top and the 1/8" x 1/4" coaming capstrips. The rear portion of the cockpit coaming is 1/4" balsa cut to the same curve as the transom but 1/8" lower than the side coaming so the finished radio cover is flush with the sides.

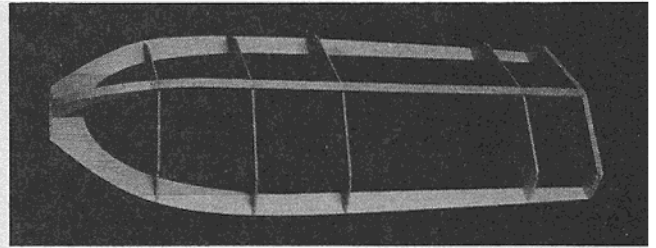
Glue 3/8" sq. pine or hardwood around the radio compartment. Glue 3/8" sq. balsa over the fore and aft hardwood pieces and sand to match the curve of the coaming. The hatch hold-down screws pass through the balsa into the hardwood. Turn the boat over and glue on the 3/16" x 1/2" bottom rear chine pieces. The forward portion of the chine edge is made by

gluing down four strips of 1/8" sq. to make the compound curve. The forward sides must now be built up with 1/8" balsa. Look at the cross section at bulkhead A. I Zapped on many strips of 1/8" sq. as can be seen in the photograph, but cross grain 1/8" balsa sheet could also be used and would probably be easier. Sand off the excess wood to fair into the sides and nose block. Shape the bottom of the chine strips after trimming the excess wood from the sides of the strips. Note, in the photograph, that one side of the boat bottom has been shaped and the other has not.

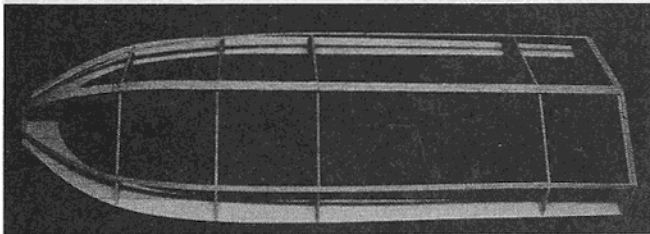
Sand all of the bottom edges rounded so that the heavy glass cloth can follow the wood. The edges can be sharpened later with a mixture of micro-balloons and resin. I glassed the entire bottom and sides with one piece of cloth and I was frantic trying to beat the setting resin. I still think that this is the best way to do it so be ready and don't mix a hot batch of resin. You will need four pieces of 1/8" sq. and a lot of pins. Lay the glass cloth over the bottom and sides and cut off most of the excess cloth. Quickly brush on a heavy coat of resin to saturate the cloth. Squeegee off the excess resin with a scrap of balsa sheet. You will now see the cloth begin to pull away from the wood around the chine edges. Pin a length of 1/8" sq. along the bottom chine edge to hold the cloth in tight. Now the cloth is pulling away on



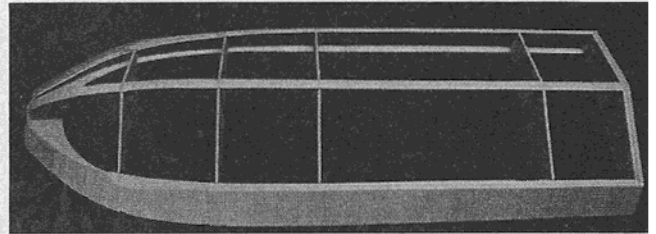
Cut out bulkheads, gunwale crutch pieces and keel. Glue bulkhead F to transom.



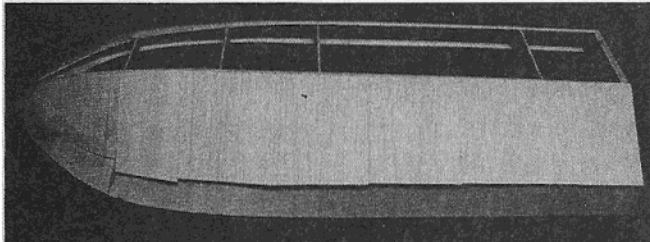
Glue the bulkheads to the crutch, over the plan and add the keel.



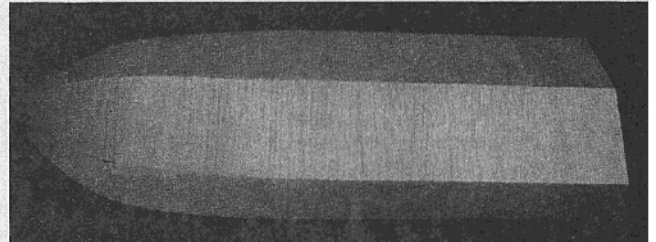
The 1/8" x 1/4" balsa chine strips must be split forward of bulkhead D to allow the wood to make the compound curve at the bow.



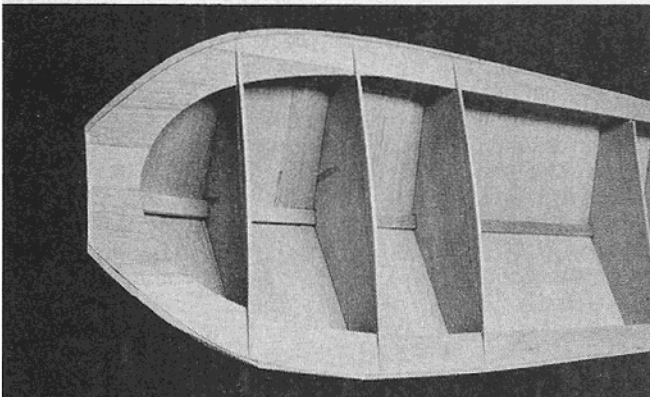
Glue on the 1/8" balsa side sheeting cross grained to the length of the boat. Notice that author sanded the sides so that the bottom sheet will run by the sides up to bulkhead B. Forward of bulkhead B the bottom sheet will butt to the side sheeting.



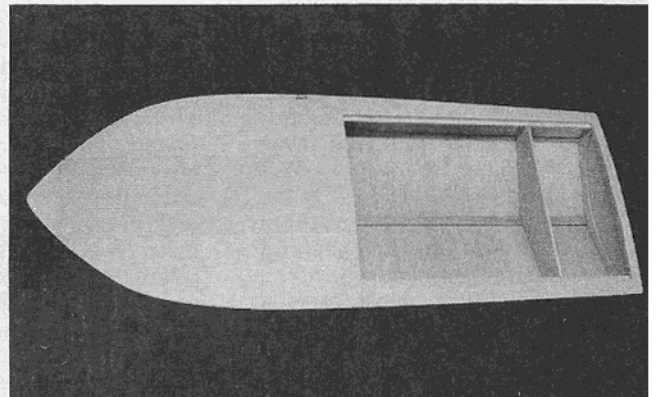
Glue on the bottom sheeting also cross grained. Align sheeting with center of keel.



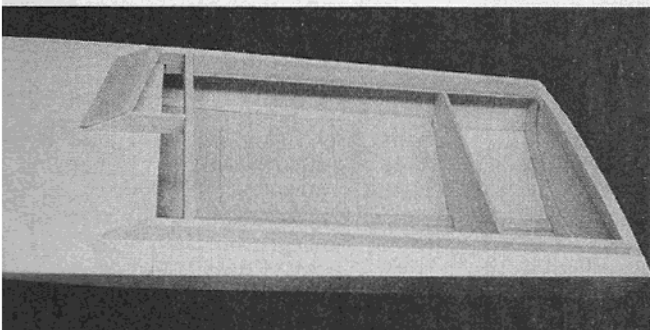
Butt joint sheeting at center of bottom. Trim and sand even with side sheeting.



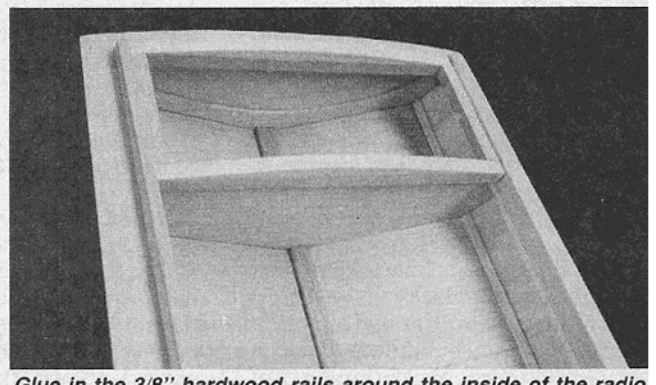
Glue on the top portions of the forward bulkheads and give the inside of the boat a coat of resin including the deck sheeting. Although not shown, install a tube through the forward bulkheads B, C, and D, to allow the addition or removal of ballast in the bow.



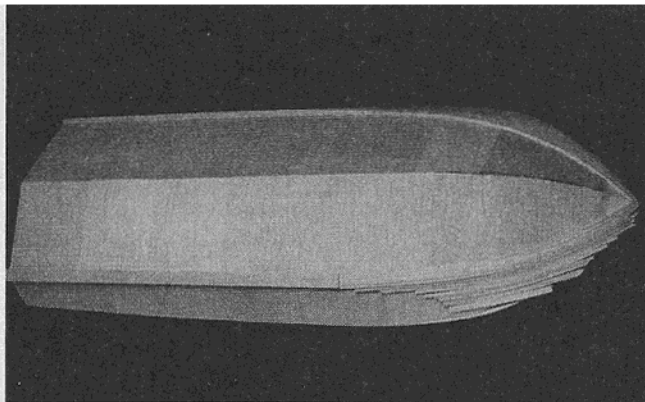
Glue on the top deck sheeting and nose block. Add the side deck 1/4" sheet and the 1/2" sq. across the transom top. Sand the sides and rear to match the curve of the deck.



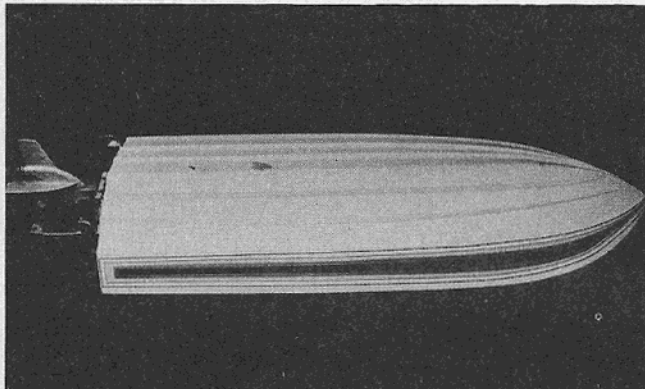
Glue in the side and rear 1/4" cockpit coaming and the dashboard. Add the cabin brace, cabin front and cabin top (not shown).



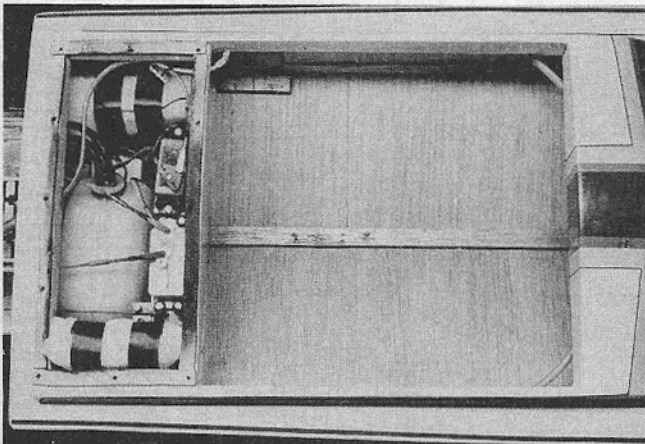
Glue in the 3/8" hardwood rails around the inside of the radio compartment for the hatch hold-down screws. Glue on 3/8" sq. balsa over the forward and rear hardwood and sand to match the curve of the deck.



Glue on the rear 3/16" x 1/2" chine strips and continue the chine edge forward of D with 1/8" sq. to make the compound curve. These strips go on very quickly with Zap. Continue the 1/8" sq. to build up the sides in this area but 1/8" sheet could also be used. Notice that the side facing the camera has not been sanded or shaped but the other side has been finished.



Bottom view showing strakes and turn fin position. Strakes are applied after glassing and then covered with lightweight glass cloth. Turn fin must be trimmed down so boat will turn flat.



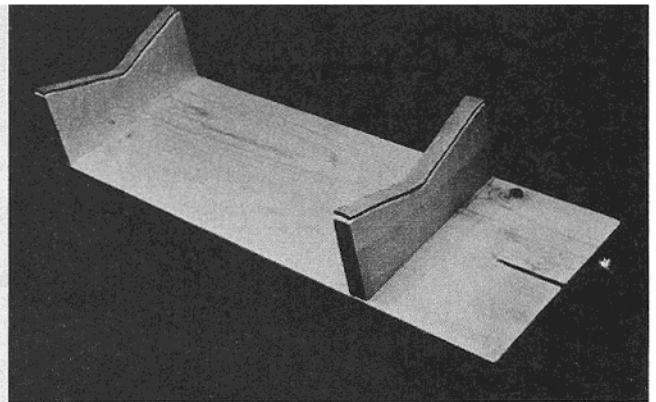
Balance the boat side to side until the boat sits level in the water. Prather stick on weights shown. The radio antenna is inside a piece of Nyrod held in place by tension under the coaming and dashboard.

the sides. Use the other two pieces of 1/8" sq. along the side edges of the chine.

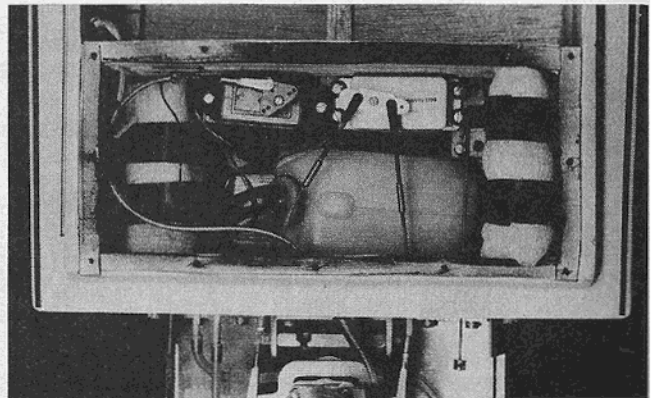
When the resin sets, remove the pins and scrape away the 1/8" sq. balsa strips. Feather the glass cloth back to the transom and round the transom edges. Cover the transom with glass

cloth and wrap the edges around the sides and bottom. Be sure to sharpen the transom edges after glassing as this is very important. Cover the deck and cabin with light glass cloth and resin. Give the entire boat, inside and out, another coat of resin. Glue on the 1/4" balsa triangle strakes and cover

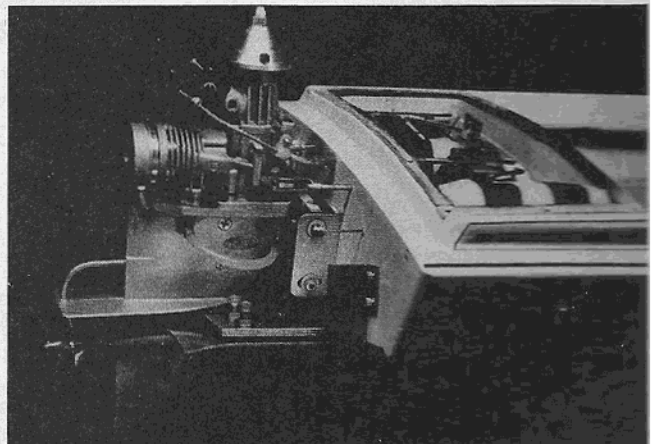
them with light glass cloth and resin. Give the boat two or three coats of primer and fill any pin holes or imperfections with auto body spot putty and wet sand with #400 wet or dry sandpaper. Paint the boat as desired. I used the scale, three color Schiada pattern.



Make a starting cradle out of 1 x 8 pine. The slot in the base is for the engine skeg. Cut notches for the strakes in the cradle (not shown) and apply foam tape to protect the bottom of the boat.



There is plenty of room in the radio compartment for any receiver or battery pack. A six ounce fuel tank is shown. The author used an Ace Atlas servo for steering anticipating more engine travel. Standard servos would work. Be sure to open up the radio hatch after running and make sure everything is dry and any moisture can escape.



Note the engine throttle linkage, radio switch pull, Prather adjustable outboard motor mount, trim plates and spin fins. Bending the corners of the trim plates down controls chine walking, a common problem of deep vee boats. Schiada model has a 16° bottom for legal NAMBA deep vee racing.

Installation:

Epoxy in the servo mounts and switch mount. Drill the holes for the control cables, switch pull, and fuel lines. Mount the Prather adjustable outboard motor mount and the Prather Deep Vee running hardware kit, consisting of trim plates and spin fins. These two items are really necessary to make the boat run right. Epoxy in the 1/8" balsa tank floor. Install the servos and the radio. The throttle linkage is the most difficult as the outer nylon tube must be able to slide through the firewall inside a larger brass tube. Otherwise, the engine could not turn without affecting the throttle. By bringing the throttle cable through the firewall at the angle shown, it minimizes the steering carburetor interaction. I used the Prather steering and throttle cable set. Hook up the push-pull steering cables as shown, but start with the clevises in the inside holes of the long servo arm. Apply 1/8" foam tape around the edges of the radio compartment and screw down the 1/16" plywood hatch.

Trim And Adjustments:

Find the balance point of the boat and mount the turn fin just behind this point on the keel with four #4 SM screws. The turn fin must be cut down as shown on the plan or the boat will just roll over on its back when you try to turn. Steering becomes very sensitive if the turn fin is too far forward. The boat should balance between 8"-10" ahead of the transom. The further aft balance point is best but if the boat blows over on its back at high speed, more nose weight may be needed. You must balance nose weight and trim plates to achieve level, smooth and slightly bow light running for optimum speed. Do not try to run either of the props that come with the engine as they will just cause you great frustration; believe me, I tried. I am running a JG Products E-20 prop. The Octura X-440 or X-442 are also good props, but I haven't tried them yet. File the leading edge of the prop sharp from the front leaving the back of the prop flat. Clean off any flashing, and then balance. A simple balancer can be made with two razor blades and a piece of 3/16" music wire. Run the E-20 prop at the depth shown to start. Gradually raise the engine 1/16" at a time until best speed is reached.

Initially set the trim plates in line with the boat bottom. Bend the rear outside corners of the trim plates down about 3/32" to control chine walking or hopping during straight running. These corners should be bent as little as possible as this also drives the nose of the boat down and affects running trim.

Set the engine needle valve open 4 1/2

turns for the first run. This setting should be a little rich. If the engine is real rich return to shore and turn the needle in at least 1/2 turn. ABC engines should not be run rich or cold when they are new. Turn the needle in about 1/4 turn with each run until the engine sounds right. If the engine is too lean, it will sag and quit at full throttle.

The slowest reliable engine speed on the water is still pretty fast. The throttle linkage should be adjusted so that at high trim and low throttle gives the reliable slow speed (about 1/4 open). Low trim should kill the engine.

Initially you may have to slow the engine during tight turns to keep the boat from spinning out. Back off the power going into the turn and add power coming out of the turn.

Spinning out is controlled by the turn fin, spin fins, and the engine thrust angle. If the turn fin is too small, the boat rolls into the turn; the engine skeg, now angled downward, lifts the back of the boat up and the boat spins. Adjust the turn fin for level running in the turns. The spin fins were installed exactly according to the Prather directions for his 31" deep vee and they worked, I have not moved them. The boat propeller also tends to lift the back of the boat but this can be countered with the engine thrust angle. By tilting the engine — lower unit away from the transom — the thrust pulls the stern down and holds the boat down on the water through the turns allowing the boat to turn tighter. Adjust the engine tilt to improve the turns, and adjust the trim plates to control the running attitude of the boat. If you are racing and only concerned about turning right, you can leave off the left turn fin. I am running with both fins. Raise the back of the trim plates if the bow rides too low and the boat appears to be glued to the water down the straights. The bow should appear light and you should be able to occasionally see the turn fin. If the bow comes up too high it may blow over and should be lowered by lowering the back of the trim plates. The trim plates should also be lowered if the boat porpoises or slaps the water at a regular beat.

Do not attempt to adjust the running engine out of the water as the engine will over-rev and damage itself. Similarly it does not do much good trying to hold the boat in the water and adjust the needle valve. Instead, set the needle valve as I mentioned earlier or according to the directions with the engine if they differ. To start the engine you need a good glow plug battery and a fast engine starter such as the Sullivan. We tried one of the small geared

starters and it just wouldn't start the engine reliably. The engine should be supported during starting by holding the engine by the plate under the cylinder. Do not get your hands anywhere near the propeller! You should build a cradle for your boat like the one shown in the photographs so there is support directly under the transom as fairly heavy downloads are placed on the engine during starting with an electric starter. Once the engine is started at low throttle, get the boat into the water as quickly as possible. To launch the boat, give it a good toss so that it is moving forward when it hits the water. As the boat hits the water, advance the throttle. With the boat in the water, and running, you can begin the trimming process. You will quickly realize that getting the engine to run right and getting the carburetor adjusted for reliable running is very important. If Murphy had been a boater he would have concluded that the engine always will quit when the boat is furthest from you.

To get your boat back you should have a retrieval boat of some sort available and one with a motor is preferable. Remember Murphy? Fortunately, as the model gets adjusted, you will need the boat less, but you will still need it. If you cannot find a boat to borrow or use, be sure you are downwind on the lake. You do not want the boat to drift to the opposite shore. Wind, though, is fickle. Maybe it will bring your boat back and maybe it won't. The wind can shift directions or die suddenly. A spinning rod and reel is very helpful in retrieving your boat if it is not too far from shore and you will get very good at casting the weight over the boat and snagging the engine on the retrieve.

I began this project with limited boat experience so I started the trimming procedure with a bare hull and engine only. Gradually I added the strakes, turn fin, ballast, new prop, trim plates and spin fins and learned how each affects the final boat trim. I don't recommend that you do it this way as I got a lot of practice rowing a boat. I got a lot of help from John Brodbeck, Sr. and Jack Garcia at K & B. Without their help I might still be rowing. Thank you gentlemen. Now that the little Schiada is running smoothly it is a real pleasure and a lot of fun. To double the fun, get a friend to build a boat with you or join other boaters. There is something special in seeing two or more boats running side by side with roostertails flying.

I would also like to thank Bert Hart, manager of Schiada Boats, for allowing me to measure and photograph the boats at the Gardena, California, plant. □