

SKI VEE 40

The Ski Vee 40 is a scale-like model of an outboard, deep vee ski boat and is designed for both sport and racing. Either the 7.5cc or the new 11cc outboard engines from K & B can be used. The performance of both of these engines on this boat is spectacular.

The planning of the Ski Vee 40 started a couple of years ago when I first saw the 7.5cc outboards run during a Southern California race. At the time, I was developing my Schiada SS 20 for the 3.5cc outboard engine from K & B (RCM May, '84). The 7.5cc boats were bigger and much faster and I had to have one. The 7.5cc boats are running at over forty miles per hour and are

spectacular. During a later conversation with John Brodbeck Sr., of K & B, I found out that K & B was developing an all new 11cc (.65 cu. in.) outboard engine using the same lower unit as the 7.5cc (.45 cu. in.) outboard engine. With this knowledge the Ski Vee 40 was born. I decided to build a boat that would handle both the 7.5cc and the 11cc outboard engines. I knew that 40" was a little larger for racing

with the 7.5cc engine, but that it would make a great sport boat and could be raced. A 40" boat would be easier to trim out and provide smoother running at the cost of only a couple of mph at top speed. The boat at 40" is perfect for the 11cc engine for either sport or racing. I would estimate the speed of the Ski Vee 40 with the 11cc engine to be over 50 mph on sport fuel and the stock prop. Even

at that speed, the boat is solid and hardly bobbles as it hits chop or other boat wakes. With the C.G. properly adjusted, the Ski Vee 40 will turn sharply, both right and left at full throttle.

For those who want to go faster, the boat is designed to be shortened by simply moving the transom forward. The plans show the hull can be trimmed to as short as 35" for the 7.5cc outboard for deep vee racing. Most of the current racing hulls are 36-40" long. If you choose to shorten the hull to less than 37", move bulkheads E and F forward to maintain room for the fuel tank. I have not run this boat shorter than 40". I would expect that, as the hull is shortened, the speed would go up a little but the hull would be more sensitive to trimming and handling adjustments. I would suggest that only more experienced boaters consider making the boat smaller.

I began running my Ski Vee 40 with the engine, spin fins, and trim plates as shown on the plan but without any bow ballast or turn fin. I concentrated on tuning the engine during the first few runs. The boat ran smoothly from the start. It would not turn sharply, but there was no chine walk or porpoising. However, as I adjusted the needle valve between runs and the rpm increased, vibration began to loosen the engine and the mounting bolts. On the fifth run, the engine quit unexpectedly, and when I retrieved the boat, I found the carburetor off but dangling on the linkage. After trying a couple of other methods, I finally epoxied the carburetor into the engine and have had no more trouble. I also Zap locked all of the engine bolts and mount bolts into the Prather adjustable motor mount to cure the other vibration problems. I also rebalanced the propeller. As the engine peaked, the speed increased and the boat began to spin out in the turns.

As a general rule, a boat should balance at about 33% of the hull length from the transom. Without any nose ballast, the Ski Vee 40 balanced further aft at about 20%. I poured enough BBs through the ballast tube to move the C.G. forward to 33% (which was almost a pound) and tried the boat again. The boat was now stable and would not spin out. I then mounted the turn fin as shown on the plan and like magic the boat could zig-zag sharply right and left without flipping or spinning out, even at full throttle. I adjusted the bow ballast to the lowest amount that would still provide stable running. The C.G. has proved to me to be the most important factor in boat stability and handling. Once the C.G. is established, you can

pour a little resin down the ballast tube to set the BBs so they don't rattle. I suggest that you resin or epoxy 8-10 ounces of lead into the bow during construction to reduce the amount of loose BBs that will need to be added. When I changed to the heavier 11cc engine, I had to add about two ounces more to the bow to stabilize the hull. Once the C.G. was adjusted with the 11cc engine, no other trim changes were needed. At fifty miles per hour, this boat is fun.

CONSTRUCTION

Like the Schiada SS 20 for the 3.5cc outboard that I built earlier, the Ski Vee 40 is built entirely of balsa, except for the 1/4" plywood transom, and is covered with fiberglass cloth and resin. This produces a light but strong boat that is easy to build and is not

SKI VEE 40

DESIGNED BY:

Fred Reese

TYPE OF AIRCRAFT

Outboard Deep Vee

LENGTH OF HULL

40 Inches

LENGTH OVERALL

48 Inches

WIDTH

12 3/8 Inches

ANGLE OF VEE @ TRANSOM

16 Degrees

DEPTH OF HULL @ TRANSOM

4 1/2 Inches

RADIO COMPARTMENT SIZE

(L) 11" X (W) 9" X (H) 4"

ENGINE

K & B 7.5cc

or 11cc Outboard

FUEL TANK

12 Ounce

REC. NO. OF CHANNELS

2

CONTROL FUNCTIONS

Rudder & Throttle

BASIC MATERIALS USED IN CONSTRUCTION

Balsa & Ply

Wt. Ready To Run 128 Oz.

very expensive. There has not been any major structural damage to my Ski Vee 40 in spite of several mishaps and crashes.

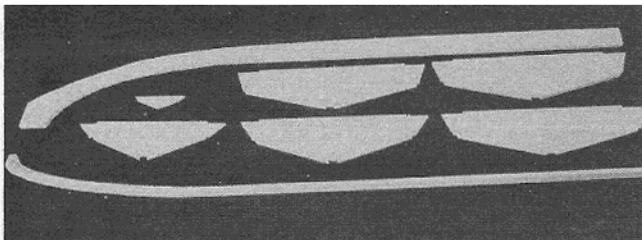
Cut out the lower portions of the bulkheads, the 1/4" plywood transom (motor mount), the keel and stern from 1/2" balsa and the 1/8" balsa crutch. Mark the bulkhead locations on the crutch and glue the bulkheads and transom to the crutch. The deck curves down slightly at the bow so place a 1/8" shim under the crutch at A during the initial construction. Glue the stem to the 1/4" x 1/2" keel and glue to the bulkheads and crutch. Glue the 1/8" x 1/4" inside chine strips to the bulkheads. Sheet the hull sides first. Use 3" or 4" wide, 1/8" balsa sheet and glue on piece by piece, starting at the transom, with the grain perpendicular

to the length of the hull. Trim off the excess sheeting with a razor saw. Mark the centerline of the keel with a ballpoint pen, then bevel sand the chine edge and the keel for the bottom sheet. I use a 3 1/2" x 10" sanding block with #50 grit sandpaper to make short work of this job. Glue on the bottom sheet piece by piece, fitting and beveling the sheet along the keel centerline. The bottom sheeting should be glued on with the frame on a true flat surface to avoid a twisted hull. Sand off the excess sheeting even with the sides.

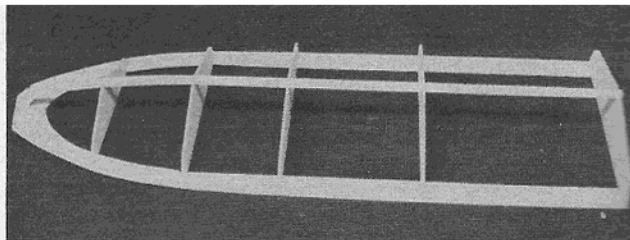
Turn the hull over and glue on the tops of bulkheads A, B, C, and D. Make a sheet of 1/8" balsa 12" x 18" with the grain lengthwise for the forward deck. Trim the deck sheet to 1/4" larger than the crutch down the sides. Before gluing on the deck, seal all of the wood inside the forward portion of the boat with resin or varnish, including the underside of the deck sheet. Install the 1/4" aluminum ballast tube between bulkheads B and D. The tube should end absolutely flush with the forward side of B so the ballast BBs can be easily removed. Epoxy or resin 8-10 oz. of lead evenly alongside each side of the stem and up against bulkhead A. This weight will get the boat close to the final balance but will still require some additional ballast in the form of BBs. There is no point in putting any more weight into the boat than is necessary. Glue on the forward deck using pins and masking tape to hold the deck down around the edges while the glue sets. Five minute epoxy is good for this job. Glue on the 1/4" balsa side deck strips and J, cut from a piece of 1/2" sq. balsa. Glue on the balsa nose block and finish shaping the nose and the deck.

Glue in the 1/4" balsa cockpit sides and the dashboard, H. Glue on the 1/8" balsa top. This is the raised portion of the deck forward of the cockpit. This top deck can be curved, straight or peaked as shown on the plan to give the deck its "character." Glue on the 1/8" x 1/4" cockpit side capstrips. For durability, use spruce or basswood for this job, if available. Add E-2 and I and the two Ks. Glue in the two 3/8" sq. pine or spruce strips along the sides of the hatch opening. Glue in the servo mount and the fuel tank mounts at this time.

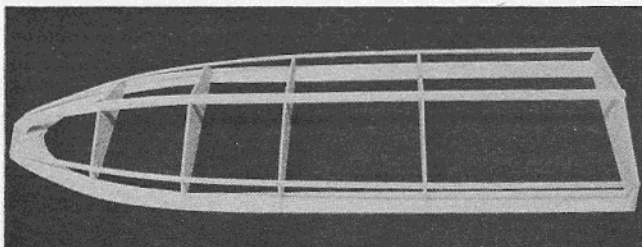
Turn the boat over and glue on the 1/8" x 3/8" outside chine strips and shape them to match the cross sections on the bulkhead views. After fine sanding, the boat is ready to be covered with glass cloth. Be sure to sand the bottom at the transom beveled to the transom and round at the transom edge so the glass cloth will easily wrap around the corner. The beveled bottom will allow the



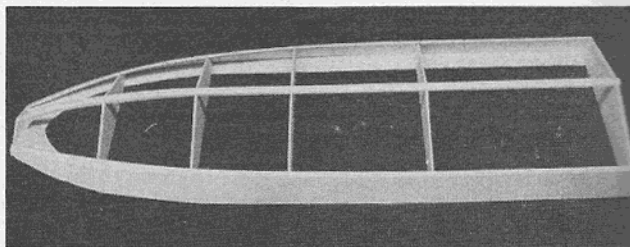
Cut out the bulkheads, transom, crutch and keel.



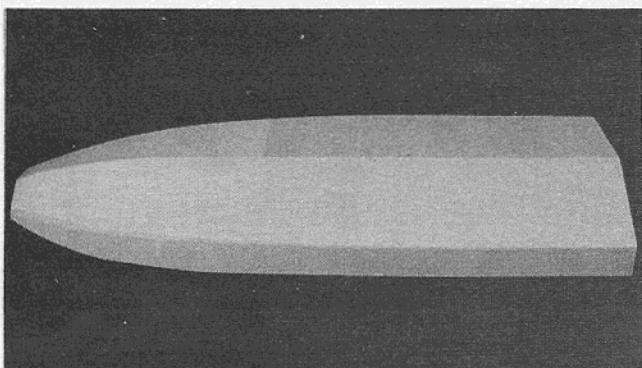
Glue the bulkheads to the crutch and glue the keel to the bulkheads.



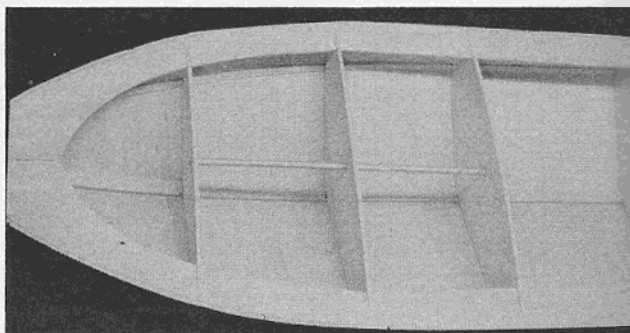
Glue on the 1/8" x 1/4" chine strips.



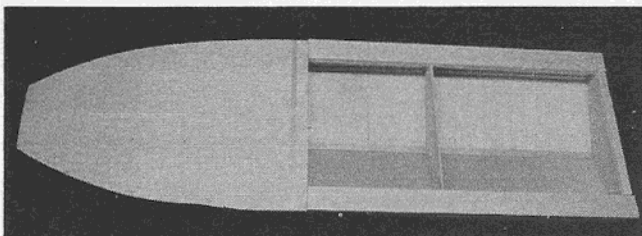
Glue on the 1/8" balsa side sheeting cross grained to the length of the boat.



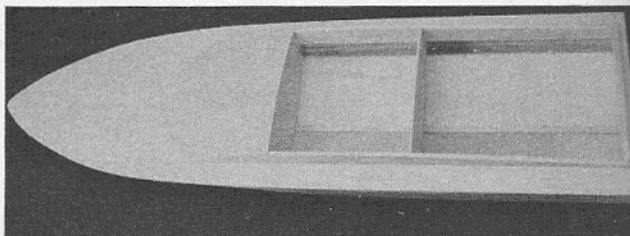
Bevel sand the keel and the chine edge. Glue on the bottom 1/8" sheet also cross grained. Sand the bottom even with the sides.



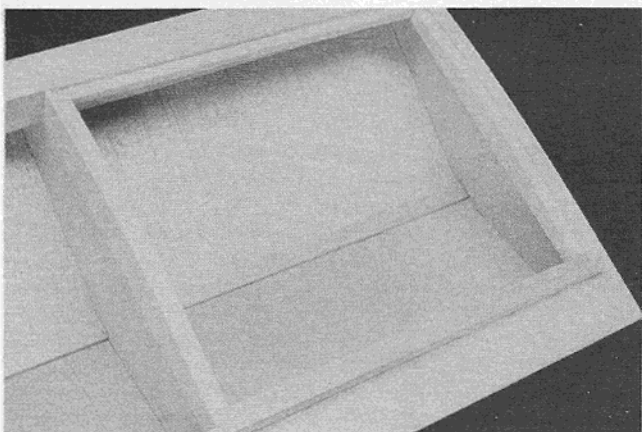
Glue on the top portions of bulkheads A through D. Install the aluminum ballast tube flush with B. Give the inside of the forward part of the boat a coat of resin or varnish including the underside of the deck sheet.



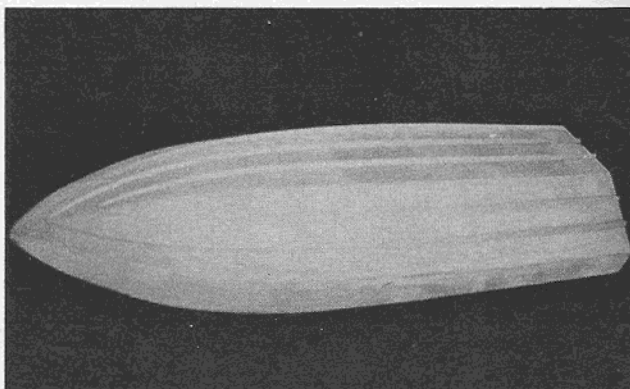
Glue on the forward deck and the 1/4" side deck and J. Sand and trim the deck edges.



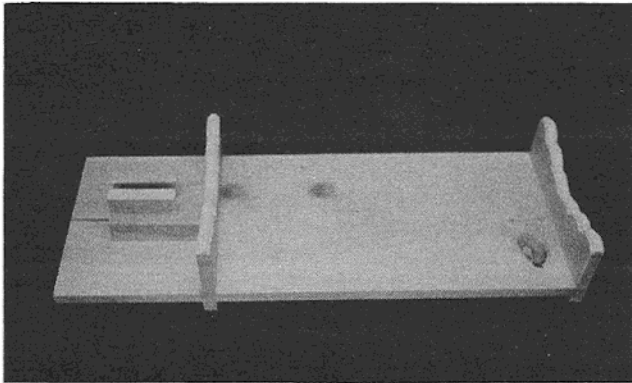
Glue in the cockpit sides, the dashboard H and the top deck sheet. Add the noseblock and carve to shape.



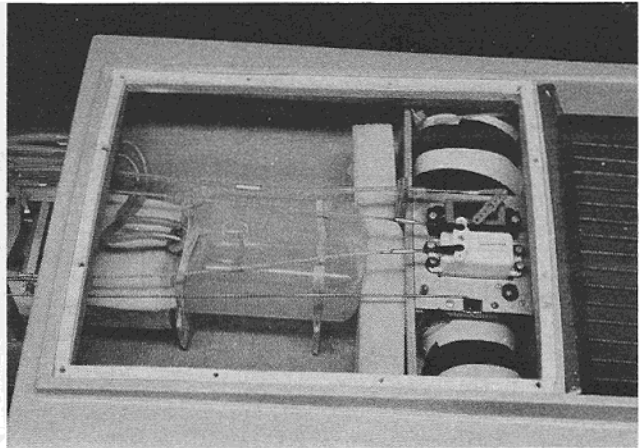
Glue in I and the two K bulkheads. Add the 3/8" pine side rails that complete the hatch opening. Although not shown, glue in bulkhead F and the servo and tank mounts.



Glue on the outside chine strips and sand to shape. Cover the bottom and sides with heavy glass cloth and resin. True up the bottom and add the 1/4" triangle strakes and cover them with medium weight glass cloth and resin. Sand and primer the hull for painting.



Build a boat cradle from 3/4" pine 1 x 12. Notch the supports for the strakes and glue on foam padding strips. Add support blocks to support the engine during starting. Finish the stand with varnish or urethane.



Install the radio and fuel tank as shown in the plan.

second layer of cloth, applied over the transom, to be wrapped over the bottom without producing a bump at the transom edge. Cover the bottom and sides with one piece of glass cloth and resin. It will be necessary to pin lengths of 1/8" sq. balsa along the edges of the chine to hold the cloth to the wood while the resin sets. The strips can easily be scraped and sanded away after the resin sets. Trim the excess cloth at the deck edge and feather the edges. Apply a layer of the heavy glass cloth over the transom and overlap the sides and bottom about 1" with this piece of cloth. Use scraps of the heavy cloth on the inside of the boat around the transom so that cloth extends forward at least 1" from the transom. Cover the deck and the cockpit sides with light glass cloth and resin. Overlap the deck cloth onto the sides and feather sand into the sides. Apply another coat of resin to the entire boat, inside and out. Wet sand the boat with #320, wet or dry paper. Fill any imperfections or pinholes with auto-body spot putty or a mixture of micro-balloons and resin. Use the resin and micro-balloons to build up

the bottom edge of the transom so that it is sharp and square.

Check the bottom with a straightedge. It must be absolutely straight and true from E aft. The slightest bump must be sanded away and the slightest dip must be filled. At speed, the boat rides only on the last few inches of the bottom so this is the most critical area and can greatly affect the boat trim.

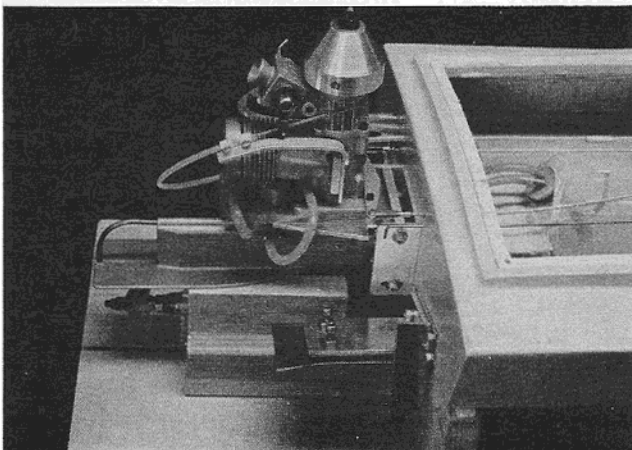
Glue on the 1/4" triangle strakes. I used two per side, but one is all that is required for racing. Some commercial boat kits use two per side while others use only one. If you use only one strake per side, center it between the strakes shown on the plan. Slightly round the edges of the strakes and cover them with a 1" wide strip of 2 oz. glass cloth and resin. Feather sand the edges of the cloth into the bottom and apply another coat of resin to the entire bottom and wet sand in preparation for paint. I highly recommend K & B Super Pox primer and paint to finish the boat.

Before any further construction, build a simple boat stand from 3/4" pine. A 30" length of 1 x 12 was used

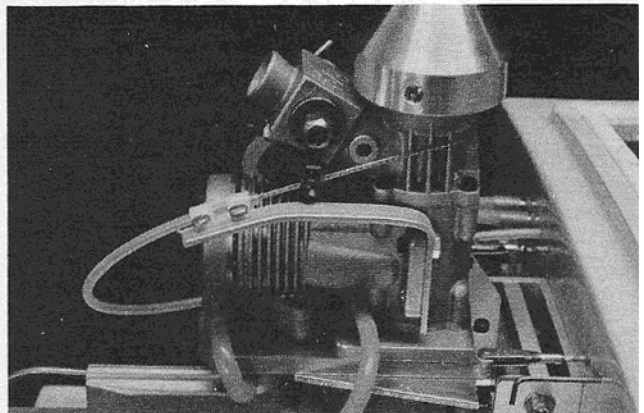
for the base of the stand. Cut notches in the supports for the strakes and apply strips of 1/8" foam over the supports to protect the finish of the bottom. After the engine is installed, cut blocks to fit under the bottom plate of the engine to support the engine when starting. Give the stand a couple of coats of varnish or urethane to seal the wood.

Install the radio, engine, fuel tank and Prather running hardware as shown on the plan. Use a heavy duty servo for steering such as the Ace R/C Atlas Servo, as very high loads are placed on this servo. A standard servo can be used for the throttle. Follow the directions for the Prather 40" deep vee when installing the Prather trim plates and spin fins. The bottom of the trim plates must be even with the bottom of the boat.

Fit the 3/32" plywood radio hatch cover and paint to match the boat. Use Rocket City 1/16" x 1/4" foam wing seating tape around the inside edges of the hatch opening to seal out moisture. Hold the hatch firmly in place and drill down through the hatch and 3/8" sq. mount strips in the



Install the engine on the Prather adjustable motor mount and add the Prather Outboard Running Hardware set. This includes the trim plates and anti-spin fins.



Close up picture of the throttle linkage, steering cable connectors, 1/16" wire switch pull, and fuel and pressure lines. It is also very important that you use engine turn limiters such as the Prather Servo Savers #8140 to prevent damage to the steering servo when the boat spins out. A spin out at over 40 mph, without the Servo Savers, ripped the servo mount out of the boat and the servo out of the mount!

boat for the 4-40 hold-down bolts and blind nuts. Glue #4 washers on the top of the deck over the holes to protect the wood from the screws.

I did not use any special seals for the cables passing through the transom as the clearances to the engine are close. Instead I just used 1/4" lengths of the nylon tubing provided with the cable to act as bearings in the transom and then apply Vaseline to the cable. The only time water gets into the hatch is when the boat sits upside down in the water for a long time. If this happens, pick the boat out of the water with the bow high and remove the hatch and any water that has entered. If any part of the radio is wet, open up the case and allow to dry quickly in the sun. I do not recommend running in salt water. Always open the hatch as soon as you are through running so that no water is trapped inside to cause corrosion. If you wrap the receiver and battery pack in a baggie during running, remove the baggies or open them up when you are through running. Any trapped moisture can cause damage to your radio so it is important to get everything opened up to free air circulation as soon as possible after a day at the lake. I used an eraser, cut from a pencil, to plug the ballast tube.

It's time to go play in the water. You need a lake or pond at least a hundred yards in diameter and that is very small as the boat can cover that distance in the blink of an eye it seems. You need a rowboat or raft or canoe to retrieve the boat when it quits out in the middle of the lake. Murphy's Law concerning model boats holds true that the boat will always quit when it is furthest from you. Sometimes on rare occasions, the engine quits when the boat is near to shore and then it is handy to have a spinning rod with a tennis ball for casting weight to snag the boat and drag it in.

You need a good electric starter such as the Sullivan 12 volt starter to spin the engine. Set the needle valve for the first run according to the directions that come with the engine. The K & B outboard engines are of the ABC type piston and sleeve and should not be run rich to break them in. Instead they should be run at near peak during the break-in period. You cannot adjust the needle valve with the engine running out of the water nor can you adjust the needle valve while holding the boat in the water. It just doesn't work. You have to set the needle valve, run the boat and bring it back for adjusting. Set the engine to idle (run the boat as slow as possible) at high throttle trim and have the engine quit at low throttle trim. You need to be able to kill the engine on command. Turn the needle in about

1/4 turn with each run until the engine sounds right. If the engine is adjusted too lean at peak rpm, it will sag and quit at full throttle in the water.

The propellers that come with both the 7.5cc engine and the 11cc engine are good props and will give good performance. They are made of plastic though and will break easily. I suggest that you buy a copper beryllium prop from Octura or JG. I have been running the Octura X447 prop on the 7.5cc engine and the Octura X455 prop on the 11cc engine.

Balance the boat side to side with Prather stick-on weights in the cockpit. A boat will turn towards the heavy side. Be sure you bend down the corners of the trim tabs evenly to control the chine walk that usually goes with deep vee hulls. Don't bend them down any more than needed. Start with about 3/32". If the boat slaps the water at high speed (porpoising), turn the screws down on the trim plates to bend them down. This pushes the bow down. The bow should be a little light for fastest running. You should be able to see the turn fin occasionally in straight away running, but the bow should not slap. Engine or propeller thrust should be close to 0°. You may need to tilt the engine back slightly to help hold the back of the boat down in the turns. Spinning out can be controlled by the C.G. as I have talked about before; I use anti-spin fins on the transom and the engine thrust angle. I used the spin fins that are included with the Prather Outboard Running Hardware Set #1051 at their maximum depth. Inboard boats with the engine and other components located in the middle of the hull, often do not require

any additional nose weight to be stable in the turns. If you already have a boat that continues to spin out, regardless of engine thrust and spin fins, try adding some weight to the bow. If the balance is already near or at 33% of the hull length, it may only require another ounce or two to stabilize the boat and tighten up the turns. The boat will turn sharper if it does not heel over in the turns. The natural tendency of any vee bottom boat is to lean or roll into the turn. When the boat leans with the rudder turned, the rudder acts like an elevator and lifts the stern of the boat and lifts more of the propeller out of the water and can cause the boat to spin out. Since the boat is also skidding in the turn, the turn fin places a force on the boat opposite to the roll force and straightens the boat up. The turn fin must be adjusted in size to work best at top speed. If the fin is too large, the boat just rolls over on its back with a very large splash. If the fin is too small, there is excess skid and inward roll and the boat is not turning as sharply as is possible.

I hope this trimming information helps you when running this boat. I also hope it will help other boaters if they are having trouble trimming out another boat. I especially hope it will help anyone who built my Schiada SS 20 for the 3.5cc outboard as I did not fully understand the importance of C.G. in the trimming instructions with that article.

Build your boat and get a friend to build one with you. Try to join up with other boaters somehow, as one boat is fun, but two or more running side by side with roostertails flying is a little more than just fun.

□