



The "Dunlap 3.5 Vee" between test runs, above, and at right, being held by the designer's eleven year old daughter, Denise. Decking made to appear like offshore racing styles.



# DUNLAP 3.5 VEE

Build this all-plywood constructed offshore racer style boat for next season's contest schedule.

## R/C POWER BOATS

By JERRY DUNLAP

### ● THE "DUNLAP 3.5 VEE"

The 3.5 cc or .21 cu. in. class engine has always been my favorite engine size. They are less expensive to run, repair, and seem to cause me less problems than larger size engines. For the last few years, the efforts of the Dunlap Racing Team have focused pretty much on 3.5 powered boats. My

twelve year old son, Paul, has been a very strong competitor in the 3.5 deep vee class running his Ward Marine Deep Vee 21. However, Paul has been racing the boat for four seasons and it is definitely showing the effects of competition.

Knowing that Paul would soon need something to replace his fiberglass deep

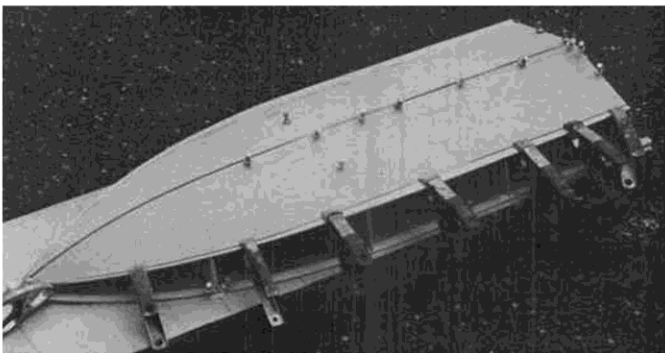
vee, I decided to build a wooden version. If some of you detect a resemblance between the "Dunlap 3.5 Vee" and some of Frank Ward's model boats you are perceptive. I happen to like the deck style used on the Ward Marine models. The hull itself is a conventional deep vee configuration. There is absolutely nothing "trick" about this boat. It wasn't my intention to design something new or different. I call it the "Dunlap 3.5 Vee" because I've never used my last name on any of my previous designs. And at the time I needed a name, I couldn't come up with a catchy or cute handle. I suppose I could have called it the "No Name 3.5 Vee" but that certainly isn't very ego gratifying.

For the model boater who has built wooden kits, the construction of the "Dunlap 3.5 Vee" should look very familiar. The technique is similar to that used when building Dumas boat kits. It is a fairly simplistic building method.

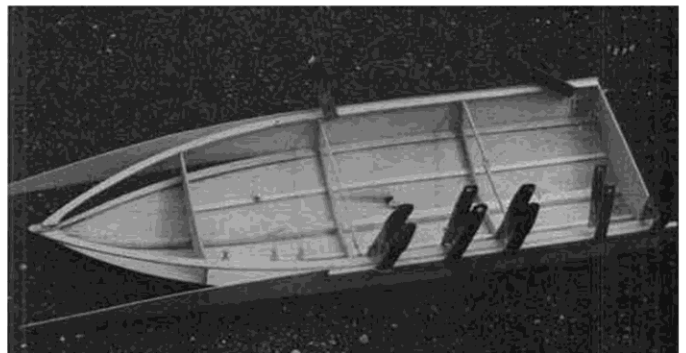
I have attempted to keep the sizes of wood needed for building the boat fairly



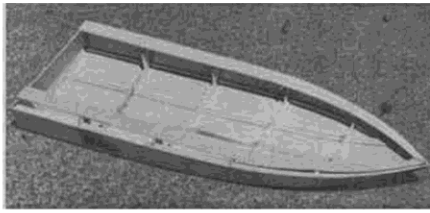
Hull framework is built on FLAT building surface. Hot Stuff Super T and Hot Shot Accelerator were used to speed up the building process.



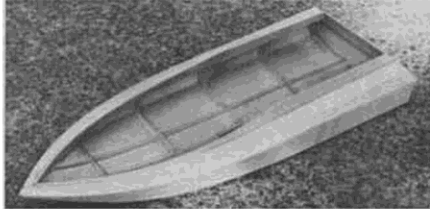
Clamps and aluminum map tacks hold bottom sheeting to the hull framework.



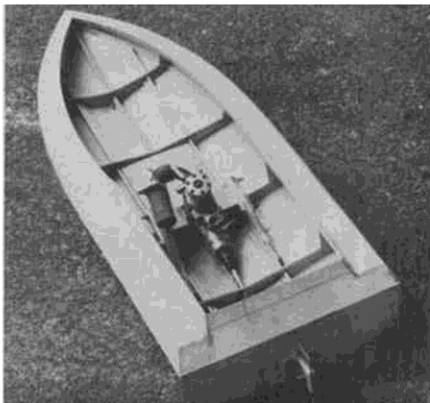
Clamps and tacks can be used to hold side sheeting against framework. With instant glue, clamps are hardly necessary.



Top Deck Sheer is part of the deck framework.



Cowl Side is glued to Top Deck Sheer and deck siding is attached.



K&B 3.5 Marine mounted on Marine Specialties 21 mount. Norco coupler to flex cable.



Top deck framework and hatch framework ready for sheeting.

simple. Basically, only two sizes of plywood are used. 1/8 for frames and 1/16 for sheeting. A small amount of 1/4 plywood is used for the motor mount bearers. The stringer material is either 1/4 x 1/4 or 1/8 x 1/4. The use of aircraft grade plywood is highly recommended. It costs a little more, but is worth it.

There are two methods of using the plans to make the different parts. If you think you'd like to save the patterns, use a spray adhesive like Scotch Spray Mount to affix the plans to tag board paper. Tag board can be cut with scissors, yet is sufficiently stiff to be used as a pattern. Or the plans can be attached to the plywood using the spray adhesive and then the pattern can be peeled off after the part is cut.

#### BUILDING THE HULL FRAMEWORK

The hull framework for the "Dunlap 3.5 Vee" is assembled on a flat building surface. A building surface 36 x 12 of half-inch plywood would work well. Use spray

adhesive to tack the top view of the plans to the building board. Spray the adhesive to the plans and lay a piece of wax paper over the plans. The top sheer pieces can be pinned to the plans using aluminum map tacks. The cross frames are positioned on the plans and tacked to the top sheer pieces with an instant glue. Use a right angle to ensure the cross frames are perpendicular to the top sheers.

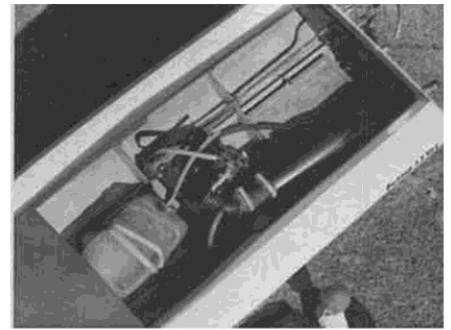
The two-part keel is now fitted into the cross frames. A keel collar is used on Frame 3 where the Front Keel butts up to that frame. The back half of the keel consists of two pieces of 1/4 x 1/4 stringer material. Following the attachment of the keel, the 1/4 x 1/4 bottom stringers are glued to the cross frames. The hull framework is completed by gluing the 1/8 x 1/4 stringers used for the bottom chine.

The hull framework should be block sanded to bevel the keel and bottom chine stringers to accept the bottom sheeting of 1/16 plywood. Check the bevel by placing a flat edge from the keel to the bottom chine stringer. The construction of the framework is probably the most important aspect of the entire building process. Attention to details during this construction phase will help assure a hull without twists. A hull that is straight or true will perform better.

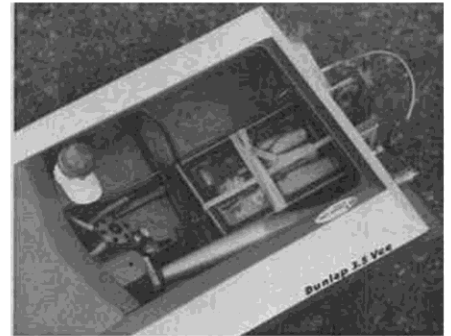
#### SHEETING THE HULL FRAMEWORK

The bottom sheeting is attached to the hull framework while it is still pinned on the building surface. If the framework has been properly prepared, the bottom sheeting should lay flat on the framework. Map tacks and clamps are useful in keeping the sheeting in position on the framework. As I did with the framework construction, I used Hot Stuff Super T to glue all the sheeting to the framework.

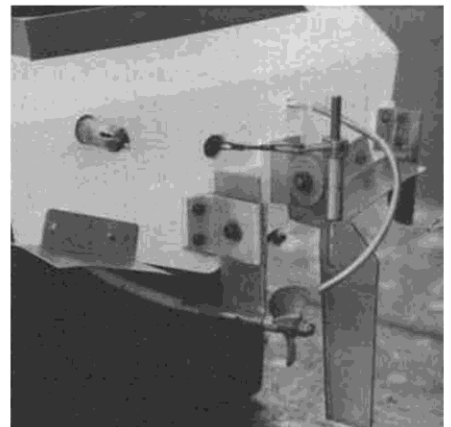
After the bottom sheeting has been attached to the framework, remove the framework from the building surface and trim the bottom sheeting along the bottom chine stringer. Block sand the top and bottom chine stringers to accept the 1/16 side sheeting. Using instant glue, it is possible to attach the side sheeting to the hull framework without using any clamps. Begin by gluing the sheeting to the framework between Frames 1 and 3. Place gap-filling instant glue on the remainder of the framework and spray the sheeting with an accelerator like Hot Shot. Roll the side piece onto the framework and hold with your hands until the instant glue fires off. With the use of an accelerator, that will be very quick. When using instant glues, it is most important that the pieces be positioned correctly. There are instant



Sullivan 12-oz. tank and Prather tuned pipe. Note brass tubing water pickup.



G&M Models radio box strapped in place. Water pickup tube just behind prop.



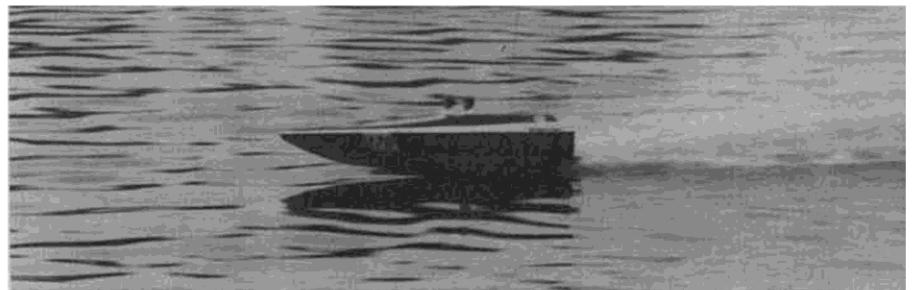
Author's boating friend, Ron Erickson made running hardware. Prop is J.G. Products G-25. Prather Non-Spin Transom Fin.

glue removers, but it is easier to make sure you get it right the first time.

With the sides on the framework, it is time to trim that sheeting even with the bottom and top sheer lines. The sheeted hull framework is now ready for the deck framework.

#### BUILDING THE DECK FRAMEWORK

Before going into the construction of the  
*Continued on page 93*



Yes, it do go! Still being tuned for best performance, but showing lots of promise.

deck framework, I'm going to mention a possible deck modification that might interest some builders. A simple flat deck could be applied to the top chine. The result would be a deep vee hull with a runabout or day cruiser type deck. I won't go into how to build a flat deck on this hull. However, if you know a little about model boat building you can come up with a simple deck framework that will provide a flat deck.

The deck framework for the "Dunlap 3.5 Vee" was designed to provide the hull with an offshore type of appearance. It does take more time to build and probably adds some additional weight to the boat. However, I rather like the way an offshore boat appears as it moves across the water. The deck framework begins with gluing Deck Frame 1 on top of Frame 1. It will be necessary to bevel the bottom edge of Deck Frame 1 to allow it to slant as shown on the plans. Reinforce this butt joint with a 1-inch wide strip of fiberglass cloth and a thin instant glue like regular Hot Stuff. If you haven't tried this method for attaching fiberglass reinforcement strips you're missing the boat. It's quick and just as strong as if you'd used fiberglass resin.

The Top Deck Sheer piece is attached to Deck Frame 1 and the bow. Note that there is a 1/8 spacer at the bow to space the Top Deck Sheer off the Top Sheer. Deck Frame pieces 2-5 are attached to their corresponding cross frames to provide support for the Top Deck Sheer. The Top Deck Sheer should be straight from the transom to the bow. Trim the deck frames to provide for this straight line.

The Cowling Side pieces are glued to the Top Sheer pieces. The Cowl Side pieces are slanted slightly. Bevel the inside edge of the Top Sheer pieces to insure a gapless butt joint between these two parts. Deck Frames 4A and 5A are glued against the Cowl Side pieces. The Center Deck Stringer is attached to the front of the Top Sheer and to Deck Frames 4A and 5A.

To insure a strong gluing surface for the Deck Side pieces, it is necessary to attach a 1/8 plywood gluing strip on top of the Top Deck Chine. The Top Deck Chine can be used as a pattern for this glue strip. The strips should be beveled to the same angle as the deck frames. The Top Deck Sheer pieces should be beveled to this same angle to accept the Deck Side pieces of 1/16 plywood.

#### **SHEETING THE DECK**

Before sheeting the deck framework, seal the interior of the hull. I use the following method to both seal the wood and increase hull strength. Using Hobby Poxxy Formula II glue and a heat gun, brush the glue on the interior sections of the hull and then give it a shot with the heat gun. The heat causes the glue to become thin enough to be easily brushed around the inside of the hull. The epoxy both seals the wood and creates better glue joints. It is a good idea to seal all the deck framework pieces with either epoxy glue or epoxy paint prior to gluing together the framework and doing the sheeting.

The Deck Side pieces can be attached to the deck framework in similar fashion as the side sheeting was glued to the hull framework. The two pieces of the Top Deck are glued to the top deck framework. All deck sheeting can then be trimmed to proper shape. Using instant glue and fiberglass cloth strips, reinforce the inside of the joint where the Cowling Sides form a butt joint with Deck Frame 1.

#### **BUILDING THE DECK HATCH**

I built my hull with a removable front hatch to provide easy access to the fuel tank. The hatch framework consists of a front frame, two side frames, a back piece and a center stringer. The hatch framework should be constructed and then fitted into place and sanded to match the deck framework. Before gluing the sheeting on the hatch framework, drill the holes for the 1/8 dowel used for seating the hatch to Deck Frame 4A. To keep the hatch down on the deck framework, install a small cup hook near the back of the center stringer. A rubber band used to keep the fuel tank in place can be stretched up to the cup hook.

The sheeting for the hatch framework will extend beyond the framework to the outside edge of the Cowling Side. The 1/8 dowel pieces keep the front of the hatch in place and the overlap of the hatch sheeting allows the hatch to stay in position when rubber bands are connected to the cup hook.

#### **INSTALLING THE FUEL TANK AND RADIO BOX**

Mounting plates for the fuel tank and radio box in my boat are 1/8 plywood cut to fit inside the bottom stringers. Some 1/4 x 1/4 stringer material was used to make an edge to keep my G&M Models radio box in position on the radio box mounting plate. Small cup hooks are used on the sides of the mounting plate to attach rubber bands to hold the radio box in the boat. These cup hooks are used on either side of the fuel tank as fasteners for rubber bands that keep the fuel tank in place. A 10 or 12 ounce fuel tank is recommended for a 3.5 size engine. Be sure to seal the underneath side of the fuel tank and radio box mounting plates before attaching them between the stringers.

#### **INSTALLING THE ENGINE AND DRIVE LINE**

Mounting the engine in the "Dunlap 3.5 Vee" can be accomplished through the use of either a Marine Specialties or Octura Models motor mount. Both of these mounts use a vertical motor mount stringer to bolt the mount to the hull. A pattern for this motor mount stringer is shown on the plans. Mount the engine as close to the bottom of the boat as possible. The angle used to mount the engine in the boat is determined by the angle of the flex shaft where it enters the hull. A brass tube is used for a flex shaft guide where the flex shaft enters the boat. Make the hole for the brass guide tube slightly oversize, to allow for some adjustment in alignment of the flex shaft and coupler on the engine.

There are a number of flex shaft and outdrive units that will work on this boat. Dumas Boats, Prather Products, Steve Muck R/C Boat Supplies, Marine Specialties, and Octura Models all have drive systems for 3.5 hulls. Directions for mounting these various drive systems are included with the units.

#### **FINISHING AND PAINTING THE "DUNLAP 3.5 VEE"**

Before painting, fill all pin holes and seams. Automobile body putty works very well for filling in gaps. Once the boat has been puttied up and sanded it is ready for painting. Different model boaters have different methods of finishing their handiwork. I'll describe the method I use. It works well for me.

After sanding, the boat is wiped clean with a tack rag and a coating of K&B Super Poxxy Clear, thinned 25% is brushed over the entire exterior of the hull. After drying, this coat is sanded, wiped clean, and a coat of K&B Super Poxxy Primer is sprayed on the boat. This primer coat will reveal areas that need additional filling. Automotive spot and glazing putty does an excellent job of covering up these small blemishes.

The boat is sanded again and another coat of primer applied. This second primer coat is sanded lightly and the boat is ready for final color coats. A three-color paint scheme was used on the original boat. The entire boat was painted white first. The other color sections were then masked off and the darker colors sprayed over the base white.

Regardless of what method is used to finish the boat, your final finish will only be as good as the preparation that went into the sanding and priming. A good paint job requires good preparation. Stick-on numbers, decals, and striping tape can be used to add detail to the finished boat.

#### **RUNNING THE "DUNLAP 3.5 VEE"**

The following items will make this boat run better. Full length ride plates 1-1/2 inches in width will assist in trimming the hull. Transom mounted fins like those available from Prather Products help improve the boat's cornering characteristics. An adjustable strut will allow the riding characteristics of the boat to be changed through adjustment of the prop depth and prop angle.

Prop selection is always something that interests model boaters. The following props have been used on the original boat with good success; from Octura Models the X-442 and X-445, from J.C. Products, the F-25, G-20, and G25 props. Different props work best at different strut locations. As a starting point, I would suggest setting the strut so the centerline of the propshaft is 3/4 inch below the boat at the transom.

To achieve the maximum performance from any boat, it will be necessary to do extensive experimenting with props, strut depths, and strut angles. Using these variables, it is possible to set the "Dunlap 3.5 Vee" to run from mild to wild. Running the boat very free will provide greater straightaway speed but sacrifice handling in the corners. Like most things, optimum performance is a matter of compromises.

In setting up my boat, I've attempted to achieve a ratio that will allow the boat to be cornered at full throttle both to the right and to the left. In order to achieve this type of ride characteristic, I have set the boat down on the water. I've sacrificed some top end speed to gain better handling through the turns. It has been my experience with deep vee hulls that more problems occur while cornering than running down the straightaways.

The boat has been entered in three races thus far. It would be a great feeling to tell you that my boat just blew away the competition. Well, that just didn't happen. The boat ran well and for a new boat I was pleased with its performance. But it is not any better than other boats in its class. The success of this boat will depend on continued fine tuning. But that is basically true of any boat.

The "Dunlap 3.5 Vee" would make a good building project this winter. By the time the weather improves, you could have a new 3.5 deep vee design ready for racing or fun running.

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