

## H<sup>2</sup>O Pylon

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of lead ballast, and has a gross weight of from 24 to 27 pounds. The hull and bulb fin keel are molded fiberglass.

Let's look at the hull in a different light. We'll call it a "platform" for the sail. To get the most efficiency out of a sail, it must be supported by a hull-fin-ballast-rudder set up that will offer a minimum of pitch and roll, and have the ability to be controlled on a true course to the wind. Excessive pitching will shake the wind out of the sails and kill their driving power. Roll is taken care of by the ballast, fin, draft, and the length and beam of the hull. If too large a beam measurement is used in an effort to decrease the amount of ballast or roll, the boat will develop a pitching action in choppy water. Another problem in an extremely wide boat, especially a light displacement type, is that when it heels over to an extreme angle in a gust, the rudder will lift out of the water. When this happens, the boat will round up into the wind and luff, losing all headway.

A high aspect ratio sailing rig with a conservative amount of area has been used. The high AR is more efficient for a given amount of area. It also places sail area high enough off the water to catch light winds, which usually don't blow close to the surface. Actually, the most important feature of high AR is its ease of control in rough weather.

Another positive control feature is the rudder-skeg set up coupled with a long tail moment. (Boats too, huh? Ed.) The Yacht will "groove in" when sailing to the windward and will hold a course with only slight rudder correction now and then for wind direction changes. The skeg helps to restrain the stern and prevents skidding around when the yacht is hit by a strong gust.

In order to have an R/C yacht that has good performance and positive control on all points of sailing, it is best to steer clear of scale designs. Just accept the fact that these are models and "scale effect" has as much influence on model yachts as on model airplanes. A scale model usually has a displacement type hull with maximum speed limited by the waterline length. Drag is set up if the hull cannot plane. High drag, coupled with sudden increases in off-centered thrust, creates a major control problem.

There is bound to be controversy on this point. Scale type yachts have been raced for many years in a "free flight"

("free float?" Ed.) manner. Vanes are used in this type of racing. The vane steers the yacht on a straight course to the wind that is determined before the yacht is launched. The boats are manually tacked when they reach the edge of the pond.

Standard control system for the R/C racing sailboats is based on 4 or 5 channels; two for hauling in or letting out sail, two for trimmable rudder, and if desired, a fifth for neutralizing rudder. (A fifth can also be used for neutralizing some of the skippers! R/C Ed.)

A surplus drone servo (C&H Sales Co., 2174 East Colorado St., Pasadena 8, Calif.) is available for \$4.00 that will handle both the sail and the rudder. Amplifiers have been developed to use this servo with relayless equipment (see end of article). The popular 6" by 2" by 1/2" wet-cell nickel cadmiums (also available from C&H) are the most frequently used power supply for the servos.

Individual rudder and sail servos may be constructed as illustrated. These have been used with a great deal of success. Use a powerful 6 to 12 volt motor for the sail winch. Pitman Panther or G.M. Decaperm, for example. The winch must be capable of lifting at least 10 pounds before it stalls and must be able to pull in 12 inches of line in 6 to 8 seconds. (Unloaded)

The gear ratio of the winch will come out somewhere around 200 to 1. The diameter of the drum can be varied to reach the correct power and speed. The drum can best be made out of wood, and in fact, does not have to be perfectly round. They usually turn out to be about one inch in diameter and should turn between 40 to 80 R.P.M. A single line from the winch, through a pulley on the boom and secured to the centerline of the deck, will give an additional 2 to 1 gear reduction so to speak, but will require 24 inch line travel.

The rudder servo does not have to be as powerful as the sail winch. The traveler should move about an inch per second on the servo illustrated. A neutral is not absolutely necessary, but serves as a handy reference point once in a while. A Bonner trim servo may be used, however experience has shown it to be a little too fast from stop to stop, and short on power in strong winds.

R/C sailboat races are run in much the same manner as for full size yachts. During regattas, or official contests, the yachts are raced in pairs. Basically only six of the eighty or so race rules for big yachts are used, and these are loosely in-

terpreted. Points are deducted for infractions rather than disqualifying. Cutting a marker buoy requires circling back as in pylon racing.

Races are run off in this manner; there is a 60-second warning signal before the start. This signal is usually sounded as the last yacht is launched. This warning allows the skippers to jockey their yachts for the most advantageous start. A yacht must not cross the start-finish line until the starting signal is sounded. From then on, it's every skipper for himself.

Race courses are either triangular or two-leg, with each leg varying in length from 100 to 300 feet, depending on the space available.

Well there it is. The next time the wind is blowing too hard to fly, don't fret Fred. Get out of that muddle and head for the biggest puddle. Before you know it, you will be complaining when there isn't enough wind.

The Santa Barbara One Design may be purchased in various kit stages, ranging from the molded fiberglass hull with wood sheer strips and mahogany transom installed, plus the F.G. keel with keel bolts installed for a total of \$32.50, on up to a complete kit with hull, keel, rudder assembly, deck beams, deck, hatch material, semi-shaped mast blank, booms, finished sails, and all fittings for \$65.50. Many items included—too numerous to mention here. Any item may be purchased separately. Shipping cost of complete kit to New York \$9.50, Chicago \$8.25.

Drone servo, complete with amplifiers (enclosed in aluminum cover) and ready for a nine pin connector, is available for \$49.95. Average drain 400ma., 700ma. stalled. Total weight with electronics about two pounds. For complete details of items available and breakdown price list, write to T. D. Protheroe, 476 Paseo Del Descanso, Santa Barbara, Calif.

## Two-Tube

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fitted over and glued to the leading edge, wing center section by cutting two slits in the tube so it can be fitted over and glued to the leading edge.

Tail. Cut slots in the tail end of the tube so the 1/16 sheet balsa stabilizer and rudders can be inserted. Press the top and bottom ends of the tube together over the stabilizer and cut off excess parts of the tube so a smooth contour is accomplished. Any holes left by excess cutting can be covered with tissue later. Glue the stabili-

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