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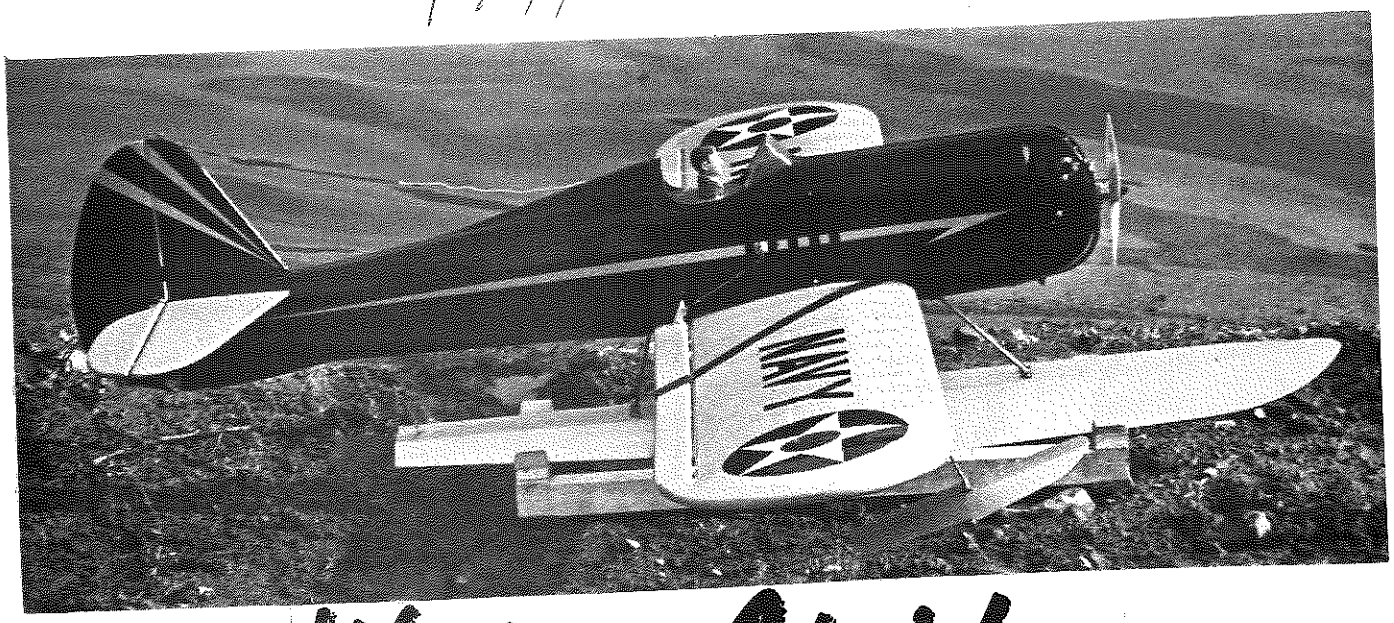

Water Strider

by BOB VON KONSKY

● Looking back, I can't exactly remember what made me decide to try flying seaplanes. I recall that flying sites were scarce and there was much anxiety among our club members about when and where we would find a permanent flying field.

We have many lakes in our area (San Jose, California) and I suppose the alternative of flying seaplanes was a natural answer to the problem of where to fly. Besides, the lakes are surrounded by beautiful countryside and afford a great place to relax and leave the hustle and bustle of everyday life far behind. And, if you get tired of flying, you can always go for a swim.

The advantages of seaplanes are many. Crashes on water do much less damage to the plane than stuffing it in the ground at terminal velocity. If you are a bum pilot like me, you pick a lake with five acres of water to land on. This way, your ego never gets "clobbered" when your friends ask why you landed "way out there." You simply answer "Cuz, I felt like it dum-dum." It is easier than explaining to the other aces in the group why you strained your plane through the fence at the end of the runway. I could go on and on along this vein, but I think you understand what I'm driving at. To put it in plain English, flying off the water is a heck of a lot of fun! "Try it, you'll like it!"

Seaplanes are, of course, more for the sport flier than those trying to perfect the AMA pattern or win a pylon race. It is obvious that a plane hauling floats is not going to maneuver like a pattern ship with retracts, or a pylon racer designed to go 150 mph. Don't be fooled though, a seaplane can do anything a good pattern ship can, but just not as well. The real thrills of seaplane flying are in the landings and takeoffs. There is no way to explain it. You'll just *have* to try it!

Actually, landings and takeoffs on water are much easier than on land, and, in my judgment, a beginner will have greater success and suffer fewer failures and crash damage if he learns to fly off water. The whole secret to water flying is directly related to float design, water control, wing loading, and power-to-weight ratio. Seaplanes can be flown free flight, rudder only, rudder and throttle or full house . . . take your pick.

Build the seaplane as light as possible to minimize the float weight penalty. You will be safer overpowered than underpowered.

If you are a beginner, run your plane around the lake. Test its handling characteristics. Advance and retard the throttle and watch the plane rise on the step and settle down again. Some planes need right rudder at the beginning of the takeoff run. This is gradually eased to the neutral position at the point of takeoff. When you take off, give your seaplane full throttle and don't "horse" it off the water. Let it run on the water as long as it wants. When *and if* it is ready, it will come off the water by itself if it has been trimmed properly.

When we started flying seaplanes, we formed a little group of "Good Guys" and called ourselves the South Bay Seaplaners. We have had a lot of fun over the last several years and have sponsored many fun fly contests. Some of our events consist of mock combat, balloon busting, limbo, a trophy dash and pylon racing. In fact, our group is planning a Spring contest and we would welcome new participants. If you think you would be interested in coming, please send me your name and address and we will try to send you a notice of when and where the contest will be held when it has been decided upon. We usually hold our contests at one of the lakes close to San Jose, California. The fun in seaplane flying is always related to the number of people participating. The more the merrier! I would suggest, therefore, that anyone deciding to build a seaplane get a couple of friends to join him.

I can't go on without commenting about wet radios! I am certain many prospective seaplaners worry about getting their radio wet and therefore never give the sport a try. I can certainly understand this concern. The primary rule is to never fly on salt water unless you have a waterproof canister for your radio. Salt water corrosion will ruin a radio quickly. Conversely, fresh water doesn't seem to hurt the radio, although I'm certain that water of any kind won't do them any good. Our club members dunk their planes occasionally, and wet radios usually result. When this happens, they take the cover off their receiver and servos and immediately wash the P/C boards with alcohol. They blow them off and let them dry thoroughly. I have never heard of anyone ruining a radio by getting it wet in fresh water. The servo motors are the weak link in the chain, but even here, damage is rare. I tend to be cautious, however, and put my radio in a waterproof canister which is usually built into the fuselage. As a result, I have never gotten my radio wet. I am the only one in our group, however, who goes to this trouble.

I have flown hull, twin float and single main float seaplanes. My favorite is the single main float design with outriggers. This float configuration tracks and handles well in the water on both takeoffs and landings. Hull ships also work well on the water, but I prefer

conventional low wing configurations for their maneuverability in the air. The twin float designs are good, although they have a tendency to drag one float or the other on take off, making the plane a bit "squirrely." This is not a real problem, however, once you've had enough practice.

The design of the Water Strider is the result of personal experience and preferences which I have had and developed over the last several years. This seaplane can best be described as easy handling, forgiving, and a good flier. It will loop, roll, fly upside down and do just about anything you might want it to do. The Water Strider is particularly fun to fly in our sport pylon racing event. It grooves and can turn tightly without skidding all over the sky. The water takeoffs are very realistic and easy to accomplish. This seaplane features a built-in water proof canister with the aileron servo mounted inside the fuselage canister instead of in the wing. An O.S. Max 60 pulls it through the sky with ease.

Anyone desiring to build this sport flying seaplane can begin construction as follows:

FUSELAGE

Basic fuselage is a rectangular framework of hard 1/4 square balsa, built in the old familiar longerons-verticals-diagonals-cross pieces tradition. Once the 1/4 inch plywood firewall is in place and bulkheads T-1 through T-5 are installed, the upper portion of the body may be completed with sheeting and stringers. The section over the wing, including the cockpit, is a removable hatch to the radio compartment. It should be assembled in place, but kept separated from the main fuselage by plastic wrap material, while gluing.

The designer chose to make the radio compartment completely waterproof, though many float-fliers don't take this extra precaution. To do or not to do is up to the gambling instincts of the builder. One of the photos illustrates the method used on the prototype. A plexiglass lid is screw-fastened to a gasketed ledge. A film of vaseline completes the seal. The floor, walls and end bulkheads "A" and "B" are waterproofed with epoxy, inside and out, before becoming inaccessible. Wherever wire pushrods exit the compartment, flexible seals fabricated from toy balloons or rubber medical finger guards maintain watertight integrity.

Sides of the fuselage are shaped out with 3/16 stringers and sheet fillers, while the bottom, aft of the wing, is cross-grain sheeted with 1/4, 3/16, 1/8, and 1/16 balsa, tapering as shown.

The wing saddle is made up of 1/2 inch thick pieces ("S") set flush with the 1/4 inch side frame exterior, plus 3/16 inch filler sheet. All of this carries forward to form most of the lower cowl behind the firewall. The battery compartment indicated was used on the original, with a bottom access hatch and a permanent cable extension leading to the radio compartment. Better to put the battery in the waterproof area if possible, so watch your balance and see if you can move it.

The removable cowl and fixed chinblock are built up and carved from balsa blocks. You may prefer to fabricate the removable portion from fiberglass. In either case, be sure to cut out those hot air exit ducts!

Hardwood motor mounts, 1/4 x 3/4 x 9 inches long, are permanently epoxied in place. Short hardwood engine bearers of 3/8 x 1/2 maple are bolted to the mounts, using 6-32 blind nuts and bolts. An 1/8 inch aluminum engine plate (the one shown is for an Enya .60) bolts to the short bearers. Note that the fuel tank is slipped into its fuel-proofed compartment through the firewall, and is retained by the engine.

MAIN FLOAT

Begin assembly by marking bulkhead locations on the top sheet, as indicated in phantom lines between fuselage and float side-views. Also mark location of 1/4 x 1/2 top keel piece. This 1/8 inch top sheet, placed marking-side-up on a flat building surface, forms a jig for accurate construction of the float.

After gluing the 1/4 x 1/2 top keel in position, install bulkheads No. 1 through 10. Note that the step former, No. 6, is a sandwich of balsa-ply-balsa. Next, install hardwood strut mounting blocks and the rudder post brace; also the 1/8 inch ply doubler for No. 10. Side stringers of 1/4 x 1/2 balsa run from former No. 4 to No. 8, reinforcing the step and mounting areas. Add these, and the bottom 1/4 x 1/2 keel pieces, which must then be beveled. Now apply all bottom sheet covering.

When the above assembly is dry, remove from the building board. Drill holes and install blind nuts for the strut plates. Now sand top and bottom sheet edges, beveling to suite the sloping bulkhead sides. Complete float construction by gluing sides in place and sanding smooth when dry.

Float struts are fabricated from 3/16 steel rod and 3/32 thick steel plate. Make up a jig to get them straight, and silver solder or braze the joints. If 3/16 rod is not available, use doubled 1/8 or tripled 3/32 music wire.

TIP FLOATS

Construction of the tip floats follows exactly that of the main float, though considerably simpler. Don't forget to epoxy the maple strut mount block in place *before* sheeting the bottom or sides.

TAIL SURFACES

The vertical and horizontal stabilizers, elevators, and rudder are all built up from 1/4 inch thick balsa, covered with 1/16 inch sheet both sides. Trailing edges of both rudder and elevators are rounded, not tapered.

Horizontal stab glues directly to top of fuselage longerons, and vertical fin is fastened to top of horizontal stab and butts against back of T-5. Soft fairing blocks, pre-shaped prior to installation, continue the lines of the fuselage rear deck.

WING

Except for some 1/8 inch sheeting on the center section, the wing is entirely open construction. Build both panels over the plan, *upside-down*, by pinning the 3/8 square top spar in place and installing all W-Z ribs. Add the leading and trailing edges, shimming them to proper height with scrap blocks. Add the bottom 3/8 square spar and the 3/16 x 3/8 rear spar. Allow to dry completely before removing from board.

Being extremely careful of alignment, join the two panels, using the 3/8 inch sheet balsa spar joiner, and beveling all spars, leading edge, and trailing edge for precise fitting butt joints. Epoxy all ply dihedral braces in place and add two-piece W-1 ribs. Install 1/8 inch center section sheeting.

Glue the tip-float mounting material in place as shown. Install 6-32 blind mounting nuts to receive the tip-float strut-plate screws. Also add all triangular gussets along leading and trailing edges.

Build up the 1/2 inch sheet wing tips over the plans, and when dry, install on wing panels. Next, glue in the 1/4 inch sheet spar tips and add two-piece ribs W-3. Crack the rear spar at the outer W-2 rib and at W-3 so that it can be connected to the tip. Finally, install the 1/4 inch sheet filler pieces from leading edge to W-3, and when all is dry, carve and sand the wing tip area (and the whole wing, for that matter) to provide smooth contours for the covering material.

In order to avoid flutter problems, select firm, hard balsa stock for the strip ailerons. If available, you might even use spruce. Reason for this is that the control horn is mounted at the extreme inboard end of the aileron (especially if you plan to use the watertight R/C compartment idea), and as a result, there can be a great deal of twisting at the tip end from air loads.

FINISHING

Covering and finishing can be according to the builder's preference. However, keep in mind as you work that even if you never dork into the water, your ship will eventually get wet in all areas. Plastic covering, such as Monokote and Solarfilm is OK too, but keep an eye on the float bottom, particularly at the step, for wear and tear. This area usually gets rough treatment when taxiing onto the beach.