

SEAFOAM



RCM'S CHIEF SUNDAY FLIER COMES UP WITH HIS NEWEST OFFERING . . . THE **SEAFOAM** , A 44" SPAN AMPHIBIAN FOR .09-.10 ENGINES THAT IS EQUALLY AT HOME ON WATER OR LAND.

BY KEN WILLARD

What do you think about when designing an amphibian? Lots of things, of course. But there's one thing you have to think about more so than the other items, and that's water. Yes, water. Why? Well, because most of the requirements regarding hull line, angle of attack of the wing when on the step, positioning of wing floats, etc., are pretty well established – but everytime you put a flying boat hull in the water, unless you've considered every possible source of leakage or seepage, that old bugaboo water finds every little pinhole, opening, or crack, gets inside, soaks up the wood, thus adding a lot of weight, and may even get into your radio system and short it out. So, when designing a plane that's going to operate off of water, make water protection one of your prime concerns.

Water invasion of the wing and stabilizer surfaces is equally troublesome – particularly if water gets in one wing panel and not the other.

With all of these things in mind, I thought I'd try to design an amphibian that would minimize the water problem, yet be very easy to build. It also should take advantage of some of the new products which are commercially available.

Selection of the first commercially available items was easy. I would design the model around the Midwest foam wing and stab combination. I had flown several models which used the foam wing, and its 44" span was just right for what I wanted. By selecting this wing and stab combo, the problem of water seepage was instantly solved insofar as the flying surfaces were concerned. And there was the side benefit of not having to build a wing or a stab, thus eliminating about one third of the construction time.

I'll discuss the other commercial items as they come up during the construction sequence.

HULL

After you've studied the plans for a while, you won't need much help regarding the basic structure. The hull is a simple box — two sides of 3/32" balsa, with plywood bulkheads, a couple of 1/8" balsa braces in the aft section, 1/16" balsa top and bottom except from the step forward to the nose block, where the bottom is cut from 1/16" plywood, since this is the part that takes the beating, especially when you fly the model as a land plane.

The windows and the windshield area are cut out for appearance, or you can leave the wood in place and paint the windows in if you prefer. It may depend on what you use for covering material.

LANDING GEAR

This is optional, really. If you're going to be flying off water all the time you can leave the landing gear fittings off entirely.

But if the lake is some distance away, and your local flying field is handy, you may want to fly the Seafoam as a land plane. The conversion is very simple. Note that on the main gear, three blind nuts are imbedded in 3/8" squares of 1/8" thick hardwood which are glued to the plywood bottom of the hull. Holes are drilled through the hull to accommodate the 2/56 bolts which bolt the landing gear wire to the hull, using Top Flite nylon wire guides. Be sure to locate the guides on the wire BEFORE you bend it — they won't go around the bends.

The nose gear wire passes up through a brass tube which is imbedded in the noseblock. The top of the wire extends up above the top of the hull about 1/4" and a wheel collar slips over it. Use a wheel collar large enough to hold not only the landing gear wire, but also have another wire inserted, which has a hook on it as shown. They you cinch the wheel collar down tight, lining up the nose wheel first, and hold the nosewheel in alignment with a spring or a rubber band extending from the hook to a screw which has been inserted into the noseblock about 1 1/4" ahead of the nosewheel wire. This doesn't give you a steerable nosewheel, but if you use a light spring, the nosewheel will caster when you apply rudder and throttle, and you can steer the model on the ground, although it isn't as good as if the nosewheel were tied in with the rudder. But that would take some doing — so I didn't do it.

Note the 1/8" plywood skid at the rear of the hull. Also, note that the rudder is in two pieces — the main rudder and the sub-rudder. When flying as a land plane, remove the sub-rudder, otherwise it will get all beat up if your runway, like most of them, is a little rough and occasionally the model rocks back on the tail skid.

Attaching and removing the sub-rudder is simple. Use a couple of strips of MonoKote — the "wet" type.

MOTOR PYLON

This has to be tailored to your engine. I've shown a setup which fits the Max .10. The aluminum legs are bent to fit the sides of the hull, and up at the top the width is determined by the mounting hole spacing of the engine. The tank sits on a plywood tray which fits between the motor mounts and is bolted to the crosspiece section of the legs.

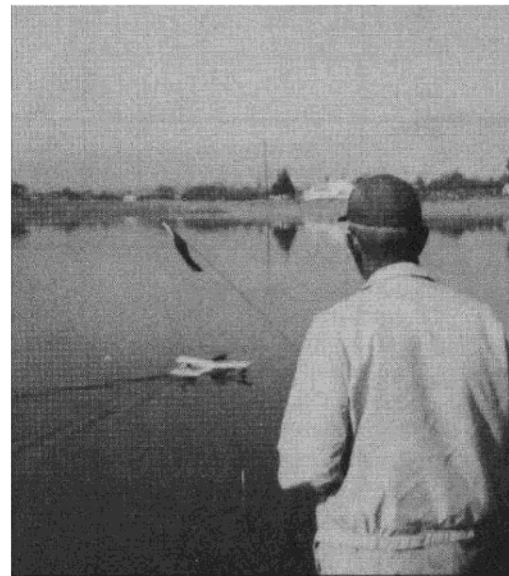
Some of you with sharp eyes will note that the photo of my prototype shows a slight variation in that the rear of the motor mounts has a slight drop in it, and the tank tray goes above the rear leg and below the front one. Well — that was a straight goof on my part — I cut the leg too short. This has been corrected in the plans.

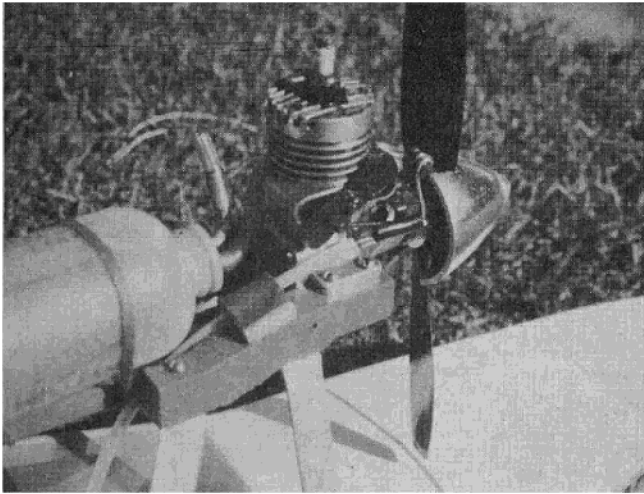
The cowl for the engine and tank can be built up as shown in the plans, or you can make it by hollowing out a balsa block if you prefer. The built up version was easiest for me since the bottom is left open from the rear of the motor mounts to the forward end.

TAIL SURFACES

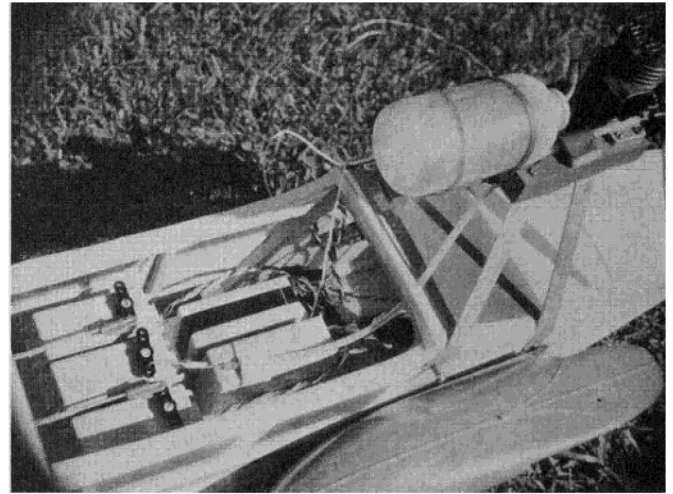
Since the stab is a standard Midwest foam stab, all that is necessary is to make elevators from 1/8" balsa, joined at the center with a 1/8" dowel, and attach them to the stab with hinges. The prototype has the elevators covered with SuperMonoKote, so it was logical to use MonoKote hinges. However, the part of the hinge which is attached to the stab must be the "wet" type, since you can't use the iron to attach it because the heat would melt the stab surface. "Wet" MonoKote adheres very well to the foam just by pressing it firmly in place. The joint at the hinge line between the "wet" MonoKote and the SuperMonoKote should be about 1/8" overlap.

Some people don't like to use MonoKote hinges — they believe they won't stand up under vibration and heavy use. Maybe so, with a big .60 powered job, but I've never had any trouble with any model using up to a Max .15. There are hinges available that can be used if you prefer; I happen to find the MonoKote hinges simple, fast, and reliable.





Detail showing engine and tank mount. Note flexible throttle shaft taped to motor mount.



Seafoam equipment installation showing Kraft servos, Rand Swing'N Keepers used.

Most of the photos were taken when I was experimenting with a vertical fin cut from half of a Midwest foam stab. It worked all right, but I found that the size was too small, and at slow speed the Seafoam had "dutch roll" instability. So I increased the fin area to the size shown on the plans, and it has eliminated the problem.

EQUIPMENT INSTALLATION

The plans show the setup for a Kraft system, using the KPS-10 servos and the 225 ma. battery pack. Flight tests have shown that the model has plenty of excess power using the Max .10, and the model could easily carry the larger servos and battery pack.

For pushrods, I used 1/8" nylon tubing inside 3/16" nylon – slightly smaller than the standard Nyrods. The wire at both ends of the nylon tubing is cut from a standard large size paper clip. This is relatively soft wire, but holds its shape well enough for this purpose. Also, to connect it to the nylon inside tubing, all that is necessary is to put a slight crimp in the wire, then force it into the nylon tubing about 3/8" to 1/2". It won't come out without pulling very hard on it – much harder than any flight load which will be imposed.

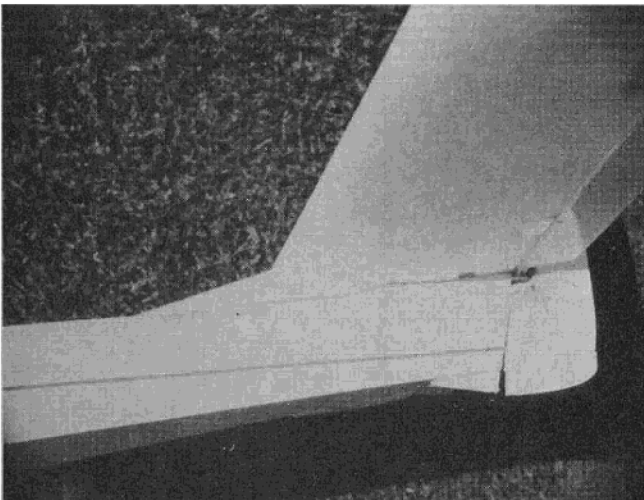
Note how the tubing is held in place behind the servos by passing through a crosspiece of 1/8" balsa, then it emerges

through the top of the hull and runs along the top of the hull back to the rear, where another wire cut from a paperclip is inserted in the end and then fits into the hole of the elevator horn and the rudder horn, held there by Rand Swingkeepers. Adjustments to the rudder and elevator settings are made by making bends in this wire as necessary to lengthen it or shorten it.

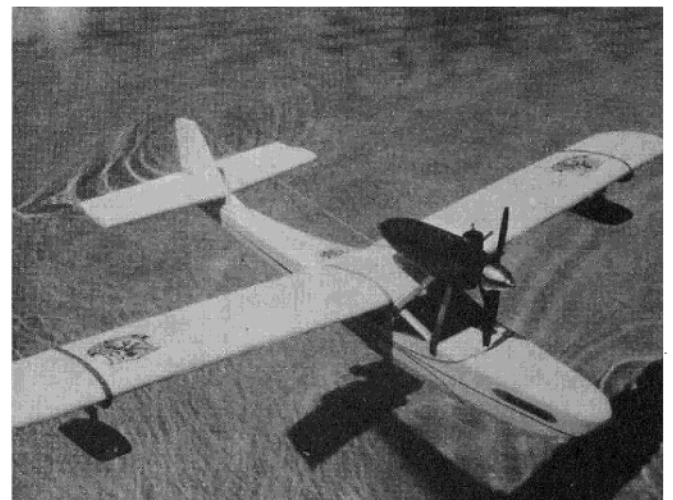
The nylon tubing is fastened to the top of the hull simply by ironing a strip of MonoKote over it and ironing the strip directly to the hull. This seals the opening where the nylon goes through the hull as well as holding it in place.

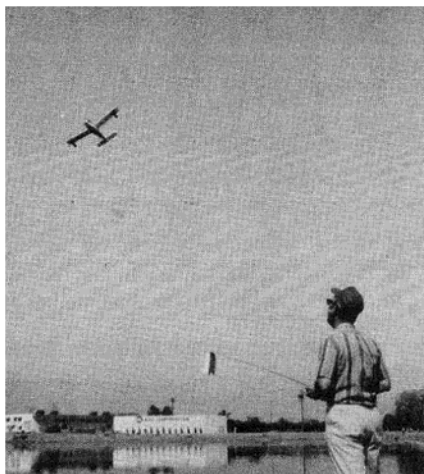
The flexible rod going to the motor is held in place with mounting tape holding it to the top of the receiver case just ahead of the servo, and also with mounting tape holding it to the right motor mount just behind the motor. I used a flexible wire inside nylon tubing for this pushrod, because the bend in the tubing is fairly sharp, and the wire handled it with less friction than an inner nylon tubing would have. Connection to the throttle arm on the motor required a bit of fitting and adjusting. Here again a piece of paperclip wire was soldered to the flexible wire, and this makes it relatively easy to adjust the linkage for high and low throttle just by bending the wire.

Detail of sub-rudder and rudder control linkage.



The Seafoam at rest after series of test flights. Author recuperating from 400 yd. swim!





Bud Freeman flying the Seafoam. This was his first experience with a flying boat, and he loved it!

No matter what control system you use, be sure to set it up on a tray — or use some of the commercially available holders in such a way that the servos, receiver, and battery pack are up off the bottom of the hull. No matter how hard you try, sooner or later water will get inside due to a bad landing shifting the wing from its cradle (note the cradle is sealed by using mounting tape and snugging the wing down tight on it) and if your radio system is up off the bottom it is less likely to get wet other than for a couple of drops splashed over it.

I like the tray arrangement, with the units mounted to it with doublestick mounting tape like Rand's or Rocket City's. It's quick, easy to install and remove, and the units can easily be removed from the tray for use in another model when the occasion arises.

HINTS AND KINKS

If you install the removable landing gear fittings, it's easy to change from flying boat to landplane, and the reverse. You may think a bit about sealing the holes where the bolts go through, but all you do is cover them with a piece of scrap MonoKote — which is easily pulled off if you want to put the gear back on, but will seal the hole against water seepage.

The legs of the motor pylon are bolted to the sides of the hull, using blind nuts as shown. At the bottom of the rear leg, note that a brass tube sleeve has been fitted over the mounting bolt. This sleeve, about 3/16" long, holds the head of the bolt out away from the hull, and this allows you to use the bolt as the forward anchor for the wing rubber bands.

If you are careful in making the engine and tank cowl, it will fit snugly against the motor mounts, and a couple of mounting screws are all that are necessary to hold it in place. Slides on and off in a hurry.

The plans show the switch mounting just below the lower brace for the window area. If you decide to paint your windows in, you can mount the switch a little higher. I haven't had any trouble with the existing setup, but the higher location would reduce the possibility of the switch getting wet.

I covered the prototype with Super MonoKote, and to make windows, all I did was to clean off the adhesive in the open area, using methylethylketone (MEK) solvent. Instant windows.

WING TIP FLOATS

The wing tip floats and struts shown in the plans are slightly shorter than those used on the original prototype. You'll note in the photos that the wingtip floats were fairly far out on the wing. However, I subsequently moved them in and raised them slightly for better take-off performance. The floats should be mounted to the wing about 9" in from the tip.

On the prototype I used adjustable struts so that I could try various lengths and angles. The plans show the best setup as proven by the flight and take-off tests.

The strut is cut from 3/32" plywood with the bottom shaped like the float, then balsa block, cut to that shape, is glued to the strut on both sides. The 1/8" balsa brace at the top gives a base for the 1/32" plywood cradle to rest on.

The hook for the rubber band which straps the strut and float to the wing is cut from paperclip wire and glued to the plywood. This strap-on arrangement makes it easy to remove the floats for landplane flying.

FLYING

Seafoam is one of the best performing flying boats I've had. On the water the handling characteristics are excellent; the water rudder (sub-rudder) steers it very well at idling speed, and when you give it full throttle the model comes up on the step and take off practically unassisted. Full power of the Max .10 is more than enough to lift the

model off, even in glassy water where the surface tension tends to hold the model down, or in rough water where the model has to plow into the waves. Naturally, since this is a relatively small model, you can't expect it to handle a two foot chop, but on a normal sized small lake, where a ten mile breeze kicks up ripples about four inches high, Seafoam has no trouble at all.

In the air the performance is spectacular. Inverted flight is easy with the foam wing, and the speed is very evident. There's only one thing to watch out for, and that is the characteristic of the wing, since it is tapered both in planform and thickness, to have a rather sharp wingtip stall at high angles of attack. This becomes very apparent when landing the Seafoam; if you flare out for a landing and slow down a little too much, one wing will drop out on you and you've dumped the model into the water. It happened a couple of times to me before I realized what was going on; since then I've been careful to make the flareout into a flat, but not nose high attitude.

You'll find that your flights with Seafoam are mostly short ones, for the simple reason that it flies very well, and the most fun is taking off and landing on the water, and making touch and goes.

Incidentally, it seems like there are always some modelers who want a larger version of some small job that I've designed, and the probability is that some of you may want to build a larger Seafoam. Here's a suggestion, if you happen to be one of those; Lanier makes a 66" wing with matching stab that you can buy. It would make up into a 1.5 size Seafoam. My guess is that you would have to use about a .35 for engine — maybe even a .45 if you build heavy.

In any event, whether you build a 44" Seafoam or a bigger version, I'll lay odds that it will rapidly become one of your favorite models for Sunday flying.

And that's what it was designed for.

Bud Freeman taxis the Seafoam back after flight.



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