



**A practical seaplane  
for a .20-.25 size  
engine.**

**By Ken Willard**

**T**he Seamaster II was designed expressly to fill a void in the existing designs for amphibious radio controlled aircraft. In the past, there have been several designs in the .049 to .15 powered models, and in the .40 to .60 size jobs. For some reason or other, the power range from .15 to .30 has been neglected --- perhaps because models in this power range were not as popular as the other sizes. Now, however, engines in this displacement category are becoming increasingly popular due to their economy as well as their improved reliability. Couple those factors with the rapidly rising popularity of seaplanes and flying boats, and a .20 to .25 powered flying boat design is a natural. Add a removable landing gear so the model has the versatility to fly off water or your favorite runway, and you've got the best of both worlds. The Seamaster II fulfills that requirement, and is a good intermediate trainer as well.

And why is it named the Seamaster II? Simple answer; most of you are aware that I designed the Seamaster Sport 40, so named because it uses the wing design and stab design of the Headmaster Sport 40 which was published some time ago in RCM and later put in kit form by Top Flite

# SEAMASTER II



Models. Well, even before that, RCM had published the original Headmaster, a smaller version which used .15 to .35 size engines, and also was kitted. Well, if you're going to design an amphibious flying boat for that size engine, I say to myself, why not use a well-proven wing and stab combination, and mount them on a flying boat hull? So I did. Not too long ago, Top Flite had updated the Headmaster (the smaller one) and identified it as the Headmaster II, so it seemed logical to me to call this new flying boat the Seamaster II.

Mind you, it is not a scaled down version of the Seamaster Sport 40. On the contrary, it is a totally different design. Full planing hull instead of boat-tail, vertical sides instead of tumble-home --- which makes it a bit easier to build --- and a T-tail to keep the stab up out of the water when taxiing. Finally, the hull bottom forward of the step extends out from the sides to provide a combination chine and spray rail configuration that gives excellent transition for displacement to planing mode. It also gives the model good handling characteristics in a comparatively heavy chop. You'll love the way it handles, both on the water (or runway with gear attached) and in the air. Finally, its simple construction makes it easy to build, easy to repair, and easy to carry around.

There are a couple of things worth mentioning before you start building the Seamaster II. First, with respect to the wing. Although the construction is essentially the same as the Headmaster II wing, there are minor differences, and one major difference. The major difference is in the amount of dihedral and the addition of ailerons. True, you could fly the Seamaster II with rudder and elevator only, but the performance would suffer, so I don't recommend it. Use the dihedral shown on the plans. Even that amount is not really required with aileron control, but it "looks right." And some dihedral does help prevent the wing tips from dipping in the water when taxiing crosswind; the tip floats do the rest.

The other point worth mentioning is that it has been my experience that most modelers make deviations from any set of detailed plans --- particularly in radio and engine installations. Therefore, the installations shown on the plans are largely schematic in nature. You may have a different size set of servos, or radio, or battery --- and you may want to use an engine that has a slightly longer crankshaft so the prop will be further forward. No matter; it isn't critical. Mount your equipment where it fits best. Just be sure, when you do,



that the center of balance is not moved too far one way or the other. Keep it within a quarter of an inch either forward or aft of the location shown for best performance.

Finally, if you don't want to make the model amphibious, and just fly it as a flying boat, you probably will have to add some ballast in the nose. It will depend on how you install your equipment.

Look the plans over carefully before you start --- and particularly observe the construction sequence for the hull. It will save you a lot of headaches when connecting the flex rods to the control surface and the flex cable to the engine up on the pylon.

Enough of the precautionary remarks. Start building.

#### Construction

##### Wing:

The wing is totally conventional in construction. You can build it from the plans, or, if you have an old Headmaster II wing that you want to convert, you can do that. Cut it down the middle, install dihedral plywood braces with the reduced amount of dihedral, and glue the panels back together. To install ailerons, slice away the trailing edge sheeting, add a strip of 1/8" balsa to the rear end of the ribs, deep enough to reach from bottom to top. Then make the aileron from a piece of medium grade balsa. I even tried making the aileron from the cut away part of the wing, but it's

easier to make it from solid balsa, and the weight difference is negligible.

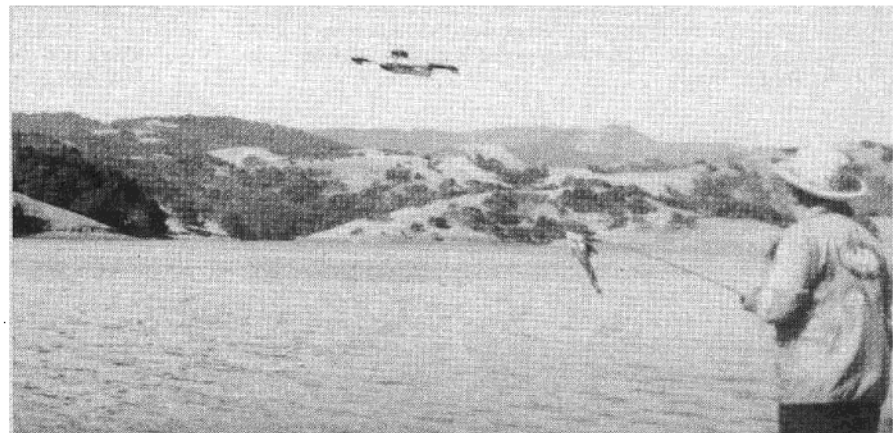
Note that the hinge line is on the top of the wing, so the gap which is needed to permit down aileron action is on the bottom. The gap is made by slanting the trailing edge of the wing slightly forward, and the leading edge of the aileron slightly back. For hinges, I used full length strips of Super MonoKote. It's plenty strong, and provides a closed hinge line for better aileron action.

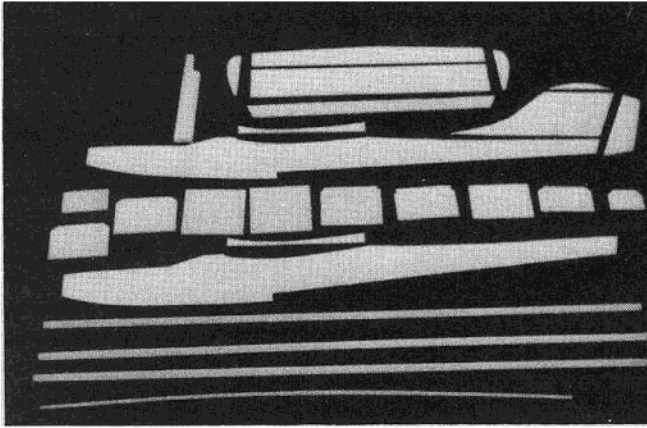
Since the hinge line is on the top, the control arms have to go down through the wing and come out the bottom. The hole through which they pass must be elongated at the bottom to allow for the forward and aft movement.

The aileron servo is mounted on rails buried in the wing as shown on the plans. Their location will depend on the size servo you install. Just make sure that the installation lets the servo wheel move without striking a bulkhead. Also note that the control rods go to a position on the servo wheel which results in differential action --- more up than down --- for the ailerons.

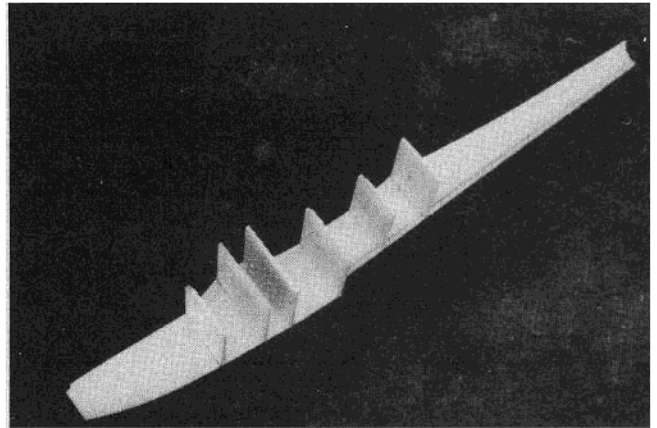
The fairing block in the center gives a smooth line to the top where the wing butts up against the pylon. The 1/4" dowel slips into a mounting hole drilled in the back of the hardwood pylon, and the holes for the rear nylon mounting bolts are drilled to match the mounting blocks in the hull.

The wingtips are built up as shown,

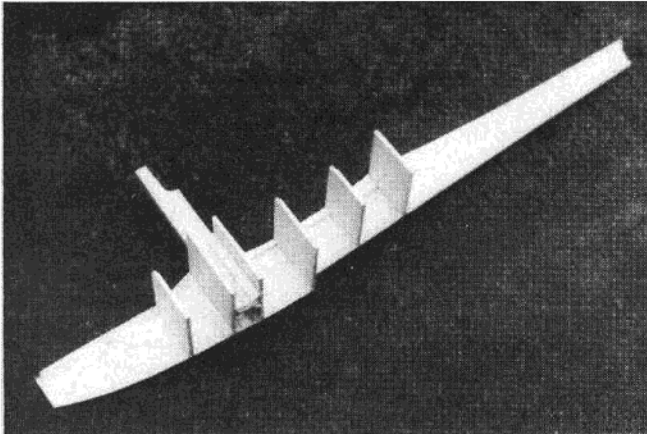




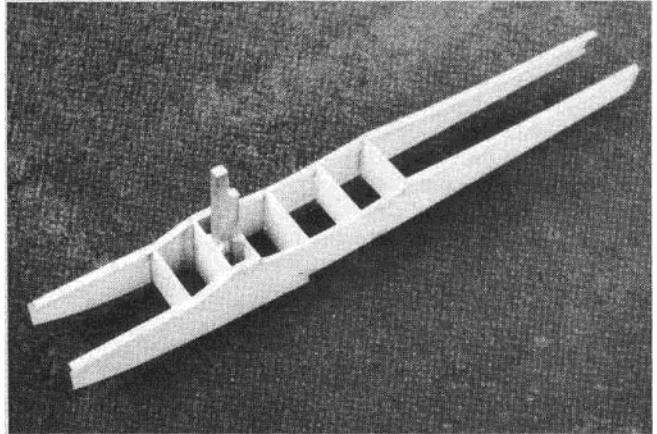
1. Cut-out parts for hull, fin, and stab.



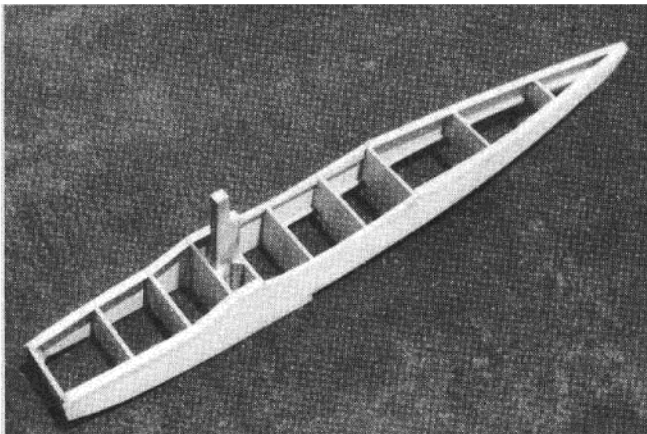
2. First assembly step. Right hull side structure with bulkheads of uniform width glued in place.



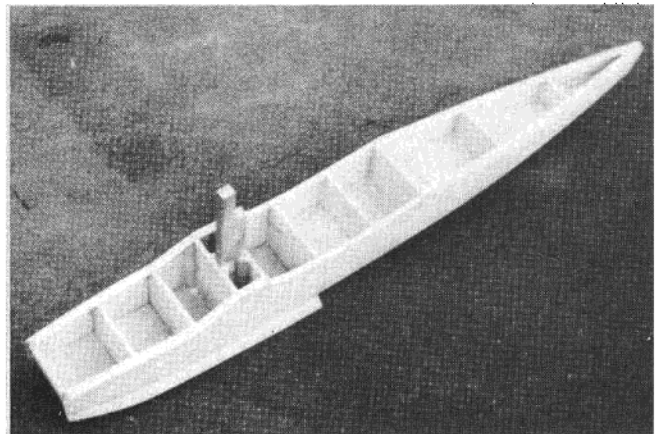
3. Second step. Engine pylon located and glued in place with triangular braces.



4. Left hull side glued to uniform width bulkheads.



5. Nose bulkhead and tail post glued in, with remaining bulkhead added. Make sure sides of hull curve in uniformly to tail and forward to nose.



6. Bottom sheeting installed. Note triangle stock outside of hull forward of step. At this point in construction, coat inside of hull with at least two coats of clear dope.

but if you prefer, solid block tips can be shaped from medium soft balsa.

The tip floats can be made in two ways. One is to cut them out of soft balsa block; the other is to cut a foam core to shape and cover it with 1/16" balsa sheet. This can be done very rapidly if you use Pacer's Z-Foam Primer. There are also two ways to mount the tip floats. One is to put a strip of Velcro on the wing, with the matching material mounted on the

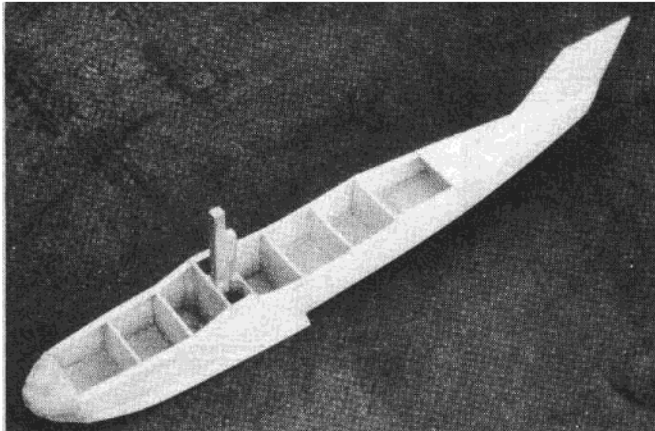
float. This makes it easy to remove the tip floats when flying off land. You can also use 1/16" servo mounting tape --- but it does make it harder to remove the floats once they are mounted.

#### Hull:

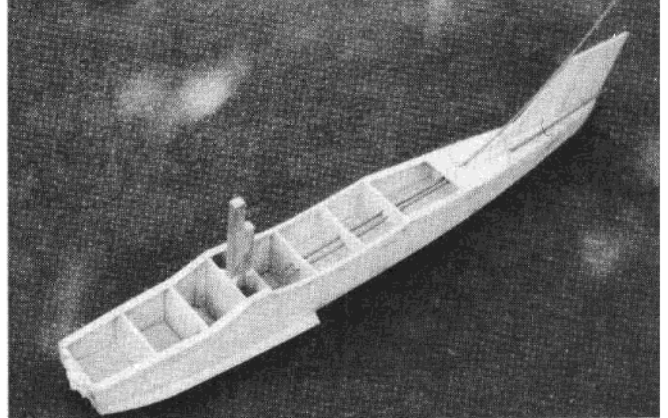
Photos #1 through #9 show the progressive steps in making the hull, starting with the cut out pieces and winding up with the installation of the flat "tray" on which the fuel tank rests. By studying the plans and

photos, you should have no problems in putting the hull together. All the details are there, including installation of the vertical fin and partial covering of the top of the hull, then installing the flex rods before finishing up the covering of the top of the hull. Note that the triangle stock forward of the step is on the outside of the hull sides; this provides the chine and spray rail configuration.

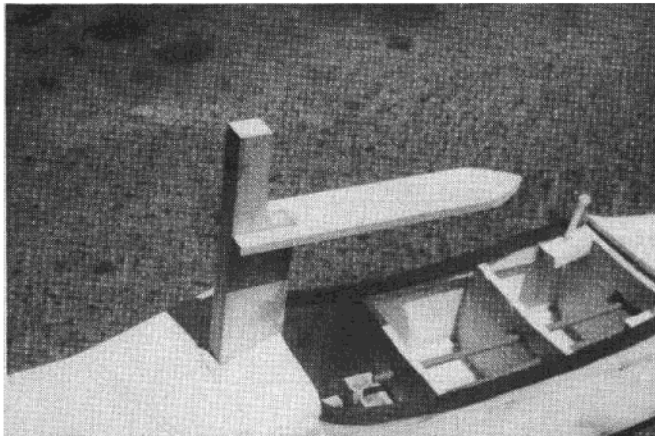
Before going any further than the



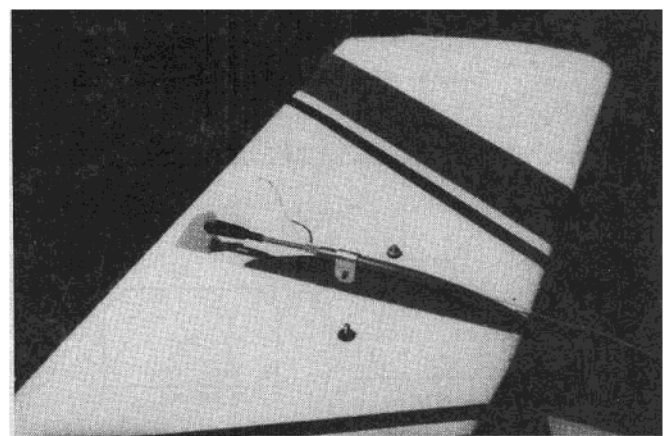
7. Nose block temporarily added and shaped. Top rear sheeted and fin installed with triangular bracing to top sheeting.



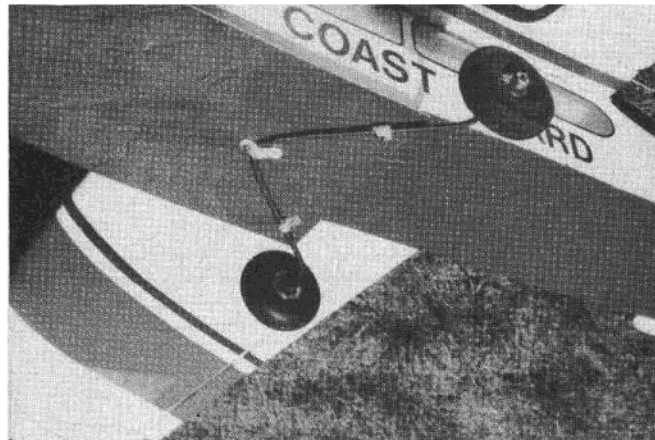
8. Nose block removed and nose gear fixtures installed. Also, flexrods to rudder and to elevator (along leading edge of fin, the flexrods attached by epoxy) are threaded through bulkheads to servo compartment.



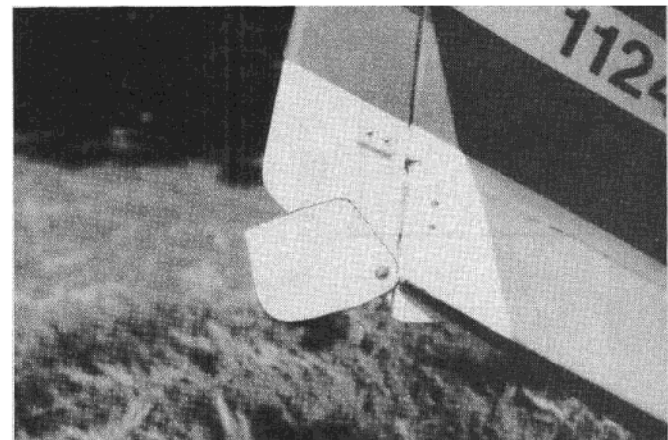
9. Tray for fuel tank glued to pylon. Also, note mounting blocks for nylon bolts installed.



10. Elevator flexrod attached to top of fin extension with aluminum strap. And bolts to plywood plate under stab can be seen. Not needed if stab mounted permanently.



11. Main landing gear strapped on with three retainers.



12. Water rudder extended. (Top outline has been inked in because it does not show clearly.)

assembly shown in photo #8, install your servo rails, servos, and the flex cable to the engine alongside the pylon. Note that the nose block, temporarily attached in photo #7 to assure good fit, has been removed and the nose gear mounting fixtures are installed. Run the flex rod from the rudder/nosegear servo forward and adjust it for proper action before covering the top surface of the hull. The same precaution applies to

installation of the rudder and elevator flex rods.

Now you can finish up the hull by covering the top, adding the fairing block to the pylon as shown in the plans and photo #9, and hollowing out the nose block to accommodate the nosegear fixtures. Make sure there is clearance for the steering arm to move.

#### **Empennage:**

This structure, a T-tail, is so simple

that you really don't need instructions. Cut out the stab, glue it to the top of the fin, add the 3/8" triangular stock reinforcements on either side of the fin, add the fairing on the top to which the flex rod is attached, install the elevator with hinges, and that's all there is to it.

On the prototype, to facilitate shipping it in a box, I installed a crosspiece to which the stab was

bolted, as shown in photo #10. Then the elevator flex rod was held in place with an aluminum strap. You can do this if you want to, but don't do a stupid thing like I did. I shipped the model to Chicago, and reassembled it there, but forgot to tighten the retaining bolts firmly; on the fourth demonstration flight, they vibrated loose. Dum-dum. But the repair didn't take too long. Even so --- unless you plan to ship your model somewhere, I recommend permanent installation of the stab.

#### Landing Gear:

A quick look at the plans shows how the nosegear and main gear are installed for quick removal. Photo #11 shows the bottom of the hull with the main gear attached. You can see how easy it is to put on and take off. However, when you do remove it, be sure to cover the mounting holes with either trim strip or plastic tape so water won't go up into the holes.

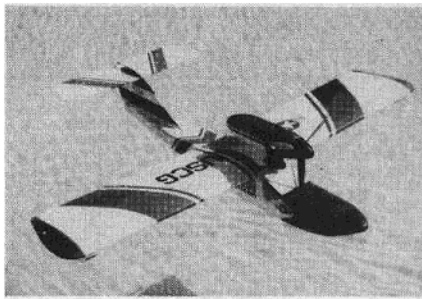
#### Water Rudder:

This model is amphibious, so the water rudder, which is attached to the main rudder, has to be retractable. Photo #12 shows it swung down for operation on the water. The bolt at the swivel axis has to be tight enough to hold the rudder down, but also it's a good idea to have it loose enough so that if it hits an obstruction in the water, it will swing up without tearing the rudder loose from its hinges.

#### Engine Pylon:

The plans show the basic shape for the main pylon member, and you can see how it is installed by looking at the construction photos in sequence. Take another look at photo #9 and note how the tank tray slides in place on the pylon. By gluing "lemon slice" semicircular hardwood plates on either side of the pylon, cut and sized to fit the rear face of the engine mount you select to hold the engine of your choice, you have, in effect, a "firewall" structure for mounting your engine. Using that firewall shape, you can then make a streamlined housing to cover the tank, building it up out of balsa blocks which are hollowed out, or alternatively, making plastic shells if you have one of Idea Development Company's "Formicators."

For an engine cowl, I used one of the plastic bases from an R/C Cola bottle. To do this, you cut the base free from the bottle, cut-out the center of the bottom, then cut the cowl transversely from front to rear. Next, overlap the sides and reduce the diameter to the size you need for your engine and firewall combination, cut away the excess, leaving about 1/2" overlap, and bolt the sides together. Then cut-out holes to accommodate the cylinder and carburetor. It makes a neat cowl.



### SEAMASTER II

Designed By:

Ken Willard

**TYPE AIRCRAFT**

Amphibious Flying Boat

Trainer

**WINGSPAN**

48 Inches

**WING CHORD**

9 Inches

**TOTAL WING AREA**

426 Sq. In.

**WING LOCATION**

Top of Hull

**AIRFOIL**

Semi-Symmetrical

**WING PLANFORM**

Constant Chord

**DIHEDRAL EACH TIP**

3/4 Inches

**O. A. FUSELAGE LENGTH**

36 Inches

**RADIO COMPARTMENT SIZE**

(L) 5 3/4" X (W) 3 3/4" X (H) 2 3/4"

**STABILIZER SPAN**

19 Inches

**STABILIZER CHORD (incl. elev.)**

5 3/4" (Avg.)

**STABILIZER AREA**

105 Square Inches

**STAB AIRFOIL SECTION**

Flat

**STABILIZER LOCATION**

Top of Fin

**VERTICAL FIN HEIGHT**

5 1/4 Inches

**VERT. FIN WIDTH (incl. rud.)**

9" (Avg.)

**REC. ENGINE SIZE**

.19-.25

**FUEL TANK SIZE**

6 Oz.

**LANDING GEAR**

Removable Tricycle

**REC. NO. OF CHANNELS**

4

**CONTROL FUNCTIONS**

Rud., Elev., Throt., Ail.

**BASIC MATERIALS USED IN CONSTRUCTION**

Fuselage ..... Balsa & Plywood

Wing ..... Balsa & Plywood

Empennage ..... Balsa

Wt. Ready To Fly ..... 60 Oz. (flying boat)

63 Oz. (with wheels)

Wing Loading ..... 20.3-21.3 Oz./Sq. Ft



#### Assembly:

When assembling the wing to the hull, you will find it necessary to make cut-outs in formers 7 and 8 to accommodate the aileron servo control rods and the elevator and rudder flex rods. This is not shown on the plans because it will vary depending on how you set up your radio installation. It's not hard to do, since the opening under the wing provides ready access to make the required cut-outs.

Be careful when drilling the hole in the pylon to accept the dowel in the wing. Don't drill the hole any deeper than necessary --- about 1/4" --- so you don't weaken the pylon. Also, locate the hole so that when you fasten the wing down with the rear nylon mounting bolts, the wing is snugged down tightly on the wing cradle tape. This will keep water from getting inside the hull.

#### Covering and Finishing:

How you cover and finish your Seamaster II is up to you. I used Super MonoKote on the wing, stab, fin and rudder, and painted the hull with Sig Aerogloss. In addition to painting the outside, the inside of the hull should also be doped with clear dope during construction so that any water that does get inside (and it will, believe me) won't soak into the balsa.

How you decorate your Seamaster is a matter of personal choice. The Coast Guard motif which I used on the prototype was copied from another Seamaster which was built by Darrell Rohrbeck of Mount Clemens, Michigan. He sent me a photo of his model and I couldn't resist copying the Coast Guard theme. He did a truly outstanding job.

#### Flying:

If you have built the model in accordance with the plans, and have the center of balance located as shown, you will find this model one of the best flying in your whole collection. Off water, all you have to do is taxi out, head into the wind, add power, keep it straight with the rudder, and it will take-off virtually unassisted. The same is true when operating off a runway with the landing gear installed, although a tad of up elevator may be needed to get the nose into a climbing angle.

You'll find it easy to build, and even easier to fly. Of course, if you put a Schneurle .30 up on the pylon, you'd better be ready for some spectacular performance. I like it best with a good .25 --- and if you want a really nice, quiet performer, put on one of the HB .20 four cycle engines. Purr-r-r-r-ect.

I guarantee you'll love the Seamaster II. □

**From RCModeler  
May 1984**