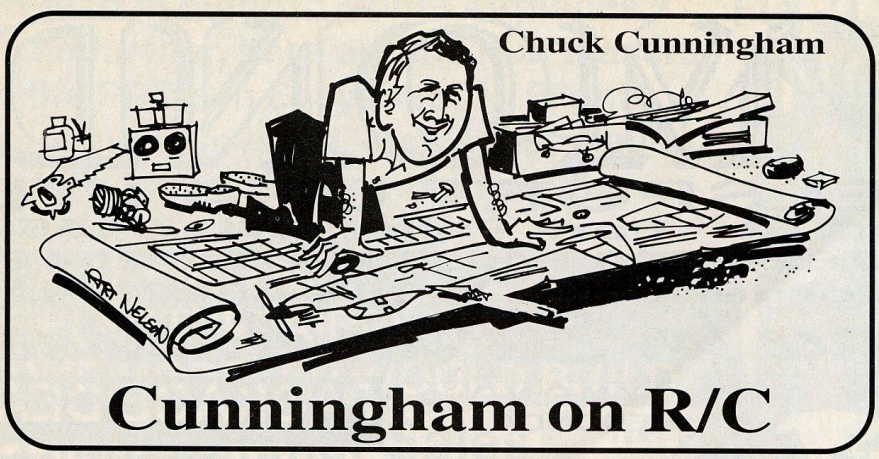
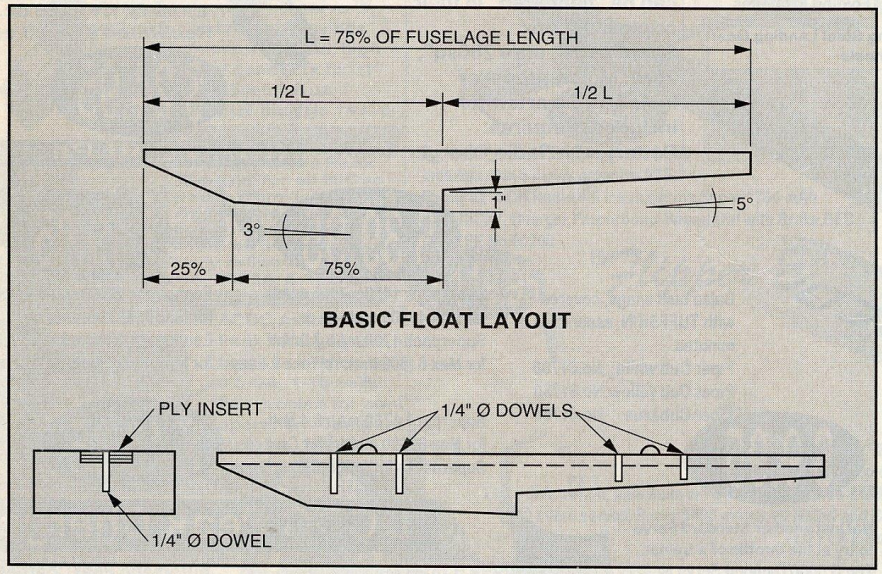


FLOAT FLYING: PART II

Adding floats to a radio controlled model is an easy thing to do. Doing it correctly takes just a bit more time. If you have a set of commercial floats for your aircraft then install them according to the manufacturer's instructions (you did read them, didn't you?). However, if you are starting from scratch — both to build your floats and attach them to your model — read on, this is for you.

If you are considering adding floats to a simple trainer-type aircraft so that you can learn to fly from water, you really do not need to make them a thing of beauty and joy forever. If, on the other hand, you are building a set of floats for a really good looking model and your plan is to visit a number of float-flies, then you will want to take a bit more time with the finishing touches.



Design

The first step is to decide how large your floats should be for your particular aircraft. A length of 75-80% of the length of the fuselage — measured from the back of the prop to the elevator hinge line — will give you the required overall length. As an example, let's assume that the fuselage length of your aircraft is 48"; 75% of that gives us 36" as an overall float length. Next, the distance from the nose of the float to the step should be approximately 50% of length of the float, depending upon how long the nose of your aircraft might be. It is desirable for the floats to protrude out ahead of the propeller by at least 2", based on the size of the floats used in our example.

If you are designing floats for a much larger or smaller model, then make allowances accordingly for the nose length and other features of your particular aircraft. For example, if you are putting floats on a larger model with an overall length of 72", then your float length needs to be 75% of 72", or 54" long, with the nose of the floats extending out ahead of the propeller by about 6% — 6% of 54" = 3.25".

A very important factor when figuring out the size of your floats is determining the balance point of your existing model, as it is when you are flying it with the wheels attached and when it has no fuel on board. Mark this "dry" balance point on your aircraft. Next, fill the fuel tank completely and determine the "wet" balance point and mark it on the aircraft. Now, you have two reference points. Locate the floats so that the step is right under the wet balance point. Later, when you are getting ready to fly, pick up the assembled aircraft and balance it on the dry balance point that you marked on the fuselage. Then, if it is tail heavy, add weight to the **nose of the floats** to bring it into correct balance. **Don't** add the weight to the fuselage — put it in the floats where it belongs. If you follow this procedure, your aircraft will still balance properly when you convert back to wheels.

Since you have already determined the necessary length for your floats, it is time to complete the design. It is a good idea to sketch it out on your aircraft plans, as it will save quite a bit of time when it comes to cutting and fitting parts. First, draw a line on your plans to represent the step. For most of our models, a 1" step will be sufficient. However, if you are using these ideas to design a small set of floats, then reduce the height of the step accordingly. For much larger models, you would, obviously, increase the height.

Having added floats to about twelve or more of my aircraft over the years, I began to realize two things that increased the ability of the aircraft to get off any type of water in a hurry. The first is to increase the upward angle of the rear of the floats from 3° to 5°. This keeps the aft end from dragging the water when making a take-off run. The second is to eliminate the curve at the forward end of the float, and make this a flat plane instead. This flat plane comes out of the water much more rapidly than does the curved or boat type forward shape. Take a look at the sketch accompanying this month's column to see what I am talking about with these two modifications. When making a take-off run with a set of floats, the idea is to get the model up on the step as quickly and as easily as possible. I have equipped my 62" Lazy Ace with a set of floats designed this way and it will almost leap off the water even though it may be as smooth as a mirror.

The height and width of the float is, again, a factor of the size of the aircraft. So, for our 36" long floats used in the example, the height should be about 3" and the width of each float should be about 4".

Construction

Floats can be constructed from balsa and plywood for a built-up, or hollow, type of construction. You can also buy float kits that are molded out of plastic and, again, are hollow inside. These are very attractive floats, but you **must** make sure that all of the plastic seams are tightly sealed, and that there are no leaks. I have witnessed hard landings from aircraft equipped with both built-up balsa floats and hollow plastic floats where they sprang a leak, and almost ruining the aircraft they were designed to support. To prevent the latter from happening, make sure that all your float joints are tightly sealed, and that you practice and learn the technique of landing a float equipped model.

In my opinion, the best material for constructing floats is standard one pound Styrofoam — the same material that is used for hot wired foam wings. Several years ago, I brought you the information on how to figure the weight and size of the foam

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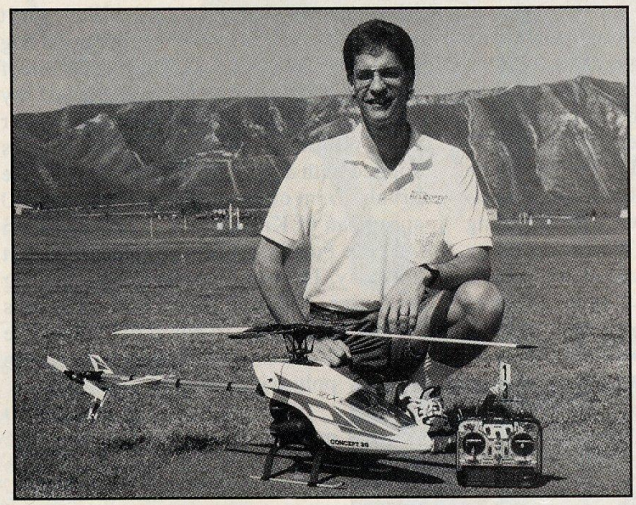

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needed for just about any size model based upon the ability of the foam to support the weight of the model. You can figure this out for yourself if you really need to by assuming that a cubic foot of foam weighs one pound, and a cubic foot of water weighs about 60 lbs. Use a safety factor of two, and assume that a set of floats to support a 30 lb. aircraft will need to displace only one cubic foot of water.

When making floats from Styrofoam, you do not need to use a hot wire. Instead, you can use a band saw with a 15-tooth, or a metal cutting blade. If you don't have a band saw, a hand saw will also work. Whichever method you use, simply draw the float outline on the side of the foam block with a felt marking pen and cut out the float. Make two that are just alike, then sand each float with fine sandpaper. Use a vacuum cleaner to get all of the sanding dust off of the float.

Next, you need to groove the top of each float to accept the plywood stiff back. You can glue the stiff back to the top of the float without making a groove, but to make it aesthetically pleasing, you should recess it into the foam. This can be done with an X-Acto knife and a sand block or, more easily, with router and table. If you do not have the latter, you will find that the router bit will fit into a small drill press. You can make the "upside down" router table by mounting the bit into the drill press, then blocking up the table of the drill press so that the router bit cuts a groove 1/4" deep. If this is the method you are going to use to cut the groove in the top surface, then do this router operation prior to cutting out the side view of the float.

Once you have cut the slot, make a stiff back out of 1/4" plywood, running the full length of the float. Glue it in place with epoxy. When the epoxy has dried, drill the 1/4" holes as shown in the drawing, filling each hole with epoxy and inserting a 1/4" dowel into each hole. Cut the dowels off flush with the top of the stiff back. Do **not** eliminate this step, as the dowels transfer the load from the stiff back to the Styrofoam. Without the dowels, the stiff back will tear loose from the Styrofoam as soon as you make your first really rough landing.

From this point on you can make the decision as to the type of finish you want on your floats. You can glue balsa over the foam, then progressively fine sand the wood and, finally, spray paint the floats to match the finish on your aircraft. Make sure you use a paint that will not harm the foam inside should it penetrate the balsa.

The finishing touch is to set the aircraft-to-float connections so that the wing is sitting positive to the top of the float. A 1/2" positive angle relative to the float will do it for a wing with a 12" chord. Remember — you want the wing to help lift the aircraft from the surface adhesion of the water.

See you next month.

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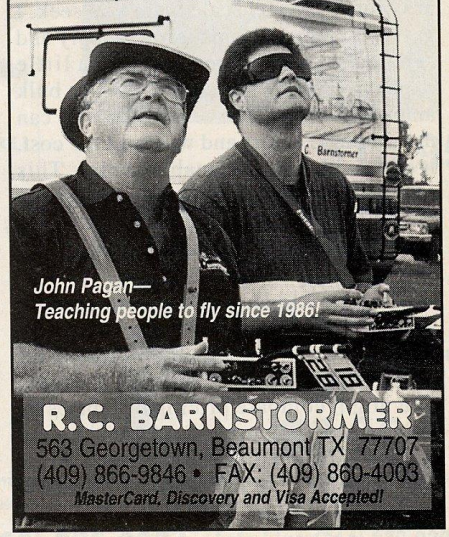

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