Flying from Water
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Why fly from water? It provides an opportunity to expand the experience of our hobby, and you can learn new skills specific to water flying. Most importantly, it's just plain fun!
The following is an attempt to provide a foundation for successful flying from water. For those of you who haven't tried float-flying or have had an unsuccessful attempt, the following tips from my 25 years of float-flying should help.

This Sikorsky S-39 was built by Bob Grossman and flown by John Krupp at the Midwest Regional Float Fly. RCM Plans were enlarged by 18% to get it to a 90-inch wingspan.

Floatplane vs. Seaplane
Floatplanes are typical-configuration airplanes, equipped with pontoons. Seaplanes have boat-shaped fuselages that provide flotation. I will primarily discuss floatplanes.
Land-Based Models
Most land-based models can easily be converted to floatplanes. Does your model have spritely performance off of grass? If so, it is a good candidate. If your model struggles to get off of grass, it probably will not handle the extra weight and drag of floats.
The Right Float Size
The rule of thumb is that the fl oat length should be 75-80% of the length of your fuselage, from the propeller disk to the rudder hinge. If in doubt, go to the larger float size, particularly if your model has a

higher-than-average wing loading. You may think that smaller floats look correct, but undersized floats create multiple takeoff and landing problems.
The design of the bottom of the float can make a significant difference in your model's water handing! On model aircraft, flat-bottom fl oats generally work fine on sport models up to a .40 size. For larger models or Scale models, a shallow V-bottom works best. Deep "V" or Cathedral bottoms can be challenging to use and should be left to advanced pilots. They have a tendency to groove in the water, which can result in sudden directional changes.

Most commercially available floats are of the correct proportions and have shallow V-bottoms. ARF floats are available from Horizon Hobby, Tower Hobbies, and other major suppliers. SeaPlane Supply provides foam cores in many sizes and designs or will custom cut cores to your specifications.

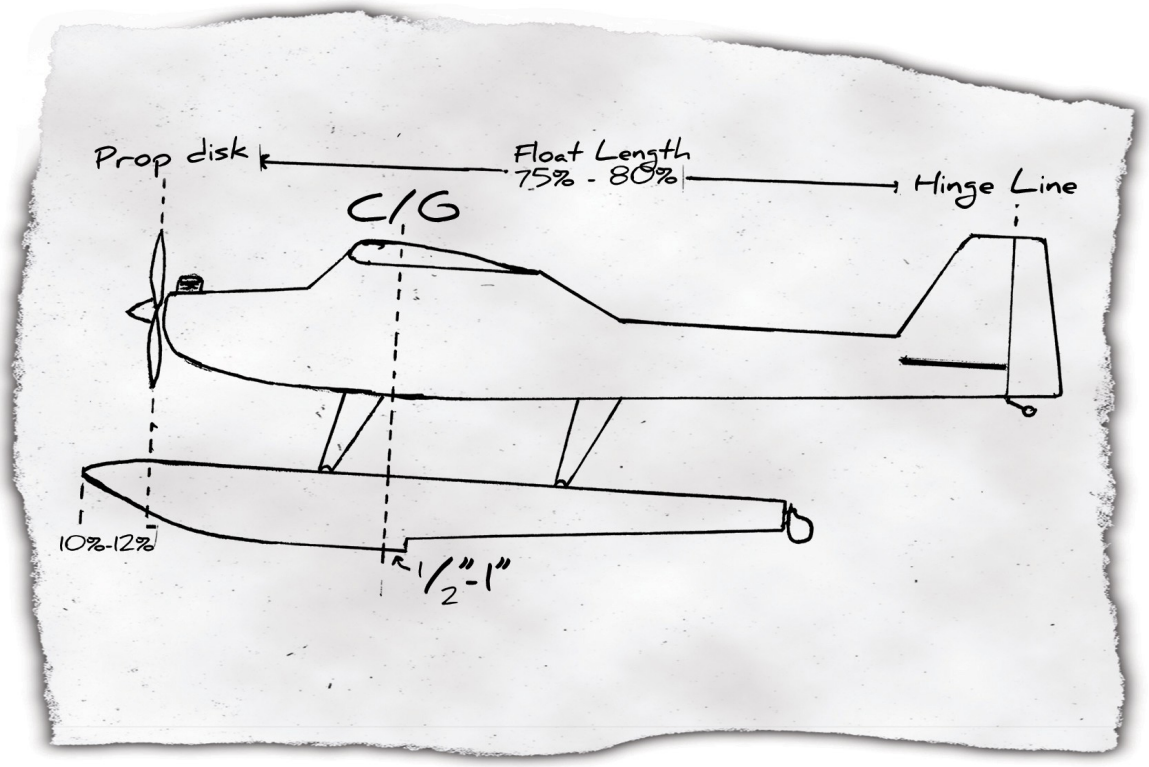
I will not attempt to cover designing your own floats here because it is an extensive subject.

Steve Fredericks' Maule Rocket uses Balsa USA EDO floats that are available in 1/3 and 1/4 scale.

Float-Attaching Methods
For most models you can use the existing main landing gear as the principle attaching point. Simply add a matching, or similar, landing gear at the rear of the fuselage. You will need to add a plywood plate on the inside of the fuselage where the second set of gear is mounted for reinforcement.
Because most commercially available fl oats have a hardwood spine down the top of the float, I use nose gear-mounting blocks to attach the axle to the fl oat. The recommended distance between the fl oats, center to center, is 30% of the wingspan. The existing gear is not that wide, but it works for my models up to and including a 1.80 cu.in. model—except in significant wind.

Your entire float system should be rigid. This requires a crossbrace slightly ahead of the front mounting point. On larger models, another crossbrace behind the rear mounting point is a good idea. I use aluminum straps from a local hardware store. On larger models I also use an N-strut from the bottom of the rear landing gear to the top of the front landing gear.

Positioning the Floats
Block up your fl oats on the workbench so that the tops are level and they are the appropriate distance apart, allowing you to set your model on its landing gear on the top of the fl oats. Typical fl oats have a step roughly 50% back from the tip of the float. When the model is setting on the top of the fl oats, the step should be 1/2 to 1 inch behind the CG. Think of the step as the axle location on a tricycle-gear model. You want the nose to gently come down when the model lands on the step.



The placement of the floats and the design of their bottoms can make a significant difference in how they handle on the water.

The front of the floats should now be 10-12% of the float length ahead of the propeller disk. If the tips of the floats are not far enough forward (and you bought the correct length of float) you can modify the step position by as much as 5% of the float length by glassing in balsa blocks behind the step.

Wing Incidence
An incidence meter is required for measurement. With the tops of the floats level, the wing needs to be approximately 2° positive. This is a critical measurement. If needed, you can use small blocks of hardwood between the nose gear blocks and the float top to achieve the proper incidence.

A group of pilots at the Heart of America Float Fly show off their Model Aero Polaris aircraft.

Water Rudder(s)
Unless you are flying in calm conditions, you will need a water rudder to have positive control of your model while taxiing. Whether you need one or two rudders is dependent upon the design and size of your model. Smaller models can typically get by with one rudder, but larger models, particularly high-wing airplanes, need two for positive control.

The water rudder(s) must be positioned so that they do not touch the water when the model is on-step (at speed). This means that the bottom of the water rudder should only extend roughly 1/2 inch below the bottom of the rear of the float. At low taxi speeds, the model rocks back toward the rear and this rudder location gives good authority at taxi speeds.

The simplest water rudder is one that uses a wire attached to the airplane's rudder. I use a 1/16 wire with a loop at the top for a 4-40 bolt. I use two rubber washers on each side of the loop and a nylon insert nut so I can adjust the tension.

The rudder needs to be able to "kick up" in case you hit something in the water or set it down against something on shore. It only needs a small spade at the bottom.

When using rudder(s) mounted on the end of the float, you can make your own, but it's easier to use the ones available from Ernst Manufacturing. You can be creative when attaching pushrods or cables. I prefer to mount the servo in the top of the float and run the servo lead up the rear strut to plug into a Y-extension from the rudder channel. If you are mounting a servo in the float, I recommend a waterproof servo.

Ernst Manufacturing retractable rudders are available in different sizes and work well.

Water Proofing
I try to seal as many openings in the fuselage as I can, including the wing saddle. Beyond that, I don't do much waterproofing. My logic is that if I tip one over, that model can't be flown for a few days until I can take it home and thoroughly dry it.
An exception is the engine. I drain the fuel tank (if I think there is any chance that water got in with the fuel), remove the plug, and spin the engine with an electric starter to get all of the water out. Then I refuel and start the engine. I want to get it hot enough that any moisture in it evaporates.

Some modelers are using CorrosionX on their electric components, which is available through the Internet. I recommend it for your ESC if you are using an electric power system.

Scale Floats for Scale Models

There are two components to scale floats: detailing of the floats and full struts, and bracing to attach the floats to the model. Things to consider for scale detailing are nonskid walkways, rails, float access ports, panel lines, and rivets. Scale struts and bracing are also important for a scalelike appearance. Scale ARF floats and float kits are available online.

Bob Mayhew scratch-built this beautiful de Havilland DHC-2 Beaver. The 83-inch wingspan model is powered by an O.S. .91 four-stroke engine and weighs 14 pounds.

Propellers

I do not recommend using wooden propellers for flying off of water. You would be amazed at how much a little spray can damage a wooden propeller.

Takeoff and Landing

On a calm day, it's no problem! Taxi out, go to idle to let whatever breeze there is weathervane your model into the wind, and apply constant throttle. Try to avoid crosswind takeoffs! You are carrying more weight, so you will need a higher airspeed before you lift off. You don't have the advantage of seeing the stuff beside the runway speeding by, and airspeed can fool you on a flat lake.

Let the model skim along on-step for a while. If you correctly set the incidence, it will try to lift off on its own. You should not need to apply much elevator to take off. If you do, then you probably don't have enough airspeed and a tip stall is likely. When airborne, gradually climb out at a low angle.

You will eventually have to land. Flair into your approach, but add a couple of clicks of throttle shortly before touchdown. You want the aircraft to skim onto the water, not prop into it. If it plops, the possibility of going tail over nose increases.

On breezy days, the taxiing can be challenging. Use your ailerons and rudder to quarter into the wind as much as possible. There is nothing more frustrating than a slow roll onto your back before you even get in your first flight. If you are a first-time water pilot and it's windy, control your urge to try it and wait for a calmer day for your first water flight!

Retrieval

I would never attempt to fly off of water without a retrieval boat available. I also like to have a rod and reel handy. I attach a tennis ball to the line and cast it out over the model for retrieval.

Unique Challenges

Because the flotation is in the center of a seaplane, the model has a tendency to tip to one side on taxi and takeoff. There are tip floats on the wing to help keep the model level, but it is easy to catch a tip float.

There are some sport seaplanes that minimize this problem—models that set low in the water with a pod or a tail-mounted engine/motor. Some of these aircraft are acceptable for first-time water fliers. (The Polaris Seaplane Parkflyer, Tidewater, ICON A5, and Neptune 40 have all been reviewed in this magazine and are good examples.)

Single-float models provide the same challenges as seaplanes, but the problems are accentuated because the weight of the model sets on struts high above the water. This creates a slight inverted-pendulum effect, so this type of model has a greater tendency to tip.

Old-Timer Floats
I am fond of Old-Timer-style floats when the model has a vintage appearance. It performs similar to a water ski. With the top of the fl oat level, the wing incidence is either zero or slightly negative.

Hangar 9 1/4-scale Cub floats are on Doug Crummley's Cub.

Summary
Yes, there are additional challenges when flying from water, but the reward of seeing your model skimming across the water makes the effort worthwhile. I hope you found this article helpful.
For information about two great float-flying events, the Midwest Regional Float Fly and the Heart of America Float Fly, visit the websites listed in "Sources."

Tips for Success
- Choose a model that has spritely takeoff power on grass.
- Floats should be 75-80% of the fuselage's length.
- Install rigid float attachments.
- Ensure +2° wing incidence.
- Step slightly behind the CG.
- 10% of the float should be ahead of the propeller disk.
- The water rudder clears the water when on-step.
- Take off into the wind.
- The aircraft should fly to the water maintaining a little power.

SOURCES:

Hangar 9
(800) 338-4639
www.hangar-9.com
Balsa USA
(800) 225-7287
www.balsausa.com
Horizon Hobby
(800) 338-4639
www.horizonhobby.com
Tower Hobbies
(800) 637-6050
www.towerhobbies.com

SeaPlane Supply
(248) 391-5970
seasplanesupply.com
Heart of America Float Fly
rcbarnstormers.info
Midwest Regional Float Fly
www.skymasters.org