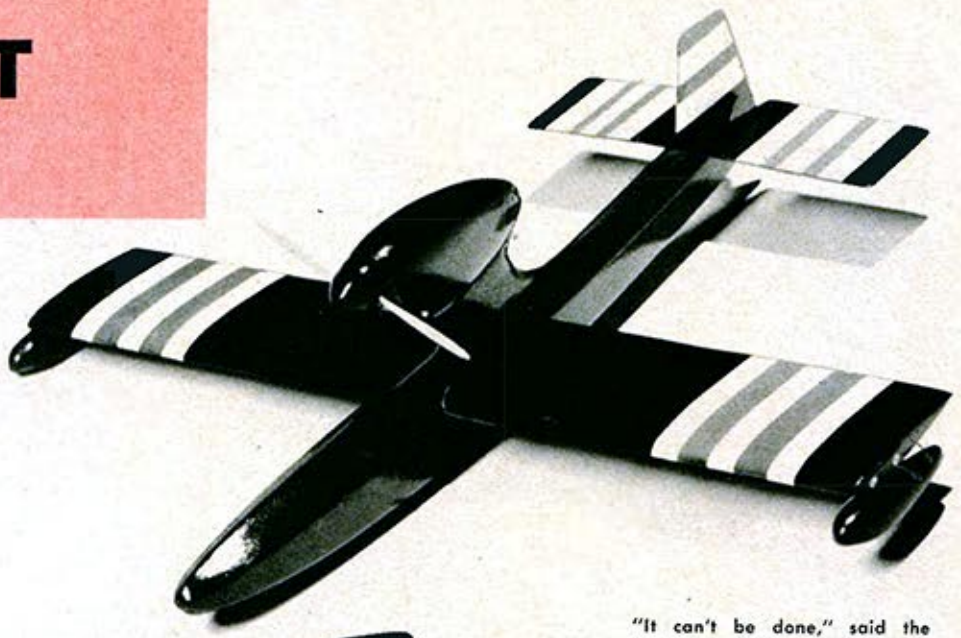
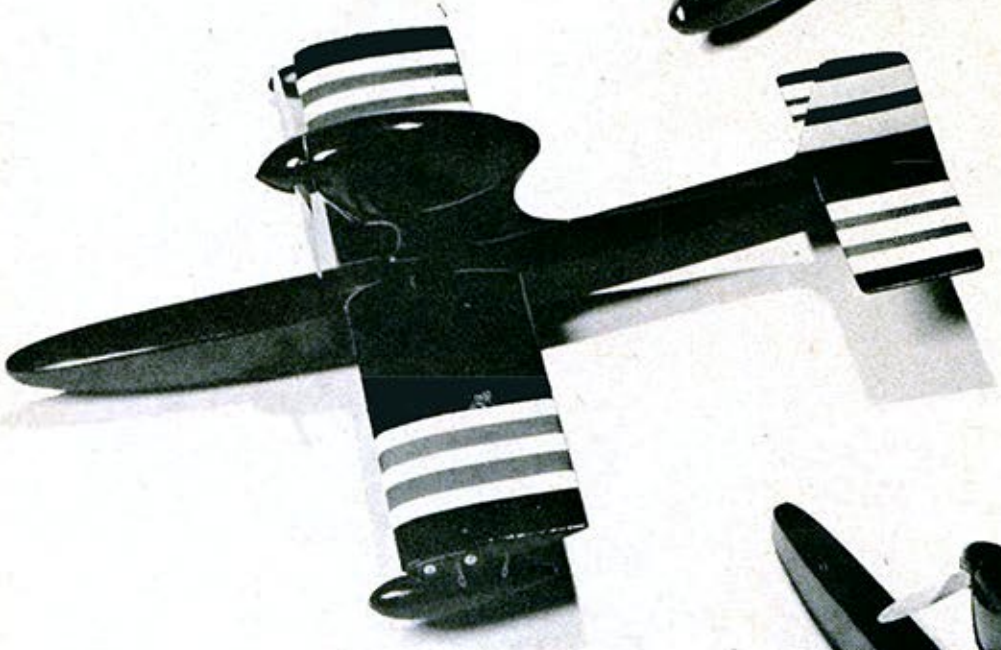
AQUABAT

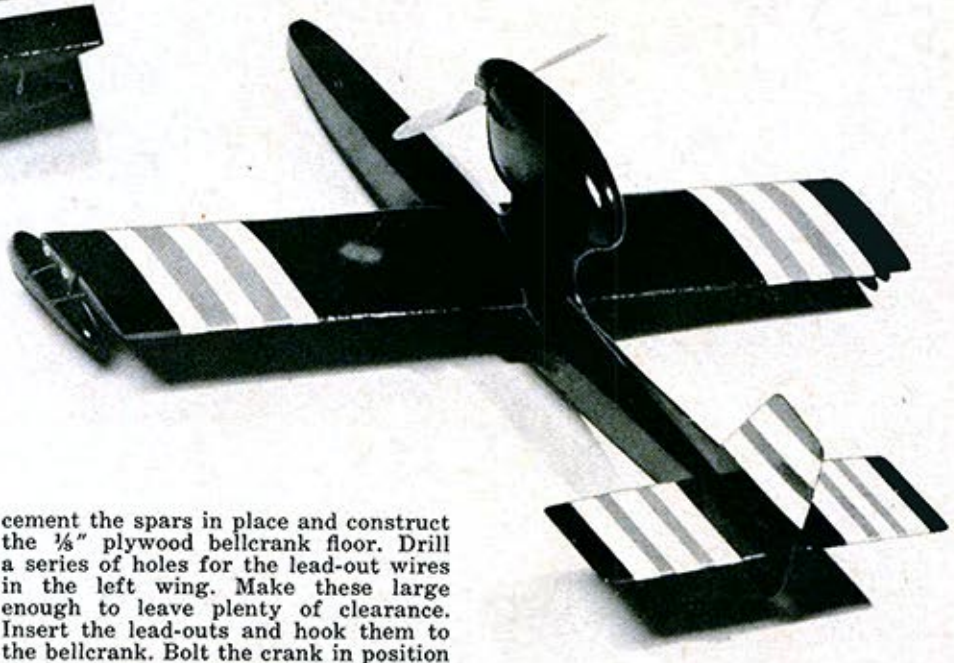
First in a series of new types of models—a hydro stunt flying boat for control-line modellers

by Earl Cayton





"It can't be done," said the first five well-known model designers we contacted. Starting with that, each of them gave us long and detailed reasons on why a control-line stunt hydro couldn't fly. After they got through, we wondered why control-line models flew at all! But Earl Cayton was brave enough to give the idea a whirl. His answer was the "Aquabat"—a successful hydro stunt model which proved to be a terrific flyer on the first attempt . . . opening an entirely new era of model aviation. Scale up the quarter-size plan and be an "aqua-stunter." — *The Editors*



• Yo ho ho and a bottle of fuel! Here's a model that's guaranteed to wet the feet of any landlubber—a control-line stunt flying boat. What's that you say? No water! Well fret not, the Aquabat is equally at home over land or sea.

It's simple to build, too. We've used the squared-off design lines currently popular in stunt circles. The only deviation is the cute team-racer type cowl—and that's optional. So if you're interested, why not try "aqua-stunting?"

PLANS: These are drawn quarter-scale, with the bulkheads, rib and firewall shown full-size to save you time. It will be necessary, however, to scale the dimensions for the wing, tail section and fuselage sides. Note that the top edge of the fuselage side is straight from the bow to the tail—use it as a reference line.

WING: Cut out all of the parts before you start cementing any pieces together. This actually saves a lot of time. Pin down the leading and trailing edges and cement the ribs in position.

After the assembly is dry, fit and cement the spars in place and construct the ⅛" plywood bellcrank floor. Drill a series of holes for the lead-out wires in the left wing. Make these large enough to leave plenty of clearance. Insert the lead-outs and hook them to the bellcrank. Bolt the crank in position so that it moves smoothly and easily. The pushrod should be made from 1/16" piano wire and should be mounted in position at this time.

Using ⅛" plywood, cut and shape the tip float struts. Note that they are bolted to the wing tips. It's advisable to put a piece of brass shim stock under the nuts, and solder them in position. This permits removal of the tip floats without having the nuts drop off inside of the wing.

Once the internal construction of the wing is completed, plank the leading

(*Please turn to Page* 28)

AQUABAT

(*Continued from Page* 10)

edges, wing tips and center section, top and bottom, as indicated.

FUSELAGE HULL: The sides represent the key point in the construction of the fuselage hull. Take care in cutting these parts to shape, and avoid complications. Mark the position of the bulkheads on the inner walls with a ball-point pen. Keep these lines at right angles to the top edge of the hull for accurate alignment of the bulkheads and sides. Use 3/32" sheet balsa for all parts of this assembly.

Next, locate and cement the wing into position. Take care to obtain a 0° (perfectly flat) alignment.

ENGINE POD & PYLON: Cut the firewall from a sheet of 3/16" plywood, following the full-size pattern shown. Make any modifications which may be required by your particular engine before proceeding with construction. The original model used a K&B .19 engine mounted radially, inverted. This was done with the aid of a radial mounting plate. If you prefer, beam installation can be used.

The pylon is made from a lamination of two ¼" sheets of hard balsa. Follow the complete outline shown on the plan. Cut out an opening large enough to insert your favorite fuel tank and hook it up to the engine. The entire assembly is covered with soft balsa blocks which are cemented in place and carved to shape.

You can leave the engine out in the breeze for simplicity, or carve a neat cowl from a 2¼" x 2¼" x 3¾" balsa block. Another ideal method is to use fibre-glass molding materials to form the cowl.

Insert the pylon assembly and cement it securely to the fuselage hull and the top of the wing. Add some balsa gussets at the base of the joint to stiffen the mounting. Cover the open sections with 3/32" balsa sheet.

Add a rock-hard nose block to the front of the fuselage. This can be carved from a piece 1½" x 2" x 2". Don't hollow this out.

Note the balsa fillet which mounts under the stab. This acts as a tail mount and should not be omitted since it supplies extra strength.

UNDER-HULL DETAILS: Since the model is designed for use on land as well as water, we included a 1/16" piano wire skid along the bottom of the hull and the tip floats. This also prevents damage by floating debris which you might encounter. Use a piece of the same wire for the rudder skid.

A small aluminum rudder is bolted into position as shown. This is a great aid during taxiing, since it will keep the model toward the outside of the circle until flying speed is reached. Usually, only a small amount of offset is required.

Landlubbers can insert a wheel-type landing gear by mounting a 3/32" i.d. tube through the fuselage. Make up a plug-in gear, as indicated, and you're all set for land-locked flying.

TAIL SURFACES: The rudder and elevator are both made from hard ⅛" sheet balsa. Be sure to cement ⅛" square strips along the bottom of the stab to prevent warping. Also, notice that the stab is double-thickness at the center section. This is done to strengthen the unit for shock landings.

Mount the elevator with a ⅛" negative incidence (the leading edge lower than the trailing edge). This is done to counteract the nose-down tendency produced by the high placement of the thrust line.

Cement the rudder in position and fair the long dorsal fin into the top of the fuselage. The curve should blend right into the pylon.

Use your favorite elevator hinges and horn. Make sure that these work smoothly without being sloppily fit. The pushrod comes out of the fuselage side at about the leading edge of the stabilizer. Bend the wire so that it parallels the fuselage hull and engages the elevator horn. This can be done on either side of the model.

TIP FLOATS: Use soft balsa blocks to make the tip floats. Cut the blocks roughly to shape and cement them to the struts. If you wish, hollow out the centers to reduce weight. Then carve and sand the floats to shape.

FINISHING: Cover the wing with model silk. This material is rugged and will take considerably more abuse than silkspan. Apply at least ten coats of fuel-proof dope for a proper seal. It would be advisable to dope the entire framework with three or four coats before covering, to waterproof the wood. It's unfortunate, but model airplane dope seems to leak water. Taking a hint from model boat builders, you may find that materials like Interlux Marine Primer will prove more durable for the hull and tail surfaces. In any event, don't spare dope.

FLYING: This model handles pretty much the same as any stunt model. Full "up" is necessary throughout the entire take-off run to prevent dunking. Hold full control until the model climbs up to about ten feet—small waves cause the model to bounce up and off before flying speed is reached.

We suggest that you fly from the shore line or out in shallow water. Flying from a boat is fine if you can keep from falling out! Admittedly, the Aquabat will not perform the full stunt pattern as smoothly as regular jobs, but it does provide more fun. Besides, the combination of swimming, boating and flying is hard to beat!

BILL OF MATERIALS

(Balsa unless otherwise specified)

3—3/16" x 3/16" x 36" (hard)	Leading edge, spars
2—1/16" x 1" x 36"	Trailing edges
4—1/16" x 2" x 36"	Wing planking
3—3/32" x 2" x 36"	Wing ribs, fuselage sides
2—1/8" x 2" x 36"	Tail
1—1/4" x 3" x 36"	Pylon
1—1-1/2" x 2" x 2" (hard)	Nose block
2—1" x 3-3/4" x 5-1/2"	Pod blocks
1—2-1/4" x 2-1/4" x 3-3/4"	Optional cowl
2—1-1/2" x 1-1/2" x 7"	Tip floats
1—3" x 6" x 1/8" (plywood)	Float struts, landing gear floor, tip wing ribs

.099 to .23 glow or diesel engine; 3/16" plywood; 3/32" piano wire; 3/32" i.d. metal tubing; "J" bolts; 4-40 nuts and bolts with washers; control horn; bellcrank; 1/16" piano wire; .020" piano wire; 1-5/8" spinner (optional); control hinges; stunt tank; 2" diameter wheels; cement; clear fuel-proof dope; colored fuel-proof dope; marine primer; silk or paper covering; aluminum sheet; 1/8" square balsa; 10" diameter prop; plastic fuel line.