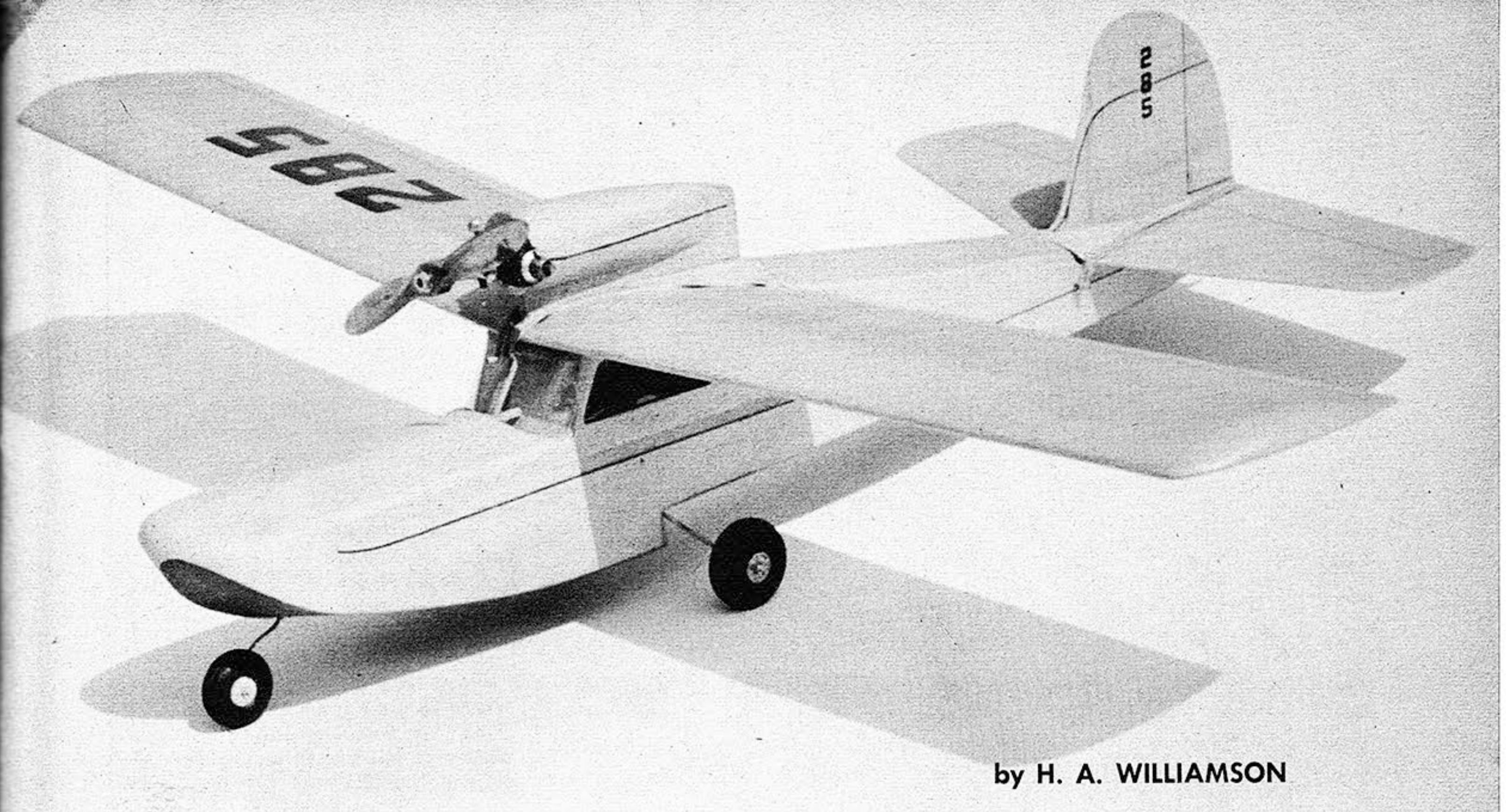


by H. A. WILLIAMSON

More apparent features include the lowest possible thrust line for this type design, and trike gear—all wheels "retract" for water operation.

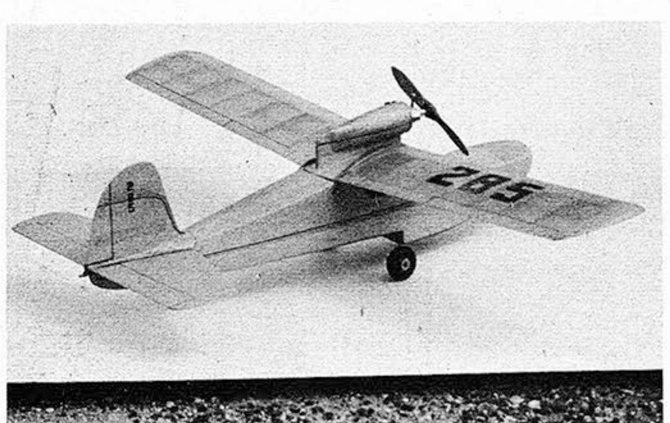
SHOEHORN

This is the time of year when fancy turns to hydro flying. And with a classy boat like this Half-A to try, season gets started with a splash. It's amphibious.

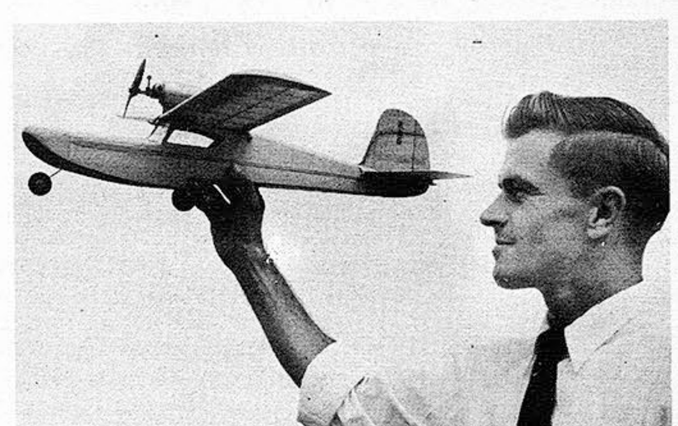
▶ Evidence of the growing popularity of hydro flying was established this year with the inception of several all ROW contests, that included Payload, radio control and flying scale events, all run on the briny deep. Speedy runabouts replaced the old familiar "chase cars."

One of the contributing factors in the sudden interest in ROW models is, undoubtedly, the almost depleted source of suitable land flying sites, particularly along the East Coast. Another factor, perhaps, may be the desire on the part of many modelers to get away from the "cut and dried" classes and try some new and relatively unexplored fields. Admittedly, there has always been a fair amount of interest in the free flight ROW events, particularly at the Nationals. Unfortunately, these models have seldom, if ever, in recent years, reflected any especially noteworthy hydro design. In the main, they were, and are, tried and proven pylon type ROG models quickly converted to this new medium by the addition of several small floats. This is not to say that the ROW contestants don't know what the score is: they certainly do! The models are designed to give maximum performance under the existing AMA rules and those guys who have the courage to fly a red-hot pylon job off the wet handkerchief that passes as a tank get my nomination for the Croix de Guerre!

Flying a free flight model off the water for sport is the particular phase we are interested in, since it alone offers the opportunity to try something (*Continued on page* 50)



Low engine mounting and fairly wide hull enables ship to get off water without help of troublesome sponsoons or tip floats. Weight is 8 ounces.



Classy little wagon, we'd say! Hull is given three coats dope, covered, then three top coats—also three coats inside cabin. Green and yellow.

Shoehorn

(*Continued from page* 19)

new and unusual without being hampered by a stopwatch.

An amphibian such as the Shoehorn is an example of a model of this type. It will never win an ROW free flight contest. It probably couldn't get off the water in the tanks usually provided at contests. This ship was designed to give semi-realistic flight and hydro characteristics and is built ruggedly enough to withstand more than a normal amount of abuse.

If you're in the market for something a little different, this may be just the job for you. Even if you don't live within miles of a sizable body of water, or can't swim, the Shoehorn is a nice performer flown as a conventional sport job with the gear down and locked. Several features of this little ship are perhaps interesting enough to mention before we get into the construction details.

The fuselage or hull design is the conventional and very popular sheet balsa type with 1/8 in. square balsa stringers at the intersection of the sides, top and bottom. In addition to an appreciable increase in structural strength, it also reduces the hazard of a cemented joint popping open and thereby allowing water to enter the hull with possibly serious consequences.

When we just "doodled" the design on a piece of scrap paper, it was decided that a "trike" gear would be the thing to have, never giving a thought at the moment to the feasibility of making it work. After one heck of a lot of head scratching and lost slumber we hit upon the arrangement shown on the plans. The nose gear (the real fly in the design ointment) is formed like a bobby pin and pressed into an aluminum tubing socket that is sewn to the first former. The main gear is held on the face of the step by three small clamps and No. 2 wood screws. In this position the ship is rigged out for land flying. To convert to ROW operation, the nose gear is slipped out of the aforementioned socket and inserted in the socket shown in the nose block. The screws in the side clamps of the main gear are removed and the gear is rotated into the retracted position shown on the plans. The two small holes in the step can be plugged by replacing the screws and the main gear is held in the retracted position with a rubber band. This arrangement overcomes the problem of severe center of gravity changes when converting from ROG to ROW and vice versa.

The hull is somewhat wider and more spoon-billed than is normal for a model. This was done in a conscious effort to eliminate troublesome tip floats or sponsons. So far, the idea seems practical, if care is exercised in ROW take-offs. To increase further the hydro stability, the engine nacelle height was kept to an absolute minimum, providing only sufficient clearance for a 6 in. dia. prop and thereby lowering the CG.

Whether or not the hull design is hydrodynamically efficient is debatable. A yacht designer friend says it could be improved and without doubt this is correct. The fact remains, however, that it works and provides loads of flying fun.

The Shoehorn is designed for .049 to .065 engines. Total weight, ready to fly, should be approximately 8 oz. Wing span is 32 in.; wing area, 165 sq. in.

The original model is covered with light green tissue, with yellow trim and black pin striping. So much for the preliminaries. Let's get on with the main event—building your version of the Shoehorn.

Cut out the sides from medium hard 1/16 in. sheet balsa. Notice where the sheets are joined together to get the proper width. Trace the outline of each of the formers on the proper type of material as indicated on the plans. Cut the formers carefully and accurately to size.

Mark the location of bulkheads No.'s 3 and 5 on each of sides and begin assembly by cementing them in place, paying careful attention to proper alinement of the sides. After the cement has dried, begin with former No. 1 and cement the rest of the formers in place.

The 1/8 in. square medium hard balsa stringers are slipped into the notches in the formers and securely cemented in place. Sand the corners of the stringers off to fair them in with the slope of the sides. The top and bottom of the hull or fuselage are cut from 1/16 thick quarter-ground sheet and carefully cemented to each former and jointed together along the center stringers.

Cut the stab platform from 1/16 in. sheet and slip it between the sides and cement in place.

The windshield fairing is cut from 1/4 in. hard sheet balsa and cemented to the front of former No. 3.

Trace the noseblock side and top outline on a medium hard balsa block and roughly carve to shape. Spot cement the block to former No. 1 and carefully carve and sand the block to fair with the fuselage lines. Pay careful attention to the sweep of the bottom lines as shown in the side and front views on the plans. The entire fuselage should be sanded at this point in the construction. Be careful not to round off the chines (junction of the bottom and sides); keep it sharp as shown in the former details.

Make up two aluminum sockets from 1/4 OD x 1/32 tubing as shown in detail by carefully squeezing in a vise. One socket is wired and cemented to former No. 1 and the other is inserted in the front of the noseblock. Then replace the noseblock, cementing it permanently in place.

The nose gear and main gear are bent to shape from 1/16 dia. steel music wire following carefully the outlines shown on the drawings. Place wheels of the proper size on the gear and retain by soldering small brass washers to the wire. Make three small clamps from .010 thick sheet brass by forming it around a piece of 1/16 wire and squeezing it flat with a pair of pliers. The main gear is held in place as previously mentioned with three No. 2 x 3/16 round head brass wood screws.

For maximum strength and watertightness, the fuselage should be given at least three coats of clear dope and a final sanding before covering with tissue or lightweight Silkspan. The covering material should overlap about 1/8 in. at the chines and at the junction of the sides and top. For maximum strength and toughness the noseblock may be covered with silk or nylon. After covering, the fuselage should get three coats of clear dope outside and also in the cabin area. The original was covered with dyed tissue, eliminating the necessity for colored dope and keeping the weight down to a reasonable figure.

To finish the fuselage, the wing and stab hold-down dowels are placed as shown and the .010 thick celluloid windshield and windows cemented in place.

The basic wing construction is undoubtedly "old hat" to all, so we will refrain from any tedious step-by-step procedure. Instead, let's talk a little about some of the points that are a little out of the ordinary. Note, during construction of the wing, that a 1/8 in. space is left between the W-2 ribs to accommodate the 1/8 in. thick plywood engine nacelle keel. This unit should fit snugly between these ribs after the leading edge and center panel have been covered with 1/16 in. soft sheet and the dihedral formers are in place. Care should be taken during construction of the wing to aline ribs W-2 squarely with the leading and trailing edges to insure proper alinement of the engine.

The sides of the engine nacelle keel are covered with 1/16 sheet balsa after it is assembled to the wing. Cheeks, carved and sanded from soft balsa blocks, plus the 1/8 in. ply firewall are cemented to the nacelle as shown. The firewall should be drilled for the particular engine used and may be mounted with small wood screws. If your engine does not have an integral gas tank, an eyedropper, located as shown, may be utilized.

Some 1/16 in. thick sheet balsa is used to construct the fairing from the top of the fuselage to the wing center panel. The wing should be alined properly and pinned to the top of the fuselage to insure accuracy between the face of the fairing and the fuselage. The entire wing assembly should be covered with dyed tissue or lightweight Silkspan. Six coats of clear dope will insure a watertight covering job and reduce the weight of the ship in the long run by reducing the amount of moisture the frame work will absorb.

The rudder and stab are of the simplest design. The rudder is made of 1/16 thick medium hard sheet, while the stab is cut from medium hard 3/32 thick balsa. Anti-warp strips, accurately cut from sheet, are carefully fitted in slots cut in the rudder and stab as shown and carefully cemented in place. Soft balsa fairing blocks are cemented to the rudder and stab and carefully carved and sanded to blend in with the fuselage. In addition to improving the appearance, these blocks add materially to the strength of the cemented joint between stab and rudder.

The empennage group, like the rest of the ship, should be covered with tissue or span and given two coats of very thin dope.

The finished ship should balance on, or very near, the front spar, as shown on the plans. Any wide variations from this point should be compensated for by the addition of weight to the nose or tail, whichever is required. Carefully sight along the wing and tail surface for any signs of warping. Any that may be present should be steamed or doped out before going any farther.

Flight testing, to be on the safe side, should begin by hand gliding into a patch of soft grass. Adjust wing and stab incidence angles to obtain a smooth straight glide with just a trace of stall. First power flights, as with glide tests, should be attempted over land. Initial attempts should be made with reduced power, gradually increasing the throttle settings until full power is attained. Power flight path should be almost perfectly straight, with a smooth, steady climb. Offset engine thrust line as required to remove all traces of power turn.

At this point in the flight testing, a little left turn should be added to the glide path, but not enough to affect powered flight, to keep the Shoehorn within walking or swimming distance. After the ship is flying satisfactorily over terra firma, the initial water flights can be made.

The gear should be retracted for all ROW flying and the ship hand-glided several times to make certain the balance point has not changed.

ROW take-offs require a great deal of practice and patience but are well worth the effort. If your Shoehorn has been adjusted properly over land, no trouble should be experienced on the bounding main.

You haven't lived until you've spent a warm Sunday afternoon flying a hydro job. Try it and see! END