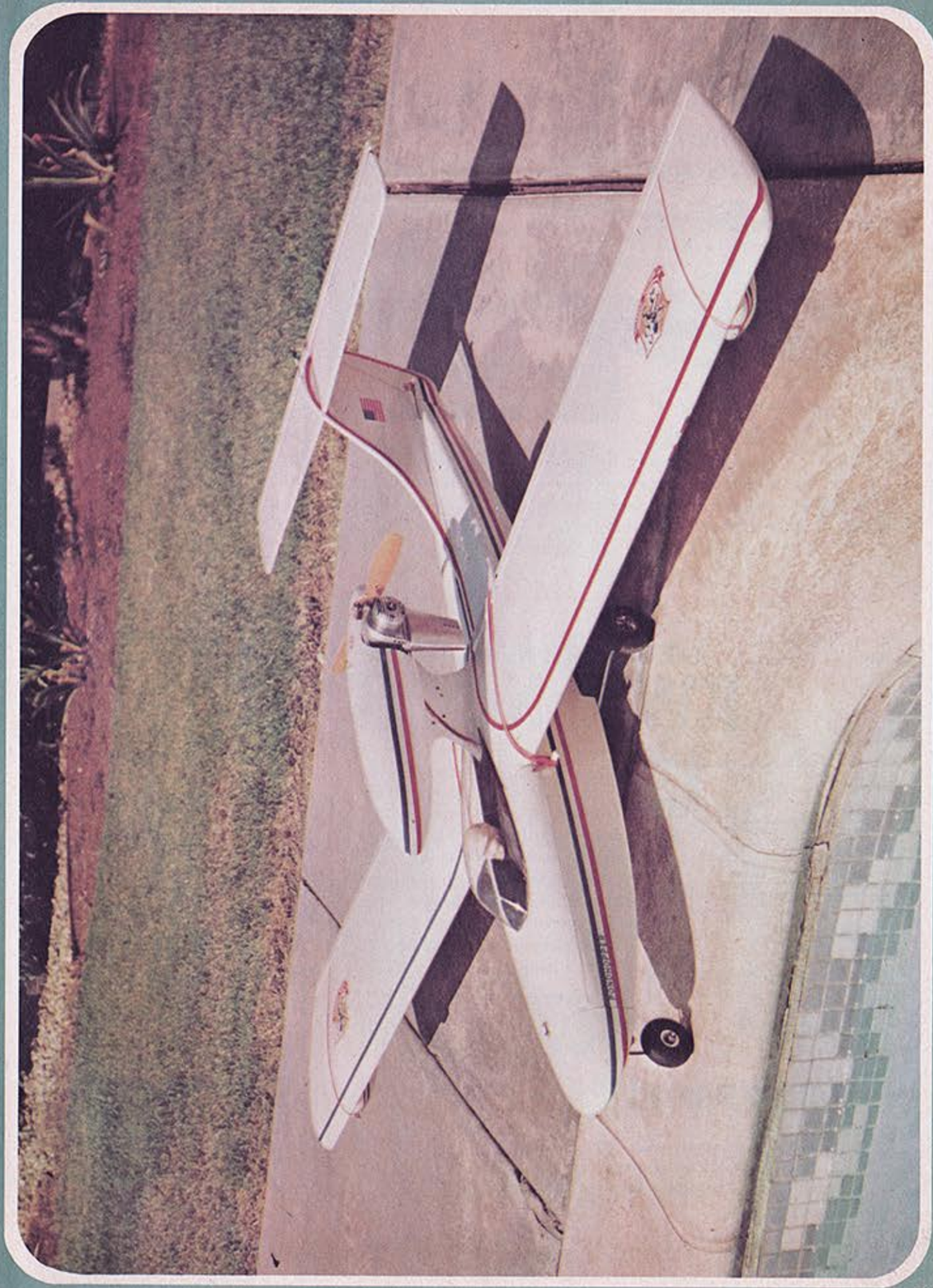


PONDHOPPER

BY KEN WILLARD

The Pondhopper is an amphibious sport plane specifically designed in response to the many requests for such an R/C model that could use engines in the .35 to .40 range. An earlier design, the Puddlejumper, was intended for .09 to .15 engines, and the Wavemaster is a six foot job for .60 power. The Pondhopper fills the ''power gap'' for all you enthusiasts who have a .35 or .40 and want to have the choice of runway or water take-offs.

It's not really a new design. Those of you who built the Puddlejumper will immediately spot the basic design similarity. The reason is simple; the Puddlejumper had excellent water handling characteristics, as well as good sport flying ability. Also, the rectangular cross-section of the fuselage, makes it easy and fast to build. And, by using a slightly modified Goldberg Falcon 56 wing kit, the wing construction is very easy to accomplish. In contrast to this simplicity, the Wavemaster — if you were to build it from balsa — has sweeping double curvature surfaces that would be very time consuming, but which, in a plastic kit, are easy to mold. So, for the scratch-builder, straight lines and single curvature surfaces are the way to go. You'll find that the Pondhopper goes together like any old box fuselage, yet the finished product has very pleasing lines. And the performance with a K & B .40 is WOW!

It takes off easily from the water at half throttle, and almost jumps off if you give it full power. In the air, it will do all the recognized maneuvers (well, maybe not a Lumcavek — or whatever you call it), although I don't recommend it for pattern contests, since it is not all that precise. For pure sport flying, either at the lake or the club field, it's pretty hard to beat.

Construction is quite conventional. There are just one or two details that might need some explanation.

Fuselage (or Hull, if you prefer):

Straight box construction, with the top rounded off at the corners as shown. This gives the impression of double curved surfaces aft of the wing — a pleasing effect. Keep the corners on the bottom sharp; they act as spray rails.

Wing:

The wing is a Goldberg Falcon 56 wing, with the dihedral reduced. Actually, with ailerons, no dihedral is necessary, but with one half inch at each tip, it keeps the wing from having that ''droopy'' look. If you get one of the kits, you can discard the joiners; make new ones from 1/8'' plywood, with the proper dihedral angle as shown on the plans.

Note that the center ribs are separated by 3/8'' so the bottom of the engine pylon can be inserted and epoxied in place. Also, for added strength, I mixed up some micro-balloons with epoxy resin and filled in the rest of the gap after inserting the pylon. Then, at the leading edge, carve some scrap balsa to fair the wing into the line of the aft end of the hatch. And at the trailing edge, add a piece of 1/16'' ply, about one inch wide, to take the strain of the wing rubber bands. For those modelers who think wing dowels and rubber bands are old

fashioned, wing bolts can be used, but they're more work, and take more time, and won't keep the hull sealed any better, so I didn't use them.

Tail Surfaces:

The fin, rudder, and elevator are all cut from medium grade 1/4" balsa, with the rudder and elevator shaped to a taper. You can use one inch trailing edge stock for the elevator. In fact, if you don't feel like building up the stab, it can be cut from 1/4" balsa sheet. It will be a bit heavier, requiring a little more balance weight in the nose, but if you have a K & B .40 for power, the added weight won't even be noticed.

Ailerons:

These are made from one inch trailing edge stock, and installed by trimming the regular trailing edge of the wing to approximately 5/16" wide, rounding, and attaching the ailerons with three hinges on each one.

Forward Hatch:

Carve from a medium soft balsa block.

Nose Block:

Carve from a medium hard balsa block. It will have to be partially hollowed out to accommodate the Goldberg nose gear fixtures and steering arm. Attach it to the hull with tape.

Engine Pylon:

Because of the limitation of my shop equipment, I cut out three 1/8" plywood pylons to the shape shown on the plans, then epoxied them together to get the 3/8" thickness shown. Before you make your pylon, if you're not using a K & B .40, make the necessary changes to fit the mounting holes of your engine. And don't worry about the fact that, with the pylon center mounted, the engine thrust line will actually be 3/16" off center. You'll never notice it either on the water or in the air.

The tank cradle consists of two coffee stir sticks epoxied to the sides of the pylon so they extend back as shown, then fill in the gap between them with scrap balsa. Shape it to fit the bottom of the tank, and hold the tank in place with rubber bands. Incidentally, the ten ounce tank shown will give you about twenty minutes of flight time at cruising speed.

Tank And Engine Pod:

Construction of this unit is optional. On the prototype, I used a couple of Wavemaster half shells and cut them to fit. But, unless you want to buy the whole kit, they are not available separately, since they are molded on the same sheets with other parts. So you'll have to go a different route. There are several. One of the easiest is to carve a block of styrofoam to shape, then cover it with a couple of layers of 6 ounce fiberglass which is solidified with epoxy resin. When dry, cut it down the middle, pour dope thinner or acetone on the foam and dissolve it, leaving the fiberglass shell. This is then cut out as required to fit your engine and muffler combination and attached to the pylon with wood screws. A balsa block at the forward end, shaped to fit the inside of the shell, can be epoxied in place and the shell screwed to the block to hold the two sides together.

Other possible methods are to use a round cardboard box, with the ends cut off and shaped balsa added, then the whole unit epoxied together. Or you can carve a balsa block to shape and hollow it out. One thing to avoid — metal, such as a can. It might be easy to shape, but when screwed to the pylon, if it should work loose, the metal-to-metal contact of the can to the screws could, under vibration, affect the radio.

Wing Tip Floats:

These are carved from balsa blocks. They are held in place on the wing with a rubber band stretched over the top of the wing and looped over the T-pin in the front and the wood screw at the back. Note the notch at the back to keep the rubber band from sliding off. Also, the rubber band is inserted through the slot between the trailing edge of the wing and the leading edge of the aileron. If you have a close fit, make a slight indentation on the trailing edge of the wing. The floats are attached between the second and third ribs in from the tip (counting the tip rib as one).

Landing Gear:

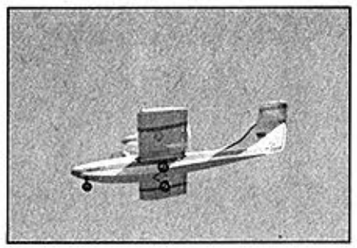
The main gear is a length of 5/32" wire, bent to the shape shown, and attached to the bottom of the hull with three "J" bolts. The nose gear is a standard Goldberg unit, cut to the proper length. Since it is short, there is quite a torsion load on the axle, so be sure to file a flat spot on the strut so the retaining screw won't slip out of line in rough landings. For water flying, the main gear is simply disconnected and the holes for the J bolts covered over with waterproof tape or MonoKote Trim Strip. The nose gear housing is left in place and the strut removed together with the steering arm. Also disconnect the clevis on the control rod — or remove the entire rod. Then plug the hole with tape or Trim Strip.

Radio Installation:

Since it is difficult to put the servos in waterproof housings, they should be up and off the bottom in case water does get in the hull. I used the simple method for the elevator and rudder servos — taped them to the sides of the hull with servo mounting tape. Now some flyers don't trust that system, but I've never had a failure. If you prefer, servo rails can be epoxied in place, but the servos must be separated so the NyRods going back to the control surfaces will clear the aileron and motor servos which are mounted in the wing.

The aileron servo is mounted to the wing on rails which are epoxied to the bottom of the wing. A cut-out in the wing sheeting between the leading edge and the forward spar permits the servo to be partially buried in the wing. Another cut-out on the other side of the center gap accommodates the motor servo, which is inserted at an angle so the end of the flexible shaft to the motor control horn comes through the wing and is parallel to the top of the servo. The servo is held in place with servo tape on the side holding it to the side of the center rib.

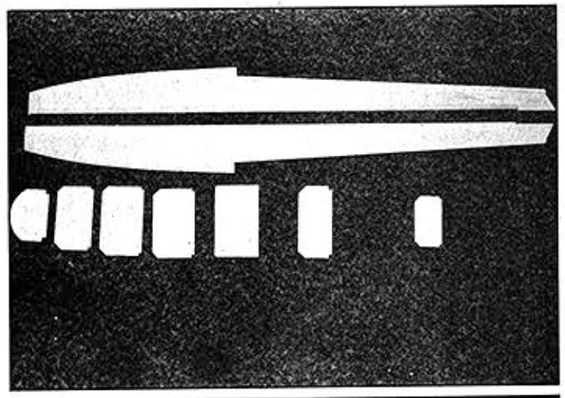
The receiver and battery pack are

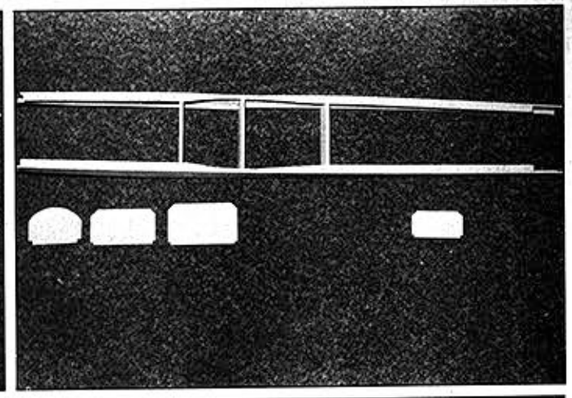


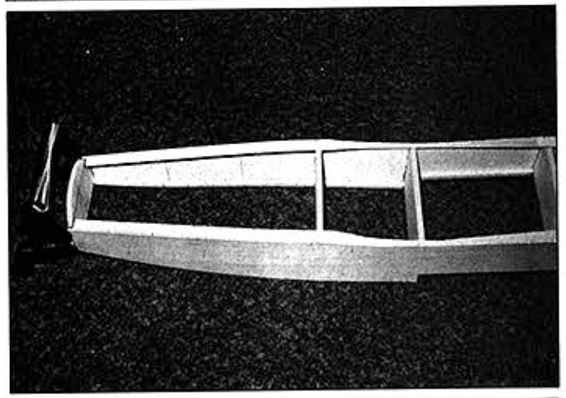
PONDHOPPER
Designed By: Ken Willard

TYPE AIRCRAFT
Amphibian, General Sport
WINGSPAN
56 Inches
WING CHORD
10¼ Inches
TOTAL WING AREA
570 Square Inches
WING LOCATION
Shoulder Wing
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL, Each Tip
½ Inch
O.A. FUSELAGE LENGTH
44¾ Inches
RADIO COMPARTMENT AREA
(L) 10½" X (W) 5" X (H) 3"
STABILIZER SPAN
24 Inches
STABILIZER CHORD (Incl. elev.)
6 Inches (Avg.)
STABILIZER AREA
144 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
T-Tail
VERTICAL FIN HEIGHT
5¾ Inches
VERTICAL FIN WIDTH (Incl. rudder)
8 Inches (Avg.)
REC. ENGINE SIZE
.35-.40 cu. in.
FUEL TANK SIZE
10 ounce
LANDING GEAR
Tricycle or Water
REC. NO. OF CHANNELS
Four
CONTROL FUNCTIONS
Rudder, Elevator, Ailerons, Throttle
BASIC MATERIALS USED IN CONSTRUCTION

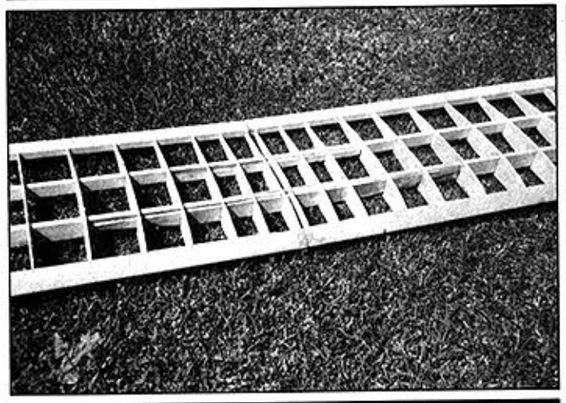
Fuselage	Balsa and Ply
Wing	Balsa and Ply
Empennage	Balsa
Weight Ready-To-Fly	96 Ozs. (with wheels)
Wing Loading	24.3 Oz./Sq. Ft.

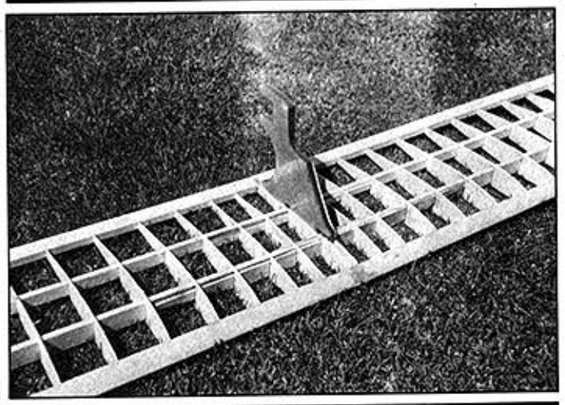


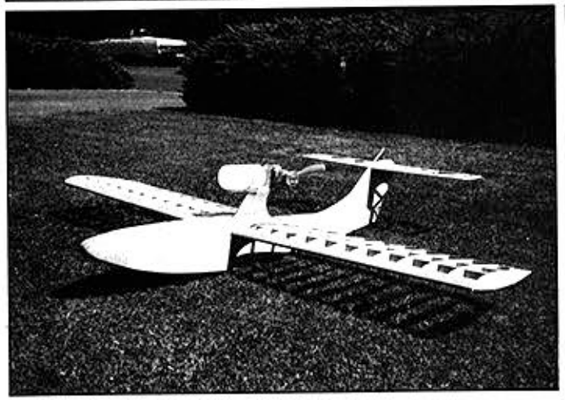


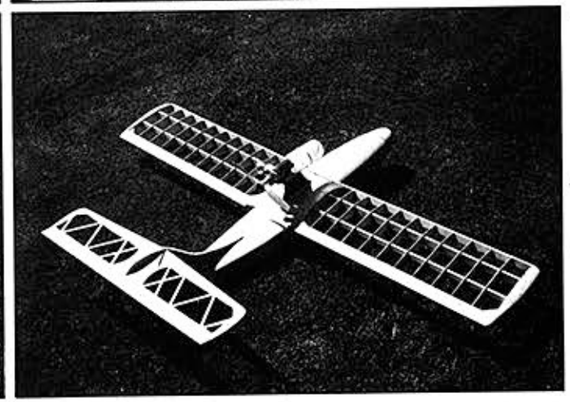


1ST ROW, LEFT: Basic fuselage sides marked for former positions. Formers cut out, ready for installation. RIGHT: Three main formers used to join fuselage sides together. 2ND ROW, LEFT: Clamps used to hold nose former in place. Check fuselage side curvature for proper alignment. 3RD ROW, LEFT: The modified Falcon 56 wing used on the Pondhopper. Note center section slot for tank and engine pylon. RIGHT: Engine mount pylon in place in center section slot. 4TH ROW, LEFT: The Pondhopper, ready for covering. RIGHT: Top three quarter view of the Pondhopper. Simple construction and top performance.









RCM's Chief Sunday Flier and a Pondhopper prototype. Equally at home on land or in the water, the performance of Ken Willard's new design leaves little to be desired. Any .35 to .40 engine suitable for power.

wrapped in foam, and then put in plastic bags with the tops twisted around the lead-out wires and taped, or rubber banded, tightly closed to keep out water. There's plenty of room in the hull to put them wherever the balance dictates. With the light stab, my plane balanced out with the receiver and battery pack both in the compartment just ahead of the wing.

Note how the NyRods are routed from the servos back to the tail. The elevator NyRod serves as a leading edge for the fin, and the rudder NyRod goes alongside the fin back to the rudder. To hold the NyRods in place, I used Zap.

Waterproofing:

Every exposed piece of wood must be waterproofed. If you finish your model with Hobbypoxy or one of the resin finishes, that takes care of it. I finished the main surfaces of my model by covering them with MonoKote, overlapping the seams at least 1/4'' to make a good seal. Then, where MonoKote wasn't practical, or easy to use, such as on the tip floats, I painted the surfaces with Hobbypoxy. The inside of the hull forward of the bulkhead at the trailing edge of the wing, should also be waterproofed, since the wing, or the hatch, might be dislocated in some way during a rough landing, letting water inside.

Both the wing and the hatch sit on mounting tape which is attached to the top of the sides of the hull. In addition, cross pieces at the forward end of the hatch, the rear end of the hatch, and under the leading and trailing edges of the wing, are epoxied to the hull and have tape on the top. Thus, when you cinch down the wing with rubber bands, the tape seals the opening. The same is true for the hatch. In the latter case, I used a metal fitting which can be turned through 90° to press down the forward end of the hatch, then epoxied a couple of T-pins in place on either side of the hatch just forward of the wing, and ran rubber bands over them and down around the wing dowels. It's very effective in keeping the compartments dry.

Canopy:

This is just for appearances, but it does add a touch of scale realism. It can be mounted permanently, or held in place using the thin servo mounting tape. The rear end is cut out to fit around the front edge of the engine pylon, and lifts off easily without having to be removed from the hatch.

Flying:

When flying as a land plane, the Pondhopper is just like any other sport plane. If all your surfaces are true, and the C.G. is properly located, it is a stable and easy flying plane with handling characteristics which you can set up to your own taste. Lots of control surface travel will give you all the violent maneuvers you want. Personally, I prefer moderate movement and gentle maneuvers. One thing I'd suggest: Leave the tip floats off so they don't get scuffed up if you drop a wing on landing.

As a flying boat, the Pondhopper is about as well behaved as you can ask for. With the engine idling it taxies around and is easily steered by the rudder, since the bottom extends down into the water when the model is in displacement mode. To take off, just add throttle; the model will pick up speed and come up on the step without having to rock it with elevator. If you go to full throttle it almost jumps up on the step. Keep the wings level with the ailerons — easy if you are headed right into the wind — and then, with just the slightest touch of elevator, it lifts off and heads up for whatever flight maneuvers turn you on.

For landing, just throttle back (you'll need a pretty low idle, otherwise it won't come down) and hold the nose up in level attitude. The model will sink slowly, drop gently on the water, slow down and sink into displacement mode, and you're ready to taxi in, or make a touch-and-go if you prefer.

So far, I have put about fifteen flights on my Pondhopper off the water, and about ten off the runway. There have been no problems. After each flight off the water I have removed the wing and the hatch to check for water in the hull, and each time I've found about three drops. Where they get in I'll never know, but that isn't enough to worry about anyway. But I suggest you do the same thing. It's better to be dry, and safe, than have some water get in and possibly affect your servos.

If you have a .35 or a .40 engine and like the flexibility of flying off water or land, you'll like the Pondhopper.

Tell me about yours. □

FULL SIZE PLANS AVAILABLE — SEE PAGE 189