

PUDDLEMASTER CONSTRUCTION

You are about to embark on a unique R/C modeling experience! The PuddleMaster will provide remarkable performance on a common "can" type 05 electric motor and 6 or 7 cells. We have several motor/battery/prop recommendations for good performance. Refer to the plans for details.

An electric R/C seaplane has much appeal Its ability to fly off of a small pond in silence makes it a plane that can be flown just about anywhereatanytime. The Puddle Master comes up on step almost immediately and is airborne shortly thereafter; it flies in a relaxed manner yetdoesn't "wallow" around like some electrics.

One of the secrets of this plane's performance is its light weight construction. Don't add weight by using excess glue; we recommend construction using thin and medium CyA glue entirely; stay away from heavy epoxy. To construct the PuddleMaster, you will need a flat work surface at least 2' X 3' and common modeling tools.

We would suggest going ahead and punching out all the die cut parts. Carefully remove all the notches from the fuselage side parts and the ribs; clean up any frayed edges with a sanding block. You will be able to identify all the parts by referring to the plans; it would be wise to label them with a soft pencil.

You will find the PuddleMaster's simple construction will build quickly and accurately. We have provided step-by-step instructions to guide you.

FUSELAGE CONSTRUCTION

[] Test fit the fuselage side top and bottom parts; block sand if needed for a good fit. [] On a flat surface covered with waxed paper, make two fuselage sides by carefully gluing

the tops to the bottoms. Drill 3/16" holes for the wing hold down

dowel into each fuselage side where indicated by the "tic" marks.

] Lay both fuselage sides down on a flat surface; position them so both front edges are either to the right or the left and the top edges of each side are facing one another; this way, when you glue the wing saddle doublers in place, you will be making a right and a left side. Glue a wing saddle doubler on the inside surface of the tops of both fuselage sides, being sure you make a left and right fuselage side. After the glue has set, drill the 3/16" dowel holes in the doublers, using the holes you already drilled in the sides as a guide.

[] Cut a piece of scrap balsa from the excess die cut wood, 3/32" X 1/2" X 3/4". Glue this Tail Post to the inside rear of one of the fuselage

[] Test fit the top and bottom halves of the twopart formers (F2A/B, F3A/B, and F4A/B), trimming if needed. On a flat surface covered with waxed paper, glue the two-part formers

[] Drill two 3/16" holes in F5 where indicated by the "tic" marks.

[] On each of the formers, use a pencil to mark a vertical center line, centered from left to right. Use a triangle to draw a vertical center line on each of the formers.

[] On former F3 mark a line 1" on either side of the center line and use your triangle to extend it top to bottom.

[] From the length of 3/16" sq. hardwood furnished, cut two pieces 4" long. On a flat surface, glue these two lengths of 3/16" sq. hardwood onto the front surface of F3, aligning the inside edges of each of them on the two lines you just drew and flush with the bottom of the former. You should have 2" between these two lengths; they will serve as bracing for the motor pylon.

] "Dry" assemble the fuselage by installing the formers into their slots in the inside of both fuselage sides, holding things together with masking tape....DO NOT GLUE!

[] Position the fuselage over the plan's Top View and check that the center lines on the formers are in proper alignment. Adjust and re-tape as needed. When satisfied, glue the formers to the inside of the fuselage sides and join the sides at the tail. Our favorite technique is to run a bead of medium CyA along each joint. Check for proper alignment as the glue sets. When set, remove the tape.

[] Find the triangular shaped 1/2" X 2-1/8" X 5" balsa Step. Study the Side View to determine how it is positioned on the fuselage. Note that the front edge is 1-3/16" to the rear of F3 and the rear 90° angle is perpendicular to the bottom edge. Glue the Step onto the bottom of the

fuselage, positioning it properly fore and aft and centering it left and right.

[] Sheet the bottom of the fuse forward of the Step using the furnished 3/32" balsa sheet stock crossgrained. Start at the Step and work forward. Note: the last two pieces may need to be soaked in a warm water/household ammonia solution (50/50) so they conform to the curvature of the fuselage bottom.

1 Study the plans and note there are two 3/16" square balsa crossbraces on the fuse bottom halfway between F1 and F2 and between F2 and F3. Cut, fit, and glue these in

At this point in time, trim the excess bottom sheeting from the fuselage and block sand, keeping the edges square....DO NOT round off. This is important for the performance of this amphibian.

[] Mark the top edges of the fuselage sides 5-1/2" from the rear.

[] From the length of 1/16" X 2-7/8" balsa furnished, cut a piece 3" long.

[] Glue this piece of sheeting to the fuse lage top from the marks forward to F5. Using a sharp blade, trim away the excess sheeting.

[] Next, use a 3/16" drill to form the hole in this sheeting for the outer "nyrod" to exit through. To do this, first drill two holes 1" back from F5 and lined up with the holes in F5. Next, elongate the holes by slanting the drill rearwards while rotating the drill bit.

[] Locate the two 36" long outer "nyrods" (the larger diameter). Roughen up the outer surface by using some fine sandpaper between your thumb and forefinger. While roughening, PULL the nyrod through the sandpaper

only...DO NOT PUSH or you will kink it. [] Starting at the front, thread each outer nyrod through the slots and holes provided in formers F2 through F5 and through the top piece of sheeting you just drilled. Leave about 1/2" sticking out the front of F2. Glue the nyrod to F3, F4, F5, and the top sheeting. (Do not glue to F2 until after the servos are installed.) After the glue has set, use a fresh, sharp razor blade to trim the excess nyrod off flush with the top

[] Finish sheeting the top of the fuselage from F5 to F4 with 1/16" balsa, crossgrained. When

the glue has set, trim off the excess. [] Referring to the plans, cut, fit, and glue some more 3/16" sq. balsa fuselage braces in place: two vertical braces on the inside of both fuselage sides, half way between F4 and F5 and one across the bottom, right in front of the vertical braces; make sure you don't distort the natural taper of the fuselage sides. Cut and install two 3/16" sq. balsa inside bottom corner braces between F3 and F4.

[] Finish sheeting the bottom of the fuselage with 3/32" balsa, crossgrained. When glue has set, trim off the excess sheeting.

[] At this point in time, we suggest you install your servos and temporarily install the rudder and elevator linkage. We recommend small micro or mini sized servos plus either a BEC (Battery Eliminator Circuit) or a small 100 to 270 mah receiver battery pack for optimum performance. Total radio weight shouldn't exceed 6 oz. Hardware is furnished for the

ROUND EDGE

ROUND EDGE

suggested radio installation as shown on the plans. Install 3/16" sq. hardwood servo rails where desired, making sure proper control linkage alignment is maintained.

HATCH II.

1 Fabrication of the hatch is next. Study the Hatch Detail for clarification and follow this

Cut three pieces of the 1/16" X 2-7/8" sheeting, 3-1/4" long. Glue them together to form a part about 9" X 3-1/4". Trim to 8" X 3-1/4"; we will call this the "front deck". Using a fresh, sharp blade, carefully cut out the hatch according to the dimensions shown on the Hatch Detail and set the hatch aside.

[] Using the 1/16" X1/4" balsa stick furnished, cut and glue "hatch lips" on the inside of the deck, leaving a 1/8" lip all around the cut-out. [] Cuta 5-3/4" long piece of 1/16" X 1/4" balsa stick; it is the Hatch Spine. Glue it on edge to the bottom surface of the hatch, centered left to right and front to back.

] Put the Hatch back in place on the front deck and hold it in place with tape; fit this assembly onto the fuselage front top with the Hatch spine engaging the slot in F2. It will be necessary to trim away F2 to clear the 1/16" hatch lips so the deck fits down flush on the fuselage top. When satisfied with the fit, glue the deck in place. When the glue has set, trim away the

[] After the plane is finished, the hatch is to be secured with waterproof tape all along the

Locate the two 1/4" X 1/2" X 8-3/4" hardwood motor pylon parts. Securely glue them to the front side of F3 and the inside of the 3/16" sq. braces that are installed on F3, flush with the fuselage bottom. Refer to the plans for the proper relationship of the parts. The outer edges of the pylons should be 2" apart.

The 1/8" plywood motor plate can be installed later.

[] Complete sheeting the windshield area of the fuselage with 1/16" balsa crossgrained. You'll have to cut slots to clear the hardwood pylons.

III. TAIL SECTION **ASSEMBLY**

ROUND EDGE

HINGE LOCATION

16 X 1-3/8 X 7-1/2 BALSA ELEVATOR

For the horizontal stabilizer and wing construction, we prefer the Hot Stuff/3M Spray 77 pinless method of construction; that is, use Spray 77, lightly applied, to stick the plans to a flat, smooth work surface. Then spray the plans lightly and cover with waxed paper (not plastic wrap). Now a coat of Spray 77 on the wax paper and you can begin putting the parts down. When you need to remove the wing from the surface, work a thin steel straightedge between the wing and the wax paper and it will

3/16 X 2 X 5-1/8

BALSA STAB PLATE

come off cleanly. If you prefer, conventional techniques can be used with pins and a soft work surface.

[] On a flat surface covered with waxed paper, glue the balsa Fin Front to the Fin Rear, keeping the bottom flush; weigh down to keep flat. When dry, set aside.

] The horizontal stabilizer and elevators will be built over the full-size plans. Put the plans on a flat surface and cover with waxed paper. [] Using the 3/16" sq. balsa stick stock and the pre-cut 3/16" balsa Stab Plate furnished, build the horizontal stabilizer (stab) by cutting, fitting, and gluing the parts together. A fresh, sharp razor blade and a sanding block are your most important tools; good, tight joints are the secret to a strong, light stab. Use pins or weights to keep the structure flat.

[] Using a piece of waxed paper to keep it from sticking to the stab, securely join the elevator halves with the 3/16" dowel joiner. Keep the elevators flat and aligned with the stab as the

] When dry, remove from the work surface.

IV. WING CONSTRUCTION

[] The Main Spar Assembly is the secret to the light, strong wing of the PuddleMaster. It is a balsa/hardwood sandwich; study the outer rib side view on the wing plans to see what we are doing. Locate the four 1/8" X 1/4" X 22-3/4" pieces of hardwood and the two 1/4" X 3/8" X 22-3/4" balsa spars.

[] This is one spot that we recommend using some 30 minute epoxy. On the top and bottom edges of each of the two balsa spars, epoxy a 1/8" X1/4" hardwood part in place. Keep the two spar sandwiches absolutely straight and flat while the glue sets.

[] Leaving some extra paper all around it, cut out the "Dihedral Guide" that is located elsewhere; glue it onto a piece of scrap balsa. Trim and sand to the exact size.

[] Using this Dihedral Guide, sand the angle into one end of each of the main spars. This end of the spar will go to the center (root) of the

[] The wing is to be built over waxed paper covered plans on a flat surface.

[] Starting with the right wing panel, build the wing panels in the following sequence. Line up all parts on the center line of the wing; let any excess go out the end of the wing. Pin a 1/16" X1-1/4" X22-3/4" balsa T.E. sheet on the plans, keeping the edge flush with the wing center

[] Using several outer ribs as a guide, pin down the main spar assembly in proper alignment,

flat on the work surface, keeping the edge that of the wing, making sure you have a 1/2" you sanded the dihedral angle in flush with the wing center line and the angle slanted properly to accommodate the dihedral when the two wing panels are joined.

[] Glue all the outer ribs in place, keeping them perpendicular to the work surface.

Locate the two 1/8" ply Dihedral Braces. Securely glue them to both sides of the main spar at the center of the wing, keeping the CyA. bottom of the braces flat on the work surface and located as indicated on the plans; clothespins are a handy clamp while the glue sets. Pin some scrap 1/16" balsa spacers flat on the work surface where the center ribs go.

[] Now glue the two center ribs in place, keeping the second rib perpendicular to the work surface and the first, innermost rib (root rib) slanted inward, using the Dihedral Guide to establish the angle.

[] Glue the top 1/16" X1-1/4" X22-3/4" balsa T.E. sheet in place.

Glue the 1/4" sq. X 23" Leading Edge Using the 1/16" balsa sheeting provided

cut, fit, and glue the top center sheeting to the two center ribs. Note that the sheeting is crossgrained to the ribs.

[] Using the 1/16" balsa sheeting, also cut, fit and glue the sheeting between the outer ribs in the location indicated for the wing float assembly. The sheeting is flush with the **bottom**

surface of the wing. [] When the glue is dry, remove the wing from the work surface.

[] Using the 1/16" balsa sheeting, cut, fit, and glue the bottom center sheeting to the two [] Trim and block-sand the excess material that

extends beyond both the root and the tip ribs.

] With the wing on a flat surface, glue the 1-3/16" X 1-5/8" X 8-3/8" triangular shaped balsa tip block to the tip rib. The 1-3/16" surface goes against the rib and the 1-5/8" surface runs horizontal to the top surface of the

Carve and sand the tip block to match the

[] Set the right wing panel aside. Build the left off the sawdust. wing panel in the same manner, except for one

Any of the film-type covering materials are

] When it comes time to glue the dihedral wing panel into place and attach it to the left tics. wing panel by securely gluing the dihedral braces (which are affixed to the right wing motorpylons and the firewall is the easiest way panel) to either side of the left wing panel's to finish them. You may also chose to paint the main spar. Block up the bottom edge of right wing panel's tip 4-1/2" to maintain the correct "P1". dihedral angle.

shown on the side view.

From the length of 4" wide fiberglass material (we call it "polymat"), cut four pieces 2" X 9". Use them to reinforce the center section

3/16 X 3/16 BALSA STICK

3/16 X 1-3/8 X 7-1/2 BALSA ELEVATOR ~

overlap in the very center of the wing. Spray a thin coat of Spray 77 cement on to one side of the cloth. Apply the adhesive side of the cloth to the center section of the wing. Be sure to work out all air bubbles. Next, impregnate the cloth with thin CyA. . . Use good ventilation! After the smoke clears, sand the "fuzz" off the

cloth. It may be necessary to apply some more

V. WING FLOATS

] Refer to the Wing Float Assembly Detail and Section B-B for the following steps.

] Lay the balsa P3's flat on the building surface; it is a rectangular part with square corners. Note the slot in the middle of these parts and that the slot is closer to one edge than the other; the closer end is the "front". Label it

[] Glue the flat edges of four P2's vertically on each P3. The pointed end of the P2 goes to the front and the rear edge of each P2 should be flush with the rear edge of P3. The middle two P2's need to be spaced 1/8" apart and lined up on the outside edges of the slot; use the 1/8" plywood P4 to get proper spacing.

Using 1/16" balsa crossgrained, sheet the bottom and rear end of both wing floats. You will need to bevel the edges of P3 with a sanding block for proper fit.

[] Lay each P1 on the building surface. Study the Wing Float Assembly Detail to determine the proper installation of the plywood P4. Glue each P4 to P1, keeping it perpendicular. Reinforce with two 3/8" triangular X 1" braces cut from the material furnished.

] Next glue each P4 into one of the float assemblies, again making sure they are installed properly; P4 should bottom out on the

1 Trim and sand the float assemblies.

VI. COVERING

Before covering, sand the plane smooth with fine sandpaper and thoroughly vacuum

recommended for the PuddleMaster. Any other finishing technique will add too much braces in place, you will need to move the right weight and severely affect flight characteris-A couple coats of enamel paint on the

vertical portion of the wing floats as well as In any event, we recommend a coat of [] Complete the left wing panel as instructed. Coverite Balsarite. It will help waterproof the Round off the leading edge of the wing as structure plus help the adhesion of the covering to the balsa surfaces. Keeping the plane waterproof has to be utmost in your thoughts while finishing. Overlap all seams at least 1/4" and make sure the whole length of the seam is

sealed completely. Before covering the tail surfaces, determine where the glue joints will be to affix the fin to the stab and the stab to the fuselage. Mark with a pencil so that you don't apply the covering to the gluing area. It's best to do it this way rather

3/16 BALSA STICK

fashion. Each hinge location grouping should consist of at least four alternating hinges.

VII. FINAL ASSEMBLY

Elevator: 3/8" Up, 3/8" Down. The wing floats can be installed one of two

floats, the question of non-water flying has

than trimming the covering material away later; if you do it later, you will probably cut through the surface of the wood and weaken it

Cover the fuselage, wing, and tail surfaces. Install the wing hold down dowels.

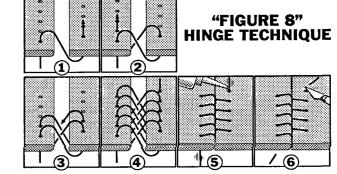
significantly.

] Glue the stab to the fuselage and the fin to the stab, making sure you maintain proper alignment; i.e., the stab square to the fuselage and the fin perpendicular to the stab.

[] Apply a piece of waterproof tape to the fuselage bottom in front of the step for rein-[] Coat the inside of the forward compartment

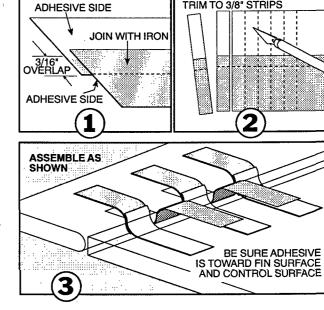
and the area under the wing with some polyurethane varnish to waterproof them. The elevators and rudder can be hinged

one of two ways; either a "Figure 8" thread hinge or an "X" hinge using the covering ma-



If you chose the thread hinge, obtain some heavy button and carpet thread. Using a 1/16" or smaller drill bit, drill a series of five holes in each of the surfaces, 1/8" in from the edge and 1/8" apart. Keep them directly opposite one another. Drill a series of holes at each location indicated on the plans (two for the fin and four for the elevators).

Take a 8" length of thread and harden one end for about 1/2" with thin CyA; it will act as a needle. Tie a knot in the other end. "Sew" the hinge as follows. Move the surface into position. Thread the hardened end through one of the outer holes then bring it back through the gap between the surfaces and thread it through the hole opposite the first one. Repeat for all five holes. Snug the thread so the surfaces are tight together and lined up. When satisfied, put a drop of thin CyA on the thread where it exits each hole.



If you chose the "X" hinge technique, a piece of glass is handy. Cut two pieces of the covering material 1/2" wide by about 10" long. Remove the protective backing from the material. Overlap these two strips adhesive-toadhesive along the edge about 3/16" and secure them together with an iron. Here is where a piece of glass is handy to work on because the film won't stick to it. Now cut them into pieces

about 3/8" wide. Use them to hinge the surfaces in an "X"

Install the radio linkage as illustrated on the plans. Control horns, clevises, and hardware is furnished. It is recommended that radio weight not exceed 6 oz.; larger radios will fit, but weight will detract from the performance. The radio should be housed in the compartment forward of the wing. Throws are measured at the rearmost edge; Rudder: 1" Right, 1" Left.

ways. If you are only going to fly off of water, use silicone sealer to glue them in place. If you want them removeable, use two strips of 1/2" or 3/4" wide self-stick Velcro on either side of P1 along the full length. Of course, the mating Velcro will go on the bottom of the wing.

(While talking about removeable wing

been brought up. The PuddleMaster works fine as an amphibian. Usually, just take the wing floats off and fly off grass...hand launch and belly land. You should put a reinforcing piece of waterproof tape on the fuselage's step for protection. If you want wheels, the plans show the location of removeable wheels. An 1/8" music wire axle can be attached with a couple of standard nylon landing gear clamps; a pair of Dave Brown lite weight 1-1/2" wheels work fine. A plywood reinforcing plate needs to be installed on the inside of the fuselage bottom to secure the clamps.)

Pre-drill the motor pylons for the firewall with a 1/16" drill; screw the firewall onto the top of the motor pylons with No. 2 X 1/2" screws. The motor is secured to the mount with two appropriate screws. The plans show power recommendations and a wiring schematic. The motor wires should run down the rear edge of the motor pylons; waterproof tape can hold them in place....you will have to notch F3 and the windshield so the wires can enter the fuselage. Once everything is in place and operating properly, some silicone sealer will prevent water

The motor batteries can be "velcroed" in the bottom of the wing compartment; make sure the batteries are positioned so the plane balances on the main spar.

If a "can" motor is used, it is recommended that the motor be "broken-in". Run it for about an hour without a prop using your battery charger as a power source and the current set somewhere between one and two amps. That will help seat the brushes initially. The motor will continue to improve in performance after it has been flown awhile.

VIII. FLYING

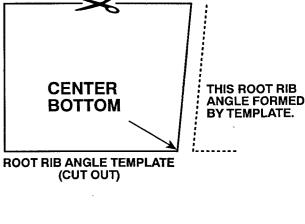
A few things to check before flying. Double check that all covering seams are tight. Use some waterproof tape all along the perimeter of the hatch to both seal it and hold it in place.

Verify the surface throws are the proper amount and the proper direction. Check that the airplane balances at the center of gravity as shown on the plans (the middle of the spar). Make sure the wing is not warped; if it us, twist the wing opposite the warp while you re-heat

the covering. Picka calm day for the test flights. Have the batteries charged. Secure the wing with ten No. 64 rubber bands. Launch the model on the water, apply power, and steer directly into the wind. Adjust the direction so neither wing float touches and when the plane is up to flying speed, feed in a small amount of up and it should break water. Climb slowly until the model is up to altitude. The PuddleMaster is capable of mild aerobatics; you may have to dive a bit to increase speed. When the motor starts to slow down, turn off the motor and glide back to the water. You will find that the PuddleMasterslowsdownnicely. Before touching down, apply just enough up elevator to skim across the top of the water. After landing, you should have enough power to taxi back to

A note on motor thrust. If you are experiencing a stalling tendency under power, decrease the amount of motor upthrust by shimming the top of the firewall with washers. If it tends to dive, do the opposite.

We hope you enjoy your PuddleMaster. If you have any comments, we'd appreciate hearing from you.





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3/16 DOWEL ELEVATOR JOINER