

Primary Class

A 46" span versatile 4-function R/C aircraft for primary fun flying

PeTe 10 has a big brother who is 6 foot 4", so be nice to him!



PeTe 10 is the smallest and youngest of four brothers, all called PeTe by their unimaginative parent. They are differentiated by their number, which indicates engine size - so this one takes a .10, or up to a .15 engine (1.5 to 2.5 cc). This smallest member of the PeTe clan is a bit small for a first trainer and was developed not for training, but for portable fun with trike, taildragger, float-plane or skis.

The name PeTe (originally PT) stands for Primary Trainer - but this assumes that you will have the assistance of an instructor in a club environment. If you're alone, put your 10 in a Lone Ranger (see Oct '99 RCMW free plan), and build PeTe 10 as a follow-on. You can build this model for 3-functions, steered by rudder, or the full 4-functions if you build the aileron wing. Or you can start with the 3-function version and build the aileron wing later. My model used four standard servos and a standard 500 mAh Ni-Cad.

I have gone into some detail in the construction, but the model is really quite simple if built in the intended sequence. So decide now whether to build the aileron wing with 2 degrees of dihedral each side, or the plain wing with 5 degrees of dihedral. Decided? Right then!

Dive In

The tailplane is 3/16" medium balsa, 3" by 16", with 1/2" by 4" strips glued on each tip. Taper the 1" wide elevator as shown.

Make up the fin and rudder from what is left of the sheet.

The wing is similar to the Lone Ranger wing (but without cap strips for simplicity) so refer to the Ten top Tips article which accompanied the Lone Ranger plan in October '99 RCMW.

Use firm, medium density 1/8" sheet for the main spars and doublers, while the aft spars and LE doubler can be light or medium 1/8" sheet. Cut a set of 1/16" balsa ribs, noting that six of them are cut to the dotted line to allow for the centre section sheeting and spar doublers. The LE strip is cut 5/8" wide from 1/4" light balsa.

Assemble the right wing over the plan, starting with the LE strip, the 1/16" LE sheeting and its 1/8" doubler, centre section sheeting, the pre-notched TE, and the lower spars and doubler. Dry fit the ribs to get the spar positions fitting exactly. Now glue the ribs vertical,

except W1 which leans towards W2 by 2 degrees (aileron wing) or 5 degrees (plain wing). Glue the three bay doubler to the underside of the top spar, then glue the spar in place. Add the top LE sheeting (described in last October's Top Tips). Carefully cut a 1/16" vertical slice out of W1 and the first W2 behind the main spar and glue in the 1/16" birchply dihedral brace. Glue 1/16" balsa webs, grain vertical, in the remaining bays. On the aileron wing only, add W6 sub rib which will form the aileron servo box side. Add top centre section sheeting.

Lift the wing from the building board and trim the spars and sheeting flush with end ribs. Bevel bottom edge of one tip piece to 45 degrees and glue to the end rib, supported by three W5 pieces (grain horizontal) and trim them, and the tip, level with rib tops.

Move the right wing along to the position shown dotted (phantom line) on the plan and pin it down with the tip propped up so that the plywood dihe-

dral brace lies flat along the building board.

Build the left wing using the same rib positions as the right wing, except for a 1/16" vertical slice out of W1 and the first W2 before gluing them either side of the dihedral brace. When complete carefully shape the LE with razor-plane and sanding block to shape.

To further reinforce the centre join, give the wood a priming coat of dope or Clearcoat, rub down when dry, then lay on two dry layers of thin glasscloth, 3/4" then 2" wide, then paint on another coat through the glasscloth to wet it out.



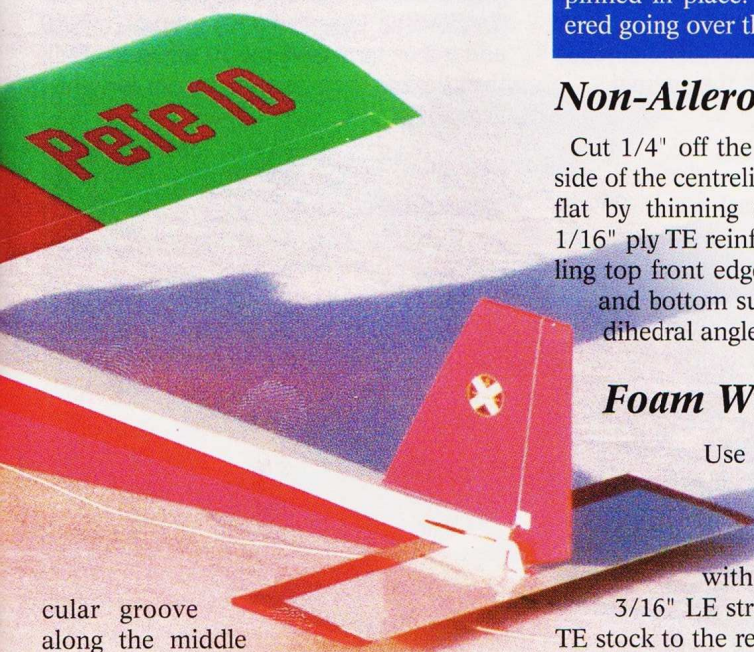
With the main gear in the forward position PeTe is a practical taildragger.

Ailerons

Make a pair of torque rods from 16 swg piano wire, using 2 pieces of brass tube 1/2" long, for the bearings. A 1/2" long piece is soldered on, flattened in a vice, and drilled 1/16" for the clevis connection.

Cut 3/4" from the TE strip, from the centreline to within 3/4" from the tip (which you leave in place). A piece 2 1/4" long is cut from the inner end, and from that 1/4" is cut from the thin edge. Make a semicir-

PeTe learned to ski that snowy winter four years ago - and loved it.



cular groove along the middle of the face that was cut off the TE, and a matching groove along the TE, so that the torque rod in bearing tubes fit snugly between. Glue the wood with torque rod back on, and when dry, file the balsa flat for the 1/16" ply TE reinforcement which you bevel on front and sides, and score top and bottom to make it fit the dihedral angle.

Bevel front edge of ailerons 15 to 20 degrees, shorten to give 1/16" clearance each end, drill the hole and groove for the torque rod, and they are ready to cover and hinge in place.

Hot Tip

My method is to film cover the TE of the wing with a 3/4" strip of film. Then iron a strip of film (3 x aileron chord) to ONLY the LE of the aileron. I slit the ailerons for Mylar hinges and cyano and pin in place. Then continue to cover the rest of the aileron, first taking the top piece around the TE and onto the bottom - followed by the bottom surface back to the TE where there is an overlapped join. The wing TE is then cut for the hinges, and when it all fits perfectly with no gap, the hinges are glued and pinned in place. Then the wing is covered going over the hinge pins.

Non-Aileron

Cut 1/4" off the TE about 2 1/4" either side of the centreline. Sand the top surface flat by thinning its rear edge and glue 1/16" ply TE reinforcement on top, beveling top front edge and sides, scoring top and bottom surfaces to make it fit the dihedral angle.

Foam Wing

Use white foam, cut with templates to match the shape on the side view, and cover with Obeche veneer. Fit 3/16" LE strip, and stick a 1" x 1/4" TE stock to the rear edge, from which the 3/4" chord ailerons are cut exactly as described above, including the 1/16" ply reinforcement. The tips were sheeted with 1/8" balsa.

Fuselage Kit

Liteply is best cut with a scroll saw, but straight lines are easily and accurately cut with a strong sharp knife and steel ruler.

Cut a pair of 1/16" liteply doublers for fuselage sides from the front of F1 to the front of F2. Make sure the bottom rear corner is right-angled, and the bottom front

corner has the correct downthrust angle (cut two together, then separate).

From 1" wide strips of 1/8" liteply make two identical F4 formers and fuselage-side top edges, angled 45 degrees at front and 30 at rear. Mark a line at right angles across both strips at 1.15" (30 mm) from the 45 degree corner, and mark the line 'F2', checking the plan.

Cut out the other fuselage formers to the plan, taking care to get the corners square. Bevel bottom edge of F1 for downthrust angle.

From two sheets of 1/8" balsa, matched for weight and stiffness, cut to 2 1/2" wide by 33 1/2" long and lay side by side. Mark adjacent edges both 'bottom' and 'front' at the far ends, and mark 'left' and 'right'. A line across both sheets perpendicular to the edges, 5.9" (150 mm) from front end, marks front edge of F2.

Place the two sides together, aligning top edges and F2 lines, cut rear ends to length, cut angle of the lower edge, cut 3/16" wide tailplane slot 3/4" from top edge and parallel to it, and make sure both sides are the same.

Hot Tip

If you prefer to cover the tail before gluing it in, you must cut away plastic film to let the glue stick to wood. Cutting with a balsa knife may cut the wood too, leaving a weak point. Try marking the line, lay a steel ruler over the bit you want to keep, and draw a hot soldering iron along the edge of the ruler. The hot iron sticks down the edge of film as it melts through, without scoring the wood.

Fuselage Building

Glue liteply fuselage top pieces edge to edge with the balsa fuselage sides, aligning the marked F2 lines. Check that the liteply tank bay doublers fit accurately along the fuselage bottom and F2 line, then glue. Trim the balsa sides to match doublers along their top and front edges, and glue leftover TE stock to the ply, 1/4" back from front edge. Glue the two F4 pieces, at right angles to the bottom edge, in position, checking the plan and measuring from F2. Glue 1/4" x 1/8" balsa strips on inside edges from F4 to F6 on the top, from F4 to F5 on the bottom edge. Placing the two sides together again, drill 3/16" dowel holes.

Cut the liteply bottom slightly oversize, mark a centreline and pin on your building board or jig, over the plan. Glue F2 in place, at right angles to centreline. Stand



With the main gear aft and a nose wheel PeTe 10 makes a dainty trike.

the sides in place and mark position of F3 on the bottom, and glue in place. Glue two strips of 1/8" birchply to fuselage bottom between F2 and F3. Fix the fuselage sides in place, gluing only to F2 and F3 and the bottom and the ply strips in between. When dry, pull in the sides at the front gluing them to the bottom, and gluing F1 securely to the bottom and sides. Ensure that F1 is central and square on the fuselage bottom.

Pull in the rear of the fuselage sides and glue to F6 above the centreline on the drawing. This is the only tricky bit, and a jig of scrap liteply may help to keep F6 at the right height and on the centreline throughout rear fuselage assembly. Now glue F7 above the tailplane slot, glue F5 in front of F7, then glue on the rearmost piece of fuselage top, whose grain runs front to back. Sheet the bottom with pieces of 1/8" balsa, grain side to side back to about an inch from F5.

Now glue the completed tailplane in place, level with the building board and square with the centreline. Add the final piece of balsa fuselage bottom, grain fore and aft, bevelled to fit against the tailplane snugly.

Make a servo tray from 1/8" liteply, with additional small pieces of birchply glued on to take the servo screws. Trial fit the servo tray in the fuselage, with 3 servos in position.

Stretch thread from the top centre of F3 to F6 and mark a centre line down the piece of top sheet. Cut a slot 3/16" wide for the fin and glue it to the tailplane and top sheet. Dry fit the rudder, attach the control horns, and fit the 'snakes' (oversize). There are guidelines on the plan to help. Fit two strips of 1/8" balsa, drilled to support the snakes, one against F3 and the other half way back in the fuselage. Complete the sheeting of the fuselage top.

Fit scraps of 1/8" balsa on top of the fuselage sides against F2, sand them flush with the plywood ahead of F2, and to fit the curve of the wing behind it.

Fit the throttle snake through F1 and F2 and install a 2 oz fuel tank as high in the bay as possible, with a floor to support it made from 1/16" liteply or 1/8" balsa resting on balsa blocks glued to F1 and F2 or the floor. The tank bay hatch cover is 1/8" liteply cut, rounded off and film covered. It is then taped in place while the 1/4" balsa



With floats fitted you can have a practical floatplane which is happy with smooth or choppy water.

windscreen is cut to fit snugly above it, and against F2 and sides, and then glued in position.

Your fuselage should be straight and true, as it is still pinned down to the plan. Lift it from the board now, sand the top and bottom sheeting to fit, and round off the corners and the windscreen. Fit the engine mount (note offset to left side) with a strip of 1/16" birchply glued to the firewall behind its left edge to give 2 to 3 degrees right thrust. Mount the engine in place and build a balsa cowling with triangle in the corners. Sand the front of the cowling so that when you fit a prop and spinner there is room for F8 with a small clearance, then glue F8 to match up with the spinner.

Undercarriage

Cut two pieces of hard wood (beech engine bearer), grooved across to take the wires, and bend the two pieces of wire to the shapes shown, as retainers. Bolt the wires in place, bind the ends with fuse wire and solder them. The position shown is for a taildragger.

For a trike, position the wheels about 3 1/4" behind the wing LE. Bend a 3 turn coil in 12 swg piano wire for the noseleg, angle the top end to fit behind the engine mount, and bend the axle so that the model sits level, or very slightly nose down. I used a 1 3/4" (45 mm) nosewheel.

Finishing

If using ailerons, cut away the bottom wing sheeting and W1 behind the dihedral brace to make a space for the aileron servo and mount in place on strips of birchply. Make up aileron linkages.

Remove the engine, mount and U/C and shape the cowling with razor plane and sanding block. Give the whole model a final sanding and fuel proof the inside of the cowling and tank bay (I use Solarlac Clearcoat) and the U/C retaining blocks. Cover the whole model with your

favoured lightweight finish, like Solarfilm or Fibafilm or equivalent. Keep it light.

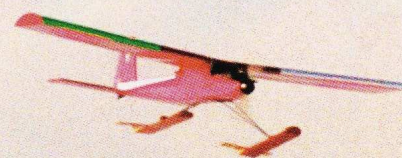
Re-mount the engine, fuel tank, undercarriage etc. and adjust the positions of the servos and Ni-Cad to get the C of G at 2 1/4" aft of the wing LE. The servos can be moved fore and aft, and the Ni-Cad can go under the tank, behind F2 under the Rx, or strapped to the floor behind the servos. Glue the servo tray in position, reinforcing the joint with balsa strips, secure the Ni-Cad and Rx, and make up the control linkages.

Flying

Set the control throws (each way) to 22 mm on rudder, 5 mm for ailerons, 8 mm for elevator. I used an 8 x 4 prop on my .10 and a 2 oz tank gave me 10 minutes of full throttle, but there is plenty room for a bigger tank if you have a problem with that. The trike U/C works well on short grass, but use the taildragger arrangement (with bigger wheels) on longer grass, or with skis on snow, or as the front attachment for floats.

Mine flew well at 44 oz but you can easily save weight. As weight goes down performance goes up. Even at 51 oz with floats the .10 was just adequate, but I have since changed to an ASP .12.

RCMW



Alasdair Sutherland