CONSOLIDATED PT-1 FLOAT PLANE

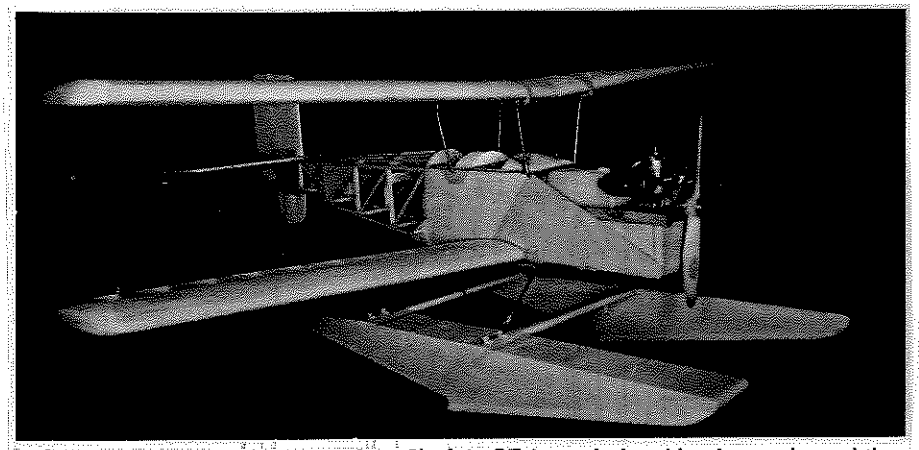
By GEORGE WILSON . . .

• The Consolidated PT-1 was selected because of this author's affinity to relatively square aircraft that have their motors completely exposed. (The editor's preference for biplanes came to mind also!) It is not even "eyeball scale" . . . my source documentation is a single sketch by Douglas Rolfe in the book *Airplanes of the World*. He points out in the caption that the engine was fully exposed to facilitate easy maintenance . . . a sterling approach to aircraft design!

The general configuration was inspired by Bob Lovejoy's *Rumplestadt* published many years ago in *RCM*.

About 10 years ago Fred (Fritz) Hess brought a *Rumplestadt* to the Brimfield meet. It had a single main float and wing tip floats for balance. With a .15 motor, it would not get off the water. However, as Fritz puts it, "With a .19 motor in it, it went like a scalded cat!"

The original model differs from the final plans in several relatively unimportant ways. In fact, the plans were redrawn to simplify some of the construction and add some (probably unneeded) strength to the rear end of the fuselage. The wing structure was also simplified and made lighter. The original uses the built-up wings shown in the plans . . . the foam wings used on the *Rumplestadt* (see the plan) should also work well.



The uncovered airframe (and water frame?) of the PT-1 reveals the wide wing spacing and the uncowled motor . . . like the full-size version. Foam wings could also be used.

FUSELAGE CONSTRUCTION

The fuselage is not difficult, but the following order of assembly will be helpful. Make a left and a right side as follows:

1) Build the 3/16 square frame over the plan.

2) Add the 3/16 gusset behind F2.

3) Install the 3/16 sheet doubler that is above the lower wing. Be sure to leave a slot for F2 to fit into.

4) Carefully laminate the large triangular 1/16 ply front outer sheeting to the rectangular 3/16 sheet doubler that goes under the motor bearers. When cutting out the ply piece, note the notch required for the cabane strut assembly and the hole for the wing elastic band pegs. Note that the doubler is installed 1/8 inch above the bottom to allow for the bottom sheeting.

5) Cement the laminated assembly made in Step 4 to the front of the side frame work. Be sure leave a slot for F1. Join the two sides by pinning them over the top view of the fuselage as follows:

6) Loose fit F1, F2, the rear cabane support, and the two servo tray supports to see that everything is square.

7) Cement the items fitted in Step 6. Pin to the board and to each other, check the squareness, pull the tail end together, and pin temporarily. Take a break and let this much dry well.

8) Cement the tail end together making sure it is centered over the centerline.

9) Add the 3/16 square pieces between the top and bottom frame members under F3 through F6.

10) Add the 3/16 x 1/2 cross pieces at the top behind F1 and in front of F2.

11) Remove from the plan and install the bottom sheeting (cross grain balsa and ply) from the nose to the lower wing.

12) Now is a good time to seal the inside of the partially completed fuselage. Don't forget to seal the inside of the pieces that will not be accessible when they are closed in by other parts of the structure.

13) Install the floor (cross grain) under the tank and motor area.

14) Install the 3/8 sheet "radiator." You may laminate 3/16 sheet if 3/8 is not available. Consider the problem of battery access at this point. The original battery pack was made from individual AA cells mounted on a one-inch by eight-inch piece of 1/32 ply. The cells were taped two by two at one end, on the same side of the piece of ply. A 3/8 square piece of wood was cemented in front of the cells to act as a stop. This assembly was slid in from the rear to the compartment under the tank and motor. The battery assembly can be moved forward or rearward to achieve proper balance.

Before closing up the battery compartment, line it with foam and see that the battery assembly can be slid in and out easily.

15) Install the blind nuts in the motor bearers and then install the motor bearers themselves.

16) Install the 1/16 side sheeting. Cement it lightly in the area of the 1/16 ply inset under the rear cabane strut. (Cut a rough hole for the end of the cabane mounts).

17) Cut out the siding to fit the inset under the rear cabane strut and install the 1/16 ply inset.

18) Now is a good time to think about and make provisions for your push rod installation.

19) Install F3 through F6 and sheet the turtle back area.

20) Install the bottom sheeting (cross grain and 1/16 ply). Install blind nut assemblies as you install the 1/16 ply bottom at the tail end.

21) Install the 1/16 sheet floor over the lower wing area.

22) Install the 1/8 ply gear and float mount stops on the bottom of the fuselage.

23) Install triangular 1/4 sheet gussets (pine, balsa, or ply) for the blind nuts that retain the "hatch cover."

24) Cut and fit the 1/8 ply "hatch cover", and cement the front and rear cowl blocks to it.

25) Finish with whatever technique you have chosen. The original was covered with lightweight Silkspan and doped. Note that the original was not sheeted aft of the cockpit. The Silkspan was doubled in this area. This makes for a lighter tail. If you go this route, make sure that you adapt the tail wheel/tail skid and water rudders accordingly. The blind nuts in the rear bottom of the narrower fuselage will be a challenge. The original had 2-56 tapped bakelite rods in place of blind nuts.

FLOAT CONSTRUCTION

The floats have no compound curves . . . just about as square as you can get and still have them do their thing. This makes them very easy to build.

Cut out the sides and bulkheads and assemble them upside down on your building board. Install the cross-grained

bottom sheeting. Cut the interfloat struts from pine and shape the exposed parts to a streamlined cross section. This is best done before they are installed. Predrill the holes (16 of them) for the clips that will hold the fuselage/float struts to the floats. Install the interfloat struts with the whole assembly held down upside down on the building board. This keeps things nice and square.

When the glue is dry, remove and install the top cross grain sheeting. Rough shape the nose blocks and install them. Finish shaping after installation. Install the chine strips. The original floats were covered with nylon on the bottom and light Silkspan everywhere else. The final finish was dope.

Bend the wire struts as shown on the plan. Install the main struts using the clips. Mount the main struts in the strut stops on the bottom of the fuselage using elastic bands. Then wire wrap the diagonal brace struts to the main struts and solder them. Place a rag under the joints being soldered to prevent excess solder from burning the floats. These struts are "self-jigging" if you follow the foregoing instructions.

CONSTRUCTION OF MAIN LANDING GEAR

Bend the wire struts as shown on the plan. Mount them on the fuselage, wire wrap them, and solder them together. Again, use a rag to prevent burning. Install the wheels.

WING CONSTRUCTION

The built-up wings shown in the plans are very strong and still relatively light. With Coverite's Micafilm, each wing weighed 4-1/2 ounces. Built-up wings can be used wherever a "Clark Y" type, 270 square inch, 42-inch span wing is appropriate. The material that follows is more of an assembly sequence than a detailed set of instructions. However, you will find it helpful to avoid some mistakes that were made while building the original wing.

Build the wing on a flat surface. Attach the plan to the surface and cover it with waxed paper or Saran Wrap. Then, build the wing over the plan. Pin the various parts to the board (or the part already built) as they are called for in the following list:

1) Bottom spars, *use 1/32 sheet scraps to raise them 1/32 inch off the board.*
2) Install the R1 ribs.
3) Install trailing edges.
4) Install the dihedral braces (on one side only).
5) Install the R2 ribs. Use 1/32 scrap under these ribs to space them from the board. Tilt the center ribs to the dihedral angle.
6) Install the sub-leading edges.
7) Install the top spars.
8) Install the 1/32 to top front sheeting on the side with the dihedral braces installed.
9) Join the two panels by pinning the side without the top sheeting to the board and then, adding the other panel carefully blocking it up to the proper dihedral angle.
10) Add the top front sheeting to the panel pinned to the board. *Now*, if you want washout under the tips . . . about 3/16 inch is recommended . . . the trailing edge should be blocked up by several shims (or a tapered strip about 1/2 or 3/4 inch wide) whenever a panel is pinned to the board during the remaining assembly steps.
11) With the panel pinned to the board, install the top *rear* sheeting, first on one panel, then on the other.
12) Install the bottom sheeting (both panels). This is done with the wing off of the board . . . be careful not to build a warp in at this time.
13) Install the webbing between the spars . . . one side at a time with the panel pinned to the board.
14) Install the leading edges . . . one panel at a time, panel pinned to the board.
15) Install the gussets at the corner of the spars and the R2 ribs.
16) Rough shape the tip blocks and cement them in place.
17) Sand the tips and leading edge to final shape.
18) Sand overall and finish with the covering technique of your choice.

CABANE STRUTS CONSTRUCTION

The most difficult parts of biplanes are the building and aligning of the interwing and cabane struts. In this case, the interwing struts were simply omitted . . . a total, but unscale-like solution. The cabane struts had to stay! They were made simply by designing and using the jig shown on the plans. The main struts and diagonal wires are bent to as good a fit as is practical . . . don't be too fussy. The straight wires that go directly under the wing are cut and mounted in the jig. *Before you solder this assembly*, slide some fuel tubing over the center parts of the straight wires to act as cushions and anti-slip devices under the wing.

Wire wrap the struts together and solder them . . . you are done! The jig assures squareness and automatically builds in the proper incidence.

TAIL CONSTRUCTION

The vertical and horizontal tail members are made from 3/16 sheet and are about as simple as they can get. If you like, circular lightening holes can be cut, and hard balsa strips (3/8 X 3/16) added each side of the hinge lines.

Another trick to improve flat surfaces of this sort is to inset strips (3/8 X 3/16 would be o.k.) at right angles to the grain to help prevent warps. The original has none of these frills and seems to be just fine.

Mount the vertical stabilizer on the horizontal stabilizer. Cover and finish each individual piece and add the horns. Then, hinge the elevator and rudder (in that order). The assembly should then be glued to the fuselage . . . nice and square!

FLYING THE PT-1

The moment of truth came long after the water got soft in the Boston area. The roll-out was in midwinter, but the first flight was made a week before Brimfield in May! The wet, windy spring made test flying either impossible, or totally foolhardy.

The first flight was in relatively constant 15 mph winds . . . onshore, thank goodness! A short taxi test came first . . . and we couldn't wait any longer . . . full throttle, a few bounces on the tops of three to four-inch waves and it was airborne! The crosswind landing was a bit hairy, but we taxied back to the beach without problems (the real test of a seaplane).

Next week at Brimfield, it turned out that the original balance point was too tail heavy. With this corrected, the PT-1 flew very well. The only other correction was to lower the water rudder an inch (as shown on the plans). It was coming out of the water at normal taxi speeds as the model rose up out of the water.

A few instructions on flying the PT-1 may be of interest.

1) Use all the rudder throw you can manage . . . a little more rudder area could be built in.

2) Elevator response is good with the clevis in the horn's third hole out.

3) Getting on the step may require a bit of *down* elevator. Gather speed at neutral elevator and then hold down a bit to lift the float aft ends out of the water.

4) Landings will take some practice. With the flat bottom airfoil and light loading, the PT-1 has to be flaired out immediately before touch down, or it will balloon and try to keep flying. However, even "splash downs" are relatively gentle.

All-in-all, you will find the PT-1 an easy-to-fly water plane. It taxis well and does not tend to tip badly in the wind as it turns.

The PT-1 has lived up to my expectations. It will provide all of the fun-flying features of the *Rumplestadt* and add to it the fun of water flying. To date, the land gear has not been tired. However, it would be difficult to imagine poor results.

The author has a thing about seaplanes: why risk spoiling a good seaplane by flying it off the hard, hard ground!

POSTSCRIPT

Summer came, and the land gear was installed. It flew great! And, so far the only dings have been during transportation.

Ed McCarty suggested an incidence change in the top wing. (The *Rumplestadt* with the Range 42 wings needed negative incidence in the top wing, and that's the way the PT-1 was built originally. [The plans are correct.])

Bob Martin made the second test flight, and the results were great. All of the three-channel maneuvers are solid. You have to be quick to stop it at a single snap roll! Takeoffs and landings track very well.

Oh, well, we can't help it if it flies as well as a land plane! Even this old duffer feels competent to fly it and enjoy it. •