PBY-2 CATALINA

In its own way, the Consolidated PBY Catalina is like the DC-3 and the J-3 Cub - - - - it has earned its place in a select group of classic aircraft that promote unbridled nostalgia and great affection.

By Bud Chappell

The Consolidated PBY Catalina is ugly! The streamlining that it does possess is compromised by many examples of parasitic or induced drag. It cannot boast of speed, or comfort, or nimble maneuvering to offset its numerous drawbacks. But in its own way, like the DC-3 and the J-3 Cub, it has earned its place in a select group of aircraft that promote unbridled nostalgia and great affection. These facts, when mixed with a little challenge, make the Catalina an ideal subject for one of the Classic Models.

The features that make it easily recognizable by anyone with the slightest interest in aviation are the same features that seem to cause model designers to shy away. A pylon-mounted wing with struts is not so bad in itself, but the fact that the pylon base must be removable and waterproof is a little more difficult. Adding twin engines to the above, apparently must have exhausted nearly all of the enthusiasm to develop this model; pointed up by the obvious lack of an R/C kit, or even plans except for one or two attempts that have been around for a long time.

The Catalina is not an easy model to build. The construction methods used are not very difficult, but many methods are incorporated in this plane that require lots of time and patience.

On the other hand, if you enjoy building Sport Scale models and especially hydro models, the results and rewards that this airplane can give in return are worth all the time and trouble.

Weighing in at approximately 5 pounds, the plane is powered by two O.S. .10 R/C engines, which I promote and plug all the time. They simply do a great job. The plans are designed as a three channel machine, and I'm sure, as I write this, someone will be thinking that two .15's and ailerons would be even better. Very possibly they are right, but my basic premise in developing Sport Scale models is to keep power, size, weight, and cost at the level where it is sensible and attractively economical.

Apparently, some modelers don't feel secure when considering a twin engined model unless they have two .40's or .60's to haul their creations around. I don't agree with this waste of power and actually feel that many scale-type ships that are built this way suffer terribly from over-power and speeds far in excess of aircraft structural capability and pilot control ability. In general, keeping the model light, simple, and adequately powered is the formula for me. This keeps cost at a minimum, and produces a really flyable airplane.

And flyable is the Catalina's best quality! Taxi her into the wind, open the throttles, a little back-pressure on the stick has her barreling along on the step and then comes that majestic rise from the water — that exhilarating transformation from boat to airplane! Make your climbing left turn to the left, trim a little if you like, and bring the throttles back to one-half. Watching her cruise overhead with that twin-engine gutteral sound always brings out goose bumps

on my neck. How about you - - - do you get the same feeling? Are you ready to start building? If so, let's go!

First, carefully study the plans. Try to visualize the different steps involved. Then, cut from 1/8'' balsa sheet all of the fuselage bulkheads and formers, and the backbone or keel pieces. One exception here is bulkhead ''C'', which is sawn from 1/8'' plywood.

The tray that is formed by gluing 1/16'' sheet balsa inside the formers from A2 to F is a plus in the construction method that gives the hull a great deal of strength. Glue the forward and bottom keel sections to these bulkheads, and then glue on the remaining keel pieces that provide the outline for the top and rear of the hull. Also glue in the tailpost K at this time. One nice thing about this type of construction is that it begins to look like something early in the building stages.

Once all the hull formers are in place, the chine strips and rear side strips are put on. Up to this point, the hull is quite flexible in the rear, and the strips just mentioned allow adjustment and alignment as you go along. The pine wing strut strips come next, followed by the hatch rails of 1/4'' x 3/8'' balsa. The hull, at this point, will become much stronger and easier to handle.

The entire hull is covered with 1/64'' plywood, 3-ply wingskin material, which was chosen for its high strength to weight ratio, and its ability to be bent smoothly around the formers. The material I used was purchased from Sig Mfg. Co., and was very satisfactory.

Cover the bottom first, using pieces that fit only the square from the keel out to the chine and from the center of one former to the next. In short, the hull is covered with lots of small pieces. Also, the top of the hull has very few large pieces because it is too hard to glue much of an area and pin on the skin before the glue dries. However, don't cover the rear from bulkhead F until the pushrods are installed.

This would be the proper time to construct and install the elevator horn, which is exactly like a control line type split elevator installation with the exception of the horn itself pointing directly forward instead of down, when it is installed. The rudder horn, I would like to mention, was purposely not hidden in the hull because of the problem of trying to waterproof the rudder hinge/linkage area.

When the hull has been covered and the nose and tail blocks have been sanded to contour, it is time to construct the pylon. Select a piece of hard 1/8'' balsa sheet and cut pieces to cover the hatch, grain crosswise. When these have been glued together, mark off a centerline and glue on the 7/8'' x 3/4'' balsa strip. To this strip, glue on the 1/16'' plywood side plates. Install the front and rear balsa blocks. Next, glue in the pine header strip, using liberal amounts of your favorite epoxy and some type of clamping arrangement — such as clothespins. Then, put the triangular balsa along each side of the header strip. This forms a base for the 3/16'' plywood wing seat which, in

turn, is drilled and tapped for the wing hold-down screws.

At this point, the dowels should be epoxied to the bottom of the pylon assembly. Take special care to align them correctly and glue very strongly, because they carry most of the wing/hull load. The rear pylon hold-down screws are next, with holes drilled through the rear of the pylon that match the hardwood blocks in the rear corners of the radio compartment. Also glue in a spacer block between the hardwood blocks just mentioned to provide a continuous seat for the foam cushion material.

A little trick I thought of to increase the effectiveness of the foam cushion material as a water seal is this: Glue a piece of heavy mailing twine to the bottom edges of the pylon assembly and across the front of C2 on the front of the pylon assembly. When the pylon is then set into place, the twine will push deeply into the cushion, and prevent water from getting past this point. It is also helpful in equalizing a slightly uneven fit in the pylon construction. Doping the twine is important, too, to keep the twine from soaking up water. Incidently, the pylon assembly is painted with two coats of sanding sealer, and then two coats of color to match whatever scheme the builder intends to use. The original model shown in this article was decorated in the colors of the U.S. Navy, San Diego, California 1938, as shown in the Profile Publication of the PBY. The engine nacelle assemblies should also be doped. The rest of the airframe is covered with Super MonoKote and Trim MonoKote for strength and complete water proofing, but the compound curves of the pylon and the nacelles are extremely difficult to decorate otherwise.

The wing is probably the most conventional part of the model to build, much like most built-up kit wings in other current models. A couple of unusual things to be mentioned are the wing tips which are the floats in the retracted position. As shown on the plans, a set of flying floats should be built and fastened to the wing with rubber bands. This flexible method is not too fancy, but very durable and forgiving to the wing structure.

After the basic wing is assembled, the plywood wing seat plate and the engine nacelle plates are epoxied on, with the next step being to glue up the blocks that form the engine nacelle shapes. Tanks, cowlings, and throttle linkage pretty well finish up this phase.

Some of you modelers may choose to modify this plan to build the PBY 5, or 6. Most of the difference is in the tail group and blisters.

This idea might be interesting to those who would like to build a different version of the PBY. I looked a long time for a commercially packaged product that would provide the proper plastic shape to lend itself to double for the blisters that are the trademark of the later models of the Catalina. I had no way to form them, and I would guess most builders would have the same problem. Fortunately, I discovered an excellent item, in the cosmetic section of a Woolworth's Dept. Store. It is called a "Goody" Hair Foundation, mfg. by the H. Goodman & Sons Co., Inc., N.Y., 10001.

The cost is now 59 cents, and when modified slightly, will do a very creditable job. Some of the "bars" should be cut away to make the window sections look larger. Black MonoKote should be used under each blister unit to give the correct appearance of depth. By also changing the outline of the rudder, which is also not difficult, the builder can construct the late PBY 4 or the PBY 5. If the PBY 5A is chosen, wheels must also be added or simulated on the side of the hull between the lift struts. One of the most complete works of information I have seen on the history of the PBY is found in a current publication called "Wings," Volume 5, #2, April, 1975. Published at Sentry Magazines, 1120 Ave. of Americas, N.Y. 10036, it is $1.25 and packed with information and pictures that are just fantastic. It is a nostalgic gold mine.

PBY-2 CATALINA
Designed By: Bud Chappell

TYPE AIRCRAFT
Stand-Off Scale Flying Boat
WINGSPAN
66½ Inches
WING CHORD
8¼ Inches
TOTAL WING AREA
520 Square Inches
WING LOCATION
Pylon
AIRFOIL
Mod. Clark Y
WING PLANFORM
Double Taper Outer Panel
DIHEDRAL, EACH TIP
3/4" Outer Panels
O.A. FUSELAGE LENGTH
43 Inches
RADIO COMPARTMENT AREA
(L) 15" X (W) 2½" X (H) 2"
STABILIZER SPAN
21¾ Inches
STABILIZER CHORD (incl. elev.)
4⅜" Average
STABILIZER AREA
88 Sq. In. Approx.
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
1/2 Way Up Fin
VERTICAL FIN HEIGHT
7¾ Inches
VERTICAL FIN WIDTH (incl. rudder)
8½" Average
REC. ENGINE SIZE
(2) O.S. Max .10 or .15
FUEL TANK SIZE
(2) 2 or 3 Ounce
LANDING GEAR
Optional
REC. NO. OF CHANNELS
3
CONTROL FUNCTIONS
Rudder, Elevator & Throttle
BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa & Ply
Wing	Balsa & Ply
Empennage	Balsa & Ply
Weight Ready-To-Fly	80 Oz.
Wing Loading	23 Oz./Sq. Ft.

I chose the 2 model, for the generous rudder lends itself to the 3 channel type of control. Of course, the PBY 5 has a redesigned and smaller rudder, which would make single-engine operation much more difficult to manage. With the "2" rudder, the model flies quite well on one engine, and will do nearly all mild maneuvers, except take-off. In fact, with both engines pulling well together throughout the flight, the ease with which this model flies is reminiscent of handling an H-Ray. The long wing and average wing loading are a good combination that produces a lot of lift at low speed and loafs along at cruise like a sailplane.

At this point, I would like to offer a couple of hints in areas that might not have been too clear on the plan. The stabilizer should have about 2 degrees of positive incidence; the opposite of the trim on many models. Be sure not to set the stab at zero incidence — you'll have to fly with down elevator most of the time if you do.

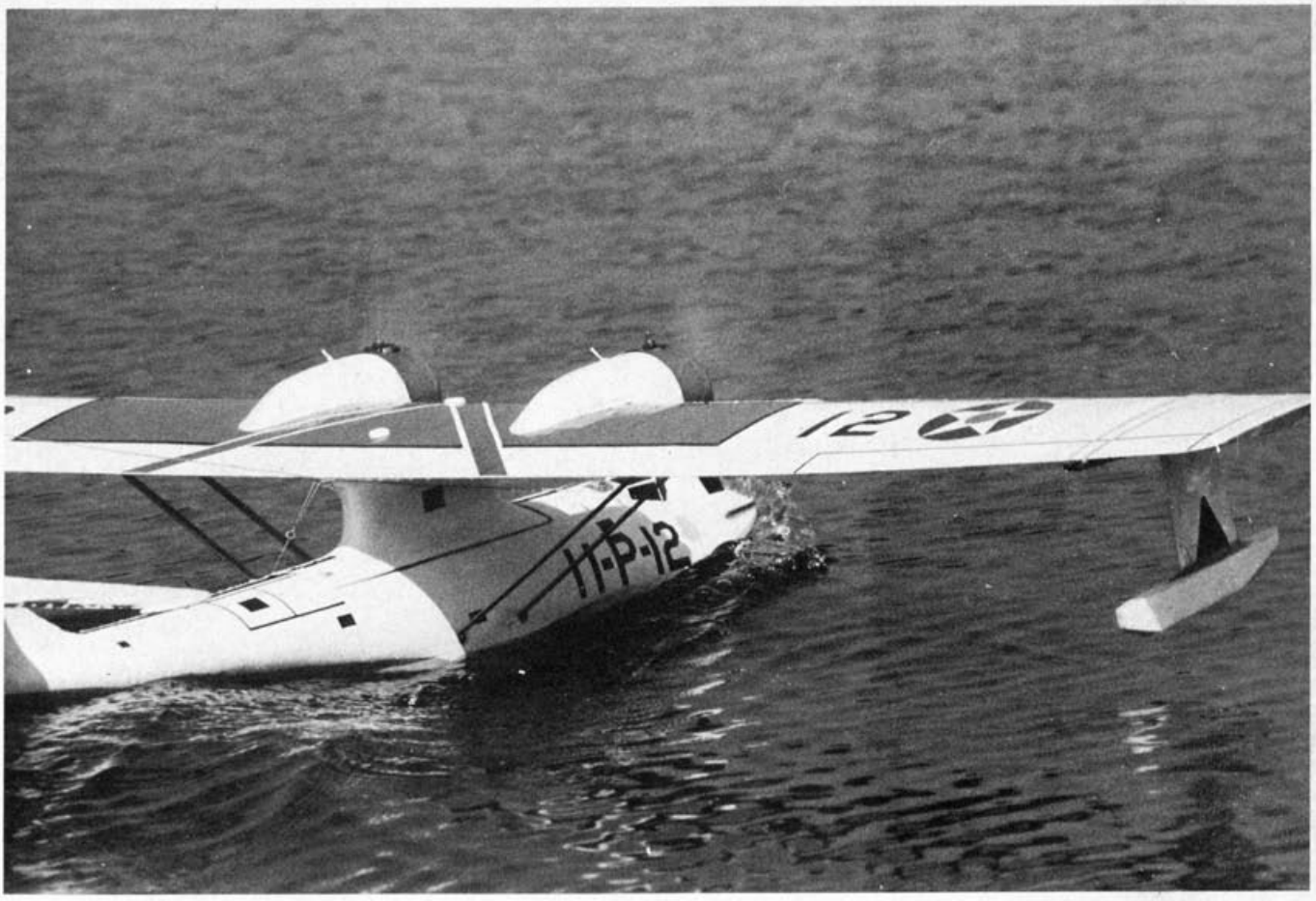
The original model has a tendency to be tail heavy and keeping this in mind as you build will help to diminish this problem. Try to keep the tail structure as light as possible. However, some nose weight may have to be added. The spray rails up front offer a chance to slip in more weight here. I hit on the idea of making them from 16 penny nails (spikes) in the shape of outsized staples, filleted with RTV Silicone rubber material. The results were excellent and provided the extra weight in the form of a functional detail.

This plane will also operate from land on wheels. By making a long vertical hole in the nose at Point A1, and epoxying in a section of 1/8" brass tubing, a pivot point is made to accept a nosewheel. The proper sized wire to go into the tubing should be shaped like a large tailwheel yoke, and long enough to extend through the tubing to be secured by a wheel collar. Even though the nosewheel has no steering capability, it swivels at the command of the large rudder and allows the model to taxi very well.

For the main gear, bend a blank such as a Hallco Gear to fit the bottom of the hull, and then down to meet the main wheels on each side. This unit is then strapped to the wing struts with rubber bands which are hooked together with wire "S" hooks. Be sure to pad the gear blank under the hull with wing seat cushion strips to prevent damage to the bottom.

The landing gear greatly increases the model's versatility and permits you to operate it anywhere you might be — on land or water.

Either way, both ways - - - Happy Flying! □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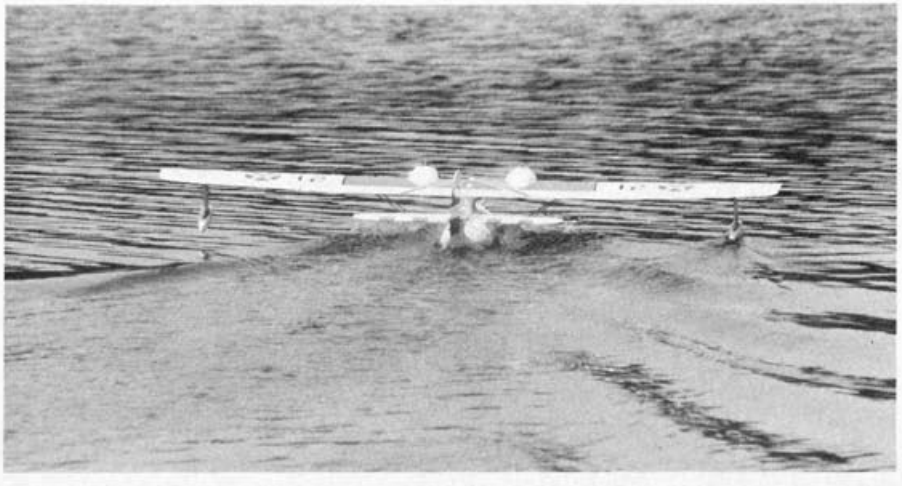

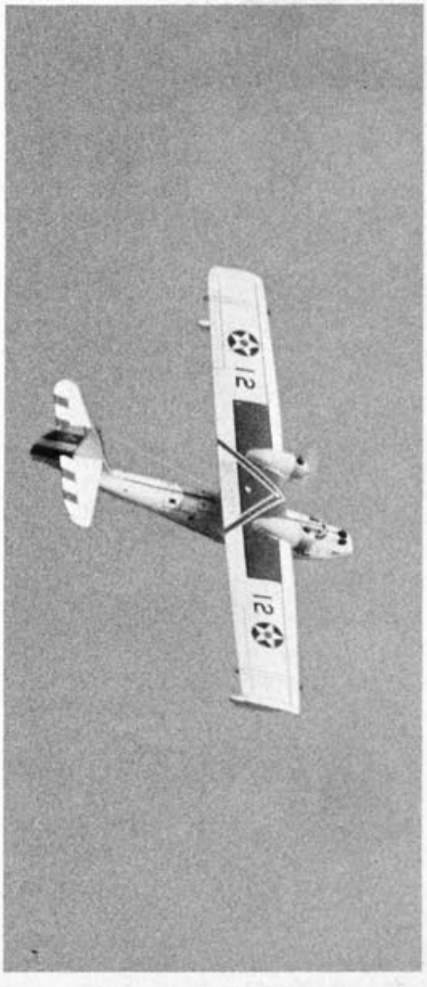
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