The author's PBY Catalina poses on a map of the Pacific Theatre. Advanced techniques were used to build this 1/48 scale masterpiece.

Dental acrylic resin, clear acrylic stock, and polyester resin-coated wood are the main ingredients in this modeling recipe.

Looking for a challenge? Try scratchbuilding!

This outstanding 1/48 scale PBY-5 Catalina was built with unusual techniques

BY PAUL BUDZIK

THE CONSOLIDATED PBY has always been one of my favorites, but there has never been an injection-molded kit in 1/48 scale. Scratchbuilding was my only alternative. Rather than show you how to scratchbuild a PBY, I'm going to highlight some techniques useful in producing parts for any scratchbuilt project.

Dental resin fuselage. I decided to cast the hull from dental acrylic resin — I'm a dentist and work with it often (see "Casting parts in dental acrylic resin," September 1989 FSM). First, I made a wood form for the fuselage

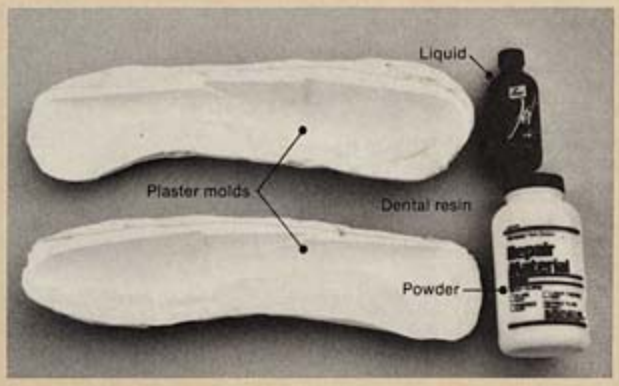

Fig. 1. The fuselage for Paul's Catalina was made of dental acrylic resin formed in a plaster mold.

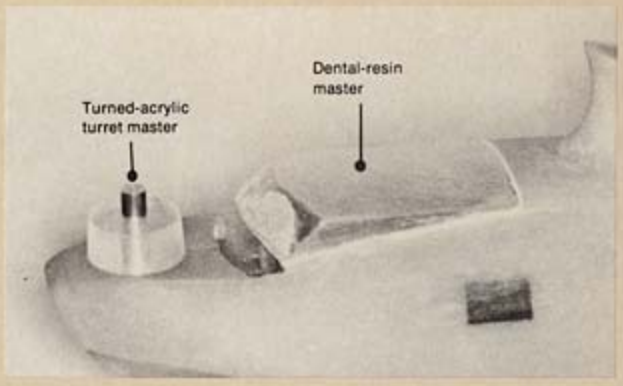

Fig. 2. A resin canopy master and a turned acrylic turret were used to vacuum form the transparencies.

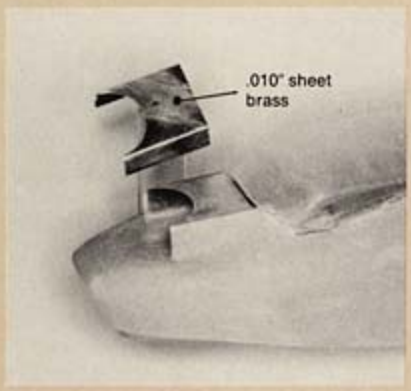

Fig. 3. The fairing between the cockpit and turret was made from sheet brass faired in with dental resin.

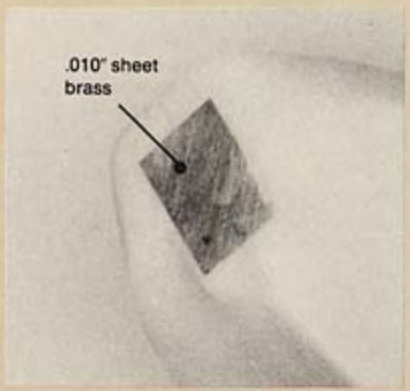

Fig. 4. A rectangle of sheet brass reserved space for the bombardier's window as the bottom contours were formed.

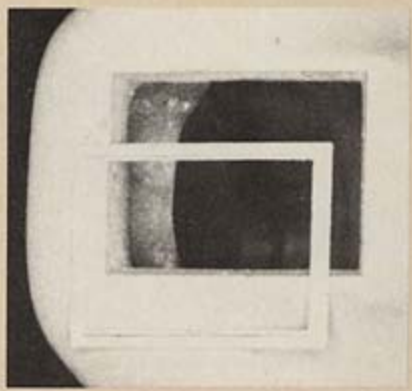

Fig. 5. The brass rectangle was made into a frame for the scribed-styrene window cover.

halves, then made plaster molds, Fig. 1.

Before casting, I applied a light coat of mold-release agent (a light oil or silicone) to the insides of the plaster mold. Casting with dental acrylic resin is easy, but you must avoid inhaling the fumes. I first added liquid, then powder, and repeated the process all along the hull halves until I achieved sufficiently thick fuselage halves. The resin cures in less than 15 minutes. Once the resin set, I removed the hull halves and sanded the mating edges flat.

I used resin to join the fuselage halves and used more resin to improve contours where needed. I opened the cockpit and nose compartment, then added thin sheet acrylic for the roof of the nose compartment and cockpit walls. Next, I made a resin master for vacuum forming the canopy. The nose-turret master was turned on a lathe from acrylic rod stock, Fig. 2. For the fairing around the nose turret I used .010" sheet brass, cut and bent to fit around the turret and up to the windscreen. With the turret and canopy masters temporarily attached, I installed the brass fairing with super glue. Dental resin was applied to the sides of the brass to blend it into the hull, Fig. 3.

A rectangle of .010" brass corresponding to the size of the bombardier's window was cemented to the nose and more dental resin was built up around it, Fig. 4. I sanded to produce the contours of the nose, then removed the turret and canopy masters. Next, I removed the brass rectangle from the nose, opened the resin behind it, and cut out the opening for the nose turret. Removing the center of the brass rectangle produced a frame, Fig. 5, to hold a piece of .030" scribed styrene that simulates the louvered door over the window.

I used the canopy master to vacuum form the large transparency from thin acrylic sheet. I applied Bare-Metal Foil around the new canopy as I fit it into the hull. Dental acrylic resin was used to fair the canopy smoothly into the fuselage, Fig. 6. Since the dental resin won't bond to the foil, I could remove the canopy once the resin had set.

I built the cockpit and nose compartment interior from sheet styrene with machined brass control wheels, Fig. 7. Both interiors were installed through the cockpit opening and cemented in place, Fig. 8.

Acrylic windows. The small windows on either side of the hull and wing pylon were produced with an unusual technique. First, I cut an oversize opening around the location of each window and installed a piece of clear acrylic stock. I painted the inside end of each piece interior green. Since I wanted to be able to see through the windows in the wing pylon, I made the pair from a single piece of rod, faired and sanded smooth with the surrounding contours, Fig. 9. I painted the circumference of the rod with interior green. When the model was painted, each window was masked, producing a flush, clear, rectangular transparency.

The tail section. The horizontal stabilizer was carved from a single piece of clear acrylic sheet. I cut an opening in the fin to accept the horizontal stabilizer, Fig. 10. I scribed in all the panels and control surface hinge lines. For the rib detail on the fabric-covered areas, I cemented thin copper wire around each surface, twisted the ends together to produce tension, then cemented the wires in place with super glue. When this had set, I used a sharp blade to cut away the excess wire, then tapered the ends and blended the wires into the surface with sandpaper.

In order to add interior details to the

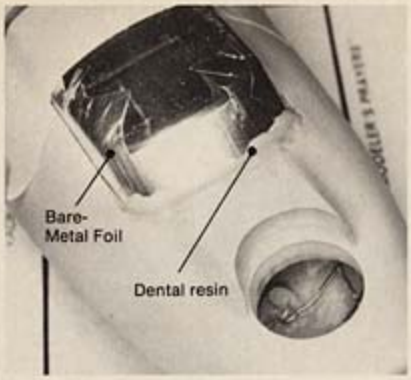

Fig. 6. Bare-Metal Foil acts as a barrier while fitting the vacuum-formed canopy to the fuselage.

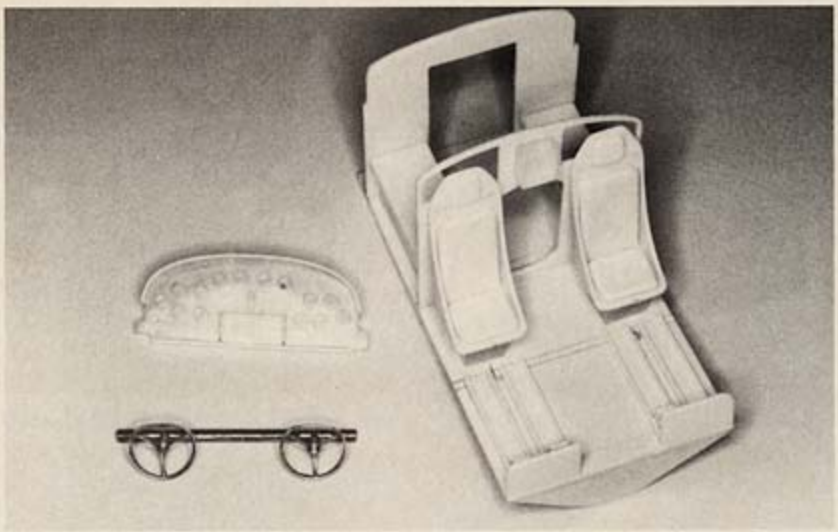

Fig. 7. Paul machined brass control wheels and made the rest of the Catalina's cockpit interior from bits of sheet styrene.

Fig. 8. Both the nose compartment and the cockpit interiors were slipped into the fuselage through the cockpit opening.

waist positions, I had to remove a portion of the fuselage top. I built up the fuselage walls with sheet and strip styrene, then added fore and aft bulkheads, Fig. 11. I converted two Combat Series 1/35 scale .30 caliber machine guns into 1/48 scale .50 caliber guns by reducing the diameter of the barrel and building the shock-absorbing mount, side-mounted grips, site, and shield, Fig. 12.

I made the waist position blisters by vacuum forming thin acrylic sheet over masters carved from dental resin.

Building the wing. Originally I had planned to build the wing from solid acrylic, but this proved to be too heavy and difficult to contour. Instead, I shaped a pine plank with a belt sander. I coated the wing with polyester resin, the kind used in fiberglass construction. I made a simple jig to hold the wing as I applied the resin, Fig. 13. I applied multiple coats of resin, sanding and checking the contours between each coat. Polyester resin can be mixed to set up rapidly so you can build up the thickness you need in a hurry. I fell in love with this resin (even though it stinks to high heaven — work outside) and plan to use it throughout my next scratchbuilding project.

Once the wing was shaped to its final contour, I located the center and drilled two holes through the wing to accept screws for mounting to the pylon on the hull. I placed the wing on the pylon and marked the position of the holes, then drilled into the pylon.

To fair the pylon into the wing, I first covered the mating surface of the wing with Bare-Metal Foil, then loosely screwed the wing to the pylon. I added styrene strip shims between the wing and the pylon until the wing was properly positioned, then tightened the screws and applied dental resin around the edge of the pylon, blending it to the wing. After the resin had set, I drilled two additional .055" holes through the wing and into the pylon center line for wires that would provide precise relocation, Fig. 14. I removed the screws and lifted the wing from the pylon.

All panels and control-surface hinge lines on the wing were scribed in. Scribing polyester resin is a joy — each

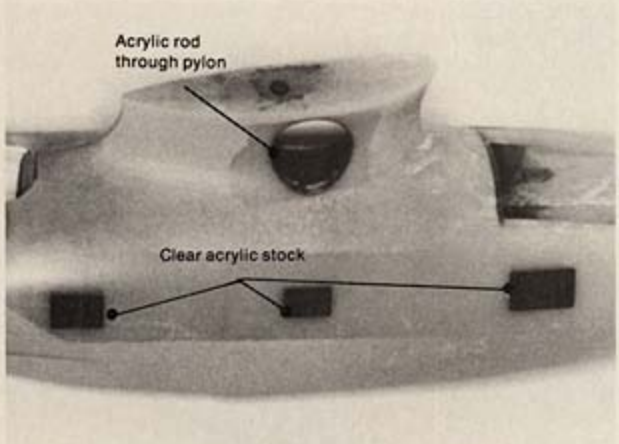

Fig. 9. For fuselage and pylon windows, Paul used clear acrylic stock sanded to shape and polished smooth.

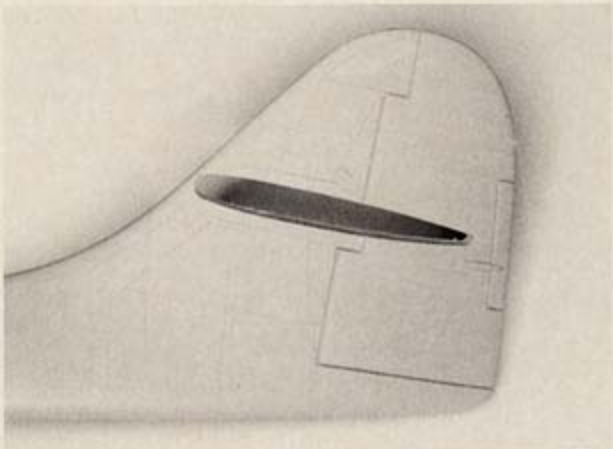

Fig. 10. An opening was cut into the fin and rudder for the acrylic-sheet horizontal stabilizer.

line is clean and sharp. The fabric ribbing on the trailing edge of the wing was accomplished with the same method I used on the stabilizers, but this time I made a jig to hold the wing and wire while the super glue bonded, Fig. 15.

I cut out the landing-light housings in the leading edge of the wing and installed turned-aluminum reflectors covered by pieces of clear acrylic. Next, I milled the underside of the wing tips to form the recesses for the float supports. These were then boxed in with styrene strips. I carved the triangular center section from clear acrylic sheet.

Engines and nacelles. I robbed two engines from a Monogram B-24 kit and removed their rear mounting surfaces. I turned the nacelles from acrylic rod and mounted thick-walled PVC pipe cowlings to the nacelles. (PVC pipe is available in hardware stores and home improvement centers.) Using an acrylic template as a guide, I milled the cutouts for the wing into the nacelles. I clamped the nacelles side by side in a jig and cut them with a sharp bit, Fig. 16.

Next, I drilled holes in the cowls to accept exhaust stacks, then mounted the nacelles to the wing. Each engine received a wiring harness made from brass tube and wire. The interiors of the cowls were painted black, then the engines were installed. I machined the oil coolers from brass and super glued them underneath the cowls.

The next step was to fashion struts for the wing. I remounted the wing and determined where the struts attached, drilled holes in the wing and fuselage, and made the strut cores from .032" wire bent at each end. The struts were then faired with laminated sheet styrene. I covered the attachment points with Bare-Metal Foil and snapped the struts into position. The flared ends of the struts were built up with dental resin. Once the resin set, I removed the struts and shaped the ends with sandpaper.

I used propellers from two Monogram TBF Avenger kits, but to establish the correct blade profile, I filed and sanded the blades using a tin template as a guide, Fig. 17.

Each float was shaped from a solid chunk of acrylic. I used fine brass wire for the mooring rings and inserted them in holes drilled into the floats. I made the float supports from acrylic stock and an .030" sheet styrene veneer for the underside panel, Fig. 18. The retracting mechanism was fabricated from brass wire and square stock. I airbrushed the mechanism Testor Chrome Silver thinned with Floquil Dio Sol, then oversprayed with Dullcote; I find this method gives a smoother flat aluminum sheen than any aluminum paint.

To ensure perfect alignment of the horizontal stabilizer, I placed the model on a flat surface and supported each wing and stabilizer tip with blocks. When everything was aligned, I applied a few drops of super glue to the junction of the horizontal and vertical stabilizer. After this had set, I reinforced the joint using gap-filling super glue, and finally a layer of Weld-On

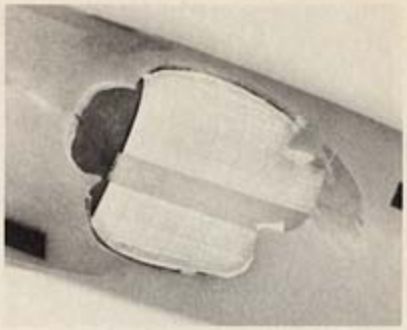

Fig. 11. A section of the roof of the fuselage had to be removed to detail the waist interior.

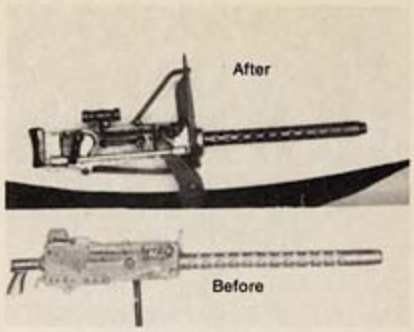

Fig. 12. Paul converted a pair of 1/35 scale .30 caliber machine guns to 1/48 scale .50 caliber weapons.

Fig. 13. To hold the wing while applying polyester resin, Paul assembled this rig. Polyester resin has quite an odor, so work outside.

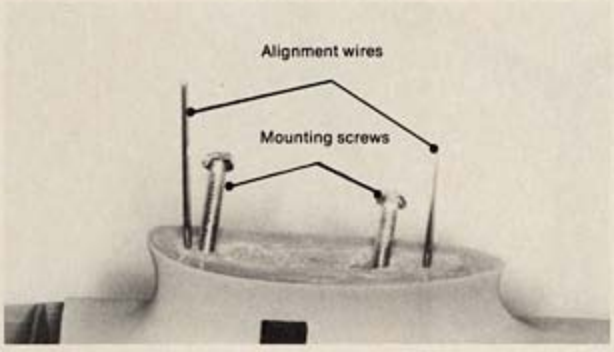

Fig. 14. Two screws hold the wing to the fuselage. The wires help align the assembly.

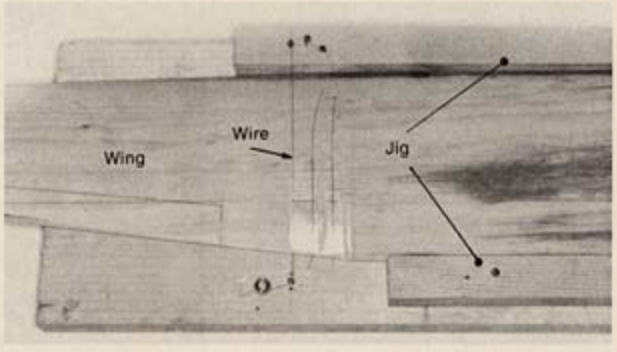

Fig. 15. A simple jig holds the wing while super glue bonds the wires to the surface.

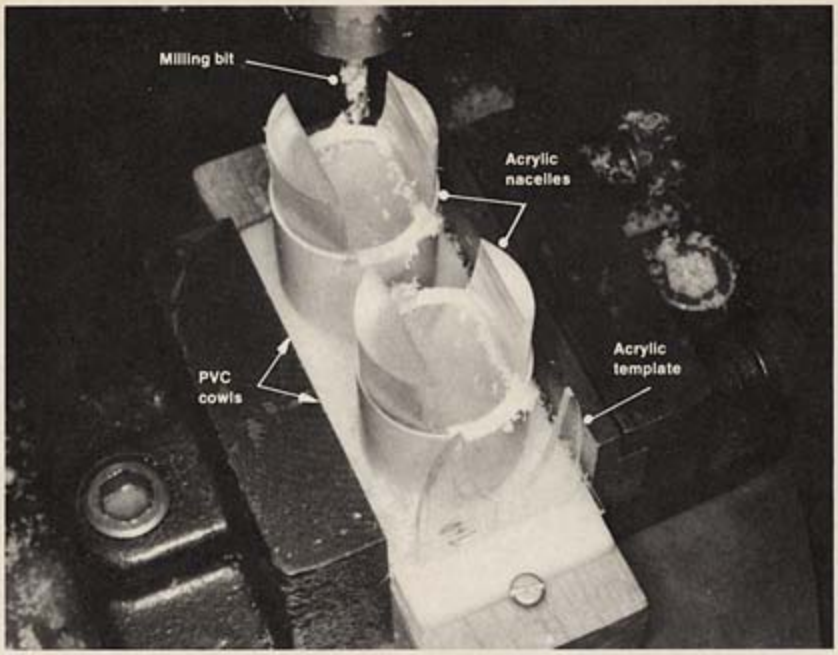

Fig. 16. Paul used a sheet acrylic template to guide the milling bit as it made cutouts in the nacelles for the wing.

No. 16 acrylic tube cement to develop the fillet around the joint. The fillet extends to the leading edge of the rudder.

I used strips cut from a Zipatone Mylar sheet (available in artist's supply stores) to raise the panels around each waist blister and the reinforcement panels on the upper hull in line with the propellers. These strips protected the hull from ice chips flying off the propeller blades.

Prime, paint, and final details. I masked all transparencies with Bare-Metal Foil, removed the wing, and primed all parts with sandable gray auto-body lacquer primer. Except for the simulated fabric-covered areas, the model was sanded smooth, then I finished all panel scribing and prepared the model for color.

First, I drilled holes for the anchor cable, fuel vents, and all the radio antennas. I made the brackets for the anchor cable from bits of brass wire that were bent and filed to shape and fit into holes drilled into the hull.

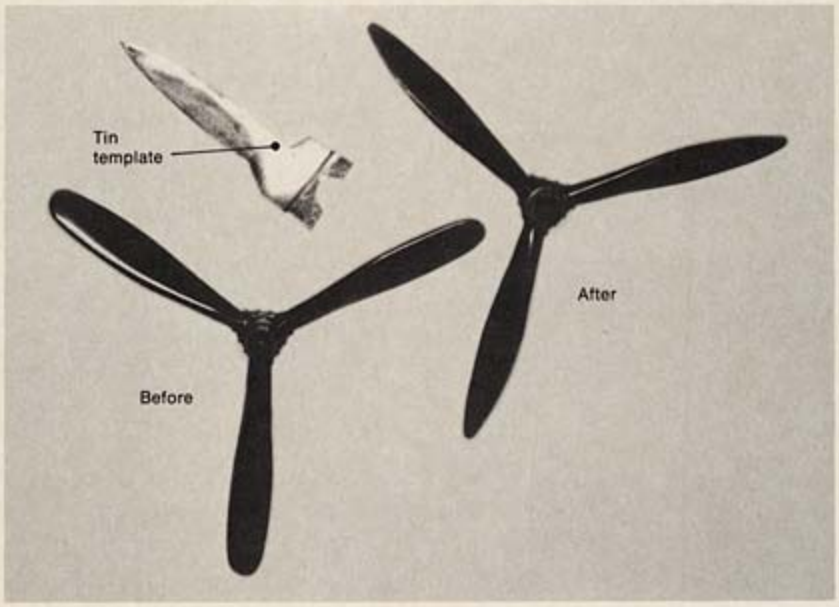

Fig. 17. Two propellers from Monogram TBFs were modified for the PBY.

Fig. 18. The Catalina's retractible wing-tip floats were made from acrylic stock, sheet styrene, and brass.

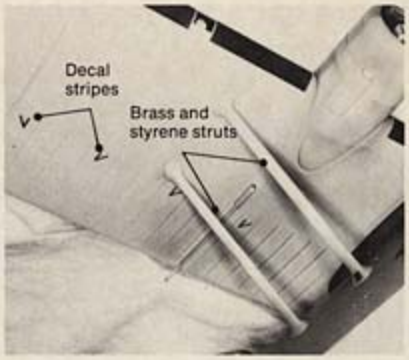

Fig. 19. Black chevrons on the undersurface of the wing locate zippered access hatches in the fabric.

I use Floquil paints almost exclusively, so I mixed colors to approximate ANA 602 Light Gray (close to FS 36440 Light Gull Gray) and ANA 603 Sea Gray (close to FS 36118 Neutral or Gunship Gray). I applied Light Gray to the hull, wing, floats, supports, and struts. To get a soft but tight color demarcation line, I held an index card against the model as I airbrushed the darker color. After the color coats had set, I masked around the de-icer boots and painted them flat black.

The wing was screwed in place for the final time and the screw holes on top of the wing were filled with dental resin, sanded smooth, and painted. I used insignia and letter decals from Super Scale, depicting a Catalina based in the Aleutian Islands with Patrol Squadron 42 in 1942. I applied black decal stripes for the hash marks that locate access zippers on the fabric-covered areas, Fig. 19.

After the decals were dry, I airbrushed an overcoat of Testor Dullcote, then weathered with the airbrush, applying exhaust stains and stains around the fuel filler ports on the wing, Fig. 20.

I made the antenna masts from brass and strung the aerials with .003" monofilament fishing leader. I display the model on a wood base covered with a map of the Pacific Ocean, the theatre where the PBY Catalina gained fame.

FSM

SOURCES

- Bare-Metal Foil: Bare-Metal Foil & Hobby Co., P. O. Box 82, Farmington, MI 48024
- Brass castings: Combat Series, 7070 North Harrison, Pinedale, CA 93650
- Brass tubing: K&S Engineering, 6917 West 59th, Chicago, IL 60638
- Polyester resin: Sig Manufacturing Co. Inc., Route 1, Montezuma, IA 50171

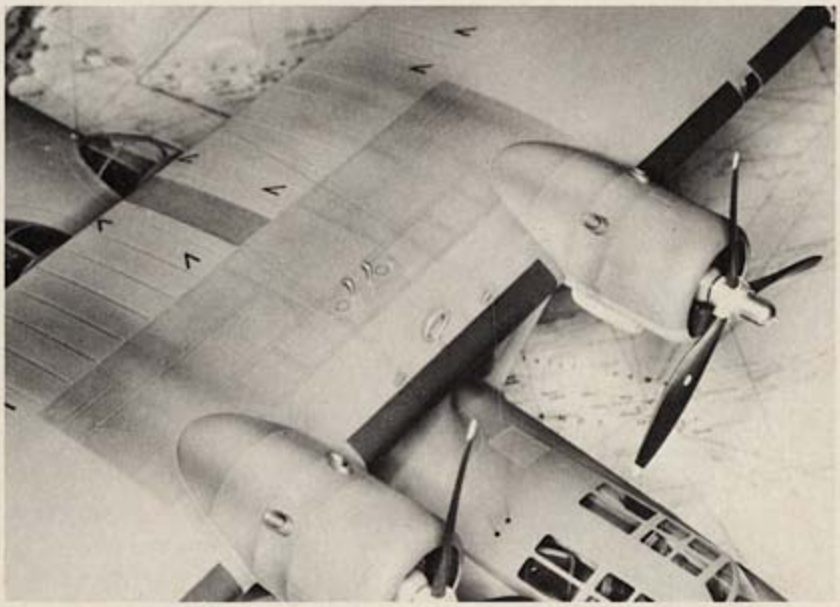

Fig. 20. Paul airbrushed exhaust and fuel stains on the wing.

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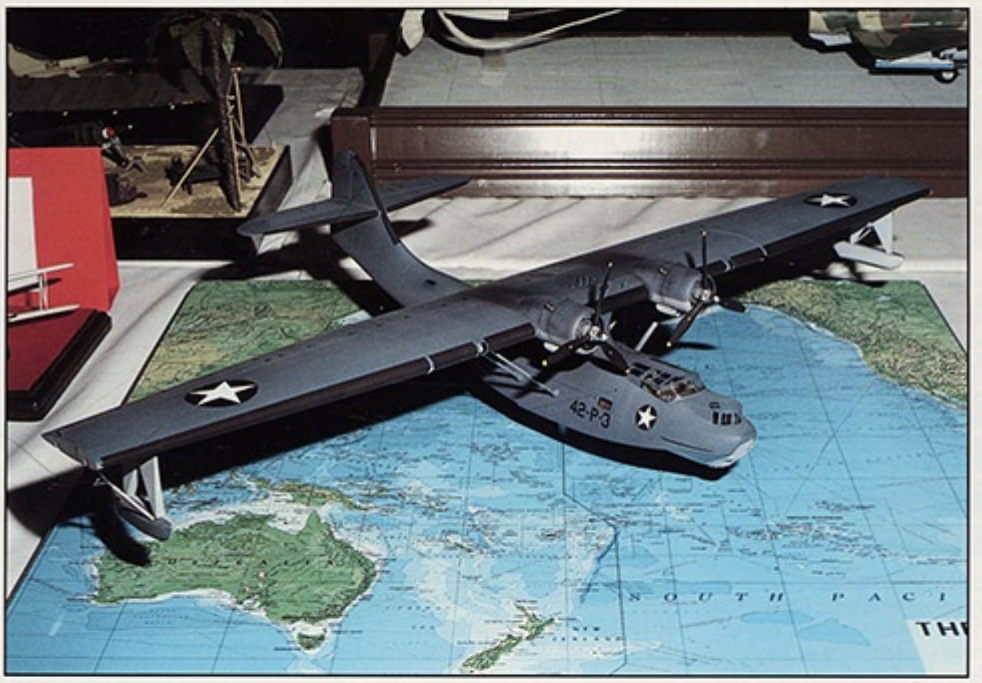

1989 National Convention Issue

At the 1989 IPMS National Convention, the PBY won 5 awards: First Place for Scratch Built 1/48 Aircraft; Best Aircraft; Best Floatplane Aircraft; Best Convair/Consolidated-Vultee Product; Judges Grand Award. This tied the record, with George Lee's Keystone Bomber, for the number of awards won by a single model at a Nationals.


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