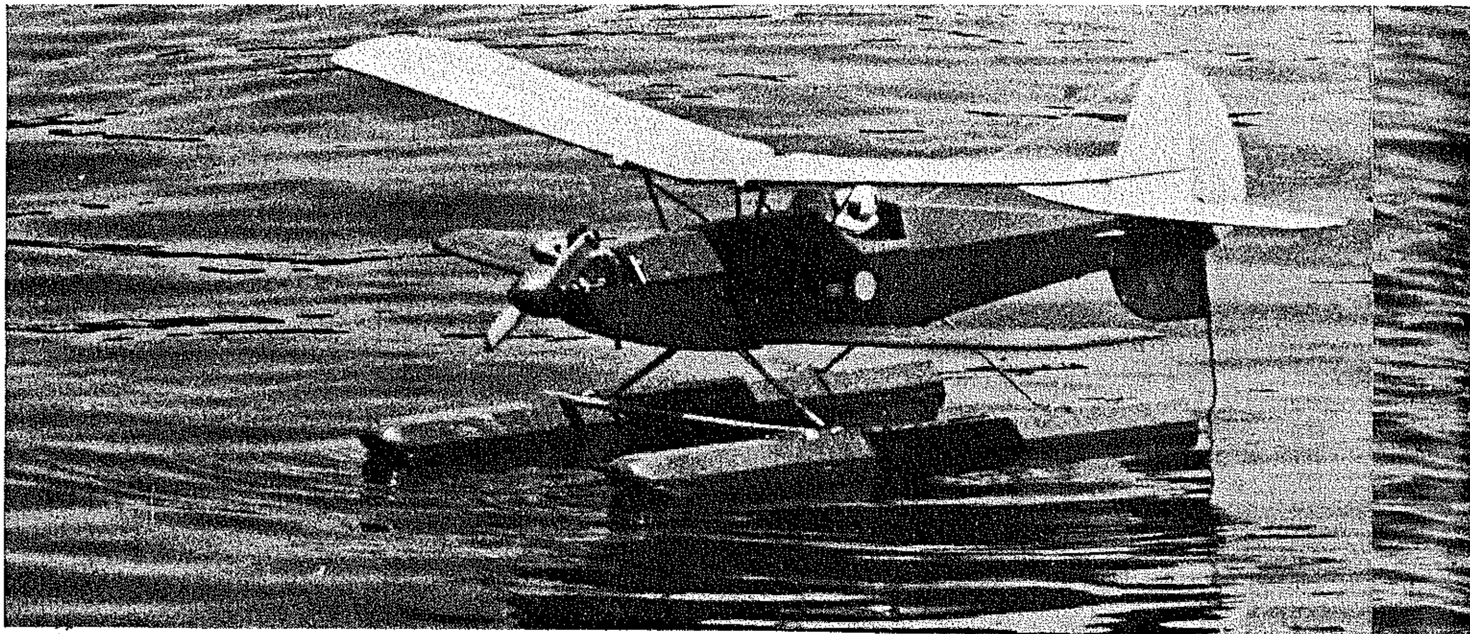


Photos by Ed McCarty and the author

SEASTRUTZ

209

SINCE THIS design is developed from Ted Strader's Strutz-Echo, (1967) and in the Wilson seaplane tradition, we chose Seastrutz for its name. It proved to be a fine flying, easily built biplane that does a great job on land or sea.

The basic construction is built-up balsa and straight forward. The most formidable problem in biplane construction, the cabane struts, was simplified by building a jig that makes that part of the project a snap. Good flying characteristics of Strutz Echo were preserved and, hopefully, improved by the following modifications.

Bottom wing was lengthened six inches to insure enough area to handle added weight of floats. Total wing area is about 515 sq. in., or about an effective 440 sq. in. when multiplied by biplane efficiency factor of 85%.

Weight at tail was minimized by using covered framework for tail surfaces and turtleback. Flying weight (dry) is 3½ pounds as a landplane, 4 pounds as seaplane. Covering is nylon over light Silkspan for open areas, heavy Silkspan over all sheet wood, except nylon-covered float bottoms. Wing loading is 19.6 oz./sq. ft. as landplane, 22.4 oz. as seaplane. The .19 is ample power. As landplane all normal three-channel maneuvers are performed with ease. As seaplane, loops, snap rolls, etc., are possible. Seaplane performance is realistic, takeoffs easy, water-handling good.

Next to the Statue of Liberty, this pose is the favorite author-model picture. At Cape Cod, the author poses with the landplane version of Seastrutz. For a bipe it is simple and functional.

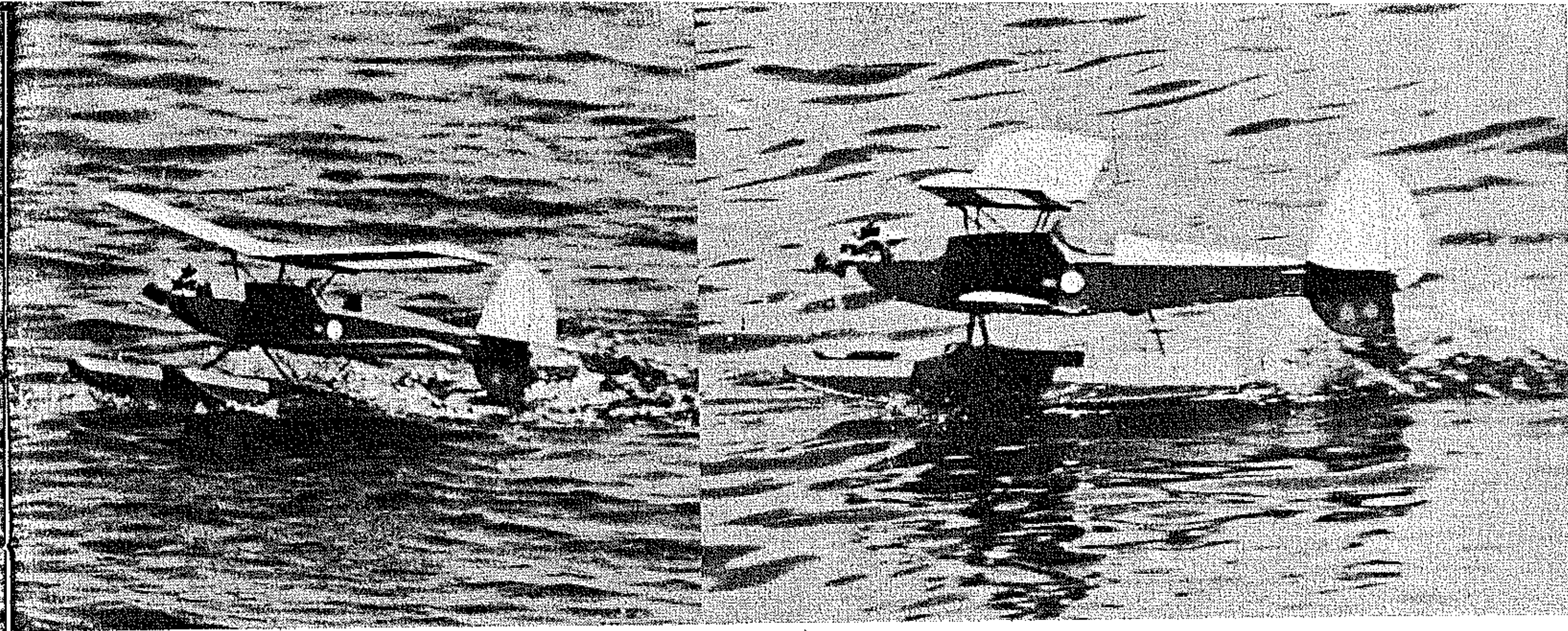
Interchangeable water rudder and tail wheel fixtures were provided. Front landing gear struts were lengthened for more prop clearance when water flying, wider tracking on land. Fuselage was redesigned to use servo tray, provide for mounting rear float struts, and for inverted building over top view of plan.

Fuselage was waterproofed by sheeting over the opening above lower wing, using Nyrod (or equivalent) pushrods, gasketing removable front hatch. Floats and sub-rudder/water rudder assembly are new additions. Author's "high-step" design was used with flat float bottoms, proved by his other recent seaplanes.

From my experience with model seaplanes, and from observation of full-size seaplanes, only small distance is required between tip of step and afterbottom; step itself can be slight and still perform its function.

However, *height of float at step (from tip of step to top of float)*, must be great. Also, rear end of float must be high enough to allow model to rotate nose up to make angle-of-attack of wing at least 8°—12° is not too much!

The high-step float bottom allows model to rock (rotate) backward on float tip, and allows maximum lift from wings for takeoff. The step minimizes water drag, helping model to gain speed on water. As model rises on the step, wetted area becomes less,



Opposite page: The floats are big enough to float the model easily—the first rule in float design. Above: Coming up on the step. Steering is good at all water speeds. White circle on side is medicine bottle cap over charging plug. Right: Running on the step. A touch of up elevator and it is airborne. By holding down, model will plane on the flat bottoms at high speed when you wish to get back quickly to the beach.

Developed from the popular Strutz Echo by Ted Strader, this .19-powered biplane for REM controls, is a delight to fly from land or water. ■ George Wilson

and water drag decreases. Bottom of float behind step should be completely out of water during most of run.

Construction

Instructions assume reader is not a novice, so step-by-step detail is not given. Construction is straight forward and simple. Cabane strut system (devised by Strader) is strong and easily constructed if recommended jig is used to assemble struts.

I am partial to aliphatic-type glues, such as Titebond. If model is properly waterproofed, and if you dry surface immediately if wet accidentally, you will have no problem with these glues. But avoid white glues.

Fuselage: Bottom is built first. Cut out main side pieces, add plywood doublers and ½ in. strip doubler. Cut out and assemble bulkheads (except firewall) and sides upside down over plan. Don't add bulkhead doublers K and L until you install front gear struts. Firewall and motor bearers are installed after bottom part is removed from building board. Build hatch as separate piece and fit it neatly to bottom part. Hatch starts with its bottom plate. Cut it ⅛ in. narrower than fuselage sides and sand edges to match slant of bulkheads. Make cut-out to fit fuel tank you use. Add hatch bulkheads.

Install side sheeting, then top sheeting. Turtle back is cemented directly onto bottom section. Install bulkheads first, then add stringers and filler pieces. Double cover this section with Silkspan. Install guide tubes for pushrods. Dope inside of fuselage before adding bottom rear sheeting. Dope inside of bottom sheeting before installation. Install front gear struts and doublers K and L before installing front bottom sheeting. Add sheeting over lower wing opening, after servo tray is installed.

Front hatch is water-proofed with 1/8 × 3/16" foam rubber gasket attached with Pliobond to bottom section around outer edges of hatch. Hatch is held down with four 2-56 machine screws and blind nuts. Sufficient pressure is required to assure tight fit. Scuba diving shops may have good fuel-proof foam rubber sheeting.

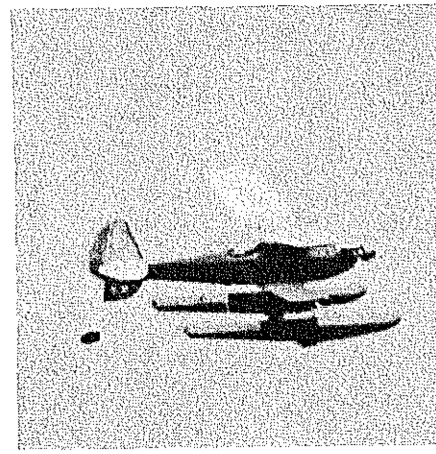
Triangular doublers behind cockpit are installed before plywood bottom sheeting for the rear float strut mounting. This sheeting has blind nuts for rear strut screws installed, before cementing in place. Blind nuts for tail wheel/sub-rudder are installed before bottom sheeting at tail is cemented in place.

Tailwheel/Sub-Rudder: These assemblies are built on very hard balsa base plates for strength and to minimize crushing by hold-down screws. *Use washers under bolt heads to help spread load.* Sections of dowels or short lengths of tubing are inset at these places to take pressure of screws. Hinge tubes are 1/16 I.D. nylon, sewn and epoxied in place. Use thin monofilament fish line for reinforcing joints, and for figure-8 hinges.

Floats: Construction is similar to that used for fuselage. Assemble sides and bottoms of bulkheads over set of lines drawn on separate sheet. Add bottom sheeting before removing basic assemblies from building board. Remove from board, add top bulkheads. Dope inside of floats, and inside of sheeting used to cover float tops. Add upper side sheeting, then upper top sheeting. Cut pine blocks for strut mounts; carefully install blind nuts. Mark locations of strut stops with pencil. Dope bottoms and install on the floats. Trim bottoms even with upper side sheeting, using razor plane and sandpaper. Install, then shape nose blocks. Install the triangular stops for struts.

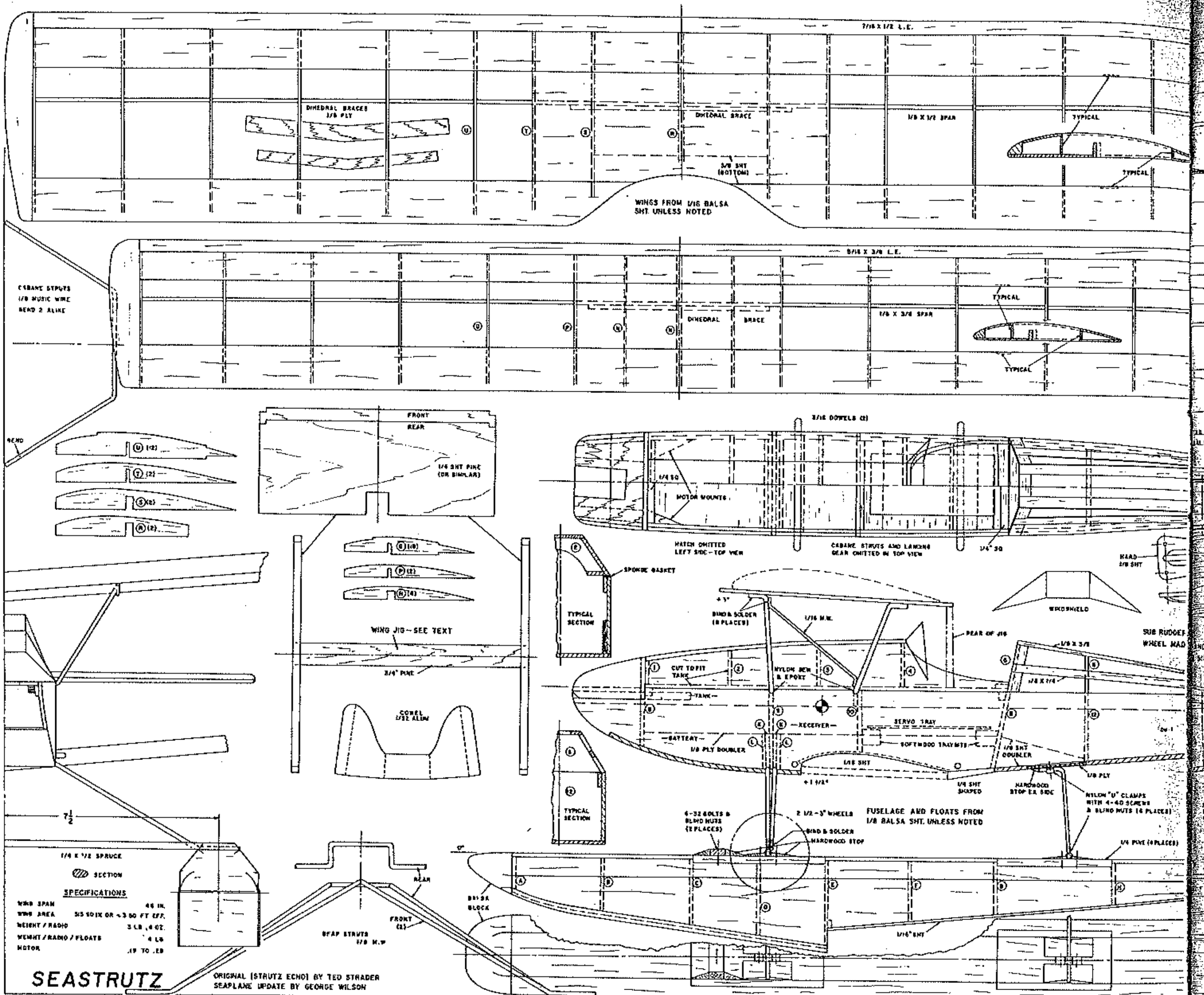
Angle of floats with respect to thrust line is not overly critical. I prefer degree or two negative angle (top-of-float to thrust line) to minimize air drag, and to increase maximum takeoff rotation angle. Float angle is set when bending rear struts; slightly more or less angle between rear strut legs will change angle neatly.

Inter-float strut is spruce or hard pine, sanded to streamlined shape between floats. Ends fit snugly between stops on float tops.



In the air, Seastrutz is realistic, yet agile enough to loop and roll with its .19 engine.

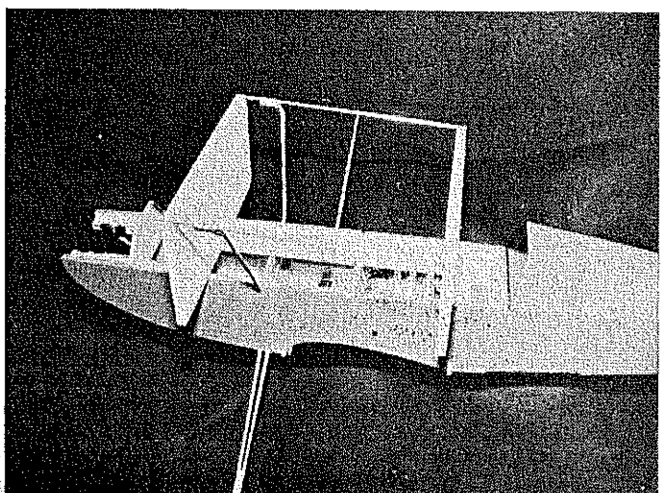
Tail Surfaces: These parts (including the sub-rudder) are built from 3/16 sheet and strip. Use light, good-quality wood for minimum weight and anti-warping. Center member in stabilizer, and rear upright of sub-rudder, are medium hard for strength.



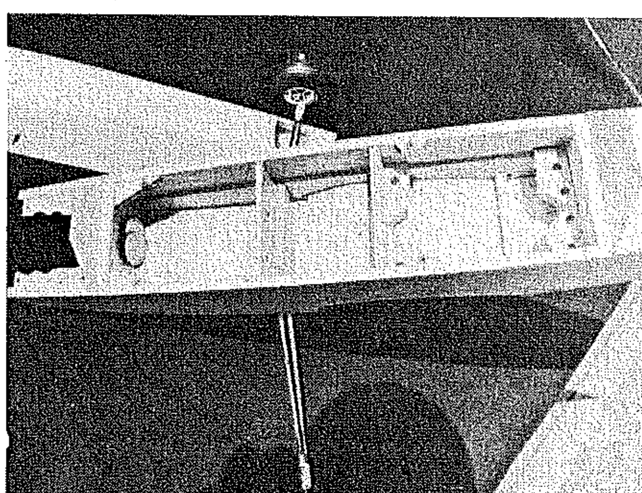
FULL-SIZE PLANS AVAILABLE .... SEE PAGE 104

Note plywood side pieces inset in lower extreme of rudder; they absorb beating from tailwheel and water-rudder control links. Original model used nylon monofilament figure-8 stitches.

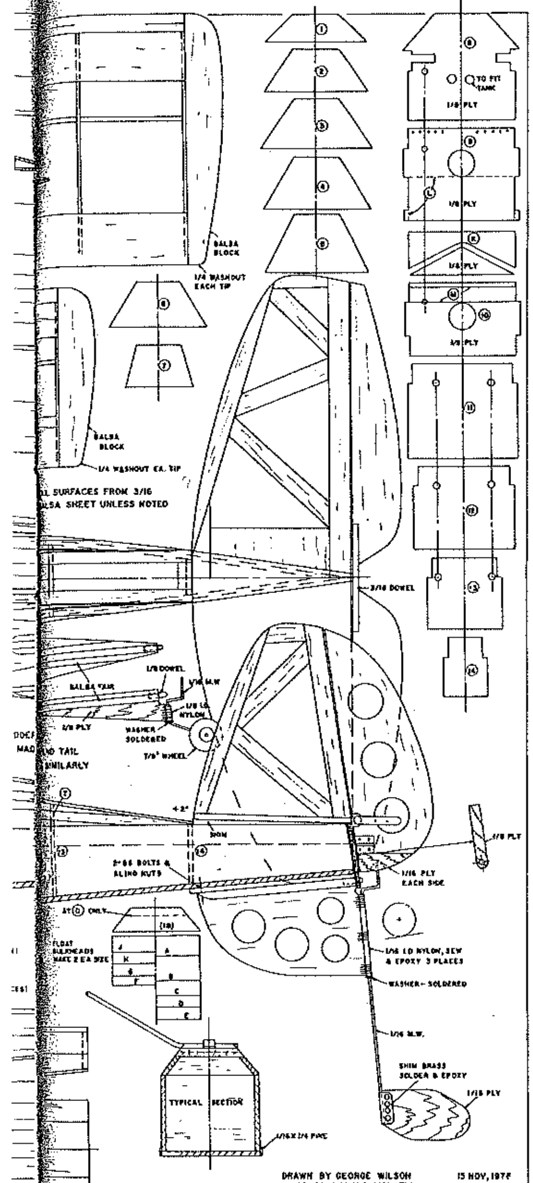
Wings: Both wings are built over plan. Build dihedral brace into first panel of each wing. Join two halves before top sheeting is added. Order of assembly is as follows: Pin down bottom sheeting. Cement dihedral brace to spar. Position spar and install ribs, pinning them in place until glue is dry. Angle center rib to match dihedral. Install leading edge. Install 3/8 sheeting at center (top wing only). Remove first panel



Cabane strut jig shown in place on top of the fuselage simplifies the construction of the strut assembly and insures accurate alignment.



Plywood is used liberally for doublers and gear mounting. (Quarters were used to balance for picture.) Note hatch hold-down blind nuts.



from board and build it into second panel, using same order of assembly. First panel is blocked up to dihedral angle, while second panel is being built.

Washout is built into wings while top sheeting is being installed. Pin leading edge and center rib of one panel to building board. Block up rear wing tip by amount of washout shown on plan and pin in place. Block trailing edge up in two or three other places between tip and center, making it straight line center-tò-tip. Install leading edge sheeting, center sheeting, and trailing edge sheeting. Amount of washout is not overly critical. Just make sure both sides have equal amounts of washout. Model is stable at slow speeds, and has no tendency to snap-roll.

Tip blocks are installed after they have been rough shaped. Trim and sand after they are in place.

Cabane Struts: Until cabane strut jig came to mind I was dubious about building a biplane. Vertical wooden struts used in many model designs solve the problem in a practical but not pretty manner.

Jig is built of most any material, but must be accurate. It provides places to rest tips of wing supports while they are being attached to struts. This is done with struts in position on fuselage, and jig resting atop the part of the fuselage normally under hatch.

First, build jig. Cement stops to center it on fuselage. These simplify positioning while you are building struts. Next, bend to approximate shape two U-shaped pieces of 1/8 music wire, and two 1/16 music wire tie struts. Cut two 1/8 m.w. wing supports to length. Using rubberbands and soft wire (#16 or 18 solid copper), mount wing supports in jig and fit U-shaped pieces to them. Rebend as necessary to fit neatly in slot through fuselage, and for reasonable fit with wing support. When satisfied with fit, bind ends to wing supports, using thin copper wire, apply flux, and solder. Before you do second U strut, remove partially made assembly from jig, and slip piece of silicone rubber tubing over center part of wing supports. This makes soft, non-slip mount for wing. Push tubing as far as you can toward solder joints. Fit and attach second U-shaped piece. Tie struts are fitted, bound, fluxed, and soldered. Finished strut assembly slips off jig with little difficulty. Strut assembly is mounted to fuselage, using nylon monofilament line and epoxy. This produces well-aligned top wing mount.

Finishing: Insides of all structures are sealed with dope or thinned epoxy. (Hobbypoxy Formula 2, diluted 1-to-1 with thinner or 90% isopropyl alcohol, is good sealer.) Seal inside of pieces that are used to close the structure.

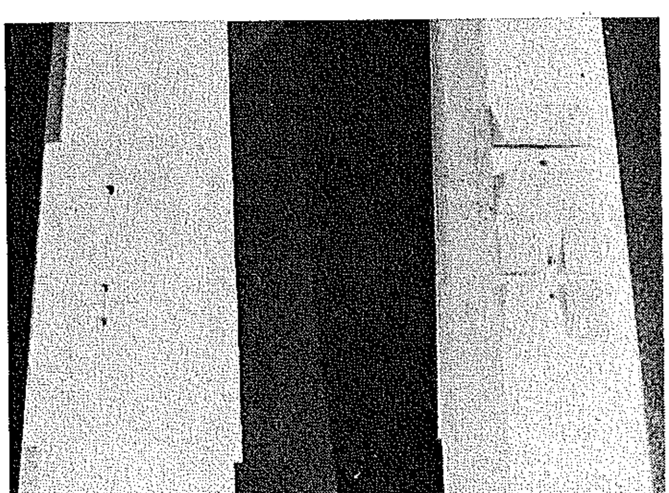
My model was finished using Silkspan over wood, except for float bottoms that were nylon covered. Open areas are covered with light Silkspan, then with nylon. Heatshrink materials are not easy to waterproof.

Flying: *Seastrutz* didn't quite fly right-off-drawing-board. I planned an engine check and a bit of taxiing. Then Bob Martin and Bruce Selig made bids to test fly it. Weather was good, wind steady 10 mph. Takeoff required ten feet, climb-out was dramatic. Bob fed in full down trim and wished he had more. Except for too much climb and ballooning glide, first flight was a great success. Bruce verified Bob's findings. In its first two flights Seastrutz in its landplane configuration did most of rudder-elevator maneuvers that Bob and Bruce could think of, including inverted flight. They agreed that increased rudder area would be useful, and at least an 1/8 in. down trim in stabilizer was necessary. Slow speed flight was steady with no unexpected snaps.

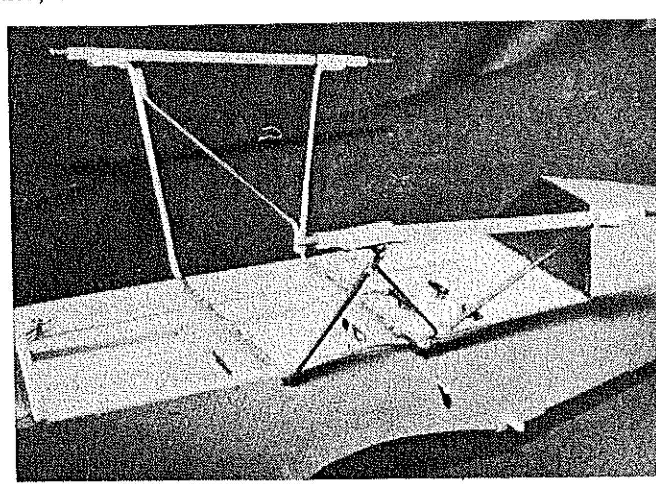
The next day Ed McCarty flew water tests. Wind was at least 20 mph with gusts. We found a place that was shielded by hills. Seastrutz steered well on water (a must if you are going to enjoy seaplane flying), got up on step with ease. Although the lake was deceptively calm, trees were blowing on the hill top. As usual, caution was thrown to the winds. We theorized that float drag would offset down-trim required for land flying, and set elevator trim to zero.

Takeoff was dramatic. After 75 feet

Continued on page 86



Float attachments are pine and hardwood. Left, shows pine blocks with blind nuts in place. Hardwood stops, right, are installed after the pine blocks have been sanded to match the contours of the floats.



Finished cabane struts. Fuel tubing pieces installed during assembly provide soft bed for the wing. Struts sewed to bulkheads with monofilament, then epoxied. Allows wide tolerance in making the necessary bends—ordinarily a problem when bending heavy music wire.

Homebuilts: With Bill Youman's first-place win in Masters Class at Greenville NRCHA Nationals last August, there seems to be an increasing interest in home-built helicopters. He won with a scratch-built of his own design and composite components. Bill came within 10 points of aceing their hover course. A local flier, Norm Holland, has developed a scratch-built using Kavan mechanics, tri-cycle landing gear, Rev-o-lution canopy, Futaba S15M ball-bearing servos, EK single-stick radio, Kraft engine, and Tach-Tron governor, weight 12½ pounds. It is very smooth and precise. If enough people are interested, it could soon be put in kit form. Look to this column for further details.

Dual Counter Rotating Head Scratch-Built: Gilbert Laforest from Montreal successfully flew counter rotating-head helicopter of his own design at Greenville NRCHA Nats. It had one Webra Speed .60 driving both heads, and unbelievably complicated pushrod system. Self-designed transmitter with two single sticks and dual rudder knobs, and much more. Separate collective control to each head, as well as separate cyclic control. Tremendous undertaking, to say nothing about getting his mind synchronized with his hands. Radio is custom Can-Air, which is Canadian Pro-Line. He had some radio interference problems.

Next month's column will cover a unique finish for helicopters and the first part of building the Aerospatiale SA-341G Gazelle with ducted fan-tail rotor.

If you're not flying, you're not trying hard enough!

Walt Schoonard, 2080 Sharon Rd., Winter Park, FL-32789.

Letters

continued from page 7

quality of *Model Aviation*. For my money, it is the best model aviation magazine in the field.

William R. Barr
AMA 31415
Claremont, CA

It is MA policy to publish all types of models, so eventually we shall get around to Mr. Barr's suggestions.

Mistaken Identity

No doubt you have received a few letters on this one already, but in the rare event that you haven't, I would like to point out that the photograph in the lower right hand corner of page 25 of the Aug. 1977 issue of *Model Aviation* is incorrectly captioned. The gentleman in the photo is Rick Pearson, winner of last year's Soar Nats as well as many other contests, and the sailplane that he is holding is a Paragon. Rick did an outstanding job of flying under less than ideal conditions and it would be a shame if he did not receive credit for his display of flying skill.

Since it is generally true that at least 75% of a sailplane's performance is a direct function of the pilot's skill, it would follow that mention of the sailplane used would not be significant.

I have no doubt that this was an unintentional error and know that you would want these errors called to your attention so that the proper caption can be used.

Ed Slobod
Pierce Aero Company
Northridge, CA

Size of It/Powers

continued from page 13

ing and slower speed and even reduce somewhat the power requirements. This is because we are scaling down our prototype in its weight-empty condition, rather than its gross-weight condition.

And that's..."About the Size of It."

(Questions and comments may be addressed to Bradford W. Powers, in care of this magazine.)

Seastrutz/Wilson

continued from page 18

with full throttle and some down-elevator, Ed pulled up and Seastrutz was off like a scared duck. In a full stall attitude at 50 feet, it hit wind blowing toward hill and was blown end-over-end into the trees. Damage was minor. Test flying continued next week at the Fall Brimfield meet. By this time, stabilizer had shim under its leading edge, and rudder area had been doubled. Seastrutz flew beautifully. Among its test pilots was Ted Strader's son Eric, who testified that it flew very much like its predecessor, the Strutz Echo.

If your Seastrutz is built with the incidences shown, it will perform very well. It is relatively docile. With its 46-in. wing span and compact biplane configuration, I felt it might be too quick for the average flier. This is not the case. It is not a difficult machine to fly from the land or water. Have fun!

Radio Technique/Myers

continued from page 14

- An ammeter (to measure charging, discharging and operating currents).
- A turntable or drum-type chart feed (to measure servo transmit time).
- A shaker (to find intermittent problems).
- A heat lamp.
- A can of Freezit, or similar chiller, to locate temperature-sensitive components.
- Special tools of various types, like desoldering irons.

You've seen a lot of the items listed under "additional" in advertisements, and in all probability, you should leave them there. I will describe some simple, non-destructive tests that you should perform