



Stahlwerk Mark MS-IIb

By WALT MOONEY

• Obscure airplanes intrigue me and with the arrival of a three-view of the Stahlwerk Mark MS-IIb, showing the wing and fuselage lettering, an inspiration took place. How about using condenser paper for covering and doing the decoration with a black felt pen prior to covering? The felt pen will not run because the condenser paper is not porous and does not have a grain. Also, if permanent ink is used, the covering can be water shrunk and does not have to be doped, saving weight.

Besides the interesting markings, the design has a simple structure, a slab-sided fuselage, and no round tips on the wings or the tail surfaces. It does have a couple of potential drawbacks besides the complication of the biplane configuration, namely a very small scale horizontal tail and no real color documentation—although black letters on clear varnished fabric looks like a reasonable scheme that is nicely simulated with black ink on condenser paper.

The fuselage is a relatively simple structure; two sides are built directly over the plans. When dry, the side frames are removed from the plan and separated from each other using a thin blade. Then cross-pieces are added to make a fuselage box frame. The nose has two side pieces that are cut from 1/16 sheet, a bottom piece

Right: No shortage of wing area here! Scale size tail surfaces are shown on the plan, but the model can be made easier to fly by enlarging the horizontal stab by a couple of inches.

made from a solid 1/4-inch thick piece, and a top piece made from the same materials but hollowed as much as possible. The very front of the cowl uses a large Peck-Polymers plastic thrust bearing. Between the cockpits, and aft of the rear cockpit, the top of the fuselage is covered with thin balsa sheet or bond paper.

The wings have conventional structure: a leading and a trailing edge, two upper surface spars, tips, gussets to round off the corners of the tips, and cutouts at the center. All the wing ribs are the same airfoil shape. Make a pattern and cut out all the

ribs, including the heavier ones used at the tips. Stack the ribs, all but the ones to be used for the tips, and cut the notches for the spars. Make the notches just a bit shallower than the spars so that the top of the spars will be slightly above the top of the ribs. This will allow the spars to be effective turbulators and will keep the covering above the ribs, eliminating the "starved" look a tissue covered wing sometimes gets with the ribs pushing up strongly under the tissue.

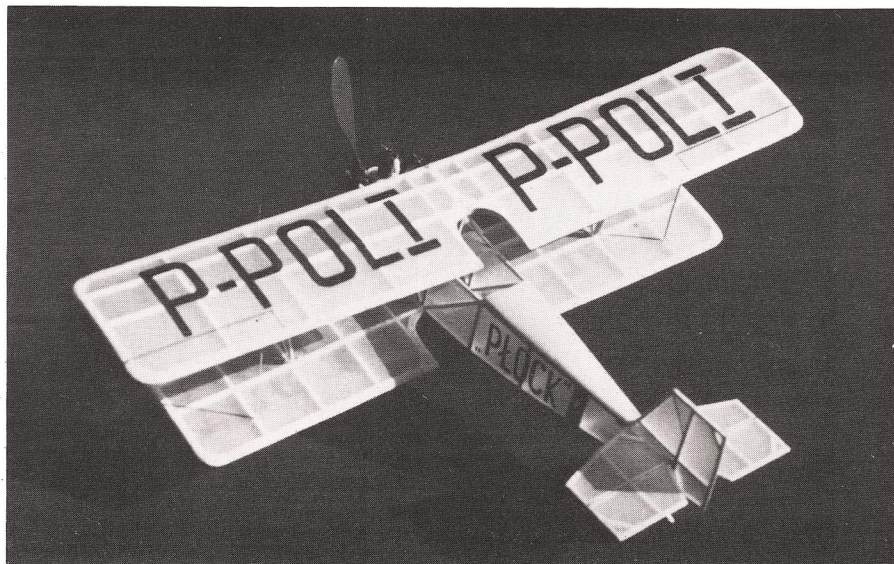
Assemble the wings directly over the

A VINTAGE POLISH BIPLANE IN PEANUT SCALE

plans by pinning down the leading and trailing edges and inserting the ribs and the tips. It is easier if the leading and trailing edge sticks are a bit too long so they can be pinned down through the wood. It also makes the tip gussets easier to install, the rounding at the corners being done after the wing structure is completely dry and has been removed from the plan. Use 3/16 balsa or three layers of 1/16 balsa to fill in the areas at the center that will be shaped for the trailing edge cutouts. Carve and sand the leading and trailing edges to the correct airfoil as shown in the side view.

The plans show the wing to have zero dihedral, at least on the top wing, but the photos of the model show that I felt it

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needed at least a little dihedral. My recommendation is for at least 3/8 of an inch under each tip of the top wing.

The tail surface structure is strictly conventional, and built directly over the plan. Scale tail areas are shown, but the model will undoubtedly be easier to fly if a larger horizontal tail is constructed. Increase the span of the tail by about two inches if desired. Using sandpaper, round the leading edges and taper the trailing edges of the tail surfaces.

The landing gear is composed of balsa wheels, balsa stick strut legs, round bamboo sway braces and cross axle, and bent piano wire to take the loads that model airplane landing gears get in action. Bend the wire part first, making sure it is the right length and the same length on both sides. Fit it in the fuselage frame and cement it in place. It will provide a support for the rest of the landing gear structure while it is being assembled. Take a piece of 1/16x1/8 balsa and sand it to the streamline V-strut cross section shown. Use this to make the struts for each side of the landing gear and lightly cement them to the fuselage frame. Note that the struts are just inside the wire and will be supported by the wire, but are not to be cemented to the wire. Now, using round bamboo, install the cross axle and the two sway braces. When all these pieces have been securely cemented together, they can be carefully removed from the fuselage, to be reinstalled after it is covered.

The cabanes were constructed from round bamboo. The forward cabane is a simple inverted V, and the aft one is two inverted V's connected at the top to make a four-legged pyramid assembly. The legs of the cabanes can be sharpened so they can be stuck into the top covering of the fuselage for easier and stronger assembly.

Lightly cement the top wing in place on the cabanes and block up the tips with books or whatever is handy. Lightly cement the lower wings in place on the sides of the fuselage and block them up. Now sand another piece of 1/16x1/8 balsa to a streamlined cross section and carefully make the wing struts to fit between the wings. I find it easier to assemble the wings, struts, cabanes, etc., before the model is covered because being able to see and insert your fingers or tweezers through the structures makes it easier to get accurate alignment and fits. Now disassemble all the lightly cemented parts.

The covering on the model in the photos is condenser paper. It is light, airtight, shrinks well, and could even be the right color for a model of this time period. Two black, waterproof, permanent, felt pens are used to decorate the paper before it is used to cover the model. A fine felt pen is used to outline the letters and a broad one is used to fill them in.

For each set of letters, take a piece of condenser paper somewhat larger than the

part of the airplane to be covered. Tape this down over the plan so it won't slip around, and trace the outlines of the letters with the fine felt pen. Using the broader pen, fill in the outlines very carefully. This is done for the top of the upper wing, the bottom of the lower wing, and for each side of the fuselage. Note that the lettering on the fuselage is shown for the left side and must be put on a piece of paper so that it reads correctly on the right side. That is, with the letters facing forward and the "P" to the rear with the "K" to the front. Note that the letters on the lower wing must be slightly smaller to fit.

The paper on the model was attached using a commercial glue stick. There are several on the market. They are really

paste, not glue, and are white, sticky, solid, and about the consistency of lipstick. Don't get a liquid. Simply rub the glue stick all around the outline of the part to be covered, and attach the condenser paper, pulling it as smooth as you can. Make sure, if the paper is one with lettering on it, that the lettering is properly located. It takes a sharp blade to trim condenser paper so use a new razor blade to trim around the parts. After all the parts are covered, lightly fog on a mist of water and let the parts dry. A nice, smooth covering job should be the result. If some areas are still wrinkled, those areas can be rewetted to shrink some more.

Because the model has been assembled in the uncovered condition, it is a simple matter to reassemble the covered components into a complete model with the exception of details like the engine cylinders, cylinder heads, pushrods, and the tail skid. Carefully paint the tires flat black.

The cylinders on the model are plastic dummies made by Williams Brothers with black dress-snap heads and straight-pin pushrods. Intake tubes are made for the back side of the cylinders from balsa scrap or thin plastic tubing. The engine on the Stahlwerk appears to have a single exhaust valve on each cylinder and no exhaust pipes. It sure must have been noisy. There is a small hole in the side of the nose just behind the left upper cylinder which may have been the air inlet to the carburetor. ●
