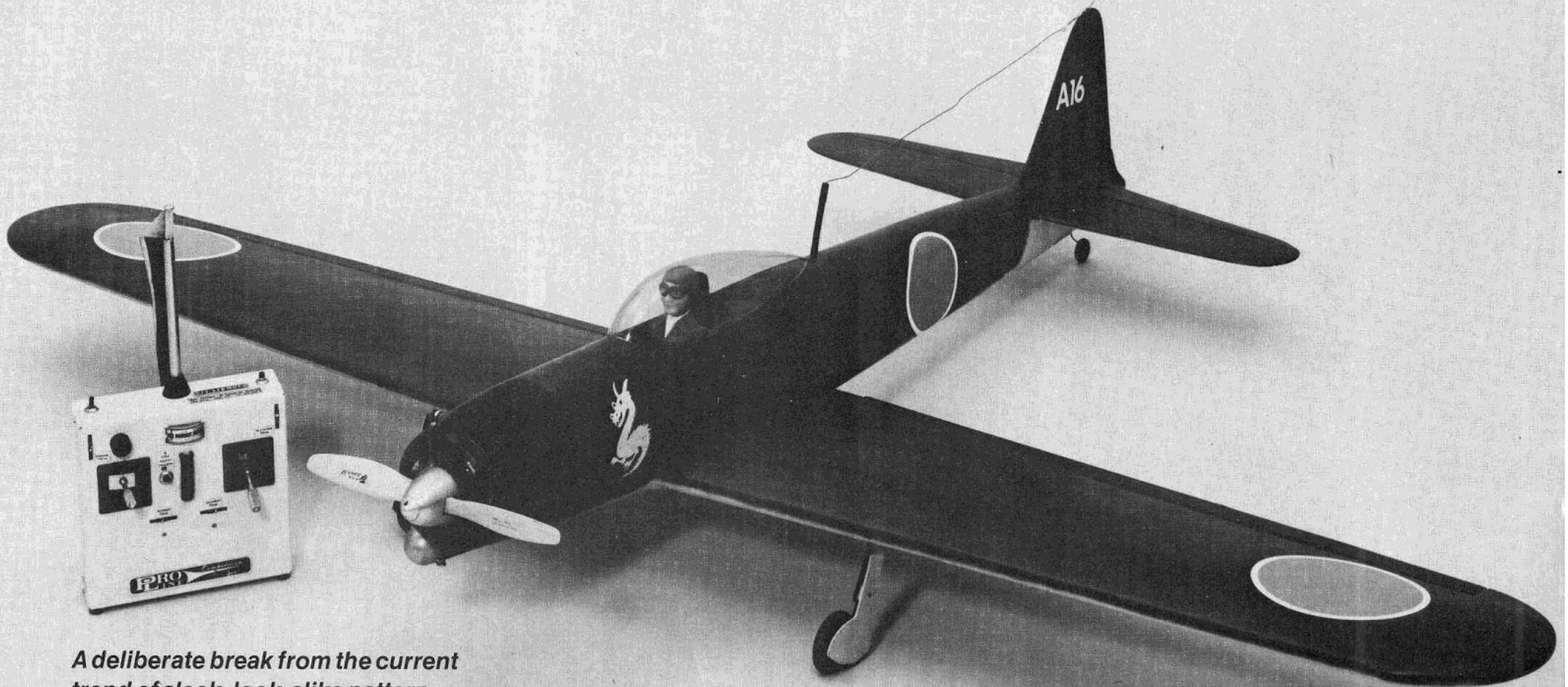
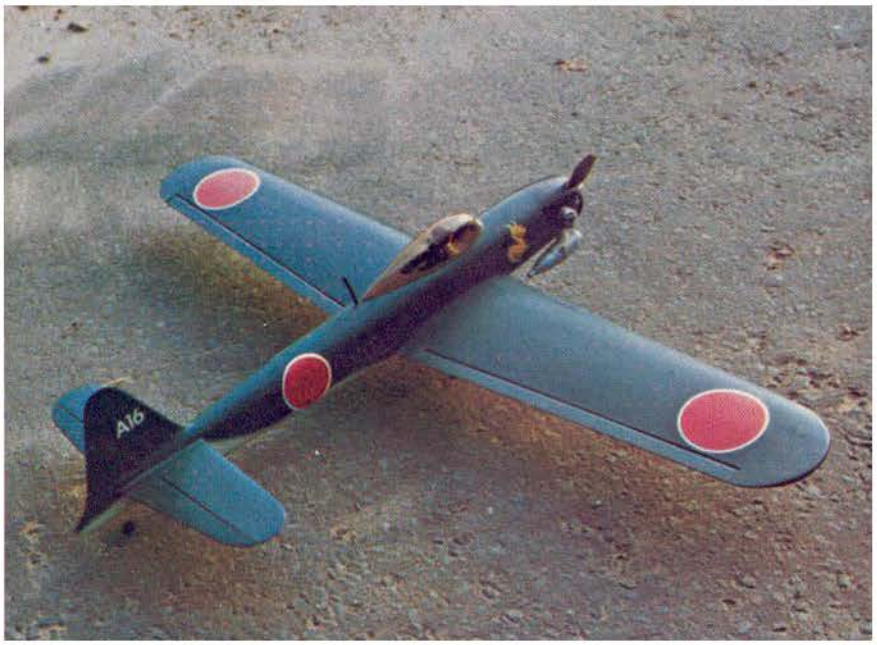
SAMURAI



A deliberate break from the current trend of sleek, look-alike pattern ships, the Samurai is the result of stretching the famous Japanese Zero. The attention it will receive on the ground will be exceeded only by the admiration for its outstanding flight characteristics.

BY BOB WALLACE



The current trend in pattern aircraft has been toward sleek looking designs that exhibit excellent flight characteristics. Unfortunately, most of these designs do not resemble any known full scale aircraft; on the other hand, most scale World War II vintage fighter designs do not lend themselves well to "Sunday Flier" type of use with regard to ideal flight qualities.

The Samurai was conceived and designed in an effort to combine the best of both of these worlds and result in a sport pattern aircraft that would fly with pattern ship smoothness, be easy for the average Sunday flier to build and fly, and resemble a World War II fighter.

The Samurai was the result of stretching the famous Japanese Zero design (admittedly to the limit) to incorporate desirable flight producing dimensions. While the Samurai is certainly not even Stand-Off Scale material — it still retains the basic shape and lines of the Japanese Zero.

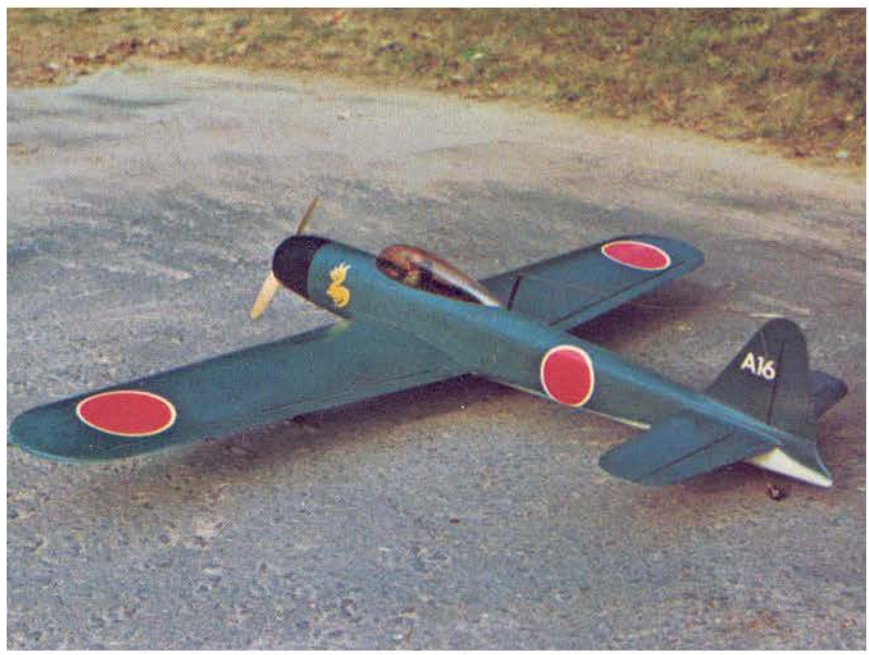
The Samurai is guaranteed to attract more spectator attention at the flying field than the usual "all look-alike pattern ships" and the ugly box fuselage slab wing sport designs. The attention it garners on the ground will be retained when the Samurai becomes airborne as its flight performance is outstanding. It will easily perform every pattern maneuver; is as smooth and stable as a pattern ship, while not quite as fast; and lands like a trainer. It's been flown by experienced pattern pilots who confirm its flying qualities, but even more important, it has been easily flown by average sport type fliers with no difficulty.

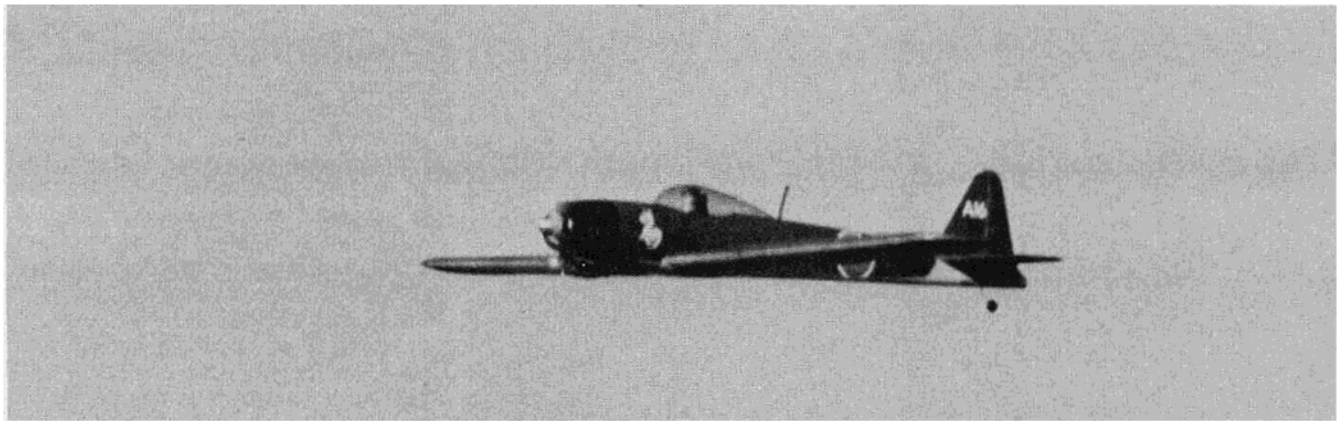
If you're searching for a sport pattern aircraft with a World War II look, why not build a Samurai!

CONSTRUCTION

Fuselage: Cut out the two 3/16" sheet balsa fuselage sides (if 48" long stock is available in your area — you can avoid making the splice). Save the scrap pieces cut out over the stabilizer/elevator area. Cut out the 1/4" sheet balsa fuselage doublers. Glue the doublers to the fuselage sides. Cut out the fuselage firewall and formers (F-1, F-2, F-3, F-4, and F-5) from 1/4" ply or sheet balsa as indicated. Glue the firewall (F-1), F-2 and F-3 in place. (If you own a fuselage building jig, use it.) Be sure all formers are properly aligned. Add formers F-4 and F-5 and bring the fuselage sides together at the tail and glue. Add 3/8" triangular stock around the firewall (F-1). Drill the engine mount holes in the firewall (F-1) and install the mount with 6-32 screws and blind nuts. Bevel the angular side sheets (top and bottom of the fuselage) and install. You may leave the other edge of these strips rough and, after they are glued in place, merely plane or sand them down flush with the top and bottom of the formers. Install the top and bottom fuselage sheeting. Plane and sand the fuselage to the indicated shape. Coat the fuel tank compartment with fiberglass resin or thinned epoxy. Install your engine (be sure to seal off the exhaust, carb opening, and fuel nipple). Cut the front nose ring out of 1/2" pine or hard balsa and shape it. Position the cowl nose ring according to the engine thrust washer and proceed to cowl-in the engine with 1/2" sheet balsa blocks. Plane and sand the cowl (using the fuselage at F-1 and the nose ring as guides) to the proper shape. Cut the cowl opening around the engine to allow for engine removal. Cut out the cockpit opening and install the cockpit formers and floor. Install the hardwood wing mounting blocks. Set the fuselage aside for now.

Tail Surfaces: Construct the stabilizer and vertical fin directly over the plan using the indicated balsa sizes. Cover the stabilizer and vertical fin with 1/16" sheet balsa on the top and bottom. Sand to shape. Cut the elevators, elevator spacer block, and rudder from 3/8" sheet balsa. Sand to the proper shape. Cut all slots for the hinges and drill holes for the horn. Install the hinges and the horn in the stabilizer/elevator assembly. Notch the elevator spacer block to allow for the control horn movement and install. Do not assemble the vertical fin/rudder at this time. (Be sure to strive for a good close fit between all control surfaces.) The tail surfaces can now be glued in place on the fuselage, using the following sequence: mount the 1/16" ply





tail wheel plate with its brass tube bearing in place; silver solder the brass control arm to a piece of 1/16" music wire; insert the 1/16" wire in the brass bearing; and solder a washer to the wire on the bottom of the fuselage. Make the required bends to accept the tail wheel. Drill a hole in the elevator spacer block for the top of the rudder/tail wheel wire to go through. As the elevator pushrod connection is internal, the rod should be made and connected to the elevator horn now with a clevis and the stabilizer/elevator then glued in place. Use either 1/4" hard balsa or a 3/16" hardwood dowel for a pushrod. With the stabilizer/elevator now in place, the vertical fin is glued in position. Bend the rudder/tail wheel wire 90 degrees to accept the rudder and install the rudder. Use the scrap 3/16" pieces that were saved when the fuselage sides were cut out, to fill in on top of the stabilizer after trimming off to allow for the stabilizer/elevator thickness. Install the balsa blocks on both sides of the rudder. Sand to shape and, using a micro-balloon type filler, blend the vertical fin/rudder smoothly into the fuselage.

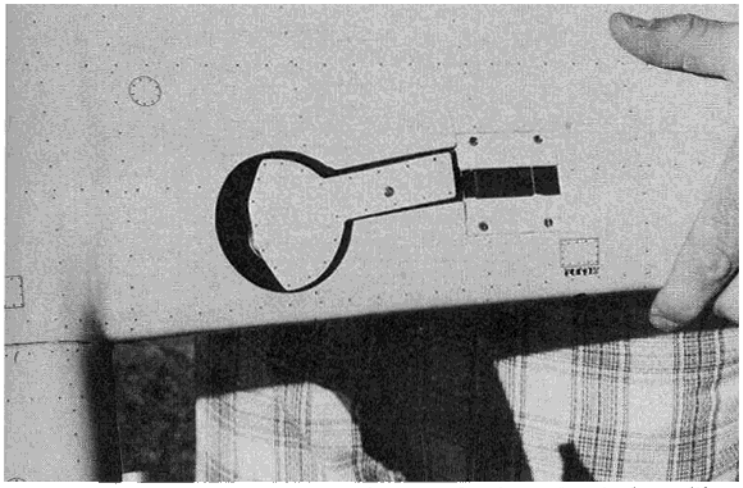
Wing: Cut out the required number of ribs leaving the alignment tabs in place. Cut out all half ribs and wing tips. (If you own a rod type of wing building jig cut the alignment tabs off the ribs — stack ribs for each wing concentrically, using the main spar notches as a guide, and drill your rod holes.) Glue the ply half ribs W-4A and W-5A to their respective ribs (2 left, 2 right). Pin the lower spruce spar to the plan. Pin the ribs in place using the alignment tabs. Angle rib W-1 to allow for the dihedral. Add the 1/4" balsa leading edge, 3/16" balsa trailing edge, 3/32" balsa shear webbing and the top spruce spar. Glue the structure together, making sure all ribs and spars are properly aligned. Add the 1/4" balsa wing tips. Remove the wing structure from your building board and trim off the alignment tabs. Install the landing gear mounting blocks (fixed or retract). Cover the wings with 1/16" sheet balsa, covering both sides simultaneously to avoid warpage. Glue the 1/16" sheeting out to rib W-10 only, but allow the sheet stock to extend over the tip. After the wing is sheeted on both sides out to rib W-10, cut a small vee in the sheeting seam which extends over the tip block. This allows the sheeting to be glued to the compound curved tip with no buckling. Draw the tip sheeting down to the edge of the 1/4" tip from both sides simultaneously and glue. Block up the tips of both wing panels at rib W-10 to the proper dihedral angle and glue together. Install the ailerons and wing tip aileron stock. Notch out the wing center section aileron stock to accept the aileron horns and install. Sand the wing smooth to the indicated airfoil. Add the 1/2" wing hold-down bolt dowels. Cover the center section with 4" to 6" fiberglass tape and resin. Add the 1/4" leading edge wing dowels. If you are installing retracts, the openings and wheel wells should be cut now and the 1/64" ply walls installed. If fixed position landing gear is to be used, cut the slots for the 5/32" L.G. wire and hold-down straps. Cut the aileron servo (and retract servo, if used) openings and install the servo mounting beams. Position the wing to the fuselage and drill the holes with a #7 drill through the 1/2" dowels into the fuselage hold-down blocks. Tap the fuselage hold-down block holes with a 1/4-20 tap. Drill out the holes in the wing dowels to accept 1/4-20 nylon bolts. Bolt the wing in place with the 1/16" ply plate glued in place. Add the balsa blocks to the wing bottom and shape to the fuselage contour.

The cockpit details, pilot, head rest, canopy, and antenna mast should now be installed. The entire model should now be fine sanded in preparation for finishing.

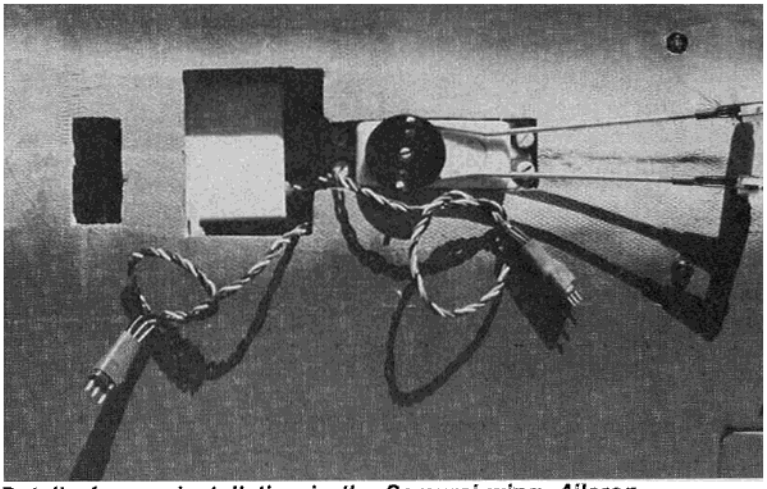
Finishing: The method and type of finish is left up to you. I much prefer and suggest using 3/4 ounce fiberglass cloth and resin over the entire model. This adds considerably to its strength, seals the wood, and requires far less primer for finishing. I used the toilet tissue, excess resin removal method and it works super. If you are not familiar with this technique it is as follows: Cut the 3/4 ounce fiberglass cloth to size and lay on the surface to be covered. Apply the resin with a brush to the cloth. You don't have to be fussy here — just be sure the cloth is completely wetted with resin.

SAMURAI
Designed By: Bob Wallace

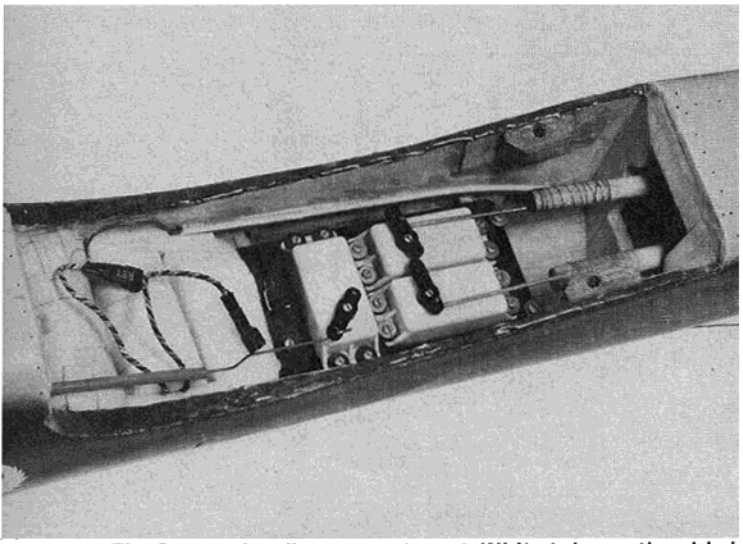
TYPE AIRCRAFT
Sport Pattern
WINGSPAN
61 Inches
WING CHORD
9¼" (Avg.)
TOTAL WING AREA
560 Square Inches
WING LOCATION
Low Wing
AIRFOIL
Symmetrical
WING PLANFORM
Double Taper
DIHEDRAL, Each Tip
3/4 Inch
O.A. FUSELAGE LENGTH
43½ Inches
RADIO COMPARTMENT AREA
(L) 10¾" X (W) 3" X (H) 2⅝"
STABILIZER SPAN
22 Inches
STABILIZER CHORD (incl. elev.)
5¼" (Avg.)
STABILIZER AREA
113½ Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Near Top of Fuselage
VERTICAL FIN HEIGHT
6⅝ Inches
VERTICAL FIN WIDTH (incl. rudder)
5" (Avg.)
REC. ENGINE SIZE
.40 Cubic Inch
FUEL TANK SIZE
8—10 Ounce
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
Four - Five
CONTROL FUNCTIONS
Rudder, Elevator, Ailerons, Throttle
Retracts (Optional)
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa and Ply
Wing ..... Balsa, Ply and Spruce
Empennage ..... Balsa
Weight Ready-To-Fly ..... 82 Oz.
Wing Loading (incl. stab) ... 17.5 Oz./Sq. Ft.



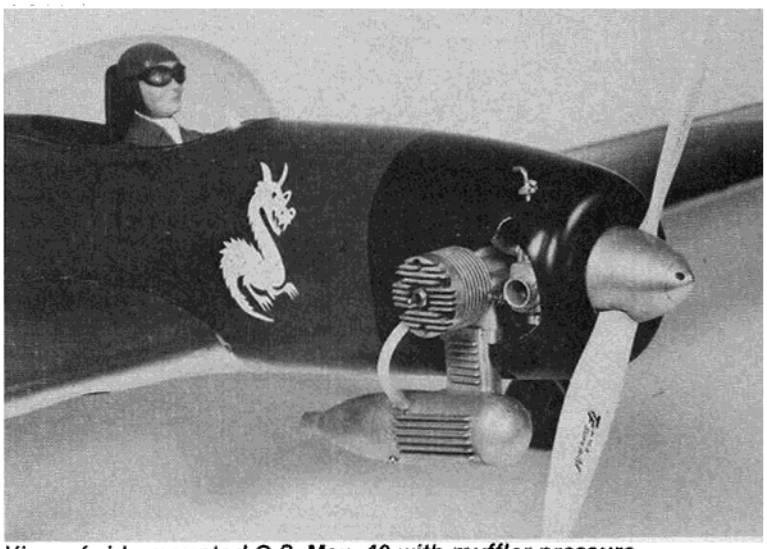
View of one of the main gear in the retracted position. Retract gear is optional but certainly adds to flight realism. Rivet and panel detail done with a draftsman's pen and acetate based ink.



Detail of servo installation in the Samurai wing. Aileron servo shown at right, retract servo is buried in wing at center left. Pro Line radio used in author's prototype shown in these photos.

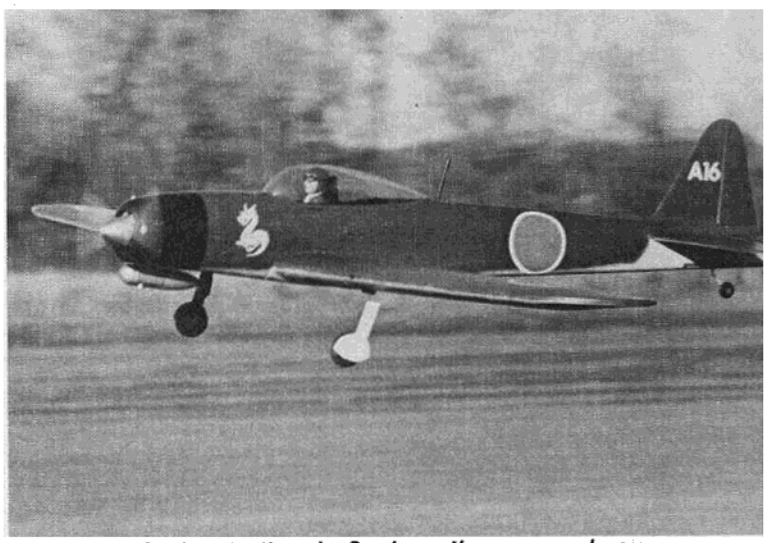


The Samurai radio compartment. White tube on the side is a soda straw used to route receiver antenna to the flexible mast. Battery pack is against a bulkhead, the receiver next, and then the PLS-15 servos on a Kraft tray.



View of side mounted O.S. Max .40 with muffler pressure. Top Flite 10/6 prop. "Dragon" design on fuselage sides made from wet sanded yellow trim MonoKote. Perfect Paint used over glass cloth & resin base.

The author with the Samurai after a day's flying at Central Connecticut RC Club Field in South Windsor, Conn. Radio antenna mast is completely flexible, allowing it to "give" in case you should flip over on a landing.



The Samurai takes to the air. Suck up the gear and you have a realistic looking pattern aircraft that the Sunday flyer will find easy to fly. In fact, the novice could use the Samurai as a low wing, full-house trainer.

Gently smooth out all wrinkles and bubbles in the cloth. Now take a roll of toilet tissue, lay it on the prepared surface, and unroll a length over the cloth and resin. Tear off from the roll and gently blot the excess resin with the tissue and throw it away. Continue this process until the tissue no longer absorbs any resin. Let the covered surface cure and dry. You might think that the tissue would stick to the cloth or pull it off the surface and result in a sticky mess. Be assured that it won't. After the resin has hardened, sand the surface just enough to remove any high spots — don't sand too much or you'll sand the cloth right off! Next, I used K & B Superpoxy Primer which was sanded to a smooth surface and R & S Perfect camoflauge enamels. The top surfaces were done with #PC-51 Japanese Naval Green and the bottom with #PC-36 Light Gray. Rivet and panel detail was added with a technical drafting pen and acetate based ink. The cowl was painted with R & S black and the insignias were made from trim MonoKote, which was wet sanded first to give it a flat look. The entire model was then covered with R & S clear satin finish. While you can use the shrinkable films to finish your model, you should bear in mind that you are restricted to using olive drab, silver or grey in the flat colors, if you wish to obtain a World War II vintage look. It all depends on how realistic you want your Samurai to look. I feel the painted finish is far superior and well worth the additional time and effort.

Radio Installation: The radio compartment is of sufficient size to accommodate almost all types of radio systems, using your preferred method of installation. Therefore, no detailed information has been provided such as servo rail placement, pushrod supports, etc.

FLYING

If you are the type of RC pilot who approaches the first flight of a new model with an air of uncertainty and apprehension — there is no need to this time, as the Samurai is not a Kamikaze. Take-off is smooth and gentle and in-flight behavior is identical. Landings are surprisingly slow and easy, much like a trainer.

I sincerely hope you will build a Samurai and derive much fun and enjoyment from flying it.

Good luck! □

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