

# IKARUS IK-2

By WALT MOONEY . . . Here's a Golden Age fighter that made it into the early part of World War II. The long nose and landing gear lend themselves well to rubber power, but check that fin area, you'll need a lot!

• Two sources of information are available for a three-view of this interesting Yugoslavian design. Aircraft Profile 242, "IK Fighters" (Yugoslavia: 1930-40's) has considerable information, as well as a three-view and several side views in color. "Warplanes of the Second World War, FIGHTERS", volume four, on page 203-204, also covers the IK-2, and has a three-view. This model was drawn up from this latter three-view.

When German forces invaded Yugoslavia in April 1940, eight of these fighters were still serving with the 34th squadron of the 4th fighter regiment, and took part in the early fighting. This design shows some of the influence that the Polish gull-wing fighter designs had on other aircraft designers. However, the

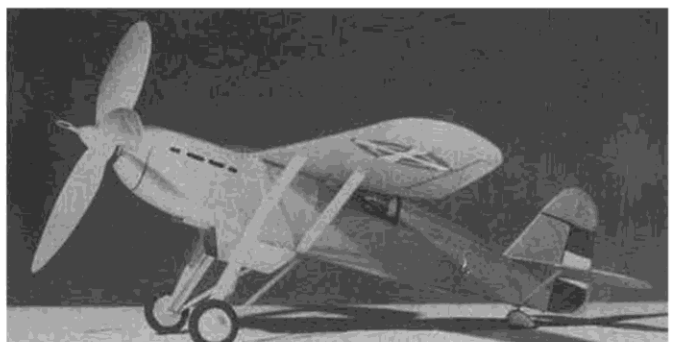
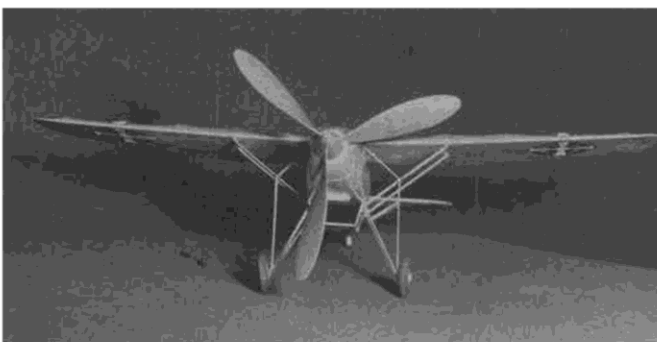
designers of the IK-2 obtained their gull-wing effect only in terms of the chord and thickness of the wing. The spar was not bent, and as a result, this little gull-winged peanut model is a little easier to build than might otherwise be expected.

The author (ole prof, or whatever other names have been hung on him) expected this model to be an excellent flier, and easy to trim. "Sic transit gloria!" It sure didn't fly right off the board. Early test flying revealed a nasty spinning tendency. Standard cure-alls, such as washing-out the wing tips and moving the center-of-gravity forward, were of little avail. The final solution was the addition of more vertical tail area. A piece of clear plastic was added to the vertical tail, as shown by the phantom line, and then the model

flew relatively well. Best times have been on the order of twenty-five seconds, which is somewhat disappointing. However, there is no doubt that someone will build a lightweight version that will give much-increased flight times.

The model is basically a simple design and uses very conventional structural techniques. The wings and tail surfaces are built directly over the plans. Both the horizontal and the vertical tail are flat structures. Note that the horizontal tail is built in two halves, and is later attached on each side of the vertical tail. Sand the leading edges of the tails round, and the trailing edges to almost a knife edge, for better aerodynamic streamlining.

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Long landing gear on this Yugoslavian design allows plenty of room for large flying prop, which is glued up from two Sleek Streak props and a rocket nose.

Build the bottom surfaces of the wings directly over the plan, by laying down the trailing edges, rib bottoms, and the tips. Then cut out two spars to match the pattern, and cement them in place on top of the ribs. Block up the tips so they can be cemented to the ends of the spars.

Next, slice the rib tops from sheet balsa, and cement them in place on top of the spar and rib bottoms. Finally, make the balsa root fairings, notch them to fit over the spar, and cement them in place. Finally, remove the wings from the plan and sand them smooth, tapering the trailing edges to a triangular section, and the leading edges and tips to a half-round section.

The fuselage is a conventional stick box, made with two sides that are assembled directly over the plans. The side structure is shaded on the plan for clarity. Pin the longerons in place and add the uprights. Make the hole for the rear motor peg before you install those particular uprights, because it's easier to do it now than trying to make the holes after the fuselage is assembled. When the sides are dry, remove them from the plan and separate them by using a thin razor blade. Lightly sand the two sides to remove any rough spots, and taper the two tail posts so they can be cemented together at the correct angle. Cement the two sides together at the tail posts, and block them up so they are both vertical as they lay on their bottom longerons over the plan view. Let this cemented joint dry thoroughly before adding any of the cross pieces. The proper alignment of the tailpost joint is important for assuring an accurate fuselage box, so check it carefully as you support the sides. Then add the cross pieces, cutting them from 1/16 sq. balsa, except for the most forward one, which is 1/16 x 1/8 balsa. Although it doesn't show in the top view, all the bottom cross pieces (except at the very front) should be 1/16 of an inch shorter than the corresponding upper one.

Cut the fuselage formers from sheet balsa and add them to the fuselage box. Add the stringers aft of the cockpit (5), and the two forward of the cockpit. Cut, fit, and hollow out the cowl pieces, and then cement them in place. There is a vertical sheet filler outside formers A and B on top of the upper longerons, to help support the wings.

Make up the nose block and the plug, and cement them together. It is usually a little easier to make the noseblock a little oversize and do the final shaping with sandpaper, with the nose plugged into the front

end of the fuselage. Sand the fuselage structure to remove any bumps or roughness.

Cover the major structural pieces with your favorite material. The model in the photos was covered with silver Japanese tissue. Water shrink the tissue, then give it a couple of thin coats of dope. At this point, add the insignia and whatever numbers you feel are required. The Profile article shows several color schemes. The model in the photos has wing insignia and rudder markings. The Cross is white, the outer circle is red, the next circle is white, and the inner circle is blue. The rudder is blue uppermost, then white, and red. Control outlines are made with a fine black pen. All the color added to the model was done with felt pens designed for marking acetate sheet, except the white, which isn't a color anyway. The white on the model is liquid paper correction fluid. It is very white, very opaque, and besides, it was handy at the time.

Install the landing gear wire in the fuselage. Then add the wings and tail surfaces. Block them up with books or blocks, so the cement will dry with all the components properly aligned.

Next, make the struts for the model. Obtain the model railroad basswood stock required, and sand it to the proper streamlined cross-section. Paint it with silver dope. When it is dry, cut it to the right lengths and cement it in place. Do not cement the landing gear struts to the landing gear wire, just alongside. Add the wire bracing to the tail. Poke a pinhole in the tail structure in the appropriate places, then thread the monofilament line through the holes and tie it under the fuselage. A drop of cement at each hole and trimming off the ends at the knot complete the job.

Finally, make the propeller assembly. A small balsa rocket nose, available at the local model shop, was cut to length for this model. A 1/16-inch diameter hole was drilled in it, and a piece of aluminum tubing, filed to make a free-wheeling ratchet, was bonded in place with "Hot Stuff". The real plane had a nose cannon, so the free-wheeler is allowed to stick out a little. Two Sleek Streak plastic propellers supplied the blades for the model. These were cut off near the hub, and then bonded in slots cut in the balsa spinner. A washer and a "Peck-Polymers" plastic thrust button, in conjunction with a standard nose hook, completes the assembly.

A loop of 1/8-inch flat rubber will power the model. A smaller motor

may be enough, if your model is light in weight. The model should balance in a horizontal attitude when supported at the wing spar. If it doesn't, add modeling clay ballast at the nose or tail, as required. Start your testing by giving the motor about fifty hand winds. Adjust the tail surfaces so that the model does a smooth, gradual descent with little or no turn. Then, gradually increase the turns in the motor. If the model shows signs of stalling under power, add a shim to get more downthrust. Similarly, use sidethrust to eliminate any violent turning tendencies. The ideal flight would be a gently-turning, climbing circle, followed by a gently-descending wide circle. The motor should run out of turns about the same time the model is landing. Experiment with motor lengths and sizes and with thrust adjustments, until the model flies to your satisfaction.

If your model continually falls off on a wing or tries to spin in, try adding some more area to the vertical tail. This was necessary to obtain reasonable flights from the model in the photos. ●