



Rubber Scale

Mig-3

This early Soviet low-wing fighter has the looks of a 30's racer/Larry Kruse

The Russian MIG-3 is an interesting dichotomy as a scale subject. While the full-sized craft is somewhat of a dog compared to its contemporaries like the Ju. 87 Stuka, the Messerschmitt Me. 109, and the Hawker Hurricane, as a modeling subject for free flight scale, the MIG-3 has exciting possibilities. Its long nose moment, ample (when enlarged slightly) tail surfaces and double taper wing make it a mean looking ship even in static pose. In fact, when I showed my modelling friend, Doc Mathews, my construction drawings for the MIG, he remarked that it looked more like a classic air racer than a fighter.

I first became interested in the MIG-3 as a free flight subject through William Green's *Warplanes of World War II*. Then I ran across the MIG again in a stand-off-scale construction article appearing in *Scale R/C Modeler*. Accompanying Alan R. Spievack's article was a center-spread three-view done in full color. Enough said. I went directly to my drafting table, did not pass "Go," and did not collect \$200.

In all fairness, I must say that in no way do I have a monopoly on the design, though. The great Earl Stahl did a MIG-3 for rubber scale, circa 1938 or thereabouts. However, as I compared my MIG-3, enlarged two and one half times directly from the Mendenhall drawings in *Scale R/C Modeler*, to Stahl's (now available from John Pond), I found significant differences in rudder and stabilizer shape, nose and tail moments, wing shape, landing gear placement, cockpit placement, scale detailing and construction techniques. In short, I felt the project was worth doing again. (If imitation is the sincerest form of flattery, consider yourself flattered Earl).

Special Construction Techniques

There are several items I need to discuss prior to dealing with the general construction sequence: the canopy, the pre-formed wing tips, and the pre-formed tail surfaces.

Now, I'm probably no different than most modellers in my hesitancy to tackle anything that requires a new technique or two. Typically, I'll analyze a design to determine what skills are necessary, and then decide to build or not to build based on how well I feel my present modeling skills will suit the project. Consequently, I guess I end up building a lot of slab-sided fuselages, squared-off wing tips and open cockpit designs. Somehow it's easier to start a project if you're assured some degree of success in completing it to your satisfaction.

You'll have to look pretty hard, though, at the MIG-3 to find anything slab-sided, squared-off or open. It has curved surfaces aplenty and a compound curved canopy as an added challenge. But, I had wanted to build it for years, so I was not to be deterred by being thrown a curve or two.

The canopy was molded using a male plug carved and sanded to the canopy shape. Light celluloid was placed in a frame, heated over the kitchen stove (with gloved hands) until it smoked, drawn down over the mold and held until cooled. Be patient with the process. It took me five tries to get a canopy I found acceptable. Heating the celluloid to just the right temperature seemed to be the key. If the celluloid was too hot, bubbly-looking "stretch" marks appeared. If it was too cool, it wouldn't conform to the full compound curvature. Canopy frame lines were made with DJ's Multistripe tape and the canopy was

attached using RC-56 glue.

Wing tips, rudder, and stabilizer outlines were all made using $1/32$ " balsa strip laminations pulled around $1/8$ " scrap balsa forms. Since time was of the essence on this project, I tried a couple different techniques in the laminating process that seemed to work rather well. I soaked the lamination strips in hot water laced with ammonia and then used an aliphatic resin to hold it all together. In order to speed up the process, I used Hot Stuff instead of an aliphatic resin, and then baked the laminations in the oven at 275° for 30 minutes to remove all the moisture still in the wood. The process effectively cut the time needed to cure the laminated pieces from about 48 hours to about an hour and a half. You might try the Hot Stuff method of laminating if you're in a bit of a hurry.

General Construction Notes

The MIG-3 employs a built-up box section for the fuselage with the super-structure added after the box is complete. Start by building one fuselage side over the plan. Lay a sheet of Saran Wrap over the completed side, and build the second side directly on top of the first. All formers should be cut out of four to six pound "C" grain and installed after the fuselage crosspieces are in place. Rather than pre-cutting the stringer notches in the formers, I recommend merely marking the stringer locations and then notching each former as the stringer is installed, working either from the back to front or front to back. This method gives even stringer placement with none of the waviness that sometimes comes with rounded fuselage construction. Do not install the stringers on the fuselage until the wing is glued in place.

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The wing is built on top of the plans. However, you will need to cut the tapered bottom spars and leading edge prior to construction. Build the right panel and center panel flat. Block-up the leading edge of the left panel $\frac{1}{8}$ " at the outside rib bay. This will insure the appropriate amount of wash-in needed to keep the left tip up during the powered portion of flight.

Install the dihedral and landing gear, sand the structure carefully, then cover the entire wing before installing it in its fuselage saddle. Steam out any warps other than the prescribed wash-in in the left panel.

Tail surfaces are built flat on the plans with an optional double spar in both the rudder and the stabilizer. Both can be hinged with soft copper wire for flight adjustments.

Wheels are constructed from balsa laminations using short pieces of aluminum tubing as bearings. A drop of cement on the end of each axle will hold the wheels in place.

Finishing and Detailing

Cover all surfaces with white Japanese tissue using a 50/50 mixture of white glue and water as an adhesive. The fuselage is done with numerous long strips of tissue. It's best to "scallop" all formers that might jut up into the covering using a piece of sand paper wrapped around a $\frac{3}{8}$ " dowel. Shrink the tissue with rubbing alcohol and watch all surfaces carefully for warps. Two coats of 50/50 nitrate dope and thinner should be enough on the tail surfaces. The fuselage and wings can take from 4-6 coats.

Details such as the supercharger, gear covers, tail wheel, and landing gear fairings can be added after assembly of the flight surfaces.

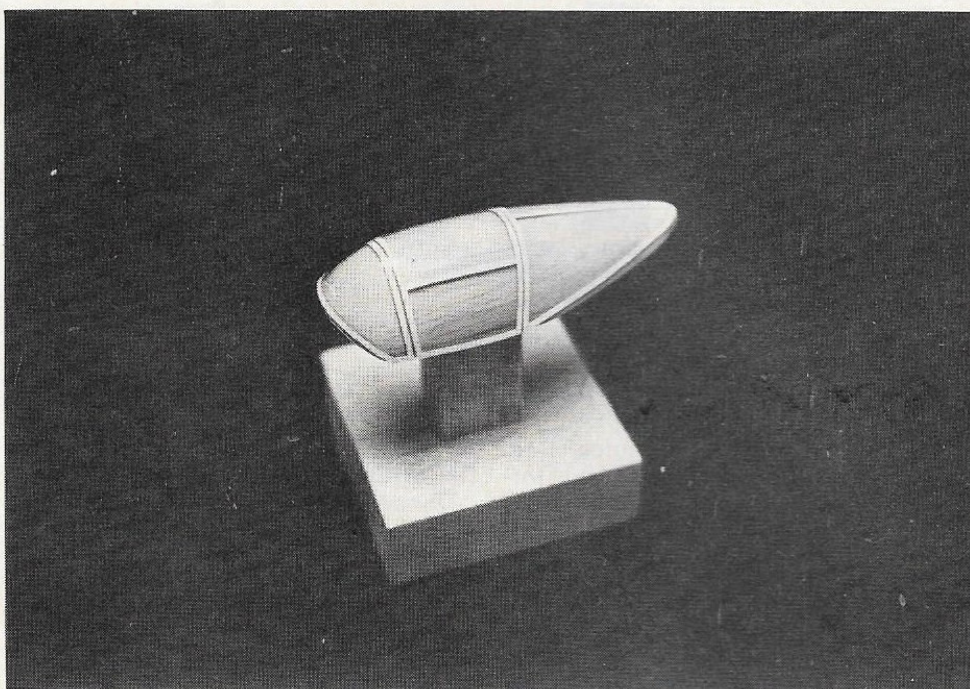
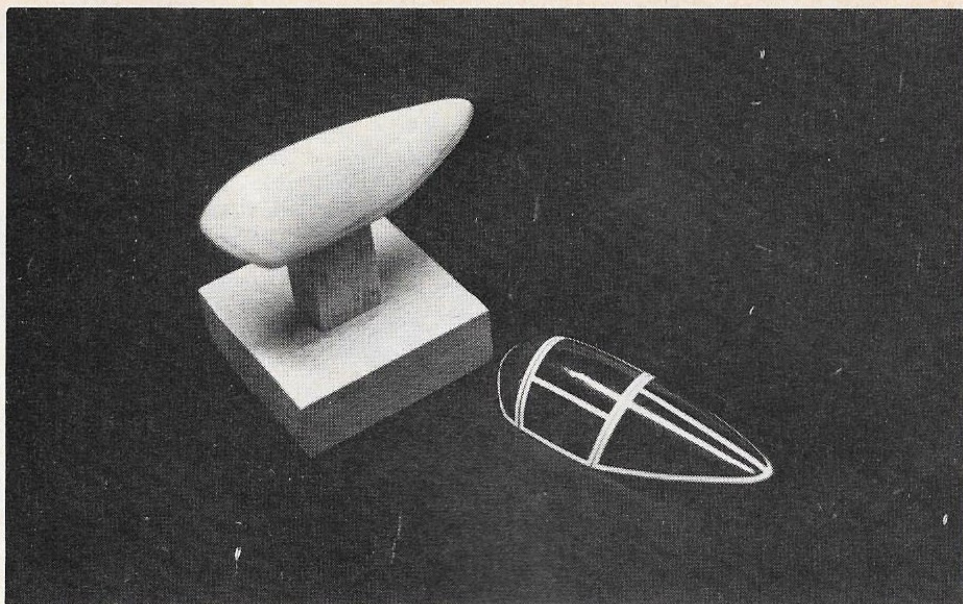
Color trim is done with red tissue in the MIG's winter camouflage color scheme shown in Mendenhall's drawings.

Flight Trimming

Low wing airplanes are typically more difficult to fly than high wing cabin ships. However, the MIG's tip dihedral, long nose moment, and low slung landing gear make it relatively easy to trim. Start with one loop of $\frac{1}{4}$ " FAI rubber 24" long as the flight trimming power source. Assuming the CG is correct (If it isn't, add clay to whichever end needs it), crank in about 200 hand winds and launch the little beast over the universally available tall grass. It should climb gently to the left and descend without either diving or stalling. Use the rudder to adjust the turn and the stab to compensate for diving or stalling. As you gain more confidence in the ship, and assuming it shows no self-destructive tendencies, you can increase both the amount of rubber and the number of turns. The plane is capable of good contest performance when trimmed carefully under maximum winds.

I'll be happy to respond to any comments you might have if you'll send them in care of this magazine. Good luck with your version of the MIG.

CE



Shown here is the canopy mold and a finished canopy ready to install (top). The canopy is shown here mounted on the mold (above). The stripes are DJ's Multi-Stripe. The finished, uncovered frame (below).

