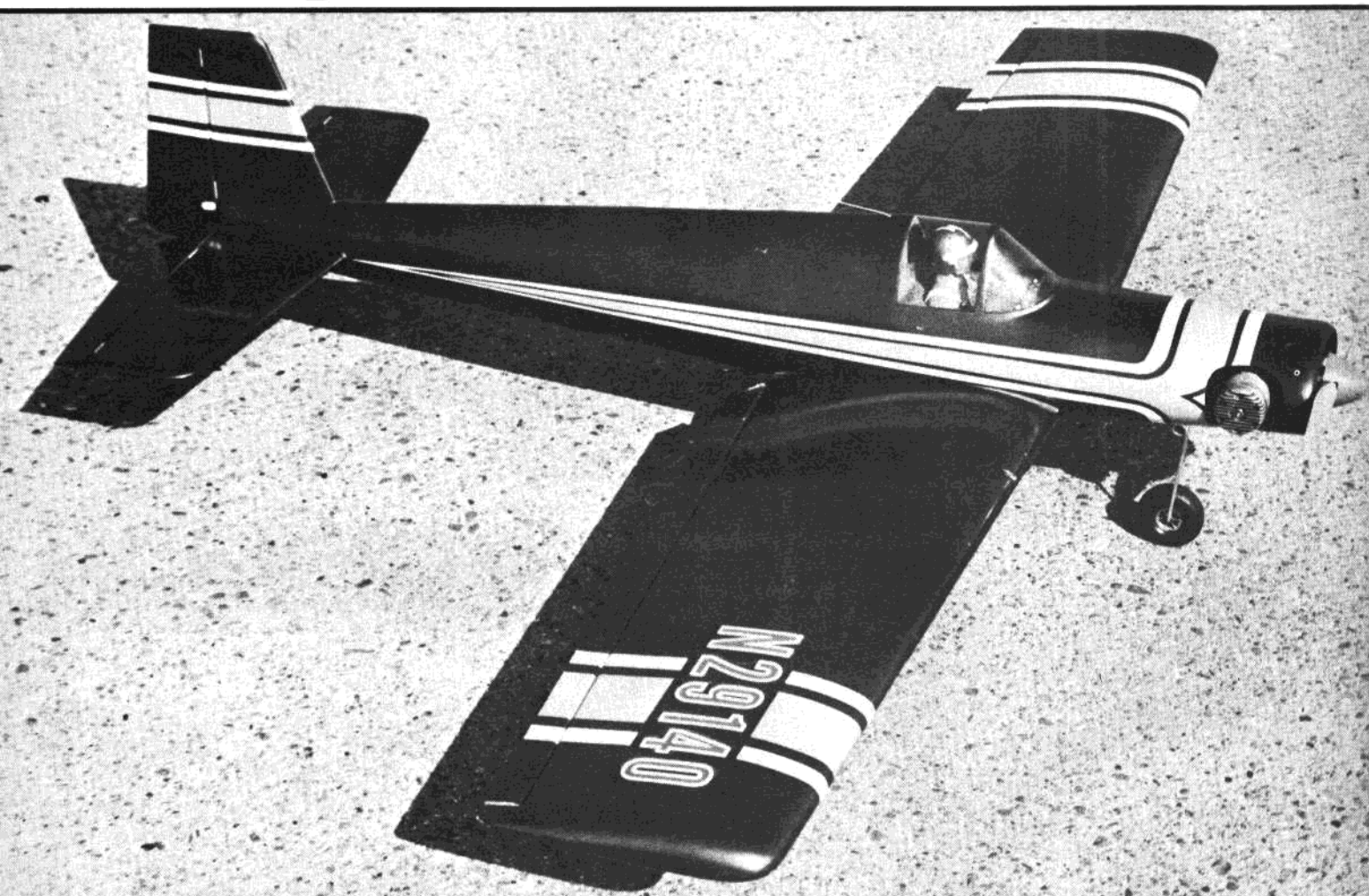


Grouper

Its unique nose named it, but author's proud creation uses stock ready-to-fly wing.



BUD PHILLIPS

THE GROUPER WAS conceived when I grew tired of today's high performance, look-alike, slab-sided super stunt models. I wanted to design, build and fly a model airplane which looked different. This concept necessitated a round fuselage. The engine had to be hidden or at least made less obvious. The ship had to look like a full-sized plane. Thus, the Grouper was created.

I was not sure how the ship would look, but under these conditions it was destined to be different. The front section is a horizontal ellipse, almost large enough to conceal a side-mounted engine, and is egg-shaped aft of the canopy. The veteran Lanier foam wing was selected.

This combination had to be successful. A side-mounted engine is a good compromise between concealment and ease of starting. The round fuselage with the turtle-deck provides the necessary realism and aerodynamic cleanliness. The Lanier wing would permit me to get the plane in the air quickly.

Construction began on the fuselage, but spring weather diverted me from the workbench to flying. Then one bright and blustery day, my Lanier Thunderball landed hard and shattered its nose gear mount. After 150 or more

flights accumulated prior to this damage, the fuselage was ready to be retired. But what to do with the wing? Mate it to that dusty, partially completed Grouper fuselage!

Immediately a clash of proportions was apparent. The wingspan was too great, but the hacksaw solved that. The span was reduced to five feet, including straight-back wingtips. A model this size is convenient and still retains the large model flying characteristics.

A somewhat similar approach was used to name the Grouper. Its most noticeable feature is the wide oval nose. Stretch the imagination a bit and it looks like a big mouth. My wife said it reminded her of a fish. Visions of a large, slow-moving, big-mouthed rock bass appeared. In true aerodynamic thinking, the appropriate hydronautical name of Grouper was chosen. Planes have been named after various birds, objects, places and mythological creatures, so why not a fish?

Construction

The fuselage is unconventional in shape and design. It is a monocoque fuselage with a high strength to weight ratio. The skin is supported by formers built upon a horizontal $\frac{1}{4}$ " thick balsa crutch. Construction re-

quires little more work than for a wing—which could set back model aviation several decades! No removable cowl or tank compartment hatch are needed. The side-mounted engine throws the glop down and away and keeps the airplane cleaner.

Cut the crutch from $\frac{1}{4}$ " medium hard balsa either from one wide sheet (as I did) or from two sheets. The right forward section of the crutch will be cut off later to allow clearance for the engine. Gather the necessary wood for the formers and cut them out as shown.

My method for cutting out balsa formers, ribs, wing saddles, etc., is to glue (rubber cement is great) the outline of the piece to stiff cardboard and cut that out. Then put a loop or two of masking tape with the sticky side out on the back of the cardboard template, which is then placed on the piece of wood to be cut. The loop of tape holds the template to the wood as you cut around it.

When the parts have been cut, start assembling the fuselage. Spread the forward section of the crutch to allow formers F3 and F2 to be glued in place. Then add F1. The remaining

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formers are glued in place, top and bottom. The top and bottom $\frac{1}{4}$ " stringers can be installed in the aft section to give the formers support.

While the fuselage is drying, start building the fin and stabilizer framework over the plans, which must be separated by waxed paper or plastic wrap. The framework is covered with $\frac{1}{16}$ " sheet balsa, not paper! Build on a flat surface. After the frames are dry, glue the $\frac{1}{16}$ " covering to both sides and pin flat. Sand and shape the fin and stab when dry. Glue the fin to the stab at right angles (they look better that way) and set aside to dry.

Return to the fuselage and work on the nose section. Box in the area around the tank compartment with $\frac{1}{8}$ " and $\frac{1}{4}$ " balsa. The $\frac{1}{4}$ " balsa extends to the outer edge of formers F2, F3, and F4. It will be sanded later to support the skin in that area. Glue the $\frac{1}{4}$ " stringers on the top and bottom in the nose section. Taper the forward portion of these stringers to allow clearance for the engine mounting plate.

Permanently mount the lower nose gear bearing mount in place. Cut away part of the lower $\frac{1}{4}$ " stringer to provide clearance. Lock the screws in the blind nuts with epoxy. They will be difficult to tighten once the fuselage is sheeted. Locate the upper nose gear mount.

Glue the fin-stab assembly to the crutch, lining it up with the centerline of the fuselage. Now, glue the upper side stringers in place. Taper their aft ends to blend smoothly with the fin. While gluing these stringers, do not induce a twist in the fuselage. Glue the lower aft stringers in place.

Cut out two wing saddles from $\frac{1}{4}$ " balsa and glue in place. Add the $\frac{1}{4}$ " balsa reinforcements between F3 and F4. Make a cockpit floor from $\frac{1}{8}$ " balsa and glue in place. Add scrap $\frac{1}{4}$ " balsa to build out the wing saddle surface. Sand to the curvature of the fuselage.

Now cover the fuselage with medium grade $\frac{3}{32}$ " sheet balsa (plank, if you prefer). I cut the balsa sheets so all joints would butt over the stringers, which gives some added support to the butt glue joint when sanding. The fuselage should be supported on a flat surface and the top sheeted first. This will ensure a true fuselage. Once the top is sheeted, no further twist can be built in. When dry, remove and sheet the bottom.

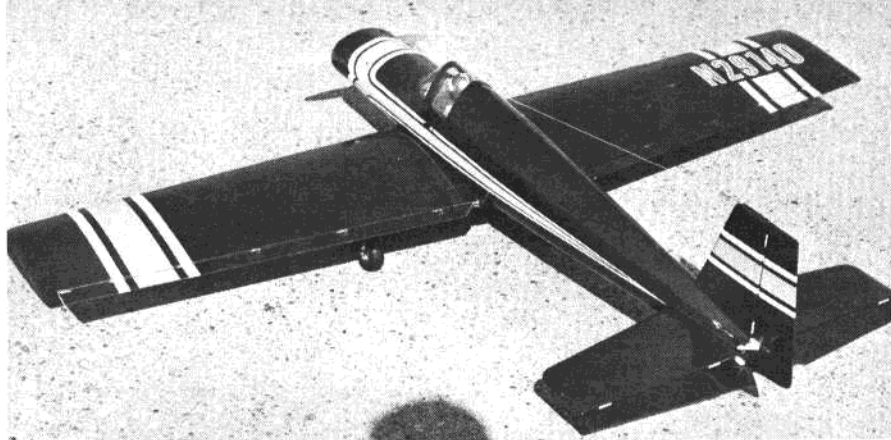
Add the $\frac{1}{2}$ " thick balsa cowl ring to F1 and round when dry. Epoxy the wing holddown block in place.

After the fuselage is completely covered, it is sanded, doped, and silked. Cut out an opening for the engine, large enough for it to pass through. Cut the rudder and elevators from $\frac{3}{8}$ " sheet. Sand to shape, silk, and hinge by your favorite method.

Decide how to finish the cockpit area. I covered the interior with stick-on red velvet plastic. A black readrest adds to appearance. Cover the instrument panel with stick-on walnut plastic and add Tatone instruments. A two-in. scale pilot flies the ship.

Recess the sheeting around the cockpit area for the acetate sheet disguised as a canopy. Make these recesses about $\frac{1}{8}$ in. wide to provide adequate gluing

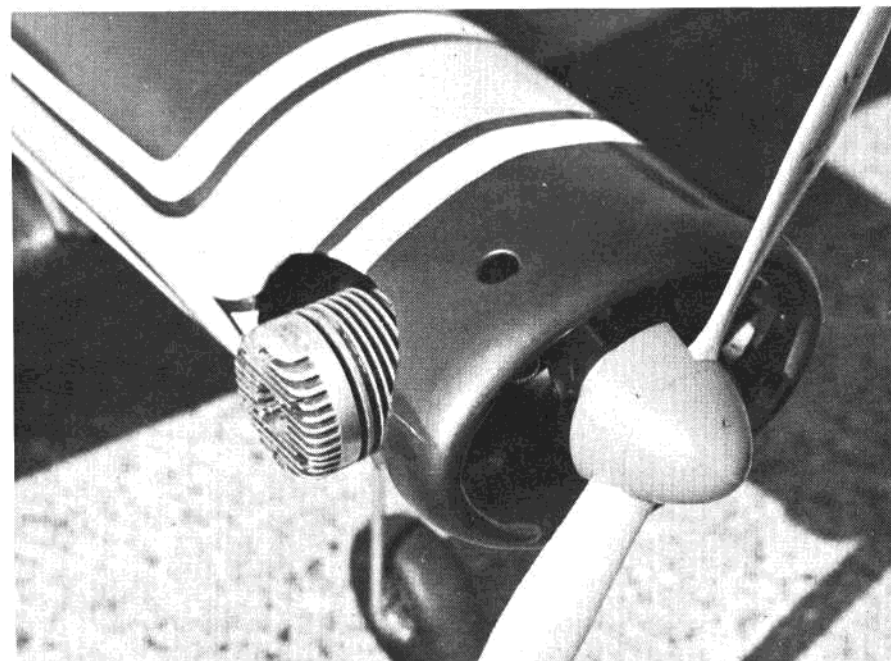
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This Grouper's bare Lanier wing was balsa-covered for appearance, is much heavier.



Cockpit details always attract attention and make a non-scale model look real. Interesting here is the use of a plywood canopy for handling strength.



The Grouper nose provides ample air inlet and place for battery on the left side. In flight, the engine is hidden. Mufflers are located unobtrusively below nose.

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surface. Sand an angle at the top of the windscreen support and blend downward to the contour of the windscreen. Glue the acetate in place with Duco, Testors or Aero-Gloss.

When dry, mask the canopy to the edge of the wood underneath it. Leave about $\frac{1}{8}$ in. around the windscreen-fuselage joint. Mix some Hobbypoxy II and coat the canopy joints. The epoxy will hold, fill and smooth the joints and make a built-in rather than a built-on installation. Remove the masking tape before the epoxy is thoroughly cured. Sand, scrape and fill to blend with the fuselage. Mask again, leaving about $\frac{1}{32}$ in. of acetate sheet exposed for the finish coats of paint.

Purchase a Lanier foam wing and cut off the tips to make each panel 29 in. long. Join them in the normal manner. Add one-in. thick tips and round them, letting the tips come straight back. Make the ailerons and hinge in place. Check wing alignment on the fuselage. Drill and tap the wing holddown block for $\frac{1}{4}$ -20 nylon screws.

For finishing, simply fill with sealer and clear dope. Wet sand until the surface is satisfactory. Avoid weight buildup.

The Grouper was painted Aero-Gloss Candy Apple Red with New Curtis Blue and White trim. Spray the entire fuselage, including the canopy, with at least two coats of clear.

The wing was finished with Aero-Gloss to match the fuselage. The dope does not dissolve the Aero-Skin covering. However, spray light coats of dope and allow each to dry thoroughly if the entire wing is painted. The dope shrinks and tends to pull the wing covering, tearing the finish at the overlaps. Coat the wing tips with Hobbypoxy II and scrape smooth before painting the wing.

The Grouper is clean, fast and responsive. It flies at a more constant speed than most. Rolls are almost axial, with just a touch of down elevator required. I have a little trouble in getting it to spin. It recovers immediately from a spin when the controls are neutralized. Loops are sheer majesty. They are easy to make large and the model tracks easily through consecutive loops. Landings are smooth. The ship tracks well and can be slowed down without fear of snap rolling.

The straightback wing tips aid in low-speed handling. By keeping the air from spilling, the effect is much like that achieved with vortex tips, but without the resultant problems of tip scrape. (I fly from blacktop).

The Grouper was not intended to be a competition model, although it was entered in some contests. Rather, it is for that vast majority of modelers who love to build and fly radio controlled model airplanes.