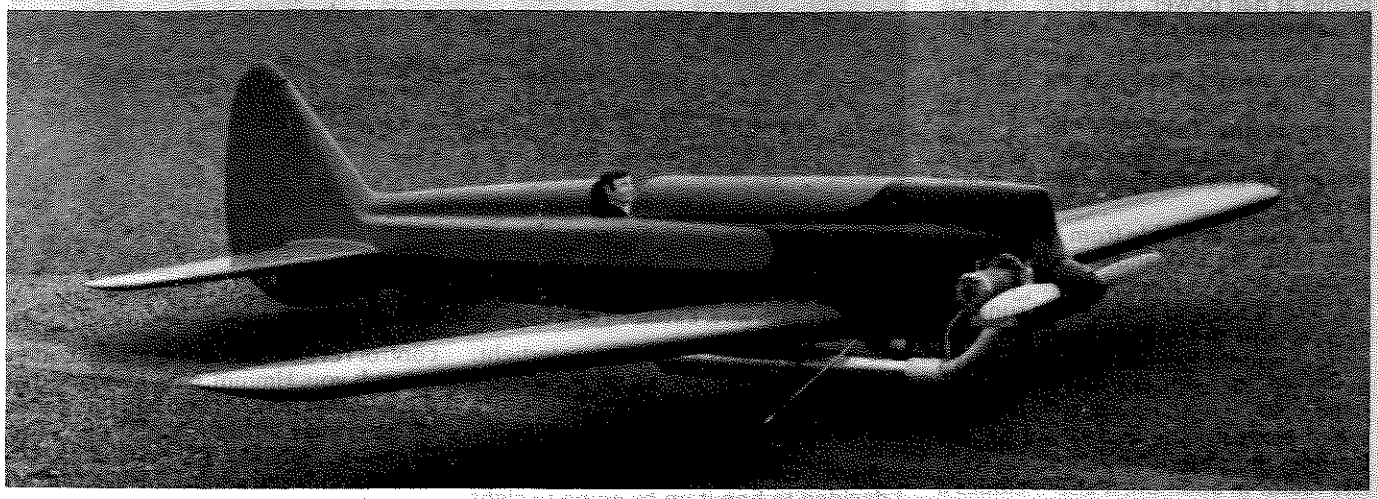
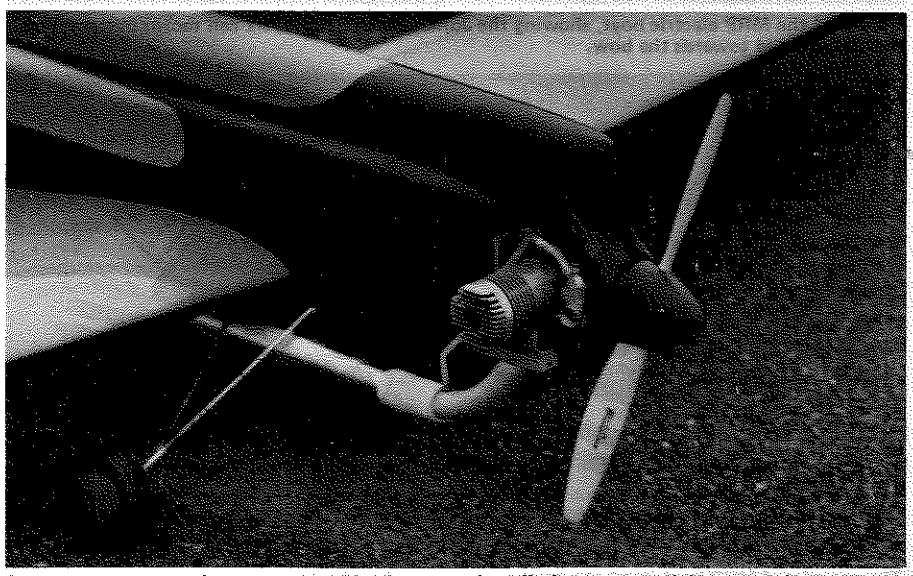


»»» "SNEAKY PETE" «««

By DICK HANSON . . . Behind the sorta-looks-like disguise is a carefully designed, full-schedule pattern machine. Best of all, it's built from materials that your local hobby shop normally carries. PHOTOS BY AUTHOR

• Sneaky Pete is a semi-scale design intended for aerobatic flying of all types. We used the basic layout of the old Howard "Pete" racer because it offered the best set-up for good lateral area and force arrangements. Nothing was really scaled from the Pete; we simply sneaked a few lines and angles we wanted (so much for scale!). Five different models were constructed before we arrived at the one shown here. Each of the other models differed slightly in various ways, such as dihedral, stab area, wing planform, landing gear type, etc. Some interesting points were noted along the way, such as the Dural gear originally used contributing to a coupled pitch-dive problem. It acted as a down force when the model was yawed with rudder. Retracts would eliminate this problem, but we wanted to keep a fixed gear, so the wire type gear was substituted for the Dural. Dihedral was also found to be reasonably critical if a perfectly balanced yaw and dive control was desired. We added dihedral as we went by the "saw & glue" method. It may be of interest to note that many older well-known pattern designs have suffered from coupled yaw and dive problems. However, most of the really good current ones are set up to prevent this problem (Phoenix 8, Curare, Tiporare, etc.). The wing planform was not critical on the shapes we tried, but note that we stayed with rectangular shapes with round tips or mild tapers with rounded tips, and all with low aspect ratios.

One design factor showed up crystal clear. You must use large stabs and big elevators if you want optimum results. We used 26% on this design and up to 35% on smaller models. The very low speed flight characteristics are excellent, and sensitivity problems are taken care of by the dual rate switch on the radio. By the way, if you think dual rates are for the contest set only, stop kidding yourself. They are great for everything from 1/2A to the "flying forests" seen today.



Side-mounted S.T.-60 and pipe is not as pretty an installation as an upright, rear-exhaust engine with pipe in forward cowl, but it happens to be Dick's favorite powerplant.

You may notice that the pictures show a side-mounted engine while the plans describe an enclosed, upright engine configuration. We have also built the Sneaky Pete with an upright engine and no cowl. This is probably the simplest arrangement, although it is not as attractive as the side or enclosed set-up. The side-mounted version shown in the pictures had a tuned pipe on an S.T. X-60. This set-up is fast, but the tuned pipe placement caused some problems by shifting the lateral area and making the model dive when rudder was applied. The version drawn up for this article has all the problems corrected that we could find in previous building attempts. We have also tried to give you the best construction techniques we could invent (or copy). We left out a bill of materials because we prefer to strip pieces from larger stock as needed and laminate when necessary to get large blocks. The one advantage with this technique is that you purchase wood based on density or grain pattern rather than finished size. I laminate with polyester resin (K&B) or Hot Stuff as required, and have found that the finished parts are frequently easier to use than virgin stock. The benefits are: 1) Better weight selectivity; 2) A built-in "centerline" for sanding; and 3) Improved stiffness at a low weight gain.

All the wood needed for the Sneaky Pete is soft or medium soft balsa, except as noted. Please save the lightest stock for the stab, elevator, vertical stab, and rudder. Frankly, I would use foam cores (Curare or Tiporare wings and stabs are OK) and sheet with dead soft 1/16 if I wanted the best weight-to-strength. The all-wood construction shown is plenty strong if glued properly. Use 5-minute epoxy or cynoacrylate where possible and laminate the blocks on the fuselage top and cowl with polyester resin. This

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will make shaping and sanding much easier. These three glues are compatible and will keep you from tearing your hair out waiting for resin to dry over slow epoxy or white glue. We will describe construction one unit at a time for quick reference.

WING

Make 1/16 ply templates of root and tip ribs, including the spar cutouts. Trace around the finished parts, then flip the part over and see if it still matches the traced outline. Sand as necessary until the shapes are absolutely symmetrical. Align the root and tip templates and drill and bolt the rib blanks between them. Use a new 100-grit sanding block to shape the ribs, then razor cut the spar slots. Lightly score the rib positions on the l.e., t.e., and spars, using a fine 1/8-inch flat file. Assemble each panel over waxed paper on the plans, and final shape the l.e. and t.e. with a long sanding block. Add shear webs after the basic framing is dry. The plywood landing gear plates may be epoxied in and the hole for the aluminum rod should be final fit. Splice the wing sheeting by applying Hot Stuff to the joint and then passing a Monokote iron over the seam for fast, strong joints. Cut out the sheeting to cover from the t.e. to the center of the spar. Lay the sheeting on a perfectly flat surface and align the t.e., then Hot Stuff together up to the spar. Flip the panel over and repeat. The panel is now rigid and you should correct any twists before proceeding (this can be done by cutting the sheeting loose from the t.e. and spar on one side, then blocking the panel into place and reattaching the sheeting with Hot Stuff).

Now add the forward sheeting, using Titebond. Add the aileron linkage, t.e., and tips, and final shape both panels making certain they are identical in size and shape. (Note: Use a completed panel to draw the wing saddle shape on your unassembled fuselage sides before joining wings. Ditto for stabilizer.)

Align and join the wing panels using Hot Stuff or 5-minute epoxy. Cover the center section with a 2-inch ribbon of 6-oz. glass tape and overlap 3 inches fiberglass drywall tape to provide a 5-inch wide band on the center section. This entire operation can be done in one step, using Hot Stuff to locate the tape and a squeegee to apply the polyester resin in a thin coat. This technique is strong and requires no sanding afterwards. Cut a 3/16-inch deep half-round notch for the rear gear strut and install the aluminum rod in the l.e., using epoxy.

STABILIZER AND ELEVATORS

Build these using the steps described in the wing building sequence. Add the pre-shaped 1/2-dowel pieces after the elevators are sanded to shape. Drill the 3/32-inch holes and insert 4/40 bolts, using epoxy.

FUSELAGE

This is basically a flat-top box built upside down, then flipped over and completed by adding the cowling and headrest fairing. Start by making the 1/8 sheet box top. This piece must be symmetrical. Make identical side pieces from 3/16 sheet and add the 1/32 ply doublers using polyester resin. Allow a 1/8-inch gap at the fuselage top edge for the top sheet. Epoxy the firewall and both bulkheads to the top sheet, then add the sides, using Hot Stuff at the seams. Now install the 3/8-inch triangle corner pieces using polyester resin and install the firewall fillets using 5-minute epoxy. Clamp tightly until dry. You should now have a perfectly straight, square box with the wing and stab in perfect alignment. Add the cowl blocks and headrest fairing using polyester resin to join the fillet blocks to the cowl side pieces. Carve to shape using a round X-Acto draw blade and a dowel wrapped with 80-grit paper.

FIN AND RUDDER

Add the tail post and notch as shown. Add the forward fin block and the fin top, then shape the fin block using the fuselage sides as a guide. Frame the inside fin block and fuselage top with 1/8-inch stock, leaving a 1/16-inch space for the side sheeting. Add the ribs flush with the framing and tail post, then add sheeting using Hot Stuff on one side and Titebond on the opposite side. Carve the rudder using a centerline reference. Add the 1/2-inch dowel piece as described in the stabilizer sequence.

MISCELLANEOUS

All forward fuselage blocks are joined with polyester resin, then shaped and cut out for the engine. If you are using the pipe in the top set-up, cut the cowl loose at the thrust line as shown in the cowl detail sketch. The finished cowl blocks should be thin (approx. 1/8 inch), and a layer of light glass cloth should be added for strength, using polyester resin. Steel pins, brass eyelets, and a Dzus or any small panel fastener provide a solid mounting arrangement.

Add the 1/2 x 1/2 gear mounting block to the forward bulkhead and cut a 5/32-inch half-round slot for the gear to set in. Add the wing mounting plate and square up the wing by checking distances from each tip to the tailpost. Drill and mount wing with 1/4-20 nylon bolts, then drill and add the plywood reinforcing plate to the wing bottom, using 5-minute epoxy.

TAIL WHEEL

Center drill a 1/4-inch maple dowel with a 3/32 drill bit. Drill a 1/4-inch hole in the sub-fin and up into the fuselage, then mark a 1/4-inch slot in one side of the sub-fin to intersect the 1/4-inch hole. Cut the dowel in half and epoxy in place, leaving the slot open. Add the 3/32-inch tail wheel wire bent to the desired length. Using a 2-56 bolt and nut and a 3/32-inch wheel collar, mount a missing link (Rocket City) and add a "Z" bent wire to connect to the rudder. Bury a small elevator horn in the rudder, leaving approx. 1/4-3/8 inch of arm into which to drill and hook the "Z" bent wire. This set-up will permit adjustable steering and replaceable tail wheel legs.

MAIN GEAR

Bend the front piece cold and make certain it will lie perfectly flat on a flat surface. Install the front piece on the fuselage using plastic plates from an elevator horn set. Swing the gear into position and add the rear wire to the slot in the wing block. Remove and rebend the rear wire. Use heat (if required) until it falls neatly against the front wire. Bind and solder, using a soft copper or iron wire plus a good acid flux and solder. If you do not know how to solder, do not try to learn on this job. Get help.

Mount your wheels as closely as possible to the bend to prevent any splaying tendencies when landing. I know this gear looks unusual, but it was designed to rip *off*, not *out*, in a controlled crash such as when trying to taxi over a curb stone at 30 mph.

FINISHING

Sand the entire model smooth with 180 to 320-grit sanding blocks. Vacuum thoroughly and brush on a very thin coat of polyester sanding resin (K&B). Sand lightly and spray on a heavy coat of K&B primer in progressive passes. Try to sand it all off with dry 280-320 paper after 2 or 3 days. Spray on a thin coat of primer, this time to see if everything looks OK. If not, mix up some primer and micro balloons and fill all imperfections. Sand these when dry and spot in with sprayed primer again. Now lightly sand to provide an even-colored primer base. Your paint job should now be layed out and sprayed on. The entire airframe, painted, but without any gear, etc., should weigh between 3-3/4 and 4 lbs. Ready-to-fly weight will be 7 to 8-1/4 lbs. Control throws should be as follows: ailerons 3/8-inch total, elevators 1/2 inch total, rudder 3 inches total.

FLYING

First check for perfect lateral balance; add lead to the tips as required. The CG can be 4 to 5 inches from the leading edge at the root. Trim for hands-off ailerons, both upright and inverted (this may require sealing all the hinge lines). Trim for inside loops to the smallest possible radius before the plane becomes unmanageable. If it always breaks out one way, check the elevators for equal throw. If it simply drifts sideways, try rudder correction. Add tip weight as a last resort. Trim for outside loops in the same manner. The amount of stick pressure required for inverted flight depends on CG, down thrust, linkage slop, servo dead band, and level upright trim setting (hands off). Do not start shifting the CG and down thrust until you are certain all other factors are correct. Have a good time! •

R/C MODEL BUILDER
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