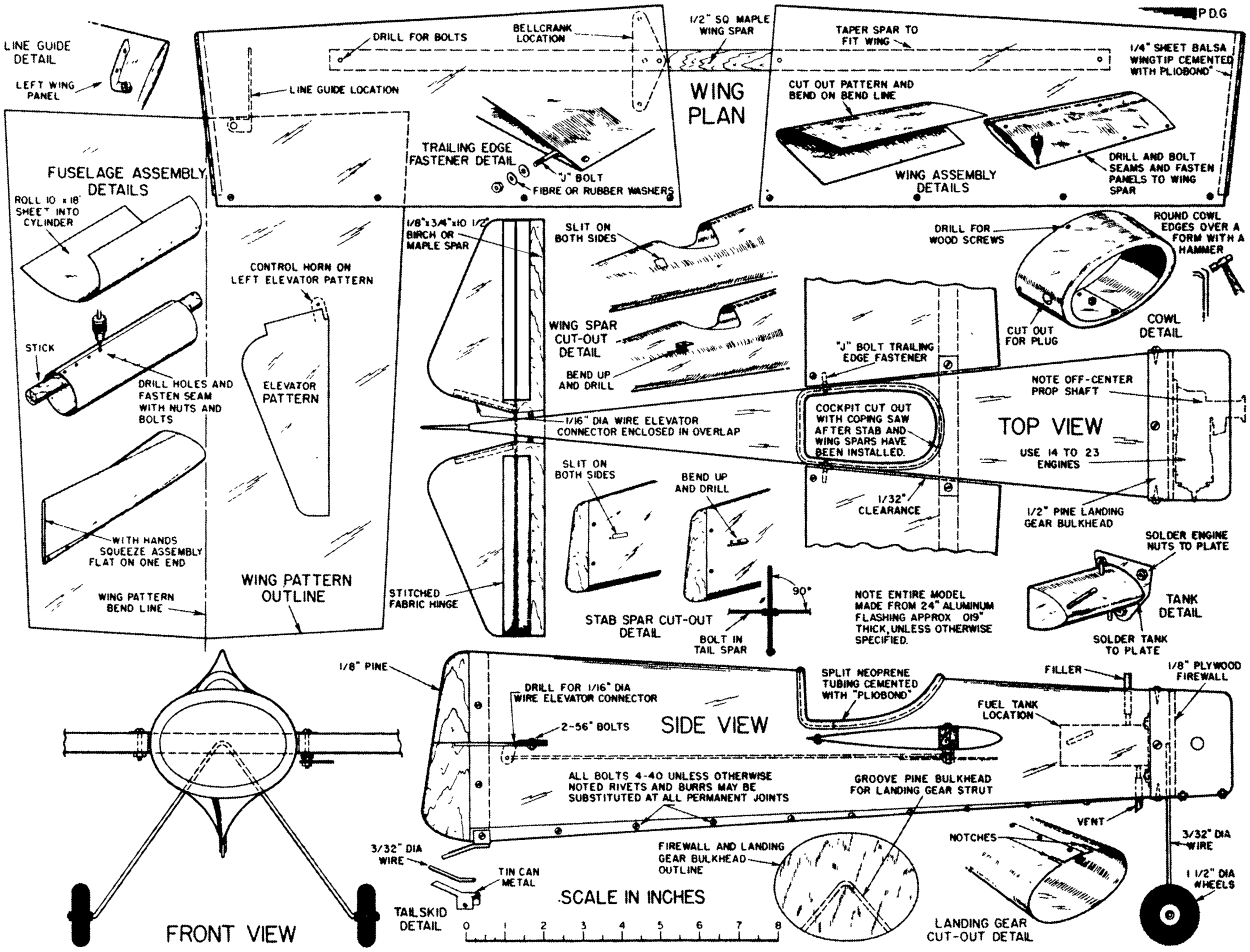
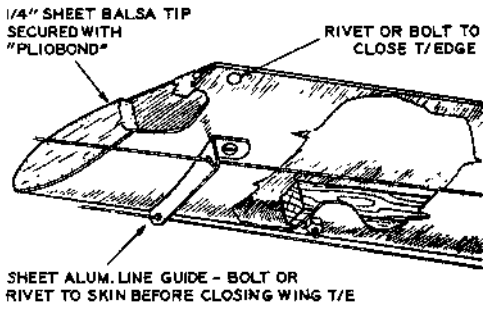
FLY THE ALL-ALUMINUM PLANE!





SHEET METAL SUSIE

By ROY L. CLOUGH, JR.

No hot fuel problems here; Susie's unique vibration isolation assembly means a long-lasting model

• *Suzie* looks like a rather complex bit of sheet metal work, but actually this gleaming aluminum beauty can be yours at a cost of so little time and effort that you won't believe it until you try.

The trick is the use of simple basic geometry which will distort naturally into the shape we desire. We squeeze the ends of a cylinder and there is our fuselage; we draw together the sides of a right angle and there is our wing section.

The main disadvantage of sheet metal models is the effect that high frequency engine vibration has upon metal-to-metal junctures. This punishing vibration will erode or fatigue the toughest metal in a short time. Add to this the rough shocks of repeated landings and it is easy to understand why the operating life of

metal models of the past has been brief.

Suzie was designed with the elimination of this weakness as a major point of effort. Note: there are no direct metal-to-metal component junctures; no points where metal can chatter against metal, and no points where heavy mass or flight loads fall upon flat, or unsupported sheet metal areas, in concentrated fashion. Engine vibration is isolated and absorbed by a wood bulkhead, which also takes landing shocks; the wings are attached to a wooden spar, as are the tail surfaces, the wood in turn being attached to the fuselage. The result of this type of construction is a model which will still be flying years from the time you build it—provided you don't run it into stonewalls too often.

How about the weight?

We won't kid you. *Suzie* is fabricated from .019 aluminum sheet and this stuff isn't microfilm. She squats on the take-off line with a full tank at 24 oz., and uses up one-third to half a circle to get airborne with a Cub .14—the smallest engine you should use. Once aloft, however, she flies as good as any sport-type model with an elevator response, climb and dive, which belies its weight. When the engine quits *Suzie* whistles into a high-momentum glide as flat as a tabletop and keeps pulling on the lines until she stops rolling. You'll like her.

Construction:

Stop in at your local building material outlet and ask for a couple feet of 24" aluminum flashing. This shouldn't cost over 75c. This stuff should mike about .019; don't get the heavy-duty .024 grade.

Note that this material has a "grain," that is the long way and you'll get a better and easier job by observing the lay of the metal. Cut out a piece 18" x 10" and roll this into a cylinder, then get your perimeter dimension by setting the bulkhead in place in one end, mark and then remove the bulkhead, line up the cylinder, prick and drill and bolt the edges together with ¼" round head 4-40 bolts and nuts. (Riveting is okay if you have the equipment.)

Now observe the inside edge of the lap joint; this must come at the bottom right (outside) fuselage. With this in mind gently squeeze the tube into shape to receive the tailpiece, the wood rudder, and bolt this in place. Run a #3 drill through the sides, taking care to be perpendicular to the rudder piece and then carefully slit the fuselage as shown and bend the resulting tab upward on each side. Drill and bolt the hardwood stabilizer to these tabs—a modicum of bending is permissible if necessary for good alignment.

Set the fuselage aside and make up the engine - mount - bulkhead - tank - landing gear assembly. This is a separate and independent unit and note that the engine shaft will be off-center to the left; regardless of what engine you use, the shaft position will be dictated by having just the glow plug tip project beyond the fuselage side. This permits use of the popular "flat-opposed" type of engine cowl. Next take the nose assembly and stick it into the open fuselage end—line your assemblies up simply by twisting one way or the other, and when you are satisfied with the alignment notch out the fuselage end—line your assemblies up simply by twisting one way or the other, and when you are satisfied with the alignment notch out the fuselage metal around the landing gear legs—this will maintain the arrangement. You may wish to drill for the wood screws now and put them in place temporarily.

With a straightedge draw pencil lines down each side from the stabilizer center to the centering marks on the bulkhead. Balance the assembly between fingertips and mark at this point. (This will vary somewhat between the ultralight Cub .14 and something heavier, like an O&R .23). Do not make any allowances for missing elevators or prop, but cut for the spar at this point in similar fashion as for the stabilizer-spar, except that the tabs here are on the bottom. Poke the wing spar into place, drill and bolt temporarily.

Only at this time do we cut out the cockpit. Use a coping saw and leave the edges rough, smear with Pliobond cement, slit a 12½" length of heavy-wall black neoprene tubing and push it in place as moulding around the cockpit rim.

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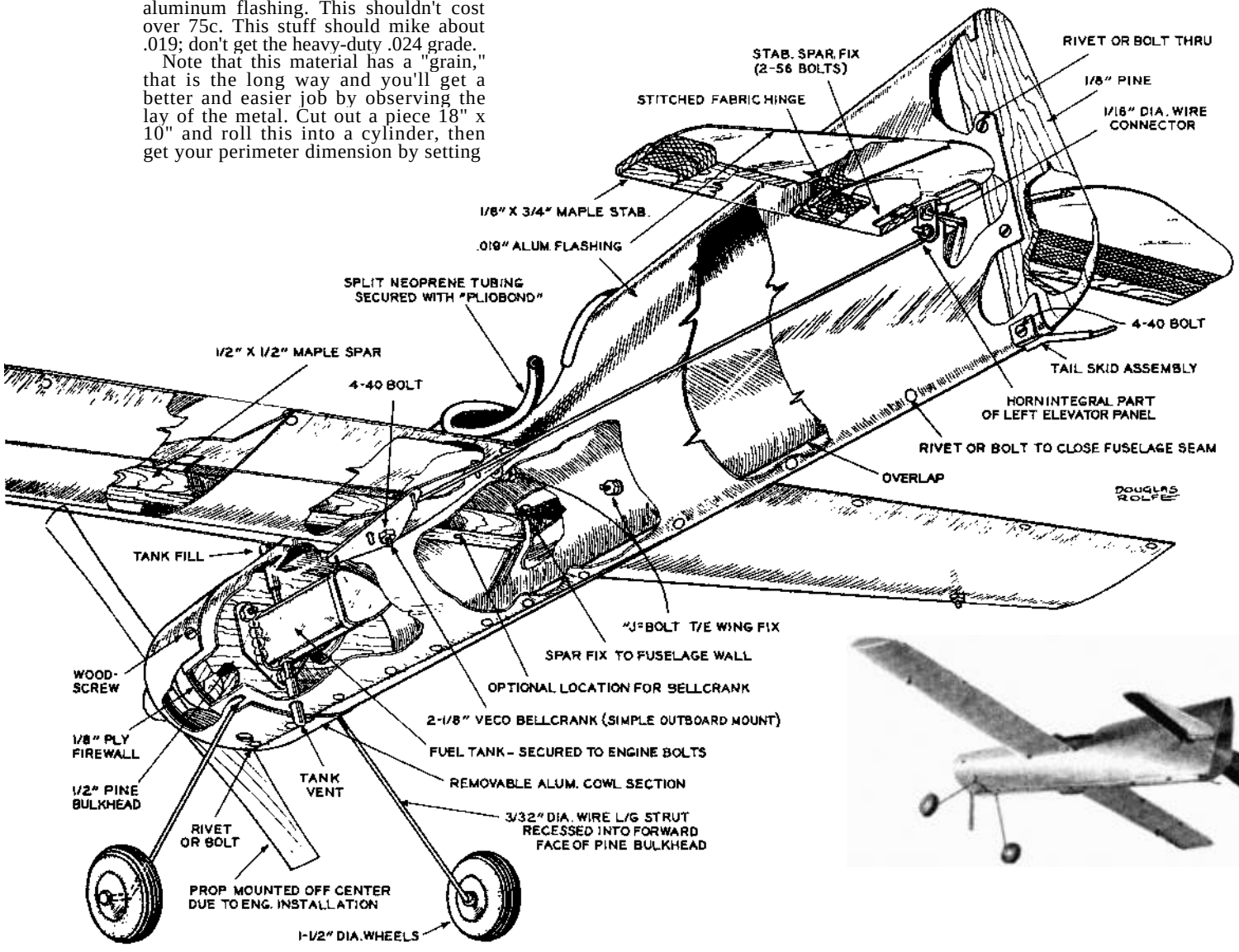
Full-size plans for Sheet Metal Susie are found on Group Plan #356 by Hobby Helpers, 770 Hunts Point Ave., New York 59, N. Y. (35c)



Sheet Metal Susie

(Continued from page 31)

Now for the wings. These are simply cut out and bent to shape with the trailing edges bolted or riveted together—there is a little trick that makes it easier and more foolproof, however. Clamp the metal along the leading edge line between a couple of stout sticks and bend it to 90 degrees, then remove the sticks and finish bending by hand to a nice "natural" symmetrical section. Then hold the trailing edges together with the sticks while you drill and fasten them together—this prevents a wavy edge from developing. Remove the spar bolt from one side, slip the wing over the spar, spot the inboard hole and the one near the end of the spar and drill them. Dig up a couple of "J" bolts and drill into the underside of the wing and the side of the fuselage and install the "J" bolt with a fiber washer between wing root and fuselage as shown on the plan view. Do not omit this!

Now do the other wing, spotting the "J" bolthole so as to provide a slight amount of washout effect on the outboard wing. Next put in the balsa end caps, sticking them in place with Plio-bond. The cowling is simply a strip of aluminum wrapped around the nose, slotted for the landing gear legs and the glow plug tip and held together with a couple of bolts or rivets at the bottom. You will find it easy to bump a nice edge on the cowl using an inkbottle form (one of the oval ones) and a plastic mallet. (From my experience I suggest you use an *empty* inkbottle!) Add an extension to the needle valve and lead this through the cowling. Four nickel-plated wood screws hold the whole front end together.

The elevators are next. Use a stitched bias tape hinge and roll an inter-connector of 1/16" wire into the flippers as shown—it is fairly easy, but maybe you would like to practice rolling a bit of scrap with wide flat nose pliers first. (This is a good trick to know—once you learn it you'll never be caught short for a bit of tubing for any purpose!) The elevator horn is simply an integral tab on the left side. Make up the tailskid and bolt this in place. We put the control quadrant under the left wing, pivoting on the inboard bolt for simplicity, but you can pick up a little speed by putting it inside the fuselage, on the spar, if you wish to take the extra trouble. If an external horn is used, make up a wire line-guide and bolt this in place with the spar tip bolt. The deep tail and the skid places the model in proper take-off position, just let it taxi—it'll take off by itself as the proper speed is reached. Check all bolts for tightness after the first flight and occasionally after that until you are sure she has snugged down to business. Never wipe sand or dirt away with a rag, wash it off with kerosene to prevent scratching the metal.