



# SKEETO SA8

By Paul Denson

**S**keeto was the product of an experiment in the ultra-light concept conducted by Ray Stits way back in the middle '50's. It was developed as a lightweight, economical, homebuilt project which would cost no more than \$500.00. This cost would include everything, even fabric, dope, engine, wheels and prop. The majority of the 175 lb. plane was made of wood with chromoly tubing at strategic places for safety. At this price, it was obvious that a modified, off the shelf, engine would be required.

Industrial wheels, with no brakes, were used and it was necessary at times, when taxiing downwind, for the pilot to "bail out" and stop the plane before it hit a fence or ran into a ditch. Since he weighed more than the plane, it was always stopped in time.

As designed, Skeeto had a 24 ft. wingspan which was stretched to 30 ft. when the original engine was found insufficient in the power department and a heavier engine was installed. The extra wing length helped keep the proposed loading at 3.1 lbs./sq. ft. The length was 18 ft., 150 sq. ft. wing area, 45 mph cruising, 20 mph landing, and

250 ft./min. rate of climb. No question about it, Skeeto did fly but, in every case, it was the engine that quit first, apparently one of those projects that was "born 30 years too soon." Sorry to say, after making a complete evaluation, the project was shelved in 1958 due to lack of a suitable lightweight engine and it was decided to donate Skeeto to the Air Museum in Claremont, California.

Since Sport flying is our forte, we are always looking for something that will fill this category. When we found Skeeto in a 1965 copy of Homebuilt Aircraft, we were looking for a plane that could fly low and slow, something small enough to fit into the car without take-down, low fuel consumption and need a minimum of care. Skeeto fit the bill, parasol wing for stability, small uncowed engine, big rudder and stab for quick maneuvers and, as a whole, particularly uncomplicated.

Already, we had a wing in mind and to the best of our research, the airfoil was designed by Ken Willard and made its first appearance years ago in RCM on his Showmaster. The "banana winged plane" as it has, of

**Here is another design from the famous homebuilt aircraft designer, Ray Stits. Paul Denson has created this Stand-Off Scale reproduction of the full size bird.**

late, been fondly called with its .049 engine, was designed specifically for the schoolyard or other small field flying. After building and flying the Showmaster, we plotted the positions of the upper and lower cambers then enlarged the wing to its present chord and span. The wing has been used previously on a number of planes and we are very familiar with its flying characteristics, this is the main reason for its choice. We have even experimented with strip flaperons which did absolutely nothing for this fine wing. It flies so well on three channels that, even though Skeeto has ailerons, we decided to keep it simple.

With the wing already picked out, it was but a quick bunch of scratches on butcher paper that we had enough lines to build a plane. Do not ever ask a scratch-builder to borrow his plans, they do not exist or at least so no one else could build a plane from them. If it flies, then he takes all the time necessary to draw a buildable set of plans. Before Skeeto was even half completed, it was discovered that it

had the same inherent problem the full size had — **nose heaviness.** Heavier and heavier engines necessitated adding a sandbag ballast to the tail area for balance. Once, this bag was removed for patching and reinstallation was forgotten on a test flight. Needless to say, Ray had the stick in his lap the whole flight. If you look closely in one of the photographs, taken before covering, you can see a big lead weight in the tail for balance. It is a good thing our model is "stand way off" scale because we chopped a full half inch off the nose and moved the engine back as far as we could on the mount. This took out a lot of the nose heaviness but, as in the full scale, it is necessary to carry some weight in the tail. This, however, in no way affects the great way she flies.

We feel the beginner should start with a low powered engine, .15-.20, a parasol wing with lots of dihedral and one that is not too complicated to build. The Skeeto fills that bill. Not only is it easy to build but it is also a snap to fly. You experts don't let the above turn you off, it is also fun to fly, you can relax from your zoomers and play around the field at one fourth speed a couple of feet off the ground, making sudden turns without worrying about snapping into the ground. In a slight breeze, it will fly backwards with full up elevator. (P.S. you do not need a lumber yard to build it.)

We generally kit a scratch-built before starting any construction. You need a fair amount of 3/16" square balsa longeron stock, a few sheets of 3/32" balsa for wing ribs, and various other sticks and sheets for odds and ends. Pick up a couple of pieces of 3/4" T.E. stock in addition to the required 1/4" T.E. stock; this is used as shim stock when building the wing.

Pin the leading edge to the plans, cut rib notches in the trailing edge then pin it to the plans over the shim. Then merrily drop the ribs into each station. Sock them in securely with a cyanoacrylate such as Super Jet, then mist a bit of X-Cel over all to thoroughly set up the glue. Place a strip of waxpaper between the T.E. and the shim or, with Super Jet, it will become an integral part of the wing. Add both top spars and glue securely in place. Do not glue the two center ribs at this time. Leave them loosely in place until you epoxy the dihedral joint. Remove from the plans, turn upside down and add the bottom spars. To build in the dihedral, pin the left half of the wing to the plans, check, then butt the right and left halves together along the centerline. Prop up the right tip to 6 1/2", no! it isn't too much, even though it looks that way. Sand off the spars until they match lengthwise and anglewise. When everything fits like a glove or even like a mitten, slap on a bunch of epoxy, it fills the gaps, and you have a

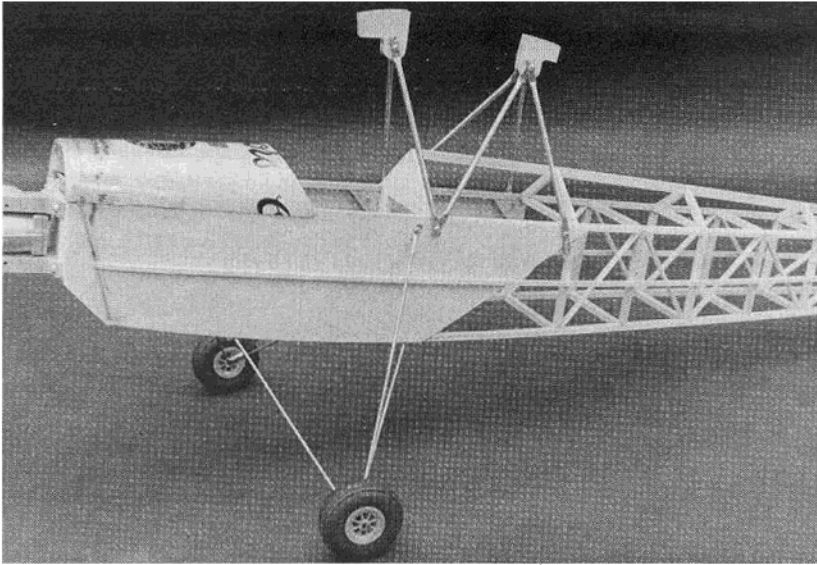
one-piece wing. Check the location of your dihedral braces and remove small parts of the center rib so the braces may be epoxied to each side of the spars. Glue the center section rib to the spars and you are ready for webbing. Cut a bunch of webbing, grain up and down, from 3/32" sheet and glue it to the front sides of the forward spars only. Plane or sand the leading edge spar until it matches the curve of the ribs, then add the leading edge sheeting allowing it to overlap the leading edge spar. The center sheeting and capstrips follow; these and the leading edge sheeting go on top of the wing only. Next, add the wing tips, they keep the covering from pulling the outer ribs into deep curves. This wing is kind of different from most, it has two tabs in the lower center for the cabane and two short spars in the outer wing for strut anchors.

The tail is very simple and straightforward. Just pin down the proper size and length of pieces on the plans and Super Jet them in place. Because we have a belt sander, we tapered the rudder and elevator, however, it really isn't necessary. In fact, the whole tail could be built from 3/16" light sheet balsa and you would need less weight in the tail.

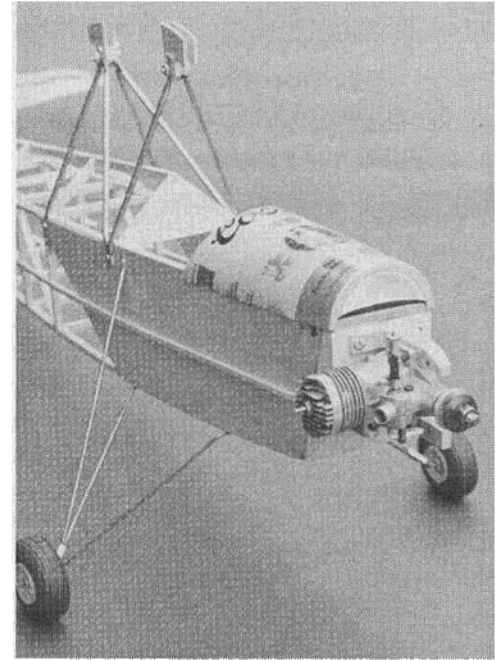
The fuselage is built like the old rubber jobs. Pin down the longerons and glue all the cross sticks in-between. We do not recommend



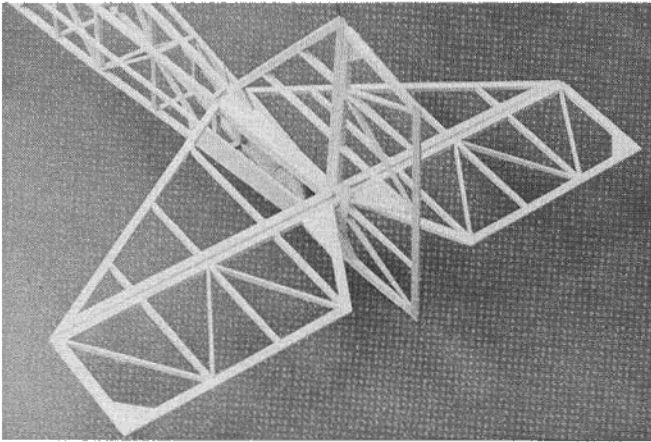
Ray Stits shown with the original full size Skeeto. A.F. Bergman photo.



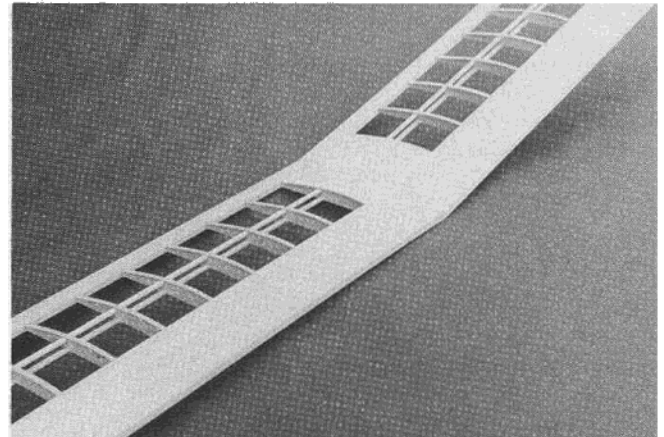
*Ah! yes, the amber colored 16 oz. beverage can finds its place.*



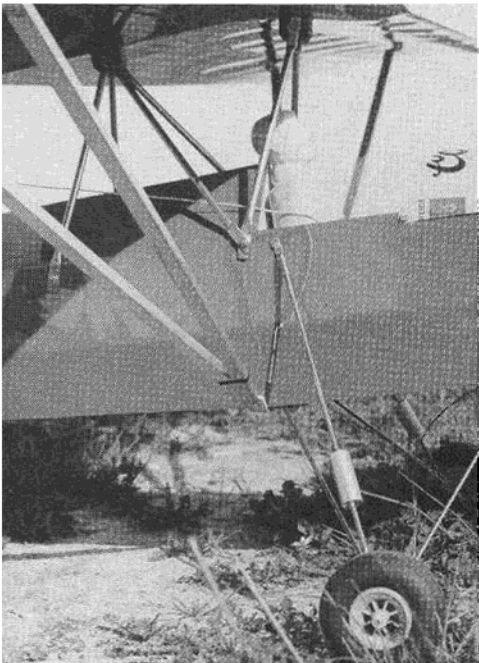
*Cabane struts have wing anchors attached. Will be secured into wing.*



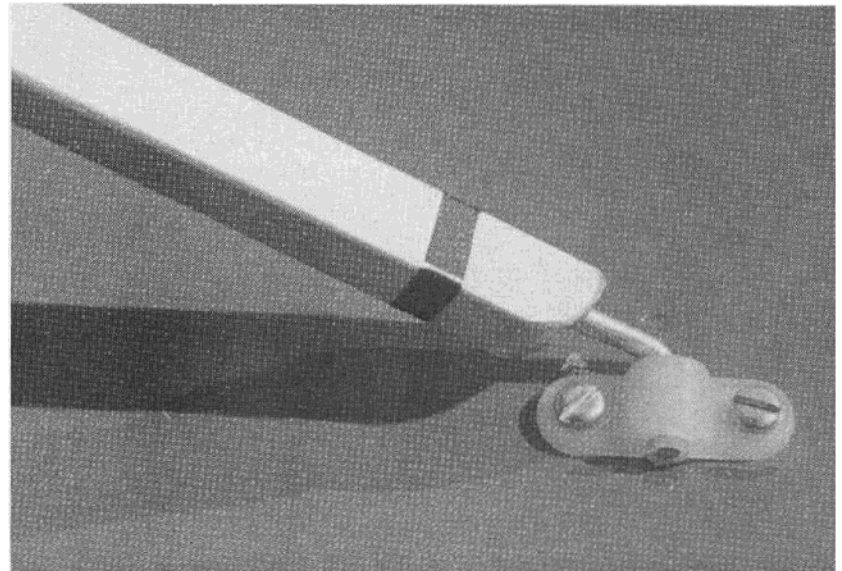
*Tail ready to cover. How many pounds of lead did you say?*



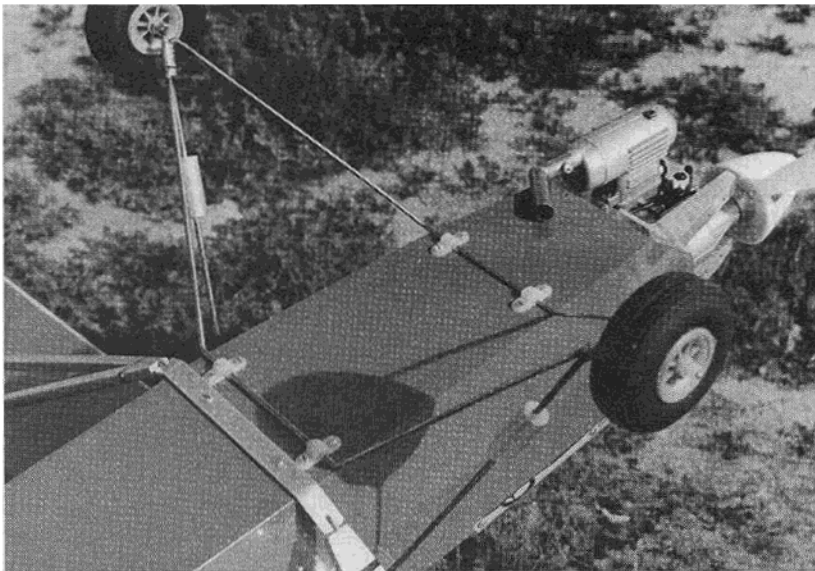
*Round the leading edge and sand. The wing is ready to cover.*



*Close-up of cabane struts and landing gear side brace.*



*Goldberg landing gear clip used as strut terminal on wing. Note NyRod filler on end of cup hook.*



Landing gear attachment lower strut brace. Note muffler extension which was later turned 90° to point down.



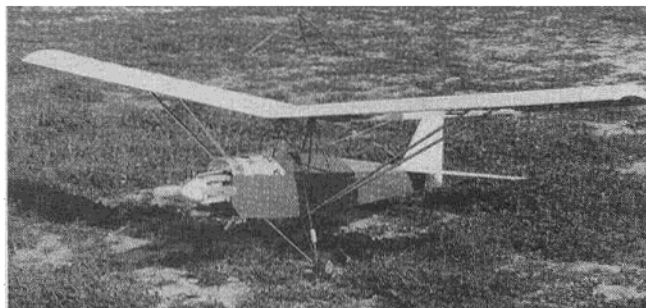
Paul ready for a Saturday of flying. Photo by Kenton Krauss.



Skeeto relaxes after first flight.



Skeeto looks kinda nude without trim.



Coors hatch was painted at a later date.



Skeeto flight shot by Kenton Krauss.

building the second side on top of the first side. If you do, and use cyanoacrylates, they will now be one and you will never get them apart. If, when you build, you are careful, the two sides will be the same. Cut the two pieces of side sheeting from 1/32" ply and glue them to the fuselage frames. **Be careful** — do not make two left sides. Why do we always caution you builders about that? No one ever makes two left fuselage sides! Oh! really --- once we built a glider from a set of plans drawn in France, would you believe it, the plans had two left wings and we built them that way before we discovered the error!

By using the firewall and Former #1 you can sort of assemble the

fuselage upside down on the top view. Pull the tail ends together with a clothespin until the glue dries. Turn over and drop Former #2 in place; the compression will hold it there till the Super Jet sets. Hah! Now you are a "Jet Setter" — bad joke! All the cross members may be cut and glued in place. We put the turtledeck longeron in place, glue it at each end then, using 1/4" x 1/8" balsa strips, glue in the bracing, kind of cut and try. Just remember the old adage, "If it is too short, cut it off some more, if it is too long, throw it away," or something like that. Do not forget the ply gussets, you will need anchors for the cabane and landing gear screws.

Why the nose block? Well, it adds

weight to an already too nose heavy plane. And, besides, the full size has something up front that looks like that — okay? It does give you something solid to anchor your engine mount to. We used long 6-32 bolts but sheet metal screws would work just as well.

The first time we saw a picture of Skeeto, we discovered that the cowl in front of the cockpit was actually the gas tank. That impressed us. Almost immediately, a beverage can came to mind as a perfect scale replacement for that tank. First off, we tried soft drink beverage cans, then, as the plane came to fruition and the fuselage took size in relationship to the wing, we came to the conclusion that since soft drinks only came in 12

oz. cans which were too short, we would have to shift to the kind of beverages that came in the longer, 16 oz. cans.

So, for experimental purposes only, a six pack of these cans was purchased. As we cleaned out the cans we discovered that most of them had dents in the soft aluminum, which were acquired in manufacture and transportation to the local outlets. When this cowl would be painted to match the fuselage, these dents would detract from the fine finish. So, there was nothing else to do but buy another six pack of the amber beverage and proceed to empty these cans . . . hic! . . . like we did with the ozzhers. This time the dents in the cans were getting smaller and smaller and harder and harder . . . hic! . . . to shee . . .

Please note the way the muffler fits the bottom of the fuselage exactly. It is the precise engineering, long range planning and a lot of dumb luck that it came out that way. You might put your engine with its muffler on your favorite mount and see where everything goes, before driving home the screws. Plan ahead.

When you fabricate the landing gear, please check plans and photos; the whole thing is made from 5/32" piano wire. All three pieces on each side must be wired and soldered together as a unit. The side supports are not soldered into the brass fittings, they kind of move up and down in the tubing as a sort of shock absorber. The wheels are actually on the back wire, the front and side ones are braces.

The most complicated part of the whole plane is the cabane, but if you do it this way, it is much easier than it looks. Cut the forward tubing to size (see A-A), flatten as shown, drill holes 3/16" from the ends and bend. Temporarily screw them in place on the fuselage. The rear tubing is cut 1/2" longer than the front, it is flattened and bent as was the front one. The extra 1/2" is flattened on the bottom ends. The top holes only are drilled, then they are bolted to the rear cabane anchor block on the wing. Spread the front cabane tubes and bolt them to the front wing anchor block. The wing is now mounted above the fuselage. Clamps or clothespins hold the rear cabane tubes in place on the fuselage. With the fuselage sitting on the landing gear, without wheels, elevate the tail until the top fuselage longeron is equally spaced from the building board from tail to nose. Now we are going to put in the wing incidence. Check that the front and rear cabanes have a forward-aft angle similar to that on the plans. Measure

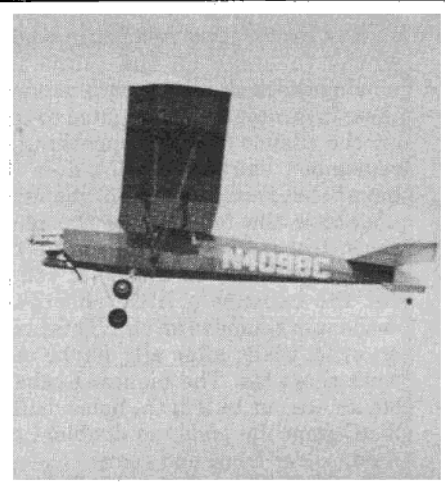
ground full length of the runway, altering height with the throttle, then pull up at the end of the field, give it hard rudder, swing around and dive back across the full length of the field again. Another fun thing is to stand at the flight line and fly the plane in circles out in the middle of the field like it was U-control. She will roll if you do it like you used to do with single channel. Put it into a shallow dive to get up speed, pull out, point the nose up then give it full rudder and she will roll around the inside of a great big barrel, kind of like a loop with a bit of rudder added. If you get into trouble, just let go of everything and that deep dihedral will get you out level and moving away, nothing to it.

We have not found it necessary to take Skeeto down on the way to the field, she will fit into either of our small compacts. Of course, there is much more room for flight box, etc., in the station wagon, but everything will fit neatly in the Tercel hatchback.

If you are looking for a plane to fly, one that is not constantly needing adjustment, one that is ready when you are, Skeeto is the one for you. We have found that when flying her, it is a relaxing interlude from our varoomers, a time we can really enjoy. Hopefully, you will also find it that way.

We would like to thank Mr. Ray Stits of Stits Poly-Fiber Aircraft Coatings in Riverside, California, for the historical background and the picture of the full size plane. □

## From RCModeler Jan. 1984



### SKEETO SA 8

Designed By:

Paul F. Denson

**TYPE AIRCRAFT**

Stand-Off Sport Scale

**WINGSPAN**

55 Inches

**WING CHORD**

9 3/4 Inch

**TOTAL WING AREA**

536 Sq. In.

**WING LOCATION**

Parasol

**AIRFOIL**

High Undercamber

**WING PLANFORM**

Constant Chord

**DIHEDRAL EACH TIP**

3/4 Inch

**O.A. FUSELAGE LENGTH**

39" (inc. rud.)

**RADIO COMPARTMENT SIZE**

(L) 6" (W) 3" (H) 3"

**STABILIZER SPAN**

18 Inches

**STABILIZER CHORD (inc. elev.)**

6 Inch (Avg.)

**STABILIZER AREA**

99 Sq. In.

**STAB AIRFOIL SECTION**

Flat

**VERTICAL FIN HEIGHT**

8 Inches

**VERTICAL FIN WIDTH (inc. rud.)**

7" (Avg.)

**REC. ENGINE SIZE**

.15-.25

**FUEL TANK SIZE**

4 Oz.

**LANDING GEAR**

Conventional

**REC. NO. CHANNELS**

3

**CONTROL FUNCTIONS**

Rud., Elev. Throt.

**BASIC MATERIALS USED**

Fuselage	Balsa, Pine, Ply
Wing	Balsa, Pine, Ply
Empennage	Balsa
Wt. Ready To Fly	48 Oz.
Wing Loading	12.9 Oz./Sq. Ft.