Photos by the Author

Wind-up a "Whippet"

Nearby clearings are all you need. An appealing sport design that flies in silence. A neat rubber trainer for the novice.

by Ted Strader

Anybody who would show up at a full blown R/C contest of sophisticated expert multi flyers and start winding up a rubber band ship is probably not playing with a full deck, right?

Frankly, I thought the idea was pretty cool until I looked up and into the faces of some of the spectators who had wandered over from the flight line. Some, probably, just to prove to themselves that what they thought was happening wasn't really happening at all!

The two-day contest hosted by the Thundervolts R/C Club late in May each year at the Schenectady County Airport always draws a good crowd. It's a huge expanse of real estate and I was taking up only a small spot of ground off in one corner . . . a long way away. It was a perfect day to test the ship under the very best conditions, and anyway, everybody was facing the other direction. Who would know? Now, finally, I could see what it would do with eight 3/16" strands and a thousand turns. (That may not sound like much to you, but prior to this day I had kept the turns down to 500 on six strands as our flying—in excess of 100 flights to this point—had been confined to a school playground surrounded by an impenetrable forest.) It's surprising what keen eyesight some modelers have! Even more surprising was the number of modelers who were genuinely interested and the age range certainly was gratifying. There was easily a fifty year age span asking questions and taking pictures. And we added 25 or 30 more flights to the *"Whippet's"* flight log that day—every one without a flaw. (I was particularly happy as I don't often walk away from the flying field with that much reusable flying gear intact!)

All in all, the entire experience with the design has been pleasurable and I hope those who build one will have as much fun as I have had and am still having with it. All the photographs of the finished model were taken late in the fall after the ship had logged somewhere between 250 and 300 flights. On a few occasions the prop has become entangled in grass upon landing, forcing the nose plug out, resulting in the wire hook poking a hole in the tissue between bulkheads #1 and #2. I would strongly suggest you consider covering the entire area back to the cabin with 1/16" sheet balsa—unless you don't mind occasionally patching a small hole or two. Incidentally, these are the only patches on the model as it retired for the winter.

As far as I know, the *"Whippet"* conforms to no rules other than those of an aerodynamic nature. It started out as a labor of love and an exercise in design engineering to see—if after a four year layoff—I could still draw a bunch of parts that would fit. There was no attempt at making the ship light. The intent was to purposely make it strong in the hopes it would survive some of my less than perfect heaves. And it has!

Another factor was to make it as easy to copy as possible so you wouldn't have to be a graduate bird surgeon to make one. This is the reason for keel pieces in conjunction with a center crutch and top cap stripping. The one place I fouled up was not sheet covering the nose area between #1 and #3 bulkheads which, as we mentioned earlier, would eliminate the possibility of the wire hook poking through. Adding sheet here would not add any additional weight as the nose plug requires some lead shot as we'll discuss later to arrive at the proper balance. However, the ques-

tion, "To sheet or not to sheet" can be wrestled with at the proper time.

Fuselage Construction

The fuselage construction begins with the main crutch cut from 1/8" sheet. Ours was made of two pieces joined as shown in the top view. This allowed the two pieces to be pinned together, sanded identically and then joined and cemented over the plan top view. The bulkheads are cut in one piece and then the top portion of each separated from the bottom along the angle lines shown on the plans. We found this to greatly facilitate building and alignment.

Cement the top portions of the bulkheads to the crutch. Next, cement the keel pieces K-1 and K-2 in place and follow this with the cabin side sheets. Cement the corresponding bottom portions of each bulkhead in place and allow to dry thoroughly before installing the 1/8" square stringers. Check as you go along to be certain the alignment is being maintained as the stringers are added. Now the 1/16" sheet wing rest and top cap sheet can be cemented in place.

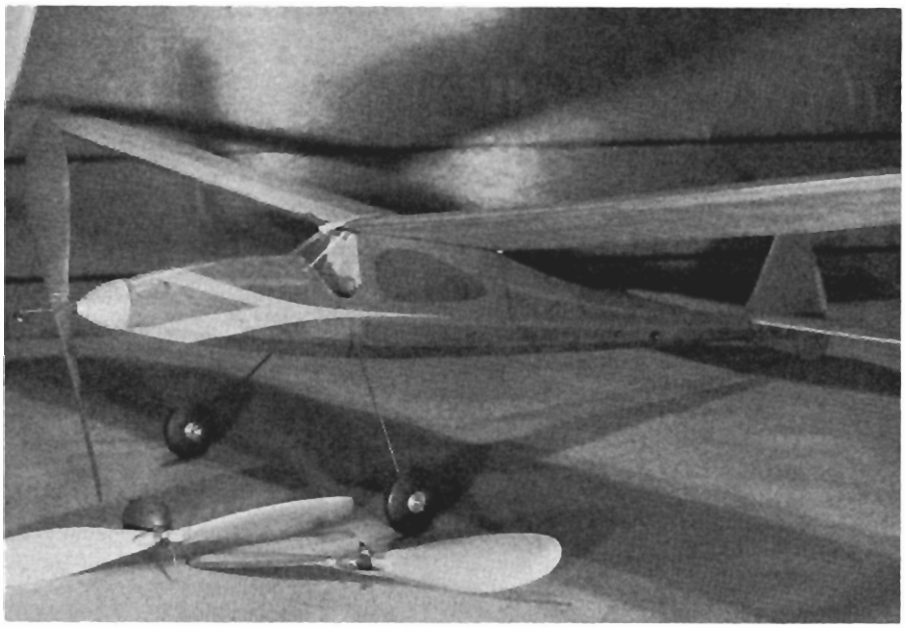
The landing gear, bent from 1/16" dia. piano wire can be fitted in place next. Cut two pieces of 1/8" sheet to act as support for the gear where it exists the fuselage between #3 and #4. Cut and sand these for fit and when satisfied they are ready, drill a 3/32" dia. hole through both of them where the landing gear will appear. Slip the landing gear through the fuselage at this point and then slide the sheet pieces—one on either side—up the landing gear and into position. Prepare a short strip of 3/16" square to be used to secure the gear to #4. Check carefully for alignment before cementing the 1/8" sheet pieces to the stringers and the 3/16" square mount.

The rear rubber mount is made of scrap 1/8" sheet which is cut and fitted to be used between #8 and #9. Cut one for use above the crutch and just below the crutch on the other side. You'll have a ball explaining that it's not really in crooked!

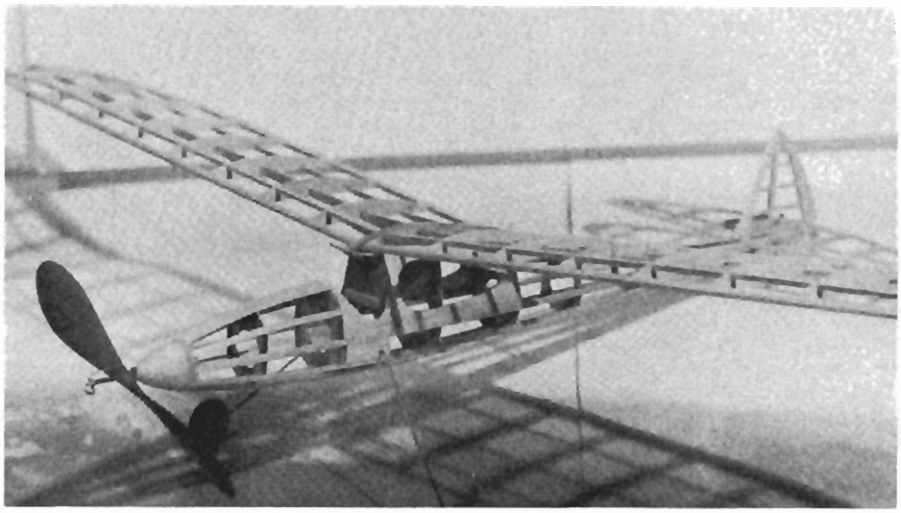
The dowel pieces used to secure the wing with rubber bands can be fitted in place but removed until until after the framebeen sanded. The sub fin may be cemented now, also.

The nose block on the original is made in the following manner. Drill a 1/4" dia. hole in the block of balsa and hope that the piece of dowel you will use as a plug is oversize! Cut the dowel a bit longer (3/4" longer) than the nose block is to be. Slip the block onto the dowel and chuck it in a small electric drill. Either lock the drill into a vise or pin some fine sandpaper on the bench and gently work the nose block into shape. When it's almost the right diameter, remove the dowel from the block and sand the large end of the block—the part that faces the nose plate—so that when the block is butted against the fuselage and ready for use it will have a slight angle. Because the nose plug is circular, you will have an almost infinite variety of thrust settings up or down and right or left—plus combinations.

Now, cut the dowel the length shown on the plans and drill a hole down the center large enough to accommodate a length of 3/32" O.D. (1/16" I.D.) brass tubing which will act as a bearing. (A #42 drill will make a snug hole for the brass tube). When you get one the way you want it, slip it into the



Traumatic experience with fence fractured prop. Termites in balsa spare. Facing page: Winds unravel and it just sits there. That's discouraging.



It doesn't take much space, or wood, or money. Long on fun and pleasure. Below: Eric Strader puts it all to use. Rugged enough for active fliers. This is the kind of model that lasts long enough to train a new modeler.

balsa nose plug and cement it in place. Then do the same with the brass tubing.

After our model was finished and we could determine how much weight we needed in the nose to achieve a proper balance, we cut out as shown on the side view of the nose plug and melted some small "shot" type lead sinkers into this cavity. When the right balance was achieved, the lead was covered with a coating of model cement and that was that. Our prop/nose plug/hook/lead combination weighs 9/10th ounce.

Wing Assembly

Cut the trailing edge, tip pieces and main spar of 1/8" medium stock. T-1 is beveled along the joint line between it and the 3/16" square leading edge as shown on plan.

Building begins by pinning the main spar, notched trailing edge, T-1, 2 and 3 and the bottom 1/8" square spar in place directly over the plan. Cement ribs in place, slanting the center 1/8" sheet rib according to the angle of the main spar to get the proper dihedral when both wing panels are joined together. The top 1/8" square spar is cemented in place, cracked slightly at rib #3 and the end cut and sanded to join smoothly onto T-1. Let the framework dry thoroughly before sanding.

The Tail Surfaces

Both the stabilizer and fin are made of 1/8" sheet and 1/8" square strips. The rudder tab on the fin is cut, cracked slightly to effect a shallow right turn and then cemented in place. Its actual deflection is about 1/8".

The stabilizer begins as a flat framework of 1/8" sheet and strips. The ribs are merely additional 1/8" square strips cemented in place as shown and sanded to an airfoil shape when the assembly has dried sufficiently. If this is not scientific enough for you, feel free to cut ribs similar to the pattern shown and install them instead.

Once sanded, I cemented the fin to the stab prior to covering. If you'd rather cover each before joining, that's a decision for you to make. The completed assembly was not cemented to the fuselage however, until the fuselage had been covered.

When the aircraft was first built, I had one (1) count it—wun 8" Kaysun plastic prop that I had picked up from Bob Quick in Miami more than 15 years before. Here was an item that had really had an opportunity to age!! The third flight of the first day out and this antique item came apart trying to screw its way through the wire mesh of a baseball backstop.

If the neighborhood hobby shop had been able to replace my old two-piece for a new one-piece prop I may never have found out what most avid rubber modelers have known for a long time . . . that making your own props—though time consuming—is not all that impossible.

As so often happens, once you finally undertake a project you thought was less than exciting, you are intrigued enough to take it farther than planned. I wound up making four props from which two were selected. Now I have three as the plastic prop was repairable with Testor's plastic cement (in the small bottle).

Two blade outlines are shown for your selection. The differences between the two finished propellors is as follows: The thin bladed prop has less pitch, spins faster and causes the plane to climb a bit faster in a straight line. However, the motor turns are dissipated sooner. The wide blade prop has more pitch, turns slower with the same motor and number of turns, doesn't cause the model to climb as steeply, and oddly enough creates a lesser vortex as the model will turn slightly to the right as it climbs. All three do an acceptable job for the kind of sport flying we do . . . so you will have to make up your own mind, unless you make one of each.

The hub is made of 5/16" dia. hardwood dowel and the blade slits cut with a saw. Drill the prop shaft hole first. Using it as a guide, saw the blade slits while the hub is held securely in a vise or clamped in some manner. A hub could be made of balsa. However, I'd suggest after the blades were cemented in place that the balsa hub be wrapped with gauze and impregnated with a couple of coats of epoxy for strength. Both of our balsa bladed props have been broken several times, repaired with epoxy, and are still in use. If you look closely at the photo of the three together you may detect the repaired breaks which I no longer attempt to hide with paint!

One other angle we haven't covered is the folding prop. If you have experience along these lines and feel so inclined, have a go at it. It's going to take a bit more coaxing before I tackle that.

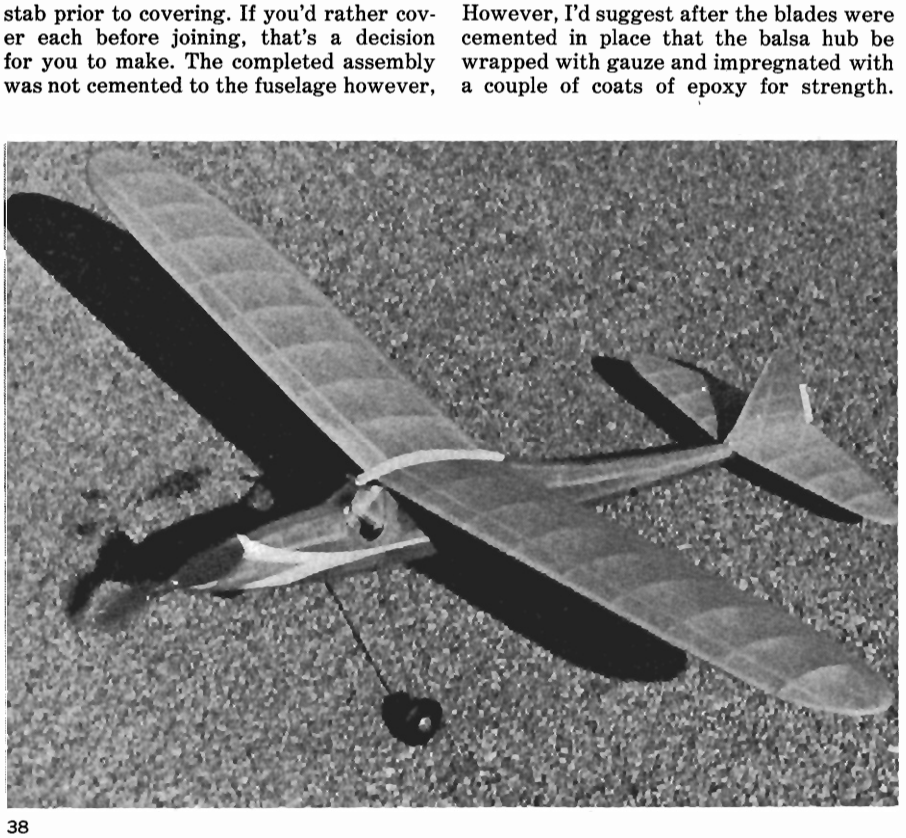
Finish

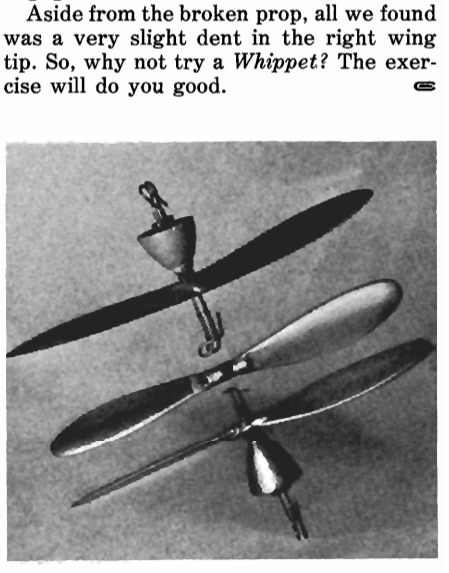
The ship is covered with colored Silkspan, some of which is steeped in even more antiquity than the 15 year-old plastic prop. However, if you can't come by colored, your ship should still fly well with white Silkspan and colored dope. Our model has five coats of clear plus some trim on the nose of the fuselage. It's not a lightweight, tipping the scales right now at 5 ounces. It weighed almost 5½ oz. shortly after it was finished but before the dope had a chance to thoroughly dry out during the summer.

Flying

Naturally the normal precautions must be observed here. The model should have a gentle, flat glide with only a slight turn to the right. Be certain the prop is disengaged and free on the wire shaft prior to test gliding, as a locked prop will cause more right turn than when it is free-wheeling. My first test flight began with about 150 turns in a six strand motor of 3/16" rubber. The model succeeded in climbing to about 30 feet before Mother Earth beckoned it back. The next flight had about 300 turns and the model made a rather large circle after rising to about 40 feet. The third began with almost 500 turns stored inside. The climb was beautiful, the transition to glide superb, the long gentle right turn magnificent, the sudden stop in the baseball backstop demoralizing, the damage, negligible.

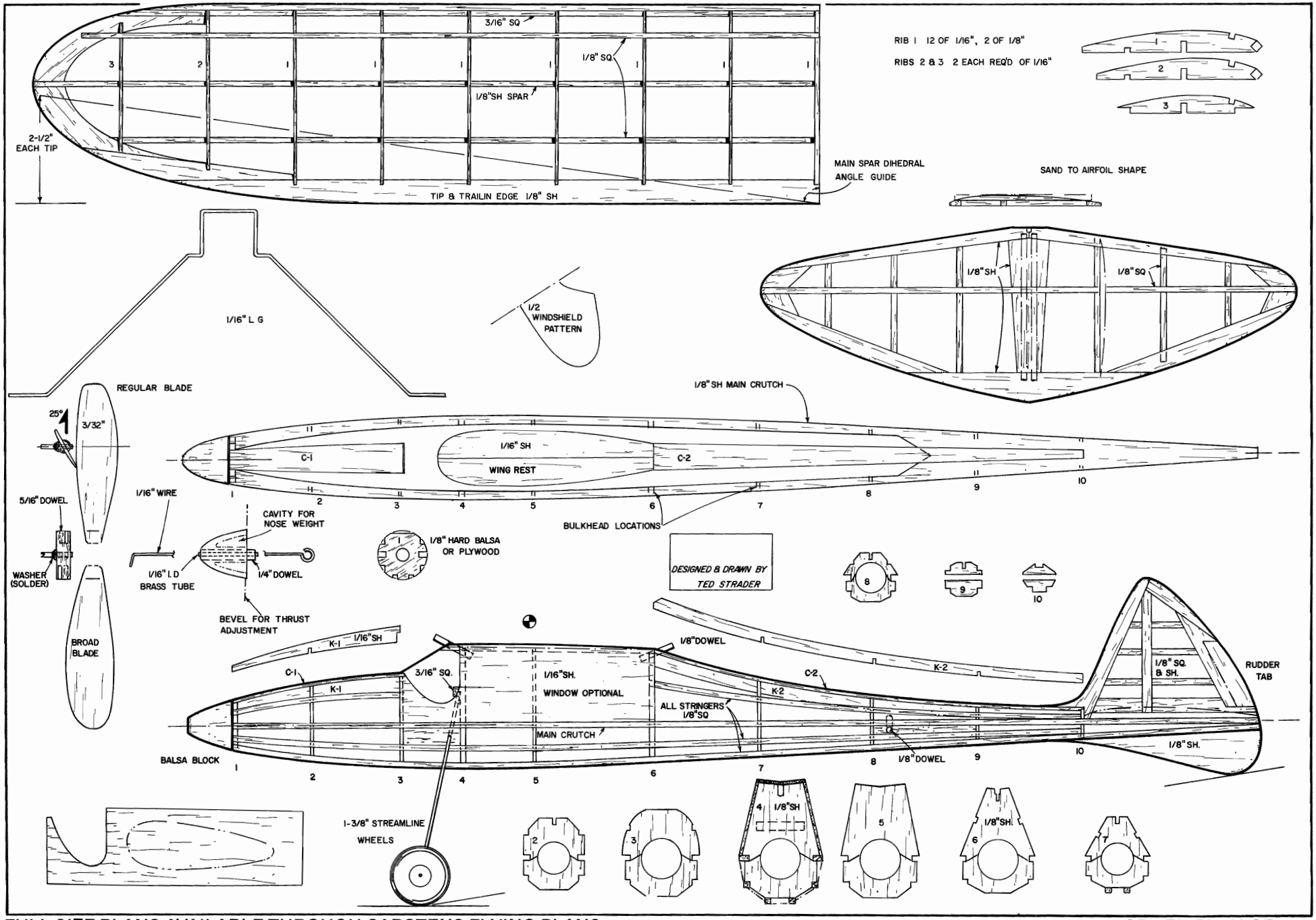
Aside from the broken prop, all we found was a very slight dent in the right wing tip. So, why not try a *Whippet?* The exercise will do you good.





Plastic prop or carved of balsa, it flies well with either. A circular nose block, shimmed for thrust setting. Revolving block gives you shaft angle for flight trim. Note the winding hooks.

At left: Many modelers got their start in Free Flight with agile, durable rubber sport craft. "Whippet" is stressed to bounce back for more. It keeps a young flier involved in the action.



FULL SIZE PLANS AVAILABLE THROUGH CARSTENS FLYING PLANS

ORDER PLAN CF-304