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SQUARE CAT

By JOHN JAMES

● The Square Cat design is an attempt to come up with an airplane that will be stable enough and simple enough for the beginner to fly in the carrier events.

Most of the current designs being offered in plans and magazines are getting a little too complicated, in my estimation, for a junior to build and compete with. Not without a lot of Dad's help, that is.

This plane doesn't have flaps, ailerons, kick-over rudder, or movable leadouts, but it's proven its contest ability and stability by helping my 12-year-old son build and fly successfully in his first year of competition flying.

Build the plane as shown, save the gadgets for the big boys, and I'm sure you will be pleased by the flight characteristics and winning capabilities of a plane that's as simple as you can make it.

Several of the design considerations and reasons for them follow.

First of all, the longer inboard wing and lots of wing weight will actually make the model roll *away* from you as you kick in the high throttle when the plane is stalled. After seeing the opposite happen too many times in Class I and II, as well as profile carrier, this will be greatly appreciated.

The nose area of the model is quite large in comparison with contemporary profiles. The reason for this is to protect the engine and carburetor. The difference in drag on a profile model is negligible.

The only changes I've made since the original is to build the elevator in one piece (simpler), make a fatter wing, and add half-ribs in the wing. This didn't affect the high speed one bit, and made flying in a semi-stalled condition a lot easier, as the old wing stalled quite suddenly.

The times that we have attained so far are 28 seconds for high speed and 94 seconds for low. These times are with Sig "Peter Chinn's contest fuel" and a 9-7 Tornado nylon prop. A Fox



36X R/C plain bearing is the engine we used and these are stock engines. These engines are competitive as far as performance is concerned, but if you have great disdain for monkeying around with carb settings, I would suggest the McCoy 35 R/C with the Perry carb. I've been a Fox man since I could tell the difference, but that carb isn't anything for a beginner to be messin' around with!

Right now you're going to hear about profile planes that will do 20-21 seconds on high speed and 3-1/2 hours on the low end. I would like to say right here and now that these planes are mighty hard to find on contest day. Build the Square Cat as shown, and if your high end is around the 30-second mark and the low end is anywhere above 60 seconds, you'll make a lot of honest people out of those who say they have the super plane and the new top secret gadget.

BUILDING

The plane follows standard profile model construction. If you've got a Flight Streak or Ringmaster under your belt, the structure will be no problem. If you are careful, and buy a straight piece of 3-inch wide by 1/2-inch thick balsa, you can make the fuselage out of it by laying the edge along the line on the plans that runs aft from the top of the motor mounts, cut the bottom section out, and then use what's left to make the top piece and canopy.

Start the wing by cutting a piece of 3 by 3/32 balsa down the middle with as straight a cut as possible. Pin one trailing edge piece down on the

plans and lay one of the wing spars over the plans. Carefully put the wing ribs on the spar, omitting the half rib for now. When all ribs are on the spar, use the other spar under the first one as a shim and prop up the spar and rib assembly with the rib trailing edges on the 3/32-inch trailing edge piece. Pin this assembly to the work table and glue only the spar and trailing edge at this time. Cut out the trailing edge web pieces now and fit them between all the ribs and glue them in place. Make sure they fit well and are glued all around. When this assembly has dried, place the top trailing edge sheet in place and check for total contact with rib and web surfaces. When assured of this, glue the top trailing edge piece to the wing assembly, and pin the whole thing down to the work bench.

Be sure now that the trailing edge is straight, 'cause when this assembly dries, any warp you have built into the wing by now is there for keeps. You could substitute a solid balsa trailing edge for this assembly, but the weight and warp-resistance will not be in your favor if you do. When this is dry, pull the pins from the table and lay the spar flat on the table and put the top spar and leading edge in the ribs and glue in place. Make sure that the trailing edge is parallel to the table at this time. Next, install the tips, half ribs, bottom sheeting, bell crank, and lead out assembly. Install pushrods to the bell crank and glue the top sheeting in place.

Now get out the sanding block and

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sand the radius in the leading edge and chamfer the tips and generally go over the whole wing structure for bumps and glue balls at this time. When done sanding you should have a complete wing assembly. Add the wing tip weight and you're ready to install it in the fuselage.

When installing the wing in any profile model I have developed a trick that might help you get a stronger joint.

1. Cut hole in fuselage approximately 1/32 to 1/16 larger than the finished wing size when installed in fuselage.

2. Install wing and place temporary balsa shims in crack to align wing. Make sure these don't stick out from under fuse on one side.

3. Use 5-minute epoxy and popsicle sticks to make a fillet around the wing-to-body joint on the side that doesn't have the shims protruding from under the fuse. Make sure not to lose your alignment. Don't try to force the epoxy into the crack but try to make sure the crack is sealed all the way around on one side of the body only.

4. Let epoxy set up and then pull shims out. You'll now have a big crack all around the wing joint. Hang

the model by the wing tip with the crack side up and fill joint with Hobby-poxy Formula II glue. Clean all the excess off with a balsa scraper. If the 5-minute epoxy fillet doesn't have a hole in it, and the glue doesn't run out of the crack, you'll have an indestructible joint. Finish up with a 5-minute epoxy fillet on the remaining side.

The hook set up is as simple as possible. Note that the little spring that drops the hook also holds it in position to catch the carrier strings.

The gas tank I used was a Veco 2 oz. wedge, which is satisfactory. Or use a homemade square tank with the fuel pickup in the bottom outside corner. If you can find one, a Veco or Perfect 2 oz. square tank will work fine.

FLYING

Set up the hook so it drops when you have about 3/4 of your down elevator deflection. Make it easy on yourself to drop it, as you shouldn't use any extreme control function until you are done with the high speed flight.

Take off as smooth and as low as you can, then climb gradually to the 20-foot maximum altitude. The climb should take 3/4 to 1 lap. Hold this altitude for the duration of the high

speed flight.

If you are new, just take off and fly as smooth and as level a course as is possible for you. The key item as to whether you decide to fly the high course or the low one is smoothness. Practice smooth, straight-ahead takeoffs. Don't try to jerk the plane off the deck as soon as it's released. This will lose you 1 to 3 seconds on your high end.

For low speed, all I can say is practice both in the wind and on calm days. This is the only way you can know what to expect when the model comes downwind and loses lots of lift. You'll develop the knack and reaction time necessary to counteract this only through practice in flying in the wind.

For landing, be sure you are lined up with the deck. Have your helper watch the plane during the low speed flight to make sure you're aligned with the deck.

Well, that's about all there is to a Square Cat. Why the name? Well, it's sort of a square-winged Bearcat, which adds up to Square Cat. Again, build this one as shown. Don't worry about the lack of gadgets. Practice and you'll be in the trophy line too. ●