



Launched by author, a Half Fast gets off to a fast start, Shirley Austin doing the flying. Shirley scored two kills to take a Nats first.

HALF FAST



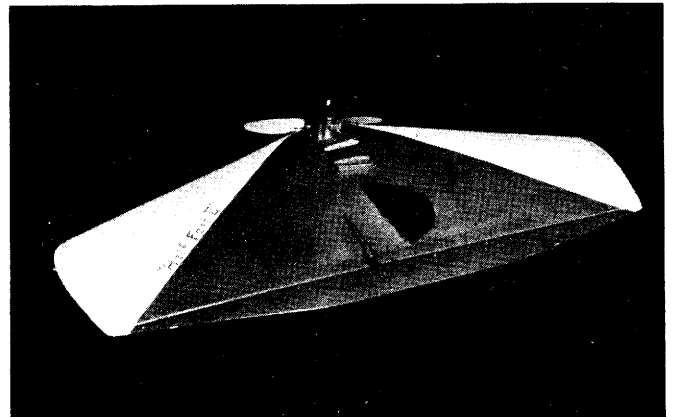
By W. F. NETZEBAND, JR.

Miss Shirley Austin ran the Senior Class boys into the ground in combat at the Nationals. In ten flights, design outscored opposition by 11 to 1.

▶ Fellows, here's the ship used by Miss Shirley Austin to win Senior Combat at the '54 Nationals. This is your opportunity to have a ship as good as hers. The other four of us couldn't get any kills, but we got plenty of cuts. With this plane it is fairly easy to give out more than you take. It's fast, quick on the turns, rugged and simple to build. Two evenings are plenty for one and in three evenings, you can build two. If you haven't a large supply of scraps, get to the hobby shop and pick up the stuff listed in the Bill of Materials.

In ten combat flights in all classes we scored 1,100 points, two kills by Shirley and 15 cuts, while we were scored on for 100 points. In most cases, Half Fast was the aggressor, using its superior speed and maneuverability to turn tightly and solidly to carry the fight to the other plane. In local competition, Half Fast has given a very good account of itself; ten different people have built the ship and all of them swear by it.

Historically, Half Fast is the sixth in a line of pure combat ships. One of these was the Scared Kitten, which Frank Zaic used in his 1951-52 Year Book. When the '53-'54 rules came out, it was obvious that combat would develop into "sudden



All there is, there ain't no more—and why should there be? Half Fast is sixth in a line of designs. Clocked speed with streamer is 76.8 mph.

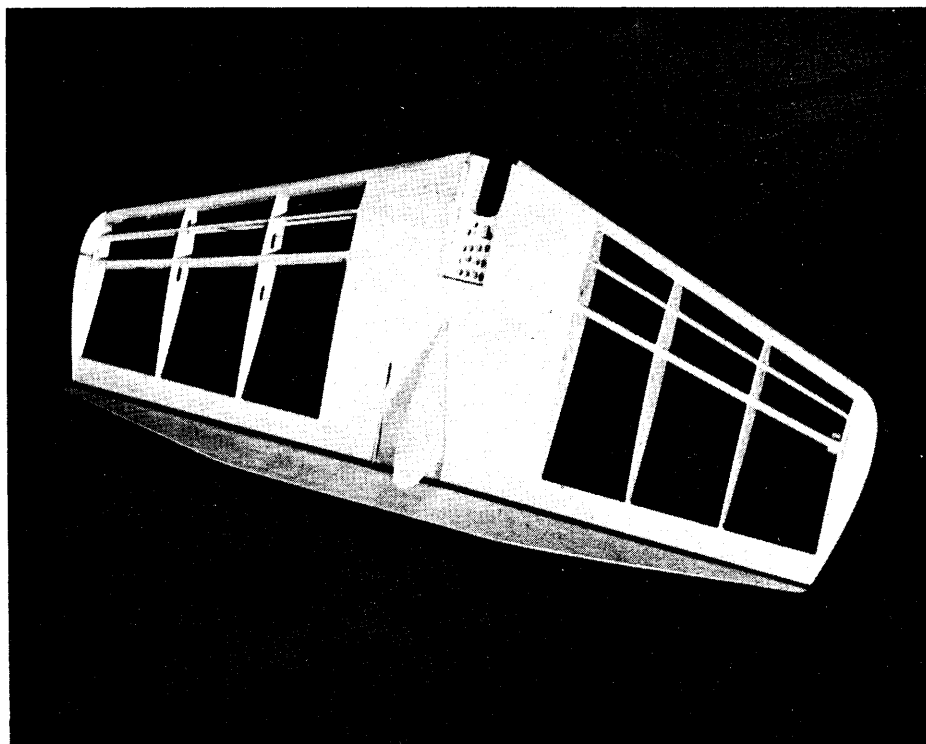
Shirley and author fire up a Half Fast. Paint is for pictures—weight a penalty. Too fast, or too slow, a ship not so good—hence the Half Fast.



death," so an extremely simple ship became the goal. One flying wing, defying several aerodynamic laws, was tried and abandoned. Another achieved some degree of success, but it became apparent that we were on the wrong track. So we sat down and did some tall thinking. Having worked with deltas for speed, we tried that rack, which gave the basic shape. The result was Half Fast. No. 1 flew right "off the board" and, after thorough testing, revisions were made. Then I built a jig for assembly and the Austins and Stanfords built eight airplanes. These, including my two, were the ones flown at the Nationals.

Design features are extremely simple construction with an absolute minimum of parts, shortened outboard panel for good solid tug in all positions, rugged frame with engine and tank solidly attached to the lines for maximum safety, delta stability combined with short moment arm maneuverability, low drag and all parts made from stock sizes of wood. Clocked top speed, with streamer, is 76.8 mph. Wing area is 304 sq. in. and elevator, 60 sq. in. Airfoil, NACA 0012; weight, 16 to 22 oz. Center of gravity should be 30 per cent of root chord or forward. Engines used so far include Fox .35 and K & B .32. Since Half Fast was designed around a Fox .35, it is necessary to insert 3/4 oz. of lead in the rear end to balance the ship when using a K & B. This compensates for the 1-1/2 oz. difference in engine weight. Prop tests have proved that a 9 x 8 Power Prop works best for 16 through 19 oz. planes, while a 9 x 7 Tornado works best on 20 through 22 oz. ships. We have burned ordinary stock sport fuels so far with good results.

When I begin construction, I cut out all parts first. The crutch is made from 1/2 x 2 x 6 in. maple or similar wood. Cut-out is for Fox .35 but may be altered for your engine. Be sure the back corners are radiused as shown. Lightly score the edges to be cemented with a thin saw. This will give the cement something to grab onto. No. 1 ribs are from 1/4 in. medium balsa and are installed without the notches for spars. This comes later. Better cut the 1 x 1/16 in. slot in the left-hand rib for the bellcrank support. Mark center line of ribs on inside face next to crutch. This is essential for assembly. Other ribs are 1/16 in. hard "C" grain or medium 3/32 in. Cut the notches in No.'s 2 through 5. Trailing edge stock is 1/4 x 1 in., tapered to 5/32 in. at trailing edge. Notches are 3/16 in. deep. Wing tips are 1/8 in. medium with outside edges beveled top and bottom for smooth covering. Elevator is 2-1/2 in. wide, 1/8 in. hard sheet, rounded on the leading edge and tapered to a small radius on the trailing edge. The rudder is shaped to an approximate Clark Y with curved surface facing left-hand tip and set on airplane at 3°. Bellcrank support is from S-T aluminum, 1/16 in. thick.



Simple construction, minimum of parts, and a rugged frame are combat musts. Delta stability a help.

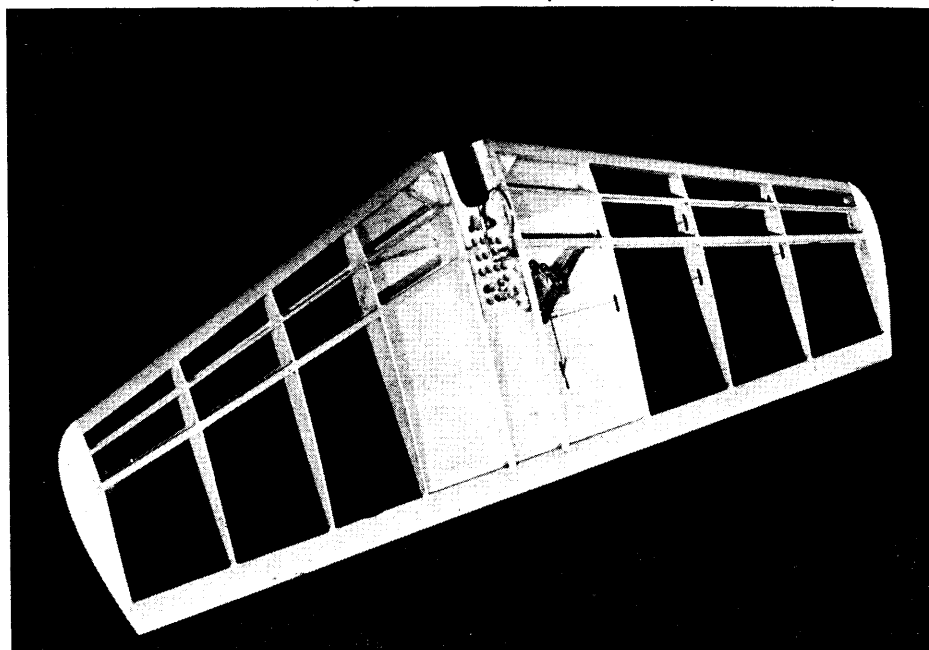
If you are unable to obtain aluminum, you can fill the space from No. 1 to No. 2 ribs about 3 in. wide with 1/8 in. plywood. I like the aluminum strap because this ties the engine and tank to the lines for traditional safety.

Now for assembly. Cement No. 1 ribs to crutch, making certain top of crutch is on the center line of the ribs. You'll notice that the ribs don't come all the way to the front of the crutch. This is proper. While this cement is tacky, stick on the trailing edge and tip ribs. I now use a jig, but the first two ships were built "in the hand." You can block it up vertically and use a triangle or square to get alignment. Right now is the time to

eliminate warps. Next, the 1/2 x 1 leading edges are added. Check the plans and be sure you're clear on the joints. Next add ribs, lining them up with your square. When dry, cement all joints a second time. Add the 1/4 in. square and 1/8 in. square spars, cutting the notches in No. 1 ribs with a jeweler's saw or razor blade. Drill holes for mounting skid and bend from 3/32 in. wires as shown on plans. Use flush screws on top side of crutch. Install bellcrank, lead-outs, and brass or aluminum tubes in wing tip. The line guides are brought out in the ideal position to give maximum yaw.

I use a 3 in. Veco bellcrank with push-rod in the (Continued on page 39)

Underneath view shows bellcrank, engine mounts. Most expendable combat planes not expendable.



Half Fast

(Continued from page 10)

second hole. Pushrod should be bent to approximate shape and fixed at the bellcrank; 1/2 oz. wing-tip weight is fixed solidly between 1/4 in. square spars. Planking on top of wing should be cut approximately and slot for pushrod cut. Pushrod is slipped through this slot as planking is cemented down. Length of slot may be adjusted later. Planking is put on top of ribs with no recess. This won't harm performance at all and makes assembly much simpler. Bottom is planked between No. 1 ribs only. Elevator is attached with cloth hinges spaced evenly along span. I use cotton aircraft rib tape 3/8 in. wide. It is available in various widths at airport supply houses. Install horn using a piece of plywood on bottom to back of screws. Make certain elevator is neutral when bellcrank is neutral, since it is essential to have exactly the same amount of up and down motion.

My original had double covering of Japanese tissue, cross-grained for strength and resistance to splitting. We fly in weeds, making this tough covering essential. One ship was silk-covered and, as expected, has proved very rugged. Dope used was two coats of 80-20 nitrate, plasticized, and one coat of fuelproofener.

The 1/32 in. wire tank hold-down is shoved up through the No. 1 ribs and the hooks are then bent. Drill holes for engine and mount engine and tank. We use a square tank, 2 x 1 x 3 in., with a single vent. However, one ship has flown with a commercial wedge tank with no trouble. Suit yourself. Don't forget the 1/4 x 3/8 in. tank fix. This helps keep the tank from sailing forward in the event of a crack-up. The rudder should be cemented well, as it is used as a handle in launching. Solder a washer on pushrod at elevator horn. We've also found that a piece of 1/4 in. O.D. tubing or a grommet is handy in the streamer mounting hole. It prevents the string from stripping out the rudder. After a checking over, she should be ready for flying.

A word about flying: be very certain the CG does not fall behind the indicated position. Launching is accomplished in this manner—the helper holds the rudder in his right hand and the leading edge in his left. The plane is tilted up about 10° and launched from a standing position with a gentle push forward. She accelerates rapidly, so be ready. Response to control movement is rapid and positive, although level flight is steady enough for "eyes off" flying. After a conventional plane, she'll seem sensitive, but after a little time, the ordinary ship seems sloppy.

If, after trying one, you want more, I suggest some time well spent in building a jig for assembly. This could be a club project. This, with tin templates and a jig saw, will enable you to turn out hot combat ships at a good clip.

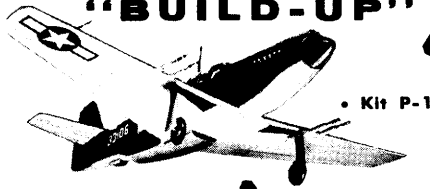
Bill of Materials

(Measurements in Inches)

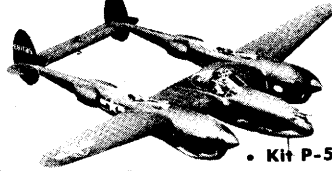
- One—1/2 x 2 x 6 maple, gum, etc., crutch.
- One—1/4 x 3 x 36 balsa (hard) No. 1 ribs and trailing edge.
- One—1/8 x 3 x 36 balsa (hard) elevator, wing tips.
- Three—1/16 x 3 x 36 balsa (C) ribs and planking.
- One—1/4 x 3 x 36 balsa (medium) rudder.
- One—1/2 x 1 x 36 balsa (soft) leading edges.
- Two—1/4 sq. x 36 balsa (hard) spars.
- Two—1/8 sq. x 36 balsa (hard) spars.
- One—1/16 x 3 x 1 24S-T aluminum bellcrank support.
- One—.040 x 1 x 2 24S-T aluminum control horn.
- Three—No. 6 screws and nuts; 3/32 wire; 1/16 wire; 1/32 wire; 1/8 O.D. tubing for lead-outs; 3 in. Veco bellcrank and usual hardware.

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