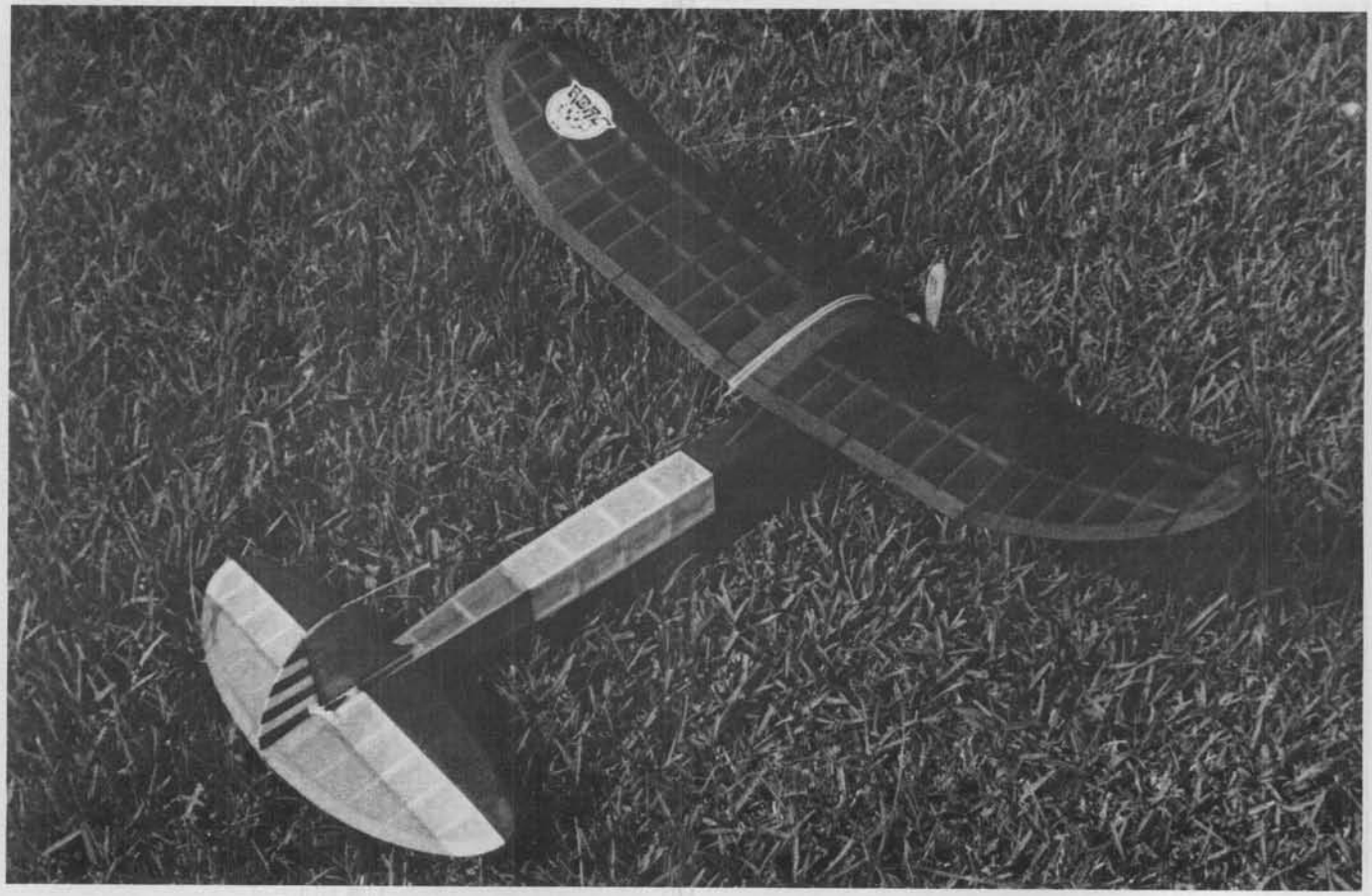

KERSWAP

1/2 A Texaco Old Timer

By BOB ISAACKS . . .Here's a 1/2A Texaco Old Timer with an impressive contest record and straightforward construction. An ideal combination for newcomers to the Old Timer scene.

• The "KERSWAP" was designed by Gil Morris, who built three of them in 1941-1942. Originally powered by an Ohlsson .19, the 288 square-inch airplane must have been a "bomb." In 1982, the NFFS Digest reported that a Kerswap was being flown (freeflight) in the California area powered by a rare Ohlsson 33; that one had to be even more spectacular. Rumor has it that the Kerswap was named for the sound it made when augering in; as Gil is still around, and an active freeflight competitor, I plan to check out the rumor.

DESIGN CONSIDERATIONS

The Kerswap is a straightforward, simple airplane. In its original size, it is almost ideal for conversion to 1/2 A R/C Texaco. To keep the airplane weight down, I changed some of the wood sizes from the original; but the Kerswap, as presented in this article, conforms to the original in planform and size.

The Kerswap has minimal frontal area and a surprisingly thin undercambered airfoil when compared to other Old Timer airplanes. Both of these factors contribute to its ability to penetrate into the wind. Because the wind blows all of the time in Texas, it is important to build airplanes that can cope with that problem.

The airframe is about as simple as you can get (allowing for the elliptical flying surfaces). Although I am a notoriously slow builder, the airplane constructed for this article was built in two weeks of part time (evenings) effort.

CONSTRUCTION

At about this time in most construction articles, the author states that "I am not going to bore you with the details of how to glue 'A' to 'B'." If you have read this far, you are in for a surprise! I fully intend to describe the construction process, as this airplane may be attempted by a "first time" builder.

FUSELAGE

The fuselage is constructed almost entirely of 3/16-square balsa strips. Try to pick out four fairly firm pieces for the main longerons, the remainder can be built from medium light stock. I normally jig-build my fuselages to keep them straight; this is accomplished on the Kerswap in the same manner that wooden ribs are constructed for full-size aircraft. Using a flat, wooden building board, tape

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Erica Eppler, a sophmore at Alief Elsik High School in Houston, with the 1/2A Kerswap.

event. We were much more comfortable flying the Acrostar on low rate. Pattern flyers generally prefer a softer response than sport flyers and hotdoggers may prefer the higher rates.

In general, the Acrostar with the Enya 80-4/C is precise and maneuverable, but at a slower pace than the average 40-size pattern mode. We were glad that we opted to maintain the built-in right thrust as the Acrostar still requires a healthy amount of right rudder on takeoff. Our ship also showed a slight tendency to yaw to the left during any steep climb or sharp pullup. This is due primarily to the large prop used with the four-stroke and should be less of a problem on two-stroke-powered versions. It actually isn't that objectionable unless you are trimming for precise pattern maneuvers. Some added right thrust would probably help and some radios such as the Futaba PCM have mixing functions that allow rudder compensation to be programmed in.

The flaps are very effective and at just half the maximum travel called for. Landings, which are easy without the flaps, are slowed even more and the Acrostar has no bad habits or snap or roll tendencies with or without the flaps. With full flaps, some elevator trim is necessary and the ailerons tend to get a little mushy. The flaps can also be coupled with the elevators as is done in the full-size Acrostar.

The Enya 80-4/C appears to be an ideal powerplant for the Acrostar. We used Red Max 15% Four Cycle fuel, the glowplug provided, and after some experimentation, a Zinger 13x8 prop. On the first outing, our Acrostar appeared to have about the same vertical ability as Pat Joyner's Y.S. .60 powered Atlanta, although at a slower speed. We must be doing something wrong as this is our second review using a four-stroke engine and we have yet to experience many of the difficulties others talk about. The Enya started easily on an electric starter and ran smoothly and predictably. The only difficulty involved the forward-facing glowplug. It is quite a feat to remove the battery connector without getting your hand in the prop. A remote connection of some sort is definitely in order in my opinion.

Overall, the Acrostar is an excellent aerodynamic design suitable for a wide variety of flying styles, depending on the powerplant chosen. If you are looking for a scale-like aerobatic sport machine in this size category, the Acrostar 40 and the Enya 80-4/C make an excellent combination. The Acrostar offers rapid, easy assembly, great performance, and something refreshingly different from the plethora or Cap 21's and Lazers. •

Kerswap . . . . . *Continued from page 39*

the plans to the board, cover with waxed paper and proceed as follows:

Bevel the main longerons to match the plan at the rear of the fuselage and glue them together (I use Goldberg Super Jet); cut a number of short lengths (1/2 to 3/4-inch) of scrap 1/4-square hard balsa and secure the longerons to the plan/board by placing the 1/4-square pieces opposite each other, snug against the longerons securing them to the board with small wire brads.

Note that the fuselage is exactly 2 inches square; therefore the majority of the uprights as well as cross pieces are exactly the same length. I fashioned a "stop" on my miter box and expedited the construction process by cutting the equal length pieces, all at one time.

After the uprights are glued in place, you can carefully lift the first fuselage side from the plan and build the second side in its place, utilizing the 1/4-square strips which are still nailed to your board. This will produce two identical fuselage sides, ready for assembly without the annoyance of having to separate them if they were built on top of each other as is conventional practice.

When the second side is complete, you may continue to use your fuselage jig for assembly! Remember that the fuselage is square so you can stand the fuselage sides vertically on the fuselage *side view* and proceed with the addition of cross pieces. Note that there are a few 3/16-square pieces which form a base for the pylon. Remember to bevel the *inside* of the longerons at the rear before joining the fuselage at that spot. Now add the 1/16-balsa sheeting at the front and rear of the fuselage being sure to observe the grain direction. I find that the use of a machinists square (or a drafting triangle) helps to insure a square fuselage; also "eyeballing" the fuselage from the rear during construction will assure an even taper and make for ease of assembly and an easy to trim airplane. Double check the front of the fuselage for squareness; then add the 1/8-plywood firewall using epoxy.

The landing gear is bent from 3/32-inch diameter music wire and attached to the firewall with clips made from .202 brass sheet; small sheet metal screws are adequate for this job.

The hatch is simply a piece of 1/32-plywood, 2 inches wide × the length indicated on the plan. It is attached to

spruce gussets with small sheet metal screws.

The pylon is made up of three layers of 1/8-thick wood, laminated with epoxy. Note that the center layer contains a 1/8-plywood center section; also be careful to orient the wood grain on each layer as indicated on the plan. The wing saddle is also constructed of 1/8-balsa; again note the grain direction. After the pylon is radiused fore and aft, you may add the wing saddle taking care to see that it is perpendicular to the pylon and centered on it.

WING

Prepare a wing "kit" before assembly. The kit consists of C-grain ribs, tip pieces, leading edges cut to length and laminated, trailing edges cut to length and notched, and spars which are a snug fit in the rib notches.

Begin by planing the leading edge, tip pieces, and trailing edges on the wax paper covered plan. Using your favorite instant glue, assemble the tip pieces and the tip leading edge. Proceed by assembling the ribs to the leading and trailing edge. (Note that you will have to shim the ribs 1/32 off the plan to allow for the bottom capstrips.) After the ribs are added, you may proceed to unpin the wing and bevel the dihedral angles and join the wing at the dihedral joints using instant glue. Now turn the wing over and add the wing spars and dihedral braces. I add the ribs at the dihedral joints last and "split the difference" to provide an equal angle between wing panels. Sheet the wing center section with 1/16-sheet and add the rib capstrips using instant glue. Sand the leading edge and tips to shape and the wing is ready to cover.

STABILIZER

The stabilizer is built flat on the plan in the same manner as the wing. Notice that the entire leading edge is laminated and capstrips are on the *top only*. To get a smoothly tapered eliptical stab, I utilize rectangular pieces of balsa for the ribs and sand the entire stabilizer to shape with a long sanding block. Using this method, it will be necessary to trim away 1/32 from the top of the ribs to allow for the capstrips and center sheeting.

Note that the stabilizer is hinged on one side only; this is simpler to build and provides adequate pitch control. I use a jigsaw to separate the elevator from the stabilizer after covering is complete, then sand a bevel on the leading edge of the elevator. Mylar hinges are positioned 1/32 below the top edge of the elevator spar.

RUDDER AND SUB FIN

Build these surfaces on the plan, then jigsaw the vertical stabilizer and rudder apart on the hinge line. Radius the leading edge of the rudder and finish sanding all edges as indicated. Add a music wire skid to the bottom of the sub fin.

COVERING AND FINISHING

All components were given three full-strength coats of nitrate dope, lightly sanding with 400 grit wet or dry sandpaper between coats. The fuselage was covered with lightweight silkspan adhered to the frame with nitrate thinner which is brushed *through* the silkspan. After the silkspan is adhered to the framework and trimmed, spray it with rubbing alcohol. When the alcohol dries you will have a taut, smooth outer surface. Dope the silkspan with three or four coats of 50/50 nitrate dope/nitrate thinner and you are finished. The colored trim on my fuselage is silk on the forward section and Japanese tissue on the rear. This was applied using thinner to give me a double-covered surface with very little weight gain.

The stabilizer was covered with lightweight silkspan applied in the same manner as the fuselage; the same story on the trim. The rudder is covered with Japanese tissue as well as the sub fin.

The pylon was covered with silk; only two pieces were used to cover the pylon sides and wing saddle. Try that with an iron-on covering sometime.

The wing is covered with silk, again using nitrate dope. A tip is in order here. Use bath soap applied to the pre-doped structure where you *don't* want the silk to adhere. I used soap on the spar bottom between ribs and on the tip to prevent the silk from pulling down too far and spoiling a smooth covering job.

The stabilizer, vertical fin, sub fin, and pylon are now assembled to the fuselage with slow drying epoxy. You will have to cut away the silkspan/tissue at appropriate places for this operation.

Be sure that the stabilizer is mounted at zero degrees to the thrust line and that the pylon has about 1/8-inch positive incidence. Also be sure that everything is square. Hinges are cut from sheet drafting mylar and Hot Stuffed in place.

The Cox Black Widow is mounted to the firewall with 2-56 screws and blind nuts. Wing hold down dowels are glued into carefully drilled holes using epoxy.

Disassemble the engine and landing gear and give the entire airframe a light spray coat of K&B clear epoxy paint for fuel proofing. Next, reassemble the airplane and install the radio of your choice. I used a mini-flight pack from Indy R/C which weighs in at about 3.5 ounces. Incidentally, I used Golden Rods (flexible) for control surface to servo hook up. I have *not* experienced any significant trim changes in varying weather conditions using this product despite what others in the model press have said about them.

TRIMMING AND FLYING

A word is in order here about colors. My Kerswap is done in a red, white and blue color scheme; at a distance, red appears black and is easy to see. Believe me, this airplane is going to get up there, so please don't use an all-white, or white-yellow combination because those colors will "gray out" or disappear in many sky conditions.

Your Kerswap should balance at 85-90 percent of the wing chord. I know this is different from what others have recommended, but it works! An aft C.G. location will help you in two ways: the airplane will glide more slowly and control response will be excellent. The control throws on my Kerswap are 3/4-inch left and right on the rudder and 5/16-inch up

and down on the elevator. You will find these deflections will give good response and allow use of *trim only* to set up the glide circle.

For power I use a Cox Black Widow with two extra head shims and a Top Flite 8-4 "Super M" prop; this combination delivers about 5500 rpm and a five minute engine run. This airplane will fly out of sight in about 2-1/2 to 3 minutes so count on reaching altitude and cruising around under power for several minutes.

Build you Kerswap to the plans, keep it light, fly it often and enjoy! •

Enya R120 . . . *Continued from page 20*

and this typical methanol/glow plug unit engine which, in fairness, is not really trying in this particular area.

Power Test 2. Enya silencer. Other equipment as test 1.

Using this well-constructed and solidly-fitting unit made a small impression only on torque and fuel consumption figures, but served to take the edge off the quite aggressive open exhaust sound level.

IDLING POINTS

Carburetor construction differs from the standard 120 in that the earlier "flap valve" starting choke has now been replaced by the new Enya idea of moving the whole throttle barrel laterally sideways within the carb. body, which both reduces air supply and allows richer mixture to flow when starting and/or engine is cold. This device is, by Enya's own reckoning, strictly unnecessary if using mechanical starting, and in any case should be returned to normal running position quite quickly—to prevent excess fuel entering cylinder—a condition to be guarded against with all i.c. engines, but maybe more so with the 4-stroke because it lacks the 2-stroke's relatively self-clearing exhaust port at bottom of liner.

As advised by Enya, and found also during this test, best results follow from adjustment of mixture strengths at slightly rich point, on both maximum rpm and idling positions. The mid-range itself is actually kept slightly rich automatically by the carburetor's internal design.

Idle rpm with silencer fitted was 1,900 on 18 x 6 Graupner wooden propeller, though 2,500 was easier to achieve and required less precise throttle and idle screw adjustments. Enya advised figures are 2,500 to 3,000.

Using the 24 x 8 Zinger, an idle rpm of 1,280 was reached. . . but is maybe not representative of likely usage. . . however, it certainly sounded very relaxed!

SUMMARY

The new R120 has all the attributes of a pacesetter—at least for the rest of 1985. The manner and amount of performance would appear difficult to improve on at this stage of development, and in any case seems "quite enough engine" for the demanding FAI schedule.

It will be fascinating to observe the effect of this new motor on the "balance of power" within the F3A class, because at present the 2-stroke tune-pipe unit still finds majority support amongst competitors.

For most sports flying however, the R120 is probably unnecessarily powerful and intimidating, so for such operations the earlier 120 engine would provide a more satisfyingly placid mode of performance. •

PB-1 . . . . . . *Continued from page 15*

ed to the glo-plugs and routed to a common "ground" wire under the lower wing to facilitate starting; loose battery leads are a hazard with so many prop blades a-churning!

Your PB-1 can be operated off land by adding a simple 2 or 3-wheel landing gear, best held in place with rubber bands. The water-lovin' version should be well-doped for the inevitable dunkings that always occur.

Although the plans specify a Babcock BCR-3 receiver, any similarly reliable receiver can be used.

Prior to test flying, the model should balance at the point shown—just aft of the top spar. Additional weight may be necessary in the nose if R/C gear and batteries are not sufficient for proper balance. Our original required considerable nose weight when free-flighted.

Adjust for straight flights during glide tests, before attempting power hops. Front engine should be set with a rich mixture since it has a tendency to lean out during the climb. After a few hops, you get the "touch" more or less by instinct. You will find the PB-1 very easy to fly—it is a slow job easy to hand-launch.

For flying over large bodies of water, do not use green or blue colors on your seaplane. Orange is best for visibility. I trimmed my model in black. •

Skipper . . . . . . *Continued from page 47*

to employ a double bellcrank linkage system. It looks rather Rube Goldbergish, but