

# The **DIGESTER**



by Don Mathes



*Don Mathes straps on the wing as RCM's Editor looks on. Over 2,000 flights on the Digester prototype when these photos were taken.*

*Fueling up. The Digester is one of the easiest handling ships that we have flown, yet will perform even the aileron maneuvers with ease.*



*(Editors Note: The Digester is, in many ways, one of the most remarkable models we have even had the pleasure of building and flying. The finest proportional trainer available today, it, will also perform the entire A.M.A. pattern with ease. Although the construction is completely straightforward, we will caution the unsuspecting beginner against taking the following article too seriously — we suggest, in fact, that the less experienced RCer consult one of the “old pro’s in his local group before tackling this project. Read on, and you’ll find out why!)*

The Digester has many desirable features. Among them are such attributes as ease of construction and flying, ruggedness, plus an inherent stability with no loss of maneuverability. In fact, despite its large economy size and light wing loading, the Digester would make an excellent Class II competition machine. Its most outstanding trait, however, is that it will not rip, rattle, warp, tear, or smell bad in warm weather. Patent pending.

This particular design came about as an effort to help my good friend Glen Sigafoose of Sig Balsa during a slack season. That, and the fact that as former manufacturers developing radio equipment, we needed a test vehicle for our proportional equipment. Thus, the name Digester — Digicon tester. The fact that there is ample room in the equipment compartments for any radio gear available today can best be illustrated by the fact that we flew this ship utilizing two complete radio systems — the various proportional rigs undergoing flight tests, plus a permanent reed rig with its servos cross coupled by trim bars to the proportional servos.

To date, the original Digester prototype is still flying and has logged well over two thousand flights without any form of mishap. In addition, quite a few RC’ers have racked up their first proportional stick time on this ship, learning to fly consistently and well with an ease that would be impossible on many of the proportional designs currently available.

This is not to imply that the Digester is a goat — the Veco .45 powering the prototype hauls the eight and a half pound ship through the air at a speed of approximately sixty-five miles per! In the hands of a good pilot it will do the entire pattern including aileron maneuvers. In the hands of the beginner, it is responsive, yet forgiving. Power requirement is from .35 to .60, with a good .45 recommended.

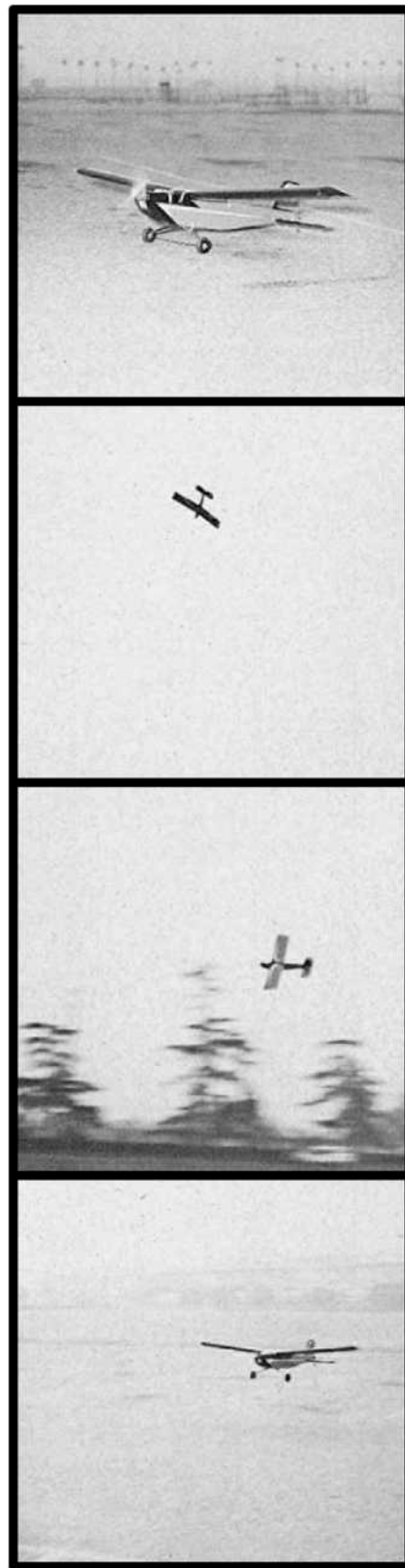
The initial design of the Digester

was accomplished quite scientifically. After carefully considering all of the top designs of the day, we discarded them one by one. Selecting a four foot length of six inch wide sheet from our lumber-mill, we drew the outline of a fuselage on it with ball point pen. Holding this pattern aloft and making noises like an airplane, we decided that the design looked just right. Obviously, therefore, it would fly. Besides, we had a pair of 3 1/2” wheels around for which we had to find a use.

So, if you’re going to build the Digester, go out and obtain the following — (a) one proportional system (b) one twelve-page Sig balsa wood order blank (c) one rip saw and lumberman’s axe (d) a lease on an empty 5000 square foot industrial plant zoned for light manufacturing (e) a helluva lot of glue. You might also consider investing in a surplus parachute which you’ll need when you get to the covering stage. Outside of that, the construction should offer no particular problems. Since you obviously won’t be flying with two separate radio systems, it may be interesting to note that the Northeast Corner Bowery Boys made a complete flight evaluation of the Digester and discovered that two regular size cans of beer can be carried aloft with no difficulty — obviously an added plus for this design.

#### Construction

No problems should be encountered during the construction of the Digester. The most important factor is to have, at all times, an adequate supply of six-packs on hand. The plans, themselves, are self-explanatory. We know, for we drew them with a pencil and warped piece of trailing edge stock so the draftsman would have no excuse for inaccuracies. All he had to do was trace them. The genius that edits this magazine (Ed’s note: True!) built the second prototype of this design from our original plans and ended up with an undercambered wing. Regardless of what he may claim, it wasn’t the fault



of the plans — it was the linoleum cutter he used for a knife!

**Wing:** Big deal. Four sheets of 3/32" x 4" x 36" used full size with two 3/8" square and two 3/16" x 3/8" spars in between. Plus an assortment of 3/32" ribs. And a leading edge—1/4" square spruce or hard balsa. Lay the lower leading and trailing edge sheeting down, then the lower center section sheeting, and cap strips. Glue the two lower spars to their respective sheeting. Glue the ribs down. Add the top trailing edge sheeting. Add the spar joiners and webbing where shown. Add the 1/4" center section rib. Moisten the lower leading edge sheeting, add a heavy bead of glue along the entire bottom of the spruce or balsa leading edge, then bend the sheeting up and join. Hold in position with a few hundred clothes pins. When dry, remove clothes pins (if your wife hasn't already done so), and add top sheeting. Cement and secure until dry in the same fashion as above.

Build the other wing panel in the same fashion, joining to spar braces on first panel. Cut a full-grown balsa tree in equal halves and form the wing tips from these two pieces. Sand entire wing. Before doping the structure, and prior to covering, add a strip of Top Flite pinking tape around entire center section. Apply three or four coats of butyrate to the finished wing structure, sanding after second and last coats. After purchasing all of the silk available at hobby shops within a hundred mile radius, you can proceed to cover the wing. A gallon or two of clear dope applied with an exterior stucco paint roller will complete the wing ready for final color trim. If you are still financially solvent, add color dope as desired. Set wing aside in any convenient auditorium so that the dope will thoroughly "cure!"

**Fin and Stab:** The stabilizer is of conventional construction. Two layers of silk with balsa wood in between. The fin is made from a framework of quarter inch square stock, scrap of quarter inch sheet, and diagonals of 1/4" x 3/32". One-sixteenth inch sheet skins each side. Vertical and horizontal flippers of quarter inch sheet.

**Fuselage:** Make two sides from 1/8" x 6" x 48". Add 3/8" hard sheet nose doublers, and all 3/8" square and 1/4" square vertical and horizontal members. Cut out plywood and balsa formers. Add 1/4" wing mount supports. Join sides with formers. Add firewall. Add tail post followed by 1/8" x 1" cross pieces. Add top sheeting (grain lengthwise), plywood servo board, plywood fuel tank base, and plywood front sheeting. Hold the latter in place with masking tape until dry. Install the blind mounting nuts for your servos. Finish planking by adding

lower sheeting with grain crosswise. Add 1" x 1" soft nose blocks.

The motor mount is fabricated from 1/16" aluminum sheet. If you do not have access to the proper fabricating tools, write the author care of RCM and we'll provide you with one at a nominal cost from a local sheet metal shop. The same goes for the landing gear which is formed from heavier material than is commonly available. The motor mount is held to the 3/8" plywood firewall with four 4-40 bolts and blind mounting nuts. Be sure the top of the motor mount is exactly level with the top of the firewall so that your engine thrust line will be accurately positioned.

Install the fin and rudder. Sand entire fuselage. Fiberglass the nose section of the Digester and paint the firewall and fuel compartment with fiberglass resin. When dry, sand entire structure and cover with silk. Add the fuel tank, landing gear, wing and stab hold down dowels. Finish the ship in your usual manner. If you do most of your flying from smooth terrain, simply run a 1/8" wire axle all the way across the gear spread and through both of the aluminum gear legs. Add a pair of 3-1/2" DuBro wheels. If you fly from a rough, or rocky terrain, use 8-32 stainless or hardened cap screw axles.

Install the radio gear. We simply wrapped the battery pack in foam and inserted it in the first compartment, draped the cables loosely over the ply partition, then wrapped the Kraft proportional receiver in foam and laid it in the second compartment. Servo cables were connected to the three proportional servos which were mounted side by side in the servo compartment. Standard balsa and wire pushrods with DuBro Kwik Links were used to the control surfaces.

Power for the Digester is supplied by a Veco .45. A Veco 8-ounce clunk tank completes the equipment requirements. Prop used is a Tornado 1 2/4. Fuel, KB 100. The original model was finished in the color scheme as shown on the front cover of this issue — orange, white, and black.

#### Epilogue

Standard first flight trim procedures should be followed. Be sure your plane balances where shown. It is doesn't, add an old pipe wrench or two until proper balance is achieved. Strap on the wing, stab, and gear, then grasp the Digester firmly amidship, just behind the landing gear. Raise to shoulder height, run, and launch into the wind, slightly downward, at a point fifty feet away. Your model should float gently down without any tendency to scallop, or alternately, nose down. All eight or nine pounds of it! Simply remember that you must reach a ground speed of

approximately fifty- five miles per hour before releasing the model.

After being satisfied that the Digester glides properly, you're ready for your first powered flights. With a .45 or better for power it has' a healthy ground speed. It does steer well, however — the steerable tail wheel is quite effective. As proof, we have two cats, a crow, and a slow moving little old lady from Pasadena to our credit. After the first thousand yards, you might try giving it a bit of up-elevator. If you give it too much, don't worry about it. It won't stall out—it'll simply come right back at you. Inverted. From here on in, you're on your own. You'll find it to be an excellent proportional trainer, plus a highly maneuverable ship that'll do everything in the book.

If you're a real sport, you could try cutting ailerons into the wing. It won't hurt any — but we've never tried it. If you're one of those guys who is still back in the Comet Zipper era, you could even fly this beast on reeds. But proportional is more fun — so what if it does cost \$600 or so? It's for a good cause, isn't it?

And that's the Digester. We think you'll like it. A simple functional design which, although large, is quite fast building, and which combines an inherent stability and forgiving nature with a maneuverability that will please even the most experienced pilot.

You should have no difficulty. Unless, of course, you take this article too seriously. Good flying!