

500 ML

BY PAUL DENSON

Back in July 1940, a sport type plane appeared in the Air Trails Magazine that was so small that it didn't even meet the weight requirements based on engine displacement according to the "new Academy rules", therefore, it couldn't be entered in competition.

The plane, the Half Pint, was "so small it could be carried to the flying site in a shopping bag, so the aeromodelist would be spared much embarrassment and explanation on the way to the field. Jeers from the neighborhood kids, truck drivers, and dogs, will cease when you tuck your Half Pint under your arm and set out for the field."

The above is quoted from the article by the designer, the late Lou Garami, who also said he had never seen a "sporting flyer". Since Garami didn't design the Half Pint for competition, then perhaps he was our first sport flyer.

In 1971 I designed a plane with a 1/4A engine which I called the Quarter Pint. I was not then aware of the above article and plans; I had only a side view of the plane along with the wingspan and length. The Quarter Pint faintly resembled its famous ancestor, but it flew like a dream. It started out to be a single channel R/C but, because of various and sundry difficulties, it would end up being free-flight. It flew through many flying sessions before it was retired. Those wheels sticking way out in front were intended to protect the plane from hard contact with the ground, although they were really never necessary for that. With power off, it floated to the ground in a wide flat circle and many times I caught it without having to move a step from where I originally launched it.

Recently, when we lost our field and moved to the nearby San Diego Charger football stadium for our sport flying, I wanted a plane that could use the light poles to advantage rather than flying above them like everyone else did. I wanted something that would take-off short, land even shorter and turn on a dime. I wanted to play ring-around-Rosie with the light poles, which is similar to pylon racing, I am told.

Why not scale up the Quarter Pint and put in a 3 channel radio, have a highly undercambered wing so it would fly backwards in a gentle breeze, and could be taken to the field, in a "shopping bag" which has more carrying capacity than some of our compact cars?

Why 500 ML? Well, as you know, the metric system is on its way and, to introduce you to millimeters, centimeters and cubic centimeters, all the dimensions on the plans are metric. Have no fear, the English equivalents are just below. There are no exact



500 ML

Designed By: Paul Denson

TYPE AIRCRAFT

Old Timer

WINGSPAN

57½ Inches

WING CHORD

9¾ Inches

TOTAL WING AREA

560 Square Inches

WING LOCATION

Pylon Mounted

AIRFOIL

Undercamber

WING PLANFORM

Constant Chord

DIHEDRAL, EACH TIP

3¼ Inches

O.A. FUSELAGE LENGTH

30¾ Inches

RADIO COMPARTMENT AREA

(L) 9¼" X (W) 2½" X (H) 3¾"

STABILIZER SPAN

17 Inches

STABILIZER CHORD (incl. elev.)

5¾ Inches

STABILIZER AREA

97 Square Inches

STAB AIRFOIL SECTION

Flat Bottom

STABILIZER LOCATION

Mid-Fuselage

VERTICAL FIN HEIGHT

6½" (twin rudder)

VERTICAL FIN WIDTH (incl. rudder)

6" Each

REC. ENGINE SIZE

.15 Cubic Inch

FUEL TANK SIZE

4 Ounce

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

3

CONTROL FUNCTIONS

Rud., Elev., Throt.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa, Ply, Spruce

Wing Balsa, Ply, Spruce

Empennage Balsa & Spruce

Weight Ready-To-Fly 44 Oz.

Wing Loading 11.34 Oz./Sq. Ft.

equivalents for the dimension in which balsa wood comes without going to decimals so these are just eyeball equivalents. I don't want you science students writing in bothering our Editor telling him that 1/16" isn't exactly 1.5mm - - - I know, I teach Chemistry. (Actually 1/16" is 1.5874999mm. -Ed.) Originally, the Quarter Pint was almost called the .125 Liters which is 1/4 of a pint. Since the new plane is about twice the size of the original Half Pint that would make it a full pint and that brings a lot of things to mind, but they aren't metric, so 1 pint is equal to .5 liters which is 500 milliliters or 500 ML. Confused?

In building the fuselage, it saves time if you cut the two 3/32" sides to shape and build the frame around them. It will be confusing if I use metric in the text, so all measurements here will be English. To build your left and right side, pin the sheet to your building board and build around it with 3/16" spruce longerons and 3/16" square balsa for the cross members. To make the other side, shim up the 3/32" sheet with 3/32" scrap and build around it the same as the first side. The cross members behind the sheet are 3/32" x 3/16" strips. Finish the fuselage in your conventional manner but be sure to use 1/2" triangular strips to reinforce the joint between the fuselage and the firewall. Coat the firewall with epoxy for strength and fuel proofing after the landing gear is sewn in. The landing gear wire is bent to fit outside the blind mounting nuts used to attach the motor mount. Drill 1/16" holes in the firewall and lace the landing gear on with fine copper wire and epoxy.

This is a good time to get the tank in place. A 4 ounce tank is more than sufficient with a .15 and, if you mount the tank horizontal with the top of the fuselage, there will be room enough under the tank for the battery. I used a 500 mil battery pack and it must be up against the back of the firewall to get her to balance where Mr. Garami recommended on the Half Pint — 40% from the trailing edge of the wing.

The pylon makes installation of the radio gear through the bottom necessary. Cover the bottom back to the first cross member with 1/16" ply, then leave the remainder open back to where the side sheeting stops. This will be your compartment access and can be covered later with a 1/16" cross grain ply hatch cover.

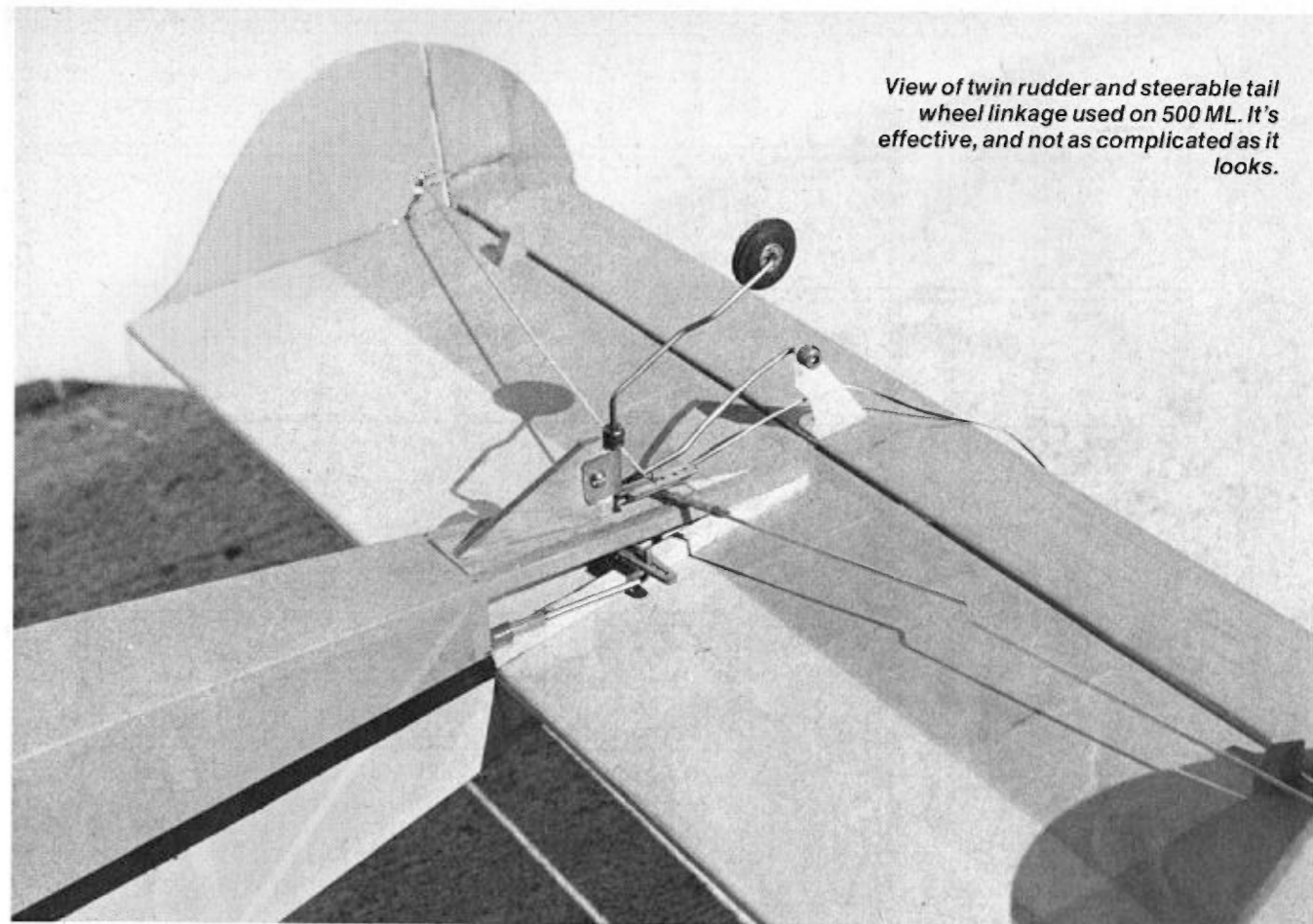
The stab and elevator are standard, no problems here. The stab is installed on its platform and the sides of the fuselage are sheeted in above it with 1/16" balsa. Be sure it is installed at right angles to the centerline of the fuselage and has no tilt.

The wing is unconventional in that the

The 500 ML, with wing removed, showing the pylon mount and wing saddle.



View of twin rudder and steerable tail wheel linkage used on 500 ML. It's effective, and not as complicated as it looks.



The 500 ML ready-to-fly. For sheer flying pleasure, high and thermalling or low and slow, this design just can't be beat.



Close-up view of wing attachment to pylon wing hold-down dowels. Erya .15 engine used on prototype



bottom spars are put on before the top, even though it is built right side up. Notch the trailing edge to take the ribs. I tape pieces of hack-saw blades together to cut these notches, two blades equal 1/16" and three equal 3/32". A piece of 1/8" square stock taped length-wise to the blades 3/16" from the cutting edge acts as a depth stop. The trailing edge is shimmed up with a scrap piece of 3/4" lumber and the leading edge is flush on your building board. Install the ribs

between the leading and trailing edge and glue in place. Allow to dry thoroughly then apply the bottom spars, making sure they do not stick out of the notches on the bottom of the ribs. When dry, glue the 1/16" webbing between the ribs. If necessary, trim flush with the top rib notches, then apply the top spar. Prop one wing half up 6 1/2" and fit the dihedral braces, one on each side of the spars, front and back alike. Add the wing tips and either use cap strips on the top of each rib from the leading edge to the trailing edge or sheet the wing back to the front spar with 1/16" sheet then run the cap strips from there back to the trailing edge. Sheet the center section of the wing.

How do you transmit servo motion to the tail wheel and both rudders located out on the ends of the stab? Study the plans carefully, look at the picture, and you are on your own. 1/16" piano wire can be bent back double on itself if you are careful (a

wise helps). The actuator is a single piece of 1/16" wire from just under the stab all the way to the tail wheel. Be sure to get the wire in the plane before you epoxy the horns in place. A narrow slot about 1/2" in length and 1/16" wide will allow the wire to be pushed up through the ply triangular filler which acts as a support for the whole mechanism.

500 ML, in addition to being a fun plane, was a test bed for color. I wanted the plane

to be in the Fall colors of orange, brown, and yellow. I could not find brown dope or brown MonoKote. The rudders were sanded, then covered with Silkspan, while the fuselage and pylon were also covered with Silkspan. All this was given three coats of filler, sanding between coats, then sprayed with yellow and orange dope. When this was dry it was masked and given a coat of brown automotive undercoat then a coat of brown acrylic laquer. All of this was

over-coated with clear dope for fuel proofing. The aft two-thirds of the wing was covered with orange MonoKote, the sheeting forward was covered with yellow. The brown stripe was made by applying a 1" strip of transparent MonoKote, which holds paint, to the juncture of the yellow and orange. It was then masked and given the same coat of brown that the fuselage had. The paint was purchased at a retail paint

from page 29/25

... outlet store and it seems to hold its color well and be fuel-proof. Be sure it is acrylic laquer or enamel. Always try a test spot to see if the material applied over it is compatible.

Test flying was interesting to say the least.

Turn on a dime, that is what the prototype did on its first flight. The elevator pushrod was in the inner hole. The servo had a long tab. The plane was in a shallow dive and I discovered old light pole J4 was coming into my periferal vision so I had better pull up and get above the light poles. I applied what I thought was a little up and Zaaaaaaap! — there I am flying in the opposite direction upside-down and full bore! So, be sure to use your smallest servo tab and the outside hole on the elevator horn for your first flight then she becomes as docile as a lamb. Move the pushrods in a hole or so, only as you know her better. Give yourself all the rudder you can. Pylon planes with lots of dihedral are inherently stable and even resist turning.

Get it way up there and cut the engine, it becomes a glider and really doesn't want to come down. This would be a good way to practice your LSF landings. Pick out your landing spot, launch,

climb to altitude, cut the engine and try to land on the spot. Beats chasing winch and high start parachutes.

Good luck - - - I hope you learned the metric system and enjoy your 500 ML as much as I have. □