

Len Purdy's JUBILEE

RCM Editors test L. R. Purdy's amazing ready-to-fly multi.

● This month, following several weeks of extensive testing by your editors, RCM takes great pleasure in presenting an entire new concept in radio controlled model aircraft—introducing the Jubilee, by Len Purdy.

Basically the Jubilee is a ready-to-fly model for multi-channel usage. Design-wise, it is not much of a departure from the usual multi aircraft — but here the similarity ends! The result of Len Purdy's seven years of investigation, testing, and evaluating various building materials for use in model construction is one of the finest models we have ever had the privilege of flying — not only in the unique properties of the material used in its construction, but in its actual flight performance. This feeling is shared by all of the fliers who have had the opportunity of putting the Jubilee through its paces.

Quite frankly, we weren't overly enthused when we heard rumors about a "ready-to-fly" multi ship "constructed of some kind of plastic." We have seen, or conducted experiments with several domestic and foreign RC products that departed from the usual balsa and fabric construction. Usually an attempt was made to increase the longevity of the model by boosting its strength, with a resultant disastrous increase in weight. Where the strength-weight ratio was not

a prime factor, the experiments usually resulted in a flimsy ship that was considered successful if it could last for one erratic lap of the flying field without folding its wings! Add to this the problems of repairing specially fabricated materials, and the inability of most of those materials to withstand the hot fuels used in today's mills, and it is little wonder that the dream of a new and ideal building material has not progressed much beyond the stage of experimentation.

It is our belief that the Jubilee has not only overcome these problems in a highly satisfactory manner, but will, perhaps, open a whole new era in model construction, carrying the trend of pre-fabrication and pre-finishing to the highest degree possible.

The Jubilee is constructed of a patent-protected material known as Air-O-sheet, a custom made extruded sheet compounded of two different blends of resin specially formulated for model construction. Several different gauges of this material are used in the Jubilee, to conform to the findings of design stress analysis. Although the ship is completed except for painting, the plates accompanying this article will illustrate the unique and unusual method of fabrication. The wing, stab, and rudder cores, are of a very high grade of styro-

foam with hard balsa spars. Tips are premolded by vacuum forming. The fuselage is constructed entirely of several gauges of Air-O-sheet, including the formers and braces. Only the motor mounts and flooring are made from conventional hardwood. We found the Air-O-sheet to be tougher and more durable than conventional construction materials. The Jubilee fuselage was considerably lighter than its conventional counterpart would be, while the styrofoam filled wing was slightly heavier. The overall weight of the ship was equal to, or slightly lighter than conventional aircraft of the same size. We found the Air-O-sheet to be completely fuel-proof and compatible with lacquer, epoxy, and butyrate dope finishes. Temperature stability was excellent with brittleness occurring only when the temperature was reduced to 0 degrees F, and softening (and a resultant loss in strength) occurring only at temperatures above 200 degrees F — obviously far in excess of the normal operating range.

Prior to installing our radio equipment and the subsequent flight tests, we inflicted deliberate damage to the various surfaces of the ship in order that we might test the recommended method of repair. We experienced no difficulty in

working with the strips of Air-O-sheet and its adhesive, Air-O-cement, as provided by the manufacturer. The thinner gauge sheets follow any contour and cement bonding is instantaneous. Field repairs of almost any nature are possible with this material.

Before we elaborate upon the flight tests, let's take a look at this new construction as opposed to conventional building materials. Chart A lists various factors to be considered in the use of materials for model aircraft construction. Several such materials have been listed, including the new Air-O-sheet, and a relative value assigned to each in reference to the factor under consideration. Everyone will agree that it is a matter of opinion as to what material is "best" for any given application. Since it is easy to find fault with almost any product, or in this case, building materials, the charts are based on the "least wrong" concept. That is to say, each factor is considered separately with a rating assigned to it. For example, whereas the strength-to-weight ratio of balsa as a building material for radio controlled model aircraft is "good," the compressive strength is "poor." This, obviously, does not imply that balsa is unsuited for construction purposes. In each case, the material must be evaluated in the light of whether the strength-to-weight ratio, for example, is more important than the compressive strength of the material for the intended application. By the same token, Air-O-sheet, you will notice, is rated as "poor" for the factor of fabrication and formability. This simply means that the average home builder would find it difficult to "scratch build" a model equivalent to the Jubilee without the necessary vacuum forming equipment. Again, this does not reflect upon the "total" application of the material.

Chart B is a further breakdown of materials and their relative values for use in wing structures and fuselage structures. As an addendum to the charts, here are our feelings as to a general summation of the materials involved:

Balsa: This material will always find widespread application, but in view of the trend toward prefabrication and prefinishing, its time-consuming disadvantages foretell its decline as a "basic" material.

Fiberglass: This is a case where the materials own inherent advantage becomes its greatest disadvantage, specifically, the strength-to-weight factor. Although there are quite a few models in general usage that employ the use of fiberglass, the strength factor is overshadowed by the increase in weight. The specific gravity of the cloth and resin will definitely limit the use of this material to certain well-defined areas of application.

Poly-urethane foam: This material

Chart A					
BUILDING MATERIALS: PAST AND PRESENT					
	Balsa	Fiberglass	Urethane Foam	Styrene Foam	Air-O-Sheet
Tensile Strength	1	4	0	0	3
Specific Gravity	4	1	3	4	3
Strength-to-Weight	3	4	1	1	4
Shock Resistance	1	3	0	0	3
Compressive Strength	1	4	0	0	3
Elongation before Fracture	1	2	2	1	3
Temperature Resistance	3	4	4	4	3
Fuel Resistance	1	4	1	1	4
Weathering-Aging	1	4	1	3	3
Cost Factor	3	1	2	3	3
Formability & Fabrication	2	1	0	0	1
Ease of Adhesion	4	1	0	0	4
Painting	2	1	0	0	4
TOTAL RATING:	27	34	14	17	41
Rating equivalents: 4—Excellent; 3—Good; 2—Poor; 1—Fair.					

shows promise as a filler, but the cost and density of that currently available will limit its widespread usage.

Styrene foam: This is the filler material, or cores, used in the Jubilee. We feel it will find wide-spread use for this purpose.

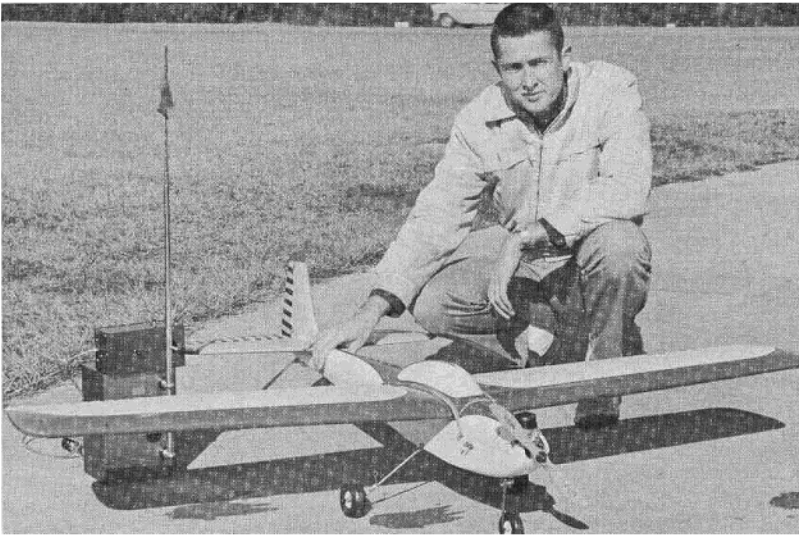
Air-O-sheet: An excellent material, as evidenced by its usage in the Jubilee. Further development will prove it to be useful in all sizes of model aircraft.

The prototype of the Jubilee tested by RCM had a wingspan of 65", length of 44½", flying weight of 6 pounds, and

employed a semi-symmetrical airfoil. Color of base material was white, with red, yellow, blue, and black trim. Paint was AMT model car lacquer with one coat of Poly-Aqua clear epoxy sprayed over the entire model. Flight equipment was as follows: Engine was a standard Merco .49 R/C with 6 ounce Veco clunk tank. Nose wheel was a 2½" Hillcrest and main gear wheels were 3" DuBro. No brakes were used. Radio gear consisted of a Kraft Custom ten channel

(Continued on page 49)

Chart B				
BUILDING MATERIALS FOR WING STRUCTURES				
	Balsa-Silk	Styrofoam Balsa-Silk	Styrofoam-Fiberglass	Styrofoam-Air-O-Sheet
Relative Weight	4	2	1	3
Strength to Weight	3	2	2	3
Time of Fabrication	1	1	2	4
Temperature Resistance	3	3	4	3
Rigidity	3	3	4	4
Ease of Fabrication	1	1	1	4*
Painting	2	2	1	4
Repair	1	3	1	3
TOTAL RATING:	18	17	16	28
*rating based on pre-cut blank being furnished by material supplier.				
BUILDING MATERIALS FOR FUSELAGE STRUCTURES				
	Balsa-Silk	Styrofoam Balsa-Silk	Moulded Fiberglass	Moulded Air-O-Sheet
Weight	3	2	3	4
Strength to Weight	2	2	3	3
Rigidity	3	3	4	3
Ease of Fabrication	2	1	1*	1*
Painting	2	2	1	4
Fuel Resistance	1	1	4	3
Ease of Repair	3	2	2	3
Time of Fabrication	1	1	2	4
TOTAL RATING:	17	14	20	25
*rating does not include moulded structures.				



THE JUBILEE

superhet receiver, end mounted; Medco NiCad pack; and four Bonner Transmitters mounted on an RGA Servo Solver Transmitter tray. (The Servo Solver simplifies the installation, and proved to be the exact size for the Jubilee). A fifth servo for the aileron was mounted inside the painted canopy on top of the wing. A Skyline trim bar was used for elevator trim. Transmitter was the new Kraft Custom 10.

The initial test flight conducted by RCM Managing Editor Chuck Waas, was plagued by vibration affecting control surface movement. Upon landing, the nose gear proved to be slightly long and loose in its bearings, and the Jubilee cartwheeled, wingtip over wingtip. Although this was sufficient to cause extensive damage to a conventional multi ship, no damage was done to the Jubilee. Upon correcting the nosegear and receiver mounting problems, the Jubilee was put through its paces. It proved to be outstanding in all respects. Flight characteristics were similar to an Orion, although slower. It performed the entire AMA pattern with ease, with good inside and outside maneuvers. Vertical eights and rolls were excellent. The ship appears to have "built-in" spin characteristics, with the spins proving to be something to behold! Take-offs on all flights were very good. The Jubilee proved to be completely controllable at all speeds, and not tricky in any respect, as evidenced by the comments of the many fliers who handled the controls. Several beginners piloted the Jubilee and experienced little, if any, difficulty. In this respect, this new ship prove excellent for the

beginner to multi. In addition, its durability is far greater than the conventional ships to which we have become accustomed.

Overall flight test rating: Excellent, all respects.

By the time this article is in print, the first Jubilee's should be in full production. Price will be \$49.95, ready to "stuff" after a simple wing splice and gluing on of the tab. We feel this is a good price, and subsequently less than the amount of money invested in a conventional multi built from scratch. Finished wings will also be offered separately in a 2415 section tapered from 12" to 9". This is the stock Jubilee wing and will be priced at \$9.95.

Having thoroughly tested and experimented with the Jubilee, RCM offers the following suggestions in the event repairs should become necessary:

- 1) Thoroughly read all of the data furnished with the ship.
- 2) Go through the familiarization experiment shown on the instructions and note the effect of too much Air-O-cement. A little of this adhesive, working by capillary action, goes a long way — too much softens the material.
- 3) Don't get *any* Air-O-cement on the foam filler, should the latter become exposed by damage.
- 4) Make all repairs between two dissimilar materials with *epoxy* cement. Use only Air-O-Cement for repairs involving adhesion of Air-O-sheet to Air-O-sheet.
- 5) Use a .45 or .49 for best performance. Study the plans accompanying this article for the proper thrust angles.
- 6) For first flights, fly at $\frac{1}{2}$ to $\frac{2}{3}$ power so that you can get the "feel" of the ship.

We tested it and we liked it. The Jubilee has earned our highest recommendation. This ship can be ordered direct from L. R. Purdy, Powder Springs, Georgia. Price is \$49.95 and cash, check, or money order should accompany your order.