



The Prue 160 Sailplane

By IRV PRUE

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PERHAPS to be acclaimed by some people as a modified "Screaming Wiener" the Prue 160 is in reality the development of an original idea of the designer dating back to 1935. This idea was basically "a very light ship," gaining strength through its small size. Materials of all descriptions were considered, structural designs and weight analyses run in plywood, steel tube, dural and finally magnesium. Spans, aspect ratios, and all the other design criteria to be considered in preliminary design work were thrashed over, pro and con. Actual construction was begun three times on three designs before the 160 came to life at Rosamond Dry Lake and flew in October 1946.

The ship was constructed in the normal manner of building in metal, all attachments being rivets, bolts or screws. Advantage was taken of magnesium's wonderful forming properties while heated to 400° F. in forming wing and tail surface ribs. This was all done in the kitchen oven and on pine male form blocks adequately and generously radiused. Wing ribs are .064" JSI-H alloy, wing skin .032" and .020" thickness, also JSI-H alloy. This alloy has an ultimate tensile strength of 47,000 and compressive strength 30,000 p.s.c. All material used has the mill chrome pickle finish and was generously coated with zinc chromate primer on assembly to prevent corrosion. As information, let it be said now that magnesium alloy in its present stage of development cannot be worked or formed in the cold condition. Application of heat is absolutely necessary in all forming operations.

The fuselage from the nose to the aft torsion spar section of the wing is nothing more than a salvaged P-38 droppable tank with the three forward stiffeners removed. Maximum diameter of this tank is 28" and length used is 6 feet. Material is 1010 steel. There was no problem in adapting this fine aerodynamic shape to the circular aft fuselage of magnesium.

At the suggestion of Harold Huber, who had flown the ship, a vee tail was incorporated along the lines that Bob Stanley has suggested in articles in "Soaring" magazine. This vee tail seems to have definite advantages, especially in a small ship. These are stability, low weight, and aerodynamic efficiency.

The wing is monospar, with magnesium solid web, and 24ST extruded angle cap strips. The spar is located at 40% of the chord and the wing is straight on the 40% chord line giving slight sweep back to increase stability. The wing is joined in the middle of the fuselage by two main pins fore and aft. Additional pickups are made from the seat back to the spar and at 80% of the wing chord to the fuselage for torsion.

Landing gear is of built-up metal structure skid with a two-wheel dolly. The lucite canopy is built around a steel tube, overturn structure.

Specifications

Span 36'	Area 75'
A.R. 17.3	Weight empty 185 #
Area tail 12'	Length 16'
Height 44"	Dihedral 6°
Aerofoil N.A.C.A. 0013 to 0020	Ailerons twisted 5°

CALCULATED PERFORMANCE

Minimum sink 2.7 feet per second
 Best glide 26.4 to 1 at 49 m.p.h.
 Sink of 6.5 feet per second at 75 mph.
 Placard speed 100 mph.

FLIGHT TESTING THE PRUE 160

By HAROLD HUBER

Culminating two years of spare time labor and much burning of the midnight oil, Irving Prue's midget magnesium sailplane successfully completed its preliminary flight tests at El Mirage Dry Lake, Sunday, March 30.

The first flights were made by auto tow with a 600 foot line at Rosamond Dry Lake March 23, to determine controllability and general handling characteristics. Since this sailplane was somewhat of a departure from the conventional in size, weight, and type of empenage, we proceeded to study its flight characteristics with due deliberation.

We made several ground tows below stalling speed, and two flights up to 25 feet to become familiar with control reactions. Five additional flights were made from 150 to 500 feet, including "S" turns and 360s to