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AIRCRAFT CIRCULARS

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

No. 36

THE ROHRBACH "ROBBE" RO VII SEAPLANE

(Military or Commercial)

Washington
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In the design of this seaplane, Dr. Rohrbach has chosen the tapered wings, both in chord and ordinate. It will be recalled that in previous designs he used wings of uniform chord and ordinate from root to tip. An all-metal construction similar to former types has been retained with a somewhat unusual feature in the pronounced "V" bottom of the hull, especially in front of the main step. The wing floats are still used for the purpose of stabilizing the seaplane on the water, this being particularly necessary in this design with the main hull relatively narrow and high and the engines a considerable distance above the wing, placing the center of gravity rather high.

The Ro VII seaplane can be equipped for either military or commercial use, the hull being sufficiently large to accommodate four passengers, with pilot and mechanic occupying the cockpit above.

*Taken from circular published by the Rohrbach Metal Aeroplane Co.

General Characteristics

The plates and open profiles of duralumin permit of easy control and preservation, with the possibility of inspection of all rivet heads from both sides. All individual parts are detachable and interchangeable, hence easily assembled, with perfect attendance and prompt repair. The metal covering of hull and wing can be walked on with perfect ease and safety. Great strength is combined with low weight. The wing components consist of a central hollow box girder, front nose-rib boxes, and rear end-rib boxes. The rib boxes are detachable for the purpose of inspection of inner wing structure with the nose- and end-rib boxes partially designed as gasoline tanks, giving increased range due to augmented tank capacity. The tail-plane unit is of similar design to that of the wing, hollow box girder and rib boxes being used.

A monoplane wing is used with a pronounced dihedral and a semicantilever design, with bracing from the hull by means of wires. Each wing half is secured to hull by means of steel fittings and bolts. and can be walked upon with perfect ease.

Two steps are provided in the hull, the front being of a pronounced hollow V-shape up to main step, and the rear of a pronounced V-shape. The boat form insures convenient distribution of bottom forces and smooth landing. No porpoising is experienced at start and there is no spraying. Cruiser stem with

towing, anchoring ring and belaying cleat for ropes are provided.

The floats are of boat-like design with V-shaped bottom and braced against wing by streamlined, easily interchangeable struts with a subdivision by means of two bulkheads into three water-tight compartments. Drain screws are provided in each compartment and tight hand-holes with the possibility of glass covering.

Six bulkheads subdivide the hull into seven water-tight compartments. A central locking device permits of immediate closing of the water-tight doors in case of danger. The arrangement of bulkheads allows any two compartments to be flooded without sinking or capsizing the hull.

Two water-cooled BMW IV engines of 230 HP. each are used and mounted well above the wings on steel tubes of streamlined section with steel fittings. Gasoline is carried in the nose- and end-rib boxes with gasoline delivery to carburetor by means of pump. The engine controls are operated by means of rods, The oil tanks are situated in the engine nacelles and the radiators in front of engine with a ventilator, behind the radiators, operated from the pilot's seat. The reserve tanks are above the engines.

Hand-wheel controls are used with rods leading to aileron and elevator. The controls for the vertical surfaces consist of foot lever with rods leading to the rudder. Dual control can be installed as required.

In the pilots' cockpit seats are arranged side by side in fore-boat in front of wing with good vision in all directions. The seats are upholstered and equipped with safety straps. The control levers, throttle, ignition, fire-cock, fire extinguisher are all within easy reach of the pilot. One common board contains the navigation and engine instruments.

The hull, fitted as a cabin accommodates, as previously mentioned, four passengers, one of whom occupies the fore-cabin, one the rear-cabin, and the remaining two the intermediate cabin. Two seats are hinged.

A propeller-driven generator with storage battery furnish the current for position lights, searchlights and heating. A wireless outfit is contemplated.

Dimensions		
Span (over-all)	17.4 m	57.09 ft.
Height with running propellers)	5.5 "	18.04 "
Length (over-all)	13.2 "	43.31
Wing area	40.0 m ²	430.56 sq.ft.
Aspect ratio	1 : 7.6	
Wing loading	84.0 kg/m ²	17.20 lb./sq.ft.
Power "	7.3 kg/HP.	15.87 lb./HP.
Fuel & Oil for 4 3/4 hours, full throttle at ground level	484.0 kg	1067 lb.
Crew (2 persons)	160.0 "	354 "

Weights

Dead weight (including water and oil in engines and radiators)	2000 kg	4409.24 lb.
Useful load	1360 "	2998.28 "
Total weight	3360 "	7407.52 "

Performances with Full Load

	With full engine output	With 1/2 engine output
Speed at sea-level	195 km/h (121.17 M.P.H.)	150 km/h (93.20 M.P.H.)
Speed at 2000 m	210 " (130.49 ")	
Landing speed	116 " (72.08 ")	
Climb to	1000 m	(3281 ft.) 5 min.
" "	2000 "	(6562 ") 10 "
" "	3000 "	(9843 ") 16 "
Absolute ceiling	5000 "	(16400 ")
Service "	4500 "	(14675 ")
Range	1200 km	(745 mi.)
with a speed of	180 km/h	(111.85 M.P.H.)

Above performances are calculated with an allowance of $\pm 5\%$.

Load Factors for a Weight of Flying Structure
of 3150 kg (6945 lb.)

Case A (high incidence)	5.0
Case B (low incidence)	0.7 (A + C)
Case C (maximum speed of dive)	2.0
Case D (inverted flying)	2.4
Elevator control	250 kg/m ² (51.2 lb./sq.ft.) (breaking load)
Vertical fin and rudder	205 kg/m ² (42.0 lb./sq.ft.) (breaking load)
Metacentric height	8.5 m* (27.89 ft.)

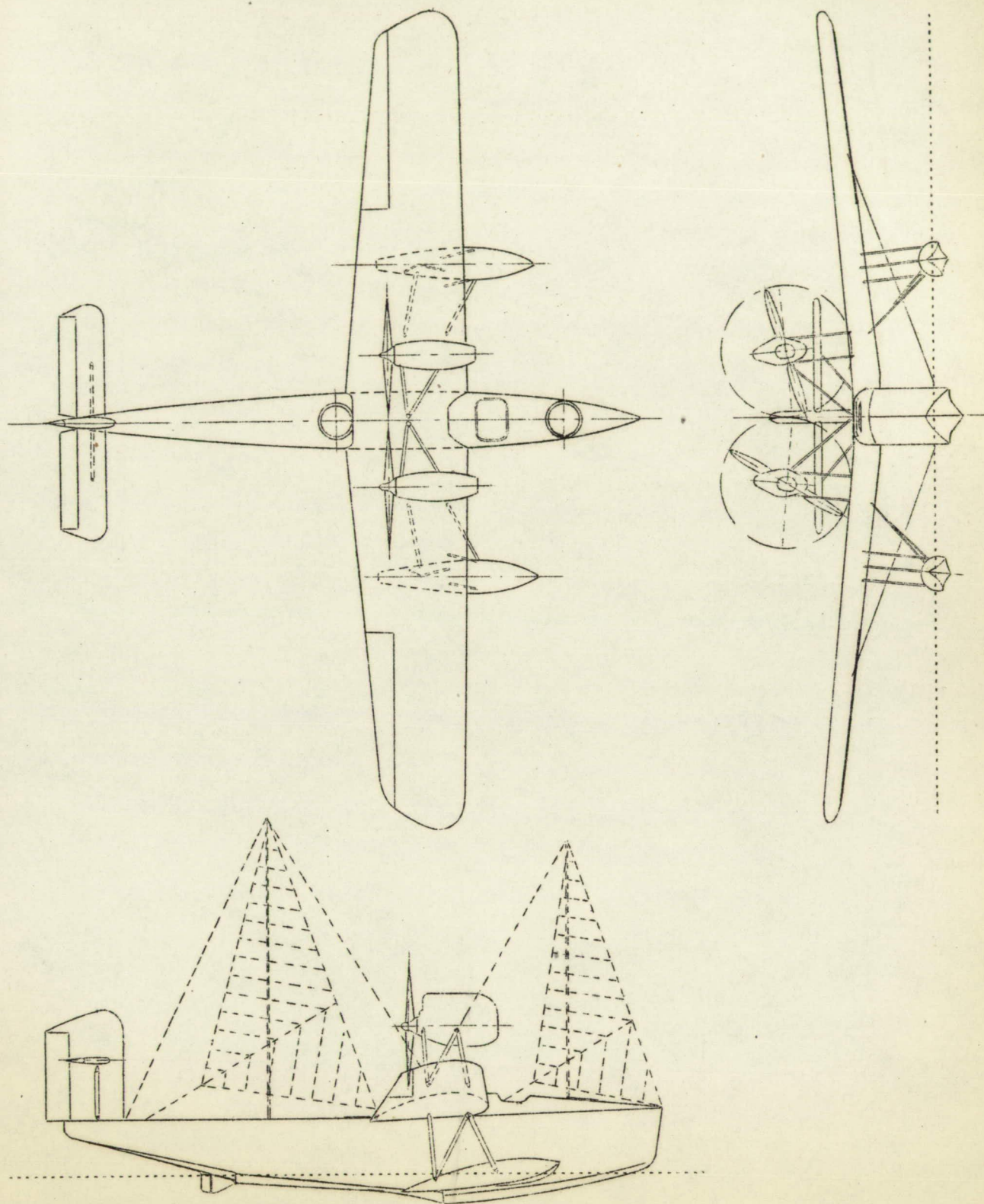


Fig.1 The Rohrbach RoVII "Robbe" seaplane or flying boat, 2 230 HP. B.M.W. engines.



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Figs. 2,3, & 4 Rohrbach Ro. VII "Robbe" seaplane; two 230 HP. B.M.W. engines.