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PERFORMANCE TEST OF ROLAND D-VI-B WITH 200 H.P. BENZ ENGINE

Official Performance Test - Summary of Results

Date, August 4, 1920

Airplane, Roland D-VI-B. No. P-132
Type I. Engine 200 H.P. Benz

Propeller, X-16889. Equipped as single seater pursuit.

Weight empty (including water)	1,523
Armament and equipment	137
Crew	180
Gasoline	132
Oil	15
Weight loaded	1,987
Weight (square foot)(i)	8.53
Weight (horsepower)	9.94

(i) Area of radiator in top wing deducted from supporting surface.

	Climb				Speed		
Standard altitude in feet.	Time in min-utes	R.P.M	Rate (feet) in min.	Flow (Gal. per hour)	M.P.H.	R.P.M.	Flow (Gal. per hour)
0	....	1,490	1,230	.....	114.0	1,610	.....
6,500	6.5	1,475	820	.....	111.5	1,520	.....
10,000	11.5	1,460	585	.....	108.0	1,540	.....
15,000	24.0	1,430	260	.....	99.0	1,480	.....
20,000	....	.....	.....	.....	.....	.....	.....
25,000	....	.....	.....	.....	.....	.....	.....
17,400 service ceiling	38.3	1,415	100	.....	90.0	1,440	.....
19,000 absolute ceiling	....	1,400	0	.....	79.0	1,400	.....

Endurance, full throttle at 10,000 feet (including climb) 1 hour, 30 minutes. Minimum speed at sea level (lowest throttle 58 M.P.H.).

PILOT'S OBSERVATIONS.

The flying qualities of this airplane are very similar to those of the Fokker D-VII. Its controls have about the same degree of effectiveness but operate more easily. Its maneuverability is well above that of the average single seater.

The balance is normal, tail heavy with full engine and slightly nose heavy at slow speed with engine throttled. In a normal glide it will balance without the use of the controls. The lateral balance is good.

The airplane takes off quickly with a very short run. It lands rather slowly with out rolling bery far, but has a tendency to ground spin. The rudder is not very effective in taxying.

From a maintenance point of view the airplane is well designed. Engine parts which require attention are accessible, with the exception of the water pump, which is somewhat difficult to reach. In order to remove the gas tank, it might be necessary to take out the engine. The oil tank is easily removed.

It is very difficult to keep the engine from overheating at low altitudes. Even in moderate weather it is impossible to fly with the upper-engine cowling in place. In addition, there are no radiator shutters, making it difficult to keep the engine warm on a glide.

There is no altitude control, but the rate of decrease in revolutions per minute with altitude seems to be normal in spite of this fact. In place of the usual control on German engines, a throttle handle which, when opened beyond a certain point, operates the altitude control. A stop is provided which allows the throttle to open to a position giving about 1,400 revolutions per minute. Moving the lever beyond this stop simply opens the throttle further. It was probably intended not to run the engine at full throttle at low altitudes.

Louis P. Moriarty,
Second Lieut., A.S.A., Test Pilot.

DESCRIPTION OF AIRPLANE

Dimensions

Over-all span, 30 feet, 10 inches.
Over-all length, 20 feet 9-3/4 inches.
Over-all height, 9 feet 3 inches.
Height at hub of propeller above ground:
  In flying position, 5 feet 2 inches.
  At rest, 6 feet 1½ inches.

Airplanes

Sweepback, none.
Dihedral, degrees:
  Upper plane, none.
  Lower plane, 1-3/4
Stagger, 20 inches.
Total area including ailerons, 233.16 sq.ft.
Gap, 56 inches at outer struts, 58 inches near center.

Upper Plane
(Including center section.)

Span, 30 feet 10 inches.
Chord, 4 feet 7 inches.
Area, with ailerons, 127.16 square feet.
Incidence, 3½.

Lower Plane

Span, 27 feet 11 inches.
Chord, 4 feet.
Area, 106 square feet.
Incidence, degrees:
  Left side, 1½ to 3/4.
  Right side, 1½ to 1-1/3.

Ailerons or Flaps.

Arrangement, upper planes.
Upper length, 5 feet 5½ inches.
Upper chord, 15½ inches.
Upper area, 14.4 square feet.
Total area, 14.4 square feet.
Distance from center of ailerons to longitudinal axis of airplane 12 feet 3½ in.

Stabilizer

Area, 18.68 square feet.
Setting, plus 1½ with flat upper surface and convex lower surface.

Elevator

Area, 6.09 square feet.

Rudder

Area, 6.09 square feet.
Distance from leading edge of rudder to center of gravity of airplane, 13 feet 1-1/8”.

Fin

Area, 4.54 square feet.

Landing Gear

Tread, 5 feet 8 inches.
Shock-absorbing system, rubber cord.
Braking device, tail skid.
Wheels ahead of center of gravity, 13-5/8 inches.

DISTRIBUTION OF WEIGHTS

Weight empty (with water)	1,523
Armament and equipment	137
Crew	180
Gasoline	132
Oil	15
Weight loaded	1,987
Weight on front wheels (tail skid on ground)	1,802
Weight on tail skid (tail skid on ground)	185
Weight on front wheels (flying position)	1,834
Weight on tail skid (flying position)	153
Center of gravity (distance from wheels in flying position)	1’-1-5/8”

DESCRIPTION OF POWER PLANT

Engine

Make, Benz. Factory No. 29167. Type, 6 cylinder, vertical. Rated horsepower, 200. Rated revolutions per minute, 1,400. Bore, 5.512. Stroke, 7.430. Weight dry, 638.2 pounds. Gas consumption, 0.491 pound/B. horsepower-hour. Oil consumption, 0.468 pound/B. horsepower-hour. Weight of water in engine, 19 pounds.

Remarkes: Performance good but not exceptional. Not recommended as a service type.

Ignition

Battery or magneto make, Bosch Z.H. 6. Number, 2. Advance, degrees, 32 b.t.c. Plugs: Make, Bosch. Gap, 0.012 inch.

Remarks: Firing order, 1-5-3-6-2-4. Speed, 1½ times crank shaft.

Carburetors

Make, Benz. Type, barrel throttle, water jacketed. Number, 2. Setting jet: Main, 0.039 inch; idling, 0.020 inch. Choke, 1.654 inches. Air intake, through crank case to carburetor. Mixture control, none.

Remarks: Probably not intended to run the engine wide open at low altitudes.

Radiators

Type, wing tubular. Position, center section wing. Length, 26 inches. Width, 24 inches. Temperature adjustment, none. Flow, gallons per minute, not known.

Exhaust Pipes

Description, 6-in-1 pressed-steel tube with opening at front of engine.

Lubrication

Capacity oil tank, 2 gallons. Oil used (brand) Liberty, specification 3501. Oil pressure, 28 pounds/square inch. Type pump, gear; dry. Description lubrication system, dry sump pressure system with pressure gearpump and scavenging gear pump.

Fuel System

Number of tanks, 2; location, front of pilot. 17.5 gallons main, 5 gallons reserve. Capacity, main pounds, 103. Capacity, reserve pounds, 29. Description of fuel-supply system, plunger pump through pressure reservoir to carburetors.

Motor control

Description, throttle and spark on left-hand side of fuselage with extra throttle on control stick.

Propeller

Make, German design; made at McCook Field. Number of blades, 2. Diameter 9 feet 4-5/8 inches. Pitch, 6 feet 6 inches. Tips, cloth covered and enameled. Clearance 5-11/16 inches. Manufacturer's No. 16889. A. S. No. 108974.

Remarks: Made of birch covered with aluminum leaf; tipped with cloth and enameled.

VISIBILITY OF ROLAND TYPE D-VI-B

The visibility of this airplane is exceptionally good. The design is such that all the totally blind spots are elliminated except that below the lower wing. The pilot is perched high above this wing and his cockpit is designed to give him considerable freedom of movement, both of which factors tend to reduce the blind area to a minimum.

Blind areas in percent of total area:

View	Partially blind	Totally blind
Front	44.4	1.0
Side	18.3	5.3
Back	21.1	...
Top	....	...
Bottom	100.0	21.1
Total	30.9	5.3