

AIRCRAFT CIRCULARS  
NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

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No. 12

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FARMAN MONOPLANE F.170

Commercial Airplane with One 500 HP. Farman Engine

By J. Serryer

From "Les Ailes," April 8, 1926

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Washington  
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FARMAN MONOPLANE F.170.\*

Commercial Airplane with One 500 HP. Farman Engine.

By J. Serryer.

The new Farman monoplane F.170 was built for strength, safety and economy, the essential qualities of a good commercial airplane.

As regards economy, the Farman Brothers believe the first condition to be realized is good flight efficiency, i.e., the ability to carry a heavy load at a high speed with the minimum utilization of power and the minimum fuel consumption.

With 370 kg (816 lb.) of fuel and a pay load of 850 kg (1874 lb.), it has a maximum speed of 203 km/h (126 mi./hr.) and a ceiling of 4300 m (14107 ft.). With an actual utilization of only 300 HP., a speed of 180 km/h (112 mi./hr.) has been attained, thus enabling a non-stop flight of five hours or 900 km (560 miles) in still air.

On dropping to the minimum power of 215 HP., the F.170 can maintain a speed of 140 km/h (87 mi./hr.). Under these conditions, it could carry a pay load of 4 kg (8.8 lb.)/HP. 900 km (560 miles). This increases the flight safety and the longevity of the engine.

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Although the Farman engine has won, on two occasions, the world endurance record for non-stop flights (in 1924, with 38 hours of continuous running, and in 1925 with 45 hours) and although its strength has been demonstrated by numerous endurance tests on the bench, it is nevertheless true that a moderate speed tends to improve its functioning. Moreover, the unused power in normal flight remains at the disposal of the pilot in all the difficult situations of flight, especially near the ground.

Independently of the engine-propeller group, the safety of the airplane is increased, on the one hand, by its general robustness, due to the careful selection of the materials, and on the other hand, by its flight qualities (maneuverability and speed range), which make the F.170 practically independent of possible errors in piloting.

Nothing has been omitted in the way of possible protection against fire (insulation of engine parts, metal engine bed, location of fuel tanks, rapid draining, stop-cocks, and fire extinguishers).

The F.170 has a semi-thick wing, rigidly braced by oblique struts. This wing is embedded in the top of the fuselage. It has a span of 16.1 m (52.82 ft.) and a chord of about 3.6 m (11.81 ft.). Viewed in plan, its shape is perfectly rectangular. Its cross section is uniform, so that the ribs are all alike, thus simplifying its construction. The ailerons are

not balanced and are operated by means of exterior wooden horns. The wing is braced on each side of the fuselage by two pairs of oblique struts, their lower ends being attached to a small plane which, in turn, is secured to the bottom of the fuselage. The wing is wooden and is covered with fabric.

The large fuselage contains, in front, the engine propeller group and then the pilot's seat, entirely insulated from the engine and cabin and provided with a separate door. The spacious passenger cabin is 1.1 m (3.6 ft.) wide by 1.8 m (5.9 ft.) high, with its bottom very near the ground, in order to facilitate access. It is pleasingly decorated and has 8 very comfortable seats. Large glass windows enable the occupants to admire the landscape, the view of which is not obstructed by any part of the airplane. Trap doors enable the passengers to regulate, at will, the aeration of the cabin. The airplane is provided with a hot-water heating system. The baggage is stowed in a large compartment behind the cabin, which has a door separate from the latter.

The horizontal empennage consists of a stabilizer and a two-part non-balanced elevator. The vertical empennage consists of a fin and a balanced rudder.

The 500 HP. Farman engine, 12 W E, is installed in the front end of the fuselage, on a metal bed which is easily removable. The entire hood can be quickly removed, for inspecting and adjusting all the engine parts.

The engine drives a large four-bladed tractor propeller by means of a reduction gear with a ratio of 2 : 1. The engine is water-cooled through the medium of a honeycomb radiator installed in the rear end of the fuselage. This unusual arrangement makes it possible to give the engine hood a better shape. A reliable electric starter is always at the disposal of the pilot. Two long exhaust pipes, extended well behind the cabin, constitute an effective silencer, which happily relieves the passengers of the deafening noise of the engine.

The landing gear has a very wide wheel gauge. It consists simply of two wheels, located between the wing struts at the extremities of the small plane fastened to the bottom of the fuselage. The axles and the shock absorbers are streamlined by this small plane. A strong tail skid is mounted under the fuselage even with the leading edge of the stabilizer.

#### General Characteristics

Span	16.10 m	52.82 ft.
Length	11.75 m	38.55 ft.
Height	3.20 m	10.50 ft.
Wing area	52.50 m <sup>2</sup>	565.10 sq.ft.
Load empty, but equipped	2018 kg	4449 lb.
Weight of pilot and fuel	452 kg	996.5 lb.
Weight of freight	850 kg	1874 lb.

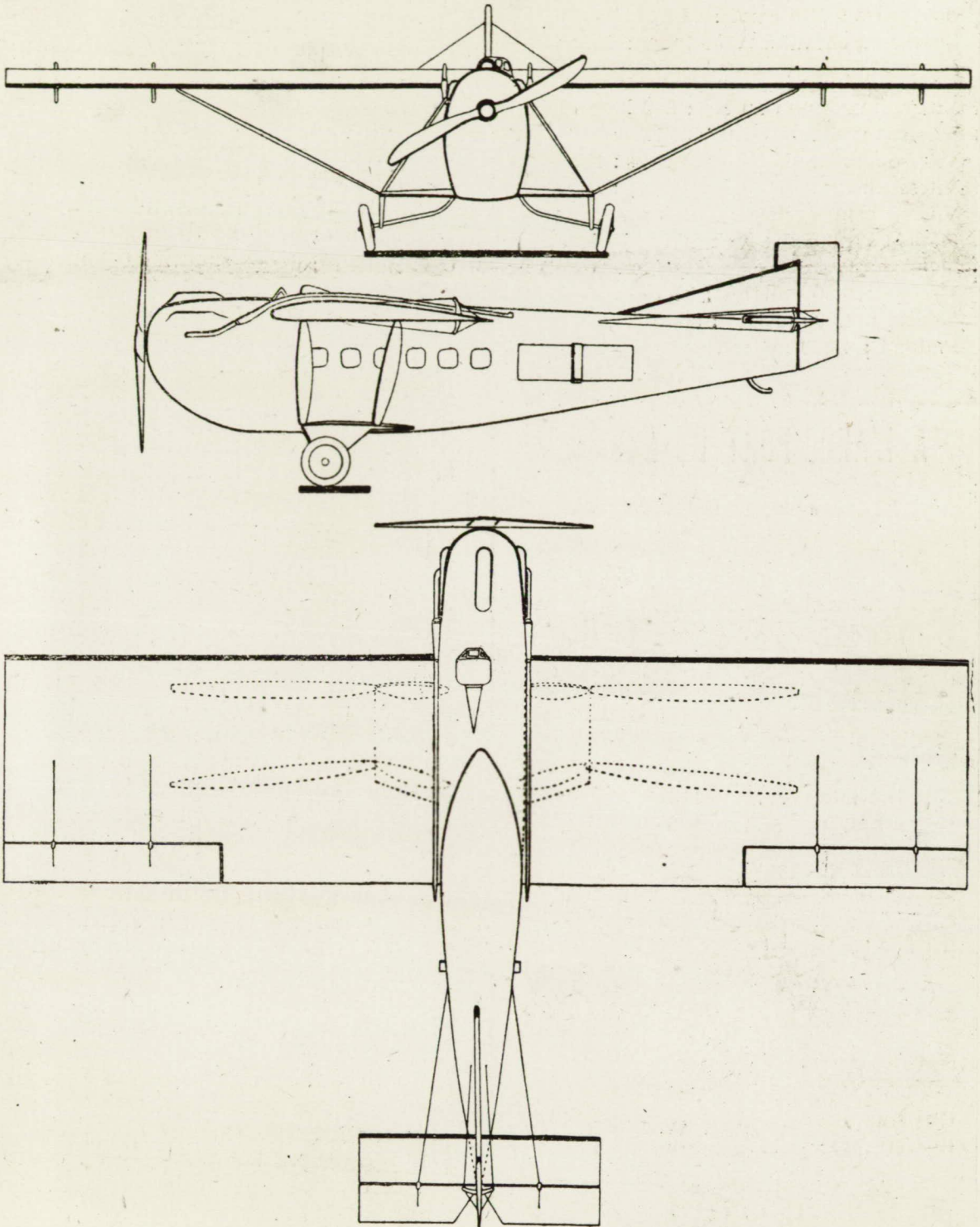
Useful load	1302 kg	2870 lb.
Weight in flying order	3320 kg	7319 lb.
Wing loading	64.20 kg	141.5 lb.
Load per HP. (at 2150 R.P.M.)	6.64 kg	14.64 lb.

## Performances

Maximum speed near ground	203 km/h	126 mi./hr.
" " at 1000 m (3281 ft.)	197 km/h	122.4 mi./hr.
" " " 2000 m (6562 ft.)	191 km/h	118.7 mi./hr.
" " " 3000 m (9842 ft.)	183 km/h	113.7 mi./hr.
Commercial speed	190 km/h	118 mi./hr.
Climb to 1000 m (3281 ft.)	5 min. 54 sec.	
" " 2000 m (6562 ft.)	14 min. 25 sec.	
" " 3000 m (9842 ft.)	27 min. 21 sec.	
" " 4000 m (13123 ft.)	58 min. 45 sec.	
Ceiling	4300 m	14108 ft.

Translation by Dwight M. Miner,  
National Advisory Committee  
for Aeronautics.

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