AIRCRAFT CIRCULARS
NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

No. 12

FARMAN MONOPLANE F.170
Commercial Airplane with One 500 HP. Farman Engine
By J. Serryer
From "Les Ailes," April 8, 1926

Washington
August, 1926
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.

* From "Les Ailes," April 8, 1926.
Although the Farman engine has won, on two occasions, the world endur-
cance record for non-stop flights (in 1924, with 38 hours of continuous running, and in 1925 with 45 hours) and al-
though its strength has been demonstrated by numerous endur-
ance 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, lo-
cation 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 rectangu-
lar. 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.

<table>
<thead>
<tr>
<th>General Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Span</strong></td>
</tr>
<tr>
<td><strong>Length</strong></td>
</tr>
<tr>
<td><strong>Height</strong></td>
</tr>
<tr>
<td><strong>Wing area</strong></td>
</tr>
<tr>
<td><strong>Load empty, but equipped</strong></td>
</tr>
<tr>
<td><strong>Weight of pilot and fuel</strong></td>
</tr>
<tr>
<td><strong>Weight of freight</strong></td>
</tr>
</tbody>
</table>
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.
Farman Commercial airplane with 500 HP. Farman engine
Farman Commercial airplane with 500 HP Farman engine