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WAR DEPARTMENT
AIR CORPS, MATERIEL DIVISION

MEMORANDUM REPORT ON

DAD/CA/52

SUBJECT: Dual-Rotation Propeller System
Used on P-24 Engine.

Date: August 21, 1941

SECTION.....EXPERIMENTAL ENGINEERING

SERIAL No....EXP-M-52-587-12

Contract No. _____
Expenditure Order No. 587-1
Purchase Order No. _____

A. Purpose.

1. To report on the dual-rotation propeller system used experimentally with the Fairey P-24 engine.

B. Factual Data.

1. Propeller Laboratory is very much interested in dual-rotation propellers and considers their use essential in certain classes of airplanes now undergoing design and development.
2. The Materiel Division's program of dual-rotation propeller development has not progressed beyond less than 100 hours of flying on a non-controllable propeller. The dual-rotation controllable propellers on the program have not yet completed whirl testing and hence have not been flown.
3. The Fairey P-24 propeller-engine combination consists of a dual propeller, each half of which is driven by one unit of a sort of double-unit engine. One of these combinations is reported by Captain A. Graham Forsyth, representing the British Air Commission, 1785 Massachusetts Avenue, Washington, D. C., to have passed their bench and flight experimental tests with but minor difficulties. This has included the completion of 300 hours testing on the contra rotating propellers and 100 hours of flying at powers ranging from 1200 to 1600 b.h.p. and take-off up to 2000 b.h.p. at 3000 r.p.m. at 9 lbs. boost.
4. While the efforts of the Materiel Division have been with the two halves of the dual-rotation geared together and driven by a single-unit engine, the Fairey experiment involves a separate and independent drive of each half of the propeller by one of the units of the two-unit engine. (Each unit of the engine can be run independently of the other unit.)

Exhibit "3" to
EXP-M-52-592-29

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On Change to Restricted
Date 17 Dec 1995
P. J. [Signature]

Classification Changes
By Change to Restricted
Date 10/15/45
By [Signature]
10/15/45

5. The Fairey dual-rotation propeller can be modified for use on a single-unit engine such as was planned for the dual-rotation propellers of the Division's experiments.
6. The Fairey dual-rotation propeller and two-unit engine combination can be made available to the Materiel Division already installed in a test airplane and can be delivered to Wright Field with sufficient spares to assure reasonable expedition of the tests.
7. As now constructed the Fairey dual-rotation propeller and two-unit P-24 engine permits performance studies for various relative speeds between the two propeller units, covering the range from full speed on the front unit and the rear unit feathered to full speed on the rear unit and the front unit feathered. Thus it may be determined whether the relative speeds should be other than equal and, if so, whether their ratio is fixed or should be variable.
8. The subject installation also affords an opportunity to study the use of plain journal bearings between the dual-rotation shafts and the attendant lubricating problems.

C. Conclusions.

1. Circumstances warrant the keen interest of the Materiel Division in the Fairey dual-rotation propeller.
2. Full advantage should be taken of the quick availability to the Materiel Division of the experimental installation which has already had considerable flying time in England on the two-unit P-24 engine.
3. The Materiel Division has no first-hand experience with an installation such as the Fairey type.
4. Modifications of the Fairey dual-rotation installation on the P-24 two-unit engine would have to be made for single-unit engine installations, but such modifications appear to be quite possible. This would require redesign and manufacture of a new propeller.

D. Recommendations.

1. It is recommended that the Fairey dual-rotation propeller installed on the P-24 two-unit engine and a test airplane be sent

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from England to Wright Field with ample spares to facilitate complete tests.

- 2. It is further recommended that this report be not interpreted as an approval of the Fairey dual-rotation propeller for any more than an experimental program at the present.

*Classification Cancelled
OR Changed to Restricted
Date: 6 June 1943
P. A. Carroll*

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Concurrence:

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