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Capt. U.S.A.F.

U.S.
ARMY AIR FORCES
MATERIEL CENTER COMMAND

ELS:sw:19

MEMORANDUM REPORT ON
North American P-51, AAF No. 41-37427 &
P-51A AAF No. 42-6009

Date 25 June 1943

SUBJECT: Report of Spin Tests

SECTION Flight

SERIAL No. Eng-19-1615-A

Contract No.
Purchase Order No.
Purchase Order No.

A. Purpose

1. To forward results of spin tests on P-51 Airplane, AAF No. 41-37427, (4) 20 millimeter cannon installed in the wings, gross weight of 8874 pounds with c.g. at 28.14 percent M.A.C. gear up; and P-51A AAF No. 42-6009, (4) .50 calibre guns installed in the wings, gross weight 8145 pounds with c.g. at 28.8 percent M.A.C. gear up.

B. Test Results

1. A total of 65 spins of from three to nine turns were made on these two airplanes by eight different pilots. The test results given are based on five turn spins - before attempting recovery.

2. With normal spin control positions: rudder full with, elevator full up, and ailerons neutral, 3500 feet was required to complete five turns. For complete recovery approximately one and one quarter turns and 2000 feet are required. The number of turns for recovery were variable depending on the direction of the spin and the point on the oscillation at which recovery measures were taken. Recovery was affected by applying full opposite rudder and it was found that neutral elevator was sufficient for normal recovery. For the complete maneuver 5500 feet was the normal amount of altitude lost.

3. All control forces were light during the spin and all the controls tend to neutralize themselves.

4. A steady spin to the left was usually obtained in three turns and was fairly smooth exhibiting slight oscillation. Turns before the steady spin was established were rather violent in that each turn contained an oscillation of considerable whip with the nose position varying from 60 degrees to about 40 degrees below the horizon. The airplane just about stopped rotating at the high point of the oscillation and if recovery was attempted there the airplane would complete the oscillation before coming out. Applying controls for recovery at the low point of the oscillation resulted in almost immediate recovery. In all cases the speed of rotation increases when controls for recovery are applied.

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5. A violently oscillating spin with the oscillations becoming progressively worse with each turn was developed if ailerons were applied either with or against the spin before the spin became steady. Ailerons applied once the spin became steady seemed to have no adverse effect.

6. With the lateral c.g. position to one side of the center line of the airplane due to unsymmetrical gas usage, the spin characteristics were similar to those exhibited when aileron was applied in an unsteady spin. The violent spin was in the direction of the off-set c.g. while a steady spin was obtained in the other direction.

C. Conclusion

1. Although some of the spins encountered were violent in nature, recovery was always easily accomplished. Conscious effort had to be made to hold the airplane in the spin and no spins were obtained which were difficult to recover from.

2. The spin characteristics of the two airplanes were essentially the same, the only marked difference being that the P-51A equipped with (4) .50 calibre wing guns and with a more rearward c.g. spun slightly faster and somewhat steeper than the P-51 equipped with (4) 20 millimeter cannon in the wings.

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