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ARMY AIR FORCES
MATERIEL ~~ENGINEER~~ COMMAND
FLIGHT SECTION

MEMORANDUM REPORT ON

North American P-51A, AAF No. 42-6009

ELS/WHB:mem:19

SUBJECT: Report of Power-On Spin Tests

Date 10 July 1943

SECTION FLIGHT

SERIAL No. ENG-19-1621-A

Contract No.
Expenditure Order No. 726-25
Purchase Order No.A. Purpose.

1. To supplement MR ENG-19-1615-A "Report of Spin Tests" for the power-on spin condition. These supplemental spin tests were run on P-51A airplane AAF No. 42-6009 with (4) .50 calibre guns installed in the wings, gross weight 8,145 pounds with c.g. at 28.8 per cent of m.a.c. gear up. Additional spins on the P-51 airplane AAF No. 41-37427 with (4) 20 millimeter cannon installed in the wings were not made because the airplane was not available for further tests.

B. Test Results.

1. A total of approximately forty spins of from two to six turns each were made on this airplane using various power-on conditions.

2. Spins were made from power-on stalls with power settings varying from sixteen inches Hg. manifold pressure and 2,000 RPM up to forty inches and 3,000 RPM. Power was left on in the spin until recovery controls were applied.

In spins to the right, the airplane spun with the nose rather well down, but oscillating violently. Recovery was always prompt within 1-1/2 turns after recovery controls were applied and power pulled off.

In spinning to the left, the spin had a tendency to become flat - some of them being almost horizontal. Generally, the left spins were smooth, except for a lateral rocking of the wings which was not particularly violent. In a few of the left power-on spins, a vertical oscillation was encountered, with the nose varying from 30 degrees below the horizon to 30 degrees above during each turn of the spin.

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In all cases when the power was cut off and recovery controls applied the nose dropped, the spin stopping when a nose position of between 45 degrees to 60 degrees from the horizontal was obtained. The average number of turns required for recovery for a 2 to 5 turn power-on spin was 4 turns with a loss in altitude of 6,000 feet. In a few cases 6 turns were required for recovery.

In one spin the power was cut off and the controls kept on with the spin. The nose began to drop immediately and a normal power-off spinning position was obtained in about 3 turns. One recovery was attempted with power-on but violent oscillations developed necessitating the pilots cutting off the power, after which a normal spin recovery was effected.

3. Power-on spins entered from a turn, in either direction, were not noticeably different from those entered from a power-on stall.

4. Spins were made in each direction from snap rolls at about 160 MPH using 22 inches Hg. and 2,200 RPM. The spins were held for 2 turns to the right and exhibited large oscillations with the nose fairly well down. The cutting of power and application of recovery controls resulted in recovery within 1-1/2 turns.

Spins out of a left snap roll were held for 3 turns. The resultant spin was fairly flat varying from the horizontal to 10 degrees below the horizontal. The spin was smooth in all cases and when the power was cut and recovery controls applied the nose dropped. Recovery from the spin was obtained when the nose had dropped to about 60 degrees below the horizontal.

The average number of turns for recovery from a 3 turn spin was 4 turns. Several spins from left snap rolls required only 3 turns for complete recovery while some others required up to 5-1/2 turns.

One isolated case was experienced where an estimated 10 turns was required for recovery. This spin was entered in the same manner as other spins to the left and held for 2 turns before attempting recovery. Alternately gunning the motor had no effect on recovery except it may have accounted for the prolonged number of turns required for recovery. The nose dropped a little more with each succeeding turn until full recovery was accomplished. The spin was entered at 14,000 feet and full recovery was had at 6,500 feet.

The average spin from a left snap roll was a 3 turn spin requiring 3-1/2 turns for recovery; the spin starting at 15,500 feet and full recovery being obtained at 9,500 feet.

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