

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA25LA053

ENGINE RUN REPORT

June 11, 2025

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A. ACCIDENT

Location: Doylestown, PA
Date: November 18, 2024
Time: 12:21 EST
17:21 EST
Airplane: Beechcraft A36 Bonanza, N8152R

B. ENGINE RUN REPORT

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Party Coordinator	PJ Beavers Textron Aviation Wichita, Kansas
Party Member	Phillip Grice Continental Aerospace Technologies Mobile, Alabama
Technician	Lisa Jersild Continental Aerospace Technologies Mobile, Alabama
Technician	Randy Bryant Continental Aerospace Technologies Mobile, Alabama

C. SUMMARY

The engine examination and test run did not reveal any anomalies that would have precluded normal operation.

D. DETAILS OF THE EXAMINATION

1.0 Engine Preparation

The engine was shipped to Continental Aerospace Technologies in an engine shipping crate. The crate appeared to be undamaged from shipping. The engine was removed from the crate and visually examined for damage. All four engine mounts were broken, the left side exhaust risers were slightly bent, the No. 1 intake tube had a hole near the Y-tube attach

coupling, and the intake Y-tube had a large dent in the tube at the attach coupling end. The engine mounts were replaced with serviceable engine mounts, the damaged intake tube was replaced with a serviceable tube, the exhaust risers were replaced with straight pipes, and the dent in the intake Y-tube was manually reshaped to prevent any intake leaks during the engine run. The magneto to engine timing was checked, and the left magneto was found to be 25° before top dead center (BTDC), and the right magneto was found to be 26° BTDC. The magneto timing specifications for the IO-550-B engine was 22° BTDC. A cold compression check was conducted with the following results:

Cylinder 1	Cylinder 3	Cylinder 5	Cylinder 2	Cylinder 4	Cylinder 6
9psi (exhaust)	17 psi (exhaust)	42 psi (rings)	42 psi (rings)	18 psi (rings/exhaust)	34 psi (rings/exhaust)

To facilitate the engine run, the airframe baffling, the alternator, the vacuum pump, the propeller governor, and the fuel flow transducer were removed. Low-pressure air was blown through the fuel flow transducer and its attaching fuel lines, and there were no blockages found. The propeller governor drive was rotated, and it was observed to pump residual oil. The alternator drive coupling remained intact, and the drive was able to rotate freely.



Photograph 1: Top of engine overview

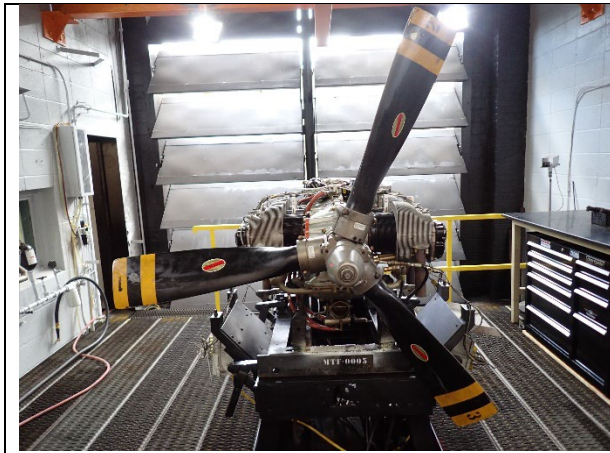


Photograph 2: Bottom of engine overview (impact damage to intake tube visible)

2.0 Engine Run

The engine was placed on a test stand, and a test club propeller was installed on the crankshaft. The engine started on its first attempt without any stumbling or hesitation. The engine RPM was advanced in steps for warm-up and preparation for full power operation. The engine RPM was advanced to 1,200 RPM and held for five minutes to stabilize. The engine RPM was then advanced to 1600 RPM and was held for five minutes to stabilize. The engine RPM was then advanced to 2100 RPM and was held for five minutes to stabilize. While at 2100 RPM, a magneto check was performed, when running on the left magneto, the RPM drop was 50

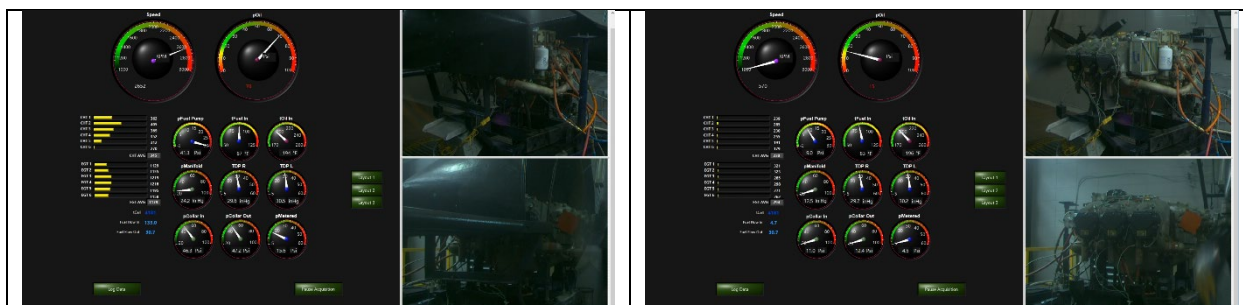
RPM. When the magneto was switched to the right magneto, the RPM dropped by 220 RPM, and the No. 5 cylinder EGT level dropped to levels consistent with combustion no longer occurring in the cylinder. The magneto switch was put back into the both position and the No. 5 cylinder EGT levels indicated normal combustion within the cylinder. The engine run continued, and the RPM was increased to 2450 and allowed to stabilize for five minutes. The throttle was then advanced to full throttle, and the engine RPM increased to approximately 2620 RPM, and the engine continued to run smoothly without any stumbling or hesitation. The engine RPM was decreased to idle, and the engine was allowed to cool prior to shutting down the engine. After the engine was shut down, the engine was troubleshooted to determine the cause of the high RPM drop during the right magneto check. The No. 5 top spark plug was found to have the outer and center electrodes contacting each other, resulting in a short that would have prevented a spark from forming between the gap. The spark plug electrode gap was compared with the photographs taken of the spark plug prior to the engine run. The photographs show a clear gap between the electrodes during the examination. This is consistent with the spark plug being damaged during engine preparation for the engine run. A new spark plug was installed into the No. 5 cylinder top position and another engine run was performed. At 2,100 RPM, another magneto check was performed; the engine RPM only dropped approximately 50 RPM, and the No. 5 cylinder EGTs were normal. Another full power check was performed, and the engine RPM increased to 2700 RPM and without any stumbling or hesitation. While at full power, it was observed that the unmetered fuel pressure was higher than specifications; however, it did not prevent the engine from operating normally at full throttle. The engine was then brought back to idle RPM and multiple throttle bursts from idle to full power were performed. The engine accelerated normally during each throttle burst and would reach 2,700 RPM during each throttle burst.



Photograph 3: Engine on test stand



Photograph 4: Engine on test stand



Photograph 5: Screenshot of engine test run video while engine is at full throttle (Source: CAT)

Photograph 6: Screenshot of engine test run video while engine is at idle (Source: CAT)



Photograph 7: No. 5 top spark plug on initial examination (Source: CAT)



Photograph 8: No. 5 top spark plug found after initial engine run with no gap (Source: CAT)

3.0 Post Engine Run Examination

After the engine run, another compression test was conducted while the engine was still warm with the following results:

Cylinder 1	Cylinder 3	Cylinder 5	Cylinder 2	Cylinder 4	Cylinder 6
62 psi (rings)	64 psi (rings)	66 psi (rings)	65 psi (rings)	63 psi (rings)	65 psi (rings)

The engine was then placed into a crate in preparation for shipment.

Submitted by:

Kurt Gibson
Aviation Accident Investigator