

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA24LA229

ENGINE EXAMINATION SUMMARY

July 25, 2024

A. ACCIDENT DETAILS

Location: Bennett Field (1N5), Salisbury, MD
Date: May 26, 2024
Time: 12:00 Local
16:00 Zulu
Aircraft: N818K Great Lakes 2T-1
Engine: Menasco Super Pirate D-4-87

B. EXAMINATION PARTICIPANTS

Investigator In Charge Ryan Enders
Aviation Safety IIC
Washington, DC

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C. SUMMARY

On May 26, approximately 12:00 the Great Lakes N818K departed Bennett Field, turned right, then impacted the ground off the end of runway 35. Aircraft sustained substantial damage, figures 1 and 2. The examination of this engine revealed no evidence of pre-accident damage or anomalies that would have precluded the normal operation of the engine.



Figure 1 Aircraft Before Recovery



Figure 2 Aircraft in Hangar

D. ENGINE EXAMINATION SUMMARY

Walk Around, Initial Examination

The engine was a Menasco Super Pirate model number D-4-87, engine number 4342, figure 3 and 4. The engine had no noticeable damage other than from impact with the ground. The engine was complete with all components still attached. The oil tank was ruptured leaving oil on the hangar floor. The propeller was badly splintered and broken into many small pieces, figure 5. The engine mount was bent and broken in many locations as well.



Figure 3 Menasco Super Pirate



Figure 4 Engine Data Tag



Figure 5 Propeller

Engine Examination

The propeller was removed so the nose cowling could be removed. The top cowl was removed and both side cowlings. This exposed the lifting eyes for the engine. The engine and aircraft were lifted so the nose bowl and bottom cowl could be removed. Examination of the engine controls followed. Figures 6 and 7.

- Mixture not installed on this aircraft. The carburetor was equipped with a mixture control, but it had been safety wired into the full rich position and remained secured full rich.
- Throttle was found full open, and continuity was confirmed to the cockpit control.
- Carburetor heat control found in the off position and continuity to the cockpit control confirmed.



Figure 6 Carburetor Linkage



Figure 7 Second View of Linkage

Crankcase And Cylinders

Spark plugs were removed, and a mixture of fuel and oil drained from cylinders number 1 and 2. The aircraft was sitting in a nose down position for an extended period. This would explain the fuel running from the cylinders.

The engine was turned over, cylinders 2, 3, and 4 had compression, cylinder number 1 was weak. While turning the engine, continuity in the accessory drive and valve train was confirmed, through compressions, impulse couplings snapping, and when turned backwards, the starter drive engaged. Engine turned free and smoothly.

Fuel System

The fuel strainer was drained and mixture of 100LL and automotive gas was obtained. The sample contained considerable amounts of debris. The greenish color along with the smell indicated the mixture of fuels. The fuel strainer screen was removed and found to be free of debris. Figure 8.



Figure 8 Fuel Screen

Removed the air filter from the intake system to gain access to the carburetor. The filter was clean but suffered impact damage. Also attached to the carburetor was the carb heat box that also contained a clean inlet filter. The carb heat box was also impact damaged. Part of the engine mount formed a hole in the rear portion of the box. Figure 9.



Figure 9 Carb Heat Box Damage

Removed two intake hoses and intake tube assemblies from cylinders 2 and 3 to facilitate removal of the carburetor. The intake system contained a considerable amount of fuel. This fuel was consistent with what was found in the fuel strainer, a mixture of automotive gas and 100LL. The carburetor was removed, the carb heat system removed from the carburetor, then the carburetor disassembled.

Internally the carburetor appeared to be in good serviceable condition. A small amount of debris was found in the bowl. The needle, seat, and float were all in good condition. The float was silent when it was shaken indicating it was not leaking, figure 10. The float also had a slight yellow tint on the bottom portion, the part in the fuel, consistent with the use of auto fuel, figure 11.



Figure 10 Carburetor Bowl



Figure 11 Float

The venturi and the accelerator pump each appeared to be in good condition. The venturi was tight in the carburetor housing. The main jet was in good condition and tight in the carburetor housing. Figures 12 and 13.



Figure 12 Carburetor Bowl, Venturi, Main Jet



Figure 13 Accelerator Pump Mixture Needle

Ignition System

Both magnetos had remained on the engine. The ignition harnesses for left and right systems had been damaged due to the top wing impacting the top cowling, pressing into the engine bay, and crushing the oil tank and tank mount into the back of the magnetos. This also damaged the engine starter. Figures 14 and 15.



Figure 14 Left Magneto and Oil Tank



Figure 15 Right Magneto and Oil Tank

The magnetos were removed. Both magnetos had impulse couplings installed and fired consistently. The left magneto impulse was intermittent and would skip occasionally but sparked every time it snapped.

There was a mixture of mass electrode and fine wire plugs in the engine. Cylinder numbers 1, 2 forward plugs, and cylinder number 4 rear plug were mass electrode. Cylinder numbers 3 and 4 forward, along with cylinder numbers 1, 2, and 3 rear contained fine wire plugs. All plugs showed normal wear and were not fouled, figures 16 and 17.



Figure 16 Spark Plugs Forward 1 From Left



Figure 17 Spark Plugs Rear 1 From Right

Lubrication System

The engine oil tank had been ruptured at impact due to the top wing crushing the cowling. The oil screen was removed and found free of contaminants, figure 18. All oil lines and hoses remained attached to their respective locations on the engine and oil tank.



Figure 18 Oil Screen

Submitted by:

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