

# National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA24FA096

## **WRECKAGE EXAMINATION**

January 27, 2024

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## **A. ACCIDENT**

Location: Weston, FL  
Date: January 23, 2024  
Time: 1844 EST  
2344 UTC  
Airplane: N737VC; Cessna 172-N

## **B. WRECKAGE EXAMINATION**

IIC Joshua Young  
National Transportation Safety Board  
Washington, DC

Party Coordinator Tony Hershberger  
Textron Aviation  
Wichita, KS

## **C. SUMMARY**

On January 23, 2024, about 1844 eastern standard time, a Cessna 172N, N737VC, was substantially damaged when it was involved in an accident near Weston, Florida. Both commercial pilots were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

## **D. DETAILS OF THE INVESTIGATION**

### **1.0 Accident Site**

The airplane came to rest in a swamp/marsh area near Weston, FL. The debris path was about 100 yards in length and was oriented on about a 010° magnetic heading. The first piece in the debris path was the nose wheel which had been impact separated from the nose landing gear strut and was about 100 yards from the main wreckage. The nose landing gear was in the vicinity of the nose wheel and had been impact separated from the firewall at all attachment points. The left -wing was impact separated from the fuselage and was located about 50 yards from the main wreckage. The main wreckage came to rest on a heading of about 130° magnetic, and in an area of about 4 ft of water. There was a postaccident fire which consumed portions of the fuselage and right wing. The instrument panel, firewall and engine remained attached

to each other and were impact separated from the main wreckage. They were found about 25 ft from the main wreckage.



**Photo 1: View of the main wreckage.**



**Photo 2: View of the impact separated left wing.**



**Photo 3: View of the instrument panel impact separated from the fuselage.**

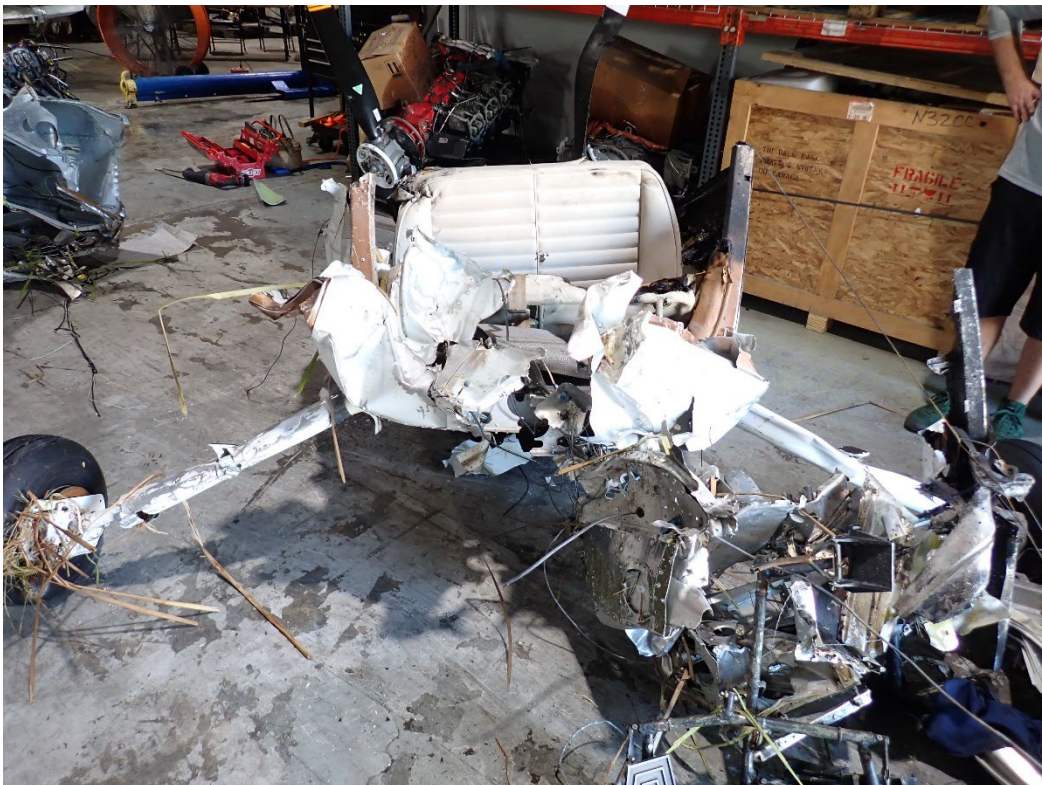
## **2.0 Airframe Examination**

### **2.1 Fuselage**

The fuselage was impact separated into multiple pieces. The instrument panel and firewall were impact separated at the windshield bottom attachment. Both doors, the roof, both skylights, rear window, and the floor were impact separated into multiple sections.



**Photo 4: View of the largest section of fuselage. (Textron Aviation Photo)**



**Photo 5: View of the fuselage wreckage. (Textron Aviation Photo)**



**Photo 6: View of the forward fuselage. (Textron Aviation Photo)**

## **2.2 Empennage**

The empennage was held onto the fuselage only by control cables. Control continuity of the elevator, elevator trim, and rudder were confirmed from the flight control surfaces to the controls in the cockpit through impact fractures and cuts made for recovery. The left horizontal stabilizer was undamaged, and the left elevator remained attached at all attachment points and was impact fractured down at the tip. The right horizontal stabilizer exhibited impact damage and was bent up about 80°. The right elevator exhibited impact damage and remained attached at the outboard attachment point; the inboard 45 inches were impact separated and recovered. The elevator trim tab remained attached to the recovered section of the right elevator. When measured the elevator trim tab actuator showed a trim of 15° tab up. The vertical stabilizer and rudder exhibited impact damage and remained attached at all attachment points.



**Photo 7: View of the empennage as first viewed at the recovery facility. (Textron Aviation Photo)**



**Photo 8: View of the right side of the empennage. (Textron Aviation Photo)**



**Photo 9: View of the impact separated portion of the right elevator and the elevator trim tab.**



**Photo 10: View of the left horizontal stabilizer and elevator.**



**Photo 11: View of the elevator trim actuator with scale. (Textron Aviation Photo)**

## **2.3 Aircraft Wings**

The left wing was impact separated from the fuselage. The left wing tip was impact separated and was not recovered. The leading edge was impact crushed aft, from the upper strut attachment point outboard to the end of the wing and was twisted. The inboard portion of the wing was twisted downward from the strut inward about 30°. The wing strut had about a 2 inch cut along with multiple strike marks about 31 inches from the end of the wing strut fairing near the wing attach point. The left flap remained attached to the wing at all attachment points and the flap drive cable exhibited tensile overload. The inboard 56 inches of the left aileron remained attached to the wing. A 21 inch section of the left aileron was impact separated and recovered the remainder of the left aileron was not recovered. Control continuity of the left aileron was confirmed from the flight control surface to the flight control in the cockpit through multiple overload fractures.



**Photo 12: View of the left wing leading edge as first viewed at the recovery facility.**



**Photo 13: View of the left wing strut.**



**Photo 14: View of the left wing tip. (Textron Aviation Photo)**



**Photo 15: View of the cut and witness marks on the left wing strut. (Textron Aviation Photo)**



**Photo 16: View of left wing control cables.**

The right wing remained attached to the main wreckage through the right aileron direct control cable. The wing tip was impact separated and not recovered. The leading edge was impact crushed aft from the upper strut attachment point outboard to the wing tip. The right flap remained attached at all attachment points. The flap motor was impact separated from the mount and found inside the wing. The flap actuator was measured and was found to be consistent with a flaps UP position. The right aileron remained attached to the wing at all attachment points. Control continuity of the right aileron was confirmed from the flight control surface to the flight control in the cockpit through multiple overload fractures. The aileron balance cable exhibited tensile overload.



**Photo 17: View of the right wing as first viewed at the recovery facility. (Textron Aviation Photo)**



**Photo 18: View of right wing tip. (Textron Aviation Photo)**



**Photo 19: View of the flap actuator with scale. (Textron Aviation Photo)**



**Photo 20: View of right aileron balance cable.**

## 2.4 Landing Gear

The nose landing gear strut was impact separated from the firewall. The nose wheel was impact separated from the nose strut. The main landing gear remained attached at all attachment points.



**Photo 21: View of the nose landing gear.**



**Photo 22: View of the nose wheel fork.**

## **2.5 Cockpit**

The cockpit area was impact damaged and in multiple pieces. The only instrument that remained attached was the tachometer. The recovered switches were in the following positions:

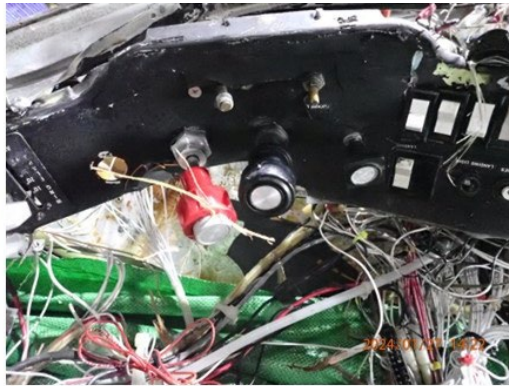
- Master Switch - ON
- Landing Light - ON
- Radios - UP

The following circuit breakers were popped out:

- TPX
- GPS
- Unknown 5 amp circuit breaker
- HSI
- Unknown 5 amp circuit breaker



**Photo 23: View of the instrument panel.**



**Photo 24: View of cockpit switches and circuit breakers.**

## 2.6 Survivability

The left side of the fuselage exhibited thermal damage from postaccident fire. Both pilot seats were impact separated from the seat rails. 3 of the 4 seat rails remained attached to their attachment points on the floor. 1 seat rail was impact separated and was not recovered. All 3 pilot seat belt attachment points remained attached to the airframe and the seat belt buckle was latched. The buckle operated normally. The outboard lap belt and shoulder attachment points of the copilot seat belt remained attached to the airframe. The inboard copilot lap belt attachment point was impact separated and not recovered. The harnesses exhibited thermal damage from postaccident fire.

## 2.7 Fuel/Fuel System

Both wing fuel tanks were ruptured, and the right wing was damaged by postaccident fire. Both wing fuel caps were secured in place and were undamaged. The fuel selector handle and control arm were recovered, and the position could not be determined. The fuel selector valve was impact separated and not recovered.



**Photo 25: View of the right wing fuel cap.**



**Photo 26: View of the left wing fuel cap.**



**Photo 27: View of the control yoke and pedestal.**

## **2.8 Other Systems**

An ELT was installed on the airplane and was turned off by the initial Federal Aviation Administration Inspector on-scene. The ELT was manufactured in December 2022, and expired in September 2029.



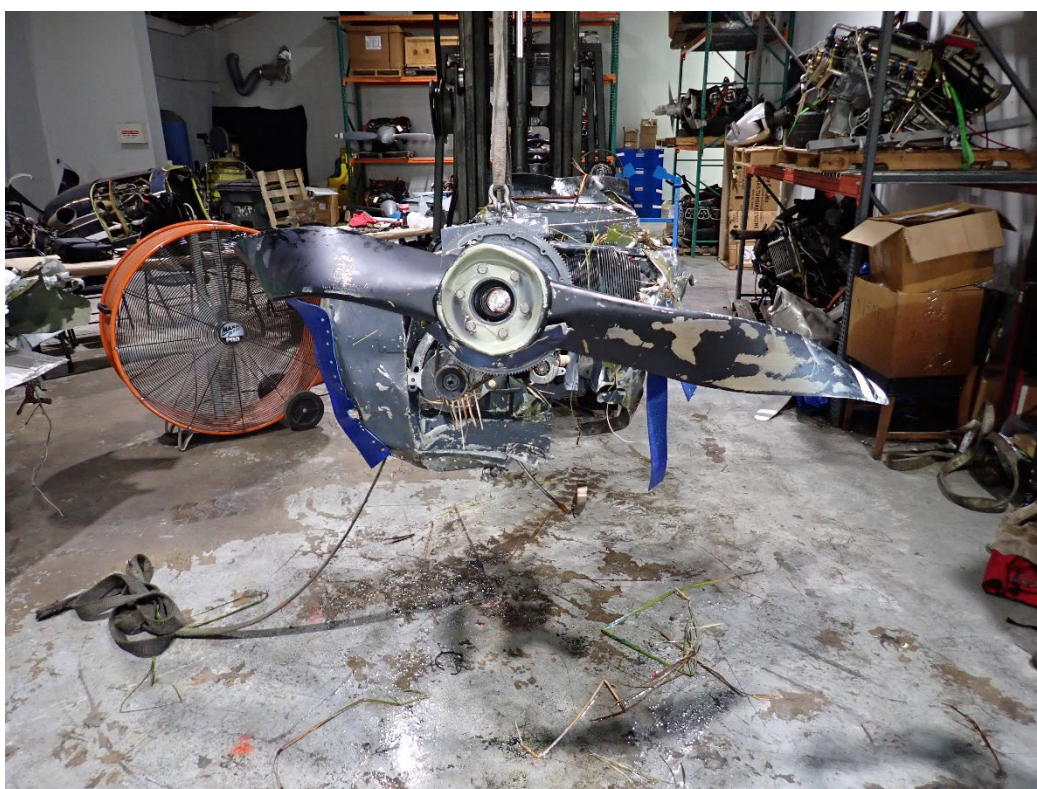
**Photo 28: View of the ELT.**

### **3.0 Engine Examination**

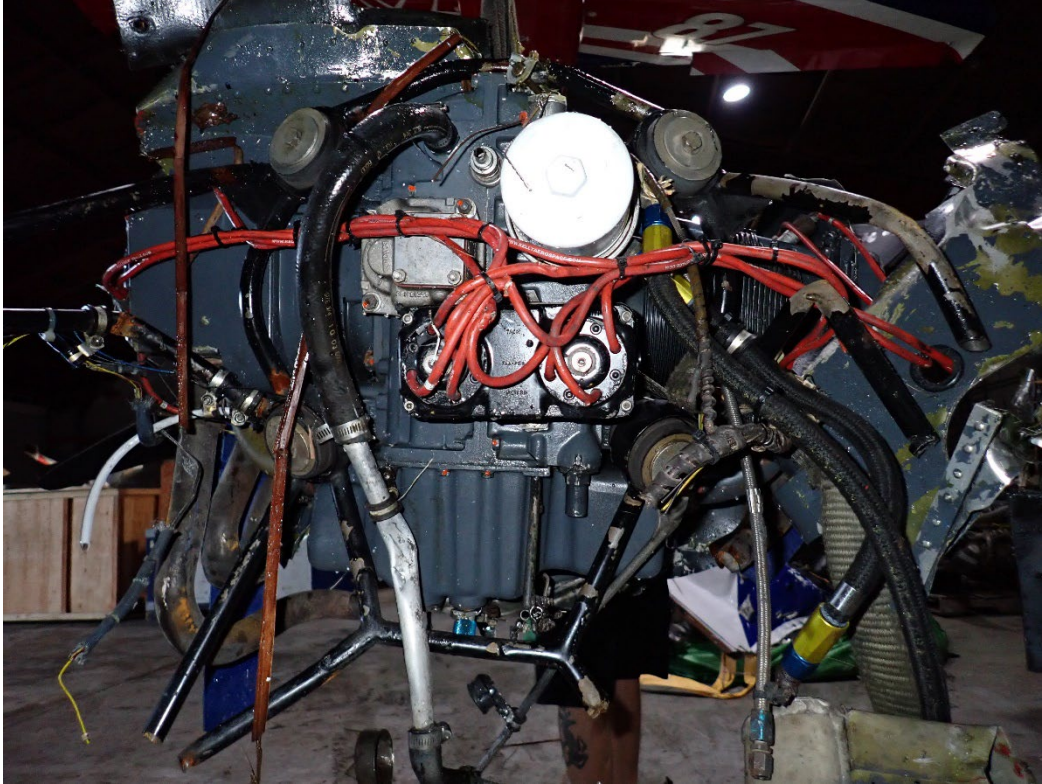
The engine model was a Lycoming O-320-H2AD, serial number L-3361-76. The last inspection was a 100 hour inspection performed on January 20, 2024, and noted an engine total time of 1958.8 hours and a time since major overhaul of 388.3 hours. The engine remained attached to the engine mount at 3 of the 4 attachment points, the lower right engine mount tubes were impact separated. The alternator and starter remained attached to the front of the engine at all attachment points. The alternator belt remained attached and under tension, organic debris was observed on the alternator pulley when the alternator belt was removed. The top spark plugs, and rocker box covers were removed to facilitate rotation attempts. The No. 2 intake push rod was impact damaged and was removed to facilitate crankshaft rotation. Compression and suction were confirmed on all cylinders using the thumb method when the crankshaft was rotated through 720° of rotation by hand using a tool in an accessory drive pad. Valvetrain continuity was confirmed when the crankshaft was rotated through 720° of rotation by hand using a tool in an accessory drive pad.



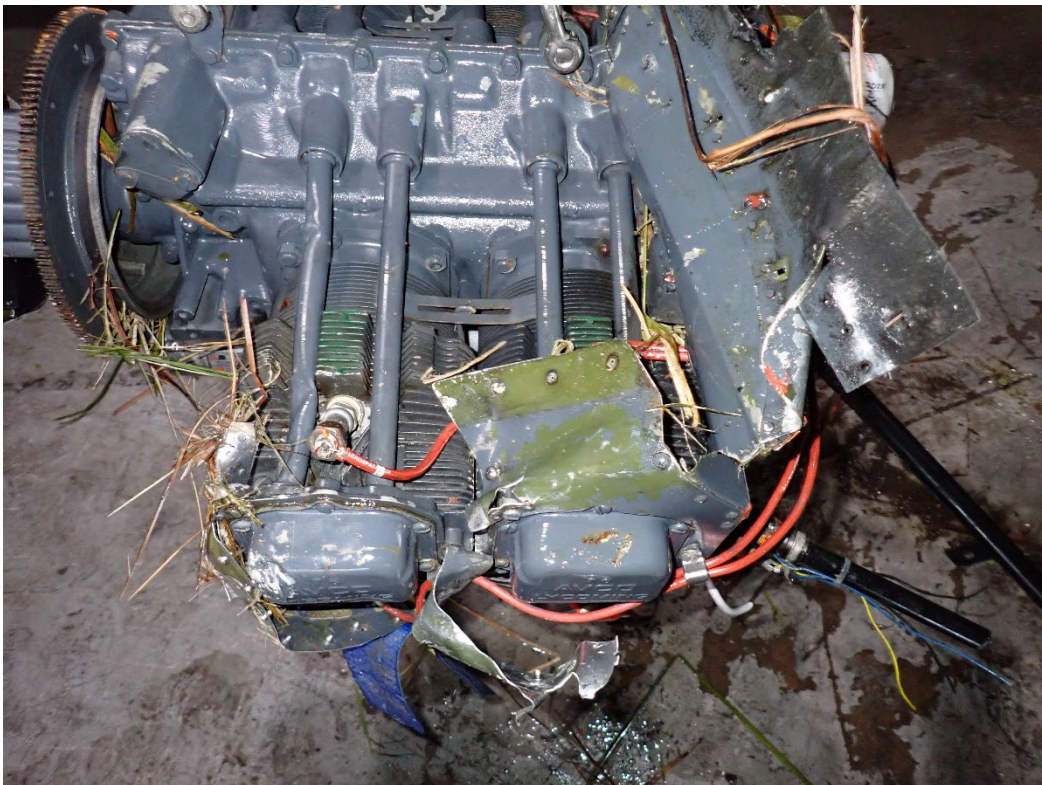
**Photo 29: Engine as first viewed at the recovery facility.**



**Photo 30: View of the engine suspended from a forklift. (Textron Aviation Photo)**



**Photo 31: View of the engine accessory case and accessories. (Textron Aviation Photo)**



**Photo 32: View of damage to the No. 2 intake pushrod. (Textron Aviation Photo)**



**Photo 33: View of organic debris in the alternator pulley.**

### **3.1 Induction and Exhaust System**

The induction system was impact separated from the engine. The exhaust stacks remained attached to the cylinder heads and exhibited impact damage. The muffler was impact separated.



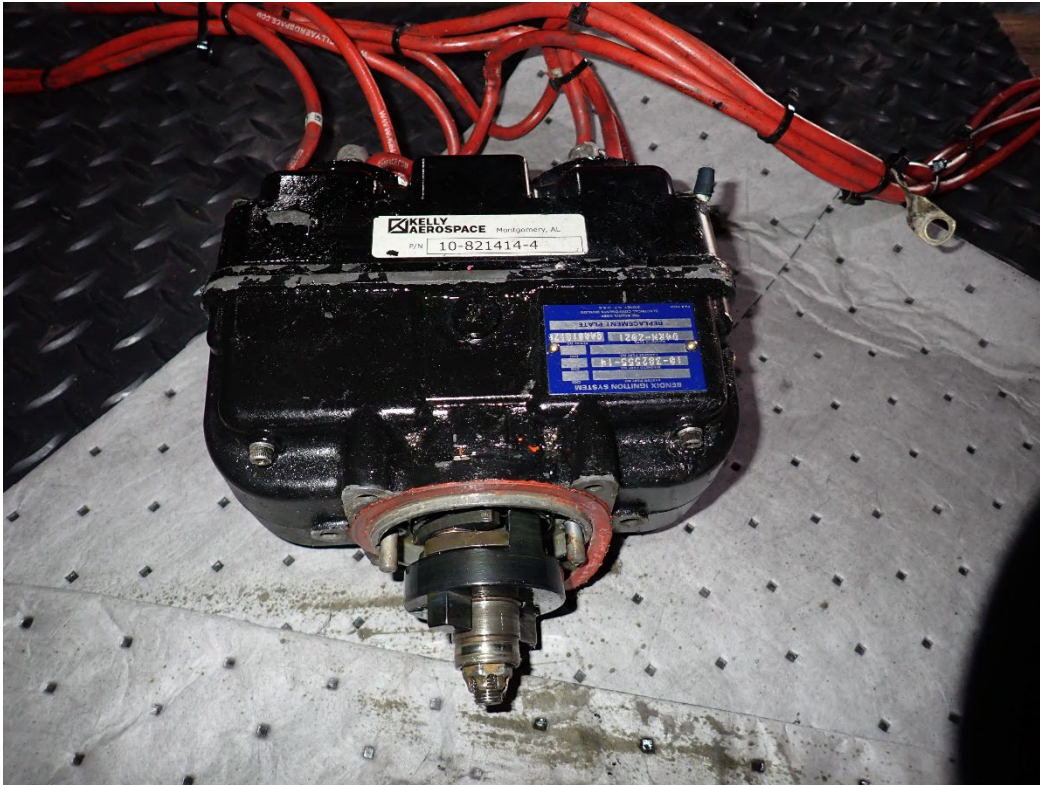
**Photo 34: View of damage to the Nos. 2 & 4 exhaust.**



**Photo 35: View of damage to the Nos. 1 & 3 exhaust.**

### 3.2 Magnetos

A single drive dual magneto remained installed on the accessory case of the engine at all attachment points. Both magnetos sparked on all leads when the drive gear was rotated using an electric drill. The impulse couplings snapped as expected.



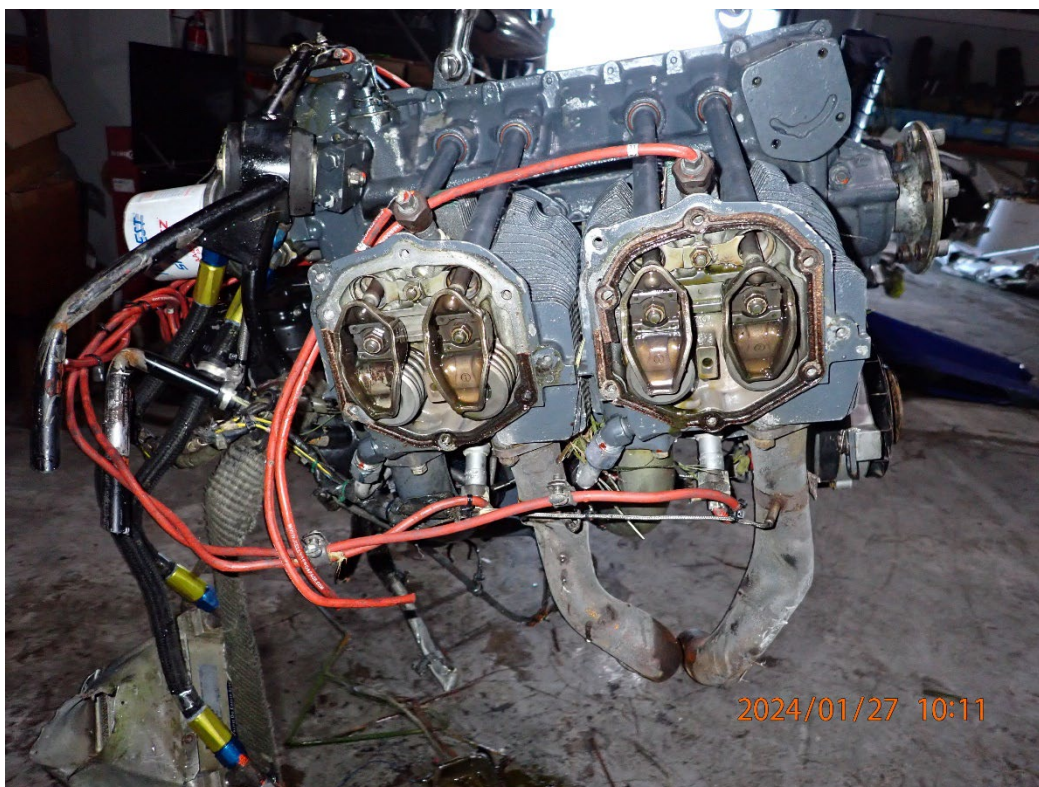
**Photo 36: View of the single drive dual magneto. (Textron Aviation Photo)**

### 3.3 Ignition System

All top and bottom spark plugs were secure in the cylinder heads and the leads remained secured to the plugs. The Nos. 2 and 3 top spark plug leads exhibited impact damage. The spark plugs were removed and examined using the Champion Aviation AV-27 Check-A-Plug chart. All spark plugs were visually consistent with worn out - severe.



**Photo 37: View of damage to the No. 2 top spark plug lead.**



**Photo 38: View of damage to the No. 3 top spark plug lead.**



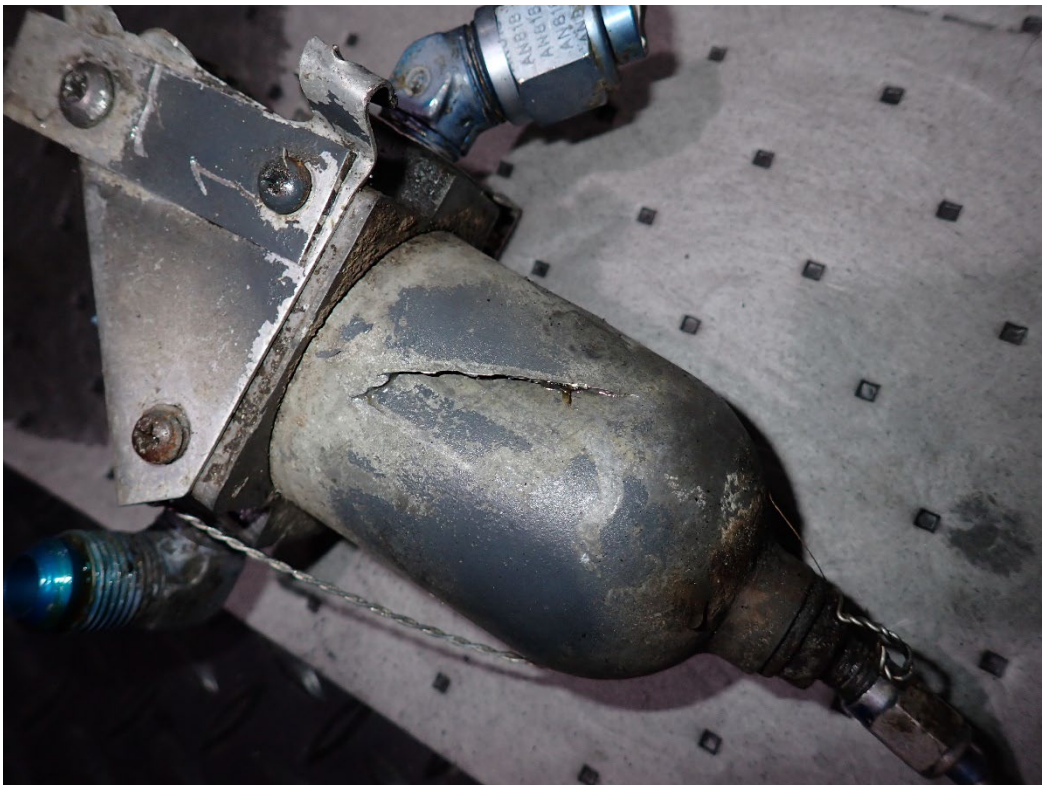
**Photo 39: View of top and bottom spark plugs. (Textron Aviation Photos)**

### **3.4 Fuel System**

The fuel strainer remained attached to the engine through the fuel lines and was impact separated from the firewall. The strainer bowl was fractured, and minimal organic debris was observed on the strainer screen. The fuel line to the carburetor remained attached to the engine. The carburetor fuel bowl and float assembly were impact separated. The carburetor fuel screen was removed and examined and contained slight organic debris. The throttle and mixture control cables remained attached to the carburetor and were continuous to the controls in the cockpit. The carburetor heat control remained secured in the cockpit and the control cable was impact separated on the engine side of the firewall.



**Photo 40: Fuel strainer and carburetor as first viewed at the recovery facility.**



**Photo 41: View of fuel strainer bowl. (Textron Aviation Photo)**



**Photo 42: View of the fuel strainer screen. (Textron Aviation Photo)**



**Photo 43: View of throttle and mixture controls attached to the carburetor.**



**Photo 44: View of carburetor fuel screen. (Textron Aviation Photo)**

### **3.5 Lubrication System**

The oil sump remained attached to the bottom of the engine and was undamaged. The oil pump and filter remained attached to the engine accessory case at all attachment points. The oil filler tube and dip stick were impact separated and not recovered. The oil pump pumped oil out when the crankshaft was rotated by hand with a tool inserted into an accessory drive pad. The oil filter was dated January 20, 2024, and was removed and cut open for examination. No debris was observed on the oil filter pleats. The oil cooler remained attached to the engine through the oil hoses.



**Photo 45: View of undamaged oil sump.**



**Photo 46: View of oil filter pleats. (Textron Aviation Photo)**



**Photo 47: Impact separated oil filler tube and dipstick.**

### **3.6 Vacuum Pump/System**

There was no vacuum pump installed on the engine. The vacuum filter and relief valve remained attached to the firewall.



**Photo 48: View of vacuum filter and relief valve. (Textron Aviation Photo)**

#### **4.0 Propeller Examination**

The airplane was equipped with a McCauley 1C160/DTM7557M1 fixed pitch, 75 inch propeller. The propeller remained attached to the crankshaft flange at all attachment points. The propeller was removed, and the propeller blades were arbitrarily labeled A and B to facilitate examination. Blade A was bent aft at the midspan about 30°. The blade exhibited chordwise scratching, trailing edge gouging, and white and blue paint transfer. Blade B was bent aft about a third of the length outboard from the hub about 90°. The blade exhibited chordwise scratching, tip polishing and blue and white paint transfer.



**Photo 49: Overview of propeller. (Textron Aviation Photo)**



**Photo 50: Overview of blade A.**



**Photo 51: Tip of blade A.**



**Photo 52: Trailing edge of blade A.**



**Photo 53: Overview of blade B.**



**Photo 54: Chordwise scratching on blade B.**



**Photo 55: Tip of blade B.**

Submitted by:

Joshua Young  
Air Safety Investigator