

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



ERA24LA179

ENGINE EXAMINATION

N3FR, Cessna R172E

A. ACCIDENT DETAILS

Location: Rocky Mount, North Carolina
Date: April 15, 2024
Time: 0330Z (4/14/2024 2330 EDT)
Airplane: N3FR, Cessna R172E

B. EXAMINATION PARTICIPANTS

Investigator In Charge Lynn Spencer
 NTSB/AS-ERA
 Washington, DC

FAA Party Coordinator Jose Rene Ruiz
 Federal Aviation Administration/FSDO
 Greensboro, NC

FAA Christopher Sims
 Federal Aviation Administration/FSDO
 Greensboro, NC

C. SUMMARY

On April 14, 2024, about 2330 eastern daylight time, a Cessna R172-E, N3FR, was substantially damaged when it was involved in an accident near Rocky Mount, North Carolina. The pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 positioning flight.

After an uneventful night cross country flight, a few minutes after the pilot reduced engine power to begin the descent, the engine lost power and the propeller continued to windmill. After remedial action failed to restore engine power, the pilot performed a forced landing to a lit road.



Photo 1- Photo taken by pilot after forced landing (Courtesy of pilot)

Examination of the wreckage took place on May 31, 2024, at Bass Aviation at the Rocky Mount Airport. The Textron Aviation representative could not attend due to weather-related travel cancellations, and it was determined that a limited airframe examination would occur, and a full airframe examination on a later date if necessary.

D. AIRFRAME EXAMINATION

Airframe

As first viewed, the fuselage and empennage remained intact, and the engine remained attached at its mounts. The empennage was impact crushed on the left side aft of the rear seats and showed deformation on the right side aft of the rear seats. Both wings had been cut for recovery. The tail was intact and undamaged except for the left horizontal stabilizer which sustained substantial damage. The left main landing gear was impact separated from the fuselage.

Both wings were substantially impact damaged. The left wing was in two sections, and the fuel tank was fractured. Liquid recovered from the left tank was consistent in color and smell to aviation fuel and free of water and contaminants. The right wing fuel cap was not in place, and no fuel was recovered from the right tank. When the right filler port was covered, air was blown into the right fuel tank and the tank expanded with no leaks readily evident.

Cockpit Controls

Carburetor heat - OFF

Throttle - Half open

Mixture - Full Lean

Propeller - IN

Fuel pump - LOW

Altimeter - 29.94 in. Hg

Fuel primer - IN

Magnetos - OFF (key missing)

Fuel selector - BOTH (Photo taken at the accident site showed fuel selector in OFF position)

E. AIRFRAME EXAMINATION PHOTOS



Photo 2 - View of airplane from the left (wings removed for recovery).



Photo 3 - View of airplane from the right (wings removed for recovery).



Photo 4 - View of the outboard right wing.



Photo 5 - View of the inboard right wing.



Photo 6 - View of right wing root with missing fuel cap.



Photo 7 - View of the right fuel tank filler neck with rust.



Photo 8 - View of the inboard section of left wing (inverted).



Photo 9 - View of the outboard section of left wing.



Photo 10 - Left tank fuel port with fuel cap in place.

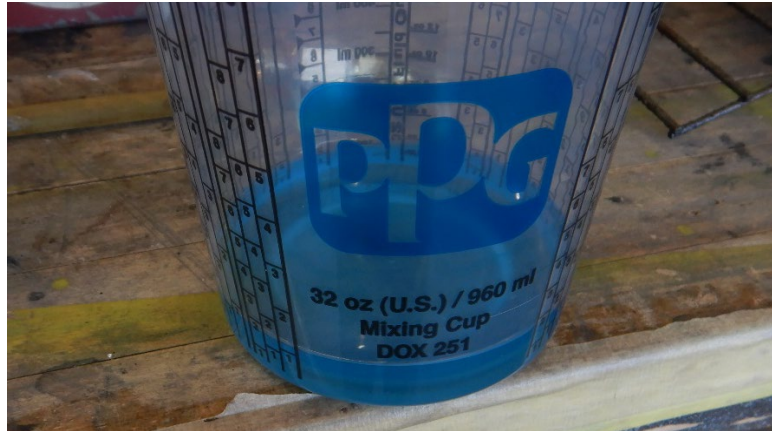


Photo 11 - Fuel sample recovered from left wing fuel tank.



Photo 12 - Fuel selector in BOTH position.

F. ENGINE EXAMINATION AND PHOTOS

The engine remained attached to the engine mounts and displayed no damage. The engine mounts were not bent, and the engine instruments were attached and undamaged. All fuel and oil lines were secure. Continuity of the throttle, mixture, carburetor heat, and propeller governor were confirmed to the cockpit controls.

Internal Engine Continuity/Ignition System

The spark plug ignition leads were disconnected and the top spark plugs were removed. The top spark plugs showed normal wear when compared to a Champion Aviation Check-A-Plug chart. The rocker covers were removed. When the crankshaft was rotated by hand, no thumb compression or suction could be achieved on cylinder No. 3. Borescope examination of the cylinders revealed that the intake valve on the No. 3 cylinder was stuck open, and the cylinder walls displayed circumferential markings. The piston rings were evident at the edge of the piston face and did not

seem to be properly seated. The lower spark plugs were removed and showed normal wear when compared to a Champion Aviation Check-A-Plug chart with Nos. 1 and 3 spark plugs oil fouled. The pushrod tube retainer lock tabs were incorrectly installed, 90° to the correct position. Cylinder No. 3 was removed for further examination and documentation.

Both magnetos remained attached, and the engine-to-magneto timing was determined to be 25 before top dead center. The magnetos were removed for examination. The magnetos sparked on all leads when bench tested with a power drill.

Induction/Exhaust System

The air intake tubes and air filter screen were intact, free from obstruction, and undamaged.

Fuel/Carburetor

The fuel lines to the carburetor were secure and the carburetor was moved from the engine. The throttle and mixture arms were actuated from stop to stop. The fuel inlet screen had been affixed with a putty like material to the carburetor and was removed with plyers. There was a small amount of debris on the fuel filter screen. The carburetor floats were free from deformation and the needle valve and needle valve seat were unremarkable. 100 ml of liquid was recovered from the carburetor bowl. It was a very light green color with about 1 teaspoon of water along with large amounts of sediment. The gascolator bowl contained 100 ml of liquid that was also a very light green color with another teaspoon of water and large amounts of sediment. The gascolator strainer contacted a white gel-like contamination on its interior.

Oil and Oil Filter

The oil level was just under 4 quarts when measured with the dipstick. The oil filter was removed, and the oil filter element displayed minimal specks of metallic debris.

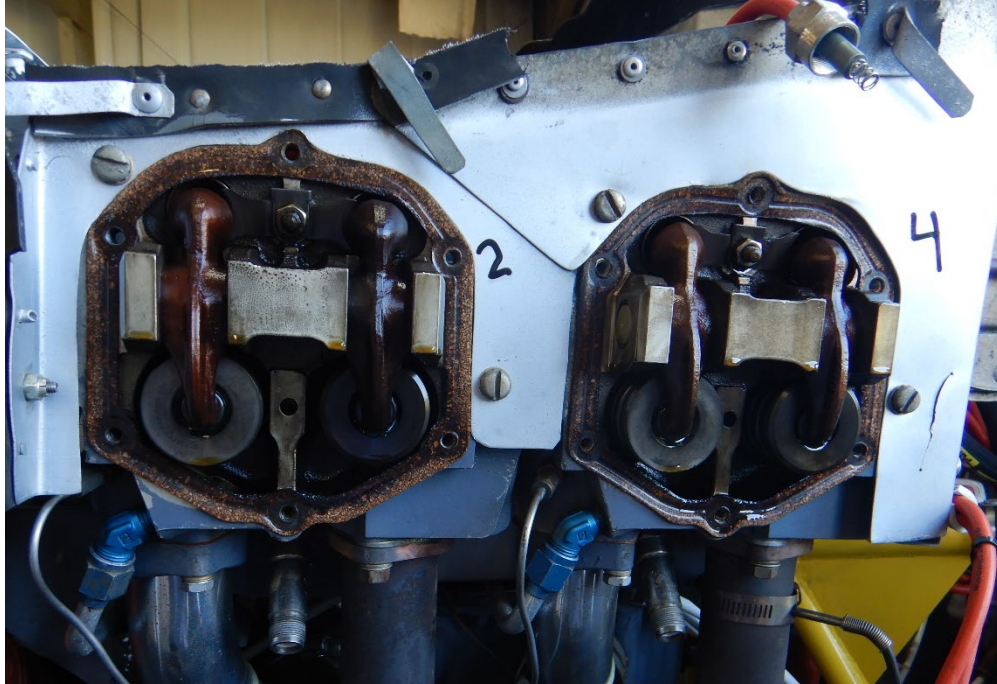


Photo 13 - Cylinder Nos. 2 and 4 with rocker covers removed.

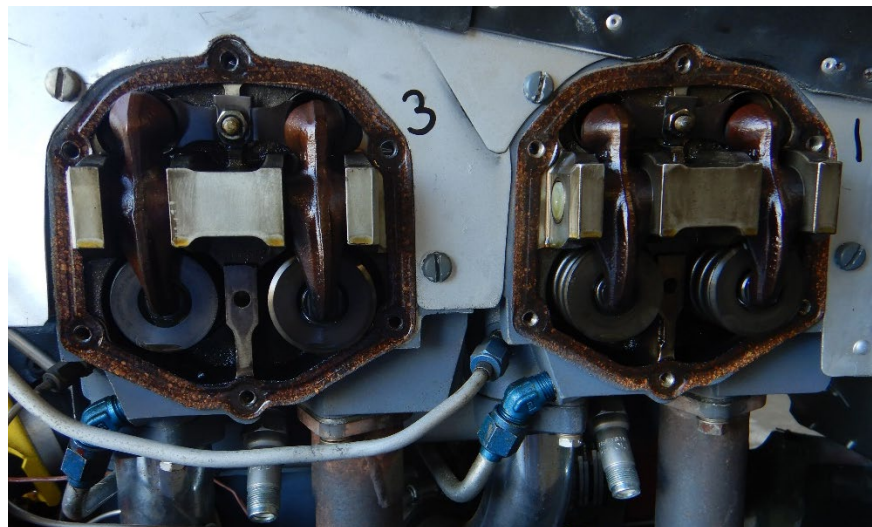


Photo 14 - Cylinder Nos. 1 and 3 with rocker covers removed.



Photo 15 - Oil just under 4 quarts on dipstick.



Photo 16 - Spark plugs (lower Nos. 1 and 3 oil fowled).



Photo 17 - Liquid recovered from carburetor bowl.



Photo 18 - Contaminated fuel from carburetor and gasolator bowls (combined).

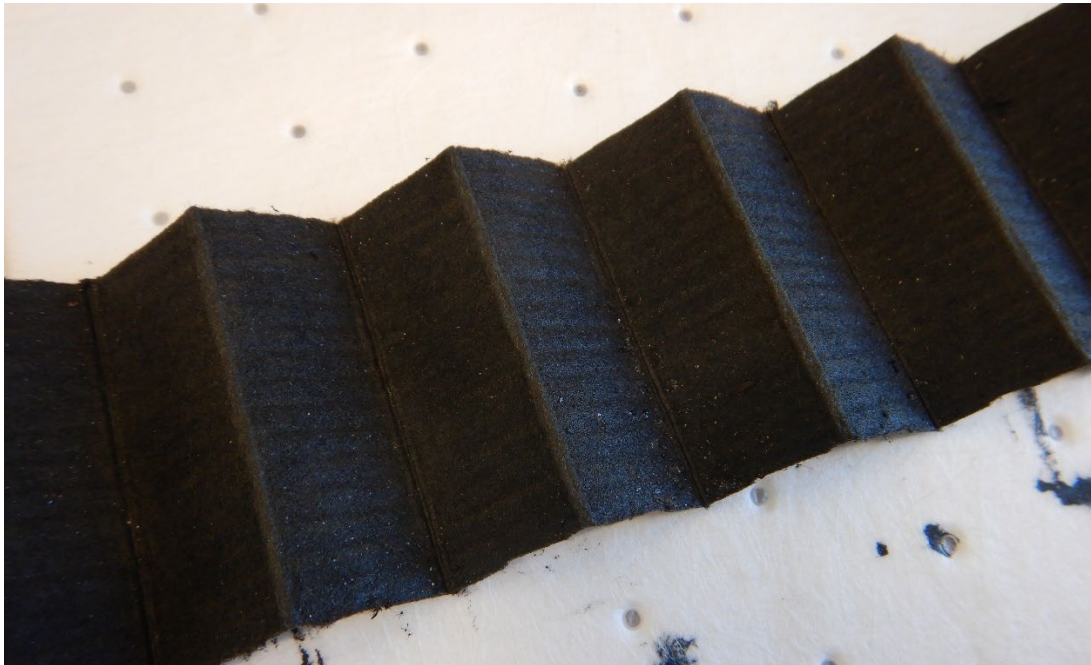


Photo 19 - Oil filter element.



Photo 20 - White gel-like substance within gascolator stainer.



Photo 21 - Carburetor fuel screen.

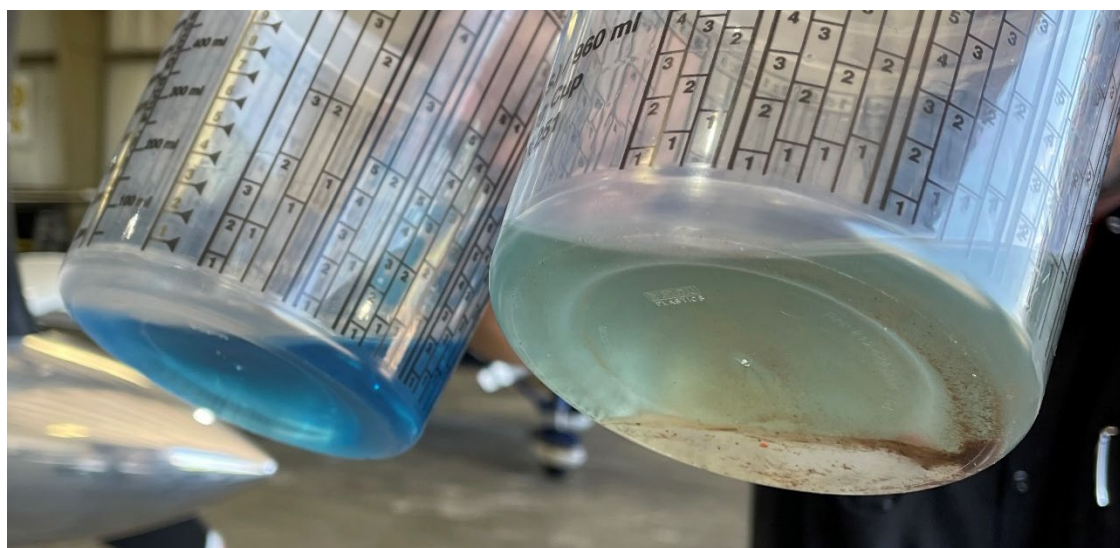


Photo 22 - Fuel from wing tank (left) and carburetor and gascolator bowls (right).



Photo 23 - Borescope photo of No. 3 cylinder wall with circumferential markings.



Photo 24 - Borescope photo of cylinder No. 3 with piston rings visible/gap between piston face and cylinder wall.



Photo 25 - Interior of cylinder No. 3 after removal of cylinder from engine.

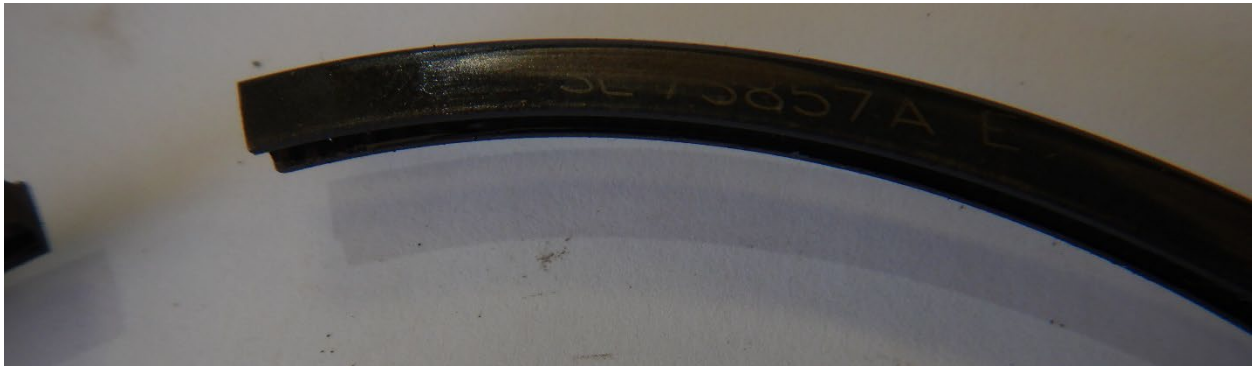


Photo 26 - Close-up view of oil control ring after removal from No. 3 piston.

G. PROPELLER EXAMINATION AND PHOTOS

The variable pitch propeller remained attached to the crankshaft flange and the two blades remained attached to the hub. The spinner was in place. Examination of both propeller blades revealed no twisting, bending, or leading edge damage. No chordwise scratching was evident.



Photo 27 - View of airplane and propellers from front.

Submitted by:

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