

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR24FA080

ENGINE EXAMINATION

Jun 10, 2024

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A. ACCIDENT

Location: Concord, California
Date: January 31, 2024
Time: 1029 PST
1829 UTC
Airplane: Swanson R/Swanson S, Vans RV-6 N30AK

B. ENGINE EXAMINATION

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C. SUMMARY

On January 30, 2024, at 1029 Pacific standard time, an experimental amateur-built Vans RV-6, N30AK, was substantially damaged when it was involved in an accident near Concord, California. The pilot was 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 Engine Examination

Engine Model: Lycoming engines O-320-2AB

Engine Serial# 2754-27

Engine Tachometer: 0434.9

Engine TT: 2184.4 hours 1/15/2024

Engine TSMOH: 2157.8 hours 11/21/2023



Figure 1: Front view of accident airplane during examination

Examination of the recovered wreckage revealed that the engine was impacted damaged and displaced aft. The engine was observed near the pilot seat location in the cockpit. The engine was separated from the wreckage and forward accessories were removed one at a time.

The engine sustained impact damage that precluded engine rotation. Mechanical continuity was established from a partial engine disassembly and borescope examination. Holes were drilled in the crankcase along the rotational plane of each connecting rod. The engine internal components were observed with a lighted borescope. There was no evidence of mechanical malfunction or heat distress at any of the rotating or reciprocating components. The camshaft remained intact, and each of the cam lobes exhibited its characteristic elliptical shape.

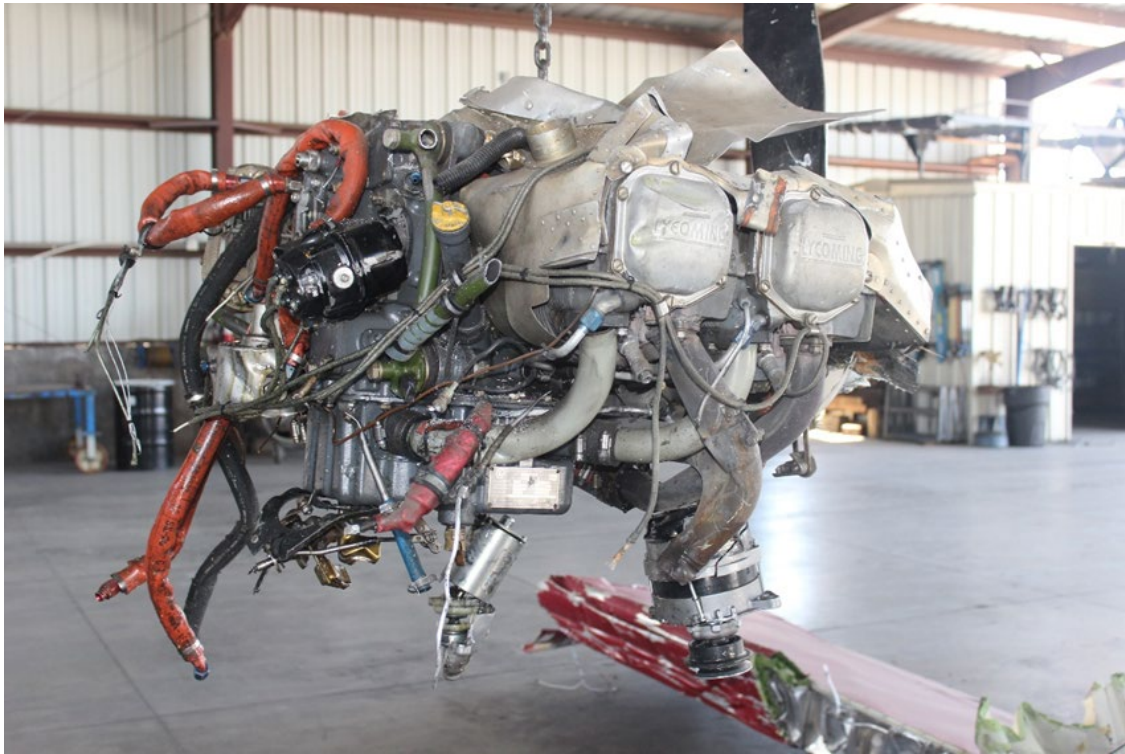


Figure 2: Engine after removal from airplane

The rocker box covers were removed. The intake and exhaust rocker arms were intact. The intake and exhaust rocker arms were oil coated. All intake and exhaust valve springs were in place and visually appeared to be undamaged. The upper spark plugs were removed, and all four cylinders were examined internally using a lighted borescope. A normal amount of combustion deposits was observed within the combustion dome.

The top spark plugs were the massive electrode type. All spark plugs exhibited gray deposits within the electrode area. All spark plugs exhibited signatures consistent with worn-normal when compared to the Champion Check-A-Plug comparison chart.



Figure 3: View of spark plugs

The accessory case cover was removed. The accessory gears including the crankshaft gear bolt and dowel were intact and remain undamaged with no indication of preimpact malfunction. The oil pump gears had no indication of pre impact malfunction. The rocker boxes and valve train remained free of any pre impact malfunction. The ignition harness remained attached to each magneto and spark plug. The ignition harness sustained varying degrees of impact damage. The left magneto had been displaced from its mounting pad. The attachment hardware remained in place.

The right magneto was partially displaced from its mounting pad. Portions of the mounting flange remained attached to the mounting pad with the attachment hardware. Both magneto's produced spark at their respective leads during hand rotation of the drives.

Fuel selector valve shaft was bent over 45 degrees with the hand pointing to the right tank. The fuel system lines showed varying degrees of impact damage. The fuel pump was electrically energized using an external power supply. It emitted noise consistent with being operational. The gaskolator was displaced, and the screen remained free of contaminants. The gaskolator fuel line at the B-nut was displaced as a result of impact. The other end of the fuel line was securely attached at the inlet side of the engine driven fuel pump. The engine driven fuel pump remained attached at it mounting pad. The output B-nut remained securely attached at its fitting. Fuel pump was disassembled. The internal components remained intact and free of visible contamination. The diaphragm remained intact and pliable.



Figure 4: Output fuel line B-nut as found.

The fuel pump output fuel line to the carburetor B-nut was detached from the carb fuel inlet filter screen fitting. The B-nut remained free of any impact related damage the threads of the B-nut and the respective fitting remained intact and undamaged.

The carburetor flange remained secure at the mounting pad. The throttle and mixture controls remained secure at their respective control arms. The serrated interface at the throttle arm remained secure and the castellated nut and cotter pin remained in place. The remaining carburetor was fragmented consistent with impact damage.

2.0 Maintenance History

Engine Model: Lycoming engines O-320-2AB

Engine Serial# 2754-27

Engine TT: 2184.4 hours 1/15/2024

Engine TSMOH: 2157.8 hours 11/21/2023

A review of the engine and airframe logbooks revealed that the airplane had received its most recent engine overhaul on September 26, 1996. The engine logbook displayed entries for a 100-hour inspection November 21/2023 with the tach reading of 421.4 and a SMOH of 2132.9. The airplane tach time and date written on the oil filter recovered was 421.4 on 11/03/2023. The accident tach hours off the instrument panel read 0434.9 hours, 13.5 hours sense the oil change.

3.0 Summary of Examination

The engine sustained significant damage during impact. The engine fuel pump outlet hose B-nut was found disconnected at the carburetor fuel inlet filter screen. Both ends of the connection showed no stress damage associated with the accident. The threads of the B-nut and fitting remained intact and free of physical damage.

Submitted by:

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