

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



CEN24LA004

EXAMINATION SUMMARY

January 18, 2024

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A. ACCIDENT

Location: Hochatown, Oklahoma
Date: October 1, 2023
Time: 1230 central daylight time
Airplane: Robinson Helicopter R44, N379SH

B. EXAMINATION SUMMARY

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C. SUMMARY

On October 1, 2023, about 1230 central daylight time, a Robinson R44 helicopter, N379SH, was substantially damaged when it was involved in an accident near Hochatown, Oklahoma. The pilot was not injured. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

The pilot reported that he was conducting an autorotation during a proficiency flight. As he reduced engine speed to idle, the engine experienced an un-commanded total loss of power. The pilot entered an autorotation and completed a forced landing to a field. The pilot landed hard in the field and the tail boom was severed by the main rotor blades during the hard landing. The pilot exited the helicopter unassisted.

D. DETAILS OF THE EXAMINATION

1.0 General Observations

The engine was still within the air frame (Figure 1). The main rotor blades were still attached to the hub, but cut about 4 ft from the hub to facilitate transport. The main rotor blades showed some damage due to ground and tailcone contact. A bolt head from the tail rotor hub was embedded into the leading edge of one of the main rotor blades (Figure 2).



Figure 1: Helicopter and engine as presented for examination.



Figure 2: Bolt Head from tail rotor embedded in main rotor blade

The main rotor gear box chip detector was removed and had paste-like residue that contained some fine metallic particles.

The fuel tank bladders were not comprised. The auxiliary fuel tank cap was not a standard part.

The main rotor was rotated more than 360° by hand with no anomalies noted.

2.0 Main rotor Flight controls

Flight control continuity from the cyclic and collective up to the main rotor swash plate confirmed. One pitch link was fractured at the upper rod end consistent with overload. All three servos operated smoothly by hand. The aft servo exhibited leakage at the upper seal.

3.0 Tail Rotor flight controls

The tail rotor had continuity from the anti-torque pedals to the forward end of the tailcone. The flight control tube was fractured in multiple areas consistent with impact damage to the tailcone and overload. The pitch control on the tail rotor output shaft was separated from the control bell crank consistent with impact forces. The pitch control slid smoothly on the output shaft.

4.0 Engine examination

Fuel from gascolator and main tank was clean, clear, and free of water when checked with water finding paste (figures 4 and 5).

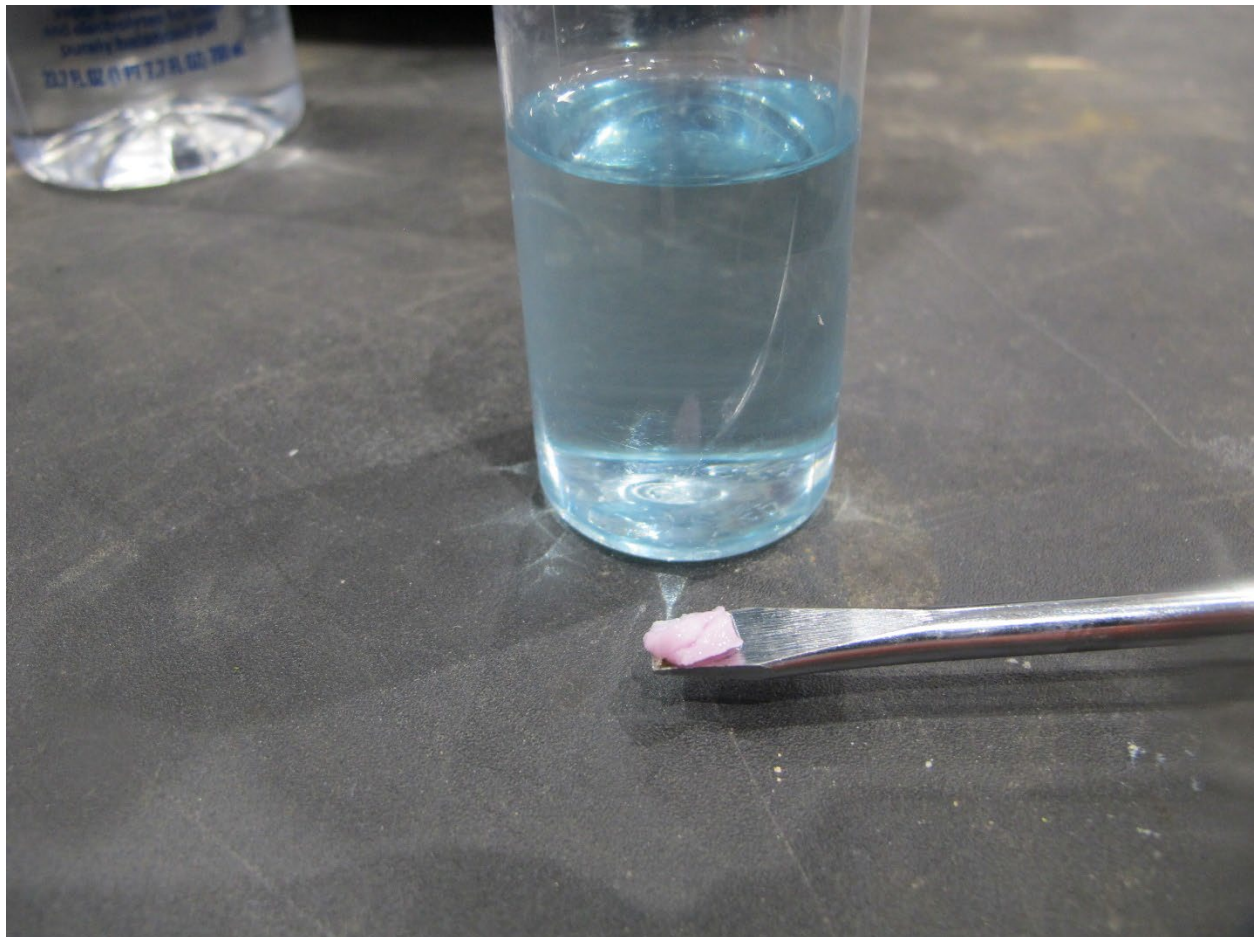


Figure 4: Fuel from gascolator

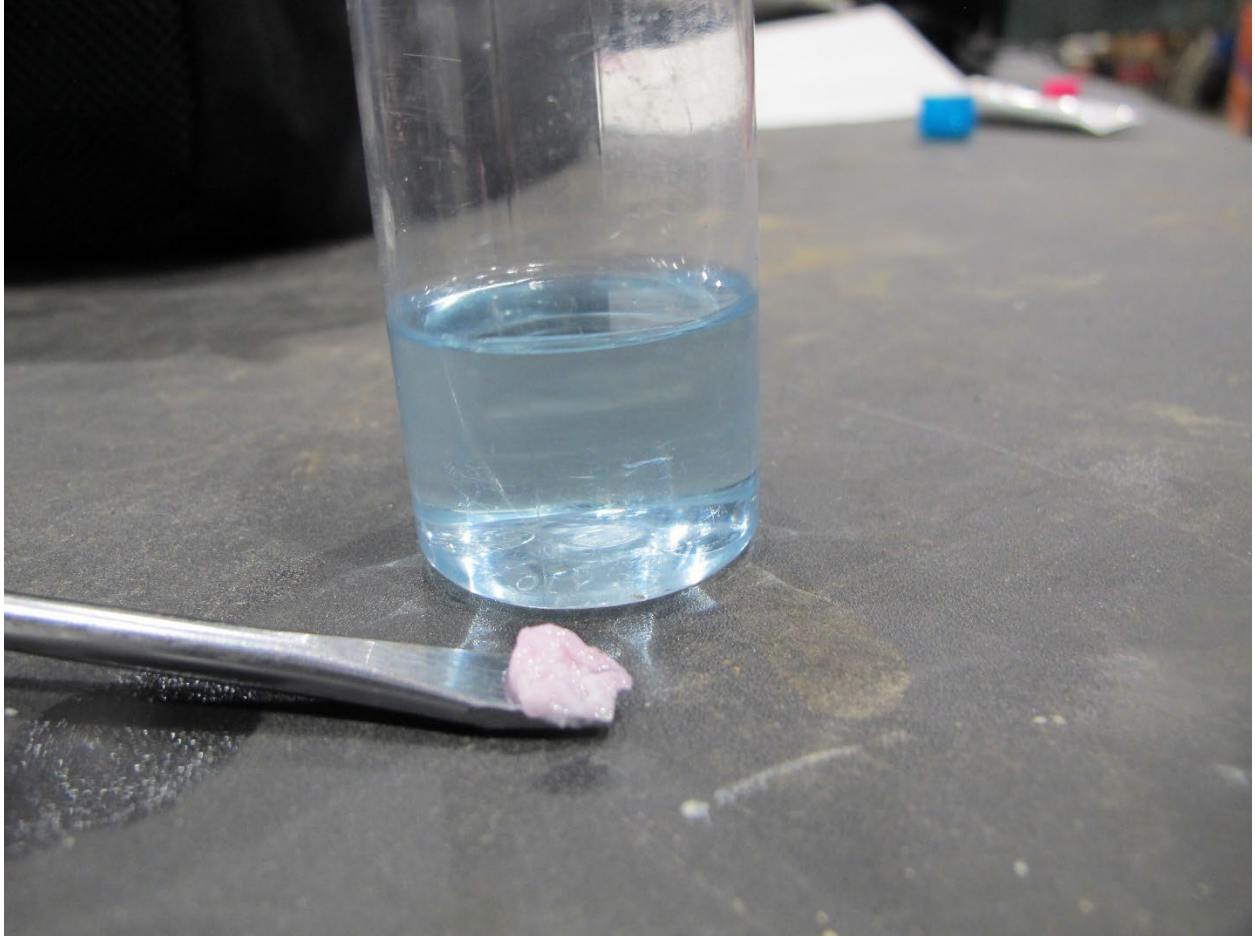


Figure 5: Fuel from the main tank.

The gascolator screen was removed and found 5-10 percent of the screen was covered with a fibrous material (Figure 6).

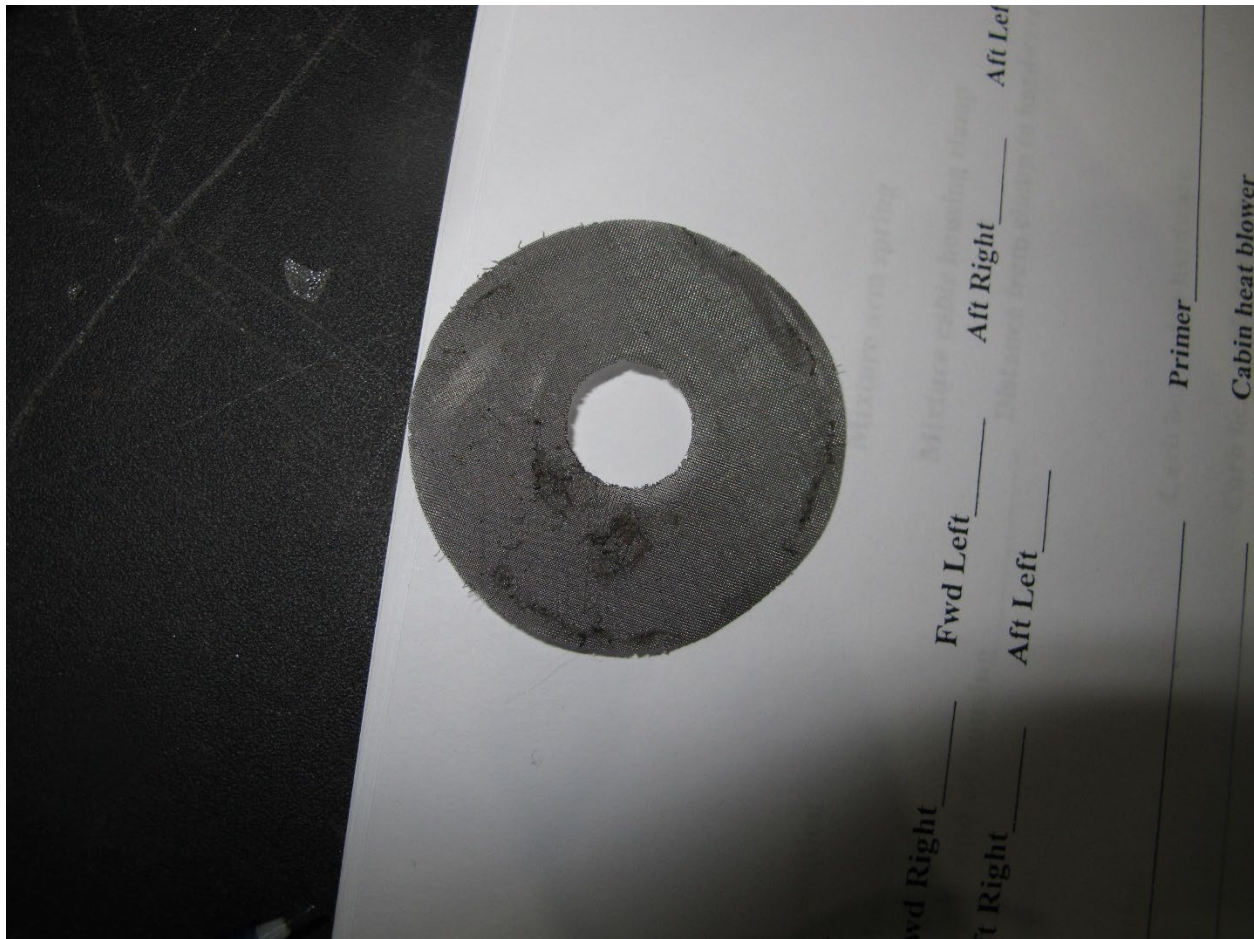


Figure 6: Gascolator screen

All spark plugs were removed. All spark plugs were consistent with normal wear and color when compared to Champion Check-a-Plug chart (Figure 7).



Figure 7: Spark plugs

The crankshaft was rotated by hand multiple revolutions freely by turning the cooling fan. All cylinders exhibited thumb compression and suction as the crankshaft was rotated.

The mixture and throttle control cables moved freely stop to stop. The carburetor heat control knob was jammed in the full heat position. Further examination revealed improper rigging of the carburetor heat control cable (Figure 8). The rigging of the carburetor heat control cable caused binding when fully actuated.

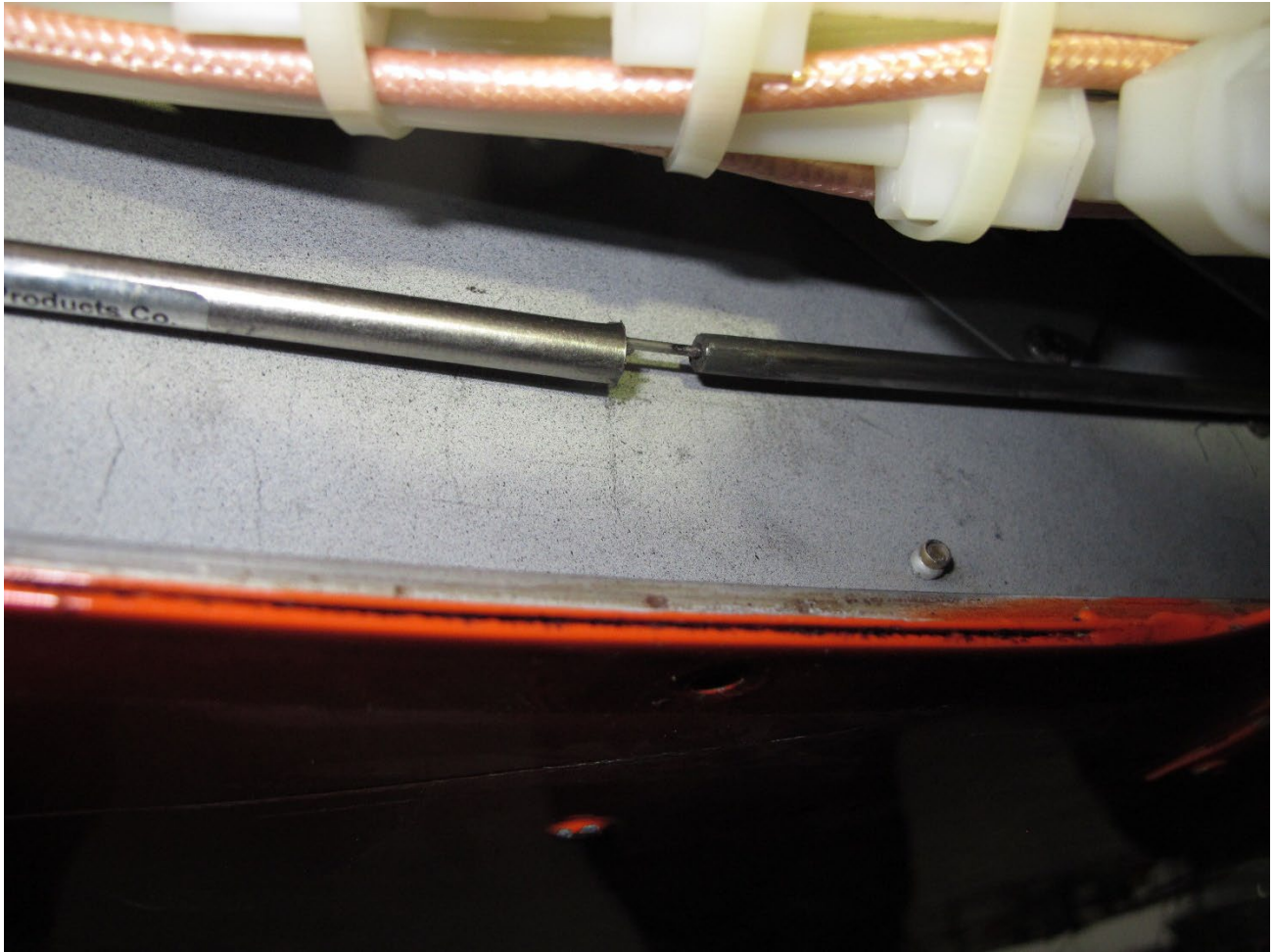


Figure 8: Carburetor Heat control cable.

The V-Belts and tail boom were cut and removed to facilitate an engine run.

The engine started and ran at various power settings. The idle was set to below 50 percent (typical idle speed without drive belts is 60-65 percent). The governor functioned normally. Engine gauges indicated normally. A magneto check was performed at 75% engine rpm resulting in a 12% rpm drop on both magnetos.

Robinson Helicopter Company Safety Notices 27 and 38 advise on how to slowly reduce throttle while practicing autorotations to prevent the engine from stalling which can, and has happened, when the throttle is "chopped" down to idle. With the idle speed set below 50%, it is even more susceptible to a stall.

Single contact marks on the fore and aft faces of the upper sheave and adjacent components indicated that the engine was not running at the time of impact.

5.0 Drive train

The V-belts showed normal wear. The overrunning clutch operated normally. The belt tension actuator was positioned at 1.5 inches of extension. The tail rotor gear box input yoke was rotated by hand several rotations with no anomalies. The output shaft of the tail rotor gearbox was bent.

6.0 Landing Gear

The landing gear remained intact, except the left skid toe was separated at the left strut.

Submitted by:

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